Jon Jackels, SRF Consulting Group

Intersection Conflict Warning Systems (ICWS)

Rural and Small Community Traffic Management Technology
Safety Challenges
Traditional Improvements

Indirect Turns

Roundabouts

Stop Sign Beacons
Intersection Conflict Warning Systems (ICWS)
MnDOT RICWS System Operation – Major Road Warning

- Major Road warning active when vehicles are in the red zone.
MnDOT RICWS System Operation – Minor Road Warning

- Minor Road warning active when vehicles are in the red zone.
History of ICWS in Minnesota

- Intersection Decision Support (IDS)
- Cooperative Intersection Collision Avoidance System (CICAS)
- Intersection Warning System (IWZ)
- Safe Intersections
- Rural Intersection Conflict Warning System (RICWS)
- Advanced LED Warning System (ALERT2)
- Mainline Dynamic Warning System (MDWS)
- Local RICWS Project
National Effort to Study ICWS
ENTERPRISE Transportation Pooled Fund

- Foundation for Architectural Review & Systems Engineering
- Design Decisions
- Testing and Validation Results
- Maintenance Logs
Safe Intersection
MnDOT’s Rural Intersection Conflict Warning System (RICWS) Project

• 50+ Deployments, 3 years operation
• Project Findings
  – Safety improved (35 to 45%)
  – Standard equipment for ease of maintenance (once/year)
  – Systems are reliable
  – Detection accuracy and driver confidence (99.98%)
• Additional 350+ Sites Identified
  – At discretion of Districts
RICWS Components

• Detection
  – Canoga Micro Loops
  – Loop Detectors

• Controller
  – Econolite ASC/3

• Signs
  – Blank Out
  – Static
• Advanced LED Warning System for Rural Intersections
Mainline Dynamic Warning System
St. Louis County, MN – “Local” RICWS Project

• “Local” RICWS Project Goals
  – Lower cost
  – Easier to operate and maintain
  – Reliable
  – Minimize underground locate requests
  – Can be leveraged by other counties
“Local” RICWS Project Team

• Technical panel to lead project:
  – Vic Lund (St. Louis County)
  – Guy Kohlnhofer (Dodge County)
  – Tim Bray (Crow Wing County)
  – Karin Grandia (Itasca County)
  – Mark Vizecky (MnDOT State Aid)
  – Rick West (Ottertail County)
  – Jodi Tech (Stearns County)
  – Taek Kwon (UMD)
  – Joe Gustafson (Washington County)
  – Sara Buermann (Wright County)
  – Chad Hausmann (Wright County)
  – Virgil Hawkins (Wright County)
“Local” RICWS Systems Engineering Approach

- Architectural Review
- Concept of Operations
- Systems Requirements
- System Design
- Construction
- Project Documentation

- Intersection Location
  - County Hwy 25 & County 16
Architectural Review – Overall Process

• ENTERPRISE Transportation Pooled Fund
• Literature search into ICWS effectiveness (sign type, wording, driver perception, etc.)
• Leverage relationships with agencies that have ICWS
• Broad survey of agencies that have ICWS
Architectural Review – State DOT Outreach

- National search for existing systems
  - System components
    - Make and model of components
    - Controller types and capabilities
    - Sign choice
    - Detector technology
    - Communication
    - Power
  - Notable issues and overall cost
  - Future upgrades or deployments
<table>
<thead>
<tr>
<th>Survey Topic</th>
<th>Response</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Include Minor Road Alert</td>
<td>1. Depends on site conditions</td>
</tr>
<tr>
<td>2. Underground Components</td>
<td>2. Local agencies prefer to minimize</td>
</tr>
<tr>
<td>4. Maintenance</td>
<td>4. Want option to maintain with own staff</td>
</tr>
<tr>
<td>5. System Cost</td>
<td>5. Cheaper is better</td>
</tr>
<tr>
<td>6. Remote Monitoring</td>
<td>6. Important as long as low cost</td>
</tr>
</tbody>
</table>

**Conclusions:**
- Findings align with project goals
- Open to solar, detection, and wireless to reduce cost
- Remotely monitor for MnDOT support
Systems Engineering - Conceptual Design
Local” RICWS Project Approach – Next Steps

- Finalized Systems Engineering
  - Concept of Operations
  - System Requirements
- Completed System Design
  - Project has be let, not awarded
- System Deployment
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Thank you!

jjackels@srfconsulting.com  │  (763) 249-6722