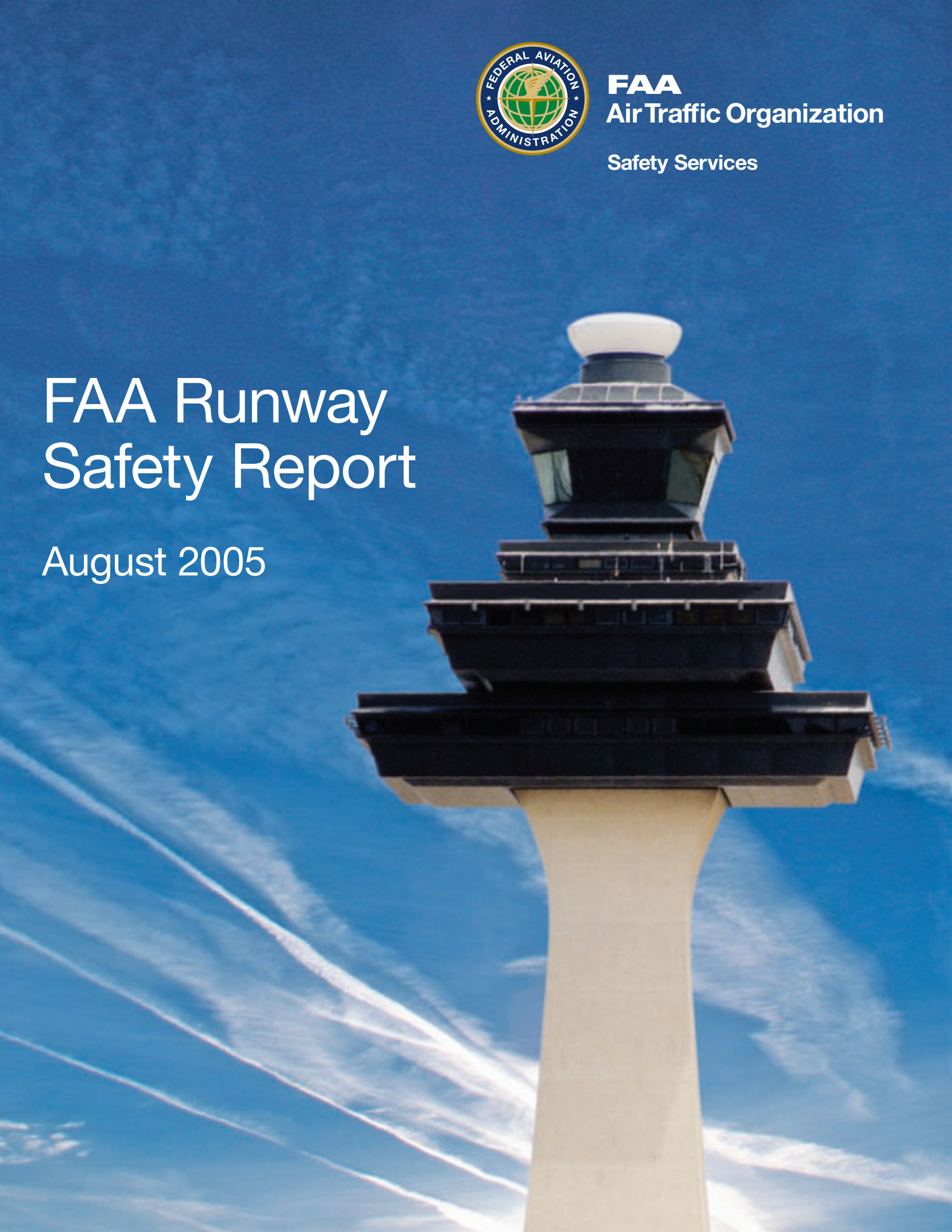
FAA
Air Traffic Organization

Safety Services

FAA Runway Safety Report

August 2005



Message from the Administrator

Safety is the Federal Aviation Administration's primary mission, and we are proud to say that the fatal accident rate for commercial aviation is the lowest it has been in aviation history. We have achieved this success with the help of our colleagues in commercial and general aviation, airports, industry, and other government agencies. The *2005 Runway Safety Report* demonstrates that our collective efforts are indeed paying off. For the fourth consecutive year, the total number of serious runway incursions—instances where a plane comes too close to another plane or ground vehicle—has decreased. For the third consecutive year, there were zero Category A (most serious) runway incursions between two commercial jets. This is a great accomplishment and a tribute to everyone who works with us to ensure the safety of our runways and taxiways.

As a result of our collective success, we are confronted with the challenge of reducing an already low runway incursion rate. Therefore, we must continue to focus our resources and energies where we will have the greatest impact in reducing risk.

Thank you for helping us achieve our significant progress over the last four years. We will continue to strengthen our partnerships and further enhance training, procedures, infrastructure, and technology.

Marion C. Blakey
Administrator

FAA Runway Safety Report

Runway Incursion Trends and Initiatives at Towered Airports in the United States, FY 2001 through FY 2004

FAA Air Traffic Safety Services


8609

Executive Summary

REDUCING THE RISKS OF RUNWAY INCURSIONS AND RUNWAY COLLISIONS is a top priority of the Federal Aviation Administration (FAA). Runway safety management is a dynamic process that involves analyzing runway incursions, understanding the factors that contribute to runway collision risks, and taking actions to reduce these risks. Runway incursion severity ratings (Category A through D) indicate the potential for a collision or the margin of safety associated with an event. The FAA aims to reduce the severity, number, and rate of runway incursions through the mitigation of errors that contribute to collision risks.

- During fiscal years (FY) 2001 through FY 2004, there were approximately 257 million takeoffs and landings at nearly 500 FAA towered airports in the United States—about 176,000 takeoffs and landings per day. Of these 257 million aircraft operations, there were 1,395 runway incursions—an average of nearly one runway incursion per day during the four-year period. *(See Page 7)*.
- Progress was made in reducing the number and rate of runway incursions across the National Airspace System (NAS) during the four-year period, but the rate of runway incursions has leveled off during the last three fiscal years. Runway safety management strategies that have been implemented during this period may have achieved their maximum effect and, therefore, the FAA plans to identify new strategies as well as re-prioritize their application. *(See Page 16)*.
- The FAA's performance target, as presented in the *FAA Flight Plan 2005–2009*, is to reduce the number of Category A and B runway incursions to no more than 27, which is equivalent to a rate of 0.39 incursions per million operations per year, by FY 2009. Over the four-year period, there was a downward trend in the total number and rate of Category A and B runway incursions. In FY 2004, there were 28 Category A and B incursions, which is only one incursion higher than the FY 2009 performance target. There was also a downward trend for the rate of Category A and B runway incursions during the four-year period. In FY 2004, the Category A and B incursion rate was 0.44 incursions per million operations, which is 13 percent higher than the FY 2009 performance target of 0.39 incursions per million operations. *(See Page 19)*.
- Five Category A runway incursions resulted in collisions during the four-year period. Four of these collisions involved two general aviation aircraft. The other collision involved a commercial cargo aircraft colliding with construction cones on a closed runway at night. No fatalities resulted from any of the collisions during the four-year period. *(See Page 18)*.
- The FAA explored the distribution of runway incursion types with respect to severity. There was a downward trend in the number and rate of pilot deviations—the most common type of runway incursion. During the four-year period, 55 percent of the Category A and B incursions were pilot deviations. In each of the last two years of the period, there were 14 Category A and B pilot deviations. *(See Page 21)*.

- The number and rate of operational errors/deviations have increased since FY 2002. This type of incursion accounted for 28 percent of the NAS Category A and B runway incursions (42 of 150 incursions). In FY 2004, there were 97 operational errors/deviations—the highest number in the four-year period. *(See Page 24)*.
- There was a downward trend in the number and rate of vehicle/pedestrian deviations during the four-year period, with the number of Category A and B vehicle/pedestrian deviations reaching its lowest level (three incursions) in FY 2004. *(See Page 28)*.
- The FAA explored runway incursion trends in terms of the type of aircraft operation involved—commercial or general aviation. During the four-year period, the majority of incursions involving at least one commercial aircraft were Category C and D events—502 of the 564 commercial aviation runway incursions. FY 2004 marks the third consecutive year with zero Category A runway incursions involving two commercial aircraft. *(See Page 32)*.
- The number and rate of general aviation runway incursions decreased from FY 2001 through FY 2003 but increased in FY 2004. Seventy-six percent of Category A and B incursions (114 of 150 incursions) in the NAS involved at least one general aviation aircraft. Specifically, the number and rate of Category A and B incursions involving two general aviation aircraft decreased throughout the period, but continue to represent the largest segment of Category A and B incursions in the NAS. *(See Pages 43 and 48)*.
- Airports that primarily handle commercial operations and airports that primarily handle general aviation operations were explored to identify where changes to technology, procedures, and infrastructure may provide the most benefit to risk reduction for runway safety. The 35 FAA *Operational Evolution Plan* (OEP-35) airports accounted for 28 percent of the total number of runway incursions in the NAS (385 of 1,395 incursions). There was progress in reducing the severity of incursions at the OEP-35 airports as Category A and B incursions involving two commercial aircraft decreased from 14 in FY 2001 to one in FY 2004. In comparison, the busiest general aviation airports (GA-35) accounted for 17 percent of the total number of runway incursions in the NAS (240 of 1,395 incursions). Eleven percent of these incursions were the more serious Category A and B events. *(See Pages 37 and 47)*.
- The airports that drive NAS runway safety trends are not fully represented by the OEP-35 or GA-35 airports. The Focus-35 airports (identified specifically for this report) are those airports that have reported the most runway incursions during the four-year period. As the Focus-35 airports accounted for 41 percent of the total number of runway incursions in the NAS (565 of 1,395 incursions), these airports provide a useful benchmark for measuring the progress made toward improving runway safety. Thirty-nine percent of the 150 Category A and B incursions in the NAS were reported by the Focus-35 airports. The number of these most serious incursions decreased from 24 incursions in FY 2001 to seven incursions in FY 2004 at the Focus-35 airports—a 71 percent decrease. *(See Pages 54 and 55)*.

The FAA will continue its efforts to identify and respond to risks on the runway through analysis of runway incursion trends and the errors that lead to runway incursions. Due to the collective efforts of the FAA and the aviation community, several runway incursion trends and risk metrics have reached a very low frequency of occurrence and have begun to flatten. To continue our progress, the FAA's evolving safety management approach will include:

- More sophisticated measures for identifying emerging risks and assessing the potential benefits of runway safety initiatives;
- A focus on airports that offer the greatest potential for reducing runway incursion severity, frequency, and rate; and
- An expanded viewpoint that encompasses the en route and terminal domains to help identify pervasive errors and institutionalize system-wide best practices.

The 2005 *FAA Runway Safety Report* presents an assessment of runway safety in the United States for fiscal year (FY) 2001 through FY 2004. The report also highlights runway safety initiatives intended to reduce the severity, number, and rate of runway incursions.[1] Historical runway incursion data and trends can be found on the Federal Aviation Administration (FAA) Web site (**http://www.faa.gov**).

[1] *A glossary of terms and a list of acronyms used in this report are provided in Appendix A.*

Introduction

THE UNITED STATES NATIONAL AIRSPACE SYSTEM (NAS) has nearly 500 FAA/contract towered airports that handle more than 176,000 aircraft operations—takeoffs and landings—a day, averaging approximately 64 million airport operations per year. Of the approximately 257 million takeoffs and landings at United States towered airports from FY 2001 through FY 2004, there were 1,395 reported runway incursions. This performance record means that there were approximately 5.4 runway incursions for every one million operations and less than one serious (Category A or Category B) runway incursion for every one million operations. Five of the 1,395 incursions resulted in collisions on the runway. No fatalities occurred from these collisions. Of the nearly 500 FAA towered airports, 317 airports reported at least one runway incursion during this four-year period.

Of the approximately 257 million takeoffs and landings at United States towered airports from FY 2001 through FY 2004, there were 1,395 reported runway incursions.

To operate safely and efficiently, the NAS relies on clear communication and smooth coordination among more than 15,000 air traffic controllers, more than 600,000 pilots, and a wide variety of airport vehicle operators[2]. This shared responsibility is reinforced by a system of "checks and balances" that includes:

- Operational procedures, such as pilot readbacks of controller clearances;
- Airport infrastructure, such as airfield signs, pavement markings, and surface surveillance systems;
- Air traffic management, such as the coordination between ground and local control; and
- Training and awareness for the safe conduct of airport movement operations.

This network of people, procedures, infrastructure, and technology enables the NAS to be both the busiest and the safest air traffic management system in the world.

To understand historical runway incursion trends—as well as anticipate and mitigate emerging runway safety risks—this report examines runway safety from a quantitative and qualitative perspective. This approach will help guide the further implementation of technologies and procedures that enhance runway safety and improve airport efficiency in response to industry demands. Runway safety trends are discussed from the period beginning in FY 2001 through FY 2004 and expand on the analyses presented in previous FAA Runway Safety Reports.

[2] *There is the potential for as many as one thousand vehicle operators to be working at a single large airport.*

Background

ONE OF THE FAA'S TOP PRIORITIES is to reduce the frequency of runway incursions and the risk of a runway collision. The FAA aims to reduce the severity, number, and rate of runway incursions by implementing a combination of technology, infrastructure, procedural, and training interventions to decrease the prevalence of human errors and increase the error tolerance of airport surface movement operations. As outlined in the *FAA Flight Plan 2005–2009*, the FAA is developing airport design concepts and surface movement procedures, such as the potential use of perimeter taxiways, to decrease the number of runway crossings and thereby reduce the risk of runway incursions. Related efforts address the errors committed by pilots, air traffic controllers, and airport-authorized vehicle operators and pedestrians.

Airports with air traffic control towers in the United States report the occurrence of operational surface incidents, which may take place in the runway environment or other airport movement areas. The FAA reviews all of these incidents, identifying a subset as runway incursions. A runway incursion, as defined by the FAA, is any occurrence in the airport runway environment involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in a loss of required separation with an aircraft taking off, intending to take off, landing, or intending to land.

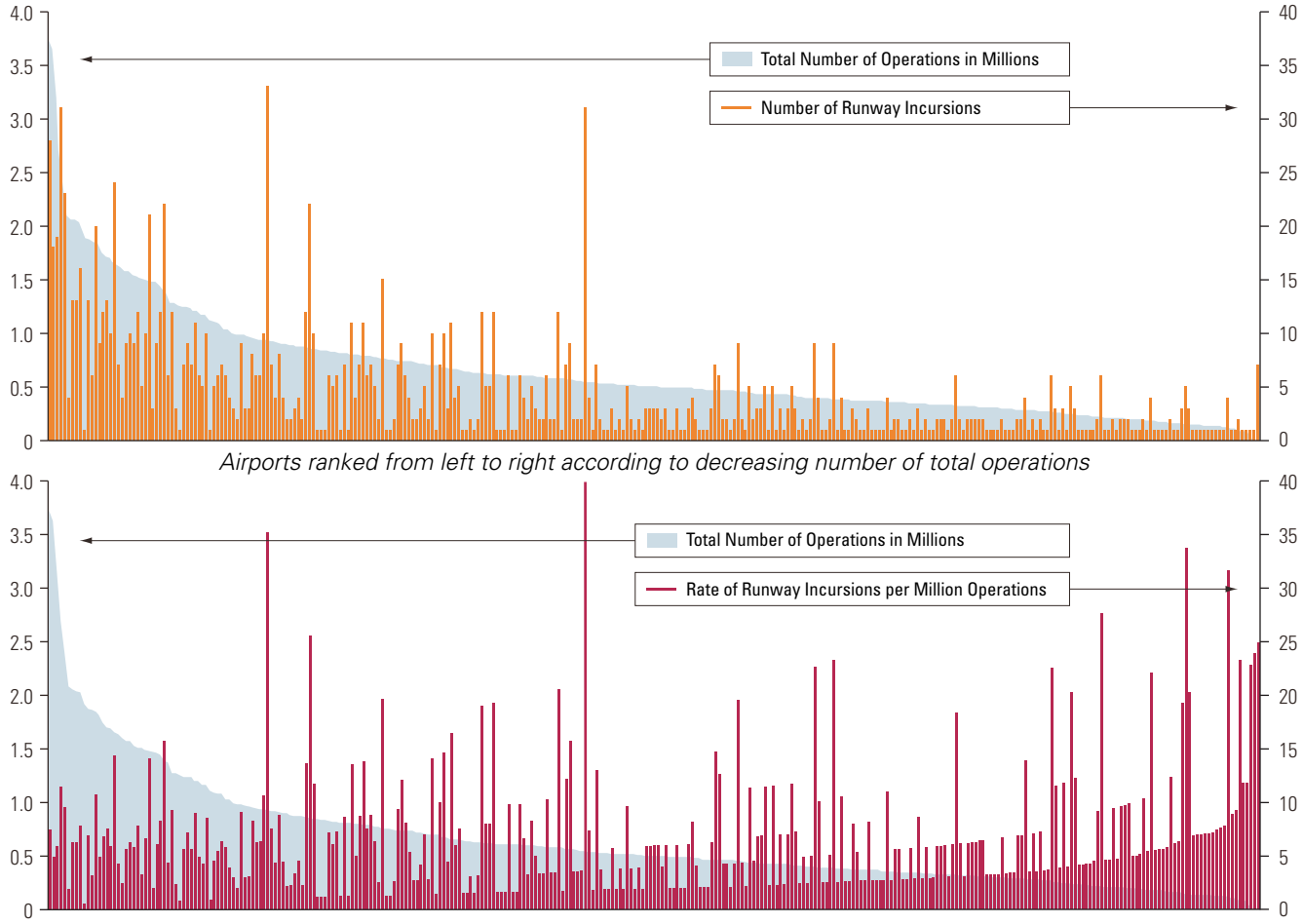
The FAA analyzes runway incursions to identify collision risks on the runway. Runway incursion severity represents the potential for a collision or the margin of safety. The severity ratings consider factors such as the actions required to avoid a collision and the distance between an aircraft and another aircraft or object. It is also important to understand the factors that may contribute to—or help prevent—runway incursions. Traffic volume is commonly viewed as the principal factor that influences the number of runway incursions. As the volume of traffic increases, the possible operational scenarios and opportunities for errors also increase. Notionally, each additional aircraft operation represents at least one more potential interaction with each existing aircraft or object on the airport surface. However, traffic volume is not the only factor contributing to runway incursions.

As shown in *Figure 1*, variations in the number of runway incursions at airports across the country are due to other factors in addition to traffic volume. Traffic volume explains less than 50 percent of the variations in the number of runway incursions among airports. Airport-specific factors—for example, infrastructure, procedures, operations, and environment—influence the potential occurrence of runway incursion scenarios by providing opportunities for, or defenses against, human errors. These factors must be analyzed to develop more sophisticated safety metrics that complement current runway safety performance indicators.

A runway incursion, as defined by the FAA, is any occurrence in the airport runway environment involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in a loss of required separation with an aircraft taking off, intending to take off, landing, or intending to land.

Figure 1

The Relationship Between Traffic Volume and the Number and Rate of Runway Incursions at Towered Airports in the United States (FY 2001 through FY 2004)



Runway Safety Metrics

The FAA uses three primary metrics to assess runway safety trends: the frequency of runway incursions, the severity of runway incursions, and the types of runway incursions. These metrics are used in this report to examine national trends and trends for specific aircraft operations and airports.

Frequency of Runway Incursions

This report refers to both the number and rate of runway incursions to accurately present runway safety trends. The number of incursions provides a description of magnitude. Runway incursion rate describes how often events occur for a given number of operations.

The rate also accounts for the different number of operations at each airport and serves as a basis for comparing runway safety trends among airports—for example, trends for the number of pilot deviations per million aircraft operations.

Severity of Runway Incursions

The FAA reconstructs each runway incursion using the available information and plots the approximate location of each event on airport diagrams. The FAA also uses this exercise to systematically categorize each runway incursion in terms of severity. Appendix B.1 contains a description of the FAA's runway incursion severity classification process. Appendix B.2 lists the factors considered in the severity ratings. Appendix B.3 provides the year, location, and runway incursion type for the one runway incursion during the four-year period that did not contain enough information to support a reliable rating of severity.

Increasing Severity

Category D	Category C	Category B	Category A
Little or no chance of collision but meets the definition of a runway incursion	Separation decreases but there is ample time and distance to avoid a potential collision	Separation decreases and there is a significant potential for collision	Separation decreases and participants take extreme action to narrowly avoid a collision, or the event results in a collision

Severity Categories A through D consider factors such as the speed and performance characteristics of the aircraft involved, the proximity of one aircraft to another aircraft or a vehicle, and the type and extent of any evasive action by those involved in the event. Aircraft involved in runway incursions are grouped into either commercial aviation operations or general aviation operations. Commercial aviation operations are defined as scheduled or chartered for-hire aircraft used to carry passengers or cargo. These aircraft are typically operated by airlines, charter services, and air cargo for the transportation of ticketed passengers and cargo. General aviation operations encompass the full range of activity from student pilots to multi-hour, multi-rated pilots flying sophisticated aircraft for business or pleasure. This includes small general aviation aircraft, such as Cessna 152 or Piper Cherokee, and large general aviation aircraft, such as Cessna Citation C550 or Gulfstream V.

Types of Runway Incursions

The FAA divides runway incursions into three error types: pilot deviations, operational errors/deviations, and vehicle/pedestrian deviations. Identification of a runway incursion as a pilot deviation, an operational error/deviation, or a vehicle/pedestrian deviation is not an indication of the cause of the runway incursion; it is a classification of an error type. These error types typically refer to the last event in a chain of pilot, air traffic controller, and/or vehicle operator actions that led to the runway incursion.

Identification of a runway incursion as a pilot deviation, an operational error/deviation, or a vehicle/pedestrian deviation is not an indication of the cause of the runway incursion; it is a classification of an error type.

Operational Errors / Deviations	An operational error (OE) is an action of an air traffic controller (ATC) that results in: ■ Less than the required minimum separation between two or more aircraft, or between an aircraft and obstacles (e.g., vehicles, equipment, personnel on runways). ■ An aircraft landing or departing on a runway closed to aircraft. An operational deviation (OD) is an occurrence attributable to an element of the air traffic system in which applicable separation minima were maintained, but an aircraft, vehicle, equipment, or personnel encroached upon a landing area that was delegated to another position of operation without prior coordination and approval.
Pilot Deviations	A pilot deviation (PD) is an action of a pilot that violates any Federal Aviation Regulation. For example, a pilot fails to obey air traffic control instructions to not cross an active runway when following the authorized route to an airport gate.
Vehicle / Pedestrian Deviations	A vehicle or pedestrian deviation (V/PD) includes pedestrians, vehicles, or other objects interfering with aircraft operations by entering or moving on the movement area without authorization from air traffic control. NOTE: This runway incursion type includes mechanics taxiing aircraft for maintenance or gate re-positioning.

Overview

This 2005 Runway Safety Report presents an analysis of all runway incursions reported in the United States from FY 2001 through FY 2004. The results are discussed from three different vantage points:

- **National Airspace System Performance:** Provides the number, rate, and severity of runway incursions across the NAS and presents the progress made toward reaching the *FAA Flight Plan 2005–2009* performance target for the reduction of the number of the most serious (Categories A and B) runway incursions.
- **Aircraft Operations:** Presents runway incursion trends in terms of the type of aircraft operations involved and the airports where these aircraft operate (see *Commercial Aviation Operations and General Aviation Operations*).
- **Airport Operations:** Examines the airports with the most runway incursions during the four-year period to identify where the most risk reduction benefits may be gained (see *Airports for NAS Runway Safety Management*).

National Airspace System Performance

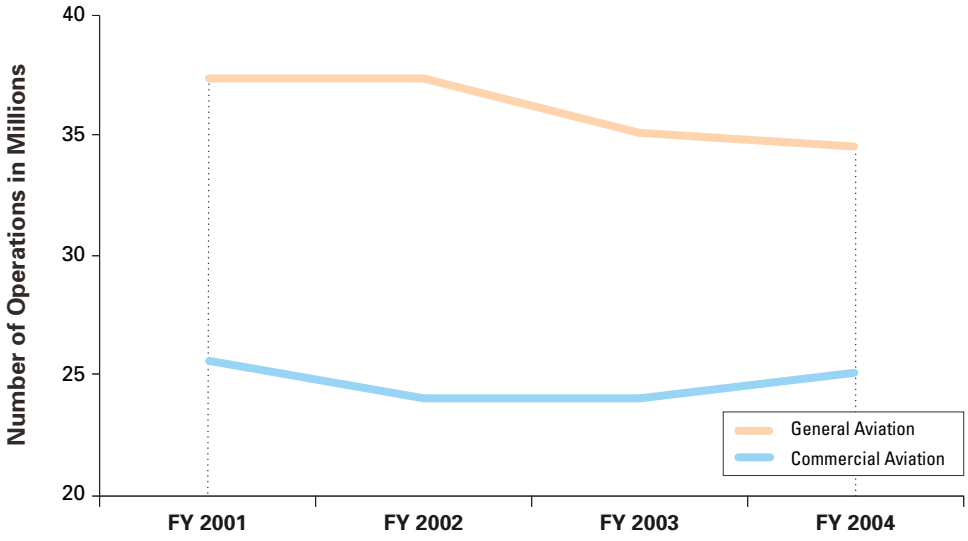
OPERATIONS AT UNITED STATES AIRPORTS ARE SHOWING SIGNS OF RECOVERY after the cyclical downturn in the United States economy. Thirteen of the nation's major 35 airports are operating above 9/11 traffic levels, and the FAA expects seven additional major airports to join them by the end of FY 2005[3]. Meanwhile, changes to commercial aviation and general aviation markets continue to pose operational and financial challenges to airports throughout the NAS. As numerous airport infrastructure programs are under way, the challenge once again involves managing safety while responding to demands for greater capacity.

FY 2004 marks the second consecutive year that commercial aircraft operations have increased. Significant increases in operations at most of the nation's busiest airports over the past fiscal year contributed to approximately 900,000 additional commercial operations in the NAS. In contrast, general aviation operations decreased by 7 percent across the NAS from FY 2001 through FY 2004 *(see Figure 2)*.

FY 2004 marks the second consecutive year that commercial aircraft operations have increased.

Figure 2

Commercial Aviation and General Aviation Operations (FY 2001 through FY 2004)



[3] *Based on FAA OPSNET database and the FAA Capacity Needs in the National Airspace System Report, June 2004.*

Figure 3 presents the distribution of aircraft operations in the NAS and their involvement in runway incursions. General aviation accounted for more than half (57 percent) of the NAS activity and was involved in a disproportionate number (74 percent) of runway incursions. Commercial aviation accounted for 38 percent of NAS activity during this period, and military aviation accounted for the remaining 5 percent of aircraft operations. The involvement of commercial and military operations in runway incursions was in proportion to their activity in the NAS.

Figure 3
Comparison of Aircraft Operations in the NAS and Their Involvement in Runway Incursions

	FY 2001 through FY 2004	
	Percentage of NAS Aircraft Operations	Percentage of NAS Runway Incursions[4]
Commercial Aviation	38%	40%
General Aviation	57%	74%
Military Aviation	5%	3%

Frequency of Runway Incursions

During the four-year period, progress was made in reducing the number and rate of all runway incursions nationally, but the rate has leveled off during the last three fiscal years.

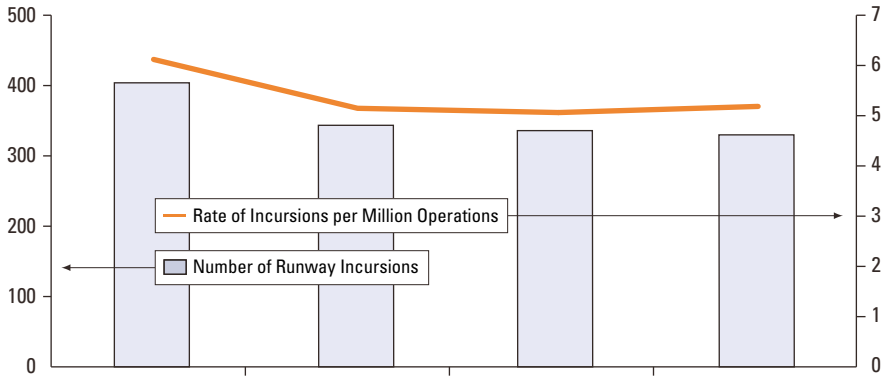
From FY 2001 through FY 2004, United States towered airports reported 1,395 runway incursions—an average of nearly one runway incursion per day. During this four-year period, there were more than 257 million aircraft operations at the nation's towered airports—about 176,000 takeoffs and landings per day.

Although there was a notable decrease in the total number and rate of runway incursions from FY 2001 to FY 2002, this trend has flattened over the remainder of the period *(see Figure 4)*. Runway safety management strategies that have been implemented during this period may have achieved their maximum effect. Therefore, the FAA plans to identify new strategies and re-prioritize their application.

[4] *To emphasize the risk of an incursion rather than accountability for a runway incursion, the statistics in this report refer to aircraft as being "involved" in runway incursions and do not distinguish between the aircraft responsible for the deviation and the aircraft being incurred upon. Therefore, an incursion that involved a commercial aircraft and a general aviation aircraft may be considered as both a commercial aviation runway incursion and as a general aviation runway incursion. This explains why the "Percentage of NAS Runway Incursions" column in Figure 3 does not total 100 percent.*

Figure 4

Number and Rate of Runway Incursions (FY 2001 through FY 2004)



	FY 2001	FY 2002	FY 2003[5]	FY 2004	Total
Number of Runway Incursions	407	339	323	326	**1,395**
Rate of Runway Incursions per Million Operations	6.1	5.2	5.1	5.2	**5.4**
Total Number of Operations	66,188,812	64,958,293	62,783,048	63,102,324	**257,032,477**

NOTE: *Appendix D provides a listing of the number and rate of runway incursions for all U.S. towered airports that reported at least one runway incursion or surface incident for the four-year period.*

Severity of Runway Incursions

During the four-year period, progress was achieved in reducing the severity of runway incursions. Specifically, progress was achieved in the reduction of Category A and B incursions, although this downward trend has appeared to flatten.

