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William J. Hughes Technical Center
Aviation Research Division
Atlantic City International Airport
New Jersey 08405

Runway Incursion Mitigation Fiscal Year 2022 Annual Summary Report

April 2023

Final Report

U.S. Department of Transportation
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NOTICE

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16. Abstract

In fiscal year (FY) 2012, the Federal Aviation Administration (FAA) Office of Airports (ARP) initiated a research study to identify and geographically locate areas at airports with nonstandard taxiway geometry. This research was advanced because an earlier study (Legarreta, 2012) had shown nonstandard taxiway geometries to be associated with a higher prevalence of runway incursions. The FAA defines a runway incursion (RI) as "any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft." These occurrences include wrong runway landings and takeoffs. This research effort developed a geographic information system (GIS) database of approximately 520 airports with civilian air traffic control towers. For each airport, the location of nonstandard geometries, RIs, airfield hotspot areas, airport diagrams, and other airport-related information is identified. This research study identified 140 airfield locations with a high incidence of RIs using data from October 1, 2007, to September 30, 2013. As a result, a 15- to 20-year improvement program, known as the Runway Incursion Mitigation (RIM) program, launched in FY2015. The goal of the program was to mitigate airfield locations with high incidences of RIs. A subset of the 140 locations identified was then validated for inclusion in the RIM program and prioritized for mitigation.

The RIM program is updated annually utilizing the GIS airport database to identify construction-related changes to airfield layout and their impacts on taxiway geometries, the airfield location of new RIs, and the status of airfield locations prioritized for mitigation.

This report summarizes the status of the RIM program through FY2022. In FY2022, the program georeferenced 1,309 RIs, added 84 nonstandard geometry locations, prioritized 20 locations for mitigation, and identified 19 locations as mitigated. Since program initiation, 15,191 RIs have been georeferenced at airports along with more than 6,633 nonstandard geometry locations. In addition, 217 airfield locations were prioritized for mitigation and 89 of these locations have been mitigated. For mitigated locations, where at least one year of post-mitigation incursion data are available, the incursion rate reduced by 78%.

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TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

LIST OF ACRONYMS

AC	Advisory Circular
ADIP	Airport Data and Information Portal
ARP	Office of Airports
ATIS	Automated Traffic Information System
CY	Calendar year
EB	Engineering Brief
FAA	Federal Aviation Administration
FY	Fiscal year
GIS	Geographic information system
HQ	Headquarters
HS	Hot spot
ILS	Instrument Landing System
LAHSO	Land and hold short operations
NOTAM	Notice to Air Mission
NPIAS	National Plan of Integrated Airport Systems
PD	Pilot deviation
PTG	Problematic taxiway geometry
RDM	RIM Data Management
REIL	Runway end identifier lights
RI	Runway incursion
RIM	Runway incursion mitigation
RWY	Runway
TWY	Taxiway
V/PD	Vehicle/pedestrian deviation

LIST OF FEDERAL AVIATION ADMINISTRATION LOCATION IDENTIFIER AIRPORT CODES USED IN THIS REPORT

ABQ	Albuquerque International Sunport, Albuquerque, New Mexico
ACT	Waco Regional Airport, Waco, Texas
ADS	Addison Airport, Dallas, Texas
APA	Centennial Airport, Denver, Colorado
APC	Napa County Airport, Napa, California
ARR	Aurora Municipal Airport, Chicago/Aurora, Illinois
ASE	Aspen-Pitkin County Airport/Sardy Field, Aspen, Colorado
ATL	Hartsfield-Jackson Atlanta International Airport, Atlanta, Georgia
AZO	Kalamazoo/Battle Creek International, Kalamazoo, Michigan
BET	Bethel Airport, Bethel, Alaska
BFI	Boeing Field/King County International Airport, Seattle, Washington
BJC	Rocky Mountain Metropolitan Airport, Denver, Colorado
BOI	Boise Air Terminal/Gowen Field Airport, Boise, Idaho
BOS	General Edward Lawrence Logan International Airport, Boston, Massachusetts
BTV	Burlington International Airport, Burlington, Vermont
BUR	Bob Hope Airport, Burbank, California
CAK	Akron-Canton Regional Airport, Akron, Ohio
CCR	Buchanan Field Airport, Concord, California
CHD	Chandler Municipal Airport, Chandler, Arizona
CLE	Cleveland Hopkins International Airport, Cleveland, Ohio
CLT	Charlotte Douglas International Airport, Charlotte, North Carolina
CMA	Camarillo Airport, Camarillo, California
CMI	University of Illinois-Willard Airport, Champaign-Urbana, Illinois
CNO	Chino Airport, Chino, California
CRG	Jacksonville Executive at Craig Airport, Jacksonville, Florida
CRP	Corpus Christi International Airport, Corpus Christi, Texas
CRQ	McClellan-Palomar Airport, Carlsbad, California
CSG	Columbus Airport, Columbus, Georgia
CXO	Conroe-North Houston Regional Airport, Houston, Texas
DAB	Daytona Beach International Airport, Daytona Beach, Florida
DAL	Dallas Love Field Airport, Dallas, Texas
DCA	Ronald Reagan Washington National Airport, Washington, DC
DEN	Denver International Airport, Denver, Colorado
DSM	Des Moines International Airport, Des Moines, Iowa
DVT	Phoenix Deer Valley Airport, Phoenix, Arizona
DWH	David Wayne Hooks Memorial Airport, Houston, Texas
EWR	Newark Liberty International Airport, Newark, New Jersey
FAI	Fairbanks International Airport, Fairbanks, Alaska
FAT	Fresno Yosemite International Airport, Fresno, California
FCM	Flying Cloud Airport, Minneapolis, Minnesota
FDK	Frederick Municipal Airport, Frederick, Maryland
FFZ	Falcon Field Airport, Mesa, Arizona
FRG	Republic Airport, Farmingdale, New York
FTY	Fulton County Airport-Brown Field, Atlanta, Georgia

FXE	Fort Lauderdale Executive Airport, Fort Lauderdale, Florida
GCN	Grand Canyon National Park Airport, Grand Canyon, Arizona
GLS	Scholes International Airport, Galveston, Texas
HIO	Portland-Hillsboro Airport, Portland, Oregon
HLN	Helena Regional Airport, Helena, Montana
HND	Henderson Executive Airport, Las Vegas, Nevada
HNL	Daniel K. Inouye International Airport, Honolulu, Hawaii
HOU	William P. Hobby Airport, Houston, Texas
HUF	Terre Haute Regional Airport, Terre Haute, Indiana
HWD	Hayward Executive Airport, Hayward, California
IAG	Niagara Falls International Airport, Niagara Falls, New York
IDA	Idaho Falls Regional Airport, Idaho Falls, Idaho
ISM	Kissimmee Gateway Airport, Orlando, Florida
IWA	Phoenix-Mesa Gateway Airport, Phoenix, Arizona
JLN	Joplin Regional Airport, Joplin, Missouri
JNU	Juneau International Airport, Juneau, Alaska
LAF	Purdue University Airport, Lafayette, Indiana
LAS	Harry Reid International Airport, Las Vegas, Nevada
LAX	Los Angeles International Airport, Los Angeles, California
LGB	Long Beach Airport/Daugherty Field, Long Beach, California
LIT	Adams Field Airport, Little Rock, Arizona
LOU	Bowman Field Airport, Louisville, Kentucky
LVK	Livermore Municipal Airport, Livermore, California
MAF	Midland International Air & Space Port, Midland, Texas
MDW	Chicago Midway International Airport, Chicago, Illinois
MEM	Memphis International Airport, Memphis, Tennessee
MFE	McAllen Miller International Airport, McAllen, Texas
MHT	Manchester-Boston Regional Airport, Manchester, New Hampshire
MIA	Miami International Airport, Miami, Florida
MIC	Crystal Airport, Minneapolis, Minnesota
MKC	Charles B. Wheeler Downtown Airport, Kansas City, Missouri
MLI	Quad City Airport, Moline, Illinois
MLU	Monroe Regional Airport, Monroe, Louisiana
MQY	Smyrna Airport, Smyrna, Tennessee
MRI	Merrill Field Airport, Anchorage, Alaska
MYF	Montgomery-Gibbs Executive Airport, San Diego, California
NEW	Lakefront Airport, New Orleans, Louisiana
OAK	Albert J. Ellis Airport, Jacksonville, North Carolina
OPF	Miami-Opa Locka Executive Airport, Miami, Florida
ORD	Chicago O'Hare International Airport, Chicago, Illinois
ORL	Orlando Executive Airport, Orlando, Florida
PAO	Palo Alto Airport, Palo Alto, California
PBI	Palm Beach International Airport, West Palm Beach, Florida
PDK	DeKalb-Peachtree Airport, Atlanta, Georgia
PHL	Philadelphia International Airport, Philadelphia, Pennsylvania
PHX	Phoenix Sky Harbor International Airport, Phoenix, Arizona

PIE	St. Pete-Clearwater International Airport, St. Petersburg-Clearwater, Florida
PNS	Pensacola International Airport, Pensacola, Florida
POC	Brackett Field, LaVerne, California
PRC	Prescott Regional Airport - Ernest A. Love Field, Prescott, Arizona
PSP	Palm Springs International Airport, Palm Springs, California
RHV	Reid-Hillview Airport of Santa Clara County, San Jose, California
RNO	Reno-Tahoe International Airport, Reno, Nevada
SAT	San Antonio International Airport, San Antonio, Texas
SBA	Santa Barbara Municipal Airport, Santa Barbara, California
SDM	Brown Field Municipal Airport, San Diego, California
SEA	Seattle-Tacoma International Airport, Seattle, Washington
SFB	Orlando Sanford International Airport, Orlando, Florida
SFO	San Francisco International Airport, San Francisco, California
SJC	Norman Y. Mineta San Jose International Airport, San Jose, California
SLC	Salt Lake City International Airport, Salt Lake City, Utah
SMO	Santa Monica Municipal Airport, Santa Monica, California
SNA	John Wayne/Orange County Airport, Santa Ana, California
SPI	Abraham Lincoln Capital Airport, Springfield, Illinois
SRQ	Sarasota Bradenton International Airport, Sarasota/Bradenton, Florida
STS	Charles M. Schulz-Sonoma County Airport, Santa Rosa, California
TEB	Teterboro Airport, Teterboro, New Jersey
TIW	Tacoma Narrows Airport, Tacoma, Washington
TMB	Miami Executive Airport, Miami, Florida
TOA	Zamperini Field, Torrance, California
TUL	Tulsa International Airport, Tulsa, Oklahoma
TUS	Tucson International Airport, Tucson, Arizona
TYR	Tyler Pounds Regional Airport, Tyler, Texas
UAO	Aurora State Airport, Aurora, Oregon
VGT	North Las Vegas Airport, Las Vegas, Nevada
VNY	Van Nuys Airport, Van Nuys, California

EXECUTIVE SUMMARY

In fiscal year (FY) 2012, the Federal Aviation Administration (FAA) Office of Airports (ARP) initiated a research study to identify and geographically locate areas at airports with nonstandard taxiway geometry. This research was advanced because an earlier study (Legarreta, 2012) had shown nonstandard taxiway geometries to be associated with a higher prevalence of runway incursions. The FAA defines a runway incursion (RI) as "any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft." These occurrences include wrong runway landings and takeoffs. This research effort developed a geographic information system (GIS) database of approximately 520 airports with civilian air traffic control towers. For each airport, the location of nonstandard geometries, RIs, airfield hotspot areas, airport diagrams, and other airport-related information is identified. This research study identified 140 airfield locations with a high incidence of RIs using data from October 1, 2007, to September 30, 2013. As a result, a 15- to 20-year improvement program, known as the Runway Incursion Mitigation (RIM) program, launched in FY2015. The goal of the program is to mitigate airfield locations with high incidences of runway incursions. A subset of the 140 locations identified was then validated for inclusion in the RIM program and prioritized for mitigation.

The RIM program is updated annually utilizing the GIS airport database to identify construction-related changes to airfield layout and their impacts on taxiway geometries, the airfield location of new RIs, and the status of airfield locations prioritized for mitigation.

This report summarizes the status of the RIM program through FY2022. In FY2022, the program

- Georeferenced 1,309 runway incursions
- Added 84 nonstandard geometry locations
- Prioritized 20 locations for mitigation
- Identified 19 locations as mitigated

Since program initiation, 15,191 RIs have been georeferenced at airports along with more than 6,633 nonstandard geometry locations. In addition, 217 airfield locations were prioritized for mitigation and 89 of these locations implemented mitigations. For mitigated locations, where at least one year of post-mitigation incursion data are available, the incursion rate reduced by 78%.

1. INTRODUCTION

The Federal Aviation Administration (FAA) defines a runway incursion (RI) as "any occurrence at an aerodrome involving the incorrect presence of an aircraft, vehicle, or person on the protected area of a surface designated for the landing and takeoff of aircraft" (FAA, 2015). These occurrences, including wrong runway landings and takeoffs, are a top airport safety concern for the FAA.

The FAA conducted an initial study of RIs from 1997 to 2003 resulting from a pilot deviation (PD) or vehicle/pedestrian deviation (V/PD). These incursions were then plotted on airport diagrams (Legarreta, 2012). Analysis of these incursions found that certain taxiway locations experienced far more RIs than other locations (Legarreta, 2012). Through additional research, the FAA identified taxiway geometry configurations associated with a higher incidence of RIs (Legarreta, 2012). This led the FAA Airport Engineering Division to publish Engineering Brief (EB) 75, *Incorporation of Runway Incursion Prevention into Taxiway and Apron Design*, in November 2007 (FAA, 2007). Subsequently, the updated Advisory Circular (AC) 150/5300-13, *Airport Design*, incorporated many of the airport layout recommendations from EB 75 (FAA, 2022a). Both documents provide guidance for airports to design taxiways in a manner to reduce confusion and increase situational awareness. Airport layouts not conforming to these recommendations could lead to confusion and, ultimately, RIs.

