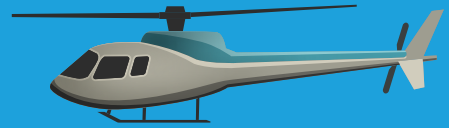




**FAA**  
Air Traffic Organization



**AIR TRAFFIC ORGANIZATION**  

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**2015 SAFETY REPORT**

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# Letter from the COO



Over the last several years, the Air Traffic Organization (ATO) developed new ways to collect and use safety data. We introduced sophisticated tracking technologies to the National Airspace System (NAS), created systematic approaches to data analysis, and fostered a culture that encourages our employees to report all safety incidents and incident precursors. The result has been a remarkably detailed picture of our safety performance—one that shows our many strengths and successes as well as the challenges that demand our attention.

This detailed picture—which we base on the policies, procedures, and tools that form our Safety Management System—helps us improve every year as we guide more than 800 million travelers to their destinations. We decreased the number of Air Traffic Management–related fatal accidents in our airspace, kept the rate of serious runway incursions at historic lows and consistently met or exceeded our own stringent safety performance targets. In fact, 99.99 percent of air traffic operations are completed with no loss of separation. So, this safety picture allows us to more clearly see and better prepare for the challenges that our rapidly evolving industry will face in the near future.

In fiscal year 2015 (FY15), some of the most significant efforts we accomplished were the following:

- Deploying the En Route Automation Modernization system, which offers the latest in surveillance, automation and safety technology to controllers of the high-altitude airspace between airports
- Developing new policy to govern the use of unmanned aircraft systems and commercial spacecraft in our airspace so that these newest NAS users integrate safely with existing aircraft and operations
- Extending our family of voluntary safety reporting programs to include nearly every Federal Aviation Administration (FAA) employee and all contract tower employees

We feature more success stories—as well as some areas of improvement—in the metrics and program highlights throughout this report.

We will continue to use hard data and careful analysis to inform our approach to safety while we continue to be proactive and focus on continuous improvement. When we turn more of the available data into actionable information, we can effectively address potential hazards in the system before they lead to incidents or accidents. Also, we can prepare ourselves for the busier, more complex airspace of tomorrow.

As we head toward a pivotal time in aviation history, the ATO’s resources, agility, and commitment to safety will ensure that our aviation system remains the safest and most efficient in the world.

A handwritten signature in black ink that reads "Teri L. Bristol". The signature is written in a cursive, flowing style.

Teri L. Bristol  
Chief Operating Officer  
Air Traffic Organization, Federal Aviation Administration



# Summary

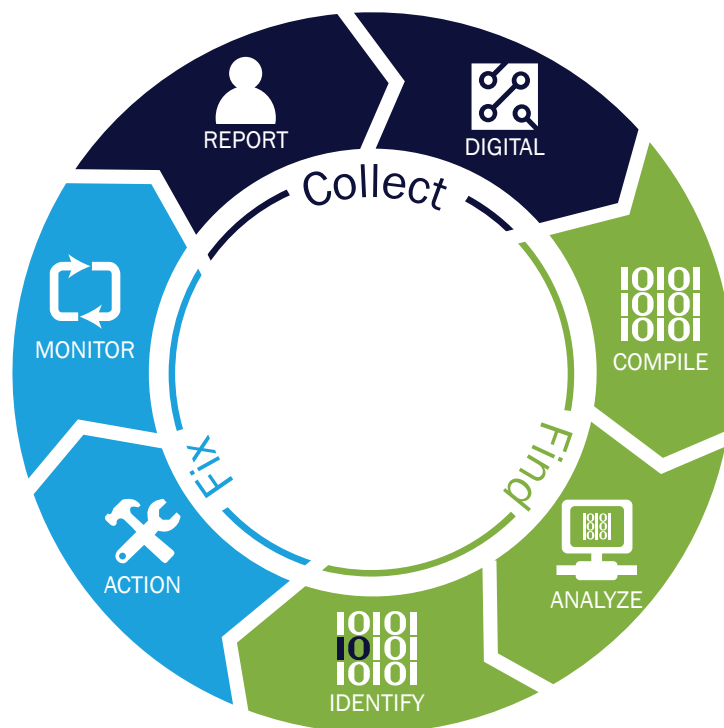
*As the operational arm of the Federal Aviation Administration (FAA), the Air Traffic Organization (ATO) daily guides some 50,000 flights through 30.2 million square miles of domestic and international airspace. Our mission—which we also consider a commitment to the flying public and our industry partners—is to ensure that every one of those flights departs and arrives safely.*

To carry out that safety mission, we hold ourselves to the highest performance standards and prepare constantly for any changes to the National Airspace System (NAS). In fiscal year (FY) 2015, we progressed in both of these areas, improving our safety record—already among the best in the world—and verifying the usefulness of the safety information we collect.

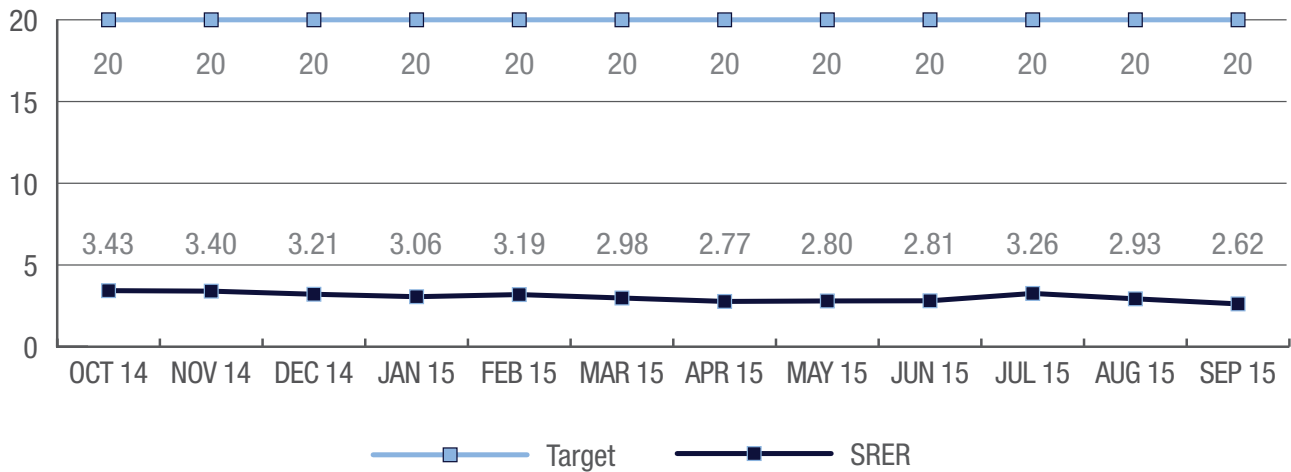
The foundation of our success is our Safety Management System (SMS). This set of concepts, policies, and processes guides everything that we do—from reporting individual

safety incidents to developing new NAS-wide technologies. The simple motto “Collect, Find, Fix” describes how we improve the safety of our airspace (Figure 1). Each day, we collect safety data, use those data to identify hazards, and address whatever risks we find. The entire process is cyclical, guaranteeing that we monitor the fixes and, where necessary, revise them.

**Figure 1: The SMS: Collect, Find, Fix**



**Figure 2: The SRER, FY15**



Our primary performance metric is the System Risk Event Rate (SRER). The SRER is a 12-month rolling rate that reflects the frequency of serious airborne losses of separation (in other words, losses in which less than 66 percent of the required separation minima were maintained). In FY15, the SRER improved just over 2 percent and remained well below our target rate of 20 serious losses for every 1,000 reported (Figure 2).

Although the SRER uses data from various sources, perhaps the most important source is the ATO’s Risk Analysis Process (RAP). Essentially a systematic approach to assessing any event in the NAS, the RAP allows us to quantify individual incidents’ level of risk and aggregate risk data from many similar incidents for trend analysis. In FY15, by working with EUROCONTROL and the Civil Air Navigation Services Organisation (CANSO), we took significant steps toward internationalizing the RAP. Every Air Navigation Service Provider (ANSP) that adopts the RAP gains greater insight into the safety of its own operations and the opportunity to contribute to an international pool of safety data that could benefit ANSPs worldwide.

The ATO’s Voluntary Safety Reporting Programs (VSRP) also grew in FY15 (Figure 3). This suite of tools allows those on the frontlines of safety—such as controllers, technicians, and flight crews—to document incidents, concerns, and potential solutions without the fear of reprisal. Compared to FY14, participation in our Technical Operations Safety

Action Program (T-SAP) grew by 383 percent and in our Confidential Information Share Program (CISP) by 22 percent. Although participation in the Air Traffic Safety Action Program (ATSAP) shrank by 9 percent in FY15, it remained the largest VSRP in the world.

**Figure 3: VSRPs by the Numbers, FY15**

ATSAP Reports Filed	15,834
ATSAP Positives*	118
T-SAP Reports Filed	579
T-SAP Positives	5
CISP Reports Exchanged	16,365
CISP Positives	21

\* The ATO’s VSRPs document successes through Positives; each Positive is a successful resolution to a safety issue our employees reported. Many VSRP reports reflect similar or related issues and, as a result, can be addressed by a single resolution.

In addition to the three VSRPs already up and running, we have begun deployment of two new tools:

- ATSAP-X, a VSRP for architects, engineers, and other specialists across the NAS
- Safer Federal Contract Tower (Safer-FCT), a VSRP which focuses specifically on air traffic control towers that private firms operate

Over the last 10 years, the ATO has worked closely with the aviation industry and labor unions to prevent serious Runway Incursions (RI), another important safety indicator (Figure 4). As a result of this collaboration, the frequency of serious RIs (Category A and B) dropped by 44 percent since 2007. The NAS now experiences between three and four RIs each day, and only 1 percent of those (or approximately 15 each year) pose any risk of collision.

