



Meridian
Environmental Technology Inc.
— An Iteris Company —



Use Case #5: Enhanced Road Weather Content Enabled by *Clarus*

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Providing Tomorrow's Technology Today

Clarus Use Case #5 Overview



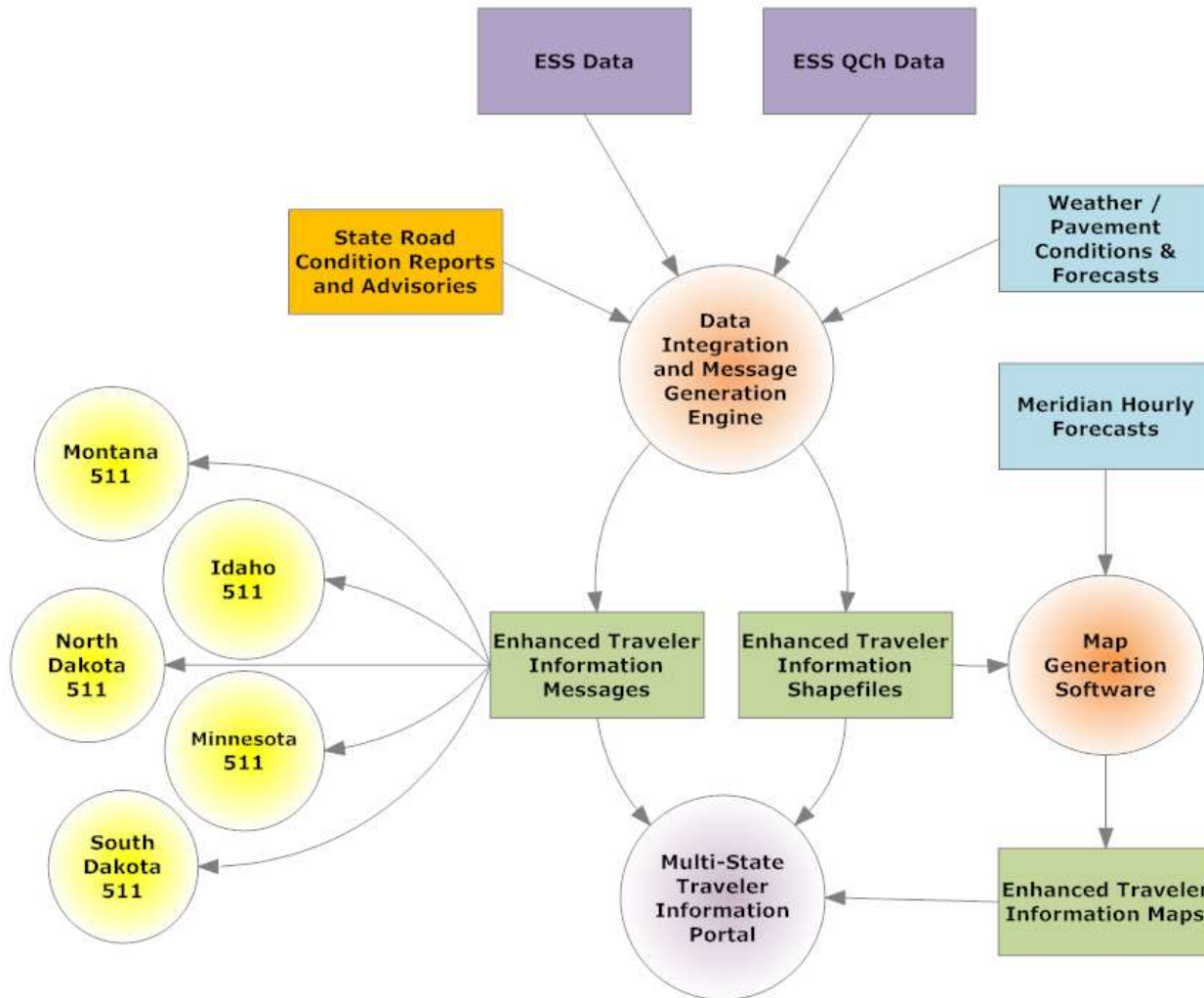
Goal:

- Use *Clarus* data to develop enhanced road weather information for travelers.

