

An aerial photograph of an airport is shown, with a large blue rectangular overlay on the left side. The overlay contains the title and date in white text. The background image shows a runway with a plane, taxiways, parking lots, and airport buildings.

# Practices in Airport Emergency Response

June 14, 2023

# Today's Learning Objectives

- (1) Identify challenges experienced by airports when utilizing an emergency plan**
- (2) Establish protocols based on best practices to handle a wide variety of emergencies, including flight diversions**

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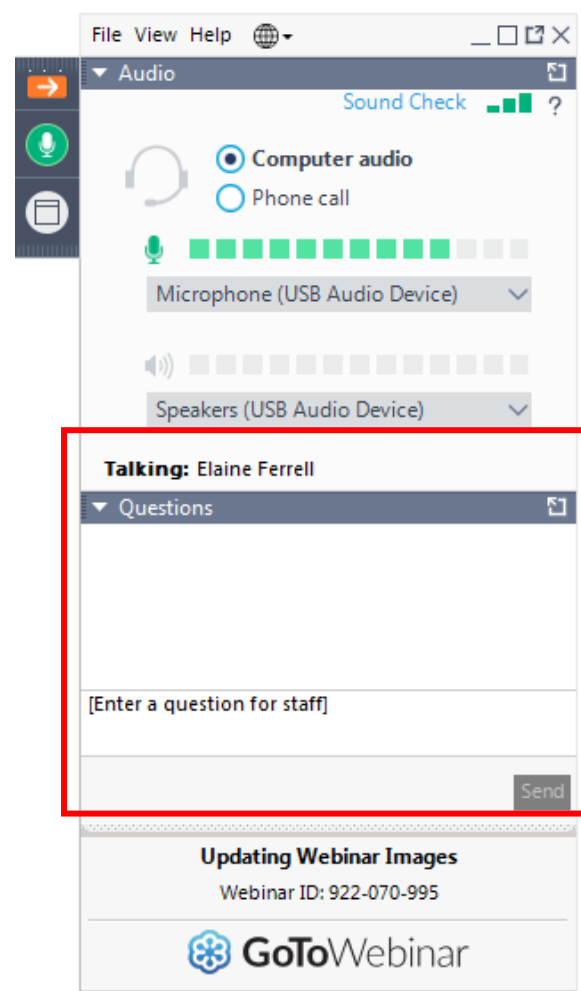
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Please type your questions into your webinar control panel

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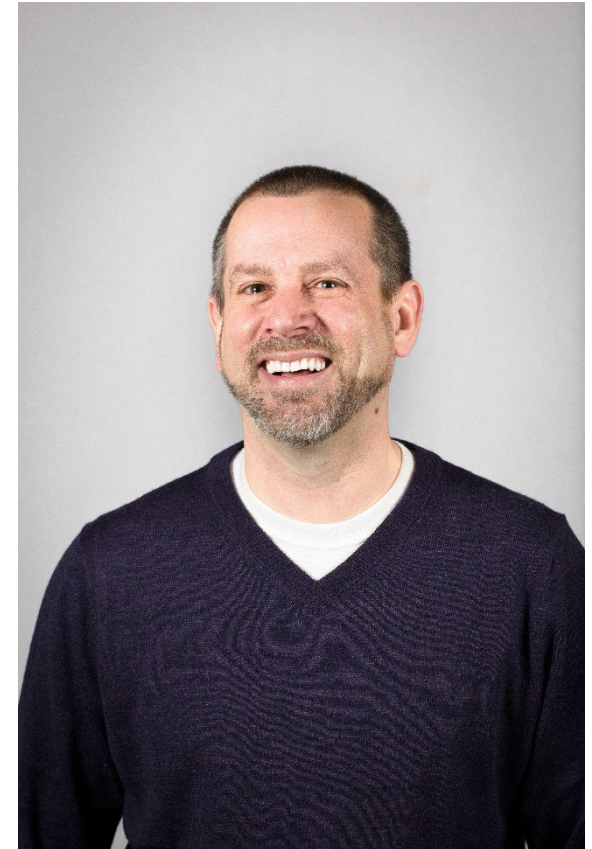
#TRBwebinar



# David DiMaria

## Barich Inc.

- Principal Consultant for Barich Inc.
- 30 years of airport operations, public safety and emergency management
- Lead Researcher for ACRP 04-23, Social Media for Emergency Management and Researcher



# Today's Speakers

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# ACRP Synthesis 121: Managing a Flight Diversion with an Emergency Response at Small, Non- Hub or General Aviation Airports



Rose Agnew, Aviation Innovation  
Christina Coverdell, Aviation Innovation



# Rose Agnew

## Principal Investigator

### Aviation Innovation – 19 years

1. Irregular Operations – Flight Diversions
2. Team Alignment - Large Airport New Construction Programs
3. Innovation Catalyst for Change: Hackathons & Culture of Innovation



# Rose Agnew

## Principal Investigator

### Irregular Operations – Disruptions – Flight Diversions

- ACRP Flight Diversions – Synthesis 121 2023
- ACRP Common Use - Volume #2 2022
- ACI-World: IROPS Foundation Training 2019
- ACRP Report 229: Airport Collaborative Decision-Making to Manage Adverse Conditions - 2020
- ACRP Report 153: IROPS Stakeholders & Assessment - 2016
- ACRP Report 65: IROPS Six Step Planning Process - 2012
- 35 Regional IROPS Workshop: 2012 - 2023

