

Announcement of Airport Research Projects August 2020

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 2021 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, 2020](#).

If you currently have a MyACRP account, you will need to re-register, since ACRP has transitioned to a new people management platform. This new platform is the same

platform used for MyTRB, so if you have a MyTRB account, you may use those credentials to log into MyACRP

Requests for proposals are expected to be released starting in the fall 2020 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.

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Projects in the Fiscal Year 2021 Program**

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Nominations will be accepted until September 21, 2020 at [MyACRP](#)

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

Summary of Approved Research Projects

Project 01-49

Knowledge Is Power: Knowledge Management Guidelines to Help Airports Thrive

Research Field: Administration

Allocation: \$350,000

Large scale changes to the airport industry are occurring, including the rapid introduction of new technology, growing financial constraints, and the retirement of baby boomers. These changes are increasing the rate that leaders and experienced employees are leaving across an organization. The result is often a significant loss of expertise, leadership, and institutional knowledge. The impacts are often greater at small airports that have limited staff. Airports are therefore having to focus on ways of managing and preserving institutional knowledge, yet little guidance is available for the unique issues airport organizations face.

The objective of this research is to develop guidelines, tools, action plans, and other resources to support the collection, organization, storage, and dissemination of airport institutional knowledge.

Project 02-91

Development of Forensic Guidelines and Tools for PFAS Source Differentiation at Airports

Research Field: Environment

Allocation: \$490,000

Airports across the United States face increasing regulatory and technical challenges for addressing per- and polyfluoroalkyl substance (PFAS) releases into groundwater and surface water from the use of aqueous film forming foams (AFFF) in aircraft rescue and firefighting (ARFF) activities. In many cases, airports also have tenants who store and use AFFF. Additionally, airports located in industrial areas may have neighbors who use and/or store AFFF or other PFASs. Construction activities at or near the airport can lead to the discovery of PFAS-impacted soils, and there is little understanding of how to determine the source of the contamination. Distinguishing among PFAS sources is an important aspect of any site characterization program and is

useful for managing the cost and liability of remediation. Research is needed to advance the understanding of source differentiation so it can be applied to airports with greater confidence.

The objective of this research is to develop a forensic method for differentiating among multiple potential sources of PFAS contamination at an airport and its environs.

Project 02-92

General Aviation Airports and Resilience: Complete Toolkits for Self-Directed Planning

Research Field: Environment

Allocation: \$320,000

General aviation (GA) airports are uniquely positioned to provide services critical to the safety and security of their community. These services include aeromedical flights, aerial firefighting, law enforcement, and disaster relief. GA airports are not only important to their local communities, but they are also integral components of the nation's airport network. It is therefore imperative for these airports to conduct resiliency planning to understand, predict, and address shocks (e.g., accidents, severe weather, utility disruptions) and stressors (e.g., employment challenges, aging infrastructure, climate change, resource limitations) before they happen. Resilience management plans are key to protecting continuity of services, yet they are often expensive and complicated to create. These constraints may impede their development at GA airports. Research is needed to provide GA airport operators with the tools necessary to develop their own cost-effective resilience management plans.

The objective of this research is to provide GA airport operators with the guidelines and tools necessary to conduct cost-effective resilience plans tailored to their unique situation and using in-house and locally available resources. These guidelines and tools would potentially include checklist assessments, easily calculated risk metrics, suggestions for minimizing risk, and guides to local resource collaboration.

Project 02-93

Guidebook for Environmental Management of PFAS at Airports

Research Field: Environment
Allocation: \$350,000

An unknown yet potentially significant number of airports have site soils, groundwater, and/or wastewater that contain elevated concentrations of one or more per-and polyfluoroalkyl substances (PFAS). The U.S. EPA recently issued recommendations and an advanced notice of proposed rulemaking related to PFAS, and as greater attention is paid to the issue, airports are faced with a growing need to address PFAS legacy environmental contamination and prevent future PFAS problems.

The objectives of this research are to compile and summarize relevant PFAS technical and regulatory information and to develop guidelines to help airports (a) assess and manage potential PFAS-related risks, (b) plan and implement remediation and treatment, and (c) monitor and maintain compliance with PFAS environmental regulations.

