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AVIATION RESEARCH

Airport Cooperative Research Program Addresses Many Needs but Could Enhance Transparency and Clarify Scope of Research Role



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Highlights of [GAO-10-729](#), a report to the Committee on Science and Technology, House of Representatives

Why GAO Did This Study

Airports are a vital part of the nation's air transportation system and face many similar challenges. In 2003, the Airport Cooperative Research Program (ACRP) was authorized to conduct applied research to help airport operators solve shared challenges that are not addressed by other federal research. As requested, this report addresses (1) the extent to which ACRP's processes reflect criteria for conducting a high-quality research program and (2) ACRP's results to date and their usefulness for the aviation community. GAO reviewed ACRP documentation and compared ACRP processes to criteria previously developed by GAO that can be applied to research programs. These criteria identify three phases of the applied research process and steps to help produce high-quality results. GAO also reviewed ACRP projects and publications and interviewed ACRP stakeholders and airport officials.

What GAO Recommends

GAO recommends that the Secretary of Transportation (1) ensure ACRP documentation reflects all participants and governance practices and (2) clarify ACRP's role in conducting security research. The Department of Transportation generally agreed with the report, provided technical comments, and is considering the recommendations. The Department of Homeland Security and the Transportation Research Board did not provide any comments on the draft report.

View [GAO-10-729](#) or [key components](#). For more information, contact Susan A. Fleming at (202) 512-2834 or flemings@gao.gov.

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What GAO Found

In each of the three phases of applied research that GAO has identified, ACRP conducts its research with processes that align with many of GAO's criteria for producing high-quality research, but some gaps exist.

- **Selecting projects:** ACRP has established a governing board, the ACRP Oversight Committee (AOC), which is composed of airport executives and other key industry stakeholders, and processes to determine the research needs of users and to select specific projects for funding. However, one organization that participates on the board—the Airport Consultants Council—and the consensus approach used to make project selection decisions are not included in the program's documented operating procedures. ACRP stakeholders commended the council's participation and the consensus approach, but their omission from documentation potentially diminishes program transparency.
- **Implementing projects:** ACRP's processes for establishing a project panel to manage research projects, selecting a researcher, and overseeing projects are well documented and include quality control steps. However, product dissemination efforts may miss some potential users, particularly staff at smaller airports and mid-level staff. The AOC has initiated a project to improve research dissemination to better serve these groups, although the project's scope and time frame is still being determined.
- **Evaluating projects and the program overall:** ACRP maintains considerable information on ongoing and completed projects that are used by program managers and the AOC to review project progress. The program, however, does not currently have a systematic process for evaluating the impact of individual projects or implementing continuous improvements to the program's overall performance. Two initiatives—the dissemination project and a project initiated to review ACRP processes—could address current gaps in project and program evaluation, though the scope and time frames of these projects are still being determined.

Through 2009, ACRP approved 169 projects, about half of which have been completed, and published 66 products on topics such as environmental impacts, policy and planning, and administration. Airport operators and other ACRP stakeholders consistently told GAO that the program provides the industry with useful and unique research that individual airports, particularly smaller airports, have neither the time nor budget to conduct. However, ACRP's role in conducting security research is unclear. ACRP materials, such as its annual solicitation of project ideas, include security as a potential topic within the scope of the program. However, the AOC has not recently funded security projects, in part because of differing views about whether ACRP should do this research. The Federal Aviation Administration, as a member of the AOC, indicated that the Department of Homeland Security is a better venue for such research. Conversely, other AOC members told GAO that ACRP could address some unmet security research needs. The AOC has the authority to determine what role, if any, is appropriate for ACRP in this area. By not doing so, over time, user satisfaction with the program could decline.

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Abbreviations

ACC	Airport Consultants Council
ACRP	Airport Cooperative Research Program
AIP	Airport Improvement Program
AOC	ACRP Oversight Committee
DHS	Department of Homeland Security
FAA	Federal Aviation Administration
MOA	Memorandum of Agreement
NASA	National Aeronautics and Space Administration
NCHRP	National Cooperative Highway Research Program
NSSA	National Safe Skies Alliance
TCRP	Transit Cooperative Research Program
TRB	Transportation Research Board
TSA	Transportation Safety Administration
Vision 100	Vision 100—A Century of Aviation Reauthorization Act

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United States Government Accountability Office
Washington, DC 20548

July 15, 2010

The Honorable Bart Gordon
Chairman
The Honorable Ralph Hall
Ranking Member
Committee on Science and Technology
House of Representatives

Airports play an important role in the nation's extensive air transportation network for both passengers and cargo, operating in a complex environment with a wide range of challenges. The 3,400 airports that make up the national integrated airport system and are eligible for Airport Improvement Program (AIP)¹ grants are a diverse group of independent entities—large and small; run by port authorities, governments, and airport commissions; located in urban and rural areas; and responsible for a mix of commercial and general aviation operations—with loose organizational connections among them. Despite this diversity, airports face similar challenges. For example, many airports have an interest in better runway pavements and many must deal with their environmental impacts, such as aircraft noise, air pollution, and deicing chemical runoff. Airports, regardless of size, are subject to federal, state, and local environmental regulations and can face significant challenges in complying with them, and airports are seeking cost-effective solutions to strengthening the security of their airfields and terminals.

Federal aviation research plays an important part in helping airports make sound decisions to address the challenges they face. The federal government spends hundreds of millions of dollars each year on aviation research—carried out by numerous federal agencies—that is focused on research, development, and technology related to the broad national aviation system, including the air traffic control system, security, alternative runway materials and designs, safety hazards, and airports, among other topics.² However, this body of research and development can

¹Inclusion in the National Plan of Integrated Airport Systems allows an airport to access AIP funds. 49 U.S.C. §§ 47103, 47105(b)(2).

²These agencies include the Federal Aviation Administration (FAA), the National Aeronautics and Space Administration (NASA), the Department of Defense, the Department of Homeland Security (DHS), and others.

overlook some important applied research topics that can help airport operators improve the safety, capacity, and efficiency of their facilities. Such research can be too expensive for one airport to fund by itself, particularly if multiple topics need to be addressed. To address this problem, the Airport Cooperative Research Program (ACRP) pilot program was authorized in 2003 as part of the Vision 100—A Century of Aviation Reauthorization Act (Vision 100) to carry out applied research on problems shared by airport operators.³ ACRP is sponsored by the Federal Aviation Administration (FAA) and managed by the Transportation Research Board (TRB), a unit of the National Research Council within the National Academy of Sciences, through a joint management agreement that went into effect in 2005.⁴ The program began publishing the results of its research in 2007. As you requested, we have reviewed the progress ACRP has made in addressing airports' research needs, focusing on the following questions: (1) To what extent does ACRP have processes in place that reflect established criteria for conducting a high-quality research program? (2) What are ACRP's results to date—including research studies, practical applications, and other results—and how useful have these results been for the aviation community? Additionally, at your request, we have described, in the background of the report, the implementation of ACRP relative to the requirements outlined in its authorizing legislation.

To assess ACRP's research processes, we compared ACRP's research processes to criteria—developed in previous GAO work—for managing information technology investments.⁵ The criteria, which can be applied to research programs with some adaptation, contain critical processes for selecting investments, implementing projects, and evaluating program

³Pub.L. No. 108-176, § 712, 117 Stat. 2490, 2586 (2003), codified at 49 U.S.C. § 44511(f).

⁴The National Research Council's mission is to improve government decision making and public policy, increase public education and understanding, and promote the acquisition and dissemination of knowledge in matters involving science, engineering, technology, and health. The Transportation Research Board—which is a division of the National Research Council—promotes innovation in transportation through research.

⁵GAO, *Executive Guide: Information Technology Investment Management: A Framework for Assessing and Improving Process Maturity*, [GAO-04-394G](#) (Washington, D.C.: March 2004).

performance.⁶ To determine the extent to which ACRP's processes align with these criteria, and to identify gaps and potential actions to address those gaps, we analyzed ACRP's program documentation and, as needed, we interviewed ACRP officials. To describe ACRP's results to date and determine how useful those results have been to airports, we reviewed ACRP's published reports and other program documentation and interviewed a wide range of officials to obtain a diversity of perspectives on the program. These interviews included FAA and TRB officials responsible for managing the program; selected industry and airport officials involved in program oversight and direction; and other airport officials who are the intended users of ACRP but who do not have vested interests in managing the program. These officials were judgmentally selected to provide a range of views, including those of small and large airports, various staff levels, and different topical areas of responsibility. The results of these interviews should not be generalized to each of the groups the officials represent or to all users of ACRP. Finally, we interviewed officials from the Science and Technology Directorate within the Department of Homeland Security to understand the extent to which its research activities address the needs of airports in the security area. We conducted this performance audit from August 2009 to July 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives. See appendix I for more information on our scope and methodology and appendix II for further details on the criteria we used to assess ACRP's processes.

Background

In 2003, ACRP was authorized as a pilot program in Vision 100 to address problems shared by airport operators that could be solved through applied, cooperative research and were not addressed by other federal research programs. ACRP has continued to function under short-term extensions of FAA's authorizing legislation, and as called for in Vision 100,

⁶To adapt the information technology framework as criteria for assessing ACRP processes, we (1) simplified it to focus on the most critical processes, rather than on organizational maturity which was extensively addressed in the original framework; (2) changed the terminology to refer to applied research, rather than information technology; and (3) added criteria on product dissemination that we determined are important to research, but are not in the original framework.

in 2008 the Secretary of Transportation transmitted to Congress a report on ACRP that included a recommendation for the program to be made permanent.⁷ ACRP addresses the shared research needs of a large and diverse target audience of 3,400 airports located across the country, including approximately 600 commercial-service airports and 2,800 smaller general aviation airports. Congress has appropriated a total of \$59.9 million for ACRP for fiscal years 2006 through 2010.⁸ Beginning in fiscal year 2009, Congress increased the program's annual appropriation from \$10 million to \$15 million, and FAA designated the additional funds primarily for research related to airport environmental issues.

