

DIVISION HIGHLIGHTS: ADVANCED TRANSPORTATION TECHNOLOGIES

DEPLOYING ITS IN DES MOINES

Project partners: Des Moines Area Metropolitan Planning Organization, Iowa Department of Transportation, Allied Signal, Booz-Allen & Hamilton

In the last decade, a few large metropolitan areas have pioneered the use of intelligent transportation systems (ITS) to manage traffic and transit services. The significant benefits observed in these urban areas compelled the U.S. Department of Transportation (DOT) to sponsor a program of financial support to assist metropolitan areas in developing ITS strategic plans. The Des Moines Area Metropolitan Planning Organization (MPO) requested and received funding to develop a Des Moines area plan and, with matching funds from the MPO and the Iowa DOT, contracted with CTRE, Allied Signal, and Booz-Allen & Hamilton to develop the plan. When the project began in 1995, Des Moines was the smallest urban area undergoing such a strategic plan.

The Des Moines metropolitan area does not face the extreme levels of traffic congestion that forced larger urban areas like Minneapolis/St. Paul, Chicago, and Detroit to adopt ITS very early. Therefore, Des Moines can take advantage of tried and tested ITS functions and technology and accrue similar safety and travel productivity improvements through a well planned and incremental deployment of ITS. Such a deployment will not only help prevent the development of extreme traffic congestion in the Des Moines metropolitan area but will also help manage and alleviate traveler delays and disruptions caused by the reconstruction of I-235 through Des Moines, scheduled to begin early in the next decade.

Accommodating over 100,000 vehicles daily, I-235 acts as the major traffic artery across the Des Moines metropolitan area, serving both long-distance trips across, and circulation within, the metropolitan area. Although the Iowa DOT plans to minimize the disruption of normal commuting patterns during I-235 reconstruction, travel conditions across the urban area are likely to be affected and traffic is likely to be diverted to parallel streets.

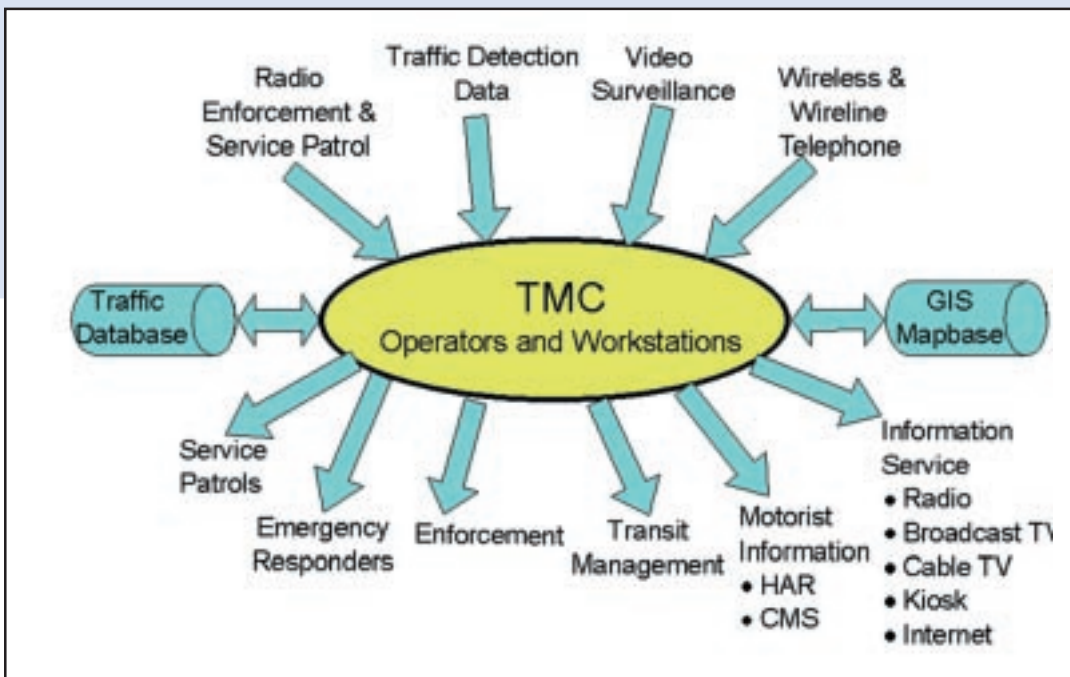
The ITS deployment plan was developed by the project partners under the direction of a steering committee representing ITS stakeholders in the Des Moines metropolitan area, including city and county traffic, engineering, police, and public works departments in the metropolitan area; Des Moines Transit Authority; Iowa State Highway Patrol; Federal Highway Administration; Iowa Motor Truck Association; Greater Des Moines Chamber of Commerce; and the Des Moines International Airport.

