Improving Airport Operations and Sustainability via Landside Vehicles

May 29, 2024

Today's Learning Objectives

(1) Identify potential opportunities for reducing an airport's carbon footprint

(2) Leverage existing and new landside data sources to inform effective decision making

American Institute of Certified Planners (AICP)

1.5 Certification Maintenance Credits

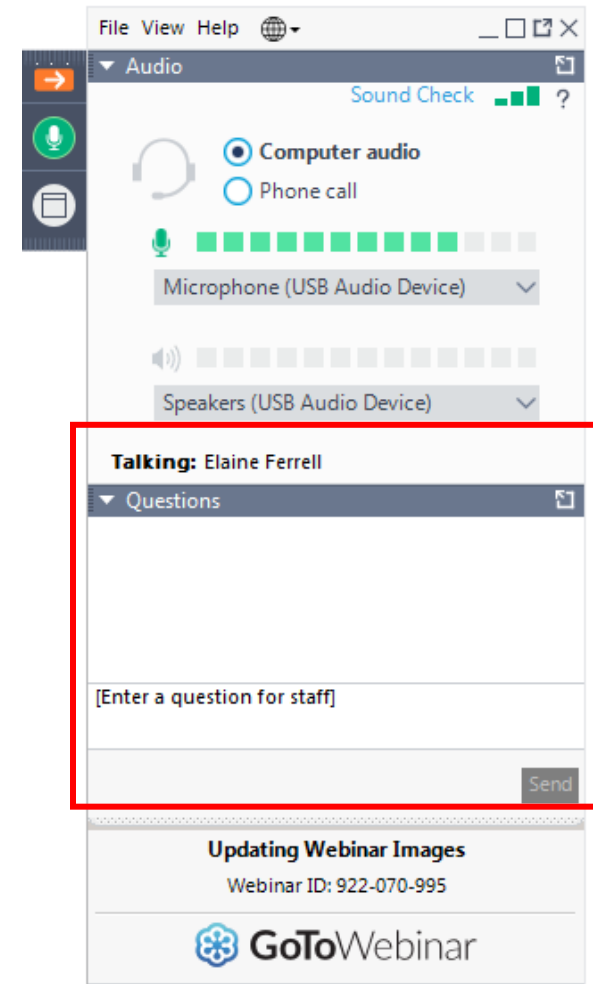## You must attend the entire webinar to be eligible for credits

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Questions and Answers

Please type your questions into your webinar control panel

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

#TRBwebinar

Peter Mandle

- Peter Mandle
- M.S. and B.S. (Civil Engineering)
- Planned and improved access and subside roadways, and parking and rental car facilities at more than 40 airports in the US and overseas
- Served as Principal Investigator for 12 Airport Cooperative Research Program projects
- Served in leadership roles in the American Civil Engineers and the Transportation Research Board
- Has authored more than 25 papers published by major transportation and airport industry groups

Today's Speakers

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ACRP Synthesis 127

Airport Programs that Reduce Landside Vehicle Carbon Emissions

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Ernest Choi
Deputy Principal Investigator

→ Senior Consultant, Inter*VISTAS*

→ Former Engineer at San Francisco Municipal Transportation Agency (SFMTA)