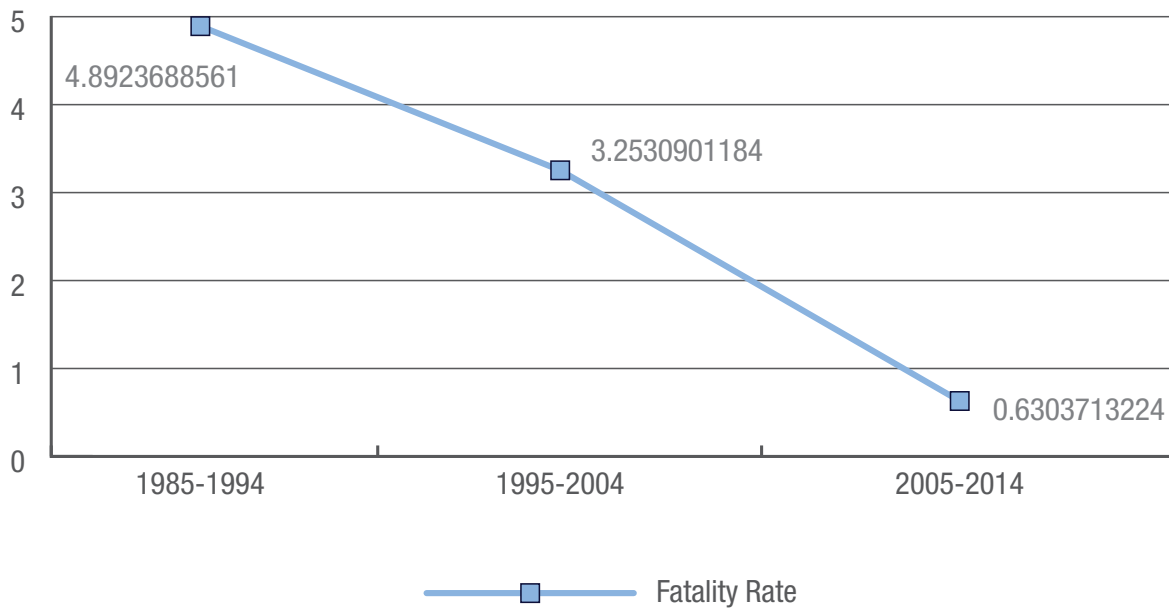
There are signs, however, that serious RIs may be on the rise again. Proactively tackling this issue, FAA Administrator Michael Huerta issued a Call to Action (C2A) in June 2015. He invited representatives from the government, private sector, and unions to focus on three specific areas of concern: 1) airfield lighting and signage, 2) communications, and 3) attention/memory issues. Their efforts provided a comprehensive groundwork from which we will develop new ways to keep our airfields safe.

**Figure 4: RI Definitions**

<b>Runway Incursion:</b> 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	
<b>D</b>	An incident that meets the definition of RI, such as incorrect presence of a single aircraft/vehicle/person on the protected area of a surface designated for the landing and takeoff of aircraft, but with no immediate safety consequences
<b>C</b>	An incident characterized by ample time and/or distance to avoid a collision
<b>B</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
<b>A</b>	A serious incident in which a collision is narrowly avoided



Figure 5: Rate of ATM-related Fatalities per 100 Million Passengers, CY85–14\*



\* Because of the depth of analysis involved, the ATO's fatality metrics tend to lag by about two years.

The ATO's fatality metrics—which, thankfully, have changed very little since FY14—indicate our success in all of these areas. The data so far, which reflect calendar years (CY) 1985–2014, indicate that our controllers have provided increasingly safe services to commercial and recreational airspace users (Figure 5). Since 2003, Air Traffic Management (ATM)-related fatal accidents account for less than 2 percent of all fatal accidents in the NAS.

To continue these trends, the ATO constantly updates our policy, procedures, and systems to keep pace with the latest in safety research and aviation technology. For example, we placed special emphasis in FY15 on the integration of Unmanned Aircraft Systems (UAS)—more commonly called drones—into the NAS. Our efforts led to new rules that govern UAS registration and non-recreational UAS operations, both of which help us control the risks that UAS pose to people, property, and other aircraft.

Our accomplishments in FY15 took countless acts of individual effort and teamwork, and we are proud of our progress. Our commitment to the SMS and the principles that underlie its operation is paying off: we not only collect more data than ever, but also we transform the data into meaningful, performance-targeted action. The result is measurable improvement in the safety of the services we provide.

We will always face challenges—new aviation technologies, increasing demand for our airspace, and so on—but as the data in this report suggest, the ATO has the expertise and agility to continue leading the world in ATM safety.







# **Safety Performance Indicators**



*Over the last several years, the ATO has considerably advanced our approach to data collection and analysis. We have refined our existing methods, developed new tools, and repeatedly verified the data’s objectivity. Consequently, we now have a more expansive and accurate pool of safety data. To maximize this resource, we focused in FY15 on how to ensure that information from the data is actionable as well as accurate.*

## The Risk Analysis Process

The ATO’s Risk Analysis Process (RAP) provides a rigorous framework to assess and categorize safety incidents, whether they occur in the air, on our airports’ surfaces, or in our technical systems. The RAP has two simple components: 1) a guide to incident examination and 2) a software tool to quantify the results of that examination.

It is responsible for:

- Expanding the scope of the safety data available to us
- Enabling more thorough crosschecks of those data
- Facilitating the integration of personnel- and system-performance information

Together, these benefits have vastly improved our view of safety across the NAS and our ability to identify and address safety issues.

In FY15, to improve how we assess risk, the ATO worked internally and in collaboration with EUROCONTROL (Europe’s intergovernmental ATM organization) to refine the RAP’s precision and consistency. With our European partners and CANSO, we also promoted the RAP as an international approach to risk analysis, expanding the safety data available to us and other ANSPs around the world.

The ATO has developed three varieties of RAP for airborne events, surface events, and engineering- or maintenance-

related events. Panels of experts—including controllers, pilots, and human factors specialists—conduct the RAPs, analyzing and scoring the risk of each incident.

### AIRBORNE RAP

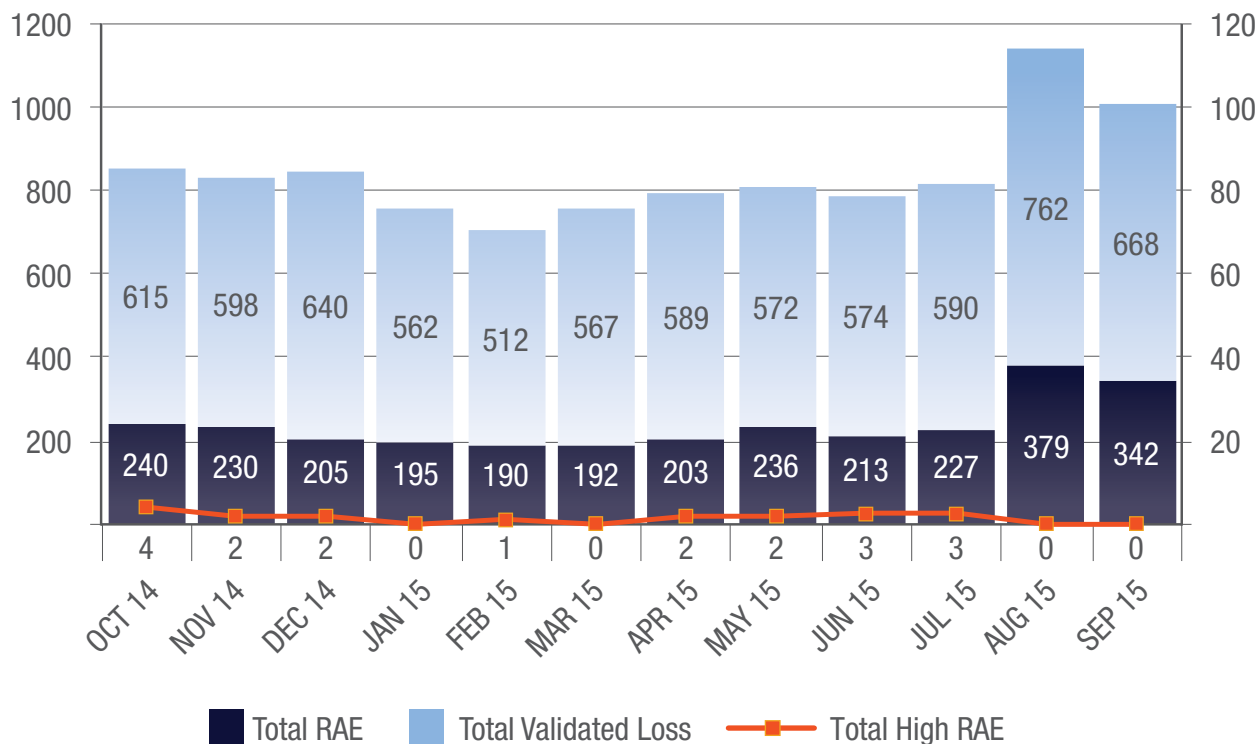
Each year, Airborne RAP panelists evaluate thousands of events in which required separation was lost (Figure 6). The purpose is to determine the level of risk that, individually, those events pose to our airspace and whether, grouped, they indicate any systemic trends.

**Figure 6: Airborne RAP by the Numbers, FY15**

Total Volume Air Traffic Operations	132,114,717
Processed Mandatory/Electronic Occurrences	320,367
Validated Losses of Separation	7,249
Non-Risk Analysis Events	4,397
Risk Analysis Events	2,852
High-Risk Events	19
Percent Air Traffic Operations with No Loss of Separation	99.99451

Of all the airborne losses of separation reported in the NAS, only those in which less than 66 percent of the required separation minima were maintained are designated Risk Analysis Events (RAEs) and subjected to the RAP. Compared to FY14, FY15 saw a slight increase in the total number of RAEs—about 5 percent—but a significant decrease in the number of high-risk RAEs—24 percent (Figure 7).

Figure 7: Total Losses, RAEs, and High-risk RAEs, FY15



Data from the Airborne RAP inform the ATO’s Top 5 Hazards and feed some of our most important metrics, such as the SRER—a 12-month rolling rate that compares the total number of airborne losses of separation with those that meet the criteria for high-risk losses. In FY15, the Safety Risk Event Rate (SRER) remained between 2.66 and 3.43 serious losses for every 1,000 losses reported, well below our target level of 20 (see page 4 of this report).

### SURFACE RAP

In FY14, the ATO deployed the Surface RAP, a version of RAP designed specifically to analyze Runway Incursions (RI). Like the Airborne RAP, the Surface RAP quantifies the risk level of safety incidents in the NAS. However, to do so accurately, it must account for the complexity of the surface environment—

the various types of vehicles, safety systems, and conditions that affect the safety of our runways and taxiways. In FY15, we provided the Surface RAP to all three Service Areas (Eastern, Central, and Western) as a web-based tool.

### SERVICE INTEGRITY RAP

Implemented across the ATO’s Service Areas in FY15, the Service Integrity RAP evaluates the risk associated with any failure, interruption, or degradation of NAS equipment that could affect the safety of our air traffic or flight information services. To qualify as a Service Integrity Event (the maintenance equivalent of an RAE), an incident must have an adverse effect on at least one of the ATO’s operational services: communication, navigation, surveillance, automation, or information.

# Voluntary Safety Reporting Programs

The ATO’s frontline employees are one of our best sources of safety information. Through our Voluntary Safety Reporting Programs (VSRP)—which are confidential and non-punitive—employees directly involved in Air Traffic Control (ATC), system service, and airline operations share vital safety concerns. With this information, we address issues before they lead to incidents.

Drawing on a long tradition of similar programs used by the airlines, the ATO implemented its first VSRP in 2008. Since then, our VSRPs have contributed to an appreciable shift in our safety culture. By encouraging employee participation in the safety management process, and by removing the fear of reprisal, they have helped to:

- Change attitudes toward sharing issues and incidents
- Increase accountability at the individual level
- Promote a proactive approach to safety

In FY15, we reaped the benefits of our existing VSRPs and began to implement two new adaptations: ATSAP-X, a VSRP for architects, engineers, and other specialists across the NAS, and Safer-FCTs, a VSRP which focuses on towers that private contracting firms operate. The data from our VSRPs inform our RAP panels’ analysis and, ultimately, decision-making at the highest levels of the ATO.