# ACRP Synthesis Report 121

## Oversight Panel

- **Kathleen Henderson**, *Airports Council International–North America, Ottawa, ON*
- **Max Zhaoyu Li**, *University of Michigan, Ann Arbor, Ann Arbor, MI*
- **David M. McCurdy**, *Tarrant County (TX) Administrator’s Office, Fort Worth, TX*
- **Michael Tobin**, *Charlotte Douglas International Airport, Charlotte, NC*
- **Kellyann Valentine**, *Port Authority of New York and New Jersey, New York, NY*
- **Kelli White**, *Emergency Response Partners LLC, Burlingame, CA*
- **Kent Duffy**, *FAA Liaison*
- **Paul James Eubanks**, *Airports Council International–North America Liaison*

# Agenda

**Part 1: Background**

**Part 2: Methodology**

**Part 3: Findings**

**Part 4: Summary**

# Today's Overview - Diversions

1. Provide a Big Picture Overview of Diversions 2021 – 2022.
2. Preparation: Before During After
3. Diversion Challenges /Impacts have change over the last 3-5 years.  
Airside - Terminal - Landside
4. Technology Tools: Airports – PAX
5. Must Have Good Practice: IROPS/Diversion Champion for Implementation!

# Today's Challenges

Weather Intensity/Disruptions

Technology Failures

Safety Issues

UAS/Drones

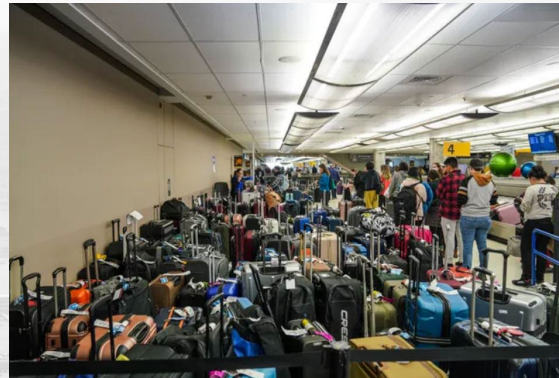
Cyber Impacts

Utility Outages

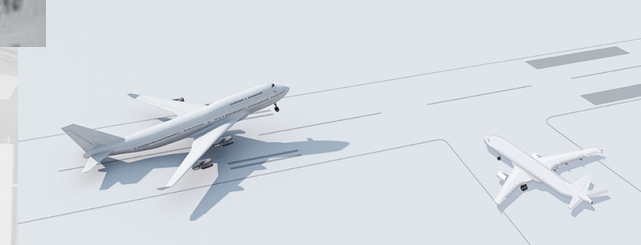
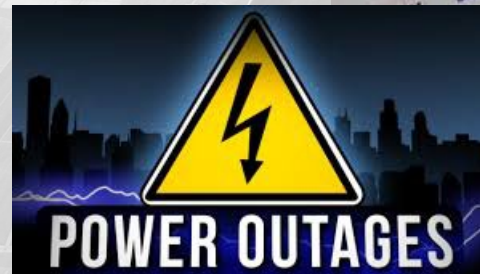
Labor Challenges

Airport Construction

2024 ELECTION YEAR!



8:45 PM	Cancelled	4607	B44	
10:20 PM	Cancelled	5769	B2	
10:29 PM	Cancelled	5739	B26	
9:15 PM	Cancelled	3321	B39	
10:25 PM	Cancelled	4164	E37	
8:32 PM	Cancelled	1771	A19	
		47p	770	C10

