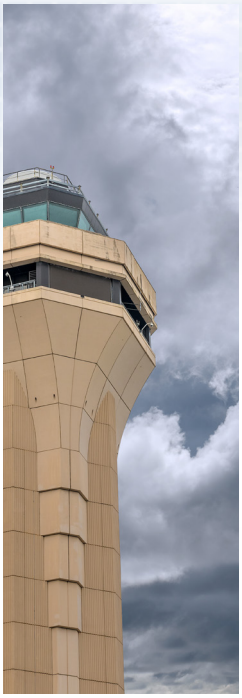
National Runway Safety Plan

2024-2026



Committed To Continuously Improving Surface Safety

Federal Aviation Administration

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Executive Summary

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Aviation captivates us with the elegance of flight, where every successful journey takes off and lands on the ground. This principle lies at the core of our focus within the National Runway Safety Plan 2024-2026.

Our mission is to deliver premier quality, data-informed safety trends, technical training, mitigations, and data management, all aimed at reducing risk in the NAS/Surface Environment. With our value proposition of innovation and dynamic leadership, we are ready to tackle the challenges of an evolving NAS.

Our vision is to be recognized for our excellence in transforming information into actionable insights that drive effective mitigations. This strategic plan outlines the vision and objectives of the Runway Safety Group for the next three years, reaffirming our unwavering commitment to mitigating surface risks and continuously enhancing runway safety.

To further bolster our capabilities, we have recently integrated Aviation Risk Identification and Assessment (ARIA) into the Runway Safety Program. This integration empowers our safety experts with valuable insights, allowing them to identify risks beyond mere compliance and make informed decisions based on data, prioritizing risk management.

By leveraging these insights and accurate data, we amplify the impact of Runway Safety's outreach initiatives. Our emphasis on proficiency, continuous education, and training for controllers, pilots, and vehicle operators ensures that we possess the necessary skills to identify and mitigate risks associated with airport surface operations.

As a prominent stakeholder in the National Airspace System (NAS), Runway Safety extends its expertise and shares best practices with a global audience, contributing to the enhancement of surface safety worldwide. Through the application of our Safety Management principles, we strive to create a safer environment for all.

We are immensely grateful for the dedication and collaboration of numerous individuals in the success of the Runway Safety Program at airports across the nation. It is through this collective effort and shared responsibility that we drive our strategic safety initiatives forward. The Runway Safety Program acknowledges and appreciates the continued cooperation of Air Traffic Services, Flight Standards Service, the Office of Airports, and Technical Operations.

Together, we are making significant strides in reducing surface risks by addressing both local and systemic issues, ultimately ensuring safer operations for all involved. Our commitment to continuous improvement and proactive measures enables us to enhance runway safety, fostering a secure environment for aviation worldwide.

Overview

Ensuring the safety of runways in the National Airspace System (NAS) remains a top priority for the FAA. The National Runway Safety Plan (NRSP) 2024-2026 aligns the strategic goals of the FAA's Runway Safety Program with the established principles of the Air Traffic Organization (ATO) Safety Management System (SMS). This commitment to safety is exemplified not only in the plan's comprehensive approach but also in the forward-looking initiatives undertaken by the ATO Safety & Technical Training (AJI).

In a proactive move, AJI initiated a strategic planning exercise for FY24-26, designed to harmonize its personnel, priorities, and expertise while seamlessly incorporating data insights and stakeholder input. This initiative, slated for finalization in October, is poised to chart a course for AJI's future, ensuring continuity and direction irrespective of potential leadership changes. To shape this strategic roadmap, the process encompassed a range of actions, including defining visionary aspirations, conducting internal focus groups, and meticulously compiling an exhaustive inventory of products and services.

Notably, the collaborative essence that underpins the NRSP is mirrored in the very development of AJI's strategy. The Acting AJI Vice President emphasized the inclusive and cooperative nature of this strategic formulation process, while the AJI Vice President underscored the critical imperative to harness the full potential of talent and technology to elevate safety standards across the expansive tapestry of the National Airspace System.

The NRSP 2024-2026 blueprint reflects these principles and endeavors. It outlines the collaborative synergies fostered among the FAA, airport operators, and the broader aviation industry. Together, they commit to enhancing safety performance across the intricate tapestry of the surface environment and the NAS. This commitment is underpinned by the strategic utilization of data-driven insights and the application of risk-based decision-making frameworks. The purview of the surface environment encompasses the safeguarding of runway and taxiway surfaces, along with the contiguous protected zones.

Guided by the four cardinal principles of the ATO SMS—Safety Policy, Safety Risk Management, Safety Assurance, and Safety Promotion—the Runway Safety Program stands as a robust cornerstone for managing the gamut of surface safety risks. Built on this bedrock, the program orchestrates a transition from a traditional compliance-centric safety assurance paradigm to the dynamic terrain of Risk-Based Safety Management (RBSM).

Overview

Serving as a continuous embodiment of the commitment to RBSM, ARIA becomes a navigational compass guiding resource allocation and fostering intelligent, risk-conscious, and data-informed decisions. This module becomes a lodestar not only for optimal resource utilization but also for the proactive identification of potential safety concerns and the recalibration of prevailing policies and procedures.

The NRSP 2024-2026 further delineates the organizational architecture of the Runway Safety Program, which spans the spectrum from ATO Safety and Technical Training to the Runway Safety Group and the Runway Safety Council (RSC). This intricate network seamlessly integrates external oversight entities, including the National Transportation Safety Board (NTSB), U.S. Government Accountability Office (GAO), and the Department of Transportation (DOT) Office of Inspector General (OIG). These collaborative forces synergize to meticulously identify and address surface risks across the various stages of the SMS process, encompassing data aggregation and analysis, policy formulation, comprehensive planning, and effective communication and education.

