Emerging Technologies: WisDOT Programming Preparedness

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• **WisDOT TSM&O Capability Maturity**
  - Capability Maturity Model
  - On-going CMM Implementation Efforts
    • Self-Assessment workshop, grants, peer exchanges, etc.

• **WisDOT Programming**
  - TSMO-TIP (project development)
  - Signals and ITS Standalone Program (project funding)
  - Configuration Management Implementation Plan (project implementation)
### Capability Improvement Framework Dimensions and Level Criteria as Applied to TSM&O Application

*Source: Institutional Architectures to Improve Systems Operations and Management. SHRP2 Report 52-U6 (2012)*

<table>
<thead>
<tr>
<th>Capability Dimension</th>
<th>Level 1</th>
<th>Level 2</th>
<th>Level 3</th>
<th>Level 4</th>
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</thead>
<tbody>
<tr>
<td>Business Processes</td>
<td>Processes related to TSM&amp;O activities ad hoc and unintegrated</td>
<td>Multiyear statewide O&amp;M plan and program exists with deficiencies, evaluation, and strategies</td>
<td>Programming budgeting, and project development processes for TSM&amp;O standardized and documented</td>
<td>Process streamlined and subject to continuous improvement</td>
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<tr>
<td>Systems &amp; Technology</td>
<td>Ad hoc approaches outside systematic systems engineering</td>
<td>Systems engineering employed and consistently used for ConOps, architecture, and systems development</td>
<td>Systems and technology standardized, documented and trained statewide, and new technology incorporated</td>
<td>Systems and technology routinely upgraded and utilized to improve efficiency performance</td>
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<tr>
<td>Performance Measurement</td>
<td>No regular performance measurement related to TSM&amp;O</td>
<td>TS&amp;M strategies measurement largely via outputs, with limited interaction analyses</td>
<td>Outcome measures identified and consistently used for TS&amp;M strategies improvement</td>
<td>Mission-related outputs/outcomes data routinely utilized for management, reported internally and externally, and archived</td>
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<tr>
<td>Culture</td>
<td>Value of TS&amp;M not widely understood beyond champions</td>
<td>Agency-wide appreciation of value and role of TS&amp;M</td>
<td>TS&amp;M accepted as a formal core program</td>
<td>Explicit agency commitment to TS&amp;M as key strategy to achieve full range of mobility, safety, and livability/sustainability objectives</td>
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<tr>
<td>Organization/Staffing</td>
<td>Fragmented roles based on legacy organization and available skills</td>
<td>Relationship among roles and units rationalized and core staff capacities identified</td>
<td>Top-level management position and core staff for TS&amp;M established in central office and districts</td>
<td>Professionalism and certification of operations core capacity positions including performance incentives</td>
</tr>
<tr>
<td>Interjurisdictional Collaboration</td>
<td>Relationships on informal, infrequent, and personal basis</td>
<td>Regular collaboration at regional level</td>
<td>Collaborative interagency adjustment of roles/responsibilities by formal interagency agreements</td>
<td>High level of operations coordination institutionalized among key public and private players</td>
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### FHWA AASHTO SHRP2

### TSM&O Capability Maturity Model
• TSM&O Capability Maturity Model:
  – Business Process
  – Systems and Technology
  – Performance Measurement
  – Culture
  – Organization and Workforce
  – Collaboration
• Development Activities
  – April 2012, WisDOT hosted “Improving Transportation Systems Management & Operations (TSM&O): A Capability Improvement Workshop”
  
  – Implementation Assistance Program (IAP) Grant ($200,000 award in September 2014)
• Operations Academy attendance

• WisDOT TSM&O Capability Maturity Self-Assessment Workshop
  – June 24, 2015

• Wisconsin DOT Transportation Systems Management & Operations Capability and Maturity Model Implementation Plan
  – 2015 ITS Forum (presented by Anne Reshadi)
• Peer Exchange with Michigan DOT for BTO, BHM and Region Staff

• Mini-Regional Operations Forum training

• TSM&O Infrastructure Plan Peer Review

• Systems Engineering training

• Peer Exchange with TN DOT for WisDOT to observe TN TIM test track

• Enhance DOT web page updates to provide public notification process for potholes, hazardous debris, signal and electrical system issues

• Host Joint Operation (law enforcement and TMC management) Peer Exchange in Milwaukee comprised of surrounding states (IL, IA, MN, MI, IN) and peers with co-located TMCs (NJ, TN)
• Programming Preparedness

  
  – Signals and ITS Standalone
  
  – Configuration Management Implementation Plan (CMIP)

TSM&O – TIP

• ANNUAL Process
• Created to be AGILE
• Takes advantage of available DATA sources
• Consistent Statewide METHODOLOGY
• Increases EFFICIENCY and EFFECTIVENESS of limited funding resources
Traffic Operations Summit
Review past and discuss future deployments with DTIM, Operations Managers, State Patrol, and Administrative Office

