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# SURFACE TRANSPORTATION

# Prospects for Innovation Through Research, Intelligent Transportation Systems, State Infrastructure Banks, and Design-Build Contracting

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Mr. Chairman and Members of the Subcommittee:

We appreciate the opportunity to testify on how innovation in federal research, financing and contracting methods has the potential for improving the performance of the nation's surface transportation system. Our testimony is based on three reports that we have recently completed for this Committee's deliberations on the reauthorization of the Intermodal Surface Transportation Efficiency Act (ISTEA), as well as ongoing work for the Committee.[1] In summary, we reported the following:

- Investments in surface transportation research have provided benefits to users and the economy. These benefits include crash protection devices, such as seat belts and car seats for infants and children; programs to reduce alcohol-related deaths; and longer-lasting highway surfaces that reduce maintenance costs. The Department of Transportation (DOT) has a critical role to play by funding research, establishing an overall research mission with objectives for accomplishment and priorities for allocating funds, and acting as a focal point for technology transfer. However, DOT's organizational structure and lack of both a strategic plan and a departmental focal point may limit its impact on research. Until these issues are addressed, the Department may not be able to respond to ISTEA's call for an integrated framework for surface transportation research.

- Established by ISTEA, DOT's Intelligent Transportation System (ITS) Program has received $1.3 billion to advance the use of computer and telecommunications technology that will enhance the safety and efficiency of surface transportation. Although the program envisioned widespread deployment of integrated multimodal ITS systems, this vision has not been realized for several reasons. First, the ITS national architecture was not completed until July 1996 and ITS technical standards will not be completed until 2001. The ITS architecture and technical standards, which define ITS elements and how they will work together, are prerequisites to a large scale, integrated deployment of ITS systems. In addition, the lack of knowledge of ITS technologies and systems integration among state and local officials, insufficient data documenting the cost effectiveness of ITS in solving transportation problems and competing priorities for limited transportation dollars will further constrain widespread ITS deployment. Before DOT can aggressively pursue widespread deployment of integrated

[1]Surface Transportation: Research Funding, Federal Role, and Emerging Issues (GAO/RCED-96-233, Sept. 6, 1996), Urban Transportation: Challenges to Widespread Deployment of ITS Technologies (GAO/RCED-97-74, Feb. 27, 1997), State Infrastructure Banks: A Mechanism to Expand Federal Transportation Financing (GAO/RCED-97-9, Oct. 31, 1996).

ITS, it must help state and local officials overcome these obstacles.

- State Infrastructure Banks (SIBs) offer the promise of helping to close the gap between transportation needs and available resources by sustaining and potentially expanding a fixed sum of federal capital, often by attracting private investment. Specifically, these banks provide states increased flexibility to offer many types of financial assistance, such as loans or letters of credit, tailored to fit a project's specific needs. Benefits include expediting project completion, recycling loan repayments to future projects, and obtaining financial support from the private sector and local communities. However, some state officials and industry experts that we talked with remain skeptical that SIBs will produce the expected benefits. Reasons for their skepticism include concern that there are (1) an insufficient number of projects with a potential revenue stream needed to repay the loans and (2) impediments under state law. Only time will tell. This program is new; only one state has begun a project under its SIB since the initial pilot states were selected for SIB participation in April 1996. Therefore, it is too early to assess how effectively SIBs will help to meet transportation needs.

Our ongoing work has found that

- the Federal Highway Administration (FHWA) is testing and evaluating the use of an innovative design-build contracting method for highway construction. This method differs from traditional contracting practice in that it combines, rather than separates responsibility for the design and construction phases of a highway project. Proponents of design-build see several advantages to the approach, including better accountability for costs and quality, less time spent coordinating designer and builder activities, firmer knowledge of project costs, and reduced burden in administering contracts. However, FHWA's authority to implement design-build is limited and 17 states have laws which, in effect, prevent the use of design-build. Finally, while design-build may result in the faster completion of projects, it may also require an accelerated revenue stream to pay for construction.

## DOT's Leadership Role in Surface Transportation Research

ISTEA expressed the need for a new direction in surface transportation research, finding that despite an annual federal expenditure of more than $10 billion on surface transportation and its infrastructure, the federal government lacked a clear vision of the role of federally funded surface transportation research and an integrated framework for the fragmented

surface transportation research programs dispersed throughout the government. The act recognized the federal government as a critical sponsor and coordinator of new technologies that would provide safer, more convenient, and more affordable future transportation systems.

