FAA
Air Traffic Organization

National Runway Safety Plan

2009-2011

Message from the Office of Safety Vice President

Safety is our first priority in aviation. This is true in all phases of flight, but particularly so in the surface environment because aircraft are in such close proximity to other aircraft and obstacles such as vehicles, pedestrians and airport structures and equipment.

Because of this, the Federal Aviation Administration has dedicated millions of dollars to enhancing the safety of runways. The Runway Safety Office within the Air Traffic Organization (ATO) Office of Safety is responsible for coordinating FAA's efforts with pilots, air traffic controllers, airport and airline operators and other interested members of the aviation industry.

Through the hard work of many individuals and organizations, we have made progress in reducing the rate of the most serious types of runway incursions by 55 percent since 2001. We are meeting the goals for the rate of runway incursions set forth in the FAA Flight Plan and, indeed, exceeding them.

Last year, we began a non-punitive voluntary safety reporting program for air traffic controllers. We also started crew resource management training to raise awareness of factors that can cause errors in air traffic control.

This plan covers both recent accomplishments and encouraging trends toward the goal of reducing the frequency and severity of runway incursions, as well as initiatives designed to bring about further improvement. We look forward to continued collaboration with airlines, airports, air traffic control and pilot unions and aerospace manufacturers to further curb runway incursions.

After all, your safe flight is our business.

Sincerely,

Bob

Robert Tarter
Vice President
Office of Safety

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Cover photograph by Jon Ross.

1.0 Executive Summary

The aviation industry in the United States continues to enjoy a period of unprecedented safety. This is true not only in the air, but on the ground as well. Serious runway incursions, those involving a significant loss of separation between two aircraft and where the risk of a collision is considerable, are trending favorably. In fiscal year (FY) 2007, these types of incursions were down 23 percent from the previous year and at their lowest level since the Federal Aviation Administration began tracking runway incursions. Serious runway incursions are down 55 percent since 2001.

Activity at the almost 600 towered airports totaled 61.15 million operations in 2007. *FAA Aerospace Forecast Fiscal Years 2008 – 2025* predicts this will grow to 84.0 million operations by FY 2025. This growth puts continued pressure on facilities and personnel and drives the need for continuous improvement in the area of safety.

Runway safety has received a great deal of attention in recent years from Congress, the public, the media and FAA leadership. In August 2007, the FAA met with more than 40 aviation leaders from airlines, airports, air traffic controller and pilot unions and aerospace manufacturers under the agency's Call to Action for Runway Safety. In January 2008, we convened a follow-up meeting. The focused efforts of all parties involved have been responsible for substantial progress toward creating a safer runway environment.

The Office of Safety is implementing initiatives in the areas of education, training and awareness that can have an immediate impact, while at the same time pursuing technological efforts that hold promise for the future. Our goal is to reduce both the frequency and severity of events that pose a risk to human life, aircraft, equipment and infrastructure. Driving their frequency down lessens the possibility of any misfortune. By reducing the severity of such events, we aim to relegate them to the realm of minor infractions.

We are making the most of our opportunities for mitigation of safety risk by concentrating resources on high yield items with the lowest cost and quickest turn around, such as improvements in runway surface marking. Education provides current information in a very dynamic environment. Raising awareness of the risks and their mitigations brings attention to the human factors element, which research has shown to be a key factor in many incidents. Recurrent training keeps skills fresh and at a professional level. Outreach brings stakeholders together in a cooperative environment that allows the synergy of coordinated efforts and the sharing of lessons learned elsewhere. Technology offers another layer of support by increasing situational awareness in both the cockpit and the control tower.

The FAA's Runway Safety Program seeks to address all aspects of surface safety in this critical environment including wrong runway departures and runway incursions. There are always new opportunities to make the system safer through continuous improvement. Growth in the number of takeoffs and landings is expected to be steady in the years ahead, adding to the already challenging nature of maintaining safe and efficient operations in the NAS.

This National Runway Safety Plan provides context first by supplying a brief snapshot of runway safety performance for FY 2004 to the present and explaining some of the driving factors that are relevant to the Runway Safety Program including input from external entities such as the Department of Transportation (DOT) Office of Inspector General (OIG), the Government Accountability Office (GAO) and the National Transportation Safety Board (NTSB). It then discusses the accomplishments, priorities and recent efforts of the Runway Safety Office. Finally, it offers a view of our near-term plans for fiscal years 2009 through 2011.

2.0 Mission

2.1 DOT Mission

Serve the United States by ensuring a fast, safe, efficient, accessible and convenient transportation system that meets our vital national interests and enhances the quality of life of the American people, today and into the future.

2.2 FAA Mission

Our continuing mission is to provide the safest, most efficient aerospace system in the world.

2.3 Runway Safety Office

The vision of the Office of Runway Safety is to set the world's standard for runway safety.

Our mission, in order to achieve that vision, is to increase the safety of the flying public by reducing the frequency and severity of runway incursions through coordinated efforts with the aviation community.

2.4 Runway Safety Strategy

Achieving a significant reduction in the frequency and severity of runway incursions requires a strategy encompassing a vision, a mission and a set of goals and objectives that provide guideposts and milestones. This document lays out a strategy undertaken by the Office of Runway Safety that ties directly to the DOT and FAA missions.

Our desired outcome is zero runway incursions. By reducing frequency, incursions of any type will become extremely rare occurrences. Corrective actions will aim to reduce the potential for human error through awareness, outreach, training, technological aids and infrastructure improvements that enhance situational awareness. By reducing severity, incursions will more likely be minor rule infractions instead of near collisions. The emphasis will be to complete actions that reduce the opportunity for collision risk in the high-energy segment of the runway. Activities include revisions to procedures, changes to airport geometry and installation of technology and infrastructure that will help to eliminate the opportunity for human error and collisions in the high-energy segment.

3.0 Introduction

Safety is the primary goal of the FAA. Runway safety is a critical component of that goal. Nowhere are aircraft in closer proximity to other aircraft and obstacles such as vehicles, pedestrians and airport structures and equipment than when on the airport surface. The agency aims to reduce the risk of runway incursions and wrong runway departures, as well as address the errors committed by pilots, air traffic controllers, vehicle operators and pedestrians by focusing on outreach, awareness, improved infrastructure and technology. All projections, dates and numbers in this plan are current as of September 30, 2008, unless explicitly stated otherwise.

The FAA established the Runway Safety Program by *FAA Order 7050.1* on November 1, 2002. This order placed the overall responsibility for the program on the Office of Runway Safety by requiring it to work with other FAA organizations and the aviation community to identify and implement activities/technologies designed to increase runway safety. The 55 percent reduction in the number of serious runway incursions since 2001 demonstrates the effectiveness of this program. In FY 2007, we saw a 23 percent reduction in the most serious (Category A and B) runway incursions from 2006. While the most serious runway incursions showed a reduction, overall incursions increased during the same time period. Although most of the incursions were Category C and D incursions – which posed little or no risk to the public – the FAA is committed to reducing the overall number of runway incursions.

The FAA is exploring new ways of mining and interpreting safety data with the focus on improving airport safety. Effective October 1, 2007, the FAA changed how it identifies runway incursions by adopting the International Civil Aviation Organization (ICAO) definition and classifying them using ICAO severity categories (slightly modified to be more inclusive). This new definition, which FAA worked with ICAO to develop, broadens the runway incursion definition, provides a greater amount of data to be analyzed, enables worldwide comparison and trend analysis of data and identifies at-risk behaviors and circumstances that might have caused a runway incursion if another aircraft had been present. See Appendix D for more details.

On August 15, 2007, the FAA met with aviation leaders from airlines, airports, air traffic control and pilot unions and aerospace manufacturers under a Call to Action for Runway Safety. The participants agreed upon an ambitious plan that focused on changes in cockpit procedures, airport signage and markings, air traffic procedures and technology. The U.S. aviation community has initiated and completed significant short-term actions while work continues on mid- and long-term goals to improve runway safety at U.S. airports. In January 2008, prompted by several high-visibility runway safety events, there were additional meetings between key officers of all carriers and top FAA safety officials to identify ways to enhance situational awareness on the runway. The top-to-bottom review of the 20 first-tier airports accomplished under the original Call to Action provided valuable data that led to many improvements and a dramatic reduction in serious incursions at those airports. We completed reviews of a second tier of 22 airports in July 2008.

Because of the urgency involved with runway safety, waiting for longer-term technological solutions alone is not practical. The busiest airports have completed low cost, fast turn-around efforts like runway paint and airport signage and efforts continue at smaller airports. The Office of Safety is implementing initiatives in the areas of education, training and awareness that can have an immediate impact, while at the same time pursuing technological efforts that hold promise for the future. These short-term initiatives include the synthesis of radar and audio data from selected actual incidents combined into a training aid for pilots, controllers and airport personnel, creation of video programs to heighten awareness of situations that lead to incursions and attendance at flight and air traffic control training to bring focus to prevention of runway incursions. Cooperative efforts to identify root causes and develop plans to eliminate them or minimize their impact include formation of the Runway Safety Council as well as numerous teams at the local and regional levels. We held three Regional Runway Summits in FY 2008 with plans for a National Summit in FY 2009 and an International Summit in FY 2011.

Education, awareness and training are only the first steps towards the implementation of more permanent technological solutions to aid pilots, controllers and airport operators. In addition to ongoing activities, the Runway Safety Office is increasing staffing in order to provide an effective runway safety program and to respond to the needs of NAS users in an effort to reduce runway incursions to as low a level as practical.

4.0 Runway Safety Performance

This section provides a summary description of the metrics used to assess runway safety performance and the results for the period covered by FY 2004 through FY 2007. A much more detailed discussion is available in the *2008 Runway Safety Report*. Airports in the United States with FAA-sponsored airport traffic control towers must report operational surface incidents, which may take place on the runway environment or on other airport movement areas. The FAA reviews all of these incidents and identifies a subset as runway incursions.

4.1 Performance Metrics

The FAA uses three primary metrics to assess runway incursions: the frequency of runway incursions, the severity of runway incursions and the types of runway incursions. We use these metrics herein to examine national trends. The Glossary in Appendix B contains detailed definitions for severity categories A through D and runway incursion types.

Frequency of Runway Incursions

The FAA describes both the number and rate of runway incursions to accurately determine runway safety trends. The number of incursions provides a description of magnitude. The rate is how often events occur for a given number of operations. Because the rate accounts for the different number of operations at each airport, it serves as a basis for comparing runway safety trends among airports.

Severity of Runway Incursions

The FAA systematically categorizes each runway incursion in terms of the severity of its outcome into one of four categories. Category A is the most serious and Category D is the least serious. The severity categories consider factors such as the speed and performance characteristics of the aircraft involved, the proximity of one aircraft to another aircraft or a vehicle and the type and extent of any evasive action by those involved in the event.

The Runway Incursion Assessment Team evaluates operational data pertaining to runway incursions. This team is composed of subject matter experts from air traffic, flight deck operations and airports although the composition of the team changes over time. The changing

composition of the team combined with the frequently subjective nature of the available data has the potential to affect the severity ratings assigned to runway incursions. This is being addressed in the next revision of the Runway Safety Order.

Types of Runway Incursions

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

4.2 Performance Results FY 2004 – 2007

Overall, traffic volumes have remained fairly stable over the period for both commercial and general aviation (GA) operations. GA operations decreased during the first three years of the period from FY 2004 to FY 2006, when it reached its lowest level of activity, but these operations increased in FY 2007. Commercial aviation operations increased from FY 2004 to FY 2005; decreased from FY 2005 to FY 2006; and, similar to GA, increased again in FY 2007.