ACRP Synthesis 127 Oversight Panel

Thomas W. Anderson, Metropolitan Airports Commission

Peter Carbonaro, Port Authority of New York and New Jersey

Brian Kramer, City & County of Denver

Lewison Lem, Port of Portland

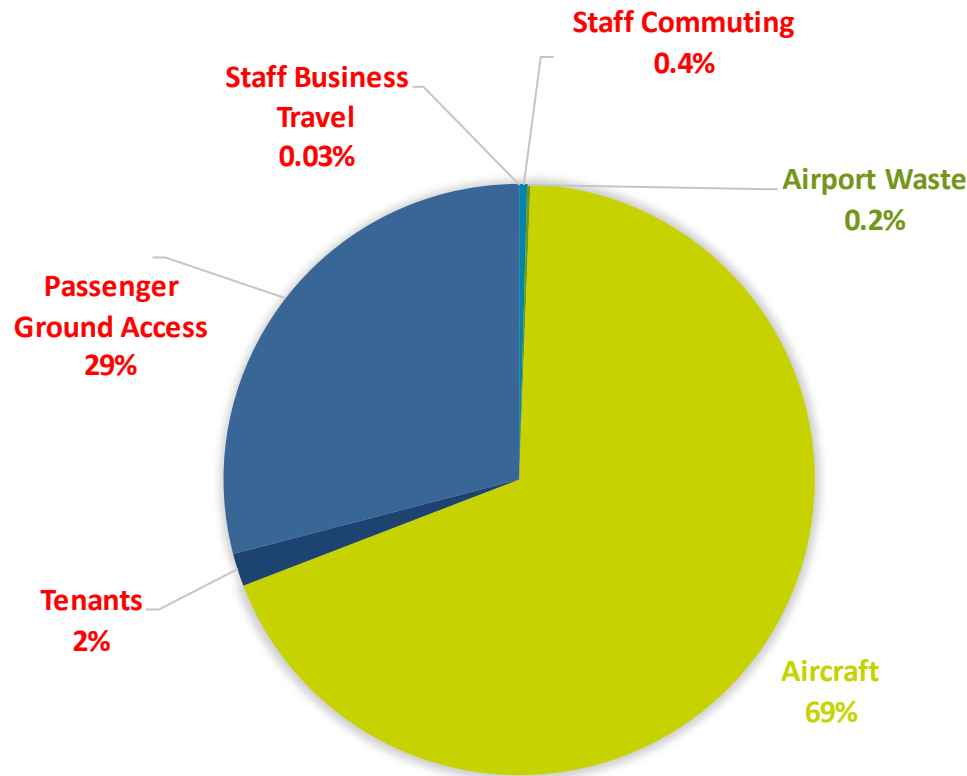Kristian Wade, Salt Lake City Department of Airports

Amanda Woodin, Kalamazoo/Battle Creek International Airport

Aneil Patel, Airports Council International North America Liaison

Christine Gerencher, TRB Liaison

Jordan Christensen, ACRP Senior Program Officer

Background and Objective

Staff Commuting
0.4%

Staff Business Travel
0.03%

Airport Waste
0.2%

Passenger Ground Access
29%

Tenants
2%

Aircraft
69%

Source: Scope 3 Emissions at Seattle-Tacoma International Airport (SEA)

Background

→ At most airports, emissions from surface traffic is the second largest carbon emitter, behind aircraft operations.

→ The intersection between aviation and air quality is a matter of increasing importance to airport operators, regulatory agencies, and the public.

Research Objective

→ Provide information on the use of airport programs or initiatives that reduce carbon emissions from surface vehicles accessing the airport

Approach

➤ Conducted a literature review

➤ Conducted a web-based survey of the busiest 100 airports in the United States and select European and Canadian airports

➤ Interviewed staff to review the programs, initiatives, and fees the airport implemented to reduce carbon emissions from landside vehicles

Case Study Airports

Categories of Emission Sources

| Scope 1	Scope 2	Scope 3
Emission sources an airport owns or controls	Indirect emissions from consumption of purchased energy	Indirect emissions
Airport fleet vehicles, airport power plants/emergency generators	Electrical power, heating, etc.	Aircraft, landside vehicles, staff travel, airport waste

Contents of Synthesis
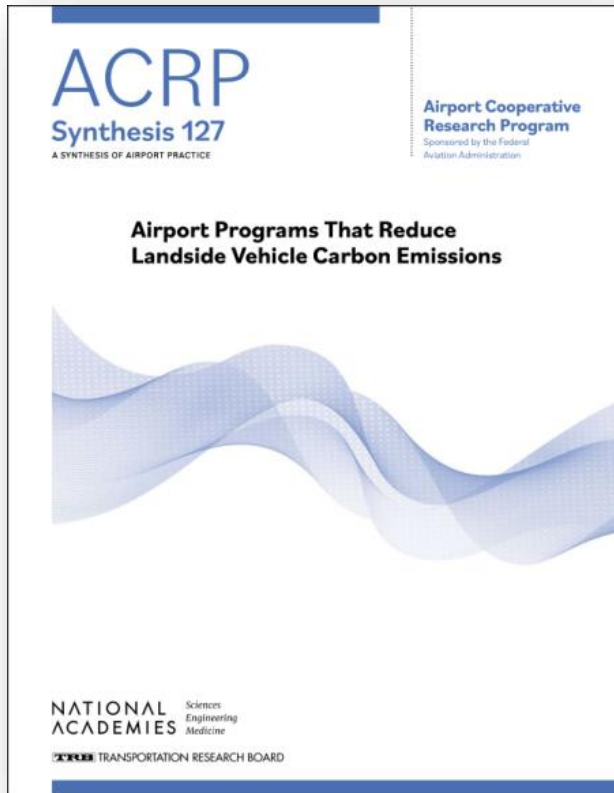
1. Why carbon emissions reduction is important to airports
2. How this synthesis was prepared
3. A summary of survey of airports
4. A summary of the case examples
5. Use of fees and other measures to promote carbon reduction
6. Potential funding sources
7. Conclusions and future research needs

