



**Battelle**

*The Business of Innovation*

# Findings and Lessons from an MDSS Winter Deployment: MaineDOT

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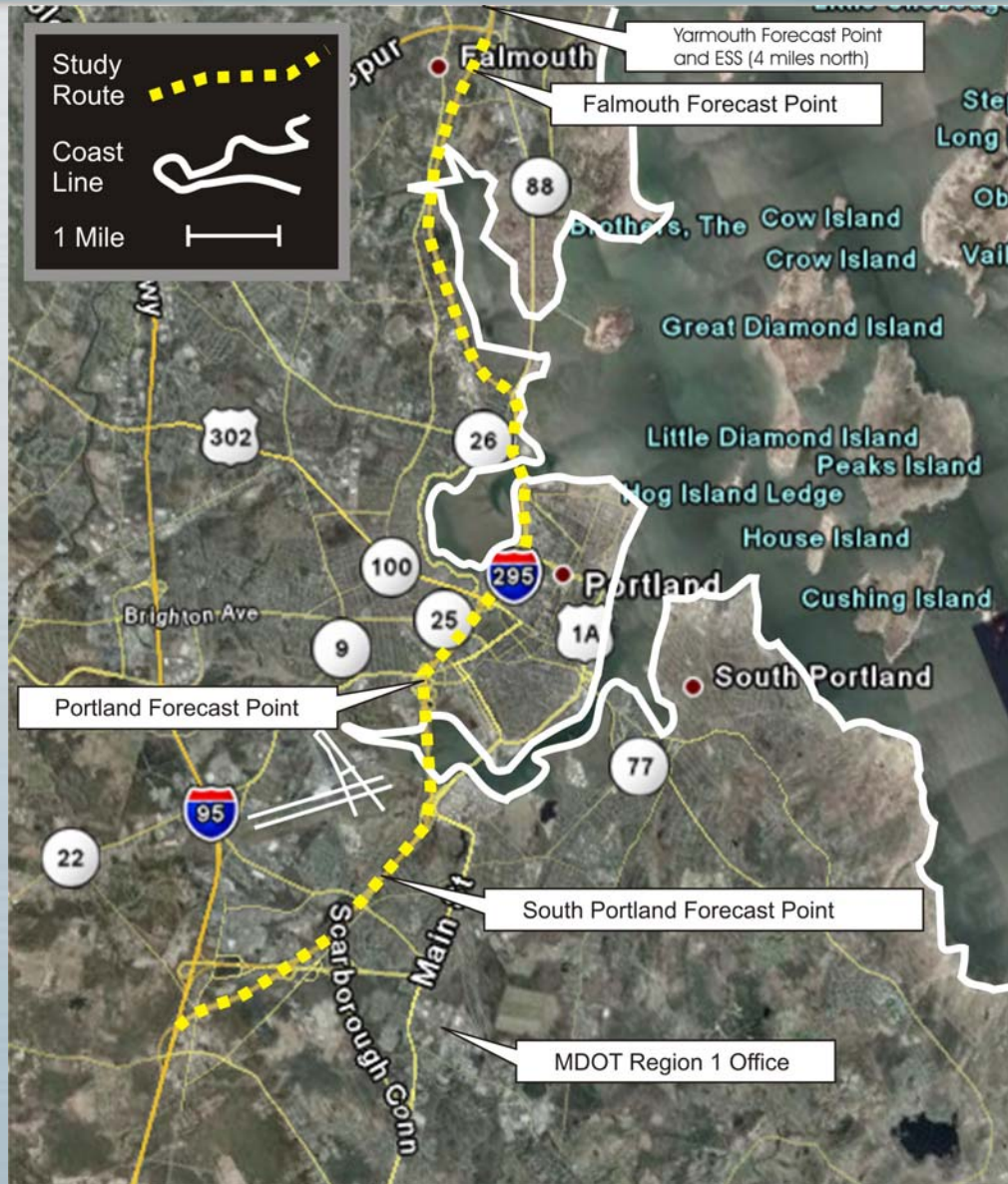
**Tuesday, September 18, 2007**

# MDSS System Background

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- **DTN Meteorlogix WeatherSentry used by MaineDOT Scarborough crew in Portland, ME area during winter 2006-07**
- **System offered:**
  - **Forecasts of storm start & end times**
  - **Precipitation type and amount**
  - **Air and pavement temperature**
  - **Bridge frost**
  - **Treatment recommendations**
  - **NWS information on a GIS platform**
  - **Storm alerts (via web, e-mail, text messages)**
  - **Multiple forecast points**
  - **Weather conditions, patterns, trends**

