



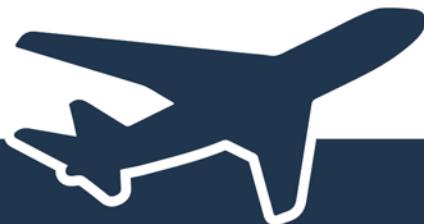
U.S. DEPARTMENT OF TRANSPORTATION
OFFICE OF INSPECTOR GENERAL

**FAA Faces Challenges in Implementing
and Measuring the Effectiveness of Its
2015 Runway Safety Call to Action
Initiatives**

FAA

Report No. AV2018058

June 27, 2018





FAA Faces Challenges in Implementing and Measuring the Effectiveness of Its 2015 Runway Safety Call to Action Initiatives

Self-Initiated

Federal Aviation Administration | AV2018058 | June 27, 2018

What We Looked At

Runway incursions—incidents involving unauthorized aircraft, vehicles, or people on a runway—have been a longstanding challenge for the Federal Aviation Administration (FAA). The Agency reported a nearly 83-percent rise in total incursions between fiscal years 2011 and 2017, and there have been serious incidents in which two aircraft have come within a few feet of colliding with each other. Due to the increase in runway incursions, in June 2015 FAA initiated a Call to Action forum that focused on developing short-, mid-, and long-term initiatives to mitigate runway incursions and improve safety. In November 2015, FAA published 22 initiatives developed at the forum. Our audit objective was to evaluate FAA's progress in implementing initiatives to improve runway safety. Specifically, we assessed the status of initiatives resulting from the 2015 Runway Safety Call to Action forum.

What We Found

As of November 2017, FAA had completed 10 of the 22 initiatives, including initiatives aimed at educating pilots on signs, markings, and other visual aids at high-risk airports and updating a best practices list for airport surface and movement areas. Ten initiatives are still in progress while two initiatives were canceled. However, the Agency faces challenges in fully implementing the initiatives still in progress. These include dedicating funding to complete four initiatives and fully implementing new technologies for seven initiatives, which could take years to complete. In addition, while FAA has implemented a monitoring plan to track the status of the initiatives, the plan does not tie the initiatives to quantifiable goals or other metrics that would measure their effectiveness in reducing runway incursions.

Our Recommendations

We made three recommendations to the Federal Aviation Administrator regarding revisions to the 2015 Call to Action monitoring plan. FAA concurred with all three recommendations.

Contents

Memorandum	1
Results in Brief	3
Background	3
FAA Has Made Progress in Implementing the 2015 Call to Action Initiatives but Faces Challenges in Implementing the Remaining Initiatives and Measuring Their Effectiveness	5
Conclusion	11
Recommendations	12
Agency Comments and OIG Response	12
Actions Required	12
Exhibit A. Scope and Methodology	13
Exhibit B. Organizations Visited or Contacted	14
Exhibit C. List of Acronyms	16
Exhibit D. Status of the 2015 Call to Action Initiatives as of November 2017	17
Exhibit E. Major Contributors to This Report	23
Appendix. Agency Comments	24



Memorandum

Date: June 27, 2018

Subject: ACTION: FAA Faces Challenges in Implementing and Measuring the Effectiveness of Its 2015 Runway Safety Call to Action Initiatives | Report No. AV2018058

From: Matthew E. Hampton 
Assistant Inspector General for Aviation Audits

To: Federal Aviation Administrator

For the Federal Aviation Administration (FAA), runway incursions—incidents involving unauthorized aircraft, vehicles, or people on a runway—are a longstanding challenge. While FAA has undertaken a number of runway safety initiatives since 2007, the number of reported incursions has significantly increased over the last several years. The Agency reported a nearly 83-percent rise in total incursions between fiscal years 2011 and 2017.

In addition, there have been serious incidents recently where two aircraft have come within a few feet of colliding with each other. For example, in January 2018, an Aeromexico flight from Mexico City was cleared to land on runway 28R at San Francisco International Airport but instead lined up with runway 28L, on which traffic was departing. The aircraft had descended to about 500 feet before executing a missed approach.¹

Due to an increase in runway incursions, FAA initiated a Call to Action forum in June 2015 with representatives from industry, labor, and Government. The forum focused on developing short-, mid-, and long-term initiatives to mitigate runway incursions and improve safety. In November 2015, FAA published 22 initiatives developed at the forum.

Our audit objective was to evaluate FAA's progress in implementing initiatives to improve runway safety. Specifically, we assessed the status of initiatives resulting from the 2015 Runway Safety Call to Action forum. In addition, forum attendees

¹ A missed approach is a procedure that a pilot follows when an aircraft landing approach to an airport is discontinued. The procedure is often used during unsafe operational situations, such as an assigned runway being occupied or inclement weather conditions at an airport.

we interviewed expressed their views regarding FAA's efforts in planning and conducting the 2015 forum. These views are included in this report.

We conducted this audit in accordance with generally accepted Government auditing standards. As part of our work, we reviewed the implementation status of the 22 initiatives developed at the 2015 FAA Runway Safety Call to Action forum. We interviewed FAA officials regarding the status of the initiatives and verified their status by obtaining supporting documentation and other evidence. Exhibit A details our scope and methodology. Exhibit B lists the organizations we visited or contacted.

We appreciate the courtesies and cooperation of FAA representatives during this audit. If you have any questions concerning this report, please call Matthew E. Hampton, Assistant Inspector General for Aviation Audits, at (202) 366-0500.

cc: The Secretary
DOT Audit Liaison, M-1
FAA Audit Liaison, AAE-100

Results in Brief

FAA has made progress in implementing the 2015 Call to Action initiatives but faces challenges in implementing the remaining initiatives and measuring their effectiveness.

