FAA
Air Traffic Organization

Annual Runway Safety Report *2009*

A Message from the FAA Administrator

Dear Colleagues:

We're making progress on the issue of runway safety, but as an agency and as an industry, we need to do more. This report details the strides we've made over the last year. It also includes our next steps to take what is arguably one of the safest locations in all of aviation—a U.S. runway—and make it safer still.

In the long term, runway safety is very, very good. Last year, we had 25 serious runway incursions. That's out of more than *58 million* operations. Serious runway incursions have dropped by more than half since 2001. Nine of those 25 serious incursions last year involved commercial aircraft. The 25 incursions were up one from the previous year, which was an all-time low.

But the 2008 totals show that we must increase our vigilance. Last year, runway incursions of all types increased by some 13 percent over 2007, rising from 891 to 1,009.

So far in fiscal year 2009, the data look promising with a projected drop in total incursions for the full year by some five percent and an accompanying reduction in serious incursions by at least 50 percent.

These data are encouraging. But while the actual runway incursion numbers are still a very thin slice of overall operations, as an aviation professional, I believe that very good is still not good enough.

As a result, we've redoubled our efforts to see more positive results in the short term. Since almost two thirds of incursions last year resulted from pilot deviations, we've required air carriers to retrain their crews. We also moved to have the carriers review cockpit procedures to identify and develop plans to minimize pilot distractions during taxi. All 112 carriers have complied with these efforts. Carriers also are emphasizing their recurrent training programs for non-pilots who operate aircraft or other vehicles on the airfield.

Earlier this year, more than 485,000 pilots received brochures and DVDs on runway safety via cooperative mailings with the Aircraft Owners and Pilots Association and the National Association of Flight Instructors.

We've taken action in other areas as well such as new technology, end-around taxiways, runway safety areas, new ATC procedures, and airport markings, lighting and signage. The pages that follow outline those and other initiatives.

As a pilot and as a passenger, I'm confident that they will bear fruit in the form of increased safety on our runways.

Sincerely,

J. Randolph Babbitt
Administrator, Federal Aviation Administration

FAA is Proactively Addressing Risk in the Runway Environment

The mission of the **Federal Aviation Administration (FAA) Office of Runway Safety** is *"To improve runway safety in the United States (U.S.) by decreasing the number and severity of surface incidents and runway incursions."* This mission is accomplished through the collaboration of the FAA and its many stakeholders in the aviation community.

The FAA and its air traffic control system, along with pilots and airport operators work together every day to ensure that procedures are followed, coordination of safe aircraft movement occurs, and that airport infrastructure is maintained. This creates a system of checks and balances designed to mitigate risk in the runway environment. Additionally, the FAA also partners with aircraft operators, pilots, airport managers and industry groups to proactively review the effectiveness of these checks and balances and identify additional means to improve safety.

Given the complexities of the runway environment and the relatively infrequent occurrence of runway incursions, the FAA tracks the frequency and severity of runway incursions on a national level to determine if the system is working in addition to looking for specific cause and effect relationships at individual airports. Moreover, in fiscal year (FY) 2008, the FAA adopted the International Civil Aviation Organization's (ICAO) standard definition of a runway incursion. This more broadly scoped definition provides for the inclusion of additional surface incidents that were previously not considered runway incursions. By including additional events to review and analyze, the FAA is gaining a greater understanding of the contributing factors to the occurrence of runway incursions as well as of the effectiveness of the various strategies being implemented to improve runway safety. With more data, the FAA can better prevent the occurrence of more serious runway incursions and accidents in the runway environment.

Adjusting for the adopted definition of runway incursion, in FY 2008 there were 13 percent more runway incursions compared to the prior fiscal year. The FAA Office of Runway Safety immediately took note of the unfavorable trend. Despite all the efforts for improving runway safety that were in place, runway incursions were occurring at a greater rate than in prior years. As a result, the FAA proactively began to address this trend so as to make changes to prevent more close calls or an accident.

Given the emergence of increasing runway incursions and armed with the Call to Action for Runway Safety previously initiated by the FAA in August 2007, it was time to re-emphasize to all its stakeholders the importance of the checks and balances in the system—heightened awareness, training, procedures, technology, a voluntary reporting

system, airport signage and markings—and to work together to identify other places where the system may be vulnerable to human error and therefore create potential for runway incursions to occur.

Led by the FAA, more than 40 aviation leaders from airlines, airports, air traffic control and pilot unions, and aerospace manufacturers agreed to an ambitious plan. The aviation community accomplished all of the short term goals for cockpit and air traffic control procedures, training, upgraded airport markings, analysis of wrong runway departures, and the initial development of a voluntary reporting program for air traffic controllers prior to the close of FY 2008 (SEE FIGURE 1). The FAA is monitoring FY 2009 runway incursion trends for signs of improvement as a result of these efforts and also moving forward with plans for the mid- and long-term goals defined as part of the Call to Action.

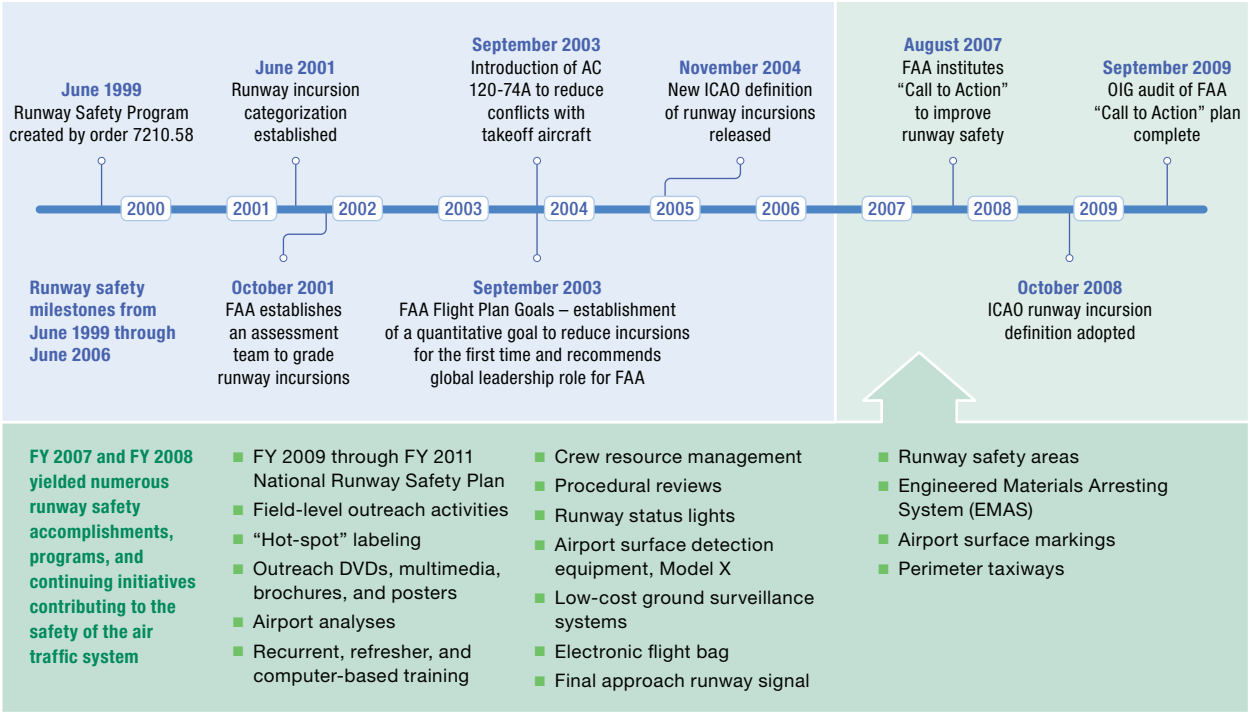
The Office of Runway Safety publishes this annual report to educate and inform all aviation stakeholders of the ongoing efforts to improve runway safety as part of its Runway Safety Management Strategy.

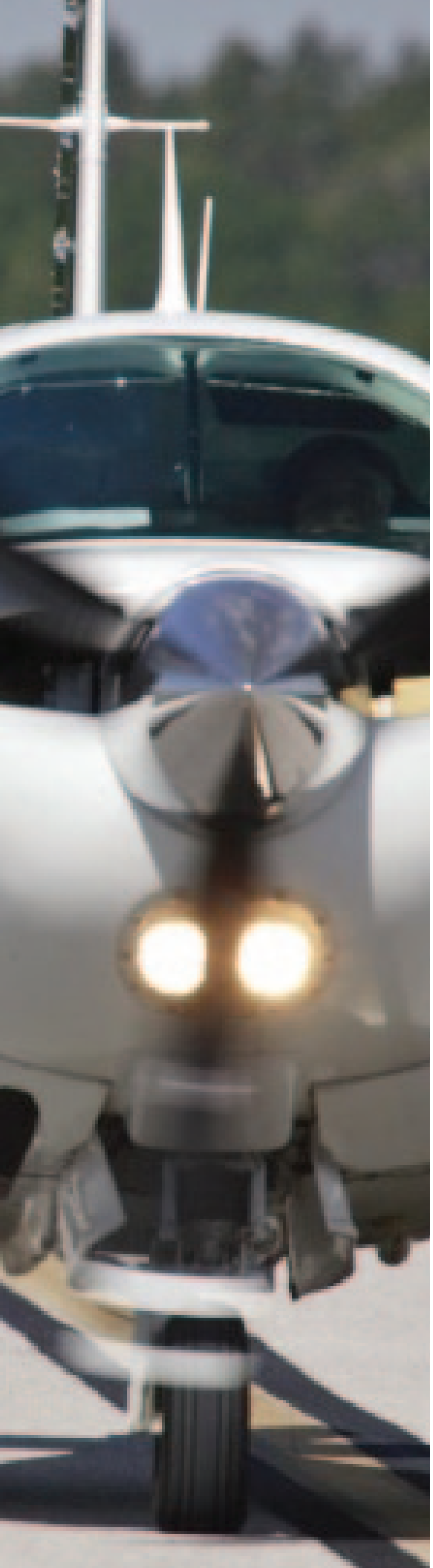
The *2009 FAA Annual Runway Safety Report* presents the FAA's progress towards the Flight Plan goals and performance targets for runway safety. The Report also articulates the various initiatives that were part of the Runway Safety Management Strategy to achieve these goals for FY 2005 through FY 2008. In cases where sufficient time has passed since the implementation of a particular strategy, runway incursion trends are presented to demonstrate the relative contribution of these strategies towards improving runway safety.

To learn more about the FAA's plans for runway safety in FY 2009, the following FAA publications are available at **www.faa.gov**:

- *National Runway Safety Plan FY 2009 through FY 2011*
- *FAA Flight Plan 2009-2013*
- *FAA Portfolio of Goals 2009*
- *FAA Office of Safety, Safety Blueprint, April 2009*

Figure 1
Runway Safety Priorities and Progress





FAA Measures Runway Safety

Pilots safely completed more than 58 million takeoffs and landings at over 500 U.S. airports with air traffic control towers in FY 2008 alone. To continuously operate safely and efficiently, the National Airspace System (NAS) relies on clear communication and smooth coordination among more than 15,000 air traffic controllers, nearly 600,000 pilots, and a wide variety of airport vehicle operators. Runway safety is ultimately a shared responsibility. Pilots, air traffic controllers, ground crews, and airport operators all work together to keep our runways safe.

This shared responsibility (SEE FIGURE 2) is reinforced by a system of "checks and balances" that include the following:

- 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

Figure 2
Runway safety is a shared responsibility in the airport environment

The FAA manages runway safety with initiatives designed to reinforce these checks and balances. When performing well, they mitigate or even prevent errors in communication or coordination from leading to incidents that may reduce safety in the runway environment.

To evaluate how well these checks and balances are working, the FAA monitors the frequency and severity of runway incursions. U.S. airports with air traffic control services must report any incident that occurs on the surface of a runway environment or on any other airport movement area. The FAA reviews all of these incidents and identifies a subset as runway incursions. On October 1, 2007, as part of its Flight Plan Goal for international leadership, the FAA adopted the ICAO standard definitions for runway incursions and runway incursion severity.

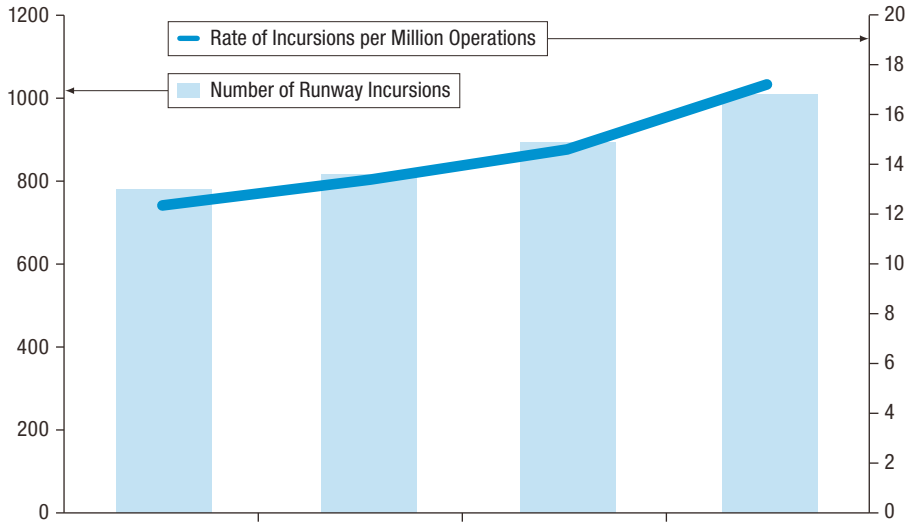
Beginning FY 2008 the FAA defines a runway incursion as:
"Any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft."

All runway incursions from FY 2008 forward are, and will, continue to be categorized using this definition.

The FAA previously tracked any incident that did not involve potential aircraft conflicts as a "surface incident." Because the FAA did not consider these incidents to be runway incursions, they were tracked and monitored separately. As a result of the FAA's adoption of the ICAO definition, the FAA has a wider range of incursion data to analyze providing for a greater understanding of contributing factors in the occurrence of runway incursions.

The FAA also adopted the ICAO definitions for runway incursion severity. These definitions categorize those events previously tracked as non-runway incursions in Category D—low-risk incidents with either no conflict potential, or ample time or distance to avoid a collision. The majority of runway incursions (see figure 3) in the U.S. continued to be Category C and Category D (see Table 1 and Figure 4) events[1] during this four-year period. Based on the new ICAO definitions, in FY 2008 there were 1,009 total runway incursions compared to 892[2] runway incursions in FY 2007, a 13 percent increase.

Figure 3
Number and Rate of Runway Incursions (FY 2005 through FY 2008)



	FY 2005 est.	FY 2006 est.	FY 2007 est.	FY 2008	Total
Number of Runway Incursions	779	816	892	1009	**3,496**
Rate of Runway Incursions per Million Operations	12.3	13.4	14.6	17.2	**14.3**
Total Number of Operations	**63,104,415**	**61,076,341**	**61,133,748**	**58,562,343**	**243,876,847**

Of the 25 serious runway incursions (Category A and B) in FY 2008, nine involved commercial flights. At this rate (nine in over 24 million operations) a person could fly on one commercial flight every day for as many as 3,768 years without encountering a serious runway incursion.

[1] FY 2005 through FY 2007 data has been interpolated using the new definition of severity and as such are only estimates. FY 2008 data was collected using the new definition of severity and as such are actual. Reference Data IV lists the number and rate of runway incursions for all U.S. towered airports that reported at least one runway incursion or surface incident over the four year period.

[2] For the purposes of this report, runway incursion data prior to FY 2008 was re-categorized to reflect the ICAO definition, FY 2005 through FY 2007 data shown in the chart above are estimates to reflect the re-categorization.

Table 1
Runway Incursion Severity Classification

Category	Description
Accident	Refer to ICAO Annex 13 definition of an accident.
A	A serious incident in which a collision was narrowly avoided.
B	An 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.
C	An incident characterized by ample time and/or distance to avoid a collision.
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 take-off of aircraft but with no immediate safety consequences.

Figure 4
Runway Incursion Severity Distribution FY 2005 through FY 2008

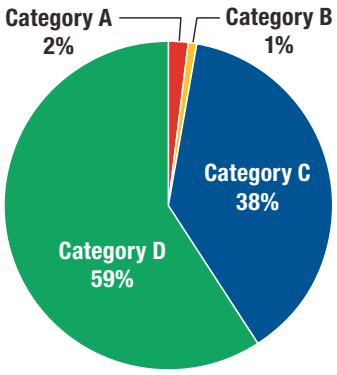
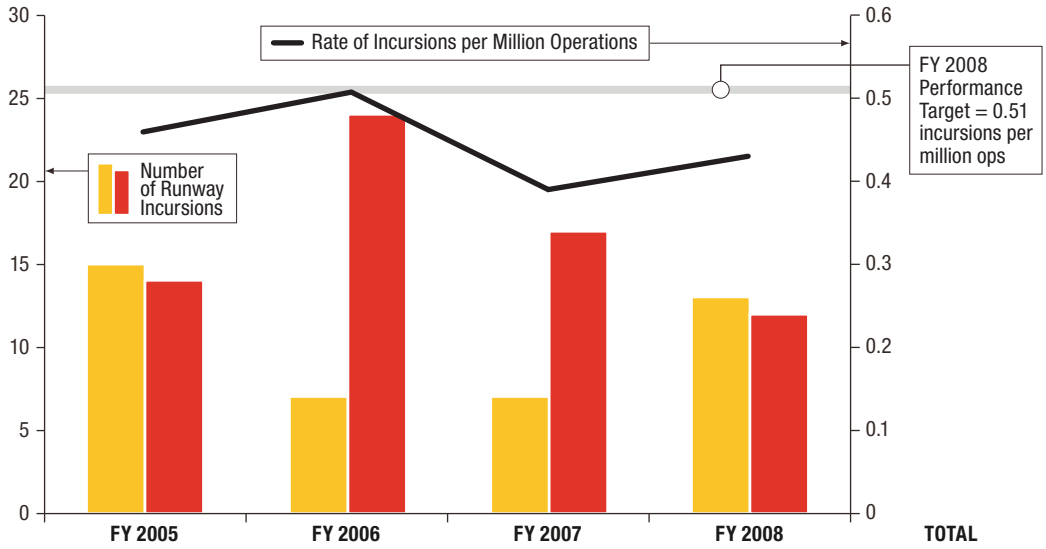


Figure 5
Total Number and Rate of Category A and Category B Runway Incursions (FY 2005 through FY 2008)



	FY 2005		FY 2006		FY 2007		FY 2008		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	15	0.24	7	0.11	7	0.11	13	0.22	42	0.17
Category A	14	0.22	24	0.39	17	0.28	12	0.20	67	0.27
Total	**29**	**0.46**	**31**	**0.51**	**24**	**0.39**	**25**	**0.43**	**109**	**0.45**

In FY 2008, there was one Category A runway incursion that resulted in a collision between a business jet and an airport mowing vehicle at Reading, Regional Airport in Reading, PA. Both the jet and the mower had received clearance to enter the runway. Although the aircraft's left wing was seriously damaged, no injuries resulted from the collision. For the period of FY 2006 through FY 2008, however, the overall trend for Category A runway incursions was downward indicating an impact of the various runway safety initiatives during the period.

The FAA Flight Plan for 2008 – 2012 performance target is to limit the most serious runway incursions (Category A and Category B) to a rate of no more than 0.45 runway incursions per million operations by FY 2010 and maintain or improve that rate through FY 2013. The FAA FY 2008 Portfolio of Goals sets forth a performance target of 0.51 runway incursions per million operations specifically for FY 2008. The FAA met both of these goals by holding runway incursions to a rate of 0.43 runway incursions per million operations in FY 2008 (SEE FIGURE 5).

FAA Strategies for Continued Improvement in Runway Safety

Although the occurrence of Category A runway incursions has recently declined, the overall increase of runway incursions in prior fiscal years, including some particularly close calls (SEE TABLE 2), has led the FAA to proactively respond to mitigate the occurrence of future serious runway incursions.

As part of the Runway Safety Strategy on August 15, 2007 the FAA announced the "Call to Action for Runway Safety". The FAA's Call to Action focused on a) cockpit procedures, b) air traffic procedures, c) airport signage and safety markings, d) technology, and e) training. Led by the FAA, more than 40 aviation leaders from airlines, airports, air traffic control, pilot unions, and aerospace manufacturers worked together to identify other places where the NAS may be vulnerable to human error and therefore create potential for runway incursions.

a) **Cockpit procedures** address the vital communications, such as the completion of safety checklists, which occur between members of a flight crew during all phases of flight, from pushback to arrival. Flight communications must be crisp and precise to ensure that the crew works as an effective team and that a sterile cockpit operating environment is maintained. It is also critical for a flight crew to seamlessly communicate with air traffic control. The FAA asked air carriers to review cockpit procedures to identify and develop a plan to address elements that contribute to pilot distraction during taxi. Of the 112 active air carriers, all have reported that they are in compliance.

b) **Air traffic procedures** address the coordination between the flight crew and air traffic controllers. Pilots must effectively coordinate with controllers, and controllers must coordinate with other controllers to maintain constant situational awareness and positive control of movements on the airport surface. The FAA has developed a variety of initiatives designed to improve communication and address explicit taxi instructions between flight crews and controllers, such as Hearback/Readback Awareness Month.

c) **Airport signage and safety markings** increase situational awareness for pilots and airport service vehicle operators. These signs and markings are key to helping pilots decide how to proceed safely with routine movements around an airport. Signage and safety markings can be compared with the road signs and painted lane stripes that guide everyday automobile traffic. The FAA regularly updates standards for runway marking and signs, eliminating confusion on airfields. The 75 largest (based on traffic volume) U.S. airports completed enhancements to their surface markings in FY 2008; the majority of medium- and small-sized airports are on track to meet their future deadlines for enhancing surface

Table 2
Runway Incursion Events That Prompted Action

Event Date	Airport Code	Airport	Brief Summary
3/21/2006	ORD	Chicago O'Hare	An Airbus A319 was instructed to hold short of Runway 4L, as an another aircraft was exiting the same runway. Simultaneously, an Embraer E145, was instructed to hold short of an intersecting runway. When the aircraft cleared runway 4L, the A319 was cleared for takeoff from Runway 4L. After approximately half-a-minute the Embraer was also cleared for take-off on the intersecting runway. Shortly thereafter the Local Monitor noticed both aircraft were rolling at the same time and told the Local Control, who canceled takeoff instructions to both aircraft. Closest proximity reported was 100 feet horizontal when the Embraer aborted its take-off after having applied maximum breaking. The Embraer had entered the intersection and the A319 had stopped just prior to edge of the intersection.
07/11/2007	FLL	Fort Lauderdale/ Hollywood	An Airbus A320 was instructed to taxi to Runway 9L. The A320 missed a left turn and ended up Runway 9L without a clearance. A go around was issued to a Boeing B757 who was about to touch down on Runway 9L. The B757 executed a go around immediately and over flew the A320 by approximately 50 feet.

markings. A safety review performed by the FAA at 20 airports resulted in more than 100 short-term initiatives, of which all have been completed. Implementation of these initiatives resulted in reducing serious runway incursions (Category A and Category B) by 50 percent.

d) **Technology implementation** in the airport environment, control tower and cockpit are designed to support operators in their compliance to procedures and recognition of potential hazards in the runway environment. The FAA is in the process of helping airports across the country install runway safety-enhancing technologies such as Airport Surface Detection Equipment, Model X (ASDE-X), Runway Status Lights (RWSL), and Final Approach Runway Occupancy Signal (FAROS). Low-cost ground surveillance systems are currently being tested at small and medium sized airports, providing scalable and adaptable coverage to the entire airport movement area, addressing poor visibility conditions. This technology provides near-term safety improvements for these airports, providing the future option of layering additional runway safety technologies as needed.

e) **Training** provides pilots, air traffic controllers, and ground crews with the skills they need to perform their jobs safely. The FAA issued an advisory recommending initial and regular recurrent ground movement training for all individuals with access to airport movement areas, including non-airport employees. Updated guidance soon to be released, was specifically designed for tug and tow operators to complement existing air carrier tug and tow training programs.