In fiscal year (FY) 2012, the FAA Office of Airports (ARP) initiated a research study to identify and geographically locate areas at airports with nonstandard geometry and a high incidence of RIs. This effort, detailed in the FAA report *Problematic Taxiway Geometry Study Overview* (Vitagliano, Canter, & Aland, 2018) ("PTG Report"), developed a geographic information system (GIS) database including

- 6,098 airport locations with nonstandard geometry, also known as problematic taxiway geometry (PTG) locations;
- all PD and V/PD deviation RIs, including wrong runway events and surface incidents;
- airport diagrams and information; and
- hot spots.

The initial study and field validation process identified 140 locations with a high incidence of RIs using data from October 1, 2007, to September 30, 2013, after reviewing 5,099 RI reports. As a result, a 15- to 20-year improvement program, known as the Runway Incursion Mitigation (RIM) program, launched in FY2015. The goal of the program is to mitigate airfield locations with high incidents of RIs. A subset of the 140 locations identified was then validated for inclusion in the RIM program and prioritized for mitigation. The FAA maintains a RIM program website, accessed at https://www.faa.gov/airports/special_programs/rim/ (FAA, 2022b).

2. ANNUAL DATABASE UPDATES

The FAA maintains the RIM database including all data relevant to the program from airports with civilian air traffic control towers (towered airports), and provides a history of database updates. The following data are maintained for each airport:

- Hub Category
- General Aviation Asset Category
- Annual Operations
- Enplanements
- Title 14 Code of Federal Regulations Part 139 status (Airport Certification, 2004), herein referred to as Part 139

The current FAA airport diagram can be displayed within the database along with Form 5010 Airport Master Record data. Additionally, hot spots and their descriptions are updated every 28 days, when applicable.

The database includes all RIs and surface incidents categorized as V/PDs or PDs by the FAA Office of Runway Safety for each airport. This includes wrong runway landings and takeoffs. On an annual basis, the database incorporates new data. This update typically occurs during the second quarter of the FY, and involves analysis of all RIs from the previous calendar year (CY). Reviewing the narrative in the incursion report determines the RI location. Each incursion is then georeferenced in the database.

In addition to analyzing RIs, an annual review of the layout of each airport determines if locations with previously identified nonstandard geometry characteristics have changes and/or mitigations. Locations with new nonstandard geometry characteristics are identified as well. In the PTG Report, the FAA identified 19 nonstandard taxiway geometry characteristics that lead to pilot confusion. Locations having at least one of the following 19 nonstandard geometry characteristics are categorized as PTG locations (FAA, 2013):

- Y-shaped taxiways crossing a runway
- Wrong runway events
- Wide expanses of taxi pavements entering or along a runway
- Convergence of numerous taxiway types entering a runway
- High-speed exit crossing a taxiway
- Two runway thresholds in close proximity
- Short taxiways (stubs) between runways
- Direct taxiing access to runways from ramp areas
- An aligned taxiway entering runway ends
- Nonstandard markings and/or signage placement
- Greater than three-path taxiway intersection
- Taxiway connection to V-shaped runways
- Taxiway intersects runway at other than a right angle
- Short taxi distance from ramp/apron area to a runway
- High-speed exits leading directly onto another runway
- Taxiway coinciding with the intersection of two runways
- Use of a runway as a taxiway
- Unexpected holding position marking on parallel/entrance taxiway
- Miscellaneous (e.g., nonsequential taxiway designation schemes, absence of full-length parallel taxiway, taxiway intersection along the middle third of a runway)

Once all RIs from the previous CY are georeferenced, a review of annual and cumulative RI counts for each PTG location determines which locations meet RIM program criteria. The criteria are

(1) three or more RIs in a single CY, or
(2) an average of one or more RIs per year during the most recent 10 years.

The analysis is limited to the most recent 10-year period to consider changes in an airport operating environment over long periods of time (e.g., operational procedures, activity profiles, fleet mix, airfield redesign).

A review of the unique characteristics of each location further narrows the locations considered for field validation. For certain locations, interpretation of incursion narratives is necessary to confirm RIM status. All RIs are georeferenced regardless of narrative description, but not all narratives provide evidence of a potential issue with taxiway geometry. For example, a lost airport vehicle might cross the same runway hold bar multiple times, generating multiple RIs for one incident. Such a location, which could technically meet RIM criteria, is not a RIM location based on the serial nature of the specific incursion incident. Short-term construction projects can cause temporary airfield hot spots that no longer apply after construction is finished. Aircraft and vehicles operating on an airfield without tower clearance provide another example of an event not related to taxiway geometry. The FAA continues to monitor these locations.

The purpose of field validation, which occurs after each annual database update, is to obtain feedback from FAA field personnel regarding locations considered for classification as RIM locations. Information obtained from the field, such as extenuating circumstances surrounding RIs (e.g., construction activity, air shows, other special events) and whether mitigations are underway, is evaluated. ARP personnel use this information to make a final determination regarding which locations to add to the RIM inventory. After final determinations, the FAA publishes the updated RIM inventory on the FAA website (2022). Figure 1 provides a summary of the annual database update process, which typically begins in January and ends in September.

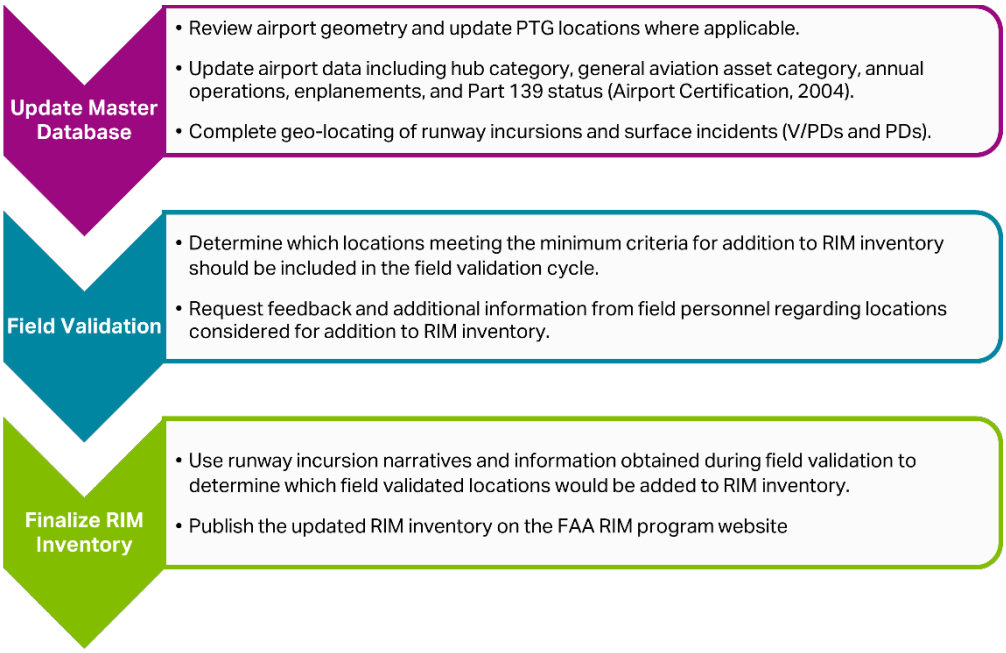

Figure 1. The RIM Database Update Process

A statistical analysis assessed incursion rates at mitigated RIM locations before and after mitigation implementation. For locations where at least one year of post-mitigation incursion data are available, analysis of incursion data through CY2021 indicates an average incursion rate before mitigation of 0.86. However, the average incursion rate after mitigation was 0.20 incursions or a 78% reduction in incursions after mitigation (Baksh, 2023).

The FAA maintains a GIS-based module, referred to as the RIM Data Management (RDM) tool , accessed through the FAA's Airport Data and Information Portal (ADIP). This tool facilitates field and FAA headquarters (HQ) personnel in sharing information related to potential or active RIM locations, monitoring the progress of mitigation for RIM locations, and tracking the success metrics of the program. Additionally, non-FAA users, such as state aviation officials, airport sponsors, and industry consultants, have limited, read-only access to the RDM tool. The RDM tool undergoes a major update annually that reflects the previous year's data and updates RIM location details. Hot Spot (HS) polygons and related PTG locations, RI, and surface incident data are updated on an intermittent basis throughout the year.

2.1 The FY2015–FY2022 Program Summary

The RIM database has undergone eight annual updates since the completion of the PTG study. These updates added a total of 10,092 RIs and 532 PTG locations to the database. Eight field validation cycles coincided with these annual database updates. These cycles were completed in July 2015, December 2016, and every year in July from 2017 through 2022. These validation cycles added 125 new RIM locations. Figure 2 provides a breakdown of RIs added with each update, and Figure 3 shows the number of PTG locations added with each update. As shown, the number of PTG locations decreased by 54 in FY2019 due to the mitigation of nonstandard geometry characteristics, through other projects. The number of PTG locations increased by 263

in FY2021 due to the establishment of new numerical criteria for identifying Geocode 14 "Short taxi distance from ramp/apron area to a runway." Analysis of data from Section 7.4 of the report *Data Gap Assessment and Exploratory Data Analysis for Runway Incursion Mitigation Program* (Baldwin and Harris, 2020) established this criterion (800 feet from non-movement area marking to runway hold line). This identified new PTG locations added to the RIM database. Figure 4 shows the counts of locations that entered the RIM inventory after each validation cycle, as well as the counts of RIM locations mitigated per fiscal year. This figure represents additions since the initial FY2012 study and does not take into consideration differences in yearly values that result from adjustments made to individual RIM locations (because of reevaluation of runway incursion reports) to account for changes in RIM location status. Section 2.2 provides an in-depth discussion of the most recent database update and validation cycle, which took place in 2022.

