Aviation lifts our eyes to the sky for the grace of flight, and every successful flight begins and finishes on the surface. That’s where we focus our attention for the National Runway Safety Plan 2021-2023.

This strategic plan not only presents the Runway Safety Group’s overall framework and mission for the next three years, but also serves as a reaffirmation of our overall commitment to reducing the severity of surface risk and continuously improving runway safety.

The recent incorporation of Aviation Risk Identification and Assessment (ARIA) into the Runway Safety Program will provide safety experts valuable insight for identifying risk, irrespective of compliance. This will enable us to make smarter, risk-based, data-driven decisions.

Insight and good data help move forward Runway Safety’s outreach initiatives around proficiency and continuous education, and training controllers, pilots, and vehicle drivers. Allocating importance to outreach at both local and national levels ensures we are well-trained to identify and mitigate risk associated with operations in the movement area of our airports.

As a key stakeholder in the National Airspace System (NAS), Runway Safety shares our best practices and lessons learned by applying our Safety Management principals to a large international audience to improve surface safety worldwide.

The dedication of so many people to the success of the Runway Safety Program at our nation’s airports, energizes and strengthens the collective effort and shared responsibilities described in our strategic safety initiatives. The Runway Safety Program is grateful for the ongoing cooperation of Air Traffic Services, Flight Standards Service, the Office of Airports, and Technical Operations.

Together, we are reducing surface risk by identifying and addressing local and systemic issues, thereby enhancing our safety initiatives throughout the NAS.

Giovanni Dipierro
ATO Safety and Technical Training Manager | Runway Safety Group

Table of Contents

- Executive Summary
- Overview
- SMS Components and Runway Safety Initiatives:
  1. Safety Policy
  2. Safety Promotion
  3. Safety Assurance
  4. Safety Risk Management
- Runway Safety Technology Roadmap
- Runway Incursion Mitigation (RIM) Program
- International Leadership
- Appendices:
  A. Surface Safety Group Portfolio of Safety Efforts
  B. Surface Safety Group Surface Safety Initiatives Team Tracker
Overview

Reducing the risk of runway safety in the National Airspace System is a top priority of the FAA. The National Runway Safety Plan (NRSP) 2021-2023 aligns the strategic priorities of the FAA’s Runway Safety Program with the established principles of the Air Traffic Organization (ATO) Safety Management System (SMS). The NRSP 2021-2023 describes how the FAA, airport operators, and aviation industry stakeholders collaborate, using data-driven, risk-based decision making, to enhance safety performance in the surface environment and the NAS. The surface environment includes runway surfaces, taxiway surfaces and the associated protected areas.

The four principles of the ATO SMS, Safety Policy, Safety Risk Management, Safety Assurance and Safety Promotion, provide a strong foundation for managing surface safety risk. The Runway Safety Program continues to build upon that foundation, in the evolution from a compliance-based safety assurance methodology to Risk Based Safety Management (RBSM).

The incorporation of the Aviation Risk Identification and Assessment (ARIA) surface module is a further step in RBSM that will change the way we look at risk throughout the NAS. In Runway Safety, ARIA will guide our use of resources to make smarter, risk-based, data-driven decisions. It will influence the way we identify potential safety issues, as well as our activities to reevaluate existing policies and procedures.

This plan also outlines the structure of the Runway Safety Program, from the ATO Safety and Technical Training, Runway Safety Group to the Runway Safety Council (RSC) to external oversight organizations such as the National Transportation Safety Board (NTSB), U.S. Government Accountability Office (GAO), and the Department of Transportation (DOT) Office of Inspector General (OIG). These groups work together to identify and mitigate surface risk through the SMS process: data collection and analysis, policy and planning, and communication and education.

The NRSP 2021-2023 sets forth the strategic and tactical initiatives of the Runway Safety Program for the next three years. They include focused activities to enhance existing technology while researching and developing the next generation of surface surveillance technology. In addition to education and outreach to air traffic controllers, pilots, and airfield drivers. Together, all of these will extend the reach of the FAA’s Runway Safety Program beyond the NAS, to strengthen runway safety throughout the world.

Supplemental documents and materials can be found on the FAA Runway Safety Website.

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**Figure 1. The Integrated Components of the ATO SMS**

Develop, distribute and promote educational materials, best practices, lessons learned and actionable information acquired through data collection and analysis to national and global stakeholders.

Establish and document organizational policies that define management’s commitment, responsibility, and accountability for safety. Safety Policy identifies and assigns responsibilities to key safety personnel.

The four components of the ATO SMS combine to create a systemic approach to managing and ensuring safety.