Figure 6
Runway Safety Management Strategy

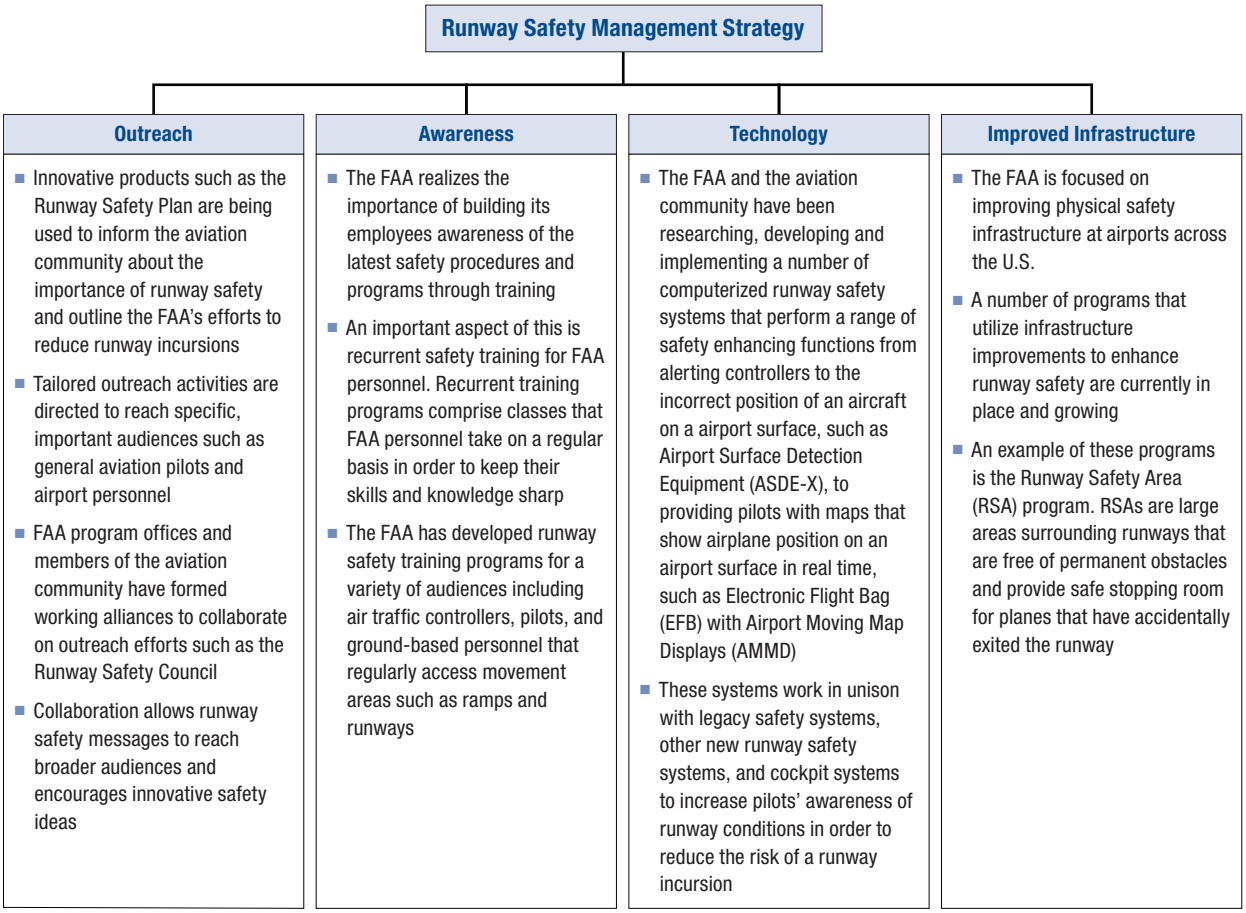


Figure 7
Runway Safety Activities

Runway Safety Management Strategy

The FAA Office of Runway Safety is contributing to the development of a proactive safety culture across the aviation community through its leadership and actions to prevent additional serious runway incursions. As FY 2008 began, developments in runway safety highlighted the need for the FAA to implement a response such as the Call to Action program. But the Call to Action is only one part of the FAA's runway safety improvement efforts. The FAA has been developing its broader Runway Safety Management Strategy for the last decade. The Runway Safety Management Strategy (SEE FIGURE 6) encompasses all of the initiatives and programs that the FAA currently administers to improve the safety of runways in the U.S. This Strategy stresses the importance of outreach to the aviation community, provides a means to increase the community's awareness of hazards contributing to runway incursions, identifies emerging technology for runway incursion prevention, and recommends areas for improved airport infrastructure.

Outreach

A critical component of the FAA Runway Safety Management Strategy is the Outreach program. The FAA directs messaging to engage aviation stakeholders on a variety of topics to address runway safety concerns. Outreach programs disseminate information that explains the roles that individual aviation users play in making runways safer. The FAA Office of Runway Safety employs outreach programs to target aviation industry stakeholders, FAA Air Traffic Organization (ATO) offices, airport executives, and trade associations that are responsible for runway safety.

The Office of Runway Safety's Outreach activities (SEE FIGURE 7) use a variety of media tools to reach their intended audiences. These tools range from traditional approaches to the latest technology, such as brochures and interactive programs, (DVDs and Adobe Flash presentations). Using this type of multi-media outreach to educate and communicate to the aviation stakeholders reinforces the safety learning objectives established by the FAA's Office of Runway Safety. In FY 2008 Outreach programs relayed information such as the National Runway Safety Plan, "Hot Spots" labeling, Hearback/Readback awareness month and other programs detailed below.

National Runway Safety Plan

In 2007, the General Accounting Office (GAO) issued a report entitled *Aviation Runway and Ramp Safety: Sustained Efforts to Address Leadership, Technology, and Other Challenges Needed to Reduce Accidents and Incidents*. The GAO suggested that the FAA develop a forward-looking plan to inform Congress and other aviation stakeholders of the FAA's plans for runway safety management and achieving its performance targets. In early 2009 the Office of Runway Safety published the *National Runway Safety Plan for FY 2009–FY 2011*.

The National Runway Safety Plan outlines the FAA's goals to improve runway safety including near- and mid-term actions designed to reduce the severity and occurrence of runway incursions. The plan addresses recommendations from the Department of Transportation (DOT) Inspector General, National Transportation Safety Board (NTSB), and the GAO for:

- Human factors that lead to runway incursions
- Improvements to airport layout and movement areas to increase safety
- Improvements to airport signage, lighting and markings, training, education and awareness programs
- The need for increased industry participation, international cooperation, and the development of various technologies

Safety Summit

The Office of Runway Safety has proactively reached out to the aviation workforce by delivering safety messages tailored to specific programs and airports. The FAA has engaged aviation employees at the regional and local airport levels to address the unique safety concerns of individual facilities. For example, the Office of Runway Safety hosted *Regional Runway Safety Summits* in Fort Worth, Atlanta, and Seattle in April, June, and July 2008, respectively. The *Summits* featured presentations from noted aviation safety leaders and experts. Breakout working groups and FAA safety recommendation sessions provided real-time feedback for stakeholders. Registrations for the *Summits* were free and attracted more than 500 combined participants from various segments of the aviation industry.

Regional Runway Safety Program Managers (RRSPM) coordinate and administer most of the FAA's outreach activities at the local airports. One of the primary activities RRSPMs are involved in is the conduct of Runway Safety Action Team (RSAT) meetings, which are held at airports that report frequent or severe runway incursions. The goal of these meetings is to identify and address existing and potential runway safety problems. One of the 115 RSAT meetings held in 2008 was *"The Methods Used by Professional Pilots to Ensure Runway Safety."* This meeting, held in South Burlington, VT, targeted general aviation pilots and highlighted best practices used by professional pilots.

Additional outreach activities which RRSPMs coordinate in the field include Safety Meetings, Incident Investigations, and Fly-Ins such as *"Runway Safety–Fly-In / Drive-In Breakfast Safety Seminar"* which occurred at Youngstown-Warren Regional Airport (YNG). The fly-in provided the opportunity for pilots to come together and discuss local procedures and how to safely fly in the Youngstown Ohio area. RRSPMs also conducted a variety of local follow-up meetings such as the *"Rocky Mountain Metropolitan Airport Runway Safety Action Team Out Briefing"* which was held in June 2008 at Rocky Mountain Metropolitan Airport in Broomfield, CO. The briefing provided

Table 3
Runway Safety Field Activities (FY 2008)

Runway Safety Field Activities (FY 2008)	Total
RRPSM RSAT	115
Local Follow Up	106
Safety Meetings	269
Incident Investigations	290
Fly-ins	25
Other Meetings	29
Total Major Activities	**834**

the local community with an opportunity to review the results of a recent FAA safety inspection. RRSPMs successfully oversaw the completion of a total of 834 various meetings in FY 2008 (SEE TABLE 3). This commitment to addressing safety concerns on a local level helps regions and individual airports more effectively tailor the safety concepts and programs directed by the Office of Runway Safety to their unique needs.

Hot Spots

The FAA is in the process of adding "Hot Spots" to National Aeronautical Charting Office (NACO) diagrams to bring attention to movement areas that have previously contributed to the occurrence of runway incursions (SEE FIGURE 8). ICAO defines a hot spot as "a location on an aerodrome movement area with a history or potential risk of collision or runway incursion, and where heightened attention by pilots and drivers is necessary."

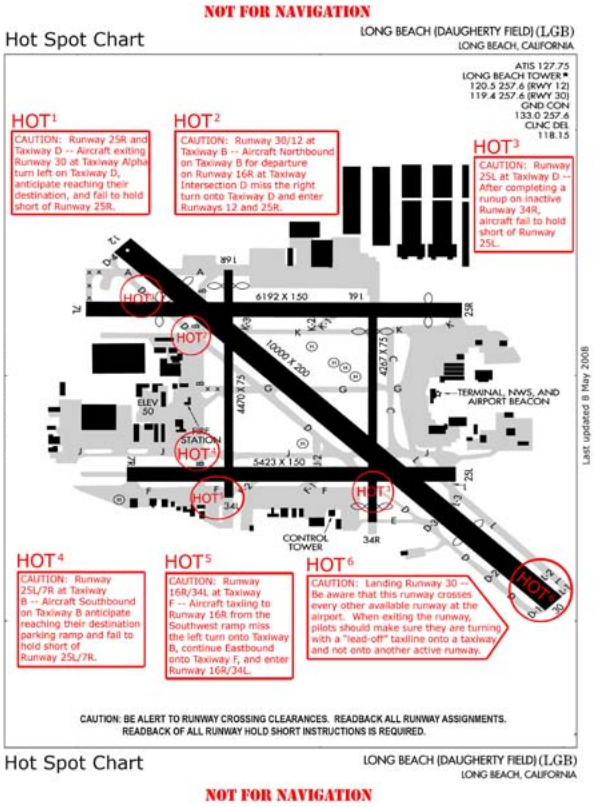
The use of labels for hot spots on all NACO diagrams will make it easier for users of an airport to plan the safest possible path of movement in and around that airport. Planning is a crucial safety activity for airport users—both pilots and air traffic controllers alike. By making sure that aircraft surface movements are planned and properly coordinated with air traffic control, pilots add another layer of safety to their flight preparations. Proper planning helps avoid confusion by eliminating last-minute questions and building familiarity with known problem areas.

While some airports voluntarily labeled hot spots on proprietary versions of their airport diagrams in the past, officially-accepted standards for such labeling did not exist. Airports Diagram Order JO 7910.4D, which is currently under review and is expected to be finalized in 2009, will make identification of hot spots standard and mandatory. The FAA recently identified 23 airports as potential candidates to receive official hot spot markings on their respective NACO diagrams.

DVD Runway Safety Series for Pilots

The FAA Office of Runway Safety included a four-part runway safety DVD series and brochure (SEE FIGURE 9) in the April 2009 issues of Aircraft

Figure 8
Hot Spots Included as Part of the NACO Diagram



Owners and Pilots Association (AOPA) Pilot and Flight Training magazines. The DVD collection includes four videos presenting different aspects of runway safety:

- ***Heads Up, Hold Short, Fly Right*** focuses on maintaining situational awareness by advocating recall of basic principles such as reviewing diagrams of departure and arrival airports, knowing the meaning of industry-standard color-coded runway signage, and asking for help from air traffic control if you are lost
- ***Was That For Us?*** examines safe taxi operations
- ***Listen Up, Read Back, Fly Right*** focuses on mission planning, preparation, and pre-flight communication
- ***Face to Face, Eye to Eye*** talks about how pilots and air traffic control can work together more efficiently and examines the real-world consequences of breakdowns and lapses in communication

Figure 9
Runway Safety Collection DVD and Safe Surface Operations Brochure

A comprehensive runway safety brochure, ***A Pilot's Guide to Safe Surface Operations***, was also included in the distribution. This brochure speaks to safe surface operations and recommends the steps that pilots need to follow in order to ensure surface safety.

The brochures and DVDs reached 485,000 pilots and flight instructors, or approximately two-thirds of the U.S. pilot population and a significant number of flight instructors. By making the information in this DVD series and brochure accessible to a wide range of pilot groups, the FAA in turn reached more general aviation (GA) pilots with its safety messages. It is particularly beneficial to reach GA pilots as 70 percent of pilot deviations in FY 2008 involved general aviation pilots (SEE FIGURE 10).

DVD Runway Safety BASICS for Controllers

In 2006 and 2007 ATO Terminal Services and ATO Office of Safety joined together to produce a DVD training series called BASICs. The four DVDs focus on different aspects of the BASIC acronym; the first DVD covers *"Be sure the runway is open,"* the second DVD focuses on *"Aircraft position verified,"* the third on *"Scan the runway,"* and the fourth on *"Issue clearances using correct phraseology,"* and *"Close the loop by getting an accurate readback."*

The BASICs Series aims to reduce the number of operational errors one of the types of runway incursions, in the Terminal environment (SEE FIGURE 11). The Series was recognized as valuable thought leadership and as such, the FAA decided to produce an additional training DVD series for En Route Centers and TRACONs.

This new series includes a total of five DVDs, which will be distributed from FY 2008 to FY 2010. In August 2008, the FAA sent the first of the additional five DVDs to the field—*Don't Keep Secrets: Airborne Icing and ATC*. The goal is to provide Air Traffic Controllers with information on how to recognize meteorological conditions that may cause icing, how encountering icing conditions may affect flight, and how ATC can assist pilots in getting out of icing conditions when encountered.

The second DVD, *Don't Keep Secrets: Thunderstorms and ATC* was distributed in February 2009 and helps air traffic controllers

Figure 10
FY 2008 Runway Incursions categorized as pilot deviations by Operating Type

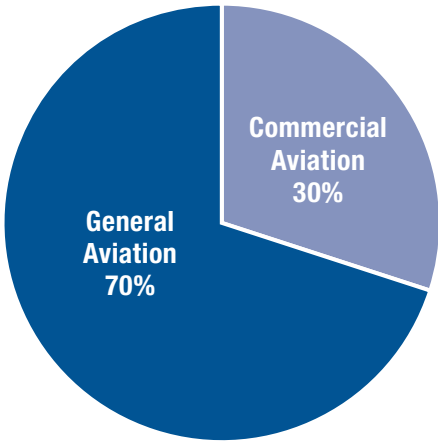
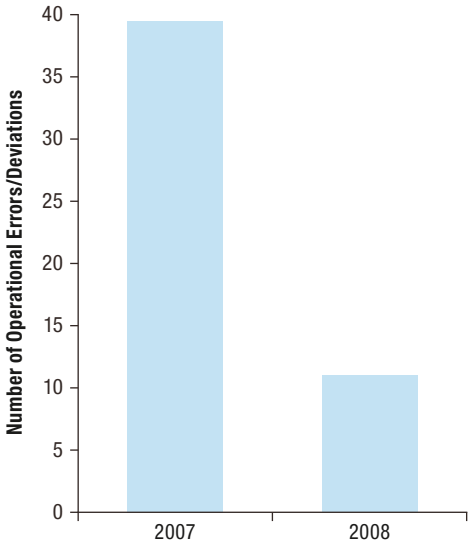


Figure 11

Number of Runway Incursions That Are Operational Errors/Deviations (FY 2007 through FY 2008)



BASICs DVDs have been distributed to controllers at towered airports throughout the United States; a sample of 20 small, medium, and large airports show a 68 (38 operational errors/deviations in 2007 compared to 12 operational errors/deviations in 2008) percent decrease in operational errors since the DVDs were distributed.

recognize weather that presents potential hazards to aviation and may be present during thunderstorm conditions, including microbursts and windshear. The DVD also provides information on air traffic controllers' responsibilities for keeping pilots informed of current weather conditions and assisting in avoiding these conditions. Positive Separation, the third DVD, is planned for distribution in August 2009. The remaining two DVDs, *Clear Communications* and *Situational Awareness*, will be released in FY 2010.

Hearback/Readback Awareness

ATO Terminal Services is actively promoting a "hearback/readback" initiative to enhance active communication between pilots and air traffic controllers. Hearback/readback is a common way of referring to the communication pattern generally accepted as a best practice for pilots and air traffic controllers. Errors in hearback/readback occur when pilots incorrectly repeat instructions to an air traffic controller and the air traffic controller fails to catch the error. Hearback/readback errors are a common aviation communication problem and are a contributing factor in numerous runway safety incidents every year.

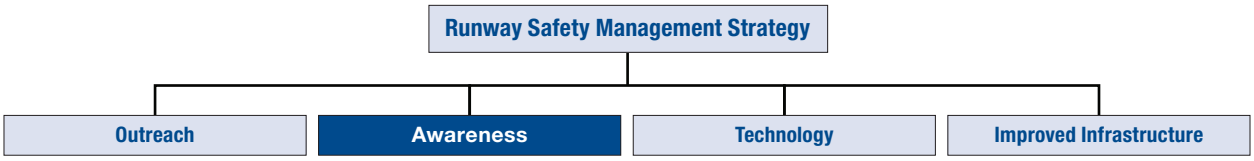
Hearback/readback errors have the potential to lead to more serious runway incursions. Pilot-controller miscommunications can result in serious breaches in runway safety, such as shown in an incident at San Diego Brown Municipal Field (SDM). This Category A incursion occurred as an outcome of a series of errors.

> A Piper PA24 landed on Runway 26R at San Diego Brown Municipal Field (SDM). The Piper pilot was then instructed to taxi off of Runway 26R and hold-short of entering Runway 26L. Although the Piper pilot was instructed to hold-short, the air traffic controller failed to correct the Piper pilot when he omitted the hold-short instruction. The Piper pilot continued crossing Runway 26L, which conflicted with a Cessna C172 that was in the process of departing on the same runway. The Cessna overflew the Piper, avoiding collision by approximately 30 feet. This incident occurred due to a hearback/readback miscommunication between the Piper pilot and the air traffic controller.

"Hearback/Readback Awareness Month" was held in January 2009 to focus pilot and controller attention on improving communications. A variety of mediums were used to build awareness and focus attention on Hearback/Readback Awareness Month. These mediums included:

- Posters on situational awareness, strategically placed in terminal facilities to attract the attention of air traffic controllers
- An Adobe Flash Player presentation containing information regarding "Pilot/Controller Loop" and hearback/readback errors, suggestions on how to prevent such communication errors, and an automated auditory replay of a series of hearback/readback situations
- Future directives for air traffic mangers to coordinate with their local users and develop procedures for sharing hearback/readback events between air traffic controllers and aviation users so errors may be brought to light and addressed on "both sides of the mic" (controllers and pilots)

Multi-faceted messaging is expected to help reduce the types of surface events that are attributable to hearback/readback errors. By creating the Hearback/Readback Awareness Month campaign, the Air Traffic Organization is strengthening its commitment to safety for its users (including military, airlines, general aviation, air taxi and corporate aviation groups).



Awareness

While the FAA's outreach program provides messages to key runway safety stakeholders addressing critical issues, the FAA recognizes that success in making our runways safer also depends on building system wide awareness with all stakeholders, especially aviation professionals. Constant safety awareness is the key to supporting safe operations and preventing errors from cascading into a serious incident. The FAA is using the Runway Safety Management Strategy to encourage aviation professionals to stay focused and constantly keep runway safety in mind while operating in the airport environment. The FAA has built an awareness program using safety analyses and comprehensive training programs, such as National Air Traffic Professionalism (NATPRO) and Crew Resource Management (CRM) training. The programs educate aviation professionals about the dangers inherent to their jobs and keep their minds focused on mitigating those dangers while operating in the runway environment. The FAA's awareness program's various initiatives (SEE FIGURE 7) are directed toward a range of aviation community members from airport operators to air traffic controllers and pilots.

Airport Surface Analysis

The FAA Office of Runway Safety recently completed runway safety reviews of 42 (20 in a first tier, 22 in a second tier) airports selected based on runway incursion data and wrong runway departure data. The reviews focused on an analysis of the safety of airport surfaces such as runways. Reviews of the airports have resulted in more than 200 short-, mid- and long-term initiatives. There were 5 serious runway incursions at the 20 first tier airports in the 17 months after the reviews, down from 13 serious runway incursions at those airports in the 17 months prior to the reviews. Top-to-bottom reviews of the initial surface analysis airports provided a valuable amount of data which has led to many new improvements.

Surface Incident Awareness Month

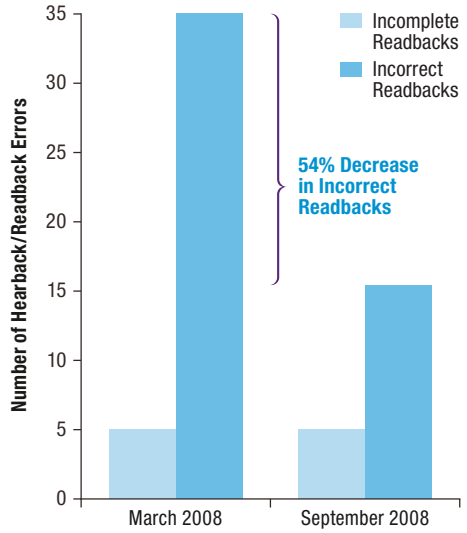
To raise awareness about runway incursions and promote runway safety, Air Traffic Managers at nine air traffic control facilities declared March and September 2008 as "Surface Incident Awareness Months." The nine airports included:

- General Edward Lawrence Logan International Airport
- Newark Liberty International Airport
- Philadelphia International Airport
- Detroit Metropolitan Wayne County Airport
- Hartsfield-Jackson Atlanta International Airport
- Chicago O'Hare International Airport
- Dallas/Fort-Worth International Airport
- McCarran International Airport
- Los Angeles International Airport

The Surface Incident Awareness Month program placed an emphasis on clear, concise pilot-controller communications and readbacks in order to reduce operational errors that contribute to the occurrence of runway incursions. Activities included:

- Briefings to inform Operations Managers and Front-line Managers that runway incursion prevention was a top priority
- Procedural changes that instructed local controllers to notify Front-line Mangers of all temporary runway closures (as opposed to simply notifying other controllers)
- Addition of "be vigilant to runway incursions" to position relief checklists
- Reiteration of runway incursion prevention measures as operational position assignments were made at towers

Figure 12
Number of Hearback/Readback Errors During and After March 2008 at Detroit Metro Wayne County Airport (DTW)*



*This data was collected by DTW Air Traffic Managers

- Placement of runway incursion awareness placards throughout air traffic facilities at the nine airports involved with Surface Incident Awareness Months

There was a noticeable reduction in surface incidents at one of the "surface nine" airports during March 2008 and September 2008 (SEE FIGURE 12). Detroit Metro Wayne County Airport (DTW) indicated that in March 2008 it had 40 documented events; five incomplete readbacks and 35 incorrect readbacks. In September 2008, DTW had 21 documented events; five incomplete readbacks and 16 incorrect readbacks. This represents a 54 percent decrease in hearback/readback errors at DTW over this period.