Methods:

- by leveraging the multi-state nature of *Clarus* to create a multi-state traveler information platform
- by applying *Clarus* data to develop enhanced road / weather forecasts that can alert drivers of conditions before they occur

Use Case #5 Design



Message Generation Engine

- System needs to consider potentially conflicting data:
 - DOT road and weather condition reports
 - roadside sensor data from *Clarus*
 - *Clarus* enhanced weather analyses and forecasts
 - *Clarus* enhanced road condition analyses and forecasts
- When integrating this information together, can we:
 - compare data to establish confidence?
 - avoid overstating what we really know about travel conditions?
 - keep the amount of information manageable for the recipient?
 - keep a common presentation across state lines?

Message Generation Engine

For a given information 'segment':

Identify which data are available

- DOT, Clarus ESS, road/weather analyses/forecasts

Separately analyze data streams to determine if a problematic condition is indicated

Progress through appropriate path in a decision tree

- Based on data availability and consistency (or lack thereof)

Generate a message and GIS attributes appropriate for the ending point in the decision tree

Multi-State Web Portal



[511 Travel Information](#)
[SafeTravelUSA.com](#)

[Home](#) [Comments/Questions](#) **Instructions:**
Mouse-over for road ID. Click icon or road segment for details.
Click on small map beside legend to zoom to a specific state.

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



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	Analysis Suggests Road Conditions
Good Driving Conditions	May Change from Good to Fair Driving Conditions
Fair Driving Conditions	May Change from Good to Difficult Driving Conditions
Difficult Driving Conditions	Sensors Indicate Conditions May Vary From Observed Road Conditions
Road Closed/Blocked	
Unknown	

[Restore Multi-State Map](#)

ATIS Web Portal



[511 Travel Information](#)
[SafeTravelUSA.com](#)

[Home](#) [Comments/Questions](#) **Instructions:**
Mouse over for road ID. Click icon at road segment for details.
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ATIS Web Portal Text Content



Safe Travel USA - Mozilla Firefox

http://uc5.clarus.meridian-enviro.com/report.pl?ident=MT-190-4-1

Location: I-90, Drummond-Exit 154 to Butte-Exit 227

Latest Road Condition Report:
Latest reported road conditions are as follows: dry between MRM 153.9 and MRM 201.9 and between MRM 210.9 and MRM 225.6, scattered wet between MRM 201.9 and MRM 210.9, falling snow between MRM 201.9 and MRM 210.9, possible fallen rocks between MRM 221.0 and MRM 225.6.