Over the four-year period, the majority (89 percent) of runway incursions—1,244 of the 1,395 runway incursions—were Category C and D events that involved little or no risk of a collision. From FY 2001 through FY 2003, the number of Category C and D runway incursions decreased by 18 percent *(see Figure 5)*. However, the number of Category C incursions has increased in each of the last two fiscal years.

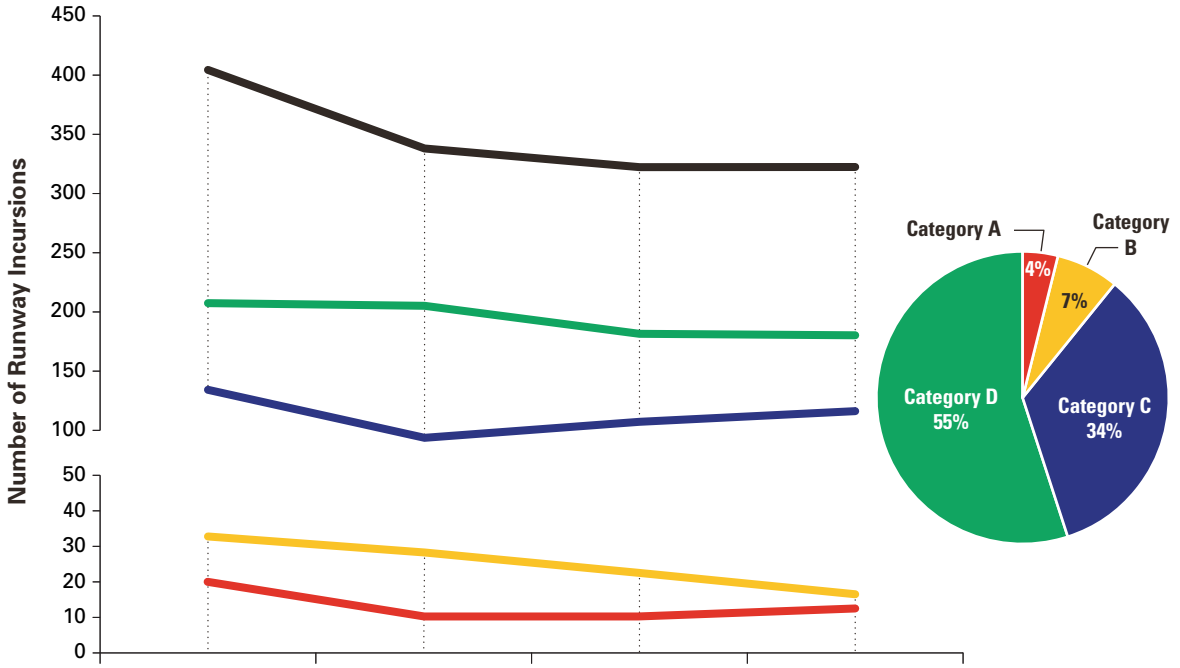
Over the four-year period, the majority (89 percent) of runway incursions were Category C and D events that involved little or no risk of a collision.

The number of Category C incursions has increased in each of the last two fiscal years.

[5] *The FAA re-classified one runway incursion from FY 2003 as a surface incident. This reduced the total number of runway incursions by one event and the rate by 0.1 incursions per million operations.*

Figure 5

Runway Incursion Severity Distribution (FY 2001 through FY 2004)



	FY 2001		FY 2002		FY 2003		FY 2004		Total	
	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops
Category D	210	3.2	208	3.2	181	2.9	178	2.8	777	3.0
Category C	143	2.2	94	1.4	110	1.8	120	1.9	467	1.8
Category B	33	0.5	27	0.4	22	0.4	16	0.3	98	0.4
Category A	20	0.3	10	0.2	10	0.2	12	0.2	52	0.2
Insufficient Data*	1	0.0	0	0.0	0	0.0	0	0.0	1	0.0
Total	407	6.1	339	5.2	323	5.1	327	5.2	1,395	5.4

**This event is not included in the pie chart.*

Five Category A runway incursions resulted in collisions during the four-year period. No fatalities resulted from any of the collisions.

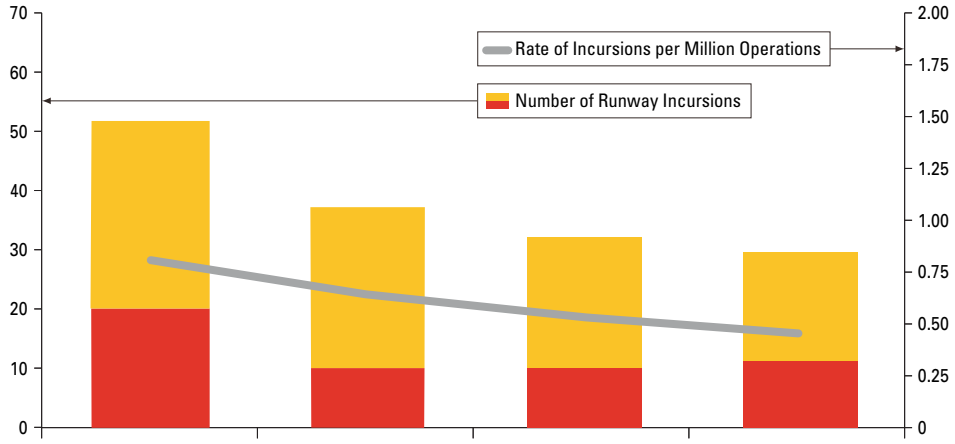
From FY 2001 through FY 2004, Category A and B incursions represented 11 percent (150 of 1,395 incursions) of all runway incursions. Five Category A runway incursions resulted in collisions during the four-year period. Four of these collisions involved two general aviation aircraft. The other collision involved a commercial cargo aircraft colliding with construction cones on a closed runway at night. No fatalities resulted from any of the collisions. Appendix B.4 provides the specific airports and dates of the collisions, as well as brief descriptions of these events.

As presented in the *FAA Flight Plan 2005–2009*, the FAA's performance target is to reduce the number of Category A and B runway incursions to no more than 27 events—which is equivalent to an annual rate of 0.39 Category A and B incursions per million operations, by FY 2009.

From FY 2001 through FY 2004, there was a downward trend in the total number and rate of Category A and B runway incursions *(see Figure 6)*. Specifically, 53 Category A and B incursions occurred in FY 2001 compared to 28 Category A and B incursions in FY 2004, which is only one incursion higher than the FY 2009 performance target of 27. The number of Category A and B incursions decreased 47 percent during the four-year period. In FY 2002, there was a reduction of 10 incursions, but this downward trend flattened in the following years *(see Figure 6)*.

Figure 6

Total Number and Rate of Category A and B Runway Incursions (FY 2001 through FY 2004)



All Events	FY 2001		FY 2002		FY 2003		FY 2004		Total	
	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops
Category B	33	0.50	27	0.42	22	0.35	16	0.25	98	0.38
Category A	20	0.30	10	0.15	10	0.16	12	0.19	52	0.20
Total	53	0.80	37	0.57	32	0.51	28	0.44	150	0.58

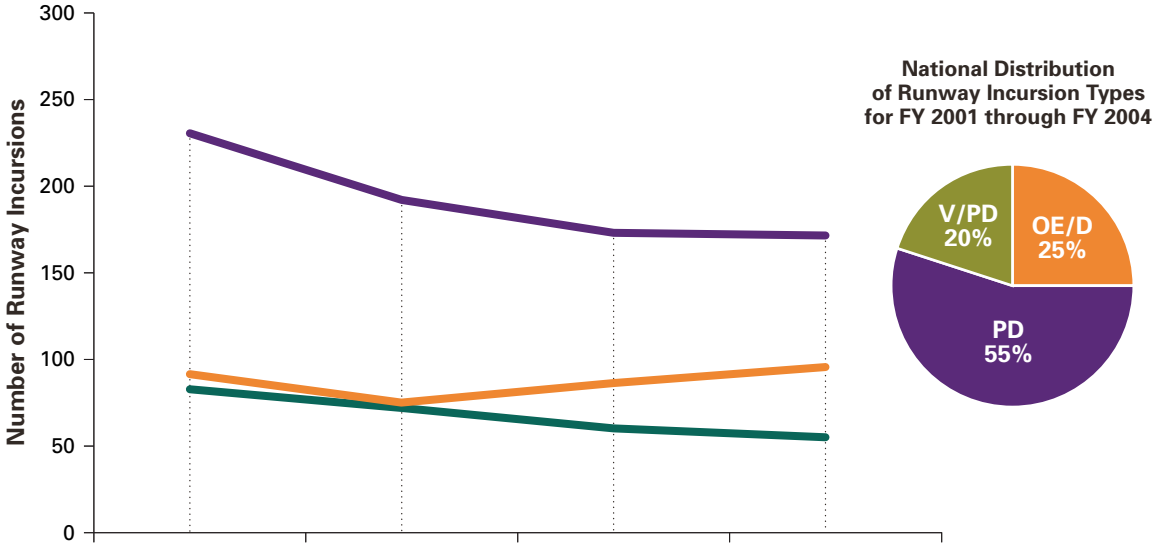
The Category A and B incursion rate for FY 2004 was 0.44 incursions per million operations, which is 13 percent higher than the FY 2009 performance target of 0.39 incursions per million operations. The types of aircraft operations involved in these incursions—and the airports where these events occurred—are presented in the *Commercial Aviation Operations, General Aviation Operations*, and *Airports for NAS Runway Safety Management* sections. These perspectives are essential to tailor training, technological, procedural, and infrastructure modifications for effective runway safety management.

Types of Runway Incursions

The following section highlights the four-year trends for the three types of runway incursions—pilot deviations, operational errors/deviations, and vehicle/pedestrian deviations. In addition, the FAA explored the distribution of runway incursion types with respect to severity.

Figure 7

Number and Rate of Runway Incursion Types (FY 2001 through FY 2004)



	FY 2001		FY 2002		FY 2003		FY 2004		Total	
	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops
Pilot Deviations	233	3.5	191	2.9	174	2.8	173	2.7	771	3.0
Operational Errors/ Deviations	91	1.4	75	1.2	89	1.4	97	1.5	352	1.4
Vehicle/Pedestrian Deviations	83	1.3	73	1.1	60	1.0	56	0.9	272	1.1
									1,395	**5.4**

Pilot Deviations

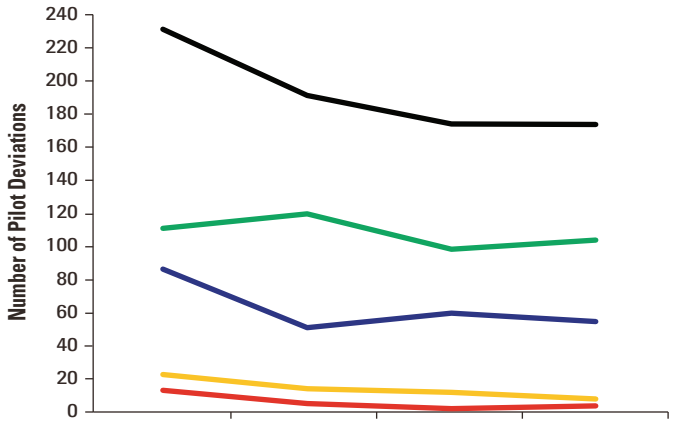
From FY 2001 through FY 2004, progress was made in reducing the number, rate, and severity of pilot deviations—the most common type of runway incursion.

Pilot deviations accounted for 55 percent of the runway incursions (771 of 1,395 incursions) during the four-year period.

Pilot deviations accounted for 55 percent of the runway incursions (771 of 1,395 incursions) during the four-year period. As a result, the FAA has focused efforts on reducing pilot deviations through awareness, education, procedures, and surface technology initiatives. From FY 2001 through FY 2004, the number and rate of pilot deviations decreased by 26 percent and 23 percent, respectively *(see Figure 7)*.

Figure 8

Number and Severity of Pilot Deviations (FY 2001 through FY 2004)



Pilot Deviations	FY 2001	FY 2002	FY 2003	FY 2004	Total PD
Category D	111	120	99	104	**434**
Category C	88	51	61	55	**255**
Category B	22	14	11	8	**55**
Category A	12	6	3	6	**27**
Total	**233**	**191**	**174**	**173**	**771**

From FY 2001 through FY 2004, 55 percent of the Category C and D incursions (689 of 1,244 incursions) were pilot deviations. Category C and D pilot deviations decreased by 20 percent over this four-year period, which was consistent with the decreasing NAS trend for Category C and D incursions.

From FY 2001 through FY 2004, 55 percent of the Category A and B incursions (82 of 150 incursions) were pilot deviations. The number of Category A and B pilot deviations decreased 59 percent during the four-year period *(see Figure 8)*. The reduction in both the total number of pilot deviations and those that resulted in Category A and B incursions represents substantial progress. However, there was no change in the total number of Category A and B pilot deviations in the last fiscal year—14 Category A and B pilot deviations in FY 2003 and in FY 2004.

From FY 2001 through FY 2004, 55 percent of the Category A and B incursions (82 of 150 incursions) were pilot deviations.

To better understand the factors involved in pilot deviations and the potential vulnerabilities in the airport environment, the FAA reviewed the pilot deviations for FY 2004 in greater detail. The results show that the most common pilot errors that lead to runway incursions involve:

- Crossing the hold short lines without authorization,
- Entering the runway without authorization, and
- Crossing the runway without authorization.

Twenty-five percent of the pilot deviations that occurred in FY 2004 involved a pilot crossing the hold short lines without authorization but not entering the runway environment. Surprisingly, almost 40 percent of these errors followed a correct readback of the instruction to hold short—indicating a disconnect between the pilot's intentions and actions.

Twenty-five percent of the pilot deviations that occurred in FY 2004 involved a pilot crossing the hold short lines without authorization.

To further understand this disconnect, the FAA reviewed 300 recent reports submitted by pilots to the National Aeronautics and Space Administration (NASA) Aviation Safety Reporting System (ASRS). These reports described runway incursions at the nation's busiest airports[6]. The majority of the reports were submitted by two-pilot, professional flight crews.

Of these 300 ASRS reports, 105 incidents involved the pilots crossing the hold short lines without authorization. Of these incidents:

- Almost half (45 events) of the pilots reported a temporary loss of "position awareness"; that is, they intended to hold short but crossed the hold short lines without realizing it.
- Crossing the hold short lines without authorization was most often related to the pilot performing heads-down tasks. In 26 percent (27 events) of the ASRS incidents, the pilots reported being heads-down in the cockpit either performing checklists or programming flight deck systems as they crossed the hold short lines.
- In one-third of these incidents (35 events), pilots mentioned that either the hold short lines were not where they expected them to be or that they were accustomed to holding (or not holding) at certain points along a route. These incidents show that expectations or habits—formed by experience and training—can also contribute to runway incursions. When instructions differ from what is expected, pilots may correctly acknowledge the instructions but unintentionally revert to habit in their actions.

Loss of position awareness was also a common factor involved in pilots entering and crossing a runway without authorization. Of the 173 pilot deviations reported to the FAA in FY 2004, 40 percent involved pilots *entering* the runway and 35 percent involved pilots *crossing* the runway. ASRS reports revealed that the most common factor contributing to these types of errors was the pilot being heads-down. One-third of the pilots who crossed or entered the runway without authorization reported to ASRS that one of the crew was heads-down at the time of the incident—most often reviewing a checklist.

To aid pilots in maintaining position awareness, the FAA and the Air Line Pilots Association (ALPA) examined the incorporation of technologies such as cockpit moving maps in airliner cockpits (see *Commercial Aviation Operations*). Additionally, the FAA worked with airport operators to implement new airfield surface safety technologies that provide additional information (or an additional reminder) to pilots that they are approaching or entering the runway environment. For example, the pilot taxiing the aircraft to the runway may see enhanced surface markings or runway status lights to indicate whether the runway environment is occupied by another aircraft. To mitigate the consequences of pilots taxiing into position on or across the runway without authorization, the FAA is conducting a research and development project at Dallas/Fort Worth International Airport (DFW) and San Diego International Airport-Lindbergh Field (SAN) to study the effectiveness of Runway Status Lights (RWSL). This technology includes a set of automatically controlled runway status lights on the edge of the runway that, when lit, provide direct indication to pilots and ground vehicle operators that a runway is occupied and, therefore, unsafe to enter or cross. The project has completed shadow operations, and the Operational Evaluation is scheduled to begin at DFW in 2005.

[6] *NASA ASRS is a voluntary and confidential mechanism for NAS users to report the occurrence of safety-related incidents like runway incursions.*

Enhancing Pilot Position Awareness

To enhance airport infrastructure features that help improve pilots' awareness of their location on the airport—especially the runway holding position environment—the FAA worked with industry safety experts, human factors specialists, pilot and controller communities, paint contractors, and airport operators to develop and evaluate enhanced surface markings and runway lighting.

In April 2004, the FAA completed field testing at T.F. Green Airport (PVD) in Providence, Rhode Island to determine if enhanced surface markings would improve pilot awareness of the runway holding position environment. Three proposed enhanced surface markings—modified runway holding position markings, additional surface-painted holding position signs, and a modified taxiway centerline—were added to every taxiway/runway intersection at PVD *(see Figures 9A.1, 9A.2, and 9A.3)*. The FAA is currently assessing the benefit of incorporating these enhancements into its surface marking standards.

Figure 9A.1

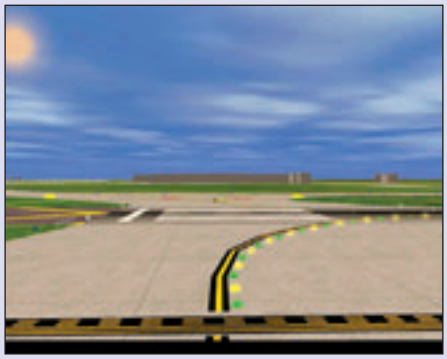
Figure 9A.2

Figure 9A.3

In FY 2004, the FAA initiated a project to investigate a modified lighting configuration for taxiway centerline lead-on lights. This modification is designed to improve pilots' awareness of the runway environment by providing an additional visual cue to distinguish between the taxiway and runway environments. Louisville International-Standiford Field Airport (SDF) was chosen as a demonstration site for this study that began in August 2004. Under the proposed modification, the color pattern for these lead-on lights, instead of being all green, would consist of an alternating green and yellow configuration *(see Figure 9B)*.

Figure 9B.1 – *Standard Configuration*

Figure 9B.2 – *Proposed Configuration*

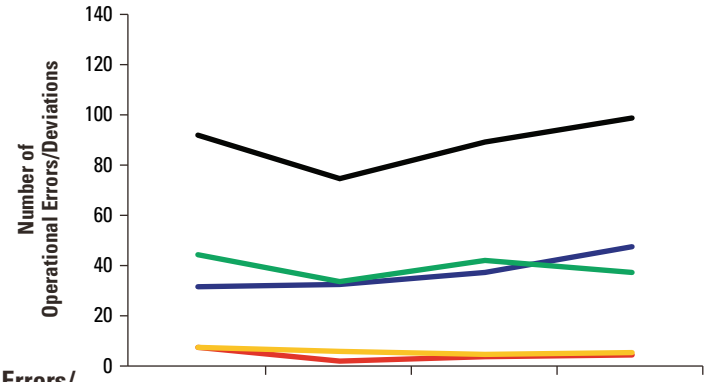


Operational Errors/Deviations

Since FY 2002, the number and rate of operational errors/deviations have consistently increased. Reversing this trend requires concerted interventions guided by more sophisticated risk measures and an improved understanding of the contributing factors.

Figure 10

Number and Severity of Operational Errors/Deviations (FY 2001 through FY 2004)



Operational Errors/ Deviations	FY 2001	FY 2002	FY 2003	FY 2004	Total OE/D
Category D	44	34	42	38	**158**
Category C	32	33	38	48	**151**
Category B	7	6	5	6	**24**
Category A	7	2	4	5	**18**
Insufficient Data	1	0	0	0	**1**
Total	**91**	**75**	**89**	**97**	**352**

Since FY 2002, there has been a 29 percent increase in the number of operational errors/ deviations and 25 percent increase in the rate.

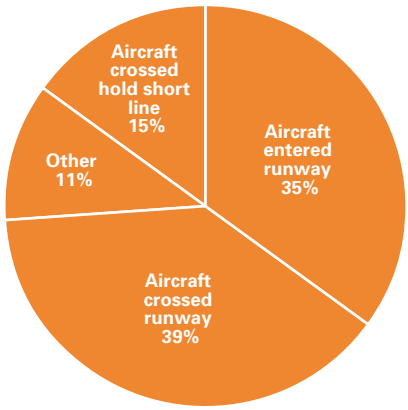
From FY 2001 through FY 2004, operational errors/deviations accounted for 25 percent of all runway incursions (352 of 1,395 incursions). Since FY 2002, there has been a 29 percent increase in the number of operational errors/deviations and 25 percent increase in the rate *(see Figure 10)*. In FY 2004, there were 97 operational errors/deviations—the highest number for the four-year period.

From FY 2001 through FY 2004, 25 percent of Category C and D incursions (309 of 1,244 incursions) were operational errors/deviations. Since FY 2002, Category C and D operational errors/deviations have increased 28 percent. Because the number of Category D operational errors/deviations fluctuated, this increase in the total of Category C and D events was attributable primarily to the increase in Category C operational errors/deviations.

From FY 2001 through FY 2004, 28 percent of the NAS Category A and B runway incursions (42 of 150 incursions) were operational errors/deviations. Since FY 2002, the number of Category A and B operational errors/deviations has increased year over year *(see Figure 10)*.

A closer examination of operational errors/deviations showed that 39 percent of operational errors/deviations in FY 2004 resulted in an aircraft crossing the runway with another aircraft taking off or landing *(See Figure 11)*. Fifteen percent of the operational errors/deviations involved an aircraft going past the hold short lines but not entering the runway environment. An additional 35 percent of the operational errors/deviations resulted in an aircraft entering (but not crossing) the runway.

Figure 11
Results of Operational Errors/Deviations (FY 2004)



An examination of the contributing factors for operational errors/deviations in FY 2004 indicated that the taxi-into-position-and-hold procedure contributed to these incursions. Twelve percent of the operational errors/deviations involved an aircraft holding in position on the runway for takeoff ("position and hold") and the controller forgetting this aircraft while clearing another aircraft to land. A complementary study of operational errors for a six-year period showed that more than two minutes had elapsed between the instruction to "position and hold" and the resulting event (e.g., landover, go around). Advisory Circular 91-73A was developed to emphasize the importance for pilots to query air traffic control if they have been asked to hold for longer than two minutes.

The FAA reviewed a previous study of 256 operational errors/deviations for the period from January 1997 through June 1999 to gain additional insights into the contributing factors. This study showed that:

- 27 percent of the incidents involved the controller "forgetting" about something—such as a closed runway, a vehicle on the runway, or an aircraft that was cleared to land or to hold at the end of the runway;
- 19 percent of the incidents involved a miscommunication between pilots and air traffic controllers. The most common error was the controller failing to correct a mistake in a pilot's readback. Due to the sheer volume of communications, there is an average of one uncorrected readback error (per frequency) every five hours. However, analyses of Tower voice tapes show that communications between pilots and controllers are surprisingly accurate—less than 1 percent of pilot readbacks contains errors and most of these readback errors are corrected; and

- 18 percent of the incidents involved incomplete coordination between air traffic controllers. This resulted in a failure of one controller to relay information needed by another controller or a failure to obtain approval for a specific operation, such as a runway crossing.

To help reduce the prevalence of operational errors, the FAA has focused on developing new and revised training offerings. For example:

- Revising FAA Course 50046, Initial Terminal Training, Lesson 25 to provide more focused and in-depth training on surface safety. The lesson reinforces crew resource management and airport ground movement and addresses air traffic control duties and responsibilities; and
- Developing and evaluating a new, intensified one-day Team Resource Management course geared toward air traffic teamwork.

To pinpoint the root causes of operational errors/deviations, the FAA is also continuing to develop JANUS[7]. An understanding of the root causes will help guide the development of future technologies and procedures to reduce risk. In FY 2004, the FAA completed a scientific and operational validation of JANUS that included the participation of facility managers and National Air Traffic Controllers Association (NATCA) representatives. A Web-based version of JANUS is currently under development and is expected to be ready for evaluation in an air traffic facility in FY 2006.

In addition to the causal factor research that focuses on past events, a proactive approach is needed to address operational vulnerabilities and improve "error tolerance" from the controller perspective—as human error is inevitable. The FAA is exploring ways to incorporate such a proactive approach in its implementation of safety risk management processes. The objective is to mitigate operational vulnerabilities using a combination of changes to technology, procedures, airport infrastructure, and the air traffic management environment.

[7] *JANUS, a voluntary structured interview technique, designed by FAA human factors specialists, employs custom-developed software that directs the interview process and records responses in a manner that helps identify both individual and system-related factors contributing to human error.*

Operational Assessments for Risk Reduction

The FAA is implementing site-specific runway safety solutions in coordination with the local aviation community. As part of these activities, the FAA has established Airport Design and Operations Teams to perform assessments of design and operational procedure changes with the goal of increasing airfield surface safety while maintaining operational efficiency. In FY 2004, assessments were completed at Seattle-Tacoma International Airport (SEA) and Detroit Metropolitan Wayne County International Airport (DTW).

The SEA assessment addressed issues associated with crossing two existing runways (16R|34L and 16L|34R) to access a third parallel runway that is now under construction. Four taxiway design changes that would improve safety were identified and, based on a simulation of operations on the airfield surface, were assessed for impacts to capacity and efficiency. The results showed that two of the proposed changes would improve not only safety (i.e., decrease the number of crossing points, eliminate a complex taxiway intersection, and move exits to the last third of the runway), but also the efficiency of operations.

The DTW assessment was conducted to determine the operational impact of discontinuing the current practice of using a crosswind runway (9L|27R) as a taxiway. The results showed that with the existing taxiway structure and current restrictions on departures due to airspace constraints, the use of the runway as a taxiway cannot be eliminated without significantly increasing taxiing delays. However, the FAA determined that construction of two additional taxiway extensions would allow the discontinuation of taxiing on the runway without an increase in delays.

Vehicle/Pedestrian Deviations

The number and rate of vehicle/pedestrian deviations decreased over the four-year period.

Vehicle/pedestrian deviations accounted for 20 percent of all runway incursions (272 of 1,395 incursions) during the four-year period *(see Figure 12)*. Over this period, the number of vehicle/pedestrian deviations decreased from 83 in FY 2001 to 56 in FY 2004—a decrease of 33 percent. Similarly, the rate of vehicle/pedestrian deviations decreased 31 percent over the same period.

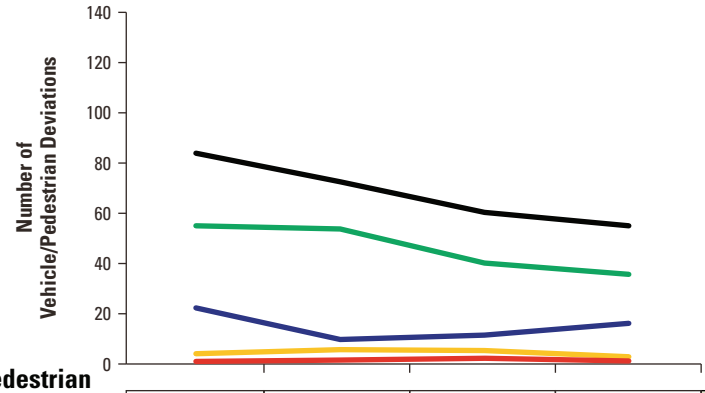
From FY 2001 through FY 2004, 20 percent of Category C and D incursions (246 of 1,244 incursions) were vehicle/pedestrian deviations. Over this period, the total number and rate of Category C and D vehicle/pedestrian deviations decreased 32 percent and 29 percent, respectively. However, the trend for Category C vehicle/pedestrian deviations showed an appreciable increase from FY 2003 through FY 2004. In contrast, the number of Category D vehicle/pedestrian deviations decreased throughout the four-year period.

There was a consistent downward trend in the overall number and rate of vehicle/pedestrian deviations from FY 2001 through FY 2004, with the number of Category A and B vehicle/pedestrian deviations reaching its lowest level (three incursions) in FY 2004.

Of the 150 Category A and B runway incursions in the NAS during this period, 17 percent were vehicle/pedestrian deviations (26 incursions). There was a consistent downward trend in the overall number and rate of vehicle/pedestrian deviations from FY 2001 through FY 2004, with the number of Category A and B vehicle/pedestrian deviations reaching its lowest level (three incursions) in FY 2004 *(see Figure 12)*. The frequency of this type and severity of vehicle/pedestrian deviations has reached a value that is as low as reasonably practicable.

Figure 12

Number and Severity of Vehicle/Pedestrian Deviations (FY 2001 through FY 2004)



Vechicle/Pedestrian Deviations	FY 2001	FY 2002	FY 2003	FY 2004	Total V/PD
Category D	55	54	40	36	**185**
Category C	23	10	11	17	**61**
Category B	4	7	6	2	**19**
Category A	1	2	3	1	**7**
Total	**83**	**73**	**60**	**56**	**272**

In FY 2004, the most common vehicle/pedestrian deviation involved an airport vehicle crossing the runway without authorization. In 77 percent of the vehicle deviations, the vehicle completely crossed a runway. Specifically,

- 63 percent of these instances involved an aircraft taking off, and
- 37 percent of these instances involved an aircraft landing.

Most of the instances that involved landings resulted in a go-around initiated either by the pilot or air traffic controller. However, only a small percentage of the takeoffs were aborted when a vehicle (or aircraft) crossed the runway. To prevent vehicles and aircraft from crossing in front of an aircraft taking off, Advisory Circular 120-70A (issued September 26, 2003) recommends that commercial aircraft turn off landing lights when holding in position awaiting takeoff clearance. Upon receiving takeoff clearance, the landing light should be turned on to indicate to aircraft and vehicles downfield that the aircraft is rolling. Without such an indication, it is very difficult to determine (from the 90-degree angle perspective of an aircraft or vehicle at an intersecting taxiway) whether an aircraft at the end of the runway is stationary or moving.