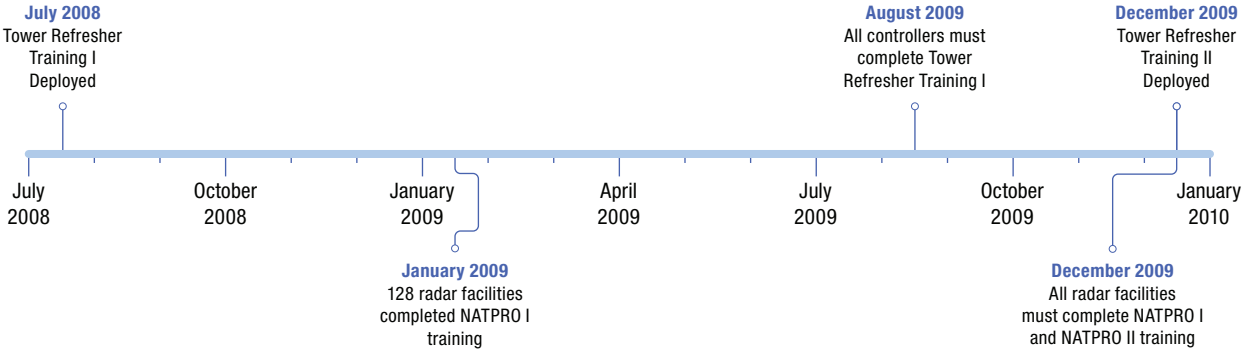
Recurrent Ground Movement Training

In addition to aircraft, airport surface activities involve airport ground equipment and operators. Dozens of airport employees have direct access to airport surfaces, either as pedestrians or drivers of a variety of service vehicles ranging from baggage trucks to large snow removal equipment. In order to prevent vehicle and pedestrian deviations, the FAA's Office of Airports developed procedures for safe ground movement.

Currently, all of the 561 certificated airports in the U.S. require initial and recurrent ground movement training for *airport employees* such as airport police and maintenance employees. However, 547 of the certificated airports also require recurrent training for *non-airport employees* such as Fixed Based Operator (FBO) employees and airline mechanics. The FAA asked certificated airports to voluntarily develop plans that require annual recurrent training for *all* individuals with access to airport movement areas. Additionally, The FAA Office of Airport Safety and Standards issued Advisory Circular 150/5210-20, effective March 31, 2008, which strongly recommends such regular recurrent training for all persons with access to movement areas. This Advisory Circular also provides recommendations and best practices for airports that do not currently have a ground movement training programs.

Some of the airport employees that have access to movement areas are "tug and tow" operators. Tug

Figure 13
NATPRO I and II and Tower Refresher Training I and II



and tow operators drive ground service equipment that shuttles airplanes when they aren't operating under their own power. To assist air carriers in their ground movement training efforts, FAA's Flight Standards Services is developing a new training DVD that addresses updated tug and tow operational procedures. The new DVD will supplement and enhance current air carrier training programs with updated information pertaining to tug and tow operations. The new DVD is planned for release to all Code of Federal Regulation (CFR) Federal Air Regulation (FAR) Part 121 and Part 135 operators by December of 2009. An updated Advisory Circular addressing guidance to air carriers regarding tug and tow operations is also planned for release in summer of 2009.

National Air Traffic Professionalism

National Air Traffic Professionalism (NATPRO) is a two-part training program that was developed to increase air traffic controllers' awareness of the mental skills that affect their performance. NATPRO combines conventional classroom instruction and computer-based (CBI) skill building scenarios. NATPRO consists of 210 exercises designed to improve the reaction time as well as cognitive and awareness skills necessary for high performance of air traffic control duties. NATPRO modules specifically target "centering," "being in the zone," attention allocation strategies, visualization, and concentration. The course is presented in a way that relates to the real world and uses mental dexterity concepts similar to those found in athletic improvement programs. The sharpened mental acuity that course participants gain heightens their sense of awareness to activity in the sky and on the ground, thereby increasing the likelihood that they will notice and mitigate unsafe situations before they lead to a runway incursion.

NATPRO I focuses on situational awareness for air traffic controllers; as of the end of January 2009, 128 radar facilities completed the training. Tower facilities must complete the NATPRO I training by December 31, 2009. NATPRO II focuses on auditory skills and hearback/readback; all radar facilities must complete NATPRO II training by December 31, 2009 (SEE FIGURE 13).

Controller Refresher Training

The FAA also recently developed a comprehensive refresher training presentation for air traffic controllers that serves as another job-performance improvement program. The refresher training includes eight modules, one of which is specifically focused on runway incursion prevention. The training presentation includes airport-specific information such as unique airport characteristics, local procedures, and a review of events that have occurred at that airport. The tower refresher presentation was deployed on August 1, 2008 and all tower controllers are required to complete it by September 30, 2009. Tower refresher II training, which will further focus on awareness of runway incursion prevention techniques, is scheduled to begin at the end of December 2009 (SEE FIGURE 13).

Controller Training for Crew Resource Management

ATO Office of Safety developed a comprehensive Crew Resource Management (CRM) program to address human behaviors that may lead to errors. The intent of this program is to enhance controller teams' situational awareness so that they can better detect and correct controller and pilot mistakes before they result in operational errors or accidents.

"Crew Resource Management: Human Factors for Air Traffic Controllers" is a one-day workshop that builds on threat-detection, team dynamics, and individual performance concepts that the FAA successfully used for pilots in the aircraft cockpit environment in the past. The application of these concepts to an additional group of aviation operators demonstrates a system-wide approach to safety management. *Crew Resource Management: Human Factors for Air Traffic Controllers* has three primary objectives:

- Threat and Error Management (TEM), which recognizes that human error is inevitable and seeks to identify, reduce, and eliminate all possible internal or external risks associated with human error

- Individual Performance, which focuses on two key air traffic controller skill areas: maintaining situational awareness and executing the plan
- Improving Teamwork, which focuses on using methods such as team self-evaluation, initiative, communication, and support to reduce the likelihood of an accident

As of April 2009, the FAA conducted workshops at 38 Operational Evolution Partnership (OEP) and high-operational-error-rate Terminal facilities. Training has continued in FY 2009 for the following towers:

- Northern California TRACON
- Southern California TRACON
- Potomac TRACON
- Orlando
- Seattle Tower and TRACON
- Baltimore-Washington
- Pittsburgh
- Atlanta-Hartsfield TRACON
- Denver Tower and TRACON
- St. Louis Tower and TRACON
- Tampa
- San Francisco
- Cincinnati
- Honolulu
- Chicago TRACON
- Chicago-Midway

The ATO Office of Safety also has trained Cadre Instructors to conduct workshops at En Route facilities, and as of April 2009, the following Air Route Traffic Control Centers have trained all of their personnel:

- Los Angeles
- Jacksonville
- Chicago
- Indianapolis
- Minneapolis
- Atlanta

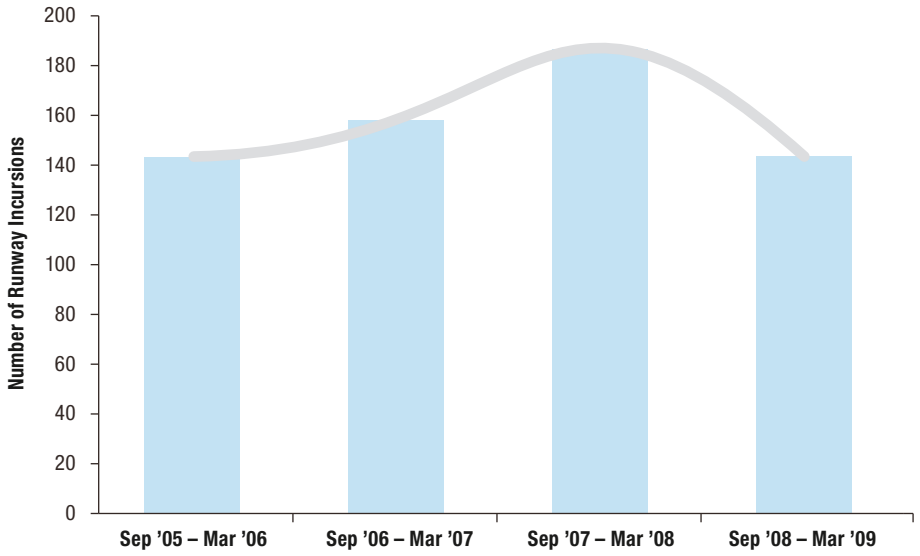
FY 2009 plans will focus on continued training at En Route Centers.

Taxi Clearance Procedures

As part of the Call to Action discourse, the FAA held a one-day meeting with key aviation industry representatives to discuss short- and long-term measures to improve runway safety. The participants of the meeting recommended that taxi clearance procedures be improved to increase runway safety. The FAA followed-up on this suggestion by forming a panel, the Safety Risk Management (SRM) Panel, which conducted a formal safety risk analysis. On May 19, 2008 the FAA issued Notice JO 7110.482 which instituted new taxi instruction procedures that are intended to reduce runway

Figure 14

Total Number of Incursions That Involved Taxiing/Landing and Taxiing/Takeoff Aircraft



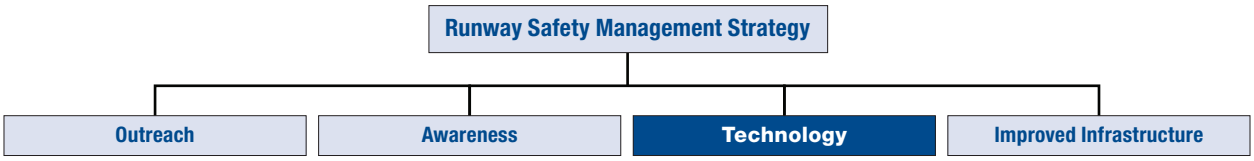
New runway taxiing procedures were implemented in May and August of 2008. There was a 23 (186 runway incursions compared to 144 runway incursions) percent decrease in the number of runway incursions caused by aircraft taxiing beyond the hold-short line of an active runway between September of 2008 and March of 2009 when compared to the same time period one year earlier.

incursions caused by controller, pilot, and vehicle driver errors. Under the new procedures which have been incorporated into Order JO7110.65, air traffic controllers must instruct all aircraft and vehicle drivers to follow a specific route when traveling across an airfield. Previously, controllers simply issued aircraft and vehicles with an intended destination point.

A panel of safety experts including representatives from the FAA's Flight Standards Services, ATO, Office of Airports, and others conducted a formal risk analysis of the taxi procedures implemented in May (SEE FIGURE 14) and determined that they mitigate hazards well. During their analysis, the panel also identified the need for a new runway crossing procedure. As such, on August 11, 2008, the FAA issued Notice JO 7110.487, which requires that all runways along the taxi route that lead to the departure runway are crossed before a takeoff clearance is issued. This procedure, also incorporated into Order JO 7110.65, excludes airport operators with airport configurations that do not allow for an aircraft to completely cross one runway and hold short of the departure runway.

As a result of additional recommendations made by the SRM panel, the FAA is also considering other procedural changes that could mitigate risk by clarifying clearance instructions between controllers and pilots:

- Simplifying procedures for authorizing an aircraft to taxi to the takeoff runway by allowing the air traffic controller to simply state "taxi to" without issuing further instructions as is current practice
- New runway-to-runway crossing clearance procedures that would require the issuance of a specific clearance to cross any runway; if multiple runway crossings are required, an aircraft/vehicle would have to cross the previous runway before another runway crossing clearance may be issued
- Improved multiple landing clearance procedures that would make it safer to grant clearance for multiple airplanes to arrive in succession of one another
- Adoption of the internationally accepted "line-up and wait" phraseology, which would provide pilots with more consistent air traffic control and further advance the use of globally accepted aviation terminology



Technology

Technological advancement is indispensable to making runways safer. In recent years, the FAA worked closely with the aviation industry to develop, test, and deploy a number of technologies that enhance runway safety (SEE FIGURE 7). These technologies provide pilots and air traffic controllers with additional tools for making safe operational decisions and help to prevent runway incursions by bolstering pilot and air traffic controller situational awareness. Technological aviation safety innovations can be of particular use in adverse operating conditions such as loss of communications, poor visibility, or heavy traffic. Some of the FAA's safety-enhancing tools are mature technologies that are operational at select high-traffic airports; other tools are still in test and evaluation at one or two key sites. As Next Generation technologies evolve, many of the existing technologies mentioned in this report may undergo re-evaluation to determine their continued effectiveness and cost benefit.

Runway Status Lights

The FAA is testing Runway Status Lights (RWSL), a technology that will alert pilots to potential runway incursions using a system of lights embedded into runway surfaces (SEE FIGURE 15). RWSL is designed to supplement existing pilot procedures, training, and visual monitoring by helping pilots identify possible conflicts with other surface traffic. The functional elements that comprise current RWSL systems are Runway Entrance Lights (RELs) and Takeoff Hold Lights (THL); RELs indicate when a runway is unsafe for entry and THLs indicate when a runway is unsafe for takeoff due to additional traffic. At Dallas/Forth-Worth International Airport (DFW), RWSL works in conjunction with Airport Surface Detection Equipment, Model X's surface surveillance systems to detect the presence of aircraft or vehicles on the runway. Whenever a runway is occupied, the RWSL system illuminates RELs and THLs as appropriate to alert other pilots and vehicle operators in the area to the presence of a traffic obstruction on the runway. RWSL does not interfere with air traffic control operations or increase air traffic controller workload; RWSL acts as an independent safety enhancement.

RWSL test-systems are currently operational at DFW and San Diego International (SAN) Airports. Due to positive feedback on the initial operational testing of these systems, the airports will expand evaluation and testing in 2009. Furthermore, FAA is working in a cooperative program with Los Angeles International Airport (LAX) to install and test RWSL equipment commencing on or about April 30, 2009. RWSLs will also be installed and tested at Boston Logan International Airport in December 2009, which will serve as the first location in the country to test RWSLs for intersecting runways. In July 2008, the FAA announced that 20 airports will be equipped with RWSL by 2011 including:

- Atlanta Hartsfield
- Baltimore-Washington
- Boston Logan
- Charlotte
- Chicago O'Hare
- Denver
- Detroit
- Washington Dulles
- Ft. Lauderdale
- Houston George Bush
- New York John F. Kennedy
- New York LaGuardia
- Las Vegas McCarran
- Los Angeles
- Minneapolis-St. Paul
- Newark
- Orlando
- Philadelphia
- Phoenix
- Seattle

RWSL at Work

"After cleared for takeoff, we began to roll and I noticed the RWSL lights turn red. I looked down the runway and saw an aircraft crossing the runway left to right and aborted the takeoff maximum speed below 80 kts. The RWSL worked awesome. I noticed that BEFORE I saw the intruding aircraft."

– Source: A major airline's Chief Pilot Office

In order to ensure that pilots take full advantage of RWSL technology, FAA's Flight Standards Services is ensuring that guidance for pilots operating at airports with RWSLs is incorporated into the *Aeronautical Information Manual* (AIM) and the *Aeronautical Information Publication* (AIP). Working with MIT's Lincoln Lab & aeronautical services provider Jeppeson, FAA's Flight Standards Services also published information indicating the presence and unique operational characteristics of RWSL on the instrument charts of airports operating the technology.

Installation of RWSL helps pilots obtain better situational awareness and may prevent potential accidents. For example, a regional turboprop (SAAB 340) was cleared for takeoff from Runway 36R at DFW. Due to confusion on the part of an air traffic controller, a McDonnell Douglas MD-80 was simultaneously cleared to cross the same runway. The SAAB pilot later reported that he "saw the red lights" of the RWSL and held in position so as to avoid a runway incursion. Once the MD-80 cleared the active runway, the SAAB was again cleared for takeoff.

Airport Surface Detection Equipment

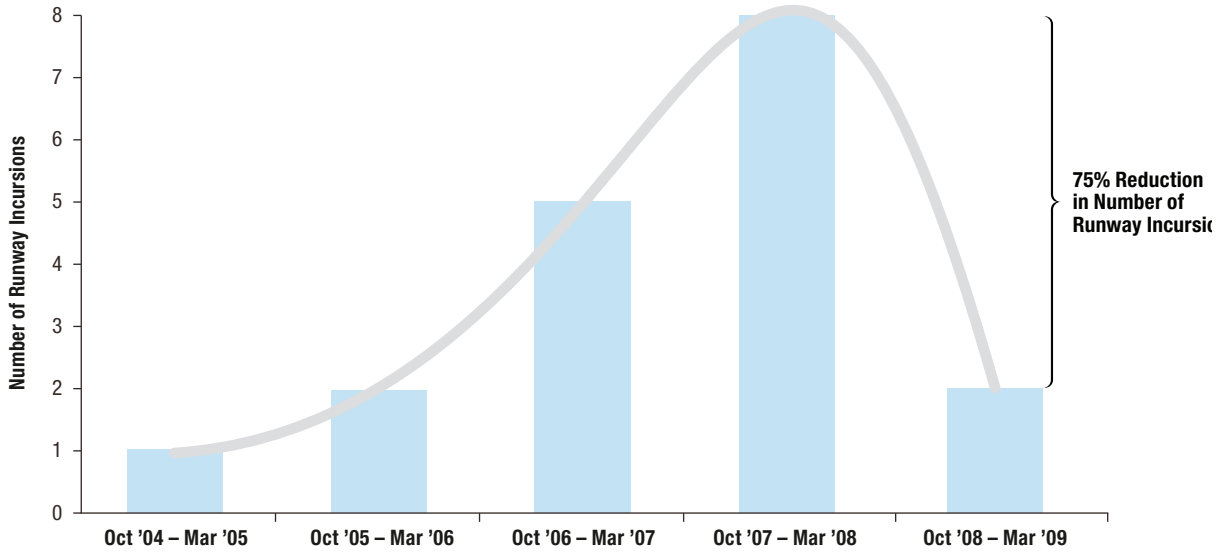
Airport Surface Detection Equipment, Model X (ASDE-X) is the latest example of surface detection equipment technology. Surface detection systems such as ASDE-X (SEE FIGURE 16) enable air traffic controllers to detect potential runway conflicts by displaying the position of aircraft and vehicles on an information screen in an air traffic control tower. These systems are particularly useful in limited visibility conditions because they provide air traffic controllers with additional information when tracking the movements of aircraft and vehicles on an airport surface. Depending on an airport's unique configuration of a surface detection equipment system, it can be integrated with other technologies (such as RWSL) to provide further safety enhancements. As of February 2009, 17 towers are currently using ASDE-X operationally; 18 additional towers are scheduled to be operational by end of spring 2011 (SEE REFERENCE DATA II).

Due to its superior effectiveness in all weather conditions (SEE FIGURE 17), ASDE-X is also being used to supersede or enhance earlier iterations of surface detection equipment such as Airport Surface Detection Equipment, Model 3/Airport Movement Area Safety System (ASDE-3/AMASS). Seattle, St. Louis, Atlanta-Hartsfield, and Washington-Dulles Airports have recently replaced their ASDE-3/AMASS systems with ASDE-X; New York LaGuardia and Las Vegas McCarran plan to replace older systems with ASDE-X technology in

Figure 15
Runway Status Lights

Figure 16
Airport Surface Detection Display

Figure 17
Number of Incursions at Detroit Metro Wayne County Airport



ASDE-X technology became operational at DTW in August of 2008. There has been a 75 percent reduction (8 runway incursions between October 2007 and March 2008 compared to 2 runway incursions between October 2008 and March 2009) in the number of runway incursions in that time.

FY 2010 through FY 2011. At another 19 airports, ASDE-X's "Multilateration" technology component is scheduled to be added to existing ASDE-3/AMASS systems to enhance their accuracy.

An example of how surface detection equipment systems like ASDE-X can aid in the prevention of runway incursions by alerting air traffic controllers to unauthorized aircraft or vehicles on the runway occurred at Chicago O'Hare International Airport (ORD).

> An airport vehicle (equipped with amber flashing lights) entered ORD's Runway 28 without contacting the air traffic control tower or receiving prior authorization. The air traffic control tower was able to confirm the unauthorized presence of the vehicle on the runway using ORD's ASDE-X system. This enabled the tower to contact a Boeing 747 which was on approach to Runway 28, 10 miles from arrival, and advise the flight crew of the possible need for a go-around. The vehicle cleared the runway and the Boeing 747 landed without incident, however, air traffic control may not have ever noticed the vehicle without the help of ASDE-X.

Low Cost Ground Surveillance

The FAA is also currently testing the effectiveness of low-cost ground surveillance systems. Low-cost ground surveillance systems may provide a practical technology that can reduce the risk of runway incursions at small- and medium-sized airports where budgetary constraints prohibit the use of expensive ASDE-X and ASDE-3/AMASS systems. Spokane International Airport is currently testing early versions of commercially available low-cost ground surveillance system equipment. In January of 2009 the FAA awarded a contract to Thales ATM to install and test low-cost ground surveillance systems at additional small- and medium-sized airports that do not have ASDE-3/AMASS or ASDE-X technology in place. This is the first of multiple contracts that the FAA plans to award to test and evaluate various low-cost ground surveillance system equipment alternatives. Integration and testing of low-cost ground surveillance systems with other safety applications is slated to begin in 2010.

Electronic Flight Bag

Electronic Flight Bag (EFB) is an electronic display system that provides pilots with information about a variety of aviation topics. EFB technology replaces paper flight charts with computerized flight charts. EFBs can either be stand-alone, laptop-like devices that are used on multiple platforms in an existing aircraft fleet, high-end displays fully integrated into the cockpits of newer aircraft, or units that are portable but take power and data directly from the aircraft's systems. Most EFB systems incorporate Airport Moving Map Display (AMMD) technology, which uses Global Positioning Systems (GPS), to show pilots their actual positions ("own ship") on the airport surface. AMMD technology allows pilots to see exactly where their aircraft is on the airfield in real time, thus reducing the chances of losing situational awareness and being in the wrong place.

The FAA is currently conducting Capstone 3, a demonstration program that will examine how EFB and AMMD improve cockpit situational awareness to enhance surface safety. The Office of Runway Safety has awarded contracts to several air carriers to equip portions of their fleets with EFB and AMMD technology. In exchange, each air carrier has agreed to collect feedback from the pilots that operate the aircraft equipped with the technology. Pilot feedback will be shared with the FAA and used to determine the value that EFB and AMMD provide in enhancing situational awareness and runway safety. Funding will provide

for two EFBs per aircraft in up to 20 aircraft per carrier. EFB installations will be coordinated with air carrier maintenance program schedules and EFB hardware/software availability.

Twenty-one high-incursion airports will serve as test locations for the Capstone 3 project. These airports include:

- Los Angeles, Boston
- Chicago-O'Hare
- Newark
- Cleveland
- Ft. Lauderdale
- Houston Hobby
- Anchorage
- San Francisco
- Las Vegan McCarran
- Charlotte
- Miami
- Philadelphia
- Albuquerque
- Daytona Beach
- Phoenix
- Dallas-Ft. Worth
- New York John F. Kennedy
- New York LaGuardia
- Atlanta Hartsfield
- Seattle Tacoma

Final Approach Runway Occupancy Signal

Final Approach Runway Occupancy Signal (FAROS) is a technology designed to prevent accidents and incursions on airport runways. FAROS activates a flashing light visible to the pilot of an approaching aircraft to warn that the runway being approached is occupied and hazardous. When the runway is occupied by a potentially hazardous target, the system flashes the Precision Approach Path Indicator (PAPI) lights as a visual indicator to the approaching pilot without the need for controller input. FAROS technology is being tested by the FAA at Long Beach-Daugherty Field (LGB) in California and DFW.

