Developing Consistency in ITS Safety Solutions: Intersection Conflict Warning Systems

National Rural ITS Conference – Session S2: ITS Safety Solutions
September 17, 2012
Outline

• ENTERPRISE Program
• Intersection Conflict Warning Systems
• Design and Evaluation Guidance
• Systems Engineering
• Next Steps
ENTERPRISE Program

• What is a transportation pooled fund?
  – Allows federal, state, and local agencies and other organizations to combine resources to support transportation needs
  – Federal, state, regional or local transportation agencies may initiate pooled fund studies
    • Private companies, foundations, and colleges/universities may partner with any or all of the sponsoring agencies to conduct pooled fund projects
  – Approved by FHWA
ENTERPRISE Program

• Goals
  – Facilitate rapid progress in the development and deployment of ITS technologies
  – Accelerate the systematic advancement of selected ITS projects
    • Members carry out ITS projects and activities including fundamental research, technology development, demonstration, standardization and deployment
ENTERPRISE Program

Members

- Arizona DOT
- Georgia DOT
- Idaho Transportation Department
- Illinois DOT
- Iowa DOT
- Kansas DOT
- Maricopa County, Arizona
- Michigan DOT*
- Minnesota DOT
- Mississippi DOT
- Oklahoma DOT
- Texas DOT
- Virginia DOT
- Washington State DOT
- Ontario Ministry of Transport
- Transport Canada
- Dutch Ministry of Transport
- FHWA

*Michigan DOT administers program and is a founding member
ENTERPRISE Program

Major Milestones

1989

Agencies began talking about concept of a group focused on ITS research and development

1991

ENTERPRISE TPF-5(231) officially formed

1993

Program Management Plan developed; foundation of program and defined annual work plan process

1994

First Annual Work Plan developed

Today

Completed over 50 projects!
ENTERPRISE Program

• Recent projects
  – Warrants for ITS Devices
  – Understanding Utilization of Third Party Travel Data and Information
  – Impacts of Travel Information on the Overall Network
  – Next Era of Traveler Information
  – Developing Consistency in ITS Safety Solutions – Intersection Conflict Warning Systems
Intersection conflict warning systems (ICWS) are used at stop-controlled intersections to provide drivers – on major or minor roads – with dynamic warning of other vehicles approaching the intersection.
Intersection Conflict Warning Systems

Major Road Warning
Intersection Conflict Warning Systems

Minor Road Warning
Intersection Conflict Warning Systems
Design and Evaluation Guidance

Bring together organizations that have developed and deployed ICWS to develop a consistent approach for accelerated, uniform deployment and further evaluation of them, and to recommend preliminary design and evaluation guidance for MUTCD consideration.
Design and Evaluation Guidance

• Webinar (June 23, 2011)
  – Shared knowledge and educated each other on systems deployed
  – Identified challenges with future deployments

• Workshop #1 (July 28-29, 2011)
  – Discussed content of a preliminary design guidance
  – Discussed roadmap for reaching standardization

• Workshop #2 (September 15-16, 2011)
  – Reviewed preliminary design guidance
  – Developed evaluation framework that may be used in future deployments
  – Discussed plans for future deployment and coordination plans
Design and Evaluation Guidance

• Results
  – Increased **awareness** of systems deployed
  – Developed **design guidance** to support more consistent deployment
  – Established **evaluation framework**
  – Created **roadmap for standardization**
• Why develop a concept of operations or system requirements?
  – ICWS are intelligent transportation systems and FHWA requires systems engineering for ITS
  – Some agencies are unfamiliar with systems engineering
  – Time and budget aren’t always available for adequate systems engineering
Concept of operations and system requirements will **offer a starting point** for transportation agencies deploying ICWS.
• Draft concept of operations reviewed on Sept 11
  – Copy available online for further review and comment
  – Stakeholders, needs, operational concept and system

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<tr>
<th>Challenge</th>
<th>ID</th>
<th>Need</th>
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<tbody>
<tr>
<td>Continuous alerts can diminish the credibility and value of a dynamic warning for drivers.</td>
<td>5</td>
<td><strong>Drivers and transportation agencies need alerts to be dynamic and not become nearly continuous so as to lose impact.</strong></td>
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3.2 Operational Concept – Transportation Agency Perspective

3.2.1 Transportation agencies will not deploy ICWS where traffic volumes cause **alerts to be displayed in a nearly continuous manner?** (5)

<table>
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<th>System Component</th>
<th>Support Required</th>
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<td><em>Overall ICWS</em></td>
<td>Determine where ICWS should be installed based on traffic volumes, speeds and intersection design characteristics for maximum safety effectiveness. (3.2.1) (3.2.12) (3.2.14)</td>
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Next Steps

• For ENTERPRISE...
  – Review draft concept of operations with ENTERPRISE board on **Sept 19**
  – Finalize concept of operations by **Oct 1**
    • Post to ENTERPRISE web site
  – Develop draft system requirements in **Oct**
  – Webinar review of draft requirements in **mid-Nov**
  – Finalize system requirements by **Dec 31**
    • Post to ENTERPRISE web site and share with key stakeholders
Next Steps

• Work beyond ENTERPRISE...
  – Traffic Control Devices TPF-5(065)
    • Human factors research on placement and legend
  – Evaluation of Low Cost Safety Improvements TPF-5(099)
    • Nationally oriented safety effectiveness evaluation
  – NCUTCD R/WSTC Task Force
    • Determine what may be needed for ICWS in MUTCD
  – AASHTO SCOTE
    • Resolution to SCOH
  – ATSSA
    • Signing Committee collaboration with ENTERPRISE
Next Steps

• More work beyond ENTERPRISE...
  – NCDOT Safety Effectiveness Evaluation
    • Major and major/minor road ICWS = 25-30% reduction (total crashes)
    • May be even higher reduction for severe injury crashes
  – MnDOT Rural ICWS project
    • Design-build deployment at 20-50 sites
Jon Jackels, MnDOT
ENTERPRISE Project Champion
jon.jackels@state.mn.us, 651.234.7377

Bill Legg, WSDOT
ENTERPRISE Program Chair
leggb@wsdot.wa.gov, 360.705.7994

Ginny Crowson, Athey Creek
ENTERPRISE Program Support
crowson@acconsultants.org, 651.600.3338

www.enterprise.prog.org