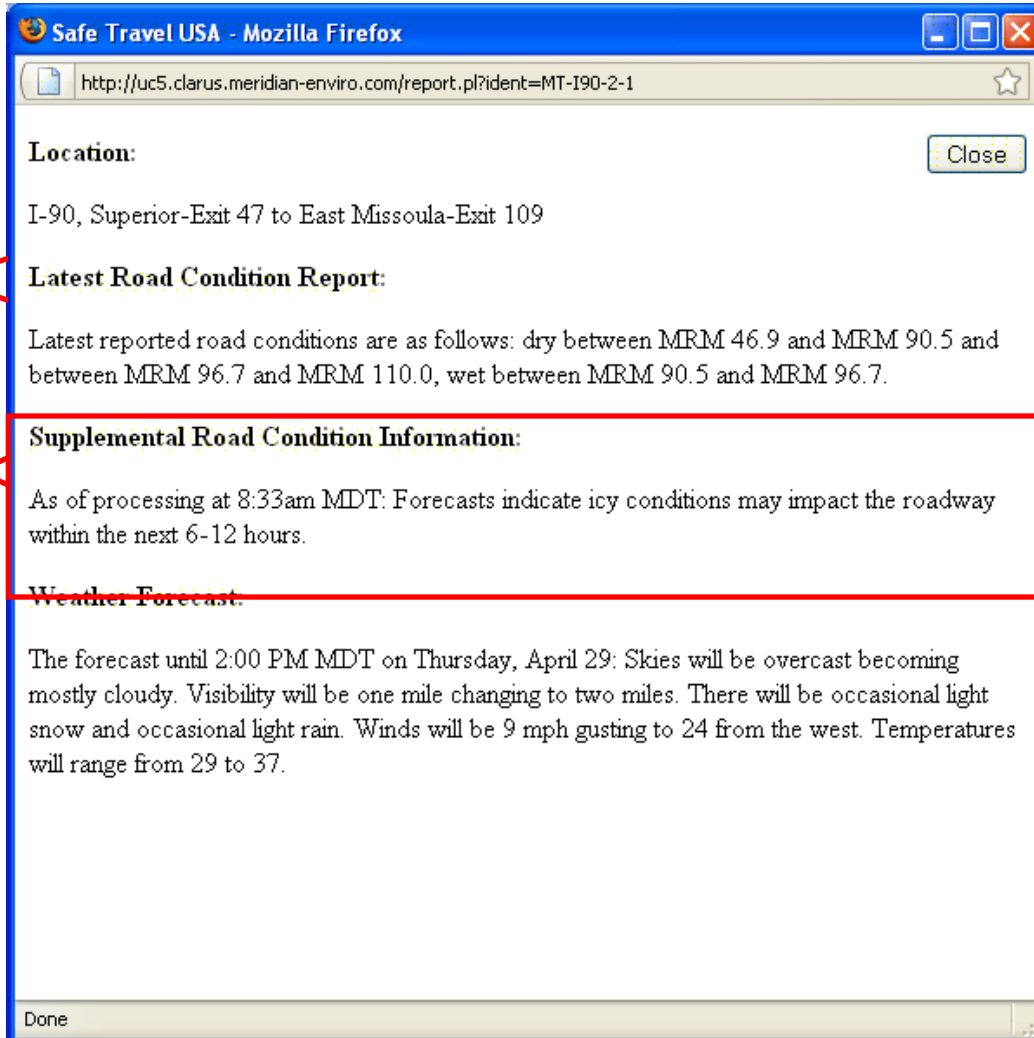
Weather Forecast:
The forecast until 2:00 PM MDT on Thursday, April 29: Skies will be overcast becoming mostly cloudy. Visibility will be one mile changing to two miles. There will be occasional light snow changing to scattered light snow. Winds will be 13 mph gusting to 32 from the west changing to 15 mph gusting to 34 from the northwest. Temperatures will range from 25 to 33.

Done

No supplemental info when DOT reports poor conditions:

- limits liability
- time of improvement often depends upon maintenance

ATIS Web Portal Text Content



Safe Travel USA - Mozilla Firefox
http://uc5.clarus.meridian-enviro.com/report.pl?ident=MT-I90-2-1

Location:

I-90, Superior-Exit 47 to East Missoula-Exit 109

Latest Road Condition Report:

Latest reported road conditions are as follows: dry between MRM 46.9 and MRM 90.5 and between MRM 96.7 and MRM 110.0, wet between MRM 90.5 and MRM 96.7.

Supplemental Road Condition Information:

As of processing at 8:33am MDT: Forecasts indicate icy conditions may impact the roadway within the next 6-12 hours.

Weather Forecast:

