

Implementing and Improving Data Analytic Capabilities in Airports

October 30, 2025
1:00-2:30 PM EST



Today's Learning Objectives

1. **Effectively implement data analytics to enhance airport operations and improve passenger experience**
2. **Estimate an organization's analytical maturity**
3. **Explore practical examples airports using data analytics to optimize decision making**

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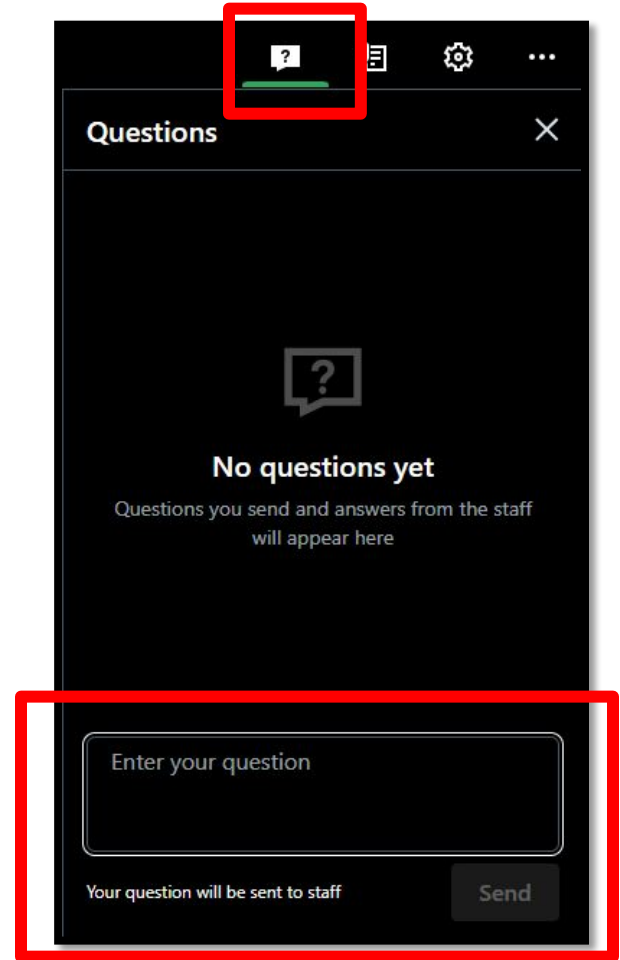
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Questions and Answers

Please type your questions into
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We will read your questions out
loud, and answer as many as
time allows

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Chelsey Jackson

ICF

Senior Manager of Organizational Development

- 13 years of experience consulting for public and private sector organizations
- Experience:
 - leading projects for a wide range of Federal, state, and local agencies
 - conducting reviews of academic and professional literature
 - analyzing quantitative and qualitative data
 - documenting project results
 - leveraging research findings to develop practical tools, recommendations, and best practice guidance
- Master's degree from UMBC in Industrial/Organizational Psychology



ACRP WebResource 18

Implementing and Improving Data Analytic Capabilities in Airports

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ACRP WebResource 18 Oversight Panel

- **Royce Holden**, Mead & Hunt, Madison, WI
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- **Raymond A. Herron**, Charlotte Douglas
International Airport, Charlotte, NC
- **Pamela S. Keidel-Adams**, Kimley-Horn and
Associates, Inc., Mesa, AZ
- **Syed Mehdi**, San Antonio International Airport,
San Antonio, TX
- **Torrance A. Richardson**, Gerald R. Ford
International Airport Authority, Grand Rapids,
MI
- **Leslie F. Ruiz**, Barich, Inc., Chandler, AZ
- **Stephanie P. Austin**, FAA Liaison
- **Aneil Patel**, Airports Council
International-North America Liaison



Background and Purpose



Project Objective

Develop a web resource to help airports leverage data more effectively by building or enhancing their data analytic capabilities.

Data Analytics Challenges

Airport data use is limited by resource constraints, data silos, inconsistent metrics, and lack of training in data science.

Data Analytics Benefits

Data analytics empowers airports to make smarter, evidence-based decisions by visualizing operations, identifying inefficiencies, predicting future scenarios, and improving planning.