GA operations accounted for 54 percent of all airport activity, but GA aircraft were involved in 69 percent of runway incursions. Forty-one percent of operations during the period were commercial operations and five percent were military operations. The number of runway incursions for commercial and military aviation was proportional to their operations.

Frequency of Runway Incursions

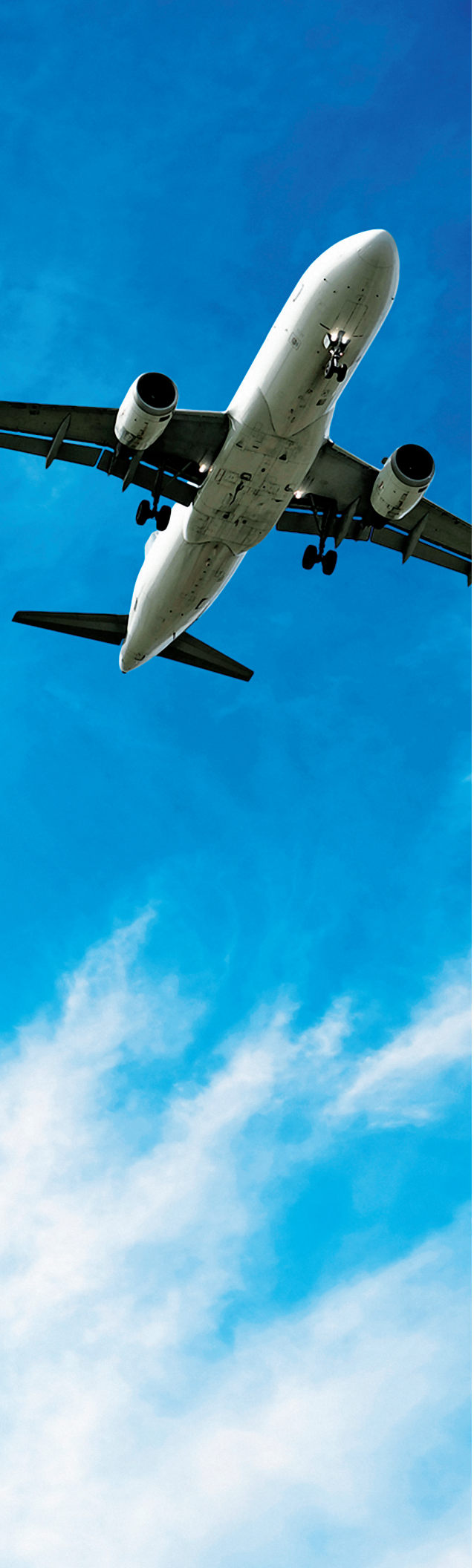
During this period, there were about 250 million operations – approximately 170,000 per day at FAA-towered airports in the United States. Of these operations, there were 1,353 runway incursions – an average of one runway incursion per 184,775 operations during the four-year period. The rate of runway incursions remained steady from FY 2004 through FY 2006 averaging 5.3 per million operations per year. The FAA reported 40 more incursions in FY 2007 than in FY 2006 increasing the incursion rate by 13 percent from 5.4 to 6.1 incursions per million operations.

Table 1. Number and Rate of Runway Incursions

	FY 2004	FY 2005	FY 2006	FY 2007	Total
Number of Runway Incursions	326	327	330	370	1,353
Rate of Runway Incursions per Million Operations	5.2	5.2	5.4	6.1	5.5
Total Number of Operations	63,126,312	63,104,415	61,076,341	61,131,629	248,438,697

Severity of Runway Incursions

During the period, Category A and D runway incursions increased while Category B and C incursions decreased. The majority (92 percent) of runway incursions (1,241 of 1,353) were Category C and D events involving little or no risk of collision. The distribution of runway incursions showed a positive shift from more severe Category C events early in the four-year period to less severe Category D incursions later in the period.



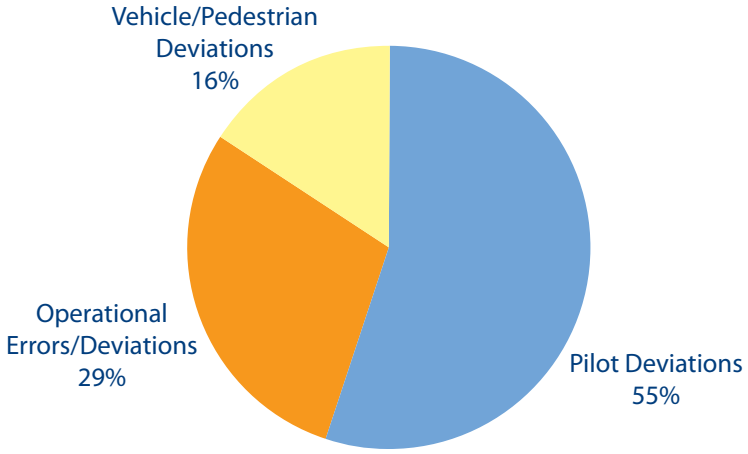
From FY 2004 through FY 2007, 112 of the 1,353 incursions (8 percent) were Category A and B incursions. Together, these incursions increased in number and rate for the first three years of the period before decreasing in FY 2007. None of the 67 Category A incursions resulted in a collision.

The FAA met its performance targets for each of the years in the period and maintained the total rate of serious (Category A and B) runway incursions to 0.45 incursions per million operations for the overall time frame.

Types of Runway Incursions

The majority (55 percent) of runway incursions during the four-year period (FY 2004 through FY 2007) were pilot deviations. Operational errors/deviations accounted for 29 percent of incursions; vehicle/pedestrian deviations were the lowest fraction at 16 percent. (See Figure 1)

Figure 1. Runway Incursions by Type, FY 2004 – FY 2007



4.3 FY 2008 Performance Results

Direct comparison with prior years' data is not possible, as the new ICAO definition of Runway Incursion and Severity Classification (see Appendix D) went into effect at the start of FY 2008. To summarize the changes made by the new definition, some events that were classified as Surface Incidents before FY 2008 are now Category D Runway Incursions and events that were Category D Runway Incursions are now included in Category C. The impact is to greatly increase total recognized runway incursions in these bottom two categories. The rationale for this change is that with more data we can more easily identify root causes.

Frequency of Runway Incursions

For FY 2008, there were about 58.4 million operations (approximately 160,000 per day) at FAA-towered airports in the United States. Of these operations, there were 1,009 runway incursions – an average of one runway incursion per 58,000 operations during the 12-month period.

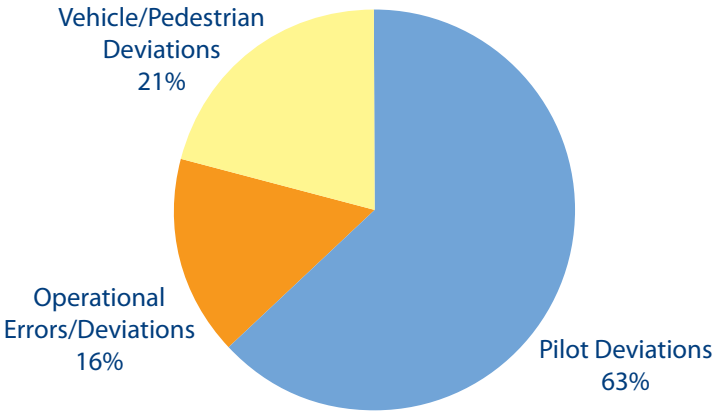
Severity of Runway Incursions

During this period, 25 of the 1,009 incursions (2.5 percent) were Category A and B incursions. The majority (97.5 percent) of runway incursions (984 of 1,009) were Category C and D events involving little or no risk of collision. The total rate of (Category A and B) runway incursions is 0.43 incursions per million operations, which is below the target rate of 0.45 incursions per million operations by FY 2010 in the *FAA Flight Plan 2008 – 2012*.

Types of Runway Incursions

The majority of runway incursions (63 percent or 637 of 1,009 incursions) during the period were pilot deviations. Operational errors/deviations were the lowest fraction at 16 percent (165 of 1,009) of incursions; vehicle/pedestrian deviations accounted for 21 percent (207 of 1,009). (See Figure 2)

Figure 2. Runway Incursions by Type, FY 2008



4.4 Performance Targets

Under the goal of "Increased Safety, Objective 3, Reduce the risk of runway incursions," the *FAA Flight Plan 2009 – 2013* contains the following performance target:

> *"By the end of FY 2013, reduce total runway incursions by 10 percent from the FY 2008 baseline."*

The table below shows total runway incursions allocated by line of business for the baseline year and target maximums for the succeeding years.

Table 2. Runway Incursion Performance Targets

LOB	FY 2008 Baseline	FY 2009 Baseline -1%	FY 2010 Baseline -3%	FY 2011 Baseline -5%	FY 2012 Baseline -7%	FY 2013 Baseline -10%
ATO	165	163	160	157	154	149
AVS	648	642	629	616	603	583
ARP	196	194	190	186	182	176
Total	1,009	999	979	959	939	908

Note: Highlighted numbers were rounded up rather than down in order to maintain proper values for the total in the corresponding fiscal year.

5.0 Runway Safety Program

FAA Order 7050.1 established the Runway Safety Program on November 1, 2002. This order placed the overall responsibility for the program on the Runway Safety Office by requiring it to work with other FAA organizations and the aviation community to identify and implement activities/technologies designed to increase runway safety. When the ATO was created, the Runway Safety Office was placed under the Vice President for the Office of Safety. While the Runway Safety Office is ultimately responsible for the runway safety initiatives throughout the agency, there are many groups that work closely together to improve runway safety. It takes people from all these groups working together on runway safety issues to make a difference.

5.1 Call to Action

FAA convened the Call to Action meeting to focus on two kinds of risk: runway incursions and wrong runway incidents. On August 15, 2007, led by then-FAA Deputy Administrator Robert Sturgell, aviation leaders from airlines, airports, air traffic control and pilot unions, aerospace manufacturers and the FAA agreed to quickly implement a five point short-term plan to improve safety at U.S. airports:

1. Within 60 days, teams of FAA personnel, airport operators and airline employees begin safety reviews at the airports where wrong runway departures and runway incursions are the greatest concern. The FAA compiled the list of 20 airports based on safety risk factors, including incursion history.

2. Within 60 days, disseminate information and training across the entire aviation industry.

3. Within 60 days, accelerate the deployment of improved airport signage and markings at the top 75 airports, well ahead of the June 2008 mandated deadline.

4. Within 60 days, review cockpit procedures and air traffic control clearance procedures, including changing cockpit procedures to minimize pilot activities and distractions while an aircraft is moving on the ground and changing air traffic control clearance procedures to make air traffic control instructions more precise.

5. Implement a voluntary self-reporting system for all air traffic organization safety personnel, such as air traffic controllers and technicians.

Participants were to pursue mid- and long-term goals to address maximizing situational awareness, minimizing pilot distractions and eliminating runway incursions using procedures and technology. A detailed discussion of Call to Action activities is available in the *2008 Runway Safety Report*.

Call to Action – Summary of Short-term Accomplishments

The Runway Safety Office completed runway safety reviews of 20 airports based on runway incursion data and wrong runway departure data resulting in more than 100 short-term and numerous mid- and long-term initiatives. We have completed 98 percent of the short-term initiatives identified. The agency has incorporated lessons learned from the initial surface analysis into the Runway Safety Action Teams (RSATs). The top-to-bottom review of the first tier airports provided valuable data that has led to many improvements. We identified a second tier of 22 airports for runway safety reviews based upon data on runway incursions and wrong runway departures. We completed these reviews in July 2008.

