

Working Group for Weather Information for Surface Transportation Research Priorities Highlights

OVERVIEW

After considering the recommendations made in various reports reviewed by the Working Group for Weather Information for Surface Transportation (WG/WIST) (see Attachment 1), the WG/WIST believes that the NOAA/NWS, commercial weather providers, and surface transportation weather information users should work cooperatively to improve the observational system, develop and improve products and forecasts, and enhance the delivery of information and services for surface transportation weather. There is a need to improve the accuracy and resolution of surface transportation weather forecast products supporting both tactical and strategic decision making. Additionally, there is a need to continue to research, develop, and enhance the standards required to facilitate access to weather and surface condition data and to ensure interoperability between sensing platforms. Current projects have focused on standards for observations. Data standards will be required for surface transportation weather and surface condition prediction products. Information presentation standards are also required to ensure that weather and surface condition information is presented in a consistent manner between jurisdictions, and between providers within single jurisdictions.

OBSERVATIONS

1. Develop/organize the infrastructure to acquire, quality control, and archive weather and road condition observations.
2. Either utilize or improve existing observational systems that may not be fully leveraged for surface transportation uses.
3. Develop mobile weather and road surface sensors.
4. Develop next-generation environmental sensor that will improve the ability to monitor conditions on and around the roadways.
5. Develop methods to assimilate new observations along with traditional weather data into numerical weather prediction (NWP) and road weather models.

MODELING, FORECASTS, WARNINGS, ADVISORIES AND VERIFICATION

1. High Resolution Forecasts (e.g., hot start techniques, numerical weather prediction, ensemble modeling) for the roadway environment (e.g., route-specific predictions, precipitation start/stop time)
 - A. Atmospheric NWP

- B. Boundary Layer/Interface Layer NWP
- C. Surface Condition Modeling

2. Model Output Statistics to improve forecasts between two and ten meters above the surface, and as input to decision support systems.

WEATHER INFORMATION DISSEMINATION & DECISION SUPPORT SYSTEMS

1. Advanced decision support systems for roadway operations including exploration of the overall impact of weather on traffic, and integration of weather and surface condition data for multiple user categories.
 - A. General
 - B. Warning and Information Systems
 - C. Flood Prediction
 - D. In-vehicle Systems
2. Human performance issues including the identification of road weather information types that should be presented to drivers, and human factors studies on various presentation methods (e.g., audible alerts, text alerts, voice response, moving map displays).
3. Confidence, risk and uncertainty assessment to research the appropriate types and amounts of uncertainty information decision makers need and how best to communicate that information.
4. Strategic planning and management models.
5. Develop a unified (system or system of systems) environmental information dissemination system.

EDUCATION, OUTREACH AND AWARENESS

1. Training for the transportation community on available road weather information products.
2. Building bridges between transportation and weather communities, with a focus on developing training for the weather community on the transportation environment and the challenges faced by road users and operators.
3. Building surface transportation expertise through academic institutions.
4. Driver education.

DATA ACCESS, ARCHIVE, AND ASSESSMENT

1. Develop filtering and fusion processes to tailor increasingly abundant information and data for specific decisions in mobile and fixed environments and for purposes of safety-warning, operations, and planning.
2. Archive and mine operational traffic observations to assess weather impacts.
3. Research, develop, and implement an integrated data collection and reporting system.
4. Develop and provide accessible weather data archive for accident research and operational strategic planning.

PERFORMANCE MEASURES AND WEATHER-RELATED CRASH REPORTING

1. Cost-benefit analysis of road weather services: includes costs/benefits to local authorities and road users, and accident and environmental costs.
2. Establish a standardized recording practice for road/rail/marine crashes/accidents, weather conditions and road/rail/marine conditions.
3. Performance evaluation to identify and quantify the benefits of improved road weather information.
 - A. Research to understand and validate the effects of weather on all transportation outcomes, including traffic management, maintenance, emergency management, travel planning, traveler warning, facility planning, and others. Each decision type requires operational research to determine and validate linkages between weather information and improved transportation outcomes.
 - B. Improve understanding of, and address the social, economic, educational, and institutional policy issues related to, open dissemination and application of weather information for surface transportation.
 - C. Transportation outcome quantification of improved environmental information, decision support and technique (generally requiring large cross-sectional or longitudinal studies with controlled interventions).
 - D. Improve understanding and models for the uncertainties, risks, and cost-benefit outcomes related to incorporating weather/geophysical observations and prediction in surface transportation decision processes.

Attachment 1—References

1. The AMS *Policy Forum* focused on “*Weather and Highways*” in November 2003.
2. COST 309 Road Weather Conditions. COST is an intergovernmental framework for European Cooperation in the field of Scientific and Technical Research, allowing the coordination of *nationally funded* research on a European level. COST Actions cover basic and pre-competitive research as well as activities of public utility.
3. National Academy of Sciences’ (NAS) Board on Atmospheric Sciences and Climate (BASC) and Transportation Research Board (TRB) report, *Where the Weather Meets the Road--A Research Agenda for Improving Road Weather Services*, January 16, 2004.
4. Weather Issues in Transportation Report on Research Focus Groups and Recommendations for Future Action September 2004, Prepared by Iowa Department of Transportation and Center for Transportation Research and Education.
5. *Weather Information for Surface Transportation - National Needs Assessment Report*, NOAA/OFCM, December 2002
6. *U.S. Weather Research Program: National Need, Vision, & Interagency Plan for FY 2000-2006*
7. Draft NOAA-FHWA Partnering Plan, last revised on July 1, 2004.
8. Intelligent Transportation Society of America, Weather Information & Applications Special Interest Group(WIA-SIG), *Transportation Weather Research and Development Needs to Support ITS*, Version 0.0, Date: 18 September 2005. Prepared by: National Center for Atmospheric Research