



Integrating mobile observations and Pathfinder strategies can help agencies manage road systems and inform travelers ahead of, and during, adverse weather conditions.

Heavy rain, snow and other storms can have significant impacts on the safety, mobility, and productivity of road users. Over the last 10 years, 22 percent of all vehicle crashes were weather related. On average, these crashes resulted in nearly 5,500 deaths and more than 415,000 injuries each year. Likewise, the delays associated with adverse weather can be profound and have significant economic impacts.

Through round four of Every Day Counts (EDC-4), this effort deploys two distinct road weather management solutions that allow state and local agencies to be proactive in managing the surface transportation system ahead of and during adverse weather events.

PATHFINDER IMPLEMENTATION PLAN

Pathfinder is a collaborative effort between the National Weather Service (NWS), state departments of transportation (DOTs), and state DOT support

contractors who provide road weather information to share and translate weather forecasts into consistent transportation impact statements for the public.

The Pathfinder Implementation Plan lays out a multi-step process on what information to share when and how before, during, and after high-impact weather events. This provides the public with consistent and actionable messages on potential impacts to the transportation system.

INTEGRATING MOBILE OBSERVATIONS

Integrating mobile observations (IMO) involves collecting weather and road condition data from government fleet vehicles, such as snowplows. The focus is on supplemental data from ancillary sensors installed on the vehicles, such as pavement temperature sensors, and it also includes native vehicle data such as windshield wiper status and anti-lock brake or traction control system activation.

The data provides maintenance managers with an extremely detailed view of the weather and road conditions along the road network. This information supports a number of road weather management strategies, such as a winter maintenance decision support system that enables agencies to use only the necessary amounts of labor and equipment to treat roads with salt and other materials. It also supports traveler advisories and warnings, ultimately resulting in improvements in safety and mobility.

In addition, many states have environmental sensor stations (ESS) strategically placed around highways. By combining the connected vehicle data with the ESS data, maintenance and operations have enhanced resources to better manage assets and inform the traveling public.



Pathfinder and IMO lead to informed decisions by operators and users prior to adverse weather events.



Road Weather Management:

Weather-Savvy Roads

STATE OF THE PRACTICE

Pathfinder was born out of the success surrounding the coordination between the Utah DOT and the NWS local forecast office during the 2002 Winter Olympics, and Utah DOT's weather support provider. The FHWA and NWS worked with the Utah DOT to document the processes, and then expanded it to be applicable across the country. The document was next used by the Nevada and Wyoming DOTs and then refined to become the Pathfinder Implementation Plan.

Most state DOTs have implemented some form of vehicle-based technology, usually for automatic vehicle location and real-time communication. IMO builds on these capabilities by adding ancillary sensors to collect road weather data, while also tapping into the engine's "black box" to collect and disseminate native vehicle data. The Minnesota, Michigan, and Nevada DOTs are deploying such systems, and FHWA is working with them to document the lessons learned from the implementation process as well as the management strategies (such as traveler information systems and road weather performance management systems) that these data improve.

PATHFINDER BENEFITS

- ▶ **Enhanced Collaboration.** Working together to execute the Pathfinder Implementation Plan strengthens relationships between the NWS and DOTs.
- ▶ **Informed Travelers.** Cohesive weather impact statements enable drivers to make better decisions regarding whether, when, and where to travel.

- ▶ **Improved Safety, Mobility, and Economy.** Consistent impact messages can reduce traffic demand, with the ultimate goal of saving lives and property and minimizing the impact of weather events.

IMO BENEFITS

- ▶ **Cost-Efficient Operation.** Employing sensors on existing fleets is a relatively low-cost method of gathering road weather observations that can support numerous maintenance, traffic, and performance management strategies.
- ▶ **Proactive Management.** Vehicle-based technologies provide agencies with the information needed to proactively manage roadway systems before the negative impacts of road weather occur.
- ▶ **Improved Safety, Mobility, and Economy.** Connected vehicles technologies, advanced weather prediction and targeted decision support enable operators to more effectively maintain a high level of service on roads, which decreases crashes and keeps traffic moving smoothly.

RESOURCES

EDC-4 Weather-Savvy Roads resources website:
<https://collaboration.fhwa.dot.gov/dot/fhwa/RWMX/SiteAssets/home.aspx>

EDC-4 Weather-Savvy Roads: https://www.fhwa.dot.gov/innovation/everydaycounts/edc_4/roadweather.cfm

FHWA Road Weather Management Program:
<http://www.ops.fhwa.dot.gov/weather/>

EDC-4 Summit Breakout Session: Fall 2016
https://www.youtube.com/watch?v=AQP_bSogYzg

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U.S. Department of Transportation
Federal Highway Administration

Every Day Counts (EDC), a State-based initiative of FHWA's Center for Accelerating Innovation, works with State, local and private sector partners to encourage the adoption of proven technologies and innovations aimed at shortening and enhancing project delivery.