We completed implementation of upgraded markings at the 75 medium and large airports with greater than 1.5 million annual enplanements before the June 30, 2008, target. In addition, the FAA issued *Change 2 to Advisory Circular (AC) 150/5340-1J, Standards for Airport Markings* on June 6, 2008, extending the marking requirement. Medium-small hubs must install the enhanced marking by December 31, 2009, while remaining airports have a deadline of December 31, 2010. As of November 30, 2008, 45 of 61 (74 percent) of medium-small hubs have installed the markings and 199 of 429 (46 percent) of the smaller airports have completed installation.

More than 90 percent of the certificated airports have agreed to voluntarily develop plans to require annual recurrent training for all individuals with access to movement areas such as runways and taxiways. FAA Regional Runway Safety Program offices continue to track the progress with airport sponsors and provide assistance. The Office of Airport Safety and Standards issued a change to *AC 150/5210-20, Ground Vehicle Operations on Airports*, effective March 31, 2008. The AC change strongly recommends annual recurrent driver training for all persons with access to the movement area. FAA is undertaking a rule-making process that will make this training mandatory.

We asked air carriers to provide pilots with simulator or other realistic training scenarios incorporating pushback through taxi. We also asked the carriers to review cockpit procedures in order to identify and develop a plan addressing elements contributing to pilot distraction during taxi operations. Of the 112 active air carriers, all have reported that they are in compliance. We also asked carriers to establish mandatory recurrent training for non-pilot employees who operate aircraft or vehicles on the airfield and to maintain a sterile cockpit environment. The FAA reviewed existing videos, posted *FAA Notice No. 0988* containing a visual depiction of a Taxi Operation Procedures chart (later canceled and replaced by this brochure: ***https://www.faasafety.gov/files/notices/2007/Sep/Pilot_Brochure_FY08.pdf***) and is now developing a new DVD for distribution to air carriers for use in their training programs.

ATO Terminal Services conducted a safety risk analysis of explicit taxi clearance instructions, explicit runway crossings clearances, takeoff clearances and multiple landing clearances (including landing clearances too far from the airport). They were also asked to adopt international phraseology such as "line-up and wait" instead of the U.S. "position and hold" phraseology. We published and distributed detailed taxi instructions to the field in May 2008 with implementation through the summer of 2008.

In March 2008, the FAA and the National Air Traffic Controllers Association signed an agreement to create an Air Traffic Safety Action Program (ATSAP) designed to foster a voluntary, cooperative and non-punitive environment for the open reporting of safety of flight concerns by employees of the FAA. Under ATSAP, all parties will have access to valuable safety information that may not otherwise be obtainable. We will analyze this information in order to develop skill enhancement or system corrective action to help solve safety issues. The agreement is for 18 months and may be renewed.

5.2 Call to Action – Next Steps

On January 15, 2008 then-Acting FAA Administrator Robert Sturgell convened a teleconference with the chief executive officers of U.S. commercial carriers to reinforce the need for improved pilot training and cockpit procedure, citing concern over recent high-visibility runway safety events. Sturgell called for meetings with all carriers and top FAA safety officials for the purpose of examining ways to enhance situational awareness on the runway.

Flight Standards Service (AFS) leadership met face-to-face with the chief pilot, director of safety and director of operations for every U.S. air carrier. Those meetings occurred over a seven-day period ending on January 25, 2008. Key officers of every air carrier attended the meetings comprising a total of 325 air carrier and 224 FAA representatives. As a result of the FAA's outreach, air carriers will provide pilots and flights engineers with the current data on runway incursions and will require crew members to review online informational safety programs by May 1, 2008. These meetings generated an extensive list of safety recommendations. Each line of business selected its top priority items for evaluation and follow on action. The following sections report those priorities.

Office of Runway Safety Efforts

- Establish annual runway incursion seminar for air traffic control, aviation industry and FAA Flight Standards.
- Partner with international organizations for runway incursion prevention. Standardize with ICAO on runway crossings.
- Publish synopsis and explanation of every A and B runway incursion.
- Take the lead in collecting, analyzing and distributing root cause data on all runway incursions.
- Request FAA to provide electronic links to pictorial and mapping data for identified Hot Spots at the Part 139 airports.

AFS Efforts

- Principal Operations Inspectors should provide updates to carriers of special emphasis items and validate the air carriers' willingness to implement.
- Publish guidance requesting positive clearance to cross any runway—all crossings of any runway must be confirmed via air traffic control clearance.
- Expedite revision to AC to allow Class II Electronic Flight Bags (EFBs) with aircraft present position on display.
- Standardize the use of aircraft lights for crossings and takeoff (revise AC).
- Require mandatory pre-taxi instructions for each aircraft utilizing Aircraft Communications Addressing and Reporting System, standardized coded taxi routes or verbal instructions.

Aircraft Certification Service Efforts

- In April 2007, AFS and Aircraft Certification Service jointly issued *AC 20-159, Obtaining Design and Production Approval of Airport Moving Map Display Applications Intended for Electronic Flight Bag Systems. AC 20-159* streamlined the process to allow own ship position on an airport moving map display for Class II (portable) EFBs, for which

airworthiness regulations were not previously established. The airport moving map display helps flight crews orient themselves on the airport surface and improve pilot positional awareness during taxi operations.

- With respect to surface traffic awareness, an RTCA industry committee has begun development of standards for the use of Automatic Dependent Surveillance-Broadcast information to improve situation awareness and alert for potential runway incursions. We recently asked this committee to accelerate its efforts, and to investigate simple improvements that industry could implement within the next few years and may be eligible for use in a portable EFB (Class II).
- In addition to this standards development, we supported the certification of the Honeywell Runway Awareness and Advisory System.
- FAA Data Communication Program Segment 1: working with industry, we plan to publish supporting guidance material for taxi clearance in 2009. The implementation of data link taxi clearance will depend on the data link program, which the FAA Joint Resources Council is reviewing.

ATO Efforts

- Mandatory detailed taxi instructions, including directional turns (directional turns are optional on needs at individual airports), to all aircraft and vehicles to and from ramps and runways.
- Prohibit the issuance of a takeoff clearance during an aircraft's taxi to its departure runway until after the aircraft has crossed all intersecting runways. If the aircraft is not able to completely cross a runway prior to reaching its departure runway then air traffic control will issue a runway crossing clearance with the takeoff clearance.
- The ATO will eliminate implied crossings, such as "taxi to" to require explicit runway crossing clearances. This recommendation calls for an explicit crossing instruction for each runway after the previous runway has been crossed and will require a change to *Code of Federal Regulations section 91.129(i)* and *FAA Order 7110.65*.
- Runway-to-runway crossing clearances. This recommendation to amend *FAA Order 7110.65* to require air traffic controllers to issue an explicit crossing instruction for each runway after the previous runway has been crossed.
- The FAA is considering adopting ICAO procedures for landing clearances. This change would require controllers to wait to issue a landing clearance to a following aircraft until the preceding aircraft has crossed the runway threshold. Other options under consideration would specify when a controller can issue a landing clearance to an aircraft by restricting the distance from the runway before issuing the landing clearance.
- The FAA is considering the standardization of terminology by adopting the ICAO phraseology "line-up and wait." This would change the existing *FAA Order 7110.65* phraseology of "position and hold."

FAA Office of Airports (ARP) Efforts

- Work with ATO and Jeppesen to explore a better system for updating the airport diagrams for construction issues.
- Establish Office of Airport Safety and Standards as the central point to report airport issues, such as poor lighting and markings.
- Work with ATO on installing runway status lights at appropriate airports to warn aircraft in position for takeoff that aircraft or vehicles occupy the runway.
- Explore with ATO and Jeppesen the practicality of including taxiway headings on airport diagrams.
- Initiate research to determine if marking hot spots with day glow-type orange paint or unique colored stop sign improves pilot situational awareness.

5.3 Recent Recommendations

Runway safety continues to receive public attention. For many years the FAA has actively invested in programs and technology development to address runway safety. The FAA believes that the technologies it is now testing and deploying will be integral in reducing both the frequency and severity of runway incursions.

While acknowledging the progress made, the FAA also recognizes the need for continued improvement in runway safety and this remains one of its top priorities. Recent recommendations have come from external entities (highlighted below) and the FAA is reviewing and responding to the recommendations in its continued effort to improve runway safety and reduce runway incursions. See Appendix C for the FAA's response.

The National Transportation Safety Board (NTSB) is an independent federal agency that Congress has charged to investigate and determine the probable cause of every civil aviation accident in the United States and certain public-use aircraft accidents. "Improve Runway Safety" continues to be on the NTSB's "Most Wanted List" of safety improvements for 2008. The bullets below describe the NTSB's current safety recommendations.

- Require, at all airports with scheduled passenger service, a ground movement safety system that will prevent runway incursions; the system should provide a direct warning capability to flight crews. In addition, demonstrate through computer simulations or other means that the system will, in fact, prevent incursions. (Source: Letter of recommendation dated July 6, 2000, to the FAA addressing runway incursions)

- Amend *14 Code of Federal Regulations (CFR) section 91.129(I)* to require that all runway crossings be authorized only by specific air traffic control clearance, and ensure that U.S. pilots, U.S. personnel assigned to move aircraft and pilots operating under *14 CFR Part 129* receive adequate notification of the change. (Source: Letter of recommendation dated July 6, 2000, to the FAA addressing runway incursions)

- Amend *FAA Order 7110.65*, Air Traffic Control, to require that, when aircraft need to cross multiple runways, air traffic controllers issue an explicit crossing instruction for each runway after the aircraft has crossed the previous runway. (Source: Letter of recommendation dated July 6, 2000, to the FAA addressing runway incursions)

- Immediately require all *14 CFR Part 121, Part 135* and *Part 91, subpart K* operators to conduct arrival landing distance assessments before every landing based on existing performance data, actual conditions and incorporating a minimum safety margin of 15 percent. (Source: Investigation of the runway overrun at Chicago Midway Airport on December 8, 2005, of Southwest Airlines flight 1248, a Boeing 737)

The U.S. Government Accountability Office (GAO) is an independent agency that provides audit, evaluation and investigation support for the U.S. Congress. It investigates how the government spends taxpayer dollars.

In December 2007, the GAO released the *Aviation Runway and Ramp Safety Report*. Its objective was to review how well the FAA and others were addressing runway and ramp safety. GAO recommended the five actions described below:

- Implement the FAA order establishing the Office of Runway Safety to lead the agency's runway safety efforts, including preparing a new national runway safety plan. The plan should include goals to improve runway safety; near- and longer-term actions designed to reduce the severity, number and rate of runway incursions; timeframes and resources needed for those actions; and a continuous evaluative process to track performance towards those goals. The plan should also address the increased runway safety risk associated with the expected increased volume of air traffic.
- Develop an implementation schedule for establishing a non-punitive voluntary safety reporting program for air traffic controllers.
- Develop and implement a plan to collect data on runway overruns that do not result in damage or injury for analyses of trends and causes, such as the locations, circumstances and types of aircraft involved in such incidents.
- Develop a mitigation plan for addressing controller overtime that considers options such as shift changes and incentives to attract controllers to facilities with high volumes of air traffic and high rates of controller overtime.
- Work with the aviation industry and Occupational Safety and Health Administration to develop a mechanism to collect and analyze data on ramp accidents and, if warranted by the analysis, develop a strategic plan aimed at reducing accidents involving workers, passengers and aircraft in the ramp area. The plan should include a discussion of roles and responsibilities, performance measures, data collection and analysis, milestones and a consideration of ramp safety practices followed by other countries.

The Office of Inspector General (OIG) is a component of the Department of Transportation. It is an independent auditing group responsible for reporting problems and making recommendations (based upon audits, investigations and inspections) to the Secretary of Transportation and to Congress.