Annual review of ITS design policies, procurement contracts, and state of technology review

Improvement decisions for Stand Alone and Traffic Operations construction projects

TSM&O TIP Evaluation Process
Identify needs, identify TSM&O deployment options and evaluate, and determine funding source

Traffic Infrastructure Process

Winter Operations

Construction Season
• Needs Analysis Tool
Benefits Analysis Tool

Safety Benefits
S1. How many crashes, by type, occurred in the past year at this intersection or corridor?
- Fatal Crashes
- Incapacitating Injury Crashes
- Non-incapacitating Injury Crashes

Mobility Benefits
M1 (W1). What is the estimated AADT for all vehicles entering the intersection? [ ] vehicles per day
M2 (W1). What is the average Relative Need at this intersection according to the Needs Analysis Tool - Service present?

Productivity Benefits
P1. For how long maintenance efforts have been increasing at the proposed device replacement location(s)? [ ]
P2. How many Cartagraph tickets have been required at this location over the length of time indicated above in P1? (If request is for multiple intersections, include cumulative total here) [ ]
P3. What was the total cost of these tickets? [ ]
P4. What is the estimate of energy and environment benefits? [ ]

Energy and Environment Benefits
Estimated Annual Energy and Environment Benefit [ ]
• Project Summary Package:
  – Documentation Checklist
  – Project Information Sheet
  – Project Operations and Maintenance Considerations

• Full Analysis Package:
  – Project Summary Package
  – Needs Maps
  – Benefits Analysis
Signals and ITS Standalone Program

- Annual program
- Potential funding source for TSM&O-TIP projects
- Streamlined with TSM&O-TIP
- Consistent Statewide methodology of evaluation and prioritization
• Annual application cycle:
  - Project description
  - Existing conditions
  - Performance goals and Objectives
  - Mobility, safety, environmental benefits
  - Project cost and schedule
### Signals and ITS Standalone Program

- **Project evaluation and prioritization:**
  - Regional ranking
  - Mobility
  - Accountability
  - Preservation
  - Safety
  - Service

### Evaluation Rubric

<table>
<thead>
<tr>
<th>Evaluation Category</th>
<th>Regional Status</th>
<th>Mobility</th>
<th>Accountability</th>
<th>Preservation</th>
<th>Safety*</th>
<th>Service</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weighted Point Value</td>
<td>20 Points</td>
<td>20 Points</td>
<td>15 Points</td>
<td>20 Points</td>
<td>5 Points</td>
<td>5 Points</td>
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#### Application Request

- Rank based on the Regional Ranking Spreadsheet administrators per region.
- In some detail, describe how the project will improve mobility and reduce operations and maintenance costs.
- In some detail, describe how the project will improve mobility and reduce operations and maintenance costs.
- In some detail, describe the existing conditions of the existing infrastructure. For example, age and current infrastructure quality and system conditions.
- In some detail, describe the anticipated safety improvements and economic impacts of the proposed project.
- In some detail, describe the anticipated safety improvements of the proposed project.
- What does the proposed project schedule indicate for implementation?
- Is this a project that will be recognized as useful to the local community?

#### Evaluation Rubric

<table>
<thead>
<tr>
<th>Project</th>
<th>Mobility Impact (based on project application response)</th>
<th>O&amp;M Impact</th>
<th>Current Age</th>
<th>Preserving Condition</th>
<th>Environmental Impact</th>
<th>Safety Impact (based on project application)</th>
<th>Implementation Ease</th>
<th>Customer Satisfaction</th>
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</thead>
<tbody>
<tr>
<td>Project expected to provide exceptional mobility improvements.</td>
<td>☑</td>
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<tr>
<td>Project expected to provide significant mobility improvements.</td>
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<tr>
<td>Project expected to provide some mobility improvements.</td>
<td>☑</td>
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</tr>
<tr>
<td>Project not expected to provide mobility improvements.</td>
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#### Level of Objectiveness

- Objective
- Moderately Objective
- Subjective

*The intent of the ITS/Signals Stand-alone Program is interpreted to be for the enhancement of mobility and lifecycle replacement of ITS and signals stand-alone projects. Therefore, safety, though considered, has been given less weight. HSIP projects funded by this program will be evaluated through the HSIP process.*
• Technology advancements and increased reliance on ITS devices demands a more defined set of policies, processes, and procedures to manage them.

• WisDOT BTO is responsible for:
  – Traffic signals and ITS devices located on state owned roadways
  – Networks used to communicate with these traffic signals and ITS devices
  – Systems used to manage traffic signals and ITS devices

Source: https://connectdot.connectsolutions.com/p1swmsn3t6/?launcher=false&fCsContent=true&phMode=normal
• New Technology Deployment Request
  – Testing
  – Integration
  – Security
  – Risk
  – Operations and management resources
  – Schedule
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