As of November 2017, FAA had completed 10 of the 22 initiatives, including educating pilots on signs, markings, and other visual aids at high-risk airports and updating a best practices list for airport surface and movement areas. Ten initiatives are still in progress, including completing studies on pilot and controller fatigue, while two initiatives were canceled, primarily because similar initiatives were already ongoing. FAA completed the first 10 initiatives within expected timeframes; however, 6 of the 10 remaining initiatives are behind their original target completion dates. The Agency faces challenges in fully implementing the initiatives still in progress. These include dedicating funding to complete four initiatives and fully implementing new technologies for seven initiatives, which could take years to complete. In addition, while FAA has implemented a monitoring plan to track the status of the initiatives, the plan does not tie the initiatives to quantifiable goals or other metrics that would measure their effectiveness in reducing runway incursions, as specifically called for at the 2015 Call to Action forum. As a result, FAA cannot determine whether the initiatives are effective in reducing runway incursions and will be limited in its ability to prioritize and adjust initiatives based on their effectiveness.

We are making recommendations to help FAA determine whether the initiatives developed at FAA's 2015 Call to Action on Runway Safety forum mitigate runway incursions.

Background

FAA defines a runway incursion as any incident involving an unauthorized aircraft, vehicle, or person on a runway.² They are rated by severity (categories A through D), with category A being the most serious and representing incidents in which a collision was barely avoided, and grouped into three types:

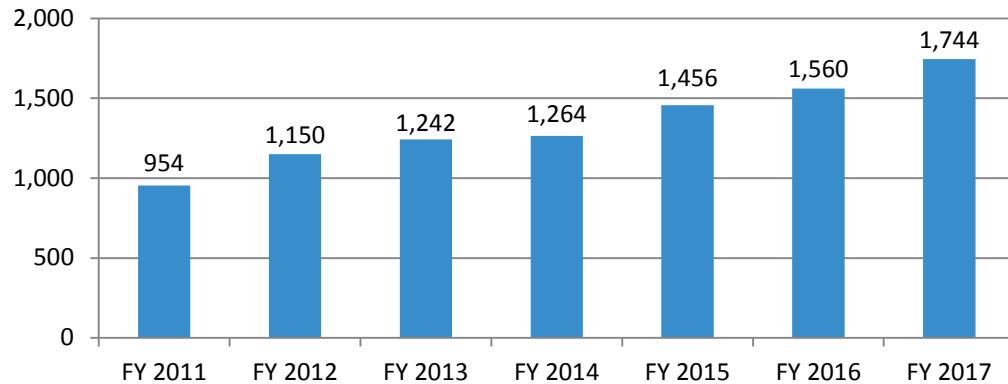
- **Operational Incidents:** An air traffic controller action that results in either less than the required minimum separation between two or more aircraft, or between an aircraft and obstacles (vehicles, people), or an aircraft landing or departing on a closed runway.

² The International Civil Aviation Organization developed this definition and FAA adopted it in fiscal year 2008.

- **Pilot Deviations:** A pilot action that violates Federal Aviation Regulations, such as taxiing an airplane on a runway or taxiway without authorization from the air traffic controller.
- **Vehicle/Pedestrian Deviations:** Pedestrians or vehicles entering any portion of the airport movement areas, such as runways or taxiways, without authorization from air traffic control.

Reports of incursions have increased in each of the last several years, with a nearly 83-percent rise in total incursions between fiscal years 2011 and 2017 (see figure 1).

Figure 1. Total Number of Runway Incursions, Fiscal Years 2011–2017



Source: OIG analysis

While the number of serious Category A and B incidents is relatively low, they fluctuated over the same timeframe, ranging from a low of 7 in fiscal year 2011 to a high of 19 in fiscal year 2016.

The 2015 forum was not the first time FAA gathered the aviation community together to address runway safety issues. In 2007, after several close calls involving commercial aircraft, FAA and industry developed a Call to Action Plan that included 11 short-, mid-, and long-term initiatives intended to improve runway safety. In 2010 and 2014, we issued reports regarding FAA's progress in implementing these initiatives.³ We found that, as of September 2014, FAA

³ *Review of FAA's Call to Action Plan for Runway Safety* (OIG Report Number AV-2010-071), July 21, 2010; *FAA Operational and Programmatic Deficiencies Impede Integration of Runway Safety Technologies* (OIG Report Number AV-2014-060), June 26, 2014; *Management Limitations May Hinder FAA's Ability To Fully Implement and Assess the Effectiveness of Its Runway Safety Initiatives* (OIG Report Number AV-2014-130), September 25, 2014. OIG reports are available on our website: <https://www.oig.dot.gov/>.

implemented 8 of the 11 initiatives, including initiatives that improved airport signage and markings and modernized aeronautical information to include graphics such as airfield construction diagrams. FAA did not implement three initiatives, all of which relied on deploying new technologies, due to project cost or technical issues.

The 2015 FAA Call to Action forum included representatives from industry, labor, and Government. Attendees were organized into three breakout groups—Visual, Communication, and Procedures and Awareness—and were charged with developing short-, mid-, and long-term initiatives to reduce the number and severity of runway incursions. The groups developed 22 initiatives that were published in November 2015 with the intent of reducing the number and severity of runway incursions.

FAA Has Made Progress in Implementing the 2015 Call to Action Initiatives but Faces Challenges in Implementing the Remaining Initiatives and Measuring Their Effectiveness

FAA has taken several important steps towards implementing its 2015 runway safety initiatives and has completed 10 of the 22 initiatives. However, the Agency faces challenges in implementing the remaining initiatives and measuring their effectiveness in mitigating future runway incursions.

FAA Has Completed 10 of the 22 Initiatives, but Challenges Remain

As of November 2017, we found that of the 22 initiatives, FAA implemented 10 initiatives, 10 are still in progress, and 2 were canceled (see table 1). Exhibit D includes a description of the initiatives and details on their implementation status.