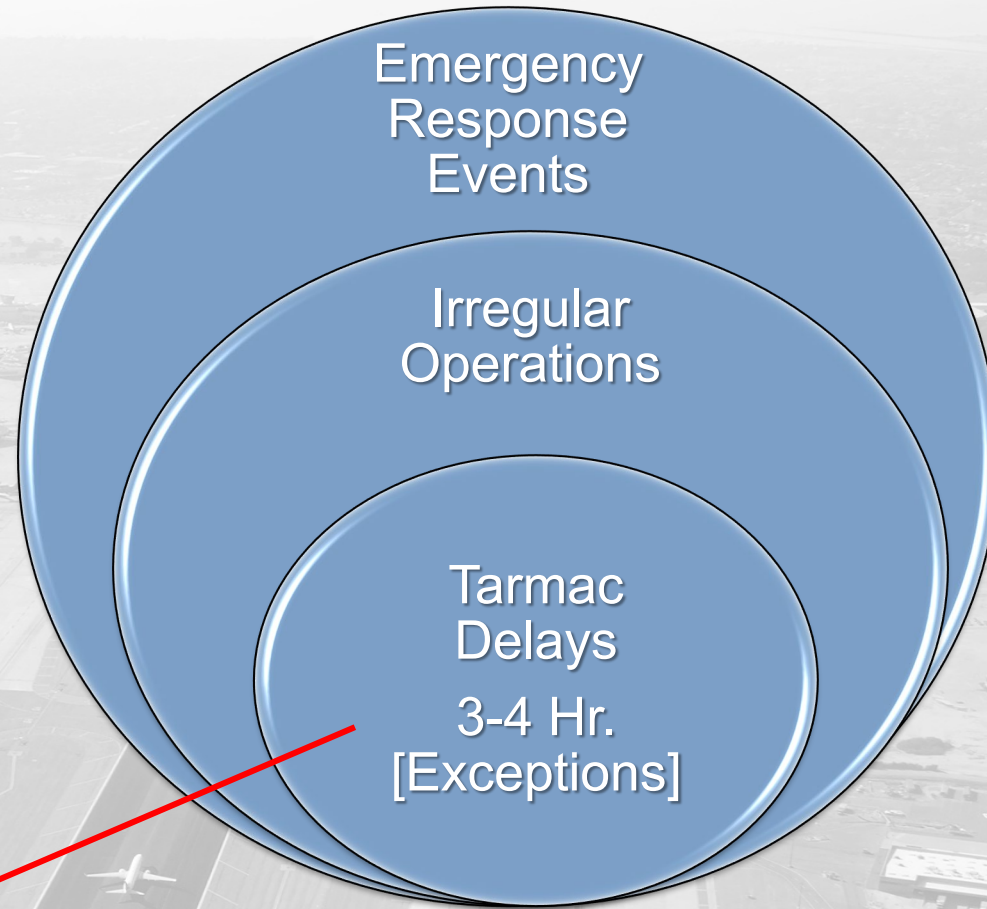


# How did we get here?

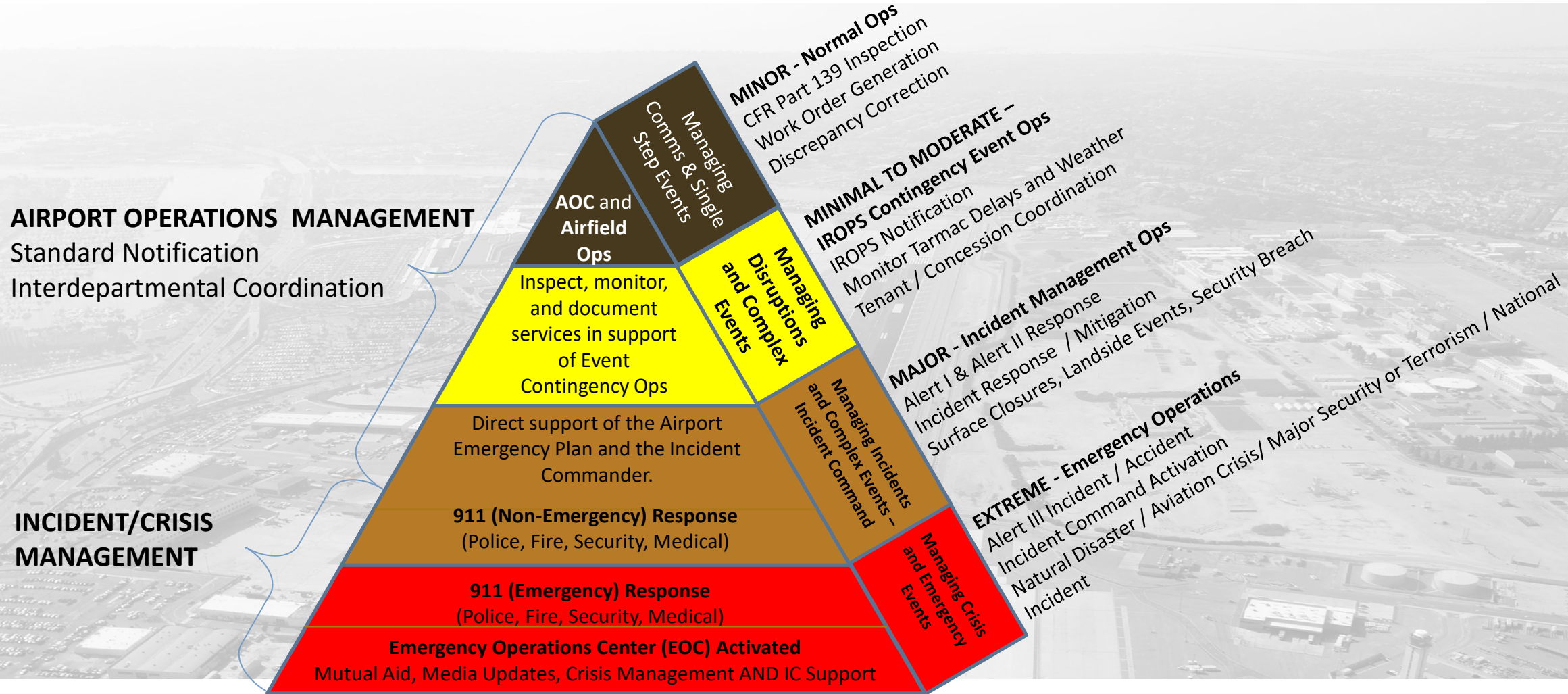
**DOT Required Tarmac Delay Plans**

**2023 Updates**

**2012**



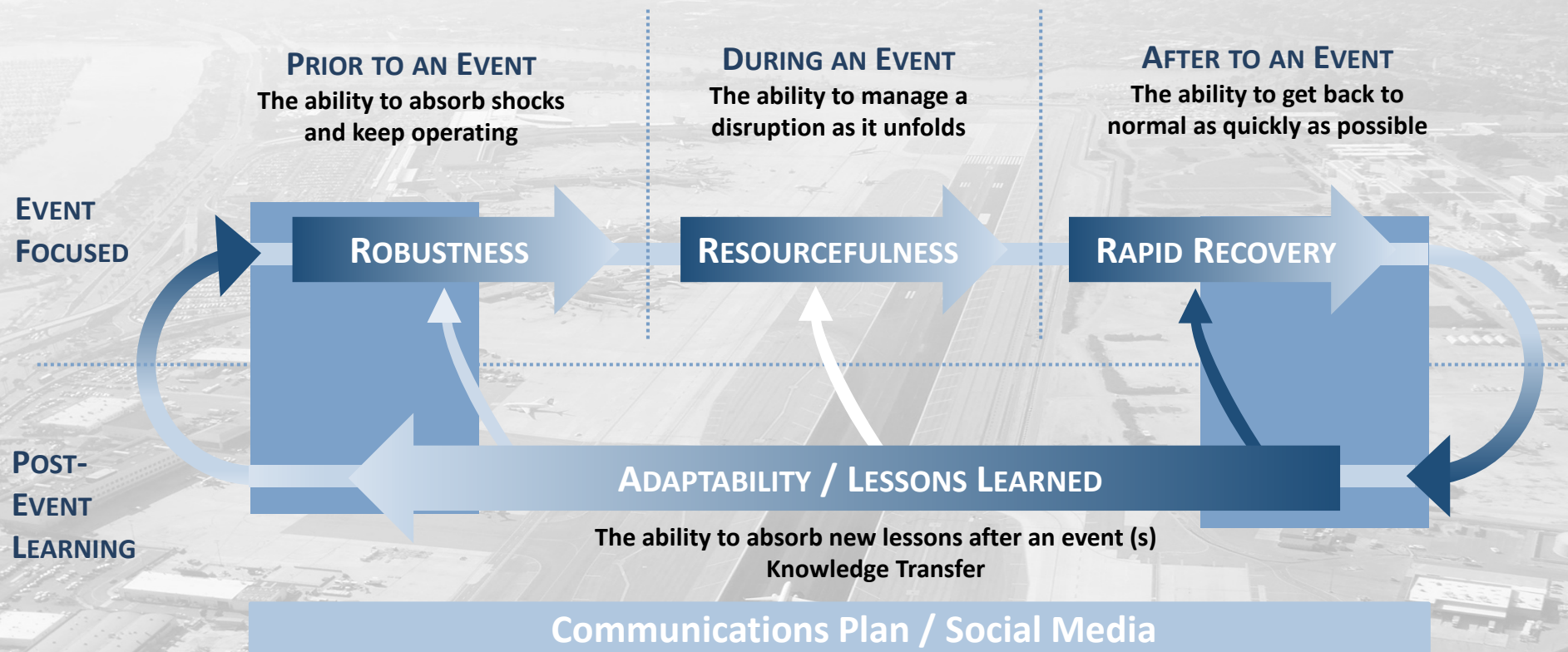
# Clarification of Operations - Levels of Activities





# Planning Cycle

## Operations *Agility* Planning



# Agenda

**Part 1: Background**

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**Part 4: Summary**

# Synthesis Project Focus

## Focus was on small airports

- Small hub (SH)
- Non-hub (NH)
- General aviation (GA), including Reliever (R) and Non-primary commercial service (CS)

# Definition: Flight Diversions

“A flight which is operated from the scheduled origin point to a point other than the scheduled destination point in the carrier’s published schedule” (14 CFR § 234.2).

**In other words, a diverted flight is an unexpected or unplanned aircraft that arrives at an unintended airport.**

# Objective

**Describe Current practices** that small hub (SH), nonhub (NH), and general aviation (GA) airports use to manage the following types of aircraft diversions:

**1. Technical stop (gas and go) diversion**



**2. Incident-level diversion**



**3. Emergency-level diversion**



# Project Background

- An exploration of **how smaller airports manage** various levels of unexpected aircraft diversions from routine to emergency.
- It investigates which **types of diversions** these airports can manage with their own **capabilities**. It also indicates who these airports call on for additional assistance (e.g., **internal and external stakeholders**)
- It discusses the **resiliency of smaller airports**, or rather, their ability to recover quickly from flight diversions to maintain regularly scheduled flight schedules and operations.

# Methodology

## Literature Review

- Focused on four areas:
  - Background information on diversions,
  - Planning and training **before** a diversion event,
  - Considerations **during** a diversion event, and
  - What happens **after** a diversion event.

## Survey

- Online survey sent to approximately 300 small hub, non-hub, and general aviation airports in the United States (71 survey responses and 24% response rate).

# Interviews / Perspectives

## Airport Regions

- Small Hub (8)
- Non-Hub (9)
- GA (8)

## Airport Regions (DFW and MSP)

## Technology Firms

- FlightAware
- Passur Aerospace Inc.
- Saab