For a consistent approach to safety issues, the ATO uses Corrective Action Requests (CAR) and Corrective Action Plans (CAP). We use CARs to describe an issue and create a formal request to those responsible for mitigating its risk; we develop CAPs to respond to CARs and detail the actions that the responsible parties will take to correct or control the issue. All CAPs include an efficacy monitoring plan with specific data sources and safety targets.

## ATSAP

Measured by the volume of reports submitted, the ATO’s Air Traffic Safety Action Program (ATSAP) is the largest aviation VSRP in the world. It allows air traffic controllers and their managers to confidentially report safety issues that they encounter and suggest solutions to those issues. Since its inception in FY08, employees filed 106,219 ATSAP reports (Figure 8).

**Figure 8: ATSAP by the Numbers, FY15**

ATSAP Reports Filed	15,834
ATSAP Information Requests Issued	13
CARs Issued	22
CARs Closed	18
ATSAP Positives	118

Seventy-seven percent of the 15,834 ATSAP reports from FY15 described specific incidents while the remaining 23 percent provided insights into policy, procedural, or equipment issues. Our analysis of the latter, known as Problem Reports, identifies systematic risks and gives us the best opportunity to target issues with roots in the same organizational gaps. The figure on page 12 depicts the subjects most often cited in Problem Reports from FY15 (Figure 9).



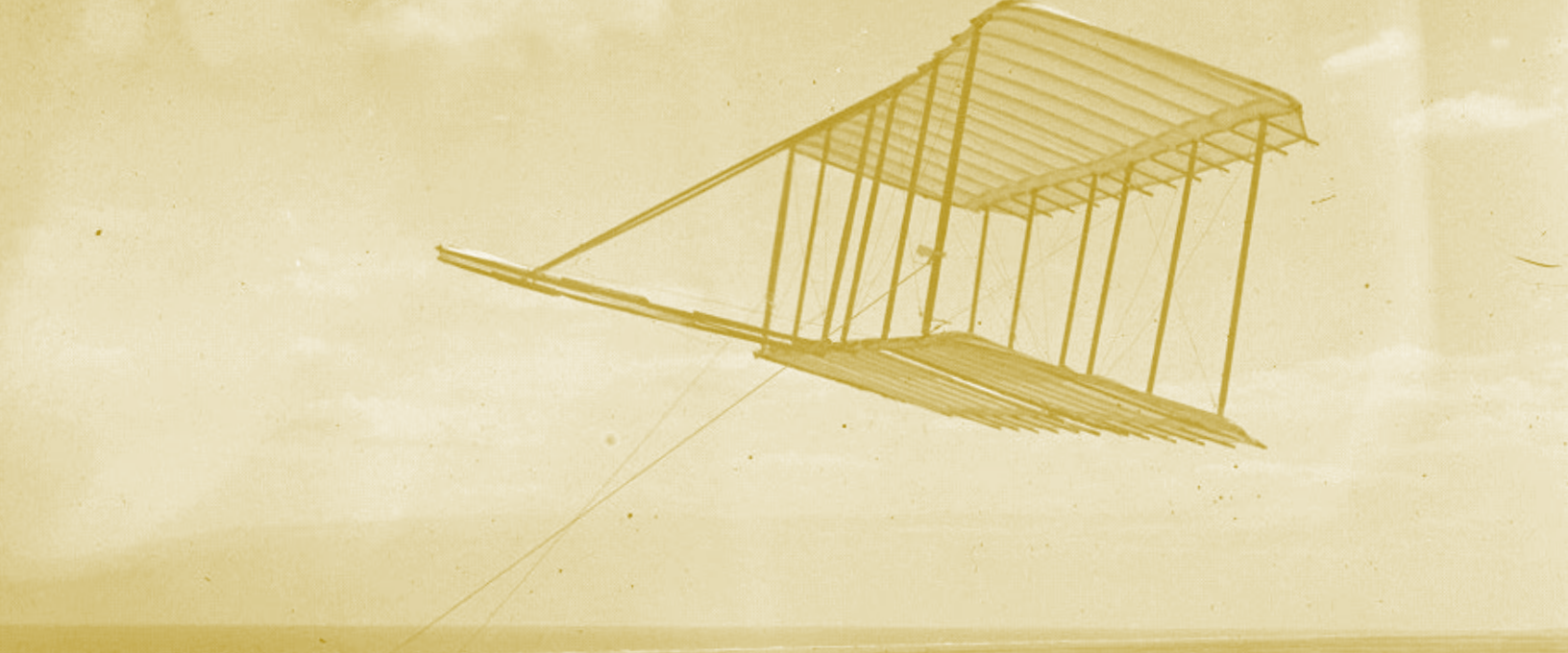
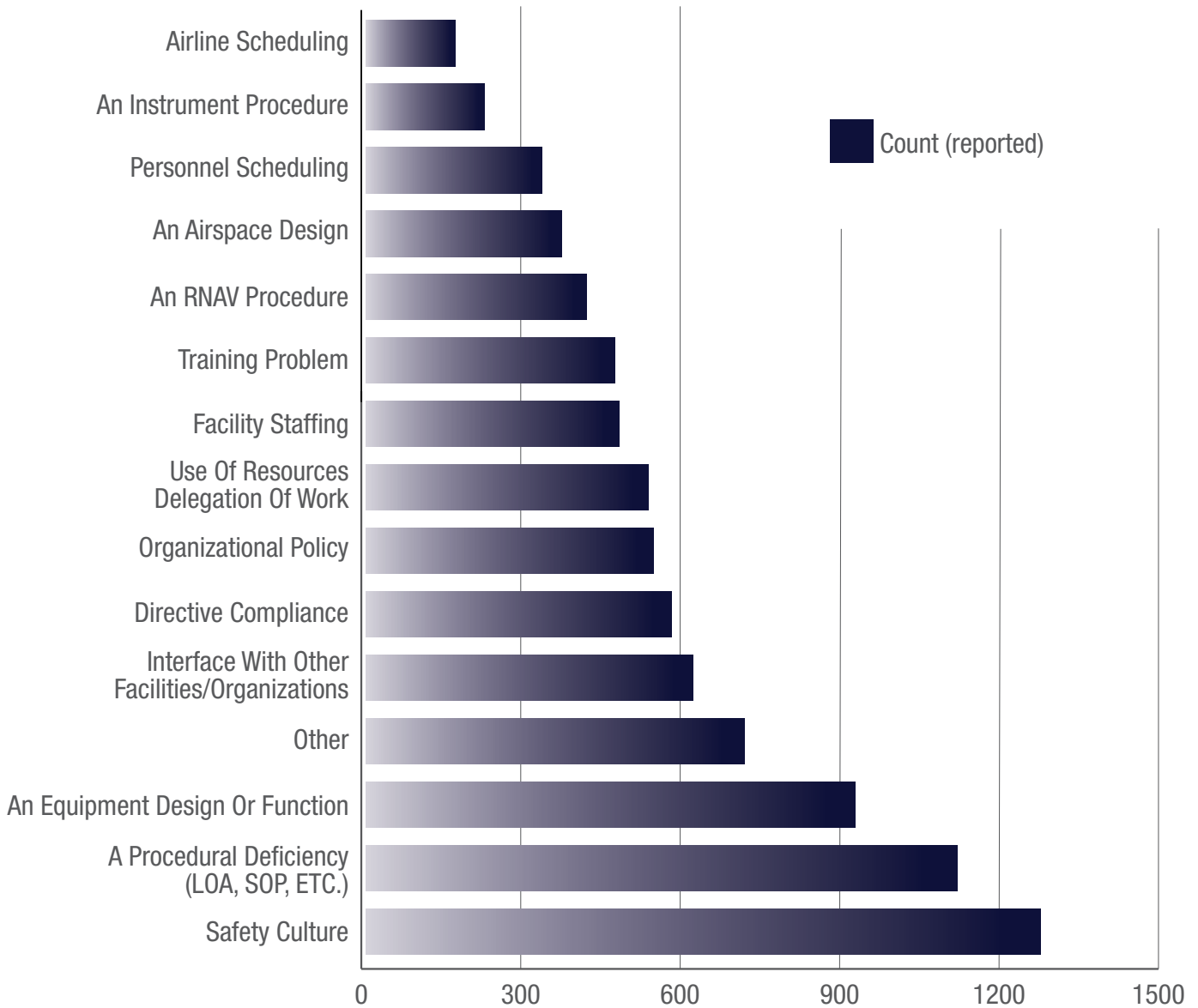


Figure 9: Safety Problem Report Categories, FY15\*



\* A single Problem Report may indicate problems in several categories.

The ATO's VSRPs document successes through Positives. Each Positive is a successful resolution to a safety issue that our employees reported in the system. In FY15, we had 118 ATSAP Positives, including the following:

- Thanks to a report submitter from San Francisco International Airport (SFO), we clarified a confusing taxiway intersection at SFO. We installed new taxiway signage and delivered a briefing on the change to the pilots most affected.
- Numerous submitters from Jacksonville Air Route Traffic Control Center (ARTCC) (ZJX) reported missed or misinterpreted transmissions from a bad communications frequency. After several unsuccessful attempts to adjust the antenna, we secured funds for its replacement.
- A submitter from Los Angeles ARTCC (ZLA) reported that solar panels from a nearby solar plant produced a glare that could distract or temporarily blind pilots. After a meeting with relevant parties, solar plant representatives agreed to redirect idle panels to minimize the glare.

We exclude a very small number of reports from the ATO's VSRPs due to lack of information or ineligible subject matter. These constitute less than 0.5 percent of the total number of reports we receive, showing that the vast majority of users understand and embrace the program.

## T-SAP

The Technical Operations Safety Action Program (T-SAP) provides ATO technicians with an avenue to report infrastructure-related safety concerns. After its first full year of national deployment, T-SAP is now available to all ATO technicians (Figure 10).

**Figure 10: T-SAP by the Numbers, FY15**

T-SAP Reports Filed	579
T-SAP Information Requests Issued	66
CARs Issued	25
CARs Resolved*	19
T-SAP Positives	5

\* T-SAP CARs Resolved includes requests closed in FY15 that were issued prior to FY15. In FY15, 5 of the 19 CARs resolved were issued in FY15; the remaining 14 were issued in prior years.

T-SAP Positives for FY15 included the following:

- Position Display Maps in a facility's control room and training area were failing. As a result, they created sparks, smoke, and a risk of fire. By working with the displays' manufacturer, we replaced the damaged panels and issued special modification instructions to prevent future failures.
- Power connections for Terminal Controller Workstations disconnected if employees improperly locked or inadvertently bumped their workstations. To address this issue, we provided a twist-lock power cable connector and retaining strap to Technical Operations employees.
- Canceled documentation at Atlanta Network Enterprise Management Center misled technicians who conducted preventative maintenance for the Weather Message Switching Center Replacement system. Following a T-SAP report, we issued new documentation.