Table 1. Status of the 2015 Call to Action Initiatives as of November 2017

Breakout Group Category	Completed	In Progress	Canceled	Total
Visual	2	5	1	8
Communication	2	0	1	3
Procedures and Awareness	6	5	0	11
Total	10	10	2	22

Source: OIG analysis

FAA Completed Initiatives in Each of the Established Categories

FAA completed initiatives in each of the three categories—Visual, Communication, Procedures and Awareness—with the most completed in the third category. The completed initiatives include:

- **Remedial Training on Signs and Markings/Surface Situational Awareness (Visual Initiative 2):** This initiative called for exploring whether to amend a Federal regulation related to flight reviews⁴ to include creating a runway safety training matrix, developing an awareness campaign aimed at flight instructors regarding effective flight reviews, and calling for remedial training for runway incursions. After consulting with relevant stakeholders, FAA decided not to amend the Federal regulation. However, FAA did amend a pilot's handbook with updated runway safety and situational awareness information. Also, working with its stakeholders, FAA developed videos, webcasts, and other materials to educate the public on runway safety issues. In addition, FAA implemented remedial training for pilots who commit a runway incursion.
- **Outreach and Education (Visual Initiative 4):** This initiative called for Government and industry representatives to analyze surface event data and develop outreach materials aimed primarily at general aviation pilots. We

⁴ Flight Review, 14 CFR § 61.56 (2012). The purpose of the flight review is to provide for a regular evaluation of pilot skills and aeronautical knowledge and is required of every active holder of a U.S. pilot certificate at least every 24 calendar months.

found that FAA, through the Runway Safety Council⁵ and other outlets, regularly analyzes surface events and distributes outreach materials based on these data in forums such as local Runway Safety Action Team (RSAT)⁶ meetings.

- **Airport Communications (Communication Initiative 3):** The initiative called for establishing a working group to review best practices for communicating on airport surface/movement areas. It also called for amending FAA orders and other documents, such as the Aeronautical Information Manual, to formalize any necessary changes. FAA established the working group, and it continues to meet. In addition, the group reviewed the best practices and, in lieu of amending orders and other documents, published a bulletin highlighting the issue in October 2016.⁷
- **Frequency Procedures (Procedures and Awareness Initiative 6):** The initiative called for a review of common protocols for military aircraft that use dual radio frequencies to determine whether hazards regarding these protocols exist and make necessary changes to FAA orders. We found FAA conducted the review and determined that no safety hazards existed that required corrective action.

FAA Canceled Two Initiatives That Were Already Ongoing

For the two cancelled initiatives, the first involved developing a formal quarterly forum to brief the General Aviation Joint Steering Committee⁸ on safety data trends and lessons learned. However, the Committee already receives this information periodically and does not believe the formal briefings are necessary.

The second initiative included scheduling formal familiarization meetings between airport operators and controllers at the nation's major airports, also known as the Core 30 airports.⁹ The initiative also called for a national working group to promote this effort. However, FAA did not implement the familiarization meetings and working group in large part because it did not believe that another working group would be helpful given that regular meetings were already

⁵ The Runway Safety Council is a joint group of agency, industry and labor officials that develops a focused implementation of integrated data-driven strategies to reduce the number and severity of runway incursions.

⁶ The purpose of RSAT meetings is to identify and mitigate hazards and risks that can lead to runway incursions. These meetings are generally held once a year, usually at individual airports, and include regional and local FAA representatives, controller and technical operations representatives, airport officials, airport operators, and other stakeholders.

⁷ Air Traffic Procedures Bulletin, Issue 1, October 2016.

⁸ The General Aviation Joint Steering Committee is a FAA/industry group formed in 1997 that focuses on improving general aviation safety.

⁹ Core 30 airports are airports located in major metropolitan areas with the highest volume of traffic and have complex, high-density operations.

occurring. We confirmed these regular meetings during our site visits, where operators and air traffic controllers at individual airports, including Core 30 airports, have outlets to discuss runway safety issues, such as local RSAT meetings.

FAA Faces Challenges With the 10 Remaining Initiatives Due to Funding Requirements and Technology Limitations

The remaining 10 initiatives that are in progress include completing data analyses and studies related to controller and pilot fatigue, studying and implementing new technologies to mitigate runway incursions, and including airport construction graphics for all towered airports in alerts to pilots, called Notices to Airmen (NOTAM).¹⁰ FAA initially established expected completion dates for the remaining 10 initiatives, but 6 of them will not be completed by the targeted delivery date. FAA has not yet revised the target delivery dates for four of these initiatives.

FAA faces several challenges in implementing the remaining 10 initiatives, specifically that 4 of the initiatives require additional funding to be completed. For example, Visual Initiative 1 calls for implementing corrective recommendations to mitigate fatigue among controllers and pilots. To complete the initiative, FAA needed to collect human factors data and perform studies using the data to determine the extent that human factors and fatigue impact runway safety. According to FAA's Runway Safety manager, while the Agency has collected relevant data related to controller and pilot fatigue, it has not yet dedicated funds to begin related studies on the issue.¹¹

In addition, seven of the initiatives depend on implementing or testing new technologies, which may not occur for several years. For example, Procedures and Awareness Initiative 10 calls for testing and using new Next Generation Air Transportation System (NextGen) technologies for issuing taxi instructions, such as Data Communications (DataComm).¹² However, while FAA is using DataComm at over 50 airport towers, FAA does not expect controllers to use the technology to issue taxi instructions to pilots until 2026 at the earliest. Other long-term technological initiatives include developing and implementing Closed Runway Operation Prevention Device (CROPD) voice recognition technology¹³ and exploring new technologies to support taxi conformance monitoring efforts. We

¹⁰ A NOTAM is a report issued by an aviation authority to alert pilots of potential hazards along a flight route or at a location that could affect the safety of the flight.

¹¹ Reducing fatigue-related accidents across all modes of transportation is one of the National Transportation Safety Board's (NTSB) top priorities regarding transportation safety. See NTSB, *2017-2018 Most Wanted List*, 2017.

¹² DataComm is expected to provide 2-way digital communications between controllers and flight crews by reducing radio voice communications, improving accuracy, safety, and reducing time.