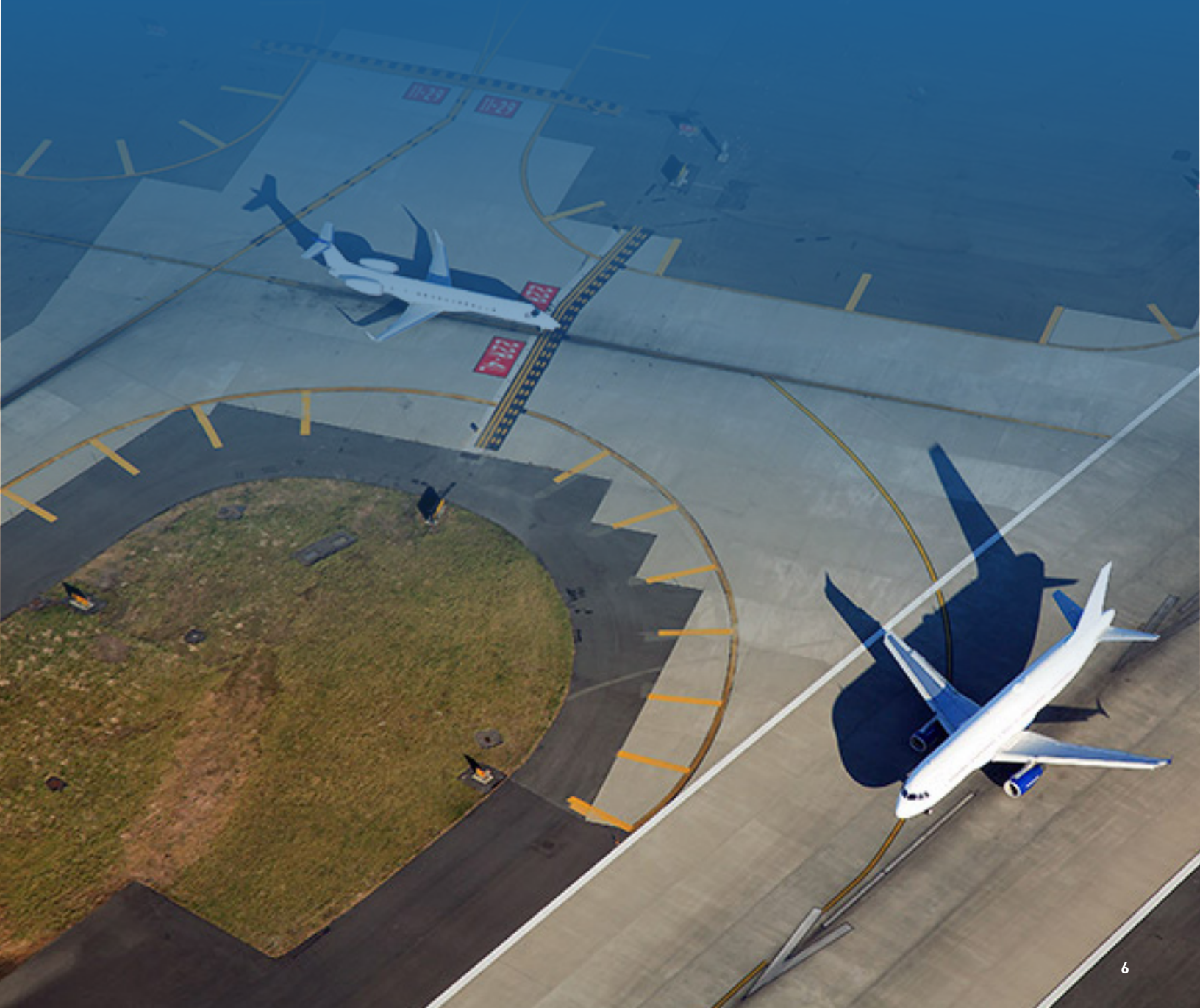
Within this strategic panorama, the NRSP 2024-2026 outlines a series of strategic and tactical initiatives charting a path for the Runway Safety Program over the ensuing three years. These initiatives cast a wide net, ranging from amplifying existing technologies to embarking on pioneering research and development ventures within advanced surface surveillance technology. Moreover, the plan underscores the pivotal role of education and outreach endeavors, tailored to empower air traffic controllers, pilots, and airfield drivers with knowledge and awareness.

Crucially, the FAA's Runway Safety Program aspires to transcend geographical boundaries and cast its safety influence far beyond the confines of the NAS. This ambition underscores the program's commitment to the global advancement of runway safety standards.

For those seeking deeper insights, a repository of supplementary documents and resources awaits on the FAA Runway Safety Website, offering an invaluable trove of information to facilitate a more comprehensive understanding of the program's tenets and undertakings.

In the symphony of these interconnected efforts, the FAA's dedication to runway safety resounds resolutely, echoed by the harmonious collaboration, dynamic strategies, and technological innovations that define the National Runway Safety Plan 2024-2026.

SMS Components and Runway Safety Initiatives



Regulations and Guidelines

Objective: The aim is to establish and maintain the necessary policies, procedures, and guidelines that foster an effective, collaborative, and adaptable safety culture within the Runway Safety Program.

In accordance with the principles of the ATO SMS, several initiatives are being pursued, encompassing responsibility, accountability, clear expectations, leadership, organizational buy-in, and continuous improvement. Acting as a comprehensive framework governing air traffic management and related services, the ATO SMS prioritizes adherence to current policies while remaining receptive to assessing the necessity for updates or adjustments.

The ATO SMS serves as the guiding principle that enables the ATO to objectively evaluate the safety of its operations. This comprehensive document is the outcome of a collaborative effort spanning the entire ATO and incorporates the latest international best practices and lessons learned within the agency. It represents a significant milestone towards achieving a mature and integrated SMS within the FAA.

To ensure the involvement and guidance of stakeholders in runway safety at both national and global levels, standard practices are implemented.

Figure 2: Runway Safety Policy

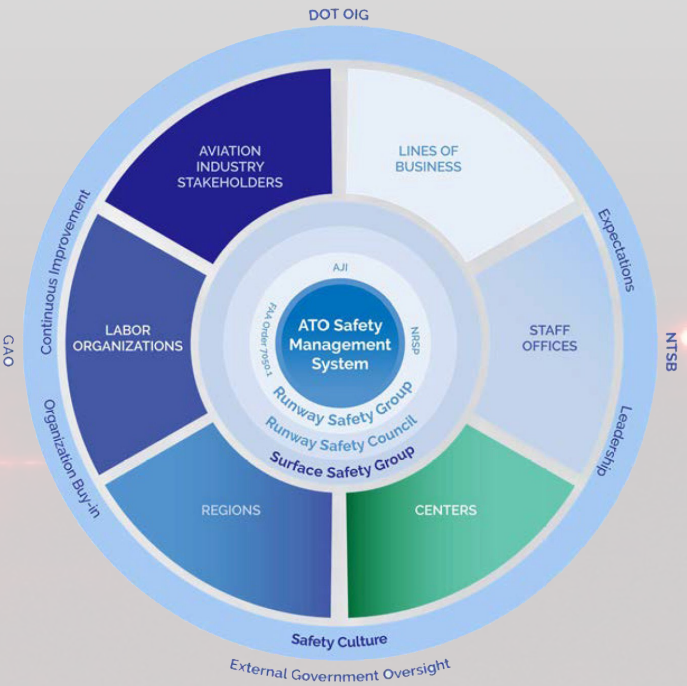


Figure 2 provides an overview of the relevant stakeholders and policy framework associated with runway safety. The RSC comprises executive leadership from stakeholder organizations, with the objective of transforming the existing safety culture and promoting a proactive management policy through collaboration among the FAA, other federal entities, and the aviation industry. Presently, the ATO Safety and Technical Training, Safety Directorate administers the RSC, as defined by FAA Order 7050.1 Runway Safety Program.