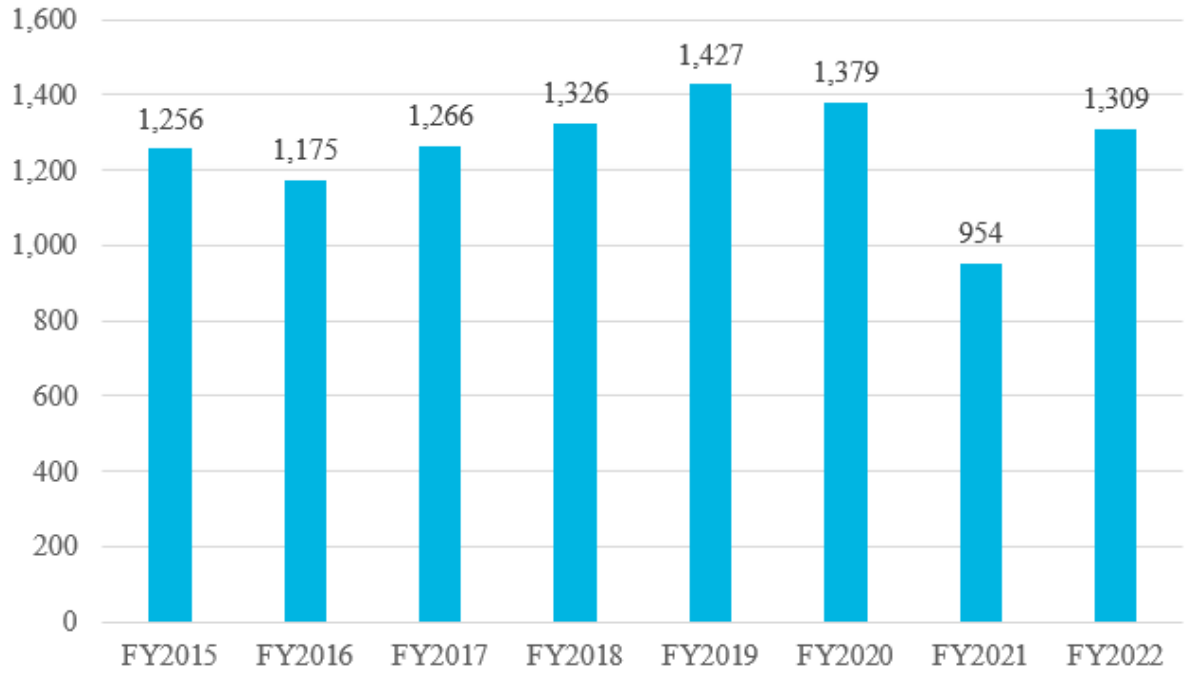

Figure 2. The RIs Added to RIM Database With Each Update

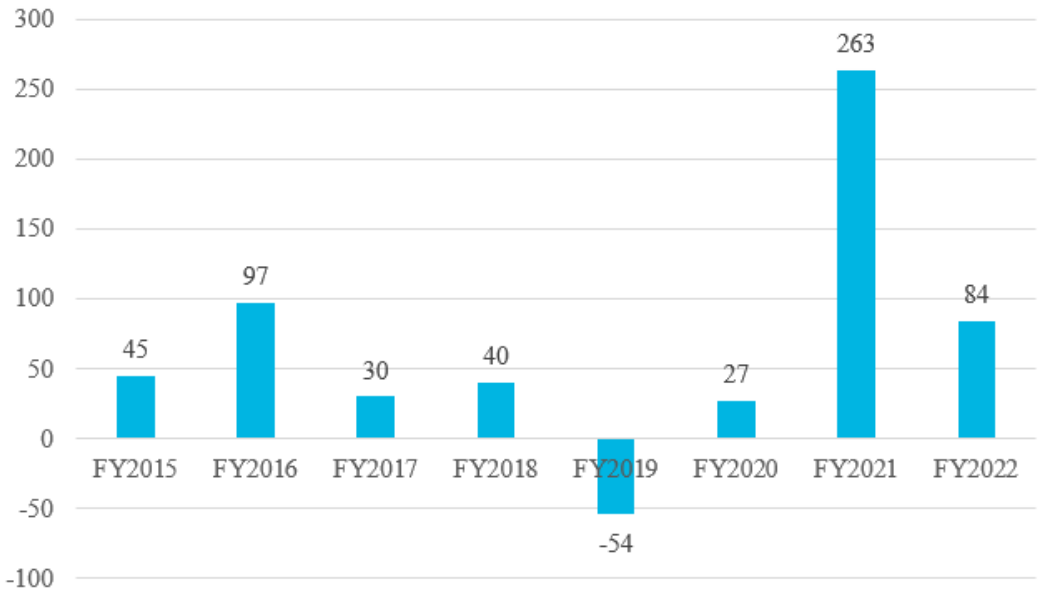

Figure 3. The PTG Locations Added to RIM Database With Each Update

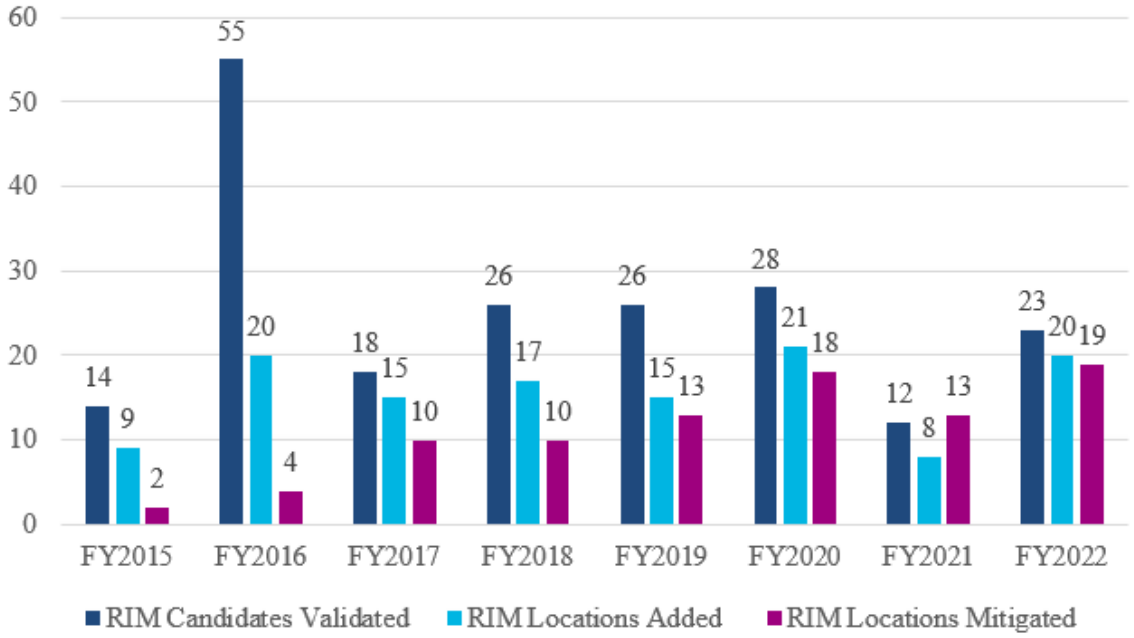

Figure 4. The RIM Locations Validated/Added/Mitigated Per FY

2.2 The FY2022 Program Update

The FY2022 RIM database update was completed in September 2022. This update analyzed and georeferenced 1,309 RIs from CY2021. This increased the overall number of RIs in the database to 15,191. These incursions occurred at 522 towered airports between FY2008 and the end of CY2021.

Analysis of RI counts identified 37 PTG locations meeting the minimum criteria for entry into the RIM inventory. Of these locations, 23 were ultimately included in the field validation/review cycle based on assessment of individual location characteristics and history. Based on information obtained during field validation, 20 locations were added to the RIM inventory in FY2022. Table 1 lists these 20 locations and provides relevant details such as location, peak year RI counts, and cumulative RI counts during the past 10 years. Due to CY2021 RI counts, five mitigated locations (indicated by an asterisk in Table 1) returned to the RIM inventory in FY2022 for additional mitigation action.

Table 1. The FY2022 New RIM Locations: Summary Data

Airport Name	Airport Identifier	Location Description	Peak CY Annual RI	Cumulative[1] RI Count
Albuquerque International Sunport, Albuquerque, NM	ABQ	Hot Spot 4: Holding positions on Taxiway E at intersection with Runway 3/21	4	10
Addison Airport, Dallas, TX*	ADS	Hot Spot 1: Holding position on Taxiway A at approach end of Runway 15	5	20
General Edward Lawrence Logan International Airport, Boston, MA	BOS	Hot Spot 4: Holding positions for Runways 15R/33L and 9/27 at the intersection of Taxiways C/D	4	17
University Of Illinois/Willard Airport, Champaign/Urbana, IL	CMI	Hot Spot 1: Complex intersection of Taxiways A, A2, B, C, D, D1, and E	3	16
McClellan-Palomar Airport, Carlsbad, CA*	CRQ	Holding position on Taxiway A1 for Runway 6/24	5	16
Phoenix Deer Valley Airport, Phoenix, AZ	DVT	Holding position on Taxiway C3 south of Runway 7R/25L	9	11
Newark Liberty International Airport, Newark, NJ	EWR	Holding position on Taxiway Z west of Runway 4L/22R	3	7
Flying Cloud Airport, Minneapolis, MN	FCM	Hot Spot 3: Holding position on Taxiway G north of Runway 10L/28R	4	9
Republic Airport, Farmingdale, NY	FRG	Holding position on Taxiway A west of Runway 1/19	3	8
Niagara Falls International Airport, Niagara Falls, NY	IAG	Hot Spot 2: Holding positions for Runway 10L/28R and Runway 10L/28R approach area at the intersection of Taxiways D/D1	6	7
Harry Reid International Airport, Las Vegas, NV	LAS	Intersection of Runway 8L/26R and 1R/19L	4	12

Airport Name	Airport Identifier	Location Description	Peak CY Annual RI	Cumulative[1] RI Count
Bill And Hillary Clinton National Airport/Adams Field, Little Rock, AR	LIT	Holding position on Taxiway K west of Runway 18/36	3	4
Bowman Field Airport, Louisville, KY	LOU	Holding position on Taxiway A1 for Runway 6/24	3	7
Charles B. Wheeler Downtown Airport, Kansas City, MO	MKC	Hot Spot 1: Holding position on Taxiway G south of Runway 3/21	4	13
Smyrna Airport, Smyrna, TN*	MQY	Hot Spot 3: Holding position on Taxiway D at approach end of Runway 19	8	22
Metropolitan Oakland International Airport, Oakland, CA	OAK	Hot Spot 3: Holding positions on Taxiway C at intersection with Runway 15/33	3	6
Palm Beach International Airport, West Palm Beach, FL	PBI	LAHSO on Runway 14/32 north of Runway 10L-28R	3	9
Reno-Tahoe International Airport, Reno, NV*	RNO	Landing threshold of Runway 34L	5	16
Santa Barbara Municipal Airport, Santa Barbara, CA*	SBA	Holding positions in close proximity on Taxiway C between Runways 15R/33L and 15L/33R	3	6
Van Nuys Airport, Van Nuys, CA	VNY	Holding position on Taxiway C west of Runway 16R/34L	4	18

* RIM locations mitigated previously but then returned to RIM inventory in FY2022 for additional mitigation.
[1] Incursion count to date from the previous 10 calendar years of available RI data (CY2012–CY2021).
LAHSO = Land and hold short operations

2.3 The RIM Inventory

At the end of FY2022, the RIM inventory consisted of 128 active RIM locations at 82 airports across all FAA regions. Several airports have more than one active RIM location. Airports with the most RIM locations are

- Montgomery-Gibbs Executive Airport (MYF), San Diego, California – 5 RIM locations
- Chino Airport (CNO), Chino, California – 5 RIM locations

The FAA categorizes airports with the greatest impact on system performance (having 1 percent of passenger enplanements or 0.75 percent or more of the total nonmilitary itinerant operations) as core airports. Table 2 lists the Core 30 airports with current RIM locations.

Table 2. Core 30 Airports With RIM Locations

Airport Name	Airport Identifier	Number of RIM Locations
Hartsfield-Jackson Atlanta International Airport, Atlanta, GA	ATL	1
General Edward Lawrence Logan International Airport, Boston, MA	BOS	4
Ronald Reagan Washington National Airport, Arlington, VA	DCA	1
Denver International Airport, Denver, CO	DEN	1
Newark Liberty International Airport, Newark, NJ	EWR	1
Daniel K. Inouye International Airport, Honolulu, HI	HNL	3
Harry Reid International Airport, Las Vegas, NV	LAS	2
Los Angeles International Airport, Los Angeles, CA	LAX	1
Memphis International Airport, Memphis, TN	MEM	1
Miami International Airport, Miami, FL	MIA	2
Seattle-Tacoma International Airport, Seattle, WA	SEA	1
San Francisco International Airport, San Francisco, CA	SFO	1
Salt Lake City International Airport, Salt Lake City, UT	SLC	2

The complete RIM inventory as of the end of FY2022 is in Appendix A.

3. MITIGATION ANALYSIS

Once a PTG location is added to the RIM inventory, relevant stakeholders (e.g., FAA personnel, local airport sponsor) coordinate to determine the most appropriate mitigation strategies for the location, as is typical for proper airport planning and design. Upon selecting mitigation strategies, the project progresses through the typical phases of planning, environmental assessment, design, and construction. The 128 active RIM locations are in various stages of mitigation. Figure 5 provides a breakdown of RIM locations by mitigation milestone. As shown, 111 (87%) active RIM locations have initiated mitigation activities and are in the planning, design, or construction phases. Note that 5 of the 17 RIM locations with no project identified entered the RIM inventory in the fourth quarter of FY2022.

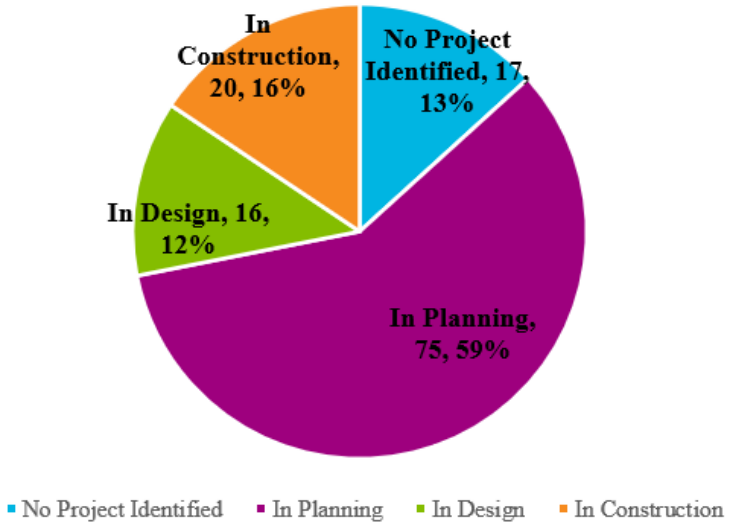

Figure 5. Status of Active RIM Locations

Airports use a variety of mitigation strategies to eliminate nonstandard geometry configurations and reduce the likelihood of pilot confusion and, ultimately, RIs. AC 150/5300-13 (FAA, 2022a) and EB 75 (FAA, 2007) provide airports with airport geometry strategies to reduce the risk of RIs. In addition to geometry improvements, airports often use a combination of mitigation strategies for RIM locations. Mitigation strategies include changes to airfield lighting, signage, markings, and/or operational procedures. Table 3 provides examples of mitigation strategies.

Table 3. Mitigation Strategy Examples (FAA, 2022)

Mitigation Type	Mitigation Strategy Examples
Airport Geometry Changes	• Reconfigure taxiway to intersect runway at 90-degree angle • Relocate taxiway to eliminate direct access • Narrow the taxiway pavement entrance • Close a taxiway or runway
Lighting	• Install runway end identifier lights (REILs) • Install elevated or in-pavement runway guard lights
Signage	• Relocate signs to meet FAA standards • Adjust hold position signs to align with incoming taxiway centerline
Markings	• Relocate markings to meet FAA standards • Install enhanced centerline markings • Collocate instrument landing system (ILS) and hold position markings • Install runway holding position markings at runway/runway intersections
Procedures/ Operational	• Notify pilots of problems with correct runway selection through Automated Traffic Information System (ATIS), Notices to Air Missions (NOTAMs), and airport diagram notations • Discontinue use of runways as taxiways

FAA personnel developed procedures to confirm mitigation of RIM locations and successful mitigation techniques.

By the end of FY2022, the RIM program mitigated 89 locations. Airports utilized a variety of mitigation strategies to eliminate the problematic geometry characteristics or reduce their effects at these locations. Refer to Appendix B for the location descriptions of each mitigated RIM location by FY.

