Development and Deployment of Standards for Intelligent Transportation Systems

Review of the Federal Program

JOCELYN N. SANDS

The author is Research Associate, TRB Studies and Information Services. cting under the authority of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and the Transportation Equity Act for the 21st Century (TEA-21), the U.S. Department of Transportation (DOT) has pursued initiatives to

• Encourage the adoption of intelligent transportation systems (ITS) technology in domestic applications, and

• Support the competitiveness of U.S. ITS providers in international markets.

These initiatives include promoting the develop-



The National Transportation Communications for ITS Protocol (NCTIP) for Dynamic Message Signs was among the applications areas discussed by the study committee. Above, an NCTIP-compliant variable message sign near Sioux Falls, South Dakota.

ment and adoption of technical standards to specify the operating characteristics of ITS components and subsystems.

In 1996, U.S. DOT established an ITS Standards Program administered by the Joint Program Office (JPO). Annual budget allocations for standardsrelated activities under the program have totaled \$7 to \$10 million.

Many activities have relied on an institutional framework provided by standards development organizations (SDOs), including the American Association of State Highway and Transportation Officials, the Institute of Transportation Engineers, the American Public Transportation Association, the Institute of Electrical and Electronics Engineers, and the Society of Automotive Engineers. U.S. DOT provides funds to support the work of the volunteer committees that devise the standards.

Evaluating the Strategy

In 1999, JPO asked the Transportation Research Board (TRB) to conduct a review of the ITS Standards Program and to evaluate the program's strategy for introducing standards. Under the auspices of the National Academies, TRB assembled a committee to review the program and published the findings and recommendations in *Standards for Intelligent Transportation Systems: Review of the Federal Program* (1), which served as Phase I of a two-phase study.

TRB subsequently formed a new committee for Phase II, drawn largely from members of the Phase I committee, with expertise in standards development and public policy, highway and traffic management, transit operations and management, automotive tech-



TRB Special Report 280, Development and Deployment of Standards for Intelligent Transportation Systems: Review of the Federal Program, is available from TRB (view the book online at, www.TRB.org/ publications/sr/sr280.pdf). nology, and systems engineering and safety (see box, below). The committee presented interim findings and recommendations in four letter reports.¹ TRB Special Report 280, *Development and Deployment of Standards for Intelligent Transportation Systems: Review of the Federal Program*, presents the final outcome of the committee's deliberations.

Phase II focused on the obstacles to effective standards deployment and how to overcome the obstacles. Emerging obstacles include

• Balancing the interests of purchasers and suppliers of ITS equipment while enhancing the public benefits from investments in the technology,

• Ensuring that federally supported standards are widely used in practice, and

• Ensuring appropriate interoperability within and among ITS installations.

After review, the committee concluded that the objectives of the ITS Standards Program have been appropriate, the overall strategy has been reasonable, and the execution has made credible contributions to achieving the congressional mandates in ISTEA and TEA-21. Despite the substantial progress, ITS development and deployment are still in an early stage. The committee recommended several improvements to enhance the effectiveness of the ITS Standards Program.

Committee for Review of the U.S. Department of Transportation's Intelligent Transportation Systems Standards Program

Jonathan L. Gifford, George Mason University, Chair Jules A. Bellisio, Telemediators, LLC A. Ray Chamberlain, Parsons Brinckerhoff Irwin Dorros, NAE, Independent consultant William F. Johnson, Independent consultant Samuel Krislov, University of Minnesota, Minneapolis–St. Paul Alexander Lopez, Metropolitan Transit Authority of Harris County, Texas James R. Robinson, Virginia Department of Transportation Steven E. Shladover, University of California, Berkeley William M. Spreitzer, General Motors Corporation (retired) Scott E. Stewart, IBI Group Philip J. Tarnoff, University of Maryland, College Park James L. Wright, Minnesota Department of Transportation

TRB Staff

Stephen R. Godwin, Director, Division of Studies and Information Services

Consultant Andrew C. Lemer, Matrix Group, LLC, Baltimore, Maryland

Setting Priorities

Although effective standards may develop without government support, the committee assumed that continued federal support would be necessary for such activities as travel by public-sector professionals to meetings of SDO committees. To determine which standards and deployment activities should have priority for government support, the committee reflected on the characteristics and sources of standards that ultimately would be effective in directing the deployment of ITS technologies.

The committee identified three primary criteria for judging the likely effectiveness of federal support:

• Goal consistency—does the standard contribute to the implementation of specific services within the framework of the National ITS Architecture?

• Role consistency—is federal support for the development of a particular standard appropriate?

• Efficiency—how do the costs of developing and deploying a standard compare with the potential benefits or losses from not having an effective standard in place during implementation?

Recommendations

The committee recognized that implementing the various suggestions would require funds and professional resources that may exceed the budget for the standards program and offered the following recommendations:

Investing Resources

• JPO should invest resources in standards development and deployment after a clearly delineated assessment of (a) how the standard would enable deployment of important ITS services and (b) the national benefits that would be gained by accelerating promulgation of the standard. The potential for contributing to interoperability on the national scale is a key indicator of benefits; however, contributing to safety, security, technological leadership, international trade, and other valid federal concerns also may justify federal support.

• JPO should develop outcome-oriented measures of effectiveness for the ITS Standards Program and should make clear that the use of standards translates into a substantial return on the public's investment.

Guiding Development

• JPO and the standards developers it supports should adhere strictly to the following stages in standards development:



Schematic view of National ITS Architecture, Version 5.0. (Source: itsarch.iteris.com/itsarch/html/entity/paents_b.htm.)

1. *Testing*. Tests must ensure that the proposed standard is useful in field applications and will perform as expected. The testing should be completed before a proposed standard is submitted for balloting and adoption under SDO procedures.

2. *Formal adoption*. Balloting or another unambiguous mechanism should identify a standard as ready for use in practice.

3. Assessment of readiness for deployment. JPO should consider the number of applications expected in 3 to 5 years, the numbers of manufacturers and system integrators capable of installations that meet the standard, and the availability of information and materials to facilitate application of the standard, such as sample specifications, documentation, and training programs.

4. *Post-adoption support*. Training and maintenance, for example, should be pursued only after a standard has passed through the stages of formal adoption and assessment of readiness for deployment.

• Rulemaking should be used sparingly or not at all for ITS standards; rulemaking may be justifiable, however, for ITS standards supporting safety and security.

Looking to the Long Term

JPO should support a range of activities to

make standards development and deployment effective in the long term, including

Research and development;

- Testing and demonstration to validate and assure usability of standards;

- Establishment of a national, independent verification and validation capability by the stakeholder community;

- Training for standards users; and

– Maintenance of the standards that have been developed with federal support.

• JPO should streamline the process for developing and revising standards.

 U.S. DOT should consider judicious expansion of the ITS Standards Program to include services that span the interface between in-vehicle and roadside infrastructure subsystems that are consistent with

The program's goals;

- The role of government as a stakeholder in advancing ITS technology; and

– Efficient investment of government resources to achieve public purposes, particularly the national interoperability of ITS.

Reference

 Standards for Intelligent Transportation Systems: Review of the Federal Program. TRB, National Research Council, Washington, D.C., 2000. http:// gulliver.trb.org/publications/reports/its_standards_ review.pdf.