Builds on Safety Risk Management (SRM) efforts by collecting and assessing data to monitor compliance, assess the performance of safety measures, and identify safety trends. The Safety Assurance component of the Safety Management System encompasses all of the Air Traffic Organization (ATO) processes and programs that survey the National Airspace System (NAS). These processes and programs can lead to the discovery of previously unidentified existing hazards and/or risk controls that are outdated or no longer effective.
The Runway Safety Program advocates six key elements of an effective safety culture. They are responsibility, accountability, clear expectations, leadership, organizational buy-in, and continuous improvement. These elements harmonize with the principles of the ATO SMS to uphold and strengthen policy and regulations that govern the Runway Safety Program.

The ATO SMS is “an integrated collection of principles, policies, processes, procedures, and programs, used to identify, analyze, assess, manage, and monitor safety risk in the provision of air traffic management and communication, navigation, and surveillance services.” The ATO SMS promotes adhering to existing policy and regulation while continuously assessing the need for change.

These practices are applied in our standard of involving stakeholders to define, motivate and guide runway safety throughout the NAS as well as globally. Figure 2 provides an overview of runway safety stakeholders and policy.

How does this work?
Executive leadership from each of the stakeholder organizations collectively form the RSC. In October 2008, then acting FAA Administrator, Robert Sturgell, kicked off the inaugural RSC meeting. The FAA convened the RSC to fundamentally change the existing safety culture and move toward a systemic pro-active management policy that involved cooperation throughout the FAA, other segments of the federal government and the aviation industry.

Today the RSC is administered by the ATO Safety and Technical Training, Safety Directorate. FAA Order 7050.1 Runway Safety Program defines the RSC as the “primary agent for initiating processes to monitor and address runway safety performance in the NAS.” The RSC does this by conducting and/or supporting monitoring activities designed to point to where existing policies and safety measures are effective and where an unacceptable level of risk still exists.

When the RSC determines further action is required, they will assign the activity to the Surface Safety Group (SSG). A cross functional working group comprised of representatives from the RSC member organizations. The SSG will take on the task and bring recommendations for enhancements to existing policy back to the RSC.

To continuously improve the safety of the NAS, the ATO conducts safety audits and assessments to determine whether the NAS is performing as expected. To evaluate how a new element may impact the performance of the NAS, the ATO convenes a Safety Risk Management (SRM) panel. Using the principles of the SMS, the SRM panel conducts a safety hazard analysis to identify any risks that the new element may introduce and the level of the potential hazard. In this way, potential risk can be addressed prior to introducing them into the NAS. When an SRM panel documents a safety requirement related to surface safety, the RSC will assign it to the SSG as appropriate for resolution. (visit for tweaking)

In addition, it is necessary for the Runway Safety Program to take into consideration the recommendations from external government oversight organizations such as the DOT OIG, GAO, and NTSB. When we receive such recommendations, they are added to the SSG Safety Recommendation Portfolio and addressed through that process.

**Initiatives:**
1. Improve external communication between air traffic managers and airport operators about terminal area incidents by requiring air traffic control managers to share information on terminal area incidents, such as operational incidents and pilot deviations, with airport operators in a timely manner. This will help airport operators identify and implement needed mitigations more quickly. (GAO Audit Report 19-639)
2. Assess existing runway safety program policies, documented in FAA Order 7050.1 Runway Safety Program, to identify where improvements can be made such as reducing ambiguity, emphasizing risk-based safety management versus compliance-only, distinguishing the role of the Runway Safety Council and leveraging the contributions of Runway Safety Action Teams.
3. Provide standardized symbology and verbiage for existing hot spots used for navigating the airport environment. Hot spots offer a visual aid in reducing risk and providing mitigation for confusing areas on the airport surface. There are two types of hot spots: ground movement hot spots and wrong surface hot spots.
4. A hot spot is a runway safety related problem area on an airport presenting increased risk during surface operations. Typically, it is a complex or confusing intersection. The area of increased risk has either a history of, or a potential risk for, runway incursions. Hot spots are indicated on airport diagrams using select symbols. They increase situational awareness by bringing attention to the problem area for pilots, airport operators, and air traffic controllers. Implementing standard criteria for existing designated wrong surface hot spots provides consistency at airports across the NAS.

**Milestones:**
1. Add a new paragraph to JO7210.632A, Air Traffic Organization Occurrence Reporting on requiring timely sharing of surface-events with airport operators. **COMPLETED 10/5/20**
2. Sign into effect FAA Order 7050.1 Runway Safety Program (as amended).
3. Replace existing non-standard hot spot symbols with standard symbols on airport diagrams.
4. Replace current wrong surface arrival symbol to standard cylinder symbol on the airport diagram for the 11 airports with existing designated wrong surface arrival hot spots, in collaboration with the Airport Mapping Aeronautical Charting Group.
5. Develop Arrival Alert Notices for wrong surface arrival hot spots for the 11 airports with existing designated wrong surface arrival hot spots.

**Figure 2: Runway Safety Policy**
Figure 3. Risk-Based Safety Management

**RISK-BASED SAFETY MANAGEMENT (RBSM)**

**Approach**

Mitigation efforts based on aggregated data that identifies and validates risk in the system.