In May 2007, the OIG released a report: *Progress Has Been Made in Reducing Runway Incursions, But Recent Incidents Underscore the Need for Further Proactive Methods*. The report provides the results of OIG's review of the FAA actions taken to address runway incursions at Boston Logan, Chicago O'Hare, Philadelphia and Los Angeles international airports. OIG's objectives were to assess the actions taken by the FAA to identify and correct the causes of recent runway incursions at those airports as well as address those issues that could affect safety system-wide. They recommended the six actions described below:

- Establish initiatives to promote increased voluntary pilot participation in Runway Incursion Information Evaluation Program and ensure the analysis of data collected to identify and mitigate runway incursion causal factors.
- Work with the pilot and airline communities to establish a process whereby Regional Runway Safety Program Managers (RRSPMs) can request site-specific redacted Aviation Safety Action Plan information on runway incursions and surface incidents to aid in identifying trends, root causes and possible local solutions.
- Develop an automated means to share local best practices that were successful in reducing runway incursions. One such mechanism would be establishing an intranet site through the Regional Runway Safety Offices.

Message from Wes Timmons Director of Runway Safety

Runway safety continues to be the focus of much public attention. For many years the FAA has actively invested in programs and technology development to address runway safety. An aggressive FAA runway safety program has effectively reduced the number of serious runway incursions by 55 percent since 2001. Last year, there were 24 serious incursions during 61 million aircraft operations – a significant reduction from 31 the previous year. The tremendous results from 2001 to 2007 were the result of the consistent execution of an effective runway safety program and the cooperation and assistance of the entire aviation industry. We still see serious runway incursions occurring, however, and in 2007 the total number of runway incursions increased. These facts prompted the initial *Call to Action*.

The entire airport community – operators and pilots, air traffic managers and controllers, airport managers and tenants – participated in conducting a safety review and identifying short-, mid- and long-term initiatives to improve runway safety. We have incorporated lessons learned from the 20 "first tier" surface analysis airports and analyzed the second tier of 22 airports for surface safety. We completed this second round of safety reviews in July 2008. We are developing a validation plan that will involve monitoring the results and evaluating the effectiveness of the measures put into place. This will be executed at the regional level and close the loop by providing feedback into the process regarding what measures work best. We have now reviewed many of the airports that have either a history of runway incursions or the presence of multiple risk factors.

Although we have made progress, we recognize the need for continued improvement in runway safety and are committed to making that happen. As runway safety continues to be one of FAA's top priorities, we are continuing to execute the Runway Safety Program, learning from our *Call to Action* efforts and improving our processes.

- Establish milestones for implementing JANUS,[1] National Air Traffic Professionalism Program and Crew Resource Management (CRM) training and tower simulator training technologies at airport traffic control towers that have a history of a high number of runway incursions caused by controller operational errors.
- Require the use of safety risk analyses to evaluate existing operational procedures at airports where FAA has identified potential runway safety risks and train appropriate personnel in conducting such analyses.
- Require each line of business to include quantitative goals in its annual business plans for reducing runway incursion risks that are specific to its oversight responsibilities. Designate the Runway Safety Office as the authority to review and approve all runway safety initiatives.

5.4 Runway Safety Office

The Runway Safety Office within the ATO Office of Safety is ultimately responsible for the runway safety initiatives throughout the agency. It is composed of a staff at the FAA's Washington, D.C., headquarters and regional runway safety offices, staffed with an RRSPM. ATO, AFS and ARP detail representatives to work for the RRSPM or serve as needed for RSATs and issue resolution. The Runway Safety Office works closely with many groups – including ARP, AFS and the Office of the Associate Administrator for Regions and Center Operations (ARC) – on its many runway safety initiatives outlined later in this section of the report.

Runway Safety Program Summary of Recent Accomplishments

Domestically, we held three regional-level Runway Safety Summits and developed and distributed materials to raise awareness and provide guidance. Included in these materials were two posters related to procedures, two graphics publications related to airport marking and signage, a four-part series of *Back to Basics for Tower Air Traffic Controllers* videos and a compilation DVD entitled *Runway Safety Collection* containing an introduction by then-Acting Administrator Sturgell and four videos concerning surface safety. We provided a briefing at the International Air Transport Association (IATA) annual conference, developed a training module on surface safety for the New Hampshire Fire Academy and hosted four presentations on runway safety topics at the Great Lakes Region Annual Airports Conference. We influenced significant changes to airport geometry at Los Angeles International Airport, both addressing high runway safety risk on the airport and aggressively supporting center taxiway construction for the north complex (as was done previously for the south complex) in order to eliminate direct (i.e., straight-line) runway crossing routes.

[1] JANUS is a technique designed to improve the data collection process for operational errors by applying human factors principles to develop interventions to enhance performance. The overall purpose is to understand the role of the individual, situation and work-related factors as they influence air traffic controllers' operational performance. The objectives are to develop an improved understanding of the human factors relating to individual performance and the occurrence of operational errors and to broaden the role of cognitive factors as they influence the performance of air traffic controllers. The FAA began testing JANUS in FY 2002 but has not implemented this program.

Internationally, we began discussions with the People's Republic of China on runway safety initiatives and worked with EUROCONTROL on harmonization of runway safety technology and practices.

Other Initiatives

Runway Safety Educational Materials: The Office of Safety produces education material for pilots, controllers and airport vehicle operators. Headquarters developed some of this material in response to trends and prominent issues, but the regions developed the majority of it in response to needs seen by regional teams then shared it nationally. Recent products include a new video for pilots on human factors and an interactive training CD for vehicle drivers.

Regional Runway Safety Programs in FY 2008: RRSPMs interface directly with aviation customers, both internal and external. The RSAT conducts meetings at airports that experience frequent or severe runway incursion incidents. The purpose of these meetings is to identify and address existing and potential runway safety problems and to identify corrective actions to further improve surface safety. Members also share best practices and lessons learned. After developing a plan, the RRSPMs assist in implementing solutions. Annually, the RRSPMs plan meetings at airports for the coming year, as well as other education and training activities that include:

Table 3. Regional Activity

Activity	FY 2007	Through July 31, 2008
RRSPM RSATs	70	103
Local/Follow-up RSATs	92	88
Safety Meetings	248	395
Incident Investigations	113	262
Fly-ins	37	20
Other Meetings	297	214
Total Major Activities	857	1,082

Note: Ten of the RSATs in FY 2007 and 32 in FY 2008 were from the Call to Action first and second tier lists.

Hot Spots: "Hot Spots" are complex or confusing intersections. ICAO has defined 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/drivers is necessary. This definition became effective November 22, 2007. There are currently approximately 50 airports with Hot Spot brochures developed prior to the adoption of the ICAO definition. Figure 3 provides an example of an existing brochure chart for Long Beach Airport (LGB) with Hot Spots. The ATO has developed a revision to its Airport Diagrams order that includes Hot Spots and a process for establishment/disestablishment of Hot Spots as well as other operational data. This order establishes qualifying criteria and guidelines for the selection, development, construction and maintenance of airport diagrams for public-use airports. It provides for the addition of Hot Spots to charts developed by the National Aeronautical Charting Office (NACO). Incorporation of Hot Spots will commence with the March 12, 2009 publication. Figure 4 is the existing NACO diagram for LGB without the Hot Spots marked. The final format of the new diagrams is still to be determined.

Figure 3. Hot Spots at Long Beach Airport (LGB)

NOT FOR NAVIGATION

Hot Spot Chart

LONG BEACH (DAUGHERTY FIELD) (LGB)
LONG BEACH, CALIFORNIA

ATIS 127.75
LONG BEACH TOWER ★
120.5 257.6 (RWY 12)
119.4 257.6 (RWY 30)
GND CON
133.0 257.6
CLNC DEL
118.15

HOT 1

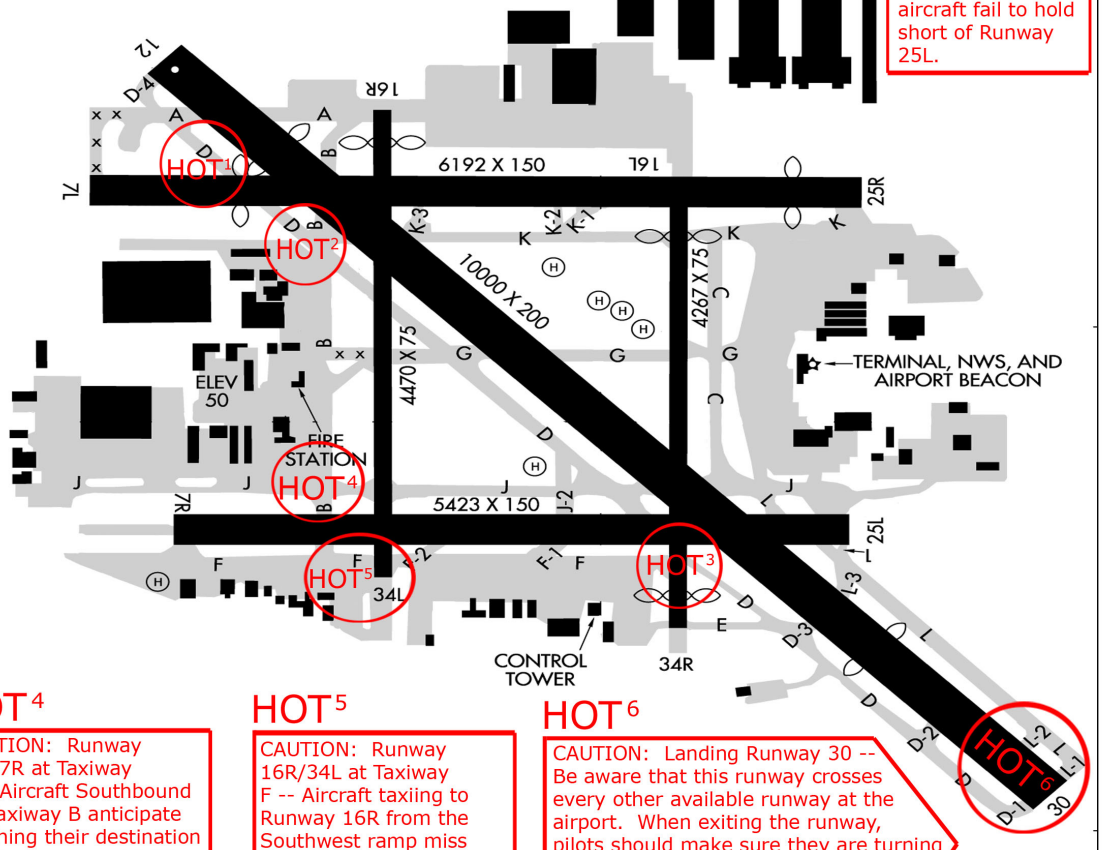
CAUTION: Runway 25R and Taxiway D -- Aircraft exiting Runway 30 at Taxiway Alpha turn left on Taxiway D, anticipate reaching their destination, and fail to hold short of Runway 25R.

HOT 2

CAUTION: Runway 30/12 at Taxiway B -- Aircraft Northbound on Taxiway B for departure on Runway 16R at Taxiway Intersection D miss the right turn onto Taxiway D and enter Runways 12 and 25R.

HOT 3

CAUTION: Runway 25L at Taxiway D -- After completing a runup on inactive Runway 34R, aircraft fail to hold short of Runway 25L.



Last updated 8 May 2008

Last updated 8 May 2008

HOT 4

CAUTION: Runway 25L/7R at Taxiway B -- Aircraft Southbound on Taxiway B anticipate reaching their destination parking ramp and fail to hold short of Runway 25L/7R.

HOT 5

CAUTION: Runway 16R/34L at Taxiway F -- Aircraft taxiing to Runway 16R from the Southwest ramp miss the left turn onto Taxiway B, continue Eastbound onto Taxiway F, and enter Runway 16R/34L.