The FAROS test system at LGB is a low-cost, fully automated system using inductive loop sensors embedded in the runway and taxiway surfaces to detect aircraft and vehicles entering and exiting monitored zones (SEE FIGURES 18 AND 19).

The DFW eFAROS (enhanced FAROS) system is more sophisticated and works in conjunction with ASDE-X to monitor the entire runway surface as opposed to monitoring specific zones on the airfield. Operational evaluation of FAROS systems has been taking place at LGB since 2006 and DFW since October 2008.

Figure 18
FAROS System

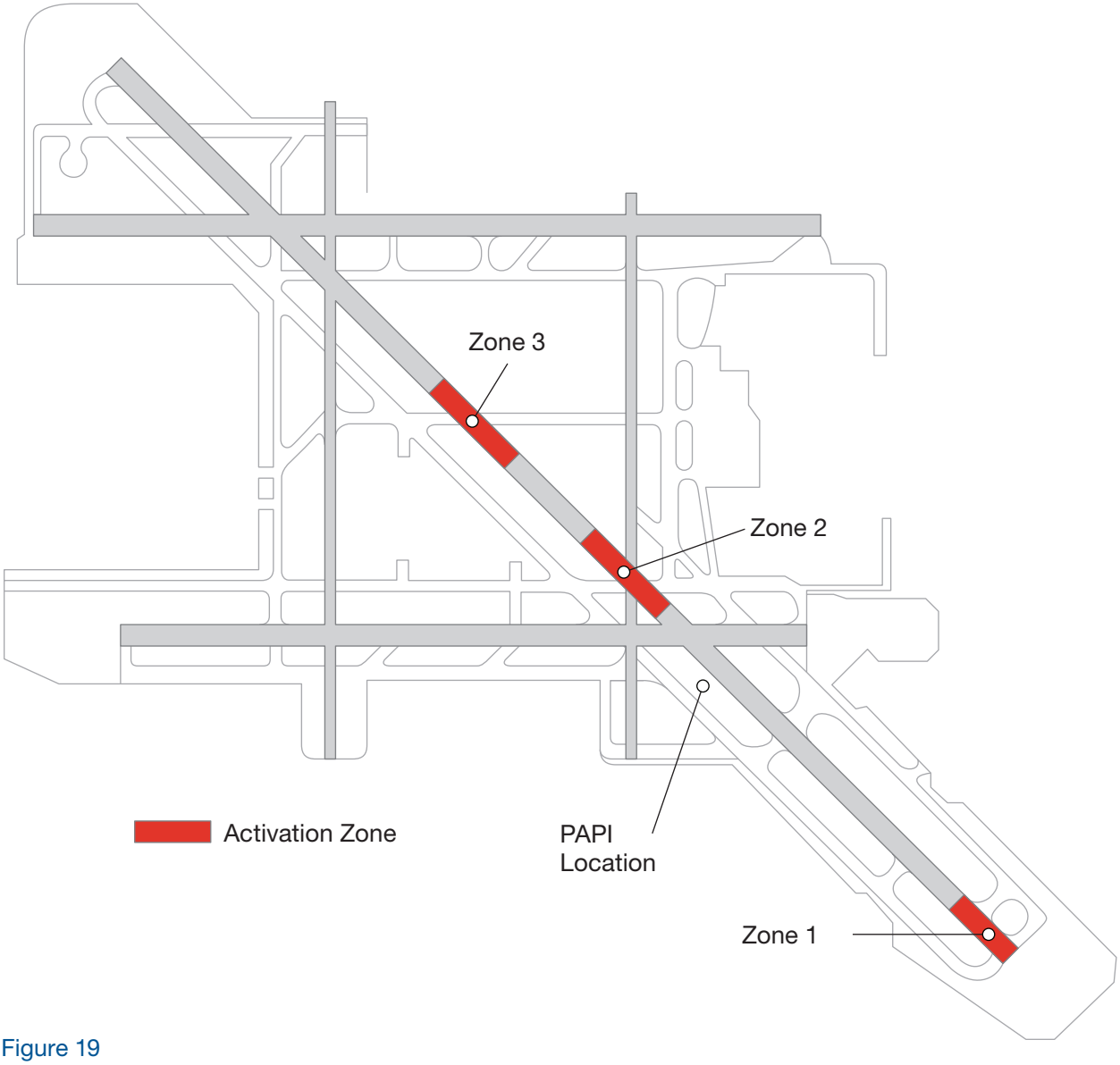


Figure 19
FAROS System Intersection Runway Logic Zones

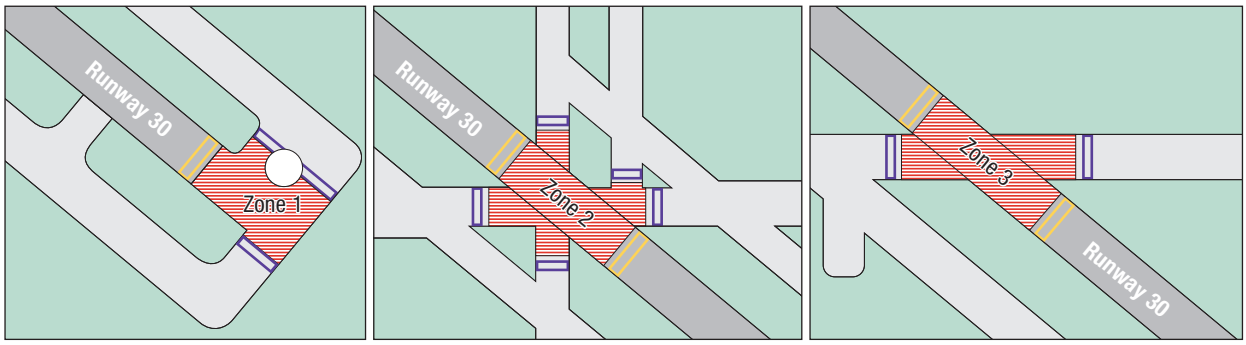
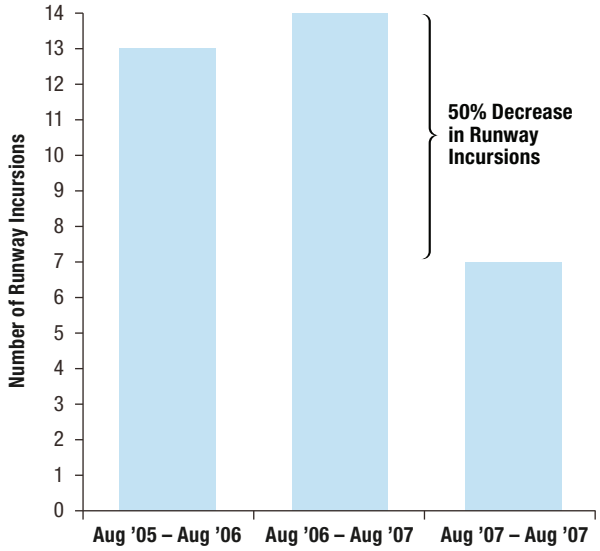
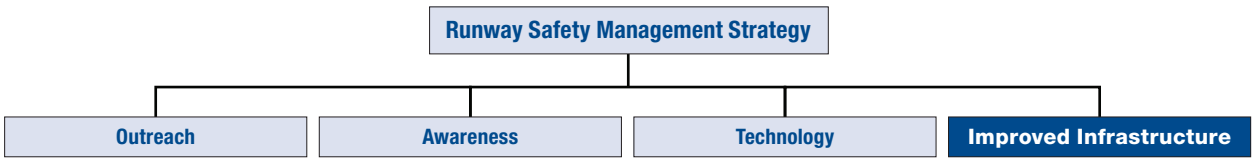


Figure 20
Number of Runway Incursions at Long Beach-Daugherty Field



FAROS technology was installed at Long Beach International Airport in 2006. There was a 50 (14 runway incursions compared to 7 runway incursions) percent decrease in runway incursions at LGB from 2007 to 2008.



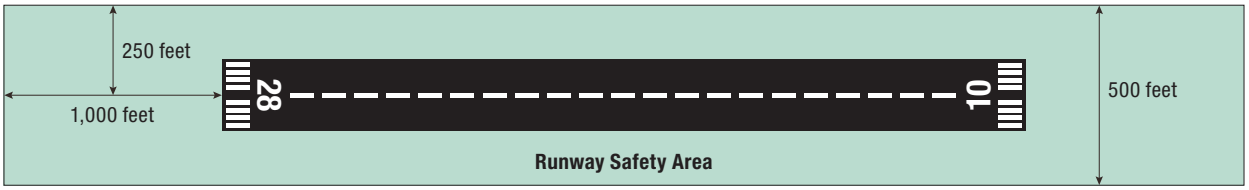
Improved Infrastructure

Although technology is critical to the achievement of goals for runway safety, a well developed infrastructure must also be in place. Safe aircraft operations depend on the presence of clearly marked, un-obstructed, and efficiently accessible space. Pilots depend on clearly marked surfaces to maintain situational awareness, ample sprawl is required to avoid confusing, dangerous, and operationally inefficient taxi- and runway crossings, and passengers need assurance that airport surfaces can accommodate their plane without dangerous obstruction. The FAA is working to ensure that airport surfaces around the country meet a safe standard. Often, this means developing innovative solutions to deal with physical constraints, legal issues, and environmental concerns. The FAA is actively addressing these concerns and has partnered with industry groups to research, develop, and deploy safety solutions that will continue to improve runway surfaces in the future (SEE FIGURE 7).

Runway Safety Area

Runway Safety Areas (RSA) are un-obstructed zones established around the perimeter of a runway to enhance safety in the event that an aircraft undershoots, overruns, or engages in an excursion from the side of the runway. Standard RSAs extend from 240 feet to 1,000 feet beyond each runway end and are between 120 feet and 500 feet wide (SEE FIGURE 21). The size of a RSA depends on the type of instrument approach procedures and size and type of aircraft served by the runway. Airports that have a greater proportion of instrument approaches (those approaches in which a pilot relies almost strictly on cockpit instruments rather than line of sight) and service a large number of commercial aircraft generally need the largest possible RSA. In order for an RSA to be effective

Figure 21
Runway Safety Area



it must be large and free of obstructions. Some airports have navigation aids (NAVAIDS) that are currently inside the RSA and are unable to be moved outside the RSA. In these cases, the FAA requires that such NAVAIDs are mounted using bolts that are frangible at a height of no more than 3 inches from the ground, allowing the NAVAID to easily break-away upon impact with an aircraft.

In FY 2002, FAA started an ambitious program to accelerate RSA improvements for commercial service runways that did not meet FAA-defined standards. RSAs that were candidates for this program were usually not large enough for airport operating conditions or contained infrangible obstructions. The FAA developed a long-term completion plan that will ensure that all practicable RSA improvements are completed by 2015. Significant progress was made and by the end of FY 2008, 71 percent (324 of the 454 runways) of RSA improvements were complete. In FY 2009, airport operators, with FAA Airport Improvement Program grant support, plan to complete 26 priority RSA improvements. By the end of 2010, 83 percent of priority RSA improvements will be complete leaving 68 improvements to be made to meet the 2015 goal.

Chicago O'Hare International Airport provides as example of how RSAs create much-needed safety buffer zones around runways at large airports with complex configurations. On July 18th 2006 a Bombardier CRJ7 was given instruction to taxi to Runway 22L via Taxiways M7 and M at ORD. The pilot disregarded instructions and proceeded onto the wrong Taxiway, Taxiway Q. Taxiway Q is in very close proximity to the approach end of Runway 28, which does not have a RSA. Taxiing onto Taxiway Q placed the Bombardier CRJ7 in conflict with a Boeing 737 that was approaching Runway 28. The Boeing 737 overflew the Bombardier CRJ7, avoiding a collision by approximately 100 feet. If Runway 28 had a RSA, this incursion would likely not have occurred.

On March 03, 2009, the Department of Transportation Office of Inspector General (OIG) released a report entitled *Actions Taken and*

Needed to Improve FAA's Runway Safety Area Program. The report assessed airport sponsors' and FAA's progress and challenges in fulfilling the congressional RSA mandate and evaluated the effectiveness of FAA's process for identifying, prioritizing, and funding needed for RSA improvements. Overall, the OIG found that the FAA and airport sponsors made significant process since 2000 in reporting that more than 70 percent of the RSAs have been improved; however, the OIG also found that 11 of the 30 largest airports failed to fully implement RSA standards. The audit also found that the FAA was generally effective in identifying, prioritizing, and funding needed RSA improvements. The report identifies two areas for the FAA to address: 1) FAA-owned NAVAIDs must be relocated or made frangible by 2015 and 2) Provide a greater level of quality and detail in the data provided to congressional decision makers.

The report recommended the following actions to FAA's Office of Airports:

1) Develop and implement an action plan for ensuring that RSAs at the 11 large airports are improved to the fullest extent practical

2) Work with the FAA's ATO to develop and implement an effective program for addressing un-frangible NAVAIDs located in RSAs

3) Issue detailed guidance and conduct training for all field offices on the proper identification, tracking, and reporting of RSA status, including NAVAIDs

4) Implement quality control procedures to ensure the accuracy and integrity of RSA data

5) Expand the annual report to Congress to identify which RSAs do not meet the full RSA design standards and list specific reasons for noncompliance, identify plans in place to allow these RSAs to attain full standards, identify challenges that exist to prevent these RSAs from meeting the full standards by 2015, and identify financial assistance needed to achieve planned improvements

The FAA concurred with all five recommendations and is taking corrective action to include:

1) The FAA has energized its efforts on completing RSA improvement plans for each of the 11 major airports cited in the OIG report

2) The FAA will develop procedures to address non-compliant NAVAIDs in RSAs and will develop a budget and schedule to complete the improvements by 2015

3) The FAA intends to issue an advisory circular on frangible bolts in Spring 2009

4) The FAA plans take a number of steps to improve the quality of the RSA Inventory data in its annual report to Congress

Engineered Materials Arresting System

Engineered Materials Arresting System (EMAS) is an airport improvement that provides the safety benefits of an RSA in cases where land is not available, land is too expensive to feasibly purchase, or it is otherwise not possible to have a standard dimension RSA. EMAS uses a light-weight, crushable concrete material, placed beyond the departure end of a runway to stop or greatly slow an aircraft that overruns the runway (SEE FIGURE 22). EMAS works by exerting predictable deceleration forces on aircraft landing gear as its material crushes. EMAS is currently installed on more than 41 runway ends at 28 airports (SEE REFERENCE DATA III). As of March 2009, the FAA had plans to install 9 additional EMAS systems at 6 additional airports in the United States: Key West,

Figure 22
EMAS Installation

EMAS at Work

Deploying EMAS can mitigate aircraft overruns and consequently save lives. Over the past several years, EMAS has successfully brought three aircraft at JFK Airport to a safe stop with no serious injuries to passengers and minimal damage to the aircraft.

FL, Winston-Salem, NC, New Castle County, DE, Lafayette, LA, Telluride, CO, Groton-New London, CT.

The FAA is continuing to undertake research toward the advancement of EMAS alternatives for RSAs. The Transportation Research Board's (TRB) Airports Cooperative Research Program (ACRP) has worked with aviation industry groups to examine runway safety issues including possibilities for future development and installations of EMAS systems. EMAS systems using crushable concrete are the only systems that are currently approved by the FAA. To advance the development of alternative aircraft arresting systems, the TRB is expected to issue a report—*Developing Improved Civil Aircraft Arresting Systems*—in the fall of 2009. The TRB released an ACRP report in May 2008 — *Analysis of Aircraft Overruns and Undershoots for Runway Safety Areas* that included an assessment of risk in relation to RSAs and highlighted alternatives to the traditional RSA. To further analyze the risks associated with RSAs, the TRB established a new ACRP study—*Improved Models for Risk Assessment of Runway Safety Areas* which is expected to be published in March 2011.

Airport Surface Markings

One of the first items identified by the Call to Action was the need to upgrade taxiway centerline markings at the 75 busiest (greater than 1,500,000 annual passenger enplanements) airports in the United States. Enhanced taxiway centerline markings are designed to increase pilot and airfield driver situational awareness when they are approaching a runway hold-short line, which establishes a boundary for safe operational distance from an active runway (SEE FIGURE 23). The FAA changed the airfield markings (paint) standard to incorporate dashed yellow lines on either side of a solid line in the proximity of a runway; previously, taxiway centerlines were marked with a less-noticeable solid yellow line.

Upgrades to airport surface markings at the original 75 targeted airports were completed as of June 30, 2008. Recent activity focused on smaller certificated airports. As of March 2009, 90 percent (56 of 62) of airports with 370,000–1.5 million annual passenger enplanements were in compliance with clarification Change 2 to AC150/5340-1J, which requires all airports of this size to be in compliance by December 31, 2009. As of March 2009, 56 percent (236 of 421) of airports with less than 370,000 annual passenger enplanements completed the enhanced taxiway centerline upgrades. Change

Figure 23
Enhanced Taxiway Centerline Markings

Previous Taxiway Centerline Markings

Enhanced Taxiway Centerline Markings

Figure 24
South East Quadrant Perimeter Taxiway at Dallas/Fort Worth

Perimeter taxiway in the South East quadrant opened in December 2008 at Dallas/Fort Worth International Airport

2 to AC150/5340-1J will require all airports of this size to be in compliance by December 31, 2010.

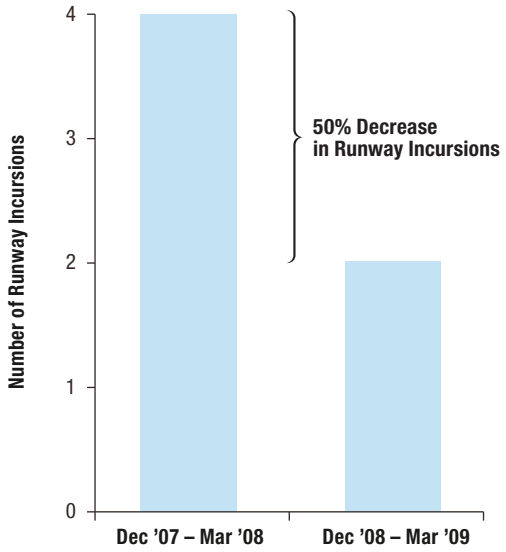
Perimeter/End-around Taxiways

The installation of perimeter taxiway infrastructure at airports with adequate space improves surface safety by reducing the number of runway crossings. Perimeter taxiways provide an alternate pathway for aircraft to travel between the runway and the gate without having to cross another runway. Airports that operate parallel runway arrival and departure configurations may also realize the additional benefit of increased traffic capacity and logistical efficiency. Perimeter taxiways also relieve radio frequency congestion because they decrease the need for pilot-controller communications.

Hartsfield-Jackson Atlanta International Airport was the first airport in the country to install a perimeter taxiway, which opened in April 2007. A perimeter taxiway also went operational at DFW's South East quadrant in December of 2008 (SEE FIGURE 24). DFW's perimeter taxiway eliminates hundreds of aircraft crossings a day at the airport, where as many as 1,500 runway crossings can occur each day. NASA's Ames Research Center is in the process of collecting data on DFW's South East quadrant to examine ways to optimize its operations. DFW will finalize potential plans to install perimeter taxiways in each of its other three quadrants once additional data on the South East quadrant perimeter taxiway is collected and analyzed.

Deploying a perimeter taxiway can reduce the number of runway crossings, and therefore the number of potential incursions (SEE FIGURE 25), that occur when taxiing aircraft cross runways without authorization. However, the addition of end-around taxiways often face airport geometry and surrounding land use/configuration challenges. The FAA continues to review opportunities for their construction taking into consideration several factors including an airport's traffic volume and configuration, its geography and costs.

Figure 25
Runway Incursion Statistics for Dallas/Fort Worth Between December 2008 and March 2009



A perimeter taxiway went operational at DFW in December 2008. Between December 2008 and March 2009 there were 2 runway incursions at DFW. This represents a decrease of 50 percent when compared to the same time period in the previous year.

Partners in Runway Safety

Safety partnerships are an important element of the Runway Safety Management Strategy (SEE FIGURE 26) and collaboration between the FAA and other aviation groups is rapidly advancing the Call to Action. The FAA's internal program offices collaborate on a daily basis to advance improvements in runway safety. This is illustrated by the working dynamic of the FAA offices most involved with runway safety policy. The Office of Runway Safety acts as the FAA's runway safety lead by overseeing all agency initiatives aimed at reducing runway incursions and coordinating the efforts of the other FAA offices that participate in runway safety improvement programs. ATO Terminal Services' role places particular emphasis on ensuring that air traffic controllers are knowledgeable of runway safety policies and procedures and that air traffic controllers keep safety principles in mind as they do their job. The FAA Office of Airports guides advancements in technology and infrastructure at airport facilities and ensures that the FAA's runway safety work is deployed in a timely manner and properly used in the field. Flight Standards Services promotes runway safety by setting standards for certifying pilots, air operators. Like ATO Terminal Services, Flight Standards Services' role is critical because it ensures that individuals that have a direct impact on the day-to-day business of runway safety are familiar with accurate information.

The FAA also actively pursues working relationships with members of the aviation community. Pilots' opinions are highly valued. Forums that allow the FAA to collaborate with pilot groups have proven to be good sources of information that has a uniquely knowledgeable external perspective of the flight procedures and their observations. The FAA also works closely with groups that advise, develop, and

Figure 26
Runway Safety Partners

Runway safety affects everybody and through collaborative partnerships, we see success with Call to Action initiatives

deploy the technology and infrastructure that has been critical to the success of current runway safety activities.

The collaborative working relationships formed through work on the Call to Action and the Runway Safety Management Strategy have proven invaluable to the advancement of runway safety. An example of a relationship that demonstrates the value of a working together for mutual benefit is the development of EFB and AMMD technologies. The FAA provided a group of air carriers with funding to install and operationally evaluate EFB with AMMD equipment. Each carrier in this group will outfit the cockpits of two airplanes with EFB equipment for testing. As these carriers use, test, and benefit from the equipment they will provide data and lessons-learned to the FAA. The FAA will in-turn use the data to further refine EFB and AMMD technologies. Eventually the results of this collaboration will have a positive affect on the entire aviation community as EFB and AMMD are made available for all carriers to use in improving the safety of their operations.

The Runway Safety Council (RSC) is another example of a successful safety partnership that will play an important role in the future of runway safety promotion. The RSC aims to fundamentally change existing safety culture in the aviation community and move toward a safety strategy that proactively involves different and varied segments of the aviation industry. The RSC was formed in October of 2008 to discuss the root causes of runway safety incidents from a deep, systematic perspective. The Root Cause Analysis Team (RCAT) is a working sub-group of the RSC that examines and analyzes the human factors and other root causes that contribute to runway incursions. The RCAT presents its analysis to the larger RSC for discussion and a decision on which segment of the aviation industry is best suited to develop a solution. Groups that partner to form the RSC include: Air Line Pilots Association, National Air Traffic Controllers Association (NATCA), Airports Council International-North America, American Association of Airport Executives, AOPA, National Association of Flight Instructors, Air Transportation Association (ATA), National Business Aviation Association (NBAA), the FAA's Office of Runway Safety, FAA ATO Safety, FAA ATO Terminal Services, FAA Air Traffic Organization Operations and Planning, FAA Air Traffic Safety Oversight (AOV), FAA Flight Standards Services, and FAA Aviation Safety Analytical Services.