**Comparison**

- Addresses compliant and non-compliant operations only.
- Confirms current risk, validates suspected risk, and identifies unknown risk across the NAS through tools, such as ARIA, using comprehensive data analysis algorithms.
- Focuses on a systemic view of the operation to identify risk before it leads to an event.
- Empowers personnel to seek out and mitigate risk.
- Categorizes and prioritizes potential risk based on projected severity and probability.
- Mitigates potential risk through training, policy, procedure, or equipment changes.

**COMPLIANCE-BASED SAFETY ASSURANCE**

Identification and mitigation efforts based on rule violations in individual events.

- Addresses non-compliant operations only.
- Identifies risk through the analysis of non-compliant events.
- Focuses on outcomes of non-compliant events.
- Involves analysis of past outcomes or events.
- Identifies unsafe acts by operational personnel.
- Mitigates potential risk through training, policy, procedures, or equipment changes.

Safety Risk Management

**MITIGATION PLAN DEVELOPMENT AND IMPLEMENTATION**

**Objective:** Continually monitor the level of surface risk in the NAS and assess the need for new and/or revised mitigations.

Ensuring the safety and integrity of the runway environment remains one of the FAA’s highest priorities. The Runway Safety Program reinforces this priority through robust safety risk management. The continuing evolution from a compliance-based safety approach to RBSM enables early recognition of potential areas of risk through data analysis. This predictive capability results in identifying and addressing risk prior to it developing into a dangerous situation.

The FAA risk management strategy includes training, education, and awareness initiatives via structured programs, refresher courses, printed materials, online products, trade, and industry journal articles to maintain runway safety as a top-of-mind priority for pilots, air traffic controllers, and airport personnel. An example of this strategy is the delivery of Special Focus RSAT (SF-RSAT) meetings at airports with high rates of wrong surface and runway events, where lines of business work collaboratively with local stakeholders in the development of mitigations and best practices.

Proper airport geometry design and technological initiatives also offer tremendous promise for the improvement of runway safety and include such devices as runway status lights and cockpit moving map displays. Runway Safety aims to implement a plan to assess the effectiveness of all of FAA’s terminal area-safety efforts, including Airport Surface Detection Equipment, Model X (ASDE-X) and the Runway Safety Program GAO 19-639 recommendation. For FY21, Runway Safety expects to complete the implementation of ASDE-X Taxiway Arrival Prediction (ATAP) technology at ASDE-X Airports, and at Airport Surface Surveillance Capability (ASSC) airports. Technological initiatives for this fiscal year also include the Runway Incursion Prevention through Situational Awareness (RIPS) system and a runway excursion mitigation plan.

Additionally, enhancements to air traffic procedures, phraseology and systems provide controllers with better tools to keep aircraft safely separated on runways and taxiways. The ARIA tool’s risk-based safety management approach will provide additional insight into the policies and procedures involved in surface safety.

Finally, collaboration with stakeholders is vital in Runway Safety’s efforts to effectively reduce surface event risk. This is done by implementing improvements and mitigations in a collective manner throughout the organization through the Surface Safety Group and Runway Safety Action Teams. Regional-level initiatives and mitigations are put forth and tracked in nine Regional Runway Safety Plans.

Regional-level initiatives and mitigations are put forth and tracked in nine Regional Runway Safety Plans.
SSG, RSAT AND RRSP

Surface Safety Group (SSG)
The SSG is a workgroup of subject matter experts from across FAA lines of business and aviation industry. It convenes on a quarterly basis to develop national surface safety strategies and mitigations. SSG members work collaboratively to discuss and review surface safety initiatives established by the group and through the safety risk management process. All initiatives are documented for accountability in the Surface Safety Group (SSG) Portfolio of Safety Recommendations. (Appendix A.)

Runway Safety Action Team (RSAT)
Runway Safety Action Teams bring local airport stakeholders together at least once a year to identify risks to surface safety at that airport and develop plans to mitigate or eliminate those risks. RSATs provide the foundation of the Runway Safety Program at individual airports. The RSAT meetings are the primary forum for pinpointing and addressing airport-specific risk in the surface environment. The product of a RSAT meeting is a Runway Safety Action Plan (RSAP) in which the stakeholders document and agree to pursue specific actions intended to improve surface safety.

Regional Runway Safety Plans (RRSP)
Similar to the NRSP, there is a Regional Runway Safety Plan (RRSP) for each of the nine regions that provides a roadmap with emphasis on regional efforts in support of the NRSP initiatives. RRSP action items are developed locally at quarterly Regional Runway Safety Team (RRST) meetings. These action items are then approved at quarterly Regional Governance Council meetings. Visit the FAA Runway Safety Website to review the nine Regional Runway Safety Plans.