HOT 6

CAUTION: Landing Runway 30 -- Be aware that this runway crosses every other available runway at the airport. When exiting the runway, pilots should make sure they are turning with a "lead-off" taxiline onto a taxiway and not onto another active runway.

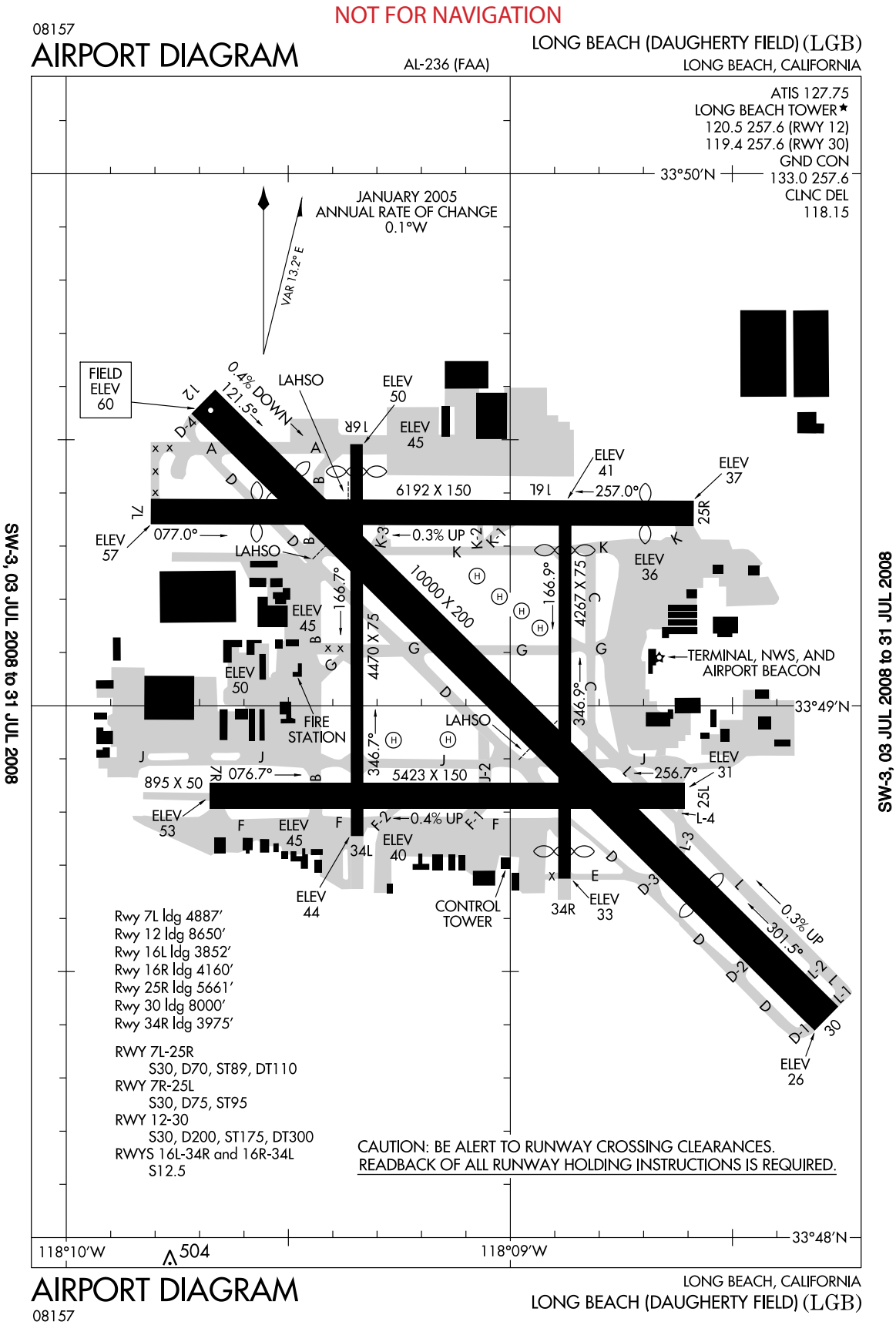
CAUTION: BE ALERT TO RUNWAY CROSSING CLEARANCES. READBACK ALL RUNWAY ASSIGNMENTS. READBACK OF ALL RUNWAY HOLD SHORT INSTRUCTIONS IS REQUIRED.

Hot Spot Chart

LONG BEACH (DAUGHERTY FIELD) (LGB)
LONG BEACH, CALIFORNIA

NOT FOR NAVIGATION

Figure 4. Existing NACO Diagram for Long Beach Airport (LGB)



6.0 Future Directions

Many of the initiatives implemented are already providing a positive impact on runway safety. This is an ongoing effort and the FAA is committed to finding ways of making a safe system even safer. In addition to current runway safety initiatives, the following efforts will further the progress of increasing runway safety over the next several years.

6.1 Implement a Safety Management System (SMS) within the Runway Safety Office

The Office of Safety is working to fully implement a SMS across the ATO. SMS will eventually encompass all of our runway safety processes. An initial area of application will be the Runway Safety Council.

The Runway Safety Council: This is a joint effort between the FAA and the aviation industry to look into the root causes of runway incursions. The Runway Safety Council, scheduled to begin meeting in Fall 2008, will be comprised of 12–15 representatives from various parts of the aviation industry. A subsidiary working group called the Root Cause Analysis Team will integrate investigations of severe runway incursions and conduct a root cause analysis. The working group will present its root cause analysis to the council and make recommendations on ways to improve runway safety. The council will review the recommendations. If accepted, the Runway Safety Council will assign the recommendation to the part of the FAA and/or the industry that is best able to control the root cause and prevent further runway incursions. The council will track recommendations to make sure responsible parties take appropriate action. The Root Cause Analysis Team will also follow up after implementation.

6.2 Training and Instruction

Tower Controller Refresher Training: To ensure air traffic controllers maintain a high level of runway incursion prevention awareness, the FAA has mandated that runway incursion prevention be included in the quarterly refresher training at every control tower. These training courses revisit the fundamentals of tower procedures. It is a supplement to what they work on at each individual airport and includes review of incident scenarios. This training began in the summer of 2008.

Pilot Training and Instruction: Proficiency training is essential to the safety of all pilots and their passengers. Each pilot must take a personal interest in their safety and that of their passengers. FAA's AFS is exploring the following initiatives:

- Flight Reviews: Flight instructors provide flight reviews, which incorporate information to refresh pilots on runway safety. These reviews consist of a minimum of one hour of ground instruction and one hour of flight instruction. Participants receive a certificate as verification of course completion. As a way of increasing awareness

with respect to runway safety, AFS began posting runway safety videos to the FAA Safety Team (FAASTeam) Web site in the summer of 2008.

- Flight Instructor Review Clinics: Flight instructors are required to renew their flight instructor certificates every two years. A Flight Instructor Review Clinic is a 16-hour course that allows the flight instructor to accomplish this requirement. In November 2007, *AC 61-83 version F* went into effect, providing more flexibility to Flight Instructor Review Clinic providers, allowing them to decide what the most important topics are and how much time to spend on each. There are still 15 core topics, but the instructors can incorporate them into their training course outline as they see fit. AFS is recommending that instructors allocate a two hour block of time for runway safety. This will provide guidance to flight instructors on runway safety techniques, which instructors will then pass on to their students.

- Flight Tests: AFS believes that including specific runway safety questions on the pilot exam will increase runway safety awareness for pilots. They are recommending that questions target the airports that pilots are likely to fly into depending on their region and flying schedules. By allowing Designated Pilot Examiners to determine which questions to use during test administration, pilots will become more familiar with the specific airports' runways they will likely use.

- FAA Industry Training Standards (FITS): FITS is a joint government-stakeholder initiative developed for GA flight operations with technically advanced aircraft. FITS introduces proven concepts that are central to system safety into the training curriculum and allows training to evolve with the introduction of new advanced in-cockpit technologies. It allows for a structured, scenario-based training that is key to achieving a high level of safety. AFS is recommending that a runway safety component and a focus on situational awareness and improved decision-making are added to these standards.

- Part 141 – Flight Schools: Implementing measures to ensure both flight school curricula and operations by inspectors emphasize runway safety, AFS will provide tools such as checklists and instructions for assessing runway safety at flight schools. AFS will also develop Program Tracking Reporting Systems codes to track/measure inspectors' activities and ensure runway safety issues are part of the inspection process.

6.3 FAASTeam

The FAASTeam will support the General Aviation Airport Surface Incident Mitigation Strategy at both the national and regional level. This will provide the guidance and educational information necessary to create a positive cultural change in the GA industry that assures airmen conduct ground operations as a critical phase of flight.

6.4 Outreach

National and International Summits: A National Planning Team comprising representatives from among the RRSPMs, the Runway Safety Office, ARP, ATO and AFS as well as advisors from airlines, controllers and pilots associations will be created to plan and organize the National Summit in FY 2009 and the International Summit in FY 2011.

Local Outreach: The Runway Safety Office also plans an increased emphasis on meeting with state and local officials and airport managers to heighten awareness and provide educational materials in FY 2008 to beyond FY 2011.

6.5 Airport Infrastructure

Runway Safety Areas (RSAs): Another facet of runway safety is preventing runway excursions. RSAs are established to enhance safety in the event of an aircraft undershoot, overrun, or excursion from the side of the runway. The standard RSA extends from 240 feet to 1,000 feet beyond each runway end and is between 120 feet and 500 feet wide, depending on the type of instrument approach procedures and size and type of aircraft served by the runway.

The FAA has accelerated the improvement of runway safety areas that do not meet agency design standards. Since 2000, 72 percent of the RSAs identified as high priorities have been improved. The FAA expects to have 86 percent of the safety areas improved by the end of 2010 and all practicable improvements made by 2015.

Engineered Materials Arresting System (EMAS): EMAS is a specific technology that can be used as a safety enhancement on runway ends that lack the level and clear terrain of a standard RSA.

EMAS has been installed at more than 30 runway ends at 21 airports. So far, there have been four safe captures in EMAS beds from overrunning aircraft. In each of these cases, there were no injuries to the crew, damage was limited to only the tires and the aircraft returned to service within days of the incident.

There are plans for 14 additional EMAS installations at eight additional airports in the United States.

RSA Program Goals

FY 2009: Complete 26 runway safety areas

FY 2010: Complete 37 runway safety areas

FY 2011: Complete 19 runway safety areas

6.6 Technology Development

The Runway Safety Office is supporting the development of a wide variety of technologies that are expected to aid in the reduction of runway incursions and surface incidents.

Capstone Runway Safety Initiative – Improved Crew Situational Awareness (CRSI-ICSA) Implementation Effort: The Electronic Flight Bag (EFB) is an electronic display system that gives pilots access to a variety of aviation data such as charts and manuals. They range from laptop-like devices totally independent of the aircraft that can be used on planes across the existing fleet (Class 1 system) to high-end displays permanently installed and fully integrated into cockpits of newer aircraft (Class 3 system). Most EFBs incorporate an Airport Moving Map, which uses GPS technology to show pilots their actual positions on the airport surface. The FAA is focusing its effort on a third type of device, referred to as a "Class 2 system," that is still portable but takes its power and data directly from aircraft systems.

In April 2007, the FAA reduced the cost and complexity of certifying EFBs that include moving map technology. *AC 91-78* was released in July 2007 and provided aircraft owners, operators and pilots operating aircraft under *Title 14 of the Code of Federal Regulations (14 CFR)*

CRSI-ICSA Program Goals

FY 2008
- Signed cooperative agreement: August 15, 2008

FY 2009
- Equipment installation/upgrade: April 15, 2009
- Initiation of operational safety data collection: May 15, 2009
- Initial results from data analysis: September 2009

FY 2010
- Midterm results from data analysis: April 2010
- Completion of operational safety data collection: September 30, 2010
- Final results from data analysis: December 2010

part 91, with information for removal of paper aeronautical charts and other documentation from the cockpit through the use of Class 1 or Class 2 EFBs. One vendor received certification for its Airport Moving Map application in March of 2008. Another vendor is currently engaged in the certification process.