¹³ CROPD is expected to use speech recognition technology to detect air traffic controller clearances to closed runways and triggers an alert if such clearances are given.

recognize that before deciding whether it is feasible to invest in new technologies for preventing runway incursions, FAA conducts an investment analysis as part of its acquisition process.

It Remains Uncertain Whether the Initiatives Developed at the 2015 Call to Action Forum Will Mitigate Runway Incursions

As part of the 2015 Call to Action forum, FAA called on attendees to establish a monitoring plan that quantified the effectiveness of the initiatives in mitigating runway incursions. However, based upon both our review and the perspectives of forum attendees, it remains uncertain if the 2015 Runway Safety Call to Action initiatives will mitigate runway incursions in the future.

Initiatives Are Not Tied to Quantifiable Goals or Specific Metrics To Reduce Runway Incursions

While FAA has implemented a monitoring plan to track the status of the initiatives, the plan does not tie the initiatives to quantifiable goals or other specific metrics that could be used to determine whether the initiatives are effective. Rather, FAA measures progress by whether it completes specific tasks associated with each initiative, such as issuing updated advisory guidance to industry, reviewing runway-safety data, or implementing new technologies. For example, Visual Initiative 4 calls for using surface event data to develop focused outreach materials for the pilot community. While FAA analyzes these data regularly to update the materials, there is not a quantifiable metric tied to the initiative to determine whether the effort helped to reduce runway incursions, such as reducing a specific type of incident on airport runways and taxiways highlighted in the materials for pilots. The lack of quantifiable measures is a longstanding issue for the Agency. In past audits, we found that FAA did not include metrics to measure the effectiveness of previous runway safety initiatives, including those contained in its National Plan for Runway Safety.¹⁴

As a result, FAA cannot determine whether the initiatives are effective in reducing runway incursions and will be limited in its ability to prioritize and adjust initiatives based on their effectiveness. This is a concern given that the number of

¹⁴ *Review of FAA's Call to Action Plan for Runway Safety* (OIG Report Number AV-2010-071), July 21, 2010; *Management Limitations May Hinder FAA's Ability to Fully Implement and Assess the Effectiveness of Its Runway Safety Initiatives* (OIG Report Number AV-2014-130), September 25, 2014.

runway incursions increased the 2 years following the forum—from 1,456 in fiscal year 2015 to 1,744 in fiscal year 2017.

FAA Used Limited Data That Focused on Incidents at the Core 30 Airports

In addition, FAA provided limited data at the forum to assist participants in developing the initiatives. FAA tasked the MITRE Corporation with reviewing 1,782 records from FAA's Runway Safety Database for fiscal years 2010 through 2015. FAA used these data to guide the Call to Action discussions and formation of the workgroups. However, these data were limited to the Core 30 airports that have systems for detecting aircraft and vehicles on runways, the Airport Surface Detection Equipment – Model X (ASDE-X) and Airport Surface Surveillance Capability (ASSC) systems.¹⁵ While forum participants discussed issues and high-level data associated with general aviation, MITRE was not tasked with analyzing similar data from smaller, non-Core 30 airports. This is important because 75 percent of the total runway incursions between fiscal years 2011 through 2015 occurred at non-Core 30 airports.

After the 2015 Call to Action, FAA recognized the need for further data analyses and tasked MITRE to find an alternate approach to detect risks of all surface events.¹⁶ MITRE officials told us that they are currently analyzing raw data collected from the ASDE-X and ASSC systems, which are located at larger, commercial airports, but do not capture data from general aviation airports, where most incursions occur. MITRE's work in this area remains ongoing.

Several Attendees Raised Concerns Regarding the Preparation and Structure of the 2015 Call to Action Forum

During the audit, we met with FAA, Government, and industry officials to obtain additional information regarding the status of the initiatives and to gather background and other information regarding runway safety issues. During these meetings, officials expressed their views regarding the 2015 Call to Action forum, including how FAA organized the forum.

Of the 16 representatives we interviewed who attended the 2015 conference, overall they believed that the forum was a good outlet for the aviation community to discuss runway incursions and related safety issues. However, six

¹⁵ ASDE-X is a surveillance system that allows air traffic controllers to track surface movement of aircraft and vehicles. ASSC allows controllers and pilots with Automatic Dependent Surveillance - Broadcast *In* and cockpit displays to see aircraft and ground vehicles on the airport surface and on approach and departure paths within a few miles of the airport.

¹⁶ We plan to review the FAA Runway Safety Group's efforts to analyze data, identify risks, and track actions for mitigating incidents on runways in a separate audit. See OIG announcement *Revised Notification—Review of Runway Safety Initiatives*, August 24, 2017.

representatives, including key Government and industry representatives, indicated that the 2015 forum was not as effective as it could have been in developing initiatives and mitigations. One attendee described the 2015 forum as a "call for ideas" rather than a call for action.

According to these representatives, they were given only a few weeks to a couple of months to prepare for the forum. In contrast, FAA's Runway Safety Manager told us that a similar forum held in 2007 took a year to prepare for. This limited the time they had to work collaboratively in identifying issues and possible solutions before the forum. This limited preparation helped contribute to the adoption of four initiatives for which full or partial actions had either already been completed or started prior to the forum, during which time runway incursions were still increasing. For example, one initiative's outcome included implementing design standards in an advisory circular to prevent direct access on a runway from an apron or ramp area.¹⁷ However, FAA implemented the new standards in February 2014, prior to the forum.

These representatives also indicated that there was inadequate coordination between the three breakout groups when developing the initiatives. Based on these discussions, along with our review of the initiatives, we determined that this resulted in duplicative initiatives or initiatives that cover similar issues. These include two separate initiatives calling for similar improvements in airport awareness for pilots and vehicle drivers,¹⁸ two initiatives calling for actions regarding improved construction graphics in NOTAMs,¹⁹ and two initiatives calling for using new technologies in conveying taxi instructions.²⁰ These concerns suggest that with additional planning and coordination, FAA may have had the opportunity to improve the development of runway safety initiatives during the Call to Action forum.