ANE New England
EEA Eastern
ASO Southern
AGL Great Lakes
ACE Central
ASW Southwest
ANM Northwest Mountain
AWP Western Pacific
AAL Alaskan

Figure 4: SSG, RSAT and RRSP

What is Aviation Safety?
CONTROL MEASURES:
ROOT CAUSES:
HUMAN FACTORS:
HAZARD IDENTIFICATION:

Figure 5: Risk-Based Safety Management (RBSM)

WHAT IS RBSM?
Risk-based safety management will provide the ATO with greater capability to understand:
1. The effectiveness of safety barriers
2. The safety barriers, under specific conditions, that are most likely to protect from the next accident, serious incident, or safety occurrence
3. The actions necessary to mitigate risk and strengthen safety barriers
4. The effectiveness of mitigations

Why Now?
The reality is compliance alone cannot assure safe operations. We have to look beyond what was done right or wrong to cause individual events, and focus on how we can improve safety across the NAS through the collection of comprehensive risk-based data.

Understanding the risk picture of normal operations within the NAS provides the ATO with an effective means of assuring a risk-based safety management system.

Benefits of RBSM
By equipping and empowering stakeholders to identify and mitigate risk in the NAS through the SMS, things like risk analysis, corrective action plans, and targeted training will improve the ATO’s safety performance, making safety everyone’s responsibility.

How does ARIA Work?
The Aviation Risk Identification and Assessment (ARIA) airborne algorithm utilizes radar track data and analyzes every encounter where aircraft in flight come within 8.33 nautical miles of each other, regardless of altitude or compliance. Every 2.5 seconds, the system recalculates a value for each encounter based on current proximity, projected closest proximity, and rate of closure. Each encounter is then given a score, based on those components. With this data, safety experts can focus on validated risk, and through a deep-dive barrier analysis review, provide decision-makers the level of risk, why it exists, its frequency, and its severity. This further facilitates RBSM by enabling safety experts to work with stakeholders to identify the root causes, develop mitigations, and measure their effectiveness. Future modules currently under development include surface and Controlled Flight Into Terrain (CFIT). As a tool to be utilized in the transition to RBSM, additional modules will also be developed as need arises.

Benefits of ARIA
• Enables a better understanding of the NAS, the operation, and the potential risk in the operation
• Facilitates the review process by providing a potential risk estimate for all detected aviation risk encounters
• Focuses Quality Assurance processes on those areas of highest potential risk in the NAS
• Applies the same encounter detection algorithm and potential risk assessment standard throughout the entire NAS
• Improves operational agility by focusing safety personnel
Safety Assurance

Data Collection, Analysis and Assessment

Objective: Apply a data-driven approach to continually evaluate the effectiveness of risk mitigation strategies and controls and pro-actively identify increasing and/or new hazards.

Safety assurance is the means to demonstrate that organizational arrangements and processes for safety achievement are properly applied and continue to achieve their intended objectives. We focus on safety performance monitoring and measuring, managing change and continuous improvement. Safety Assurance has to be dynamic. It cannot be just checking off a box. Historically, the FAA evaluated runway safety by focusing on the number and severity of runway incursions, and while there is benefit in knowing rates and statistics, those numbers do not tell the full story.

The goal is to use data to assess the risk present in the NAS. Determining the impact of Runway Safety Program initiatives depends on complete, reliable data. Taking surface safety to the next level involves identifying underlying systemic risk, and determining if existing barriers are adequate. And, if not, understanding why not. Understanding is key to introducing additional or new barriers to address the risk before it causes an accident or incident. It is important to ensure that the data used in the identification of risk and mitigations are based on accurate data.

Surface Safety Metric (SSM)
The Surface Safety Metric (SSM), implemented in October 2019, goes beyond traditional runway incursion data analysis, focused on the number of events. The SSM was developed to measure the safety performance of the NAS in the surface environment. It incorporates all relevant types of events that can occur in the surface environment including runway collisions, runway incursions, runway excursion accidents, runway excursion incidents, surface collisions and surface incidents. By incorporating every type of runway safety event, the SSM more accurately reflects the overall safety of the surface environment in the NAS.

In addition, the SSM includes more data sources than ever before, such as NTSB data and data from the Aviation System Information Analysis and Sharing (ASIAS) system. As a result, the SSM is able to point to where the risk exists and to quantify the risk objectively, providing a more accurate picture of the risk present in the NAS.

The RSC promotes applying the SSM across the agency as a critical indicator to determine how surface safety risk is trending and where additional focus is needed. In a joint-venture with the Runway Safety Group, the RSC integrates efforts across the agency, other government stakeholders, and the FAA’s industry partners, to monitor and assess the performance of mitigation tools and tactics leading to well-informed, risk-based decision making and management.

