Rapid Growth Foreseen in Airport Research

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Recently someone was overheard to remark, "When my ship comes in I'll probably be at the airport." That was most likely the comment of a frustrated individual having a string of bad luck. On the other hand, it may have been an enthusiastic proponent of intermodalism musing about the future and benefits of the integration and connectivity of transportation systems.

FAA and FRA are cooperating in studies of possible maglev and airport linkages.

New Vision for Surface Transportation

Focus on Intermodalism

The Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) establishes a new vision for surface transportation in America. Among other things, this landmark legislation promotes intermodal transportation. The focus of the intermodal effort will be the Office of Intermodalism, established within the Office of the Secretary of Transportation. This new office will maintain and disseminate intermodal transportation data and coordinate federal research on intermodal transportation. The Secretary of Transportation is authorized to make $3 million in grants available to states to develop model intermodal transportation plans, which must include systems for collecting data. Overall, this legislation embodies the vision and direction stated in the National Transportation Policy spearheaded by former Secretary of Transportation Samuel K. Skinner.

Role of Aviation

Legislation to renew the Airport and Airway Improvement Act of 1982 will stress the importance of increased intermodalism and the role of aviation in it. This legislative initiative would have a significant effect on the activities of the Federal Aviation Administration (FAA), particularly with regard to airport ground access, intermodal connections at airport terminals, and planning and development of integrated transportation systems.

Remarkable changes are taking place in the federal role in airport development. FAA is proposing increased authority for capital funding decisions at the state and local level. A limited state block grant program has demonstrated the ability of state aviation agencies to manage federal grants for airport development, and the Bush administration has asked Congress to extend the block grant program to all interested states. It also has proposed to permit grants to be used for the first time for projects to improve ground access to airports and not just for the airports and aeronautical facilities themselves. In addition, federal regulations have been enacted to permit commercial service airports to collect a passenger facility charge as a new source of capital for development projects. The new charges are expected to generate more than $1 billion annually, most of it at the busiest and most congested airports.

The block grants and passenger facility charges will provide a large part of the funds needed for airport expansion.

The availability of capital development funds and other factors such as growth in traffic and the development of a global economy and a global airline industry are expected to stimulate interest in airport expansion.

Airport Research and Increased Development

FAA is reviewing its airport research program in light of the prospect for increased development. In the past, research has been limited and focused on topics of critical concern to FAA. Top priority was given to projects related to the safe movement of

aircraft. A second tier of research projects dealt with more efficient movement of aircraft, particularly measures to reduce airfield congestion and air traffic delay as well as design guidelines and construction standards for development undertaken with federal aid. Topics within these categories were pursued with an airport research budget that never exceeded $10 million annually and was carved out of a larger budget for air traffic control and air navigation. A major aspect of this approach to research was that it dealt only with the movement of aircraft and virtually ignored passengers and cargo. That approach came under scrutiny in 1989, when then Secretary of Transportation Skinner issued a National Transportation Policy calling for an integrated national system that included an intermodal approach to maximize the efficient movement of passengers and goods. Federal transportation activities in the post-Skinner era have taken on a new look, with increased contact and cooperation among modal agencies and considerable expansion of mutual interests.

Intermodal Clearinghouse

One sign of the times is an intermodal committee on passenger terminals. Established and chaired by Gilbert E. Carmichael, Administrator of the Federal Railroad Administration (FRA), the committee brings together high-level representatives of the Federal Highway Administration (FHWA), FRA, the Federal Transit Administration (FTA), and FAA to discuss common concerns regarding passenger terminals. The group serves as a clearinghouse for ideas and information and is stimulating joint efforts that were unthinkable a few years ago.

Airport Access and High-Speed Transport

In one example of a joint effort, FAA and FRA are studying airport access applications for high-speed transport. Researchers are considering how a high-speed ground system might affect airport costs and revenues, existing contractual arrangements for ground access, airport operations, and security. The practical problems of scheduling service to meet demand peaks for airport and nonairport travel have interesting implications. For instance, if airport access is tied into a larger urban transit system, it may be necessary to increase service during holiday periods that are low demand times for urban transit but high demand times for airport access.