In July 2008, the Pilot Deviation Workgroup began meeting to examine the problem of increasing numbers of pilot deviations, to include runway incursions. The Pilot Deviation Workgroup is a partnership between Flight Standards Services, AOV, ATO, and the FAA Safety Team (FAASTeam). The Workgroup's goal is to develop and implement data-based mitigation strategies that will reduce pilot deviations by the fourth quarter of FY 2010. In order to meet this goal the Workgroup is developing Education/Training, Policy, Air Traffic Quality Assurance Improvement, and Data Analysis. The Workgroup is collaborating with Flight Standards Service's Air Transportation Division to undertake a study of all Category A and Category B runway incursions. Results of this collaboration are expected to help drive the creation of mitigating strategies. The report is scheduled for completion in November of 2009.

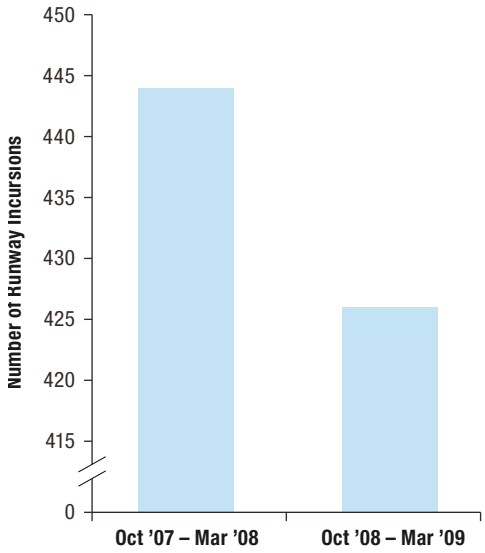
The Aviation Safety Action Program (ASAP) is a partnership designed to identify and correct adverse safety events that would otherwise not be likely to come to the FAA's attention. ASAP was established under AC 120-66 in 1997 and encourages voluntary, non-punitive reporting of safety concerns of pilots, dispatchers, flight attendants, and mechanics at over 70 certificate holders and repair stations. ASAP incident reports are filed through an electronic, web-based interface within 24-hours of the end of the duty day in which an incident occurs. Once an incident report is filed it is reviewed by an Event Review Committee (ERC). The ERC is composed of one designated

The FAA on ATSAP

"ATSAP allows us to focus on *why* errors happen, not on *who* made them."

– Bob Tarter
VP ATO Office of Safety

Figure 27
Quarter 1 and Quarter 2 Runway Incursion Statistics (FY 2008 compared to FY 2009)



representative and an alternate each from the FAA, the certificate holder, and any third party (e.g., the report-filing employee's union or representative organization). The ERC must reach a consensus when deciding whether a report is accepted into the program and when deciding on corrective action recommendations arising from the event, including any FAA administrative action. Each participating operator is required to maintain a data base of all the ASAP reports and subsequent dispositions filed under their purview. FAA headquarters also maintains a separate database of ASAP-related safety enhancements.

The Air Traffic Safety Action Program (ATSAP) is a mechanism that allows air traffic controllers and other personnel engaged in, and supporting air traffic services to voluntarily report safety concerns. ATSAP began in March 2008 and is modeled on the success of the ASAP program. The intent of ATSAP is to "identify safety events and implement skill enhancement and system corrective action to reduce the opportunity for safety to be compromised. Information obtained from ATSAP will provide stakeholders with a mechanism to identify actual and potential risks throughout the NAS."

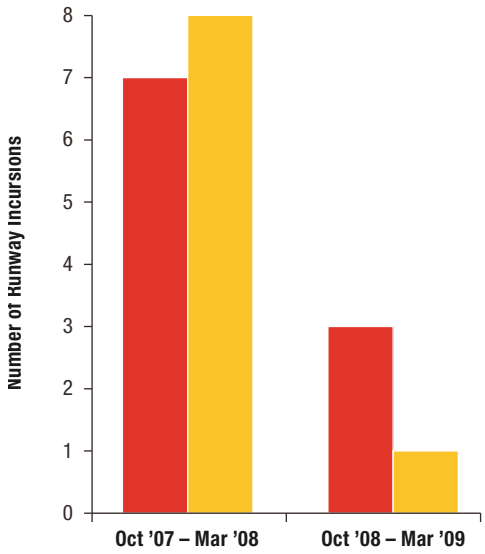
ATSAP encourages air traffic controllers (rather than pilots, dispatchers, flight attendants, and mechanics) to voluntarily report safety concerns. ATSAP's success is dependent on the collaboration of Air Traffic Controllers, ATO Safety, NATCA, and AOV. Like ASAP, ATSAP is voluntary and non-punitive. When an accepted report is filed, controllers don't have to worry about discipline or de-certification as corrective actions. ATSAP reports can be filed via the web within 24 hours of the end of the duty day in which the safety incident occurred. After a report is submitted, the information it contains is reviewed by an ERC. The ERC is composed of members representing ATO Safety, NATCA, and AOV. The ERC reviews and analyzes reports to identify actual or potential safety problems and propose solutions. These reviews facilitate early detection and improved awareness of operational deficiencies and adverse trends. ATSAP is expected to be implemented nationwide sometime during the first quarter of FY2010. As ATSAP gains momentum, a steady stream of reports (to date nearly 8,000 have been submitted) on every facet of the nation's air traffic control system will flow regularly from among some 12,000 eligible participants with the expected outcome of achieving optimal ATC safety and efficiency.

The partnerships that the FAA has built will continue to make a meaningful contribution to runway safety in the future. Preliminary runway incursion data from the beginning of FY 2009 shows favorable trends (see figure 27). The Runway Management Strategy will continue to evolve and mature in the future. As Call to Action initiatives reach full implementation and completion, the FAA anticipates a continued decrease in the number of runway incursions.

The FAA's Call to Action efforts may be paying off. For the first half of FY 2009, there were 18 less runway incursions than in the same period in FY 2008; this represents a 4 percent decrease (see figure 28). These results demonstrate the potentially positive affect that Call to Action initiatives have had in making runways safer. The most serious runway incursions, those in Category A and Category B, are down 73 percent

[3] Second quarter FY 2009 data is current as of April 24, 2009 and is subject to change. There is 1 pending event from March 2009 that is currently being investigated; the investigation may result in this incursion being classified as a serious runway incursion.

Figure 28
Serious Runway Incursion Statistics FY 2009 versus FY 2008



(15 serious runway incursions in FY 2008 and 4 serious runway incursions in FY 2009) in the first and second quarters of FY 20093 when compared to the same period in FY 2008. Based on these preliminary numbers, the FAA is optimistic to meet the goal set forth in Flight Plan FY 2009 through FY 2013 of 0.47 runway incursions per million operations.

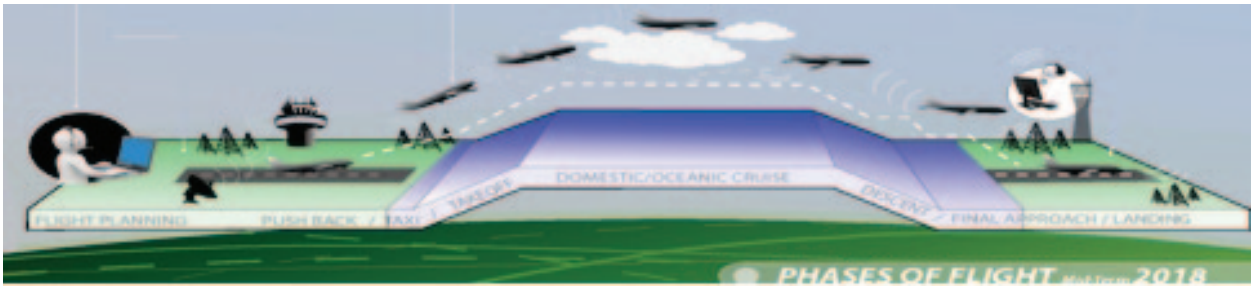
The Next Generation Air Transportation System (NextGen) is transforming the way the National Airspace System is managed. As NextGen continues to develop, runway incursion prevention will continue to advance. Pilots' situational awareness during departure and arrival will be improved by some of NextGen's technological advances. EFB with AMMD flight deck displays will portray aircraft movement on a moving map, indicating aircraft position on the airport. This technology will also display the positions of other aircraft and vehicles in the vicinity. The accurate, real-time mapping created by these flight deck displays will help prevent runway incursions and other on-ground conflicts.

Data communications will increase efficiency by providing strategic information to pilots and automate certain routine pilot and controller tasks. Decreasing the volume of voice communications will also reduce radio congestion and eliminate verbal miscommunication – a safety improvement that will reduce operational errors, including those that cause runway incursions.

Surface management systems combine the surface detection capabilities of ASDE-X and other positioning technologies such as Automated Dependent Surveillance – Broadcast (ADS-B) to increase shared situational awareness. Aircraft and vehicles will move around the airport surface more safely and efficiently, reducing the likelihood of runway incursions.

As Call to Action initiatives are completed and the Runway Safety Management strategy continues to evolve, the FAA anticipates that its recent efforts will continue to demonstrate their effectiveness. The effectiveness of Call to Action efforts will continue to be measured and tracked in the future. The FAA has made tremendous strides to improve runway safety in the short period since the Call to Action's inception. As with any major effort, it will take time to realize all of the benefits of the Call to Action and the Runway Safety Management Strategy. Several Call to Action Initiatives will reach important milestones in the next few years (SEE FIGURE 29); the FAA plans to see continued

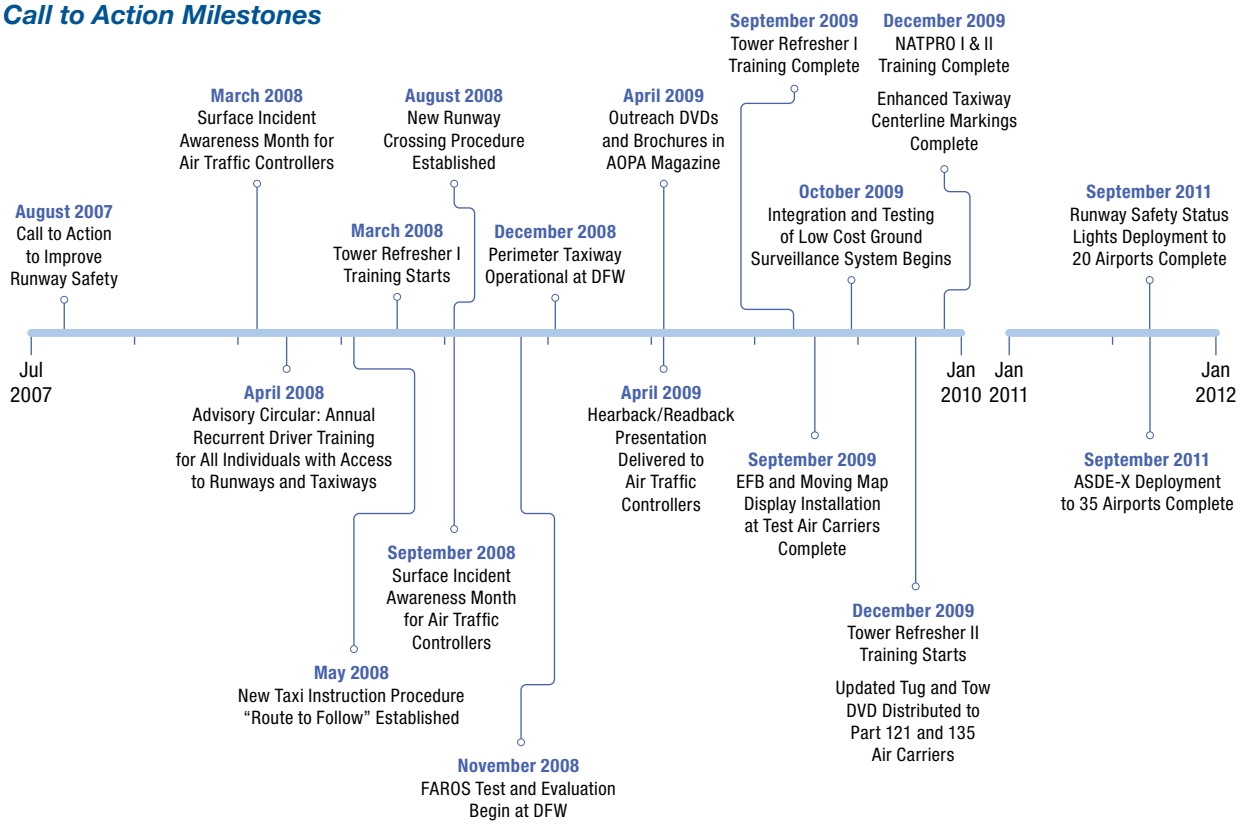
Figure 29
Next Generation Air Transportation System and Runway Safety



improvements in runway safety as these initiatives reach completion and the Runway Safety Management Strategy evolves.

FAA has made tremendous strides to improve runway safety in the short period since the Call to Action's inception. As with any major effort, it will take time to realize all of the benefits of the Call to Action and the Runway Safety Management Plan. The effectiveness of Call to Action efforts will continue to be measured and tracked in the future and several initiatives will reach important milestones in the next few years (SEE FIGURE 30). The FAA expects to see continued improvements in runway safety as these initiatives reach completion and the Runway Safety Management Plan evolves.

Figure 30
Call to Action Milestones



Reference Data

I. Types of Runway Incursions

II. Airports that have ASDE-X Operational or are Planned to Receive ASDE-X

III. Airports with EMAS Installations

IV. Runway Incursion Data for FY 2005 through FY 2008 by Airport (Sorted Alphabetically by State)

I. Types of Runway Incursions

The FAA categorizes 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 the chain of pilot, air traffic controller, and/or vehicle operator actions that led to the runway incursion.

Pilot Deviations	Operational Errors/Deviations	Vehicle/Pedestrian 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.	An operational error (OE) is an action of an air traffic controller (ATC) that results in: 1. Less than the required minimum separation between two or more aircraft, or between an aircraft and obstacles (e.g., vehicles, equipment, personnel on runways). 2. 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.	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.

For the purposes of this report, runway incursion data prior to FY 2008 was re-categorized to reflect the ICAO definition, FY 2005 through FY 2007 data shown in the tables below are estimates to reflect the re-categorization.

Number of Incursions for Each Runway Incursion Type

	FY 2005	FY 2006	FY 2007	FY 2008	Total
Pilot Deviations	447	507	575	637	2,166
Operational Errors/Deviations	126	111	124	164	525
Vehicle/Pedestrian Deviations	206	198	193	208	805
Total	**779**	**816**	**892**	**1,009**	**3,496**

Number and Severity of Operational Errors/Deviations

	FY 2005	FY 2006	FY 2007	FY 2008	Total
Category D	21	22	19	23	85
Category C	89	79	95	128	391
Category B	7	2	4	7	20
Category A	9	8	6	6	29
Total	**126**	**111**	**124**	**164**	**525**

Number and Severity of Pilot/Deviations

	FY 2005	FY 2006	FY 2007	FY 2008	Total
Category D	278	317	366	414	1,375
Category C	160	172	198	213	743
Category B	5	5	3	6	18
Category A	4	13	8	5	30
Total	**447**	**507**	**575**	**637**	**2,166**

Number and Severity of Vehicle/Pedestrian Deviations

	FY 2005	FY 2006	FY 2007	FY 2008	Total
Category D	153	147	137	156	593
Category C	49	48	53	50	200
Category B	3	0	0	1	4
Category A	1	3	3	1	8
Total	**206**	**198**	**193**	**208**	**805**

II. Airports that have ASDE-X Operational or are Planned to Receive ASDE-X

Airport Code	Airport Name, City	ASDE-X Operational
MKE	General Mitchell International Airport, Milwaukee	2003
MCO	Orlando International Airport, Orlando	2004
HOU	William P. Hobby Airport, Houston	2005
PVD	Theodore Francis Green State Airport, Providence	2005
ATL	Hartsfield-Jackson Atlanta International Airport, Atlanta	2006
BDL	Bradley International Airport, Windsor Locks	2006
SEA	Seattle-Tacoma International Airport, Seattle	2006
STL	Lambert-St. Louis International Airport, St. Louis	2006
CLT	Charlotte/Douglas International Airport, Charlotte	2007
ORD	Chicago O'Hare International Airport, Chicago	2007
SDF	Louisville International Airport-Standiford Field, Louisville	2007
DTW	Detroit Metropolitan Wayne County Airport, Detroit	2008
FLL	Ft. Lauderdale/Hollywood International Airport, Ft. Lauderdale	2008
IAD	Washington Dulles International Airport, Chantilly	2008
JFK	John F. Kennedy International Airport, New York	2008
PHX	Phoenix Sky Harbor International Airport, Phoenix	2008
BOS	Boston Logan International Airport	2009
DEN	Denver International Airport, Denver	2009
EWR	Newark Liberty International Airport, Newark	2009
IAH	George Bush Intercontinental/Houston Airport, Houston	2009
LAX	Los Angeles International Airport, Los Angeles	2009
PHL	Philadelphia International Airport, Philadelphia	2009
BWI	Baltimore/Washington International Thurgood Marshall Airport	2010
DCA	Ronald Reagan Washington National Airport, Washington	2010
DFW	Dallas/Fort Worth International Airport, Dallas	2010
HNL	Honolulu International Airport, Honolulu	2010
LGA	LaGuardia Airport, New York	2010
MDW	Chicago Midway International Airport, Chicago	2010
MIA	Miami International Airport	2010
MSP	Minneapolis-St. Paul International/Wold Chamberlain Airport, Minneapolis	2010
SAN	San Diego International Airport, San Diego	2010
SLC	Salt Lake City International Airport, Salt Lake City	2010
SNA	John Wayne-Orange County Airport, Santa Ana	2010
LAS	McCarran International Airport, Las Vegas	2011
MEM	Memphis International Airport, Memphis	2011

III. Airports with EMAS Installations

Airport	Location	No. of Systems	Installation Date
John F. Kennedy International	New York, NY	2	1996/2007
Minneapolis St.-Paul	Minneapolis, MN	1	1999
Adams Field	Little Rock, AR	2	2000/2003
Greater Rochester International	Rochester, NY	1	2001
Bob Hope	Burbank, CA	1	2002
Baton Rouge Metropolitan	Baton Rouge, LA	1	2002
Greater Binghamton	Binghamton, NY	2	2002
Greenville Downtown	Greensville, SC	1	2003*
Barnstable Municipal	Hyannis, MA	1	2003
Roanoke Regional	Roanoke, VA	1	2004
Ft. Lauderdale/Hollywood International	Fort Lauderdale, FL	2	2004
Dutchess County	Poughkeepsie, NY	1	2004
LaGuardia	New York, NY	2	2005
General Edward Lawrence Logan International	Boston, MA	2	2005/2006
Laredo International	Laredo, TX	1	2006
San Diego International	San Diego, CA	1	2006
Teterboro	Teterboro , NJ	1	2006
Chicago Midway International	Chicago, IL	4	2006/2007
Merle K (Mudhole) Smith	Cordova, AK	1	2007
Charleston Yeager	Charleston , WV	1	2007
Manchester	Manchester, NH	1	2007
Wilkes-Barre/Scranton International	Wilkes-Barre Scranton, PA	1	2008
Chicago O'Hare International	Chicago O'Hare, IL	1	2008
Newark Liberty International	Newark Liberty, NJ	1	2008
San Luis County Regional	San Luis Obispo , CA	1	2008
Minneapolis-St. Paul International	Minneapolis St. Paul, MN	1	2008
Worcester Regional	Worcester, MA	1	2008
Airport	**Location**	**No. of Systems**	**Planned Installation Date**
Key West International	Key West, FL	1	2009
Piedmont Triad International	Winston-Salem, NC	1	2009
New Castle	New Castle, DE	1	2009
Lafayette Regional	Lafayette, LA	2	TBD
Telluride Regional	Telluride, CO	2	TBD
Groton-New London Airport	Groton-New London, CT	2	TBD

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IV. Runway Incursion Data for FY 2005 through FY 2008 by Airport (Sorted Alphabetically by State)

ALABAMA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Birmingham International Airport, Birmingham (BHM)	ASO	2005				1	1	2	1.33	
		2006				2	2	4	2.81	1
		2007		1			1	2	1.45	3
		2008				2		2	1.52	1
Huntsville International - Carl T. Jones Airport, Huntsville (HSV)	ASO	2005					1	1	0.96	
		2006					2	2	2.73	
		2007					2	2	2.11	2
		2008					2	2	2.22	1
Mobile Downtown Airport, Mobile (BFM)	ASO	2005								
		2006					2	2	2.43	
		2007								
		2008								
Mobile Regional Airport, Mobile (MOB)	ASO	2005								
		2006				1	4	5	4.72	
		2007				1	2	3	3.17	
		2008								
Montgomery Regional Airport, Montgomery (MGM)	ASO	2005				1		1	1.50	
		2006					1	1	1.38	
		2007								
		2008								
Tuscaloosa Regional Airport, Tuscaloosa (TCL)	ASO	2005								
		2006								
		2007								
		2008				1		1	1.88	

ALASKA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Bethel Airport, Bethel (BET)	AAL	2005				1	2	3	2.92	
		2006				1	1	2	2.36	
		2007								
		2008					2	2	2.34	
Fairbanks International Airport, Fairbanks (FAI)	AAL	2005				4	9	13	11.46	
		2006				2	7	9	8.22	
		2007				2	5	7	6.47	2
		2008					6	6	5.27	1

ALASKA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Juneau International Airport, Juneau (JNU)	AAL	2005				1		1	0.97	
		2006								
		2007				2	4	6	6.34	
		2008					1	1	1.13	
King Salmon Airport, King Salmon (AKN)	AAL	2005								
		2006								
		2007				1		1	2.98	
		2008					2	2	2.30	
Kodiak Airport, Kodiak (ADQ)	AAL	2005					2	2	5.99	
		2006								
		2007								
		2008								
Merrill Field, Anchorage (MRI)	AAL	2005				2	7	9	4.79	2
		2006					7	7	3.81	3
		2007					9	9	5.00	
		2008				1	11	12	7.25	1
Ted Stevens Anchorage International Airport, Anchorage (ANC)*	AAL	2005				7	7	14	4.46	2
		2006				3	10	13	4.27	4
		2007		1		3	5	9	3.00	2
		2008				3	7	10	3.48	1

*Includes Lake Hood (LHD) data.