Project Approach

Literature Review

Gain an understanding of the usage of data analytics and what potential has yet to be acted upon.

Data Collection

Develop an understanding of data analytics capabilities in airports that can be used as examples in deliverables.

Case Studies

Develop case studies that acknowledge challenges faced, drive decision making, and customize services based on individual needs.

Create Final Research Products

Create final deliverables to help airports leverage data effectively by building or enhancing their data analytic capabilities.

Research Methods – Qualitative Data

Literature Review:

- ✈ Examined 90+ sources
 - Academic resources
 - Business articles
 - Direct sources from airport websites



Data Collection:

Case Study Participants:

- ✈ Des Moines International Airport
- ✈ Dublin Airport/DAA International
- ✈ Houston Airport System
- ✈ John F. Kennedy (JFK) International Air Terminal (T4)
- ✈ Phoenix Sky Harbor International Airport
- ✈ San Antonio Airport System
- ✈ Seattle-Tacoma International Airport

Focus Groups and Survey Participants:

- ✈ Fairbanks International Airport
- ✈ Ted Stevens Anchorage International Airport
- ✈ Boston-Logan International Airport
- ✈ Metropolitan Washington Airports Authority (Dulles and Ronald Reagan International Airports)
- ✈ Toronto Pearson International Airport
- ✈ Harry Reid International Airport

Research Results - WebResource

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Implementing and Improving Data Analytic Capabilities in Airports

Airports stand at the front line of data **analytics** innovation by effectively harnessing the power of **big data** to achieve strategic business objectives. As air travel continues to grow, airports will face new challenges in responding to the needs of passengers. Data **analytics** procedures and techniques can help airports gain insights from data that support decision-making and improve operational efficiency.

To remain competitive in a world of constantly changing technology and business systems, airports need to identify the strategies to implement and investments to make now that will provide the greatest returns in the future. As airports evolve in their strategies of data management, **analytics**, and governance, substantial gains can be realized by expanding the use of **analytics** and upgrading their software platforms and computing infrastructure. This project provides a roadmap for airports seeking to modernize and improve their data management and **analytics** methodologies for more effective data-based decision-making.

The primary business intelligence objective of implementing data **analytics** solutions is to make management decisions based on insights extracted from data. The effective use of data **analytics** can enable airports to harness the very large amounts of information generated across the airport—traffic, parking, passenger behaviors, operations, retail sales, financial statistics—to provide a more comprehensive understanding of the factors that affect day-to-day operations. Information about **key performance indicators (KPIs)** is communicated with reporting **dashboards** and data visualizations. Analytical models are used to forecast target outcomes based on historical and real-time information to provide actionable data that supports decision-making and business planning. Ultimately, airports can improve operations based on the insights gained from the power of data and **analytics**.

Highlighted Resources



DATA ANALYTICS PRIMER

Methods and techniques used in data **analytics**, benefits and challenges of applying data **analytics** in practice, and steps for implementing data **analytics**.



DATA ANALYTICS KEY TERMINOLOGY

Overview of common data **analytics** terminology.



DATA ANALYTICS MATURITY MODEL

Outlines levels of data **analytics** maturity. Airports can identify an estimate of where they are on the maturity model based on their data journey.

Case Studies



Des Moines International Airport is compiling a database of key airport statistics to inform operational decision-making.



Dublin Airport uses prescriptive analytics to optimize security staff scheduling based on passenger demand.



Houston Airport System deployed a Customer Journey Scorecard platform to enhance operations and improve the passenger experience.



John F. Kennedy International Air Terminal uses advanced analytics models to forecast passenger load and reduce wait times.



Phoenix Sky Harbor International Airport is tracking 85+ KPIs for financial reporting and review.



San Antonio International Airport plans to develop an Airport Information Management System to enhance efficiency.



Seattle-Tacoma International Airport is using predictive analytics to monitor the airport roadway and provide alerts about traffic congestion.