**FBOs** - Premier Jet Center

**Airlines** - Delta Air Lines





# Methodology

## Case Examples

- Dane County Regional-Truax Field, Madison, WI SH Multiple weather related - incident
- Punta Gorda Airport, Punta Gorda, FL SH Multiple weather related - incident
- St. John's International Airport, Newfoundland, Canada NH International medical - emergency
- Lincoln Airport, Lincoln, NE NH Medical - emergency
- Rick Husband Amarillo Intl Airport, Amarillo, TX NH Unruly passenger - incident
- Iqaluit International Airport, Iqaluit, Nunavut, Canada GA International aircraft - emergency
- Flying Cloud Airport, Eden Prairie, MN GA/R Aircraft mechanical - incident

# How flight diversions impact the capabilities of smaller airports

Factors associated with “**capability**” include an airport’s

- Size
- Structure
- Physical infrastructure
- Number of personnel and expertise
- Resources
- Preparedness
- Notification factors
- Communication factors
- Hours of operation

# Typical External Airport Stakeholders

## MUTUAL AID

### First Response Partners

- Aircraft Rescue and Fire Fighting (ARFF)\*
- Law Enforcement\*
- Emergency Medical Services (EMS)\*
- Fire Department
- Local Emergency Management (EM) Agency/Office
- Local Healthcare/Hospitals
- Local Public Health Department (domestic flights)

\*Sometimes under airport authority

### On-Airport Partners

- Airlines
- Fixed-base Operators (FBOs)
- Fuelers
- Deicers
- Ground Handlers
- Hangar / Aircraft Owners
- Concessionaires
- Other Airport Tenants
- Ground Transportation Companies (rental cars, shuttle buses, rideshare)
- Airport or Other Volunteer Group

### Military

- Air National Guard (ANG), U.S. Air Force (USAF), or other military joint use on airport

## NETWORK PARTNERS

### Agencies

- Federal Aviation Administration (FAA)
- Federal Bureau of Investigation (FBI)
- Customs and Border Patrol (CBP)
- Centers for Disease Control and Prevention (CDC) (international flights)
- Transportation Security Administration (TSA)
- National Transportation Safety Board (NTSB)
- U.S. Marshals
- Air Marshals

### Community Resources

- Ground Transportation (buses)
- Local Stores
- Local Restaurants
- Local Hotels
- Convention and Visitors Bureau (CVB)
- City/County Management

# Agenda

**Part 1: Background**

**Part 2: Methodology**

**Part 3: Findings**

**Part 4: Summary**

# Major Findings

Most diverted flights are “**gas and go**” technical stops in which no passenger deplaning occurs.



