

Announcement of Airport Research Projects August 2021

The Airport Cooperative Research Program (ACRP) is a contract research program with the objective of developing near-term, practical solutions to problems facing airport-operating agencies. The ACRP is sponsored by the Federal Aviation Administration (FAA) and managed by the National Academies of Sciences, Engineering, and Medicine, through the Transportation Research Board. Program oversight and governance are provided by representatives of airport operating agencies and others appointed to the ACRP Oversight Committee (AOC) by the Secretary of Transportation.

The ACRP undertakes research and other technical activities in response to the needs of airport operators on issues involving administration, construction, design, environment, human resources, legal, maintenance, operations, planning, policy, and safety at airports.

The AOC met on July 23 & 24, 2020 and selected projects for the Fiscal Year 2022 program. This announcement provides background information and a general research objective for each project.

The ACRP is now seeking nominations for serving on project panels. These panels will develop requests for proposals, select contractors, and review draft deliverables prepared by the contractors. Nominations, including self-nominations, may be submitted through [MyACRP until September 21, 2021](#).

MyACRP requires registration, and if you have a MyTRB login, you will use the same credentials. If you previously had a MyACRP account but haven't registered in the last 12 months, you will need to re-register, since ACRP has transitioned to a new people management platform.

Requests for proposals are expected to be released starting in the fall 2021 and will be available only on the World Wide Web. Each proposal will be announced by e-mail. Instructions to register for e-mail notification of requests for proposals are available at <http://www.trb.org/acrp>. Any research agency is eligible to submit a proposal; guidance for proposal preparation is provided in the brochure, [Information and Instructions for Preparing Proposals](#), available at the website referenced above.

The National Academies of Sciences, Engineering, and Medicine and the Transportation Research Board value diversity and inclusion among our research teams. To help facilitate building teams that include disadvantaged businesses, ACRP is launching ACRP Project Teaming Opportunities. This online platform lists our new FY 2022 projects, and businesses seeking disadvantaged firms with particular expertise and those offering relevant expertise may post on the site to find teaming partners. Project Teaming Opportunities may be found on ACRP's IdeaHub (log in using your MyACRP/MyTRB credentials at this link: ideahub.trb.org)

Address inquiries to:

Marci A. Greenberger
Manager, Airport Cooperative Research
Program
Transportation Research Board
The National Academies of Sciences,
Engineering, and Medicine
500 Fifth Street NW
Washington, DC 20001
202/334-1371
mgreenberger@nas.edu

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Projects in the Fiscal Year 2022 Program**

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Nominations will be accepted until September 21, 2021 at [MyACRP](#)

Project numbers are hyperlinked to that project's webpage on www.TRB.org/ACRP

Summary of Approved Research Projects

Project 01-50

Data Privacy Management Guidance for Airports

Research Field: Administration
Allocation: \$350,000

Airports are collecting and processing a large amount of data from travelers, including personal identification, medical records (e.g., COVID-19 related), and biometric information. In addition, airports need to comply with an increasing number of data protection and privacy regulations, and there is a risk of potential penalties stemming from noncompliance. An initial review of the websites of several large U.S. airports suggests that few provide any information concerning data privacy. Research is needed to understand current practices, provide guidance for fostering awareness of compliance requirements, and help airports incorporate data privacy management into their operational and business activities.

The objective of this research is to develop guidance to help airports comply with privacy-related regulations and to build and embed robust data privacy management practices into their operational practice and business strategies to enhance trust with stakeholders and the community at large.

Project 01-51

Enhancing DBE and ACDBE Participation at Airports

Research Field: Administration
Allocation: \$400,000

Airports have a desire to increase diversity among their concessionaires and other contractors, and U.S. DOT's Airport Concessions Disadvantaged Business Enterprise (ACDBE) regulations as described in 49 CFR Part 23 require many airports to set ACDBE participation goals. Interstate certification regulations as described in 49 CFR Part 26.85 are designed to reduce the challenges disadvantaged businesses face when seeking certification in multiple states. Yet the increase in disadvantaged business participation at airports has been limited, and there continue to be many challenges to achieving desired goals. For example, for airports, the effort to compile, report on, and review attainment is significant. For disadvantaged companies, wide differences in implementation

among certifiers and the impact of complying with information requests from multiple states appear to be increasing the burden for these firms. Lastly, the impacts of shifts in consumer demand (e.g., greater use of transportation network companies and public transit vs. rental cars) also need to be considered. Research is needed to review current practice to ensure the integrity of the process and to enhance opportunities for greater DBE participation in airport contracts.