ACRP's structure and many of its operating procedures were established in 2005 in a Memorandum of Agreement (MOA), as required in Vision 100, between the Department of Transportation, FAA, and the National Academy of Sciences, operating through TRB. Under this agreement, TRB is responsible for managing ACRP and overseeing the program's daily operations. The structure of the program was largely modeled after other cooperative research programs managed by TRB, such as the National Cooperative Highway Research Program (NCHRP) and the Transit Cooperative Research Program (TCRP).⁹

Vision 100 stipulates that the Secretary of Transportation appoint an independent governing board for ACRP. The MOA designates that the ACRP Oversight Committee (AOC) will function as the program's governing board and specifies the initial size and composition of the AOC. In 2005, the Secretary appointed 13 voting members to the board drawn from a diverse cross section of the airport industry. The AOC includes representatives of a variety of perspectives within the airport industry,

⁷Federal Aviation Administration, *Airport Cooperative Research Program, 2005-2007: Report of the Secretary of Transportation to the United States Congress* (Washington, D.C., June 1, 2008). In addition, the proposed FAA reauthorization bill would make the program permanent. Aviation Safety and Investment Act of 2010, H.R. 1586, § 907, 111th Cong. (2009).

⁸In fiscal year 2005, FAA used \$3 million from its Facilities and Equipment Account to fund ACRP, as requested by H.R. Rep. No. 108-671 (2004). Since fiscal year 2006, ACRP appropriations have been drawn from FAA's Airport Improvement Program funds.

⁹TRB has a long history of administering industry-driven cooperative research programs focused on different transportation sectors, having managed NCHRP since 1962 and TCRP since 1992. TRB also began administering the National Cooperative Freight Research Program and the Hazardous Materials Cooperative Research Program in 2006, after ACRP was established. A cooperative research program for rail is currently being established.

including airport executives and senior management officials from airports of different sizes; senior officials from FAA and the National Safe Skies Alliance (NSSA); and industry consultants and academics. Additionally, the MOA identifies seven nonvoting ex-officio members to serve on the AOC. The nonvoting ex-officio members represent four national associations, TRB, and two other federal agencies.¹⁰ The AOC's responsibilities include (1) prioritizing research needs identified through problem statements solicited from airport operators and others in the industry, (2) selecting research projects to address those needs, and (3) evaluating program effectiveness.

The responsibility for implementing projects selected by the AOC is handled by project panels and TRB staff assigned to the program. Project panels are appointed by TRB from nominations solicited from airports, universities, consultants, and airport associations. Panels generally consist of airport practitioners and other individuals with expertise in the subject area of the project. Panel responsibilities include (1) finalizing the scope of the project; (2) developing Requests for Proposals and selecting a researcher, often a consultant, to perform the work; (3) providing project oversight while the research is performed; and (4) reviewing interim reports and draft products. TRB staff assist the project panels in all of these tasks, perform many of the day-to-day functions required for managing the research projects, and are responsible for the final editing and production of ACRP reports.

Most federal aviation research is done outside of ACRP by a variety of federal agencies. FAA conducts research, evaluation, and development in a number of areas related to the national air transportation system, including the air traffic control system, pavement design and runway surface technologies, and other topics related to airports and aviation. The Aeronautics Research Mission Directorate in NASA performs fundamental aeronautical research in areas such as propulsion. NSSA, a nonprofit organization jointly funded by FAA and the Department of Homeland Security (DHS), conducts testing and evaluation of airport security technologies. DHS conducts research on a wide variety of security topics,

¹⁰The four national associations are the Air Transport Association, Airports Council International—North America, American Association of Airport Executives, and National Association of State Aviation Officials. The Administrator of NASA is identified as one of the AOC's ex-officio members in the MOA, but to date, NASA has not actively participated on the AOC. The Environmental Protection Agency is also listed as an ex-officio member and has participated on the AOC.

including passenger and baggage screening at airports, and the Department of Defense conducts research on topics relevant to military needs, a few of which have applications in civil aviation. TRB staff and FAA representatives work with the AOC to help prevent ACRP's research from duplicating any of these other efforts.

ACRP Has Many Processes in Place Aimed at Conducting High-Quality Research and Is Taking Steps to Help Address Gaps in Dissemination and Evaluation, but Program Documentation Does Not Reflect Some Practices

ACRP has implemented many practices and procedures that help to assure the production of high-quality applied research, but gaps exist in some areas of its research processes. Specifically, ACRP's selection processes include steps to identify research needs and evaluate potential projects, but the program's documented operating procedures do not include one current participant on the AOC or accurately reflect the enhanced role of ex-officio members in project selection decisions. In addition, ACRP has established well-documented policies for managing, overseeing, and reviewing research projects, and TRB maintains considerable information about the program's projects to assist ACRP decision makers. However, ACRP's dissemination practices may not reach all potential users of the program's research, and the program does not have systematic processes in place to evaluate its overall performance, although the AOC has recently approved two special projects to examine how to address these gaps.

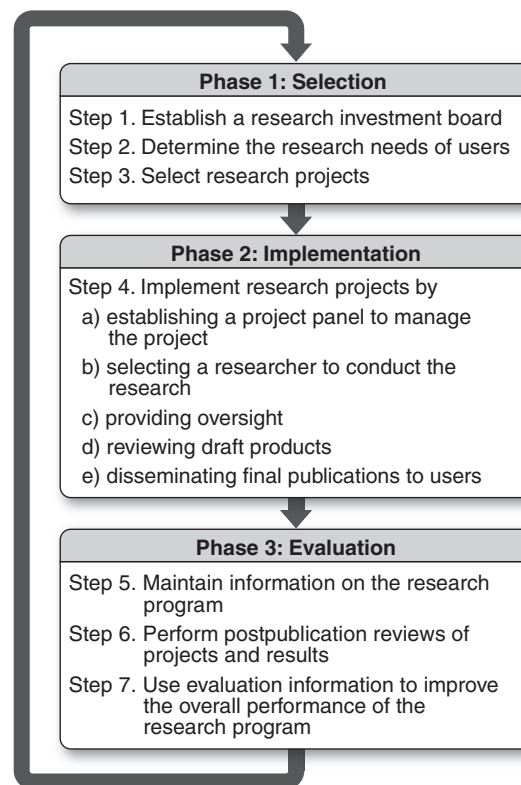
Including Certain Practices and Procedures in Research Processes Can Help Applied Research Programs Produce High-Quality Research

Applied research programs can help assure, though not guarantee, the production of high-quality research by establishing certain procedures and adhering to certain practices in their research processes. We identified these procedures and practices by adapting criteria that we previously developed for managing information technology investments to provide guidance for applied research programs.¹¹ We applied the adapted criteria to ACRP's research processes (see appendix II for additional details about the criteria we applied to ACRP). These criteria identify three key phases of the applied research process—selection, implementation, and evaluation—that encompass seven general steps and a number of specific practices needed to conduct applied research. These steps represent the key actions that programs should take within each phase of the applied research process (such as determining research needs, selecting and

¹¹See [GAO-04-394G](#).

implementing research projects, monitoring results, and improving program performance) to support the production of high-quality research. Figure 1 presents these seven steps within the three phases of the applied research process.

Figure 1: Summary of Phases and Steps in Applied Research Process



Source: GAO.

Within each of these seven steps there are a wide variety of specific practices that collectively contribute to a program's overall ability to conduct high-quality research. The extent to which ACRP has procedures and practices in place that help to assure high-quality research is summarized below for each phase of the applied research process.

Many ACRP Research Selection Processes Include Practices to Assure High Quality, but Some Beneficial Program Practices Are Not Reflected in Documentation

ACRP’s processes to establish the AOC, determine research needs, and select research projects include many of the practices that help assure high-quality work, but the program’s documentation does not accurately reflect some practices followed during the Selection phase (see table 1).

Table 1: Comparison of ACRP’s Selection Processes to GAO’s Criteria for a High-Quality Research Program

Phase 1: Selection	Key strengths in ACRP’s processes	Key gaps in ACRP’s processes
Step 1. Establish a research investment board	<ul style="list-style-type: none"> The AOC is composed of individuals from the airport industry who are responsible for making project selection decisions 	<ul style="list-style-type: none"> Program documentation does not include one group that participates on the AOC
Step 2. Determine the research needs of users	<ul style="list-style-type: none"> Research needs are identified and research topics are organized through a systematic process 	<ul style="list-style-type: none"> None
Step 3. Select research projects for investment	<ul style="list-style-type: none"> Potential research projects are evaluated and prioritized following documented policies 	<ul style="list-style-type: none"> Program documentation does not accurately reflect the enhanced role of the AOC’s ex-officio representatives, who are allowed to participate in project selection decisions through a consensus-driven decision-making approach Potential security research projects may not be selected for reasons discussed later in the report

Source: GAO analysis of FAA and TRB documentation and interviews with ACRP stakeholders.

As required in Vision 100, the AOC was established to govern ACRP and select research projects. The MOA established the initial size, composition, and role of the AOC, but the Secretary of Transportation is responsible for appointing individual members to the board and is authorized by the MOA to adjust the size of the AOC, including the number of voting and nonvoting ex-officio members. Most significantly, the AOC is responsible for making project selection decisions, and its 13 voting members include airport executives and other individuals connected to the airport industry who collectively contribute a variety of perspectives and expertise to the board’s operations. As a result, several AOC members stated that they

consider the board to be a proxy for the diverse membership of the airport industry.

However, the program's documented operating procedures do not reflect the involvement of the Airport Consultants Council (ACC) on the AOC, which reduces the transparency of the board's operations and could potentially jeopardize the group's continued participation. As previously discussed, the MOA specifies that certain national associations and federal agencies serve as nonvoting ex-officio members on the board. In practice, however, ACC, which was not identified in the MOA, has also been invited to participate on the AOC. Unlike other prominent industry associations that were involved during the establishment of ACRP and now serve as ex-officio members on the board, ACC was not involved during the program's establishment and was not included on the AOC. Instead, after the program was established and operating, the AOC, TRB, and FAA decided that the program would benefit from ACC's participation due to its role representing airport consultants, the entities that perform much of ACRP's research. In lieu of formally including ACC as an ex-officio member, program officials and FAA have allowed the group to participate informally on the AOC, in effect, largely treating ACC as an ex-officio member. Several AOC members we spoke with described ACC's contributions as beneficial to the board. As a result of ACC not being designated as an ex-officio member in the MOA or other program documentation, the transparency of the AOC's operations is diminished and ACC's continued participation on the AOC is not guaranteed. According to a senior FAA official, the FAA Administrator has initiated action to formalize ACC's membership on the AOC by sending a memorandum to the Secretary of Transportation in April 2010 recommending the Secretary appoint ACC as a nonvoting ex-officio member on the AOC. As of July 7, 2010, FAA reported that this nomination was under consideration by the Secretary. FAA officials told us that they do not plan to revise the MOA to reflect this change, should the Secretary of Transportation approve it, because Vision 100 provided the Secretary with broad authority to appoint new members to the board, and in their view, no further steps are required to document any new members in the MOA. Additionally, FAA officials pointed out that because the MOA expressly authorizes the Secretary to adjust the size of the AOC, the Secretary may appoint an additional nonvoting ex-officio member without amending the MOA. Furthermore, officials stated that if the Secretary approves ACC's nomination to the board, a signed appointment letter from the Secretary would formalize ACC's participation as a nonvoting ex-officio member and help to improve the transparency of the board's operations. However, without also revising the MOA to reflect this

appointment, the transparency of the program's documented operating procedures would remain diminished because the ACC would be the only ex-officio member not expressly identified in the MOA.