Vehicle deviations are typically caused by drivers getting lost on the airport surface, being unfamiliar with airport signs and markings or with air traffic control terminology, misunderstanding air traffic controller instructions, and misreporting the location of vehicles to air traffic control. In FY 2004, the FAA encouraged airport operators to conduct a "Safety Stand-Down" at all Part 139 (14 Code of Federal Regulations) airports. The FAA Airport Division mailed letters to more than 400 airport sponsors outlining the implementation of a Safety Stand-Down as a training review for all personnel who have driving privileges and access to the movement area. The FAA recommended that the review include the following issues relevant to the common errors leading to vehicle/pedestrian deviations:

- Discuss the definition of a runway incursion and stress the importance of preventing a runway incursion;
- Review the airport rules and regulations regarding driving on the movement area;
- Review the consequences of non-compliance with the rules and regulations;
- Review airfield geometry including taxiways, runways, access points, and aprons;
- Discuss any potential runway incursion high alert areas or confusing areas on the airfield;
- Review airfield markings, signs, and lighting—particularly hold short positions;
- Discuss procedures for tug drivers, contractors, and emergency operations personnel (e.g., fire trucks);
- Review verbal communication and phraseology—emphasizing the importance of "readback" instructions;
- Discuss potential problems such as call sign misinterpretation; and
- Ask for everyone's assistance in enhancing airfield safety and preventing runway incursions.

Commercial Aviation Operations

COMMERCIAL AVIATION OPERATIONS, as defined in this report, comprise aircraft that are typically operated by airlines, charter services, and air cargo for the transportation of ticketed passengers and cargo. From FY 2001 through FY 2004, commercial aviation operations accounted for approximately 38 percent of all aircraft operations in the NAS.

Commercial Aircraft Involved in Runway Incursions

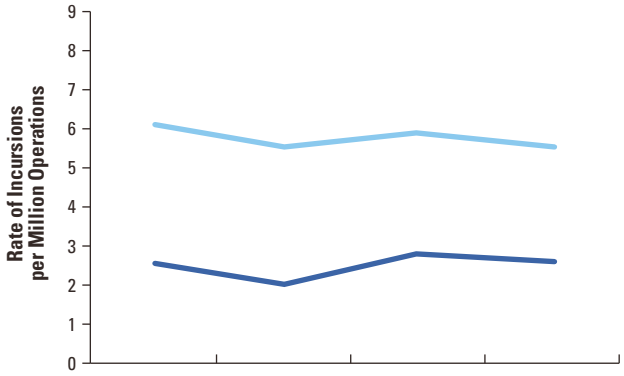
The number of commercial aviation runway incursions fluctuated from FY 2001 through FY 2003 and remained the same from FY 2003 through FY 2004.

From FY 2001 through FY 2004, 40 percent of the 1,395 runway incursions (564 incursions) involved at least one commercial aviation aircraft, which is proportionate with the representation of commercial operations in the NAS (38 percent). Over the four-year period, the number of commercial aviation operations increased by more than 900,000 operations nationally—a total increase of approximately 2,510 commercial operations per day.

From FY 2001 through FY 2003, the number and rate of runway incursions involving at least one commercial aircraft fluctuated. But during the last fiscal year, the number of runway incursions involving at least one commercial aircraft remained unchanged, whereas the rate decreased by 0.1 incursions per million operations *(see Figure 13)*.

During the last fiscal year, the number of runway incursions involving at least one commercial aircraft remained unchanged.

Figure 13
Runway Incursion Rates for Commercial Operations (FY 2001 through FY 2004)



	FY 2001	FY 2002	FY 2003	FY 2004	Total
Commercial Runway Incursions	156	124	142	142	**564**
Commercial Runway Incursion Rate	6.1	5.1	5.9	5.6	**5.7**
COMM/COMM Runway Incursion Rate	2.6	2.0	2.8	2.7	**2.5**
Commercial Operations	25,644,902	24,239,535	24,249,848	25,166,327	**99,300,612**

In FY 2002, the rate of COMM/COMM runway incursions reached its lowest point of the four-year period—a rate of two incursions per million operations.

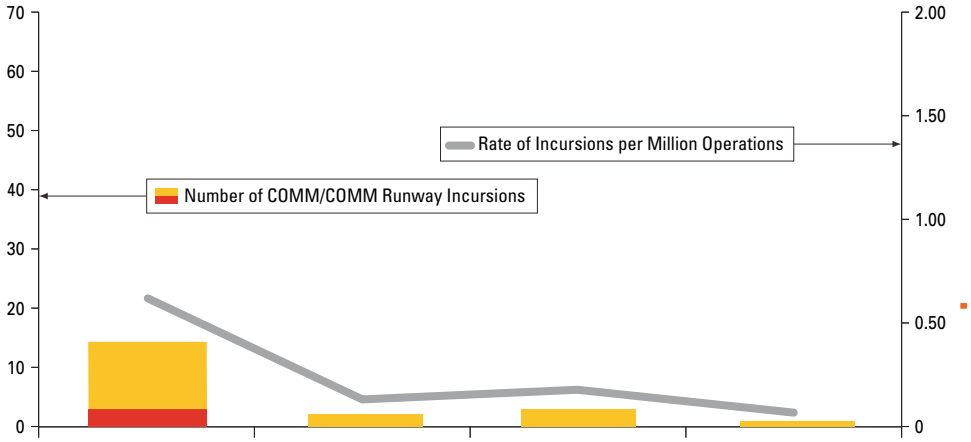
For those commercial runway incursions that involved two commercial aircraft (COMM/COMM), the number and rate of COMM/COMM incursions remained relatively stable over the four years with the exception of FY 2002. In FY 2002, the rate of COMM/COMM runway incursions reached its lowest point of the four-year period—a rate of two incursions per million operations. This past year (FY 2004), there were approximately 2.7 COMM/COMM incursions per million operations—an average of one COMM/COMM incursion every 5.4 days.

Severity of Commercial Aviation Runway Incursions

FY 2004 marks the third consecutive year with zero Category A runway incursions involving two commercial aircraft.

During the four-year period, the majority of incursions involving at least one commercial aircraft were Category C and D events—502 of the 564 commercial aviation runway incursions. Similar to the overall NAS trend for Category C runway incursions, the number of Category C commercial aviation runway incursions increased, from 39 incursions in FY 2002 to 54 incursions in FY 2004.

Figure 14
Total Number and Rate of Category A and B COMM/COMM Runway Incursions (FY 2001 through FY 2004)



COMM/COMM Events	FY 2001		FY 2002		FY 2003		FY 2004		Total	
	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops
Category B	11	0.43	3	0.12	4	0.16	1	0.04	19	0.19
Category A	4	0.16	0	0.00	0	0.00	0	0.00	4	0.04
Total	15	0.58	3	0.12	4	0.16	1	0.04	23	0.23

From FY 2001 through FY 2004, approximately 41 percent of Category A and B incursions (61 of 150 incursions) involved at least one commercial aviation aircraft. Since FY 2001, the number of these incursions has decreased 71 percent to a total of nine commercial aviation runway incursions in FY 2004. To reach the FAA performance target of no more than 27 Category A and B runway incursions by FY 2009, the FAA and the commercial aviation

community need to continue their cooperation on safety management initiatives that may include training, awareness, cockpit procedures, and new technology.

Eighteen percent of all Category C and D incursions (230 of 1,244 incursions) involved *two commercial aviation aircraft*. Since FY 2002, there has been a 46 percent increase in the number of these events, with 46 COMM/COMM Category C and D incursions in FY 2002 and 67 in FY 2004. In response to this increasing trend, the FAA is pursuing strategies that target both commercial aircraft operators and the airports that handle these operations.

Fifteen percent of all Category A and B incursions (23 of 150 incursions) involved *two commercial aviation aircraft*. During the four-year period, there was a downward trend for these most serious COMM/COMM incursions *(see Figure 14)*. The number of COMM/COMM Category A and B incursions decreased from 15 events in FY 2001 to one event in FY 2004. The rate of COMM/COMM Category A and B incursions decreased from 0.58 COMM/COMM incursions per million operations in FY 2001 to 0.04 COMM/COMM incursions per million operations in FY 2004. The frequency of the most serious COMM/COMM runway incursions has reached a value that is as low as reasonably practical. The challenge ahead is to sustain this level of performance while accommodating the predicted increase in the volume and diversity of commercial aircraft operations.

The frequency of the most serious COMM/COMM runway incursions has reached a value that is as low as reasonably practical.

Types of Commercial Aviation Runway Incursions

To tailor safety management strategies to address the specific risks involving commercial aircraft operations, the FAA analyzed commercial runway incursions by error type—pilot deviations, operational errors/deviations, and vehicle/pedestrian deviations.

Pilot Deviations

From FY 2001 through FY 2004, there was a decrease in the severity of commercial aviation runway incursions that were classified as pilot deviations.

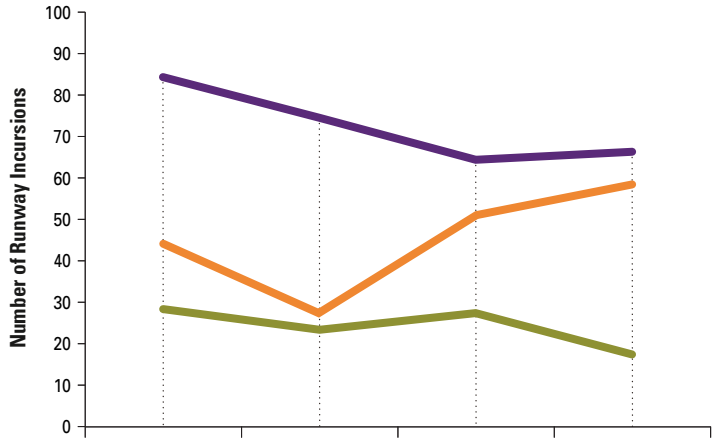
Nationally, there were 771 pilot deviations for the four-year period. Thirty-seven percent of these pilot deviations (289 incursions) involved at least one commercial aircraft. From FY 2001 through FY 2003, there was a decrease in the number of commercial aviation runway incursions classified as pilot deviations *(see Figure 15)*. However in FY 2004, the number of these incursions increased by three.

From FY 2001 through FY 2004, the number of Category C and D commercial aviation pilot deviations decreased slightly. In FY 2001, there was a total of 66 Category C and D incursions as compared to 62 Category C and D incursions in FY 2004—a 6 percent decrease. There was also a decrease in the number of Category A and B commercial aviation runway incursions that were classified as pilot deviations during this period—18 Category A and B incursions in FY 2001 as compared to five Category A and B incursions in FY 2004.

There was also a decrease in the number of Category A and B commercial aviation runway incursions that were classified as pilot deviations during this period—18 Category A and B incursions in FY 2001 as compared to five Category A and B incursions in FY 2004.

Figure 15

Number of Runway Incursion Types Involving At Least One Commercial Aviation Aircraft (FY 2001 through FY 2004)



	FY 2001	FY 2002	FY 2003	FY 2004	Total
Pilot Deviations	84	74	64	67	**289**
Operational Errors/ Deviations	44	27	51	58	**180**
Vehicle/Pedestrian Deviations	28	23	27	17	**95**
					564

The FAA has implemented initiatives to raise the awareness of the commercial aviation community regarding pilot errors that lead to this type of runway incursion. The initiatives address standard operating procedures (SOP) for taxi operations and the training and auditing of the pilots' use of these procedures. The *Flight Standards Handbook Bulletin for Air Transportation* was distributed to all commercial air carriers and air taxi operators. The bulletin specifies the FAA policy with respect to incorporating SOPs for taxi operations in company training programs and the use of those SOPs during taxi operations. It also requires principal operations inspectors to conduct special emphasis inspections for runway incursion surveillance and has become a required item on proficiency checks for both captains and first officers.

To complement runway safety risk management initiatives directed toward the airport surface, control tower, and the pilot community, technologies are being introduced in the airliner cockpit. Specifically, ALPA safety representatives are facilitating the incorporation of the Electronic Flight Bag (EFB). The EFB is an in-cockpit electronic display that may include charts, lists of worldwide procedures, weather information, and a cockpit moving-map display (CMMD)—much like the global positioning system (GPS) street map available in cars today—that shows pilots the position of their own airplane with respect to the airport surface. In a comprehensive risk mitigation study known as the Runway Incursion Joint

Safety Implementation Team report, the Commercial Aviation Safety Team (CAST) found CMMD with ownship position to be a highly effective safety enhancement for reducing the risk of runway incursions that are classified as pilot deviations.

Operational Errors/Deviations

Since FY 2002, the number of operational errors/deviations involving at least one commercial aircraft has increased 115 percent and primarily consisted of Category C and D events.

Nationally, there were 352 operational errors/deviations for the four-year period, with 51 percent (180 incursions) involving at least one commercial aviation aircraft. Since FY 2002, the number of operational errors/deviations involving commercial aviation has increased 115 percent—from 27 in FY 2002 to 58 in FY 2004 *(see Figure 15)*. This increase includes primarily Category C and D events. In FY 2002, there were 27 Category C and D commercial aviation operational errors/deviations and 54 such incursions in FY 2004—a 100 percent increase.

The number of Category A and B operational errors/deviations involving a commercial aircraft decreased from eight incursions in FY 2001 to zero incursions in FY 2002. For the last two fiscal years of the period, there were three and four Category A and B operational errors/deviations involving a commercial aircraft, respectively. As the number of Category A and B operational errors/deviations involving commercial aviation aircraft has reached single-digit levels, it has become difficult to identify trends versus anomalies. To develop pragmatic and effective safety management strategies, the FAA is exploring alternative measures and risk indices to complement the traditional metrics.

The number of Category A and B operational errors/deviations involving a commercial aircraft decreased from eight incursions in FY 2001 to zero incursions in FY 2002. For the last two fiscal years of the period, there were three and four Category A and B operational errors/deviations involving a commercial aircraft, respectively.

Vehicle/Pedestrian Deviations

Vehicle/pedestrian deviations involving commercial aircraft fluctuated over the four-year period, whereas the number of Category A and B vehicle/pedestrian deviations remained relatively consistent at approximately four or less per year.

Nationally, from FY 2001 through FY 2004, there were 272 vehicle/pedestrian deviations. Thirty-five percent of these events (95 incursions) involved at least one commercial aircraft. The total number of vehicle/pedestrian deviations involving commercial aircraft fluctuated during the four-year period *(see Figure 15)*.

During the four-year period, the number of Category C and D vehicle/pedestrian deviations involving commercial aircraft fluctuated and averaged approximately 20 such incursions per year. In contrast, the number of Category A and B vehicle/pedestrian deviations involving commercial aircraft remained relatively consistent at approximately four per year from FY 2001 through FY 2003. In FY 2004, the number of these incursions decreased to zero.

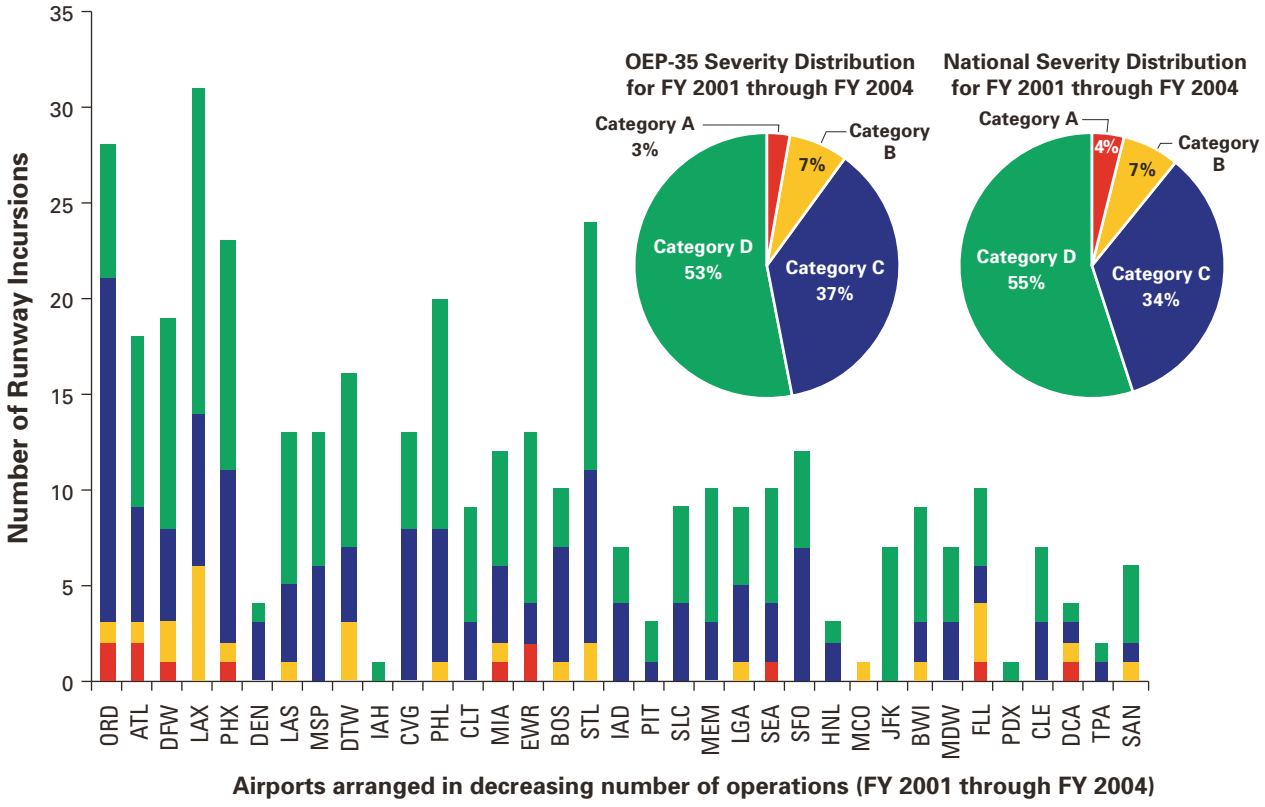
The number of Category A and B vehicle/pedestrian deviations involving commercial aircraft remained relatively consistent at approximately four per year from FY 2001 through FY 2003. In FY 2004, the number of these incursions decreased to zero.

Runway Incursions at Airports with Predominantly Commercial Aircraft Operations

Although there was no sustained reduction in the total number or rate of operational errors/deviations at airports with predominantly commercial aircraft operations, there was a 67 percent reduction in Category A and B operational errors/deviations during the four-year period.

The FAA evaluated how airport-specific factors, such as the composition of aircraft operations, might interact with traffic volume to affect the likelihood of runway incursions. Runway incursion trends were examined for airports that predominantly handle commercial operations and have a large volume of traffic. The FAA examined the airports identified in the FAA *Operational Evolution Plan (OEP)*—OEP-35 airports—because these airports manage mostly commercial operations and the FAA considers these airports to be significant drivers of NAS performance in terms of system capacity. Most of the OEP-35 airports handled a mix of traffic that consisted of more than 80 percent of commercial aircraft operations. The projected increase in traffic volume at this group of airports—and the corresponding changes in airport infrastructure, procedures, and technologies to accommodate this demand—may affect surface safety.

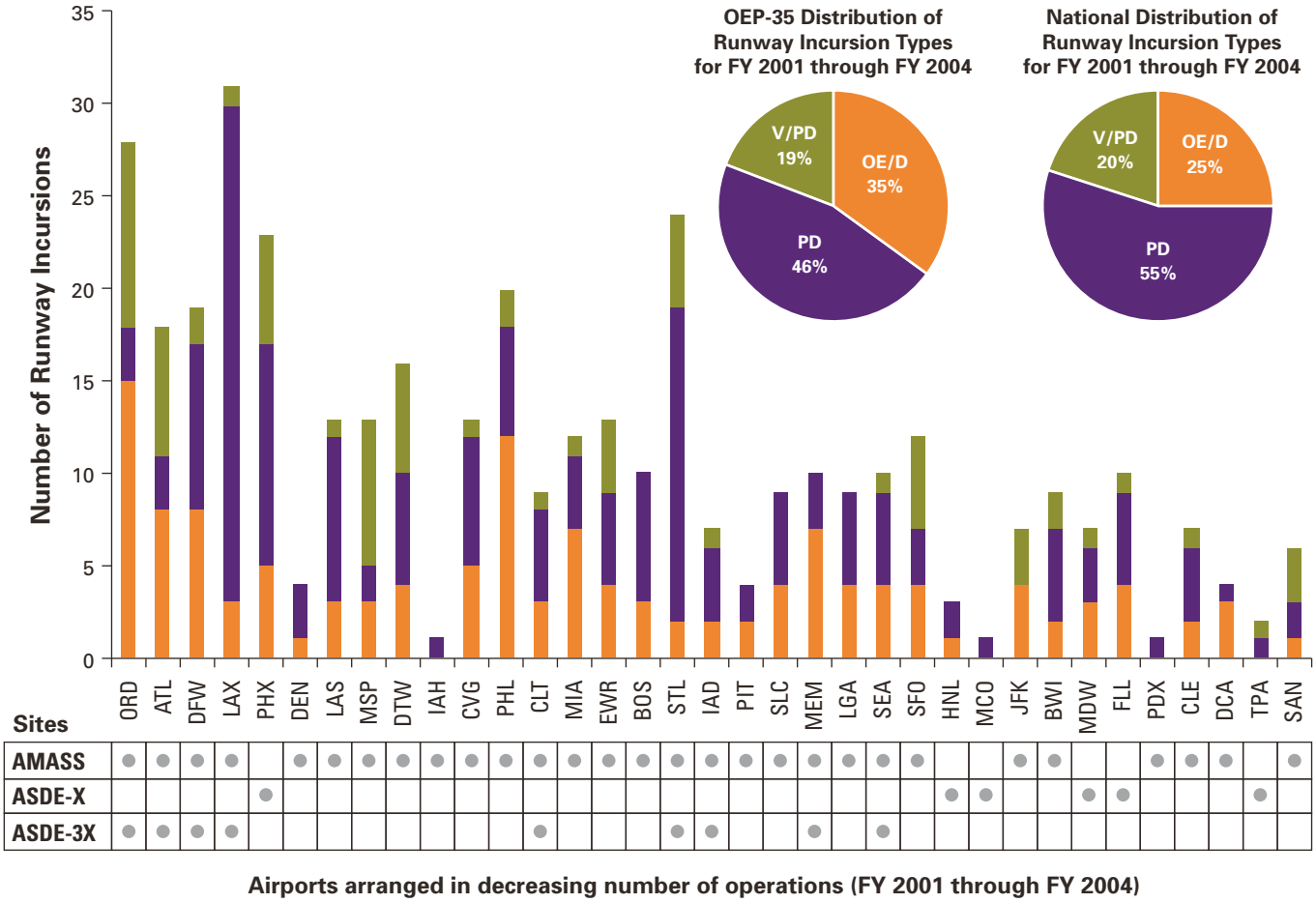
Figure 16
Number and Severity of Runway Incursions at the OEP-35 Airports (FY 2001 through FY 2004)



NOTE: Appendix C.1 lists the names and identifiers for the OEP-35 airports.

Figure 17

Types of Runway Incursions at the OEP-35 Airports (FY 2001 through FY 2004)



NOTE: Appendix C.4 lists the names and identifiers for airports where these technologies are being implemented.

From FY 2001 through FY 2004, the OEP-35 airports accounted for 28 percent (385 of 1,395) of the total number of runway incursions. This is comparable to the number of operations handled by these airports—24 percent of all NAS aircraft operations.

Category C and D incursions at the OEP-35 airports increased in each of the last two fiscal years, resulting in a 16 percent increase for the four-year period. The OEP-35 airports accounted for 27 percent of the 150 Category A and B runway incursions (40 incursions) nationwide from FY 2001 through FY 2004. In contrast to the increase in Category C and D incursions, the number of Category A and B runway incursions at the OEP-35 airports decreased over the four years. There were 20 Category A and B incursions in FY 2001 as compared to three in FY 2004—an 85 percent decrease.

There was progress in reducing the severity of incursions at OEP-35 airports as Category A and B COMM/COMM incursions decreased from 14 in FY 2001 to one in FY 2004.

As the OEP-35 airports predominantly handle commercial aircraft, it is not surprising that the majority of runway incursions (209 of 385 incursions) at these airports involved two commercial aircraft (COMM/COMM). Over the four years, 187 COMM/COMM incursions were Category C and D and 22 incursions were Category A and B. There was progress in reducing the severity of incursions at OEP-35 airports as Category A and B COMM/COMM incursions decreased from 14 in FY 2001 to one in FY 2004. Future trends will be difficult to identify because these events have reached a very low base rate.

Pilot deviations at the OEP-35 airports—Forty-six percent of the runway incursions at the OEP-35 airports (178 of 385 incursions) were pilot deviations *(see Figure 17)*. The number and rate of pilot deviations at the OEP-35 airports remained relatively stable during the four-year period. In FY 2001, there were 49 pilot deviations and a rate of 3.03 pilot deviations per million operations—or one incursion every 7.5 days. In FY 2004, there were 44 pilot deviations and a rate of 2.84 pilot deviations per million operations—or one incursion every 8.3 days.

There was a 67 percent reduction in Category A and B operational errors/deviations (six incursions in FY 2001 as compared to two incursions in FY 2004).

Operational errors/deviations at the OEP-35 airports—Operational errors/deviations represented 35 percent of the runway incursions (133 of 385 incursions) at the OEP-35 airports *(see Figure 17)*. Although there was no sustained reduction in the total number or rate of operational errors/deviations during this four-year period, there was a 67 percent reduction in Category A and B operational errors/deviations (six incursions in FY 2001 as compared to two incursions in FY 2004).

To address operational errors/deviations, surface technology such as the Airport Movement Area Safety System (AMASS)—a surface surveillance system that predicts potential collisions of aircraft and vehicles and provides visual and aural warnings to controllers—was implemented to reduce the risk of aircraft collisions on runways. Implementation of an additional surface technology—Airport Surface Detection Equipment, Model X (ASDE-X)—was initiated during this period as well. ASDE-X enables controllers to detect potential runway conflicts by providing detailed coverage of aircraft and vehicle movement on runways and taxiways.

The number and rate of vehicle/pedestrian deviations remained stable from FY 2001 through FY 2004.

Vehicle/pedestrian deviations at the OEP-35 airports—Vehicle/pedestrian deviations represented 19 percent of the runway incursions (74 of 385 incursions) at the OEP-35 airports *(see Figure 17)*. The number and rate of vehicle/pedestrian deviations remained stable from FY 2001 through FY 2004.

New Technology for Airports

The FAA has identified and deployed advanced technologies to reduce the risks of runway collisions at commercial airports. Runway surface surveillance systems use ground surveillance radar to provide tower controllers with information on the position and identification of aircraft and vehicles. After commissioning the last of the Airport Movement Area Safety Systems (AMASS) at 34 of the busiest airports in 2003, the FAA began deploying the Airport Surface Detection Equipment, Model X (ASDE-X) at 25 airports and upgrading to ASDE-3X at ten other airports.

The ASDE-X is a multi-sensor data fusion surveillance system consisting of a Surface Movement Radar (SMR), a multilateration sensor, and an Automated Dependent Surveillance-Broadcast (ADS-B) sensor that will ensure the most accurate information about aircraft location is displayed to the controller under all visibility conditions. Aircraft and vehicle position and identification information is overlaid on a color map showing the surface movement area and arrival corridors *(see Figure 18)*. The first ASDE-X system was commissioned at General Mitchell International Airport (MKE) in Milwaukee, Wisconsin in October 2003, and three more systems—at Orlando International Airport (MCO), T.F. Green Airport (PVD) in Providence, Rhode Island, and Lambert-St. Louis International Airport (STL)—achieved initial operational capability in 2004.

Figure 18
ASDE-X Display Unit

Runway Safety Initiatives at an OEP-35 Airport—Hartsfield-Jackson Atlanta International Airport

Hartsfield-Jackson Atlanta International Airport (ATL) is the world's busiest airport in terms of passenger volume, and is the world's second busiest airport in terms of total operations. During the last four fiscal years, ATL averaged nearly 2,500 operations per day with commercial traffic accounting for 98 percent of all operations. ATL is the primary hub for two major United States carriers—Delta Air Lines and AirTran Airways.

In FY 2001, there was one runway incursion and zero surface incidents reported for ATL. However, during the past three fiscal years, there has been an increase in these events, totaling 17 runway incursions and seven surface incidents. Three of the 17 runway incursions were Category A and B events.

The FAA is considering perimeter taxiways for airport capacity improvements. This airport infrastructure change may also offer improvements to surface safety due to the reduced number of runway crossings. Airports that operate parallel runway arrival and departure configurations, such as Dallas/Fort Worth International Airport (DFW) and ATL, are examples of the potential dual benefits of capacity and safety. DFW continues to investigate the magnitude of these benefits in comparison to the costs of implementation, and ATL has been given approval to pursue implementation of the perimeter taxiway.

ATL conducts operations with two sets of east-west parallel runways—north and south of the airport terminal. In general, aircraft arrive on the outer parallel runways and depart on the inner parallel runways *(see Figure 19)*. Each set of parallel runways has a center taxiway. Arrivals land on the outer runways and are directed by air traffic control into several queues on the center taxiways. To move the arrival aircraft from the center taxiway queues to the terminal area, tower controllers must establish and control gaps in the departure flow on the inner runways. Departure gaps are also created to allow for maintenance taxiing of aircraft to and from hangars and hardstands located on the north side of the airfield. The creation of these departure gaps can lead to delays for departing aircraft.

In an effort to reduce the Runway 26L departure delay, a concept was proposed to build a perimeter taxiway on the west side of the primary north departure runway (8R|26L). With approximately 67 percent of the traffic flow at ATL to the west, all arrivals on Runway 8L|26R would taxi to the current center taxiway and then onto the new perimeter taxiway—alleviating the need for building gaps in the departure flow on Runway 8R|26L and easing the transition period (arrival queue delays) of arriving aircraft to the central terminal.