Interview Questions

Does your airport charge lower fees for CGT providers operating alt-fueled vehicles including Evs?
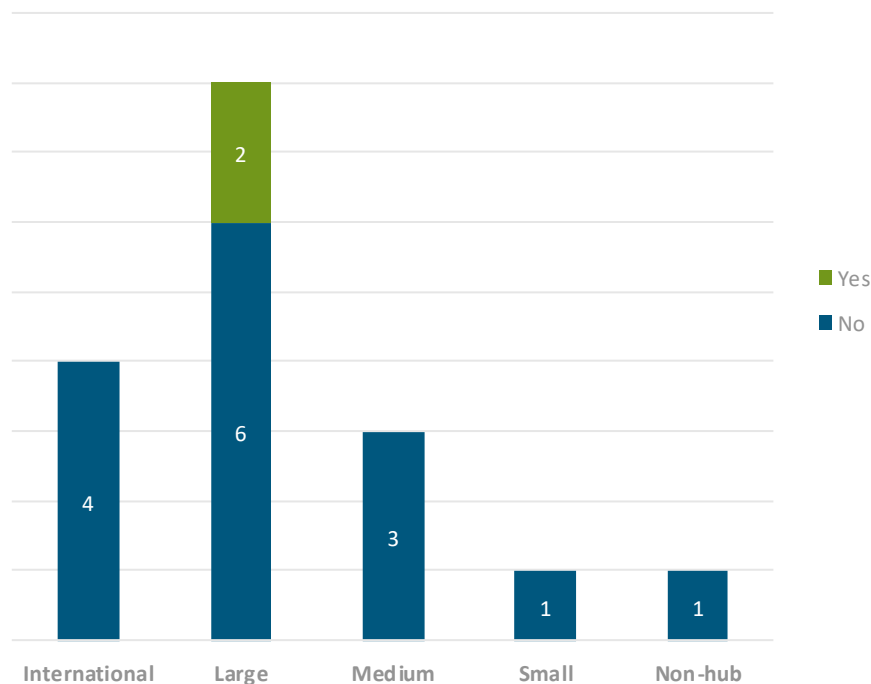
Is your airport developing programs to reduce carbon emissions from surface traffic?
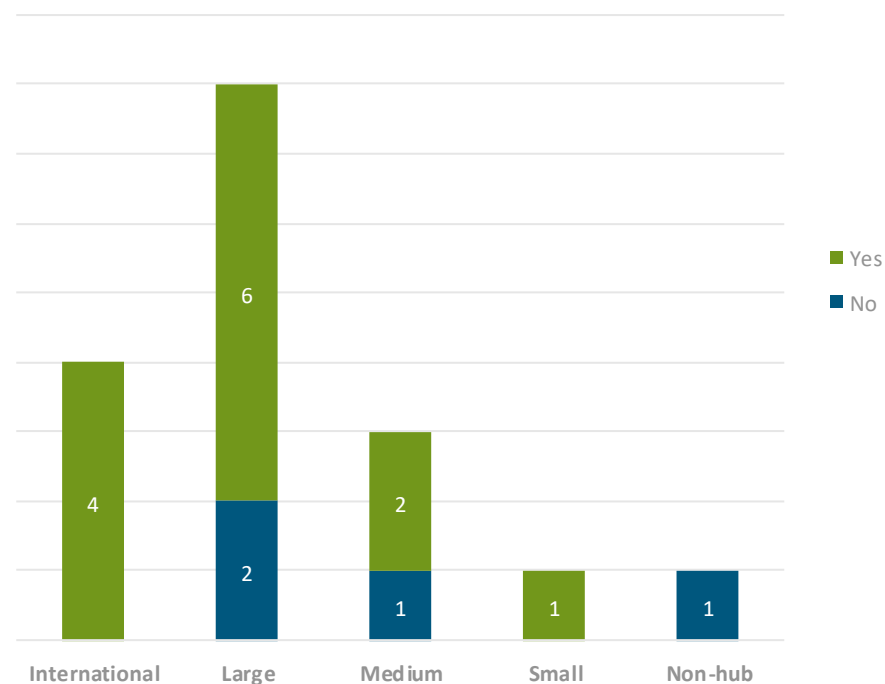
Case Example Airports

All case example airports have proposed or planned initiatives to reduce carbon emissions from all vehicles entering the airport.