ITS: Basic Components

The plan serves as a road map for developing ITS in the Des Moines metropolitan area to improve traffic flow and safety on the freeways and surface streets, provide travelers with better information on weather and highway conditions, and make transit more efficient and convenient. The plan includes the following actions:

Traffic and safety applications

- Populate the metropolitan area's roadways with traffic surveillance and traffic management assets (such as Highway Advisory Radio transmitters, Changeable Message Signs, and traffic detectors), starting at high-incident and high-crash frequency locations.
- Develop a Transportation Management Center (TMC)—a physical space for

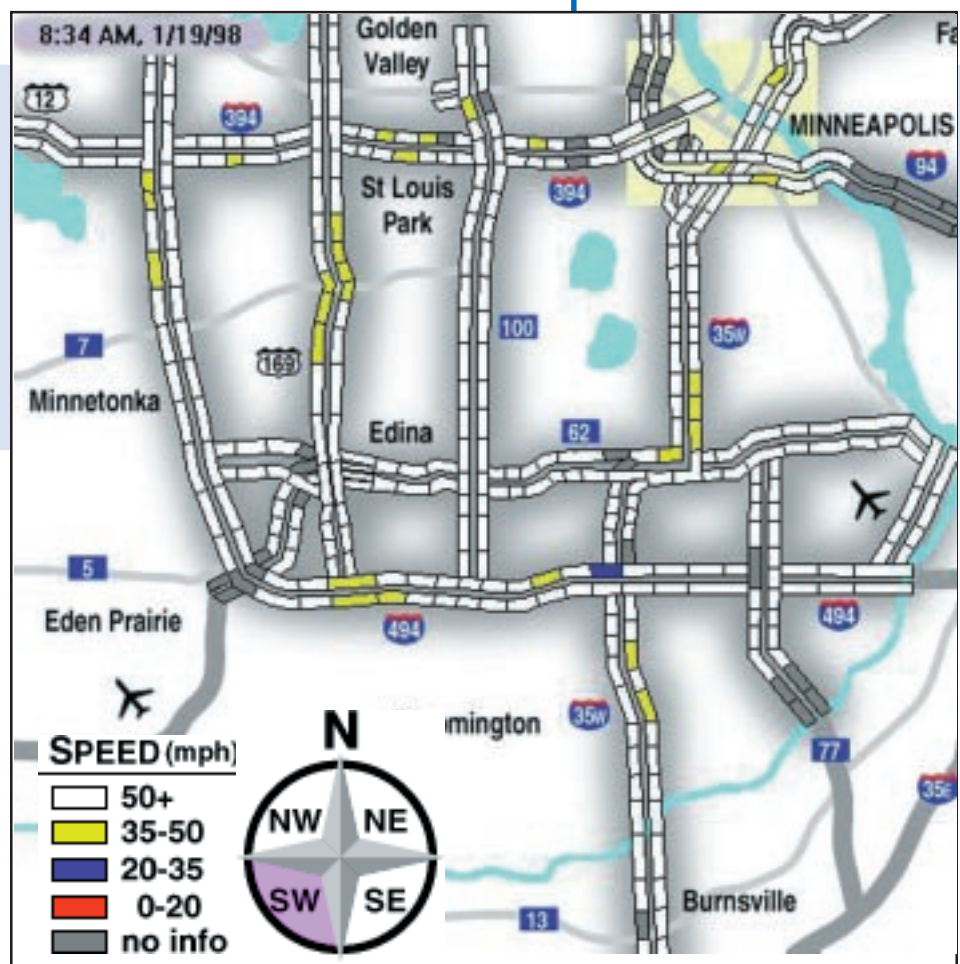


The graphic (left) represents the flow of information to and from the Transportation Management Center.

