



# Clarus

## A Clear Solution for Road Weather Information

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***“Weather forecast for tonight: Dark. Continued dark overnight, with widely scattered light by morning.”***

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These words by comedian George Carlin, while not a real weather forecast, demonstrate how insufficient forecasting can be. While the accuracy of weather forecasting has improved substantially over the last few years, when it comes to the nation’s roadways, it’s not enough. More precise, relevant, and timely weather information, and its effects on the road – road weather information – is critical for saving time, money, and most importantly – lives.

The U.S. Department of Transportation (DOT) Federal Highway Administration (FHWA) Road Weather Management Program, in conjunction with the Intelligent Transportation Systems (ITS)



Joint Program Office established the Clarus Initiative in 2004 to reduce the impact of adverse weather conditions on surface transportation users. Clarus is the 21<sup>st</sup> Century’s answer to the need for timely, high-quality road weather information.

The goal of the initiative was to create a robust data assimilation, quality checking, and data dissemination system that could provide near real-time atmospheric and pavement observations from the collective transportation department’s investments in road weather information system, environmental sensor stations (ESS), as well as mobile observations from Automated Vehicle Location (AVL) equipped trucks. The initiative also envisions utilizing weather data collected from passenger vehicles equipped with transceivers, research that is being conducted under the ITS Joint Program Office’s connected vehicle research initiatives.

The result is a more complete and accurate weather picture that is available to any user, at anytime, anywhere in the U.S. Since states use different data sets, it is helpful if they can look at what’s going on in the states around them to better prepare for weather events. Clarus standardizes data across regions, allowing a transportation manager to review data from neighboring states. This includes not only the air temperature, but temperatures on road surfaces, which are a critical element in treating roadways for ice and snow.



As any traveler knows, weather does not stop when crossing a state line. Weather is a regional phenomenon, and Clarus addresses this by collecting and analyzing data for accuracy and then packaging it in formats tailored to meet the needs of each end user, erasing jurisdictional boundaries.

Transportation managers use road weather information to make a number of critical decisions – when and where to treat roads for ice and snow; what travel advisories should be posted; and when roads should be closed due to ice, drifting snow, high winds, low visibility, or flooding.

Weather providers use the information to give up-to-date forecasts to the traveling public, which uses weather reports to not only decide whether to grab an umbrella, but when they should travel and what routes they should take.

Insufficient or poor quality road weather information can be costly in both human and economic terms. The wrong decision on when to deploy snow plows result in crews waiting hours for the first

***“Anytime, Anywhere Road Weather Information”***

snowflake to fall, or in dangerous untreated road conditions. For travelers, bad weather often results in increased risk of a crash or hours of delay.



According to the Road Weather Management Program (RWMP), weather plays a role in 24 percent of all crashes, resulting in over 7,100 deaths and more than 629,000 injuries over the last 13 years. Weather also affects road capacity and is a factor in 25 percent of all nonrecurring delays, costing drivers close to one-billion hours of delay due to snow, rain, ice, wind, and fog.

*Clarus* – the Latin word for clear – provides clear benefits to everyone involved in weather and transportation:

- Transportation managers have enhanced decision-making tools (e.g., the Maintenance Decision Support System (MDSS)) allowing them to more efficiently manage resources, more effectively maintain their roadways, and to give credible and precise travel advice.
- Weather providers are able to provide high-resolution weather analyses and forecasts and real-time travel conditions via radio, television, and

- the Internet. The accuracy of reports based on *Clarus* observations tells a traveler about a specific route and the time bad weather is likely to arrive.
- Travelers no longer have to engage in guess work when it comes to driving in bad weather or place themselves and others at risk by driving on dangerous roadways.

The *Clarus* Initiative is based on the premise that the integration of a wide variety of weather observing, forecasting, and data management systems, combined with robust and continuous data quality checking, could serve as the basis for timely, accurate, and reliable weather and road condition information.

When disseminated to a wide audience of users, this real-time information impacts decisions by both drivers and transportation operators and alleviate the safety and congestion effects of adverse weather.

The *Clarus* System offers a one-stop, Internet-based portal for all surface transportation environmental observations, allowing users to tap into the system for easy access to the data. Three critical features make *Clarus* information unique and separate from other forms of weather information available on the market today:

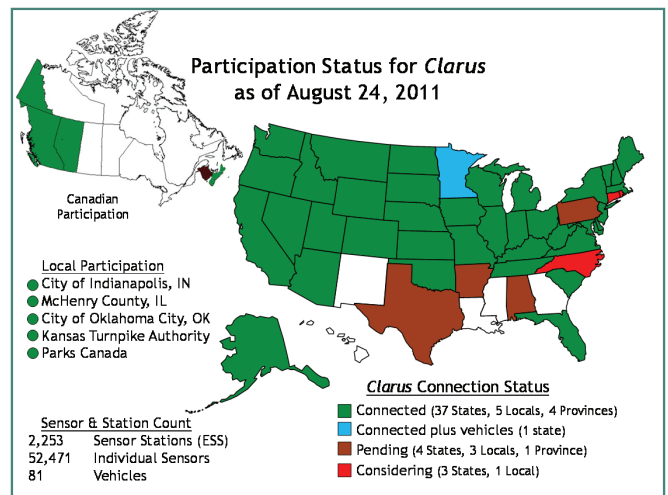
- Specific to Transportation: *Clarus* specifically provided information related to roadway conditions.
- Level of Detail: With the ability to gather data from a vast array of sensors, *Clarus* enabled

service providers to generate and deliver targeted and route-specific information.

- Quality Control: *Clarus* performed comprehensive data quality checks.

To access the system, <http://www.clarus-system.com>. For more information on the *Clarus* initiative visit the web site at <http://www.its.dot.gov/clarus/index.htm>.

*All photos and Clarus map courtesy of the Road Weather Management Program.*



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Federal Highway Administration  
Research & Innovative Technology Administration

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