The objectives of this research are to identify ways airports can reduce resource requirements for managing their concessionaire and contractor diversity practices and to identify ways to streamline and simplify ACDBE certification requirements, thereby improving diversity among airport concessionaires and other contractors.

Project 01-52

Championing the Airport System—Challenging the Paradigm

Research Field: Administration
Allocation: \$690,000

U.S. airports provide safe and reliable facilities for aircraft operations and contribute significant benefits to the economy. Aviation demand continues to grow, technology continues to advance at an increasingly rapid pace, aging infrastructure needs to be replaced and upgraded, and new safety and security protocols need to be incorporated. Yet the funding mechanisms used to finance these efforts have remained relatively unchanged for many years, resulting in a growing concern for the long-term sustainability of many airports. Additionally, in many communities, airports are not viewed as having a positive impact, which may increase funding uncertainty. Moreover, the COVID-19 pandemic has brought a new focus on the limits and deficiencies of the current airport economic model, creating an inflection point for the industry. Research is needed to identify new means for ensuring the long-term sustainability of the U.S. airport system.

The objectives of this research are to assess the current economic model for funding airports, identify and evaluate other models (including those from other countries and industries) for their

possible application to U.S. airports, and recommend new funding models and processes.

Note: The panel for this project will consist of members of the ACRP Oversight Committee; panel nominations are not being solicited.

Project 02-97
Updates to ACRP Airport Environmental Reports 11, 43, 147, and 160

Research Field: Environment
Allocation: \$650,000

Airports face significant and evolving environmental issues, and nearly one-third of ACRP's research has been related to the topic. To ensure that ACRP's environmental products reflect changes in technology, regulations, and practice, the program undertook a systematic product review to identify those products most in need of updating. Among those listed, the following products were identified:

- *ACRP Report 11: Guidebook on Preparing Airport Greenhouse Gas Emissions Inventories,*
- *ACRP Report 43: Guidebook of Practices for Improving Environmental Performance at Small Airports,*
- *ACRP Report 147: Climate Change Adaptation Planning: Risk Assessment for Airports,* and
- *ACRP Report 160: Addressing Significant Weather Impacts on Airports: Quick Start Guidebook and Toolkit.*

The objective of this research is to update *ACRP Reports 11, 43, 147, and 160*, including supporting tools and other related material, to reflect the latest developments and practice. The updates may be undertaken under more than one research contract.

Project 02-98
Airport Energy Resiliency

Research Field: Administration
Allocation: \$1,200,000

Airports are facing increasing challenges and opportunities as they strive to achieve environmental goals, increase energy resiliency, and meet the quickly evolving energy needs of their customers. For example, gas-fired central utility plants typically create the majority of greenhouse gas emissions under an airport's control, and some airports are exploring converting their plants to electric power. Additionally, airports are vulnerable to power

disruptions from the larger energy grid, which may not only cause adverse impacts to their facilities but often to large segments of the National Airspace System, resulting in millions of dollars in costs. Finally, the power requirements of airports and their customers are increasingly relying on electrification (e.g., private electric vehicles, electric ground service vehicles, and even e-aircraft), resulting in enhanced charging infrastructure and related ancillary needs. Yet some potential untapped solutions may also exist. For example, energy vectors are a means of storing energy from a place and time of availability to a place and time of utilization. And solar photovoltaic technology and vehicle-to-grid technology may also be used to tap energy stored in electric vehicles to offset peak electrical demand in the event of grid outages. While ACRP and others have conducted limited research on these topics, the practice continues to evolve, and airports need resources to ensure they meet their long-term energy requirements and those of their customers in a sustainable, reliable, and resilient manner.

The objective of this research is to provide airport industry practitioners with resources, including guidance and tools, to help address their long-range energy needs and the energy needs of their customers in a sustainable, reliable, and resilient manner. The resources should help airports develop an energy resiliency strategy, evaluate alternatives, and implement selected solutions.

Project 02-99
Use of Equity and Environmental Justice Data to Support Airport Decision Making

Research Field: Environment
Allocation: \$400,000

Environmental justice has historically focused on ensuring that disadvantaged populations do not bear a disproportionate burden of the negative environmental impacts of projects and that these communities are meaningfully included in planning and public outreach. While these goals remain important, there is increased emphasis on ensuring that infrastructure investments, including those for airports, lead to a more sustainable and just economy that addresses historical racial injustices and enhances the quality of life of disadvantaged communities. A critical element needed to better incorporate equity and environmental justice into

airport decision making is the use of robust data. Yet these data sets are often large and may come from disparate sources, and the thoughtful interpretation of the data as it relates to decision making may be difficult for airports. Research is needed to help airports understand how equity and environmental justice data can be used to support airport decision making.