Determining the research needs of users is necessary to select and conduct useful research, and ACRP has taken various steps to identify and organize topics in need of research. For example, ACRP opens its annual solicitation of problem statements to all airport operators and other industry stakeholders to help identify specific current research needs. The AOC ultimately decides which problem statements should be approved for funding, but the process of soliciting problem statements helps the AOC remain aware of the current research needs confronting airport operators.¹² Additionally, in 2008, ACRP convened focus groups and workshops with airport industry stakeholders and industry groups to help identify and organize research topics and critical issue areas viewed as important to the airport industry. The results of this effort included, among others, (1) the identification of 58 current and emerging topics for potential research that were organized into 10 critical issue areas,¹³ and (2) the inclusion of a strategic emphasis area in subsequent problem statement solicitations to encourage submissions targeting particular subjects of interest identified by the AOC, such as airport maintenance and operations for the fiscal year 2011 submissions.¹⁴

The program's project selection process also follows a systematic approach to evaluate and prioritize potential research projects. For example, multiple groups of knowledgeable individuals prescreen the problem statements by evaluating and providing written feedback on the submissions in advance of being reviewed by the AOC. Subsequently, AOC members prioritize the problem statements using an online survey, based on their view of a project's importance and the input provided by the

¹²As part of its project selection responsibilities, the AOC decides whether to fund ACRP's synthesis and legal research subprograms, but it generally does not approve specific projects to be covered in these subprograms. Instead, individual synthesis and legal research projects are typically identified and approved by separate panels established to oversee each of the subprograms.

¹³Transportation Research Board, *Current and Emerging Issues Facing the Airport Industry*, ACRP Research Results Digest 5 (Washington, D.C., January 2009) presents the 58 topics for potential research, 10 critical issue areas, and recommendations for identifying targeted focus areas in problem statement solicitations.

¹⁴Previous emphasis areas have included information technology for fiscal year 2009 and future finance and business strategies for fiscal year 2010.

various prescreening groups. The results of this survey are used to determine the order of the agenda for considering and selecting projects at the AOC's annual summer meeting. Several AOC members told us that this project prioritization procedure works reasonably well in helping the board select projects to serve the research needs of airports, although some AOC members reported that reviewing all of the problem statements—ACRP received 219 problem statement submissions for fiscal year 2010—is a time-intensive process.

ACRP's documented operating procedures do not reflect the AOC's current consensus-driven approach to selecting projects, which several AOC members praised. The MOA states that the AOC should reach project selection decisions through the affirmative vote of a majority of the board's voting members. In practice, the AOC makes decisions on the basis of consensus among its members, which essentially gives nonvoting ex-officio members (and the ACC) the same role as the formal voting members in project selection.¹⁵ Several AOC members complimented the use of this consensus approach, and the ACRP program manager said it would be detrimental to not include the views of ex-officio members in the selection process, noting that consensus decision making is fundamental to TRB's research process. Additionally, one AOC member expressed appreciation for the input provided by ex-officio members during project selection discussions, and other board members highlighted the effectiveness with which the AOC Chair facilitates the board's operations using the consensus approach. However, the transparency of ACRP's project selection processes is diminished since the program's documentation does not reflect the AOC's consensus-based decision-making approach, which enhances the role of ex-officio members.

¹⁵Ex-officio members on the AOC explicitly represent the views of their respective organizations. It is not clear what impact, if any, their role in decisions reached through consensus has on the board's independence, which is a Vision 100 requirement, because no clear guidance or legislative history is available to conclusively determine the meaning of an independent governing board in the context of ACRP.

ACRP’s Processes for Implementing Projects Help Produce High-Quality Research, but Product Dissemination May Miss Some Potential Users

ACRP’s policies and procedures for managing, overseeing, and reviewing research projects include many of the processes needed to produce high-quality research, but current product dissemination techniques may miss some potential users of ACRP’s research in the airport industry (see table 2).

Table 2: Comparison of ACRP’s Implementation Processes to GAO’s Criteria for a High-Quality Research Program

Phase 2: Implementation	Key strengths in ACRP’s processes	Key gaps in ACRP’s processes
Step 4. Implement research projects by a) establishing a project panel to manage the project b) selecting a researcher to conduct the research c) providing oversight d) reviewing draft products e) disseminating final publications to users	<ul style="list-style-type: none"> ACRP follows documented policies and procedures for establishing project panels to manage research projects ACRP follows documented policies and procedures to select and provide oversight of researchers conducting ACRP projects ACRP’s quality control process includes reviews of draft products by project panels 	<ul style="list-style-type: none"> ACRP’s current product dissemination mechanisms may miss some potential users of the program’s research. However, ACRP officials initiated a special project in July 2009 to improve their dissemination processes, increase ACRP’s awareness among airport practitioners, and improve feedback from users of ACRP products. The details of this project are still under development.^a

Source: GAO analysis of FAA and TRB documentation and interviews with ACRP stakeholders.

^aACRP Project #11-05, *Dissemination of ACRP Research Results*.

ACRP follows well-documented policies for establishing project panels to manage research projects, selecting and providing oversight of researchers, and reviewing draft products prior to publication. Project panels are assembled by TRB and generally consist of six to eight members selected from the airport industry, government, academia, and elsewhere to provide subject-area expertise and guidance to a project. Several AOC members we spoke with stated that TRB did a good job putting panels together, but one member expressed a need for greater transparency in how TRB forms panels to better assure the AOC that all of the needed perspectives are well represented and reflected in the final report. Once established, the panels work closely with TRB staff in many aspects of project management and oversight. For example, project panels are responsible for developing Requests for Proposals, selecting

contractors to perform the research, and reviewing interim reports and draft products prepared by the contractor before approving final reports for publication. External review of ACRP's products is rare, but occasionally panels have held workshops or distributed surveys about an ongoing project to participants at industry conferences. As part of the program's quality control process, after the project panel approves the final content of a report, TRB's editorial staff edits the text and manages final publication. One board member we spoke with noted that the program's research processes contain practices for ensuring quality that, while lengthy at times, are important for the success of the program. Overall, several AOC members told us that the program's project management and oversight processes function well, and some members stated that it would not be feasible or beneficial for the AOC to assume a more direct role in project oversight. Likewise, the airport operators we spoke with who have also served on ACRP project panels generally spoke highly of their experience, and several AOC members praised the ability of the panels and TRB staff to effectively oversee ACRP's research projects.

ACRP disseminates its publications through a variety of mechanisms, but its current methods may not effectively reach some potential users of the program's research. Practices used to disseminate ACRP's reports include

- providing publications for free download on the TRB Web site;¹⁶
- including notices about new ACRP products in TRB newsletters;
- enabling people to sign up to receive electronic notification of new ACRP publications;
- automatically notifying recipients of FAA's electronic mailing list when ACRP reports are posted on the FAA Web site;
- distributing reports at industry meetings and conferences; and
- working with various airport industry associations to promote ACRP publications through the associations' established distribution systems.

Although these dissemination mechanisms target many airport operators and other potential users of ACRP's research, several airport officials

¹⁶ACRP publications are available at <http://www.trb.org/Publications/PubsACRPPublications.aspx>.

expressed concern that they may not effectively reach some segments of the airport industry that could benefit from the program's research. Many of the airport officials and AOC members we spoke with stated that ACRP's visibility within the industry has increased over time, but some expressed concerns that awareness of the program was lower among some groups of airport operators than others. In particular, some airport officials and AOC members suggested that smaller airports and mid-level staff throughout the industry may be less familiar with the program's research than large airports or senior staff and managers. Various airport officials, AOC members, and TRB staff with whom we spoke noted that staff from smaller airports and mid-level staff are often less likely to be involved in national associations and attend fewer national conferences than staff from larger airports and high-level staff and managers. Some senior-level officials mentioned that they make an effort to share ACRP reports with their staff, but it is not clear how widely this practice is replicated by other airport executives and managers in the industry. As a result, smaller airports and mid-level airport staff may be less likely to be among the direct recipients of ACRP's product dissemination efforts. Maintaining an ACRP presence at industry conferences was viewed by several airport officials and AOC members as an important promotional tool for the program, and one official suggested that participating in smaller regional conferences could help ACRP connect with more officials from smaller airports. Several airport officials also stressed the importance of electronic publication of ACRP products, and one official emphasized that an easily accessible and well organized online library of ACRP resources is important for users, particularly as the program issues more reports.

In recognition of some of these gaps in ACRP's dissemination practices, the AOC approved a special project in July 2009 to (1) develop and implement a strategic dissemination process and (2) increase awareness of ACRP among airport practitioners.¹⁷ Although the specific details and overall time frame of this project are under development, the potential scope of work for this project might include an examination of practices, used both within and outside the airport industry, for disseminating and implementing research findings to determine their applicability to ACRP. Whereas most ACRP projects are concluded after a report is published, this special project may develop into an ongoing internal effort by the

¹⁷Transportation Research Board, *Dissemination of ACRP Research Results*, ACRP Project #11-05 (ongoing).

program to continually evaluate and revise ACRP's dissemination practices as the program advances into the future. Given the early stage of this project, it is not yet clear to what extent small airport staff or mid-level staff will be targeted, but some ideas being considered may serve these groups. For example, TRB staff are considering methods for presenting ACRP research results at industry conferences that TRB staff are unable to attend. TRB staff told us that they expect to present some initial results from these efforts to the AOC in July 2010, with additional dissemination initiatives anticipated to begin under this project later in 2010.

