Overview of Meeting Objectives and Federal MDSS Prototype Update

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Charlotte, North Carolina
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The MDSS Project

• Many of the attendees today are participating in a MDSS stakeholder meeting for the 1st time.

• MDSS began in 1999 out of a study of weather and rural highways. It was recognized that there was a disconnect between road weather forecasts, and the decisions made by the maintenance community.
The MDSS Project

- The **objective** is to bring the weather and transportation communities together to define and develop a system that translates current and predicted road & weather information into recommended maintenance actions.

- The **goal** is to improve the productivity and cost efficiency of transportation agencies which translates into improved mobility and safety on the nation’s roads.
The MDSS Project

• The development strategy was unique in that we built a prototype based on open system principles, and fostered an MDSS market by making that prototype freely available

• A consortium of 5 national laboratories collaborated to develop the MDSS federal prototype

• All of the engineering documents, field test results and source code can be obtained at the NCAR web site: www.rap.ucar.edu/projects/rdwx_mdss/
Stakeholder Participation

State DOT Participation in Maintenance Decision Support System (MDSS) 2000-2009

US & Intl Stakeholders who participated in Annual Meetings

| Ontario Ministry of Transportation | City & County of Denver CO. |
| Environment Canada                 | New York State Thruway Authority |
| City of Grand Prairie Texas        | Austrian Road Authority |
| Dallas Area Rapid Transit          | E-470 Highway Authority Colorado |
| City of Virginia Beach DPW         | McHenry Cnty IL, Division of Transportation |

7th Clarus & 11th MDSS Stakeholder Meetings, September 14-17, 2009, Charlotte, NC
MDSS #11 Attendees

Confirmed State DOT Attendees (32)

Additional Departments and Agencies attending
City of Virginia Beach, VA
McHenry County, IL
Denver Public Works
Private Sector Attendees

- Accuweather
- AWS Weather Bug Professional
- Battelle
- Biral
- Cambridge Systematics
- Global Science and Technology
- High Sierra Electronics
- Intelligent Devices
- ITS America
- Iteris
- IWAPI, Inc.
- Meridian Environmental Technology
- Mixon/Hill
- Nortel Government Solutions
- Quixote Transportation Technologies
- Telvent DTN
- Vaisala, Inc.
Other Key Attendees

- National Center for Atmospheric Research
- New Jersey Institute of Technology
- Ontario Ministry of Transportation
Telvent DTN Weather Sentry subscribers with MDSS winter pavement treatment recommendations
Meeting Objectives

• Update stakeholders on the program
  - Provide updates on development & deployment activities of the different systems
  - Discuss the importance of Cost/Benefit Analyses
  - Capture experiences from last winter
  - Introduce MDSS linkages to Maintenance Management Systems

• Share your experiences
  - In nearly all sessions, time has been provided for interaction. Please participate!
  - A survey will be conducted after the meeting. Details provided via email.
Session Topics

• Session 2: Status of Public and Related MDSS Activities
  - Domestic Scanning Tour: Results and Impressions
  - Pooled Fund MDSS Update

• Session 3: MDSS Benefit/Cost Analyses
  - Indiana DOT Benefit/Cost Analysis
  - City and County of Denver Benefit/Cost Assessment
  - Pooled Fund benefit/Cost Study
Session Topics

• Session 4: MDSS Experiences and Future Development
  - New Jersey Institute of Technology and New Jersey DOT MDSS Implementation
  - Nevada Efforts and MDSS Development Plans
  - Local MDSS Perspectives
  - Moderated Discussion: Everything is on the Table!! (2 sessions)
  - Clear Roads Project on Mobile Data Collection
  - 2009 Winter Maintenance Peer Exchange
  - MDSS and Maintenance Management Systems Integration
Session Topics

• Session 5: Outreach
  - MDSS AASHTO Technology Implementation Group (TIG)
  - Expanding DSS Functionality: Maintenance and Operations Decision Support Systems (MODSS)
    • Clarus Regional Demonstration Use Case
    • Indiana DOT Experience

• Session 6: Private Sector Forum
  - A showcase for new and innovative technologies related to MDSS and winter maintenance
An Update of the MDSS Federal Prototype - 2009

Michael Chapman, Sheldon Drobot, William Mahoney, Jim Cowie, and Seth Linden

NCAR - Research Applications Laboratory
What is MDSS?
Strategic Decision-making tool (12-48 hours)

Weather Information:
- Air temperature
- Relative humidity
- Wind speed/direction
- Precipitation type, rate, accumulation
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Road Surface Information:
- Road temperature
- Bridge temperature
- Bridge frost potential
- Blowing snow potential
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Treatment recommendations:
- Treatment type (plow, chemical, pre-treat)
- Treatment amount
- Treatment location
What is MDSS?

Tactical Decision-making tool (0-12 hours) - Currently

Observations:
- Air Temp
- Pavement/Bridge temp
- Wind speed/direction
- Relative Humidity
- Precipitation
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Remotely Sensed Observations:
- Radar
- Satellite
Strategic Enhancements

METRo (Model of the Environment and Temperature of Roads)*

* Environment Canada
Tactical Enhancements

Traffic Cameras:
Tactical Enhancements

Traffic Cameras:
Tactical Enhancements

AVL:

Plow diagnostics (speed, blade status, treatment rate) and dashboard cameras
Enhancements

Event Playback:
Enhancements

ESS from *Clarus* system:
New Deployments

New Jersey Institute of Technology (NJIT)
New Deployments

Denver International Airport (DIA)
New Deployments

Denver International Airport (DIA)

*Need has arisen to increase skill of 0 - 4 hour precipitation forecasts*
Ongoing Research

• Short-term precipitation forecasts are model-based and not accurate enough for the users of MDSS

• Problems with location and forecast of intense snow bands over front-range of Colorado

• Work being done to generate 5-min radar diagnostic and short-term forecast for precipitation

• TITAN or WSDDM will likely be used for first-cut

• 5-min storm motion vectors from TITAN (or WSDDM) will also be included
Another Application

Maintenance and Operations Decision Support System (MODSS)

• Non-winter weather system

• Provide support for maintenance activities such as:
  - weed spraying
  - lane striping
  - pothole repair
  - mowing
  - other weather impacted activities
Future Work

Possible Inclusion into MODSS:

- MDSS ingredients (models, observations, etc.)
- Additional Observations (NLDN)
- Nowcasting component for Thunderstorms:

  TITAN is the first-cut at this problem
MDSS Information

http://www.rap.ucar.edu/projects/rdwx_mdss

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