ITS Applications for Rural Safety

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ITS Deployment Assessment

- 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.
ITS Deployment Assessment

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.
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.
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
Deployment 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
Intersection Warning System

2007 Innovative Ideas Program
Problem

Safety at Unsignalized Intersections is a major concern. Intersection collisions are one of the most common types of crash, and in the United States, they account for nearly 2 million accidents and 6,700 fatalities every year. However, a fully signalized intersection can sometimes be hard to justify in rural areas, due to the cost of installation, maintenance, and added delays to traffic on the major through streets...

FHWA-RD-99-103
IWS - Project Goal

Our Goal is to develop a low-cost, readily deployable, low maintenance system that can be used to improve safety at low volume, non-signalized intersections.
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

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
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 reduced costs.
- Belief that *Stand Alone Smart Systems* permit this. (*Go where we haven't gone before*)
IWS Project Team

- Mn/DOT – OTSO
- Mn/DOT Metro Division
- US DOT - FHWA
- Hennepin County
- Olmsted County
- SEH / NTT
- Independent Evaluation Consultant (SRF)
- Hardware Partner - Banner Engineering Inc.
IWS Project Deliverables

- Concept of Operations
- System Requirements
- System Design
- Experimental Waiver
- Laboratory Test Plan
- Laboratory Test
- Field Installation of IWS
- Field Operational Test of IWS
IWS – Project Time Line

- Nov 2007 - Project Kick off
- Nov 07 to Jan 08 - Concept of Operations
- Dec 07 to Feb 08 - System Requirements
- Jan 08 to June 08 - System Design
- July 08 to Aug 08 - Laboratory Test
- Aug 08 - Field Installation
- Sept 08- April 09 - Field Operational Test
Concept

Warning Sign at Intersection

Radio/Radar
Sign Controller
12x12x6
Optional Radar Presence Detector

Battery/Battery Box
20x13x12

Advance Warning Sign

Optional Magnetometer
9x4x4
Initial Test Site - Medina
Medina Drive
Warning
Sign Node
Warning Sign Node
Controller Cabinet
Controller Cabinet
Controller Cabinet Electronics
Detector Node
Detector Node
Detector Node
Detector Node
Battery Box
Four-Way Intersection
CR-47 and Lawndale

4-way Intersection with thru Main and two STOP signs. Shown with active warning on one side only.
Solar Panel & Controller Cabinet
Battery Box
Warning Sign Node
(Shadow Mode)
CR 47 Looking East
Lawndale Avenue Looking North
CR 47 Looking West
CR 47 West Detector Node
Looking East
Backside of West Detector Node
Other Examples

- Other uses of Technology
  - Curve Warning System
  - Blind Merge Warning System
  - Work Zone Warning System
  - Data Collection System
Curve Warning

Status-LRRB Grant applied for by
Washington County
Blind Merge Warning
Data Collection System

- Stealthy small radar based traffic data collection (*Stop Sign Mount*)
- Provide detail speed data on approaching vehicles (*Did it Stop?*)
- Time Stamp (*Time of day bad behavior?*)
- Self contained battery powered (>2 weeks ?)
- Use *Excel* for analysis
Applications:

- **Intersection driver performance.** This system measures speed profile of each vehicle coming to stop sign.
- **Work zone performance measurements.** This system consists of one or more devices that log speed data of vehicle moving through workzone.
- **Speed Limit determination measurements.** This application requires speed data over a number of vehicles during a several day period. From this data the average speeds are determined and from this data speed limits are set.
IWS – Contacts

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Thank You!

Questions?