## ATSAP-X

Recognizing that safety starts with system design, we expanded our VSRP family in FY15 to include ATSAP-X. It is a safety reporting system for the ATO employees of Region X (named this because, unlike the other FAA regions, it does not conform to geographic boundaries). A fledgling VSRP, ATSAP-X processed only four reports in FY15; of those, two were shared with other FAA offices to gather further information and, if warranted, to issue CARs. We expect more reports once all Region X employees are aware of the program's benefits.

## SAFER-FCTS

Federal Contract Towers (FCT) control 28 percent of the nation's air traffic. An important element of the NAS, especially for those in General Aviation (GA), our FCTs now have a dedicated means of reporting the issues that they encounter. In effect for less than a year, Safer-FCTs has already processed 20 reports, resulting in one CAR and one briefing sheet. We expect more reports as the program gains traction.

## CISP

The Confidential Information Share Program (CISP) is less a VSRP and more of a conduit between VSRPs—ours and the Aviation Safety Action Programs (ASAP) from the airline industry. By exchanging safety-critical information, both sides develop a fuller picture of the safety state of our airspace. In FY15, the ATO shared 11,027 ATSAP reports with our industry partners, and they shared 5,338 reports with us. Industry continues to show great interest in the program; there are now 20 participant airlines representing more than 80 percent of the U.S. commercial air traffic (Figure 11).

Figure 11: CISP by the Numbers, FY15

ASAP Reports Submitted to the ATO	5,338
Redacted ATSAP Reports Submitted to the Airlines	11,027
Total Reports Exchanged	16,365
CISP Positives	21

CISP Positives for FY15 included the following:

- We shared an ATSAP report with our partners that indicated similar sounding call signs in airspace between Salt Lake City and San Jose. In response, the involved airline changed one of its call signs to resolve any potential confusion.
- Confusing signage on two taxiway bridges at Chicago O'Hare International Airport (ORD) could have caused unexpected taxiing maneuvers. We shared a CISP report with ORD and the city of Chicago that led to more signage and a note on the associated Jeppesen chart.
- We shared an ATSAP report with our industry partners indicating that aircraft in Atlanta Terminal Radar Approach Control (A80) airspace were slowing prematurely and creating potential longitudinal separation issues. In response, several airlines launched specific information campaigns that contributed to an 80 percent reduction in the frequency of these incidents.

## Top 5 Safety Hazards

Every year since 2012, representatives from the field, headquarters, and the labor unions—the National Air Traffic Controllers Association (NATCA) and Professional Aviation Safety Specialists (PASS)—gather to select the Top 5 hazards in the NAS. This is one of the most visible examples of the ATO’s cyclical SMS at work.

We select the Top 5 hazards after careful, quantitative analysis of data from a variety of sources. In FY15, those sources included:






- Runway safety reports
- Airborne RAP findings
- VSRP reports
- Mandatory and Electronic Occurrence Reports
- Operational Skills Assessments (OSA)
- System Service Reviews (SSR)
- Direct feedback from facilities
- National Transportation Safety Board (NTSB) accident investigations

After identifying the Top 5 hazards, the ATO initiates a national effort to create and carry out strategies (which can be procedural, technological, or educational) to mitigate the issues. We monitor every Top 5 hazard until we mitigate its associated risk or meet its performance target, completing a critical cycle of the SMS feedback loop.

We revise our tactics when monitoring shows that the mitigation strategies for a Top 5 hazard failed to meet their targets. A prime example of this is the issue of altitude noncompliance, which involves pilots flying at unexpected or unintended altitudes. First identified as a Top 5 hazard in FY12, altitude noncompliance remains among the most commonly reported issues in the NAS. In FY15, the ATO reviewed pertinent data and committed resources to addressing the hazard again in FY16, when a workgroup will convene to evaluate the issue and recommend new mitigation strategies. Once implemented, we will monitor these strategies and, if necessary, revise them until we successfully mitigate the hazard.

Of the 26 mitigations we developed to address the FY15 Top 5, we implemented 24 (or 92 percent) by the end of the fiscal year, far exceeding our target of 80 percent (Figure 12). Working with MITRE, we also expanded the ways we track and visualize the performance of these corrective actions.

Figure 12: FY15 Top 5 Hazards with Example Mitigations

	Hazard	Example Mitigations
	<p><b>Weather Dissemination</b>, which stresses the need to solicit from and disseminate to pilots weather information affecting the safety of their flights</p>	<p>Review current weather dissemination procedures for any gaps or opportunities for improvement; deploy new Weather and Radar Processor software to select ARTCCs.</p>
	<p><b>Surface Memory Aids</b>, which addresses the effective design and use of visual and mnemonic devices intended to assist tower controllers</p>	<p>Enhance the ATO's occurrence reporting systems to include data about memory aid use; develop new memory aid training materials; determine whether the use of memory aids should be mandatory for certain operations.</p>
	<p><b>Misapplied Visual Separation</b>, which emphasizes the need for tower controllers and pilots to understand and correctly apply the rules governing visual separation</p>	<p>Clarify existing visual separation procedures in the ATC Handbook.</p>
	<p><b>Inadequate Vectors</b>, which reinforces the vector requirements for Opposite Direction Operations (ODO)*</p>	<p>Conduct weekly Q&amp;A webinars on vectoring requirements; ensure that FAA facilities have developed compliant ODO procedures.</p>
	<p><b>Misjudgment</b>, which reinforces the judgment needed to properly determine aircraft rate of climb, descent, or closure when conducting ODO*</p>	<p>Review current national requirements governing ODO and issue new requirements as necessary.</p>

\* Note that two of the FY15 Top 5 address risks associated with ODO, a type of operation cited in more than 100 ATSAP reports between 2012 and 2013.

# TOP 5

The FY16 Top 5 are:

- **Wake Separation:** Pilots and controllers having difficulty applying wake separation standards, leading to losses of required separation
- **Large or Heavy Aircraft Wake Turbulence:** Large or heavy aircraft encountering wake turbulence despite maintaining proper separation
- **Helicopter Operations:** Close-proximity helicopter operations in the vicinity of an airport
- **Tower Visual Scanning:** Controllers overlooking traffic due to poor visual scanning technique
- **Weather Access:** Lack of or incomplete weather information displayed when using certain long-range radar systems

# Runway Safety

The growing complexity and congestion of the NAS is most evident in the airfield environment, where many types of aircraft, vehicles, and technological systems must interact seamlessly to maintain an acceptable level of safety. To meet the challenges of this environment, the ATO has:

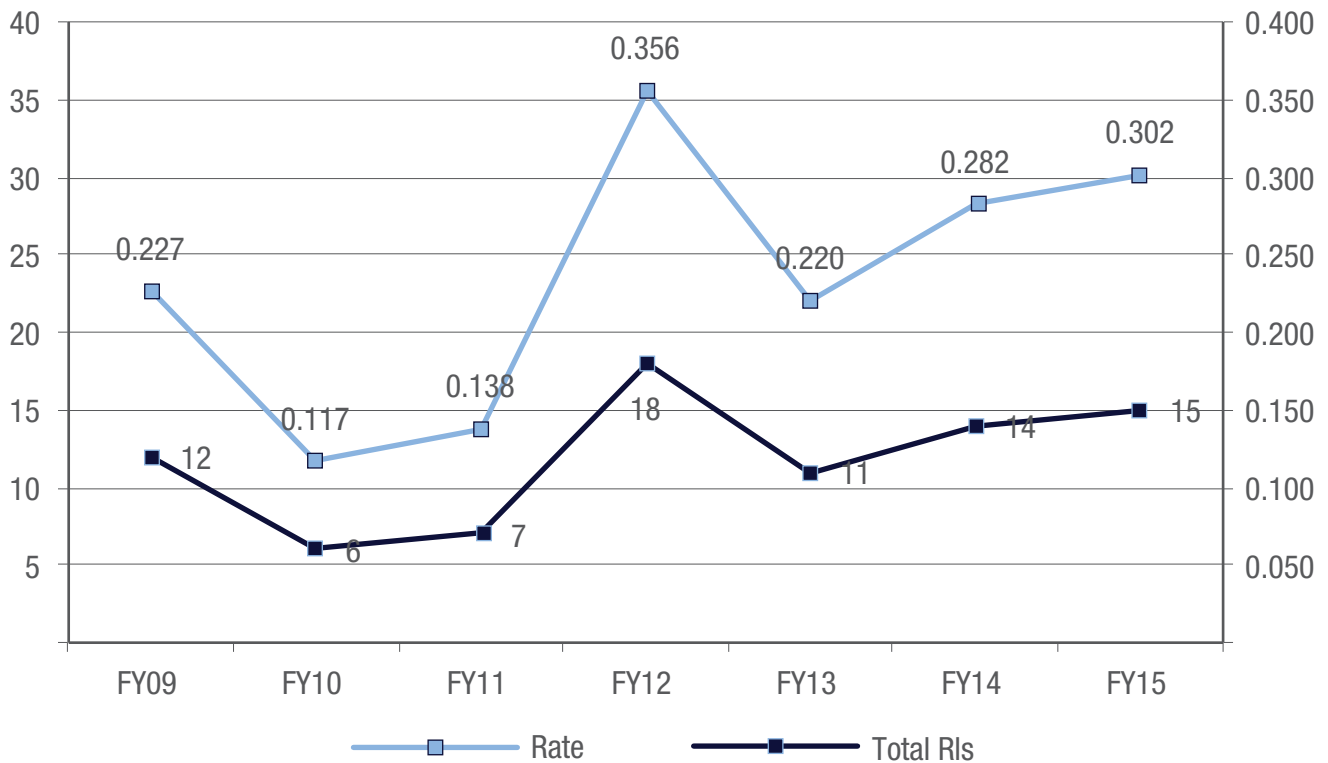
- Integrated multiple layers of surface surveillance and alerting technology
- Redesigned problematic runway and taxiway layouts
- Improved safety aids such as runway lighting and signage

Many organizations work together to ensure the effectiveness of our Runway Safety Program. At the strategic level, these include the NTSB; the Department of Transportation (DOT), Office of Inspector General; the

U.S. Government Accountability Office; and the FAA’s Air Traffic Safety Oversight Service (AOV). Within the ATO, the Commercial Aviation Safety Team, General Aviation Joint Steering Committee, Runway Safety Council, and Local and Regional Runway Safety Action Teams contribute tactical analysis and recommend coordinated improvements to runway safety initiatives.

Over the last 10 years, our efforts resulted in a 44 percent decrease in serious RIs (our primary runway safety metric) and prevented damage and injuries from Runway Excursions (RE) (Figure 13). To further this trend, in June 2015, FAA Administrator Michael Huerta brought together more than 100 representatives of the FAA, other government agencies, and the aviation industry to discuss and advance runway safety.

