Safe Intersections

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Thomas A. Sohrweide, PE, PTOE
SEH Inc.
The Problem

November 11th, 2008
1:52pm
To use commercial off the shelf technology products to provide active, real-time supplemental warning to drivers approaching an intersection and alert them to look for traffic at or approaching the intersection.
## Partners

- MnDOT Office of Traffic, Safety and Technology
- MnDOT District 4
- MnDOT District 2
- FHWA
- Clay County
- Douglas County
- Mahnomen County
- Otter Tail County
- Polk County
- SEH / NTT / Iteris
Safe Intersections

• Intersection Conflict Warning Systems
  – Major Road
  – Minor Road

• Develop
  – Commercial Off the Shelf (COTS) Products

• Field Deploy

• Operate / Maintain
Intersection Selection

- Average Daily Traffic Volume
- Crashes
  - Total
  - Fatal
  - Rate
  - Severity
  - Right Angle
- Distance from Detroit Lakes
- Electrical Power Present
Intersections

- TH 200 / CSAH 4 – Mahnomen County
- TH 210 / CSAH 35 – Otter Tail County
- TH 29 / CSAH 5 – Douglas County
- TH 75 / CSAH 2 – Clay County
- TH 75 / CSAH 21 – Polk County
Minor Roadway Warning

- Active warning for vehicles at the stop sign on the minor road
- Detection for major roadway warning
- Power
- Controller / Communications
- Fault notification
Major Roadway Warning

- Active warning for major roadway vehicles
- Detection for minor roadway warning
- Power
- Communications
- Fault notification
• Detection
  – Loops
  – Radar
  – Wireless sensors

• Communications
  – Hardwire
  – Radio
Designs

• Controls
  – Timings
  – Fault Detection

• Fault Notification
  – Blank out
  – Steady burn
  – Constant flash (eliminated)
• **Minor Roadway Warning**  
  – “Look for Traffic”  
    • LED arrows  
    • Blank out (Night time dimming)

• **Major Roadway Warning**  
  – Advance / at intersection  
    • “Traffic Entering When Flashing”  
      – Static sign w/Flasher  
      – Blank out w/Flasher
System Types

- Minor Roadway
  - Approach + Stop Bar
    - Wireless sensors
    - Radar
    - Loops
  - Stop Bar Only
    - Wireless sensors
    - Radar
### System Types

<table>
<thead>
<tr>
<th>Major Roadway</th>
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</thead>
<tbody>
<tr>
<td>- Speed Responsive</td>
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<tr>
<td>- Radar detection</td>
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<tr>
<td>- 7.5 second warning</td>
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<tr>
<td>- Pretimed</td>
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<tr>
<td>- Wireless sensor / Radar</td>
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<tr>
<td>- 7.5 second warning @ 60 mph</td>
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</tbody>
</table>
System Costs

• Range
  – $48,200 - $93,200

• Maintenance / Removal
  – $4,800 - $14,400
Minor Road Warning with LED’s
Minor Road Warning with Blank Out Sign
Major Road Warning with Static Sign
Major Road Warning with Blank Out Sign
Evaluation

- Missed Detections
- False Detections
- Operation
- Fault Notification
- Surveys
  - Received – 118
  - Positive – 35 (30%)
  - Negative – 14 (12%)
  - Indifferent – 69 (58%)
Evaluation

• “Good place for flashing sign, it alerts people – area is so wide open – easy to daydream.”

• “4-way stop would be more beneficial before anything.”
Schedule

• November 2011
  – Installations complete
    • One day and 30 day testing

• December 2011 – December 2013
  – Operate / maintain
  – Evaluation

• December 2013
  – Removal / Turn over to MnDOT
Questions?

Jon Jackels
Jon.Jackels@state.mn.us

Tom Sohrweide
tsohrweide@sehinc.com