The RSC serves as the primary agent responsible for monitoring and addressing runway safety performance within the NAS. Through monitoring activities, existing policies and safety measures are assessed to identify their effectiveness and highlight areas of unacceptable risk. When necessary, the Surface Safety Group (SSG), a cross-functional working group composed of representatives from RSC member organizations, is assigned to address identified concerns and provide recommendations for policy enhancements.

To continuously enhance NAS safety, the ATO conducts safety audits and assessments to evaluate the system's performance. For new elements or changes, a Safety Risk Management (SRM) panel, guided by SMS principles, conducts safety hazard analyses to identify potential risks and assess their level of hazard before their introduction into the NAS. The RSC will assign the SSG the task of mitigating any safety requirements related to surface safety, identified by the SRM panel.

Safety Policy

Safety Policy - The documented ocganizational policy that defines management's commitment, responsibility, and the accountability for safety

Safety Promotion - The communication and distribution of information to improve the safety culture and the development and implementation of programs.

Safety Risk Management - A process within SMS composed of describing the system; identifying the hazards; and analyzing, assessing, and treating risk.

Safety Assurance - A set of processes within the SMS that verify that the organization meets or exceeds its safety performance objectives

Initiatives

1. Improve external communications between air traffic managers and airport operators about local operations and safety challenges by requiring air traffic control managers to share information on terminal area incidents promptly. ATMs must also convene conferences as often as local operational matters warrant. This will help airport operators identify and implement needed mitigations more quickly. These practices were incorporated into the FAAO 7210.3DD change effective April 20, 2023.

2. Assess existing runway safety program policies documented in FAA Order 7050.1 Runway Safety Program to identify where safety enhancements can be made, emphasizing risk-based safety management to mitigate risks or hazards that improve surface safety.

3. Expand Arrival Alert Notices (AAN) from 11 airports to include thirty additional airports with a history of misalignment risk.

Milestones

1. FAA Order 7050.1 Runway Safety Program was signed into effect on October 20, 2021

2. Introduced Arrival Alert Notices (AAN) at 12 airports with a history of misalignment risk incorporating the new standardized hot spot symbology.

3. The Runway Safety Group worked with Mission Support Services (AJV) and the FAASTeam to publish hot spot standardization symbology on airport diagrams. Hot Spots were previously charted with a variety of shapes and no consistency. They are now defined by ground movement and distinct shapes.

Safety Risk Management

Objective: Continuously monitor the level of surface risk within the National Airspace System (NAS) and evaluate the need for new or revised mitigations.

The FAA's Runway Safety Program is firmly committed to ensuring the highest levels of safety and security within the runway environment. This dedication is exemplified by its adoption of a robust Risk-Based Safety Management (RBSM) approach, which proactively identifies and addresses potential risks through data analysis, investigations, and preemptive measures, effectively preventing the escalation of hazardous situations.

Central to the program's mission is the cultivation of a culture of runway safety through comprehensive training initiatives. Pilots, air traffic controllers, and airport personnel benefit from structured programs, refresher courses, and access to a wealth of printed materials, online resources, and industry publications. Notably, the Special Focus Runway Safety Action Team (SFRSAT) meetings are a prime example of collaborative efforts, bringing together various stakeholders at high-risk airports to develop effective mitigations and best practices.

Technological advancements and innovative design strategies play an indispensable role in advancing runway safety. Runway status lights and cockpit moving map displays have proven to be potent tools in preventing collisions and enhancing situational awareness. The program's commitment to improvement is evident in its evaluation of safety measures such as the Airport Surface Detection Equipment, Model X (ASDE-X) and Airport Surface Surveillance Capability (ASSC), which underscores its dedication to maintaining and enhancing safety standards.

A standout enhancement arising from this commitment is the ASDE-X and ASSC Taxiway Arrival Prediction (ATAP) system, which has been implemented at 43 airports within the NAS. By seamlessly integrating data from diverse sources, including radars and transponder systems, ATAP delivers precise target positioning and identification intelligence, providing air traffic controllers with heightened accuracy and control over airport operations.

The success of the Runway Safety Program is evident in the substantial reduction of runway incursions achieved through the Runway Incursion Mitigation (RIM) Program. By meticulously addressing nonstandard geometry factors and collaborating with airports, this program has realized an impressive average reduction of 78% in runway incursions at mitigated locations.

Furthermore, air traffic procedures benefit from continual enhancement, supported by tools like the Aviation Risk Identification and Assessment (ARIA) tool. Rooted in a risk-based safety management approach, ARIA offers valuable insights into aircraft operations, further fortifying the safety framework.

Collaboration remains a linchpin of the Runway Safety Program, as evidenced by the Runway Safety Council, Surface Safety Group, and Runway Safety Action Teams. These collaborative entities channel collective efforts towards the implementation of improvements and mitigations, fostering an enduring culture of safety across the aviation community. Regional Runway Safety Plans oversee and streamline these initiatives, providing a robust framework for maintaining and enhancing runway safety.