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WebResource – Data Analytics Primer

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Data Analytics Primer

Data **analytics** encompasses a broad range of techniques and tools for examining data to discover insights, make predictions, and recommend actions based on the findings of analytical models. The purpose of this primer is to inform airports and key partners of the best practices for effectively implementing data **analytics** to enhance airport operations and improve the passenger experience. It provides a basic overview of the methods and techniques used in data **analytics**, describes the benefits and challenges of applying data **analytics** in practice, and provides the steps for implementing data **analytics**. The primer is intended for airport professionals of all levels who are interested in implementing or improving their data **analytics** practices.



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Organization of the Primer

Select a section below to expand the information.

- + Data Analytics Overview
- + Data Integration and Storage
- + Key Performance Indicators
- + Descriptive Analytics
- + Predictive Analytics
- + Prescriptive Analytics
- + Example Analytics Solutions in Use
- + Technology
- + Data Architecture
- + Benefits of Data Analytics for Airports
- + Challenges and Mitigation Strategies
- + Steps for Implementing Data Analytics
- + Data Privacy and Sharing
- + FAA Regulations Governing Airports

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The **Data Analytics Primer** offers airports an overview of best practices for implementing data analytics to enhance operations and improve the passenger experience. The Primer covers key methods, benefits, challenges, and step-by-step guidance, making it an accessible reference for anyone seeking to develop and expand their data analytics practices.

WebResource - Analytics Case Studies

Data Analytics Case Studies provide real-world examples of data analytics practices in action. Each case study highlights analytic methods for addressing a business problem, lessons learned, and measurable impacts. The case studies provide insights to inform airport professionals, to enhance operations, and improve the passenger experience.

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Case Studies



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Dublin Airport uses prescriptive analytics to optimize security staff scheduling based on passenger demand.



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Houston Airport System deployed a Customer Journey Scorecard platform to enhance operations and improve the passenger experience.



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John F. Kennedy International Air Terminal uses advanced analytics models to forecast passenger load and reduce wait times.



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Phoenix Sky Harbor International Airport is tracking 85+ key performance indicators (KPIs) for financial reporting and review.



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San Antonio International Airport plans to develop an Airport Information Management System to enhance efficiency.



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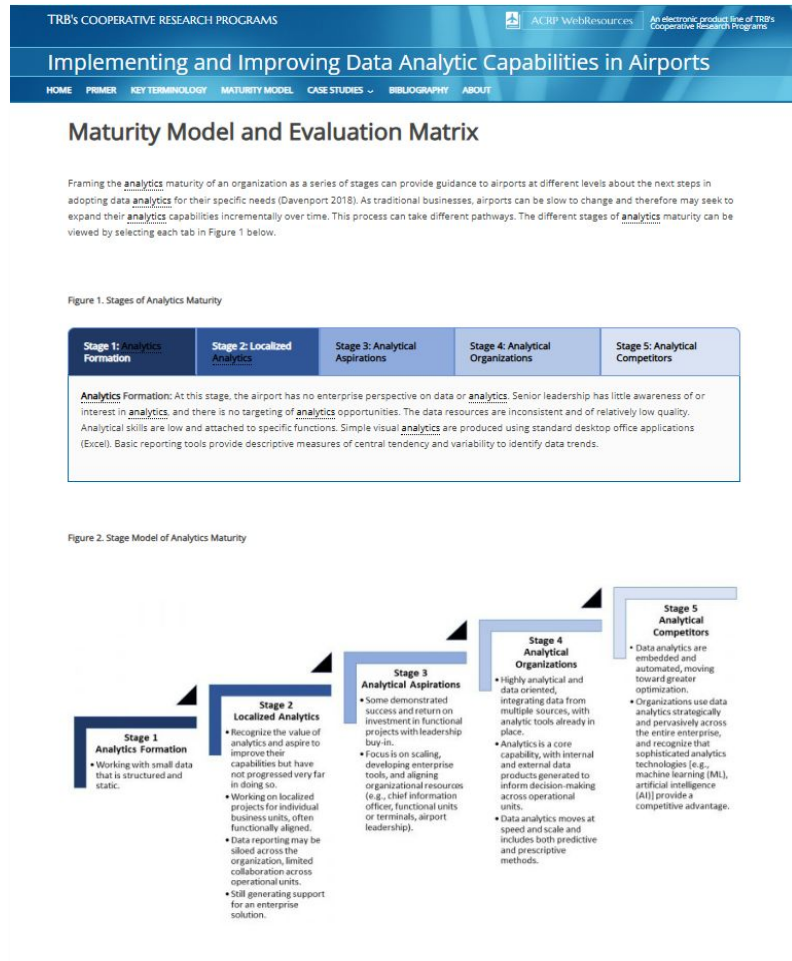
Seattle-Tacoma International Airport is using predictive analytics to monitor the airport roadway and provide alerts about traffic congestion.