TRB Maintains Considerable Information on ACRP's Projects, but the Program Is Still in the Early Stages of Evaluating Project Results and Assessing Program Performance

TRB maintains considerable information about ACRP's completed and ongoing research projects to support management decisions, but ACRP is in the initial stages of evaluating project results and the program's overall performance (see table 3).

Table 3: Comparison of ACRP's Evaluation Processes to GAO's Criteria for a High-Quality Research Program

Phase 3: Evaluation	Key strengths in ACRP's processes	Key gaps in ACRP's processes
Step 5. Maintain information on the research program	<ul style="list-style-type: none"> Information about research projects is identified and collected following documented procedures The collected information is easily accessible and understandable to the program's decision makers 	None
Step 6. Perform postpublication reviews of projects and results	<ul style="list-style-type: none"> Project panel members are surveyed about their experience at the conclusion of a project and program officials have obtained some anecdotal information from users of the research. The AOC approved two special ACRP projects in July 2009 to explore, among other things, options for conducting postpublication reviews and assessing project results from the perspective of users.^a 	<ul style="list-style-type: none"> ACRP does not have a formal process for reviewing the results of its research projects and it does not have a systematic process for obtaining feedback from users of the research about ACRP products. The two special ACRP projects initiated in July 2009 are taking steps to help address these gaps, although the specific details of the projects have not been finalized.

Phase 3: Evaluation	Key strengths in ACRP's processes	Key gaps in ACRP's processes
Step 7. Use evaluation information to improve the overall performance of the research program	<ul style="list-style-type: none"> According to TRB officials and preliminary project documentation, the two special projects approved by the AOC in July 2009 may include, among other things, (1) an evaluation of ACRP's impact and usefulness to airport operators and (2) a review of ACRP's processes and examination of ways to improve ACRP's performance.^a 	<ul style="list-style-type: none"> ACRP has not yet developed a process to systematically evaluate the program, ascertain how its publications are used by the airport industry, or obtain systematic feedback from users on how the program can be improved. The two special projects initiated in July 2009 are taking steps to help address these gaps, although the specific details of the projects have not been finalized.

Source: GAO analysis of FAA and TRB documentation and interviews with ACRP stakeholders.

^aThese options are being explored as part of ACRP Project #11-05, *Dissemination of ACRP Research Results* and ACRP Project #11-06, *Evaluating ACRP Processes*.

TRB maintains an internal database that includes considerable information—such as contract costs, staffing, and timeline data—collected on ACRP's completed and ongoing research projects. TRB provides summaries of this information to the AOC at its semiannual meetings, and shares other information as needed with program stakeholders to help them monitor project performance. Additionally, TRB prepares quarterly progress reports outlining program activities for each project. Several AOC members told us they generally receive the right amount of information from TRB staff to fulfill their responsibilities on the board, and some members commented that any additional information they need about a project is readily available upon request.

However, ACRP does not have policies in place to systematically review completed projects, assess project results from the perspective of the research users, or to evaluate the overall performance of its research portfolio, but the AOC recently approved two special projects that may begin to address these gaps. Evaluating program performance and reviewing the results of individual projects are necessary to gauge user satisfaction, and high-quality research programs should analyze the results of these reviews to identify areas for improvement and implement changes to the program's processes. Although ACRP has not systematically performed these evaluative steps, the program has developed a survey for project panel members to solicit information about their experiences upon

the completion of a project, and board members have received some informal anecdotal feedback from airport operators about the program. Additionally, in April 2010, ACRP added a feature to its Web site to allow airport operators to describe how they have used ACRP's publications. To date, this effort has resulted in the submission of more than one dozen examples of how ACRP publications have been used by members of the airport industry. FAA and TRB officials stated that in the early years of the program, too few projects had been completed to conduct extensive program evaluation, but now they believe that ACRP has grown to the point where evaluating the program's results and overall performance would be appropriate. Consequently, in July 2009, the AOC approved two special projects that, among other goals, are intended to evaluate ACRP's processes and improve the program's performance and usefulness to airport operators.¹⁸ Initial recommendations and ideas for the scope of work of these projects include several tasks that align with practices for program evaluation in a high-quality research program. These initial recommendations and ideas include the following:

- Conducting an internal program evaluation of key elements of ACRP's process.
- Developing outcome measures and collecting additional program information to benchmark ACRP's performance against the performance of NCHRP and TCRP.
- Examining the processes followed by NCHRP and TCRP in several important areas, including methods used by these programs to evaluate program performance. These programs have already addressed some of the same evaluative questions being looked at by the AOC, and ACRP may be able to learn from practices adopted by the other cooperative research programs to improve its own evaluation processes.¹⁹
- Assessing the value and usefulness of publications to the research user community through readership surveys or other means.

¹⁸Transportation Research Board, *Evaluating ACRP Processes*, ACRP Project #11-06 (ongoing) and Transportation Research Board, *Dissemination of ACRP Research Results*, ACRP Project #11-05 (ongoing).

¹⁹For example, TCRP occasionally surveys its user community to learn how its research results have been used and to gauge satisfaction with TCRP's products, whereas NCHRP surveys past project panel members every few years to discover what they have heard about ways in which the projects they worked on have been used by their peers.

Initial results from some of these tasks are expected to be presented to the AOC in July 2010, including findings from workshops with AOC members convened to examine ACRP's processes, and the results from comparing ACRP to NCHRP and TCRP for selected performance metrics. Although the scope and time frames of these projects are still under development, these continued efforts, including solicitation of actionable feedback from users of the research about specific projects and the program's overall performance, could help address gaps in ACRP's current project and program evaluation.

ACRP's Products Are Generally Well Regarded, but Its Role in Security Research Is Unclear

ACRP Has Produced a Wide Range of Products That Are Generally Well Regarded by Selected Airport Officials and ACRP Stakeholders

From January 2006 through December 2009, ACRP approved 169 projects for funding, completed approximately half of those projects, and published 66 products, covering a wide range of topics.²⁰ Once approved, most projects are organized into topical categories, as shown in table 4. According to the ACRP program manager, projects are assigned to a single category based on the main topic area for research, though some projects address multiple topic areas.

²⁰Some projects have resulted in more than one product, such as a published report and a Web-only supplement. For a current list of ACRP's projects, including published reports, see <http://www.trb.org/ACRP/ACRPProjects.aspx>.

Table 4: ACRP Projects Organized by Research Topic (Calendar Years 2005 through 2009)

Research field	Projects
Environment	34
Policy and planning	28
Administration	20
Operations	15
Safety	14
Design	7
Human resources	3
Maintenance	3
Construction	2
Security	1
Other projects ^a	42
Total projects^b	169

Source: GAO analysis of TRB data.

^aIncludes legal research projects and quick response studies to address special needs.

^bTable shows completed and ongoing projects approved as of December 31, 2009.

Since ACRP began publishing products in 2007, the program has increased the diversity of product types and the number of in-depth reports published. ACRP products include a variety of different publication types, including project reports, such as guides on airport strategic planning or environmental performance; synthesis reports that summarize already available information; research results digests that offer quick summaries on topics; legal research digests that summarize case law and other legal research; and Web-only documents that typically augment other published products (see table 5). Project reports tend to take longer to complete than other products and result in more detailed, substantive publications. ACRP products have targeted the needs of various airports and user groups. For example, ACRP has published a guide for managing small airports that focuses specifically on the needs of small airports.²¹ Some products benefit only those airports that operate in certain conditions, such as ACRP products on aircraft deicing, which target airports in

²¹James H. Grothaus, Thomas J. Helms, Shaun Germolus, Dave Beaver, Kevin Carlson, Tim Callister, Robert Kunkel, and Ann Johnson, *ACRP Report 16: Guidebook for Managing Small Airports*, for the Transportation Research Board of the National Academies (Washington, D.C.: Airport Cooperative Research Program, 2009).

geographic regions that operate in winter conditions where icing is a concern. Other products—such as the recently completed airport strategic planning guide—address issues faced by all airports.²²

Table 5: ACRP Publications Have Increased in Number and Type from 2007 through 2009

Type of publication	2007	2008	2009
Project reports (guides and other in-depth studies)	1	9	16
Synthesis reports (summarize already available information)	4	8	5
Research results digests (offer quick summaries of research results)	3	0	4
Legal research digests (summarize case law, airport regulations, and other legal research)	0	4	4
Web-only documents (supplement other publications)	0	0	8
Total publications	8	21	37

Source: GAO analysis of TRB data.

This increase in products is due to several factors. First, the program received a steadily increasing number of research proposals, from 68 for consideration for fiscal year 2007 to 219 for fiscal year 2010. Second, recent funding increases enabled the program to fund 30 projects in 2010, up from 23 in 2007. Finally, the AOC has approved projects faster than work has been completed. Specifically, while some projects can take more than 2 years to complete, the AOC approves most projects on an annual basis. Due to all of these factors, officials familiar with ACRP expect a large body of work, particularly in-depth reports, to be issued in 2010 and 2011 that will greatly increase the breadth and depth of ACRP’s library of research.

ACRP has generally produced high-quality and useful products, according to all 10 airport officials with whom we spoke. Officials generally indicated that ACRP products are consistently high quality, provide an appropriate level of detail for a given topic and audience, place an issue within its overall context, and explain the methodology used to reach its conclusions. For example, one official commented that ACRP’s two

²²Ricondo & Associates, Inc., Booz Allen Hamilton, Inc., George Mason University, and National Service Research, *ACRP Report 20: Strategic Planning in the Airport Industry*, for the Transportation Research Board of the National Academies (Washington, D.C.: Airport Cooperative Research Program, 2009).

reports on safety management systems clearly explained the principles of a safety approach and how it might change operations.²³ Officials also commended ACRP products for the number of different ways they could be used. For example, two officials noted that ACRP reports have provided reassurance that the practices used at their airport are consistent with industry practices. Other ACRP reports have been used to help educate airport staff, elected officials, and airport board members about issues facing airports. ACRP reports have also helped airports understand the implications of new regulations or proposals. For example, multiple officials mentioned that the ACRP review of airport rescue and firefighting standards was a valuable tool in understanding the cost and staffing implications of a proposed regulatory change.²⁴ Officials offered few specific examples of ACRP reports having a quantifiable financial impact on airport practices, but some indicated that ACRP products have shaped their approach to issues with financial implications. For example, officials at two airports mentioned that an ACRP report informed their strategy for managing parking facilities—an important revenue source for airports.²⁵ One of these officials explained that the ACRP report helped him ask detailed, probing questions of vendors when considering options for a capital project—without first hiring a consultant—and likely saved the airport money. See appendix III for additional comments on ACRP provided by airport officials.