The objective of this research is to prepare a primer and guidelines to help airport industry practitioners collect, share, interpret, and incorporate equity and environmental justice data in a manner that enhances how development and operational decisions can positively affect the economic and social well-being of neighboring communities in a more balanced and just way.

Project 02-100
Pathways to Airport Net Zero Carbon Emissions

Research Field: Environment
Allocation: \$600,000

In the summer of 2021, the members of the Airports Council International committed to reaching net zero carbon emissions by 2050. *ACRP Research Report 220: Guidebook for Developing a Zero- or Low-Emissions Roadmap at Airports* provides the information and resources needed for airports to create a zero- or low-emissions roadmap and addresses making the business case and working with stakeholders to set zero- or low-emissions goals and targets. In addition, *ACRP Synthesis 100: Airport Greenhouse Gas Reduction Efforts*, assesses the state of the practice and lessons learned in approaches to greenhouse gas reduction. These efforts may also offer opportunities for revenue generation, as initially explored in *ACRP Report 57: The Carbon Market: A Primer for Airports*, which was published in 2011. Yet carbon removal strategies have not been widely adopted at airports, and a key reason may be the challenges in identifying the best strategies for their unique conditions (e.g., geology/geography, land use characteristics, and funding availability).

The objectives of this research are to provide guidance and tools to help airports identify the most appropriate net-zero carbon strategies for their airports that consider their unique characteristics and to revisit the potential revenue generation opportunities identified in *ACRP Report 57*.

Project 02-101
Airport Employee Onboarding Environmental Guidebook

Research Field: Environment
Allocation: \$400,000

Airport environmental issues can be complex, occur at airports of all sizes, and are often costly if not managed properly. It is therefore important for airport employees, particularly new employees or those employees without a technical environmental background, to understand the environmental requirements and environmental programs at the airport. Airport environmental achievement and sustainability are organization-wide efforts, especially for activities like waste management. Providing guidance and resources to employees as soon as they are hired could enhance compliance and reduce the risk of negative and costly environmental outcomes. The guidance and resources could also be used as references for current employees, which ultimately could help promote a positive environmental culture within the workforce. Research is needed to develop guidance for new employee onboarding with respect to environmental laws, regulations, and programs at the airport.

The objective of this research is develop guidelines, tools, and supporting material to help airports of all sizes and levels of complexity onboard their employees to their unique environmental procedures and policies.

Project 02-102
Encouraging Community Support for Airports and Air Travel

Research Field: Environment
Allocation: \$400,000

ACRP Report 132: The Role of U.S. Airports in the National Economy (2015) demonstrated that the nation's airport system provides essential transportation services for millions of travelers and shippers of goods. Public use airports also contribute \$1.6 trillion to the economy annually when direct, indirect, and induced economic effects are considered. Yet as communities have become more socially and environmentally conscious, increased concerns have focused on some of the adverse impacts of aviation activity. This has recently appeared as "flight shaming," which is social pressure to discourage air travel. Data on

aviation activity is also sometimes intentionally or unintentionally misinterpreted. As with any activity, aviation results in both benefits and disbenefits.

ACRP Research Report 221: Measuring Quality of Life in Communities Surrounding Airports and more generic environmental, social, and governance (ESG) trackers help to measure these benefits and disbenefits. Yet airports need guidance and tools to respond to negative messaging and to translate the analyses coming from economic impact, quality-of-life studies, and ESG trackers into messages that can be understood by multiple audiences. Additionally, airports need resources to help them constructively engage with various perspectives.

The objective of this research is to develop guidance and tools to help airports respond to flight shaming and other negative messaging in a thoughtful, balanced manner and to promote community support for airports and air travel. The guidance and tools should allow airports to address their unique situations and audiences.

Project 03-65

ACRP Policy and Planning Product Updates

Research Field: Policy & Planning
Allocation: \$500,000

Since its inception, ACRP has produced hundreds of research reports, tools, databases, and other products. Recognizing the dynamic nature of the airport industry and the need to ensure that the program's products reflect the latest in practice, the program developed a systematic process to identify the products most in need of updating. To date, this process has been applied to ACRP's environmental products. ACRP will now use this systematic process to review the nearly 60 products related to airport policy and planning, some of which are more than 10 years old. Research is needed to review the suite of policy and planning products, identify those most in need of updating, and conduct an update of the highest priority products.