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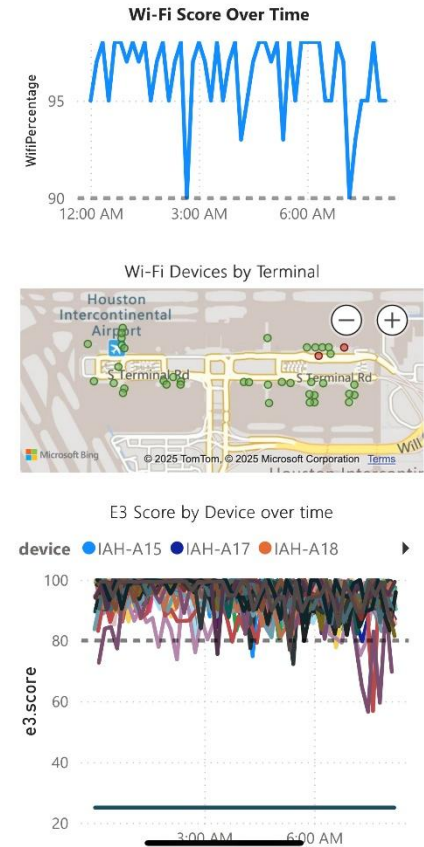
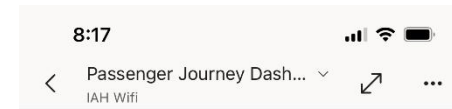
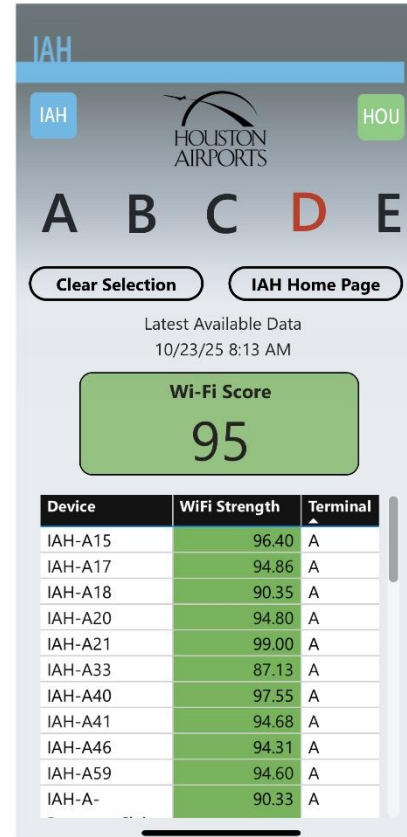
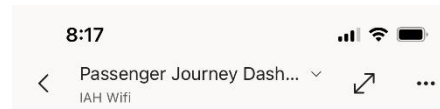
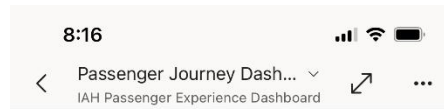
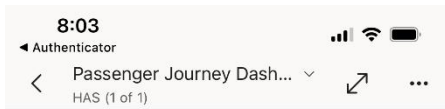
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Webresource - Analytics Maturity Model



The **Data Analytics Maturity Model** provides a structured framework to help airports assess and advance their data analytics capabilities. It outlines key stages of analytics maturity, offers practical guidance for improvement, and connects users to supporting resources and case studies. This tool is designed to help airport professionals identify where they are on the analytics journey and plan actionable steps for growth.

