CHAPTER 26
Using Intelligent Transportation Systems (ITS) to Improve Highway Safety

KEY TOPICS

- applied technology (driver and information, vehicle and driver technology, vehicle and roadway technology)
- intelligent transportation systems (ITS)

GOALS

- Reduce weather-related crashes.
- Reduce congestion- and incident-related crashes.
- Reduce emergency response and incident clearance time, and subsequent vehicular delays.
- Increase access to and from communities for travel, goods, services, and information.
- Reduce shipping and delivery delays, and subsequent costs of fleet operations.
- Provide better integration of communications and information between emergency services and law enforcement providers.
- Reduce motor emissions and improved air quality.

BACKGROUND

ITS is not intended to be a silver bullet or a solution looking for a problem. It is intended to be another possible tool for the highway safety community and should be compared with other standard or traditional solutions when selecting a method to solve traffic problems.

ITS focuses on improving the safety, efficiency, and convenience of the transportation system through the application of a wide variety of information, computing, and communications technologies. Examples of ITS safety conveniences include real time travel information, pretrip route selection tools, and roadway and weather updates.

NATIONWIDE

Increased travel volumes result in congested traffic, longer commutes, pervasive delays, increased energy consumption, and air pollution; our transportation sorrows are beginning to erode our quality of life. Applying ITS technologies will help offset the potential impact of increased traffic, allowing for a more efficient roadway system—improved capacity, reduced delays and travel times, and supportive mobility for motorists.

State and local agencies should collaborate when they develop ITS solutions to solve traffic problems. ITS projects funded by the Federal Highway Administration (FHWA) must be in conformance with a regional deployment plan to ensure that existing and planned systems will be compatible. A planned system may be able to use existing ITS infrastructure. This could result in opportunities to reduce costs or encourage partnering for the deployment of more costly technologies that might not be built if an agency were to act independently.

National Facts

The U.S. Department of Transportation estimates that cumulative benefits of ITS will exceed the costs by a ratio of 8:1. Following are some documented benefits that have resulted from ITS:

Freeway travel times	down 48%
Freeway crashes	down 50%
Urban freeway fatalities	down 10%
City street travel times	down 15%
Traffic signal stops	down 35%
Bus operating costs	down 18%
Bus on-time performance	up 23%
Red light violations	down 40%–60%

IOWA

The Iowa Department of Transportation (Iowa DOT) ITS Plan Steering Committee received internal and external input resulting in the following identification of top transportation problems and top ITS strategies listed in the Potential Solutions section of this chapter. (Note that these identified problems and strategies are directly related to a number of chapters in this toolbox.)

Top transportation problems:

- Safety/crashes on highways/city streets
- Construction/maintenance projects on highways/city streets
- Personal security on highways/city streets
- Lack of road condition information
- Roadway surface conditions on highways/city streets
- Personal security on highways and city streets
- Railroad crossings at highways and city streets
- Emergency medical services (EMS) response time on city streets
- Lack of weather condition information
- Non-recurring and recurring congestion on highways and city streets

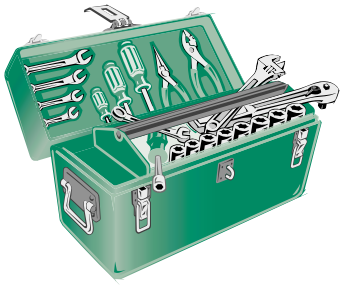
Integrated ITS and Services Deployment Plan

The Iowa DOT is in the process of finishing the development and approving the *Integrated ITS and Services Deployment Plan*. The document is a strategic plan for implementation of ITS throughout the state of Iowa. The plan identifies the transportation problems to be addressed; the overall vision, goals, and objectives to be achieved through ITS implementation; and an ITS organizational structure and programming process to be followed by the Iowa DOT. For the most current information on ITS in Iowa, visit the Iowa DOT On-Track web site (www.iowaontrack.com).

ITS Heartland Chapter

The ITS Heartland Chapter of ITS America is intended to facilitate information sharing for ITS projects and activities and to showcase ITS applications in four heartland states—Missouri, Iowa, Kansas, and Nebraska. ITS Heartland Chapter works to improve the quality of life for those transportation users who live and invest in America's Heartland Region through advanced transportation technologies and communications.