The objective of this research is to review ACRP's suite of policy and planning products to identify those products in need of updating and to undertake updates of the highest priority products.

Note: \$50,000 of this allocated amount will be used to fund a project to identify policy and planning products needing updates; the remaining funds may

be available for one or more projects to conduct the product updates.

Project 03-66

Digital Twins for Airports

Research Field: Policy & Planning
Allocation: \$350,000

Decision making in an airport environment is often complex and time-consuming. Many decisions involve numerous stakeholders and considerable resources and can include an element of unanticipated adverse impacts if a less-than-optimal decision is made. "Digital twins" are detailed virtual representations of a facility or system that are kept up-to-date with real-time data. The most advanced examples are supported by machine learning and reasoning. Digital twins allow for speedier and more confident decision making, enabling not only a better understanding of how a system operates but also how a system might operate under different parameters. Although initially limited to the domain of manufacturers and engineers, digital twins are being employed in an ever-widening array of settings. Since airports often consist of a complex set of interactive systems, the potential value of digital twins for airports could be significant. Yet the development, operation, and maintenance of a digital twin will require a significant investment of resources, and research is needed to help airports understand the potential benefits of digital twins and the steps for implementing and maintaining a digital twin for their airport.

The objective of this research is to develop guidance and tools for airports to evaluate the potential benefits that a digital twin might provide for decision making, identify which aspects of the airport could be included, and develop a digital twin that is scalable to their unique needs.

Project 03-67

Peer-to-Peer Car Sharing Challenges and Opportunities at Airports

Research Field: Policy & Planning
Allocation: \$400,000

Peer-to-peer car sharing companies allow individuals to make their personal vehicles available for rent by others through an app. Peer-to-peer car sharing activity continues to grow across the United States, but there is little data on how much of this

activity occurs at airports. It is a potential concern for airports, as it may result in lost revenue and may affect airport facilities utilization and requirements. Yet airports have had limited success in tracking and regulating peer-to-peer car sharing activity, recovering potential impact costs, and addressing legal challenges.

The objective of this research is to help airports understand the peer-to-peer car sharing market, develop estimates of its growth at their airport, identify potential facility and financial impacts, consider options for obtaining revenue from the activity, and address potential legal issues.

Project 03-68
Integrated Contingency Planning for Small and Non-Hub Airports

Research Field: Policy & Planning
Allocation: \$400,000

Airports can benefit significantly by integrating standard business planning with all aspects of resiliency planning (e.g., business continuity plans, continuity of operations plans, airport emergency plans, recovery plans, and resiliency plans). However, because of limited resources and expertise, small airports often have challenges in plan integration. Recent events, such as the COVID-19 pandemic, have shown how strong the interaction is between an airport's business plan and its ability to sustain operations and recover from adverse events. Research is needed to help small and non-hub airports understand the benefits of integrated contingency planning and identify organizational and financial opportunities to improve their resiliency and move closer to self-sufficiency.

The objective of this research is to develop guidance and products to help small and non-hub airports effectively integrate their business continuity plans, continuity of operations plans, airport emergency plans, recovery plans, and resiliency plans. The research should identify resources, provide case studies, and provide a scalable method for contingency planning integration.

Project 05-03
Mitigating and Responding to Airport Cybersecurity Events

Research Field: Security
Allocation: \$600,000

Airports rely on a significant amount of electronic information and technology in their day-to-day operations, and the amount of electronic data airports collect, store, and use continues to grow. Yet the risk of adverse cybersecurity events appears to be increasing at an even more rapid rate. These events can be significant and debilitating to operations, affect numerous stakeholders, result in adverse financial impacts, and reduce public trust. ACRP published *Report 140: Guidebook on Best Practices for Airport Cybersecurity* in 2015. Since that time, there have been many lessons learned, both within and outside the industry, and the actors instigating these attacks have grown more bold and sophisticated. The findings and guidance therefore need to be updated and expanded. Additionally, since attacks at a single airport can cause rippling effects throughout the aviation system, airports need to be able to develop response plans that address their particular facility.

The objective of this research is to provide airports with the latest understanding of cybersecurity threats, provide updated guidance and tools reflecting recent recommended mitigation and response practices, and allow airports to tailor these practices to their unique operational requirements and resources.