²³Duane A. Ludwig, Cheryl R. Andrews, Nienke R. Jester-ten Veen, and Charlotte Laqui, *ACRP Report 1: Safety Management Systems for Airports, Volume 1: Overview*, for the Transportation Research Board of the National Academies (Washington, D.C.: Airport Cooperative Research Program, 2007) and Manuel Ayres Jr., Hamid Shirazi, Samuel Cardoso, Jeffrey Brown, Richard Speir, Olga Selezneva, Jim Hall, Tara Puzin, Jeff Lafortune, Fernando Caparroz, Robert Ryan, and Edward McCall, *ACRP Report 1: Safety Management Systems for Airports, Volume 2: Guidebook*, for the Transportation Research Board of the National Academies (Washington, D.C.: Airport Cooperative Research Program, 2009).

²⁴Richard Golaszewski, Gregson Helledy, Benedict Castellano, and Robert E. David, *ACRP Web-only Document 7: How Proposed ARFF Standards Would Impact Airports*, for the Transportation Research Board of the National Academies (Washington, D.C.: Airport Cooperative Research Program, June 17, 2009). ACRP conducted this project to assess the impact on airports of more closely aligning airport rescue and firefighting regulations with certain National Fire Protection Association standards or International Civil Aviation Organization firefighting standards

²⁵Jacobs Consultancy, Walker Parking Consultants, Mannix Group, and DMR Consulting, *ACRP Report 24: Guidebook for Evaluating Airport Parking Strategies and Supporting Technologies*, for the Transportation Research Board of the National Academies (Washington, D.C.: Airport Cooperative Research Program, 2009).

Airport officials told us that ACRP provides airports with a unique source for research that airports have neither the time nor budget to fund individually, noting that the program's research can be particularly useful to small airports. One official commented that information from industry groups and peers—which airport operators typically rely on—may not be as in-depth as an ACRP report. Officials also commented that while large and small airports can benefit from ACRP's research, small airports might benefit more than larger airports because small airports tend to have fewer staff with experience in technical subjects. Officials said they expect the program to become increasingly useful as more products are released, and they commented that many ACRP reports are likely to remain relevant and applicable for multiple years, so they could find themselves using the reports in the future as issues arise at their airports.

ACRP stakeholders—FAA, industry groups, and AOC members—have also generally been pleased with the work ACRP has produced to date. FAA officials told us that the program has strongly met the agency's expectations, finding the work produced to be well done and useful to the agency and the industry. For example, according to FAA officials familiar with ACRP, FAA environmental staff will sometimes refer to ACRP products when developing advisory circulars or other guidance. Most of the industry groups involved with the AOC—namely the nonvoting ex-officio members of the board and the ACC—also indicated that the program is generally doing a good job meeting the needs of the airport industry. One group that regularly holds training seminars for its members now uses some ACRP products as part of its course materials, and another group that serves state government officials that have airport management responsibilities, including small airports, has found ACRP to be a helpful resource for its membership. The AOC voting members we spoke with also find the program is producing work that benefits industry practitioners. For example, one board member explained that ACRP's research can be particularly helpful to officials at small airports, such as his own, helping them keep up with federal requirements and providing new information on issues they may not otherwise have the resources to address. Lastly, ACRP stakeholders agreed that the program also provides some intangible benefits to the airport industry. For example, serving on an ACRP project panel can help build the technical expertise and professional networks of the participants, and ACRP's graduate student award program aids future workforce development by encouraging student interest and expertise in airport-related issues.

ACRP's Role in Conducting Security Research Projects Is Unclear

ACRP includes security as within the scope of its designated research topics in program materials—such as its annual report, Web site, and annual solicitation for research project ideas—but to date, the program generally has not conducted security research. Airport operators have direct responsibility for day-to-day airport operations, including the security of airport perimeters, access controls, and workers, as well as implementing Transportation Security Administration (TSA) security requirements.²⁶ To the extent that airports share research needs in these areas that are not adequately addressed by other federal research, ACRP's pursuit of this research would be consistent with the broad authority provided to the program in Vision 100, the legislation that authorized ACRP. Airport and AOC officials we interviewed, including two airport officials directly responsible for security, consistently told us that the security of airport operations is a shared concern for airports and that applied research could be beneficial in addressing this concern. For example, those officials told us that research could help airports

- coordinate airports' terminal design and layout decisions with new baggage and passenger security screening requirements and technologies to ensure smooth passenger flows in terminals, and
- implement new strategies for securely managing the delivery of supplies to concessionaires inside the secure area of the terminal.

Despite potential shared needs such as these and the legislative authority to address unmet security research needs, ACRP has issued one product it categorized as related to airport security as of May 2009.²⁷

Though the federal government conducts a large amount of research on transportation security, some security research needs for airports may not be fully addressed by federal research programs.²⁸ DHS, which has

²⁶Airport operators implement security requirements in accordance with their TSA-approved security programs.

²⁷Hollis Stambaugh, Daryl Sensenig, Teresa Copping, Maria Argabright, Joseph Ockershausen, and Lisa Spencer, *ACRP Report 12: An Airport Guide for Regional Emergency Planning for CBRNE Events*, for the Transportation Research Board of the National Academies (Washington, D.C.: Airport Cooperative Research Program, 2009).

²⁸Transportation Research Board, *Airport Research Needs: Cooperative Solutions*, TRB Special Report 272 (Washington, D.C., 2003). This TRB report recommended the creation of ACRP and identified airport security as a topic, among others, in which cooperative research could be beneficial for airport operators and complement the research conducted by federal agencies, such as DHS, in support of their mission.

regulated airport security since 2003 through TSA, conducts research through its Science and Technology Directorate.²⁹ The directorate's research activities are intended to support all of DHS's wide-ranging responsibilities, including transportation security for all modes such as aviation, border security, emergency preparedness and disaster recovery, immigration, and counterterrorism. In the case of aviation, the directorate's research projects are prioritized based on security needs identified by TSA and focus on technology development to aid TSA's screening operations at airports. For example, the directorate conducts research in explosive detection technologies that can be used to screen passengers and baggage at airports. To the extent that the research needs of airports do not align with TSA's security priorities, these needs would not be addressed by the directorate. For example, as also noted earlier in this report by an AOC member, a directorate official similarly indicated that airports might need research into managing the secure flow of supplies to concessionaires inside the secure area. In our prior work, we have reported that while TSA has taken some steps to coordinate with airport operators in developing and implementing new screening technologies, TSA does not have a systematic process to coordinate with airports in implementing new screening technologies.³⁰ Further, we have previously reported that while TSA has taken some steps to develop biometric airport worker credentialing and the agency has conducted some outreach to airport operators to understand their priorities, it is unclear to what extent TSA plans to address these needs.³¹ Additionally, NSSA, which is represented on the AOC, has done some security research at the request of the AOC. However, as an organization focused on testing security technologies and not on research, it is not equipped to conduct security research in all of the areas that airports might benefit from, according to NSSA officials. For example, NSSA recently declined a project referred by ACRP on the basis that NSSA does not have the

²⁹The directorate is responsible for conducting basic and applied research and advanced development, including developmental testing and evaluation. TSA is responsible for conducting operational testing and evaluation, operational integration, procurement, and deployment of new technologies, including checkpoint screening technologies. GAO, *Aviation Security: DHS and TSA Have Researched, Developed, and Begun Deploying Passenger Checkpoint Screening Technologies, but Continue to Face Challenges*, [GAO-10-128](#) (Washington, D.C.: Oct. 7, 2009).

³⁰[GAO-10-128](#).

³¹GAO, *Aviation Security: A National Strategy and Other Actions Would Strengthen TSA's Efforts to Secure Commercial Airport Perimeters and Access Controls*, [GAO-09-399](#) (Washington, D.C.: Sept. 30, 2009).

technical capacity to complete the research. Further, NSSA does not generally publish reports for widespread dissemination like ACRP.

Members of the AOC differ in their views about the appropriate role of ACRP in conducting security research. In our interviews, 7 of the 11 AOC participants that discussed the program's role in conducting security research expressed a willingness to fund proposed security research projects if those projects were meritorious and not addressed elsewhere.³² Conversely, four AOC members, including FAA, believed that ACRP should not conduct security research, noting that DHS or NSSA are more appropriate venues for this research. FAA has also raised concerns about ACRP funding security research because FAA does not regulate airport security. In its 2008 report to Congress on ACRP, FAA stated that, in its view, ACRP should not fund security research, a position the agency continues to hold.³³ However, as noted earlier in this report, project selection decisions are the responsibility of and are made by the AOC as a whole, not just by FAA or any of the other members of the AOC, based on the authority granted to the governing board in Vision 100 and the operating procedures delineated in the MOA. Further, with respect to DHS's views on this issue, DHS, including TSA and the Science and Technology Directorate, have not been involved in ACRP to date. Science and Technology Directorate officials did not state an opinion about whether ACRP should or should not address security research because these officials were not familiar with the program.

AOC members have been reluctant to pursue security research given FAA's position and the large number of nonsecurity research proposals available to fund, and also because the lack of coordination with DHS makes it difficult for the ACRP to select and execute needed and credible security research. During the January 2010 AOC meeting, members discussed ACRP's role in addressing security research and many members voiced an interest in improving ACRP's handling of security issues.

³²ACRP received 8 security related project proposals—out of 219 total—for consideration for fiscal year 2010 funding. A program official commented that ACRP does not receive many security proposals, but it is unclear whether this is due to a lack of need for security research, a lack of program awareness among individuals working in airport security, or as hypothesized by this official, because ACRP may have developed a reputation for not funding security research.