Initiatives

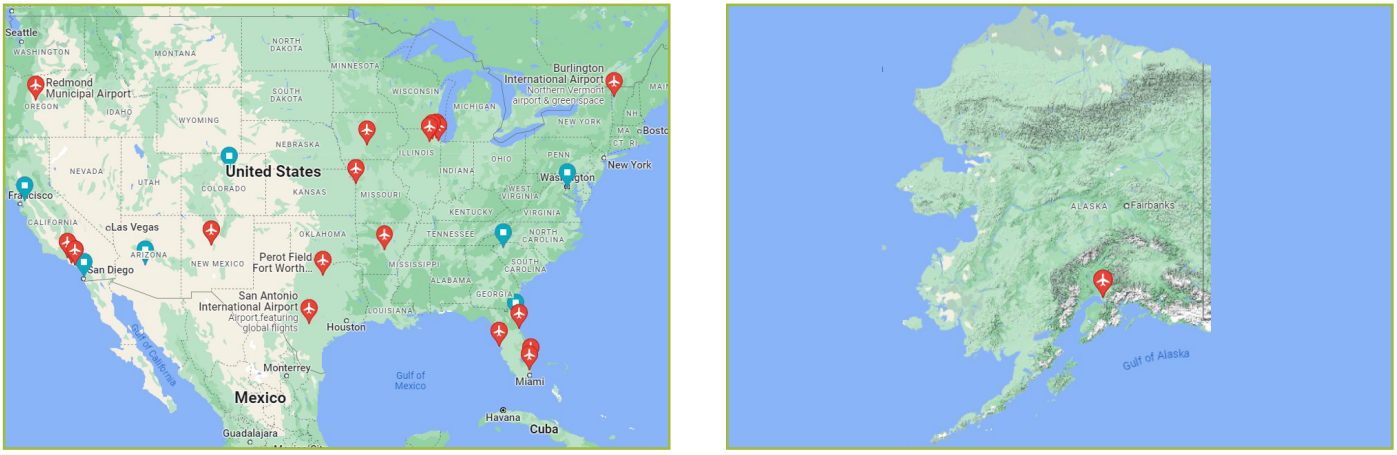
1. Promote runway safety initiatives that leverage technology.

2. Continue collaborating with the various offices of the FAA and other government industry aviation stakeholders to identify and assess surface safety risks in the NAS.

3. Making data-driven decisions to reduce risk in the NAS.

4. Utilize the RSAT web tool and its pertinent runway safety data to prepare for local RSAT meetings and conduct Safety Risk Management (SRM).

5. Establish the surface Barrier Analysis Review (BAR) process.



FY21-23 SFRSAT Locations

Milestones

1. Conducted at least nine Special Focus RSAT (SFRSAT) meetings annually at specified airports with elevated rates of wrong surface and runway incursions to develop best practices and propose mitigations. Runway Safety will subsequently monitor the effectiveness of the RSAT by tracking runway incursion rates and wrong surface operations. The SFRSAT is delivered in partnership with the Airport District Office, Flight Standards Service, and the FAA Safety Team (FAASTeam)

2. Completed implementation of ASDE-X Taxiway Arrival prediction (ATAP) at ASDE-X, and Airport Surface Surveillance Capability (ASSC) Airports (during the Covid pandemic). ATAP has demonstrated tremendous success since implementation.

3. Employing the latest data analysis, dedicated to creating and promoting educational materials that effectively address surface risks in the NAS. This encompasses a range of tools, including dynamic visuals, over 120 videos, and most notably, Pilot Handbooks. These essential guides offer concise and practical insights, enriched with visuals and clear text. This strategic focus ensures pilots possess vital knowledge to confidently manage surface risks.

Safety Assurance

Objective: Implement a data-driven approach to continuously assess the effectiveness of risk mitigation strategies and controls, while proactively identifying emerging or increasing hazards.

Safety assurance serves as the means to demonstrate the proper application of organizational arrangements and processes for achieving safety objectives. Our focus is on monitoring and measuring safety performance, managing change, and promoting continuous improvement. Safety assurance must be dynamic, going beyond mere compliance. In the past, the FAA primarily evaluated runway safety by examining the number and severity of runway incursions. While this provided some insight, it did not paint the complete picture.

Our goal is to utilize data to evaluate the risk within the National Airspace System (NAS). Assessing the impact of Runway Safety Program initiatives relies on comprehensive and reliable data. Advancing surface safety requires identifying underlying systemic risks and evaluating the adequacy of existing barriers. If the existing measures are inadequate, understanding the reasons behind it becomes crucial. This understanding allows us to introduce additional or new barriers to address the risks before they lead to accidents or incidents. Ensuring the accuracy of the data used in risk identification and mitigation is of utmost importance.

Implemented in October 2019, the Surface Safety Metric (SSM) goes beyond traditional analysis of runway incursion data, which focuses solely on the number of events. The SSM was developed to measure the safety performance of the NAS in the surface environment, encompassing various event types such as runway collisions, incursions, excursion accidents, excursion incidents, surface collisions, and surface incidents. By considering all types of runway safety events, the SSM provides a more accurate reflection of overall surface safety in the NAS.

Furthermore, the SSM incorporates an increased number of data sources, including NTSB data and information from the Aviation System Information Analysis and Sharing (ASIAS) system. This expanded data collection allows the SSM to pinpoint areas of risk objectively and quantify the level of risk, providing a more precise understanding of risk within the NAS.

The Runway Safety Council (RSC) advocates for the application of the SSM as a critical indicator across the agency to monitor surface safety risk trends and identify areas requiring additional attention. Collaborating with the Runway Safety Group, the RSC integrates efforts among the FAA, other government stakeholders, and industry partners. This collaboration facilitates the monitoring and assessment of mitigation tools and tactics, leading to well-informed, risk-based decision making and management.

In 2020, the Runway Safety Group developed and launched the Runway Safety Action Team (RSAT) Web Tool. This tool offers Runway Safety data from 2016 to the present, making it accessible to airports across the NAS. Additionally, it provides a Google Earth representation of events on an airport diagram, simplifying the process for air traffic facilities to filter areas of concern and create mitigations to prevent future surface incidents. By using pin drops to illustrate each runway incursion and surface incident, the tool effectively portrays risk, assisting facilities in identifying surface hotspots for vehicle drivers, pedestrians, and pilot awareness. Moreover, the RSAT web tool plays a crucial role in helping facilities prepare for Safety Risk Management (SRM) Panels as part of the SMS process.

The ARIA program, facilitates an enriched understanding of prospective safety hazards within the NAS. The ongoing development and application of ARIA,

coupled with diverse runway safety tools, steadfastly reaffirm the agency's dedication to Risk-Based Safety Management (RBSM). This strategic approach empowers the ATO to pinpoint potential risks, effectively tackle safety concerns, and ensure their comprehensive resolution endures.