Aviation Risk Identification and Assessment (ARIA)
Data collection through the ARIA surface module will provide better insight into potential surface safety risk in the NAS and further the transition from compliance-based risk management to Risk-Based Safety Management (RBSM). Introduced in 2020, RBSM, will help the ATO zero in on risk and identify safety issues, fix them, and ensure they stay fixed. The roll-out of the ARIA surface module is due for March 2022. See Figure 6.
Initiatives:

1. Provide better insight into potential surface safety risk in the NAS in support of the transition from compliance-based to Risk Based Safety Management (RSBM), through the implementation of the Aviation Risk Identification and Assessment (ARIA) surface module.

2. In partnership with the RSC, continue collecting data to monitor and assess existing mitigation efforts relative to the level of risk in the NAS as measured by the SSM. Leverage the RSC quarterly meetings to widely communicate findings and explore recommended solutions.

3. Investigate the trend of wrong direction intersection departures to identify and understand the factors involved. Develop a process to analyze where and under what circumstances wrong direction intersection departures pose a risk. Develop a strategy to mitigate the risk(s) as indicated by the analysis.

Milestones:

1. Roll-out ARIA surface module (FY 2021)

2. Maintain the weighted Commercial Surface Safety Risk Index at or below 0.35 per million airport operations for commercial aviation (FY 2021)

3. Maintain the weighted Non-Commercial Surface Safety Risk Index at or below 0.60 per million airport operations for non-commercial aviation (FY 2021)

4. Recategorize wrong surface events for better accuracy of the violation. COMPLETED 8/2021

5. Develop a plan to collect data and monitor the impact of the pending new wrong surface arrival standard cylinder shape on the airport diagram of the 11 airports with existing designated wrong surface hot spots.

6. Improve the process to identify and remove duplicate excursion records from the SSM. COMPLETED 9/2021

Safety Promotion

Outreach and Education

Objective: Continuously communicate, advocate and educate.

A crucial step in runway safety mitigation efforts is for local airport stakeholders to discuss risk and what is being done. Communication connects data analysis to policy and policy to stakeholders, which include pilots, air traffic controllers, and airfield drivers. Enhanced safety requires effective communication to those most affected by surface events. Increasing safety requires effective communication between the operators and the users.

The Runway Safety Program works relentlessly to promote changes made nationally to runway safety performance measures. We have also focused strategic communication products to provide local runway information and guidance obtained from data analysis.

One product is the Runway Safety Action Team (RSAT) Web Tool, which Runway Safety is continuously enhancing to ensure that each team meets, or exceeds, the program’s standard requirements. The RSAT Web Tool brings local ATC facilities better data to support local RSAT meetings by displaying the approximate location and summary of the runway incursions at each airport. Runway Safety continues to field tools and look for best practices to assist controllers prevent wrong surface landings and other high risk safety events on and around airports.

Promotional activities and products that examine problems at specific airports have proven to be effective in the promotion of local issues. These products provide broad-level instructional tools to front line audiences such as pilots, controllers, and airfield drivers.

We use multiple outreach methods to reduce risk of surface events. Runway Safety collaborates to create educational products, social media engagement, airport-specific and topic-focused videos, and animations of actual events. Outreach efforts also include participation at in-person events by hosting exhibitions at Communicating for Safety (CFS) and participation at annual air shows, annual stakeholder conferences and conventions, technology symposiums, and virtual forums such as the National Association of Flight Instructors (NAFI) MentorLIVE broadcasts.
Initiatives:
1. Enhance the RSAT Web Tool to ensure each team meets, or exceeds, the RSAT standard requirements.
2. Reduce risk of surface events through outreach and education promoted via social media engagement, video products, and an animation library based on actual events.
3. Conduct outreach to stakeholders through presentations in events such as NAFI MentorLIVE broadcasts.

Milestones:
1. Conduct, at a minimum, one RSAT meeting at each towered airport using the RSAT Web Tool. **COMPLETED**
2. Develop, distribute, and publicly promote 60 airport-specific FAA “From the Flight Deck” series videos. (FY 2022)
3. Develop, distribute, and promote a “From the Flight Deck” single-topic video on hot spot standardization.
4. Produce a quarterly animation to be added to the animation library in the Runway Safety Pilot Simulator. (FY 2021)
5. Develop a video series specific to airfield drivers. In collaboration with Tech Ops and Safety Services, PASS, Office of Airports, and AOC. (FY 2021)
6. Collaborate with AOC on a series of airfield driver articles of seasonal or timely relevance, such as winter operations or airport construction.
8. Carry out promotion to create awareness among pilots on the addition of Arrival Alert Notices.

Partnering with Flight Standards Service

The Runway Safety Group works closely with Flight Standards and the FAA on improving outreach and promotional efforts through a variety of practices. A recent example of this collaboration is the introduction of the Runway Safety Pilot Simulator as an official FAASTeam WINGS course, a proficiency program that allows pilots to earn credits while improving their aviation skills and knowledge through a number of initiatives.