The RIM-mitigated locations experienced a total of 1,080 RIs prior to mitigation, compared to 78 RIs after mitigation. Because some of these locations were mitigated relatively recently, within the past 5 years, significant post-mitigation RI trending data do not yet exist. Monitoring of these locations over time determines if mitigation efforts are successful. Appendix C provides summary data for all RIM-mitigated locations.

4. CONCLUSION

The goal of the RIM program is to identify locations at towered airports with nonstandard geometry characteristics and a high occurrence of RIs, mitigate the nonstandard geometry characteristics present at these locations, and ultimately reduce the number of RIs at these locations. This program continues to be one of the most successful safety programs in the FAA.

At the end of FY2022:

- 128 active RIM locations
- 82 airports with at least 1 RIM location
- 111 locations initiated mitigation activities (planning, design, or construction phases)
- 89 mitigated locations since the June 2015 inception
- For mitigated locations, where at least one year of post-mitigation incursion data are available, the incursion rate reduced by 78%
- Mitigations eliminated hot spots from the airport diagrams at 25 of these locations

The FAA continues to monitor these locations to ensure the mitigations successfully reduce the number of RIs.

FAA HQ personnel continue to monitor the progress of the program by visiting as many airports with RIM locations as feasible. Personnel from FAA HQ, the regions, and the Airports District Offices are available to provide advisory and financial assistance to airport sponsors with mitigation strategies, as the ultimate goal is to reduce RIs as much as possible, and eliminate RIM locations across all airports.

5. REFERENCES

Airport Certification, 14 C. F. R. § 139 (2004). https://www.faa.gov/airports/airport_safety/part139_cert

Baksh, Z. (2023, February, 2). *RIM Metrics Analysis- Updated for Calendar Year 2021*. AECOM

Baldwin, D. & Harris, M. (2020, April 10). *Data gap assessment and exploratory data analysis for runway incursion mitigation program.* AECOM

Federal Aviation Administration (FAA). (2007). *Incorporation of runway incursion prevention into taxiway and apron design*. (Engineering Brief 75). https://www.faa.gov/sites/faa.gov/files/airports/engineering/engineering_briefs/EB-75.pdf

FAA. (2013). *Airport geometry data elements*. AJI-14 Runway Safety Group, FAA internal report.

FAA. (2015). *Runway Safety: Runway Incursions*. https://www.faa.gov/airports/runway_safety/resources/runway_incursions/

FAA. (2022). Runway incursion mitigation (RIM) toolbox: A guide to understanding runway incursion geocodes and strategies for mitigation [PowerPoint slide presentation]. https://adip.faa.gov/agis/public/#/public after login to the Airport Data and Information Portal.

FAA. (2022a, March 31). *Airport design*. (Advisory Circular 150/5300-13B). Washington, DC: FAA. https://www.faa.gov/documentLibrary/media/Advisory_Circular/150-5300-13B-Airport-Design.pdf

FAA. (2022b). *Runway Incursion Mitigation (RIM) program*. https://www.faa.gov/airports/special_programs/rim/

Legarreta, G. (2012). *Improved taxiway designs for greater airfield safety and efficiency*. FAA internal report.

Vitagliano, L., Canter, G., & Aland, R. (2018). *Problematic taxiway geometry study overview* (DOT/FAA/TC-18/2). https://www.airporttech.tc.faa.gov/Products/Airport-Safety-Papers-Publications/Airport-Safety-Detail/ArtMID/3682/ArticleID/157/Problematic-Taxiway-Geometry-Study-Overview

APPENDIX A—RUNWAY INCURSION MITIGATION INVENTORY

The FAA runway incursion mitigation (RIM) program personnel developed this preliminary inventory of airport locations where runaway incursions (RIs) have occurred and are now working with airports on mitigation strategies. The RI data collected from fiscal year (FY) 2008 to calendar year (CY) 2021 indicate airport locations where three or more peak annual RIs have occurred in a given CY or where cumulative incursion counts averaged one or more RIs per year of data analyzed. Cumulative RI counts reflect total RIs to date since FY2008 for each location validated prior to 2020. For locations validated in 2020 and later, cumulative RI counts reflect total RIs beginning 10 calendar years prior to their validation year. Table A-1 shows this information, which is subject to change as the FAA works with the airport sponsors. Bold and italic rows in Table A-1 indicate new RIM locations that were added to the inventory in FY2022. The RIM program inventory will be updated as projects proceed, and additional RI data are collected.

Table A-1. The RIM Program Inventory of Airport Locations as of September 2022

Airport Identifier	Airport Name	Location	Location Identifier	Year Added to RIM	Region	NPIAS[1] Hub Classification	Asset Category	Part 139[2]	Cumulative RI	Peak CY Annual RI
ABQ	Albuquerque International Sunport, NM	Section of Taxiway G where it intersects Taxiway C and Runway 3/21	ABQ-HS3	2021	ASW	Medium	NA	Y	17	5
ABQ	***Albuquerque International Sunport, NM***	***Taxiway E at intersection with Runway 3/21***	***ABQ-HS4***	***2022***	***ASW***	***Medium***	***NA***	***Y***	***10***	***4***
ADS	***Addison Airport, TX***	***Taxiway A at approach end of Runway 15***	***ADS-HS1***	***2022***	***ASW***	***Reliever***	***National***	***N***	***20***	***5***
APA	Centennial Airport, CO	Approach end of Runway 35R	APA-07	2019	ANM	Reliever	National	N	14	4
APA	Centennial Airport, CO	Taxiway C1 at approach end of Runway 10	APA-HS3	2015	ANM	Reliever	National	N	32	4
APA	Centennial Airport, CO	Holding position on Taxiway B8 at intersection with Runway 17L/35R	APA-HS4	2020	ANM	Reliever	National	N	33	8
ARR	Aurora Municipal Airport, IL	Holding position on Taxiway A3 at intersection with Runway 9/27	ARR-03	2020	AGL	Reliever	National	N	6	3
ASE	Aspen-Pitkin County/Sardy Field Airport, CO	Taxiway A9 at approach end of Runway 33	ASE-HS3	2019	ANM	Non Hub Primary	NA	Y	18	4

Bold and italic rows are new RIM locations that were added to the inventory in FY2022.
LAHSO = Land and hold short operations
[1] NPIAS = National Plan of Integrated Airport Systems
[2] Airport Certification, Title 14 Code of Federal Regulations Part 139 (14 C.F.R. § 139).

Airport Identifier	Airport Name	Location	Location Identifier	Year Added to RIM	Region	NPIAS[1] Hub Classification	Asset Category	Part 139[2]	Cumulative RI	Peak CY Annual RI
ATL	Hartsfield-Jackson Atlanta International Airport, GA	Runway 8L/26R and Taxiway C, D intersections	ATL-HS1	2015	ASO	Large	NA	Y	16	4
AZO	Kalamazoo/Battle Creek International Airport, MI	Taxiway C at intersection with Runway 17/35 (west of runway)	AZO-02	2015	AGL	Non Hub Primary	NA	Y	6	3
BET	Bethel Airport, AK	Intersection of Runway 12/30 and Runway 1R/19L	BET-HS1	2021	AAL	Non Hub Primary	NA	Y	8	5
BFI	Boeing Field/King County International Airport, WA	Holding position on Taxiway Z parallel to approach end of Runway 14R	BFI-HS1	2020	ANM	Non Hub Primary	NA	Y	8	3
BJC	Rocky Mountain Metropolitan Airport, CO	Approach end of Runway 30R	BJC-02	2021	ANM	Reliever	National	Y	12	2
BJC	Rocky Mountain Metropolitan Airport, CO	Runway 3 at intersection with Runway 12R/30L (south of runway)	BJC-HS3	2020	ANM	Reliever	National	Y	12	5
BOI	Boise Air Terminal/Gowen Field, ID	Taxiway J between of Runway 10R approach end and 10L approach hold	BOI-01	2018	ANM	Small	NA	Y	22	9
BOI	Boise Air Terminal/Gowen Field, ID	Approach hold on Taxiway J/A at approach end of Runway 10L and Taxiway W at approach end of Runway 10L	BOI-HS1	2019	ANM	Small	NA	Y	13	3
BOS	General Edward Lawrence Logan International Airport, MA	Intersection of Runways 4R/22L and 14/32	BOS-47	2015	ANE	Large	NA	Y	9	3

Airport Identifier	Airport Name	Location	Location Identifier	Year Added to RIM	Region	NPIAS[1] Hub Classification	Asset Category	Part 139[2]	Cumulative RI	Peak CY Annual RI
BOS	General Edward Lawrence Logan International Airport, MA	Intersection of Runways 15L/33R and 4L/22R	BOS-HS1	2015	ANE	Large	NA	Y	15	3
BOS	General Edward Lawrence Logan International Airport, MA	Intersection of Runway 4L approach end and Taxiways E and K	BOS-HS3	2015	ANE	Large	NA	Y	26	4
BOS	***General Edward Lawrence Logan International Airport, MA***	***Intersections of Taxiways C and D, and Runways 15R/33L and 9/27***	***BOS-HS4***	***2022***	***ANE***	***Large***	***NA***	***Y***	***17***	***4***
BUR	Bob Hope Airport, CA	Holding positions for Runways 8/26 and 15/33 at northwest corner of air carrier ramp (non-movement area)	BUR-HS1	2019	AWP	Medium	NA	Y	11	4
CAK	Akron-Canton Regional Airport, OH	Taxiways H and J at intersection with Runway 1/19 (west of runway)	CAK-HS1	2020	AGL	Non Hub Primary	NA	Y	14	4
CCR	Buchanan Field Airport, CA	Taxiway B at approach end of Runway 32R	CCR-HS4	2016	AWP	Non Hub Primary	NA	Y	18	4
CHD	Chandler Municipal Airport, AZ	Approach end of Runway 22L	CHD-12	2021	AWP	Reliever	Regional	N	8	4
CMA	Camarillo Airport, CA	Taxiway A at approach end of Runway 26	CMA-01	2015	AWP	Reliever	National	N	16	5
CMI	***University Of Illinois/Willard Airport, IL***	***Complex intersection of Taxiways A, A2, B, C, D, D1, and E***	***CMI-HS1***	***2022***	***AGL***	***Non Hub Primary***	***NA***	***Y***	***16***	***3***
CNO	Chino Airport, CA	Taxiway P between Runways 26R approach end and 26L	CNO-05	2015	AWP	Reliever	Regional	N	15	4
CNO	Chino Airport, CA	Taxiway P at approach end of Runway 26R (north of runway)	CNO-10	2017	AWP	Reliever	Regional	N	28	8

Airport Identifier	Airport Name	Location	Location Identifier	Year Added to RIM	Region	NPIAS[1] Hub Classification	Asset Category	Part 139[2]	Cumulative RI	Peak CY Annual RI
CNO	Chino Airport, CA	Runway 26L approach end	CNO-19	2015	AWP	Reliever	Regional	N	20	6
CNO	Chino Airport, CA	Taxiway L between Runways 3/21 and 8R/26L	CNO-HS2	2018	AWP	Reliever	Regional	N	7	5
CNO	Chino Airport, CA	Intersections of Taxiways D, K, and L and Runways 8L/26R and 3/21	CNO-HS4	2016	AWP	Reliever	Regional	N	26	5
CRG	Jacksonville Executive at Craig Airport, FL	Intersection of Taxiways C, E, and F entering Runways 5/23 and 14/32	CRG-HS1	2020	ASO	Reliever	Regional	N	9	3
CRQ	***McClellan-Palomar Airport, CA***	***Taxiway A1 at approach end of Runway 24***	***CRQ-03***	***2022***	***AWP***	***Non Primary Commercial***	***National***	***Y***	***16***	***5***
DAL	Dallas Love Field Airport, TX	Holding position on Taxiway A parallel to approach end of Runway 13L	DAL-HS1	2019	ASW	Medium	NA	Y	37	12
DCA	Ronald Reagan Washington National Airport, DC	Taxiway J at Runway 19 approach end	DCA-HS2	2015	AEA	Large	NA	Y	22	4
DEN	Denver International Airport, CO	Holding positions on Taxiway ED for Runway 17R approach area	DEN-HS1	2017	ANM	Large	NA	Y	26	4
DVT	Phoenix Deer Valley Airport, AZ	Approach end of Runway 7R	DVT-07	2018	AWP	Reliever	National	N	19	3
DVT	***Phoenix Deer Valley Airport, AZ***	***Taxiway C3 at intersection with Runway 7R/25L***	***DVT-24***	***2022***	***AWP***	***Reliever***	***National***	***N***	***11***	***9***
DVT	Phoenix Deer Valley Airport, AZ	Taxiway B5 between Taxiway B and Runway 7R/25L	DVT-HS1	2015	AWP	Reliever	National	N	12	3