³³Federal Aviation Administration, *Airport Cooperative Research Program 2005-2007, Report of the Secretary of Transportation to the United States Congress* (Washington, D.C.: June 2008). This report was prepared pursuant to Section 44511 to Title 49, U.S. Code.

Members expressed differing views about whether or not they should communicate that ACRP is a venue for security research to outside parties interested in submitting security proposals. The TRB staff that manages ACRP told us that the program could do more security work, at the direction of the AOC, and that TRB has policies and procedures to properly handle secure, sensitive information. In fact, other TRB cooperative research programs regularly publish security-related products. For example, NCHRP has issued reports on blast-resistant highway bridges, vulnerability assessment guidelines, and other topics. Given the varying views of ACRP program officials and other stakeholders about whether and to what extent the program should address potentially unmet security research needs, users of ACRP's work may expect the program to produce security research that is not likely to be forthcoming. The inclusion of security as one of the research topics within the scope of the program on its Web site and in program materials, such as the annual solicitation of research ideas from the airport industry, reinforces this expectation. Over time, if expectations remain unmet, user satisfaction with the program could decline.

Conclusions

ACRP is regarded by the officials we interviewed as a generally valuable resource for addressing the shared challenges faced by airport operators, but improving some aspects of its processes could further enhance its effectiveness. To the program's credit, ACRP's research processes include many of the practices necessary to select and implement high-quality applied research. However, some gaps in ACRP's research processes hinder the program's ability to fully meet the research needs of airports. In particular, the transparency of some aspects of the AOC's operations is incomplete because the program's documentation does not accurately reflect certain program practices. For example, the involvement of ACC on the board is not accurately reflected in the MOA or other documentation. Although FAA told us it has initiated steps to formalize ACC's membership on the board, it does not plan to revise the MOA that governs the program's operating procedures to reflect this change. If the Secretary of Transportation approves FAA's request to appoint ACC to the board, obtaining a signed appointment letter from the Secretary to formalize ACC's role as a nonvoting ex-officio member would be a positive step toward increasing the program's transparency. However, the transparency of the board's operations would still remain diminished because the ACC would be the only ex-officio member not expressly identified in the MOA. Likewise, the AOC's documented decision-making process—which specifies voting procedures—differs from the board's practice of selecting projects on the basis of consensus among its members, including those

designated as nonvoting ex-officio members. AOC members and other program stakeholders generally found the participation of ACC and the consensus-based decision-making approach to be beneficial, but since the program's documentation does not fully align with these practices, there is little formal assurance they will be sustained in the future.

Additionally, levels of awareness of ACRP vary throughout the airport industry, and ACRP's current research dissemination practices may miss some potential beneficiaries of the program's research, according to the program stakeholders and airport officials we interviewed. In particular, mid-level staff and small airport officials may be less familiar with the program and more likely to not be included as direct recipients of some of ACRP's current dissemination mechanisms. ACRP is in the early stages of developing systematic processes to conduct postpublication reviews of its products, assess satisfaction with the program among the user community, and evaluate the program's overall impact and performance. These are important steps in the applied research process that ACRP can improve upon. The AOC's approval of two special projects holds promise that it will begin addressing the program's dissemination and evaluation gaps. It is an encouraging sign that ACRP's processes are on track to more fully reflect practices that help to assure the production of high-quality applied research, including project and program evaluation.

To date, ACRP has produced a variety of high-quality and useful results for the airport industry, according to the officials we interviewed. However, the program needs to clarify its scope to the airport industry by explaining what role, if any, it has in addressing the security research needs of airports. The program has the legislative authority to address security research topics, provided that the research needs are shared by airports and not addressed by other federal research. Airport security is certainly a concern shared by airport operators. Additionally, some security-related research topics, such as the use of biometric technology, may be of value to airports and are not being fully addressed by other federal research. Given the significant amount of aviation security research conducted by DHS, ACRP may or may not be an appropriate venue to address unmet needs of airports in this area. Although FAA has stated that ACRP should not conduct security research, it is the responsibility of the AOC as a whole, of which FAA is a part, to determine what role, if any, the program has in this area. The AOC has recently discussed the program's role in addressing security, but it is not clear what actions, if any, it plans to take to resolve the current lack of clarity. The present lack of agreement among ACRP stakeholders about the program's role in addressing security research—and the program's lack of coordination with DHS—has left the

program, in effect, not addressing security research, but holding out the possibility that it could to the airport industry. Clarification of the program's role in this area would better communicate to the industry what research can be expected from ACRP.

Recommendations for Executive Action

We recommend that the Secretary of Transportation take the following two actions:

(1) To better align key program documentation with ACRP program practices as implemented and to increase the transparency and stability of the program over time, we recommend the Secretary of Transportation take steps to revise the Memorandum of Agreement (MOA) between the Department of Transportation and the National Academy of Sciences, and other appropriate documentation, such that

- all organizations, including ex-officio members, that are involved in ACRP Oversight Committee (AOC) proceedings are included in program documentation, and
- project selection procedures documented in the MOA are supplemented to include, as an option, a consensus-based approach in addition to voting procedures, and a more explicitly defined role for ex-officio members in project selection.

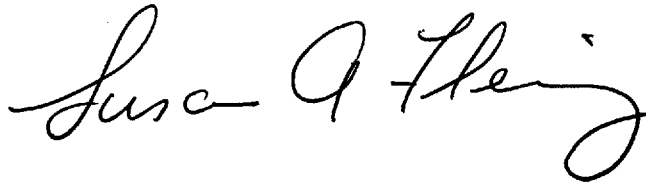
(2) To clarify the role of ACRP in conducting security research, we recommend that the Secretary of Transportation take steps to encourage the AOC—in collaboration with other key federal agencies and stakeholders—to clearly articulate ACRP's role, if any, in conducting security research and, subsequently, to ensure that ACRP's program documentation clearly and accurately reflects this role, such that airport operators and others can readily understand what to expect of the program in this area.

Agency Comments

We provided a draft of this report to DOT, DHS, and TRB for review and comment prior to finalizing the report. DOT generally agreed with the information in the report and provided technical clarifications, which we incorporated as appropriate. DOT officials also said that they are considering the recommendations. DHS and TRB did not provide any comments on the draft report.

We are sending copies of this report to the Secretary of the Department of Transportation, the Administrator of the Federal Aviation Administration, the Director of Cooperative Research Programs at the Transportation Research Board, the Secretary of the Department of Homeland Security, and appropriate congressional committees. This report is also available at no charge on the GAO Web site at <http://www.gao.gov>.

If you or your staff have any further questions about this report, or wish to discuss these matters further, please contact me at (202) 512-2834 or flemings@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Key contributors to this report are listed in appendix IV.



Susan A. Fleming
Director, Physical Infrastructure Issues

Appendix I: Scope and Methodology

To assess the Airport Cooperative Research Program's (ACRP) research processes, we compared ACRP's research processes to criteria—developed in previous GAO work—for managing information technology investments.¹ The criteria, which can be applied to research programs with some adaptation, contains critical processes for identifying user needs, selecting investments, monitoring results, and improving performance over time, among other steps. Similar to when an organization undertakes information technology investments, the applied research processes of ACRP are conducted by a third party for a group of diverse users or beneficiaries, the topics are technical in nature, and funding constraints require making decisions between competing projects. To adapt the information technology framework as criteria for assessing ACRP processes, we (1) simplified it to focus on the most critical processes, without the attention to details about levels of organizational maturity and capacity that were extensively addressed in the original framework, (2) changed the terminology to refer to applied research, rather than information technology, and (3) added criteria on product dissemination that we determined are important to research, but are not in the original framework. See appendix II for further information about the adapted criteria we used in our study. To determine the extent to which ACRP's processes align with these criteria, and to identify gaps and potential actions to address those gaps, we conducted a content analysis of a variety of program documentation and interviewed officials involved with ACRP.

To describe ACRP's results to date and determine how useful those results have been to airports, we reviewed ACRP's published reports and other program documentation and interviewed a wide range of officials to obtain a diversity of views on the program. These interviews included senior-level Federal Aviation Administration (FAA) and Transportation Research Board (TRB) officials responsible for managing the program; selected industry and airport officials involved in program oversight and direction; and other airport officials who are the intended users of ACRP, but who do not have vested interests in managing the program. These officials were judgmentally selected to provide a range of views, including those of small and large airports, various staff levels, and different topical areas of responsibility. Officials included top executives and mid-level

¹GAO, *Executive Guide: Information Technology Investment Management: A Framework for Assessing and Improving Process Maturity*, [GAO-04-394G](#) (Washington, D.C.: March 2004).

managers with expertise and responsibilities in a range of topical areas such as environmental management, security, and finance, among others. Some of these officials had also participated on ACRP project panels and, therefore, could comment on their experience as a panelist. To understand views of ACRP among stakeholders of the program and get an overall view of how well the program was meeting their expectations and to identify their areas of concern, we interviewed selected members of the ACRP Oversight Committee (AOC)—including selected voting members of the AOC and all of the industry associations participating as ex-officio members on the AOC—and representatives from the Airport Consultants Council, TRB, and FAA. Although our interviews with airport officials and ACRP stakeholders provide a reasonable view on the perspectives and views of these groups, our findings based on these interviews should not be generalized to the groups overall. Finally, we interviewed officials from the Science and Technology Directorate within the Department of Homeland Security to understand the extent to which its research activities address the needs of airports in the security area.