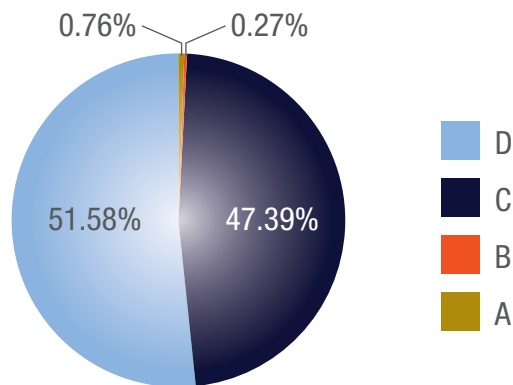
**Figure 13: Category A and B RIs, Total Number and Rate per Airport Operations, FY09–15**



## RUNWAY INCURSIONS

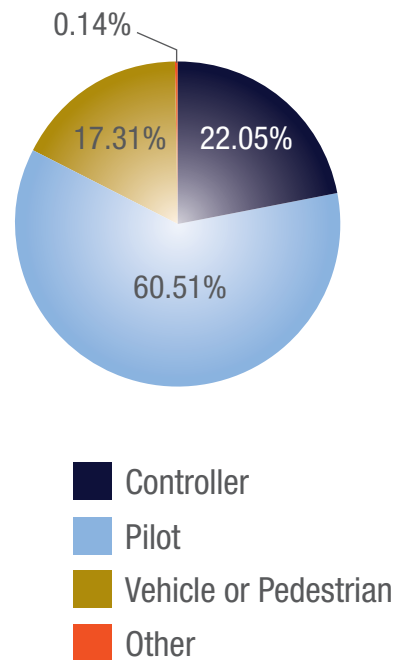
An RI is “the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft.” Once identified, RIs fall into one of four categories, from most to least severe: Category A, B, C, and D (see page 5 of this report). On average, the NAS experiences between three and four RIs each day. The vast majority of these, however, are minor (Category C or D) and pose no risk of collision. In FY15, only 15 RIs presented any risk of collision (Category A or B) (Figure 14).

Figure 14: RIs by Category, FY15



The distribution of RI types has remained largely unchanged for years. In FY15, approximately 61 percent were attributed to pilot error, 22 percent to controller error, and 17 percent to vehicle operator or pedestrian error (Figure 15).

Figure 15: RIs by Type, FY15



## RUNWAY EXCURSIONS

An RE is “a veer off or overrun from the runway surface.” One of the most dangerous events in the NAS (or any airspace system), REs can occur during the takeoff or landing phase of flight and arise from different factors, including the aircraft’s energy state, the airport layout, and weather conditions.

In FY15, the ATO experienced 532 veer offs and 120 overruns at towered and non-towered airports; approximately 30 percent of these events resulted in accidents. To drive this number down, we:

- Added an RE section to the Aircraft Owners and Pilots Association’s online Runway Safety Course (This is the association’s most popular training course and was completed 11,700 times last year.)

- Recommended that all Air Traffic Managers review their airport emergency plans and consider incorporating a dedicated radio frequency and airport grid map
- Included RE prevention in the web-based portion of ATC Recurrent Training for FY15 (see page 32 of this report for a description of Recurrent Training)

In addition to these advances, we continue to share RE data with all stakeholders, including our local Runway Safety Action Teams, regional governance councils, and other FAA organizations.

### 2015 RUNWAY SAFETY CALL TO ACTION

Eight years ago, at the FAA’s request, 40 representatives from U.S. government agencies, labor unions, and the aviation industry came together to address runway safety—one of the most important challenges facing our rapidly modernizing airspace system then and now. These representatives developed initiatives that proved a remarkable success, contributing to a 44-percent decrease in category A and B RIs (the runway incidents most likely to cause serious accidents) between 2008 and 2014. Recent data, however, suggest that serious RIs may be on the verge of rising again.

In response to this possibility, FAA Administrator Michael Huerta issued a follow-up Call to Action (C2A) in June 2015, this time gathering 108 representatives from every corner of the aviation industry. The participants split into three teams: visual surface markings, pilot-controller communications, and procedures and awareness. Each team developed short-, mid-, and long-term CAPs for its focus area. The teams presented their recommendations after analyzing (among other data) 1,782 records from the FAA’s Runway Safety Database, Mandatory Occurrence Reports (MOR), and the findings of Flight Standards investigators (Figure 16).

**Figure 16: FY15 C2A Teams and Recommendations**

<b>Visual</b>
Although pilots receive training in lighting and signage, RIs involving these aspects of the airfield occur with marked frequency. To remedy these issues, the Visual Team recommended educational strategies that would facilitate the open exchange of safety information between the FAA and the Aircraft Owners and Pilots Association (this program would be similar to InfoShare, by which the FAA and industry currently exchange safety information regarding commercial flights). Continued deployment of and research in lighting technologies were also recommended.
<b>Communication</b>
Many of the records reviewed by the Communication Team indicated that communication errors contributed to incidents; the specific causal factors were not, however, concentrated in any one area. Read-back errors, mistaking the intended recipient, and simple misunderstandings were reported by pilots of all levels of experience and at all types of airports in the NAS. To address these issues, the Communication Team proposed that the FAA and industry develop ways for pilots and vehicle drivers to alert controllers when they are new to an airport or are still learning its surface layout. They also suggested the formation of a workgroup tasked with identifying communications best practices.
<b>Procedures and Awareness</b>
The Procedures and Awareness Team considered safety risks caused by pilot distraction, memory failure, expectation bias, multitasking, and inattention during clearance delivery. Their recommendations included the deployment and further development of the Closed Runway Operation Prevention Device (a speech-recognition tool designed to prevent controllers and pilots from mistakenly attempting to use closed runways) and the establishment of a memory aid workgroup tasked with evaluating existing and potential memory aids.

# Compliance

To identify latent issues in the NAS, the ATO conducts Quality Control (QC) assessments in the field. These assessments—which target facility technical performance, systemic operation, and procedural compliance—provide a comprehensive picture of safety performance at and across NAS facilities. Analysis of data from QC assessments can lead directly to corrective actions.

## OPERATIONAL SKILLS ASSESSMENTS

The ATO’s QC OSAs take an objective sample of our frontline employees’ technical performance, meaning the degree to which their actions comply with required ATM procedures. OSA data are used to identify compliance-related trends and allow detailed crosschecks when combined with other kinds of QC data (for example, assessments of training, procedures, or airspace design).

To ensure that we have a sufficiently large and consistent dataset for trend analysis, the ATO requires facilities to perform an assigned minimum of OSAs each quarter (Figure 17).

Figure 17: OSAs by Quarter, FY15

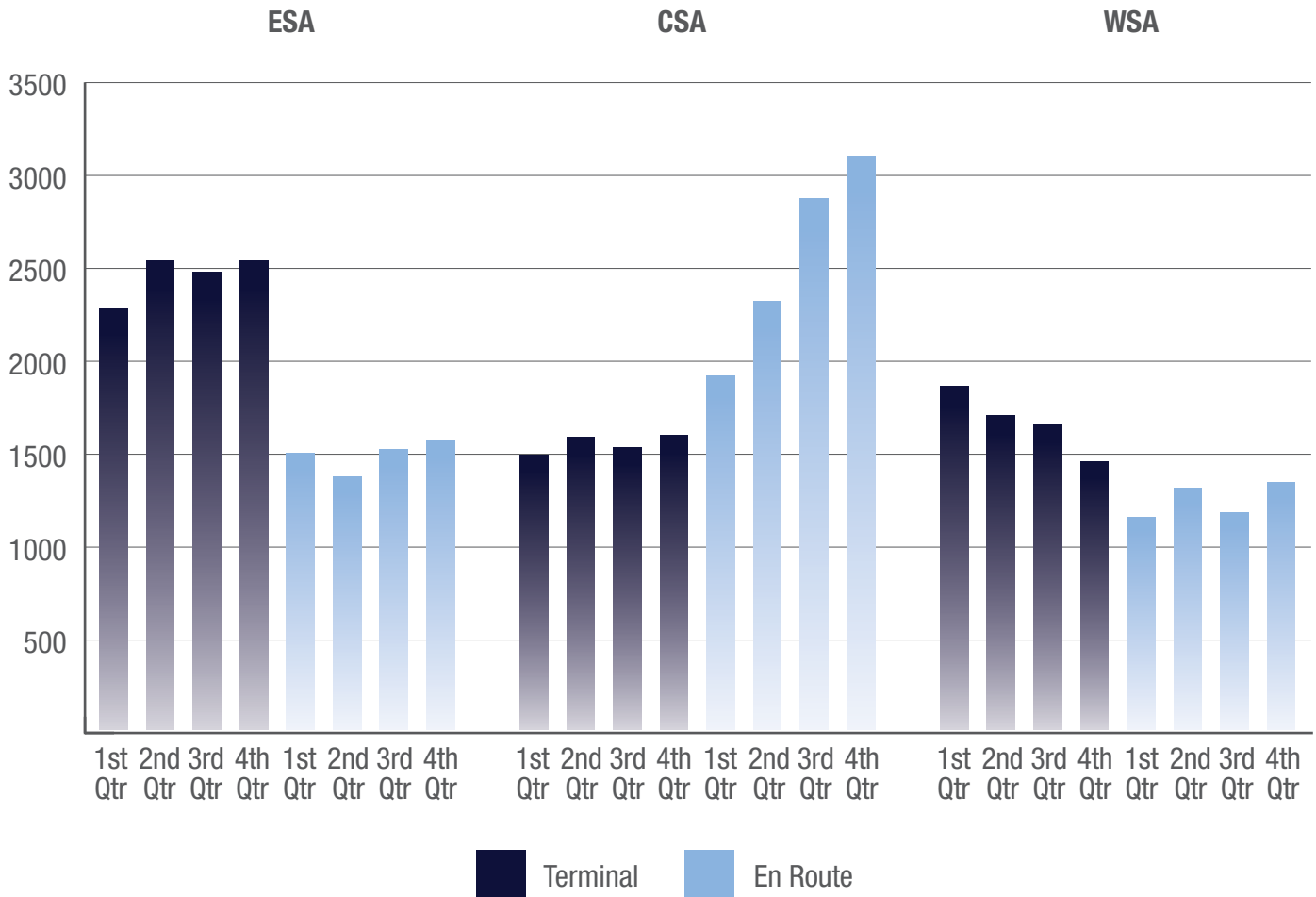
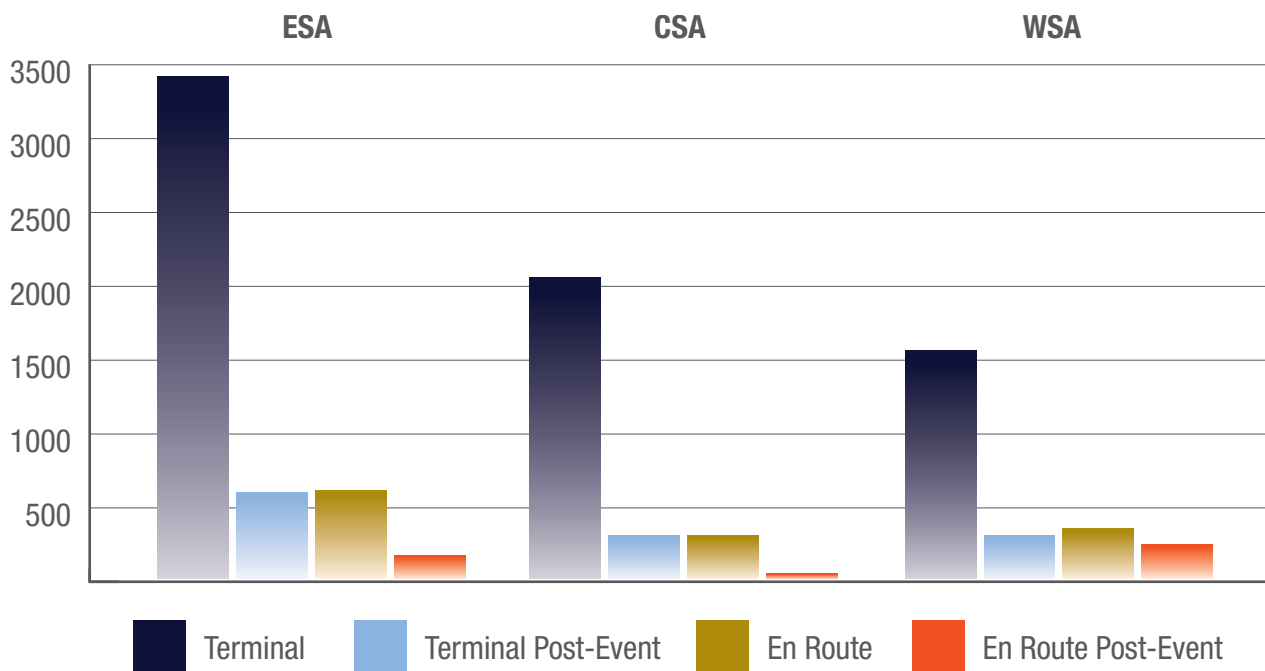




