Minnesota Guidestar Program: Deployment Assessment

by

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Definition

What is ITS?
- Next step in the evolution of the nation's transportation system
- The application of advanced technologies to the transportation system to save lives, time and money and improve the quality of life.
  - Improve safety
  - Improve reliability of travel and reduce delays
  - Improve the efficiency of the transportation system
  - Reduce traveler stress
The Project

Created by the Minnesota Department of Transportation (Mn/DOT), in cooperation with other transportation stakeholders.

The intent was to assess current programs and future opportunities for deployment of ITS.

Focus was on safety and mobility.

Two sections. Section 1 provides a “Background and Building a Foundation for Success”. Section 2 builds on Section 1 by providing information on “Future ITS Deployments in Minnesota”.

Reflects short, medium, and long-term needs and operational objectives.
The Project

The overriding goal of this project was to develop an assessment in sufficient detail that the assessment could be used to help establish priorities and secure funding for ITS deployment projects that improve safety and mobility.

- Toward that goal, two ITS program initiatives were established.
  - Minnesota Guidestar Mobility Initiative
  - Minnesota Guidestar Safety Initiative.
- Funding and deployment of these ITS projects represents a recognition of the need and value of ITS plus Minnesota’s commitment to the future.
Mobility Initiative

- Project 1: Implement dynamic lane control and variable speed limit signs
- Project 2: Implement Hard or High Occupancy Toll (HOT) shoulder concept
- Project 3: Complete Regional Traffic Management Center (RTMC) traffic management instrumentation
- Project 4: Expand RTMC traffic management systems to arterials
- Project 5: Expand RTMC travel time display locations
- Project 6: Implement contraflow lanes
- Project 7: Convert existing High Occupancy Vehicle (HOV) lanes to HOT lanes utilizing MnPASS
- Project 8: Deploy integrated corridor management
Safety Initiatives

- Project 9: Expand first responder and law enforcement systems
- Project 10: Implement Automatic Vehicle Location (AVL) technology
- Project 11: Expand interconnection between the RTMC and the Transportation Operations and Communications Centers (TOCCs)
- Project 12: Implement collision warning systems at rural highway intersections
- Project 13: Deploy automated enforcement
- Project 14: Develop a test bed for Vehicle Infrastructure Integration (VII)
Purpose

- Build on infrastructure already in place
- Emphasize innovative yet proven technology
- Take a system-wide approach
- Moves *Toward Zero Deaths*
- Start to implement *ITS Safety Plan*
- Presents a model for other states
ITS Safety Plan

- Develop ITS strategies and initiatives that reduce the number of vehicle traffic fatalities and serious injuries on roadways.
- Identified six ITS Critical Strategies supported by 22 ITS Safety Initiatives.
- The Safety Initiatives advance the six ITS Critical Strategies.
- Proactive in their approach to reducing the number of fatalities on Minnesota roadways.
Strategies

- Expand Data Collection infrastructure
- Improve traveler information dissemination
- Expand first responder and enforcement systems
- Implement next generation TOCC’s to local governments
- Expand winter maintenance operations
- Use intersection collision warning systems
Rural ITS

Key elements of rural ITS

- Traveler safety and security technologies
- Emergency services
- Fleet operations and maintenance systems
- Public traveler and mobility services
- Roadway operations and maintenance technologies
- Tourism and travel information
- Commercial vehicle systems
ITS in Greater Minnesota: Traffic Operations and Communications Centers

- Mn/DOT Maintenance Dispatch
- State Patrol Dispatch
- Transportation Operations
- Traveler Information
Working Together
To Ensure a Safe Environment on MN Roadways
Minnesota 511
Telephone and Web Information

Know the Road. Dial Up or Log On.

511mn.org

select location
Winter Maintenance
Mayday Field Systems
Operational Test
Railroad Crossing Safety
**Strategies**

- Expand Data Collection infrastructure
- Improve traveler information dissemination
- Expand first responder and enforcement systems
- Implement next generation TOCC’s to local governments
- Expand winter maintenance operations

*Use intersection collision warning systems*
Partnership

- SEH has partnered with Network Transportation Technologies, LLC (NTT)
- Belief that we can be better at saving lives by efficient utilization of technology.
- Belief that we can do this with less infrastructure, and reduce costs.
- Belief that *Stand Alone Smart Systems* permit this. *(Go where we haven't gone before)*
Rural ITS Toolbox

- Low Cost, Low Maintenance Deployments
- Collection of Sensors, Decision Controllers and Motorist Information Display Sign.
- Deploy on existing infrastructure/existing warning sign posts
- Easy to mix and match components based on need.
- Portable
Rural ITS Toolbox

- Bringing together of many hi-tech products.
  - Wireless communications
  - Low power sensors
  - Intelligent Roadside Controllers
  - Solar power when AC not available
  - Power efficient display systems (VMS)
  - Effective tools for installation and service
Rural ITS Toolbox

- Rural Intersection Warning
  - Low volume rural (non-urban) roads
  - Relatively high crash/near miss history
  - Poor sight distance areas
  - Temporary sight obstructions, i.e. cornfield intersection
  - Seasonal heavy traffic such as harvest time
Intersection Collision Avoidance
MASTER SIGN NODE

CROSS TRAFFIC
DOES NOT STOP

WATCH FOR
CROSS TRAFFIC

LOOK → LOOK

Generic Gateway

Sign Illuminates when traffic is approaching
Example of concept

- Warning Sign: 48x24
- Radio/Radar Sign Controller: 12x12x6
- Magnetometer: 9x4x4
- Battery/Battery Box: 20x13x12
- Solar Array: 29x25x1.5
Other Examples

- Technology application
  - Curve Warning Systems
  - Work Zone Safety Systems
  - Blind Merge Warning Systems
Curve Warning

Status-LRRB Grant applied for by Washington County
Workzone System

TRAFFIC SLOWS 1 MILE AHEAD
Each Node measures lane occupancy and passes information to central controller. Central controller feeds back delay information to signs at appropriate nodes.

Status – Conceptual Stage, no funding identified
Blind Lane Merge System
Blind Merge Duluth Can of Worms

AFTER INSTALLATION OF BLIND MERGE WARNING SYSTEM
ACTIVE WARNING SIGN ILLUMINATES ON APPROACHING TRAFFIC EITHER FROM LEFT OR RIGHT AND INDICATES WITH FLASHING ARROWS VEHICLE APPROACH

DULUTH MINNESOTA CAN-OF-WORMS INTERCHANGE I-35, I-535, TH 53
Vehicle Detection Example

- Controller
- 900 MHz ISM TDMA Network
- Magnetometer Vehicle Detectors mounted on Jersey Barrier with Internal 5 years Battery
- 4 Inch PVC Pipe Enclosure
Thank You!

Questions?

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