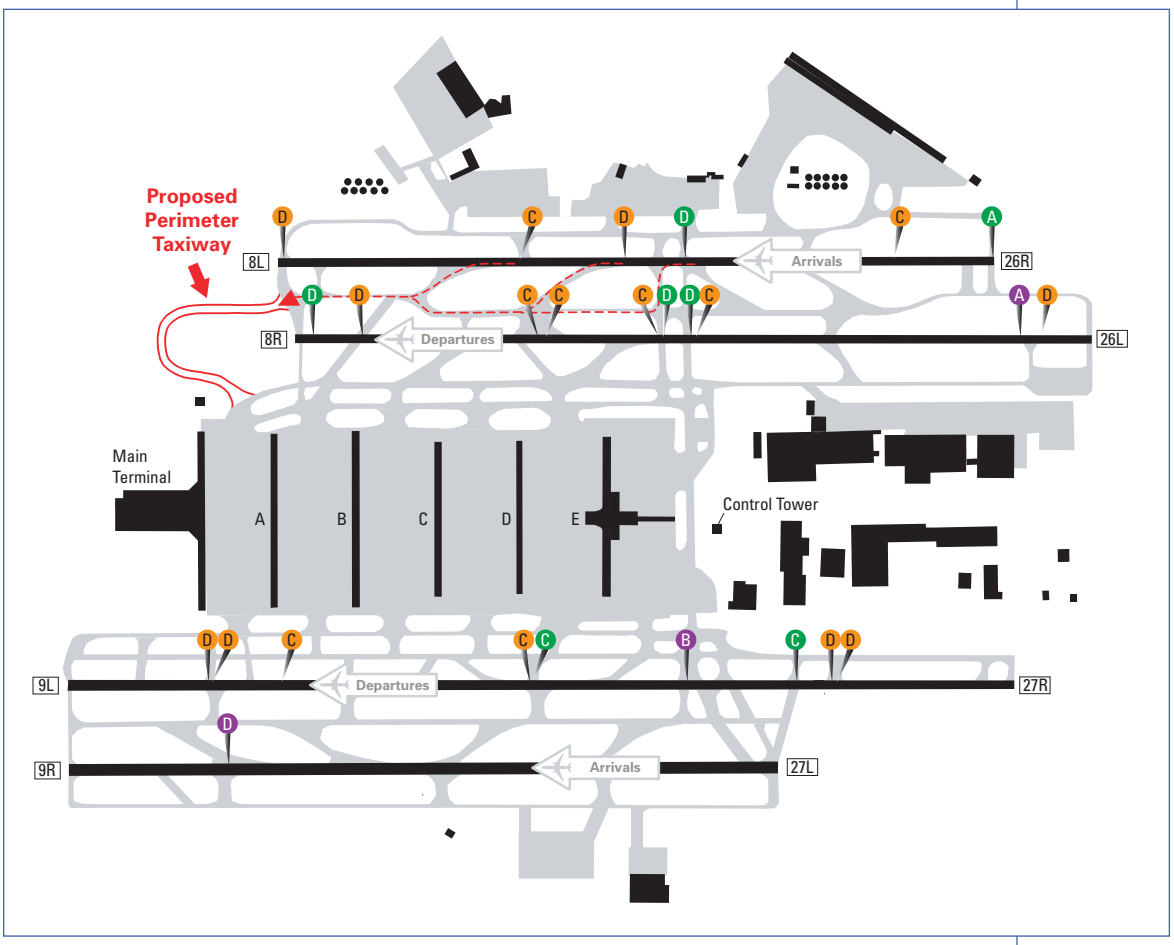
The FAA conducted a safety risk assessment for the proposed perimeter taxiway[8]. The purpose of the assessment was to determine the likelihood and magnitude of risk to safe departure operations. A human factors evaluation was conducted using pilot-in-the-loop flight simulations to determine the potential for pilots departing Runway 26L to become distracted or confused when another aircraft is using the perimeter taxiway. Visibility minima (300-foot ceiling, one-mile visibility) and a maximum tail height for aircraft on the perimeter taxiway (59 feet) were identified as operational requirements to mitigate the risk for departing aircraft and those aircraft using the perimeter taxiway at ATL. In July 2004, the

[8] *As part of the FAA's safety risk management processes, all new and modified systems, procedures, and operations in the NAS are evaluated for safety risk.*

FAA permitted the use of the taxiway based on airfield-specific policy guidelines—clearing the way for airline negotiations and the planning/design process with respect to the original concept presented in the ATL Master Plan.

Figure 19

Locations of Runway Incursions (FY 2001 through FY 2004) and Proposed Perimeter Taxiway at ATL



General Aviation Operations

GENERAL AVIATION OPERATIONS, as defined in this report, comprise all aviation activities other than military and scheduled air service (airlines). From FY 2001 through FY 2004, general aviation operations accounted for approximately 57 percent of all aircraft operations in the NAS.

General Aviation Aircraft Involved in Runway Incursions

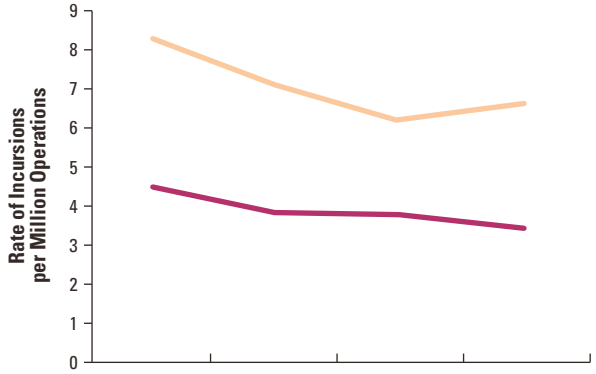
The number and rate of general aviation runway incursions decreased from FY 2001 through FY 2003 but increased in FY 2004. Although the number of Category A and B incursions involving general aviation aircraft has decreased since FY 2001, general aviation runway incursions represented the majority of Category A and B incursions.

The number and rate of general aviation runway incursions decreased from FY 2001 through FY 2003 but increased in FY 2004.

From FY 2001 through FY 2004, 74 percent of the 1,395 runway incursions (1,035 incursions) involved at least one general aviation aircraft, which is disproportionate with the representation of general aviation operations in the NAS (57 percent). After remaining stable at around 37.6 million operations during the first two fiscal years of the period, general aviation activity decreased by more than 2.5 million operations over the last two years. The number and rate of general aviation runway incursions decreased from FY 2001 through FY 2003 but increased in FY 2004. However, the rate of incursions involving two general aviation aircraft (GA/GA) steadily decreased across the four-year period *(see Figure 20)*.

Figure 20

Runway Incursion Rates for General Aviation Operations (FY 2001 through FY 2004)



	FY 2001	FY 2002	FY 2003	FY 2004	Total
General Aviation Runway Incursions	311	269	220	235	**1,035**
GA Runway Incursion Rate	8.3	7.1	6.2	6.7	**7.1**
GA/GA Runway Incursion Rate	4.6	3.9	3.8	3.5	**4.0**
General Aviation Operations	**37,626,891**	**37,653,133**	**35,524,020**	**34,957,053**	**145,761,097**

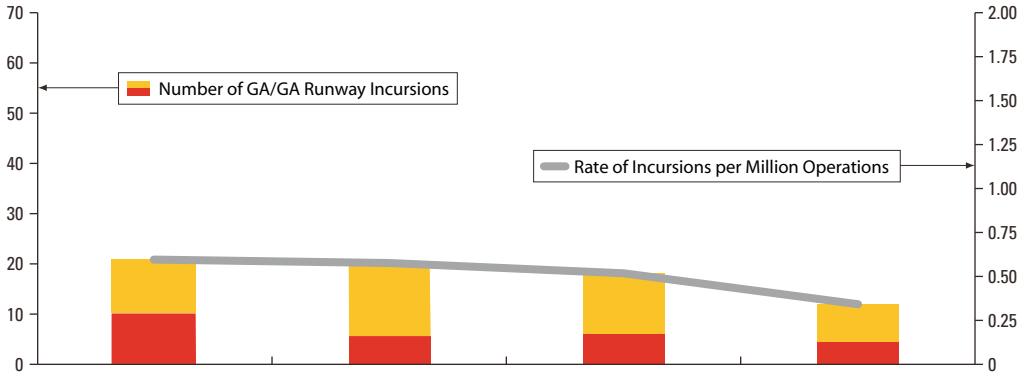
Severity of General Aviation Runway Incursions

Incursions involving two general aviation aircraft accounted for 47 percent of the most serious incursions in the NAS; however, these incursions decreased over the four-year period.

Seventy-four percent of the Category C and D incursions (920 of 1,244 incursions) involved at least one general aviation aircraft. The number of these incursions decreased 25 percent from FY 2001 through FY 2004. However, the number of Category C incursions involving at least one general aviation aircraft increased in each of the last two fiscal years.

Figure 21

Total Number and Rate of Category A and B GA/GA Runway Incursions (FY 2001 through FY 2004)



GA/GA Events	FY 2001		FY 2002		FY 2003		FY 2004		Total	
	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops	Number	Rate per Million Ops
Category B	11	0.29	14	0.37	11	0.31	9	0.26	45	0.31
Category A	10	0.27	6	0.16	6	0.17	4	0.11	26	0.18
Total	21	0.56	20	0.53	17	0.48	13	0.37	71	0.49

The number and rate of GA/GA Category A and B incursions decreased throughout the four-year period, but GA/GA incursions continue to represent the largest segment of Category A and B incursions in the NAS.

During this four-year period, 76 percent of Category A and B incursions (114 of 150 incursions) involved at least one general aviation aircraft, and there was a downward trend in the number of these most serious incursions. Forty-seven percent of Category A and B incursions (71 of 150 incursions) involved two general aviation aircraft *(see Figure 21)*. The number and rate of GA/GA Category A and B incursions decreased throughout the four-year period, but GA/GA incursions continue to represent the largest segment of Category A and B incursions in the NAS. In response, the FAA is providing runway safety awareness training and exploring the implementation of technology and procedures for risk mitigation at airports that predominantly handle general aviation operations.

Types of General Aviation Runway Incursions

The FAA examined the types of errors involved in general aviation runway incursions to better understand the circumstances involved and tailor runway safety management strategies accordingly.

Pilot Deviations

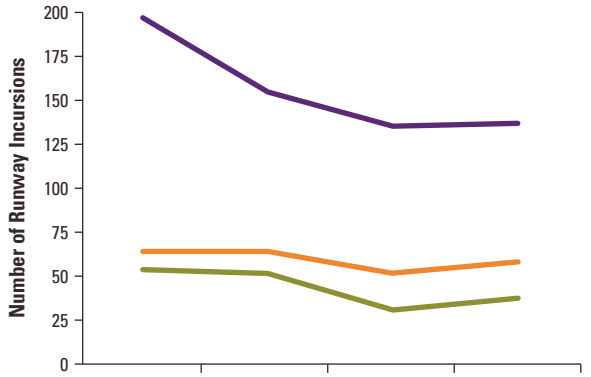
Category A and B pilot deviations involving at least one general aviation aircraft decreased from 24 events in FY 2001 to 12 events in FY 2003—a 50 percent decrease. This progress was tempered by a 17 percent increase in FY 2004. The period ended with 14 Category A and B general aviation pilot deviations.

Nationally, there were 771 pilot deviations for the four-year period and 82 percent of these runway incursions (630 incursions) involved at least one general aviation aircraft *(see Figure 22)*. From FY 2001 through FY 2003, pilot deviations involving at least one general aviation aircraft decreased in number (30 percent) and rate (24 percent). In the last year of the period, FY 2004, there was a slight increase in the number and rate of pilot deviations that involved at least one general aviation aircraft.

Of the 630 pilot deviations involving at least one general aviation aircraft, 89 percent were Category C and D incursions (562 incursions) for the four-year period. These incursions decreased by 26 percent, from 172 in FY 2001 to 127 in FY 2004. Eleven percent of the pilot deviations involving general aviation aircraft (68 incursions) were Category A and B incursions. These incursions decreased by 50 percent, from 24 in FY 2001 to 12 in FY 2003. In FY 2004, there were 14 Category A and B general aviation pilot deviations.

Figure 22

Number of Runway Incursion Types Involving At Least One General Aviation Aircraft (FY 2001 through FY 2004)



	FY 2001	FY 2002	FY 2003	FY 2004	Total
Pilot Deviations	196	156	137	141	**630**
Operational Errors/Deviations	61	61	52	57	**231**
Vehicle/Pedestrian Deviations	54	52	31	37	**174**
					1,035

The continued mitigation of pilot deviations requires expanding current pilot education and awareness efforts and developing new risk mitigation strategies. The FAA has worked with external organizations, airport officials, and safety experts to increase surface safety awareness on a national level. As part of the national initiative to raise pilot awareness of runway incursions, the FAA has developed and promoted runway safety training material in conjunction with several organizations. One such organization, the Aircraft Owners and

Pilots Association (AOPA) Air Safety Foundation—a nonprofit that promotes safety and pilot proficiency in general aviation—has been instrumental in bringing awareness of these new training materials to the pilot community through its monthly magazine and electronic newsletter. These training materials include:

- *Safety Advisor*, a brochure stressing compliance with air traffic control instructions, clearances, and readback requirements; and
- Flashcards for a review of airfield signs and markings and their meaning.

Additional FAA safety awareness efforts have included:

- Inclusion of a safety packet with each new Raytheon-Beechcraft, Bombardier-Lear, and Cessna aircraft upon delivery in FY 2004;
- Videotapes for flight training instructors, pilots, and student pilots to enhance the recognition of airfield signs and markings;
- Instructional DVDs focusing on position awareness, airport diagrams and signs, air traffic control, and night operations;
- Flight safety international schools providing a runway safety packet to students and modifying their syllabi to include specific runway safety training; and
- Identification of runway incursion "hot spots" (with help from airport operators and Jeppesen Sanderson, Inc.) highlighted on airport charts.

In response to the CAST recommendation for the development and implementation of SOPs for ground operations, the FAA also developed AC No. 91-73A, which emphasizes "best practices" for single-pilot taxi operations. The revised advisory circular provides guidance for tasks that are typically performed during surface operations, such as planning ahead for taxiing, using airport diagrams, and communicating between pilots and controllers. Educational materials to help publicize the guidance in AC 91-73A are being distributed to the pilot population.

Operational Errors/Deviations

From FY 2001 through FY 2004, the number of operational errors/deviations involving at least one general aviation aircraft did not show a consistent trend. The majority (85 percent) of these incursions were Category C and D.

Of the 352 operational errors/deviations nationally, 66 percent (231 incursions) involved at least one general aviation aircraft *(see Figure 22)*. During the four-year period, there was not a consistent trend for these incursions. From FY 2001 through FY 2002, the number of operational errors/deviations involving general aviation aircraft remained the same—61 incursions. In FY 2003, the number decreased to 52 events. The period ended with an increase to 57 operational errors/deviations involving general aviation aircraft in FY 2004.

The majority (85 percent) of all operational errors/deviations involving at least one general aviation aircraft were Category C and D, and the number of these events decreased slightly over the four-year period. In FY 2001, there were 51 of these incursions and 47 in FY 2004—an 8 percent decrease. In contrast, Category A and B operational errors/deviations involving

at least one general aviation aircraft increased by one event from nine in FY 2001 to 10 in FY 2004.

Vehicle/Pedestrian Deviations

From FY 2001 through FY 2003, there was a 43 percent decrease in the total number of vehicle/pedestrian deviations involving at least one general aviation aircraft. But, there was an increase in these incursions in FY 2004. Only 7 percent of the vehicle/pedestrian deviations involving a general aviation aircraft (13 of 174 incursions) during the four-year period were rated as more serious Category A and B incursions.

Nationally, there were 272 vehicle/pedestrian deviations for the four-year period, and 64 percent of these runway incursions (174 incursions) involved at least one general aviation aircraft *(see Figure 22)*. From FY 2001 through FY 2003, there was a 43 percent decrease in the overall number of vehicle/pedestrian deviations involving at least one general aviation aircraft. In the last year of the period, FY 2004, the number of these incursions increased by 20 percent, which is equivalent to an increase of six vehicle/pedestrian deviations.

Only 7 percent of the vehicle/pedestrian deviations involving a general aviation aircraft (13 of 174 incursions) were Category A and B events. Therefore, the majority of these vehicle/pedestrian deviations were Category C and D. In FY 2001, there were 54 Category C and D vehicle/pedestrian deviations involving at least one general aviation aircraft. In FY 2003, there were 26 events—a 52 percent decrease. But, in FY 2004, there was an increase to 34 events.

Runway Incursions at Airports with Predominantly General Aviation Aircraft Operations

The GA-35 airports accounted for 17 percent of the total number of runway incursions (240 of 1,395 incursions) during the four-year period. Since FY 2003, the number and rate of runway incursions at the GA-35 airports have increased 10 percent.

To explore the characteristics and trends for airports that are most frequently used by the general aviation community, the FAA analyzed runway incursion data for the 35 busiest airports in terms of the volume of general aviation traffic—the GA-35 airports. These airports were identified on the basis of the total number of general aviation operations handled during the four-year period[9]. General aviation operations comprised 95 percent of the traffic mix at GA-35 airports in 2004. From FY 2001 through FY 2004, the GA-35 airports handled approximately nine million general aviation operations per fiscal year. The number of general aviation operations at the GA-35 airports decreased by more than 300,000 operations this past fiscal year.

GA-35 airports accounted for 17 percent of the total number of runway incursions (240 of 1,395 incursions) during the four-year period—which is in proportion with the amount of traffic handled by these airports (14 percent of all operations). Similar to the national trends,

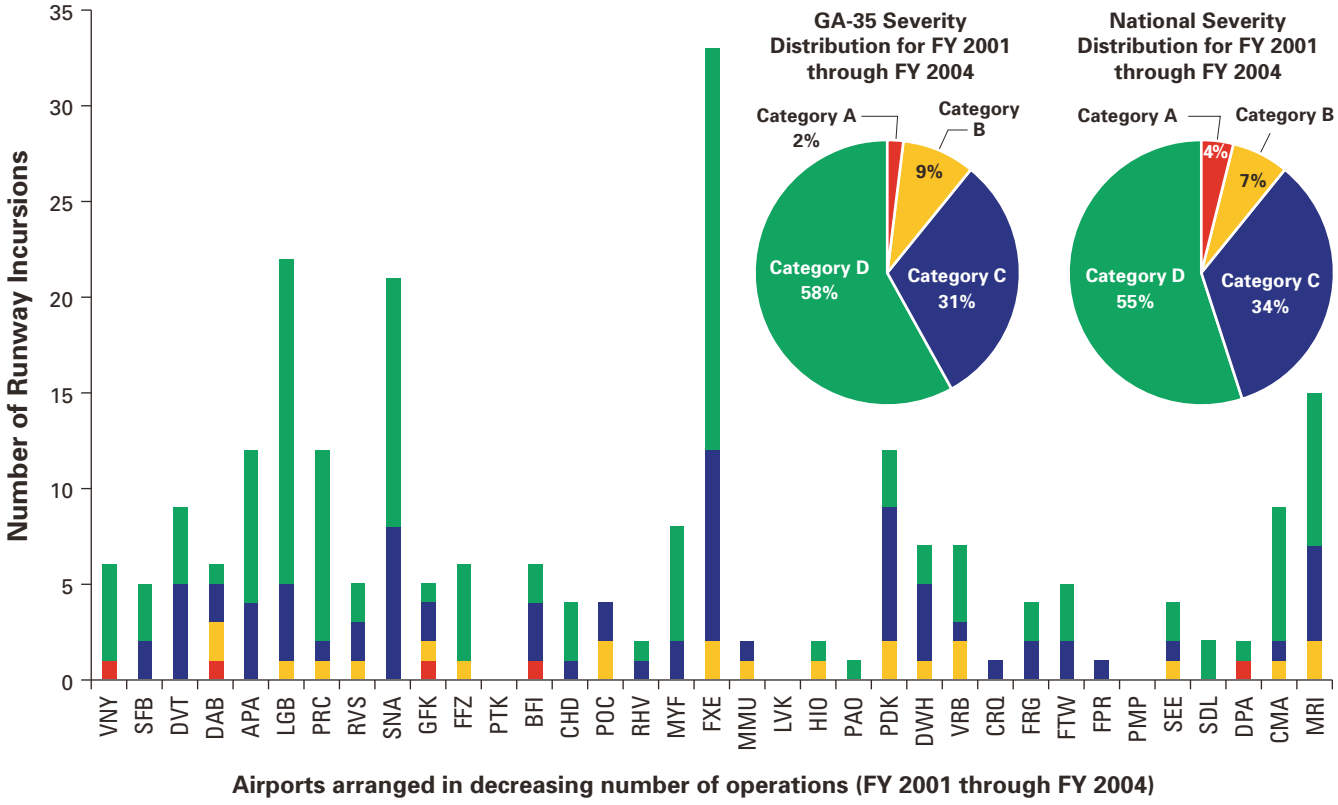
[9] *Because of natural fluctuations in the annual volume of general aviation traffic at airports, this year's list of GA-35 airports differs from the list of GA-35 airports included in the 2004 FAA Runway Safety Report. Five airports with more general aviation traffic volume replaced five airports with less traffic from FY 2001 through FY 2004. A list of the GA-35 airports is in Appendix C.2.*

there was a downward trend in the number and rate of runway incursions at the GA-35 airports. But, since FY 2003, the number and rate of incursions at the GA-35 airports have increased. In FY 2003, there were 49 runway incursions at the GA-35 airports and a rate of 5.52 incursions per million operations. In FY 2004, there were 54 runway incursions at the GA-35 airports and a rate of 6.32 incursions per million operations—approximately one event every seven days.

From FY 2001 through FY 2004, 89 percent of runway incursions (213 of 240 incursions) at the GA-35 airports were Category C and D events *(see Figure 23)*. The remaining 11 percent of the incursions were the more serious, Category A and B, events.

Figure 23

Number and Severity of Runway Incursions at the GA-35 Airports (FY 2001 through FY 2004)



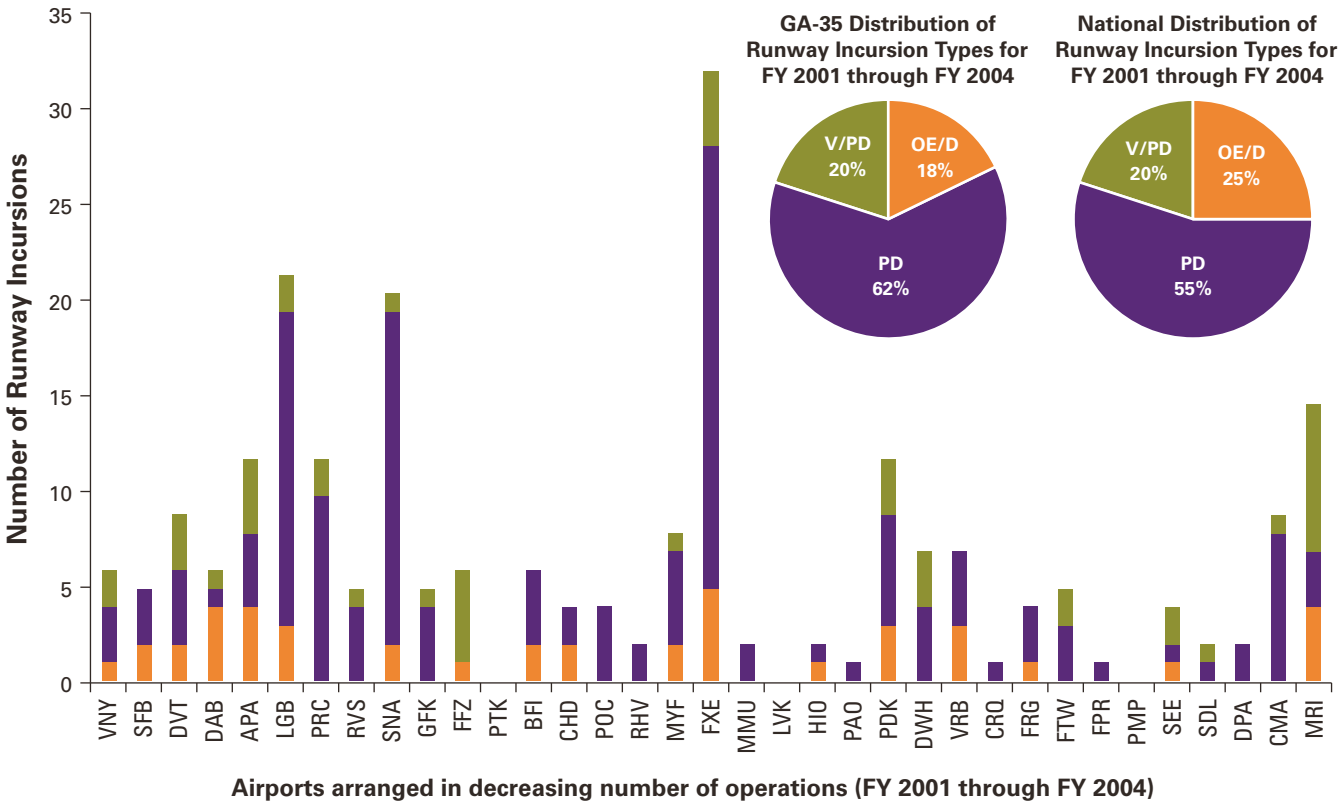
NOTE: Appendix C.2 lists the names and identifiers for the GA-35 airports.

Pilot deviations at the GA-35 airports—The majority (62 percent) of runway incursions at the GA-35 airports were pilot deviations. From FY 2001 through FY 2004, the number and rate of pilot deviations decreased 26 and 22 percent, respectively, reflecting the NAS trends *(see Figure 24)*.

Operational errors/deviations at the GA-35 airports—Operational errors/deviations accounted for 18 percent of runway incursions (43 of 240 incursions) at the GA-35 airports. Over the four-year period, there was a 31 percent reduction in operational errors/deviations at the GA-35 airports, which is in contrast to the increasing NAS trend.

Vehicle/pedestrian deviations at the GA-35 airports—Vehicle/pedestrian deviations accounted for 20 percent of the total runway incursions (47 of 240 incursions) at the GA-35 airports. Overall, there was a 13 percent decrease in vehicle/pedestrian deviations for the four-year period; however, the number of these events increased from five in FY 2003 to 14 in FY 2004. This increase is primarily attributed to increases in Category C and D incursions at three of the busiest GA-35 airports.

Figure 24
Types of Runway Incursions at the GA-35 Airports (FY 2001 through FY 2004)



NOTE: Appendix C.2 lists the names and identifiers for the GA-35 airports.

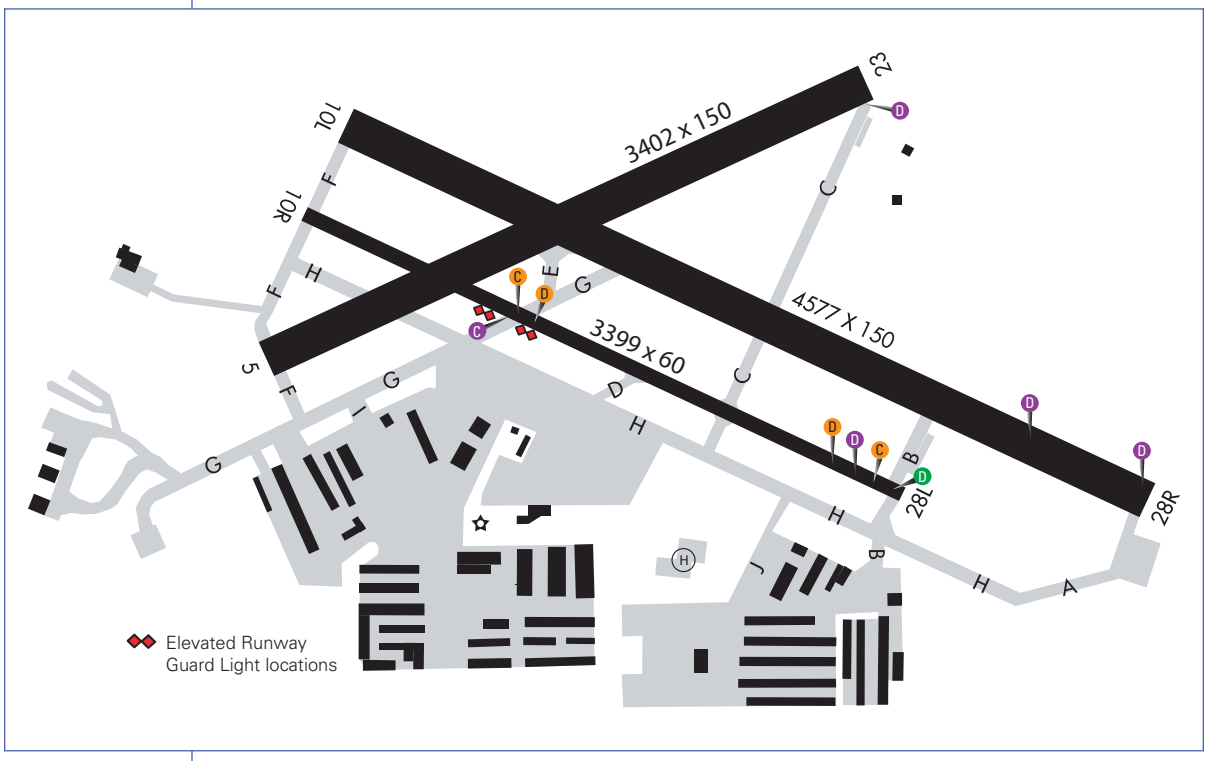
Runway Safety Initiatives at a GA-35 Airport—San Diego-Montgomery Field

San Diego-Montgomery Field (MYF), located about six miles north of San Diego, California, is the 17th busiest airport in terms of the volume of general aviation traffic *(see Figure 24)*. MYF averages 760 operations per day, and 97 percent of the traffic is general aviation. Approximately 630 aircraft are based on the airfield.

In FY 2000, MYF reported seven runway incursions and 20 surface incidents. In response, the air traffic facility manager, in collaboration with the airport, improved the lighting, markings, and signs on the airfield. Elevated Runway Guard Lights were installed at the most critical intersection, and taxiing procedures were amended to reduce the number of runway crossings *(see Figure 25)*. With the cooperation of the airport users, improvements in airfield access control were achieved through the use of controlled gates and fencing. Additionally, MYF conducted a runway safety campaign to raise the awareness of pilots and controllers of the potential hazards to safe surface operations.

The number of runway incursions and surface incidents decreased from three incursions and four surface incidents in FY 2001 to two runway incursions and one surface incident in FY 2004. During the four-year period, five of the runway incursions were pilot deviations, two were operational errors/deviations, and one was a vehicle/pedestrian deviation.