Figure 18: SSRs Conducted, FY15



## SYSTEM SERVICE REVIEWS

SSRs are one of the most flexible compliance verification tools available to the ATO. They have no set scope (in other words, they may be highly specific or evolve, as needed, to encompass broad concerns) and are used to review the air traffic services provided in any situation, at any time, under any circumstances. SSRs may be performed:

- At random
- By a schedule
- In response to public inquiries
- As follow-ups to known operational activities or events (such as traffic management initiatives, special operations, severe weather, and so on)

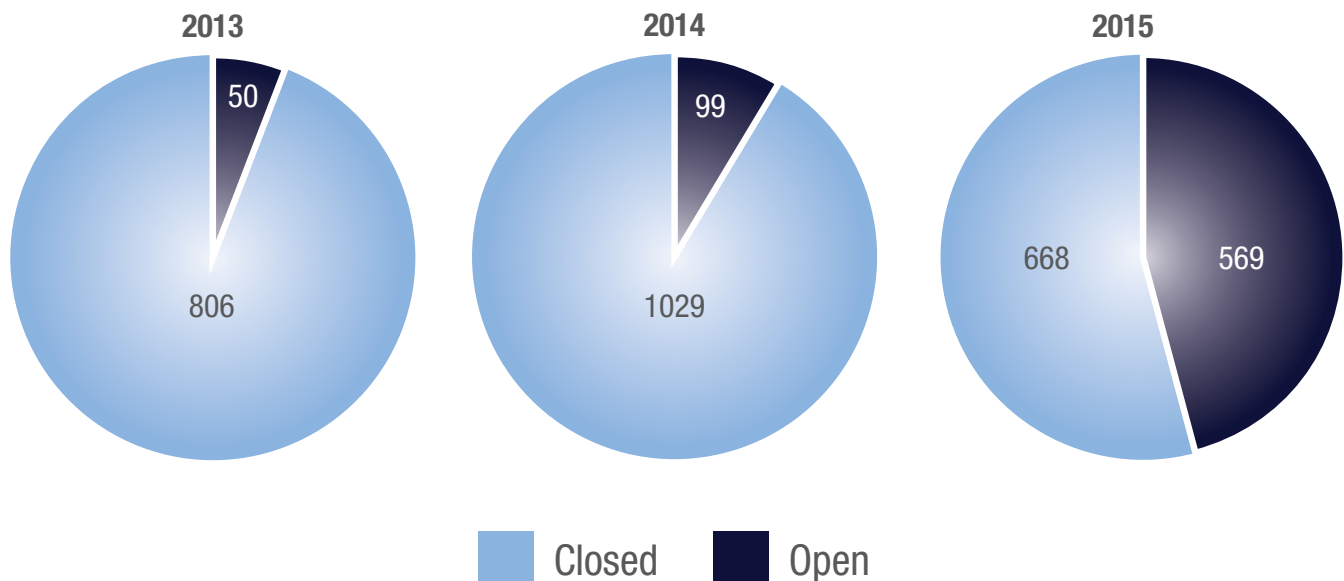
SSRs provide facilities with defined procedures and a systematic approach to address safety issues at a local level (Figure 18).

## COMPLIANCE VERIFICATION

Compliance verification is a key element of the ATO's QC efforts. It includes direct operational observations, discussions with frontline employees, reviews of voice and radar data, and other activities—all to determine whether we comply with our own procedures. Verification assessments are carried out by facilities (internal) and independent auditors sent to facilities by the Service Areas (external). In both cases, the ATO conducts data analysis with the appropriate labor unions.

If a compliance verification activity identifies issues, the ATO and labor unions work together to develop and implement mitigation plans. Of the 1,237 mitigation plans initiated in FY15 as a result of compliance verification activities, 668 have been closed, and 569 remain ongoing. At the end of FY15, a total of 718 mitigation plans, reflecting the last three years, remained open (Figure 19).

Figure 19: Status of FY13–15 Mitigation Plans Resulting from Compliance Verification Efforts



## EXTERNAL RECOMMENDATIONS

In addition to our extensive compliance verification program, the ATO answers to three non-ATO sources of safety oversight and recommendations. The first of these is the FAA's Air Traffic Safety Oversight Service (AOV), which conducts independent safety audits of ATO facilities and provides us with any findings. The second is the FAA's Office of Accident Investigation and Prevention (AVP), which collaborates with the ATO and the broader aviation community to form its recommendations. The third is the NTSB, which develops its recommendations independently of any other government agency or private organization.

The following are examples of safety oversight and external recommendations:

- **AOV Compliance Issues:** The ATO is required to develop and implement CAPs for any safety compliance issues identified through the AOV audit process. In FY15, the ATO opened 19 new AOV compliance issues and closed a total of 12; only four issues now remain open from previous years.
- **FAA Safety Recommendations:** In FY15, the ATO successfully closed 14 of the 20 open FAA recommendations (which come from AVP and the aviation community at large) and received six new FAA recommendations. For example, we successfully closed the recommendation to implement the En Route Automation Modernization (ERAM) system and Terminal Data Link Services. This implementation resolved an issue with pre-departure clearance that caused aircrews to deviate from their planned routes.
- **NTSB Safety Recommendations:** We also closed 15 NTSB recommendations in FY15 and opened three. Particularly, we closed the recommendation to apply current emergency procedures for piloted aircraft to situations involving UAS.

## AUDITS AND ASSESSMENTS

Beyond compliance, the ATO conducts a variety of Quality Assurance (QA) audits and assessments. QA guarantees that our newest technologies and procedures are safe for national deployment, that we identify and properly mitigate any safety hazards, and that our safety management practices at all organizational levels align with the FAA's overarching policy.

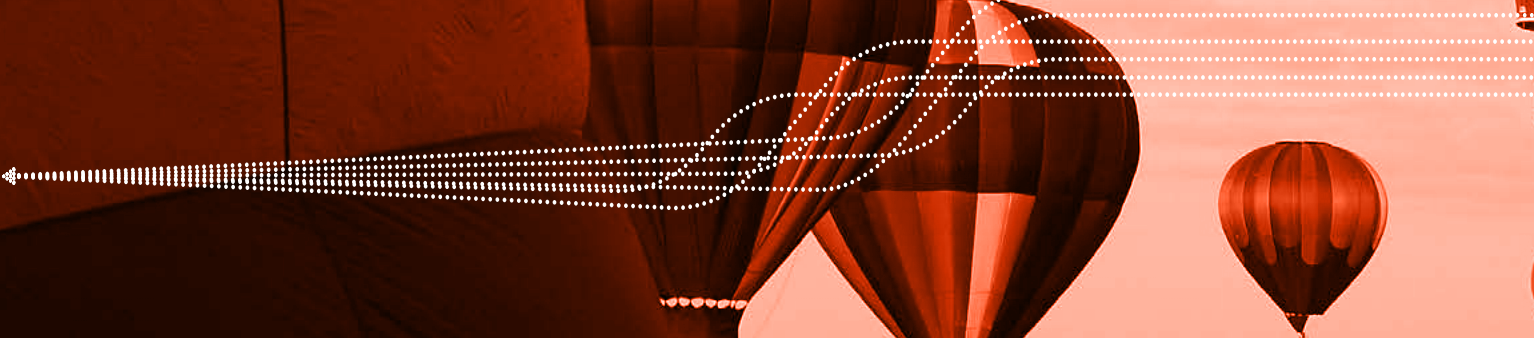
In FY15, we completed eight of these audits and assessments:

- Seven independent audits/assessments, several of which determined our compliance with SMS 4.0 requirements
- Six Technical Operations audits/assessments, one of which assessed our MOR system and another that assessed maintenance training at Dallas/Fort Worth International Airport (DFW)
- Fifteen Air Traffic audits/assessments, including an Air Traffic currency audit (to determine whether our workforce performs to current standards) and a Fatigue Risk Management (FRM) audit

Also in FY15, the ATO established an interdisciplinary workgroup to identify and rank candidates for audits and assessments. This new approach provides a forum for any ATO office to nominate systems or procedures for an audit/assessment.



# Safety Intelligence



The ATO has amassed a substantial and detailed pool of safety performance data by investing in sophisticated data recording, analysis, modeling, and visualization tools. These data, which reflect the factors affecting air navigation safety (weather, phase of flight, airport configuration) and the relationship of those factors to specific hazards, inform our safety-critical decisions. In FY15, we focused on ensuring that the information we extract from these data is accurate and actionable.

## Safety Metrics

Among the most important of our safety intelligence tools are the metrics against which we measure the safety of our services and track the success of our risk mitigation strategies.

### FATALITY METRICS

The most important statistic to the ATO is the number of fatal accidents in which a deficiency in our services played a part. The aviation industry at large measures safety performance in terms of accidents, and to be consistent with that practice, the FAA measures safety using two primary metrics: 1) the rate of fatalities per 100 million commercial air carrier passengers and 2) the rate of fatal GA accidents per 100,000 flight hours.

In FY14, the ATO followed suit: we tracked our own contribution to aviation accidents. Unlike the FAA’s metrics, which do not distinguish accidents by causation, the ATO aggregates only those accidents for which the NTSB (which operates independently of any other government agency) identified deficient air traffic services as a causal or contributory factor. Using the NTSB’s accident reports, along with data from our own investigations and other sources, we strive to better understand the hazards underlying these accidents and prevent them from recurring.

Since 2003, there have been 50 ATM-related fatal accidents in the NAS (Figure 20). Of these, one involved a commercial air carrier; the remainder involved GA flights.