In addition to the Airport Moving Map technology, the FAA is exploring the use of a variety of other products with direct warning capability including systems capable of giving aural alerts of own ship proximity to runways while landing or taxiing, systems capable of vehicle location and tracking and systems capable of incursion prediction and warning that require integration with existing/future surface surveillance systems.

Runway Status Lights (RWSL): RWSL is another technology the FAA is testing that will alert pilots to potential runway incursions. While Airport Surface Detection Equipment, Model X (ASDE-X) and Airport Movement Area Safety System detect the presence and motion of aircraft and vehicles on or near the runways, RWSL safety logic then assesses any possible conflicts with other surface traffic. The two functional elements that comprise the current RWSL system are Runway Entrance Lights (RELs) and Takeoff Hold Lights (THLs). RELs indicate when a runway is unsafe for entry and THLs advise pilots when the runway is unsafe for takeoff due to traffic on the runway. A third variety of RWSL is Runway Intersection Lights (RILs). We will test these at Boston Logan International Airport (BOS) next year.

We completed the operational evaluation of RELs using ASDE-3/ASDE-X on a single runway, runway 18L/36R, at Dallas-Fort Worth International Airport's (DFW) west airfield in 2005. These showed promising results and the test system remains in use. We have been evaluating THLs on the same runway at DFW's west airfield since 2006. Runway incursions on the test runway at DFW (runway 18L/36R) have decreased by 70 percent: during the 29 months before testing began, 10 runway incursions occurred at DFW; during the 29 months after testing began, only three occurred. In 2008, we expanded RWSL (RELs and THLs) at DFW to include two runways at DFW's east airfield runway 17C/35C and runway 17R/35L. The evaluation of RWSL with AMASS began in 2007 at San Diego Lindbergh Field (SAN) and ongoing tests are yielding promising results. The FAA's JRC provided approval in June 2008. The FAA recently issued a request for proposal from companies interested in building and deploying a nationwide system.

The FAA entered a preliminary agreement in February 2008 to install an additional RWSL system for evaluation on the north and south airfields at Los Angeles International Airport (LAX). LAX will fund the cost of the RWSL installation. It will be the first system installed on high speed taxiways. This installation will include a new RWSL capability for intersecting runways known as RILs in addition to RELs and THLs. In April 2008 the FAA entered a preliminary agreement to install an additional RWSL system for evaluation at BOS. The FAA and Massachusetts Port Authority will share in the system installation costs of

RWSL Program Goals

FY 2008
- Complete installation and integration on DFW's east airfield complex
- Expand DFW operational evaluation to cover east airfield complex

FY 2009
- RWSL operational at LAX 2nd quarter
- RIL shadow operations evaluation
- RWSL test demo installation #3 and #4

FY 2010
- RWSL operational at BOS 1st quarter
- Begin deployment to 18 additional airports

FY 2011
- Deployment to 22 ASDE-X sites completed

this RWSL installation. We will establish new test beds at LAX and BOS during the 2009/2010 time frame.

Final Approach Runway Occupancy Signal (FAROS): The FAA is testing this technology that will alert pilots to potential runway incursion. The FAROS test system at Long Beach-Daugherty Field Airport (LGB) is a fully automated system using inductive loop sensors embedded in the runway and taxiway surfaces to detect aircraft and vehicles entering and exiting the monitored zones. When a potentially hazardous target occupies the runway, the system flashes the Precision Approach Path Indicator lights as a visual indicator to pilots on approach without controller input. A more sophisticated implementation know as Enhanced FAROS (eFAROS) activates based on both runway occupancy and the proximity of an aircraft to a preset threshold (e.g., 1.5 nautical miles). Operational evaluation of eFAROS at DFW began at the end of September 2008. FAA is developing a plan for implementation of eFAROS at the larger airports.

FAROS Program Goals

FY 2008
- Complete installations of interfaces at DFW in concert with RWSL
- Initial operational evaluation at DFW

FY 2009
- Develop FAROS acquisition strategy

FY 2010
- Initial investment decision

Low Cost Ground Surveillance (LCGS) Systems: The FAA is evaluating low-cost, commercially available radar surveillance systems for potential application at certain small and medium-sized airports. We would install these systems at airports that do not have airport surface detection equipment.

We are currently testing two such systems (different technologies) at Spokane International Airport (GEG). Controllers and pilots can safely conduct ground operations through visual and voice communication due to lower traffic levels and less complex operations at these airports. A low-cost system would further reduce the risk of ground incidents or accidents, especially during periods of low visibility.

During July 2008, the FAA released a request for proposals for LCGS products to be installed and evaluated at selected airports as part of a pilot program. In addition to evaluating the operational effectiveness of selected LCGS products to increase controller situational awareness, the FAA intends to assess the suitability of these systems to support direct pilot alerting applications such as RWSL and FAROS. The Runway Safety Office intends to fund development efforts aimed at providing a Low Cost Runway Status Lights system during FY 2010.

LCGS Program Goals

FY 2008
- Obtain ATO approval for an LCGS pilot project strategy
- Initiate LCGS pilot project procurement
- Conduct ATC user evaluation

FY 2009
- Award LCGS pilot contracts
- Complete data collection activities at Spokane
- Install First Article LCGS systems at selected airports
- Obtain initial investment decision

FY 2010
- Integrate and test LCGS with safety applications (e.g., RWSL)
- Operational evaluation of LCGS at pilot sites
- Obtain final investment decision

7.0 Relationship Between Documents

The Runway Safety Plan provides an overview of the FAA's runway safety strategy. This document draws high-level direction from the FAA's Flight Plan to ensure it is in alignment with the overall agency vision. The Runway Safety Plan incorporates goals, objectives and initiatives from each of the FAA lines of business responsible for runway safety, reflecting a comprehensive FAA runway safety strategy.

Appendix A: Acronyms

AC	Advisory Circular	IATA	International Air Transport Association
AFS	Flight Standards Service within the FAA	ICAO	International Civil Aviation Organization
ARC	Associate Administrator for Regions and Center Operations within the FAA	JRC	Joint Resources Council
ARP	Associate Administrator for Airports within the FAA	LAHSO	Land and Hold Short Operations
ASAP	Aviation Safety Action Plan	LAX	Identifier for Los Angeles International Airport, Los Angeles, California
ASDE-X/ ASDE-3	Airport Surface Detection Equipment-Model X/ Airport Surface Detection Equipment-Model 3	LCGS	Low Cost Ground Surveillance
ASIMS	Airport Surface Incident Mitigation Strategy	LGB	Identifier for Long Beach Airport (Daugherty Field), Long Beach, California
ATO	Air Traffic Organization within the FAA	NACO	National Aeronautical Charting Office
ATSAP	Air Traffic Safety Action Program	NAS	National Airspace System
BOS	Identifier for General Edward Lawrence Logan International Airport, Boston, Massachusetts	NTSB	National Transportation Safety Board
CFR	Code of Federal Regulations	OIG	Office of Inspector General
CRSI-ICSA	Capstone Runway Safety Initiative-Improved Crew Situational Awareness	ORD	Identifier for O'Hare International Airport, Chicago, Illinois
DFW	Identifier for Dallas-Fort Worth International Airport, Dallas-Fort Worth, Texas	PHL	Identifier for Philadelphia International Airport, Philadelphia, Pennsylvania
eFAROS	Enhanced Final Approach Runway Occupancy Signal	REL	Runway Entrance Light
EFB	Electronic Flight Bag	RIIEP	Runway Incursion Information Evaluation Program
EMAS	Engineered Materials Arresting System	RIL	Runway Intersection Light
FAASTeam	Federal Aviation Administration Safety Team	RRSPM	Regional Runway Safety Program Manager
FAROS	Final Approach Runway Occupancy Signal	RSA	Runway Safety Area
FITS	Federal Aviation Administration Industry Training Standards	RSAT	Runway Safety Action Team
FY	Fiscal Year	RSC	Runway Safety Council
GA	General Aviation	RWSL	Runway Status Lights
GAO	Government Accountability Office	SAN	Identifier for San Diego Lindbergh Field, San Diego, California
GEG	Identifier for Spokane International Airport, Spokane, Washington	SMGCS	Surface Movement Guidance and Control Systems
GPS	Global Positioning System	SMS	Safety Management System

Appendix B: Glossary

Advisory Circular (AC) — A document that provides guidance, such as methods, procedures and practices acceptable to the administrator for complying with regulations and grant requirements. ACs may also contain explanations of regulations, other guidance material, best practices, or information useful to the aviation community. They do not create or change a regulatory requirement.

Airport Movement Area Safety System (AMASS) — Radar-based surface detection system that provides automated alerts and warnings of potential runway incursions and other hazards. The system prompts air traffic controllers both visually and aurally to respond to events on the airfield that potentially compromise safety.

Airport Surface Detection Equipment, Model X (ASDE-X) — Surface detection technology that integrates data from various sources, including radars and aircraft transponders to provide controllers a more robust view of airport operations and enable them to detect potential runway conflicts by providing detailed coverage of movement on runways and taxiways. By collecting data from a variety of sources, ASDE-X is able to track vehicles and aircraft on the airport movement area and obtain identification information from aircraft transponders.

Air Traffic Safety Action Program (ATSAP) — A voluntary, non-punitive reporting program for employees of the FAA to openly report safety of flight concerns.

Aviation Safety Action Program (ASAP) — A voluntary reporting system designed to encourage voluntary reporting of safety issues and events that come to the attention of employees of certain certificate holders. To encourage an employee to voluntarily report safety issues even though they may involve an alleged violation of Title 14 of the Code of Federal Regulations (14 CFR), enforcement-related incentives have been designed into the program. An ASAP is based on a safety partnership that will include the FAA and the certificate holder, and may include any third party such as the employee's labor organization.

Category A (FY 2007 and prior) — Separation decreases and participants take extreme action to narrowly avoid a collision, or the event results in a collision.

Category A (Beginning FY 2008) — A serious incident in which a collision was narrowly avoided.

Category B (FY 2007 and prior) — Separation decreases and there is a significant potential for collision.

Category B (Beginning FY 2008) — 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.

Category C (FY 2007 and prior) — Separation decreases, but there is ample time and distance to avoid a potential collision.

Category C (Beginning FY 2008) — An incident characterized by ample time and/or distance to avoid a collision.

Category D (FY 2007 and prior) — Little or no chance of collision, but meets the definition of a runway incursion.

Category D (Beginning FY 2008) — Incident that meets the definition of runway incursion such as incorrect presence of a single vehicle/person/aircraft on the protected area of a surface designated for the landing and takeoff of aircraft but with no immediate safety consequences.

Commercial Aviation Operations — Scheduled or charter-for-hire aircraft used to carry passengers or cargo. Airlines, air cargo and charter services typically operate these aircraft. This group of aircraft operations includes jet transports and commuter aircraft.

Crew Resource Management (CRM) — The optimal use of all available resources, information, equipment and people to achieve safe and efficient flight operations.

Engineered Materials Arresting System (EMAS) — An EMAS uses materials of closely controlled strength and density placed at the end of a runway to stop or greatly slow an aircraft that overruns the runway. The best material found to date is a lightweight, crushable concrete. When an aircraft rolls into an EMAS arrestor bed the tires of the aircraft sink into the lightweight concrete and the aircraft is decelerated by having to roll through the material.