ARIZONA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Chandler Municipal Airport, Chandler (CHD)	AWP	2005				1	1	2	0.88	
		2006				1		1	0.37	
		2007					1	1	0.38	
		2008				2		2	0.79	2
Ernest A. Love Field, Prescott (PRC)	AWP	2005				4	4	8	3.39	
		2006				1	3	4	1.76	
		2007				4		4	1.73	1
		2008				4	3	7	2.75	1
Falcon Field, Mesa (FFZ)	AWP	2005				2	4	6	2.33	
		2006					2	2	0.76	
		2007				6	2	8	2.79	
		2008		1	1	7	5	14	4.26	
Flagstaff Pulliam Airport, Flagstaff (FLG)	AWP	2005								
		2006					1	1	2.17	
		2007								
		2008								

ARIZONA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Glendale Municipal Airport, Glendale (GEU)	AWP	2005			1			1	0.78	
		2006								
		2007								1
		2008				1		1	0.72	
Laughlin/Bullhead International Airport, Bullhead City (IFP)	AWP	2005				1	7	8	28.19	
		2006					2	2	7.23	
		2007								
		2008			1			1	4.56	
Phoenix Deer Valley Airport, Phoenix (DVT)	AWP	2005		1		4	4	9	2.51	4
		2006		1		1	2	4	1.39	
		2007				1	2	3	0.76	1
		2008				1	1	2	0.55	
Phoenix Goodyear Airport, Goodyear (GYR)	AWP	2005				1		1	1.39	
		2006				1	1	2	1.43	
		2007								
		2008								
Phoenix-Mesa Gateway Airport, Mesa (IWA)	AWP	2005				2	1	3	1.15	
		2006				5	2	7	2.55	
		2007				1		1	0.33	
		2008					5	5	1.96	
Phoenix Sky Harbor International Airport, Phoenix (PHX)	AWP	2005				4	1	5	0.89	1
		2006		2		1	1	4	0.73	
		2007				1		1	0.18	
		2008				2	3	5	0.96	2
Scottsdale Airport, Scottsdale (SDL)	AWP	2005		1		4	1	6	2.83	
		2006				1	1	2	0.99	1
		2007				1		1	0.54	
		2008								
Tucson International Airport, Tucson (TUS)	AWP	2005					3	3	2.00	1
		2006		1		3		4	1.42	1
		2007				2	1	3	1.16	
		2008				2		2	0.86	1

ARKANSAS

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Adams Field, Little Rock (LIT)	ASW	2005					1	1	0.59	
		2006				1	3	4	2.74	1
		2007				3	1	4	2.82	
		2008					1	1	0.76	1
Drake Field, Fayetteville (FYV)	ASW	2005					1	1	2.34	
		2006								
		2007								
		2008								
Ft. Smith Regional Airport, Ft. Smith (FSM)	ASW	2005								
		2006								
		2007					1	1	1.42	
		2008								
Texarkana Regional Airport Webb Field, Texarkana (TXK)	ASW	2005								
		2006								
		2007								
		2008					1	1	3.64	

CALIFORNIA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Atwater-Castle Airport, Atwater (MER)	AWP	2005								
		2006								
		2007								
		2008		1			4	5	3.76	
Bob Hope Airport, Burbank (BUR)	AWP	2005					3	3	1.72	
		2006				2	5	7	3.66	1
		2007				1	3	4	2.16	1
		2008					1	1	0.81	
Brackett Field, La Verne (POC)	AWP	2005				2	1	3	1.75	
		2006				1	3	4	3.15	2
		2007					1	1	1.53	6
		2008				3	3	6	4.98	
Brown Field Municipal Airport, San Diego (SDM)	AWP	2005					1	1	0.94	
		2006								
		2007								
		2008		1				1	0.85	
Buchanan Field, Concord (CCR)	AWP	2005				2	2	4	3.24	
		2006								1
		2007				1	1	2	2.17	
		2008				1	3	4	4.21	

CALIFORNIA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Camarillo Airport, Camarillo (CMA)	AWP	2005				1	1	2	1.33	6
		2006				2	3	5	3.34	8
		2007					2	2	1.37	2
		2008					2	2	1.35	4
Charles M. Schulz - Sonoma County Airport, Santa Rosa (STS)	AWP	2005					2	2	1.72	
		2006					1	1	0.84	
		2007					1	1	0.75	
		2008					1	1	0.93	
Chico Municipal Airport, Chico (CIC)	AWP	2005					1	1	2.50	
		2006				1		1	2.21	
		2007								
		2008					1	1	1.88	
Chino Airport, Chino (CNO)	AWP	2005					2	2	1.93	
		2006					7	7	4.20	3
		2007					4	4	2.39	2
		2008					2	2	1.45	
El Monte Airport, El Monte (EMT)	AWP	2005					1	1	0.67	1
		2006								1
		2007								1
		2008				1		1	1.17	1
Fresno Yosemite International Airport, Fresno (FAT)	AWP	2005								
		2006				1		1	0.65	
		2007			1			1	0.64	
		2008		1			1	2	1.25	
Fullerton Municipal Airport, Fullerton (FUL)	AWP	2005								
		2006								
		2007								
		2008				1	1	2	2.87	
Gillespie Field, San Diego/El Cajon (SEE)	AWP	2005			1	3	1	5	2.19	
		2006		1			3	4	1.44	
		2007								1
		2008					1	1	0.40	1
Hawthorne Municipal Airport, Hawthorne (HHR)	AWP	2005								
		2006				1	3	4	6.44	
		2007				1		1	1.45	
		2008				1	1	2	3.48	
Hayword Executive Airport, Hayword (HWD)	AWP	2005								
		2006								1
		2007					1	1	0.75	
		2008								

CALIFORNIA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
John Wayne Airport-Orange County, Santa Ana (SNA)	AWP	2005				8	2	10	2.66	1
		2006				3	1	4	1.15	
		2007				9	9	18	5.15	3
		2008				8	2	10	3.58	5
Livermore Municipal Airport, Livermore (LVK)	AWP	2005								
		2006								1
		2007								
		2008				1	1	2	1.20	
Long Beach Airport - Daugherty Field, Long Beach (LGB)	AWP	2005				6	10	16	4.58	
		2006				2	4	6	1.68	2
		2007			1	5	7	13	3.26	2
		2008				6	5	11	3.51	
Los Angeles International Airport, Los Angeles (LAX)	AWP	2005				8	10	18	2.75	2
		2006		1	1	6	2	10	1.54	1
		2007			2	6	13	21	3.12	
		2008				3	6	9	1.37	1
McClellan-Palomar Airport, Carlsbad (CRQ)	AWP	2005				1		1	0.49	
		2006				3		3	1.52	
		2007				2		2	0.93	
		2008				1	2	3	1.55	2
Meadows Field, Bakersfield (BFL)	AWP	2005					1	1	0.49	
		2006					1	1	0.56	1
		2007					2	2	0.93	
		2008					1	1	0.52	
Metropolitan Oakland International Airport, Oakland (OAK)	AWP	2005					2	2	0.58	1
		2006				2	3	5	1.50	2
		2007				1	1	2	0.57	
		2008				1		1	0.34	
Monterey Peninsula Airport, Monterey (MRY)	AWP	2005				1	1	2	2.24	
		2006				2	2	4	4.35	
		2007					1	1	1.17	
		2008				2	1	3	3.72	2
Montgomery Field, San Diego (MYF)	AWP	2005				1	1	2	0.83	
		2006					1	1	0.43	1
		2007		1		2	2	5	2.24	
		2008				1	3	4	1.69	
Napa County Airport, Napa (APC)	AWP	2005								
		2006				3	2	5	4.30	1
		2007		1		1	4	6	4.89	1
		2008				2	5	7	5.89	

CALIFORNIA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Norman Y. Mineta San Jose International Airport, San Jose (SJC)	AWP	2005					6	6	2.73	2
		2006				2	7	9	4.20	1
		2007				4	5	9	4.34	2
		2008					8	8	4.63	
Ontario International Airport, Ontario (ONT)	AWP	2005				1	2	3	2.51	1
		2006				1	2	3	2.20	
		2007				1	2	3	2.69	1
		2008					2	2	1.48	
Oxnard Airport, Oxnard (OXR)	AWP	2005					1	1	1.13	1
		2006					1	1	1.13	
		2007					2	2	2.63	
		2008				2	3	5	5.57	1
Palm Springs International Airport, Palm Springs (PSP)	AWP	2005				2	2	4	4.22	
		2006			1	2	4	7	7.64	1
		2007				2	5	7	7.75	4
		2008					3	3	3.99	1
Palmdale Regional Airport, Palmdale (PMD)	AWP	2005								
		2006								
		2007					1	1	2.97	
		2008								
Palo Alto Airport of Santa Clara County, Palo Alto (PAO)	AWP	2005				1		1	0.54	1
		2006								
		2007								
		2008				3	2	5	2.86	
Ramona Airport, Ramona (RNM)	AWP	2005								
		2006								
		2007					1	1	0.59	
		2008								
Redding Municipal Airport, Redding (RDD)	AWP	2005								
		2006								
		2007					1	1	1.31	
		2008					1	1	1.47	
Reid-Hillview Airport of Santa Clara County, San Jose (RHV)	AWP	2005				1		1	0.50	1
		2006				1		1	0.59	
		2007					1	1	0.66	
		2008								1
Riverside Municipal Airport, Riverside (RAL)	AWP	2005								1
		2006			1			1	1.20	
		2007					2	2	2.47	
		2008				3		3	4.30	

CALIFORNIA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Sacramento Executive Airport, Sacramento (SAC)	AWP	2005								
		2006				1	2	3	2.65	
		2007								
		2008								
Sacramento International Airport, Sacramento (SMF)	AWP	2005								
		2006					1	1	0.57	
		2007					1	1	0.58	
		2008								
Sacramento Mather Airport, Sacramento (MHR)	AWP	2005					1	1	1.21	
		2006					1	1	1.25	
		2007								
		2008								
Salinas Municipal Airport, Salinas (SNS)	AWP	2005								
		2006				1		1	1.36	
		2007								
		2008					2	2	2.49	
San Carlos Airport, San Carlos (SQL)	AWP	2005								
		2006								
		2007					2	2	1.38	
		2008				1	1	2	1.39	1
San Diego International Airport -Lindbergh Field, San Diego (SAN)	AWP	2005					4	4	1.77	
		2006								
		2007								3
		2008			1	1	1	3	1.26	
San Francisco International Airport, San Francisco (SFO)	AWP	2005								
		2006				3	5	8	2.23	
		2007		1		3	3	7	1.89	1
		2008				11	9	20	5.80	
San Luis County Regional Airport, San Luis Obispo (SBP)	AWP	2005								
		2006					1	1	1.94	
		2007								
		2008								
Santa Barbara Municipal Airport, Santa Barbara (SBA)	AWP	2005				1	1	2	1.27	1
		2006				2	2	4	2.92	
		2007				2		2	1.62	
		2008				1	3	4	3.38	
Santa Maria Public Airport - Capt G. Allen Hancock Field, Santa Maria (SMX)	AWP	2005								
		2006				2		2	3.12	
		2007								
		2008								1

CALIFORNIA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Tota RIs	Annual RI Rate	Other Events, Non-RIs
Santa Monica Municipal Airport, Santa Monica (SMO)	AWP	2005					2	2	1.50	1
		2006					6	6	4.39	
		2007								
		2008								
Van Nuys Airport, Van Nuys (VNY)	AWP	2005			1	2	3	6	1.43	3
		2006				2		2	0.56	1
		2007					4	4	1.54	
		2008				3	3	6	1.54	
Victorville/Southern California Logistics Airport, Victorville, (VCV)	AWP	2005								
		2006					2	2	3.00	1
		2007					1	1	1.63	
		2008								
Whiteman Airport, Los Angeles, (WHP)	AWP	2005								
		2006					1	1	0.96	
		2007								
		2008				1		1	1.38	
Yuba County Airport, Marysville, (MYV)	AWP	2005								
		2006					1	1	*	
		2007								
		2008								
Zamperini Field, Torrance (TOA)	AWP	2005					1	1	0.65	
		2006				1		1	0.67	
		2007		1		2	2	5	2.97	3
		2008					2	2	1.28	1

*This was a temporary tower during a fly-in event; operational data not available.

COLORADO

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Centennial Airport, Denver (APA)	ANM	2005				2	5	7	1.96	1
		2006				1	4	5	1.55	
		2007				3	5	8	2.42	
		2008				3	2	5	1.51	
Colorado Springs Municipal Airport, Colorado Springs (COS)	ANM	2005								
		2006				1		1	0.67	
		2007				1		1	0.66	1
		2008					1	1	0.67	

COLORADO – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Denver International Airport, Denver (DEN)	ANM	2005								1
		2006					1	1	0.17	
		2007		2		2	3	7	1.14	1
		2008				3	1	4	0.63	
Eagle County Regional Airport, Eagle (EGE)	ANM	2005		1				1	2.44	1
		2006								
		2007								
		2008				1		1	2.33	1
Front Range Airport, Aurora (FTG)	ANM	2005								
		2006		1				1	1.13	
		2007								
		2008				1		1	1.30	
Pueblo Memorial Airport, Pueblo (PUB)	ANM	2005					2	2	1.92	
		2006					1	1	0.88	
		2007				1	3	4	2.76	
		2008				3	8	11	6.81	
Rocky Mountain Metropolitan/ Jefferson County Airport, Broomfield (BJC)	ANM	2005					2	2	1.16	1
		2006					1	1	5.99	
		2007				4	1	5	2.98	1
		2008				1	2	3	1.95	1
Sardy Field, Aspen (ASE)	ANM	2005				2	2	4	8.93	
		2006				1	1	2	4.50	
		2007					1	1	2.33	
		2008					2	2	4.30	3
Walker Field, Grand Junction (GJT)	ANM	2005								
		2006				1		1	1.35	
		2007								1
		2008				1	1	2	2.79	

CONNECTICUT

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Bradley International Airport, Windsor Locks (BDL)	ANE	2005				3	3	6	3.82	
		2006				2	1	3	2.00	
		2007				1		1	0.69	1
		2008				1	3	4	3.85	
Danbury Municipal Airport, Danbury (DXR)	ANE	2005								
		2006								
		2007					1	1	1.32	
		2008				1	1	2	2.42	

CONNECTICUT – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Hartford-Brainard Airport, Hartford (HFD)	ANE	2005								
		2006								1
		2007								
		2008								
Sikorsky Memorial Airport, Bridgeport (BDR)	ANE	2005								
		2006								
		2007				3	2	5	5.84	
		2008								
Tweed-New Haven Airport, New Haven (HVN)	ANE	2005					1	1	1.47	
		2006								
		2007					1	1	1.76	
		2008								
Waterbury-Oxford Airport, Oxford (OXC)	ANE	2005					1	1	1.77	
		2006					1	1	1.96	
		2007					1	1	1.64	2
		2008					1	1	1.92	1

DELAWARE

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
New Castle County Airport, Wilmington (ILG)	AEA	2005								
		2006								
		2007					1	1	0.78	
		2008								1

DISTRICT OF COLUMBIA

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Ronald Reagan Washington National Airport, Washington, DC (DCA)	AEA	2005								
		2006				2	2	4	1.44	1
		2007				1	2	3	1.72	
		2008				3	2	5	1.79	

FLORIDA

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Cecil Field, Jacksonville (VQQ)	ASO	2005					1	1	1.18	
		2006								
		2007								
		2008								

FLORIDA - Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Daytona Beach International Airport, Daytona Beach (DAB)	ASO	2005								1
		2006		1		1		2	0.78	1
		2007		1		4	1	6	1.98	1
		2008		1		2	5	8	2.39	2
Ft. Lauderdale Executive Airport, Ft. Lauderdale (FXE)	ASO	2005				2	1	3	1.44	1
		2006				3	9	12	6.14	9
		2007				4	1	5	2.54	4
		2008				6	6	12	6.42	11
Ft. Lauderdale/Hollywood International Airport, Ft. Lauderdale (FLL)	ASO	2005				2	7	9	2.68	
		2006				2	6	8	2.66	1
		2007		1		3	6	10	3.28	
		2008				1	2	3	0.98	
Gainesville Regional Airport, Gainesvilled (GNV)	ASO	2005								
		2006								
		2007								
		2008								1
Jacksonville International Airport, Jacksonville (JAX)	ASO	2005					2	2	1.61	
		2006								
		2007					1	1	0.83	
		2008								
Kendall-Tamiami Executive Airport, Miami (TMB)	ASO	2005					1	1	0.55	1
		2006				2	3	5	2.54	1
		2007			1	3	4	8	3.21	
		2008				3	2	5	1.61	1
Kissimmee Gateway Airport, Orlando (ISM)	ASO	2005				1	3	4	2.66	1
		2006				1	3	4	2.69	
		2007				2	2	4	2.38	
		2008								
Lakeland Linder Regional Airport, Lakeland (LAL)	ASO	2005								
		2006								
		2007					2	2	1.42	
		2008								
Miami International Airport, Miami (MIA)	ASO	2005				1	1	2	0.52	
		2006		1		3	1	5	1.31	
		2007				5	3	8	2.69	
		2008				3	5	8	2.12	
Opa Locka Airport, Miami (OPF)	ASO	2005					1	1	0.74	
		2006								
		2007				2	3	5	4.32	
		2008				1	2	3	3.63	3

FLORIDA - Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Orlando Executive Airport, Orlando (ORL)	ASO	2005				1	2	3	1.93	
		2006		1		1	3	5	3.47	
		2007				2		2	1.32	
		2008				2	3	5	3.57	
Orlando International Airport, Orlando (MCO)	ASO	2005				1	2	3	0.84	
		2006				1		1	0.28	
		2007				3	4	7	1.93	1
		2008					1	1	0.27	2
Orlando Sanford International Airport, Orlando (SFB)	ASO	2005				2	3	5	1.46	
		2006				2	2	4	1.29	1
		2007				3	9	12	3.84	1
		2008				5	6	11	4.91	
Ormond Beach Municipal Airport, Ormond Beach (OMN)	ASO	2005					1	1	0.73	
		2006								
		2007								
		2008								
Page Field, Ft. Myers (FMY)	ASO	2005					1	1	1.14	
		2006					1	1	1.28	
		2007								
		2008								
Palm Beach International, West Palm Beach, (PBI)	ASO	2005				1	4	5	2.51	7
		2006				3	2	5	2.58	10
		2007				2	1	3	1.57	15
		2008			1		6	7	3.89	6
Panama City-Bay County International Airport, Panama City (PFN)	ASO	2005								
		2006								
		2007								
		2008					1	1	1.28	
Pensacola Regional Airport, Pensacola (PNS)	ASO	2005								
		2006				1	1	2	1.74	
		2007				1		1	0.93	
		2008				2		2	1.83	
Sarasota-Bradenton International Airport, Sarasota (SRQ)	ASO	2005								
		2006				1		1	0.61	
		2007					1	1	0.70	
		2008					2	2	1.46	
Southwest Florida International Airport, Ft. Myers, (RSW)	ASO	2005								1
		2006		1				1	1.79	1
		2007				2	5	7	7.50	1
		2008					1	1	1.13	1

FLORIDA - Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Space Coast Regional Airport, Titusville (TIX)	ASO	2005					1	1	0.56	
		2006								1
		2007					1	1	0.59	
		2008								
St. Augustine Airport, St. Augustine (SGJ)	ASO	2005								
		2006				1	1	2	1.74	
		2007				2	1	3	2.87	
		2008				1	2	3	3.22	
St. Lucie County International, Ft. Pierce (FPR)	ASO	2005					2	2	1.23	
		2006					1	1	0.97	
		2007								
		2008					2	2	1.32	
St. Petersburg-Clearwater International Airport, St. Petersburg (PIE)	ASO	2005					1	1	0.47	
		2006					1	1	0.49	
		2007					5	5	2.66	
		2008		1	1		1	3	1.77	
Tallahassee Regional Airport, Tallahassee (TLH)	ASO	2005					3	3	3.19	
		2006		1				1	0.99	
		2007					1	1	1.28	
		2008					1	1	1.72	
Tampa International Airport, Tampa (TPA)	ASO	2005				1	4	5	1.86	1
		2006			1		5	6	2.33	
		2007					1	1	0.38	
		2008				2	2	4	1.66	1
Vero Beach Municipal Airport, Vero Beach (VRB)	ASO	2005			1	1	1	3	2.05	1
		2006								
		2007					2	2	1.36	
		2008				2	3	5	2.91	1
Whitham Field, Stuart (SUA)	ASO	2005								
		2006								
		2007								
		2008					3	3	4.45	

GEORGIA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Athens Ben Epps Airport, Athens (AHN)	ASO	2005								
		2006								
		2007								
		2008					1	1	2.15	

GEORGIA - Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Augusta Regional Airport at Bush Field, Augusta (AGS)	ASO	2005								
		2006								
		2007					3	3	1.87	
		2008								
Cobb County-McCollum Field, Marietta (RYY)	ASO	2005					1	1	0.95	
		2006								
		2007								
		2008				1		1	1.27	
Columbus Metropolitan Airport, Columbus (CSG)	ASO	2005								
		2006								1
		2007								
		2008								
Dekalb-Peachtree Airport, Atlanta (PDK)	ASO	2005			2	6	6	14	7.78	3
		2006				4	3	7	3.39	
		2007				7	2	9	4.29	1
		2008		1		1	7	9	4.57	
Fulton County Airport, Atlanta (FTY)	ASO	2005				1	1	2	1.70	
		2006					1	1	0.92	
		2007					2	2	1.64	
		2008				2	1	3	2.72	
Gwinnett County-Briscoe Field, Lawrenceville (LZU)	ASO	2005								
		2006								
		2007								
		2008								1
Hartsfield-Jackson Altlanta International Airport, Atlanta (ATL)	ASO	2005				3	1	4	0.46	
		2006				9	2	11	1.14	1
		2007				11	5	16	1.62	
		2008				14	8	22	2.23	
Middle Georgia Regional Airport, Macon (MCN)	ASO	2005					1	1	3.28	1
		2006								
		2007					1	1	3.65	
		2008								
Savannah/Hilton Head International Airport, Savannah (SAV)	ASO	2005				2	6	8	7.52	
		2006								
		2007				1	3	4	3.95	1
		2008				2	2	4	4.21	1

GUAM

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Guam International Airport, Agana (GUM)	AWP	2005								
		2006								
		2007								
		2008					2	2	3.38	

HAWAII

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Hilo International Airport, Hilo (ITO)	AWP	2005					1	1	0.85	
		2006				1	2	3	3.13	
		2007								
		2008					1	1	1.19	
Honolulu International Airport, Honolulu (HNL)	AWP	2005			1	2	2	5	1.49	1
		2006				2	3	5	1.57	1
		2007				2	6	8	2.78	
		2008			1	1	1	3	1.42	1
Kahului Airport, Kahului (OGG)	AWP	2005				2	1	3	1.79	
		2006								
		2007								
		2008					1	1	0.74	
Kalaeloa Airport, Kapolei (JRF)	AWP	2005					1	1	0.63	
		2006					1	1	0.67	1
		2007					1	1	0.80	
		2008				1		1	3.29	
Kona International at Keahole Airport, Kailua/Kona (KOA)	AWP	2005								
		2006								
		2007								
		2008								1

IDAHO

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Boise Air Terminal - Gowen Field, Boise (BOI)	ANM	2005				2		2	1.63	
		2006				1	1	2	1.16	
		2007				2	1	3	1.63	
		2008				4	1	5	3.19	
Friedman Memorial Airport, Hailey (SUN)	ANM	2005								
		2006		2				2	4.83	
		2007								
		2008					1	1	2.77	

IDAHO - Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Idaho Falls Regional Airport, Idaho Falls (IDA)	ANM	2005								
		2006					3	3	7.87	
		2007					2	2	4.48	1
		2008				1	6	7	2.32	
Joslin Field-Magic Valley Regional Airport, Twin Falls (TWF)	ANM	2005					1	1	2.50	
		2006								
		2007								
		2008								
Pocatello Regional Airport, Pocatello (PIH)	ANM	2005								
		2006					1	1	2.28	
		2007								
		2008								

ILLINOIS

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Abraham Lincoln Capital Airport, Springfield (SPI)	AGL	2005					2	2	3.63	
		2006				1	1	2	3.89	
		2007				2	3	5	1.93	
		2008				1	6	7	17.70	1
Aurora Municipal Airport, Aurora (ARR)	AGL	2005								
		2006								
		2007				1		1	1.47	
		2008								
Central Illinois Regional Airport, Bloomington-Normal (BMI)	AGL	2005								
		2006								
		2007								
		2008					2	2	5.70	
Chicago Executive Airport, Prospect Heights/Wheeling (PWK)	AGL	2005				1		1	0.76	
		2006		1		1		2	1.87	
		2007				1		1	0.84	1
		2008				3	1	4	3.94	
Chicago Midway International Airport, Chicago (MDW)	AGL	2005			1	3		4	1.33	
		2006				1	1	2	0.68	
		2007		1			2	3	0.98	1
		2008				2	4	6	2.13	
Chicago O'Hare International Airport, Chicago (ORD)	AGL	2005		1	1	4	6	12	1.22	1
		2006		2	1	6	10	19	1.98	
		2007		1		11	4	16	1.72	
		2008			1	9	5	15	1.66	