Minnesota's real-time traveler information system on the Internet (below) includes a graphic display of traffic speeds along highways in the Minneapolis/St. Paul area. Image courtesy of the Minnesota Department of Transportation, Traffic Net Web pages.

collecting real-time traffic and incident information and initiating appropriate responses across jurisdictions and lines of authority.

- Develop an incident management plan for freeways and freeway-design standard highways.
- Create an electronic communication system that provides metropolitan agencies responsible for responding to incidents with real-time data on incidents and real-time video images of incidents to allow for more efficient and swift management and clearance of incidents.
- Establish a traveler information system broadcast over the government access cable television channel, which scrolls through maps showing traffic speeds, locations of incidents, road conditions, and real-time video images.
- Develop a real-time traveler information system distributed over the Internet and at computer kiosks at public locations.



CONTINUED ON PAGE 10

CONTINUED FROM PAGE 9

Interjurisdictional traffic signals

- Execute an interjurisdictional traffic signal coordination memorandum of agreement between agencies operating traffic signals in the Des Moines metropolitan area.
- Conduct an engineering study of the physical equipment requirements to coordinate traffic signals across jurisdictions, particularly along I-235 reconstruction diversion routes.
- Implement a traffic signal coordination plan by traffic signal operating agencies.
- Where ramp meters are found to be feasible, coordinate ramp meters and traffic signals at the ramp terminals with traffic signals on adjacent streets.

Transit

- Develop traffic signal prioritization capabilities for Metro buses in downtown Des Moines, eventually migrating prioritization capabilities to signals outside of downtown.
- Adopt electronic payment system for transit services with the ability to upgrade to smart card technology in five years.

Conservative estimates of potential benefits to be realized from ITS deployments recommended in the strategic ITS deployment plan developed by CTRE and its partners were made using traffic data and crash statistics from the base year 1993 (traffic volumes and crashes have increased significantly since then). Conservatively, it is believed that the recommended systems would reduce traffic crashes on the Des Moines Interstate system by 100 per year (50 each in the morning and afternoon peak travel periods). Conservatively, speeds would increase by 14 percent (most metropolitan areas experience 20 to 48 percent increase in speed), and motorist travel hours

would be reduced by about 250,000 hours per year (an estimated value of \$2.8 million per year). Due to faster crash and incident clearance, delays would be reduced by 400,000 hours per year (an estimated value of \$4.0 million per year).

The estimated quantitative benefits do not include the benefits travelers receive when they can make more informed decisions regarding whether to travel, the route to take, the time of departure, the mode selected, and the estimated arrival time; the safety benefits resulting from accident responders being more informed and responding more quickly; or the benefits to motor carriers and shippers of a more reliable transportation system. These benefits will be particularly critical when I-235 is being reconstructed and construction activities impact the flow of traffic across the metropolitan area.

ITS: Commercial Vehicles

The ITS deployment plan also addresses applications of ITS that specifically support commercial vehicle operations (CVO). Because of Des Moines' long distance from East and West Coast markets, Des Moines area shippers stand to benefit significantly from reduced shipping costs and improved motor carrier safety resulting from the implementation of ITS-CVO applications.

The focus of land-based international trade to and from the Des Moines metropolitan area has been on I-35. This is because I-35 is the most direct route to the Mexican border through the international port at Laredo, Texas. Roughly 40 percent of the value of all surface trade between Mexico and the United States crosses the border at one of the three Laredo area bridges. Because of the increasing importance of I-35 to international trade with Mexico, I-35 is being

promoted as an international trade corridor, and the North American Super-highway Coalition (NASCo) is requesting that congress provide a special designation for the highway.

