

Chapter 8: Intelligent Transportation Systems (ITS)

Introduction

Intelligent Transportation Systems (ITS) is a designation given to numerous applications that use smart processes and technologies to improve the safety (i.e. at rail crossing, in work zones for road construction, etc.) and efficiency of the transportation system (i.e. freight movement, etc.), and provide timely information to travelers (detours, approaching accidents, etc). Ultimately, ITS is expected to increase people and vehicle carrying capacity of the multimodal transportation system. This Chapter introduces ITS and identifies existing technologies specific to APO Planning Area.

Current ITS Applications

The first task of the APO was to identify current transportation ITS applications in the St. Cloud Metro Area. Interviews were conducted with key agencies and a survey was sent to all APO member jurisdictions through the Technical Advisory Committee (TAC). The information gathered was then grouped into one of the following four categories:

Advanced Traveler Information Systems (ATIS)

Assists drivers with planning, perception, analysis and decision-making. This approach to traveler information services utilizes a broad array of communication methods to disseminate information. Currently the following technologies are operational in the St. Cloud Metro Area:

- 511 Traveler Information
The Minnesota Department of Transportation operates 511, a service to help motorists access information regarding weather-related road conditions, construction and congestion, via the web (www.511mn.org) or phone (dial 511).

Advanced Traffic Management Systems (ATMS)

Refers to an array of institutional, human, hardware and software components designed to monitor, control and manage traffic on the streets and highways. The TOCC, Transportation Operations Control Center, is located at 2725 12th Street North and operated jointly by the State Patrol and the Minnesota Department of Transportation (MnDOT). Currently, the following technologies are operational in the St. Cloud Metro Area:

Variable message signs

- Provides travel information (e.g. road construction) to motorists.

Surveillance Cameras

- A total of three cameras are currently operational along T.H. 23 and T.H. 15. The cameras allow remote monitoring of travel conditions and incidents.

Notification Systems

- Railroad warning systems can be found at various locations throughout the Metro Area.

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Emergency Response Systems (ERS)

Addresses the vehicle, dispatch, and traffic management aspects of serving emergency needs. Currently, the following technologies are operational in the St. Cloud Metro Area:

Emergency vehicle preemption

- Allows emergency response vehicles (e.g. fire and police) to override traffic patterns at a signal to move through an intersection more quickly. Therefore decreasing response time (See Exhibit 8A).

Advanced Public Transportation Systems (APTS)

Technologies used to improve the efficiency of the public transportation. Currently, the following technologies are operational in the St. Cloud Metro Area through Metro Bus:

Electronic fare boxes

- Provides various electronic fare media options, secured fare handling capabilities, and automated ridership tracking.

An advanced computerized dispatching and communication system (dial-a-ride paratransit system)

- Automatic Vehicle Location (AVL) utilizes global positioning systems (GPS) to track the location of each bus in real-time.

Transit Signal Priority

- Adds buses to the list of vehicles capable of preempting traffic signals, providing additional time to meet bus stops (See Exhibit 8A).

Potential ITS Applications

ITS architecture refers to the structure or process required for the design and implementation of intelligent transportation systems. It provides a framework that integrates telecommunications and transportation systems to ensure that all network elements can work together and support each other. Use of ITS architecture can help identify projects, as part of an integrated system approach, consistent with the Area's overall transportation needs.

ITS applications should be considered an integral part of future transportation systems, projects and services early in the project development process. In doing so, ITS will be mainstreamed into the overall planning process. For systems, projects or services that are currently in place and operating, ITS should be introduced as part of project reconstruction, service reconfiguration or fleet replacement. The types of applications that focus on existing infrastructure primarily target safety improvements, system management and efficiency. However, it should be noted that all ITS projects must be developed by first, obtaining input and approval from the appropriate stakeholders and