Our September 1996 report on surface transportation research confirmed what ISTEA stressed—DOT must play a critical role in surface transportation research. DOT's role as the leader in surface transportation research stems from the Department's national perspective, which transcends the interests and limitations of nonfederal stakeholders. For example, the states generally focus on applied research to solve specific problems; industry funds research to develop new or expanded markets; and universities train future transportation specialists and conduct research that reflects the interests of their funders.

While the Department has established councils and committees to coordinate its research, the lack of a departmental focal point and an inadequate strategic plan may limit its leadership role. First, surface transportation research within the Department is focused on improving individual modes of transportation rather than on creating an integrated framework for surface transportation research. This modal structure makes it difficult for DOT to develop a surface transportation system mission; accommodate the need for types of research—such as intermodal and systems assessment research—that do not have a modal focus; and identify and coordinate research that cuts across modes.

Second, DOT does not have a Department-level focal point to oversee its research, such as an Assistant Secretary for Research and Development. Instead an Associate Administrator of the Research and Special Projects Administration (RSPA) coordinates the Department's surface research programs. Although RSPA was established to foster cross-cutting research, it does not have the funding resources or the internal clout to function effectively as a strategic planner for surface transportation research. RSPA acts in an advisory capacity and has no control over the modal agencies' budgets or policies.

Finally, the Department does not have an integrated framework for surface transportation research. The three research plans that the Department has submitted to the Congress since 1993 are useful inventories of the five modal agencies' research activities. However, the plans cannot be used, as ISTEA directed, to make surface transportation research more strategic, integrated, and focused. Until all these issues are

addressed, the Department may not be able to respond to ISTEA's call for an integrated framework for surface transportation research and assume a leadership role in surface research.

## ITS Program Holds Potential for Innovation If Deployment Obstacles Can Be Resolved

ISTEA also reflected congressional concerns about the adequacy of the funding for advanced transportation systems, suggesting that too little funding would increase the nation's dependence on foreign technologies and equipment. The act therefore increased the funding for many existing and new research programs, especially for the ITS program. Since 1992, the ITS program has received through contract authority and the annual appropriations process about $1.3 billion. This amount represents about 36 percent of the $3.5 billion the federal government provided for surface research programs from 1992 to 1997.

Our February 1997 report examined the progress made in deploying ITS technologies and ways in which the federal government could facilitate further deployment. On the first issue, a 1995 DOT-funded study found that 7 of 10 larger urban areas were using some ITS technologies to help solve their transportation problems. An example of an area that has widely deployed ITS technologies is Minneapolis. The Minneapolis ITS program, part of the state's "Guidestar" program, first began operational tests in 1991. Since that time, about $64 million in public and private funds have been invested in Guidestar projects. With these funds, Minneapolis upgraded its traffic management center so that it could better monitor traffic flow and roadway conditions and installed ramp meters to control the flow of traffic entering the expressways. These improvements have helped increase average highway speeds during rush hour by 35 percent.

Although urban areas are deploying individual ITS components, we found that states and localities are not integrating the various ITS components so that they work together and thereby maximize the overall efficiency of the entire transportation system. For example, transportation officials in the Washington, D.C., area said that local jurisdictions have installed electronic toll collection, traveler information, and highway surveillance systems without integrating the components into a multimodal system. This lack of systems integration is due in part to the fact that ITS is a relatively new program that is still evolving and has yet to fully implement some fundamental program components such as the national architecture and technical standards. The national architecture, which identifies the components and functions of an ITS system, was completed in July 1996. In addition, a five year effort to develop technical standards—which specify

how system components will communicate—is planned for completion in 2001.

We also found that the lack of widespread deployment of integrated ITS systems results from insufficient knowledge of ITS systems among state and local transportation agencies; limited data on the costs and benefits of ITS; and inadequate funding in light of other transportation investment priorities. The funding issue is particularly important since DOT has changed the program's short-term focus to include a greater emphasis on deploying ITS technologies rather than simply conducting research and operational tests. The federal government's future commitment to a deployment program would have to balance the need to continue progress made under the program with federal budgetary constraints. Urban transportation officials in the nation's 10 largest cities we interviewed had mixed views on an appropriate federal role for funding ITS deployment. Officials in 6 of 10 urban areas supported a large federal commitment of $1 billion each year. Typically, these officials contended that future ITS deployments would be limited without specific funding for this approach. For example, a New York transportation planner said that without large-scale funding, ITS investment would have to compete for scarce dollars with higher-priority road and bridge rehabilitation projects. Under such a scenario, plans for deploying ITS would be delayed. These officials also favored new federal funding rather than a set-aside of existing federal-aid highway dollars.