Conclusion

The 2015 Call to Action forum provided FAA and aviation stakeholders the opportunity to come together and address one of the most critical safety issues facing the Agency and aviation community today. However, since the forum, the number of runway incursions has increased, and mitigating these incidents remains a significant safety challenge for FAA. While the initiatives developed at the 2015 forum represent a positive step towards addressing runway safety, by

¹⁷ See Exhibit D - Procedures and Awareness Initiative 5.

¹⁸ See Exhibit D - Communications Initiative 1 and Procedures and Awareness Initiative 4.

¹⁹ See Exhibit D - Visual Initiative 8 and Procedures and Awareness Initiative 5.

²⁰ See Exhibit D - Visual Initiative 3 and Procedures and Awareness Initiative 10.

not developing mechanisms to measure the effectiveness of the initiatives, it remains uncertain whether the initiatives will mitigate future incursions.

Recommendations

To meet FAA's goals to improve runway safety, we recommend that the Federal Aviation Administrator revise the 2015 Call to Action monitoring plan as follows:

1. Update the target delivery dates for initiatives that are still in progress, including those without target delivery dates, and implement procedures for continually updating delivery dates and descriptions of initiatives as changes are made.
2. Develop and include in the monitoring plan quantifiable metrics or other indicators that can measure the effectiveness of the initiatives.
3. Consolidate duplicate initiatives within the monitoring plan.

Agency Comments and OIG Response

We provided FAA with our draft report on May 7, 2018, and received its response on June 6, 2018, which is included as an appendix to this report. FAA concurred with our three recommendations and provided appropriate actions and completion dates. In addition, FAA included other actions the Agency is taking to mitigate runway incursions. FAA also noted that before deploying the technologies that have yet to be funded, the Agency must first evaluate the feasibility of each initiative through an investment analyses. As noted in our report, we recognize the need for FAA to conduct analyses as part of its acquisition process before deciding whether it is feasible to invest in these new technologies for preventing runway incursions.

Actions Required

We consider all three recommendations resolved but open pending completion of planned actions.

Exhibit A. Scope and Methodology

We conducted this performance audit between January 2017 and May 2018 in accordance with generally accepted Government auditing standards as prescribed by the Comptroller General of the United States. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Our objective was to evaluate FAA's progress with implementing runway safety initiatives resulting from the 2015 Runway Safety Call to Action. To address our objective, we obtained the 2015 FAA Runway Safety Call to Action Phase II report, issued on November 30, 2015, and reviewed the 22 initiatives developed during the June 2015 forum. We interviewed the manager of FAA's Runway Safety Group three times, the last time occurring on November 30, 2017, and reviewed tracking documents developed by the Group to determine the status of the initiatives. We also interviewed officials from the FAA offices responsible for implementing the 22 initiatives to verify the initiatives' status. For initiatives that were completed or in progress, we obtained and reviewed supporting documentation and other evidence to verify an initiative's status.

In addition, during the audit we met with FAA, Government, and industry officials at FAA Headquarters, the Air Traffic Organization's Eastern and Central Service Areas, and four airports to obtain additional information regarding the status of the initiatives and to gather background and other information regarding runway safety issues. During our meetings we found 16 officials who attended the 2015 Call to Action forum, which had 108 attendees. We discussed their views of the forum, including why the forum was held, the participants' roles in the forum, how the forum was conducted, and how it compared to a similar forum held in 2007. The views of those officials who attended are included in this report.

Exhibit B. Organizations Visited or Contacted

Federal Aviation Administration- Headquarters

Air Traffic Organization

- Runway Safety Group
- Program Management Organization
- Safety Services Group
- Terminal Services
- Mission Support Services

Aviation Safety- Flight Standards Service

Office of Airport Safety & Standards- Airport Safety & Operations

Office of NextGen- Technology Development and Prototyping

Airport Construction Advisory Council

Federal Aviation Administration- Regional Offices

Central Service Center- Fort Worth, TX

Eastern Service Center- Atlanta, GA

Federal Aviation Administration- Air Traffic Control Towers

Dallas/Fort Worth International Airport Air Traffic Control Tower

George Bush Intercontinental Airport Air Traffic Control Tower

Hartsfield-Jackson Atlanta International Airport Air Traffic Control Tower

DeKalb-Peachtree Airport Air Traffic Control Tower

Airlines

American Airlines

United Airlines

Other Organizations

National Air Traffic Controllers Association (NATCA)

National Transportation Safety Board (NTSB)

Airlines for America (A4A)

Air Line Pilots Association (ALPA)

Aircraft Owners and Pilots Association (AOPA)

The MITRE Corporation

Dallas/ Fort Worth International Airport Operations

Houston Airport Systems

Exhibit C. List of Acronyms

A4A	Airlines for America
AEFS	Advanced Electronic Flight Strips
ALPA	Air Line Pilots Association
AOPA	Aircraft Owners and Pilots Association
ASSC	Airport Surface Surveillance Capability
ASDE-X	Airport Surface Detection Equipment, Model X
CROPD	Closed Runway Operation Prevention Device
DataComm	Data Communications
DOT	Department of Transportation
FAA	Federal Aviation Administration
LED	Light Emitting Diode
NAS	National Airspace System
NATCA	National Air Traffic Controllers Association
NextGen	Next Generation Air Traffic Transportation System
NOTAM	Notices to Airmen
NTSB	National Transportation Safety Board
OIG	Office of Inspector General
RSAT	Runway Safety Action Team
TDD	Target Delivery Date