- ✈ All have target sustainability goals
- ✈ All have/had programs to encourage the use of alternative fueled vehicles (CNG/Hybrid)
- ✈ Transition to electrification plans/initiatives
- ✈ Increase mass transit use

Case Example Airports – Challenges

→ Availability of suitable electric vehicles

→ Transition to electrification due to lead time needed to increase electric grid capacity

→ Limited funds from federal/state/local due to competition and constraints on use

→ Difficulty in encouraging carpool/ride-sharing programs from tenants

→ Anticipated public resistance to airport access fees

→ Expected GT operator concerns with increased fees

Industry Best Practices

1. **Incentives offered to commercial ground transportation (CGT) operators**

2. **Incentives offered to motorists operating private vehicles (PV)**

3. **Incentives offered to employees**

4. **Requirements for commercial ground transportation operators**

5. Operation of regional bus services

6. Airport access fees

7. Providing electric vehicle chargers

1. Incentives for CGT

Source: LAWA Intermodal Transportation Facility

→ Preferential drop-off and pickup locations

→ Head of line privileges

→ Grants to convert to alternative fuels

→ Reduced fees for consolidated hotel/motel courtesy vehicles

→ Consolidated rental car shuttles

→ Electric vehicle chargers

2. Incentives for Private Vehicles

Source: Inter*VISTAS*

✈ Parking guidance systems/reduced exit queues

✈ Preferential parking for EVs

✈ Subsidized transit service

    ✈ Logan Express, FlyAway

✈ Parking

    ✈ Loyalty programs

    ✈ Parking reservation discount

    ✈ Parking pricing strategies

3. Incentives for Employees

Source: Patrick Cashin/Metropolitan Transportation Authority

→ Transportation Management Association (TMA)
  → Public transit subsidy/Transit passes
  → Car/van pools

→ Airport provided employee bus service
  → Sunrise Shuttle (BOS)
  → Q70 (LGA)

→ Bicycle parking

4. Requirements for CGT operators

Source: Port of Seattle

➜ Discounted fees for alternative fuel vehicles
  ➜ BOS – Limo 50%
  ➜ SFO – Alt fuel CVs 33%
  ➜ DEN – Alt fuel 10%

➜ Establish fuel consumption standard
  ➜ SEA – 45 mpg for taxis

➜ Deadhead reduction for taxis/TNCs
  ➜ E-KPI

➜ Reduce unnecessary CGT trips
  ➜ Headway fees
  ➜ Monthly trip limits

Examples of Funding Sources

Federal Funding

- **Congestion Mitigation and Air Quality Improvement (CMAQ) Program**
- **Voluntary Airport Low Emissions (VALE) Program**
- **Transit Investments for Greenhouse Gas and Energy Reduction (TIGGER) Program**
- **Diesel Emissions Reduction Act (DERA) Funding**

State/Local Funding

- **Massachusetts Clean Energy Center**
- **Washington State of Commerce, Clean Energy Fund (CEF)**
- **British Columbia, CleanBC, Specialty Use Vehicle Incentive (SUVI) Program**

Funding Sources

Other Funding – Local Utility

- ✈ Colorado Xcel Energy
- ✈ New York Power Authority (NYPA)
- ✈ British Columbia Hydro and Power Authority (BC Hydro)
- ✈ Electrify America