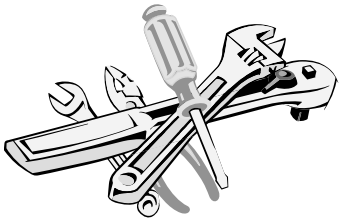
POTENTIAL STRATEGIES



Design and Technology

- Increase efforts in the following areas:
  - o Freeway service patrols
  - o Interactive traveler information/web site
  - o Roadside traveler information dissemination
  - o Advanced incident management detection and reporting
  - o Consolidated EMS communications
  - o Portable traffic management systems
  - o TV and radio broadcast traveler information
  - o Freeway network surveillance
  - o Automated enforcement
  - o Mayday support
  - o Weather and pavement sensing
  - o Internet-based route guidance
  - o Advanced maintenance technologies/vehicles
  - o Automated telephone traveler information
  - o Coordinated incident management response and cleanup
  - o Regional traffic signal coordination
  - o Traffic signal/preemption/routing/response systems
  - o Changeable message signs

SUCCESSES AND STRATEGIES IMPLEMENTED



- Improved crash data and analysis tools are available or under development (see Chapter 25, Improving Information and Decision Support Systems).
- The Iowa DOT sponsored a study of traffic safety improvement projects. The *Effectiveness of Roadway Safety Improvements* study (conducted by the Center for Transportation Research and Education) of 94 traffic safety projects concluded that there was a mean crash reduction rate of 23% on these hazard elimination and safety improvement fund projects.
- The *Traffic and Safety Informational Series* is sponsored by the Iowa Department of Transportation Office of Traffic and Safety. The goal of this project was to make available clear, concise, and consistent answers

to 25 traffic and safety questions, commonly asked by local officials and the public. The information may be altered, distributed, and used as seen fit by area officials and/or transportation professionals. It is available in print, on disk, and on the web.

- The Iowa DOT Office of Traffic and Safety is developing the "TAS" manual for highway safety practitioners and engineers at the state and local levels (to be available in print and on the Office of Traffic and Safety web site in 2002).
- The Iowa DOT Office of Traffic and Safety sponsors the annual Traffic and Safety Forum each fall to help city, county, state, and consulting highway safety engineers stay up-to-date on recent developments in highway safety technology and practice.
- Safety is the number one motive for using ITS technologies. Currently, nine ITS projects are underway that focus on three core safety areas: traveler information, incident management/emergency services, and traffic monitoring/enforcement.
- ITS technologies and applications are being identified and developed on a continuing basis in Iowa. For information on ITS in Iowa, visit the Iowa DOT On-Track web site (www.iowaontrack.com).

NOTE

The potential strategies in this chapter do not represent specific recommendations of the Iowa SMS Coordination Committee or any agency, group, or individual represented in Iowa SMS. The strategies represent a range of alternatives for legislators, department or agency directors, local governments, and citizen groups to consider when they elect to address a specific highway safety concern.

This toolbox is a living document that will continue to provide information, direction, and ideas for highway safety decision makers. Any strategies selected for implementation by Iowa SMS or any other entity will require further development through identifying potential partners, entities impacted, potential funding, steps for implementation, evaluation, and other pertinent tasks.

RESOURCES

Information in this chapter is drawn from many individuals and sources. Known sources are listed here. **Contributors:** W.D. Baldwin (primary) and Craig Markley (primary).

American Association of State Highway and Transportation Officials
Strategic Highway Safety Plan (Sept. 1997):
A comprehensive plan to substantially reduce vehicle-related fatalities and injuries on the nation's highways.
safetyplan.tamu.edu/plan/toc.asp

Center for Transportation Research and Education, Iowa State University
www.ctre.iastate.edu/index.html
Effectiveness of Roadway Safety Improvements:
www.ctre.iastate.edu/Research/detail.cfm?projectID=386

Iowa Department of Transportation
Integrated ITS and Services Deployment Plan

Iowa Department of Transportation Office of Traffic and Safety
www.dot.state.ia.us/traffic_safety/index.htm
Traffic and Safety Informational Series:
www.ctre.iastate.edu/pubs/tsinfo/index.htm
Traffic and Safety ("TAS") Manual (Jan. 2002)

Iowa Department of Transportation On-Track Intelligent Transportation Systems
www.iowaontrack.com/safety_fs.htm

Iowa Safety Management System
www.IowaSMS.org
Iowa Strategic Highway Safety Plan (Aug. 1999):
www.iowasms.org/pdfs/ishsp.pdf
Iowa Strategic Highway Safety Plan Goals and Strategies: Statewide Survey of Adults (Oct. 2000):
www.iowasms.org/pdfs/publicopinionsurveyexecsumm.pdf