Exhibit D. Status of the 2015 Call to Action Initiatives as of November 2017

Initiative	Description	Intended Outcome/Target Delivery Date (TDD)	Status	Additional Information
Visual Recommendations				
1. Fatigue Studies – Controllers/Pilots	Using available and newly conducted research, conduct human factors studies on the extent that human factors and fatigue impact runway safety events for controllers and pilots.	Develop corrective recommendations for the Air Traffic Organization, airports, and industry to mitigate the risks associated with human factors and fatigue hazards. TDD: 9/28/18	In Progress 	According to FAA, it has collected the relevant data, but has not started the studies due in part to funding not yet allocated for the project.
2. General Aviation Pilots – Periodic Training on Signs and Markings/ Surface Situational Awareness	Explore amending Federal regulations to require runway safety training matrixes. Develop an awareness campaign aimed at certified flight instructors to use and review an advisory circular and other FAA documents regarding runway safety elements. Conduct remedial training for runway incursions.	Explore the feasibility of amending 14 CFR Section 61.56 Flight Review to include runway safety training matrix. Develop an awareness campaign aimed at certified flight instructors to use appropriate methods in conducting effective flight reviews. Remedial training for runway incursions. TDD: 9/30/17	Completed 	After consulting with relevant stakeholders, FAA determined that it was not feasible to amend 14 CFR Section 61.56. Working with its stakeholders, most notably the Aircraft Owners and Pilots Association, FAA has developed videos, webcasts, and other awareness campaign materials. According to the Runway Safety Group, these materials will be updated regularly. Remedial training for runway incursions was implemented in October 2015.
3. Conveying Taxi Instructions	Convey audible taxi instructions/alerts electronically using available technology such as GPS in the cockpit.	Conduct a shortfall analysis that identifies runway incursions that may be prevented by taxi conformance monitoring concepts at airports with control towers. TDD: 9/30/17 Research and develop technologies, databases, and algorithms that support taxi conformance monitoring efforts. TDD: 9/30/18 to 9/30/19	In Progress 	FAA completed the shortfall analysis in November 2016. FAA completed the research for state-of-the-art taxi conformance monitoring technology. Additional research and development of other related technologies, databases, and algorithms is ongoing.

 *Completed*  *In Progress*  *Canceled*

Initiative	Description	Intended Outcome/Target Delivery Date (TDD)	Status	Additional Information
4. Outreach and Education	Using surface event data available to the Runway Safety Group, collaboratively develop and share focused outreach materials primarily for the pilot community.	<p>Use a joint Government/industry body to analyze surface event data to support outreach materials.</p> <p>TDD: 3/30/16</p> <p>FAA and industry representatives collaboratively develop and distribute outreach materials aimed primarily at general aviation pilots.</p> <p>TDD: 5/30/16 to 6/30/17</p> <p>Once per year, the Runway Safety Council will analyze surface event data to focus future outreach efforts.</p> <p>TDD: Continuous</p>	Completed	<p>Using the FAA/industry Runway Safety Council and other outlets, data are analyzed and used to support outreach materials.</p> <p>FAA and industry, including the Aircraft Owners and Pilots Association and the National Air Traffic Controllers Association, continuously collaborate and distribute outreach materials through forums such as RSATs.</p> <p>The Runway Safety Council does analyze surface event data to focus its future outreach efforts.</p>
5. Research/Data Analysis/Post-Event Communication With General Aviation Community	Provide a recurring forum to collaboratively share lessons learned with the general aviation community.	<p>Quarterly brief the General Aviation Joint Steering Committee on safety data trends and lessons learned from runway events.</p> <p>TDD: Continuous</p>	Canceled	<p>A formal forum to provide quarterly briefings to the General Aviation Joint Steering Committee was not created.</p> <p>According to FAA officials, the Runway Safety Group does provide the Committee with runway safety data periodically and based on the Committee's priorities.</p>
6. Technology Expansion and Utilization	Determine where technology expansion would be most beneficial using a "right site/right size" approach for candidate airports in order to decrease runway incursions.	<p>Engage stakeholders and visual panel workgroup in fiscal year 2015. A "right site/right size" technology evaluation was conducted by the Runway Incursion Reduction Program.</p> <p>TDD: 9/30/17</p> <p>Survey candidate airports for "right site/right size" approach and develop initial cost estimates for candidate technology.</p> <p>TDD: 9/30/17</p> <p>Conduct data analysis of runway incursion trends, locations, and contributing factors.</p> <p>TDD: 9/30/18</p> <p>Evaluate and deploy runway safety technologies to mitigate runway incursions.</p> <p>TDD: 9/30/18</p>	In Progress	<p>This initiative is similar to Visual Initiative 3. Data analysis of runway incursion factors was reviewed, and candidate airports were selected in November 2016.</p> <p>FAA is currently analyzing new technologies. According to FAA, implementation of new technologies is dependent upon funding availability for the programs.</p>

● *Completed* ● *In Progress* ● *Canceled*

Initiative	Description	Intended Outcome/Target Delivery Date (TDD)	Status	Additional Information
7. Incorporating Light-Emitting Diode (LED) Technology into the National Airspace System	Safely incorporate light-emitting LED technology into the National Airspace System.	Conduct flight tests of currently installed and future LEDs lighting systems at airports when funding is available. TDD: TBD	In Progress	FAA's Flight Standards division conducted flight tests in December 2015. According to FAA, future testing will be conducted when funding is available.
8. Expand Graphic Notices to Airmen (NOTAM)	Expand airfield construction graphic NOTAMs.	Develop and implement construction graphics for all towered airports. TDD: 12/31/15 to 3/2018	In Progress	FAA has completed development of the construction graphics but has not included graphics for all towered airports in NOTAMs. The Runway Safety Group expects to include these graphics shortly after the final target delivery date.
Communication Recommendations				
1. Airport Awareness for Pilots and Vehicle Drivers	Develop guidance and awareness for pilots and vehicle drivers when unfamiliar with an airport.	For vehicle drivers, deployment of the Automatic Dependent Surveillance-B squitter system was underway. Also, per Advisory Circular 5210-20A, vehicle drivers unfamiliar with an airport must receive appropriate training or be accompanied by a trained driver. For pilots, re-emphasize advisory circulars that focus on taxi operations. Incorporate any resultant updates into appropriate FAA guidance and materials. TDD: 9/30/18	Completed	Development of the Automatic Dependent Surveillance-B squitter system was ongoing prior to the Call to Action. Based on site visits and interviews with FAA personnel, vehicle drivers are receiving training or are accompanied by a trained driver. FAA has re-emphasized the advisory circulars and, according to the Agency, it will incorporate future updates into its training materials.
2. Enhance Operator/Controller Relationships	Schedule familiarization sessions between operators and controllers at Core 30 airports and regional and towered airports.	Schedule familiarization meetings between operators and controllers at Core 30 airports and then expand to regional and local towered airports. Create a national working group to meet annually and act as a public/private advocate for the effort. TDD: 11/1/16	Canceled	Formal familiarization meetings were not scheduled as a result of the Call to Action. However, there are other communication outlets used at Core 30 and other airports to discuss local runway safety issues, such as local RSATs. A national working group was not created.