The proposed development of a privately financed magnetic levitation (maglev) system in Orlando, Florida, is being studied to learn more about the practical issues of planning and design. The site and layout of the Orlando maglev terminal will be compared with theoretical optimum criteria to determine where compromises are likely and to predict their probable effect. The acquisition of acceptable sites for terminals is one of the most difficult issues faced by transit planners, and the situation could be greatly improved if airport planners would reserve appropriate sites for transit terminals 10 to 20 years in advance of their development.

Satellite Airport Terminals

Another issue under discussion by the intermodal committee is the possible use of stations as downtown satellite airport terminals. The rail stations are often well located and have space available for lease to airlines or coach and limousine services. Research requirements include better information on the origin of trips and factors affecting modal choice for airport access. Although the initial applications would probably rely on highway vehicles for airport access, they could evolve into rapid transit links from downtown terminals to the airport or high-speed intercity rail service as an alternative to air travel in dense, congested corridors such as the one linking Boston, New York, and Washington, D.C.

Measuring Ground Access

One result of the compartmentalized approach to transportation planning in the past is that there is a lack of comprehensive data available on ground access to airports. FAA is moving quickly to fill that gap so that sound decisions can be made about federal aid for airport access improvements under ISTEA and the reauthorized Airport Improvement Program. A technique for measuring the adequacy of ground access, which will be applied to major air carrier

Intermodal committee serves as clearinghouse for ideas and to stimulate joint efforts in transportation research. *From left*: John Cikota, FRA; Gilbert Carmichael, FRA Administrator and committee chairman; Paul Galis, FAA; Dane Ismart, FHWA; and Sam Zimmerman, FTA.

Zale Anis (*standing*) manages airport planning research at VNTSC, including development of airport system model by MIT professor Amedeo Odoni (*left*) and graduate student Kerry Malone.

airports, is being developed at the Volpe National Transportation Systems Center (VNTSC). A survey of proposed ground access improvements will be conducted to determine how much relief is expected during the next five years. The survey, which will be a cooperative effort among FAA, FHWA, FTA, and FRA, will provide a national overview of the demand for federal aid and the ability of current programs to meet it.

Financial Performance

The growth in federal aid (currently $1.9 billion annually, or about one-third of the total public investment in airports), has led to research into the financial performance of airports. Work is now under way at VNTSC to determine how the cost of air transportation is related to airport costs. Airports account for approximately 10 percent of all expenditures on air transportation, but little has been done in the past to measure performance or compare costs at similar airports. The initial round of research will establish measures of financial performance and lay the groundwork for possible future analyses in areas such as the effectiveness of alternative management techniques.

This research could provide a basis for evaluating the broad economic implications of developing a high-speed ground transportation system to supplement air transportation.

Computer Simulation

Breakthroughs are being made in the computer simulation of airport operations. A variety of fast time simulations have been developed for analyzing aircraft movement at individual airports or small groups of airports. Virtually every major airfield improvement program is supported by a computer model that estimates the expected benefits in terms of reduced delay. The technology behind these models was developed over the past 25 years with financial support from FAA. Current research is aimed at improving the models, easing data-entry tasks, increasing the use of graphics, and upgrading model architecture by applying object-oriented programming techniques.

Increased emphasis is being placed on system models in order to capture the national benefit as delay reduction at one airport ripples out and improves efficiency throughout the system. An analytical model now being developed at the Massachusetts Institute of Technology will permit more accurate estimates of the benefits of airport improvements, running through thousands of possible combinations of weather conditions and aircraft acceptance rates at major airports. This type of model may eventually be used to estimate the delay reduction that would result from the diversion of some air travel to high-speed rail or other modes of travel.