These types of diversions are considered routine operations for most smaller airports and are **easy for them to manage**.

Smaller airports look forward to these diversions as they **make money** from them by collecting landing fees and FBO services.

# Good Practices

Survey & Interviews revealed good practices associated with:

- **Notification**
- **Contingencies – Passenger Care**
- **Coordination with Mutual Aid and Network Partners**
- **Coordination with Airlines**
- **Coordination with Agencies/Airport Tenants**

# Agenda

**Part 1: Background**

**Part 2: Methodology**

**Part 3: Tools & Resources (Checklists – Gap Analysis)**

**Part 4: Summary**

# Appendix - Details

- **Checklists**
- **Training Exercises**
- **Sample Diversion Plans**
- **Survey Questionnaire and Interview Guide**
- **Airport Interview Questions - Diversion Planning**
- **Pilot & Airline Interview Questions**
- **Technology Interview Questions**



# Elements of Airline/Airport Technology

**Aircraft  
Autodocking  
System**

**Automated Boarding Gates**

**Baggage Handling Systems**

**Baggage  
Tracking  
Systems**

**Billing System**

**Content Management System  
Information Displays**

**Data Exchange  
and Analytics**

**Facility  
Infrastructure**

**Jet Bridge**

**Lightning  
Detection /  
Warning  
System**

**Off-site  
Passenger  
and/or Baggage  
Processing**

**Ramp Control**

**RMS**

**Self Bag-Drop**

**Video  
Surveillance  
System**

**Wi-Fi &  
Distributed  
Antennae  
System**

**Wayfinding**

# Agenda

**Part 1: Background**

**Part 2: Methodology**

**Part 3: Tools & Resources (Checklist – Gap Analysis)**

**Part 4: Summary**

# Diversion-related Challenges

- ❑ Uncertainty related to increased diversions vs. smarter planning
- ❑ Resources (supply chain, labor force)
- ❑ Small staffing size of smaller airports
- ❑ Technology (cost prohibitive or coordinating with various types)
- ❑ Compounding/escalating issues (after hours/extended delays, power outages)
- ❑ Planning- and training and exercise
- ❑ Diversion costs
- ❑ Blurred responsibilities (airport vs. airline related to passenger care)
- ❑ Coordination issues (authority structure, limited staffing)
- ❑ Safety and Risk
- ❑ Air Service
- ❑ Maintaining a state of readiness
- ❑ New knowledge application

# Good Practices

- **Update Contact List Regularly**
  - **Primary and Secondary**
  - **Multiple Contact Methods**
- **Establish Communications Protocols**
- **Use Common Definitions and Plain Language**
- **Test notification Systems**
- **Develop contingency plan for technology failures**

# Summer 2023

Weather Intensity/Disruptions

Technology Failures

Safety Issues

UAS/Drones

Cyber Impacts

Utility Outages

Labor Challenges

2024 ELECTION COMING!



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10:25 PM	Cancelled	4164	E37
8:32 PM	Cancelled	1771	A19
8:50 PM	AI 7:47p	770	C10



# Benefits of Collaborative Planning

- Better overall diverted flight mitigation
- Improved relationships among airport, mutual aid, and network partners
- Economic sustainability via partnerships
- Cost reduction (Expedited Return to Normal Operations)

# Key Change in IROPS & Diversion Management

Where was the PAIN Point of Diversions?

2012 – 2020: Airside Impacted

2021 – 2023: Terminal & Landside & Social Media - PAX!

[www.TRB.org/ACRP](http://www.TRB.org/ACRP)



[Appendix C - Download](#)

ACRP Synthesis Report 121  
[www.trb.org/main/blurbs/182934.aspx](http://www.trb.org/main/blurbs/182934.aspx)





# ACRP Synthesis 121

# Case example highlights

AIRPORT	SIZE	LEVEL AND TYPE	DESCRIPTION
<b>Dane County Regional-Truax Field, Madison, WI</b>	SH	Incident level, numerous gas and go flights	Weather caused multiple diversions to an airport with limited gates and parking availability
<b>Punta Gorda Airport, Punta Gorda, FL</b>	SH	Incident level, multiple diversions	After hours diversion of several large commercial airlines due to fog.
<b>St. John's International Airport, Newfoundland, Canada</b>	NH	Emergency level, multiple medical issues	Diversion of an international flight after normal business hours on a weekend due to weather and turbulence causing multiple medical injuries to passengers and crew members on board.
<b>Lincoln Airport, Lincoln, NE</b>	NH	Various incident- to emergency-level diversions since 2012	Most incident-level diversions were weather related, but some were medical and mechanical emergencies, and one was an international flight diversion.
<b>Rick Husband Amarillo International Airport, Amarillo, TX</b>	NH	Various incident- to emergency-level diversions since 2012	Various flight diversions due to weather as well as a medical emergency, a mechanical emergency, and a diversion due to an unruly passenger on a flight arriving after hours.
<b>Iqaluit International Airport, Iqaluit, Nunavut, Canada</b>	GA	Emergency level, engine failure	Emergency diversion of an international flight due to engine failure to a remote airport during extreme cold.
<b>Flying Cloud Airport, Eden Prairie, MN</b>	GA/R	Incident level, mechanical issue	Diversion of an aircraft with a mechanical issue to an airport under construction during its annual tabletop exercise.