Initiatives

1. Provide better insight into potential surface safety risks in the NAS in support of the transition from compliance to Risk Based Safety Management (RBSM) through the use of ARIA the Aviation Risk Identification and Assessment (ARIA) and the Barrier Analysis Review (BAR) process.
2. Continue the application of Risk Based Safety Management (RBSM) by systemic management of surface safety through a continuous and comprehensive application of investigative, reporting, analysis, mitigation, measurement, and feedback.
3. Broaden the utilization of Surface ARIA, which was implemented on October 1, 2021.
4. In partnership with the Surface Safety Group (SSG) and the Runway Safety Council (RSC), continue collecting data to monitor and assess existing mitigation efforts relative to the level of risk in the NAS measured by the Surface Safety Metric (SSM). Leverage the RSC meetings to explore recommended solutions and widely communicate the findings.
5. Validate wrong surface events for better accuracy of the violation.
6. Investigate the trend of wrong surface operations to identify and understand the factors involved. Develop a process to analyze where and under what circumstances wrong surface operations pose a risk. Develop a strategy to mitigate the risk(s) indicated by the analysis.

RISK-BASED SAFETY MANAGEMENT

What are the benefits of RBSM?

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

APPROACH

Mitigation efforts based on aggregated data that identifies and vali-dates risk in the system

RESULTS

- Addresses compliant and non-compliant operations
- 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 operations 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

Milestones

1. Maintain the weighted Commercial Surface Safety Risk Index at or below 0.35 per million airport operations for commercial aviation.

2. Maintain the weighted Non-Commercial Surface Safety Risk Index at or below 0.60 per million airport operations for non-commercial aviation.

3. Aligned the Surface Safety Metric (SSM) with the weighting used in the Airborne Safety Metric (ASM).

4. Developed a runway safety dashboard for analyzing surface risk.

Safety Promotion

Objective: Continuously communicate, advocate and educate.

Enhancing runway safety necessitates effective communication between operators and users. The Runway Safety Program tirelessly promotes national changes in runway safety performance measures. Strategic communication products have been developed to provide local runway information and guidance based on data analysis.

Promotional activities and products that address specific airport issues have proven effective in raising awareness. These products offer instructional tools to front-line audiences such as pilots, controllers, and airfield drivers.

To reduce the risk of surface events, Runway Safety engages in multiple outreach methods, including creating educational products, social media engagement, airport-specific and topic-focused videos, and animations of real events. Outreach efforts involve participating in in-person events such as Communicating for Safety (CFS), annual air shows, stakeholder conferences, conventions, technology symposiums, and virtual forums like the National Association of Flight Instructors (NAFI) MentorLIVE broadcasts.

The FAA has produced over 100 site-specific "From the Flight Deck" videos, which educate General Aviation pilots about the risks associated with operating at specific airports within the National Airspace System. These videos include actual footage, diagrams, and visual graphics to highlight hot spots and other safety-sensitive areas. The series has gained significant popularity, with over half a million YouTube views and a steady increase in engagement over the years.

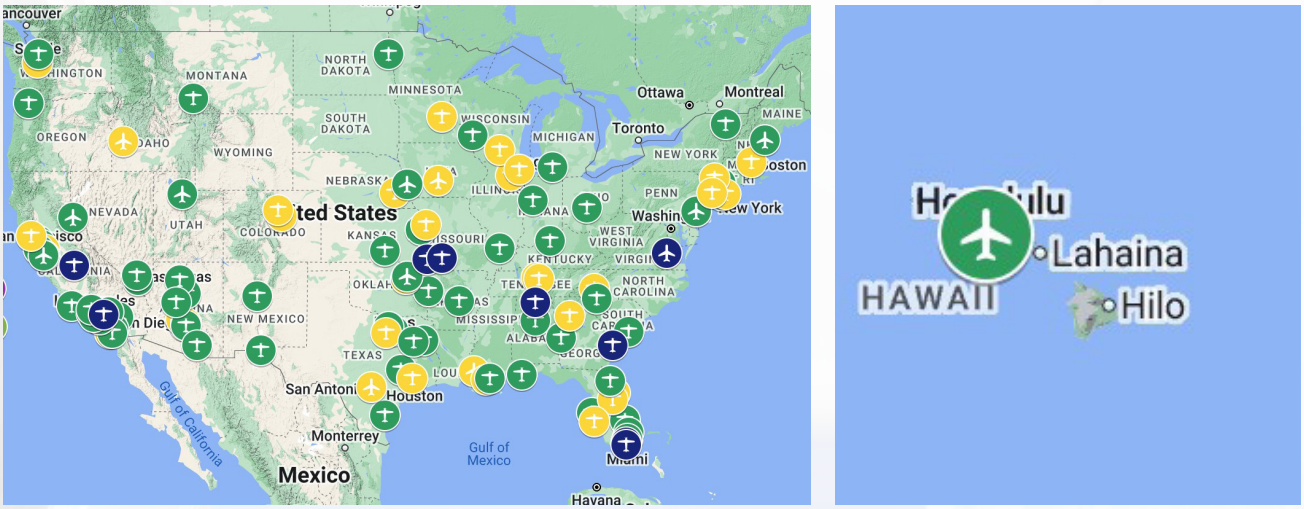
To further leverage the success of the "From the Flight Deck" series and improve surface safety, the FAA has hosted virtual events targeting General Aviation pilots, commercial pilots, and airfield operators. These events bring together industry representatives, pilots, air traffic controllers, meteorologists, and others to discuss safety and operational concerns. The aim is to provide pilots with information on runway procedures, preempt airfield errors, and reduce the potential for accidents.

In an effort to expedite content creation and facilitate smooth updates, the FAA has also made available "pilot handbooks" on faa.gov. These handbooks encompass airport-specific cautions, communication details, airspace information, best practices, tips for lost communications, and other valuable preflight planning resources.

The FAA also organizes surface safety symposiums, including general aviation, commercial and vehicle-focused events. These symposiums serve as platforms to address topics such as runway incursions, wrong surface operations, and vehicle deviations, with a particular emphasis on operator awareness and education.

Initiatives

1. Enhance the Runway Safety Action Team (RSAT) meetings by utilizing the RSAT Web Tool for data-driven discussions.
2. Reduce the risk of surface events through outreach and education promoted via social media engagement, video products, pilot controller forums, and an animation library based on actual events.
3. Develop, publish, and promote additional "Pilot Handbooks" – a written form of communication from air traffic control on what a pilot should know before operating an aircraft at that airport. The content details airport-specific cautions, important information to pilots from local air traffic controllers, specific airport communications, airspace details, airport details, best practices, lost communication tips, and other preflight planning resources.
4. Conduct outreach to stakeholders through presentations as requested.