FOR ADDITIONAL INFORMATION
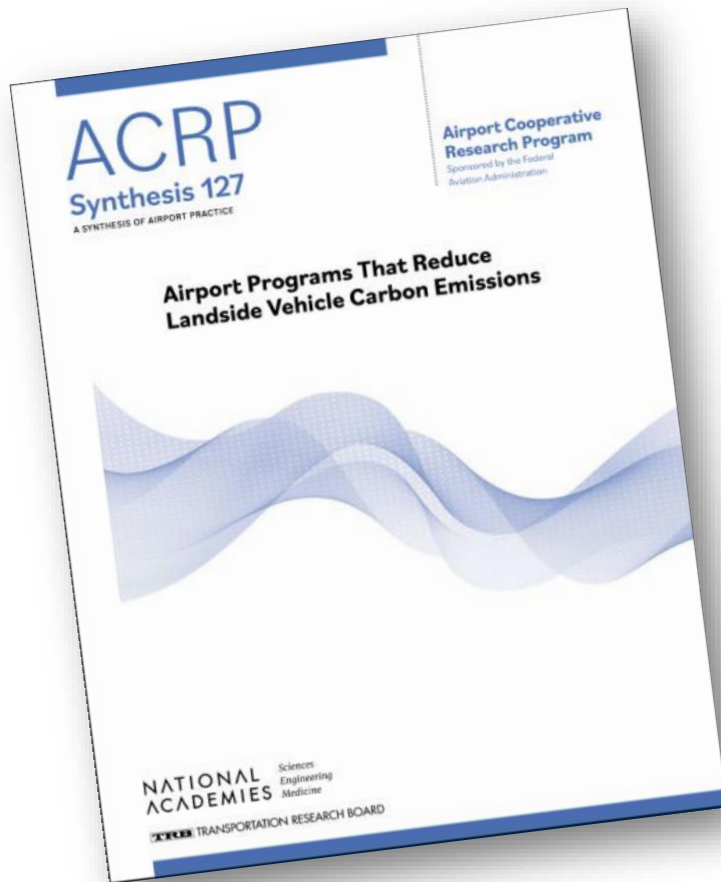
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ACRP Synthesis 132 Oversight Panel

Sheldon Daisley, Houston Airport System

Shailesh Gongal, Massachusetts Port Authority

Kimberly Howard, Metropolitan Nashville Airports Authority

Margaret Martin, Martin Airport Law, LLC

Lisa Nguyen, Denver International Airport

Jonathan Schneider, Airport Design Consultants, Inc.

Jordan Christensen, ACRP Senior Program Officer

Trey Wadsworth, NCHRP Senior Program Officer

Research Goal

Summarize ways airports collect and analyze data

✈ Data collection methods

✈ Analysis techniques

✈ Interpretation

✈ Application in making decisions

"Landside" includes:
- Roadways
- Curbsides
- Commercial vehicle facilities
- Passenger terminal up through holdrooms

But excludes:
- Parking
- Rental cars

Importance of Data to Airports

Understand a passenger's journey

Understand employee needs and requirements

Informs
- ✈ Planning and design
- ✈ Customer experience analyses
- ✈ Day-to-day operations
- ✈ Performance monitoring

Research Approach

✈ Conducted a literature review

✈ Conducted a web-based survey of the busiest 100 airports in the United States

- What types of data are collected?
- How often?

✈ Interviewed staff at nine airports to develop case examples for in-depth investigation

- Data collection tools
- Data collection costs
- Data analysis tools
- How data inform decisions (with examples)
- Legal considerations

Literature Review

✈ **ACRP research** related to

- Airport planning and operations, including analysis of airport terminals and roadways (e.g., ACRP 25 & 40)
- Execution of passenger surveys (e.g., ACRP 235)
- Legal issues associated with airport data collection (e.g., ACRP Legal Research Digest 42)

✈ **Research papers**

- One-time tests of a technology at an airport (e.g., use of Bluetooth)
- One-time field surveys, typically related to passenger processing or pedestrian flows

Literature Review

→ **Published articles & blog posts** related to general use of data to support airport operations and commercial initiatives (e.g., "Data Privacy vs. Personalisation for Airports")

→ **Presentations** at airport industry conferences, some of which are typically not readily available to the public

Survey

Figure 3-1. Online survey respondents.

Survey Results

Which of the following are collected and how often?

✈ Air passenger ground transportation (selected questions)

	Continuous	Once or more per year	As needed	Do not collect
Total vehicle volumes	30%	9%	48%	13%
Mode-specific volumes (e.g., TNCs)	52%	4%	39%	4%
Mode share	22%	9%	48%	22%
Curb dwell times	9%	4%	42%	42%
Shuttle ridership	48%	17%	13%	22%

Data that directly relate to revenues or costs are more likely to be continuously collected

Survey Results

Which of the following are collected and how often?

✈ In the terminal, *before* security (selected questions)

	Continuous	Once or more per year	As needed	Do not collect
Ticketing queues	9%	4%	57%	30%
Security checkpoint queues	52%	9%	22%	17%
Passenger flows	13%	4%	48%	35%

Source: Nashville International Airport

Survey Results

Which of the following are collected and how often?

→ In the terminal, *after* security (selected questions)

	Continuous	Once or more per year	As needed	Do not collect (or n/a)
Customs / immigration queues	22%	4%	35%	39%
Passenger flows	17%	9%	35%	39%
Passenger accumulations	4%	9%	48%	39%

Survey Results

Which of the following are collected and how often?