# ACRP Report 44

## Practices in Airport Emergency Response

Stephanie Murphy  
Ashlee Delventhal

# Stephanie Murphy, MS, CEM

## Principal Investigator

- Vice President, Tidal Basin Government Consulting
- Former Manager, Emergency Management and Preparedness, Metropolitan Washington Airports Authority
- Certified Emergency Manager
- FEMA National Planning Section Chief
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- Former Vice-Chair, International Association of Emergency Managers, Transportation Caucus



# Ashlee Delventhal, CM, CEM Researcher

- Senior Director, Tidal Basin Government Consulting
- Former Assistant Director, Emergency Management Denver International Airport
- AAAE Certified Member
- Certified Emergency Manager



# ACRP Synthesis 115 Project Panel

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Traci Clark, Allegheny County Airport Authority

Scott A. Corzine, B. Riley Advisory Services

Terrence Daley, Transportation Public Health Preparedness Consultants

Paul Khera, Alaska Department of Transportation and Public Facilities

Meaghan Smalley, Jacksonville Aviation Authority

Brandy Welch, IEM

Marc Tonnacliff, FAA Liaison

# What is an AEP Practice?

For this synthesis, the researchers defined it as any activity pertaining to the AEP that accomplishes the mission of the Part 139 regulation and supports FAA's Advisory Circular guiding AEP development and upkeep.

This can include development and update of the plan, training, and exercising, including stakeholders in the process, utilizing the plan during a response, identifying hazards and threats to the airport, outlining communication methods, and developing information to supplement the AEP.

# ARP Synthesis 115

## Practices in Airport Emergency Plans

- **Issues and challenges faced by airport emergency managers in airport emergency plans**
- **Airport emergency plan practices**
- **Successful practices, lessons learned and enduring challenges**



# Findings for AEP practices

- Airports use the AEP as a foundational plan
- Innovative ways to communicate information
- Incorporate lessons learned
- Develop plans to fill perceived gaps
- Manage new and existing threats and hazards
- Enhancing AEPs through the development of all-hazards plans
- Using capabilities-based planning efforts to foster good communication
- Using review committees
- Using Checklists
- Developing reference guides

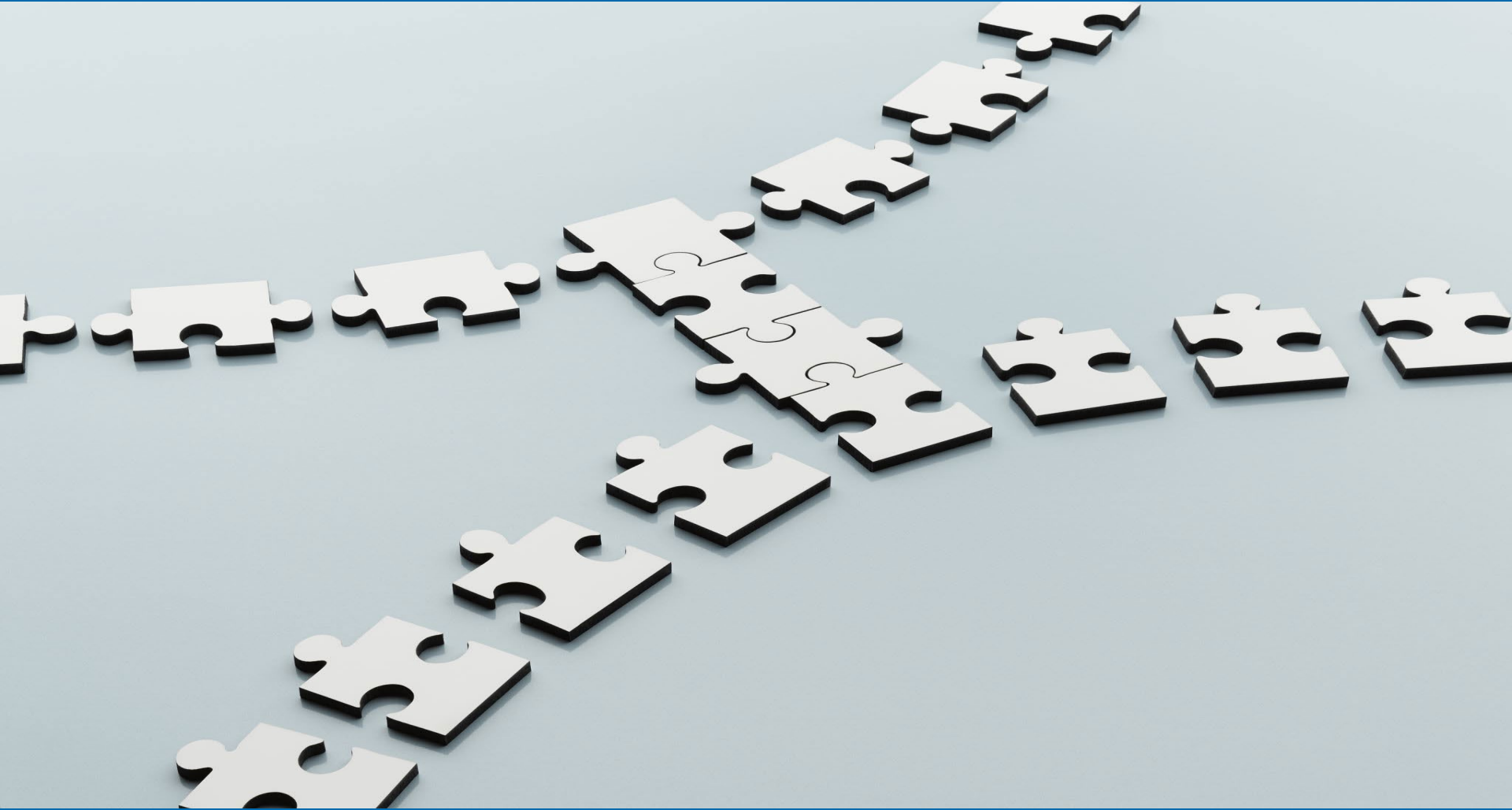
# Airport Emergency Management

## Growing maturity of airport emergency management

- Emergency management specific staff. No longer a secondary duty in many places.
- Moving beyond only plane crashes.
- New approaches to airport emergency management plans. (and response)