Strategic Planning

FAA has conducted an initial round of strategic planning for the airport system, looking at the likely demand for air travel in 2010 and beyond and the airport facilities that may be needed. As part of this effort, the Transportation Research Board issued *Special Report 226—Airport System Capacity: Strategic Choices*. The report deals qualitatively with alternative economic scenarios and corresponding strategies for satisfying transportation demand. The authors make it clear that no single strategy can adequately cover all eventualities. They suggest that the most attractive scenarios, with high economic growth and high achievement in technology, would involve an all-out effort by government and private industry to develop and implement new technology in air and ground transportation. FAA intends to continue its strategic planning process, but has not yet decided on a specific course of action. One possibility is to select an attractive future economic scenario as a goal and define the steps that must be taken to help achieve it. The future split in intercity travel among air, highway, and rail will be a major topic in this research.

Much of the airport research now under way involves the collection and compilation of available information in a format useful to airport planners. This relatively inexpensive synthesis research will provide FAA with an overview of what is known and help identify areas for further research. The next round will probably be focused

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1993 National Steel Construction Conference
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Contact American Institute of Steel Construction, Inc., One East Wacker Drive, Suite 3100, Chicago, Ill. 60601-2001 (telephone 312-670-5400, fax 312-670-5403).

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Sponsor Centers for Disease Control.
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Contact Conference Coordinator, Second World Conference on Injury Control, c/o Division of Injury Control, Mailstop F-41, NCEHIC, Centers for Disease Control, Atlanta, Ga. 30333 (fax 404-488-4349).

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Subjects State safety management system; vehicle design; intelligent vehicle-highway systems; safety hardware and software; retroreflectivity; work zones; pedestrians, older drivers, and human factors; and traffic records and accident location analysis.
Contact Send five copies of 300- to 500-word abstracts to Charles J. Goedken, 826 Lightfoot Drive, Lancaster, Pa. 17602 (telephone 717-295-7020, fax 717-295-7023).

NTSB Studies *continued from page 26*

D.C. Copies of completed safety studies are available through the National Technical Information Service, 5285 Port Royal Road, Springfield, Virginia 22161. A list of completed safety studies can be obtained by writing to the Safety Studies Division, National Transportation Safety Board, 490 L'Enfant Plaza East, S.W., Washington, D.C. 20594.

Airport Research *continued from page 16*

on specific topics and be more expensive and time-consuming.

The budgetary and institutional issues of a broad airport research program have not yet been decided, but some major points are becoming apparent. The overall goal is to develop a comprehensive and useful body of knowledge on the planning, design, and operation of airports. This involves a major expansion of FAA's past research, which concentrated almost exclusively on the movement of aircraft. The success of the effort will depend on better communication among federal, state, and local officials, including researchers, practitioners, and operators of transportation facilities. An agenda is needed to identify topics for required research and resources and to set a schedule. Much of this can be accomplished during the next few years while the current round of synthesis research is under way.

It is important to consider which agencies are most appropriate to conduct the research. Consultants are heavily relied on for airport planning. The competition among these firms has encouraged them to retain much of their practical knowledge and experience as proprietary assets instead of contributing them to the general body of knowledge. The extent to which these firms will be willing to share their accumulated knowledge, and at what price, remains to be seen.

FAA has developed an in-house operations research group that could play a major role, particularly in examining how local factors such as airport and ground access limitations contribute to air traffic congestion and delay.

Another issue will be the role of academia. Research by graduate students has been effectively used by FAA to help develop computer models, and other topics could be pursued if funds were available. Research at the undergraduate level has largely been neglected but could be useful in attracting talented students and encouraging them to plan careers in aviation. Some mechanisms are available to conduct FAA-sponsored academic research, but the scale of current activity is modest and may need to be reconsidered.

Options for the Future

FAA will probably not be willing or able to address all of the airport-related topics that warrant research. Some topics will be of greater interest to state and local governments because they are responsible for airport development and operation. Consideration should be given to a mechanism for conducting research in areas that are of limited interest to the federal government, such as airport management. The national cooperative research programs for highways and transit may provide useful models in which research is centrally financed but directed toward state and local issues.