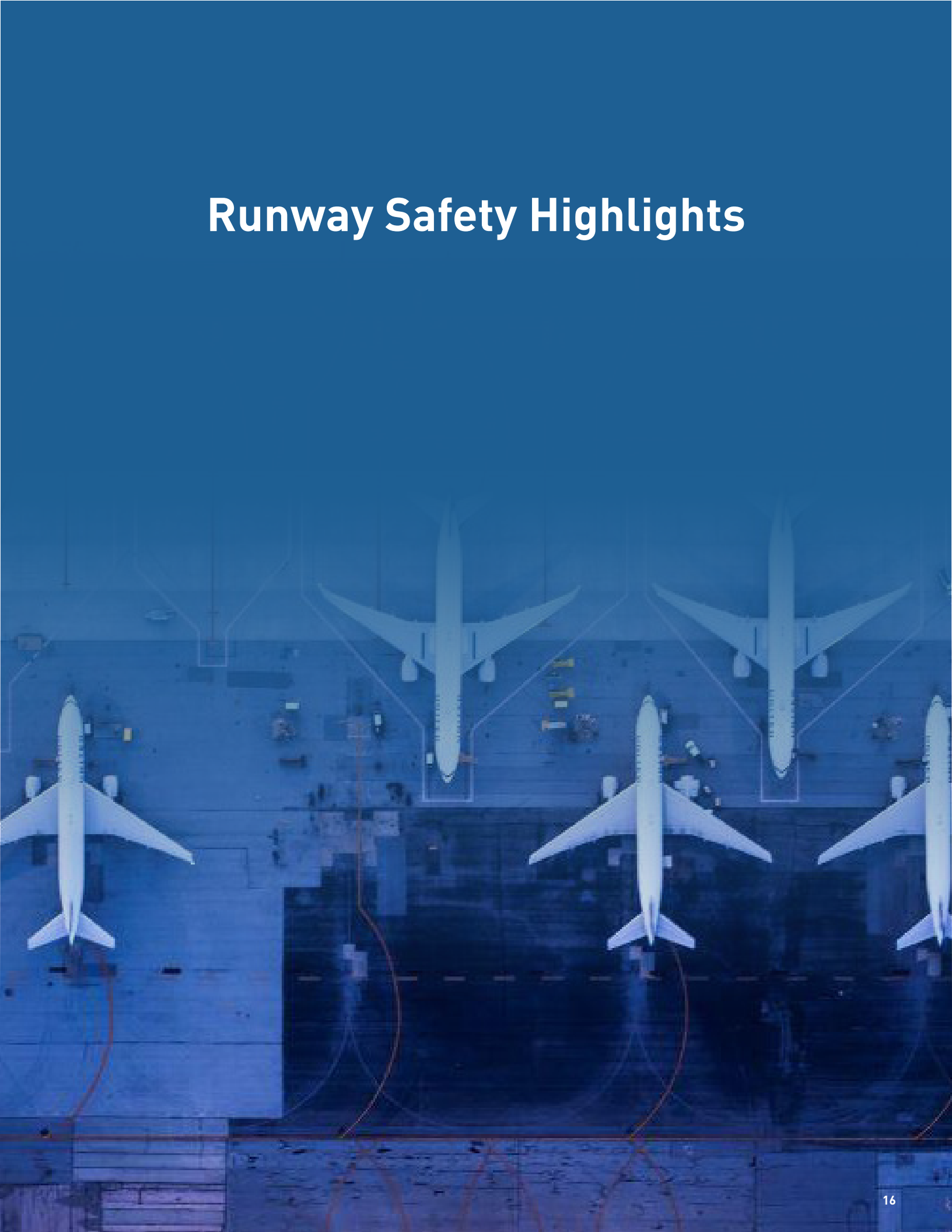


From the Flight Deck & Pilot Handbook Locations

Milestones

1. Annually, performed at least one RSAT meeting at each towered airport.
2. Utilized the RSAT Web Tool at each towered airport to review events during the RSAT Meeting.
3. Developed, distributed, and publicly promoted 120+ "From the Flight Deck" series videos
4. Developed, distributed, and promoted the use of "Pilot Handbooks"
5. Produced animation for the Runway Safety Pilot Simulator library.
6. Developed a video specific to airfield drivers in collaboration with Tech Ops and Safety Services, PASS, Office of Airports, and Office of Communications (AOC).
7. Collaborated with AOC on a series of airfield driver articles of seasonal or timely relevance, such as winter operations or airport construction.
8. Collaborated with the Office of Airports and Air Traffic Services on TALPA requirements and the timely issuance of runway condition codes.
9. The Runway Safety Group actively participated in international meetings for Africa, Singapore, Mexico, and various Caribbean nations.
10. Conduct Arrival Alert Notice widespread outreach and education through AOC, Agency, and Industry partners.
11. Conducted presentations, webinars, symposiums, and safety forums to various stakeholders with the goal of reducing surface risk and promoting Runway Safety products.