Figure 25
Locations of Runway Incursions at MYF (FY 2001 through FY 2004)



Pilot Education and Awareness

For the past few years, the FAA has placed increased emphasis on pilot education and awareness. Efforts have included the creation of interactive Web sites (in conjunction with the AOPA Air Safety Foundation) and safety awareness DVDs. One of the FAA's goals has been to communicate a consistent message about runway safety and standard operating procedures in all its training material.

Together, the FAA and AOPA Air Safety Foundation developed an interactive Web-based program to inform pilots about preventing runway incursions. The program, accessible from the AOPA and FAA Web sites, provides an introduction to runway incursion risk, information about airfield signs and markings, and strategies for enhanced position awareness and improved cockpit management. Throughout the program, various quizzes, tasks, and information visualization tools offer an interactive learning experience. As an incentive to pilots, successful completion of the program satisfies requirements for the Pilot Proficiency Awards Program (WINGS), Aviation Maintenance Technicians (AMT) program, and Runway Incursion Information Evaluation Program (RIIEP). Since its inception, an average of 1,800 pilots per month have completed the training program.

A Pilot's Guide to Safe Surface Operations is a brochure developed by the FAA that focuses on surface movement for single pilot operations. The brochure highlights five areas important to safe surface operations—pre-taxi planning; taxi procedures; use of aircraft lights; communications; and airfield markings, signs, and lights. Each section identifies safety measures to be taken to avoid errors that lead to runway incursions. In collaboration with the AOPA Air Safety Foundation, the FAA created a special edition of the guide for inclusion in the August 2004 edition of AOPA's magazine, *AOPA Pilot*, which was mailed to its 400,000 subscribers. The magazine was also widely distributed at Experimental Aircraft Association's AirVenture Oshkosh 2004.

Most recently, the FAA produced the runway safety DVD, *Heads Up, Hold Short, Fly Right!: A Guide to Runway Safety*, featuring world champion aerobatic pilot Patty Wagstaff. The DVD reviews the fundamentals of airport operations through a series of common sense rules and procedures, focusing on position awareness, airport diagrams, airfield signs, air traffic control instructions, and aircraft lighting standards. The FAA has distributed the DVD to all certified flight instructors and designated pilot examiners for incorporation in their training and recertification programs.

With the success of the *Heads Up, Hold Short, Fly Right!* DVD, the FAA plans to release two additional pilot education DVDs. One release, targeted for the commercial pilot community, will stress attention to safety through similar common sense rules and procedures, and incorporate an international perspective. All foreign carriers operating in the United States will receive a copy. The second release will emphasize standard phraseology. These DVDs will be available in summer 2005.

Airports for NAS Runway Safety Management

OF THE NEARLY 500 FAA TOWERED AIRPORTS, 176 airports (36 percent) had zero runway incursions and another 234 airports (47 percent) had one to five incursions from FY 2001 through FY 2004. In contrast, 30 airports (6 percent) had more than 10 runway incursions during the four-year period *(see Figure 26)*, representing the greatest potential for improvement.

Of the nearly 500 FAA towered airports, 176 airports (36 percent) had zero runway incursions and another 234 airports (47 percent) had one to five incursions from FY 2001 through FY 2004.

Figure 26

Runway Incursions at FAA Towered Airports (FY 2001 through FY 2004)

Number of Runway Incursions	Number of FAA Towered Airports	Percentage of FAA Towered Airports
0	176	36%
1–5	234	47%
6–10	55	11%
11–20	21	4%
21–30	6	1%
Over 30	3	1%

Total Number of FAA Towered Airports: 495[10]

Runway Incursions at the Focus-35 Airports

The airports that drive NAS runway safety trends are not fully represented by the OEP-35 or GA-35 airports. The Focus-35 airports—those airports that reported the most runway incursions from FY 2001 through FY 2004—provide a more useful benchmark for the continued measurement and management of runway incursions.

The airports that drive the NAS trends for runway safety are not fully represented by the OEP-35 or GA-35 airports. The OEP-35 airports primarily serve as capacity benchmarks and are used as a reference when assessing the impacts of NAS infrastructure changes. The OEP-35 airports were identified because they are the most capacity constrained and offer the most opportunity for improving system performance. Similarly, the Focus-35 airports—as identified for this report—include those airports that reported the most runway incursions (10 or more incursions) during the four-year period. As several runway safety metrics have leveled off or reached values that are as low as reasonably practicable, the Focus-35 airports provide a useful reference point to help the FAA productively focus limited resources on areas that offer the most benefit. The Focus-35 airports include 15 of the OEP-35 airports and seven GA-35 airports. The remaining 13 of the Focus-35 airports range from airports with mostly general aviation operations to medium-hub airports serving primarily commercial operations.

[10] *Airports with at least one runway incursion from FY 2001 through FY 2004 are listed in Appendix D of this report.*

From FY 2001 through FY 2004, the Focus-35 airports handled 20 percent of all NAS operations yet accounted for 41 percent of all runway incursions (565 of 1,395 incursions).

From FY 2001 through FY 2004, the Focus-35 airports handled 20 percent of all NAS operations yet accounted for 41 percent of all runway incursions (565 of 1,395 incursions) *(see Figure 27)*. The three Focus-35 airports that reported the highest number of runway incursions during this period were Fort Lauderdale Executive Airport (FXE: 33 events), Los Angeles International Airport (LAX: 31 events), and Concord-Buchanan Field (CCR: 31 events).

Implementing risk mitigation strategies at the Focus-35 airports offers the most immediate opportunity to continue to reduce the severity, number, and rate of runway incursions in the NAS. For example, through airport infrastructure and safety management programs, these three airports have reduced the number of runway incursions in the last one to two years:

- FXE engaged a group of key stakeholders and developed a plan for reducing runway incursions that incorporated best practices from regional runway safety meetings and recommendations from the users and tenants.
- LAX initiated runway safety management efforts including a pilot community outreach program, improvements to airport infrastructure (airfield signs, markings, and lights), and new controller procedures to prevent errors.
- CCR implemented airfield modifications and air traffic management strategies to reduce the number of complex taxi paths and runway access points, enhance aircraft movement efficiency, and reduce collision risk.

Figure 27
Comparison of Aircraft Operations in the NAS and the Runway Incursions Accounted for by Each Airport Group (FY 2001 through FY 2004)

	FY 2001 through FY 2004	
	Percentage of NAS Aircraft Operations	Percentage of NAS Runway Incursions
OEP-35	24%	28%
GA-35	24%	17%
Focus-35	20%	41%

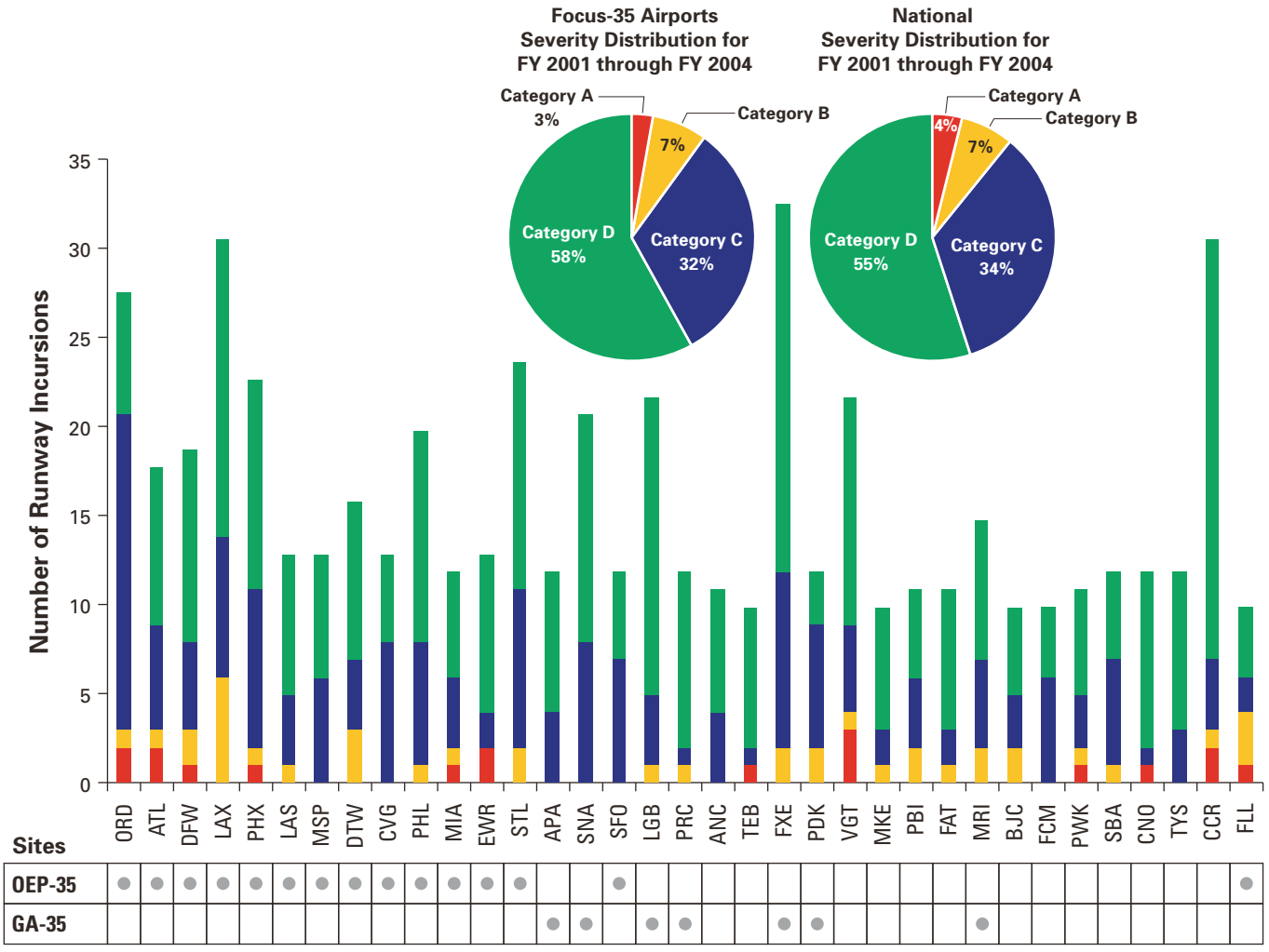
The majority of runway incursions in the NAS were rated as Category C and D incursions (89 percent). Of the 1,244 Category C and D runway incursions in FY 2001 through FY 2004, 41 percent occurred at the Focus-35 airports *(see Figure 28)*. The number of Category C and D incursions at these airports decreased slightly from 142 incursions in FY 2001 to 133 incursions in FY 2004— a 6 percent decrease. The persistence of Category C and D runway incursions at the Focus-35 airports warrants more aggressive interventions and represents a clear, near-term opportunity to improve runway safety.

From FY 2001 through FY 2004, the Focus-35 airports accounted for 39 percent of the Category A and B runway incursions. The number of these most serious incursions at the Focus-35 airports decreased from 24 incursions in FY 2001 to seven incursions in FY 2004—a 71 percent decrease.

From FY 2001 through FY 2004, the Focus-35 airports accounted for 39 percent of the Category A and B runway incursions.

Figure 28

Number and Severity of Runway Incursions at the Focus-35 airports (FY 2001 through FY 2004)



NOTE: Appendix C.3 lists the names and identifiers for the Focus-35 Airports.

Pilot deviations at the Focus-35 airports—Similar to the NAS trend, the majority of runway incursions at the Focus-35 airports were pilot deviations. Specifically, 55 percent of the runway incursions (311 of 565 incursions) at the Focus-35 airports were pilot deviations *(see Figure 29)*. The number and rate of pilot deviations at the Focus-35 airports decreased during the four-year period. In FY 2001, there were 100 pilot deviations and a rate of 7.48 pilot deviations per million operations—or one event every 3.7 days. In FY 2004, there were 65 pilot deviations and a rate of 5.09 pilot deviations per million operations—or one event every 5.6 days. Even though this overall 35 percent decrease in the number of pilot deviations at the Focus-35 airports is encouraging, the pilot deviation rate for this group of airports is still approximately double the NAS-wide rate for pilot deviations, which is 2.8 pilot deviations per million operations.

From FY 2001 through FY 2004, 88 percent of pilot deviations at the Focus-35 airports were Category C and D incursions (274 of 311 incursions). The remaining 37 pilot deviations at these airports were rated as Category A and B events—representing nearly half (45 percent) of the nation's most serious pilot deviations for the four-year period.

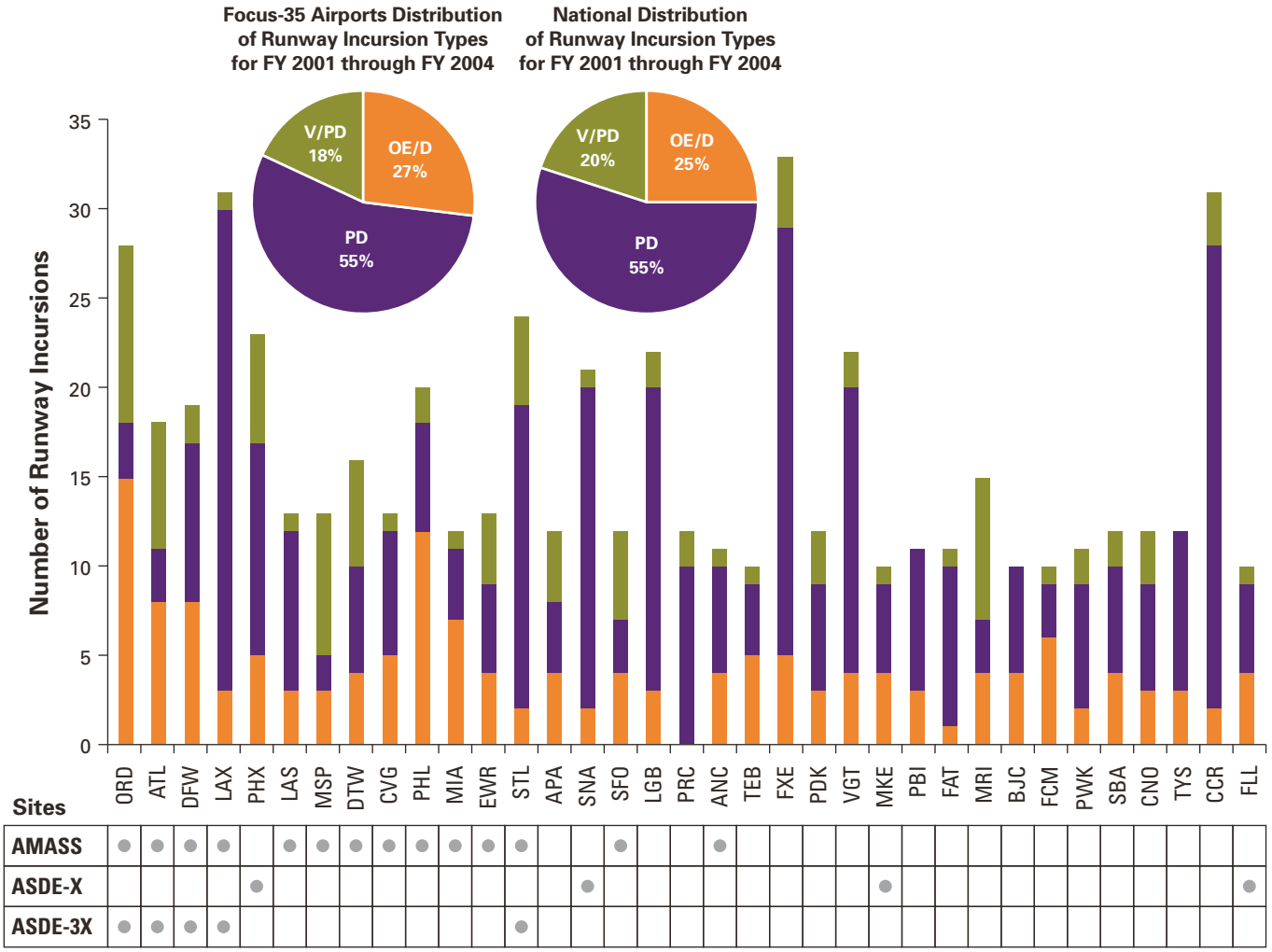
Operational errors/deviations at the Focus-35 airports—Operational errors/deviations accounted for 27 percent of the runway incursions (153 of 565 incursions) at the Focus-35 airports *(see Figure 29)*. The number and rate of operational errors/deviations at these airports have increased since FY 2002. In addition, Category A and B operational errors/deviations at the Focus-35 airports accounted for about one-third of the nation's most serious operational errors/deviations (14 of 42 incursions).

Vehicle/pedestrian deviations at the Focus-35 airports—Vehicle/pedestrian deviations accounted for 18 percent of the runway incursions (101 of 565 incursions) at the Focus-35 airports. After decreasing year-over-year from FY 2001 through FY 2003, the number of vehicle/pedestrian deviations at the Focus-35 airports increased from 20 incursions in FY 2003 to 29 incursions in FY 2004. Most of these incursions were Category C and D events.

To continue to improve runway safety in a timely and cost-effective manner, the FAA is considering this group of airports as primary targets for future risk mitigation strategies. The aforementioned trends for the Focus-35 airports offer compelling evidence that safety management initiatives applied at these airports will produce the largest runway safety benefits in the near term.

Figure 29

Types of Runway Incursions at the Focus-35 Airports (FY 2001 through FY 2004)



NOTE: Appendix C.4 lists the names and identifiers for airports where these technologies are being implemented.

Summary and Conclusions

THE FAA COMPLETED AN ANALYSIS of runway incursions reported from FY 2001 through FY 2004. National trends were investigated with respect to the frequency, severity, and types of runway incursions that occurred during the four-year period. Commercial aviation and general aviation operations were explored to determine their involvement in runway incursions across the NAS and at airports that predominantly handled their respective operations—OEP-35 and GA-35 airports. In addition, a subset of airports with the most runway incursions, the Focus-35 airports, was examined to determine the extent to which they may be used as a benchmark for runway safety management. A summary of these findings is presented below.

Frequency—Over the four-year period, there was progress in reducing the number and rate of runway incursions across the NAS. But the rate of runway incursions has leveled off during the last three fiscal years. Of the nearly 500 FAA towered airports, 176 airports (36 percent) had zero runway incursions during the four-year period. The Focus-35 airports were identified as those airports with 10 or more runway incursions for the four-year period. These 35 airports handled approximately 20 percent of NAS operations yet accounted for 41 percent of runway incursions in the NAS.

Severity—The FAA has made progress toward reaching its performance target of reducing the total number of Category A and B runway incursions to no more than 27 annually by FY 2009. In FY 2004, there were 28 Category A and B runway incursions, which represents a 47 percent decrease in the number for the four-year period.

Pilot Deviations—From FY 2001 through FY 2004, progress was made in reducing the severity, number, and rate of pilot deviations—the most common type of runway incursion. The majority (82 percent) of pilot deviations in the NAS involved at least one general aviation aircraft. To address pilot deviations, the FAA's objective has been to communicate a consistent message about runway safety and standard operating procedures to all pilots in the aviation community. With the help of aviation organizations, the FAA has developed programs to raise pilot awareness of runway incursions. Efforts have included the creation of interactive Web sites and safety awareness DVDs, as well as surface enhancements for improving position awareness.

Operational Errors/Deviations—During the four-year period, operational errors/deviations accounted for 25 percent of all runway incursions (352 of 1,395 incursions). Since FY 2002, there has been a 29 percent increase in the number and 34 percent increase in the rate of operational errors/deviations. FY 2004 had the highest number of operational errors/deviations of the four-year period. This was the only runway incursion type that showed an increasing trend in the number and rate. This upward trend was mostly attributable to an increase in Category C operational errors/deviations. The most serious incursions, Category A and B, increased slightly in each of the last two fiscal years.

The FAA has implemented technologies, such as AMASS, to prevent runway collisions and is beginning to implement ASDE-X to aid air traffic controllers in their awareness of aircraft position on the surface. The FAA is also implementing team resource management training

for air traffic controllers to recognize the potential for error in their own operations as well as those of their colleagues in the tower.

Vehicle/Pedestrian Deviations—The number and rate of vehicle/pedestrian deviations decreased from FY 2001 through FY 2004, resulting in overall decreases of 33 percent and 29 percent, respectively. Most notably, the number of Category A and B vehicle/pedestrian deviations reached its lowest level (three incursions) in FY 2004. The number of Category C vehicle/pedestrian deviations increased appreciably from FY 2003 to FY 2004. In contrast, the number of Category D vehicle/pedestrian deviations decreased throughout the four-year period.

To continue to improve runway safety, the FAA continues to monitor and manage specific segments involved in runway incursions (for example, general aviation and commercial aircraft operations). Some segments have reached levels that are as low as reasonably practical—such as serious incursions involving two commercial aircraft—and additional progress may require significant cost and trade-offs in capacity. The FAA is prioritizing its efforts to address those segments that offer the greatest opportunity for improving NAS-wide runway safety.

Future Directions

AS PART OF THE FAA'S *FLIGHT PLAN 2005–2009* goal for international leadership, the FAA is participating in efforts with global partners and industry to develop innovative methods and tools for collecting, analyzing, and sharing runway safety information. Two specific efforts—the global tracking of runway incursions and the development of a runway incursion severity categorization model—are highlighted below.

Global Tracking of Runway Incursions

The FAA has supported the efforts of the International Civil Aviation Organization (ICAO) to establish a standard definition of a runway incursion. The objective is to collect comparable data for runway incursions on a global scale. Currently, there are 20 or more definitions used by various civil aviation authorities to track these incidents. This diversity makes it difficult to reliably compare runway incursions in the United States to runway incursions in Europe, for example. A global implementation of a standard for defining runway incursions and runway incursion severity will enable a comprehensive database of information that may be used to enhance runway safety management.

A global implementation of a standard for defining runway incursions and runway incursion severity will enable a comprehensive database of information that may be used to enhance runway safety management.

Figure 30
FAA and ICAO Definitions of Runway Incursions

Current FAA	Any occurrence in the airport runway environment involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in a loss of required separation with an aircraft taking off, intending to take off, landing, or intending to land.
ICAO (effective November 2004)	Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of the aircraft.

In the next few years, the FAA will implement the new ICAO definition for a runway incursion *(see Figure 30)*. Additionally, the FAA will implement the ICAO definitions for severity categories *(See Figure 31)*. The implementation of the ICAO severity definitions will result in a change in the distribution of the severity of runway incursions in the United States *(see Figure 32)*. Runway incursions previously categorized as Category C or Category D under the FAA definition will become Category C incursions under the ICAO definitions. Surface incidents that are tracked by the FAA (but not currently considered to be runway incursions) will become Category D runway incursions under the ICAO definitions. Category A and B runway incursions will essentially remain the same.

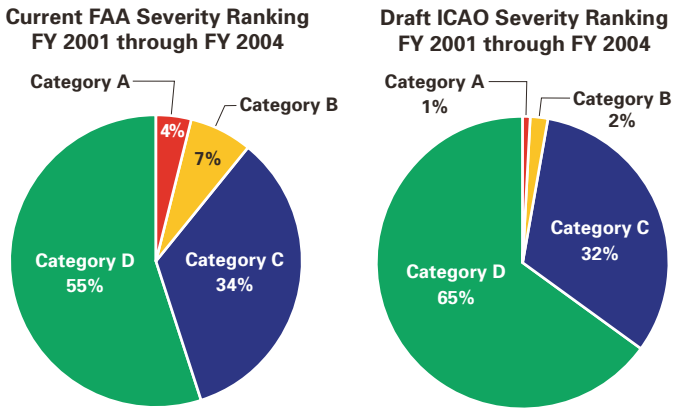
Figure 31

FAA and Draft ICAO Definitions of Severity

FAA Definitions of Severity	Category	Draft ICAO Definitions of Severity
Separation decreases and participants take extreme action to narrowly avoid a collision, or the event results in a collision.	A	A very serious incident in which a collision was narrowly avoided.
Separation decreases and there is a significant potential for collision.	B	A major incident in which separation decreases and there is a significant potential for collision, which may result in a time-critical corrective/evasive response to avoid a collision.
Separation decreases but there is ample time and distance to avoid a potential collision.	C	A minor incident characterized by ample time and/or distance to avoid a collision.
Little or no chance of collision but meets the definition of a runway incursion.	D	Incident that meets the definition of runway incursion such as incorrect presence of a single vehicle/person/ aircraft on the protected area of a surface designated for the landing and takeoff of aircraft but with no immediate safety consequences.

Figure 32

Distribution of Runway Incursions Using Current FAA Definition of Severity and Draft ICAO Definition of Severity (FY 2001 through FY 2004)



Runway Incursion Severity Categorization (RISC) Model

The Runway Incursion Severity Categorization (RISC) Model is an automated system for rating the severity of runway incursions based on the same decision processes used by FAA subject matter experts in the present assessment process (see Appendix B.2 for details). By automating this process, the expertise of the group is applied in a consistent and reliable fashion to categorize the severity of runway incursions.

The foundation for the severity categorization is "closest proximity"—that is, how close the two aircraft, or aircraft and vehicle, came in vertical and horizontal space. The goal of the model is to augment the severity rating determined by the closest proximity, based on additional factors in the incursion, to better represent the probability of a collision. Factors that influence the probability of a collision and the severity of the outcome include: aircraft dimensions and performance characteristics, visibility, the geometry of the conflict, and operator (air traffic controller, pilot, or vehicle driver) responses. The purpose of these factors is to enhance the severity rating beyond that which is suggested solely by closest proximity. The probability of a collision is also influenced by factors such as available response time, avoidance maneuvers executed, and the conditions under which they were executed.

The goal of the model is to augment the severity rating determined by the closest proximity, based on additional factors in the incursion, to better represent the probability of a collision.

The model starts with a set of situations or "scenarios" that broadly include all the types of runway incursions (with the exception of those involving helicopters). These scenarios describe the parties involved (e.g., two aircraft or an aircraft and a vehicle), the action of the parties at the point of the incursion (e.g., landing, taking off, or taxiing), and the action or outcome for each party (e.g., went around, or crossed the hold short line). After the scenario has been selected, the following information is entered or selected:

- Closest proximity (horizontal and vertical).
- Visibility (visibility in miles or runway visual range, ceiling).
- Type of aircraft (weight and/or performance characteristics).
- Whether or not an avoidance maneuver was executed. If there was an avoidance maneuver, the characteristics of the maneuver(s) are a factor. These include aborted takeoff, early rotation on takeoff, aborted landings (which includes the speed of the aircraft and the distance from the runway at which the landing was aborted), swerving, and hard braking.
- Runway characteristics and conditions (width of the runway, braking action reported).
- Degree to which the situation was controlled or uncontrolled (e.g., type of pilot/controller errors involved, whether all parties were on frequency, whether the controller was aware of all the parties involved).

The model is currently being validated by comparing the severity categorizations produced by the model against those being produced by a group of subject matter experts. Initial validation results, based on one year of incursions, indicate a high degree of agreement. Validation of the model continues with an ongoing comparison of the categorization provided by the model against the ratings provided by the group of subject matter experts. Air Services Australia and Eurocontrol also have copies of the program and have been asked to provide validation feedback. Once validated, the model will be offered to ICAO as a global standardization tool for runway incursion severity categorization.

Appendices

Runway Incursion Trends and Initiatives at Towered Airports in the United States, FY 2001 through FY 2004

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Appendix A. Glossary and Acronyms

1. Glossary

Commercial Operations — Scheduled or charter for-hire aircraft used to carry passengers or cargo. These aircraft are typically operated by airlines, air cargo, and charter services. This group of aircraft operations includes jet transports and commuter aircraft.

Commuter — An aircraft that is commercially operated by scheduled air carriers but is usually smaller and carries fewer passengers than the typical jet transport aircraft. Examples of commuter aircraft include the Embraer 120 and 145, and the Saab 340.

Error Tolerance — The degree to which a system detects and prevents the propagation of errors. In the context of runway safety, error tolerance is the degree to which the system detects and prevents the propagation of human error, procedural breakdowns, and technical failures to reduce the likelihood of a runway incursion becoming an accident.

FAA Operational Evolution Plan (OEP) — A collaborative implementation plan, led by the FAA with input from members of the entire aviation industry, centered on the evolution of capacity and efficiency improvements needed in the NAS to meet future air traffic demand over the next decade.

General Aviation — General Aviation operations encompass the full range of activity from student pilots to multi-hour, multi-rated pilots flying sophisticated aircraft for business or pleasure. This group of aircraft operations includes small general aviation aircraft (less than 12,500 lbs maximum takeoff weight) and large general aviation aircraft (maximum takeoff weight greater than or equal to 12,500 lbs). The small general aviation aircraft tend to be single-piloted aircraft, such as a Cessna 152 or Piper Cherokee. The large general aviation aircraft tend to be represented by corporate or executive aircraft with a two-person flight crew — for example a Cessna Citation C550 or Gulfstream V.

Hardstand — A paved or stabilized area where aircraft or vehicles are parked.

Hold Short — An air traffic control clearance to the pilot of an aircraft to not proceed beyond a designated point such as a specified runway or taxiway.

Jet Transport — Large airplanes that are commercially operated by scheduled air carriers. Examples of jet transports include the Boeing 737-, 747-, 757-, 767-series of aircraft, and the Airbus 300-, 310-series.

Military Operations — Any aircraft operated by the United States military.

Operational Error — An action by an air traffic controller that results in less than the required minimum separation between two or more aircraft, or between an aircraft and obstacle (e.g., vehicles, equipment, personnel on runways).

Operational Deviation — An occurrence attributable to an element of the air traffic system in which applicable separation minima were maintained, but an aircraft, vehicle, equipment, or personnel encroached upon a landing area that was delegated to another position of operation without prior coordination and approval.

Pilot Deviation — An action of a pilot that violates any Federal Aviation Regulation.

Runway Incursion — Any occurrence on the airport runway environment involving an aircraft, vehicle, person, or object on the ground that creates a collision hazard or results in a loss of required separation with an aircraft taking off, intending to take off, landing, or intending to land.

Runway Incursion Error Type — Operational error/deviation, pilot deviation, or vehicle/pedestrian deviation.