Runway Safety and the FAASTeam partner together to promote aviation safety through the Safety Program Airmen Notification System (SPANS), FAAST Blast email updates, as well as other methods of mass communication to improve the level of runway safety awareness and enable our surface safety mission. This collaborative relationship continues to grow.
Runway Safety Technology Roadmap

Technology Moving Forward

Over the next years, Runway Safety will focus on implementing technology solutions to specifically target the small to mid-size towered airports that currently have no surface surveillance system. The goal of this “right site-right size” approach is to deploy lower-cost surface safety capabilities intended for smaller airports. This method creates systems that are affordable in which safety benefits are not outweighed by hefty price tags. In addition, the Runway Safety Group will continue to promote runway safety enhancement initiatives that leverage existing technology, rather than the added cost of full-on development.

Runway Incursion Mitigation (RIM) Program

This program’s management of high-risk areas underscores the FAA’s mission to provide the safest, most efficient aerospace system in the world.

The Runway Incursion Mitigation (RIM) program is built on more than ten years’ worth of runway incursion data. Over 13,500 runway incursions, and 6,500 non-standard runway/taxiway intersections at more than 500 airports have been georeferenced and assessed by the FAA and incorporated into a Geographic Information System (GIS) Database that, when applicable, associate incursions with non-standard geometry sites and known hot spots. The RIM Program made significant progress since launching in 2015. As of May 2021, 67 RIM locations implemented site-specific enhancements including taxiway reconfigurations and changes to lighting, markings, and aircraft operations. Table 1 shows the most recent mitigation projects completed in FY19 and FY21 to-date. Airport planners and designers rely on FAA’s RIM mitigation guidance materials and support from FAA Regional program contacts.

The array of completed mitigation projects at U.S. airports illustrate the success of taxiway design element guidance paired with expertise and support from stakeholders. One airport, for instance, had experienced 15 runway incursions between 2008 and 2014 at a RIM location that was also a designated hot spot. With FAA support, that airport addressed geocodes including #6: Two runway thresholds in close proximity and #18: Unexpected holding position marking along a taxiway. After completing the projects necessary to meet current standards, the area’s hot spot was removed, and no runway incursions have occurred there since its mitigation. Its configuration before and after are pictured below.

Figure 8: RIM Map
Mitigated RIM Locations

Table: Mitigated RIM Locations

<table>
<thead>
<tr>
<th>AIRPORT NAME</th>
<th>RIM LOCATION DESCRIPTION</th>
<th>MITIGATION TYPE</th>
<th>DATE COMPLETED</th>
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<tbody>
<tr>
<td>Los Angeles International Airport, CA</td>
<td>Intersection of IAP 33 &amp; Rwy 25 A/B/C/D &amp; Rwy 1</td>
<td>Taxiway/Runway Geom. Rec.</td>
<td>10/15/2018</td>
</tr>
<tr>
<td>Cleveland Hopkins International Airport, OH</td>
<td>Intersection of IAP 33 &amp; Rwy 25 A/B/C/D &amp; Rwy 1</td>
<td>Taxiway/Runway Geom. Rec.</td>
<td>10/15/2018</td>
</tr>
<tr>
<td>Boston Logan International Airport, MA</td>
<td>Intersection of Rwy 27 &amp; Rwy 16</td>
<td>Taxiway/Runway Geom. Rec.</td>
<td>10/15/2018</td>
</tr>
<tr>
<td>Long Beach, CA</td>
<td>Intersection of Rwy 27 &amp; Rwy 16</td>
<td>Taxiway/Runway Geom. Rec.</td>
<td>10/15/2018</td>
</tr>
<tr>
<td>Miami International Airport, FL</td>
<td>Intersection of Rwy 27 &amp; Rwy 16</td>
<td>Taxiway/Runway Geom. Rec.</td>
<td>10/15/2018</td>
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<tr>
<td>Orlando Sanford International Airport, FL</td>
<td>Intersection of Rwy 27 &amp; Rwy 16</td>
<td>Taxiway/Runway Geom. Rec.</td>
<td>10/15/2018</td>
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<td>San Diego Airport, CA</td>
<td>Intersection of Rwy 27 &amp; Rwy 16</td>
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<td>10/15/2018</td>
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<tr>
<td>Salt Lake City International Airport, UT</td>
<td>Intersection of Rwy 27 &amp; Rwy 16</td>
<td>Taxiway/Runway Geom. Rec.</td>
<td>10/15/2018</td>
</tr>
</tbody>
</table>

International Leadership

Runway Safety shares our best practices and lessons learned by applying our Safety Management principals to a large international audience to improve surface safety worldwide.

Runway Incursion Prevention (RIP) Course

The Runway Incursion Prevention Course delivers RIP training to participants on the identification of contributory factors of runway incursions, standardization of methods in identifying and collecting runway incursion event data, the identification of human factors that affect air traffic controllers and preventative measures to help controllers counteract the adverse effects of human factors in runway safety, among other course objectives.