Project 03-59

Airports and the Homeless

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

There has been an increase in homeless populations at airports in recent years. There are many reasons for this increase, including the reduced number of city shelters and the attractiveness of airports for the homeless due to their relative safety, transit accessibility, climate controlled shelter, and access to food and amenities. Responses to the homeless at airports have varied. Many airports wrestle with how to balance their primary function of serving the traveling public with dealing respectfully with the homeless and the potential safety/security issues and health and mental illness challenges that are often found in this population. Research is needed to help airports partner with local resources for developing and implementing a comprehensive plan for addressing homeless populations at their facilities.

The objective of this research is to prepare a guidebook to help address homeless populations at airports. The guidance should help airports develop plans and policies that balance safety, humaneness,

and respect; promote partnerships with local resources; consider resource needs and availability; allow for flexibility; and develop strategies for public engagement to help improve outcomes and safe practices.

Project 03-60

Incorporating Shock Events into Traffic and Forecasting and Airport Planning

Research Field: Policy and Planning
Allocation: \$450,000

Airport activity forecasting and planning traditionally assume gradual and incremental change (e.g., rising traffic levels as the economy grows), but it is arguable that infrequent one-off events, such as the 9/11 terrorist attacks, the 2008/2009 global financial crisis, and most recently, the COVID-19 pandemic, have had as much impact on airport development as macroeconomic conditions. While the industry has adapted to these events and traffic eventually continued to grow, the impacts for many airports have been profound and long-lived. These impacts have typically included a significant change in or loss of air service and new passenger processing requirements. Impacts have not been uniform, affecting some airports more than others. *ACRP Report 76: Addressing Uncertainty about Future Airport Activity Levels in Airport Decision Making*, published in 2012, included an initial discussion about how rare or high-impact events might be considered in forecasting and planning. However, the report identified, and subsequent events have confirmed, a need for additional research and guidance due to their potential for significant impacts on demand as well as on facility and financial planning.

The objective of this research is to provide guidelines to help airports address large-scale, unpredictable shock events into traffic forecasting and airport facility and financial planning.

Project 03-61

Assessing and Improving Data Analytic Capabilities at Airports

Research Field: Policy and Planning
Allocation: \$300,000

Airports are currently facing numerous organizational challenges, and it is often difficult to identify the primary areas of concern, prioritize

actions, and make effective changes for the future. Yet with the advent of data analytics, airports can better understand not only their day-to-day operations, but ultimately address their challenges using evidence-based decision making. However, while data analytics is a powerful tool, airports must overcome impediments to its use, including resource limitations, data in silos, inconsistent metrics, and lack of training in the use of modern data science techniques. Research is needed to help airports improve their data analytic capabilities, which can, in turn, enable them to make more informed decisions to improve their organization.

The objective of this research is to develop a guidebook to help airports leverage their data more effectively and enhance their data analytics capabilities, including suggestions for inventorying data, using analytics in an airport setting, developing strategies and action plans for improving data analytics maturity, and providing resources for analytics training.

Project 03-62

Scenario-Based Adaptive Airport Catchment Area Mapping

Research Field: Policy and Planning
Allocation: \$300,000

An accurate estimation of an airport's catchment area enables operators and airlines to make informed decisions, target potential markets, and aid in forecasting activity. An airport's catchment area is influenced by many factors, including ground access, air service and airfares, distance from population centers, and proximity to and air service at competitive airports. It is possible that an airport's catchment area may vary as these factors change over time. Airports may even have distinct catchment areas for different passenger market segments (e.g., business travel, international travel) and for cargo demand. Often, airports must rely on costly and time-consuming survey-based approaches to estimate their catchment areas. Also, there is not a consistent approach among industry practitioners and academic researchers on how a catchment area should be defined, leading to inconsistent, static, and often biased results.

The objective of this research is to develop an analytical approach and resources to help airports establish their catchment area. The method would be tailor able to allow users to specify a particular

market segment of interest and account for unique conditions at their facility.

Project 03-63

Modernizing Air Cargo Operations at U.S. Airports

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

Air cargo contributes about 35 percent to the total value of the world's cargo activity, making it a vital part of the supply chain. With the continued growth in e-commerce, spurred by the pandemic, many airports are experiencing increased cargo activity, including those that had limited or no cargo activity previously. Yet air cargo facilities, supporting infrastructure, and operations at many of the nation's airports are inadequate and inefficient. For example, cargo buildings are often insufficiently sized and have columns and small doors; cargo handling typically still relies on manual labor; and cargo tracking often includes paper waybills. Customers choose air shipment because of its implied expediency, yet these inefficiencies impact delivery times and reliability. Inefficiencies also potentially lead to higher costs, pollution and congestion from trucks, and safety issues. *ACRP Report 143: Guidebook for Air Cargo Facility Planning and Development* provides important guidelines for cargo facility development; additional research is needed to refine these guidelines and provide recommended practices for air cargo operations and handing.