✈ Employees

	Continuous	Once or more per year	As needed	Do not collect
Mode choice	4%	13%	43%	39%
Parking permit data	57%	17%	22%	4%

Source: Cincinnati / Northern Kentucky International Airport

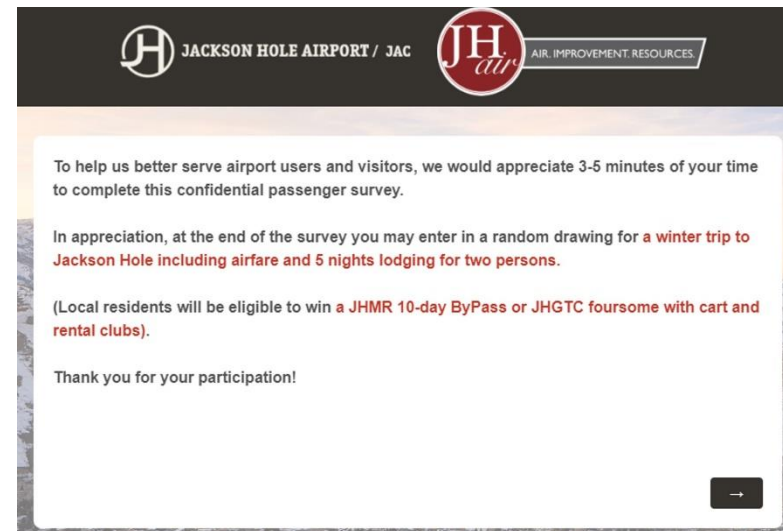# Survey Responses & Case Studies

Figure 3-1. Online survey respondents.

Case Study Findings

Types of collected data include

↗ Passenger flow and demand

↗ Terminal and facility utilization

↗ Customer experience

↗ Ground transportation

↗ Employees

Collection tools

↗ Automated counters

↗ Manual counts

↗ Intercept surveys & focus groups

↗ Vendor reporting

↗ Wi-Fi surveys

Wi-Fi survey from Jackson Hole Airport

Case Study Findings

Analysis Tools

✈ Primarily spreadsheets

✈ Some airports use business intelligence tools

Case Study Findings

Costs

✈ Data collection systems / technologies can be expensive

✈ Analysis cost

✈ Storage and maintenance

✈ Other (ongoing personnel costs, encryption / security costs)

Case Study Findings

Legal

- Requirements are complex and evolving and differ by location
- Increasing global attention to data privacy and proper management
- No comprehensive federal law regarding collection and use of personal data, but numerous state laws regarding collection and storage

Examples of Data-Drive Problem Solving

Chicago Midway
- ➔ Used TNC wait times to verify customer complaints
- ➔ Used TNC travel times to identify alternate hold lot locations and routes

Jackson Hole
- ➔ Used passenger survey data results to convince public transit agency to plan for a route serving the airport

Fort Lauderdale / Hollywood
- ➔ Used data from airlines regarding expected load factors to adjust staffing for maintenance

Others
- ➔ Used ASQ results to change concessions operating times
- ➔ Combined over 50 data sources to develop a comprehensive passenger flow model and can share results with stakeholders
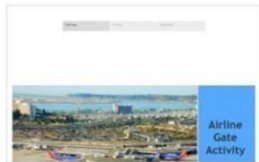- ➔ Curbside reallocation