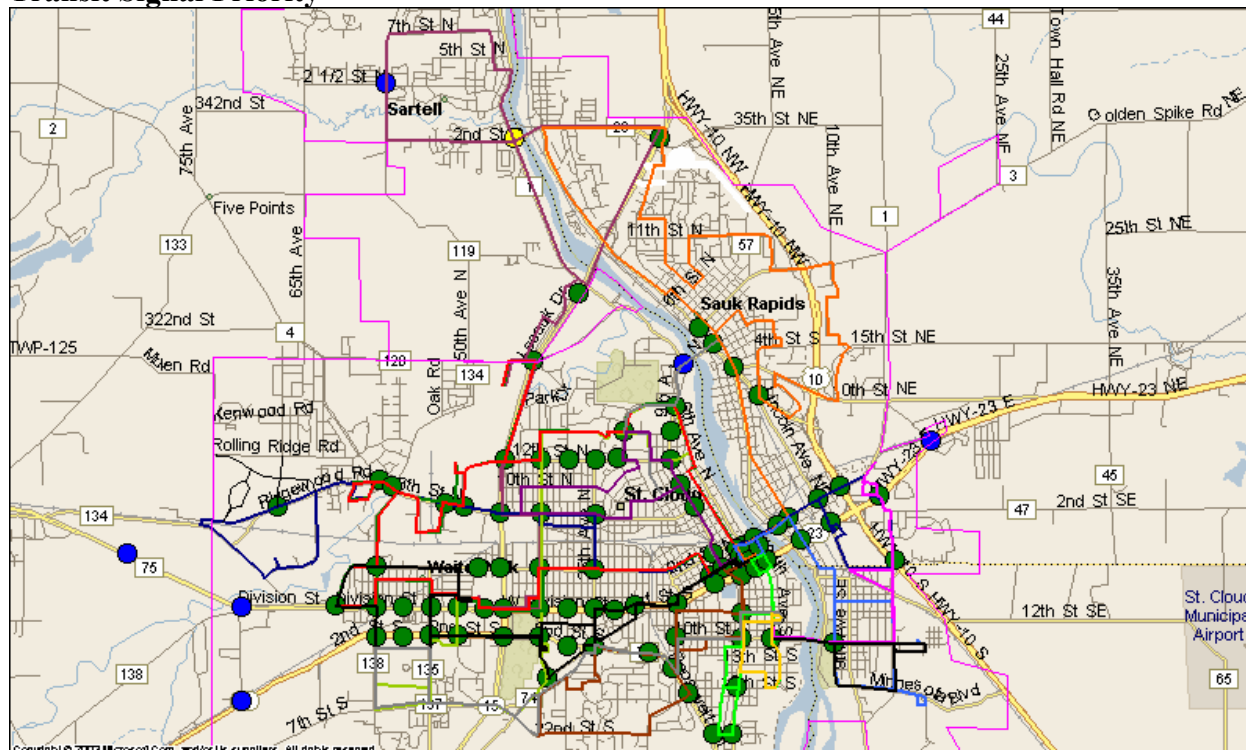
Potential Applications

- Pavement Condition Monitoring Sensors
- On-board bus, real-time schedule information to allow drivers to receive electronic updates to passenger pick-ups.

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then thoroughly researched prior to implementation (See Implementation Section). In particular, MnDOT District 3 should be involved early in the development process to garner support for all planning efforts relative to ITS.

Exhibit 8A Transit Signal Priority



The green dots signify completed fully operational TSP intersections.

The yellow dot intersection is not yet TSP operational, but will be completed in the next couple of months.

The blue dot intersections are not in our project area and are not TSP operational, but will be brought online as needed by changing bus routes.

Implementation

The complexity of ITS applications varies widely. The major factors that increase project complexity are: (1) the number of agencies and jurisdictions involved, (2) the extent and complexity of the operating software, (3) hardware and equipment required, (4) cost, and (5) geographic coverage area. A proven barrier to ITS implementation is overcoming the barriers that exist between multiple agencies and jurisdictions. When a project involves multiple entities the review and approval process can be difficult and time consuming. Each agency may have opposing objectives and constituencies that they must be responsive to. Therefore, ongoing and strong leadership is needed to maintain progress and to help refine the project concept as time proceeds. The partners must share a common vision for the project and make a commitment to work through any concerns. In order to do so, they must be willing to share resources and be open to new ideas. Accordingly, a strong communications network is key to the success of any ITS project.

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The costs of ITS applications vary widely based on the geographic coverage and level of complexity of the application. In estimating ITS project costs, it is extremely important to include capital, operating, and maintenance. Capital costs are often funded with federal or State dollars. However, operational costs are typically borne by the local agency and community. Both operating and maintenance estimates should include dollar costs, as well as, the cost of acquiring personnel to operate and maintain the system after it is deployed.

Historically, funding has been captured through federal earmarks and passed through the State of Minnesota's Guidestar Program. Minnesota Guidestar is administered by the Minnesota Department of Transportation's Office of Traffic, Security and Operations (OTSO), in partnership with the Federal Highway Administration (FHWA), University of Minnesota, numerous public and private partners, and ITS Minnesota-the state chapter of ITS America. However, for this Plan update, member jurisdictions are encouraged to solicit the Guidestar program for funding of local ITS projects until a regional ITS architecture can be developed. Accordingly, the following are APO strategies for addressing ITS.

Short-Term Strategy

- Develop an ITS architecture specific to the St. Cloud Metro Area in which 1) a comprehensive list of regional needs is identified and prioritized by stakeholders, and 2) a process for submitting potential projects is outlined.

Long-Term Strategy

- Develop a process to obtain funding for ITS projects that complement the regional transportation system.

Conclusion

The benefits that can be realized by deploying ITS technologies are dependent upon many factors and will vary between sites, corridors and regions. Although, it is difficult to quantify benefits of deploying a particular ITS technology, benefits have been associated with increased safety and capacity on freeways and reduced congestion, ultimately resulting in less fuel consumption and air pollution. Specific to transit operations, ITS technologies have contributed to increases in service reliability and increased travel times.

An important objective of ITS deployment is to reduce or postpone, over time, the need for transportation infrastructure investments. As ITS applications become more mainstreamed, the overall cost of its implementation into transportation systems, projects and services will become an integral part of the overall transportation funding package. However, federal and State funds dedicated to operational tests and deployment funding will most likely continue for some time. In addition, the development of private/public partnerships may become an integral funding source for ITS. In the past, many private-sector companies (e.g. software, hardware and equipment vendors) have found ITS to be beneficial and/or profitable and have entered into such partnerships by in-kind contributions. Therefore, the APO encourages private/public partnership for ITS applications whenever feasible.