 Completed
  In Progress
  Canceled

Initiative	Description	Intended Outcome/Target Delivery Date (TDD)	Status	Additional Information
3. Airport Communications	Convene an annual Government/industry working group that examines best practices for communicating on airport surface/movement areas. Best practices will be formalized and associated training and familiarization efforts will be implemented.	<p>Establish a Runway Safety Communications Working Group to review "best practices" and make recommendations for formalizing where appropriate.</p> <p>Develop training and familiarization as necessary.</p> <p>Amend FAA orders, the Aeronautical Information Manual, Code of Federal Regulations, and other documents as necessary to formalize any changes.</p> <p>TDD: 11/1/16</p>	Completed	<p>The Runway Safety Communication Working Group was established, initially met on June 21–23, 2016, and continues to meet. Also, the group reviewed the "best practices."</p> <p>In lieu of making changes to the Aeronautical Information Manual, the Working Group published an article in the October 2016 Air Traffic Procedures Bulletin entitled "Ground Traffic Movement."</p>
Procedures and Awareness Recommendations				
1. Implement Closed Runway Operation Prevention Device (CROPD) Voice Recognition Technology	<p>Reduce takeoffs and landings on one runway.</p> <p>Implement one CROPD per service area.</p> <p>Track each instance of CROPD alerts.</p>	<p>Prepare operational test plans and a master schedule to finish the operational test demonstration at one site and execute operational test demonstrations at two other sites.</p> <p>TDD: 9/30/17</p>	Completed	Operational test plans and a master plan for the sites were completed and testing of the system at two sites was completed by August 2017.
2. Develop CROPD Technology	Continue to develop CROPD technology by implementing additional requirements.	Implement CROPD voice recognition version and continue to develop the CROPD technology by implementing additional requirements.	In Progress	Testing is ongoing at several sites. FAA officials stated that while the technology has passed its initial tests, implementation of the technology has not been included in FAA's modernization plans and is dependent on funding availability.
3. Advanced Electronic Flight Strips (AEFS)	Evaluate National Airspace System (NAS)-wide implementation of flight strips. FAA installed this technology at the Cleveland Air Traffic Control Tower in September 2015.	Review quarterly runway incursion data from the Cleveland Air Traffic Control Tower for fiscal years 2016 and 2017 to determine if the causes, frequency, and severity of runway incursions were impacted by electronic flight strips.	In Progress	According to FAA officials, data were collected from the Cleveland Air Traffic Control Tower and are currently being analyzed. This initiative began prior to the 2015 Call to Action.

 *Completed*
  *In Progress*
  *Canceled*

Initiative	Description	Intended Outcome/Target Delivery Date (TDD)	Status	Additional Information
4. Aural Awareness for General Aviation and Ground Vehicle Operators (Maintenance Technicians, Tarmac Personnel)		<p>Airports are deploying a vehicle alerting system. Most general aviation GPS systems have "Safe Taxi" installed on them. Re-emphasize to general aviation users that this technology is for situational awareness when taxiing on the airport surface.</p> <p>Increase awareness of general aviation pilots to state to air traffic control that they are "unfamiliar" with the airport and to request "progressive" taxi instructions.</p> <p>TDD: 9/30/16</p>	Completed	This item is similar to Communications Initiative 1.
5. Airport Geometry Issues	Improve construction planning and geometry by developing procedures to avoid direct access/entrances to runways; identifying procedural gaps, geometry problems, and general issues; and improving runway construction NOTAMs and the corresponding data to address current procedural shortfalls.	<p>The Office of Airport Engineers implemented design standards from Advisory Circular 150/5300-13A to prevent direct access to a runway from an apron or ramp area.</p> <p>Include diagrams for all airports in the NOTAM database.</p> <p>TDD: 3/2018</p>	In Progress	The design standards in the Advisory Circular were implemented on February 26, 2014, prior to the Call to Action. Also, this initiative is similar to Visual Initiative 8 regarding NOTAMs, where the construction graphics have yet to be included in all NOTAMs.
6. Frequency Procedures	Review common protocols for dual frequency concerning military aircraft.	<p>Validate there is a hazard that needs to be corrected. If a hazard is discovered then make the necessary changes to FAA orders through current processes.</p> <p>TDD: 7/31/16</p>	Completed	The review found that no safety hazards existed that needed correction.
7. Air Traffic Control Memory Aids	Establish a requirement to review memory aid efficacy on an annual basis. Memory aids are visual instruments that assist controllers in performing their duties.	<p>A workgroup was formed to address Surface Memory Aids from the Top 5 safety hazards from 2015. One of the outcomes was to review memory aids annually to see if they have been effective. Six tower operations are required to use memory aids. The effective date of the change for the six tower operations was May 26, 2016.</p> <p>TDD: 7/2/18</p>	In Progress	This initiative was started prior to the 2015 Call to Action. The six tower operations have been selected for the study to measure the effectiveness of memory aids at the towers. The study is ongoing.