Aligning and cross-walking the multiple plans at airports or plans that could affect the airport developed by surrounding jurisdiction(s) is valuable to ensure plans do not conflict and enhance the airport's ability to respond to and recover from incidents and events.



# Implementing

Many airports have opted to maintain AEPs to the regulation standard, then focus on development, training, and exercise of supplemental all-hazards plans. Traditional emergency management practices are being incorporated into airport programs, placing importance on gap and threat assessments, training and exercise programs, and a formal improvement planning process.



# Emergency Plans at Airports

## AEP Annexes

- Consolidates plans in one location
- Traditional airport planning practices

## Standalone Plans

- Not part of FAA inspection
- Easier to update
- Smaller and more manageable

# Emergency Plans in Response

## Challenges

- Cumbersome
- Responder/staff familiarity
- Narrow in scope
- Implementation differences

## Best Practices

- Checklists and job aids
- Templates
- Standard operating procedures
- Training and exercise
- Review and revise

# Emergency Plans in Response

## Protocols

- **Establish procedures for coordination center**
- **Provide tools**
- **Respond the same to every incident (large or small)**
- **Communications mapping – internal and external**
- **Establish essential elements of information**

# Maintaining Plans

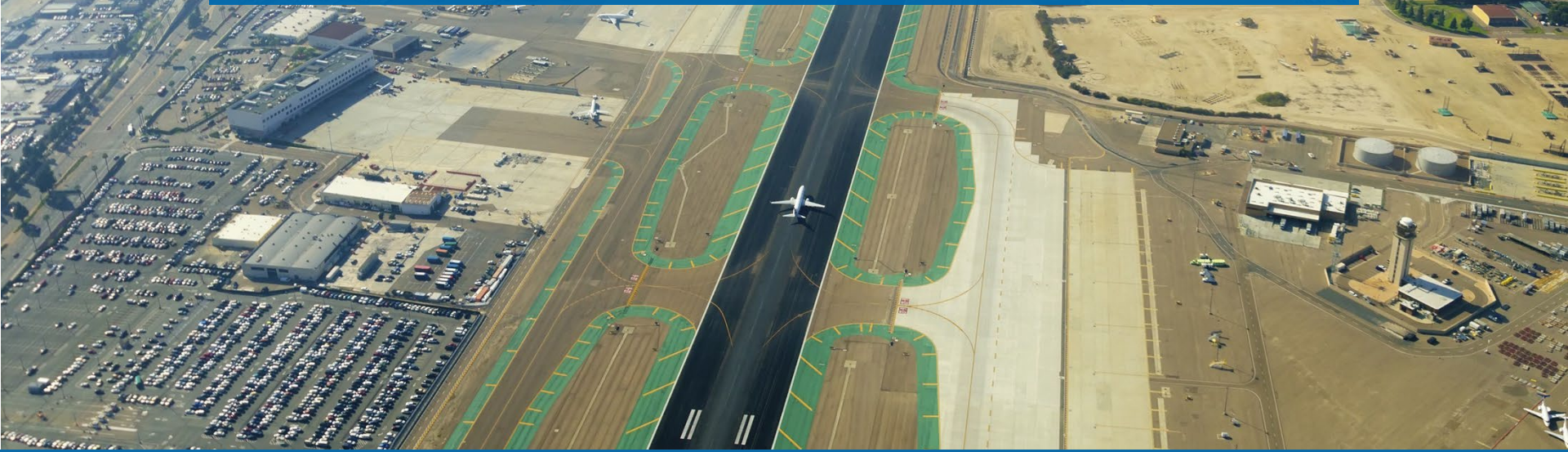
- Training and exercise
- Review and revise after major events
- Threat specific annexes – Update AEP annexes for major changes
- Include locals in planning





# Case Study

## Seattle – Tacoma International Airport Unauthorized flight and ensuing crash of Horizon airliner



# Case Study – SEA Airport Unauthorized Flight

- In August 2018, a Horizon Air employee stole an aircraft and crashed it off airport property.
- AAR detailing 34 recommendations for improvement, including updates to planning processes and all-hazards plans.
- Incorporated lessons learned and best practices into AEP, supporting annexes, and other plans.
- Developed new SOPs.