Airport Identifier	Airport Name	Location	Location Identifier	Year Added to RIM	Region	NPIAS[1] Hub Classification	Asset Category	Part 139[2]	Cumulative RI	Peak CY Annual RI
DVT	Phoenix Deer Valley Airport, AZ	Taxiway B9 between Runways 7L/25R and 7R/25L	DVT-HS2	2016	AWP	Reliever	National	N	46	7
DWH	David Wayne Hooks Memorial Airport, TX	Taxiway K at Runway 17L approach end	DWH-HS6	2021	ASW	Reliever	Regional	N	9	6
DWH	David Wayne Hooks Memorial Airport, TX	Intersection of Taxiway C and Runway 17R/35L	DWH-HS1	2015	ASW	Reliever	Regional	N	28	5
DWH	David Wayne Hooks Memorial Airport, TX	Intersection of Taxiway G and Runway 17L/35R	DWH-HS4	2018	ASW	Reliever	Regional	N	18	5
EWR	***Newark Liberty International Airport, NJ***	***Taxiway Z at approach end of Runway 22R (west of runway)***	***EWR-34***	***2022***	***AEA***	***Large***	***NA***	***Y***	***7***	***3***
FAI	Fairbanks International Airport, AK	Intersection of Taxiway U and Runway 2 ski strip	FAI-11	2015	AAL	Small	NA	Y	8	3
FAT	Fresno Yosemite International Airport, CA	Runway 29R approach end	FAT-21	2016	AWP	Small	NA	Y	13	3
FCM	Flying Cloud Airport, MN	Approach ends of Runways 28L and 28R	FCM-HS1	2015	AGL	Reliever	National	N	23	4
FCM	Flying Cloud Airport, MN	Approach ends of Runways 10L and 10R	FCM-13	2020	AGL	Reliever	National	N	16	3
FCM	***Flying Cloud Airport, MN***	***Taxiway G at approach end of Runway 10L (north of runway)***	***FCM-HS3***	***2022***	***AGL***	***Reliever***	***National***	***N***	***9***	***4***
FFZ	Falcon Field Airport, AZ	Taxiway B at intersection with Runway 4R/22L	FFZ-01	2019	AWP	Reliever	Regional	N	16	3
FFZ	Falcon Field Airport, AZ	Approach end of Runway 22L	FFZ-13	2018	AWP	Reliever	Regional	N	17	3

Airport Identifier	Airport Name	Location	Location Identifier	Year Added to RIM	Region	NPIAS[1] Hub Classification	Asset Category	Part 139[2]	Cumulative RI	Peak CY Annual RI
FRG	***Republic Airport, NY***	***Taxiway A at intersection with Runway 1/19 (west of runway)***	***FRG-02***	***2022***	***AEA***	***Reliever***	***National***	***Y***	***8***	***3***
GCN	Grand Canyon National Park Airport, AZ	Taxiways A and B at approach end of Runway 21	GCN-HS1	2020	AWP	Non Hub Primary	NA	Y	20	5
GLS	Scholes International Airport, TX	Taxiway E at intersection with Runway 18/36 (east of runway)	GLS-04	2015	ASW	Reliever	Regional	N	13	4
HIO	Portland-Hillsboro Airport, OR	Taxiway A9 at approach end of Runway 31L	HIO-05	2017	ANM	Reliever	National	N	16	3
HIO	Portland-Hillsboro Airport, OR	Intersection of Taxiways A and A6 and Runway 13R/31L	HIO-HS1	2018	ANM	Reliever	National	N	6	3
HIO	Portland-Hillsboro Airport, OR	Taxiway A8 at intersection with Runway 13R/31L	HIO-HS2	2015	ANM	Reliever	National	N	20	4
HLN	Helena Regional Airport, MT	Intersection of Taxiway C and approach end of Runway 35	HLN-01	2018	ANM	Non Hub Primary	NA	Y	10	3
HND	Henderson Executive Airport, NV	Taxiway E at intersection with Runway 17R/35L (west of runway)	HND-HS2	2020	AWP	Reliever	National	N	5	3
HNL	Daniel K. Inouye International Airport, HI	Approach ends of Runways 4L and 4R	HNL-HS1	2015	AWP	Large	NA	Y	22	4
HNL	Daniel K. Inouye International Airport, HI	Taxiway E between Runways 4L/22R and 8L/26R	HNL-HS3	2016	AWP	Large	NA	Y	12	3
HNL	Daniel K. Inouye International Airport, HI	Intersection of Runway 8L approach and Taxiways A, J, and T	HNL-HS4	2015	AWP	Large	NA	Y	20	4

Airport Identifier	Airport Name	Location	Location Identifier	Year Added to RIM	Region	NPIAS[1] Hub Classification	Asset Category	Part 139[2]	Cumulative RI	Peak CY Annual RI
HWD	Hayward Executive Airport, CA	Holding position on Taxiway Z1 parallel to approach end of Runway 28L	HWD-04	2020	AWP	Reliever	National	N	16	7
HWD	Hayward Executive Airport, CA	Approach end of Runway 28L	HWD-24	2021	AWP	Reliever	National	N	12	2
HWD	Hayward Executive Airport, CA	Holding position on Taxiway A1 parallel to approach end of Runway 28L	HWD-HS5	2016	AWP	Reliever	National	N	46	13
IAG	***Niagara Falls International Airport, NY***	***Approach hold on Taxiway D for Runway 28R and Taxiway D1 at approach end of Runway 28R***	***IAG-HS2***	***2022***	***AEA***	***Non Hub Primary***	***NA***	***Y***	***7***	***6***
IWA	Phoenix-Mesa Gateway Airport, AZ	Approach end of Runway 12C	IWA-04	2015	AWP	Small	NA	Y	13	3
JLN	Joplin Regional Airport, MO	Holding position on Taxiway E parallel to approach end of Runway 13	JLN-HS1	2018	ACE	Non Hub Primary	NA	Y	10	3
LAF	Purdue University Airport, IN	Intersection of Taxiways B, B3, and C and Runways 10/28 and 5/23	LAF-HS1	2019	AGL	General Aviation	Regional	Y	24	6
LAS	***Harry Reid International Airport, NV***	***Intersection of Runways 8L/26R and 1R/19L***	***LAS-15***	***2022***	***AWP***	***Large***	***NA***	***Y***	***12***	***4***
LAS	Harry Reid International Airport, NV	Intersection of Runways 8L/26R and 1L/19R	LAS-HS3	2015	AWP	Large	NA	Y	29	3
LAX	Los Angeles International Airport, CA	Taxiway AA between Runways 6L/24R and 6R/24L	LAX-HS1	2016	AWP	Large	NA	Y	30	6

Airport Identifier	Airport Name	Location	Location Identifier	Year Added to RIM	Region	NPIAS[1] Hub Classification	Asset Category	Part 139[2]	Cumulative RI	Peak CY Annual RI
LIT	***Bill And Hillary Clinton National Airport/Adams Field, AR***	***Taxiway K at intersection with Runway 18/36 (west of runway)***	***LIT-12***	***2022***	***ASW***	***Small***	***NA***	***Y***	***4***	***3***
LOU	***Bowman Field Airport, KY***	***Taxiway A1 at intersection with Runway 6/24***	***LOU-02***	***2022***	***ASO***	***Reliever***	***Regional***	***N***	***7***	***3***
LVK	Livermore Municipal Airport, CA	Intersection of Runway 25R approach end and Taxiway B	LVK-HS1	2015	AWP	Reliever	Regional	N	41	6
LVK	Livermore Municipal Airport, CA	Intersection of Runway 25L approach end and Taxiway C	LVK-HS2	2015	AWP	Reliever	Regional	N	21	4
MEM	Memphis International Airport, TN	Intersection of Runway 27 approach end and Taxiway V2	MEM-01	2015	ASO	Small	NA	Y	3	3
MFE	McAllen Miller International Airport, TX	Taxiway A at approach end of Runway 14	MFE-HS1	2020	ASW	Non Hub Primary	NA	Y	15	4
MIA	Miami International Airport, FL	Taxiway L1 between approach ends of Runways 8L and 8R	MIA-24	2020	ASO	Large	NA	Y	3	3
MIA	Miami International Airport, FL	Intersection of Taxiways N, M, M1, Q1, Q, and P between Runways 8R/26L and 12/30	MIA-HS4	2016	ASO	Large	NA	Y	12	3
MKC	***Charles B. Wheeler Downtown Airport, MO***	***Taxiway G at intersection with Runway 3/21 (south of runway)***	***MKC-HS1***	***2022***	***ACE***	***Reliever***	***National***	***Y***	***13***	***4***
MLI	Quad Cities International Airport, IL	Intersection of Runways 13/31, 9/27, and 5/23	MLI-HS2	2015	AGL	Non Hub Primary	NA	Y	13	8
MQY	***Smyrna Airport, TN***	***Intersection of Runway 19 approach end and Taxiways C, B, and D***	***MQY-HS3***	***2022***	***ASO***	***Reliever***	***National***	***Y***	***22***	***8***

Airport Identifier	Airport Name	Location	Location Identifier	Year Added to RIM	Region	NPIAS[1] Hub Classification	Asset Category	Part 139[2]	Cumulative RI	Peak CY Annual RI
MRI	Merrill Field Airport, AK	Taxiway K at approach end of Runway 25 (north of runway)	MRI-24	2020	AAL	Non Hub Primary	NA	N	14	3
MRI	Merrill Field Airport, AK	Taxiway K at approach end of Runway 25 (south of runway)	MRI-25	2015	AAL	Non Hub Primary	NA	N	14	3
MRI	Merrill Field Airport, AK	Taxiway G at intersection with Runway 5/23	MRI-26	2015	AAL	Non Hub Primary	NA	N	13	5
MYF	Montgomery-Gibbs Executive Airport, CA	Taxiway A at approach end of Runway 28R	MYF-01	2018	AWP	Reliever	Regional	N	20	4
MYF	Montgomery-Gibbs Executive Airport, CA	Taxiway H at intersection with Runway 5/23 (north of runway)	MYF-13	2018	AWP	Reliever	Regional	N	7	4
MYF	Montgomery-Gibbs Executive Airport, CA	Approach end of Runway 28R	MYF-15	2017	AWP	Reliever	Regional	N	16	5
MYF	Montgomery-Gibbs Executive Airport, CA	Taxiway F between Runways 10L/28R and 10R/28L	MYF-22	2017	AWP	Reliever	Regional	N	14	9
MYF	Montgomery-Gibbs Executive Airport, CA	Taxiway B at approach end of Runway 28L	MYF-HS3	2015	AWP	Reliever	Regional	N	23	5
NEW	Lakefront Airport, LA	Taxiway F at approach end of Runway 36L	NEW-HS3	2017	ASW	Reliever	National	N	24	11
OAK	***Metropolitan Oakland International Airport, CA***	***Taxiway C at intersection with Runway 15/33***	***OAK-HS3***	***2022***	***AWP***	***Medium***	***NA***	***Y***	***6***	***3***
OPF	Miami-Opa Locka Executive Airport, FL	Taxiway T8 at approach end of Runway 30	OPF-03	2019	ASO	Reliever	Regional	N	6	4

Airport Identifier	Airport Name	Location	Location Identifier	Year Added to RIM	Region	NPIAS[1] Hub Classification	Asset Category	Part 139[2]	Cumulative RI	Peak CY Annual RI
OPF	Miami-Opa Locka Executive Airport, FL	Taxiways T1 and T2 at approach end of Runway 12	OPF-20	2020	ASO	Reliever	Regional	N	10	3
PBI	***Palm Beach International Airport, FL***	***LAHSO on Runway 14/32 north of Runway 10L-28R***	***PBI-24***	***2022***	***ASO***	***Medium***	***NA***	***Y***	***9***	***3***
PBI	Palm Beach International Airport, FL	Holding position on Taxiway R parallel to approach end of Runway 10R	PBI-42	2020	ASO	Medium	NA	Y	5	3
PIE	St Pete–Clearwater International Airport, FL	Taxiway A at approach end of Runway 4 (north of runway)	PIE-HS1	2018	ASO	Small	NA	Y	14	4
PNS	Pensacola International Airport, FL	Intersections of Runways 8/26 and 17/35 and Taxiways A, B, and D	PNS-HS1	2018	ASO	Small	NA	Y	26	6
POC	Brackett Field Airport, CA	Taxiway E at intersection with Runway 8L/26R (north of runway)	POC-02	2015	AWP	Reliever	Regional	N	10	2
PRC	Prescott Regional Airport – Ernest A. Love Field, AZ	Intersection of Runway 3L approach end and Taxiways A1 and B5	PRC-HS2	2015	AWP	Non Hub Primary	NA	Y	24	4
PRC	Prescott Regional Airport – Ernest A. Love Field, AZ	Intersection of Runway 3R/21L and Taxiways C and D4	PRC-HS3	2015	AWP	Non Hub Primary	NA	Y	13	4
PSP	Palm Springs International Airport, CA	Taxiway B at approach end of Runway 31R (east of runway)	PSP-HS3	2015	AWP	Small	NA	Y	18	4
RHV	Reid-Hillview Airport, CA	Taxiway E between approach ends of Runways 13L and 13R	RHV-01	2015	AWP	Reliever	Regional	N	18	4
RHV	Reid-Hillview Airport, CA	Taxiway A at approach end of Runway 31R	RHV-HS2	2015	AWP	Reliever	Regional	N	19	3

