

# VOLPE CENTER WORK ON ITS HELPS FORGE NEW PARTNERSHIPS

*Intelligent Transportation Systems (ITS) offer the promise of increased efficiency and safety in our transportation infrastructure. But the implementation of new technologies is often hampered not so much by technical issues as by the way organizations make decisions. In addition to providing extensive support for the development and deployment of ITS technologies, the Volpe Center is actively involved in identifying non-technical barriers to ITS deployment. These efforts will help streamline ITS implementation and may offer lessons on how to more effectively structure government initiatives involving multiple parties.*



As we approach the dawn of a new century, officials who manage transportation systems around the country are increasingly using information derived from leading edge technologies to improve the efficiency and safety of those systems. From video surveillance cameras that gather data to identify the least congested route to work or help us decide whether to drive or take the bus, to high-end vehicle sensing systems that can prevent accidents in the blink of an eye, the management of transportation systems through the intelligent application of advanced technologies can help to ensure our future mobility for years to come.

The application of information and technology to the problems facing our transportation infrastructure has spawned extensive work by government agencies, industry groups, and academic research centers on the development and deployment of Intelligent Transportation Systems (ITS). Analysts and other key staff at the Volpe National Transportation Systems Center are making important contributions to this endeavor, helping to identify some of the most promising ITS technologies and determining how ITS can best transform ground transportation in the near future.

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*ITS America estimates that productivity losses due to traffic delays amount to \$100 billion annually.*

But while research and field work on the application of ITS technologies is proceeding on a number of fronts, it has become clear that the task of coordinating these initiatives is significant. Further, municipal officials charged with deploying such systems often lack sufficient understanding of ITS technologies or how to incorporate ITS into their current transit planning. Finally, because the effective incorporation of ITS requires strong partnerships between federal, state, and local transportation agencies as well as private interests, a number of institutional impediments must be acknowledged and dealt with.

Thus the Volpe Center's Economic Analysis Division also is involved in a major effort to evaluate ITS deployment around the country and to identify institutional and process-based obstacles to progress. This important work ultimately will lead to more informed and better coordinated planning for ITS deployment and more effective use of available financial resources.

## **THE NEED FOR INTELLIGENT TRANSPORTATION SYSTEMS**

Anyone who has been caught in rush-hour traffic or waited in the cold for a bus or train understands firsthand the problems transportation authorities face in coping with ever-increasing volumes of traffic and managing complex surface transportation networks. We are a nation on the move and highly dependent on the automobile to get where we want to go. Unfortunately, it often seems that we are all trying to go somewhere at the same time.

According to some estimates, Americans spend nearly two billion hours each year stuck in traffic. With more than 181 million vehicles on our roadways, we could reasonably wonder why we actually don't spend more time tied up in traffic congestion. ITS America, a Congressionally mandated public-private partnership established to coordinate the development and deployment of ITS technology, estimates that traffic congestion already costs us \$100 billion in lost productivity every year.

Of course, being delayed on our trip to work is only one portion of the cost of an inefficient transportation infrastructure. Traffic congestion dramatically increases fuel consumption and contributes to air pollution in our metropolitan areas. And then there is the human cost to the problems plaguing our current transportation infrastructure. More than 40,000 people are killed each year in traffic-related accidents, with an additional three million people injured.

Until recently, the standard solution to the growing volume of traffic has been to pour billions of dollars into new highway construction. But while the capacity of our roads and highways to carry additional vehicles may have

grown, these expenditures have not addressed the underlying inefficiencies in our current transportation model. There is a limit to how much we can increase transportation capacity simply by building more roads.

## **THE PROMISE OF ITS**

ITS really represents a broad range of diverse technologies, including communications systems and information processing, that work within the existing transportation infrastructure to move people more efficiently and safely. The use of ITS is not really new—the ubiquitous four-way traffic signal could probably be classified as one of our earliest forms of an ITS technology. But technical advances in recent years have moved ITS to the forefront of those tools now being used by transportation authorities to creatively address the problems that increased demand for transportation services has placed on our existing systems. Some typical modern-day uses of ITS technology include the following systems:

- In-vehicle computers and video displays that help drivers safely navigate to their destination;
- Systems that provide drivers with real-time information on traffic conditions and location of transit vehicles before and during their trip, helping them to avoid congested areas;
- Tracking systems that link bus scheduling to traffic signal timing, ensuring better transit on-time performance;
- Sensors that can avoid accidents by automatically applying the brakes when a vehicle is too close to another; and
- Automatic toll systems that speed collections and eliminate backups at bridges and tunnels.

These programs would have been mere science fiction even 10 years ago. Today, they represent the application of state-of-the-art technology to the problems we now face in transportation. Over the next 15 years, it is estimated that we will invest more than \$200 billion to develop and deploy these and similar systems, making ITS technologies widely available, even commonplace.

In addition to building a safer and more efficient transportation infrastructure, these investments in ITS can provide important financial benefits to federal, state, and local government agencies. A recent Volpe Center study projects that annual savings over the next 10 years from the deployment of advanced public transportation systems incorporating ITS technology could reach as much as \$1 billion, with total savings in excess of \$7 billion (in present value dollars). And those projected savings only account for the application of ITS technologies to public transportation, admittedly a small portion of the



*Examples of ITS technology include in-vehicle computers and video displays that help drivers safely navigate to their destination.*



*Effective communication between participants with an interest in ITS solutions can speed implementation.*

overall transportation network. When ITS technologies are applied to the rest of the transportation infrastructure, the potential savings are immeasurable.

