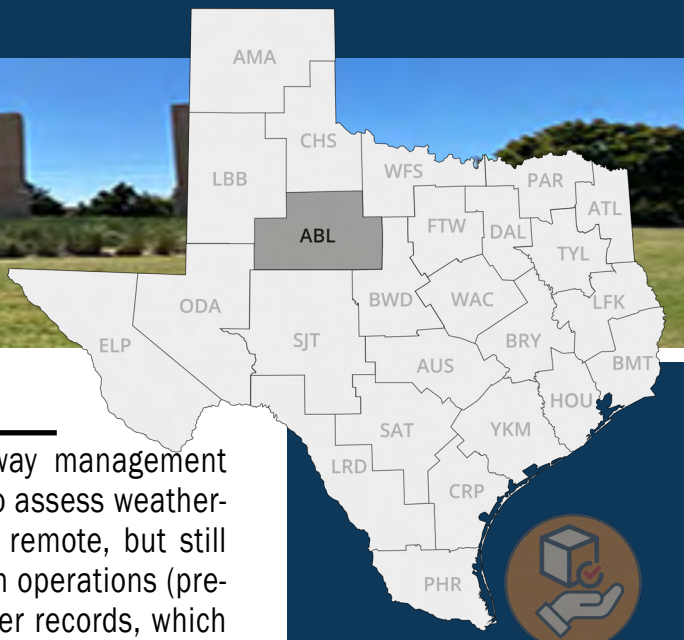
TxDOT Innovations and Technology Deployment Briefs

Weather Responsive Management Strategies



PROBLEM

TxDOT district personnel must perform weather-related roadway management over a geographically large district, in which it is often difficult to assess weather-related roadway conditions. This difficulty is especially true in remote, but still critical, areas. In addition, the current processes for winter storm operations (pre-treatment, de-icing, and snow plowing) are tracked through paper records, which makes analysis and improvement of winter weather operations and response challenging and time-consuming.

SOLUTION

Researchers at the University of Texas at Austin have evaluated several low-cost sensor solutions that allow for weather related data to be retrieved across a large region, including data from weather stations and vehicle mounted sensors. Currently, researchers are looking at how existing GPS fleet vehicle tracking systems can be augmented to show where winter operations vehicles are performing activities such as spraying brine, spreading sand, and plowing the roadway. These capabilities are currently being piloted on four vehicles in the Abilene District. These activities are viewable from within the same GIS-enabled environment that hosts TxDOT's new Emergency Response Application, which allows for live monitoring, historic data retrieval, and viewing of analytics.

BENEFITS

Collecting weather related data automatically and digitally allows for data that is more accurate and more accessible than data produced in handwritten logs. District personnel will be able to use this information to visualize current activities of winter operations vehicles and use this data to improve future winter weather response strategies. The winter operations strategies and technologies evaluated in the Abilene District are also applicable to other operations such as roadside vegetation management, general road maintenance tracking, and hurricane response activities.

PROJECT DELIVERY

CUSTOMER FOCUS

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Texas Department of Transportation

District: Abilene **March 2023**

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KEY TASKS

- Survey and synthesize weather responsive management strategies (WRMS) best practices and emerging strategies.
- Investigate data pipelines, organizational processes, and decision-making strategies.
- Develop pilot demonstration platform.
- Implement enhanced GIS capabilities.
- Apply findings to other WRMS (such as hurricane response).
- Conduct WRMS sensor and data workshop.

DATA SOURCES

The project evaluates sensor products that produce weather data, road surface wetness/ice characterization, and road surface temperature. Meanwhile, data from the National Weather Service and West Texas Mesonet are used along with data sources internal to TxDOT, including fleet vehicle data.

PROACTIVE APPROACH

Better data sources and methods for accessing and visualizing data allow for improved planning and execution, especially in a rapidly developing winter storm situations.

Brine sprayer and plow equipped with operations sensing capabilities.

This "sensor kit" interfaces between operations sensors and inputs on the existing fleet tracking system.

Project weather stations are installed in various locations within the Abilene District.

The surface condition sensor monitors roadway surface for temperature and wetness, reporting readings in a web-based environment.

POINT OF CONTACT

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