Airport Identifier	Airport Name	Location	Location Identifier	Year Added to RIM	Region	NPIAS[1] Hub Classification	Asset Category	Part 139[2]	Cumulative RI	Peak CY Annual RI
RNO	***Reno-Tahoe International Airport, NV***	***Approach end of Runway 34L***	***RNO-18***	***2022***	***AWP***	***Small***	***NA***	***Y***	***16***	***5***
SAT	San Antonio International Airport, TX	Taxiway K at intersection with Runway 13R/31L	SAT-05	2015	ASW	Medium	NA	Y	12	6
SAT	San Antonio International Airport, TX	Intersection of Runways 4/22 and 13R/31L	SAT-HS1	2015	ASW	Medium	NA	Y	40	10
SBA	***Santa Barbara Municipal Airport, CA***	***Taxiway C between approach ends of Runways 15R and 15L***	***SBA-17***	***2022***	***AWP***	***Non Hub Primary***	***NA***	***Y***	***6***	***3***
SDM	Brown Field Municipal Airport, CA	Taxiway B between Runways 8L/26R and 8R/26L	SDM-04	2018	AWP	Reliever	Regional	N	4	4
SEA	Seattle-Tacoma International Airport, WA	Taxiway C at approach end of Runway 16L (east of runway)	SEA-02	2015	ANM	Large	NA	Y	6	3
SFO	San Francisco International Airport, CA	Taxiway T between Runways 10L/28R and 10R/28L	SFO-HS3	2015	AWP	Large	NA	Y	18	4
SLC	Salt Lake City International Airport, UT	Intersection of approach ends of Runways 35 and 32, and Taxiways K1 and M	SLC-HS1	2015	ANM	Large	NA	Y	45	11
SLC	Salt Lake City International Airport, UT	Taxiway Q between Runways 34R/16L and 14/32	SLC-HS2	2016	ANM	Large	NA	Y	12	3
SNA	John Wayne/Orange County Airport, CA	Taxiway L between approach ends of Runways 20L and 20R	SNA-03	2015	AWP	Medium	NA	Y	6	2
SNA	John Wayne/Orange County Airport, CA	Taxiway L at approach end of Runway 20L (east of runway)	SNA-HS1	2015	AWP	Medium	NA	Y	16	3

Airport Identifier	Airport Name	Location	Location Identifier	Year Added to RIM	Region	NPIAS[1] Hub Classification	Asset Category	Part 139[2]	Cumulative RI	Peak CY Annual RI
STS	Charles M. Schulz–Sonoma County Airport, CA	Holding position on Taxiway A for the approach area of Runway 20	STS-08	2016	AWP	Non Hub Primary	NA	Y	17	7
STS	Charles M. Schulz–Sonoma County Airport, CA	Intersection of Taxiways H and A3 and the north run-up area	STS-HS3	2017	AWP	Non Hub Primary	NA	Y	8	4
STS	Charles M. Schulz–Sonoma County Airport, CA	Intersection of Runways 14/32 and 2/20	STS-HS4	2019	AWP	Non Hub Primary	NA	Y	28	6
TIW	Tacoma Narrows Airport, WA	Taxiway A4 at approach end of Runway 35	TIW-02	2021	ANM	General Aviation	Regional	N	6	5
TMB	Miami Executive Airport, FL	Taxiways E and H at intersections with Runway 13/31	TMB-HS1	2015	ASO	Reliever	Regional	N	15	3
TOA	Zamperini Field Airport, CA	Holding position on Taxiway H for approach area of Runway 29L	TOA-HS1	2020	AWP	Reliever	Regional	N	10	3
TUS	Tucson International Airport, AZ	Runway 29R Approach End	TUS-HS1	2015	AWP	Small	NA	Y	19	4
TUS	Tucson International Airport, AZ	Taxiway D at intersections with approach ends of Runways 11L and 11R	TUS-HS2	2015	AWP	Small	NA	Y	45	8
UAO	Aurora State Airport, OR	Taxiway A1 at approach end of Runway 17	UAO-HS1	2018	ANM	General Aviation	National	N	9	5
VGT	North Las Vegas Airport, NV	Intersection of Runway 7 approach end and Taxiways F and G	VGT-HS1	2016	AWP	Reliever	National	N	63	12
VGT	North Las Vegas Airport, NV	Intersection of Runway 12R approach end and Taxiway G	VGT-HS2	2015	AWP	Reliever	National	N	34	7

Airport Identifier	Airport Name	Location	Location Identifier	Year Added to RIM	Region	NPIAS[1] Hub Classification	Asset Category	Part 139[2]	Cumulative RI	Peak CY Annual RI
VNY	***Van Nuys Airport, CA***	***Taxiway C at intersection with Runway 16R/34L (west of runway)***	***VNY-11***	***2022***	***AWP***	***Reliever***	***National***	***N***	***18***	***4***

APPENDIX B—LOCATION DESCRIPTIONS OF RIM-MITIGATED LOCATIONS

Table B-1 lists the RIM-Mitigated locations by fiscal year and their location descriptions.

Table B-1. The RIM-Mitigated Locations By Year

FY	Airport Identifier	Airport Name	Location Description
2015	CLT	Charlotte Douglas International Airport, Charlotte, NC	Hold short bar on TWY D at intersection with RWY 5/23 (south of runway)
	FDK	Frederick Municipal Airport, Frederick, MD	Intersection of TWY A and RWY 12/30
2016	APA	Centennial Airport, Denver, CO	TWY A1 hold short bar at approach end of RWY 17L
	CRP	Corpus Christi International Airport, Corpus Christi, TX	Hold short bars on taxiways at approach ends of RWY 31 and RWY 36
	MDW	Chicago Midway International Airport, Chicago, IL	Hold short bar on TWYs E1, E2, and E3 at approach end of RWY 31C
	RNO	Reno-Tahoe International Airport, Reno, NV	Hold short bar on TWY J, east of RWY 16L/34R
2017	ACT	Waco Regional Airport, Waco, TX	Approach end of RWY 32
	DWH	David Wayne Hooks Memorial Airport, Houston, TX	Intersection of TWY D, TWY E, and approach end of RWY 17L
	DWH	David Wayne Hooks Memorial Airport, Houston, TX	Intersection of RWY 17R/35L and TWY E
	FXE	Fort Lauderdale Executive Airport, Fort Lauderdale, FL	Intersection of RWY 27 and TWY C
	FXE	Fort Lauderdale Executive Airport, Fort Lauderdale, FL	TWYs E, J, L, and P at the approach end of RWY 9
	FXE	Fort Lauderdale Executive Airport, Fort Lauderdale, FL	Intersection of RWY 13/31 and TWY A
	PBI	Palm Beach International Airport, West Palm Beach, FL	Intersection of RWY 10R and TWY S
	PBI	Palm Beach International Airport, West Palm Beach, FL	Intersection of RWY 10L and TWY L
	PHL	Philadelphia International Airport, Philadelphia, PA	Hold short bar on TWY D (north side of runway) at intersection with RWY 9L/22R
	PHL	Philadelphia International Airport, Philadelphia, PA	Intersection of TWY D and the approach end of RWY 8
2018	ABQ	Albuquerque International Sunport, Albuquerque, NM	Approach ends of RWY 8 and RWY 12
	DAB	Daytona Beach International Airport, Daytona, FL	Intersection of RWY 7L/25R and TWY P5
	HUF	Terre Haute Regional Airport, Terre Haute, IN	Hold short bar for TWY D at approach end of RWY 14 and former RWY 18
	ISM	Kissimmee Gateway Airport, Orlando, FL	Intersection of RWY 15/33 and TWY B
	MLU	Monroe Regional Airport, Monroe, LA	Hold bar on TWY A between RWY 14 and RWY 18
	PRC	Prescott Regional Airport - Ernest A. Love Field , Prescott, AZ	Hold short bar at intersection of RWY 3R/21L and TWY C2 and E
	SEA	Seattle-Tacoma International Airport, Seattle, WA	Hold short bars on TWY F at intersection with RWY 16C/34C

FY	Airport Identifier	Airport Name	Location Description
2018	SEA	Seattle-Tacoma International Airport, Seattle, WA	Hold short bar on TWY Q for RWY 16L/34R
	SMO	Santa Monica Municipal Airport, Santa Monica, CA	TWY B at approach end of RWY 21
	TUL	Tulsa International Airport, Tulsa, OK	Intersection of RWY 8/26 and TWYs C, J, and K
2019	DVT	Phoenix Deer Valley Airport, Phoenix, AZ	Hold short bar at intersection of TWY A4 and approach end of RWY 7L
	FTY	Fulton County Airport-Brown Field, Atlanta, GA	Intersection of RWY 8/26 and TWY K
	LGB	Long Beach Airport/Daugherty Field, Long Beach, CA	Intersection of approach end of RWY 26L and TWYs D and F
	LOU	Bowman Field Airport, Louisville, KY	Hold short bar on TWY J at the intersection with RWY 6/24
	MAF	Midland International Air & Space Port Airport, Midland, TX	Hold short bar on TWY A at approach end of RWY 10
	MHT	Manchester-Boston Regional Airport, Manchester, NH	Hold short bars on TWYs P and U at intersection with approach end of RWY 35
	MIA	Miami International Airport, Miami, FL	Intersection of RWY 8R/26L and TWY M5
	MIA	Miami International Airport, Miami, FL	TWY T8 between RWY 12/30 and RWY 9/27
	SFB	Orlando Sanford International Airport, Orlando, FL	Hold short bar on RWY 18/36 south of RWY 9R
	SFB	Orlando Sanford International Airport, Orlando, FL	TWY R under approach path for RWY 9R
	SRQ	Sarasota Bradenton International Airport, Sarasota/Bradenton, FL	Intersections of RWY 4/22; RWY 14/32; and TWYs A, B, C, and D
	TMB	Miami Executive Airport, Miami, FL	Hold short bar on TWY A at approach end of RWY 9L
	VNY	Van Nuys Airport, Van Nuys, CA	TWY C and approach end of RWY 16L
2020	ADS	Addison Airport, Dallas, TX	Intersection of TWY G and RWY 15
	ADS	Addison Airport, Dallas, TX	Intersection of TWY C and RWY 33
	ATL	Hartsfield-Jackson Atlanta International Airport, Atlanta, GA	Hold bar on TWY D at intersection with RWY 9L/27R (south of runway)
	ATL	Hartsfield-Jackson Atlanta International Airport, Atlanta, GA	Intersection of TWY C and D at RWY 8R/26L
	CXO	Conroe-North Houston Regional Airport, Houston, TX	Intersection of TWY J and RWY 14/32 (eastbound)
	DAL	Dallas Love Field Airport, Dallas, TX	Intersection of TWYs B5 and B6 and RWY 13L/31R
	FCM	Flying Cloud Airport, Minneapolis, MN	Hold bar on TWY C at approach end of RWY 28R from north FBO Ramp
	IWA	Phoenix-Mesa Gateway Airport, Phoenix, AZ	Intersection of TWYs V and K and RWY 12R/30L
	JNU	Juneau International Airport, Juneau, AK	Intersection of TWY D and RWY 8/26
	LGB	Long Beach Airport/Daugherty Field, Long Beach, CA	Intersection of TWY J-D and RWYs 8R-26L and RWY 12-30
	MIC	Crystal Airport, Minneapolis, MN	Hold bars on TWY E4 between approach ends of RWYs 14L and 14R

FY	Airport Identifier	Airport Name	Location Description
2020	ORD	Chicago O'Hare International Airport, Chicago, IL	The north portion of TWY T (Former RWY 14R/32L) within the approach area of RWY 9R/27L
	ORL	Orlando Executive Airport, Orlando, FL	Intersection of TWY E4 and RWY 7/25
	PAO	Palo Alto Airport, Palo Alto, CA	Intersection of RWY 31 and TWY A
	PDK	DeKalb-Peachtree Airport, Atlanta, GA	Intersection of RWY 21R and TWY G
	PDK	DeKalb-Peachtree Airport, Atlanta, GA	Intersection of RWY 3L and TWY A
	RNO	Reno-Tahoe International Airport, Reno, NV	Intersection of TWY C and TWY L
	TEB	Teterboro Airport, Teterboro, NJ	TWY B between RWY 19 and RWY 24
2021	CLE	Cleveland Hopkins International Airport, Cleveland, OH	Intersection of TWY R, TWY A, and TWY L
	DSM	Des Moines International Airport, Des Moines, IA	Intersection of TWY P and RWY 13/31
	HNL	Honolulu International Airport, Honolulu. HI	TWY E between RWY 4L/22R and RWY 4R/22L
	HNL	Honolulu International Airport, Honolulu. HI	TWY D between RWY 4L/22R and RWY 4R/22L
	HNL	Honolulu International Airport, Honolulu. HI	TWY F between RWY 4L/22R and RWY 4R/22L
	HNL	Honolulu International Airport, Honolulu. HI	Intersection of TWY F and RWY 4R/22L
	IDA	Idaho Falls Regional Airport, Idaho Falls, ID	Approach ends of RWY 17 and RWY 21
	LAX	Los Angeles International Airport, Los Angeles, CA	Intersection of TWY F and RWY 7L/25R and RWY 7R/25L
	LGB	Long Beach Airport/Daugherty Field, Long Beach, CA	Intersection of TWYs B, D, and K between RWY 8L/26R and RWY 12/30
	MRI	Merrill Field Airport, Anchorage, AK	Intersection of TWY C and RWY 7/25
	PHX	Phoenix Sky Harbor International Airport, Phoenix, AZ	Landing threshold of RWY 25R
	SNA	John Wayne Airport/Orange County Airport, Santa Ana, CA	TWY H between RWY 2L/20R and RWY 22 approach
	TEB	Teterboro Airport, Teterboro, NY	Intersection of TWY L and RWY 6/24
2022	APC	Napa County Airport, Napa, CA	Approach end of RWY19R
	BOI	Boise Air Terminal, Boise, ID	Intersection of TWYs F, B3 and RWY 10R/28L
	BTV	Burlington International Airport, Burlington, VT	Intersection of TWY C and RWY 1/19
	CLE	Cleveland Hopkins International Airport, Cleveland, OH	Intersection of TWYs S, L, and J, entering RWY 6R-24L
	CSG	Columbus Airport, Columbus, GA	Intersection of TWYs A, C, and D
	DAL	Dallas Love Field, Dallas, TX	Holding position on TWY C parallel to the approach end of Runway 13R
	DAL	Dallas Love Field, Dallas, TX	Holding position on TWY L for the approach end of RWY 13R
	FAI	Fairbanks International Airport, Fairbanks, AK	Intersection of TWY T and RWY 2R/20L
	HOU	William P. Hobby Airport, Houston, TX	Holding positions on TWY E between RWYs 17/35 and 13R/31L
	HOU	William P. Hobby Airport, Houston, TX	Holding position on TWY G at the approach end of RWY 4
	HOU	William P. Hobby Airport, Houston, TX	Holding position on TWY G at the approach end of RWY 13R