Visualization is Critical

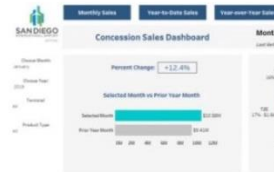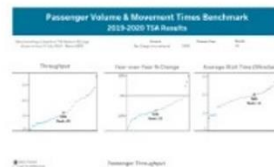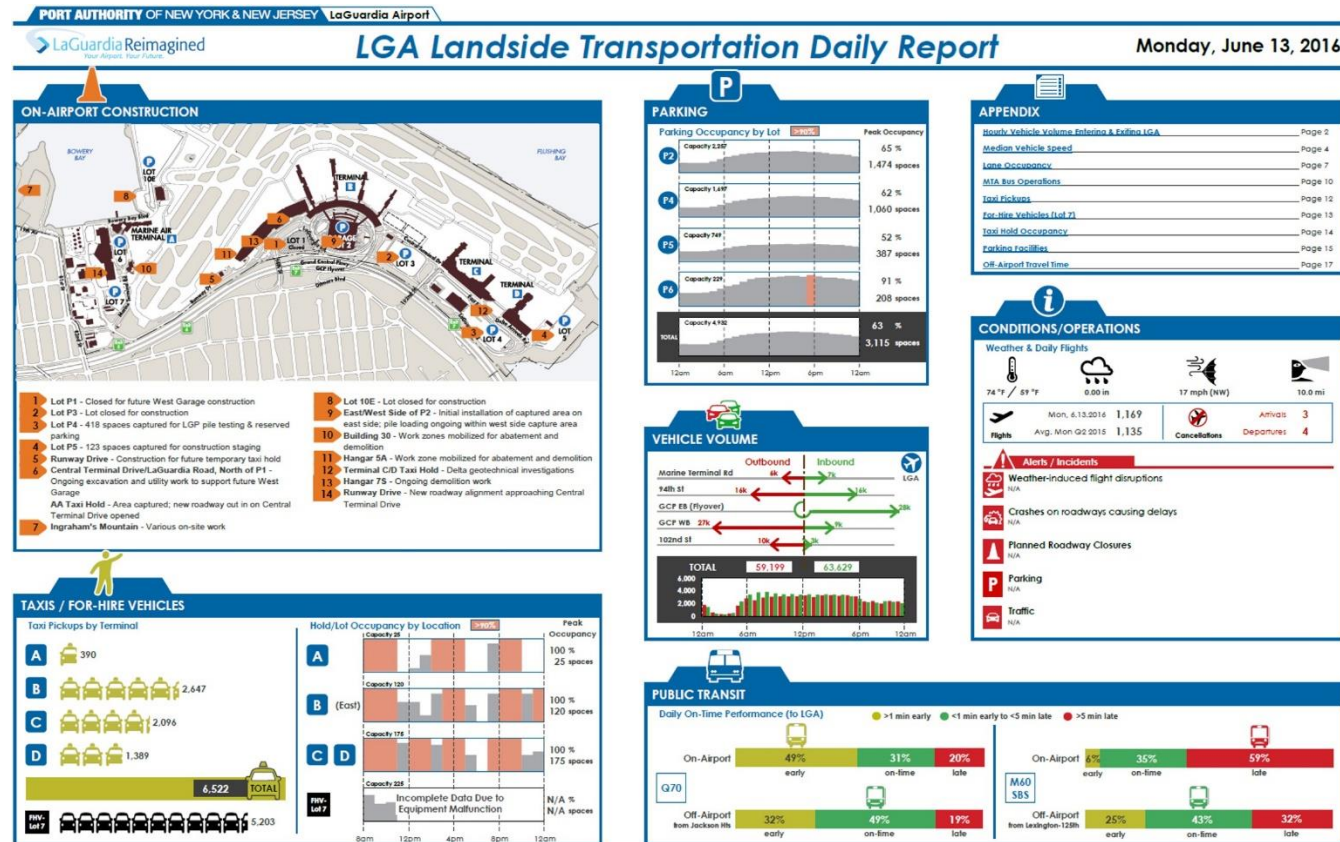*SAN uses dashboards to distill multiple data sources and inform day-to-day operations and identify trends.*

Visualization is Critical

LGA's dashboard helped staff understand how to continually manage traffic during major construction disruptions

Areas for Future Research

**Financial implications of collecting, acquiring, storing, and maintaining data**

- ✈ Equipment / technology cost
- ✈ Staffing and training
- ✈ Data security
- ✈ Cost-effectiveness of various methods

Data privacy and security

Mitigating risk of data errors, loss, and breaches

Data-sharing best practices between airports, airlines, government agencies, other stakeholders