The RIP course is expected to be delivered to participants in Singapore and in several Central American countries to include Costa Rica, Honduras, and Guatemala. This multi-day course provides a best practice for runway incursion prevention from different airport stakeholders to include airport operator, air navigation service providers, and flight crews.

International Civil Aviation Organization (ICAO) EUR Regional Expert Safety Team (IE-REST)

In March 2021, the RSG presented a virtual RSAT Meeting to the IE-REST Member States, highlighting the FAA’s runway safety practices, collaborative efforts with various lines of business and industry stakeholders, and just safety culture.

The RSG expects to continue its engagement and sharing of best practices with the ICAO African Region through IE-REST, which has recently changed its name to Regional Expert Safety Group (RESGI).

Runway Safety Workshops in the ICAO African Region

In past years, the Runway Safety Group has been actively involved with runway safety workshops in the ICAO African Region. Presently, the RSG is participating in discussions with the FAA-AU-International group and the FAA Senior Representative for Africa and the Sub-Saharan region to present a virtual RSAT Meeting to ICAO African states, highlighting the FAA’s runway safety practices, collaborative efforts with various lines of business and industry stakeholders, and just safety culture.

There has also been discussion around continuous RSAT participation in the further development and presentation of workshops in the African region.

In a virtual IE-REST forum held in September 2020, the Runway Safety Group conducted a presentation on the Runway Safety Action Team (RSAT) Web Tool and “Wrong Direction Intersection Departures During the COVID-19 Pandemic.”
## Appendices:

### Appendix A: Surface Safety Group Portfolio of SMS Safety

(Click the link below to review Appendix A)

**SSG Portfolio of SMS Safety**

### Appendix B: Surface Safety Group Surface Safety Initiatives Team Tracker

<table>
<thead>
<tr>
<th>Initiative</th>
<th>Lead Organization(s) and POC</th>
<th>POC Email Address</th>
</tr>
</thead>
<tbody>
<tr>
<td>Runway Guard Lights (RGL) to increase situational awareness for pilots and vehicle drivers</td>
<td>SSG SSIT: Caroline Gillis</td>
<td><a href="mailto:caroline.gillis@dot.gov">caroline.gillis@dot.gov</a></td>
</tr>
<tr>
<td>Small Airport Surface Surveillance (SASS)</td>
<td>MIT Lincoln Lab/NextGen ANG-C52: Robert Higginbotham</td>
<td><a href="mailto:robert.higginbotham@faa.gov">robert.higginbotham@faa.gov</a></td>
</tr>
<tr>
<td>Runway Incursion Prevention through Situational Awareness (RIPSAS)</td>
<td>NextGen ANG-C52: John Dutton</td>
<td><a href="mailto:john.dutton@faa.gov">john.dutton@faa.gov</a></td>
</tr>
<tr>
<td>Surface Taxi Conformance Monitoring (STCM)</td>
<td>MITRE/NextGen ANG-C52: Phillip Hoys</td>
<td><a href="mailto:phillip.hoys@faa.gov">phillip.hoys@faa.gov</a></td>
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<tr>
<td>ADS-B Vehicle Equipage</td>
<td>PMO Surface Surveillance AAM-411: Bill Kaplan</td>
<td><a href="mailto:bill.kaplan@faa.gov">bill.kaplan@faa.gov</a></td>
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<td>ASDE-X Taxiway Arrival Prediction (ATAPI) Enhancement</td>
<td>NASS Engineering AAM-148/ATAPI Collaborative Work Group: Margit McKee/Bridget Singharamukul</td>
<td><a href="mailto:runwaysafety@nass.gov">runwaysafety@nass.gov</a> (Bridget)</td>
</tr>
<tr>
<td>ASSC Taxiway Arrival Prediction Enhancement</td>
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</tr>
<tr>
<td>Real-time Speech Recognition for Wrong Surface landings</td>
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<td><a href="mailto:scott.proudfoot@faa.gov">scott.proudfoot@faa.gov</a></td>
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<tr>
<td>Applications of Computer Vision at the Runway Environment</td>
<td>MITRE/Runway Safety Group: AAI-140: Giovanni Dipierro</td>
<td><a href="mailto:giovanni.dipierro@faa.gov">giovanni.dipierro@faa.gov</a></td>
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<tr>
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<tr>
<td>STARS Approach Runway Verification (AVR) Enhancement</td>
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</tr>
<tr>
<td>Runway Incursion Mitigation (RMI)</td>
<td>Airports AAS-100: Steve Debban</td>
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<td>Approach/Departure Signage and Markings</td>
<td>Airports AAS-100: Mike Rottinghaus</td>
<td><a href="mailto:mroettinghaus@faa.gov">mroettinghaus@faa.gov</a></td>
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<tr>
<td>Hot Spot Standardization and Wrong Surface Hot Spots</td>
<td>POG AAM-140/Airport Mapping: AAM-142: Chantel Maddox &amp; Ray German Jr</td>
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<tr>
<td>Surface Surveillance Sustainment Portfolio</td>
<td>PMO Surveillance Broadcast Services: Bill Kaplan</td>
<td><a href="mailto:bill.kaplan@faa.gov">bill.kaplan@faa.gov</a></td>
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<tr>
<td>Runway End Identification Lights (REIL)</td>
<td>Western Service Area Runway Safety: Chris Diggins</td>
<td><a href="mailto:chris.diggins@faa.gov">chris.diggins@faa.gov</a></td>
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</table>