FY	Airport Identifier	Airport Name	Location Description
2022	MHT	Manchester Boston Regional Airport, Manchester, NH	Holding position on TWY H for the approach end of RWY 17
	MYF	Montgomery-Gibbs Executive Airport, San Diego, CA	Holding position on RWY 5/23 southbound for RWY 10R/28L
	ORD	Chicago O'Hare International Airport, Chicago, IL	Intersection of TWYs A1 and G when approaching RWYs 4L/22R and 9R/27L
	PDK	DeKalb Peachtree Airport, Atlanta, GA	Intersection of TWYs C and B between RWYs 16/34, 3L/21R, and 3R/21L
	SJC	Norman Y. Mineta San Jose International Airport, San Jose, CA	Approach end of RWY 30R
	SJC	Norman Y. Mineta San Jose International Airport, San Jose, CA	Approach end of RWY 30L
	SPI	Abraham Lincoln Capital Airport, Springfield, IL	Intersection of Runways 13/31, 8/36, and 4/22
	TYR	Tyler Pounds Regional Airport, Tyler, TX	Holding position on TWY H parallel to approach end of RWY 22

RWY = Runway
TWY = Taxiway

APPENDIX C—RIM-MITIGATED LOCATIONS

Table C-1 shows the summary of RIM-Mitigated locations, RI pilot deviation (PD) and vehicle/pedestrian deviation (V/PD) totals for years 2007 to 2021, RI totals before and after mitigation, and average RIs per year before and after mitigation. Locations mitigated in FY2022 are highlighted in the Date Complete column. In the RI Totals Per Year column, red represents years with no mitigation in place, yellow represents year of mitigation, and green represents years after mitigation in place.

Table C-1. The RIM-Mitigated Locations Summary

Color Legend

Years Prior to Mitigation	Year Mitigation Was Completed	Years After Mitigation Was Completed

RIM-Mitigated Locations					Runway Incursion (PD & V/PD) Totals Per Year														Runway Incursion (PD & V/PD) Totals		Average Runway Incursions (PD & V/PD) Per Year	
Region	**Airport Name**	**Identifier**	**Mitigation Type**	**Date Complete**	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
AAL	Fairbanks International Airport	FAI-HS1	Taxiway/Runway Geometry Reconfiguration	10/29/2021	0	3	2	4	0	1	3	0	0	4	1	5	0	0	0	23	0	1.63	NA[1]
AAL	Juneau International Airport	JNU-01	Taxiway/Runway Geometry Reconfiguration	08/05/2020	0	0	1	0	0	3	1	2	2	0	0	1	0	1	1	11	1	0.86	N/A[1]
AAL	Merrill Field Airport	MRI-13	Taxiway/Runway Geometry Reconfiguration	10/05/2020	0	2	1	4	0	0	0	4	1	2	0	0	0	1	0	15	0	1.15	N/A[1]
ACE	Des Moines International Airport	DSM-HS2	Taxiway/Runway Geometry Reconfiguration	10/30/2020	1	0	1	1	0	0	0	1	0	3	2	0	0	1	0	10	0	0.76	N/A[1]
AEA	Frederick Municipal Airport	FDK-HS3	Signage, Marking, and/or Lighting	07/10/2015	0	0	0	0	0	0	0	1	4	0	0	0	0	1	0	5	1	0.64	0.15
AEA	Philadelphia International Airport	PHL-01	Signage, Marking, and/or Lighting; Operational/ Procedural	07/27/2017	0	0	2	0	2	1	1	0	0	0	1	0	0	0	0	6	1	0.61	0.23

[1] Post-mitigation period is not long enough to provide a meaningful average that reflects the result of mitigation efforts.

RIM-Mitigated Locations					Runway Incursion (PD & V/PD) Totals Per Year																Runway Incursion (PD & V/PD) Totals		Average Runway Incursions (PD & V/PD) Per Year	
Region	**Airport Name**	**Identifier**	**Mitigation Type**	**Date Complete**	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021		Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
AEA	Philadelphia International Airport	PHL-HS1	Signage, Marking, and/or Lighting; Taxiway/Runway Geometry Reconfiguration	08/24/2017	1	2	1	1	0	1	0	0	0	1	1	0	0	0	0		8	0	0.81	0
AEA	Teterboro Airport	TEB-HS1-2019	Taxiway/Runway Geometry Reconfiguration	11/22/2019	0	0	0	0	1	3	1	1	0	0	1	1	0	0	0		8	0	0.66	N/A[1]
AEA	Teterboro Airport	TEB-HS1-2021	Signage, Marking, and/or Lighting	06/01/2021	0	0	0	0	1	1	1	0	1	0	3	1	0	0	1		8	1	0.58	N/A[1]
AGL	Cleveland Hopkins International Airport	CLE-HS1	Taxiway/Runway Geometry Reconfiguration	11/19/2021	0	0	4	0	0	0	0	1	0	0	0	0	1	0	0		6	0	0.42	N/A[1]
AGL	Cleveland Hopkins International Airport	CLE-HS2	Taxiway/Runway Geometry Reconfiguration	11/02/2020	0	5	0	0	0	0	0	0	0	0	0	0	0	0	0		5	0	0.38	N/A[1]
AGL	Flying Cloud Airport	FCM-HS2	Taxiway/Runway Geometry Reconfiguration	08/27/2020	0	0	2	0	1	0	0	1	0	1	6	0	0	0	0		11	0	0.85	N/A[1]
AGL	Terre Haute Regional Airport	HUF-HS1	Taxiway/Runway Geometry Reconfiguration	12/10/2017	0	0	0	0	0	0	2	0	1	8	0	0	0	0	0		11	0	1.08	0
AGL	Chicago Midway International Airport	MDW-03	Signage, Marking, and/or Lighting	05/09/2016	0	0	1	0	0	3	0	1	0	0	0	0	1	0	1		5	2	0.58	0.35

RIM-Mitigated Locations					Runway Incursion (PD & V/PD) Totals Per Year															Runway Incursion (PD & V/PD) Totals		Average Runway Incursions (PD & V/PD) Per Year	
Region	**Airport Name**	**Identifier**	**Mitigation Type**	**Date Complete**	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
AGL	Crystal Airport	MIC-HS6	Taxiway/Runway Geometry Reconfiguration	08/25/2020	0	1	1	4	4	1	2	0	0	1	2	2	1	1	0	20	0	1.55	N/A[1]
AGL	Chicago O'Hare International Airport	ORD-73	Taxiway/Runway Geometry Reconfiguration	06/01/2020	0	0	0	0	0	0	1	0	6	0	1	1	1	0	0	10	0	0.79	N/A[1]
AGL	Chicago O'Hare International Airport	ORD-HS1	Taxiway/Runway Geometry Reconfiguration	11/01/2021	0	1	0	0	0	0	2	0	0	1	0	1	6	2	0	13	0	0.92	N/A[1]
AGL	Abraham Lincoln Capital Airport	SPI-HS1	Taxiway/Runway Geometry Reconfiguration	09/08/2022	0	2	3	0	0	2	0	0	0	0	0	0	0	0	0	7	N/A[2]	0.49	N/A[1]
ANE	Burlington International Airport	BTV-HS2	Signage, Marking, and/or Lighting	10/29/2021	0	1	0	0	1	1	1	0	0	2	3	2	3	0	1	15	0	1.06	N/A[1]
ANE	Manchester Boston Regional Airport	MHT-HS1	Taxiway/Runway Geometry Reconfiguration	08/12/2022	2	10	2	0	1	0	0	0	0	0	0	0	0	0	0	15	N/A[2]	1.05	N/A[1]
ANE	Manchester Boston Regional Airport	MHT-HS2	Taxiway/Runway Geometry Reconfiguration	09/24/2019	2	1	1	0	1	1	0	0	0	0	0	0	0	0	0	6	0	0.50	N/A[1]
ANM	Centennial Airport	APA-HS1	Taxiway/Runway Geometry Reconfiguration; Other	03/09/2016	0	3	2	2	3	1	2	1	4	0	1	1	2	1	2	18	7	2.13	1.20

[2] Post-mitigation runway incursion data are not yet available for mitigations implemented in CY2022.

RIM-Mitigated Locations					Runway Incursion (PD & V/PD) Totals Per Year																Runway Incursion (PD & V/PD) Totals		Average Runway Incursions (PD & V/PD) Per Year	
Region	**Airport Name**	**Identifier**	**Mitigation Type**	**Date Complete**	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021		Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
ANM	Boise Air Terminal	BOI-08	Taxiway/Runway Geometry Reconfiguration	12/04/2021	0	0	0	0	0	0	0	0	0	0	0	1	3	0	0		4	0	0.28	N/A[1]
ANM	Idaho Falls Regional Airport	IDA-HS2	Taxiway/Runway Geometry Reconfiguration	06/21/2021	1	0	1	0	0	4	1	0	0	1	0	1	2	0	2		13	0	0.95	N/A[1]
ANM	Seattle-Tacoma International Airport	SEA-26	Operational/ Procedural	08/10/2018	0	1	0	1	0	0	0	4	0	0	0	0	1	0	0		6	1	0.55	0.29
ANM	Seattle-Tacoma International Airport	SEA-HS1	Signage, Marking, and/or Lighting	04/29/2018	0	1	2	2	0	1	1	1	0	0	0	1	0	0	0		8	1	0.76	0.27
ASO	Hartsfield-Jackson Atlanta International Airport	ATL-18	Operational/ Procedural	05/29/2020	0	1	0	1	0	3	0	0	0	0	0	2	0	0	2		7	2	0.55	N/A[1]
ASO	Hartsfield-Jackson Atlanta International Airport	ATL-HS2	Operational/ Procedural	05/29/2020	2	5	4	3	2	3	2	3	2	3	4	3	2	0	5		38	5	3.00	N/A[1]
ASO	Charlotte Douglas International Airport	CLT-06	Operational/ Procedural; Signage, Marking, and/or Lighting	06/18/2015	0	0	0	0	4	0	1	0	0	0	0	0	0	0	0		5	0	0.65	0
ASO	Columbus Airport	CSG-HS1	Signage, Marking, and/or Lighting	08/30/2022	0	0	0	0	0	0	0	0	0	0	0	0	4	0	0		4	N/A[2]	0.28	N/A[1]

RIM-Mitigated Locations					Runway Incursion (PD & V/PD) Totals Per Year																Runway Incursion (PD & V/PD) Totals		Average Runway Incursions (PD & V/PD) Per Year	
Region	**Airport Name**	**Identifier**	**Mitigation Type**	**Date Complete**	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
ASO	Daytona Beach International Airport	DAB-02	Taxiway/Runway Geometry Reconfiguration	08/04/2018	0	0	1	0	0	0	3	1	0	0	0	0	0	0	0	5	0	0.46	0
ASO	Fulton County Airport/Brown Field	FTY-04	Taxiway/Runway Geometry Reconfiguration	09/01/2019	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0	4	0	0.34	N/A[1]
ASO	Fort Lauderdale Executive Airport	FXE-08	Signage, Marking, and/or Lighting	02/16/2017	0	1	0	3	0	0	0	0	0	0	0	0	0	0	0	4	0	0.43	0
ASO	Fort Lauderdale Executive Airport	FXE-HS1	Signage, Marking, and/or Lighting	02/16/2017	0	2	1	1	0	3	3	3	4	0	0	1	4	0	6	17	11	1.81	2.26
ASO	Fort Lauderdale Executive Airport	FXE-HS3	Signage, Marking, and/or Lighting	02/16/2017	0	0	1	0	3	0	5	1	1	2	0	0	1	1	0	13	2	1.38	0.41
ASO	Kissimmee Gateway Airport	ISM-02	Signage, Marking, and/or Lighting	07/31/2018	0	0	0	0	0	3	0	0	0	0	0	0	0	0	1	3	1	0.28	0.29
ASO	Bowman Field Airport	LOU-01	Signage, Marking, and/or Lighting	05/01/2019	0	0	1	0	3	1	0	0	0	0	0	0	0	0	0	5	0	0.43	N/A[1]
ASO	Miami International Airport	MIA-HS1	Taxiway/Runway Geometry Reconfiguration; Signage, Marking, and/or Lighting	11/16/2018	0	3	0	0	1	0	0	1	0	0	0	0	0	0	0	5	0	0.45	0