Surface Incident — Any event where unauthorized or unapproved movement occurs within the movement area, or an occurrence in the movement area associated with the operation of an aircraft that affects or could affect the safety of flight. A surface incident can occur anywhere on the airport's surface, including the runway. The FAA further classifies a surface incident as either a runway incursion or a non-runway incursion. In this report, non-runway incursions are generically referred to as surface incidents.

Taxi Into Position And Hold — An air traffic control instruction to a pilot of an aircraft to taxi onto the active departure runway, to hold in that position, and not take off until specifically cleared to do so.

Vehicle/Pedestrian Deviation — Vehicles or pedestrians moving on the runway movement area without authorization from air traffic control that interferes with aircraft operations.

2. Acronyms

AC	Advisory Circular
ALPA	Air Line Pilots Association
AMT	Aviation Maintenance Technician
AOPA	Aircraft Owners and Pilots Association
AOSC	Airport Obstruction Standards Committee
ASDE-X	Airport Surface Detection Equipment - Model X
ASDE-3X	Airport Surface Detection Equipment - Model 3X
ASRS	Aviation Safety Reporting System
ATA	Air Transport Association
ATC	Air Traffic Controller
ATIS	Automatic Terminal Information Service
ATO	Air Traffic Organization
CAST	Commercial Aviation Safety Team
CBI	Computer-Based Instruction
CMMD	Cockpit Moving-Map Display
COMM	Commercial Operations
DOT	Department of Transportation
EAA	Experimental Aircraft Association
EFB	Electronic Flight Bag
FAA	Federal Aviation Administration
FSDO	Flight Standards District Office
FY	Fiscal Year
GA	General Aviation
GPS	Global Positioning System
ICAO	International Civil Aviation Organization
IFR	Instrument Flight Rules
IOC	Initial Operating Capability
LAHSO	Land And Hold Short Operations
LORAN	Long-Range Aids to Navigation
MIL	Military Operations
NAS	National Airspace System
NASA	National Aeronautical and Space Administration
NATCA	National Air Traffic Controllers Association
NOTAM	Notice To All Airmen
OEP	Operational Evolution Plan
OE/D	Operational Error or Operational Deviation
PD	Pilot Deviation
RIIEP	Runway Incursion Information Evaluation Program

2. Acronyms (continued)

RISC	Runway Incursion Severity Categorization
RWSL	Runway Status Lights
SMR	Surface Movement Radar
SOP	Standard Operating Procedures
TERPS	Analysis of Terminal Procedures
V/PD	Vehicle or Pedestrian Deviation
WINGS	Pilots Proficiency Awards Program

Appendix B

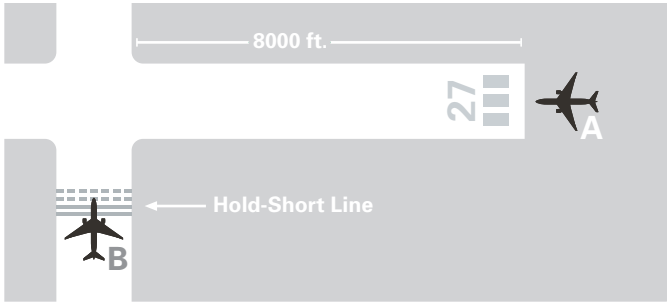
1. History of Runway Incursion Severity

In 2000, the FAA convened a government-industry team of aviation analysts with expertise in air traffic control, airway facilities, airports, flight standards, human factors, and system safety to conduct a systematic review and analysis of the 1,369 reported runway incursions that occurred from CY 1997 through CY 2000 and categorized these incidents in terms of severity. This analysis, presented in the June 2001 Runway Safety Report, provided the foundation for the continued analysis and classification of runway incursion severity. Since that time, the FAA Office of Runway Safety has continued to systematically review the reported runway incursions on a regular basis.

The following runway incursion profiles illustrate the importance of classifying runway incursion severity.

CASE 1

This incident meets the definition of a runway incursion, but there is little or no chance of collision.



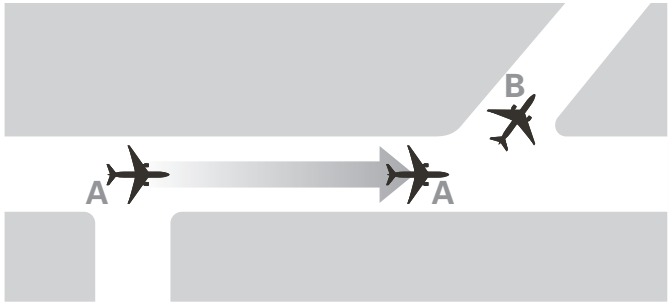
Aircraft A is on approach to Runway 27, an 8,000-foot runway. Aircraft B is taxiing to a parking area on the north side of the airport and has been instructed by air traffic control to "hold short of Runway 27" in anticipation of the arrival of Aircraft A. When Aircraft A is on a quarter mile final approach, Aircraft B's pilot informs the controller that he has accidentally crossed the hold-short line for Runway 27. Although he is not on the runway, the aircraft's nose is across the hold-short line, usually 175 feet from the runway.

A runway incursion has occurred since separation rules require that a runway be clear of any obstacle before an aircraft can land or take off on that runway. The controller instructs Aircraft A to "go around."

- The potential for a collision is low, but by definition, a runway incursion has taken place.
- This case exemplifies the most frequently reported runway incursions.

CASE 2

This is a severe situation where the margin of safety is so low that a collision is barely avoided.



Aircraft A has been cleared to taxi into position and hold on Runway 9 following Aircraft B that has just landed on the same runway and is rolling out. Aircraft B is instructed to turn left at a taxiway. Aircraft B acknowledges. The controller observes Aircraft B exiting the runway and clears Aircraft A for takeoff. A moment later the controller notices too late that Aircraft B has not fully cleared the runway and in fact appears to have come to a complete stop with much of the aircraft still on the runway.

Aircraft A has accelerated to the point it cannot stop and has only the option to fly over the top of Aircraft B.

- The potential for a collision is high and typifies the common perception of a runway incursion.
- This case is more severe but occurs infrequently.

These examples demonstrate why more descriptive runway incursion categorizations were necessary to capture the different margins of safety—or, conversely, varying degrees of severity—associated with each runway incursion. An accurate portrayal of runway incursion severity trends is essential to finding solutions that target opportunities for error and mitigate the consequences of those errors that do happen.

2. Factors Considered in the Severity Categorization

- Speed and performance of the aircraft
- Distance between parties (horizontal and/or vertical)
- Location of aircraft, vehicle, or object on the actual runway or on a taxiway inside the runway holding position markings
- Type and extent of evasive action
- Was the party on the ground stopped or moving?
- Knowledge of the other party's location
- Visibility conditions
- Night vs. day
- Runway conditions (e.g., wet, snow covered)
- Status of radio communications

3. Unclassified Event

Data for the one unclassified runway incursion (FY 2001 through FY 2004)

Airport	Airport ID	Year	Runway Incursion Type	Aircraft Operations Pair
Pittsburgh International Airport, Pittsburgh	PIT	2001	OE	JT/GA

One of the 1,395 runway incursions did not contain enough information to support a reliable categorization of severity. This event is identified in this table for completeness.

4. Runway Collisions

Data for the Five Runway Collisions (FY 2001 through FY 2004)

Date of Incident	Airport ID	Airport Location	Brief Summary
10/12/01	VNY	Van Nuys, CA	A general aviation aircraft landed and collided with another general aviation aircraft that was holding in position to take off at an intersection. No fatalities.
4/6/02	LAL	Lakeland, FL	A general aviation aircraft landed on the wrong runway and collided with another general aviation aircraft that had previously landed on the same runway. No fatalities.
5/10/03	EWR	Newark Intl, NJ	A jet transport was cleared for takeoff on a NOTAMED closed runway with men and equipment on the runway. There were orange plastic cones 2 to 3 feet in height being used as a barrier and the jet transport hit 3 cones on departure roll. No aircraft damage was reported. No fatalities.
8/1/03	OSH	Wittman Rgnl, Oshkosh, WI	An experimental general aviation aircraft was cleared to land. Due to the Experimental Aircraft Association (EAA) convention, a waiver had been issued for reduced runway separation allowing more than one aircraft to land on the runway. Another general aviation aircraft, on 3/4 mile final, was also cleared to land same runway following the experimental aircraft. After landing, the general aviation aircraft locked his brakes and struck the experimental as it was exiting the runway on the left side of the runway into the grass. No fatalities.
9/23/03	VGT	North Las Vegas Arpt, NV	A general aviation aircraft was cleared to land and, one minute later, local control cleared another general aviation aircraft for takeoff from an intersecting runway. The planes collided at the intersection of the runways. No fatalities.

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Appendix C

1. OEP-35 Airports

Airport Code	Airport Name, City
ATL	Hartsfield - Jackson Atlanta International Airport, Atlanta
BOS	Boston - Logan International Airport, Boston
BWI	Baltimore - Washington International Airport, Baltimore
CLE	Cleveland Hopkins International Airport, Cleveland
CLT	Charlotte - Douglas International Airport, Charlotte
CVG	Cincinnati - Northern Kentucky International Airport, Covington / Cincinnati
DCA	Ronald Reagan Washington National Airport, Washington
DEN	Denver International Airport, Denver
DFW	Dallas / Fort Worth International Airport, Dallas
DTW	Detroit Metropolitan Wayne County International Airport, Detroit
EWR	Newark Liberty International Airport, Newark
FLL	Fort Lauderdale - Hollywood International Airport, Fort Lauderdale
HNL	Honolulu International Airport, Honolulu
IAD	Washington Dulles International Airport, Sterling
IAH	George Bush Intercontinental Airport, Houston
JFK	John F. Kennedy International Airport, New York City
LAS	McCarran International Airport, Las Vegas
LAX	Los Angeles International Airport, Los Angeles
LGA	LaGuardia Airport, New York City
MCO	Orlando International Airport, Orlando
MDW	Midway Airport, Chicago
MEM	Memphis International Airport, Memphis
MIA	Miami International Airport, Miami
MSP	Minneapolis - St. Paul International Airport, Minneapolis
ORD	O'Hare International Airport, Chicago
PDX	Portland International Airport, Portland
PHL	Philadelphia International Airport, Philadelphia
PHX	Phoenix - Sky Harbor International Airport, Phoenix
PIT	Pittsburgh International Airport, Pittsburgh
SAN	San Diego International Airport - Lindbergh Field, San Diego
SEA	Seattle - Tacoma International Airport, Seattle
SFO	San Francisco International Airport, San Francisco
SLC	Salt Lake City International Airport, Salt Lake City
STL	Lambert - St. Louis International Airport, St. Louis
TPA	Tampa International Airport, Tampa

2. GA-35 Airports

Airport Code	Airport Name, City
APA	Denver - Centennial Airport, Denver
BFI	Boeing Field - King County International Airport, Seattle
CHD	Chandler Municipal Airport, Chandler
CMA	Camarillo Airport, Camarillo
CRQ	McClellan - Palomar Airport, Carlsbad
DAB	Daytona Beach International Airport, Daytona Beach
DPA	Dupage Airport, Chicago / West Chicago
DVT	Deer Valley Municipal Airport, Phoenix
DWH	David Wayne Hooks Memorial Airport, Houston
FFZ	Mesa - Falcon Field, Mesa
FPR	St. Lucie County International Airport, Fort Pierce
FRG	Farmingdale Republic Airport, Farmingdale
FTW	Fort Worth Meacham International Airport, Fort Worth
FXE	Fort Lauderdale - Executive Airport, Fort Lauderdale
GFK	Grand Forks International Airport, Grand Forks
HIO	Hillsboro Airport, Hillsboro
LGB	Long Beach - Daugherty Field, Long Beach
LVK	Livermore Municipal Airport, Livermore
MMU	Morristown Municipal Airport, Morristown
MRI	Merrill Field, Anchorage
MYF	San Diego - Montgomery Field, San Diego
PAO	Palo Alto Airport of Santa Clara County, Palo Alto
PDK	Dekalb - Peachtree Airport, Atlanta
PMP	Pompano Beach Airpark
POC	Brackett Field, La Verne
PRC	Love Airport, Prescott
PTK	Oakland County International Airport, Pontiac
RHV	Reid-Hillview Airport of Santa Clara County, San Jose
RVS	Richard Lloyd Jones, Jr. Airport, Tulsa
SDL	Scottsdale Airport, Scottsdale
SEE	San Diego - Gillespie Field, San Diego
SFB	Orlando - Sanford International Airport, Orlando
SNA	John Wayne - Orange County Airport, Santa Ana
VNY	Van Nuys Airport, Van Nuys
VRB	Vero Beach Municipal Airport, Vero Beach

NOTE: Four general aviation airports—airports with at least 90 percent general aviation operations—that are not included in the GA-35 airports reported 11 or more runway incursions over the four-year period. The four airports—North Las Vegas (VGT), Concord-Buchanan Field (CCR), Chino Airport (CNO), and Palwaukee Municipal Airport (PWK)—reported between 11 and 31 runway incursions for the four-year period.

3. Focus-35 Airports

Airport Code	Airport Name, City
ANC	Anchorage - Ted Stevens International Airport, Anchorage
APA	Denver - Centennial Airport, Denver
ATL	Hartsfield - Jackson Atlanta International Airport, Atlanta
BJC	Denver - Jeffco Airport, Denver
CCR	Concord - Buchanan Field, Concord
CNO	Chino Airport, Chino
CVG	Cincinnati - Northern Kentucky International Airport, Covington / Cincinnati
DFW	Dallas / Fort Worth International Airport, Dallas
DTW	Detroit Metropolitan Wayne County International Airport, Detroit
EWR	Newark Liberty International Airport, Newark
FAT	Fresno - Yosemite International Airport, Fresno
FCM	Flying Cloud Airport, Minneapolis
FLL	Fort Lauderdale - Hollywood International Airport, Fort Lauderdale
FXE	Fort Lauderdale - Executive Airport, Fort Lauderdale
LAS	McCarran International Airport, Las Vegas
LAX	Los Angeles International Airport, Los Angeles
LGB	Long Beach - Daugherty Field, Long Beach
MIA	Miami International Airport, Miami
MKE	General Mitchell International Airport, Milwaukee
MRI	Merrill Field, Anchorage
MSP	Minneapolis - St. Paul International Airport, Minneapolis
ORD	O'Hare International Airport, Chicago
PBI	Palm Beach International Airport, West Palm Beach
PDK	Dekalb - Peachtree Airport, Atlanta
PHL	Philadelphia International Airport, Philadelphia
PHX	Phoenix - Sky Harbor International Airport, Phoenix
PRC	Love Airport, Prescott
PWK	Palwaukee Municipal Airport, Chicago
SBA	Santa Barbara Municipal Airport, Santa Barbara
SFO	San Francisco International Airport, San Francisco
SNA	John Wayne - Orange County Airport, Santa Ana
STL	Lambert - St. Louis International Airport, St. Louis
TEB	Teterboro Airport, Teterboro
TYS	McGee Tyson Airport, Knoxville
VGT	North Las Vegas Airport, Las Vegas

4. Airports that have Received or are Slated to Receive AMASS/ASDE-X/ASDE-3X Systems

Airport Code	Airport Name, City	AMASS	ASDE-X	ASDE-3X
ABQ	Albuquerque International Sunport, Albuquerque		X	
ADW	Andrews Air Force Base	X		
ANC	Anchorage - Ted Stevens International Airport, Anchorage	X		
ATL	Hartsfield - Jackson Atlanta International Airport, Atlanta	X		X
AUS	Austin - Bergstrom International Airport, Austin		X	
BDL	Bradley International Airport, Windsor Locks		X	
BOS	Boston - Logan International Airport, Boston	X		
BUR	Burbank - Glendale - Pasadena Airport, Burbank		X	
BWI	Baltimore - Washington International Airport, Baltimore	X		
CLE	Cleveland Hopkins International Airport, Cleveland	X		
CLT	Charlotte - Douglas International Airport, Charlotte	X		X
CMH	Port Columbus International Airport, Columbus		X	
COS	City of Colorado Springs Municipal Airport, Colorado Springs		X	
CVG	Cincinnati - Northern Kentucky International Airport, Covington / Cincinnati	X		
DCA	Ronald Reagan Washington National Airport, Washington	X		
DEN	Denver International Airport, Denver	X		
DFW	Dallas / Fort Worth International Airport, Dallas	X		X
DTW	Detroit Metropolitan Wayne County International Airport, Detroit	X		
EWR	Newark Liberty International Airport, Newark	X		
FLL	Fort Lauderdale - Hollywood International Airport, Fort Lauderdale		X	
HNL	Honolulu International Airport, Honolulu		X	
HOU	William P. Hobby Airport, Houston		X	
IAD	Washington Dulles International Airport, Sterling	X		X
IAH	George Bush Intercontinental Airport, Houston	X		
IND	Indianapolis International Airport, Indianapolis		X	
JFK	John F. Kennedy International Airport, New York City	X		
LAS	McCarran International Airport, Las Vegas	X		
LAX	Los Angeles International Airport, Los Angeles	X		X
LGA	LaGuardia Airport, New York City	X		
MCI	Kansas City International Airport, Kansas City	X		
MCO	Orlando International Airport, Orlando		X	
MDW	Midway Airport, Chicago		X	
MEM	Memphis International Airport, Memphis	X		X
MIA	Miami International Airport, Miami	X		
MKE	General Mitchell International Airport, Milwaukee		X	
MSP	Minneapolis - St. Paul International Airport, Minneapolis	X		
MSY	Louis Armstrong - New Orleans International Airport, New Orleans	X		
OAK	Metropolitan Oakland International Airport, Oakland		X	
ONT	Ontario International Airport, Ontario		X	

4. Airports that have Received or are Slated to Receive AMASS/ASDE-X/ASDE-3X Systems – continued

Airport Code	Airport Name, City	AMASS	ASDE-X	ASDE-3X
ORD	O'Hare International Airport, Chicago	X		X
PDX	Portland International Airport, Portland	X		
PHL	Philadelphia International Airport, Philadelphia	X		
PHX	Phoenix - Sky Harbor International Airport, Phoenix		X	
PIT	Pittsburgh International Airport, Pittsburgh	X		
PVD	T.F. Green Airport, Providence		X	
RDU	Raleigh - Durham International Airport, Raleigh/Durham		X	
RNO	Reno / Tahoe International Airport, Reno		X	
SAN	San Diego International Airport - Lindbergh Field, San Diego	X		
SAT	San Antonio International Airport, San Antonio		X	
SDF	Louisville International Airport - Standiford Field, Louisville	X		X
SEA	Seattle - Tacoma International Airport, Seattle	X		X
SFO	San Francisco International Airport, San Francisco	X		
SJC	San Jose International Airport, San Jose		X	
SJU	Luis Muñoz Marin International Airport, San Juan		X	
SLC	Salt Lake City International Airport, Salt Lake City	X		
SMF	Sacramento International Airport, Sacramento		X	
SNA	John Wayne - Orange County Airport, Santa Ana		X	
STL	Lambert - St. Louis International Airport, St. Louis	X		X
TPA	Tampa International Airport, Tampa		X	

Note: All the airports slated to receive AMASS achieved initial capability in 2004.

5. Runway Incursion Types at OEP-35, GA-35, and Focus-35 Airports

5.1 Operational Errors/Deviations

National Operational Errors/Deviations

	FY 2001	FY 2002	FY 2003	FY 2004	Total
Category D	44	34	42	38	**158**
Category C	32	33	38	48	**151**
Category B	7	6	5	6	**24**
Category A	7	2	4	5	**18**
Insufficient Data	1	0	0	0	**1**
National Total	**91**	**75**	**89**	**97**	**352**

OEP-35 Airports — Operational Errors/Deviations

	FY 2001	FY 2002	FY 2003	FY 2004	Total
Category D	16	5	20	21	**62**
Category C	15	7	19	18	**59**
Category B	3	0	2	1	**6**
Category A	3	0	1	1	**5**
Insufficient Data	1	0	0	0	**1**
OEP-35 Airports Total	**38**	**12**	**42**	**41**	**133**

GA-35 Airports — Operational Errors/Deviations

	FY 2001	FY 2002	FY 2003	FY 2004	Total
Category D	7	7	4	5	**23**
Category C	5	4	5	4	**18**
Category B	1	1	0	2	**4**
Category A	2	1	1	0	**4**
Insufficient Data	0	0	0	0	**0**
GA-35 Airports Total	**15**	**13**	**10**	**11**	**49**

Focus-35 Airports — Operational Errors/Deviations

	FY 2001	FY 2002	FY 2003	FY 2004	Total
Category D	16	13	20	22	**71**
Category C	14	12	21	21	**68**
Category B	3	1	2	2	**8**
Category A	2	1	2	1	**6**
Insufficient Data	0	0	0	0	**0**
Focus-35 Airports Total	**35**	**27**	**45**	**46**	**153**

5.2 Pilot Deviations

National Pilot Deviations

	FY 2001	FY 2002	FY 2003	FY 2004	Total
Category D	111	120	99	104	**434**
Category C	88	51	61	55	**255**
Category B	22	14	11	8	**55**
Category A	12	6	3	6	**27**
National Total	**233**	**191**	**174**	**173**	**771**

OEP-35 Airports — Pilot Deviations

	FY 2001	FY 2002	FY 2003	FY 2004	Total
Category D	18	28	23	25	**94**
Category C	19	10	16	18	**63**
Category B	9	5	2	0	**16**
Category A	3	1	0	1	**5**
OEP-35 Airports Total	**49**	**44**	**41**	**44**	**178**

GA-35 Airports — Pilot Deviations

	FY 2001	FY 2002	FY 2003	FY 2004	Total
Category D	25	25	17	16	**83**
Category C	13	11	12	13	**49**
Category B	4	3	4	2	**13**
Category A	1	2	0	2	**5**
GA-35 Airports Total	**43**	**41**	**33**	**33**	**150**

Focus-35 Airports — Pilot Deviations

	FY 2001	FY 2002	FY 2003	FY 2004	Total
Category D	53	52	44	40	**189**
Category C	29	16	19	21	**85**
Category B	14	6	6	1	**27**
Category A	4	3	0	3	**10**
Insufficient Data	0	0	0	0	**0**
Focus-35 Airports Total	**100**	**77**	**69**	**65**	**311**

4.3 Vehicle/Pedestrian Deviations

National Vehicle/Pedestrian Deviations

	FY 2001	FY 2002	FY 2003	FY 2004	Total
Category D	55	54	40	36	**185**
Category C	23	10	11	17	**61**
Category B	4	7	6	2	**19**
Category A	1	2	3	1	**7**
National Total	**83**	**73**	**60**	**56**	**272**

OEP-35 Airports — Vehicle/Pedestrian Deviations

	FY 2001	FY 2002	FY 2003	FY 2004	Total
Category D	10	10	13	12	**45**
Category C	8	4	3	6	**21**
Category B	2	3	1	0	**6**
Category A	0	1	1	0	**2**
OEP-35 Airports Total	**20**	**18**	**18**	**18**	**74**

GA-35 Airports — Vehicle/Pedestrian Deviations

	FY 2001	FY 2002	FY 2003	FY 2004	Total
Category D	11	10	3	8	**32**
Category C	1	2	1	4	**8**
Category B	0	1	1	0	**2**
Category A	0	0	0	0	**0**
GA-35 Airports Total	**12**	**13**	**5**	**12**	**42**

Focus-35 Airports — Vehicle/Pedestrian Deviations

	FY 2001	FY 2002	FY 2003	FY 2004	Total
Category D	19	13	15	18	**65**
Category C	11	4	3	11	**29**
Category B	1	3	1	0	**5**
Category A	0	1	1	0	**2**
Insufficient Data	0	0	0	0	**0**
Focus-35 Airports Total	**31**	**21**	**20**	**29**	**101**

Appendix D – Runway Incursion Data by Airport for FY 2001 through FY 2004 (Sorted Alphabetically by State)

Annual number, rate, and severity of runway incursions (RI) and the annual number of surface incidents (SI) for U.S. towered airports that reported at least one RI or SI from FY 2001 through FY 2004 are presented in the following table. Rates are given per 100,000 operations.

Definition of Table Headers:

State: Denotes the State where the airport of interest is located
Airport, City (Airport Code): Denotes the airport name, city location, and airport code
Region: Denotes the FAA geographical region where the airport is located
Severity: Identifies the corresponding RI category for each airport
Total RIs/SIs: Denotes the number of RIs and SIs
Annual RI Rate: The annual rate of runway incursions per 100,000 operations at each airport

ALABAMA

			Severity								
Airport, City (Airport Code)	**Region**	**Fiscal Year**	**Collision**	**A**	**B**	**C**	**D**	**ID**	**Total RIs**	**Annual RI Rate**	**Total SIs**
Birmingham International Airport, Birmingham (BHM)	ASO	2001									4
		2002					2		2	1.37	
		2003					1		1	0.65	10
		2004									6
Huntsville International Airport - Carl T. Jones Field, Huntsville (HSV)	ASO	2001									4
		2002									1
		2003					1		1	1.04	2
		2004									2
Mobile Regional Airport, Mobile (MOB)	ASO	2001									
		2002									1
		2003									
		2004									
Montgomery Regional Airport, Montgomery (MGM)	ASO	2001					1		1	1.01	
		2002				1			1	1.18	
		2003									1
		2004									1

ALASKA

			Severity								
Airport, City (Airport Code)	**Region**	**Fiscal Year**	**Collision**	**A**	**B**	**C**	**D**	**ID**	**Total RIs**	**Annual RI Rate**	**Total SIs**
Anchorage - Ted Stevens International Airport, Anchorage (ANC)	AAL	2001									8
		2002				2	5		7	2.30	2
		2003									2
		2004				2	2		4	1.31	4
Bethel Airport, Bethel (BET)	AAL	2001									8
		2002									4
		2003				1	1		2	1.77	
		2004					3		3	2.80	1

ALASKA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	ID	Total RIs	Annual RI Rate	Total SIs
Fairbanks International Airport, Fairbanks (FAI)	AAL	2001					1		1	0.73	6
		2002									9
		2003					3		3	2.16	5
		2004				1	2		3	2.41	4
Fort Yukon Airport, Fort Yukon (FYU)	AAL	2001									
		2002									
		2003									
		2004									1
Juneau International Airport, Juneau (JNU)	AAL	2001									3
		2002					1		1	0.77	1
		2003					1		1	0.78	1
		2004									1
Kenai Municipal Airport, Kenai (ENA)	AAL	2001				1			1	1.72	
		2002									
		2003									
		2004									
King Salmon Airport, King Salmon (AKN)	AAL	2001									1
		2002									5
		2003									
		2004									
Kodiak Airport, Kodiak (ADQ)	AAL	2001									4
		2002					1		1	3.19	4
		2003					1		1	3.03	
		2004					2		2	6.07	2
Lake Hood Sea Plane Base, Anchorage (LHD)	AAL	2001									6
		2002					1		1	1.60	10
		2003				1	3		4	5.46	5
		2004				1	1		2	2.88	3
Merrill Field, Anchorage (MRI)	AAL	2001			1	3	2		6	3.19	13
		2002			1	1	1		3	1.72	19
		2003					1		1	0.49	10
		2004				1	4		5	2.58	22

AMERICAN SAMOA

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	ID	Total RIs	Annual RI Rate	Total SIs
Pago Pago International Airport, Pago Pago (PPG)	AWP	2001					1		1	8.00	4
		2002									1
		2003									
		2004									

ARIZONA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Chandler Municipal Airport, Chandler (CHD)	AWP	2001				1	1		2	0.83	6
		2002					2		2	0.89	2
		2003									2
		2004									1
Deer Valley Municipal Airport, Phoenix (DVT)	AWP	2001					2		2	0.59	4
		2002				2	1		3	0.76	3
		2003				2			2	0.52	3
		2004				1	1		2	0.56	1
Flagstaff Pulliam Field, Flagstaff (FLG)	AWP	2001									
		2002									1
		2003									
		2004									
Gila Bend AF Aux, Gila Bend (GBN)	AWP	2001									1
		2002									
		2003									
		2004									
Glendale Municipal Airport, Glendale (GEU)	AWP	2001				1			1	0.90	3
		2002									
		2003									
		2004									1
Laughlin - Bullhead International Airport, Bullhead City (IFP)	AWP	2001		1	1	1	2		5	9.65	6
		2002									1
		2003									1
		2004									7
Love Airport, Prescott (PRC)	AWP	2001			1	1	4		6	1.89	1
		2002					2		2	0.59	3
		2003					4		4	1.29	2
		2004									1
Mesa - Falcon Field, Mesa (FFZ)	AWP	2001			1		1		2	0.78	2
		2002					3		3	1.10	3
		2003					1		1	0.35	4
		2004									2
Phoenix - Sky Harbor International Airport, Phoenix (PHX)	AWP	2001			1	4	5		10	1.59	7
		2002		1		1	4		6	1.04	
		2003					2		2	0.34	2
		2004				4	1		5	0.84	7
Phoenix Goodyear Airport, Phoenix (GYR)	AWP	2001				1	1		2	1.49	1
		2002									3
		2003				1			1	0.75	3
		2004									

ARIZONA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Ryan Field, Tuscon (RYN)	AWP	2001									
		2002									
		2003									
		2004					1		1	0.65	
Scottsdale Airport, Scottsdale (SDL)	AWP	2001									1
		2002					1		1	0.53	
		2003									1
		2004					1		1	0.50	1
Tucson International Airport, Tucson (TUS)	AWP	2001				2			2	0.78	4
		2002				1	2		3	1.13	3
		2003									1
		2004				1			1	0.41	2
Williams Gateway Airport, Phoenix (IWA)	AWP	2001				1	2		3	1.87	2
		2002					2		2	1.16	4
		2003					1		1	0.56	3
		2004				1			1	0.43	2

ARKANSAS

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Fort Smith Regional Airport, Fort Smith (FSM)	ASW	2001									2
		2002									1
		2003									
		2004									1
Little Rock - Adams Field, Little Rock (LIT)	ASW	2001				1	1		2	1.15	3
		2002									2
		2003					1		1	0.57	3
		2004				1	1		2	1.08	2
Northwest Arkansas Regional Airport, Fayetteville (XNA)	ASW	2001									1
		2002									
		2003									
		2004									
Springdale Municipal Airport, Springdale (ASG)	ASW	2001									
		2002									
		2003									
		2004					1		1	1.67	

