November/December 1998

Vol 62, No.3

U.S. Department of Transportation

Federal Highway Administration

Public Roads

- featuring developments in federal highway policies, programs, and research and technology -

The ITS Metropolitan Model Deployment Initiative

by Toni Wilbur

Hooray, it's celebration time. Actually four celebrations coast-to-coast, starting last June in Seattle and running through October in New York, marked the completion of a major step in achieving the goal of a national intelligent transportation infrastructure by 2005. The official kickoffs of model deployment projects in Seattle, San Antonio, Phoenix, and the New York City metropolitan area were the culmination of an effort that began in October 1996 when then Secretary of Transportation Federico Peña announced that these metropolitan areas had been selected to participate in the intelligent transportation systems (ITS) metropolitan Model Deployment Initiative, jointly sponsored by the Federal Highway Administration (FHWA) and the Federal Transit Administration.

The intelligent transportation infrastructure is an integrated system of nine intelligent transportation components, and under the metropolitan Model Deployment Initiative, partnerships of public agencies and private companies have deployed integrated, regional transportation management systems that provide improved operations, faster emergency response, and better incident management. Travelers in these areas can receive up-to-the-minute traffic information, transit schedules and arrival times, parking availability, and other transportation information via the Internet, cable television, hand-held and in-vehicle devices, kiosks, and a variety of other devices.

FHWA Administrator Kenneth Wykle gave the keynote address at the Seattle Smart Trek Summit held June 12, 1998.

The model deployment sites provide real-life examples of how technology and information systems, coupled with better operations and management strategies, can improve transportation in metropolitan areas. A rigorous evaluation of the model deployment projects is underway to document benefits, costs, and lessons learned. Other metropolitan areas can use these evaluation results to guide their own efforts to integrate ITS into their regional transportation plans and programs.

The metropolitan model deployment projects are true public-private partnerships, with the project partners providing approximately 50 percent of the total project cost. The partnerships are committed to providing long-term operations and management of the systems after the federal Model Deployment Initiative has ended.

Departments

Public Roads (ISSN 0033-3735; USPS 516-690) is published bi-monthly by the Office of Research and Development, Federal Highway Administration(FHWA), 400 Seventh Street SW, Washington, DC 20590.

Contact Editor

Seattle Smart Trek Model Deployment

Federal Highway Administrator Kenneth Wykle gave the keynote address at the Seattle Smart Trek Summit on June 12, 1998. The summit celebrated the kickoff of this model deployment. Smart Trek is a partnership of 25 public agencies and private companies that have integrated 29 projects designed to build upon the region's significant investment in ITS infrastructure.

Information That's Easy to Use

Smart Trek provides real-time traffic and transit information that is reliable and easy to understand and use. Microsoft, a Smart Trek partner, has added real-time, customized traffic information and travel times to its "Sidewalk" online entertainment guide. Other Web applications provide updated traffic-flow maps. A variety of other systems translate traffic and transit information into usable messages. A cable television program provides up-to-the-minute glimpses of traffic conditions and average speeds along key travel corridors. Real-time traveler information is also available at kiosks and on a variety of personal devices, including personal digital assistants, two-way pagers, in-vehicle navigation devices, and interactive television. Expanded use of variable message signs and highway-advisory radio systems complete a system of traveler information throughout the region.

Transit Information at Your Fingertips

King County Metro Transit uses automatic vehicle location (AVL) technology to track and monitor its fleet of 1,200 buses. This provides better fleet management and allows Smart Trek to provide real-time arrival information over the Internet, at major transit centers, and at Seattle-Tacoma International Airport. Smart Trek also provides transit routing, scheduling, ride-matching, and trip planning information for travelers in the Puget Sound region.

Shortening Emergency Response Times

Smart Trek has introduced an enhanced 9-1-1 system that supports "mayday" devices from two private companies. When a traveler needs help, the mayday device sends location information to a response center, helping to speed emergency response and save lives. Smart Trek is also installing Global Positioning System (GPS) equipment in incident-response vehicles to monitor their location and to assist dispatching.

Improved Freeway and Ferry Operations Smart Trek includes one of the most advanced freeway traffic management systems in the country, and it covers virtually all of the freeways in the greater Seattle area. The system includes 2,500 detection sensors, 188 closed-circuit television cameras, a fiber-optic communications system, 113 ramp meters, and numerous motorist call boxes.