Runway Safety Highlights

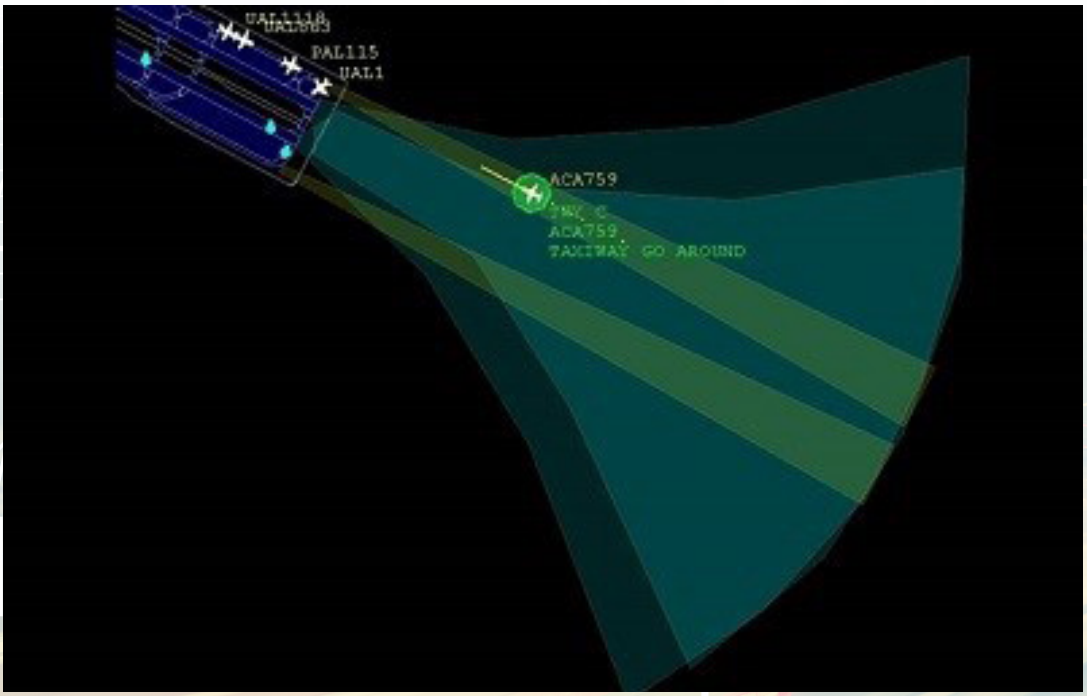


ATAP

Pilots face more than just mid-flight crashes and bad weather; they also face the risk of colliding if they mistakenly land on the taxiway instead of the runway. However, a new digital safeguard has been implemented to address this issue. The Federal Aviation Administration (FAA) has announced that 43 major US airports now utilize the ASDE-X Taxiway Arrival Prediction (ATAP) software platform. This platform alerts air traffic controllers if an aircraft is lining up to land on a taxiway by mistake. It ensures that inexperienced or fatigued aviators do not endanger lives on the ground.

The ATAP system combines standard radar and other sensors, making it compatible with aircraft of all sizes, from small turboprops to large airliners. It was initially introduced at Seattle-Tacoma International Airport in 2018, and the FAA completed software upgrades for compatible airports in September of 2022. Notable airports implementing this technology include Boston Logan, Chicago O'Hare, and New York's JFK.

The significance of ATAP extends beyond mere speculation. According to the FAA, the system has detected over 70+ potential taxiway landings between 2018 to 2023. While accidental landings are less frequent and less deadly than crashes, the software can still be invaluable in preventing disruptions to airport operations caused by an aircraft entering the wrong queue.



Alerts within 3,000 feet or 20 seconds from threshold (whichever is farther)

Requirements:

- Create new taxiway arrival regions
- Define site adaptable parameter; each airport is different
- Test regions prior to implementing at site

Goal: to achieve robust alert response with minimal nuisance alerts

Key Site: Operational at SEA since May 2018.

Runway Incursion Mitigation

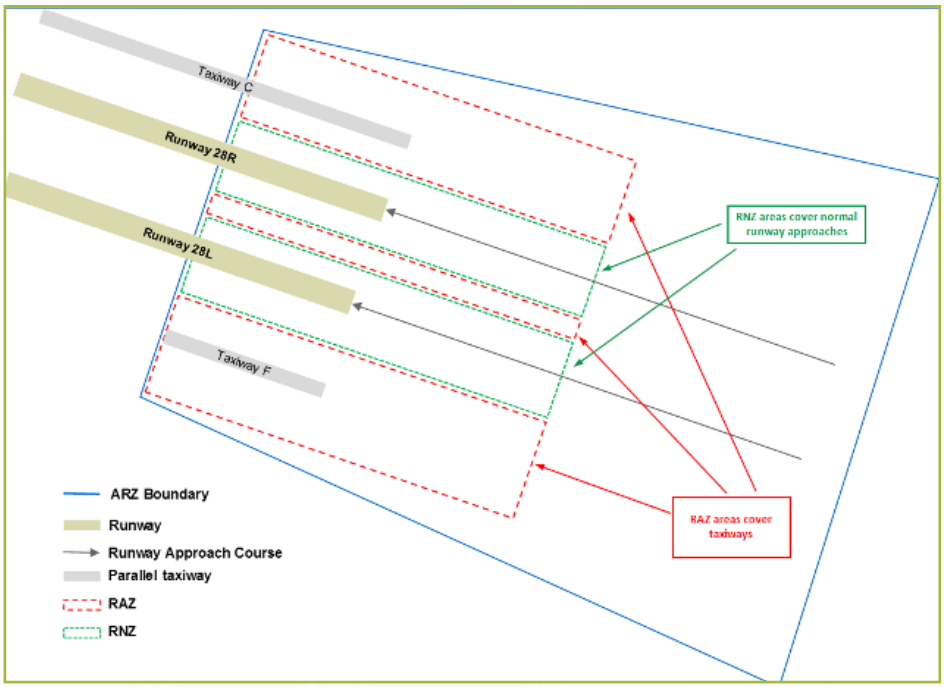
The FAA's Runway Incursion Mitigation (RIM) Program focuses on identifying and addressing non-standard geometry factors at runway/taxiway intersections that have experienced a high number of runway incursions. By analyzing and geo-referencing over 16,000 runway incursion reports spanning 14 years, the RIM Program has made significant advancements in improving runway safety since its implementation in 2015. Working in collaboration with the FAA, airports employ a variety of strategies to enhance these intersections, including modifications to airport layout, lighting systems, signage, pavement markings, and potentially operational procedures. These measures are designed to minimize pilot confusion and, consequently, reduce the occurrence of runway incursions.

As of June 2023, the RIM program has successfully mitigated 93 locations, while an additional 19 locations are in various stages of construction. These mitigations have led to an average reduction of 78% in runway incursions at their respective sites. Airport planners and designers rely on the FAA's RIM mitigation guidance outlined in AC 150/5300-13 Airport Design, along with support from FAA Regional RIM program contacts. Continuous monitoring of mitigated RIM locations is carried out over time to assess the effectiveness of the mitigation efforts and determine if additional measures are required.

Manchester-Boston Regional Airport - Hot Spot 1, mitigated Aug, 2022

Arrival Runway Verification

Arrival Runway Verification (ARV) significantly bolsters FAA's runway safety initiatives. By rigorously confirming the accuracy of approach procedures, ARV reduces the risk of errors and enhances pilot guidance during crucial landing phases. This precision prevents runway incursions, collisions, and boosts situational awareness, contributing to a safer National Airspace System. Furthermore, ARV's proactive approach ensures that approach procedures stay updated with technological advancements, aligning with FAA's commitment to ongoing safety improvement. In essence, ARV is a key tool that reinforces FAA's dedication to runway safety and supports its mission to maintain a secure and efficient aviation environment.



