Integrated Modeling for Road Condition Prediction (IMRCP)

NOCoE Webinar
August 30, 2018
Agenda and Objectives

- Describe the IMRCP objectives and background
- Review and demonstrate system functions
- Describe stakeholder opportunities
- Plans for further research and demonstration opportunities
IMRCP Program Objectives

• Develop an integrated system for road condition predictions that...
  - incorporates real-time and/or archived data and results from an ensemble of forecast and probabilistic models
    • atmospheric and road weather and hydrology
    • traffic
    • work zones and winter maintenance ops
    • incidents
    • special events
    • demand
  - fuses them in order to predict the current and future overall road/travel conditions
  - for travelers, transportation operators, and maintenance providers
Benefits and Applications

Source: Wikimedia Commons
IMRCP Development

- IMRCP-1: Tech Survey, ConOps, Architecture
- IMRCP-2: Model Deployment, Kansas City Study Area
- IMRCP-3: Model Enhancement, Operations Focus
IMRCP SYSTEM DESCRIPTION
IMRCP Functions
Phase 2 Study Area Sources

Traffic Signal  Detector  ASOS Station  Link
DMS  Ramp Detector  StormWatch/AHPS  Bridge
DEMONSTRATION
IMRCP-2 LESSONS LEARNED
IMRCP-2 Lessons Learned

• The quality of IMRCP results is dependent on foundational systems
  - Network models
  - Traffic data availability

• Expand focus beyond the workday
  - System has to account for “unusual” events

• Invest in calibration and testing
  - Phase 2 provided system shakedown
  - Phase 3 needs to focus on traffic and event details
IMRCP-2 Lessons Learned

- Report exceptions rather than the norm
  - Operators know generally what to expect
  - System needs to focus on “what’s different” or “unusual”

- Encourage direct integration of IMRCP outputs into ATMS
  - Notifications are more useful if directed to the normal operator interfaces

- Develop scenarios for using traffic prediction
  - How could predictions change operation decisions?
NEXT STEPS
Phase 3 Objectives

• Enhance IMRCP relevance to transportation system operations
  - Improve the accuracy of the traffic prediction results
  - Make the model area more consistent with the (KC Scout) operations focus
  - Make the interfaces more useful
• Operate the system over a sustained period (two full years)
• Investigate model automation and replication
IMRCP-3 Study Area
IMRCP-3 Next Steps

• Implement the enhancements
  - Expanded study area
  - Enhanced TrEPS traffic model
  - Bayesian model

• Deploy enhancements prior to 2018-19 winter weather season

• Work with KC Scout and other stakeholders to assure utility for operations support

• Operate and evaluate over two years
STAKEHOLDER OPPORTUNITIES
Stakeholders

• A stakeholder Core Working Group is shaping the research and demonstration
  - Development webinars: monitor and review the progress
  - Operational planning: help set the objectives and expectations
  - Final project experience review

• The broader Operations community can participate through the webinar and conference updates
# Stakeholder Event Schedule

<table>
<thead>
<tr>
<th>Stakeholder Activity</th>
<th>Timeframe</th>
<th>Outcome</th>
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<tbody>
<tr>
<td>CWG IMRCP-3 Kick-off Meeting</td>
<td>Early July 2018</td>
<td>Describe accomplishments through Phase 2 and set up Phase 3</td>
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<tr>
<td>NOCoE webinar</td>
<td>August 2018</td>
<td>Increase awareness of opportunities and applications</td>
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<tr>
<td>CWG IMRCP Design Consultation Meeting</td>
<td>Late August 2018</td>
<td>Obtain guidance and feedback on system</td>
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<tr>
<td>Road Weather Management Stakeholder Meeting</td>
<td>September 2018</td>
<td>Increase awareness of opportunities and applications</td>
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<tr>
<td>CWG Pre-winter Operational Planning</td>
<td>Nov-Dec 2018</td>
<td>Plan for system use, performance measures, and reporting</td>
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<tr>
<td>CWG IMRCP Operational Experience Review 1</td>
<td>Spring 2019</td>
<td>Review experience and solicit feedback for evaluation</td>
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<tr>
<td>Broad stakeholder webinar</td>
<td>Summer 2019</td>
<td>Increase awareness of capabilities and experience</td>
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<tr>
<td>CWG IMRCP Operational Experience Review 2</td>
<td>Spring 2020</td>
<td>Review experience and solicit feedback for evaluation</td>
</tr>
<tr>
<td>Broad stakeholder webinar</td>
<td>Summer 2020</td>
<td>Increase awareness of IMRCP capabilities and experience</td>
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<tr>
<td>Final CWG Meeting</td>
<td>Summer 2020</td>
<td>Describe accomplishments, evaluation results, and final deliverables; solicit concepts for further deployment and next steps</td>
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Summary

- Integrated Modeling for Road Condition Prediction can extend operational awareness from the “now” to the “what next”
- The Kansas City deployment has demonstrated the flexibility and extensibility of the models and framework
- Extended and new model deployments will move from demonstrating IMRCP capabilities to assessing decision support applications
QUESTIONS?
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