In contrast, officials from four other urban areas opposed a large-scale federal aid program because they do not want additional federal funding categories. Some of these officials also said that such a program could drive unnecessary ITS investments, as decisionmakers chased ITS capital money, even though another solution might have been more cost-effective. One official noted that a large federal program would be very premature since the benefits of many ITS applications have yet to be proven despite the claims of ITS proponents. In the absence of a large federal program, officials from 5 of the 10 urban areas supported a smaller-scale federal seed program. They said that such a program could be used to fund experimental ITS applications, promote better working relationships among key agencies, or support information systems for travellers.

Deliberations on the future funding for the ITS program should include an assessment of the current obstacles facing the program. First, the system architecture is relatively new, and state and local officials have limited knowledge of its importance. Second, it will take time for state and local

transportation officials to understand the architecture and supplement their traditional approach to solving transportation problems through civil engineering strategies with the information management and telecommunications focus envisioned by an integrated ITS approach. In addition, widespread integrated deployment cannot occur without the technical standards that DOT proposes to complete over the next 5 years.

## Innovative Financing Through State Infrastructure Banks

Until recently, states have generally not been able to tailor federal highway funding to a form other than a grant. The National Highway System Designation Act of 1995 established a number of innovative financing mechanisms, including the authorization of a SIB Pilot Program for up to 10 states or multistate applicants—8 states were selected in April 1996 and 2 were selected in June 1996. Under this program, states can use up to 10 percent of most of their fiscal years 1996 and 1997 federal highway funds to establish their SIBs. This program was expanded by DOT's fiscal year 1997 appropriations act that removed the 10-state limit and provided $150 million in new funds.

A SIB serves essentially as an umbrella under which a variety of innovative finance techniques can be implemented. Much like a bank, a SIB would need equity capital to get started, and equity capital could be provided at least in part through federal highway funds. Once capitalized, the SIB could offer a range of loans and credit options, such as loan guarantees and lines of credit. For example, through a revolving fund, states could lend money to public or private sponsors of transportation projects. Project-based revenues, such as tolls, or general revenues, such as dedicated taxes, could be used to repay loans with interest, and the repayments would replenish the fund so that new loans could be supported. Thus projects with potential revenue streams will be needed to make a SIB viable.

Expected assistance for some of the projects in the initial 10 states selected for the pilot program include loans ranging from $60,000 to $30 million, credit enhancement to support bonds and a line of credit. In some cases, large projects that are already underway may be helped through SIB financial assistance. Examples of projects states are considering for financial assistance include:

- A $713 million project in Orange County, California, that includes construction of a 24-mile tollway. SIB assistance in the form of a $25 million line of credit may be used for this project to replace an existing

contingency fund. If accessed, the plan is that the line of credit would be repaid through excess toll revenues.

- A $240 million project in Orlando, Florida, will involve construction of a 6 mile-segment to complete a 56-mile beltway. A SIB project loan in the amount of $20 million is being considered, and loan repayment would come from a mix of project and systemwide toll receipts and state transportation funds.
- In Myrtle Beach, South Carolina, a SIB loan is being considered to help with the construction of a $15 million new bridge to Fantasy Harbor. The source for repayment of the loan would be proceeds from an admission tax at the Fantasy Harbor entertainment complex.

These examples represent but a few of the projects being considered for SIB assistance by the initial 10 SIB pilot states.

SIB financial assistance is intended to complement, not replace, traditional transportation grant programs and provide states increased flexibility to offer many types of financial assistance. As a result, projects could be completed more quickly, some projects could be built that would otherwise be delayed or infeasible if conventional federal grants were used, and private investment in transportation could be increased. Furthermore, a longer-term anticipated benefit is that repaid SIB loans can be "recycled" as a source of funds for future transportation projects. If states choose to leverage SIB funds, DOT has estimated that $2 billion in federal capital provided through SIBs could be expected to attract an additional $4 billion for transportation investments.