Figure 20: Number of ATM-related Fatal Accidents, CY03-15

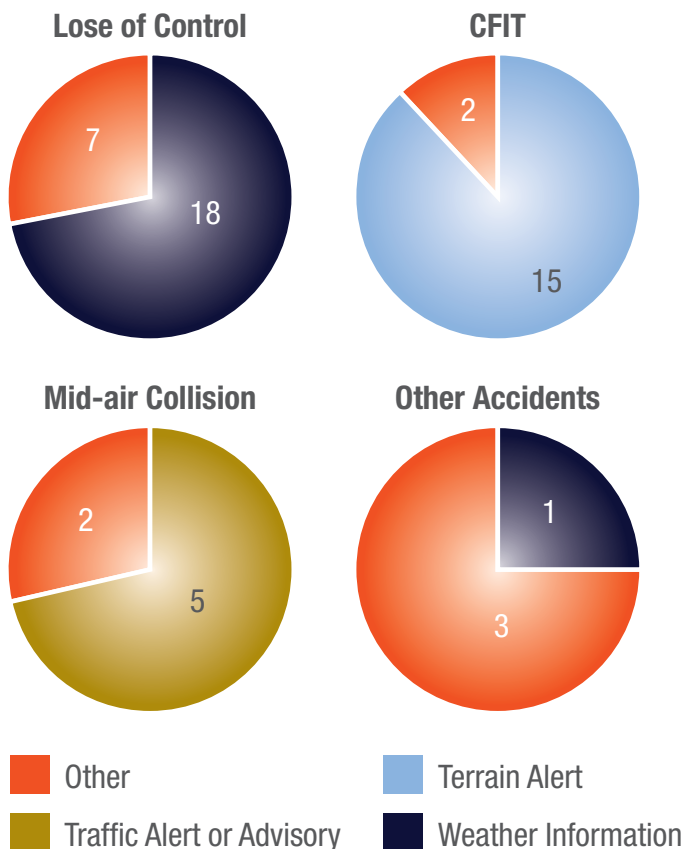


## ATO SERVICE DEFICIENCIES

The ATO’s fatality metrics not only show us the frequency of ATM-related accidents but also the types of accidents to which we contributed and the specific service deficiencies associated with those accidents (Figure 21). We know, for example, that over 90 percent of ATM-related accidents fit into one of three major categories—loss of control, controlled flight into terrain (CFIT), and mid-air collision—and that the three main service deficiencies share a common feature: failure to provide adequate information to the pilot. Significantly, no accident in the last 12 years was caused by a violation of procedurally required separation minima.

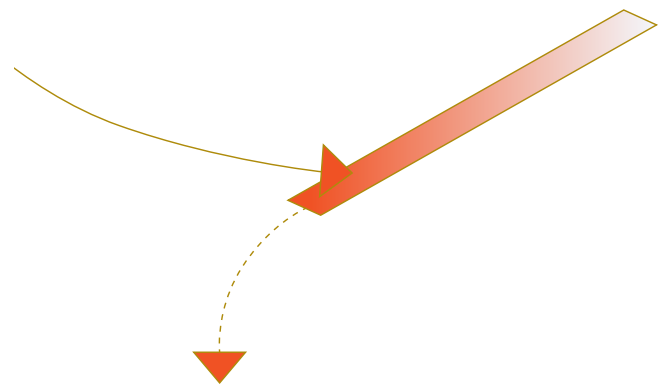
Analysis of our service deficiencies feeds critical safety decisions at the ATO’s highest levels, including our CAR/CAP process and the annual Top 5. As a result of current service deficiency data, we selected the dissemination of weather information as an FY15 Top 5 hazard.

**Figure 21: Service Deficiencies by Accident Type, CY02–14**



## OPPOSITE DIRECTION OPERATIONS (ODO)

After several unsuccessful attempts to mitigate the risk associated with Opposite Direction Operations (ODO)—a routine type of operation in which landings and takeoffs are conducted reciprocally in opposite directions on the same runway (Figure 22)—the ATO standardized new procedures across the NAS and started a thorough training program. Both the new procedures and training program are informed by our ODO Key Performance Indicator, a safety monitoring algorithm that we developed in FY14 to draw data from a variety of real-time sources. By checking our risk mitigation approaches against real-time data, we significantly improved the efficiency and effectiveness of our approach to ODO safety. The current data suggest that we are on the right track.



**Figure 22: Opposite Direction Operations (ODO)**

## Digital Safety Tools

Underpinning all of the ATO's safety management activities and metrics are a suite of digital safety tools—the means by which we collect, make accessible, and represent (for the purposes of trend analysis and education) data about safety incidents in the NAS. Critical components of our SMS, these tools help us safely operate the NAS and ensure that we are prepared to respond to future challenges in ATM.

### COMPREHENSIVE ELECTRONIC DATA ANALYSIS AND REPORTING

The Comprehensive Electronic Data Analysis and Reporting (CEDAR) tool automatically aggregates safety incident reports for analysis. Now, it also tracks the details and progress of CARs and CAPs, the formal method by which the ATO implements systemic safety fixes. With this new capability, CEDAR provides our analysts a more complete picture of the safety issues affecting the NAS and the remedies deployed to address those issues.

### FALCON

We use Falcon as the ATO's primary event playback tool (for training, incident review, and forensic purposes). With an already robust feature set, Falcon has the following new capabilities:

- Data for replays of surface operations (in other words, operations that involve aircraft on a runway or taxiway)
- Integrated features for replays of En Route and Terminal operations

With these changes, Falcon is closer to establishing a common replay resource and toolset for all operations in the NAS.

### FORENSIC EVENT ANIMATION

The ATO uses computational forensics to develop animated “lessons learned” in response to specific ATC-related incidents. In FY15, we produced 27 such animations and revised 15 others, each combining the minutely detailed operational and contextual data needed for controller training and incident review. The most recent additions to our forensic event library focus on RIs across the NAS.

Using these animations as a starting point, we also developed the following educational programs in FY15:

- A four-hour Human Factors (HF) program for the DOT's Transportation Safety Institute
- A one-hour web-based surface navigation and operations program
- An “Anatomy of an Accident” presentation

Our work in this field is available to FAA employees and approved airline safety officials.

## Search and Rescue

In the event of an accident, the ATO relays positional and communications information to Search and Rescue (SAR) personnel that can be crucial to their operation's success. Because of this, we strive to provide that information to those on the ground as quickly as possible. Through ongoing review and reporting of our SAR response times, we ensure that our facility employees are thoroughly aware of and prepared to fulfill their responsibilities. In FY15, we met the stringent criteria for information timeliness in approximately 90 percent of SAR operations.





# Safety Management System

*Collect, find, fix is the safety strategy at the heart of our Safety Management System (SMS): the integrated set of concepts, policies, and processes that we use every day to achieve a structured and consistent approach to safety. The core principles of our SMS guide our safety-critical actions and decisions whether we are reporting a minor incident at a frontline facility or preparing to deploy the latest component of the Next Generation Air Transportation System (NextGen) across the NAS.*

## **SMS 4.0**

Late in FY14, we rolled out 4.0, the most recent version of our SMS. It boasts a more conservative approach to risk assessment and a set of safety performance targets more closely aligned with our ongoing infrastructural and data-analysis advances.

After its first full year in operation, SMS 4.0 is already paying dividends. It aided us in the following:

- Spurring a lively, intra-agency discussion of SMS
- Improving the consistency and precision of our risk measurement techniques
- Consolidating our best practices
- Recommitting to the continuous improvement of our processes and policies for safety management

In FY15, we also migrated the SMS 4.0 Manual, a principle repository of SMS policy and guidance, to the Web. This significantly more accessible version of the manual has a web-based form for revision requests, which encourages all ATO employees to participate in the evolution of our SMS policy. We identified 15 changes for the next edition of the manual.

In FY15, for the first time in five years, the ATO completed an organization-wide safety culture survey. The survey—which we use to measure how we integrate our SMS and everyday work—showed some significant strides in recent years. Our employees report that they thoroughly understand the rules, endeavor to follow them, and voluntarily report when they fall short of expectations. Data from this survey, combined with observational studies, suggest that the ATO's safety culture is shifting; employees are no longer afraid to report unsafe acts or safety issues to management and, as a result, provide us with more and better information on which to base our decisions.

## SMS TRAINING

After overhauling our SMS, we needed to check whether our employees understood the new system. In FY15, many of our SMS courses focused on specific Safety Risk Management (SRM) roles, for example SRM Panel Facilitator, Risk Acceptor, and Practitioner. We held a total of 83 classes, reaching more than 800 students. Next year, we plan to expand this training program to include FCT personnel.

## SAFETY MANAGEMENT TRACKING SYSTEM

An important component of SMS 4.0, the ATO's Safety Management Tracking System (SMTS) serves as our real-time system of record, ensuring that we have the most up-to-date information possible. The SMTS collects and tracks data on the identification and management of safety hazards, enforces data standards, and provides access to ATO safety experts anywhere in the country.

To familiarize ATO employees with the new system's purpose and functions, we conducted a number of educational activities in FY15. Activities include more than 50 user-group presentations and a series of workgroup meetings to promote understanding of the new system and solicit users' feedback. Thanks in part to that feedback, we released a new version of the SMTS, version 1.2, in July 2015. Updates included the ability to create reciprocal links between different types of data (for example, data from SRM and audit/assessment activities) and to aggregate those data in new "views" appropriate for in-depth analysis.

## Safety Programs

The ATO's SMS drives many of our safety programs and initiatives. Each program is supported by our data collection and analysis activities such as digital tools, VSRPs, RAPs, audits, assessments, and so on. Also, each program plays a role in identifying, managing, and monitoring safety issues in the NAS.

## PARTNERSHIP FOR SAFETY

Successfully managing risk in the NAS requires that all levels of the ATO cooperate and maintain open, effective lines of communication. Partnership for Safety (PFS) helps us empower local management and union representatives to establish Local Safety Councils (LSCs) to identify and mitigate safety issues at the facility level.

Near real-time safety data shared with the LSCs reflect:

- Missed approaches
- Traffic alert and collision avoidance system resolution advisories
- Mandatory reporting trends
- ATSAP trends
- High-energy approaches
- Sector traffic
- Runway overshoots
- Arrival winds
- Facility weather conditions
- Similar-sounding call signs

ATC InfoHub, which is a safety information portal available on the PFS website, documents and disseminates the LSCs' work, their lessons learned, and feedback. Thanks to PFS, successful risk mitigation techniques are being shared with and adopted by similar facilities across the NAS.

Having established LSCs at all 315 FAA-staffed facilities in FY14, the ATO committed to expanding the LSC program. In FY15, we published an order for the creation of safety councils above the facility level; these higher-level councils will, in some cases, be better positioned to investigate and make recommendations to mitigate issues affecting local and regional airspace.

## HUMAN FACTORS

Understanding the role that Human Factors (HF) play in the safety of the NAS—as both a potential source of errors and a barrier against their consequences—is essential to the ATO’s safety mission. As advanced as our automation systems have become, human beings must monitor or, more often, mediate the influence of those systems on operations in our airspace. HF, a field of study long fostered in the ATO, became a key focus area in FY15.

