System Description
The winter Maintenance Decision Support System (MDSS) is a tool designed to support pavement snow and ice control operations. The MDSS is based on leading diagnostic and prognostic weather research capabilities, road condition algorithms, and rules of practice for anti-icing, which have been developed by national research centers. Private sector weather service providers are utilizing prototype MDSS technologies to develop operational versions of the system for use by departments of transportation (DOTs).

MDSS Integrated Technologies
- Pavement Weather Forecast System
- Pavement Chemical Concentration Algorithms
- Pavement Temperature Model
- Anti-icing Rules of Practice Module
- Winter Maintenance Display Application

The development of the MDSS began in 2001 and refinements are ongoing. The system has been field tested in Minnesota, Iowa and Colorado. The City and County of Denver is currently supporting a version of MDSS that is used by Denver International Airport to support runway maintenance activities. It’s also being tested over large urban area in the Unites States that have diverse climates.

Project Results
The MDSS project has developed an operational capability that:
- Capitalizes on existing pavement and weather data sources
- Fuses data to make an open, integrated and understandable presentation of current environmental and pavement conditions
- Generates diagnostic and prognostic maps of pavement conditions emphasizing the 1 to 72 hour horizon
- Supplies recommendations on winter maintenance courses of action together with anticipated consequences of action or inaction
- Delivers all of the above on a single platform, with simple and intuitive operating requirements, and does so in a readily comprehensible display
- Resides in an open source framework to support shared enhancements

The MDSS was designed to be flexible and extensible so that it could be reconfigured to support a broad category of decision makers involved in snow and ice control operations. Although the system was initially developed for state and local winter maintenance practitioners, it has also been applied to support airport surface snow and ice control operations.

The MDSS was designed to be flexible and extensible so that it can be reconfigured to support a broad category of decision makers involved in snow and ice control operations.
MDSS Products Include Predictions of:

- Pavement Temperature
- Pavement Condition (snow and ice deposition)
- Weather Impacts
  - temperature
  - wind
  - humidity
  - precipitation (type, intensity, amount)
- Pavement Frost Potential
- Blowing Snow Potential
- Treatment Recommendations
  - type of chemical and amount
  - location
  - timing
- Ability to Generate “What if” Scenarios

Technology Transfer
The MDSS technologies are being provided openly to all parties interested in snow and ice control decision support systems. Technical information on the MDSS and instructions for obtaining MDSS software and documentation can be found at: ral.ucar.edu/projects/maintenance-decision-support-system-mdss

The development of the MDSS was initially sponsored by the Federal Highway Administration (FHWA) Office of Transportation Operations (HOTO) and the ITS Joint Program Office. The project is managed by the FHWA Road Weather Management Program.

For More Information, Contact:
pikalert@ucar.edu
National Center for Atmospheric Research (NCAR)
Research Applications Laboratory (RAL)
PO Box 3000 Boulder CO 80307-3000
303-497-8401 fax www.ral.ucar.edu