# Map of Study Route (~12 miles)



# Assessment Approach

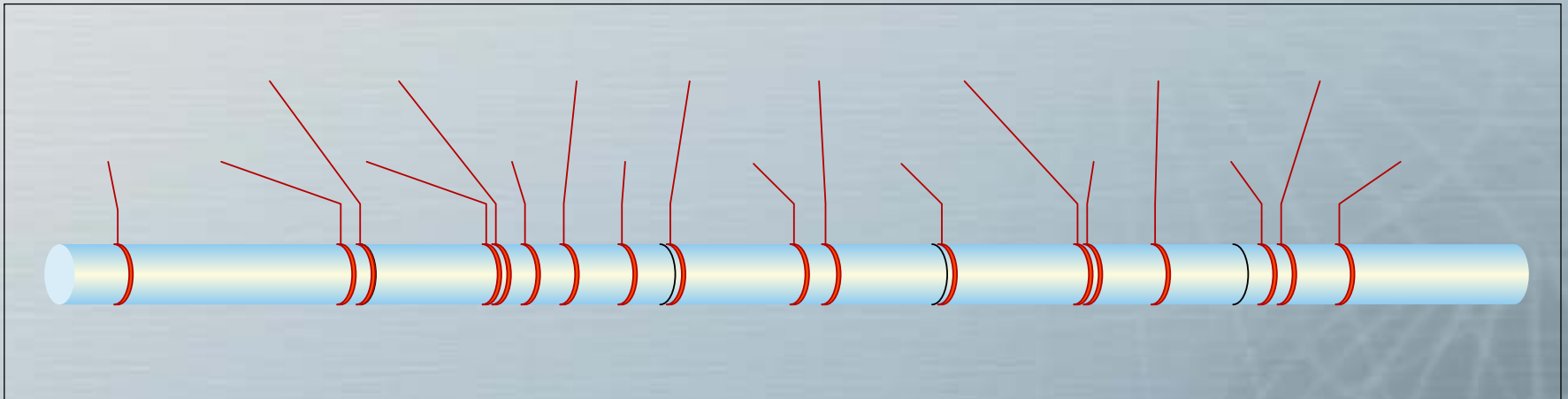
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- **Initially planned as a benefit-cost assessment with before-after design and hypothesis tests**
  - Not a feasible approach in limited time period due to lack of baseline collection and data collection time constraints
  - Current usage not conducive to “with or without” study with adjacent routes
- **Changed scope to a case study with lessons learned**
- **Methodology was an intensive reconstruction of each storm event**
  - Tracked resource usage (materials, equipment, labor)
  - Debriefing interviews after each storm event to record storm details, information used, role of the MDSS, actions taken
  - Retrospective assessment of what crew would have done in the absence of an MDSS

# Winter Storms of 2006-07, Portland, ME

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**Start dates for 18 winter storm events  
(reconstructed first 12 in detail)**



# Findings and Lessons

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- Southern Maine's maritime climate made storm forecasting particularly difficult
  - The MDSS was more accurate forecasting the start time of a storm (which was very important to Maine DOT) than the precipitation type and amount

## Lesson:

- MDSS forecast accuracy and consistency are important factors leading to user trust and confidence
  - Local observational data are an essential ingredient in support of accurate forecasts
  - Crews are more likely to follow MDSS recommendations when its forecasts and treatment recommendations appear accurate
  - Crews need to be willing to follow MDSS recommendations in order to fairly assess their value

## Findings and Lessons (continued)

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- The first season using an MDSS can offer a valuable learning experience
  - MaineDOT saw this as a step toward integrating route-specific weather and pavement condition information along with region-wide NWS forecasts on a GIS platform
  - First time users have a chance to experiment with the MDSS and explore its potential

### **Lesson:**

- There is a lot of information to get used to. Experience working with the service and training by MDSS vendor are needed to achieve the full potential of an MDSS
  - Crews need to understand the “pathways to benefits”
  - On-going vendor support is essential
  - Learning and fully accepting a new MDSS will take time

## Findings and Lessons (continued)

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- The MaineDOT crew intentionally applied more materials than the MDSS recommended
  - The crew historically uses more materials in their road treatments, to avoid having to play “catch up” if conditions worsen
  - Treatment recommendation protocols were placed in the MDSS based on state-wide average treatments.
  - The statewide averages were low for the study location, which is a priority corridor in Maine

### Lesson:

- An MDSS needs to be configured to fit local conditions as well as national best practices
  - A finely tuned MDSS can offer savings in labor and materials.
  - DOTs should work closely with the MDSS vendor to develop customized recommendations which incorporate local conditions as well as national/state-wide best practices

# Findings and Lessons (continued)

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- MDSS alerts warning of an approaching storm are useful
  - Forecast of precipitation type, amount and timing
  - Signals a need to consult MDSS in detail
- Too many alerts can be distracting and not useful

## Lesson:

- Carefully select alert parameters and timing that will be most helpful in making road treatment decisions
  - Consider alerts outside the immediate maintenance area to provide earlier warnings
  - Only issue alerts when conditions or forecast have changed
  - Only issue alerts when conditions vary significantly between forecast points

## Findings and Lessons (continued)

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- MaineDOT found an MDSS more useful at the front end of a storm than during the storm
  - Current condition information was not well integrated
  - The maintenance crew was too focused on “fighting the storm” to have time to effectively make use of an MDSS

### **Lesson:**

- To be useful during the storm, the integration of prior pavement treatment data, current conditions, and forecasts into an MDSS, allowing forward corrections, is essential
  - Crews need to learn how to evaluate and interpret MDSS forecast trends to use that information in on-going decision making during a storm

# Findings and Lessons (continued)

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- The MDSS was used by MaineDOT as one of several “tools” in their toolbox, including:
  - Various weather forecasting services
  - Other nearby maintenance crews
  - Neighboring states
  - On-the-road observations and experienced judgment
  - The Augusta control center (which also tracked the MDSS)

## Lesson:

- An MDSS is an important new tool being added to the road weather management tool box
  - An integrated platform for forecast display and analysis
  - New capabilities not previously available (pavement temperature and bridge frost forecasts, historical trends, alerts)
  - Offers educational/training value

# Final Thoughts from Maine Assessment

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- An MDSS offers important new benefits
  - An integrated GIS platform that state DOTs can use to assess a variety of weather data
  - A new perspective, efficient strategies, and potential cost savings for state-wide road maintenance
  - Consistent treatment recommendations based on best practices
  - Educational and training value for management and crews
- The needs for winter maintenance decision support tools are likely to vary from state to state
  - From a basic weather forecasting / observation tool to a fully elaborated MDSS tool
  - This suggests the value of encouraging different kinds and complexities of tools that provide viable choices to meet different needs

## For More Information, Contact:

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