Over the course of the year, we incorporated two new modules into our Recurrent Training program, “Introduction to Human Factors” and “Human Information Processing.” Also, on a monthly basis, we delivered HF-related training to our frontline facilities through PFS. Our HF experts also lent a hand in the design and execution of the FY15 Top 5 corrective activities, which reflect our attempts to mitigate the most serious hazards in our airspace. Through these and many other HF initiatives, we constantly expand our positive influence on human performance.

An important part of HF is Fatigue Risk Management (FRM), and for ATO personnel, it is a part of everyday safety. We maintain the availability and safety of our ATC services by maintaining alertness on the job (by getting the restorative rest we need, for example) and collaborating to mitigate systemic fatigue hazards (such as overtaxing shift schedules).

In FY15, we stood up a new component of ATSAP that will allow our frontline employees to report the FRM dimensions of any issues they encounter. We also enhanced our already successful Fully Charged educational campaign and completed a comprehensive baseline study of controller fatigue. We used data from this study to define fatigue mitigation strategies deployed throughout the ATO’s operational work environments.

With de-identified data from our VSRPs, operational reports, and external sources (including the National Aeronautics and Space Administration), the ATO is developing a scientific understanding of the hazards of and factors contributing to fatigue. One way that we communicate our progress in this area is Fully Charged, a multimedia campaign that provides our employees with tools to identify, understand, and mitigate fatigue hazards.

Fully Charged uses a multilayered approach addressing:

- Individuals’ responsibility for proper sleep, fitness, and nutrition
- Facilities’ responsibility for scheduling shifts and breaks based on best practices
- The FAA’s top-down, nationwide commitment to developing thoroughly informed fatigue policy

# Safety Promotion

Safety promotion includes two equally important components of the ATO's SMS: our communication campaigns and our training programs. Both keep our frontline employees focused on safety, apprised of issues and data trends that affect their work, and prepared for any upcoming technological or procedural changes to the NAS.

## COMMUNICATION

In FY15, we saw the continued success of our primary communication initiatives:

- Top 5, by which, each year, we rank the most pressing safety issues facing the NAS
- All Points Safety, which educates and recognizes the contributions of our operational employees
- Fully Charged, which promotes fatigue management

Our recurring publications—which range from single-page bulletins to full-fledged magazines—have also matured. These publications promote specific safety achievements, encourage employees to participate in our safety culture, and spread valuable lessons learned throughout the ATO. In FY15, Safety Matters, our quarterly flagship publication, tackled everything from the broad policy strokes of the ATO's new Blueprint Safety Initiative to the intricacies of an “early turn” issue at Seattle Center.

## TRAINING

To remain at the forefront of aviation safety training, the ATO leverages cutting-edge teaching developments from other technical fields, including immersive human-in-the-loop simulation, modeling, and adaptive learning technologies. In addition to input from our controllers and technicians, the ATO's seven Centers of Excellence (COE) (which formalize our close relationship with academia) have proved particularly helpful in advancing our training programs. Research conducted at the COEs is shaping an increasingly “blended” and effective approach to teaching and learning—one that can keep up with the speed of technological development.

Among our most successful training programs is Recurrent Training, a nationwide curriculum that provides instructor-led and web-based courses to controllers. Developed collaboratively with NATCA, Recurrent Training is delivered twice a year and is designed to increase controllers' proficiency, enhance their awareness of HF, and promote behaviors that identify and correct risk. We select topics for training from the ATO's data sources (VSRPs and MORs, for example) and suggestions from our stakeholders. In FY15, Recurrent Training covered, among other subjects, human information processing, ODO, and initial departure separation.

Beyond their specific subjects, these courses also provide an open-ended forum for our controllers by encouraging them to discuss safety issues that affect their facilities and share lessons learned with each other. Because of this flexibility, Recurrent Training is an important feedback loop within the ATO, returning valuable lessons to the front lines and contributing to the mitigation of risk throughout the system.





## GLOBAL LEADERSHIP

By working closely with international organizations—the International Civil Aviation Organization (ICAO), CANSO, and EUROCONTROL in particular—and other ANSPs, the ATO strives to provide the best leadership in ATM. Our goal is to guide our peers to adopt globally harmonized safety management practices.

Toward that end, in FY15 ATO employees:

- Served as the CANSO Safety Program Manager
- Supported the CANSO Safety Standing Committee
- Contributed to many international workgroups, including the CANSO SMS Capability Workgroup, the CANSO Safety Performance Measurement Workgroup, and the ICAO Runway Safety Partnership Team.

Last year, we had several key international accomplishments: We worked with ICAO to develop an FRM System Implementation Guide for ANSPs; encouraged other ANSPs to adopt the RAP as their standard approach to risk analysis; and collaborated with UK NATS and Airservices Australia to advance leading-indicator and risk-assessment research.

To share our best practices and lessons learned with others, we regularly attend international conferences and other forums. In FY15, these included the following:

- ICAO Regional Safety Seminar in Livingstone, Zambia
- Latin American and Caribbean Regional Conference in Mexico City, Mexico
- CANSO Global Air Traffic Management Safety Conference in Bangkok, Thailand



# Future Systems

*As demand for our nation's airspace grows, the FAA is developing new technologies and techniques to meet that demand. We design these technologies and techniques, collectively referred to as NextGen, to provide more precise tracking and routing of aircraft to enhance safety, reduce delays, and save fuel. To pave the way for NextGen, we keep our procedures and approach to safety management aware of the latest changes to the NAS and ready for those on the horizon.*



## Unmanned Aircraft Systems

One of the FAA's ongoing priorities is the safe integration of Unmanned Aircraft Systems (UAS), or drones, into the NAS. In February 2015, the FAA proposed new regulations that, once finalized, will permit the use of UAS weighing less than 55 pounds for non-recreational purposes. The regulations limit small UAS to daylight, line-of-sight operations; this means that operators must be able to see their UAS. They also propose operator certification standards and specific operational restrictions to minimize the risk that UAS pose to people, property, and other aircraft.

To prepare for a wider integration of UAS, the FAA also approved six congressionally-mandated test sites where we will gather data on UAS operations:

- Pan-Pacific UAS Test Range Complex in Fairbanks, Alaska
- Nevada's Desert Rock Airport (NV65)
- New York's Griffiss International Airport (RME)
- Northern Plains UAS test site in North Dakota
- Texas A&M University—Corpus Christi UAS test site
- Virginia Polytechnic Institute and State University UAS test site

Selected from a total of 25 proposed sites, these six reflect a diversity of conditions (geography, climate, airspace use, and so on) that will help us answer questions concerning system safety, command and control links, and the implementation of a reliable sense-and-avoid capability.

## En Route Automation Modernization

In April 2015, the ATO completed one of the most ambitious aviation safety overhauls of the last 40 years—En Route Automation Modernization (ERAM). Often described as the backbone of the NAS, ERAM is a foundational flight- and surveillance-data platform that is helping us to transition

from a ground-based system of ATC to a satellite-based system of ATM. Its full deployment delivers the latest in surveillance, automation, and safety technology to controllers responsible for the high-altitude airspace between airports.

With ERAM, controllers at all 20 of the nation's En Route facilities will process more flight data from more sensors with greater efficiency. Among many benefits, the system:

- Tracks 1,900 aircraft at a time (instead of the previous 1,100)
- Automates transitions between sectors (even when planes have been diverted from their planned course)
- Provides controllers with identical flight plan information regardless of their location

The result is increased capacity and improved efficiency for the entire airspace system.

## Handbook Revisions

To keep our procedures aligned with NextGen, we lead a joint FAA-NATCA-industry workgroup to review and revise the ATC handbook (FAA Order JO 7110.65). Every year, this workgroup selects 15 issues to analyze and address in our ATC procedures. In FY15, we revised procedures that govern En Route passing and diverging operations, tower-applied visual separation, and transitional separation during the execution of go-arounds. We completed 11 of the 15 proposed revisions in FY15; we will complete the remaining four early in FY16.

# Moving Forward



*Our commitment to safety resonates in our willingness to embrace change. As the NAS evolves, our success will depend on staying ahead of the knowledge curve, while maintaining the momentum of our safety culture and strengthening our relationships with stakeholders within and beyond the FAA.*

We will draw on all of the resources available to us: the various existing and future safety data streams, vast experience of our frontline employees, and insights of those who work in other industries.

Whatever challenges we face, the ATO will continue to deliver on our core promise to our customers: to provide the safest and most efficient airspace system in the world.

# Acronyms

A80	Atlanta Terminal Radar Approach Control	LSC	Local Safety Council
ANSP	Air Navigation Service Provider	MOR	Mandatory Occurrence Report
AOV	Air Traffic Safety Oversight Service	NAS	National Airspace System
ARTCC	Air Route Traffic Control Center	NATCA	National Air Traffic Controllers Association
ASAP	Aviation Safety Action Program	NextGen	Next Generation Air Transportation System
ATC	Air Traffic Control	NTSB	National Transportation Safety Board
ATM	Air Traffic Management	NV65	Desert Rock Airport
ATO	Air Traffic Organization	ODO	Opposite Direction Operations
ATSAP	Air Traffic Safety Action Program	ORD	Chicago O’Hare International Airport
ATSAP-X	Air Traffic Safety Action Program, Region X	OSA	Operational Skills Assessment
AVP	Accident Investigation and Prevention	PASS	Professional Aviation Safety Specialists
C2A	Call to Action	PFS	Partnership for Safety
CANSO	Civil Air Navigation Services Organisation	QA	Quality Assurance
CAP	Corrective Action Plan	QC	Quality Control
CAR	Corrective Action Request	RAE	Risk Analysis Event
CEDAR	Comprehensive Electronic Data Analysis and Reporting	RAP	Risk Analysis Process
CFIT	Controlled Flight into Terrain	RE	Runway Excursion
CISP	Confidential Information Share Program	RI	Runway Incursion
COE	Center of Excellence	RME	Griffiss International Airport
CSA	Central Service Area	SAR	Search and Rescue
CY	Calendar Year	SFO	San Francisco International Airport
DFW	Dallas/Fort Worth International Airport	SMS	Safety Management System
DOT	Department of Transportation	SMTS	Safety Management Tracking System
ERAM	En Route Automation Modernization	SOP	Standard Operating Procedures
ESA	Eastern Service Area	SRER	Safety Risk Event Rate
FAA	Federal Aviation Administration	SRM	Safety Risk Management
FCT	Federal Contract Tower	SSR	System Service Review
FRM	Fatigue Risk Management	T-SAP	Technical Operations Safety Action Program
FY	Fiscal Year	UAS	Unmanned Aircraft System
GA	General Aviation	VSRP	Voluntary Safety Reporting Program
HF	Human Factors	WSA	Western Service Area
ICAO	International Civil Aviation Organization	ZJX	Jacksonville Air Route Traffic Control Center
LOA	Letter of Agreement	ZLA	Los Angeles Air Route Traffic Control Center



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