FOR ADDITIONAL INFORMATION
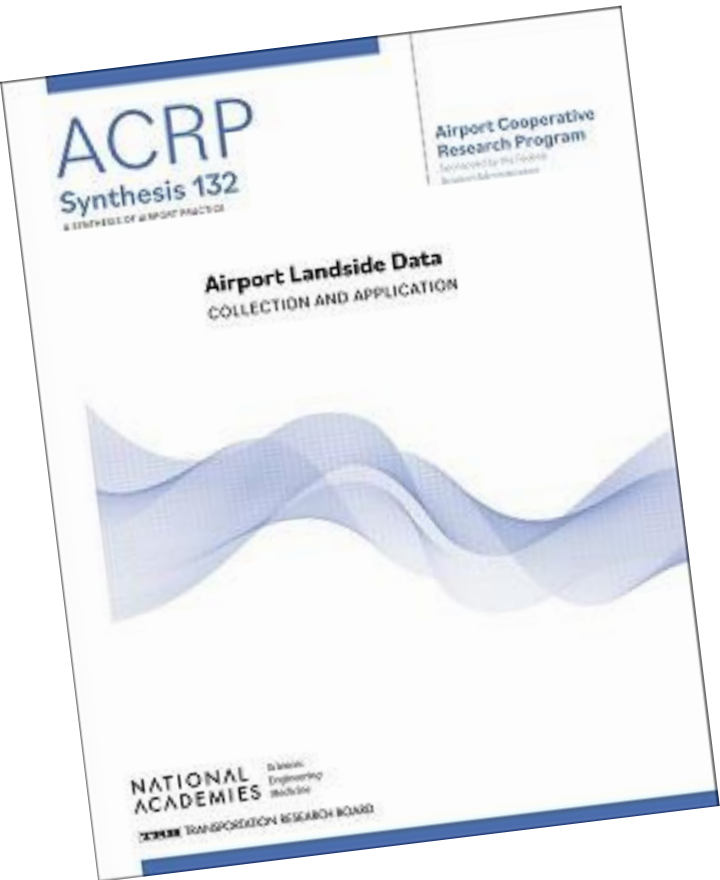
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1. Join the ACRP IdeaHub community
2. Volunteer for a project panel
3. Prepare a research proposal
4. Answer an ACRP survey
5. Apply the research results
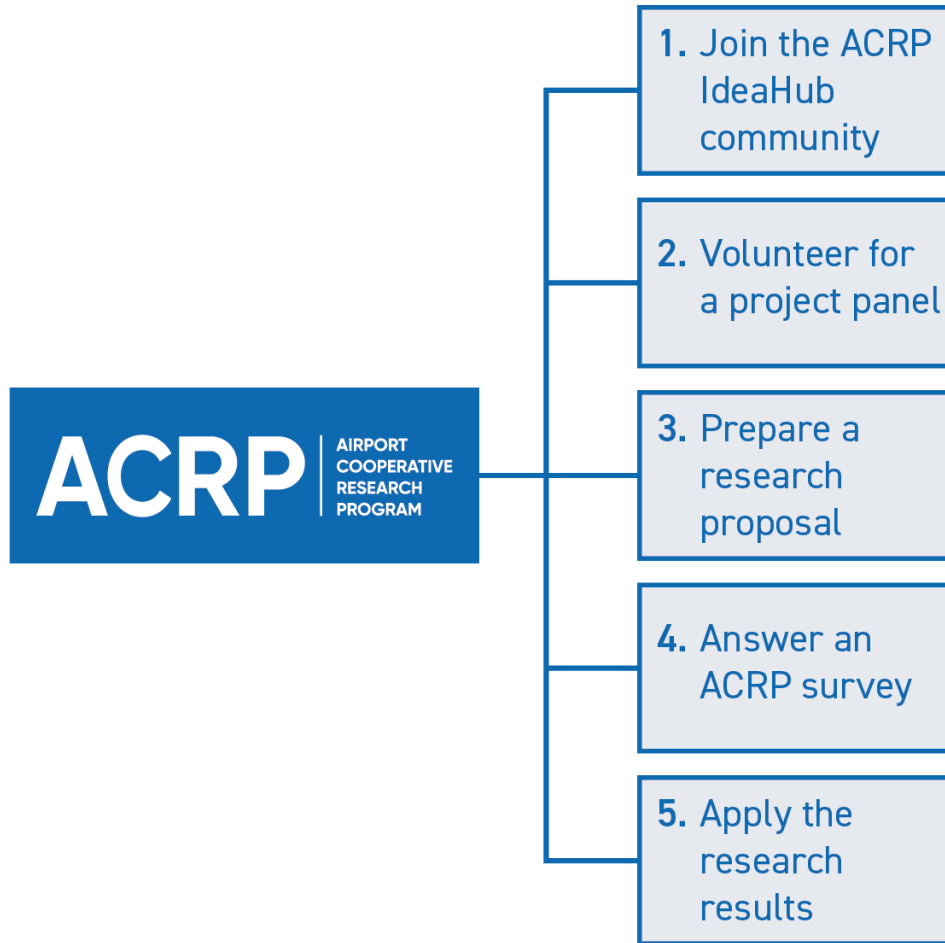
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