For some states, barriers to establishing and effectively using a SIB still remain. One example is the low number of projects that could generate revenue and thus repay loans made by SIBs. Six of the states that we surveyed told us that an insufficient number of projects with a potential revenue stream would diminish the prospects that their state would participate in the SIB pilot program. Ten of 11 states that we talked with about this issue said they were considering tolls as a revenue source. However, state officials also told us that they expected tolls would generate considerable negative reaction from political officials and the general public.

Some states expressed uncertainty regarding their legal or constitutional authority to establish a SIB in their state or use some financing options that would involve the private sector. Michigan, for instance, said that it

does not currently have the constitutional authority to lend money to the private sector.

Since $150 million was appropriated for fiscal year 1997 and the 10 state restriction was lifted, DOT has received applications from 28 additional states. DOT has not yet selected additional states for the program. In addition, DOT has not yet developed criteria or a mechanism for determining how the funds will be distributed to selected states.

The SIB program has been slow to start-up. Only one state—Ohio—has actually begun a toll road project under its SIB since April 1996 when the first states were selected for the program. The program will need time to develop and mature.

## Innovative Practices Using Design-Build Contracting

Innovation can also occur through different methods to design and construct transportation projects. Of particular note is FHWA's special project to test and evaluate the use of design-build contracting methods under the agency's authority to conduct research. The project is an outgrowth of a 1987 Transportation Research Board task force report that identified innovative contracting practices such as design-build. The design-build method differs from the traditional design-bid-build method since it combines, rather than separates responsibility for the design and construction phase of a highway project.

Proponents of design-build have identified several benefits. First, the highway agency can hold one contractor, rather than two or more, accountable for the quality and costs of the project. This compares to the traditional approach where problems with the project resulted in disputes between the design and construction firms. Second, by working together from the beginning, the designer and builder would have a firmer understanding of the project costs and could thereby reduce costs by incorporating value engineering savings[2] into the design. Finally, design-build proponents state the approach will reduce administrative burden and expenses because fewer contracts would be needed.

State interest in the design-build contracting approach is rising. According to FHWA, as of January 1997, 13 states have initiated at least 50 design-build projects under the agency's special program. The size of state projects varies considerably, from bridge projects costing a few million dollars to

[2]Value engineering is the formal technique by which contractors or independent teams identify methods for constructing projects more economically.

the $1.4 billion reconstruction of I-15 in Utah. While states are becoming more receptive to design-build contracting, FHWA still considers the approach experimental, and an overall assessment of the broad benefits, costs, and applicability of design-build remains limited by the small number of completed projects.

One difficulty in implementing design-build lies in state laws limiting its use. A 1996 Design-Build Institute of America survey of state procurement laws documents this problem. The survey identified 17 states that did not permit the use of combined design and construction contracts. In addition, a 1995 Study by the Building Futures Council noted that some states indirectly preclude design-build by requiring separation of design and construction services—construction services being awarded to the lowest bidder only after the design is complete.

In addition, similar requirements applicable to state highway construction contracts under the federal-aid highway program limit FHWA's authority to allow design-build contracts outside those that are part of its special project. However, an official within FHWA's Office of Engineering suggested that continuing the current special project may be appropriate because no consensus exists within the highway construction industry on the desirability of the design-build approach.

A final consideration that may limit the use of design-build contracting is project financing. When design-build is applied to expensive, large infrastructure projects, financing can be more complex because the projects are constructed faster than under conventional contracting practices. Faster construction means that funds will be required faster, which may pose difficulties if the project's revenue stream does not keep pace. For example, in our review of a large design-build transit project, the extension of the Bay Area Rapid Transit (BART) system to the San Francisco International Airport, we found that BART required a borrowing program to cover cash shortfalls during construction. With design-build, BART may save construction costs but will incur additional financing costs.

Design-build contracting, while becoming increasingly common in the private sector for facilities such as industrial plants and refineries, does not yet have an established track record in transportation in the United States. However, the experiences now being gained through the 50 projects under FHWA's special project, along with four Federal Transit Administration funded demonstration projects, may provide sufficient evidence of the efficacy of design-build. Early experience suggests that in

instances when time is at a premium, and project revenue sources quickly cover construction costs, design-build may provide a good fit with project requirements. One area where these opportunities may exist is FHWA's Emergency Relief Program, which places emphasis on the quick reconstruction of damaged facilities.

Mr. Chairman, this concludes our prepared statement on the potential benefits and challenges of four examples of innovation in surface transportation research, finance and contracting. We will be happy to respond to any questions you might have.

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