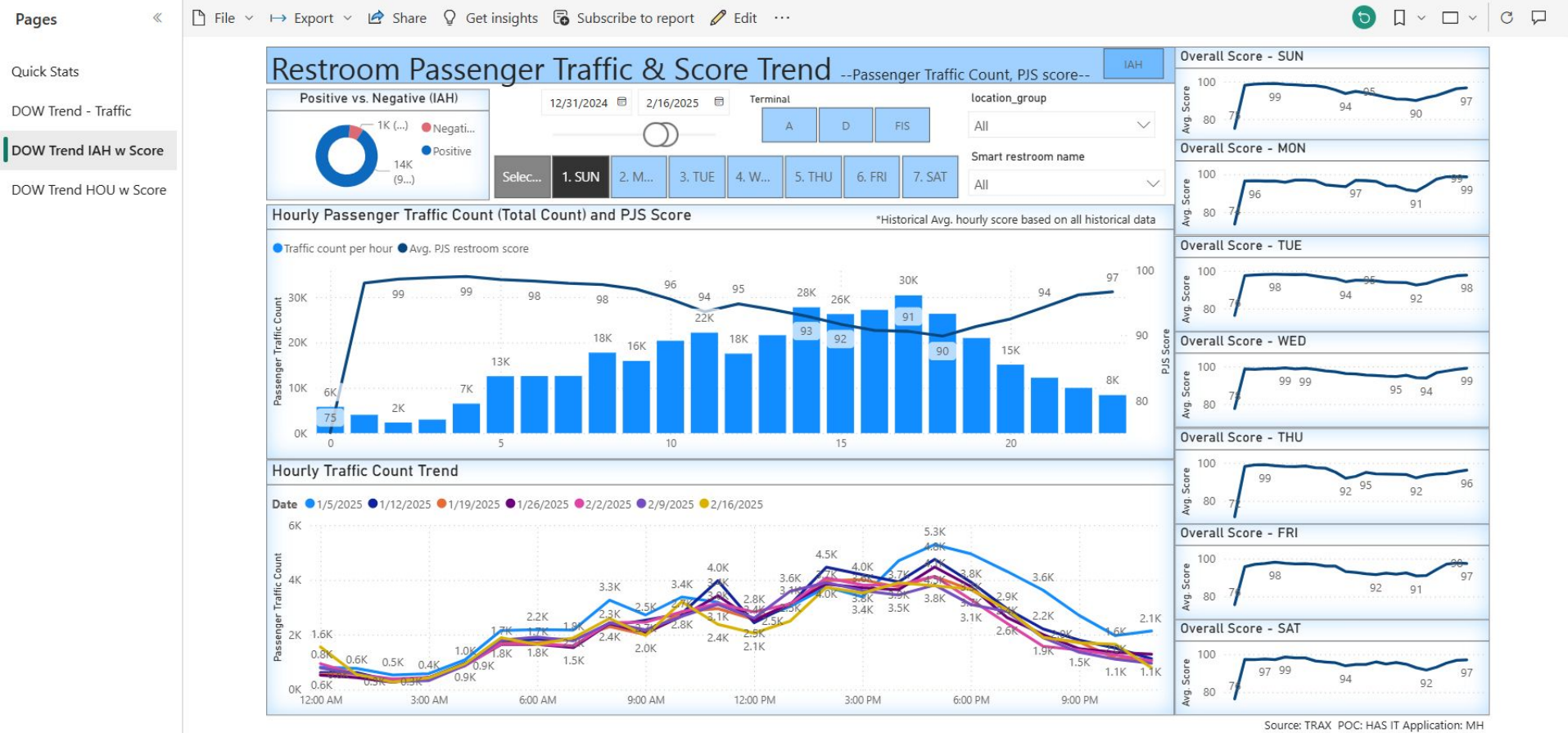
Case Study: Houston Airport System (HAS) - Passenger Journey Scorecard



Design Principles

- Prioritize near real-time data processing.
- Implement a mobile-first user experience.
- Focus on areas with readily available data initially.
- Drive for all passenger touch points over time.
- Leverage existing skill sets across the team.