We conducted this performance audit from August 2009 to July 2010 in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

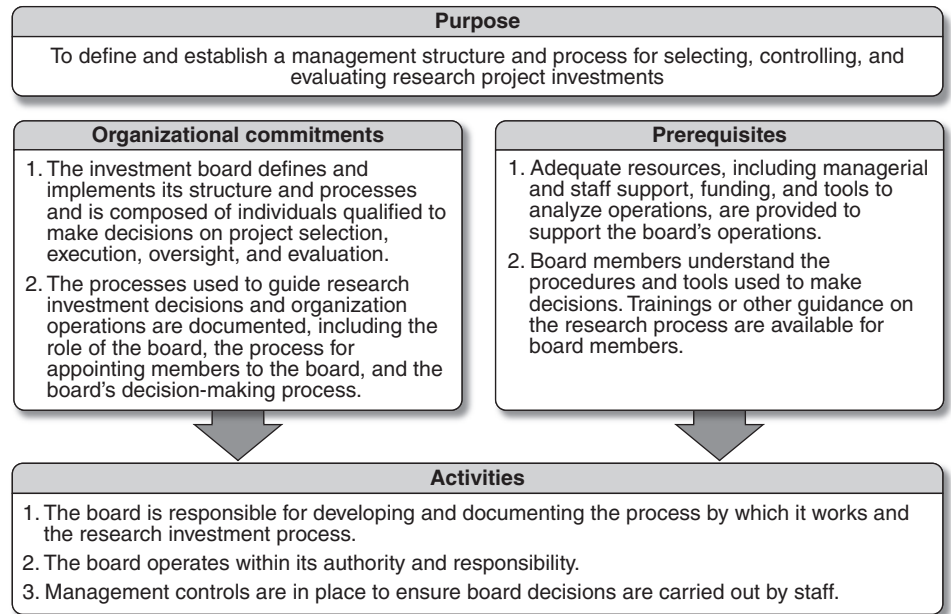
Appendix II: Criteria for Assessing Applied Research Processes

To assess ACRP's research processes, we adapted an existing GAO framework for managing information technology investments to make it applicable to the processes followed by applied research programs to produce high-quality research.¹ This adapted framework served as our criteria for evaluating ACRP's processes, and allowed us to identify the elements of ACRP's processes that help the program produce high-quality research, as well as identify gaps in ACRP's processes that can be addressed to improve the program. Figures 2 through 8 present the specific practices (categorized as "organizational commitments," "prerequisites," and "activities") in each step of the applied research process that programs follow to help facilitate the production of high-quality applied research. We analyzed the extent to which ACRP's processes align with each of the practices contained in these figures, and we summarized the results of this analysis for key elements of ACRP's processes in the body of this report.

Within each step of the applied research process, "purpose" refers to the primary function of the step and states the desired outcome of completing the step; "organizational commitments" refer to the management actions and practices that ensure necessary processes to perform the step are established and will endure; "prerequisites" refer to the conditions that must exist within an organization to implement the necessary processes successfully; and "activities" refer to the key practices necessary to implement the critical processes and successfully complete the step.

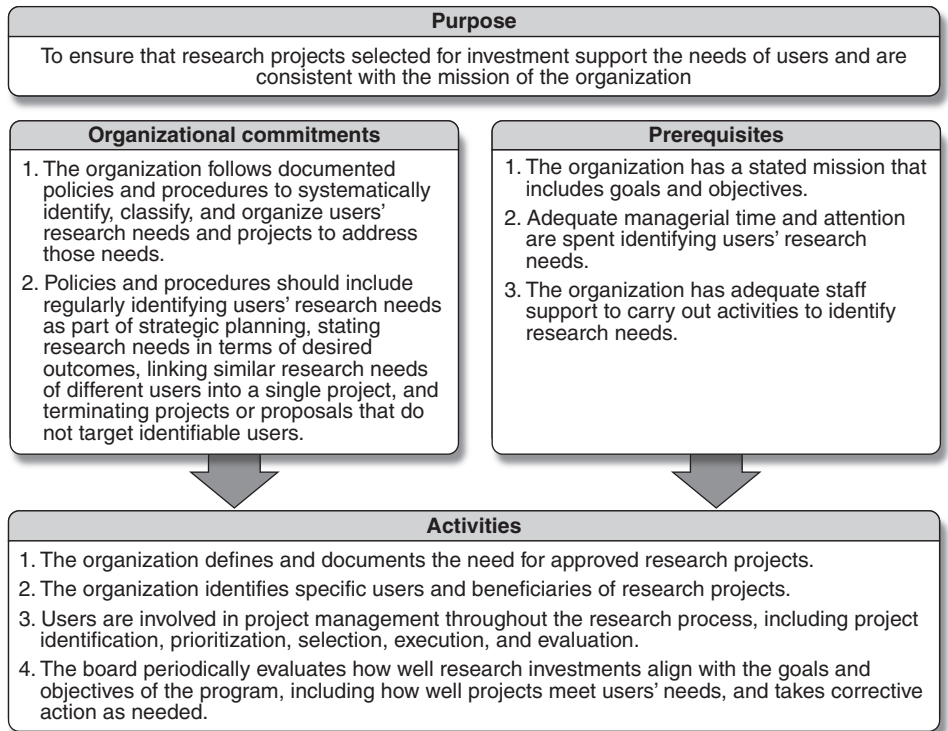
¹[GAO-04-394G](#).

Figure 2: Step 1—Establish a Research Investment Board



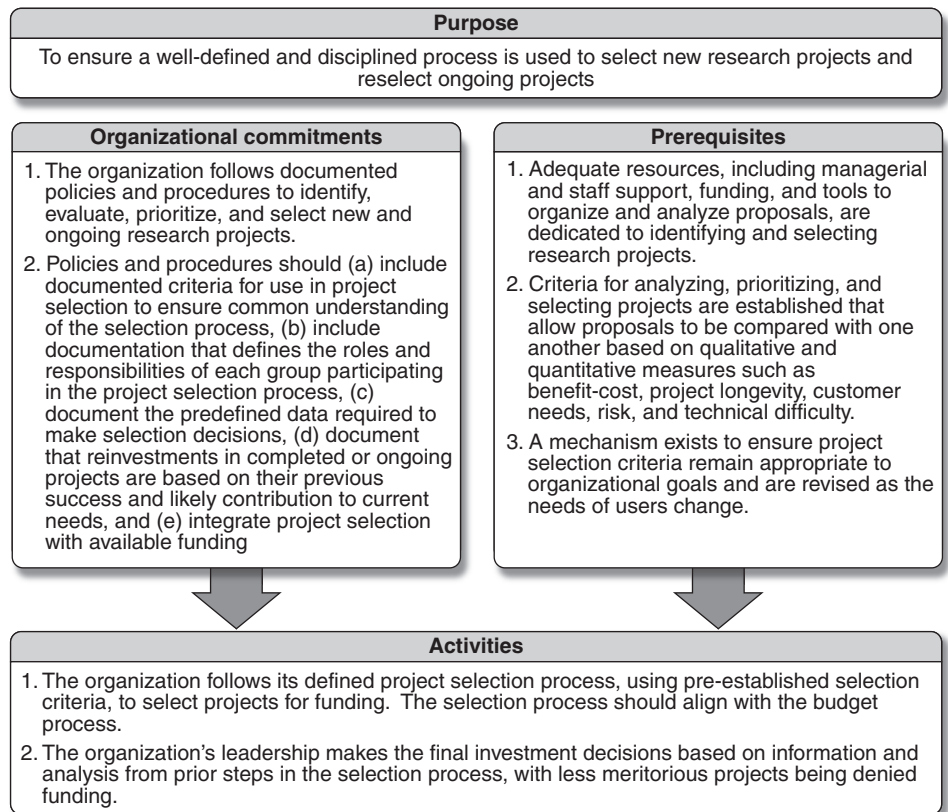
Source: GAO.

Figure 3: Step 2—Determine the Research Needs of Users



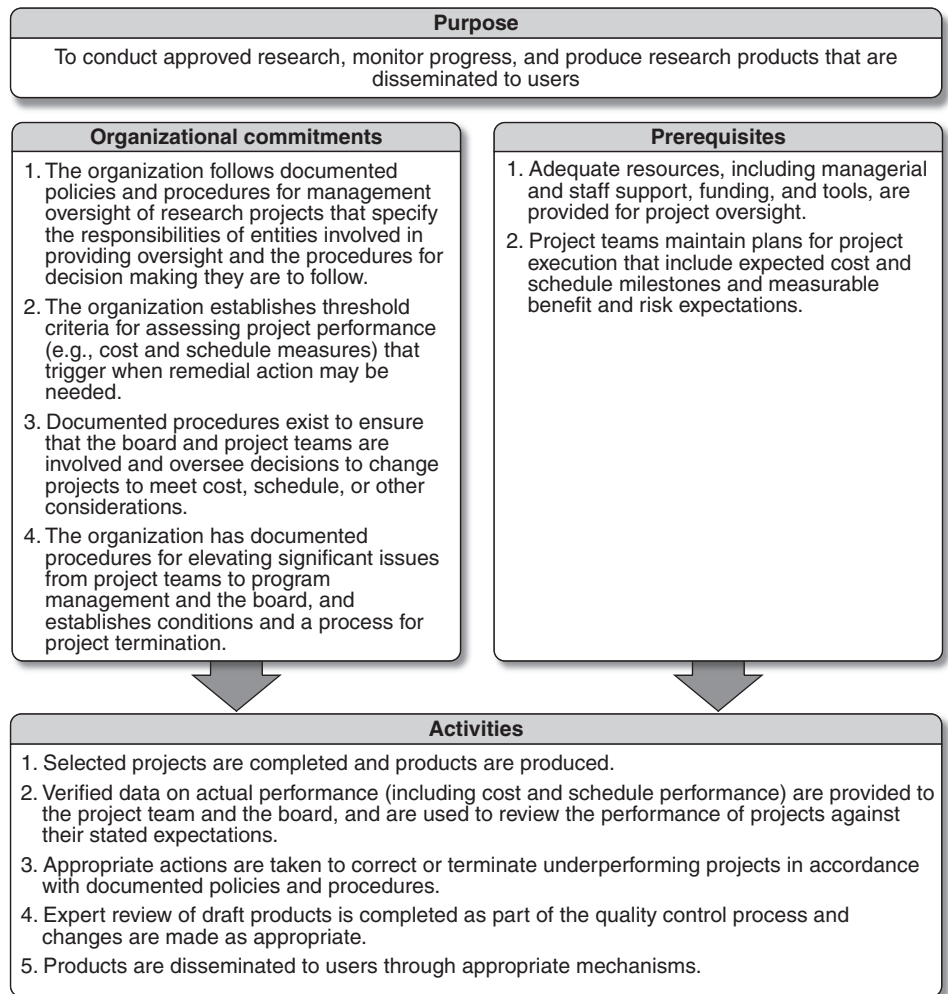
Source: GAO.

Figure 4: Step 3—Select Research Projects for Investment



Source: GAO.