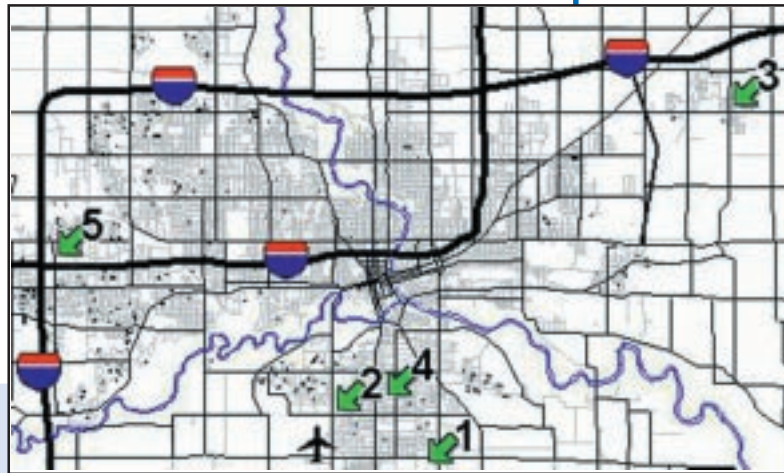
Most ITS-CVO functions are under the purview of federal and state officials. For example, one of the principal applications of ITS-CVO is to check the size and weight of trucks on the freeway mainline at freeway speeds, allowing trucks within acceptable limits to bypass weigh stations without stopping to be checked and weighed on a static scale. Although the Des Moines Area MPO and local governments in the Des Moines metropolitan area do not have authority over many ITS-CVO functions, three areas of ITS-CVO where Des Moines area agencies and organizations can contribute directly to ITS-CVO efforts include:

- Providing commercial traveler information via the World Wide Web to allow commercial drivers to make more informed decisions regarding travel in, around, and through the Des Moines metropolitan area. A prototype Web site developed for this study includes such practical information as maps to emergency health and dental services.
- Developing ITS functions and services to support international trade from the Des Moines area. Services and facilities could include a location for carriers and vehicle operators to have customs inspections performed or to have vehicles repaired.
- Using ITS technology to more quickly and accurately determine the characteristics of, and mitigation strategies for, incidents involving hazardous materials. Specifically, the Des Moines Fire Department's Hazardous Materials Response team, the first response team for hazardous

materials spills in the metropolitan area, could subscribe to Operation Respond Emergency Information System (OREIS), a

CONTINUED ON PAGE 12

The locations of Des Moines-area dentists who take walk-in patients are shown on the prototype Web page for CVOs.



Accidents involving carriers of hazardous materials (below) require special handling.

Photo courtesy of Federal Highway Administration.



CONTINUED FROM PAGE 11

national database and response network supported by the National Institute of Occupational Safety and Health (NIOSH).

ITS: Implementing the Plan

Supporting decision making regarding ITS requires more sophisticated decision-making tools than those currently available to Des Moines agencies. Two computer tools are recommended for development. The first is a more precise travel demand model. The Des Moines Area MPO's current travel demand model estimates travel volumes for the entire day, and the model does not estimate the time of day trips are made. The model needs to be improved so that peak travel demand estimates can be made. The second recommendation is that a high-fidelity traffic simulation model be generated for Des Moines so that designers of the reconstructed I-235 and other transportation improvements can estimate the impacts of modifications to the transportation system.

ITS can provide Des Moines area travelers and goods transporters with enhanced transportation productivity, reliability, and safety. Implementing the ITS strategic plan will require strong leadership from public and private stakeholders. Unlike improvements to physical transportation infrastructure like a new bridge, a widened roadway, a new overpass, or a new fleet of buses, ITS improvements do not provide very visible signs of improvement that the general public can see, understand, and appreciate. At the same time, ITS improvements often compete for funding with physical infrastructure. Therefore, if ITS is

to be deployed, influential individuals and/or organizations must champion ITS improvements.

The Des Moines Area MPO will serve as champion for the deployment of ITS in the Des Moines metropolitan area. In partnership with the MPO's member governments, the Iowa DOT, and the U.S. DOT, the MPO will champion ITS deployment in the metropolitan area. To guide the deployment of the plan, the steering committee for the ITS deployment study has become a standing committee and will now help steer implementation of the recommendations. **end**

CONTINUED FROM PAGE 7

strategies is to identify and communicate the benefits of access management to all stakeholders. The study group is taking several actions to educate and inform the various constituents interested in and affected by access management.

- A May 1998 statewide conference brought together a variety of Iowa stakeholders to focus on the benefits of access management and identify best access management practices.
- The study group has published three reports: *Access Management: A Review of Recent Literature*; *Access Management: Current Policies and Practices in Iowa*; and *Access Management: Phase II Report* (as well as a *Phase II Summary Report*). These reports are online at the Iowa Access Management Project World Wide Web site: <http://www.ctre.iastate.edu/access>. Limited printed copies of the reports are available through CTRE.
- A brochure and videotape have been developed, and a how-to handbook will soon be available. **end**