Enhanced Road Weather Content for ATIS Resulting from the Clarus Initiative

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History

• 1998: Desire to determine current and future road conditions to improve safety and mobility.
  – 60% of all traveler fatalities occur within the transportation network of rural America.
  – Goal to construct Mesonetworks across each state to increase the reliability and spatial availability.

• 2000: Meridian developed operational principles to collect, quality check, and manage data across multiple agencies.
History

• 2004: *Clarus* Initiative was established by US Department of Transportation
  – Created to reduce impact of adverse weather on travelers through the use of collected surface weather data.
  – Goal to establish a management system for sharing quality checked surface transportation atmospheric and pavement observations.

• 2006: First phase of data acquisition complete and continued work with Multi-state Regional Demonstrations.
Multi-state Demonstrations

• Objectives:
  – 1) Prove *Clarus* System functions as designed through the addition of several state and local agencies’ ESS networks;
  – 2) Demonstrate transportation systems could provide a proactive response to inclement road and weather conditions; and
  – 3) Provide an additional source of high-resolution surface weather information to create new and improved services for the benefit of the public.
Clarus Demonstration Use Cases

UC #1: Enhanced Road Weather Forecasting

UC #2: Seasonal Weight Restriction Decision Support Tool

UC #5: Enhanced Road Weather for Traveler Advisories
Use Case #5

• Built from enhanced road weather forecasts and observed road weather conditions.
• Utilizes (where possible) existing infrastructures used by states for road weather management controls and advisories.
• Provided as operational services during the demonstration period.
  – Only upon acceptance by the participating states
  – At no additional cost to the participating states
Enhanced Road Weather Content for Traveler Advisories

- Services to improve current and predicted pavement conditions
  - Will also enhance other road weather forecast elements
- Support for multi-state trip planning
  - Bridge across state 511 systems
  - Provide content for corridor-wide web information resources
Message Content
Decision Tree for Traveler Advisories

• Consideration made of various possible road condition scenarios (decision trees)

• Each scenario is mapped to make sure non-conflicting information is provided to the traveler

• Decisions include use of observed, analyzed and forecast conditions
Multi-State Web Portal

Multi-State View

Information regarding triggers for current Clarus Use Case 5 supplemental messages can be accessed [here](#).

Loop Forecast Road Conditions (this is a forecast simulation, forecast conditions may differ from the actual conditions that occur!)

Zoom
Click below to zoom to a specific state.

- Observed Road Conditions
  - Good Driving Conditions
  - Fair Driving Conditions
  - Difficult Driving Conditions
  - Road Closed/Blocked
  - Unknown

- Analysis Suggests Road Conditions
  - May Change from Good to Poor Driving Conditions
  - May Change from Poor to Difficult Driving Conditions

Restores Multi-State Map

Observed Temperature
Observed Wind
Observed Weather
Multi-State Web Portal

Observed Road Conditions

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Multi-State Web Portal

Predicted Road Conditions

Actual road conditions may vary from this report. Motorists are cautioned to be alert to changing conditions.

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- May Change from Good to Fair Driving Conditions
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Restores Multi-State Map

Observed Temperature
Observed Wind
Observed Weather

Meridian Environmental Technology Inc.
Multi-State Web Portal

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Clarus Enabled Road Conditions
Multi-State Web Portal

Zoom to Individual State View

Clarus
Clarus Enabled
511 Travel Info

811 Travel Information
SafeTravelUSA.com

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- May Change from Good to Fair Driving Conditions
- May Change from Good to Difficult Driving Conditions
- Sensors Indicate Conditions May Vary From Observed Road Conditions

Restores Multi-State Map

Observed Precipitation
Observed Wind
Observed Weather
Multi-State Web Portal

National Weather View
Multi-State Web Portal

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- May Change from Good to Difficult Driving Conditions
- Sensors indicate conditions may vary from observed road conditions

Restores Multi-State Map

Observed Road Conditions
- Observed Precipitation
- Observed Wind
- Observed Weather
Multi-State Web Portal

Actual road conditions may vary from this report. Motorists are cautioned to be alert to changing conditions.

Location:
I-15, Shelby-Exit 363 to US Customs and Canadian International Border

Latest Road Condition Report:
Latest reported road conditions are as follows: dry along the entire segment.