RIM-Mitigated Locations					Runway Incursion (PD & V/PD) Totals Per Year																Runway Incursion (PD & V/PD) Totals		Average Runway Incursions (PD & V/PD) Per Year	
Region	**Airport Name**	**Identifier**	**Mitigation Type**	**Date Complete**	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021		Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
ASO	Miami International Airport	MIA-HS3	Taxiway/Runway Geometry Reconfiguration	8/16/2019	0	0	0	4	2	0	0	2	0	0	0	1	0	0	1		9	1	0.76	N/A[1]
ASO	Orlando Executive Airport	ORL-01	Taxiway/Runway Geometry Reconfiguration	05/06/2020	0	3	0	0	3	0	1	1	0	1	2	3	2	0	0		16	0	1.27	N/A[1]
ASO	Palm Beach International Airport	PBI-02	Taxiway/Runway Geometry Reconfiguration; Signage, Marking, and/or Lighting	09/01/2017	0	0	3	0	0	0	0	0	0	0	0	0	0	0	0		3	0	0.30	0
ASO	Palm Beach International Airport	PBI-HS1	Signage, Marking, and/or Lighting	02/03/2017	1	1	1	0	0	2	5	0	0	0	1	0	1	0	0		10	2	1.07	0.41
ASO	DeKalb Peachtree Airport	PDK-HS1	Signage, Marking, and/or Lighting	12/31/2019	0	3	4	1	1	0	1	3	2	0	1	1	0	0	4		17	4	1.39	N/A[1]
ASO	DeKalb Peachtree Airport	PDK-HS3	Signage, Marking, and/or Lighting	12/31/2019	0	0	4	1	1	0	1	0	0	1	1	0	0	1	0		9	1	0.73	N/A[1]
ASO	DeKalb Peachtree Airport	PDK-11	Taxiway/Runway Geometry Reconfiguration	10/01/2021	0	1	0	0	1	0	1	2	3	4	0	0	1	0	0		13	0	0.93	N/A[1]
ASO	Orlando Sanford International Airport	SFB-05	Taxiway/Runway Geometry Reconfiguration	10/15/2018	0	0	1	0	1	1	1	0	1	0	1	0	0	0	0		6	0	0.54	N/A[1]

RIM-Mitigated Locations					Runway Incursion (PD & V/PD) Totals Per Year																Runway Incursion (PD & V/PD) Totals		Average Runway Incursions (PD & V/PD) Per Year	
Region	**Airport Name**	**Identifier**	**Mitigation Type**	**Date Complete**	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
ASO	Orlando Sanford International Airport	SFB-HS2	Taxiway/Runway Geometry Reconfiguration	10/15/2018	0	3	1	0	1	3	0	2	5	2	0	0	0	0	0	17	0	1.54	N/A[1]
ASO	Sarasota Bradenton International Airport	SRQ-HS1	Taxiway/Runway Geometric Reconfiguration, Signage, Marking, and/or Lighting Change(s), Technological Enhancements	08/08/2019	0	0	0	1	2	5	7	2	2	7	5	3	6	0	2	39	3	3.29	N/A[1]
ASO	Miami Executive Airport	TMB-04	Taxiway/Runway Geometry Reconfiguration; Signage, Marking, and/or Lighting Change(s)	03/29/2019	0	0	0	1	0	3	2	2	4	3	2	4	0	0	0	21	0	1.83	N/A[1]
ASW	Albuquerque International Sunport	ABQ-HS1	Taxiway/Runway Geometry Reconfiguration	05/11/2018	0	1	0	2	1	2	2	2	1	0	0	2	1	0	1	12	3	1.13	0.82
ASW	Waco Regional Airport	ACT-04	Taxiway/Runway Geometry Reconfiguration; Operational/ Procedural	10/10/2016	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	1	0	0.11	0
ASW	Addison Airport	ADS-HS4	Operational/ Procedural	11/11/2019	0	0	0	1	1	0	9	0	0	0	0	0	0	0	0	11	0	0.91	N/A[1]
ASW	Addison Airport	ADS-HS8	Operational/ Procedural	11/11/2019	1	1	0	1	2	1	0	0	1	0	0	0	0	0	0	7	0	0.58	N/A[1]

RIM-Mitigated Locations					Runway Incursion (PD & V/PD) Totals Per Year															Runway Incursion (PD & V/PD) Totals		Average Runway Incursions (PD & V/PD) Per Year	
Region	**Airport Name**	**Identifier**	**Mitigation Type**	**Date Complete**	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
ASW	Corpus Christi International Airport	CRP-HS1	Taxiway/Runway Geometry Reconfiguration	05/26/2016	0	1	6	2	2	2	1	1	0	0	0	0	0	0	0	15	0	1.73	0
ASW	Conroe-North Houston Regional Airport	CXO-02	Signage, Marking, and/or Lighting	09/14/2020	0	0	0	0	4	1	0	0	0	0	0	0	0	0	0	5	0	0.39	N/A[1]
ASW	Dallas Love Field	DAL-HS2	Signage, Marking, and/or Lighting	07/01/2022	0	1	6	3	1	0	3	5	3	5	3	0	3	0	2	35	N/A[2]	2.45	N/A[1]
ASW	Dallas Love Field	DAL-15	Signage, Marking, and/or Lighting	07/01/2022	0	0	0	0	0	1	0	0	0	0	2	7	2	0	0	12	N/A[2]	0.84	N/A[1]
ASW	Dallas Love Field Airport	DAL-33	Taxiway/Runway Geometry Reconfiguration	10/31/2019	0	0	1	0	3	0	3	2	0	0	0	1	0	0	0	10	0	0.83	N/A[1]
ASW	David Wayne Hooks Memorial Airport	DWH-HS2	Signage, Marking, and/or Lighting; Operational/ Procedural; Taxiway/Runway Geometry Reconfiguration	12/31/2016	1	0	1	1	1	1	6	5	15	9	0	0	0	0	0	40	0	4.32	0
ASW	David Wayne Hooks Memorial Airport	DWH-HS3	Signage, Marking, and/or Lighting	12/31/2016	0	1	0	2	0	1	1	3	6	0	3	3	4	1	4	14	15	1.51	3.00
ASW	William P. Hobby Airport	HOU-01	Taxiway/Runway Geometry Reconfiguration	07/01/2022	0	0	1	3	0	0	1	0	0	2	1	3	0	2	1	14	N/A[2]	0.98	N/A[1]

RIM-Mitigated Locations					Runway Incursion (PD & V/PD) Totals Per Year														Runway Incursion (PD & V/PD) Totals		Average Runway Incursions (PD & V/PD) Per Year	
Region	**Airport Name**	**Identifier**	**Mitigation Type**	**Date Complete**	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
ASW	William P. Hobby Airport	HOU-15	Taxiway/Runway Geometry Reconfiguration	07/01/2022	1	0	0	0	0	1	1	0	0	1	3	1	0	0	1	9	N/A[2]	0.63	N/A[1]
ASW	William P. Hobby Airport	HOU-HS2	Taxiway/Runway Geometry Reconfiguration	07/01/2022	0	0	4	2	3	0	1	0	0	3	1	2	2	1	2	21	N/A[2]	1.47	N/A[1]
ASW	Midland International Air & Space Port	MAF-HS2	Taxiway/Runway Geometry Reconfiguration	01/01/2019	0	1	0	0	6	1	1	0	1	2	1	0	0	0	0	13	0	1.15	0
ASW	Monroe Regional Airport	MLU-HS1	Taxiway/Runway Geometry Reconfiguration	05/04/2018	1	0	0	4	0	0	0	0	0	1	0	0	1	0	0	6	1	0.57	0.27
ASW	Tulsa International Airport	TUL-HS1	Taxiway/Runway Geometry Reconfiguration	08/01/2018	0	0	0	0	0	0	3	0	0	0	0	0	0	0	0	3	0	0.28	0
ASW	Tyler Pounds Regional Airport	TYR-HS2	Signage, Marking, and/or Lighting	08/04/2022	0	0	0	0	0	0	0	0	0	0	0	0	5	1	2	8	N/A[2]	0.56	N/A[1]
AWP	Napa County Airport	APC-09	Other	11/23/2021	0	0	0	0	0	0	0	0	1	0	1	4	0	1	0	7	0	0.49	N/A[1]
AWP	Phoenix Deer Valley Airport	DVT-12	Taxiway/Runway Geometry Reconfiguration	05/07/2019	0	0	0	1	2	3	0	1	2	3	0	1	0	2	1	13	3	1.12	N/A[1]
AWP	Honolulu International Airport	HNL-01	Signage, Marking, and/or Lighting	07/02/2021	0	0	1	1	0	1	2	0	2	3	1	0	0	1	2	14	0	1.02	N/A[1]

RIM-Mitigated Locations					Runway Incursion (PD & V/PD) Totals Per Year																Runway Incursion (PD & V/PD) Totals		Average Runway Incursions (PD & V/PD) Per Year	
Region	**Airport Name**	**Identifier**	**Mitigation Type**	**Date Complete**	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021		Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
AWP	Honolulu International Airport	HNL-02	Signage, Marking, and/or Lighting	07/02/2021	0	0	1	0	1	4	1	2	3	2	2	1	0	0	1		17	1	1.24	N/A[1]
AWP	Honolulu International Airport	HNL-HS6	Signage, Marking, and/or Lighting	07/02/2021	0	0	1	0	0	1	0	4	3	1	2	0	2	0	0		14	0	1.02	N/A[1]
AWP	Honolulu International Airport	HNL-36	Signage, Marking, and/or Lighting	07/02/2021	0	0	0	0	0	1	1	0	1	3	0	4	1	0	2		13	0	0.94	N/A[1]
AWP	Phoenix-Mesa-Gateway Airport	IWA-16	Taxiway/Runway Geometry Reconfiguration	07/16/2020	1	1	3	0	1	1	2	1	0	1	1	3	0	0	0		15	0	1.17	N/A[1]
AWP	Los Angeles International Airport	LAX-HS3	Signage, Marking, and/or Lighting	08/08/2021	3	1	3	1	2	3	1	3	3	5	2	1	6	2	2		38	0	2.74	N/A[1]
AWP	Long Beach Airport/Daugherty Field	LGB-HS1	Taxiway/Runway Geometry Reconfiguration	12/29/2020	0	1	0	0	0	1	0	0	0	0	2	3	0	0	0		7	0	0.53	N/A[1]
AWP	Long Beach Airport/Daugherty Field	LGB-HS3	Taxiway/Runway Geometry Reconfiguration	09/15/2020	0	2	3	2	0	0	1	1	1	1	1	0	0	1	0		13	0	1.00	N/A[1]
AWP	Long Beach Airport/ Daugherty Field	LGB-35	Taxiway/Runway Geometry Reconfiguration	10/11/2018	0	0	1	1	0	1	4	0	0	0	1	0	0	0	0		8	0	0.72	0
AWP	Montgomery-Gibbs Executive Airport	MYF-HS2	Operational/Procedural	01/07/2022	0	0	0	0	0	0	0	0	0	0	1	0	1	5	3		10	N/A[2]	0.70	N/A[1]
AWP	Palo Alto Airport	PAO-01	Taxiway/Runway Geometry Reconfiguration	12/31/2019	0	5	0	3	1	2	1	5	4	7	7	4	5	1	2		44	3	3.59	N/A[1]

RIM-Mitigated Locations					Runway Incursion (PD & V/PD) Totals Per Year																Runway Incursion (PD & V/PD) Totals		Average Runway Incursions (PD & V/PD) Per Year	
Region	**Airport Name**	**Identifier**	**Mitigation Type**	**Date Complete**	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021		Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
AWP	Phoenix Sky Harbor International Airport	PHX-02	Technological Enhancements	08/26/2021	0	2	0	1	0	1	1	0	0	0	0	1	0	0	0		6	0	0.43	N/A[1]
AWP	Ernest A. Love Field Airport	PRC-HS2	Taxiway/Runway Geometry Reconfiguration	08/31/2018	0	0	2	0	0	3	2	1	2	1	0	1	0	0	0		12	0	1.10	0
AWP	Reno-Tahoe International Airport	RNO-11	Taxiway/Runway Geometry Reconfiguration; Signage, Marking, and/or Lighting	05/31/2016	0	0	0	0	0	0	0	0	5	0	0	0	0	0	1		5	1	0.58	0.18
AWP	Reno-Tahoe International Airport	RNO-HS2	Taxiway/Runway Geometry Reconfiguration	07/11/2020	0	0	0	1	0	0	0	2	4	5	3	0	2	0	0		17	0	1.33	N/A[1]
AWP	Norman Y. Mineta San Jose International Airport	SJC-28	Signage, Marking, and/or Lighting	09/08/2022	0	0	2	0	0	0	1	0	1	1	0	0	0	0	0		5	N/A[2]	0.35	N/A[1]
AWP	Norman Y. Mineta San Jose International Airport	SJC-29	Signage, Marking, and/or Lighting	06/06/2022	1	2	0	0	0	0	0	0	0	1	0	0	0	0	0		4	N/A[2]	0.28	N/A[1]
AWP	Santa Monica Municipal Airport	SMO-02	Taxiway/Runway Geometry Reconfiguration	12/22/2017	0	0	0	0	0	3	3	5	3	5	1	1	0	0	0		20	1	1.95	0.25
AWP	John Wayne Airport/Orange County	SNA-HS2	Signage, Marking, and/or Lighting	04/03/2021	0	1	1	0	0	1	0	4	0	6	0	1	0	0	2		14	2	1.04	N/A[1]
AWP	Van Nuys Airport	VNY-02	Signage, Marking, and/or Lighting	03/31/2019	0	1	0	0	0	1	2	4	1	0	2	0	0	0	1		11	1	0.96	N/A[1]

RIM-Mitigated Locations					Runway Incursion (PD & V/PD) Totals Per Year														Runway Incursion (PD & V/PD) Totals		Average Runway Incursions (PD & V/PD) Per Year	
Region	**Airport Name**	**Identifier**	**Mitigation Type**	**Date Complete**	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Before Mitigation	After Mitigation	Before Mitigation	After Mitigation
																				1080	**78**	**1.02**	**0.34**