ACRP Problem No. 12-02-26

Environmental Assessment of High Speed Rail and Air Corridors

ACRP Staff Comments: The scope of the proposed research would need to be developed to complement the ongoing efforts for ACRP Project 03-23, Integrating Aviation and Passenger Rail Planning.

TRB Aviation Group Committees Comments: ENVIRONMENTAL IMPACTS OF AVIATION CMTE - Support. This is an interesting project and it could be helpful in the future for airports in densely developed areas. It could provide a source for airports to respond to agency and citizen questions. It should be expanded to include all surface modes.

AVIATION SYSTEM PLANNING CMTE - We lack consensus on this problem statement. While timely and important, the proposed work does not seem to get at the essence of the issue in a compelling way. Several reviewers pointed to other completed or ongoing pertinent work that hasn’t been referenced in the problem statement, but might offer insights to help focus this proposal more effectively (e.g., Texas High Speed Rail Commission reports, GAO reports, and work done by the UK's Aviation Forum of the Chartered Institute of Logistics and Transport). The variety of opinions concerning the approach to the project indicates that the problem may be bigger and more complex than the problem statement would lead the casual reader to believe. As it stands, the problem statement elicited a large number of comments which, taken in the aggregate, suggest that it would benefit from a thorough review of current research, a more explicit statement of the proposed research, and a better explanation of the use and value of the results. Not recommended.

Review Panel Comments: Recommended — There haven't been many, if any, environmental life-cycle comparative studies of high speed rail versus corridor air service. This research would add to the ability to discuss the comparison more intelligently. High speed rail has not addressed the security issue and the costs associated with adding that factor into the mix.

AOC Disposition: Approved and funded as a synthesis project at $116,000. There was a sense that the study was premature, but that it could address some of the unsubstantiated rhetoric surrounding this issue and help high level folks better understand it. The effort should therefore be limited to a synthesis of how high speed rail and air corridors have been compared to date. Most data will likely come from Europe.
I. PROBLEM TITLE
Environmental Assessment of High Speed Rail and Air Corridors

II. RESEARCH PROBLEM STATEMENT
Much of the press surrounding recent investments in HSR infrastructure is focused on the environmental benefits. For example, the American HSR Alliance claims that carbon would be significantly reduced by “cancelling automobile and airplane trips”. Within this statement are assumptions about environmental trade-offs and ridership that are unknown and untested. In-depth environmental assessments are needed to understand the total costs of long-distance travel. Additionally, in our deregulated system the mere presence of improved rail service does not directly translate into reduced trips on other modes, but rather means a more diverse set of modes from which passengers may choose and an increasingly fiercely competitive market.

A recent session at the TRB Annual Meeting was entitled: “Environmental Tradeoffs of Aviation and High Speed Rail”. A brief summary of some of the highlighted issues follows:

▪ **Passenger Choice and Competition:** ACRP 31: Innovative Approaches to Addressing Aviation Capacity Issues in Coastal Mega-regions presents a comprehensive case study of the impact of high speed rail on aviation capacity. The study concludes that while introduction of Acela Amtrak service between Boston and New York has reduced passenger traffic by about 1/3, the number of flights between the two cities has dropped by only about six percent – shuttle operators have just adapted by substituting smaller aircraft on those routes to meet the schedule demand. Additionally, it was shown that the presence of HSR does not necessarily draw passengers away from air, depending on passenger preferences for different modes.

▪ **Noise:** Noise assessments for aviation and high speed rail both rely on Day Night Average Sound Level, but direct comparison of impacts between the two modes is challenging and has not been conducted. A cursory analysis in the New York-Boston Acela corridor indicates that total noise exposure is higher for rail than aviation.

▪ **Air Quality and Climate:** Life-Cycle Assessment (LCA) comparison of air emission outputs from automobiles, aviation, and HSR includes not just the operation of the vehicles, but infrastructure and energy requirements. Existing research has shown that these components can contribute dominating effects to life-cycle environmental performance.

III. OBJECTIVE
The objective of this project is to prepare an environmental comparison of several potential high speed rail corridors (e.g., Florida, California, the Northeast, etc.). The comparison will be based on ridership forecasts (and the potential for switching from air and automobiles to high speed rail) and life-cycle environmental data. The environmental indicators to be evaluated include energy consumption, air emissions (including greenhouse gases), and noise.
IV. RESEARCH PROPOSED
The Study Team will prepare an environmental cross-corridor evaluation based on projected mode-splits with and without high speed rail, and will use the LCA approach.

LCA is a systems-oriented approach for evaluating the environmental tradeoffs of processes or decisions. For transportation systems, LCA has been used to capture propulsion effects as well as ancillary processes (e.g., infrastructure construction and maintenance, vehicle manufacturing) and their supply chains in a more comprehensive system boundary.

V. ESTIMATE OF THE PROBLEM FUNDING AND RESEARCH PERIOD
Recommended Funding: $500,000
Research Period: 2 years

VI. URGENCY AND PAYOFF POTENTIAL
The U.S. is poised to invest billions of dollars in high speed rail infrastructure, on the assumption that there are significant environmental benefits. These claims have not been evaluated in any rigorous fashion, and the US aviation industry is finding itself in a position of defending against unquantified claims.

VII. RELATED RESEARCH
ACRP Report 31, Innovative Approaches to Addressing Aviation Capacity Issues in Coastal Mega-regions looked at the capacity implications for aviation vs. high speed rail in California and the Northeast.

VIII. PERSON(S) DEVELOPING THE PROBLEM
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IX. PROCESS USED TO DEVELOP THE PROBLEM STATEMENT
The authors of this problem statement presented jointly at the 2011 Annual TRB Meeting as subject matter experts on various environmental impacts of aviation and high speed rail. There is similarity of need for additional research in each of the subject areas.

The ACI-NA Environmental Affairs Committee Steering Group reviewed and supports this proposed project.

X. DATE AND SUBMITTED BY
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REFERENCES
FRA High-Speed Ground Transportation Noise and Vibration Impact Assessment, 2005

ACRP Report 31, Innovative Approaches to Addressing Aviation Capacity Issues in Coastal Mega-regions, 2010

FAA Order 1050.1E, “Policies and Procedures for Considering Environmental Impacts”

High Speed Ground Transportation for America Report to Congress, 1997