The objective of this research is to develop a manual of best practices for developing and operating air cargo facilities. The manual should be focused on helping airports and their air cargo partners be ready for the anticipated changes in technologies, practices, and customer demand for the next 20 to 30 years.

Project 04-25

Airports and Pandemics—Reducing the Spread of Communicable Diseases

Research Field: Safety
Allocation: \$900,000

In recent years, as air travel has increased worldwide, attention to the global spread of communicable diseases via air travel has also grown, as exemplified by the COVID-19 pandemic. Because airports serve a vital role in facilitating easy

movement of passengers and goods, they must also play a key role in communicable disease mitigation and control. ACRP has conducted a convening event and produced tools and guidebooks to help the airport community and stakeholders deal with communicable disease outbreaks, and Project 03-49 will provide guidelines and best practices to mitigate transmission. Yet it is apparent that considerable gaps in research and practice remain. Recognizing these needs and the significant impact pandemics can have on airports, the ACRP Oversight Committee allocated funds for additional research with the understanding that the specific scopes and objectives of the research would need to be further developed by a project panel.

The objectives of this research are to conduct research to address gaps in the airport community's role and response to communicable disease pandemics and to prepare products to help airports address these gaps.

Project 04-26

A Framework for Airport Evacuation: Assessment of Airport Landside Capacity Using a Micro-Meso Simulation Tool

Research Field: Safety
Allocation: \$400,000

Safe and rapid evacuation of airport terminal occupants is critical in an emergency event (e.g., acts of terrorism, fire, power outages, natural disasters, bomb threats). In some instances, and based on the nature of the emergency, it may also be appropriate to consider facilitating the relocation of occupants to safe locations at some distance from the threat area (either on or off-airport). Such research would need to consider a wide array of transportation facilities and resources, including vehicles, on-airport roadways and parking; mass transit access and service; and the regional transportation network. The complexity of the analysis suggests potential benefit from using a micro-meso simulation tool to model flows across the network, determine their impact, and evaluate various scenarios. Modeling would also enable stakeholders to better understand the impact on their systems and their role during the response.

The objective of this research is to help airports and their stakeholders improve terminal evacuation strategies, including the relocation of occupants to

safe locations through the use of a micro-meso simulation tool.

Project 04-27

Effective Practices for Monitoring and Managing Tree Growth off the Airport

Research Field: Safety
Allocation: \$300,000

Off-airport tree growth may penetrate the airspace surfaces established to maintain safe aircraft operations. The traditional method for monitoring tree growth is through obstruction surveys, which are often expensive. If a survey has not been conducted in recent years, potential obstructions resulting from tree growth could go unidentified and could potentially contribute to an accident and possible liability exposure. The issue is often more pressing at small airports in rural settings as GPS approaches are established, and resource limitations impact the monitoring and control of tree growth. Alternative practices such as the use of UAS-collected LiDAR or photogrammetry may provide more cost-effective solutions for gathering data. In addition, new practices, such as the establishment of zone-based maintenance schedules, may be useful. Research is needed to identify new technologies and practices and determine their effectiveness for monitoring and managing off-airport tree growth.

The objective of this research is to evaluate alternative methods for monitoring off-airport tree growth relative to their effectiveness, accuracy, ease of use, cost, training/expertise requirements, and ability to translate findings into actionable data. The results should provide airports with methods and tools to monitor and control tree growth in a cost effective manner.

Project 04-28

Investigating the Potential Alternative Materials and Configurations for EMAS Design

Research Field: Safety
Allocation: \$575,000

An engineered material arresting system (EMAS) is often used at airports where a full runway safety area (RSA) cannot be provided. An EMAS is positioned within the RSA and is made of an energy absorbing material that brings an aircraft rapidly and safely to a stop. *ACRP Report 29: Developing Improved Civil Aircraft Arresting Systems* (2009) evaluated

alternative EMAS materials and potential active arrestor designs for civil aircraft applications. Since the report's publication, significant development in materials and technologies have occurred, indicating a need to update the research. Additionally, exploring options for systems to arrest aircraft at small airports would be beneficial.

The objective of this research is to investigate potential alternative materials, configurations, and technologies for EMAS design. The research should help practitioners identify which application(s) may be most appropriate for their unique need, including those of GA airports.