# Case Study – SEA Airport Unauthorized Flight

## Prior to the incident

- **Emphasis on incident management and response prior to incident.**
- **Rigorous training program and biannual NIMS/ICS training.**
- **Ensured AEP was consistent with NIMS.**

# Case Study – SEA Airport Unauthorized Flight

Formal AAR/IP process for exercises and real-world events prior to the incident

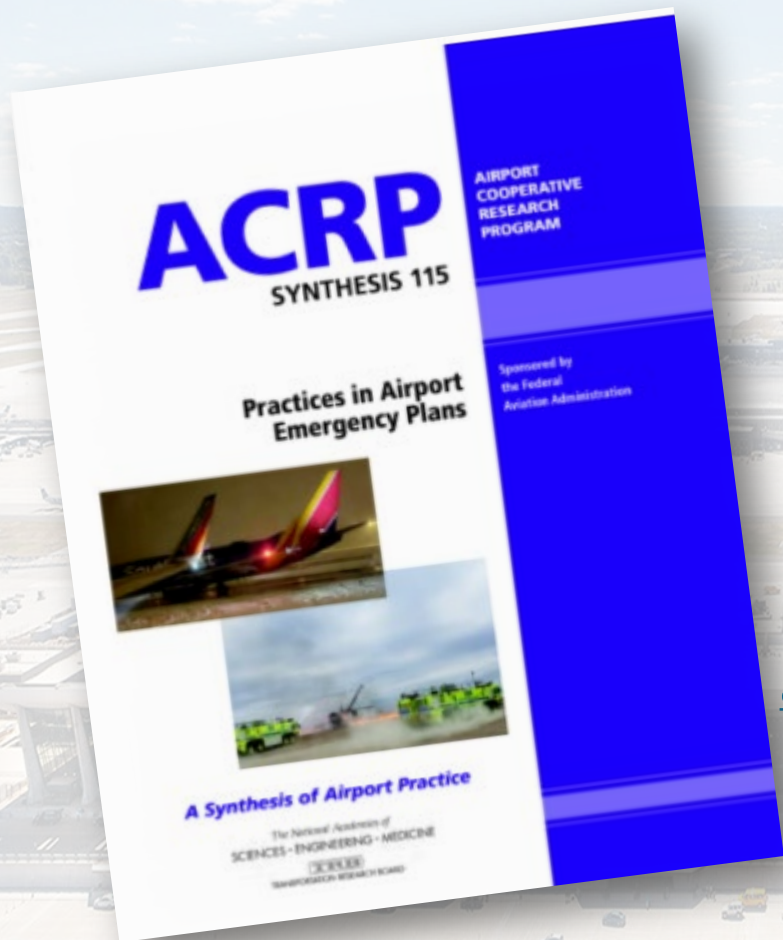
- **Event notification**
- **Communications center coordination**
- **Emergency communications and coordination**
- **Command and control roles**
- **Customer care plan**

# Case Study – SEA Airport Unauthorized Flight

## Incident Outcomes

- Updates to notifications, included in the AEP
- Formal AAR process
- Incorporation of lessons learned from other airports
- Additional SOPs for notification and coordination between ramp tower, FAA tower, airport 911 using mass notification

# FOR ADDITIONAL INFORMATION



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# Photo Credits

Slide 5

- Tornado on DIA property. Credit: Denver 7 News

Slide 7

- Airport emergency exercise at CLT Airport. Credit: Michael Tobin.

Slide 11

- Exercise sign at John Wayne Airport: Credit Tidal Basin

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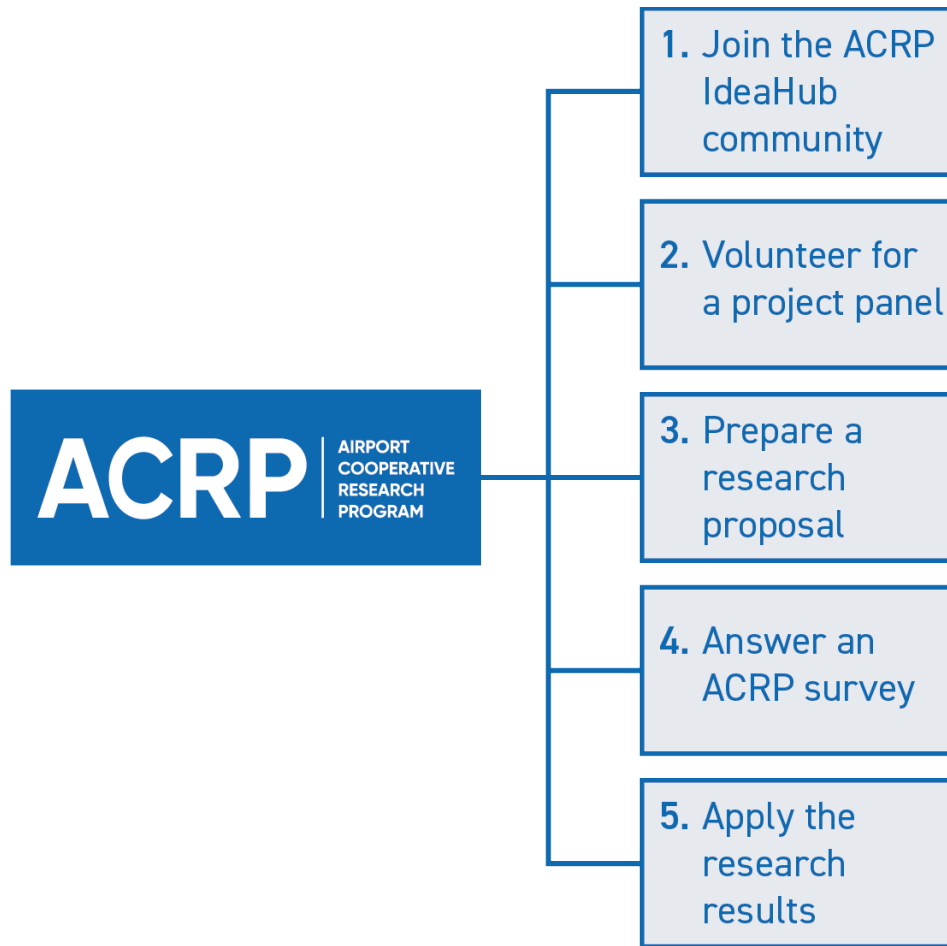
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