CALIFORNIA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Brackett Field, La Verne (POC)	AWP	2001			1				1	0.43	6
		2002			1	2			3	1.20	3
		2003									3
		2004									2
Brown Field Municipal Airport, San Diego (SDM)	AWP	2001									
		2002									
		2003									1
		2004									1
Bob Hope Airport, Burbank (BUR)	AWP	2001									5
		2002				1	1		2	1.24	1
		2003				1	1		2	1.14	1
		2004									1
Camarillo Airport, Camarillo (CMA)	AWP	2001				1	1		2	1.12	9
		2002					2		2	1.01	14
		2003					1		1	0.51	12
		2004			1		3		4	2.37	4
Chino Airport, Chino (CNO)	AWP	2001				1	1		2	1.34	5
		2002		1			1		2	1.27	11
		2003					5		5	3.22	3
		2004					3		3	1.90	4
Concord - Buchanan Field, Concord (CCR)	AWP	2001				3	10		13	8.35	6
		2002		1	1		4		6	4.22	1
		2003				1	6		7	5.61	3
		2004		1			4		5	4.03	1
El Monte Airport, El Monte (EMT)	AWP	2001					1		1	0.57	2
		2002									
		2003									1
		2004									
Fresno - Yosemite International Airport, Fresno (FAT)	AWP	2001			1	2	3		6	2.05	5
		2002					4		4	2.40	2
		2003									
		2004					1		1	0.61	2
Fullerton Municipal Airport, Fullerton (FUL)	AWP	2001									
		2002				1			1	0.99	
		2003									
		2004									
General William J. Fox Airfield, Lancaster (WJF)	AWP	2001									1
		2002									1
		2003									
		2004									

CALIFORNIA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Hawthorne Municipal - Northrop Field, Hawthorne (HHR)	AWP	2001					1		1	1.30	2
		2002									
		2003									
		2004									
Hayward Executive Airport, Hayward (HWD)	AWP	2001									1
		2002					1		1	0.66	1
		2003									
		2004									
John Wayne - Orange County Airport, Santa Ana (SNA)	AWP	2001				4	8		12	3.11	13
		2002				2	2		4	1.06	7
		2003					1		1	0.28	3
		2004				2	2		4	1.10	4
Lake Tahoe Airport, South Lake Tahoe (TVL)	AWP	2001									
		2002									
		2003									
		2004									1
Long Beach - Daugherty Field, Long Beach (LGB)	AWP	2001				1	5		6	1.66	12
		2002				1	4		5	1.42	5
		2003			1	1	4		6	1.77	7
		2004				1	4		5	1.45	8
Los Angeles - Whiteman Field, Los Angeles (WHP)	AWP	2001					1		1	0.89	3
		2002									3
		2003									
		2004									1
Los Angeles International Airport, Los Angeles (LAX)	AWP	2001			3	3	3		9	1.15	12
		2002			2	2	2		6	0.94	10
		2003				1	8		9	1.43	7
		2004			1	2	4		7	1.08	4
Mather Airport, Sacramento (MHR)	AWP	2001									
		2002									
		2003									
		2004				1			1	1.24	1
McClellan - Palomar Airport, Carlsbad (CRQ)	AWP	2001									1
		2002									1
		2003									
		2004				1			1	0.48	1

CALIFORNIA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Meadows Field, Bakersfield (BFL)	AWP	2001				1			1	0.54	
		2002			1				1	0.63	
		2003			1		1		2	1.48	3
		2004				1			1	0.71	4
Metropolitan Oakland International Airport, Oakland (OAK)	AWP	2001				1	2		3	0.73	14
		2002									2
		2003									1
		2004									2
Modesto City County - Harry Sham Field, Modesto (MOD)	AWP	2001									1
		2002									
		2003									1
		2004					1		1	1.24	1
Monterey Peninsula Airport, Monterey (MRY)	AWP	2001									2
		2002									1
		2003									
		2004									
Napa County Airport, Napa (APC)	AWP	2001									
		2002									
		2003					1		1	0.80	1
		2004				1	1		2	1.72	
Norman Y. Mineta San Jose International Airport, San Jose (SJC)	AWP	2001		1		1			2	0.70	12
		2002					1		1	0.44	18
		2003					1		1	0.46	4
		2004			1	1			2	0.92	3
Ontario International Airport, Ontario (ONT)	AWP	2001									3
		2002									2
		2003					5		5	3.43	2
		2004				1			1	0.65	6
Oxnard Airport, Oxnard (OXR)	AWP	2001									
		2002									
		2003									
		2004				2			2	2.08	3
Palm Springs International Airport, Palm Springs (PSP)	AWP	2001				1	2		3	3.07	8
		2002					2		2	1.85	5
		2003					1		1	1.05	1
		2004					3		3	3.16	1

CALIFORNIA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	ID	Total RIs	Annual RI Rate	Total SIs
Palmdale Regional Airport, Palmdale (PMD)	AWP	2001					1		1	2.48	
		2002									1
		2003									
		2004									1
Palo Alto Airport of Santa Clara County, Palo Alto (PAO)	AWP	2001									
		2002									
		2003					1		1	0.47	
		2004									
Redding Municipal Airport, Redding (RDD)	AWP	2001									1
		2002									2
		2003									
		2004			1				1	1.28	
Reid - Hillview Airport of Santa Clara County, San Jose (RHV)	AWP	2001									1
		2002					1		1	0.43	2
		2003									1
		2004				1			1	0.49	
Riverside Municipal Airport, Riverside (RAL)	AWP	2001									
		2002			1				1	0.96	1
		2003									
		2004									
Sacramento Executive Airport, Sacramento (SAC)	AWP	2001									
		2002									
		2003			1		1		2	1.59	
		2004				1			1	0.74	
Sacramento International Airport, Sacramento (SMF)	AWP	2001									
		2002									3
		2003									1
		2004					1		1	0.61	1
Salinas Municipal Airport, Salinas (SNS)	AWP	2001				1			1	1.15	1
		2002									3
		2003									1
		2004				1			1	1.28	
San Diego - Gillespie Field, San Diego (SEE)	AWP	2001				1			1	0.56	11
		2002					1		1	0.55	4
		2003									5
		2004			1		1		2	1.01	6

CALIFORNIA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
San Diego - Montgomery Field, San Diego (MYF)	AWP	2001					3		3	1.37	4
		2002				1	1		2	0.83	3
		2003				1			1	0.45	
		2004					2		2	0.89	1
San Diego International Airport - Lindbergh Field, San Diego (SAN)	AWP	2001			1		2		3	1.41	1
		2002									3
		2003				1	1		2	0.97	1
		2004					1		1	0.47	2
San Francisco International Airport, San Francisco (SFO)	AWP	2001				2			2	0.49	9
		2002				1	3		4	1.14	4
		2003				2	1		3	0.89	
		2004				2	1		3	0.85	3
Santa Barbara Municipal Airport, Santa Barbara (SBA)	AWP	2001				2	1		3	1.82	8
		2002			1		1		2	1.24	8
		2003				2	2		4	2.59	6
		2004				2	1		3	2.00	4
Santa Maria Public - Hancock Field, Santa Maria (SMX)	AWP	2001									
		2002		1					1	0.62	
		2003									2
		2004									
Santa Monica Municipal Airport, Santa Monica (SMO)	AWP	2001					2		2	1.28	5
		2002			1	2			3	2.02	4
		2003									2
		2004					1		1	0.74	2
Sonoma County Airport, Santa Rosa (STS)	AWP	2001				2			2	1.44	11
		2002									5
		2003				1			1	0.85	
		2004									1
Stockton Metropolitan Airport, Stockton (SCK)	AWP	2001									1
		2002									
		2003									
		2004									
Van Nuys Airport, Van Nuys (VNY)	AWP	2001									1
		2002	1				4		5	1.00	2
		2003									2
		2004					1		1	0.22	5

CALIFORNIA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Vandenberg Air Force Base, Lompoc (VBG)	AWP	2001									
		2002									
		2003									
		2004									1
Zamperini Field, Torrance (TOA)	AWP	2001									1
		2002									1
		2003									
		2004									

COLORADO

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual R Rate	Total SIs
			Collision	A	B	C	D	ID			
Aspen - Pitkin County / Sardy Field, Aspen (ASE)	ANM	2001									3
		2002			1	1			2	4.25	
		2003				1	1		2	4.57	
		2004									
City of Colorado Springs Municipal Airport, Colorado Springs (COS)	ANM	2001									1
		2002									
		2003									
		2004		1					1	0.55	
Denver - Centennial Airport, Denver (APA)	ANM	2001					1		1	0.27	4
		2002					2		2	0.47	1
		2003				2	3		5	1.34	1
		2004				2	2		4	1.13	5
Denver - Jeffco Airport, Denver (BJC)	ANM	2001					2		2	1.21	14
		2002				1	1		2	1.10	5
		2003			1		1		2	1.18	4
		2004			1	2	1		4	2.14	8
Denver International Airport, Denver (DEN)	ANM	2001				1			1	0.19	1
		2002					1		1	0.20	1
		2003				1			1	0.20	
		2004				1			1	0.18	1
Eagle County Regional Airport, Eagle (EGE)	ANM	2001									
		2002									
		2003									1
		2004									

COLORADO – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Pueblo Memorial Airport, Pueblo (PUB)	ANM	2001									
		2002									1
		2003									
		2004				1			1	1.09	
Walker Field, Grand Junction (GJT)	ANM	2001									
		2002									1
		2003									
		2004					1		1	1.14	

CONNECTICUT

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Bradley International Airport, Windsor Locks (BDL)	ANE	2001				1	1		2	1.17	6
		2002									1
		2003									4
		2004									2
Danbury Municipal Airport, Danbury (DXR)	ANE	2001					2		2	1.80	5
		2002									1
		2003									
		2004									
Groton - New London Airport, Groton (GON)	ANE	2001				1	1		2	2.55	2
		2002									2
		2003									1
		2004									
Hartford - Brainard Airport, Hartford (HFD)	ANE	2001									
		2002									
		2003									
		2004					1		1	1.02	
Igor I. Sikorsky Memorial Airport, Bridgeport (BDR)	ANE	2001				1	2		3	3.31	
		2002									
		2003									1
		2004									
Waterbury - Oxford Airport, Oxford (OXC)	ANE	2001									
		2002									1
		2003									
		2004									1

DELAWARE

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
New Castle County Airport, Wilmington (ILG)	AEA	2001									
		2002				1			1	0.75	
		2003					1		1	0.84	
		2004				1			1	0.85	

DISTRICT OF COLUMBIA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Ronald Reagan Washington National Airport, Washington (DCA)	AEA	2001		1	1	1	1		4	1.22	
		2002									
		2003									
		2004									

FLORIDA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Albert Whitted Airport, St. Petersburg (SPG)	ASO	2001									2
		2002					1		1	1.01	
		2003									
		2004									
Boca Raton Airport, Boca Raton (BCT)	ASO	2001									
		2002									1
		2003				1			1	1.11	
		2004									
Cecil Field, Jacksonville (VQQ)	ASO	2001									
		2002									
		2003		1			1		2		1
		2004									
Craig Municipal Airport, Jacksonville (CRG)	ASO	2001									1
		2002					1		1	0.59	
		2003									
		2004									1
Daytona Beach International Airport, Daytona Beach (DAB)	ASO	2001		1		1			2	0.54	1
		2002			1				1	0.28	
		2003				1	1		2	0.59	1
		2004			1				1	0.32	3

FLORIDA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Fort Lauderdale - Executive Airport, Fort Lauderdale (FXE)	ASO	2001			1	5	9		15	6.07	20
		2002				2	7		9	3.67	27
		2003			1	2	3		6	2.63	14
		2004				1	2		3	1.41	6
Fort Lauderdale - Hollywood International Airport, Fort Lauderdale (FLL)	ASO	2001		1	1				2	0.67	2
		2002			1	1			2	0.73	
		2003			1	1	1		3	1.06	1
		2004					3		3	0.97	1
Jacksonville International Airport, Jacksonville (JAX)	ASO	2001									
		2002									1
		2003									
		2004					1		1	0.82	1
Kendall Tamiami - Executive Airport, Miami (TMB)	ASO	2001					1		1	0.54	1
		2002									
		2003					1		1	0.55	2
		2004					1		1	0.56	3
Key West International Airport, Key West (EYW)	ASO	2001									1
		2002									
		2003									
		2004									
Kissimmee Municipal Airport, Orlando (ISM)	ASO	2001		1					1	0.61	
		2002					1		1	0.70	6
		2003									1
		2004									
Lakeland - Linder Regional Airport, Lakeland (LAL)	ASO	2001									8
		2002	1				2		3	2.03	2
		2003			1	1			2	1.46	1
		2004									
Melbourne International Airport, Melbourne (MLB)	ASO	2001									
		2002				2			2	1.03	
		2003									
		2004									
Miami International Airport, Miami (MIA)	ASO	2001		1		1	1		3	0.61	
		2002					1		1	0.23	1
		2003			1		1		2	0.47	1
		2004				3	3		6	1.51	3

FLORIDA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual R Rate	Total SIs
			Collision	A	B	C	D	ID			
Naples Municipal Airport, Naples (APF)	ASO	2001				1			1	0.74	4
		2002									
		2003									
		2004									3
North Perry Airport, Hollywood (HWO)	ASO	2001									1
		2002									
		2003									
		2004					1		1	0.71	1
Opa Locka Airport, Miami (OPF)	ASO	2001									
		2002									
		2003									1
		2004									
Orlando - Executive Airport, Orlando (ORL)	ASO	2001		1		1			2	0.96	1
		2002					2		2	0.97	3
		2003		1					1	0.60	1
		2004				1			1	0.63	
Orlando - Sanford International Airport, Orlando (SFB)	ASO	2001									1
		2002									3
		2003									
		2004				2	3		5	1.38	3
Orlando International Airport, Orlando (MCO)	ASO	2001									2
		2002			1				1	0.33	
		2003									1
		2004									1
Page Field, Fort Myers (FMY)	ASO	2001									
		2002									1
		2003									
		2004									
Palm Beach International Airport, West Palm Beach (PBI)	ASO	2001			1		1		2	0.90	1
		2002				1	3		4	2.14	
		2003				1			1	0.51	2
		2004			1	2	1		4	2.02	4
Panama City - Bay County International Airport, Panama City (PFN)	ASO	2001									1
		2002									1
		2003									
		2004									1

FLORIDA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Pensacola Regional Airport, Pensacola (PNS)	ASO	2001				1			1	0.85	3
		2002					2		2	1.54	
		2003									1
		2004									2
Sarasota - Bradenton International Airport, Sarasota (SRQ)	ASO	2001		1		1	1		3	1.79	3
		2002			1				1	0.62	
		2003			1				1	0.73	
		2004									1
Southwest Florida International Airport, Fort Myers (RSW)	ASO	2001									
		2002									2
		2003									
		2004									
Space Coast Regional Airport, Titusville (TIX)	ASO	2001									
		2002					1		1	0.54	
		2003									
		2004									1
St. Augustine Airport, St. Augustine (SGJ)	ASO	2001									
		2002									
		2003									2
		2004									3
St. Lucie County International Airport, Fort Pierce (FPR)	ASO	2001									3
		2002									1
		2003				1			1	0.54	2
		2004									
St. Petersburg - Clearwater International Airport, St. Petersburg (PIE)	ASO	2001									
		2002					1		1	0.47	3
		2003									
		2004									
Tallahassee Regional Airport, Tallahassee (TLH)	ASO	2001									
		2002									2
		2003									1
		2004									3
Tampa International Airport, Tampa (TPA)	ASO	2001				1			1	0.37	
		2002									
		2003					1		1	0.43	2
		2004									2

FLORIDA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Vero Beach Municipal Airport, Vero Beach (VRB)	ASO	2001					1		1	0.45	
		2002			2		1		3	1.27	2
		2003				1	2		3	1.63	1
		2004									2
Witham Field, Stuart (SUA)	ASO	2001					1		1	0.83	
		2002									2
		2003									
		2004									

GEORGIA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Athens - Ben Epps Airport, Athens (AHN)	ASO	2001					1		1	1.44	
		2002									
		2003									
		2004									
Augusta Regional Airport at Bush Field, Augusta (AGS)	ASO	2001									1
		2002									
		2003									
		2004									
Cobb County Airport - McCollum Field, Marietta (RYY)	ASO	2001									
		2002									1
		2003									
		2004									
Columbus Metropolitan Airport, Columbus (CSG)	ASO	2001				1			1	1.96	1
		2002									1
		2003									
		2004									
Dekalb - Peachtree Airport, Atlanta (PDK)	ASO	2001			1	1	1		3	1.40	15
		2002				2	1		3	1.36	6
		2003			1	1			2	0.91	3
		2004				3	1		4	1.82	2
Fulton County Airport - Brown Field, Atlanta (FTY)	ASO	2001									
		2002									3
		2003									1
		2004									

GEORGIA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Gwinnett County Airport - Briscoe Field, Lawrenceville (LZU)	ASO	2001									
		2002									
		2003									
		2004									1
Hartsfield - Jackson Atlanta International Airport, Atlanta (ATL)	ASO	2001				1			1	0.11	
		2002			1		3		4	0.45	2
		2003		1		3	2		6	0.67	1
		2004		1		2	4		7	0.73	4
Middle Georgia Regional Airport, Macon (MCN)	ASO	2001									1
		2002									
		2003									
		2004									1
Savannah International Airport, Savannah (SAV)	ASO	2001				1			1	0.91	2
		2002		1	1				2	1.74	2
		2003									
		2004									2
Southwest Georgia Regional Airport, Albany (ABY)	ASO	2001									
		2002									1
		2003									2
		2004									
Valdosta Regional Airport, Valdosta (VLD)	ASO	2001				2	1		3	5.14	
		2002									
		2003									
		2004									

HAWAII

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Honolulu International Airport, Honolulu (HNL)	AWP	2001									
		2002									4
		2003				1	1		2	0.64	3
		2004				1			1	0.32	3
Kahului International Airport, Kahului (OGG)	AWP	2001									2
		2002									
		2003				1	1		2	1.30	3
		2004									1

HAWAII – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Kalaeloa Airport - John Rodgers Field, Kapolei (JRF)	AWP	2001									1
		2002									
		2003									
		2004									
Kona International at Keahole, Keahole (KOA)	AWP	2001									1
		2002									
		2003									
		2004									
Lihue Airport, Lihue (LIH)	AWP	2001									
		2002					1		1	0.98	1
		2003									
		2004									

IDAHO

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Boise Air Terminal - Gowen Field, Boise (BOI)	ANM	2001					3		3	1.82	8
		2002					1		1	0.61	7
		2003									3
		2004					1		1	0.60	1
Fanning Field, Idaho Falls (IDA)	ANM	2001									
		2002									2
		2003				1			1	2.00	2
		2004									
Friedman Memorial Airport, Hailey (SUN)	ANM	2001									
		2002									
		2003									
		2004									1
Joslin Field Magic Valley Regional Airport, Twin Falls (TWF)	ANM	2001									1
		2002									1
		2003									
		2004									

ILLINOIS

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Aurora Municipal Airport, Chicago / Aurora (ARR)	AGL	2001									
		2002									
		2003									
		2004									1
Dupage Airport, Chicago / West Chicago (DPA)	AGL	2001		1					1	0.52	3
		2002					1		1	0.57	2
		2003									1
		2004									1
Greater Peoria Regional Airport, Peoria (PIA)	AGL	2001									
		2002									
		2003									1
		2004									
Greater Rockford Airport, Rockford (RFD)	AGL	2001									2
		2002					1		1	1.19	3
		2003									2
		2004					1		1	1.34	3
Midway Airport, Chicago (MDW)	AGL	2001					2		2	0.71	
		2002									1
		2003					1		1	0.31	
		2004				3	1		4	1.17	
O'Hare International Airport, Chicago (ORD)	AGL	2001		1		5	3		9	0.97	7
		2002		1	1	3			5	0.55	1
		2003				6	1		7	0.76	6
		2004				4	3		7	0.71	5
Palwaukee Municipal Airport, Chicago (PWK)	AGL	2001		1			3		4	2.31	2
		2002			1				1	0.62	
		2003				1			1	0.59	
		2004				2	3		5	3.12	
Quad City International Airport, Moline (MLI)	AGL	2001									
		2002				1			1	1.47	3
		2003					2		2	2.99	3
		2004				2	1		3	4.54	3
Springfield - Capital Airport, Springfield (SPI)	AGL	2001									1
		2002					1		1	1.39	1
		2003									1
		2004									3

ILLINOIS – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
St. Louis Downtown - Parks Airport, Cahokia / St. Louis (CPS)	AGL	2001									4
		2002									
		2003				1			1	0.60	2
		2004				1	1		2	1.16	1
St. Louis Regional Airport, Alton / St. Louis (ALN)	AGL	2001									
		2002					1		1	1.21	
		2003									
		2004					1		1	1.42	1
University of Illinois - Willard Airport, Champaign / Urbana (CMI)	AGL	2001									
		2002					1		1	0.79	
		2003				1			1	0.75	
		2004									
Waukegan Regional Airport, Waukegan (UGN)	AGL	2001				3			3	3.15	2
		2002									3
		2003									1
		2004		1					1	1.21	

INDIANA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Evansville Regional Airport, Evansville (EVV)	AGL	2001		1					1	1.20	1
		2002				1			1	1.13	1
		2003									
		2004									
Fort Wayne International Airport, Fort Wayne (FWA)	AGL	2001									2
		2002									
		2003				1	1		2	2.45	3
		2004				1			1	1.20	1
Gary / Chicago Airport, Gary (GYY)	AGL	2001									
		2002									
		2003				1			1	2.10	
		2004									
Indianapolis International Airport, Indianapolis (IND)	AGL	2001					1		1	0.39	4
		2002					1		1	0.48	1
		2003				1	1		2	0.98	2
		2004									1

INDIANA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Monroe County Airport, Bloomington (BMG)	AGL	2001									
		2002									
		2003									
		2004									1
Purdue University Airport, Lafayette (LAF)	AGL	2001									
		2002									
		2003									
		2004					1		1	0.82	
South Bend Regional Airport, South Bend (SBN)	AGL	2001					2		2	2.69	2
		2002									1
		2003									1
		2004									
Terre Haute International Airport - Hulman Field, Terre Haute (HUF)	AGL	2001									1
		2002									1
		2003					1		1	1.14	1
		2004				1			1	1.11	

IOWA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Cedar Rapids - The Eastern Iowa Airport, Cedar Rapids (CID)	ACE	2001					1		1	1.33	
		2002									
		2003									
		2004									1
Des Moines International Airport, Des Moines (DSM)	ACE	2001				1	1		2	1.65	2
		2002					1		1	0.84	2
		2003					1		1	0.85	1
		2004				1	1		2	1.76	1
Dubuque Regional Airport, Dubuque (DBQ)	ACE	2001									1
		2002					2		2	3.78	4
		2003									
		2004									

IOWA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Sioux Gateway Airport, Sioux City (SUX)	ACE	2001					1		1	2.46	2
		2002									1
		2003									
		2004									2
Waterloo Municipal Airport, Waterloo (ALO)	ACE	2001									1
		2002					1		1	2.32	
		2003					1		1	2.70	2
		2004									

KANSAS

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Forbes Field Airport, Topeka (FOE)	ACE	2001									
		2002									1
		2003									5
		2004									
Garden City Regional Airport, Garden City (GCK)	ACE	2001									3
		2002									1
		2003									6
		2004				1	1		2	8.75	1
Hutchinson Municipal Airport, Hutchinson (HUT)	ACE	2001									3
		2002									
		2003									2
		2004									1
Johnson County Executive Airport, Olathe (OJC)	ACE	2001									
		2002									1
		2003									4
		2004									
Manhattan Regional Airport, Manhattan (MHK)	ACE	2001					1		1	2.12	2
		2002									
		2003									
		2004									
New Century AirCenter Airport, Olathe (IXD)	ACE	2001									1
		2002					2		2	2.75	
		2003				1			1	1.62	
		2004									1

KANSAS – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Phillip Billard Municipal Airport, Topeka (TOP)	ACE	2001									3
		2002									1
		2003									
		2004									
Salina Municipal Airport, Salina (SLN)	ACE	2001									
		2002									1
		2003				1			1	1.12	
		2004									1
Wichita Mid - Continent Airport, Wichita (ICT)	ACE	2001			1		1		2	0.94	1
		2002				1	1		2	0.93	7
		2003					1		1	0.55	1
		2004				1	1		2	1.12	2

KENTUCKY

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Blue Grass Airport, Lexington (LEX)	ASO	2001									1
		2002									1
		2003									
		2004									
Bowman Field Airport, Louisville (LOU)	ASO	2001					1		1	0.87	1
		2002				1			1	0.83	2
		2003									
		2004									
Cincinnati / Northern Kentucky International Airport, Covington / Cincinnati (CVG)	ASO	2001					1		1	0.26	
		2002				1	1		2	0.42	1
		2003				3	1		4	0.80	1
		2004				4	2		6	1.16	
Louisville International Airport - Standiford Field, Louisville (SDF)	ASO	2001				2			2	1.99	6
		2002					1		1	1.05	2
		2003			1		3		4	2.28	1
		2004									1
Owensboro - Daviess County Regional Airport, Owensboro (OWB)	ASO	2001									4
		2002									3
		2003									1
		2004									

LOUISIANA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Acadiana Regional Airport, New Iberia (ARA)	ASW	2001									
		2002									
		2003									3
		2004			1				1	1.40	1
Baton Rouge Metropolitan Airport, Baton Rouge (BTR)	ASW	2001					1		1	0.88	1
		2002				1	2		3	2.77	4
		2003					1		1	0.97	1
		2004									1
Lafayette Regional Airport, Lafayette (LFT)	ASW	2001									2
		2002				1			1	1.30	2
		2003									
		2004									
Lake Charles Regional Airport, Lake Charles (LCH)	ASW	2001									
		2002									1
		2003									
		2004									1
Lakefront Airport, New Orleans (NEW)	ASW	2001				1			1	0.77	2
		2002					1		1	0.90	2
		2003					1		1	1.02	
		2004									
Louis Armstrong - New Orleans International Airport, New Orleans (MSY)	ASW	2001									1
		2002					1		1	0.67	1
		2003					1		1	0.70	
		2004									
Monroe Regional Airport, Monroe (MLU)	ASW	2001									5
		2002									2
		2003									2
		2004									
Shreveport Downtown Airport, Shreveport (DTN)	ASW	2001					1		1	2.63	5
		2002									
		2003									
		2004									3
Shreveport Regional Airport, Shreveport (SHV)	ASW	2001									1
		2002					1		1	1.44	1
		2003									
		2004									1

MAINE

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Bangor International Airport, Bangor (BGR)	ANE	2001									
		2002									
		2003									2
		2004									1

MARYLAND

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Andrews Air Force Base, Clinton (ADW)	AEA	2001									2
		2002									2
		2003									4
		2004					1		1	1.30	3
Baltimore - Washington International Airport, Baltimore (BWI)	AEA	2001					1		1	0.30	
		2002			1		3		4	1.29	2
		2003				1	1		2	0.68	3
		2004				1	1		2	0.65	6
Hagerstown Regional Airport - Richard A. Henson Field, Hagerstown (HGR)	AEA	2001				2			2	3.84	
		2002									
		2003									
		2004									
Salisbury - Ocean City - Wicomico Regional Airport, Salisbury (SBY)	AEA	2001									
		2002									
		2003					1		1	1.98	
		2004				1			1	1.76	

MASSACHUSETTS

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Barnes Municipal Airport, Westfield (BAF)	ANE	2001					1		1	1.59	1
		2002									
		2003									
		2004									
Barnstable Municipal Airport - Boardman Polando Field, Hyannis (HYA)	ANE	2001									1
		2002									
		2003									
		2004			1	1			2	1.72	

MASSACHUSETTS – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Beverly Municipal Airport, Beverly (BVY)	ANE	2001					1		1	1.00	
		2002									
		2003					1		1	1.21	
		2004									
Boston - Logan International Airport, Boston (BOS)	ANE	2001			1	3	2		6	1.20	3
		2002				1			1	0.25	1
		2003				2			2	0.52	1
		2004					1		1	0.24	
Laurence G. Hanscom Field, Bedford (BED)	ANE	2001			1				1	0.48	2
		2002									1
		2003									
		2004									1
Lawrence Municipal Airport, Lawrence (LWM)	ANE	2001									1
		2002									1
		2003									1
		2004									
Martha's Vineyard Airport, Martha's Vineyard (MVY)	ANE	2001									1
		2002									
		2003									
		2004									
Nantucket Memorial Airport, Nantucket (ACK)	ANE	2001									1
		2002									1
		2003									
		2004			1				1	0.70	
New Bedford Regional Airport, New Bedford (EWB)	ANE	2001									1
		2002									
		2003									
		2004									
Norwood Memorial Airport, Norwood (OWD)	ANE	2001									3
		2002									
		2003									
		2004									

MICHIGAN

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Ann Arbor Municipal Airport, Ann Arbor (ARB)	AGL	2001									4
		2002				1			1	1.08	
		2003									
		2004									
Bishop International Airport, Flint (FNT)	AGL	2001					1		1	0.74	
		2002					1		1	0.75	
		2003									
		2004									
Detroit City Airport, Detroit (DET)	AGL	2001									3
		2002									
		2003									
		2004									
Detroit Metropolitan Wayne County International Airport, Detroit (DTW)	AGL	2001			2	1	1		4	0.74	5
		2002			1	2	1		4	0.82	7
		2003				1	2		3	0.61	
		2004					5		5	0.97	2
Gerald R. Ford International Airport, Grand Rapids (GRR)	AGL	2001									
		2002					1		1	0.79	1
		2003									
		2004									
Jackson County - Reynolds Field, Jackson (JXN)	AGL	2001				1	2		3	4.99	2
		2002				1	1		2	3.02	1
		2003									
		2004									
Kalamazoo - Battle Creek International Airport, Kalamazoo (AZO)	AGL	2001				2			2	2.10	4
		2002					1		1	1.03	
		2003									
		2004					1		1	1.05	
Lansing Capital City Airport, Lansing (LAN)	AGL	2001									
		2002									
		2003									1
		2004									
MBS International Airport, Saginaw (MBS)	AGL	2001									1
		2002									1
		2003									
		2004									