ILLINOIS – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Dupage Airport, West Chicago, (DPA)	AGL	2005				2	1	3	2.14	
		2006				1		1	0.97	
		2007					1	1	0.97	
		2008				1		1	1.93	
Greater Peoria Regional Airport, Peoria (PIA)	AGL	2005					1	1	1.74	
		2006					2	2	3.67	1
		2007					3	3	5.92	
		2008				1		1	1.93	
Greater Rockford Airport, Rockford (RFD)	AGL	2005				2	3	5	7.11	
		2006				2	2	4	5.35	
		2007				1	2	3	3.89	1
		2008				1	1	2	3.39	1
Quad City International Airport, Moline (MLI)	AGL	2005								
		2006				1	1	2	3.78	
		2007								
		2008		1		1	4	6	11.98	1
St. Louis Downtown Airport, Cahokia/ St. Louis (CPS)	AGL	2005								
		2006				1	2	3	1.94	
		2007					1	1	0.87	
		2008					2	2	1.74	
Waukegan Regional Airport, Waukegan (UGN)	AGL	2005								
		2006								
		2007				1	1	2	2.89	
		2008								
Willard Airport - University of Illinois, Champaign/Urbana (CMI)	AGL	2005								1
		2006				1	1	2	1.68	
		2007				2		2	1.84	
		2008				2		2	1.98	

INDIANA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Columbus Municipal Airport, Columbus (BAK)	AGL	2005								
		2006					2	2	5.35	
		2007					2	2	5.75	
		2008					1	1	2.54	
Delaware County Airport - Johnson Field, Muncie (MIE)	AGL	2005								
		2006				1		1	3.85	
		2007								
		2008								

INDIANA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Evansville Regional Airport, Evansville (EVV)	AGL	2005					1	1	1.49	
		2006				1		1	1.53	
		2007					2	2	2.87	
		2008				2		2	3.18	1
Ft. Wayne International Airport, Ft. Wayne (FWA)	AGL	2005				1		1	1.24	
		2006				4	1	5	6.78	
		2007				1	2	3	4.18	
		2008					1	1	1.57	
Indianapolis International Airport, Indianapolis (IND)	AGL	2005					3	3	1.32	
		2006					3	3	1.44	1
		2007								1
		2008				2		2	0.99	2
Monroe County Airport, Bloomington (BMG)	AGL	2005								
		2006								
		2007								
		2008					1	1	2.99	
Purdue University Airport, Lafayette (LAF)	AGL	2005				1		1	0.89	
		2006				1		1	0.87	
		2007					1	1	0.87	
		2008					1	1	0.93	
Terre Haute International Airport - Hulman Field, Terre Haute (HUF)	AGL	2005				1		1	1.24	
		2006					3	3	4.15	
		2007								
		2008								
South Bend Regional Airport, South Bend (SBN)	AGL	2005				1	1	2	3.48	
		2006				1		1	1.67	
		2007		1				1	1.89	1
		2008				1		1	2.00	2

IOWA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Des Moines International Airport, Des Moines (DSM)	ACE	2005					2	2	1.84	1
		2006				2	1	3	2.78	
		2007								
		2008				3	1	4	4.12	1
Dubuque Regional Airport, Dubuque (DBQ)	ACE	2005					1	1	1.88	
		2006					1	1	1.83	
		2007								
		2008								

IOWA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Sioux Gateway Airport - Col. Bud Day Field, Sioux City (SUX)	ACE	2005								
		2006				2	1	3	1.58	
		2007				1		1	4.14	
		2008								
Waterloo Municipal Airport, Waterloo (ALO)	ACE	2005				1		1	2.94	1
		2006								
		2007					1	1	3.42	
		2008					2	2	7.92	1

KANSAS

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Forbes Field, Topeka (FOE)	ACE	2005								
		2006					1	1	2.27	1
		2007					1	1	2.57	1
		2008								2
Garden City Regional Airport, Garden City (GCK)	ACE	2005				1	1	2	9.89	
		2006								
		2007					1	1	4.67	
		2008								
Hutchinson Municipal Airport, Hutchinson (HUT)	ACE	2005				1		1	2.17	
		2006								
		2007								
		2008								
New Century AirCenter Airport, Olathe (IXD)	ACE	2005								
		2006				1	1	2	3.66	
		2007					2	2	3.47	1
		2008					2	2	3.55	
Philip Billard Municipal Airport, Topeka (TOP)	ACE	2005								
		2006								
		2007								
		2008					1	1	1.64	
Salina Municipal Airport, Salina (SLN)	ACE	2005								
		2006								
		2007				1		1	1.25	
		2008				1		1	1.42	
Wichita Mid-Continent Airport, Wichita (ICT)	ACE	2005				2	2	4	2.29	1
		2006				1	3	4	2.30	1
		2007				1	5	6	3.66	
		2008					1	1	0.65	

KENTUCKY

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Blue Grass Airport, Lexington (LEX)	ASO	2005								
		2006					1	1	1.25	2
		2007					1	1	1.23	1
		2008				3		3	3.91	
Bowman Field, Louisville (LOU)	ASO	2005								
		2006								
		2007				1		1	1.00	
		2008				1	3	4	4.56	
Louisville International Airport -Standiford Field, Louisville (SDF)	ASO	2005								
		2006				1		1	0.56	2
		2007				2	1	3	1.69	1
		2008				2		2	1.20	1
Owensboro-Davies County Airport, Owensboro (OWB)	ASO	2005								
		2006								
		2007								1
		2008								

LOUISIANA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Acadiana Regional Airport, New Iberia (ARA)	ASW	2005								
		2006								
		2007					1	1	0.71	
		2008								
Baton Rouge Metropolitan Airport, Baton Rouge (BTR)	ASW	2005								
		2006					1	1	1.64	
		2007				2		2	2.22	
		2008					5	5	6.37	1
Chennault International Airport, Lake Charles (CWF)	ASW	2005								
		2006					1	1	2.11	
		2007								
		2008					1	1	3.32	
Lafayette Regional Airport, Lafayette (LFT)	ASW	2005				1		1	1.34	1
		2006								
		2007					1	1	1.42	1
		2008				2		2	2.65	3
Lake Charles Regional Airport, Lake Charles (LCH)	ASW	2005								
		2006								
		2007								
		2008								4

LOUISIANA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Lakefront Airport, New Orleans (NEW)	ASW	2005				1	1	2	2.29	
		2006								
		2007					2	2	3.25	
		2008								1
Louis Armstrong New Orleans International Airport, New Orleans (MSY)	ASW	2005					1	1	0.67	1
		2006				3		3	2.78	
		2007				1	1	2	1.68	
		2008				3	2	5	3.70	3
Monroe Regional Airport, Monroe (MLU)	ASW	2005								
		2006								
		2007				1		1	2.25	1
		2008					2	2	4.41	1
Shreveport Downtown Airport, Shreveport (DTN)	ASW	2005								
		2006					1	1	1.73	
		2007					2	2	3.45	1
		2008					3	3	5.44	
Shreveport Regional Airport, Shreveport (SHV)	ASW	2005								
		2006								
		2007								
		2008					1	1	1.81	

MAINE

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Bangor International Airport, Bangor (BGR)	ANE	2005								
		2006					2	2	2.64	
		2007								
		2008					1	1	1.51	
Portland International Jetport, Portland (PWM)	ANE	2005					1	1	1.15	
		2006					5	5	6.60	
		2007				1		1	1.34	
		2008				1		1	1.36	

MARYLAND

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Andrews Air Force Base, Camp Springs (ADW)	AEA	2005				2		2	2.23	
		2006								
		2007		1				1	1.54	
		2008					1	1	1.27	

MARYLAND – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Balitmore-Washington Thurgood Marshall International Airport, Baltimore (BWI)	AEA	2005			1	3		4	1.28	1
		2006								
		2007				1	2	3	0.99	
		2008			1	2	2	5	1.75	
Easton/Newnam Field, Easton (ESN)	AEA	2005								
		2006								
		2007								
		2008				3	2	5	12.39	
Salisbury-Ocean City Wicomico Regional Airport, Salisbury (SBY)	AEA	2005								
		2006								
		2007				1		1	2.74	
		2008								

MASSACHUSETTS

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Beverly Municipal Airport, Beverly (BVY)	ANE	2005								
		2006								
		2007					1	1	1.44	
		2008								
Gen. Edward Logan International Airport, Boston (BOS)	ANE	2005		1		14	4	19	11.15	
		2006				7	10	17	1.60	2
		2007				4	5	9	5.32	1
		2008				9	8	17	9.55	
Hanscomb Field, Bedford (BED)	ANE	2005			1			1	1.39	
		2006				2		2	2.49	
		2007				3	3	6	7.69	
		2008				1		1	1.86	
Lawrence Municipal Airport, Lawrence (LWM)	ANE	2005								
		2006				1		1	0.24	
		2007								
		2008								
Martha's Vineyard Airport, Vineyard Haven (MVY)	ANE	2005				1		1	1.89	
		2006								
		2007								
		2008				1		1	1.99	
Nantucket Memorial Airport, Nantucket (ACK)	ANE	2005					1	1	0.68	
		2006								
		2007					1	1	0.65	
		2008								

MASSACHUSETTS – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Norwood Memorial Airport, Norwood (OWD)	ANE	2005								
		2006								1
		2007								
		2008								
Worcester Regional Airport, Worcester (ORH)	ANE	2005								
		2006								
		2007					1	1	1.54	
		2008								

MICHIGAN

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Ann Arbor Municipal Airport, Ann Arbor (ARB)	AGL	2005								
		2006								
		2007								
		2008					1	1	1.45	
Battle Creek International Airport, Kalamazoo (AZO)	AGL	2005			1	1	4	6	6.49	
		2006				2	2	4	5.39	
		2007				1	1	2	3.16	1
		2008					1	1	1.61	1
Bishop International Airport, Flint (FNT)	AGL	2005				1		1	0.75	
		2006					1	1	1.12	1
		2007				2		2	2.35	
		2008								
Capital City Airport, Lansing (LAN)	AGL	2005				1	1	2	2.38	
		2006								3
		2007					1	1	1.27	
		2008								
Coleman A. Young - Detroit City Airport, Detroit (DET)	AGL	2005				2	1	3	3.90	
		2006					2	2	2.57	
		2007								
		2008					1	1	1.67	
Detroit Metropolitan Wayne County Airport, Romulus (DTW)	AGL	2005				1		1	0.19	
		2006				2	4	6	1.23	
		2007				2	4	6	1.27	
		2008				8	3	11	2.35	
Gerald R. Ford International Airport, Grand Rapids (GRR)	AGL	2005								
		2006					1	1	0.89	
		2007					1	1	0.97	
		2008				1		1	1.00	

MICHIGAN – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Jackson County-Reynolds Field Airport, Jackson (JXN)	AGL	2005					1	1	2.14	
		2006				2	1	3	6.25	
		2007					3	3	6.36	
		2008					1	1	1.97	1
MBS International Airport, Saginaw (MBS)	AGL	2005					1	1	1.96	
		2006					2	2	4.94	
		2007				1	2	3	7.88	
		2008								
Muskegon County Airport, Muskegon (MKG)	AGL	2005				1	1	2	3.84	1
		2006								
		2007								
		2008								
Oakland County International Airport, Pontiac (PTK)	AGL	2005				1	1	2	0.93	
		2006		1			4	5	2.56	
		2007				1	2	3	1.43	
		2008					3	3	1.76	1
Sawyer International Airport, Marquette (SAW)	AGL	2005								
		2006								1
		2007								1
		2008					1	1	4.64	1
W. K. Kellogg Airport, Battle Creek (BTL)	AGL	2005					1	1	1.96	
		2006					1	1	1.97	
		2007								
		2008								
Willow Run Airport, Ypsilanti (YIP)	AGL	2005				2	1	3	2.89	
		2006				1		1	1.12	
		2007								
		2008								

MINNESOTA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Anoka County - Blaine Airport, Blaine (ANE)	AGL	2005								
		2006								
		2007								
		2008				1	3	4	5.64	
Crystal Airport, Minneapolis (MIC)	AGL	2005				1	2	3	4.20	
		2006					1	1	1.52	
		2007				1	2	3	5.65	1
		2008				1	2	3	5.62	

MINNESOTA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Duluth International Airport, Duluth (DLH)	AGL	2005				1	3	4	5.80	
		2006		1				1	1.53	
		2007					2	2	2.88	
		2008					1	1	1.53	
Flying Cloud Airport, Minneapolis, (FCM)	AGL	2005								
		2006				2	1	3	2.11	1
		2007					1	1	0.85	
		2008				2	3	5	4.24	
Minneapolis-St. Paul International/ Wold-Chamberlain Airport, Minneapolis (MSP)	AGL	2005				5	3	8	1.47	
		2006				5	1	6	1.25	
		2007				2	1	3	0.66	1
		2008					1	1	0.22	
Rochester International Airport, Rochester (RST)	AGL	2005				1	2	3	4.52	
		2006								
		2007				1		1	1.74	
		2008								
St. Cloud Regional Airport, St. Cloud (STC)	AGL	2005					5	5	8.77	
		2006					5	5	9.57	
		2007					5	5	9.44	1
		2008					1	1	2.56	
St. Paul Downtown Airport - Holman Field, St. Paul (STP)	AGL	2005				1	2	3	2.43	3
		2006					2	2	1.53	1
		2007								4
		2008					2	2	1.79	1

MISSISSIPPI

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Golden Triangle Regional Airport, Columbus (GTR)	ASO	2005					3	3	6.40	
		2006					1	1	2.66	
		2007								
		2008					2	2	6.21	
Gulfport-Biloxi International Airport, Gulfport (GPT)	ASO	2005								1
		2006		1			1	2	3.14	1
		2007					2	2	3.83	
		2008					1	1	1.83	
Jackson International Airport, Jackson (JAN)	ASO	2005					1	1	1.40	
		2006								
		2007								
		2008				1	1	2	2.96	

MISSISSIPPI – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Mid Delta Regional Airport, Greenville (GLH)	ASO	2005								
		2006					1	1	2.99	
		2007								
		2008					1	1	3.96	
Tupelo Regional Airport, Tupelo (TUP)	ASO	2005					1	1	1.46	
		2006								
		2007								
		2008								

MISSOURI

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Charles B. Wheeler Downtown Airport, Kansas City (MKC)	ACE	2005				2	6	8	7.89	1
		2006				6	4	10	12.36	
		2007					1	1	1.48	
		2008				1		1	1.27	
Joplin Regional Airport, Joplin (JLN)	ACE	2005								
		2006					1	1	2.88	
		2007								
		2008					3	3	12.92	
Kansas City International Airport, Kansas City (MCI)	ACE	2005					2	2	1.17	
		2006					2	2	1.13	
		2007								
		2008					1	1	0.53	1
Lambert-St. Louis International Airport, St. Louis (STL)	ACE	2005				2	1	3	1.17	
		2006				1	1	2	0.70	
		2007				3	1	4	1.54	
		2008				1	2	3	1.17	
Spirit of St. Louis Airport, St. Louis (SUS)	ACE	2005								
		2006					3	3	2.12	
		2007								
		2008				1		1	0.89	1
Springfield-Branson National Airport, Springfield (SGF)	ACE	2005		1				1	1.16	
		2006					1	1	1.26	
		2007				1	4	5	6.71	
		2008								1

MONTANA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Billings Logan International Airport, Billings (BIL)	ANM	2005					4	4	3.86	
		2006					3	3	2.90	
		2007								
		2008				1	4	5	5.24	
Gallatin Field, Bozeman (BZN)	ANM	2005					1	1	1.45	
		2006					3	3	3.69	
		2007				1	1	2	2.54	
		2008					2	2	2.55	
Glacier Park International Airport, Kalispell (GPI)	ANM	2005					1	1	1.91	
		2006								
		2007				1		1	2.67	
		2008								
Great Falls International Airport, Great Falls (GTF)	ANM	2005				1	1	2	4.14	
		2006								
		2007								
		2008								
Helena Regional Airport, Helena (HLN)	ANM	2005					2	2	3.71	
		2006					1	1	1.78	1
		2007			1		1	2	3.40	1
		2008					1	1	1.61	
Missoula International Airport, Missoula (MSO)	ANM	2005								
		2006								
		2007					1	1	1.84	1
		2008				1	1	2	4.72	

NEBRASKA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Central Nebraska Regional Airport, Grand Island (GRI)	ACE	2005								
		2006								
		2007								
		2008					1	1	4.97	
Eppley Airfield, Omaha (OMA)	ACE	2005				1	4	5	3.43	
		2006				1	5	6	4.29	
		2007				1	2	3	2.21	1
		2008					7	7	5.64	
Lincoln Municipal Airport, Lincoln (LNK)	ACE	2005				2	3	5	6.36	1
		2006				1		1	1.17	1
		2007					1	1	1.25	1
		2008				1		1	1.39	1

NEVADA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Elko Regional Airport, Elko (EKO)	AWP	2005					1	1	3.80	
		2006					4	4	6.81	
		2007								
		2008								
Henderson Executive Airport, Las Vegas (HND)	AWP	2005								
		2006								
		2007								
		2008				1		1	1.52	1
McCarran International Airport, Las Vegas (LAS)	AWP	2005				6	1	7	1.16	1
		2006				5	3	8	1.29	
		2007				2	6	8	1.30	
		2008				6	6	12	1.98	1
Reno/Tahoe International Airport, Reno (RNO)	AWP	2005				3	3	6	2.67	
		2006		1		1	5	7	3.70	2
		2007				6	7	13	5.93	2
		2008				1	1	2	1.11	2
North Las Vegas Airport, Las Vegas (VGT)	AWP	2005		1		6	1	8	5.20	3
		2006				8	9	17	11.19	
		2007				11	13	24	14.79	
		2008				2	11	13	9.37	7

NEW HAMPSHIRE

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Boire Field, Nashua (ASH)	ANE	2005								1
		2006				1		1	0.85	1
		2007								
		2008					1	1	1.18	
Lebanon Municipal Airport, Lebanon (LEB)	ANE	2005								
		2006								
		2007					1	1	1.59	1
		2008								
Manchester Airport, Manchester (MHT)	ANE	2005				1	2	3	2.87	
		2006								
		2007				2	1	3	3.24	
		2008					16	16	19.87	

NEW JERSEY

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Atlantic City International Airport, Atlantic City (ACY)	AEA	2005					1	1	0.82	
		2006								
		2007								1
		2008				1	5	6	6.44	
Essex County Airport, Caldwell (CDW)	AEA	2005			1	1	3	5	4.48	
		2006					3	3	2.74	
		2007				2	3	5	4.99	1
		2008								
Morristown Municipal Airport, Morristown (MMU)	AEA	2005								
		2006								
		2007					2	2	1.14	
		2008					1	1	0.72	
Newark Liberty International Airport, Newark (EWR)	AEA	2005		1		4	4	9	2.41	1
		2006				7	2	9	2.12	
		2007					3	3	0.67	1
		2008			1	2	5	8	1.80	
Teterboro Airport, Teterboro (TEB)	AEA	2005			1	3	5	9	4.12	1
		2006				3	5	8	4.73	
		2007		1		5	3	9	4.45	1
		2008			1	2	1	4	2.14	
Trenton Mercer Airport, Trenton (TTN)	AEA	2005					1	1	0.99	
		2006					1	1	1.63	1
		2007					2	2	2.18	
		2008								

NEW MEXICO

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Albuquerque International Airport, Albuquerque (ABQ)	ASW	2005				1	2	3	1.53	
		2006				2	1	3	1.54	1
		2007				1	3	4	2.14	
		2008				2		2	1.78	
Four Corners Regional Airport, Farmington (FMN)	ASW	2005								
		2006								
		2007				1		1	0.96	
		2008								

NEW MEXICO – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Roswell Industrial Air Center Airport, Roswell (ROW)	ASW	2005				1	1	2	3.24	
		2006								
		2007								
		2008					1	1	1.89	

NEW YORK

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Albany International Airport, Albany (ALB)	AEA	2005								
		2006								
		2007								1
		2008				1		1	1.64	
Binghamton Regional Airport, Binghamton (BGM)	AEA	2005								
		2006					1	1	3.65	1
		2007								
		2008					1	1	4.39	1
Buffalo Niagra International Airport, Buffalo (BUF)	AEA	2005					1	1	0.73	
		2006								
		2007				1		1	0.73	1
		2008				1		1	0.72	
Dutchess County Airport, Poughkeepsie (POU)	AEA	2005					1	1	0.79	
		2006				1		1	0.88	
		2007					1	1	1.87	
		2008					2	2	2.32	1
Elmira/Corning Regional Airport, Elmira (ELM)	AEA	2005								
		2006				1	1	2	5.16	
		2007								
		2008					1	1	2.67	
Greater Rochester International Airport, Rochester (ROC)	AEA	2005					1	1	0.73	
		2006				1	1	2	1.45	
		2007			1		7	8	6.69	
		2008								
Ithaca Tompkins Regional Airport, Ithaca (ITH)	AEA	2005								1
		2006								1
		2007					1	1	2.52	
		2008								
John F. Kennedy International Airport, New York City (JFK)	AEA	2005		1		3	1	5	1.39	
		2006				4	2	6	1.59	1
		2007				2	1	3	0.66	
		2008				9	2	11	2.43	

NEW YORK – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
La Guardia Airport, New York (LGA)	AEA	2005					1	1	0.24	
		2006				2		2	0.49	
		2007				5		5	1.25	
		2008				2	1	3	0.77	
Long Island MacArthur Airport, Islip (ISP)	AEA	2005				1	1	2	1.13	
		2006		1			1	2	1.85	2
		2007				1		1	0.54	1
		2008					1	1	0.55	
Niagra Falls International Airport, Niagra Falls (IAG)	AEA	2005				1		1	2.12	
		2006					5	5	12.42	
		2007					6	6	15.22	
		2008					1	1	3.95	
Oneida County Airport, Utica (UCA)	AEA	2005					1	1	1.47	
		2006					2	2	3.80	
		2007								
		2008								
Republic Airport, Farmingdale (FRG)	AEA	2005				1	2	3	1.47	
		2006				1		1	0.52	
		2007				1	1	2	1.49	
		2008								
Stewart International Airport, Newburgh (SWF)	AEA	2005								
		2006								
		2007								
		2008				2		2	2.35	
Syracuse Hancock International Airport, Syracuse (SYR)	AEA	2005				2		2	1.66	1
		2006				1		1	0.86	
		2007								
		2008			1	1		2	1.98	1
Westchester County Airport, White Plains (HPN)	AEA	2005				2		2	1.24	1
		2006				1		1	0.52	
		2007				1		1	0.49	
		2008				1	4	5	2.66	

NORTH CAROLINA

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Asheville Regional Airport, Asheville (AVL)	ASO	2005								
		2006								1
		2007								
		2008								1

NORTH CAROLINA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Charlotte/Douglas International Airport, Charlotte (CLT)	ASO	2005				4	1	5	0.96	1
		2006				2	5	7	1.38	2
		2007				3	4	7	1.34	1
		2008				3	4	7	1.29	1
Concord Regional Airport, Concord (JQF)	ASO	2005					1	1	1.52	
		2006								
		2007								
		2008								
Piedmont Triad International Airport, Greensboro (GSO)	ASO	2005				1		1	0.74	
		2006					1	1	0.87	2
		2007				1		1	0.91	2
		2008					2	2	1.98	
Raleigh-Durham International Airport, Raleigh (RDU)	ASO	2005					1	1	0.40	1
		2006				1		1	0.41	4
		2007				1	2	3	1.19	18
		2008				3	2	5	2.97	6
Smith Reynolds Airport, Winston Salem (INT)	ASO	2005								
		2006								
		2007					1	1	1.68	
		2008								
Wilmington International Airport, Wilmington (ILM)	ASO	2005					2	2	2.68	
		2006					1	1	1.22	1
		2007				1		1	1.17	
		2008				2	1	3	4.19	

NORTH DAKOTA

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Bismarck Municipal Airport, Bismark (BIS)	AGL	2005								
		2006					1	1	1.99	
		2007								
		2008					2	2	4.19	
Grand Forks International Airport, Grand Forks (GFK)	AGL	2005		1				1	0.39	1
		2006				1	3	4	1.76	
		2007					2	2	0.89	1
		2008				1	1	2	0.87	4
Hector International Airport, Fargo (FAR)	AGL	2005				1	2	3	3.79	1
		2006					2	2	2.82	
		2007					2	2	2.74	
		2008								