Project 07-19
Update to ACRP Report 25: Airport Passenger Terminal Planning and Design

Research Field: Design
Allocation: \$500,000

ACRP Report 25: Airport Passenger Terminal Planning and Design comprises a guidebook, spreadsheet models, and a user's guide in two volumes and a CD-ROM. These products provide guidance in planning and developing airport passenger terminals. Since its publication in 2010, *ACRP Report 25* has been the most downloaded ACRP publication. Over the last 10 years, significant changes in technology, protocols, design, passenger behavior, and customer expectations have occurred, with many of these changes being accelerated by the COVID-19 pandemic. In addition, ACRP and others have subsequently published numerous terminal-related guidance and tools (many of which are accessible on *ACRP WebResource 2: Airport Passenger Terminal Design Library*) that are not referenced in the current version of the report. Lastly, the means by which

airport industry practitioners access ACRP products has evolved (e.g., many practitioners no longer have access to CD readers). Research is therefore needed to update the products associated with *ACRP Report 25* and to provide them in more user-friendly formats.

The objective of this research is to update *ACRP Report 25* and its associated products to reflect the latest recommended practices in airport passenger terminal design and planning and to provide these products in easily accessible, user-friendly formats.

Project 09-22
Cost-Effective Training for Airfield Electricians at Small Airports

Research Field: Maintenance
Allocation: \$300,000

Budget resources at small airports are typically limited and are often not able to support full-time electricians, leaving the maintenance of airfield lighting to other airport staff. A small airfield lighting issue may then result in significant operational impacts if a repair cannot be made quickly.

The objective of this research is to develop basic electrical safety and airfield lighting maintenance training, guidance, tools, and modules for use by staff at small airports. The guidance should help airport staff recognize hazards of airfield lighting, safely undertake simple maintenance tasks, and know when to call a qualified electrician to perform repairs.

Project 10-33
Incorporating Emerging Ground Access Technologies at Airports

Research Field: Operations
Allocation: \$500,000

Electric vehicles and autonomous vehicles (AVs) (including robotaxis) are expected to contribute an increasing share of landside activity at airports. The transition will likely affect all components of an airport's landside facilities, including roadways, curbs, parking, and ground transportation centers. Airports must consider these trends in their facility planning, yet little is known about the degree to which these new technologies will advance and the pace at which growth will occur. In addition, the

facility impacts of these emerging technologies are yet to be defined: Will AVs require more or less curb space? Will dwell times be higher or lower? Should AV activity be segregated from traditional activity? Will airports see significant shifts in mode shares that result in overused and/or underused facilities? What revenue impacts and opportunities might be anticipated?

The objective of this research is to provide guidance and tools to help airports incorporate emerging ground access technologies into their landside facilities, including roadways, curbs, parking, and ground transportation centers.

Project 10-34
Airport Microgrid Toolkit Upgrade to ACRP WebResource

Research Field: Operations
Allocation: \$100,000

ACRP published *Research Report 228: Airport Microgrid Implementation Toolkit* in 2021. The toolkit has a suite of reference materials and guidance to help airports consider, plan for, and implement microgrid solutions at their facilities. The toolkit includes modules covering microgrid basics, airport energy profiles, resilience, stakeholder engagement, energy options, finance and ownership, as well as operations and maintenance. The toolkit currently is not hosted by ACRP, and research is needed to identify the upgrades and steps needed to migrate the site to an ACRP WebResource and to carry out the actual migration.

The objective of this research is to upgrade and migrate the Airport Microgrid Implementation Toolkit to an ACRP WebResource.

Project 11-02/Task 43
Quick Response: Successful Community Integration of Advanced Air Mobility

Research Field: Special Projects
Allocation: \$100,000

Advanced air mobility (AAM) includes the use of highly automated aircraft to transport passengers and cargo at lower altitudes. Activities will likely include commercial inter-city travel, cargo delivery, public services, and private/recreational use. The initial ecosystem will utilize existing facilities (airports or heliports) but, in the future, new,

dedicated facilities will likely be developed. ACRP and others are conducting research to help airports and communities understand the potential benefits, challenges, facility needs, and impacts of AAM activity. *ACRP Project 03-50: An Airport-Centric Study of the Urban Air Mobility Market* will assess potential impacts of AAM at airports and help them understand potential opportunities and planning considerations. ACRP will also be hosting an Insight Event in early 2022 that will cover on-demand aviation services for passengers and goods. Yet the very nature of AAM and the high degree of uncertainty relative to its adoption require robust coordination and planning among airports, regulators, and communities.

The objective of this research is to conduct a quick response effort to summarize the current state of the practice with regard to community, airport, and agency coordination relative to AAM activity and to recommend steps stakeholders can take to successfully integrate and benefit from AAM activity in their communities.