ACRP Problem No. 12-02-07

Optimizing Aviation’s Role in Developing Sustainable Multi-modal Transportation Systems

ACRP Staff Comments: The proposed research picks up on the current industry emphasis on sustainability. The scope would have to be careful about potential policy implications and would have to examine the potential for real, near-term application in the airport community. The funding level may not be adequate to undertake the proposed research; suggest $500,000.

TRB Aviation Group Committees Comments: ENVIRONMENTAL IMPACTS OF AVIATION CMTE - Support with modification. While there is an important need for multimodal research like this to inform transportation policy in the U.S. and to better understand where the aviation industry should focus its sustainability efforts, the project's proposal to develop a comprehensive sustainability framework for comparing the different transportation modes may be too broad. The committee supports the project with the modification that the analysis be simplified to include only comparing the lifecycle greenhouse gas emissions for each transportation mode. This will enable the production of clear and tangible research results as a first step to shaping the discussion of system-wide policies.

AVIATION SYSTEM PLANNING CMTE - The importance of this proposed work is appreciated by all reviewers; however, there seems to be a variety of opinions regarding applicability and scope that would benefit from some refinements in a project scope of work during RFP development. The proposed research will be very useful for practitioners dealing with mode choices in multi-modal systems in a financially constrained environment. Recommended.

Review Panel Comments: Not recommended — The problem statement is too broad and not a very realistic project.

AOC Disposition: No funds allocated. No discussion.
ACRP 2012 Research Problem Statement

PROBLEM TITLE

Optimizing aviation’s role in developing sustainable multi-modal transportation systems

RESEARCH PROBLEM STATEMENT

The vibrant global economy of today is completely dependent on the availability of efficient air transportation, and airports serve as transportation hubs everywhere they are found. The rise of interest in sustainability and planning for a future of resource shortages has focused largely on the environmental effects of aviation and the development of alternative fuels. Because of aviation’s dependence on jet fuel, alternative modes of travel such as high-speed rail and maglev have been promoted as being more sustainable for the future, even though they are powered by electricity largely generated by burning coal. These alternatives are much more expensive than the existing aviation infrastructure, and have significant environmental impacts, service gaps and inflexibility. At the system level, research is needed to understand the true efficiencies of airports and air service as a mode of transport, and their role in economic development, to advise government policies on transportation system priorities in the new era of financial and resource scarcity.

Likewise, the economy of every city is utterly dependent on the airport providing it with ready access to and from global markets. Airport directors looking to be part of local sustainability initiatives tend to focus on reducing the airport’s carbon footprint, through energy efficiency in buildings, recycling, alternative fuels and alternative access modes, and so forth. These actions generally make sense and can save money, but how can the airport director become part of a regional sustainability strategy that may involve increasing the use of aviation at the expense of, say automobile inter-city travel, in order to reduce overall carbon emissions for the region? Research is needed to develop a sound methodology for understanding the local and regional role of airport service in contrast to other inter-city modes, and giving the airport director the tools for keeping the aviation mode at the center of a well-informed community strategy to achieve long term sustainability.

Unfortunately, transportation research tends to be carried out within each mode, and it has been difficult to accomplish true apples-to-apples comparisons of the life-cycle sustainability implications of different choices for transportation system development, either at the local or national level. This proposed research project would start with a high level comparison of the sustainability performance of each mode of inter-city travel, explore the economic, social and environmental implications of a manageable set of multi-modal transportation system development options, and identify policy implications for national governments and airport directors in moving forward a logical aviation sustainability agenda that will optimize the uses of aviation for global and local economic development in the future.
OBJECTIVE

1. Provide national and local aviation practitioners with reliable information about the sustainability implications of developing and using different modes of regional, national and international transportation.
2. Use existing research and data where possible, to minimize the level of effort and potential for duplication.
3. Engage with the research community in all the modes of transportation to assure valid and consistent results.
4. Consider the environmental, social and economic implications of the modes in developing the methodology.
5. Incorporate any life-cycle information into the analysis, where reasonably practical.
6. Provide a final report which gives a roadmap to the sustainability analysis methods and data needed to make comprehensive policy assessments of transportation system alternatives at the regional and national level. Particular emphasis will be placed on optimizing the role of aviation in transportation systems to maximize long term sustainability and resilience.

RESEARCH PROPOSED

The overall approach to this research is to:
- assess what information is already available for comparing the life-cycle sustainability of different modes of transportation,
- develop a sustainability framework and model for comparing them,
- make the comparison between the different transportation modes used in different roles in the system, and
- develop conclusions and communication tools for national and local aviation practitioners to make effective use of the study’s results.

ESTIMATE OF THE PROBLEM FUNDING AND RESEARCH PERIOD

Recommended Funding: $300-400,000.
Research Period: 18 months.

URGENCY AND PAYOFF POTENTIAL

This research is important because it provides the aviation industry with a valid and forward-looking way to develop a more positive role for aviation in the sustainability movement. Without it, aviation stakeholders continue to run the risk of being wrongly marginalized in the continuous pressure to blindly reduce global carbon emissions without understanding the unintended consequences of reducing global commerce or making the transportation system less efficient in the long run. The main barrier to this research is resistance from individual transportation modes (and their lobbyists) to agree with the analysis framework if they find the results unfavorable.

RELATED RESEARCH
A number of past and present TRB research projects will provide useful information for this project, including, and this is just a small sample:

- ACRP 03-16 Guidebook for Estimating the Economic Impact of Air Cargo at Airports
- ACRP 03-19 Passenger Value of Time, Benefit-Cost Analysis, and Airport Capital Investment Decisions
- ACRP 03-21 Developing and Maintaining Support for New Airport Capacity
- ACRP 03-23 Integrating Aviation and Passenger Rail Planning
- NCHRP 02-17(3) Macroeconomic Analysis of the Linkages Between Transportation Investments and Economic Performance
- NCHRP 02-17(4) Measuring the Relationship Between Freight Transportation Services and Industry Productivity
- NCHRP 02-17(6) Tourism Travel Contributions to Economic Development
- NCHRP 02-20 Economic Trends and Multimodal Transportation Requirements

PERSON(S) DEVELOPING THE PROBLEM

This problem statement was developed by Burr Stewart, Principle, BURRST, 204 NW 112th St, Seattle, WA 98177, 206-660-1145 (cell).

PROCESS USED TO DEVELOP PROBLEM STATEMENT

Burr is the chair of the TRB Aviation Sustainability Subcommittee (AV030(1)), where this problem has been frequently been discussed as one of the key emerging issues in aviation sustainability.

DATE AND SUBMITTED BY