Example ARV Arrival Runway Zone (ARZ)

Up to 512 Arrival Runway Zones can be adapted

Aircraft on approach to runways are expected to be stabilized in Runway Normal Zones (RNZ)

If a track is stabilized in an RNZ, flight data is checked to ensure the runway is open. If not, an alert is generated.

If a track is stabilized in an RNZ, flight data is checked to make sure aircraft is on approach to the correct runway. If not, an alert is generated.

If a track is determined to be stabilized in a Runway Alert Zone (RAZ), an alert is generated.

Future Technologies

Surface Awareness Initiative

Air Traffic Controllers (ATC) bear the responsibility to maintain situational awareness not just in the skies but also on runways, taxiways, and other airport surface areas. Improving the situational awareness of ATC personnel on the ground is a priority for the future of surface safety, and this is precisely where the Surface Awareness Initiative (SAI) steps in.

This initiative aims to equip airports lacking surface surveillance capabilities with innovative and cost-effective technological solutions, thereby expanding the ATC's situational awareness. The cornerstone of SAI's technology is Automatic Dependent Surveillance–Broadcast (ADS-B), a system that t provides real-time aircraft position data on the surface.

Through the SAI, aircraft and vehicles with ADS-B capabilities will be displayed on an airport surface map. This comprehensive view may include runways, taxiways, hold ramps, and other movement areas. By integrating ADS-B technology, the SAI ensures that the airport surface is visible to controllers, regardless of weather conditions.

The FAA's unwavering dedication to safety is evident through their continuous efforts to enhance air traffic control operations. The introduction of the SAI marks a significant milestone, equipping controllers with advanced tools for better surface situational awareness. In the evolving landscape of air traffic control, the SAI contributes toward a safer, more efficient future for the NAS. Through innovation, collaboration, and a steadfast commitment to safety, the FAA is shaping the future of aviation, one runway at a time.

RIRP/RIPSA

The Runway Incursion Reduction (RIR) Program aims to enhance runway safety by researching hazard-detection technologies. It aligns with National Transportation Safety Board (NTSB) recommendations, focusing on alerts for corrective actions, catering to both large and smaller airports.

The Runway Incursion Prevention through Situational Awareness (RIPSA) project, within the RIR Program, specifically addresses runway incursions at airports without advanced ground surveillance systems. RIPSA uses a "Right-Site-Right-Size" approach to test affordable technologies at smaller airports, emphasizing surface surveillance and operator annunciation concepts.

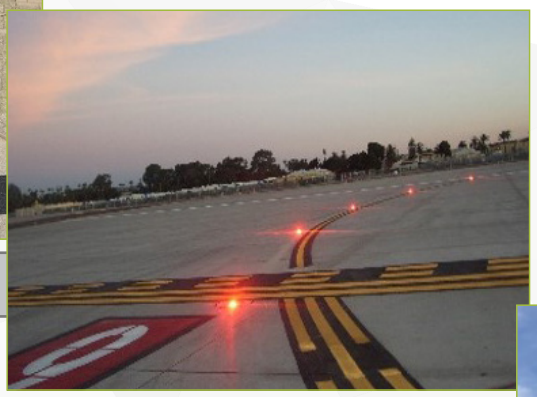
RIPSA's main goal is deploying "direct to pilot" safety solutions at high-risk areas like hold short lines and runway intersections. San Antonio International Airport (SAT) is the initial test site, with Operational Test & Evaluation (OT&E) planned for FY24/FY25.

In FY23, SAT focuses on site planning and system installation coordination with FAA and SAT Airport Stakeholders. Contracts for Site Preparation and Lighting Software will be prepared and awarded, followed by pre-construction activities.

FY24 will see the completion of the SMR Tower/Shelter and Field Lighting System installation at SAT, along with shadow operations and system optimization.

By FY25, the operational test and evaluation phase at SAT will assess the effectiveness of RIPSA technologies.

Surveillance Sensor (Radar)



REL Operation

Radar Installation

Partnering with Flight Standards

The Runway Safety Group actively collaborates with Flight Standards and the FAA to enhance outreach and promotional endeavors using a range of strategies. A recent instance of this partnership involves incorporating the Runway Safety Pilot Simulator into the official FAASTeam WINGS course lineup. This proficiency program enables pilots to accrue credits while enhancing their aviation aptitude through various initiatives.

Runway Safety and the FAASTeam have joined forces to advance aviation safety through the Safety Program Airmen Notification System (SPANS), FAAST Blast email updates, and other forms of widespread communication. These efforts aim to increase awareness regarding runway safety and empower our surface safety mission. This cooperative rapport continues to thrive and develop.

International Leadership

As a global leader, FAA Runway Safety works with international organizations to promote our best practices and lessons learned by applying our Safety Management principles to a large international audience. The FAA's Runway Safety Program plays an essential role in resolving current challenges to global aviation challenges, collaborating with our partners to improve surface safety worldwide.

The FY23 Business Plan Target is to improve aerodrome conditions worldwide to better accommodate U.S. airlines, corporate, and private operators. Many foreign aerodromes face challenges as they have not kept up with the advancements in larger aircraft and increased traffic volumes. These challenges can negatively affect U.S. stakeholders operating in those aerodromes. By leading aerodrome safety improvements, the FAA aims to enhance the operational environment for U.S. operators while creating opportunities for American aerodrome equipment manufacturers and service providers. The FAA will provide assistance to targeted aviation authorities and aerodrome operators in areas such as aerodrome certification, planning, assessment of State Safety Programs, and adoption of innovative technologies, equipment, and procedures to enhance operational safety.

To promote runway safety, the FAA worked closely with the International Civil Aviation Organization (ICAO) to facilitate three events demonstrating best practices and showcase FAA products like the Runway Safety Action Team Workshop. At the first event, representatives from the Runway Safety Group and Airports Division (ARP) conducted a Runway Safety Action Team (RSAT) Webinar and follow-on RSAT Meeting mock-up with RSAT role-playing for virtual students in Africa on April 22, 2022. The second event, representatives from the Runway Safety Group and Air Traffic Organization led a Runway Incursion Prevention (RIP) course and adaptive Runway Safety Action Team (RSAT) training class at the Singapore Aviation Academy (SAA) on December 5-6, 2022. During the third event, representatives from the Runway Safety Group conducted a Runway Safety Action Team (RSAT) Workshop for virtual students in Mexico and the Caribbean on May 23-26, 2023.

The Runway Safety Group will continue to support FAA International Outreach efforts with similar training opportunities as requested and as opportunities arise.