Trend Analysis



Future Direction

- Expand monitoring scope to new areas.
- Develop visual enhancements for the platform.
- Enhance the data ETL process to resolve data delay.
- Build AI logic and forecasting capabilities.
- Explore better data sources for drill-down and diagnosis.
- Investigate integration with external airline data.
- Technical considerations:
 - Unify development environment for data preparation, analysis, AI/ML
 - Enhance collaboration for data engineers, data scientists, and business analysts
 - Simplify workflow management and governance
 - Accelerate data and AI discovery
 - Access comprehensive AI capabilities
 - Provide users with flexibility and integration

The Future of Data Analytics

Impact of Generative AI

on data analytics in airports remains uncertain and was outside the scope / timing of our research project. However, we can speculate informally that it presents the potential for both positive and negative disruptions. The technology itself might enable a more rapid maturity development within an airport in several ways.



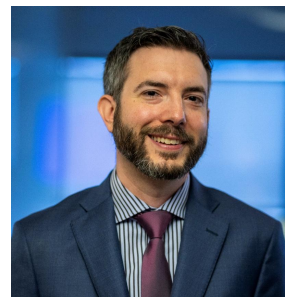
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Other Events for You:

November 4, 2025

Diagnostic Assessments and Countermeasure Selection in the Safe System

November 6, 2025

Simulation Art: DOT Practices for Operational Traffic Simulation Models

November 19, 2025

Incorporating Unbonded Post-Tensioning in Concrete Bridges

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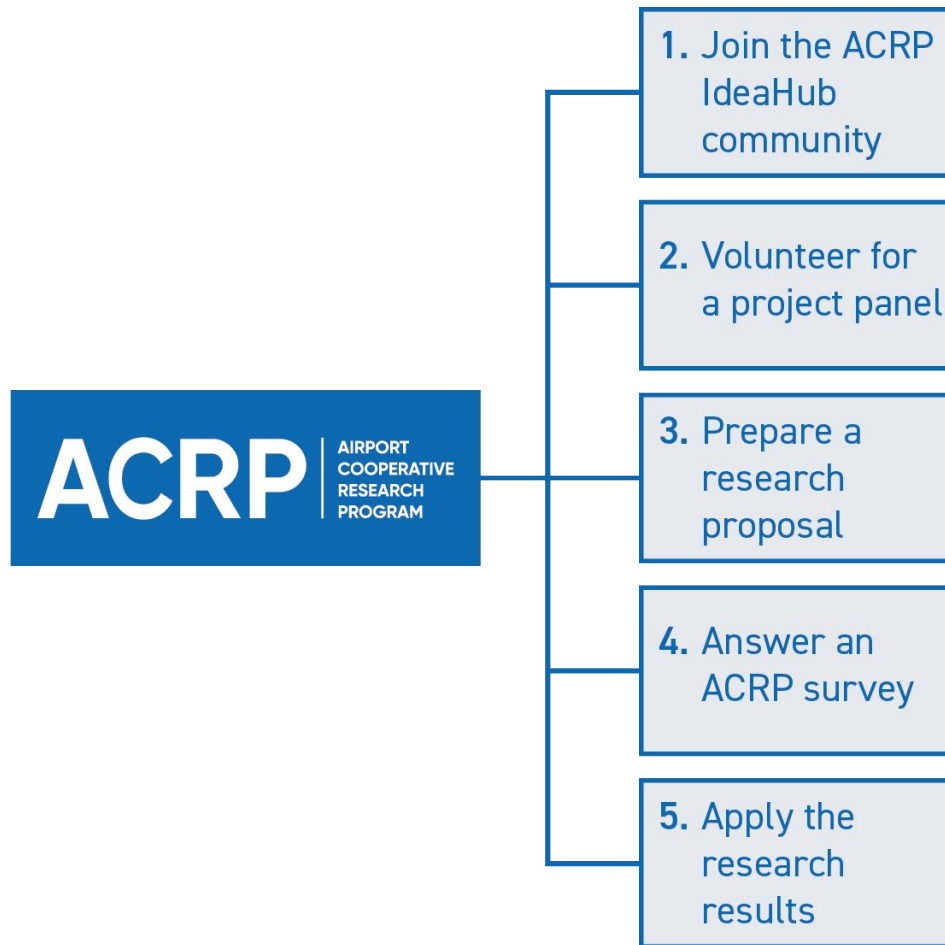
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