Supplemental Road Condition Information:
As of processing at 6:58am MDT: Good driving conditions are expected to persist for the next 12 hours.

Weather Forecast:
The forecast until 12:00 PM MDT on Saturday, May 01: Skies will be partly clear. Visibility will be ten miles. There will be widely scattered very light rain. Winds will be 9 mph from the northwest changing to 10 mph gusting to 18 from the west. Temperatures will range from 37 to 41 increasing to 46 to 50.
Multi-State Web Portal

Safe Travel USA

Location:
I-94, MT State Line to Dickinson-Exit 61

Latest Road Condition Report:
Latest reported road conditions are as follows:
good driving conditions along the entire segment.

Supplemental Road Condition Information:
As of processing at 6:58am MDT: Forecasts indicate high likelihood icy conditions may impact the roadway within the next 6 hours.

Weather Forecast:
The forecast until 12:00 PM MDT on Saturday, May 01: Skies will be overcast. Visibility will be one mile changing to five miles. There will be frequent light snow changing to frequent light rain. Winds will be 23 mph gusting to 40 from the west northwest. Temperatures will range from 34 to 36.
Multi-State Web Portal

Latest Reported Road Conditions are as follows:
- Good driving conditions along the entire segment.

Supplemental Road Condition Information:
- As of processing at 6:58am MDT: Forecasts indicate high likelihood icy conditions may impact the roadway within the next 6 hours.

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Multi-State Web Portal

Animation View
Multi-State Web Portal

Animation View

Map showing road conditions with a highlighted area indicating "Local Forecast Road Conditions (this is a forecast simulation, forecast conditions may differ from the actual conditions that occur)."
Depiction of Expected Conditions

Precipitation & Road Condition Forecast
2010/05/01 12:00 CDT (11:00 MDT)

Future Radar
- Very Light Rain
- Light Rain
- Moderate Rain
- Heavy Rain
- Very Heavy Rain
- Very Light Mix
- Light Mix
- Moderate Mix
- Heavy Mix
- Very Heavy Mix
- Very Light Snow
- Light Snow
- Moderate Snow
- Heavy Snow
- Very Heavy Snow
- Very Light Frz
- Light Frz
- Moderate Frz
- Heavy Frz
- Very Heavy Frz

Road Conditions
- Dry
- Damp
- Damp < 34 F
- Wet
- Wet < 34 F

- Dusting Snow
- Light Snow
- Snowcovered
- Deep Snow
- Compacted Snow

- Lightly Icy
- Icy
- Very Icy
- Risk of Frost
- Frost Likely

- Chem Wet
- Light Slushy
- Slushy
- Deep Slush
- NA
Depiction of Expected Conditions

Precipitation & Road Condition Forecast
2010/05/01 12:00 CDT (11:00 MDT)

Future Radar
- Very Light Rain
- Light Rain
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- Light Mix
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- Very Light Snow
- Light Snow
- Moderate Snow
- Heavy Snow
- Very Heavy Snow
- Very Light Frz
- Light Frz
- Moderate Frz
- Heavy Frz
- Very Heavy Frz
- Precip Prob: 0-49% Prob.
- 50-79% Prob.
- 80-100% Prob.

Road Conditions

<table>
<thead>
<tr>
<th>Condition</th>
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<th>Wet</th>
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Meridian
Environmental Technology Inc.
Depiction of Expected Conditions

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Precipitation & Road Condition Forecast
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Current & Predicted Road Conditions
Individual State Viewing
Project Status

• State training completed and field deployment completed during late winter

• Operational support continuing

• Analysis and evaluation of Clarus System nearing completion
Preliminary Results

• State participants are excited about . . .
  – Multi-state coverage and depiction of road weather conditions
  – Predictive capabilities of sub-surface conditions

• Challenges ahead . . .
  – Understanding liability issues associated with providing predicted road conditions
  – Establishing *in situ* validation of sub-surface conditions
  – Human factors of information delivery
Next Steps

• Product Marketing and Distribution
  – Use Case 5: Discussions underway with migrating demonstrated services into existing ATIS services

• Additional Research
  – Use Case 5: Human Factors of information consumption
For More Information

Contact . . .
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