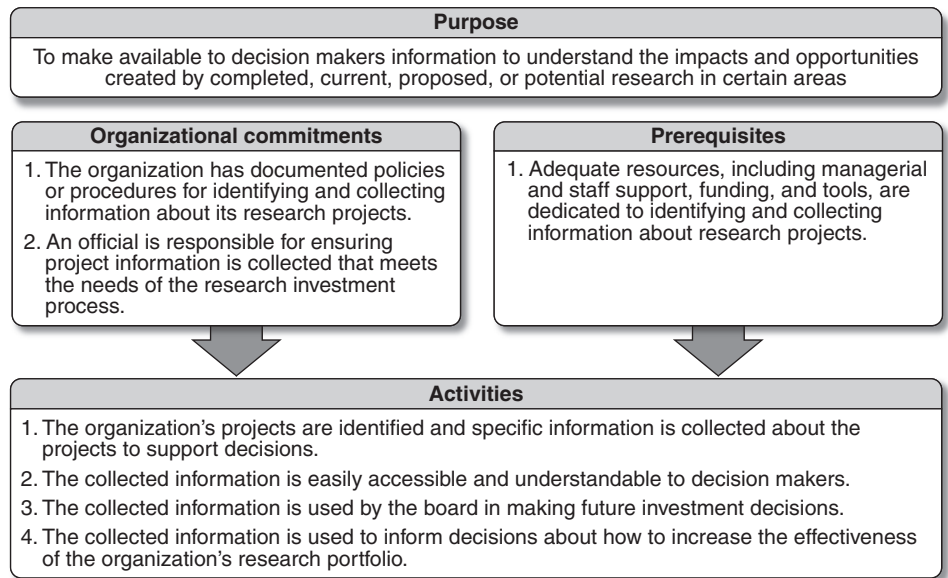
Figure 5: Step 4—Implement Research Projects



Source: GAO.

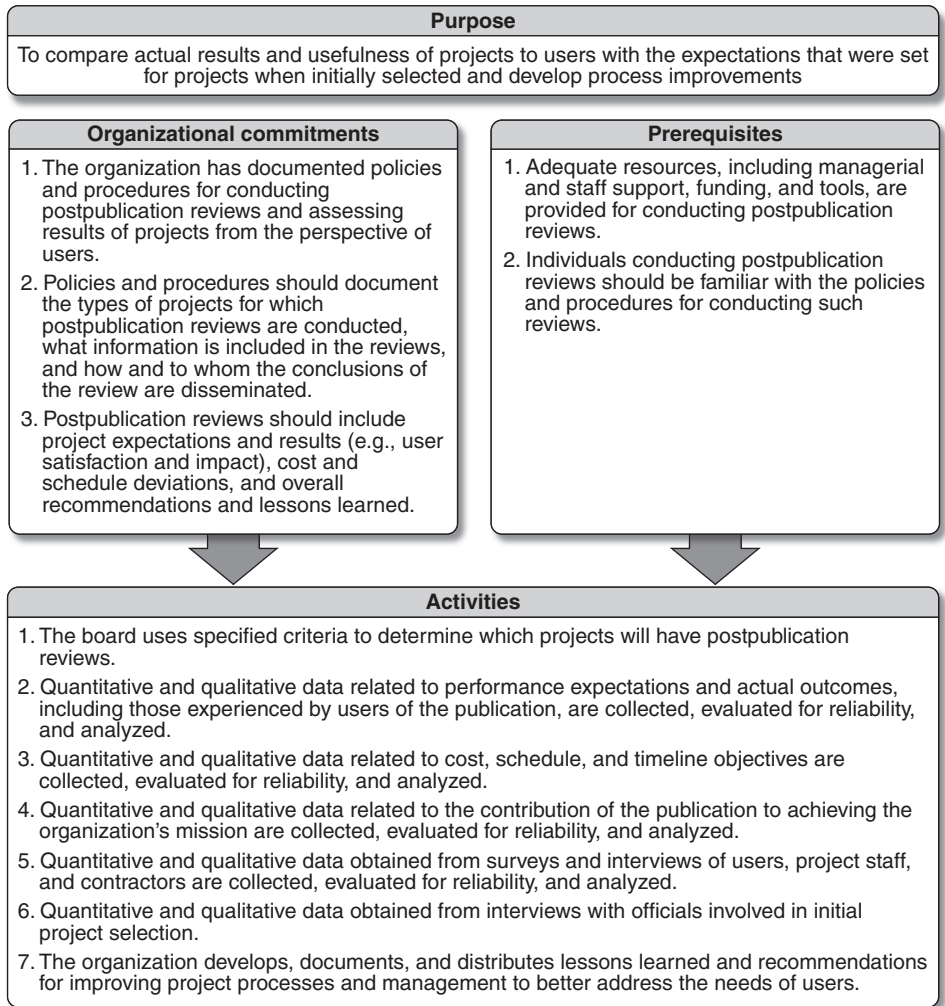
Note: Step 4 involves implementing research projects by (1) establishing a project panel to manage the project, (2) selecting a researcher to conduct the research, (3) providing oversight, (4) reviewing draft products, and (5) disseminating final publications to users.

Figure 6: Step 5—Maintain Information on the Research Program



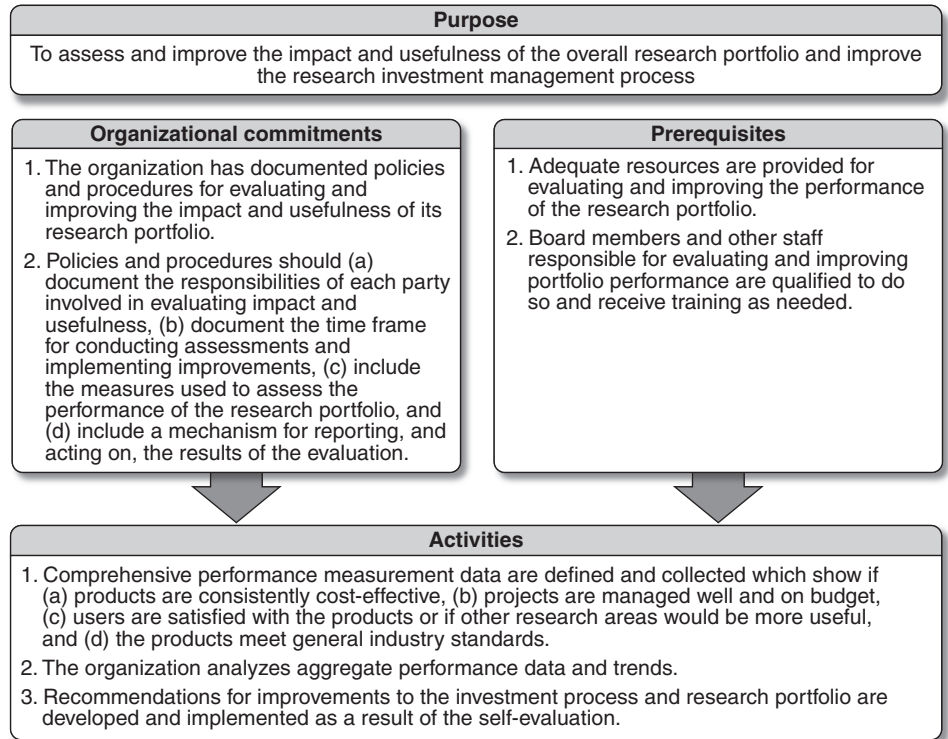
Source: GAO.

Figure 7: Step 6—Perform Postpublication Reviews of Projects and Results



Source: GAO.

Figure 8: Step 7—Use Evaluation Information to Improve the Overall Performance of the Research Program



Source: GAO.

Appendix III: Additional Comments from Airport Officials

As part of our assessments of ACRP's research processes and ACRP's results to date, we conducted interviews with selected airport officials—the primary intended beneficiaries of ACRP's work—to learn their views on, among other topics, areas in which ACRP might consider actions to improve the quality or usefulness of its products. The major themes that came out of these interviews are presented in the body of this report. Additionally, a number of other comments were made by these officials, some of which are summarized below. Their inclusion should not be construed as a GAO endorsement or recommendation for action, but instead are included because they may be of interest to officials involved in ACRP.

- Some ACRP products are very general in nature. As the program produces more work, future products may need to explore some issues more in-depth.
- Over time, some ACRP products will need to be updated as the information in the original reports become outdated. Reliance on the normal project submission process may not effectively assure updates are completed.
- An executive summary of longer reports may be helpful for some users. A summary might help readers understand the major points of a report without reading all the details, some of which may not apply to all readers.
- Some airport officials may not understand that ACRP produces quick-response projects, in addition to conducting longer term research. As a result, some users with research needs may not seek out ACRP's help for problems that require a quick response. ACRP may be a more useful resource to airports if the diversity of its products were better understood.
- Use of social media may help promote ACRP to some members of the airport industry, particularly younger staff, and enhance accessibility of ACRP products.
- Organizing ACRP products into logical categories in an online library that takes only a click or two to navigate would make it easier to access reports.
- An interactive, open-architecture Web site that allows users of ACRP reports to post comments, questions, and read what other users think about reports might enhance the impact of the reports and be a mechanism for TRB to get feedback from the industry.

- ACRP distribution through the TRB newsletter—which includes information on research in transportation modes other than aviation—can be unwieldy, even with the ability to customize the TRB newsletter to include only topics of interest to the recipient.
- Airport officials already get lots of surveys and completing these surveys can be burdensome. Efforts to streamline and consolidate the surveys ACRP conducts during its research might ease this burden.
- Additional formal guidance and clarification for project panels on precisely what final ACRP products are intended to accomplish, and how to specify a Request for Proposal to do so, might help panels execute their oversight of research more effectively. Panelists are often airport officials or other industry members that may not be experienced in research methodologies, costs of research, or other relevant issues.
- Nonairport specific professional organizations—such as bar associations—may be a channel to reach airport officials within these professions.

Appendix IV: GAO Contact and Staff Acknowledgments

GAO Contact

Susan A. Fleming, (202) 512-2834 or flemings@gao.gov

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In addition to the contact named above, Rita Grieco (Assistant Director), Lauren Calhoun, Patrick Dudley, Joel Grossman, Delwen Jones, Stephen M. Lord, Faye Morrison, Madhav Panwar, Laura Shumway, John W. Stambaugh, and Joshua Wiener made key contributions to this report.

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