NORTH DAKOTA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Minot International Airport, Minot (MOT)	AGL	2005								
		2006								
		2007								
		2008					1	1	2.84	

OHIO

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Akron-Canton Regional Airport, Akron (CAK)	AGL	2005				2		2	1.86	2
		2006				1	1	2	1.86	
		2007					2	2	1.92	
		2008					2	2	1.98	
Bolton Field, Columbus (TZR)	AGL	2005					1	1	1.85	
		2006								1
		2007					1	1	2.16	
		2008								
Burke Lakefront Airport, Cleveland (BKL)	AGL	2005					1	1	1.37	
		2006								
		2007					2	2	2.75	
		2008								
Cincinnati/Northern Kentucky International Airport, Cincinnati (CVG)	ASO	2005		1		3		4	0.78	
		2006				1	1	2	0.55	
		2007				1		1	0.32	
		2008								1
Cincinnati-Lunkin Airport, Cincinnati (LUK)	AGL	2005				1	1	2	2.30	
		2006					1	1	1.47	
		2007				1		1	1.38	
		2008				2	3	5	7.93	1
Cleveland-Hopkins International Airport, Cleveland (CLE)	AGL	2005				2	2	4	1.53	
		2006		1		3	2	6	2.39	
		2007				7	6	13	5.27	
		2008			1	5	8	14	5.77	1
James M. Cox Dayton International Airport, Dayton (DAY)	AGL	2005					2	2	1.61	
		2006					2	2	1.78	
		2007					1	1	1.33	
		2008								
Mansfield Lahm Regional Airport, Mansfield (MFD)	AGL	2005				2		2	6.49	1
		2006				2	1	3	8.46	
		2007								
		2008								

OHIO – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Ohio State University Airport, Columbus (OSU)	AGL	2005					1	1	1.22	
		2006								
		2007					5	5	5.99	
		2008				2	2	4	5.79	1
Port Columbus International Airport, Columbus (CMH)	AGL	2005								
		2006					3	3	1.55	
		2007					2	2	1.15	1
		2008								2
Toledo Express Airport, Toledo (TOL)	AGL	2005								
		2006					1	1	1.51	
		2007					2	2	3.35	1
		2008								
Youngstown-Warren Regional Airport, Youngstown (YNG)	AGL	2005					1	1	1.23	
		2006				1	1	2	2.69	
		2007								
		2008				1	3	4	6.51	1

OKLAHOMA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Ardmore Municipal Airport, Ardmore (ADM)	ASW	2005								
		2006					1	1	3.36	
		2007								
		2008								
Enid Woodring Regional Airport, Enid (WDG)	ASW	2005					1	1	2.54	
		2006			1			1	3.29	
		2007								1
		2008								
Richard Lloyd Jones Jr. Airport, Tulsa (RVS)	ASW	2005				3	1	4	1.18	
		2006				1	3	4	1.58	1
		2007				1	3	4	1.49	
		2008					1	1	0.29	1
Tulsa International Airport, Tulsa (TUL)	ASW	2005				1	2	3	1.89	
		2006					1	1	0.70	
		2007				2	2	4	2.95	2
		2008				2	2	4	2.96	
University of Oklahoma Westheimer Airport, Norman (OUN)	ASW	2005				1		1	0.98	
		2006								
		2007					1	1	1.46	1
		2008								

OKLAHOMA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Wiley Post Airport, Oklahoma City (PWA)	ASW	2005								
		2006					1	1	1.25	
		2007								
		2008					1	1	1.35	
Will Rogers World Airport, Oklahoma City (OKC)	ASW	2005				1	1	2	1.77	
		2006					4	4	3.65	
		2007								
		2008					1	1	0.75	

OREGON

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Mahlon Sweet Field Airport, Eugene (EUG)	ANM	2005					2	2	2.16	1
		2006				1	1	2	2.18	
		2007					2	2	2.32	1
		2008				1	3	4	5.37	1
McNary Field, Salem (SLE)	ANM	2005				2		2	4.11	
		2006					1	1	1.54	
		2007								
		2008					1	1	1.56	
Portland International Airport, Portland (PDX)	ANM	2005				1		1	0.38	
		2006				1		1	0.38	
		2007								2
		2008				4	1	5	1.97	
Portland-Hillsboro Airport, Portland (HIO)	ANM	2005				1		1	0.46	
		2006								
		2007								1
		2008				2	1	3	1.16	
Portland-Troutdale Airport, Portland (TTD)	ANM	2005					1	1	1.51	2
		2006					3	3	4.34	
		2007								
		2008				1		1	1.65	1
Roberts Field, Redmond (RDM)	ANM	2005								
		2006								
		2007				2		2	2.17	
		2008								

PENNSYLVANIA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Allegheny County Airport, West Mifflin (AGC)	AEA	2005								
		2006								
		2007					1	1	1.22	
		2008								
Erie International Airport - Tom Ridge Field, Erie (ERI)	AEA	2005								1
		2006								
		2007								
		2008								
Harrisburg International Airport, Harrisburg (MDT)	AEA	2005					4	4	5.49	
		2006								
		2007				1		1	1.39	
		2008					1	1	1.47	
Lancaster Airport, Lititz (LNS)	AEA	2005					1	1	0.82	
		2006								
		2007								
		2008								
Lehigh Valley International Airport, Allentown (ABE)	AEA	2005					1	1	0.78	
		2006								
		2007					1	1	0.82	
		2008		1			1	2	1.64	
Northeast Philadelphia Airport, Philadelphia (PNE)	AEA	2005				1	1	2	1.85	1
		2006				3	1	4	3.87	
		2007					2	2	1.96	
		2008				2	1	3	3.37	2
Philadelphia International Airport, Philadelphia (PHL)	AEA	2005	1			8	5	14	2.62	
		2006				7		7	1.35	
		2007				4	3	7	1.39	
		2008				9	5	14	2.81	1
Pittsburgh International Airport, Pittsburgh (PIT)	AEA	2005				1	2	3	1.77	
		2006								
		2007					1	1	0.45	
		2008				3		3	1.69	
Reading Regional Airport - Carl A. Spaatz Field, Reading (RDG)	AEA	2005								
		2006								
		2007								1
		2008		1			2	3	3.29	
Wilkes-Barre/Scranton International Airport, Avoca (AVP)	AEA	2005								
		2006								
		2007					1	1	1.27	
		2008					2	2	2.85	

PUERTO RICO

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Aguadilla - Rafael Hernandez Airport, Aguadilla (BQN)	ASO	2005								
		2006								
		2007								
		2008					2	2	3.66	
Fernando Luis Ribas Dominicci Airport, San Juan (SIG)	ASO	2005					1	1	0.85	2
		2006								1
		2007								1
		2008								1
Luis Munoz Marin International Airport, San Juan (SJU)	ASO	2005					3	3	1.50	5
		2006				1	3	4	2.22	6
		2007					2	2	1.52	4
		2008				1	1	2	1.93	4

RHODE ISLAND

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Theodore Francis Green State Airport, Providence (PVD)	ANE	2005				1		1	0.90	
		2006				3		3	2.83	1
		2007								
		2008				2	1	3	3.23	

SOUTH CAROLINA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Charleston International Airport, Charleston (CHS)	ASO	2005		1		2	2	5	3.98	1
		2006				2	2	4	3.62	3
		2007				2		2	1.79	
		2008				2	3	5	4.45	
Columbia Metropolitan Airport, Columbia (CAE)	ASO	2005					1	1	0.87	
		2006					4	4	4.87	1
		2007				2	2	4	4.13	1
		2008				1	2	3	3.26	1
Donaldson Center Airport, Greenville (GYH)	ASO	2005								
		2006								
		2007				1	2	3	6.56	
		2008					1	1	2.58	
Florence Regional Airport, Florence (FLO)	ASO	2005								
		2006					2	2	6.73	
		2007								
		2008					1	1	3.56	

SOUTH CAROLINA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Myrtle Beach International Airport, Myrtle Beach (MYR)	ASO	2005								
		2006								
		2007					1	1	1.85	
		2008								

SOUTH DAKOTA

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Joe Foss Field, Sioux Falls Regional Airport, Sioux Falls (FSD)	AGL	2005				1	4	5	5.51	
		2006				1	3	4	4.55	
		2007					2	2	2.39	
		2008				2	1	3	4.47	1
Rapid City Regional Airport, Rapid City (RAP)	AGL	2005					1	1	1.88	
		2006								
		2007								
		2008				1	2	3	6.96	1

TENNESSEE

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Lovell Field, Chattanooga (CHA)	ASO	2005								
		2006								1
		2007				1		1	1.27	
		2008					1	1	1.34	
McGhee Tyson Airport, Knoxville (TYS)	ASO	2005				2	2	4	2.92	
		2006				1	1	2	1.52	
		2007				2	2	4	3.76	1
		2008					6	6	4.79	
Memphis International Airport, Memphis (MEM)	ASO	2005				1	2	3	0.76	1
		2006				2	2	4	1.24	1
		2007								
		2008				3		3	0.81	2
Nashville International Airport, Nashville (BNA)	ASO	2005					3	3	1.30	
		2006				2	1	3	1.41	1
		2007				3	4	7	3.27	1
		2008				1		1	0.53	

TENNESSEE – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Smyrna Airport, Smyrna (MQY)	ASO	2005								
		2006					1	1	1.68	1
		2007								
		2008								
Tri-Cities Regional Airport, Blountville (TRI)	ASO	2005					2	2	2.44	
		2006								
		2007								
		2008								

TEXAS

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Abilene Regional Airport, Abilene (ABI)	ASW	2005								
		2006								
		2007								
		2008				1		1	1.14	
Addison Airport, Dallas (ADS)	ASW	2005				2	3	5	3.76	1
		2006				3		3	2.24	
		2007				3		3	2.28	1
		2008				5	6	11	7.45	5
Amarillo International Airport, Amarillo (AMA)	ASW	2005					5	5	4.80	
		2006								
		2007					1	1	1.30	
		2008				1	1	2	2.42	
Arlington Municipal Airport, Arlington (GKY)	ASW	2005								
		2006								
		2007								
		2008					1	1	0.74	
Austin-Bergstrom International Airport, Austin (AUS)	ASW	2005								
		2006								
		2007				1		1	0.49	
		2008				1		1	0.46	
Brownsville/South Padre Island International Airport, Brownsville (BRO)	ASW	2005								
		2006								
		2007								
		2008								2
Corpus Christi International Airport, Corpus Christi (CRP)	ASW	2005					1	1	0.87	
		2006								
		2007					1	1	1.14	
		2008								

TEXAS – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Dallas Executive Airport, Dallas (RBD)	ASW	2005								
		2006								
		2007		1				1	0.69	
		2008								
Dallas Love Field, Dallas (DAL)	ASW	2005				1	4	5	2.12	
		2006								
		2007				1	1	2	0.89	
		2008				5	4	9	3.90	
Dallas/Ft. Worth International Airport, Dallas (DFW)	ASW	2005				4	2	6	0.81	2
		2006				4	1	5	0.80	
		2007				8	5	13	1.89	
		2008		1		7	5	13	1.94	
David Wayne Hooks Memorial Airport, Houston (DWH)	ASW	2005			1	1	2	4	1.93	
		2006				1	3	4	1.51	
		2007				1	1	2	0.85	
		2008					4	4	1.86	
Denton Airport, Denton (DTO)	ASW	2005					8	8	9.56	
		2006					1	1	1.20	
		2007								
		2008					1	1	0.85	
East Texas Regional Airport, Longview (GGG)	ASW	2005				1		1	1.76	
		2006					7	7	6.95	
		2007					3	3	3.38	
		2008					3	3	3.26	
El Paso International Airport, El Paso (ELP)	ASW	2005				1	1	2	1.80	
		2006				1		1	0.99	
		2007				1		1	0.98	
		2008				2	2	4	4.12	
Ft. Worth Alliance Airport, Ft. Worth (AFW)	ASW	2005								
		2006					1	1	1.11	
		2007								
		2008					1	1	1.44	
Ft. Worth Meacham International Airport, Ft. Worth (FTW)	ASW	2005					3	3	3.98	4
		2006				2	2	4	4.89	1
		2007				1	1	2	1.99	1
		2008				1	1	2	1.65	1
George Bush Intercontinental Airport, Houston (IAH)	ASW	2005				4	1	5	0.96	
		2006				2		2	0.33	
		2007								1
		2008				3	3	6	1.99	

TEXAS – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Grand Prairie Municipal Airport, Grand Prairie (GPM)	ASW	2005								
		2006								
		2007								
		2008				1		1	0.99	
Laredo International Airport, Laredo (LRD)	ASW	2005				1	3	4	6.56	
		2006					1	1	1.92	1
		2007								
		2008								
Lubbock International Airport, Lubbock (LBB)	ASW	2005				1	1	2	2.27	
		2006					1	1	1.75	
		2007				2	3	5	5.64	
		2008				1	5	6	7.72	1
McAllen Miller International Airport, McAllen (MFE)	ASW	2005					1	1	1.66	
		2006								
		2007								
		2008								
McKinney Municipal Airport/Collin County Regional, McKinney (TKI)	ASW	2005					1	1	0.99	5
		2006					1	1	0.96	
		2007								
		2008								
Midland International Airport, Midland (MAF)	ASW	2005				1		1	1.15	
		2006					1	1	1.19	
		2007				2		2	2.35	
		2008				1	1	2	2.36	
San Antonio International Airport, San Antonio (SAT)	ASW	2005				1	2	3	1.39	
		2006				1	2	3	1.40	
		2007				3	3	6	2.84	
		2008				2	5	7	3.15	
Scholes International Airport, Galveston (GLS)	ASW	2005								
		2006				1	4	5	7.46	
		2007								
		2008								
Southeast Texas Regional Airport, Beaumont (BPT)	ASW	2005					1	1	1.52	
		2006								
		2007					2	2	5.39	
		2008								
Stinson Municipal Airport, San Antonio (SSF)	ASW	2005								
		2006								
		2007					1	1	0.67	
		2008								

TEXAS – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Sugar Land Regional Airport, Houston (SGR)	ASW	2005								
		2006								
		2007				1		1	1.16	
		2008								
TSTC Waco Airport, Waco (CNW)	ASW	2005					2	2	3.19	
		2006								
		2007					2	2	4.74	
		2008				2		2	5.74	1
Tyler Pounds Regional Airport, Tyler (TYR)	ASW	2005								
		2006								
		2007								
		2008					1	1	1.78	
Valley International Airport, Harlingen (HRL)	ASW	2005								
		2006				1	1	2	3.79	
		2007								
		2008				1		1	1.79	
Waco Regional Airport, Waco (ACT)	ASW	2005								
		2006				1	1	2	5.41	
		2007				1		1	2.73	
		2008								
William P. Hobby Airport, Houston (HOU)	ASW	2005					1	1	0.41	1
		2006					7	7	2.93	
		2007				4	2	6	2.50	
		2008				4	5	9	4.25	

UTAH

Airport, City (Airport Code)	Region	Fiscal Year	Severity: Collision	A	B	C	D	Total RIs	Annual RI Rate	Other Events, Non-RIs
Ogden-Hinckley Airport, Ogden (OGD)	ANM	2005								
		2006				2		2	1.67	
		2007					2	2	1.86	
		2008								
Provo Municipal Airport, Provo (PVU)	ANM	2005								
		2006		1		3	3	7	4.22	1
		2007				2	2	4	3.00	
		2008					3	3	2.43	
Salt Lake City International Airport, Salt Lake City (SLC)	ANM	2005				2	4	6	1.34	
		2006				4		4	0.94	1
		2007				1	2	3	0.71	
		2008					4	4	0.99	

VERMONT

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Burlington International Airport, Burlington (BTV)	ANE	2005				1	1	2	1.82	
		2006					2	2	2.13	1
		2007				1	1	2	2.62	
		2008				1	1	2	2.13	

VIRGIN ISLANDS

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Cyril E. King Airport, Charlotte Amalie (STT)	ASO	2005								
		2006								
		2007		1				1	1.18	
		2008								

VIRGINIA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Lynchburg Regional Airport - Preston Glenn Field, Lynchburg (LYH)	AEA	2005								
		2006								
		2007								
		2008				1		1	1.62	
Manassas Regional Airport, Manassas (HEF)	AEA	2005								
		2006					1	1	0.81	
		2007					2	2	1.82	
		2008					1	1	0.87	
Newport News/Williamsburg International Airport, Newport News (PHF)	AEA	2005								1
		2006								
		2007								
		2008								
Norfolk International Airport, Norfolk (ORF)	AEA	2005				1	1	2	1.62	
		2006								
		2007				1	2	3	2.21	
		2008					1	1	0.85	
Richmond International Airport, Richmond (RIC)	AEA	2005								
		2006								
		2007								
		2008					1	1	0.82	
Roanoke Regional Airport - Woodrum Field, Roanoke (ROA)	AEA	2005								
		2006								
		2007								
		2008					1	1	1.45	

VIRGINIA – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Washington Dulles International Airport, Reston, VA (IAD)	AEA	2005				2	1	3	0.60	
		2006					1	1	0.23	1
		2007				4		4	0.93	
		2008			1		4	5	1.24	2

WASHINGTON

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Bellingham International Airport, Bellingham (BLI)	ANM	2005								
		2006				1		1	1.33	
		2007								
		2008				1		1	1.55	
Boeing Field - King County International Airport, Seattle (BFI)	ANM	2005		1		2	3	6	2.12	
		2006					1	1	0.34	
		2007								
		2008					1	1	0.33	
Felts Field, Spokane (SFF)	ANM	2005					1	1	1.46	
		2006			1		1	2	3.57	
		2007				2		2	2.76	
		2008				1		1	1.51	1
Grant County International Airport, Moses Lake (MWH)	ANM	2005								
		2006					1	1	1.25	1
		2007					3	3	4.24	
		2008								
Olympia Airport, Olympia (OLM)	ANM	2005								
		2006								
		2007								
		2008								1
Renton Municipal Airport, Renton (RNT)	ANM	2005								
		2006								
		2007				1		1	1.57	
		2008								
Seattle-Tacoma International Airport, Seattle (SEA)	ANM	2005				1		1	0.29	1
		2006				2	1	3	0.88	2
		2007				3	3	6	1.74	7
		2008				5	2	7	1.99	1
Snohomish County Paine Field, Everett (PAE)	ANM	2005					3	3	1.97	
		2006				1	1	2	1.48	
		2007				1	2	3	2.28	
		2008				1	2	3	2.11	

WASHINGTON – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Spokane International Airport, Spokane (GEG)	ANM	2005								
		2006								
		2007				1		1	1.32	
		2008				1		1	1.14	
Tacoma Narrows Airport, Tacoma (TIW)	ANM	2005								
		2006								
		2007								
		2008								1
Tri-Cities Airport, Pasco (PSC)	ANM	2005								
		2006				1	1	2	3.31	
		2007								
		2008				2	2	4	6.86	
Yakima Air Terminal/McAllister Field, Yakima (YKM)	ANM	2005					1	1	2.25	1
		2006								
		2007					3	3	6.26	
		2008								

WEST VIRGINIA

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Mid-Ohio Valley Regional Airport, Parkersburg (PKB)	AEA	2005								
		2006								
		2007					1	1	2.56	
		2008				1	1	2	5.90	
Tri-State Airport - Milton J. Ferguson Field, Huntington (HTS)	AEA	2005								
		2006								
		2007					2	2	6.28	
		2008								
Yeager Airport, Charlston (CRW)	AEA	2005								
		2006								
		2007					2	2	2.63	
		2008								

WISCONSIN

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Austin Straubel International Airport, Green Bay (GRB)	AGL	2005					1	1	1.18	
		2006								
		2007					1	1	1.18	
		2008				1		1	1.14	

WISCONSIN – Continued

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Central Wisconsin Airport, Mosinee (CWA)	AGL	2005								
		2006								
		2007				1		1	4.66	
		2008					1	1	4.50	
Chippewa Valley Regional Airport, Eau Claire (EAU)	AGL	2005								
		2006								
		2007					3	3	9.43	
		2008								
Dane County Regional Airport -Truax Field, Madison (MSN)	AGL	2005				1	1	2	1.67	
		2006				1	1	2	1.76	
		2007				1	4	5	3.99	1
		2008				2	2	4	3.54	
General Mitchell International Airport, Milwaukee (MKE)	AGL	2005				2	3	5	2.27	
		2006				3	14	17	8.27	1
		2007				10	14	24	11.98	3
		2008		1		6	7	14	7.25	1
Kenosha Regional Airport, Kenosha (ENW)	AGL	2005					1	1	1.30	
		2006								
		2007								
		2008								
La Crosse Municipal Airport, La Crosse (LSE)	AGL	2005					1	1	2.44	
		2006								
		2007								
		2008								
Outagamie County Airport, Appleton (ATW)	AGL	2005					1	1	1.99	
		2006					4	4	8.86	
		2007					2	2	4.37	2
		2008					2	2	4.62	1
Southern Wisconsin Regional Airport, Janesville (JVL)	AGL	2005								
		2006				3		3	5.46	
		2007								
		2008				1		1	2.14	
Waukesha County Airport, Waukesha (UES)	AGL	2005								
		2006								
		2007				1	3	4	6.71	1
		2008								1
Wittman Regional Airport, Oshkosh (OSH)	AGL	2005								
		2006				1	1	2	2.18	
		2007					2	2	2.35	
		2008				1	2	3	3.68	

WYOMING

Airport, City (Airport Code)	Region	Fiscal Year	Severity					Total RIs	Annual RI Rate	Other Events, Non-RIs
			Collision	A	B	C	D			
Cheyenne Airport, Cheyenne (CYS)	ANM	2005								1
		2006								
		2007								
		2008								
Jackson Hole Airport, Jackson Hole (JAC)	ANM	2005					1	1	3.80	2
		2006								
		2007					1	1	3.28	2
		2008					1	1	3.23	1
Natrona County International Airport, Casper (CPR)	ANM	2005								
		2006								1
		2007					1	1	2.48	
		2008				1	2	3	7.75	

A Message from the FAA Director of Runway Safety

Dear Colleagues:

The FAA's Runway Safety Call to Action initiative launched two years ago was an ambitious undertaking aimed squarely at reducing the frequency and severity of runway incursions. A series of near-, mid- and long-term goals comprised the Call to Action ranging from training and heightening awareness at airports and in cockpits to enhanced airport signage and markings to moving map technology for pilots and vehicle drivers. As you will conclude from this annual report, progress has been formidable and is on track to continue.

While the Call to Action provided a considerable boost to our redoubling of runway safety efforts, the stark reality is such that a never-ending continuum is fundamental to achieving long-term success. Over the coming months and years, new techniques, procedures, lighting and technology will be introduced—all with the specific focus of preventing incursions and enhancing runway safety. Some examples include a change to the "Position and Hold" instruction from a controller to an aircraft which has been used for decades to maximize runway utilization and streamline operations. That phrase soon will be replaced by "Line Up and Wait", which will more clearly convey the instruction as well as provide U.S. compliance with worldwide ICAO standards. Runway Status Light Systems, which warn pilots of an occupied runway while taxiing, taking off or landing, will be installed at 22 airports across the United States by 2011. Finally, a cockpit moving map display with "own ship" capability that will enable flight crews to determine exactly where their aircraft is on an airport vis-à-vis runways and other aircraft is currently being tested and will be operational within a few years.

I urge you to carefully review this Runway Safety Report as it will provide you with facts, figures and an accurate perspective of where we have come from, where we are, and where we are going in the never-ending challenge to improve runway safety.

Sincerely,

Wes Timmons
Director, Office of Runway Safety

FAA
Air Traffic Organization

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