Project 04-29

Transportation Emergency Response Application (TERA): Migration Options Beyond 2020

Research Field: Safety
Allocation: \$50,000 (ACRP share)

The Transportation Emergency Response Application (TERA) software was originally developed by the National Guard for EOC training, and the transit, highway, and airport communities adapted the platform for their use by developing relevant scenarios through the cooperative research programs. TERA contains learning objectives, scripts, and other content that are considered to be valuable resources for tabletop exercises.

Unfortunately, the TERA application is built almost entirely on the Flash multimedia software platform, which is no longer supported by its developer.

Currently, most browsers still allow users to access Flash content by manual approval, but this option eventually will generally no longer be available by the end of 2020. Additionally, the developer of TERA recently concluded that there was not a business case for migrating to another platform and planned for the tool's end of life to coincide with that of Flash in December 2020. Recognizing the value of the application's content and features, it is important to identify options for migrating it to a sustainable long-term platform.

The objective of this research is to identify and evaluate options for migrating TERA's core features, training capabilities, scenarios, and content to a modern, supported platform.

Project 10-32

Airside Automated Ground Vehicle Technology (AGVT) Demonstration to Support Airport Operations

Research Field: Operations
Allocation: \$450,000

Automated ground vehicle technology (AGVT) is increasingly being used to support road transportation, and *ACRP Research Report 219: Advanced Ground Vehicle Technologies (AGVT) for Airside Operations* identified potential opportunities for its use for airport operations. Areas for possible use include mowing, perimeter security, foreign object debris (FOD) detection, and other applications. Recognizing the unique challenges to using AGVT in an airport setting, research is needed to conduct a demonstration to better understand its uses, benefits, and limitations.

The objective of this research is to conduct an on-airport demonstration of a selected AGVT application to support airport operations. The research would include technology and application selection, stakeholder coordination, planning, deployment for testing, documenting findings, and recommendations.

Project 11-02/Task 40

Quick Response—Airport Organizational Redesign

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

As in other settings, airports continue to reshape their workforce and organizational structure, transform their business model, or move in a new strategic direction. Yet even after a year, airports may still not have realized the anticipated benefits. As airports look to make dramatic and unanticipated changes in response to the COVID-19 pandemic and other factors, they will benefit from practical guidelines for making the needed changes "stick." *ACRP Synthesis 40: Issues with Airport Organization and Reorganization* (2013) explored past and then-current practices in operational design.

Since then, however, much research on organizational redesign has been done outside the airport industry, as organizational needs and models continue to evolve. Additional research is therefore needed to translate recommended practice to the airport setting.

The objective of this research is to provide airports with resources and guidelines to facilitate the desired transformation they seek within their organization.

Project 11-02/Task 41

Quick Response—Identifying and Implementing Contactless Technologies at Airports

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

As technology has continued to evolve, moving airports to a “contactless travel” model has been seen as a means of enhancing security, providing a smoother passenger journey, and reducing wear and tear on physical devices. Yet the COVID-19 pandemic has identified another potential benefit: the elimination of the many common touchpoints along a passenger’s journey (e.g., check-in kiosks, paper boarding passes, concessionaire points of sale units, manual bag tagging), which are now seen as points of disease transmission. Research is needed to examine the airport processes and functions that could potentially benefit from being replaced with contactless technologies.

The objective of this research is to develop a primer to help airports evaluate and implement contactless technologies. The primer should allow airports to develop a plan for using the technologies to meet the unique needs of their facility and resources, and to address potential impediments to implementation.

Project 11-11

Facilitating Implementation of ACRP Products

Research Field: Special Projects
Allocation: \$500,000

ACRP exists to develop, through research, implementable and practical solutions to solve airport industry issues and challenges. Implementation of research results may be challenging for airports, particularly those with limited staff and resources. Although implementation is a key goal for the program, ACRP has yet to undertake a formal set of activities that would lead to the implementation of its products. Research conducted by ACRP identified potential activities for the program that could provide support for airports, including training, peer exchange workshops to disseminate lessons learned, pilot demonstrations, and how-to webinars and videos. This project would serve as the platform to for

facilitating the implementation of ACRP’s products for use at airports.

The objective of this research is to develop and undertake efforts to facilitate the implementation of ACRP products in an airport setting. Activities include (a) developing guidance to help airports identify and nominate appropriate candidate products, (b) developing scopes of work and budgets for conducting the implementation activities, and (c) the actual implementation activities themselves, and related administrative activities.