For More Information:

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Published by ATO Safety and Technical Training
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<td><strong>Appendix A:</strong> Utilize peer learned and opportunities</td>
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<td>Use the Take a Stand for ACs campaign to raise awareness encouraging participation from both GA and Air and the transfer and the transfer of communication systems. Pilot in-the-Loop).</td>
<td>Use pilot controller operators emphasizing Runway Safety (RIPSA); using available technology using available technology continuously.</td>
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### Visual Recommendations

<table>
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<tr>
<th>Initiative</th>
<th>Description</th>
<th>Assigned to</th>
<th>Baseline Target Date</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Technology and Utilization</td>
<td>Determine where technology adoption would be most beneficial using a “right straight run” approach for candidate airports in order to decrease runway incursions.</td>
<td>NextGen</td>
<td>9/30/2018</td>
<td>In progress</td>
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<tr>
<td>2. General Aviation Pilots—Periodic Training on Ground Markings/Surface Operational/Environmental Awareness</td>
<td>Exploring federal regulations to require runway safety training resources. Develop an awareness campaign aimed at certified flight instructors to use and review an advisor circle in other M&amp;A documents regarding runway safety elements. Conduct internal training for runway incursions.</td>
<td>NextGen</td>
<td>9/30/2017</td>
<td>In progress</td>
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<tr>
<td>3. Communications</td>
<td>Convey Pilot Training to Operators: Aural Communications</td>
<td>NextGen</td>
<td>9/30/2019</td>
<td>In progress</td>
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### Provisions and Awareness

<table>
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<tr>
<th>Initiative</th>
<th>Description</th>
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<th>Due Date</th>
<th>Status</th>
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<tbody>
<tr>
<td>1. Implement Closed Runway Operation—Prevention Device (CROPD) Voice Recognition Technology</td>
<td>Relocate ✗ technology landings on one runway. Implement one 🛇 per service area. Track each execution of CROPD data.</td>
<td>9/30/2017</td>
<td>Complete</td>
<td>IG has acknowledged as complete.</td>
</tr>
</tbody>
</table>

**Complete to OIG in May 31, 2019 response to OIG Report No. AV2018058:**

The FAA proposes closing out this recommendation with the transfer of the initiative to the SSG.

**Recommendation #6**

The FAA proposes closing out this recommendation with the transfer of the initiative to the SSG.

**Baseline Target Date:** 9/30/2018

**Status:** In progress

**Complete to OIG in May 31, 2019 response to OIG Report No. AV2018058:**

As noted in November 2018 OIG Report, FAA conducted research, evaluating implementation of closed runway operation prevention device (CROPD) on 19 high-risk runways. The FAA is working on the implementation of CROPD technology to 17 additional high-risk runways, with installation expected to be complete in 2019.

**Complete to OIG in May 31, 2019 response to OIG Report No. AV2018058:**

As noted in November 2018 OIG Report, FAA conducted research, evaluating implementation of closed runway operation prevention device (CROPD) on 19 high-risk runways. The FAA is working on the implementation of CROPD technology to 17 additional high-risk runways, with installation expected to be complete in 2019.

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**Baseline Target Date:** 9/30/2018

**Status:** In progress

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As noted in November 2018 OIG Report, FAA conducted research, evaluating implementation of closed runway operation prevention device (CROPD) on 19 high-risk runways. The FAA is working on the implementation of CROPD technology to 17 additional high-risk runways, with installation expected to be complete in 2019.

**Recommendation #6**

The FAA proposes closing out this recommendation with the transfer of the initiative to the SSG.
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<th>WSRMRA</th>
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<tr>
<td>WSL-SRMRA-07</td>
<td>7/15/2020</td>
<td></td>
<td>This will be closed with WSL-SRMRA-10.</td>
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<tr>
<td>WSL-SRMRA-17</td>
<td>4/15/2020</td>
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<td>This will be closed with WSL-SRMRA-02.</td>
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<tr>
<td>WSL-SRMRA-29</td>
<td>9/27/2019</td>
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<td>This will be closed with WSL-SRMRA-18.</td>
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</table>

Due to the large number of recommendations within the WSRMRA, only a few examples are provided to illustrate the structure of the recommendations. Each recommendation is assigned a unique number and date, indicating when it was considered or updated. The descriptions are concise and focus on specific aspects of the recommendations, such as the date and number of the recommendation, the description, and potentially the actions or outcomes associated with it.