 *Completed*
  *In Progress*
  *Canceled*

Initiative	Description	Intended Outcome/Target Delivery Date (TDD)	Status	Additional Information
8. Pilot Memory Aids	Evaluate memory aids for pilots. Also, mandate at least one or two pilots to be "heads up" during taxi train/practice for "recovery in unusual situations."	Re-emphasize advisory circulars that contain specific information regarding pilots maintaining situational awareness. TDD: 9/30/16	Completed 	The advisory circulars were re-emphasized to the pilot community. However, according to the Runway Safety Group manager, this initiative did not have measurable impact.
9. Taxi Instructions	A workgroup will be put together to evaluate taxi instructions and related phraseology.	Determine if changes to the current procedures are necessary. TDD: 9/30/16	Completed 	A workgroup did evaluate several events related to taxi instructions. Based on this review, the workgroup proposed changes to how taxi instructions are issued. The proposal is currently being reviewed within the Agency.
10. Hold Short Taxi Instructions	Evaluate the use of NextGen technologies, such as DataComm and Taxi Conformance Monitoring, when issuing taxi instructions.	TDD: 2026–2029	In Progress 	Evaluation of the technologies is ongoing but is dependent upon implementation of new technologies such as DataComm. FAA plans to use DataComm for issuing instructions in the 2026 to 2029 timeframe.
11. Tower/ Maintenance Communication	Evaluate current standards regarding communications between the air traffic control tower and maintenance vehicles at the airport.	Require towered facilities at non-Part 139 airports that receive FAA funding to enter into a Letter of Agreement with the airport operator. TDD: 9/30/17	Completed 	Initiative completed on 9/1/15.

Source: OIG analysis of FAA data

 *Completed*  *In Progress*  *Canceled*

Exhibit E. Major Contributors to This Report

ROBIN KOCH	PROGRAM DIRECTOR
FRANK DANIELSKI	PROGRAM MANAGER
MY LE	SENIOR ANALYST
MICHAEL BROADUS	SENIOR ANALYST
NICK FORD	ANALYST
AUDRE AZUOLAS	SENIOR TECHNICAL WRITER
PETRA SWARTZLANDER	CHIEF STATISTICIAN

Appendix. Agency Comments



Federal Aviation Administration

Memorandum

Date: June 6, 2018

To: Matthew E. Hampton, Assistant Inspector General for Aviation Audits

From: H. Clayton Foushee, Director, Office of Audit and Evaluation, AAE-1

Subject: Federal Aviation Administration's (FAA) Response to Office of Inspector General (OIG) Draft Report: FAA's 2015 Runway Safety Call to Action Initiatives

A handwritten signature in blue ink, appearing to read "H. Clayton Foushee".

The FAA has made significant progress toward the implementation of a formal process to identify and address the greatest areas of risk to runway safety. A key element of the process is collaboration across FAA lines of business, as well as with government and industry stakeholders, with an emphasis upon those initiatives providing the greatest benefit.

For example, in 2015, the Agency implemented the Runway Incursion Mitigation (RIM) program, which utilizes risk-based, decision-making methodology to determine which specific locations have a history of runway incursions. Since deploying the RIM program, FAA has implemented mitigations at 20 locations. At these locations, there were 227 geometry-related runway incursions before mitigation, and zero after mitigation.

Based upon the FAA's review of the draft report we offer the following clarifications:

- In reporting, "*FAA cannot determine whether initiatives are effective in reducing runway incursions*" and "*given that the number of runway incursions increased the 2 years following the forum*," the OIG is narrowly defining effectiveness based on the count of reported runway incursion. The Agency monitors both the reported events and quantifiable metrics of the risk to people in the National Airspace System. The Agency has deliberately taken steps to increase the number of reports received with voluntary safety reporting programs like the Air Traffic Safety Action Program, Confidential Information Share Program, the Technical Operations Safety Action Program, the Mandatory Occurrence Reports, and the Comprehensive Electronic Data Analysis and Reporting Tool. These programs encourage personnel to demonstrate their commitment to safety by sharing issues without fear of reprisal.

In 2017, the FAA convened a Safety Risk Management Panel to "*identify a successful approach to achieving a transformed safety culture, whether by building upon previous efforts focused toward mitigating related safety issues or by exploring new strategies for overall risk reduction.*" As noted in the report, Safety Risk Management Document, Runway Incursion Safety Issue, Version 1.1, October 27, 2017, "*the observed increase in*

reported RIs in all categories may be reflective of a thriving safety culture rather than a decrease in safety.”

Also in 2017, the International Civil Aviation Organization Runway Safety Program Partners established a Runway Safety Action Plan Working Group co-chaired by FAA Runway Safety. The FAA paper, *Runway Safety Risk Metric, January 13, 2018*, describes the analysis of all available runway incursion, runway excursion surface incidents data using a weighted runway safety risk index methodology developed by the FAA. The analysis concluded the NAS runway safety risk has decreased because of more informed mitigation activities.

- In reporting, “*FAA faces several challenges in implementing the remaining 10 initiatives, specifically that 4 of the initiatives require additional funding to be completed,*” the OIG asserts the FAA is obligated to implement each of the recommendations recorded at the 2015 Call to Action. Regarding the 4 unfunded technology initiatives, the FAA must first evaluate the feasibility of each initiative and demonstrate the ability to execute it. Still, prior to funding, the FAA must conduct a rigorous lifecycle investment analysis to ensure fiduciary responsibility. Once the FAA determines the likelihood of implementing any or all of these initiatives, it will be able to provide a completion date or cancel as unachievable.

The FAA appreciates this opportunity to respond to the OIG draft report. We concur with the recommendations, as written. We plan to implement recommendations 1 and 3 by January 31, 2019 and recommendation 2 by May 31, 2019.

Please contact H. Clayton Foushee at (202) 267-9000 if you have any questions or require additional information about these comments.

U.S. DOT OIG Fraud & Safety Hotline

hotline@oig.dot.gov | (800) 424-9071

<https://www.oig.dot.gov/hotline>

Our Mission

OIG conducts audits and investigations on behalf of the American public to improve the performance and integrity of DOT's programs to ensure a safe, efficient, and effective national transportation system.