Smart Trek has integrated the arterial and freeway systems so that traffic control can adjust to varying congestion levels. Congestion on airport approach roads and terminal drop-off/pick-up points is broadcast on separate arriving and departing radio channels and on variable message signs.

A ferry-locator system is using GPS to provide real-time information to travelers and operators on the location, heading, and speed of ferries. Vehicle queues at several ferry terminals are being monitored and broadcast to travelers through a variety of radio channels, variable message signs, and within terminal areas.

San Antonio TransGuide Model Deployment

San Antonio TransGuide Model Deployment provides better information to travelers, improved management capabilities for all public agencies, and greatly enhanced public safety. TransGuide's kickoff and a press event were held on July 21, 1998.

Telecommunications Can Save Lives

The LifeLink system uses the TransGuide telecommunications backbone to provide two-way video teleconferencing between emergency medical personnel in a trauma center and paramedics in an ambulance at the scene or en route to the hospital. Video cameras, microphones, and computers placed

inside ambulances allow trauma center physicians to actually see the patient, monitor vital signs, determine the types of injuries involved, authorize the proper treatment, and route patients to the appropriate facilities. This is the first time a traffic management system's telecommunications capabilities have been used in this way.

New Ways to Collect Traffic Information

So far, more than 20,000 private citizens have volunteered to put "traffic tag" sensors inside the windshields of their vehicles. The tags transmit a signal to antennas placed along the freeways and arterial streets to allow TransGuide to calculate average traffic flows. This information and reports of traffic accidents, lane closures, and other incidents are used to provide information on traffic conditions to travelers throughout the city.

Interactive touchscreen traveler information kiosks are placed at key tourist points. At the touch of a screen, travelers can access real-time traffic information; bus and airport information; weather reports; and points of interest, such as tourist attractions and restaurant locations.

In-vehicle navigational units provide drivers with turn-by-turn instructions to reach their destinations, along with real-time traffic conditions, congestion information, and information on regional points of interest. The navigational unit communicates the routes and other information using a map-and-guide display and voice prompting.

21st Century Transportation Management

TransGuide is the first system of its kind to respond to traffic incidents with preprogrammed scenarios — a process adapted from the National Aeronautics and Space Administration (NASA) space program.

TransGuide uses fiber optics, sensors, and video cameras to detect changes in traffic flow and alert operators in the TransGuide Operations Center. Operators then use remote cameras to identify the type of incident and dispatch the appropriate help within two minutes. Once the type of incident is determined, within 15 seconds, lane control signals are automatically changed, and information is displayed on overhead variable message signs.

Phoenix AZTech Model Deployment

AZTech is a partnership of public agencies and private companies supporting a program for intelligent transportation systems in the entire Phoenix metropolitan area. Better traveler information, more accurate transit operations, and integrated transportation systems improve the commute for the millions of residents and visitors traveling in the Valley of the Sun.

AZTech Model Deployment came online in July 1998, and the kickoff ceremony was Sept. 28, 1998.

Integrating Transportation Systems

Seven cities, the state, county, transit agency, and emergency services agencies have integrated 13 operations centers in the Phoenix metropolitan area. Advanced communication technologies link these centers to monitor traffic conditions, manage incidents, and coordinate traffic signals across jurisdictional boundaries.

A network of road sensors, electronic signs, cameras, computers, communication equipment, and people provide the backbone for ITS in the Phoenix metropolitan area. On 67 kilometers of freeway and 240 kilometers of surface streets, advanced technologies detect congestion, identify incidents, notify response teams about accidents, and suggest alternate routes for drivers.

Smart Corridors and Shared Resources

AZTech uses technology to improve traffic flow along eight arterial "Smart Corridors," which serve as alternate routes when accidents or long delays force traffic to exit the freeways. Electronic signs alert drivers to delays, suggest alternate routes, and divert traffic between the Smart Corridors and the freeways. Traffic sensors and upgraded traffic signals allow the Smart Corridors to better handle increased traffic levels when diversions occur.

"Peer-to-peer permissive control" allows multiple agencies to share the use of field equipment, such as variable message signs and closed-circuit television cameras, when incidents or other events occur. Peer-to-peer permissive control also allows the local agencies to share control of their signal systems, providing backup coverage during periods when some operations centers are not staffed.