Another important benefit in the efforts to develop ITS solutions to deal with our transportation problems has been the role played by non-traditional industries in the formulation of solutions. Previously, construction companies and automobile manufacturers would have been the focal point for technical innovation. But the application of technology to today's transportation issues brings into the picture a host of companies, such as manufacturers of advanced electronic products, that would have been considered outsiders in the past. These newcomers are not bound by traditional thinking about transportation and realize the business

opportunities inherent in improved transportation systems. Such potential benefits provide sufficient incentive for private industry to continue to invest in ITS development and deployment.

### **IDENTIFYING BARRIERS TO ITS DEPLOYMENT**

But the promise of ITS is potentially plagued by non-financial impediments. For example, an understanding of ITS products and services often requires specific technical knowledge that transportation analysts and planners may not currently have. Effectively implementing ITS solutions may involve coordinated efforts between multiple parties including federal, state, and local government agencies as well as private parties, all of whom bring a different set of issues to their participation.

In recognition of these potential obstacles to ITS deployment, the U.S. Department of Transportation's Joint Program Office for ITS requested the Volpe Center's Economic Analysis Division to evaluate the rate at which ITS solutions are being implemented and to identify institutional and non-technical barriers to implementation. Allan DeBlasio and other Volpe Center analysts and contractors conducted extensive research into how transportation planners make decisions regarding deployment of new technology, and how to adapt ITS-based improvements to existing transportation systems.

DeBlasio and other Volpe Center staff members conducted a preliminary study to determine the extent to which ITS solutions were being considered in local transportation planning processes. The study was expanded in 1993 to include the preparation of case studies on programs in seven major metropolitan areas.

These in-depth ITS program reviews included interviews and discussions with representatives of federal, state,

regional, and local transportation and transit agencies; county and local governments; metropolitan planning organizations; state, county, and local law enforcement officials; and others. Some of those interviewed were part of the initial planning process, while others were involved in day-to-day project activities.

### **EFFECTIVE EARLY PLANNING: A KEY TO SUCCESSFUL DEPLOYMENT**

An important early outcome of this research was the finding that Early Deployment Planning (EDP) studies are instrumental in the success of most ITS implementations. EDP studies generally represent the initial effort to determine the scale and scope of a local deployment of an ITS solution. As a planning tool, EDP studies can help participants to think about ITS and its applications, and allow them to safely evaluate alternative approaches in the early stages of planning before commitments are made.

Because the success of ITS deployment often depends on the cooperation of various federal, state, and local agencies, the process of completing an EDP study also can help to build working coalitions that include all of the major transportation players involved in a particular area. Further, the process of developing such a plan of action requires the best efforts of all of the participants and can, therefore, help to build a consensus.

In some cases, the preparation of an EDP plan identifies solutions to transportation issues that cannot be solved through the application of technology. Volpe Center research found at least one instance where the top three transportation needs identified were more frequent transit service, more routes of service, and increased hours of operation—issues more likely to be



*Impediments to ITS deployment include institutional factors, such as conflicting agendas of participants.*

solved only through increased funding rather than through more efficient resource utilization. In that way, the process of preparing an EDP plan helped to determine early on that ITS solutions were not appropriate.

### **THE IMPORTANCE OF EDUCATION AND TRAINING**

The research conducted by DeBlasio and other Volpe Center staff also uncovered evidence that lack of knowledge of information on ITS technology and deployment is a key institutional obstacle to the implementation of ITS programs. In a working paper presented to the annual meeting of ITS America in Houston in April 1996, DeBlasio reported that the most frequent theme noted in interviews with participants in the Volpe Center study was the critical role that education and learning play in the planning and deployment process.

“The interviewees and respondents mentioned the word education many times during the case study process as a solution to a range of issues,” said DeBlasio. “They said ‘educate yourself, educate your partners, educate your

management, educate your coworkers and subordinates, educate other possible players, educate government officials, and educate the general public.”

In this context, education does not represent traditional book learning, although formal training may be helpful in certain areas. Rather, according to Volpe Center research, participants in successful ITS deployment efforts see education and learning as a way of gaining greater technical knowledge and of staying informed about how transportation administrators in other cities are implementing ITS technologies. Further, education and learning can help lead to a better understanding of the administrative processes of effective systems deployment as well as the needs and attitudes of prospective users.

### **TEAM BUILDING THROUGH COMMUNICATION**

Ultimately, the research conducted by the Volpe Center on effective ITS deployments points to the critical importance of effective communication as a means of overcoming non-technical barriers to implementation. Indeed, sound planning, education, and learning are all dependent on the extent to which participants are willing to engage in active communication with each

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other and to share their knowledge of ITS technology, as well as their unique perspective on ITS deployment.

The ability of the participants to communicate effectively with one another will also dictate how successfully they can build a working partnership

with other players and with the general public on the critical transportation issues facing us all. As such, the research conducted by the Volpe Center has application for the development of other such multi-party partnerships, one that goes far beyond the implementation of a particular technology.

### **RESOURCES**

- “ITS Operational Tests: Lessons Learned,” ITS Quarterly, Summer, 1996.
- “Benefits Assessment of Advanced Public Transportation Systems,” Volpe Center Internal Document, July 30, 1996.
- “Assessment of ITS Deployment: State and Local Issues in ITS Planning,” Volpe Center Working Paper, January 11, 1996.
- “ITS User Acceptance Research on Transportation Managers,” Volpe Center Report, March 21, 1996.
- “Overcoming Non-Technical Barriers: Lessons Learned From ITS Operational Tests,” Volpe Center Working Paper, April 15, 1996.
- “Review of Metropolitan Areas: Discussions of Crosscutting Issues,” Volpe Center Report, July, 1996.