RWIS in Michigan’s Upper Peninsula

National Rural ITS Conference
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Background

MDOT Seeking
- Safety
- Mobility
- Congestion Relief
MDOT’s Superior Region (Upper Michigan)

- Location
Purpose and Need

- Extreme weather conditions
- Maintenance Activities
- Distance between population centers
- Lack of definitive information
- Dissemination of information
Productivity Benefits

• Decrease in delivery time
• Improved scheduling of crews
• Increased efficiency when planning and preparing for storms
• Scheduling of treatments more effectively, avoiding wasted materials or wrong material
Project Location
Site Selection

• Concept of Operations
• System Needs Assessment
• Site - Specific Criteria
Selected System Overview

• Evaluation of sites
  – Six RWIS
  – Five DMS
• M-28 (Munising to Marquette)
• US-2/I-75
• Other locations
M-28 (Munising to Marquette)
Preliminary ESS Design

- Site Weather Conditions/Climatology
- Instrumentation
- ESS Site and Sensor Requirements
- Maintenance and Security
- Power requirements
DMS Preliminary Design

- Sight Distance/Visibility
- Sign selection
- Power Requirements
- Power Service
Aesthetics

• Avoid visual density/cluttered site locations
• Provide visual uniformity
• Coating field devices (structures, towers, cabinets, etc.)
• Site/device erosion control and maintenance
• Being a good neighbor
Communications

- Requirements
- Alternatives
- Selection
### Estimated ESS and Data/Image Size Calculations per Device

<table>
<thead>
<tr>
<th>ITS Device</th>
<th>Kilobyte (KB)</th>
<th>Kilobit (Kb)</th>
<th>Megabit (Mb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Streaming Video &amp; Control Data (MPEG-4)</td>
<td>384</td>
<td>3072</td>
<td>3</td>
</tr>
<tr>
<td>ESS Data Set (Complete Basic ESS Station)</td>
<td>9</td>
<td>72</td>
<td>0.07</td>
</tr>
<tr>
<td>Set of 3 still 150x150 B/W Images</td>
<td>1.5</td>
<td>12</td>
<td>0.01</td>
</tr>
<tr>
<td>Set of 3 still 640x480 Color Images</td>
<td>25</td>
<td>200</td>
<td>0.3</td>
</tr>
<tr>
<td>DMS Message Set (Including Diagnostics)</td>
<td>2.5</td>
<td>20</td>
<td>0.02</td>
</tr>
</tbody>
</table>
Communication Alternatives

- Private Telecommunications Network
- 800 MHz MPSCS Network
- Plain Old Telephone Service (POTS)
- Cellular Network
Communication Alternative 1

- **Private Telecommunications Network**
  - Requires point to multi-point communications
  - Requires several hundred miles of conduit, a network of towers, or a hybrid of both
  - Network should be flexible and not dependant on single solution or manufacturer
Communication Alternative 2

- **800 MHz MPSCS Network**
  - Designed for voice data communication
  - Used primarily by emergency responders
  - Data rates are very low
  - MPSCS Network could be used for outlying areas to extend network coverage or as ITS network grows
  - Expansion and modification would be costly
Communication Alternative 3

- **Plain Old Telephone Service (POTS)**
  - For low bandwidth ITS applications and can only support limited still images
  - No technological advances are foreseeable
  - Lack of infrastructure and geographical expandability
  - POTS cannot support real time data, but can be used to fill in the gaps as system grows
Communication Alternative 4

- **Cellular Network**
  - Limited number of providers
  - Conversion of analog to digital improved network capacity
  - Ability to support multiple users
  - Demand should only increase
Estimated Cost

- Costs are on a per site basis
  - Basic ESS installation $100,000
  - Maintenance $8,000-$10,000
  - Operation $400
  - Training $200
Current Projects

• 2007-2010
  – Design project for up to twelve (12) ESS and five (5) DMS

• 2008
  – Currently Installing Four (4) ESS
    • Two (2) east-west corridors that experience frequent winter closures
    • Warranty/Maintenance for up to four (4) years
    • Software to access up to 40 ESS sites
      – Easy to navigate web pages and interpret data
    • Training on how to utilize, maintain, etc.
Current Projects

- **2008**
  - Concept of Operations for a Traffic Management Center in the Upper Peninsula
    - Co-locate with Michigan State Police in Negaunee at Central Dispatch
    - 7 day/24 hour coverage
- **2009**
  - Install 2 ESS and 3 DMS
- **2010**
  - Install 6 more ESS and 2 DMS
Future of RWIS in Upper Michigan

- Network of 25-35 ESS sites
- Web site that will allow public access to weather and road data
- Software to assist in application of maintenance treatments (Management Decision Support System)
- Develop performance measures for RWIS
Thanks!

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