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

Hold Short — An air traffic control instruction to the pilot or an aircraft or a vehicle driver not to proceed beyond a specified point.

Hot Spot — A location on an aerodrome movement area with a history or potential risk of collision or runway incursion where pilot/vehicle operator heightened attention is necessary.

JANUS — JANUS is a technique designed to improve the data collection process for operational errors by applying human factors principles to develop interventions to enhance performance. The overall purpose is to understand the role of the individual, situation, and work-related factors as they influence air traffic controllers' operational performance. The objectives are to develop an improved understanding of the human factors relating to individual performance and the occurrence of operational errors and to broaden the role of cognitive factors as they influence the performance of air traffic controllers. The FAA began testing JANUS in FY 2002 but has not implemented this program.

National Transportation Safety Board (NTSB) — An independent U.S. federal agency that investigates every civil aviation accident in the United States and significant accidents in the other modes of transportation, conducts special investigations and safety studies and issues safety recommendations to prevent future accidents.

NextGen Implementation Plan — This plan defines the FAA's path to the Next Generation Air Transportation System. The NextGen Implementation Plan contains firm, fully-funded commitments to new operational capabilities, new airport infrastructure and improvements to safety, security and environmental performance. The plan's management process ensures these will be delivered by a specific near-term dates. The FAA and its partners are also undertaking research, policy and requirements development, and other activities, to assess the feasibility and benefits of additional proposed system changes that could be delivered in the mid-term (2012–2018). The goal of this plan is to turn these proposals into commitments, and to guide them into use. The NextGen Implementation Plan was formerly called the Operational Evolution Partnership. Its name has changed to clarify its purpose.

Notice to Airmen (NOTAM) — Information on unanticipated or temporary changes to components of or hazards in the NAS provided to aircraft operators until the FAA amends the associated charts and related publications.

Operational Deviation (OD) — 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.

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

Operational Evolution Partnership (OEP) — This partnership is led by the FAA and requires collaboration, commitment, monitoring and accountability among internal and external stakeholders to transition the National Airspace System to NextGen. In particular, the OEP serves as the integration and implementation mechanism for NextGen. See NextGen Implementation Plan.

Office of the Inspector General (OIG) — The OIG has a responsibility to report, both to the Secretary of Transportation and to the Congress, program and management problems and recommendations to correct them. The OIG carries out these duties through a nationwide network of audits, investigations, inspections and other mission-related functions performed by OIG components.

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

Precision Approach Path Indicator (PAPI) — A lighting system that primarily assists pilots by providing visual glide slope guidance in precision approach environments. The glide path is comprised of a maximum of four lights (red and white) that illuminate in combinations (e.g., two white and two red when the pilot is on the correct glide slope or one red and three white when the pilot is slightly above the glide slope) to assist the pilot in adjusting the approach accordingly.

RTCA, Inc. — A private, not-for-profit corporation that develops consensus-based recommendations regarding communications, navigation, surveillance and air traffic management (CNS/ATM) system issues. RTCA functions as a Federal Advisory Committee.

Runway Entrance Lights (REL) — A lighting system located at runway-taxiway intersections that illuminates a string of red lights and serves as an indicator for pilots and vehicle operators when it is unsafe to enter or cross the runway.

Runway Incursion (RI) (FY 2007 and prior) — Any occurrence on the airport runway environment involving an aircraft, vehicle, person or object on the ground that creates a collision hazard or results in a loss of required separation with an aircraft taking off, intending to take off, landing or intending to land.

Runway Incursion (RI) (Beginning FY 2008) — 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.

Runway Incursion Error Type — Operational error/deviation, pilot deviation, or vehicle/pedestrian deviation. These error types are not necessarily an indication of the cause of the runway incursion, they typically refer to the last event in a chain of pilot, air traffic controller, and/or vehicle operator actions that led to the runway incursion.

Runway Intersection Lights (RIL) — A lighting system located at runway-runway intersections that illuminates a string of red lights and serves as an indicator for pilots and vehicle operators when it is unsafe to enter or cross the runway.

Runway Safety Action Team (RSAT) — An RSAT is established at either the regional or local level to develop a Runway Safety Action Plan for a specific airport. The RSAT's primary purpose is to address existing runway safety problems and issues. A secondary purpose is to identify and address potential runway safety issues. RSATs operate in accordance with standard operating procedures issued by the Office of Runway Safety.

Runway Safety Area (RSA) — The FAA requires that commercial airports, regulated under Part 139 safety rules, have a standard Runway Safety Area (RSA) where possible. At most commercial airports the RSA is 500

feet wide and extends 1,000 feet beyond each end of the runway. The FAA has this requirement in the event that an aircraft overruns, undershoots or veers off the side of the runway.

Runway Status Lights (RWSL) — Warning system located on the runway that provides a visual indication to pilots and ground vehicle operators not to enter or cross a runway on which there is approaching traffic. Types include Runway Entrance Lights, Runway Intersection Lights and Takeoff Hold Lights.

Safety Management System (SMS) — A quality management approach to controlling risk. It also provides the organizational framework to support a sound safety culture. For General Aviation operators, an SMS can form the core of the company's safety efforts. For certificated operators, such as airlines, air taxi operators and aviation training organizations, the SMS can also serve as an efficient means of interfacing with FAA certificate oversight offices. The SMS provides the organization's management with a detailed roadmap for monitoring safety-related processes.

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

Takeoff Hold Lights (THL) — A system of lights that advise pilots when the runway is unsafe for takeoff due to traffic on the runway.

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

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

Appendix C: External Entity Recommendations

GAO Recommendations

Implement the FAA order establishing the Office of Runway Safety to lead the agency's runway safety efforts, including preparing a new national runway safety plan. …The plan should also address the increased runway safety risk associated with the expected increased volume of air traffic.

> FAA Order 7050.1 *established the Runway Safety Program on November 1, 2002. This order placed the overall responsibility for the program on the Office of Runway Safety by requiring it to work with other FAA organizations and the aviation community to identify and implement activities/technologies designed to increase runway safety. ATO Safety is currently updating this Order.*

Develop an implementation schedule for establishing a non-punitive voluntary safety reporting program for air traffic controllers.

> *In March 2008, the FAA and the National Air Traffic Controllers Association (NATCA) signed an agreement to create the Air Traffic Safety Action Program (ATSAP) a joint pilot program in which controllers can voluntarily self-report safety hazards and incidents to the agency for review and risk assessment without fear of retribution. ATSAP comes after several years of negotiation and is a logical extension of the FAA's Aviation Safety Action Program in which air carriers voluntarily participate. The duration of the pilot program is 18 months during which time either side may terminate the agreement. Several targeted facilities will host the initial implementation.*

Develop and implement a plan to collect data on runway overruns that do not result in damage or injury for the analyses of trends…

> *Airports Engineering is addressing this recommendation by formulating a plan for the best approach for collecting and analyzing this data.*

Develop a mitigation plan for addressing controller overtime that considers options such as shift changes and incentives to attract controllers to facilities with high volumes of air traffic and high rates of controller overtime.

> *The FAA initially developed a 10-year air traffic controller workforce staffing plan in 2004 and updates it annually. The plan focuses on addressing the size and composition of the controller workforce to address retention, losses due to retirement, training, incentives and proper staffing levels at facilities. The current plan covers 2008–2017.*

Work with the aviation industry and OSHA to develop a mechanism to collect and analyze data on ramp accidents and, if warranted by the analysis, develop a strategic plan aimed at reducing accidents involving workers, passengers and aircraft in the ramp area.

> *A working group has been formed consisting of Airports (ARP), Flight Standards Service (AFS) and the Airports Council International. A report is due out in March 2009.*

DOT OIG Recommendations

Establish initiatives to promote increased voluntary pilot participation in RIIEP and ensure the analysis of data collected to identify and mitigate runway incursion causal factors.

> *Runway Incursions Information Evaluation Program (RIIEP) was a Voluntary Safety Program. Flight Standards expected the pilot to share valuable safety information that would help us identify the cause of the runway incursion in which the pilot was involved. We wanted this information to determine root causes of runway incursions and to develop effective corrective actions to help reduce or eliminate this problem. RIIEP was not an Immunity or "Amnesty" program. The alleged violator must have had a constructive attitude toward complying with the regulations.*
>
> *In March 2000, the FAA implemented RIIEP for a period of one year. Through the RIIEP the FAA sought information about runway incursions by interviewing pilots involved in such events. The original RIIEP generally spared pilots punitive legal enforcement action for an apparent violation involving a runway incursion in exchange for cooperation with FAA inspectors by providing information about the incident. Effective October 2008, the RIIEP program was not renewed and a pilot deviation working group was formed to improve the investigation questionnaire to include RIIEP-like questions instead of having two different programs asking for similar information.*
>
> *The FAASTeam will support the General Aviation Airport Surface Incident Mitigation Strategy (ASIMS) at both the national and regional level. This will provide the guidance and educational information necessary to create a positive cultural change in the General Aviation industry that assures airmen conduct ground operations as a critical phase of flight.*

Work with the pilot and airline communities to establish a process whereby Regional Runway Safety Program managers can request site-specific, redacted ASAP information on runway incursions and surface incidents to aid in identifying trends, root causes and possible local solutions.

> *Management of the Voluntary Safety Information Sharing (VSIS) program has transitioned from NASA Ames to FAA headquarters, where the Office of Aviation Safety Analysis is managing it. The program is now entitled, Aviation Safety Information Analysis and Sharing (ASIAS) and has been restructured to enable aggregate analysis of many different sources of safety related data, including ASAP data obtained from participating airlines. The system can accomplish automated queries from multiple data sources associated with any particular safety issue; including runway incursions. Regional Runway Safety Program managers can access that aggregated information.*
>
> *However, the FAA has implemented an alternative process for the acquisition by Runway Safety Program Managers and other FAA safety personnel of site specific information concerning runway incursions and safety incidents. That process makes use of an FAA automated system entitled Air Traffic Quality Assurance (ATQA).*

Develop an automated means to share local best practices that were successful in reducing runway incursions, e.g., an intranet site through the Regional Runway Safety Office.

> *Best practices for Airfield Safety are now available at the following Web site:*
> ***http://www.faa.gov/runwaysafety/best_practices.cfm***
>
> *Included are sub-categories for air traffic controllers, pilots and airport personnel.*

Establish milestones for implementing JANUS, National Air Traffic Professionalism Program (NATPRO), and CRM training and tower simulator training technologies at air traffic control towers that have a history of a high number of runway incursions caused by controller operational errors.

JANUS is a technique designed to improve the data collection process for operational errors by applying human factors principles to develop interventions to enhance performance. The overall purpose is to understand the role of the individual, situation and work-related factors as they influence air traffic controllers' operational performance. The objectives are to develop an improved understanding of the human factors relating to individual performance and the occurrence of operational errors and to broaden the role of cognitive factors as they influence the performance of air traffic controllers. FAA began testing JANUS in FY 2002 but has no plans to implement this program at this time.

The FAA Academy is nearly finished with an update to NATPRO. The newer version of NATPRO is more modern looking but the games are the same. It will be supported by a larger server and a help desk will be created. On August 24, 2008, the old server will be shut down so data can be downloaded into the new server. All facilities will be downloaded, including towers. The new server will be on-line August 29, 2008. An improvement to the newer version, there is not a prerequisite to complete NATPRO 1 before starting NATPRO 2. NATPRO 2 targets readback/hearback.

A Computer Based Instruction (CBI) module accompanies this newer version. The CBI replaces the need for cadre instructors. The CBI will be about 45 minutes long and will include movies similar to those from previous NATPRO seminars. Once the CBI is completed a student can begin NATPRO.