MICHIGAN – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Muskegon County Airport, Muskegon (MKG)	AGL	2001					1		1	1.21	3
		2002									2
		2003									5
		2004									1
Oakland County International Airport, Pontiac (PTK)	AGL	2001									
		2002									3
		2003									
		2004									1
Willow Run Airport, Detroit (YIP)	AGL	2001									4
		2002				1	3		4	3.39	7
		2003				1	2		3	2.65	13
		2004			1		1		2	1.74	1

MINNESOTA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Anoka County - Blaine Airport, Minneapolis (ANE)	AGL	2001					1		1	0.75	2
		2002									2
		2003									
		2004									1
Crystal Airport, Minneapolis (MIC)	AGL	2001									4
		2002					3		3	2.29	3
		2003					4		4	3.76	
		2004									1
Duluth International Airport, Duluth (DLH)	AGL	2001									3
		2002				1	1		2	2.69	6
		2003									4
		2004									
Flying Cloud Airport, Minneapolis (FCM)	AGL	2001				1			1	0.55	9
		2002				3	3		6	3.31	16
		2003				1	1		2	1.26	6
		2004				1			1	0.63	4
Minneapolis - St. Paul International Airport, Minneapolis (MSP)	AGL	2001				3	1		4	0.78	5
		2002				1	2		3	0.60	3
		2003				1	3		4	0.79	6
		2004				1	1		2	0.37	3

MINNESOTA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Rochester International Airport, Rochester (RST)	AGL	2001					1		1	1.29	4
		2002					1		1	1.44	1
		2003					1		1	1.42	1
		2004					1		1	1.45	
St. Paul Downtown - Holman Field Airport, St. Paul (STP)	AGL	2001									3
		2002					1		1	0.58	1
		2003									
		2004					1		1	0.76	5

MISSISSIPPI

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Golden Triangle Regional Airport, Columbus (GTR)	ASO	2001									
		2002									
		2003									
		2004									1
Gulfport - Biloxi International Airport, Gulfport (GPT)	ASO	2001					1		1	0.96	
		2002					1		1	0.92	2
		2003					1		1	0.94	6
		2004									1
Hawkins Field, Jackson (HKS)	ASO	2001									
		2002									
		2003									
		2004									1
Jackson International Airport, Jackson (JAN)	ASO	2001									1
		2002									3
		2003									
		2004									
Mid Delta Regional Airport, Greenville (GLH)	ASO	2001				1			1	2.84	
		2002									1
		2003									
		2004									
Tupelo Regional Airport, Tupelo (TUP)	ASO	2001									1
		2002									1
		2003									
		2004									

MISSOURI

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Cape Girardeau Regional Airport, Cape Girardeau (CGI)	ACE	2001									
		2002									
		2003					1		1	4.08	
		2004									1
Charles B. Wheeler - Downtown Airport, Kansas City (MKC)	ACE	2001									6
		2002					1		1	0.82	1
		2003									
		2004									
Columbia Regional Airport, Columbia (COU)	ACE	2001									1
		2002									
		2003									
		2004									
Joplin Regional Airport, Joplin (JLN)	ACE	2001					1		1	2.74	1
		2002					2		2	5.06	1
		2003									1
		2004									4
Kansas City International Airport, Kansas City (MCI)	ACE	2001									
		2002				1			1	0.51	1
		2003									1
		2004									
Lambert - St. Louis International Airport, St. Louis (STL)	ACE	2001				6	2		8	1.64	2
		2002					7		7	1.54	4
		2003			2	2	4		8	1.90	4
		2004				1			1	0.33	5
Spirit of St. Louis Field, St. Louis (SUS)	ACE	2001									3
		2002									2
		2003									
		2004									
Springfield - Branson Regional Airport, Springfield (SGF)	ACE	2001				1	1		2	1.99	
		2002									2
		2003					1		1	1.10	
		2004									

MONTANA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Billings - Logan International Airport, Billings (BIL)	ANM	2001									
		2002									
		2003									3
		2004					1		1	1.01	1
Great Falls International Airport, Great Falls (GTF)	ANM	2001									
		2002									1
		2003									
		2004									
Helena Regional Airport, Helena (HLN)	ANM	2001									
		2002									
		2003									
		2004				1			1	1.70	
Missoula International Airport, Missoula (MSO)	ANM	2001									1
		2002			1				1	1.56	1
		2003									
		2004									

NEBRASKA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Central Nebraska Regional Airport, Grand Island (GRI)	ACE	2001				1			1	4.27	
		2002									
		2003									3
		2004									1
Eppley Airfield, Omaha (OMA)	ACE	2001				2			2	1.36	7
		2002				1	1		2	1.40	4
		2003			1		1		2	1.40	3
		2004					1		1	0.71	3
Lincoln Municipal Airport, Lincoln (LNK)	ACE	2001					2		2	1.89	1
		2002									5
		2003									4
		2004									5

NEVADA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Elko Regional Airport, Elko (EKO)	AWP	2001									3
		2002									2
		2003									3
		2004					1		1	3.79	2
McCarran International Airport, Las Vegas (LAS)	AWP	2001			1	1	2		4	0.78	1
		2002				1	1		2	0.41	
		2003					3		3	0.60	4
		2004				2	2		4	0.72	4
North Las Vegas Airport, Las Vegas (VGT)	AWP	2001		1	1	1	6		9	4.47	6
		2002				1	6		7	3.48	1
		2003	1			2			3	1.34	3
		2004		1		1	1		3	1.30	3
Reno - Tahoe International Airport, Reno (RNO)	AWP	2001					1		1	0.70	7
		2002				2	1		3	2.07	3
		2003				2			2	1.43	10
		2004				2	1		3	2.08	6

NEW HAMPSHIRE

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Manchester Airport, Manchester (MHT)	ANE	2001									2
		2002									2
		2003			1				1	1.04	1
		2004									1

NEW JERSEY

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Atlantic City International Airport, Atlantic City (ACY)	AEA	2001									
		2002					1		1	0.80	1
		2003									
		2004									4
Essex County Airport, Caldwell (CDW)	AEA	2001									1
		2002				1			1	0.65	1
		2003									
		2004					1		1	0.93	2
Morristown Municipal Airport, Morristown (MMU)	AEA	2001									
		2002									
		2003			1	1			2	0.97	
		2004									1

NEW JERSEY – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Newark Liberty International Airport, Newark (EWR)	AEA	2001					3		3	0.65	5
		2002				1	1		2	0.49	4
		2003	1				2		3	0.74	2
		2004		1		1	3		5	1.15	4
Teterboro Airport, Teterboro (TEB)	AEA	2001					1		1	0.37	2
		2002		1			3		4	1.73	3
		2003					1		1	0.46	3
		2004				1	3		4	1.81	
Trenton Mercer Airport, Trenton (TTN)	AEA	2001									2
		2002									
		2003									1
		2004									

NEW MEXICO

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Albuquerque International Sunport, Albuquerque (ABQ)	ASW	2001		1		1			2	0.84	2
		2002			1	1			2	0.78	
		2003				1			1	0.44	1
		2004				1	1		2	1.00	
Roswell Industrial Air Center, Roswell (ROW)	ASW	2001									1
		2002									
		2003									1
		2004									
Santa Fe Municipal Airport, Santa Fe (SAF)	ASW	2001				1			1	1.28	1
		2002					1		1	1.15	
		2003									
		2004									

NEW YORK

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Albany International Airport, Albany (ALB)	AEA	2001					1		1	0.67	
		2002									1
		2003									
		2004					1		1	0.74	1
Binghamton Regional Airport, Binghamton (BGM)	AEA	2001			1				1	2.50	1
		2002									
		2003					1		1	2.65	
		2004					1		1	2.77	1
Buffalo Niagara International Airport, Buffalo (BUF)	AEA	2001									
		2002				1			1	0.73	
		2003									1
		2004		1					1	0.71	
Dutchess County Airport, Poughkeepsie (POU)	AEA	2001				1			1	0.74	3
		2002									
		2003									
		2004									1
Elmira Corning Regional Airport, Elmira (ELM)	AEA	2001									2
		2002									
		2003									5
		2004					1		1	2.00	1
Farmingdale Republic Airport, Farmingdale (FRG)	AEA	2001									3
		2002				1	1		2	0.97	2
		2003				1			1	0.53	
		2004					1		1	0.50	
Greater Rochester International Airport, Rochester (ROC)	AEA	2001			1	1	1		3	1.73	8
		2002									2
		2003				1			1	0.72	6
		2004									1
John F. Kennedy International Airport, New York City (JFK)	AEA	2001					3		3	0.88	2
		2002					2		2	0.69	3
		2003					1		1	0.34	3
		2004					1		1	0.31	
LaGuardia Airport, New York City (LGA)	AEA	2001			1	2	1		4	0.99	2
		2002				1	1		2	0.56	
		2003				1	1		2	0.53	2
		2004					1		1	0.25	1

NEW YORK – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Long Island MacArthur International Airport, Islip (ISP)	AEA	2001		1		1			2	0.86	1
		2002				1	1		2	0.90	1
		2003		1					1	0.54	1
		2004					1		1	0.56	
Niagara Falls International Airport, Niagara Falls (IAG)	AEA	2001									1
		2002									
		2003									
		2004									
Stewart International Airport, Newburgh (SWF)	AEA	2001									1
		2002									
		2003		1					1	0.91	
		2004		1					1	0.97	
Syracuse Hancock International Airport, Syracuse (SYR)	AEA	2001				1			1	0.68	2
		2002									1
		2003									
		2004									3
Tompkins County Airport, Ithaca (ITH)	AEA	2001									
		2002									2
		2003									1
		2004									
Westchester County Airport, White Plains (HPN)	AEA	2001					1		1	0.47	1
		2002				3			3	1.51	1
		2003					1		1	0.53	2
		2004			1				1	0.52	1

NORTH CAROLINA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Asheville Regional Airport, Asheville (AVL)	ASO	2001									1
		2002									
		2003									
		2004									1
Charlotte - Douglas International Airport, Charlotte (CLT)	ASO	2001				2	2		4	0.85	4
		2002					1		1	0.21	
		2003				1	2		3	0.68	2
		2004					1		1	0.22	3

NORTH CAROLINA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Craven County Regional Airport, New Bern (EWN)	ASO	2001									
		2002									1
		2003									2
		2004									
Hickory Regional Airport, Hickory (HKY)	ASO	2001									2
		2002					1		1	2.15	
		2003									
		2004									2
Kinston Regional Jetport at Stallings, Kinston (ISO)	ASO	2001									
		2002									
		2003					1		1	3.28	
		2004									
Piedmont Triad International Airport, Greensboro (GSO)	ASO	2001				1			1	0.72	
		2002					1		1	0.81	1
		2003					1		1	0.85	
		2004									1
Raleigh - Durham International Airport, Raleigh / Durham (RDU)	ASO	2001				2	1		3	1.02	6
		2002									3
		2003									4
		2004									
Wilmington International Airport, Wilmington (ILM)	ASO	2001					1		1	1.24	1
		2002					1		1	1.19	2
		2003				1	1		2	2.54	
		2004				1	1		2	2.42	

NORTH DAKOTA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Grand Forks International Airport, Grand Forks (GFK)	AGL	2001				1			1	0.39	2
		2002				1	1		2	0.71	
		2003									2
		2004		1	1				2	0.75	2
Hector International Airport, Fargo (FAR)	AGL	2001									2
		2002				2			2	2.34	2
		2003									
		2004									6

OHIO

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Akron - Canton Regional Airport, North Canton (CAK)	AGL	2001									2
		2002			1	1	1		3	2.50	2
		2003									3
		2004									1
Bolton Field, Columbus (TZR)	AGL	2001									1
		2002									
		2003									
		2004									
Cincinnati Municipal Airport - Lunken Field, Cincinnati (LUK)	AGL	2001					1		1	0.79	9
		2002				1			1	0.76	6
		2003				1	1		2	1.69	3
		2004									
Cleveland Hopkins International Airport, Cleveland (CLE)	AGL	2001					1		1	0.33	7
		2002					1		1	0.38	7
		2003									4
		2004				3	2		5	1.89	2
Cuyahoga County Airport, Cleveland (CGF)	AGL	2001									
		2002					1		1	1.49	
		2003									1
		2004									
Dayton International Airport, Dayton (DAY)	AGL	2001		1					1	0.74	4
		2002				1			1	0.80	3
		2003									1
		2004									1
Mansfield Lahm Regional Airport, Mansfield (MFD)	AGL	2001									
		2002									1
		2003									
		2004					1		1	2.73	
Ohio State University Airport, Columbus (OSU)	AGL	2001					1		1	1.05	1
		2002									
		2003									
		2004					2		2	2.00	1
Port Columbus International Airport, Columbus (CMH)	AGL	2001					1		1	0.41	
		2002									1
		2003				1			1	0.42	1
		2004					1		1	0.44	

OHIO – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Toledo Express Airport, Toledo (TOL)	AGL	2001									
		2002									1
		2003									1
		2004									
Youngstown - Warren Regional Airport, Vienna (YNG)	AGL	2001									1
		2002					1		1	1.06	1
		2003					1		1	1.32	1
		2004									

OKLAHOMA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Ardmore Municipal Airport, Ardmore (ADM)	ASW	2001									
		2002									
		2003									
		2004									1
Enid Woodring Regional, Enid (WDG)	ASW	2001					1		1	1.74	
		2002									
		2003									1
		2004									
Richard Lloyd Jones, Jr. Airport, Tulsa (RVS)	ASW	2001				1	1		2	0.77	
		2002				1			1	0.31	10
		2003			1				1	0.33	
		2004					1		1	0.35	
Stillwater Regional Airport, Stillwater (SWO)	ASW	2001									
		2002									
		2003									
		2004				1			1	1.67	2
Tulsa International Airport, Tulsa (TUL)	ASW	2001				1			1	0.51	
		2002									
		2003				1			1	0.57	1
		2004									4
University of Oklahoma - Westheimer Airport, Norman (OUN)	ASW	2001				1			1	0.85	
		2002									
		2003									
		2004									

OKLAHOMA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Wiley Post Airport, Oklahoma City (PWA)	ASW	2001									
		2002									3
		2003									1
		2004									
Will Rogers World Airport, Oklahoma City (OKC)	ASW	2001					1		1	0.58	1
		2002					1		1	0.58	2
		2003									1
		2004									5

OREGON

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Eastern Oregon Regional Airport at Pendleton, Pendleton (PDT)	ANM	2001									
		2002				1			1	2.89	
		2003									
		2004									
Hillsboro Airport, Hillsboro (HIO)	ANM	2001									
		2002					1		1	0.46	
		2003									
		2004			1				1	0.55	
Klamath Falls Airport, Klamath Falls (LMT)	ANM	2001					1		1	2.16	
		2002									1
		2003									
		2004									
Mahlon Sweet Field, Eugene (EUG)	ANM	2001				2	2		4	3.69	4
		2002				1	1		2	2.16	5
		2003				1			1	1.09	8
		2004					2		2	2.16	8
McNary Field, Salem (SLE)	ANM	2001									2
		2002				1	1		2	4.13	1
		2003									1
		2004									2
Portland International Airport, Portland (PDX)	ANM	2001									4
		2002									10
		2003					1		1	0.37	3
		2004									

OREGON – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Portland Troutdale Airport, Portland (TTD)	ANM	2001					1		1	1.43	3
		2002									5
		2003				1			1	1.35	6
		2004									1
Roberts Field, Redmond (RDM)	ANM	2001				2	1		3	5.57	
		2002				1	1		2	3.73	1
		2003									
		2004					1		1	1.78	

PENNSYLVANIA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Allegheny County Airport, Pittsburgh (AGC)	AEA	2001									5
		2002					1		1	0.83	1
		2003			1	1	1		3	2.92	
		2004					1		1	1.09	2
Capital City Airport, Harrisburg (CXY)	AEA	2001				1			1	1.50	
		2002				1			1	1.58	
		2003		1					1	1.95	
		2004									3
Erie International Airport - Tom Ridge Field, Erie (ERI)	AEA	2001									1
		2002									
		2003									
		2004									
Harrisburg International Airport, Harrisburg (MDT)	AEA	2001									
		2002									
		2003									
		2004									8
John Murtha - Johnstown - Cambria County Airport, Johnstown (JST)	AEA	2001									1
		2002									
		2003									
		2004									
Lancaster Airport, Lancaster (LNS)	AEA	2001									
		2002									
		2003									
		2004									1

PENNSYLVANIA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Lehigh Valley International Airport, Allentown (ABE)	AEA	2001									
		2002									
		2003									
		2004									1
Northeast Philadelphia Airport, Philadelphia (PNE)	AEA	2001									
		2002									
		2003									
		2004				1			1	0.90	1
Philadelphia International Airport, Philadelphia (PHL)	AEA	2001									3
		2002				1	1		2	0.43	3
		2003			1	4	6		11	2.45	2
		2004				2	5		7	1.53	6
Pittsburgh International Airport, Pittsburgh (PIT)	AEA	2001						1	1	0.22	1
		2002					1		1	0.23	
		2003					1		1	0.27	5
		2004				1			1	0.28	2
Reading Regional Airport - Carl A. Spaatz Field, Reading (RDG)	AEA	2001					1		1	0.68	
		2002				1			1	0.66	1
		2003									1
		2004									1
Wilkes-Barre / Scranton International Airport, Wilkes-Barre / Scranton (AVP)	AEA	2001									
		2002									1
		2003									
		2004									1
Williamsport Regional Airport, Williamsport (IPT)	AEA	2001									1
		2002					1		1	3.79	3
		2003									1
		2004									

PUERTO RICO

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Fernando Luis Ribas Dominicci - Isla Grande Airport, San Juan (SIG)	ASO	2001									
		2002									3
		2003									1
		2004				2	1		3	2.40	6
Luis Muoz Marin International Airport, San Juan (SJU)	ASO	2001				1	1		2	0.95	12
		2002				1	2		3	1.49	5
		2003									6
		2004									8

RATAK ISLANDS

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Bucholz AAF, Kwajalein (KWA)	AWP	2001									4
		2002									1
		2003									
		2004									

RHODE ISLAND

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
T.F. Green Airport, Providence (PVD)	ANE	2001				1			1	0.67	3
		2002					1		1	0.69	
		2003					1		1	0.75	1
		2004				1			1	0.85	

SOUTH CAROLINA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Charleston AFB / International Airport, Charleston (CHS)	ASO	2001									2
		2002									2
		2003					1		1	0.84	
		2004									3
Columbia Metropolitan Airport, Columbia (CAE)	ASO	2001									1
		2002									
		2003									2
		2004				2			2	1.73	

SOUTH CAROLINA – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Florence Regional Airport, Florence (FLO)	ASO	2001		1					1	2.58	
		2002									
		2003									
		2004									
Grand Strand Airport, North Myrtle Beach (CRE)	ASO	2001									
		2002									1
		2003									
		2004									
Greenville - Spartanburg Airport, Greer (GSP)	ASO	2001									
		2002									1
		2003									1
		2004									
Greenville Downtown Airport, Greenville (GMU)	ASO	2001									
		2002					1		1	1.22	1
		2003									
		2004									
Hilton Head Airport, Hilton Head Island (HXD)	ASO	2001									1
		2002									
		2003									
		2004									
Myrtle Beach International Airport, Myrtle Beach (MYR)	ASO	2001									
		2002									
		2003									1
		2004									1

SOUTH DAKOTA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Joe Foss Field, Sioux Falls (FSD)	AGL	2001					1		1	1.00	2
		2002					1		1	0.94	2
		2003				2			2	2.12	1
		2004									
Rapid City Regional Airport, Rapid City (RAP)	AGL	2001									
		2002									2
		2003				1			1	1.79	3
		2004									2

TENNESSEE

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Lovell Field, Chattanooga (CHA)	ASO	2001									1
		2002									1
		2003									
		2004									
McGee Tyson Airport, Knoxville (TYS)	ASO	2001				1	5		6	4.06	5
		2002					1		1	0.66	7
		2003				2	3		5	3.58	8
		2004									3
McKellar Sipes Regional Airport, Jackson (MKL)	ASO	2001									5
		2002									
		2003									
		2004									
Memphis International Airport, Memphis (MEM)	ASO	2001				1	2		3	0.75	3
		2002				1			1	0.25	3
		2003					2		2	0.50	3
		2004				1	3		4	1.05	1
Nashville International Airport, Nashville (BNA)	ASO	2001					1		1	0.41	2
		2002				1			1	0.43	1
		2003					1		1	0.44	4
		2004		1		1	1		3	1.28	5
Smyrna Airport, Smyrna (MQY)	ASO	2001									1
		2002									
		2003									
		2004				1	1		2	2.44	
Tri-Cities Regional Airport, Blountville (TRI)	ASO	2001									
		2002									
		2003					1		1	1.13	
		2004									1

TEXAS

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Abilene Regional Airport, Abilene (ABI)	ASW	2001									1
		2002									
		2003									
		2004									
Addison Airport, Dallas (ADS)	ASW	2001					1		1	0.62	2
		2002					1		1	0.63	
		2003				1	3		4	2.66	4
		2004									1

TEXAS – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Amarillo International Airport, Amarillo (AMA)	ASW	2001					1		1	0.82	
		2002									
		2003				1			1	0.83	1
		2004									
Austin - Bergstrom International Airport, Austin (AUS)	ASW	2001									
		2002									1
		2003									
		2004									
Brownsville South Padre Island International Airport, Brownsville (BRO)	ASW	2001					1		1	3.25	
		2002									
		2003									
		2004									1
Dallas / Fort Worth International Airport, Dallas (DFW)	ASW	2001		1	2	1	2		6	0.72	2
		2002									
		2003				2	4		6	0.78	
		2004				2	5		7	0.86	2
Dallas Love Field, Dallas (DAL)	ASW	2001									1
		2002									2
		2003				1			1	0.42	5
		2004				1	1		2	0.79	
David Wayne Hooks Memorial Airport, Houston (DWH)	ASW	2001					1		1	0.53	6
		2002			1	1			2	1.01	3
		2003				2	1		3	1.47	6
		2004				1			1	0.46	
Denton Municipal Airport, Denton (DTO)	ASW	2001									
		2002									
		2003									
		2004									2
East Texas Regional Airport, Longview (GGG)	ASW	2001									2
		2002					1		1	1.08	
		2003									1
		2004					1		1	1.15	2
El Paso International Airport, El Paso (ELP)	ASW	2001					1		1	0.77	1
		2002									
		2003									1
		2004				1			1	0.86	2

TEXAS – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Fort Worth Alliance Airport, Fort Worth (AFW)	ASW	2001									1
		2002									
		2003									
		2004									
Fort Worth Meacham International Airport, Fort Worth (FTW)	ASW	2001					1		1	0.40	2
		2002					1		1	0.43	1
		2003				1			1	0.65	5
		2004				1	1		2	1.39	1
George Bush Intercontinental Airport, Houston (IAH)	ASW	2001									
		2002					1		1	0.22	2
		2003									
		2004									1
Lubbock International Airport, Lubbock (LBB)	ASW	2001									1
		2002									3
		2003									3
		2004				1			1	1.24	4
McKinney Municipal Airport, McKinney (TKI)	ASW	2001									
		2002									2
		2003									
		2004									1
Palestine Municipal Airport, Palestine (PSN)	ASW	2001									
		2002									
		2003									1
		2004									
San Antonio International Airport, San Antonio (SAT)	ASW	2001			1				1	0.43	3
		2002				1	1		2	0.85	7
		2003				2	2		4	1.61	2
		2004					1		1	0.42	1
Stinson Municipal Airport, San Antonio (SSF)	ASW	2001									
		2002			1				1	0.54	
		2003									
		2004									
Sugar Land Regional Airport, Houston (SGR)	ASW	2001				2			2	2.10	1
		2002									
		2003									
		2004									1

TEXAS – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Texas A&M University Easterwood Airport, College Station (CLL)	ASW	2001									
		2002									
		2003		1					1	1.51	
		2004									
TSTC Waco Airport, Waco (CNW)	ASW	2001									
		2002									
		2003									1
		2004									1
Tyler Pounds Regional Airport, Tyler (TYR)	ASW	2001									2
		2002									
		2003									
		2004		1					1	1.24	1
Valley International Airport, Harlingen (HRL)	ASW	2001									
		2002									
		2003									1
		2004									
Waco Regional Airport, Waco (ACT)	ASW	2001					1		1	1.75	
		2002									
		2003									2
		2004									
William P. Hobby Airport, Houston (HOU)	ASW	2001				2			2	0.81	2
		2002					1		1	0.40	2
		2003			1	1	2		4	1.64	1
		2004				2			2	0.81	2

UTAH

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Ogden Hinckley Airport, Ogden (OGD)	ANM	2001									1
		2002									
		2003									
		2004									
Provo Municipal Airport, Provo (PVU)	ANM	2001									
		2002									1
		2003									
		2004									
Salt Lake City International Airport, Salt Lake City (SLC)	ANM	2001				1	1		2	0.55	7
		2002				2	2		4	1.00	5
		2003				1	2		3	0.75	7
		2004									5

VERMONT

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Burlington International Airport, Burlington (BTV)	ANE	2001					1		1	0.84	3
		2002					1		1	0.90	1
		2003									2
		2004									1

VIRGINIA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Lynchburg Regional Airport - Preston Glenn Field, Lynchburg (LYH)	AEA	2001									1
		2002									1
		2003									1
		2004									
Manassas Regional Airport - Harry P. Davis Field, Manassas (HEF)	AEA	2001				1			1	0.76	
		2002									1
		2003									
		2004									1
Norfolk International Airport, Norfolk (ORF)	AEA	2001									
		2002				1			1	0.78	1
		2003									1
		2004									1
Richmond International Airport, Richmond (RIC)	AEA	2001									4
		2002					1		1	0.74	2
		2003									3
		2004									1
Roanoke Regional Airport - Woodrum Field, Roanoke (ROA)	AEA	2001					1		1	1.02	3
		2002									2
		2003									1
		2004									
Washington Dulles International Airport, Sterling (IAD)	AEA	2001					1		1	0.23	
		2002									3
		2003				3			3	0.81	
		2004				1	2		3	0.68	1
Williamsburg International Airport, Newport News (PHF)	AEA	2001									2
		2002									1
		2003			1		1		2	0.98	1
		2004					1		1	0.43	

WASHINGTON

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Boeing Field - King County International Airport, Seattle (BFI)	ANM	2001									5
		2002		1					1	0.36	1
		2003				2	2		4	1.31	2
		2004				1			1	0.33	
Felts Field, Spokane (SFF)	ANM	2001				1			1	1.44	
		2002									1
		2003									
		2004									
Grant County International Airport, Moses Lake (MWH)	ANM	2001									2
		2002									1
		2003									1
		2004									
Olympia Airport, Olympia (OLM)	ANM	2001									2
		2002									
		2003									
		2004									
Renton Municipal Airport, Renton (RNT)	ANM	2001									
		2002					1		1	0.88	2
		2003					1		1	1.04	
		2004									2
Seattle - Tacoma International Airport, Seattle (SEA)	ANM	2001		1		2	1		4	0.94	8
		2002				1	3		4	1.11	8
		2003									5
		2004					2		2	0.56	3
Snohomish County - Paine Field, Everett (PAE)	ANM	2001				1	1		2	0.94	3
		2002									
		2003									1
		2004									2
Spokane International Airport, Spokane (GEG)	ANM	2001					1		1	0.89	1
		2002				1			1	0.93	
		2003					1		1	0.93	2
		2004									
Tri-Cities Airport, Pasco (PSC)	ANM	2001									
		2002									1
		2003				1			1	1.08	
		2004									
Yakima Air Terminal - McAllister Field, Yakima (YKM)	ANM	2001									2
		2002									1
		2003									1
		2004									2

WEST VIRGINIA

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Harrison Marion Regional Airport, Clarksburg (CKB)	AEA	2001					2		2	3.53	1
		2002									2
		2003									1
		2004									1
Morgantown Municipal Airport, Morgantown (MGW)	AEA	2001			1				1	2.40	
		2002									
		2003									
		2004									
Tri-State Airport - Milton J. Ferguson Field, Huntington (HTS)	AEA	2001									1
		2002									
		2003									1
		2004									
Yeager Field, Charleston (CRW)	AEA	2001					1		1	1.15	1
		2002									
		2003									3
		2004									

WISCONSIN

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Austin Straubel International Airport, Green Bay (GRB)	AGL	2001									
		2002									
		2003									
		2004									1
Central Wisconsin Airport, Mosinee (CWA)	AGL	2001									1
		2002									
		2003									
		2004									
Dane County Regional Airport - Truax Field, Madison (MSN)	AGL	2001				1			1	0.80	1
		2002									1
		2003			1	2			3	2.33	1
		2004			1				1	0.74	3
General Mitchell International Airport, Milwaukee (MKE)	AGL	2001			1		1		2	0.93	7
		2002				1			1	0.47	2
		2003				1	3		4	1.89	4
		2004					3		3	1.41	

WISCONSIN – continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Kenosha Regional Airport, Kenosha (ENW)	AGL	2001									1
		2002					1		1	1.17	3
		2003									
		2004									
Outagamie County Regional Airport, Appleton (ATW)	AGL	2001									
		2002									1
		2003									
		2004					1		1	1.93	
Rock County Airport, Janesville (JVL)	AGL	2001			1				1	1.24	1
		2002									1
		2003				1			1	1.32	2
		2004									
Waukesha County Airport, Waukesha (UES)	AGL	2001									
		2002									3
		2003									
		2004					2		2	2.22	
Wittman Regional Airport, Oshkosh (OSH)	AGL	2001			1		1		2	1.94	1
		2002									1
		2003	1						1	0.91	1
		2004				1	1		2	1.88	1

WYOMING

Airport, City (Airport Code)	Region	Fiscal Year	Severity						Total RIs	Annual RI Rate	Total SIs
			Collision	A	B	C	D	ID			
Jackson Hole Airport, Jackson (JAC)	ANM	2001									8
		2002									10
		2003									4
		2004		1					1	3.19	3

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