Improved Transit Management

GPS is used to locate more than 85 buses as they travel their routes. Dispatchers receive updates on traffic conditions and route status to determine if buses are on schedule. Electronic messages at transit centers and bus stops inform riders of the location of their bus. An Internet site and kiosks at transit centers also provide riders with information on bus routes, schedules, traffic conditions, and tourist attractions.

Informing Travelers

Travelers receive up-to-the-minute, regional traffic information through one of the first privatized traveler information systems in the country. Several private-sector AZTech partners are offering traffic information through a variety of products and services. Kiosks provide traffic updates and tourist information at malls, business centers, bus terminals, and other locations. Travelers can also view current traffic conditions on a cable television traffic channel and on the Internet.

Travelers can purchase computerized devices and services to receive personalized traffic reports. Information services on pagers, e-mail, and radio devices warn commuters about traffic problems along their route. Hand-held computers help residents and visitors travel the Phoenix metropolitan area by providing turn-by-turn directions, highlighting points of interest, and showing locations of various services.

New York-New Jersey-Connecticut iTravel Model Deployment

The iTravel model deployment, launched on Oct. 5, 1998, serves New York City, Long Island, the Lower Hudson Valley, southwest Connecticut, and northern and central New Jersey — an area with a population of more than 18 million people. The area has the highest population density, most complex transportation network, and most active public transportation system in the United States. More than 100 different transportation service providers operate and maintain the region's transportation network.

Information-Sharing for Better Transportation Management

Public-sector responsibilities for iTravel are coordinated through TRANSCOM, a coalition of 15 highway, transit, and public safety agencies. TRANSCOM's "regional architecture" is the multimodal information backbone that combines information on incidents, weather, special events, construction activities, and real-time transportation information. The regional architecture ensures coordination and integration of the transportation management and traveler information systems that are being implemented by the TRANSCOM agencies. iTravel adds information from various transit systems to the TRANSCOM regional architecture, providing the basis for the other iTravel elements.

Regional Traveler Information

iTravel disseminates real-time, multimodal information from the regional architecture to the general public through the iTravel Traveler Information Center. The information is available free of charge via telephone and the Internet.

Seamless Transit Itinerary Planning

A single trip in the New York-New Jersey-Connecticut metropolitan area might involve the subway and several different bus rides, depending on the time of day and the direction of travel. The regional iTravel Transit Itinerary Planning System (TRIPS) provides transit route guidance, schedules, rates, and real-time arrival information free of charge to users by telephone and on the Internet. A TRIPS user specifies the desired time of travel, origin and destination points, and the criteria for designing the trip. Criteria might include shortest walk, least expensive trip, or shortest travel time, to name a few. For the three-state region, and through multiple transit jurisdictions, TRIPS designs a trip that considers real-time travel conditions and the preferences provided by the user. TRIPS also notifies the user if there are any known impacts to travel along his or her preferred route.

Proactive, Personalized Traveler Information

The iTravel subscription-based, customized Personalized Traveler System is targeted at daily commuters, who proactively receive messages about real-time incidents, special events, or construction via telephone, e-mail, fax, or pager. A subscriber to the system provides a traveler profile, specifying the times of travel, the preferred route(s) and mode(s), payment options, and the way the information should be delivered. The traveler is contacted if his or her preferred travel route(s) is impacted prior to or during the specified travel times. The information is provided proactively, so the traveler does not need to remember to seek it out.

Conclusions

Each of the four ITS metropolitan model deployment sites has addressed the challenges of developing an integrated, multimodal intelligent transportation infrastructure in different ways, but all are focused on the common vision of providing more efficient transportation systems and better traveler information. This means that both travelers and operators can make smarter choices and better decisions about how to use and manage our transportation systems.

Toni Wilbur is a program delivery team leader for FHWA's Office of Traffic Management and ITS Applications. She is responsible for providing policy guidance and technical assistance to facilitate ITS deployment. She is also the co-leader of the multiagency team that is responsible for the management of the metropolitan ITS Model Deployment Initiative. Wilbur began her career in the FHWA Office of Research and Development and has worked in the ITS program since its inception. She has a bachelor's degree in mathematics from Wake Forest University and a master's degree in computer science from American University.