The Office of Safety is conducting a series of one-day workshops on Crew Resource Management (CRM). CRM teaches the principles and methods for improving teamwork, improving individual performance and incorporating threat and error management in daily operations. The threat and error management section (the cornerstone of CRM) focuses on identifying and reducing error vulnerabilities and applying countermeasures to those that remain.

These workshops are ATC-specific, operationally-oriented and relevant to the daily operations and culture of each facility. The Office of Safety compiles the ideas recorded in the workshops into a feedback document and delivers this to each facility. The Safety Office then offers on-site facilitation for follow-up action planning to address the issues identified in the workshops and to integrate CRM into the daily operations and safety culture of the facility.

CRM Accomplishments

- *21 Terminal Operational Evolution Partnership (OEP) facilities have completed CRM training*
- *11 en route facilities have already trained 10 percent or more of controllers*
- *Follow-up action planning has been conducted at six terminal facilities*
- *A CRM Basics DVD was distributed to all terminal and en route facilities in July 2008*
- *CRM articles were published in the FAA Managers Association Journal and the Air Traffic Bulletin; and an additional CRM article is scheduled for distribution by late summer of 2008*
- *Periodic CRM newsletters are published to maintain the focus on human factors throughout the field*

Plans for FY 2009 and Beyond

- *Remaining 14 OEP facilities are planned to receive CRM training in FY 2009*
- *Quarterly CRM refresher training that provides audiovisual replays of accidents and major operational errors, with guidelines for local discussions, will be delivered in FY 2009*
- *Resident CRM facilitators will be established in all en route centers, consolidated TRACONS, the Systems Command Center, and towers at the 35 OEP airports by September 2010*

Require the use of safety risk analyses to evaluate existing operational procedures at airports where FAA has identified potential runway safety risks and train personnel in conducting such analysis.

FAA Order JO 7050.1 *has been revised to require this and is currently in the process of coordination.*

Require each line of business to include quantitative goals in its annual business plan for reducing runway incursion risks that are specific to its oversight responsibilities and designate the Office of Runway Safety as the authority to review and approve all runway safety initiatives submitted by all lines of business.

The annual business plans of the individual lines of business as well as the FAA Flight Plan reflect runway safety initiatives from this plan.

NTSB Recommendations

Require, at all airports with scheduled passenger service, a ground movement safety system that will prevent runway incursions; the system should provide a direct warning capability to flight crews. In addition, demonstrate through computer simulations or other means that the system will, in fact, prevent incursions.

> *The FAA is exploring the use of a variety of products with direct warning capability including Electronic Flight Bags with Moving Map Displays showing own ship position, systems capable of giving aural alerts of own ship proximity to runways while landing or taxiing, systems capable of vehicle location and tracking and systems capable of incursion prediction and warning that require integration with surface surveillance systems.*

Amend *14 Code of Federal Regulations (CFR) section 91.129(I)* to require that all runway crossings be authorized only by specific air traffic control clearance, and ensure that U.S. pilots, U.S. personnel assigned to move aircraft and pilots operating under 14 CFR Part 129 receive adequate notification of the change.

> *A Safety Risk Management Document (SRMD) for explicit runway crossing clearances was completed on January 7, 2008. During the review process it was determined that the panel did not address all hazards pertaining to this change. The SRM panel held a telecom to address the additional hazard. The updated SRMD was prepared and has been sent back for review. Once this SRMD is approved, Terminal Services will send a request to begin the rule making process. This could take up to two years to complete. The panel plans to hold a telecom to discuss making a change to* FAA Order 7110.65 *while rule-making is ongoing to require a clearance for each runway crossing. If no high risk is identified, implementation could occur as soon as October 2008.*

Amend *FAA Order 7110.65*, "Air Traffic Control," to require that, when aircraft need to cross multiple runways, air traffic controllers issue an explicit crossing instruction for each runway after the aircraft has crossed the previous runway.

> *The Runway to Runway SRMD was completed and sent for review. The SRM panel believed this change needed to take place after the explicit runway crossing clearances change and if the change were not accomplished in this sequence a high risk would be introduced into the NAS. The panel also believed that some airports have a need to cross multiple runways with one clearance. The panel suggested a taxi study be completed by Flight Standards and Human Factors to help determine a safe distance that could be allowed when crossing multiple runways with a single clearance. During the SRMD review process questions were raised about the study. Human Factors, Terminal Services, Office of Safety and AOV met to address the study and the modeling methods to be employed. Terminal Services has since decided to solicit impact statements from field facilities. The panel will meet again to review the field input, determine allowed distance for multiple crossings and prepare a revision to the SRMD.*

Immediately require all 14 CFR Part 121, Part 135 and Part 91, subpart K operators to conduct arrival landing distance assessments before every landing based on existing performance data, actual conditions, and incorporating a minimum safety margin of 15 percent.

> *This is a summary of events to date:*
>
> *June 7, 2006 – FAA published a notice in the Federal Register providing advance notice of policy statement. Summary: The following advance notice of policy and information would provide clarification and guidance for all operators of turbojet aircraft for establishing operators' methods of ensuring that sufficient landing distance exists for safely making a full stop landing with an acceptable safety margin, on the runway to be used, in the conditions existing at the time of arrival and with the deceleration means and airplane configuration to be used.*

June 12, 2006 – Letter from NATA to Jim Ballough, Director, Flight Standards Service

NATA took exception to FAA's application of part 121-driven guidance to parts 91,125 and 135 operators and opposed the apparent bypassing of the rulemaking process.

August 31, 2006 – FAA published Safety Alert for Operators (SAFO) 06012

Requested operators make a voluntary commitment to the practice until the rulemaking was completed.

October 23, 2006 – Letter from NATA to Marion C. Blakey, administrator

NATA registered its ongoing concerns about the policy as recorded in the SAFO and applied outside part 121.

October 12, 2007 – FAA issued Order 1110.149 *creating a Takeoff/Landing Performance Assessment Aviation Rulemaking Committee*

November 6, 2007 – FAA published Advisory Circular 91-79 Runway Overrun Prevention

Four meetings of the Aviation Rule-making Committee (ARC) have taken place with the fifth scheduled for Denver on September 30 thru October 2, 2008. At this meeting the FAA expects the ARC's Steering Committee to furnish the first set of draft recommendations from the respective workgroups.

Appendix D: ICAO Runway Incursion Definition and Severity Classification

As part of its Flight Plan goal for International Leadership, the FAA supported the efforts of ICAO to establish standard definitions for runway incursion and runway incursion severity. The FAA adopted the ICAO definition beginning in FY 2008 (October 1, 2007):

> *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.*

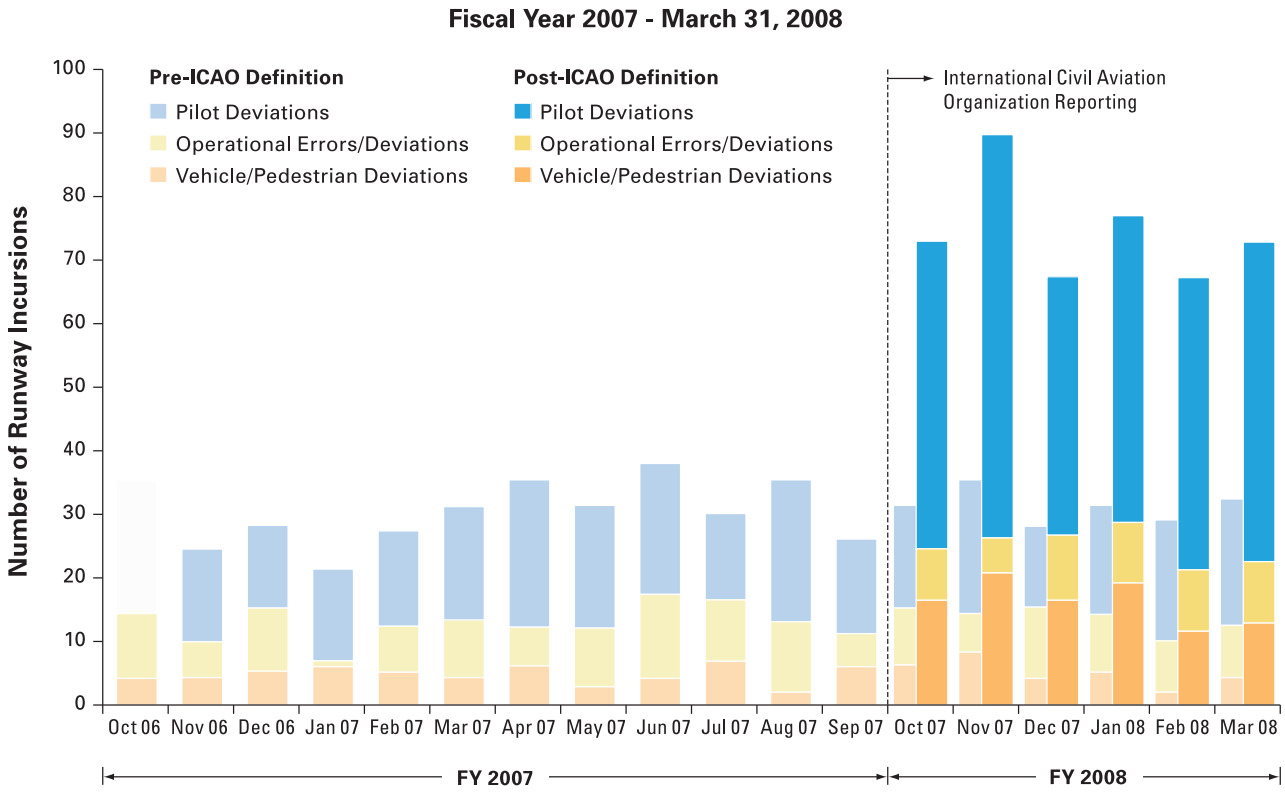
Figure D1 shows a comparison between the FAA definition used prior to October 1, 2007, and the current definition for runway incursion severity classifications.

Figure D1. Comparison of Previous and Current FAA Definition for Runway Incursion Severity Classifications

FAA Definition Prior to FY 2008		Current FAA Definition	
Class	Description	Class	Description
A	Separation decreases and participants take extreme action to narrowly avoid a collision, or the event results in a collision.	Accident	Refer to ICAO Annex 13 definition of an accident.
		A	A serious incident in which a collision was narrowly avoided.
B	Separation decreases and there is a significant potential for a collision.	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	Separation decreases, but there is ample time and distance to avoid a potential collision.	C	An incident characterized by ample time and/or distance to avoid a collision.
D	Little or no chance of a collision but meets the definition of a runway incursion.		
Other Surface Incidents	An event during which unauthorized or unapproved movement occurs within the movement area or an occurrence in the movement area associated with the operation of an aircraft that affects or could affect the safety of flight. (This subset includes only non-conflict events.)	D	Incident that meets the definition of runway incursion such as incorrect presence of a single vehicle/person/aircraft on the protected area of a surface designated for the landing and takeoff of aircraft but with no immediate safety consequences.
		Not Defined	(FAA non-conflict surface incidents include more than just ICAO class "D" events.)
ID	Insufficient Data: inconclusive or conflicting evidence precludes severity assessment.	E	Insufficient information inconclusive or conflicting evidence precludes severity assessment.

Prior to the adoption of the ICAO definition, the FAA reviewed all surface incidents, identified a subset as runway incursions, and assigned a severity. Effective FY 2008 the FAA began categorizing runway incursions using the ICAO definition of incursions and the ICAO severity categories. Figure D2 shows a comparison of the number of runway incursions after the FAA adopted the new reporting standard in October 2007.

Figure D2. Comparison of the Number of Runway Incursions with the New Reporting Standard Adopted in October 2007



Notes

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