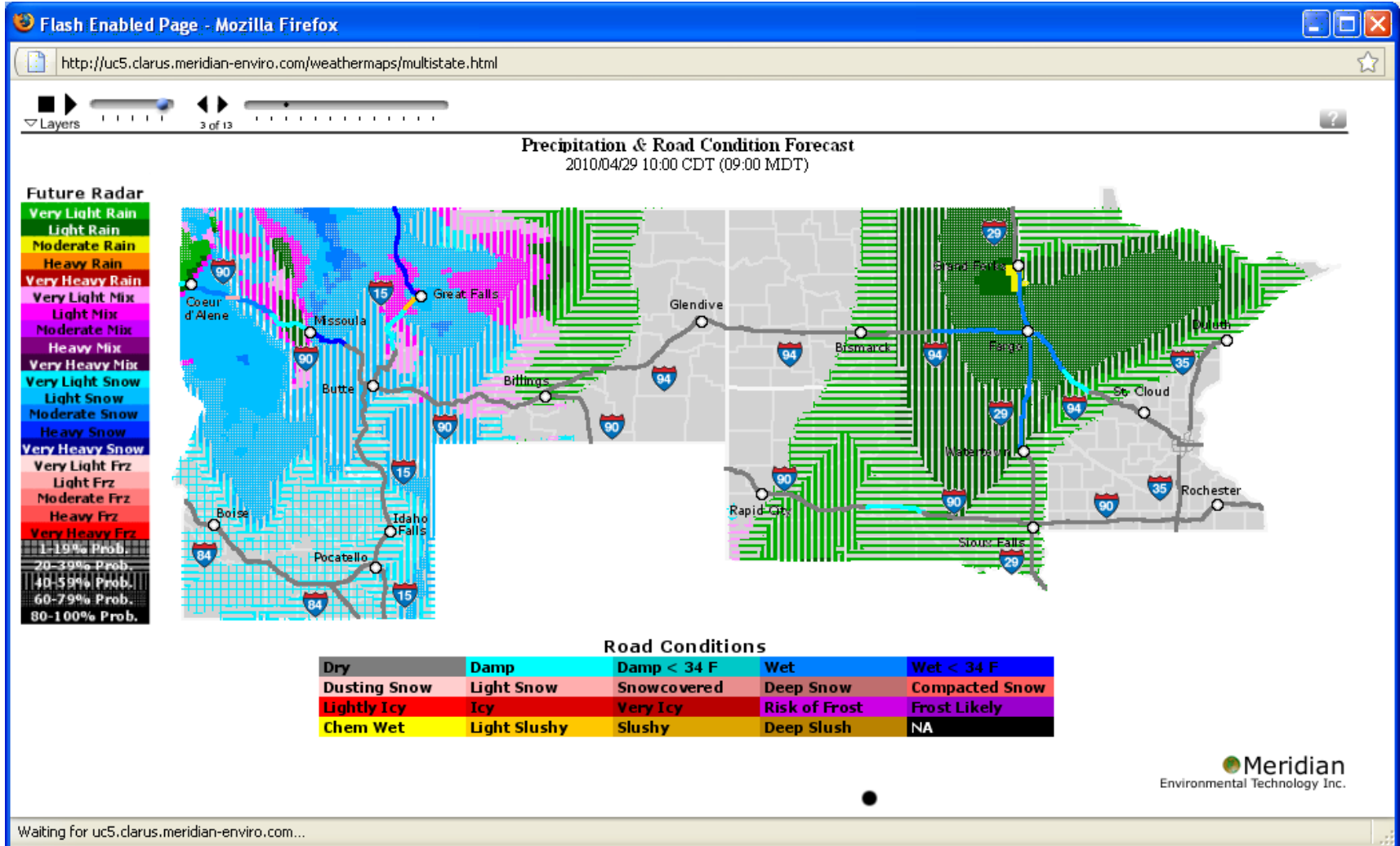
The forecast until 2:00 PM MDT on Thursday, April 29: Skies will be overcast becoming mostly cloudy. Visibility will be one mile changing to two miles. There will be occasional light snow and occasional light rain. Winds will be 9 mph gusting to 24 from the west. Temperatures will range from 29 to 37.

Done

Primary benefits therefore:

- earlier reporting of deteriorated conditions
- advance notice of deteriorating conditions

Multi-State Travel Weather



Findings

- Algorithms for making sense of **incomplete and/or conflicting data** are vital
- Need to provide actionable information without providing too much information
 - **Overstating what is known can lead to distrust in the system and heightened liability concerns.**
 - Conditions vary over both time and space – how do you convey the threat without overwhelming the user?

Findings

- There may be more value in multi-state and forecast information via a web portal relative to telephony systems
 - “a picture is worth a thousand words”

- With current data availability, the system holds more promise for alerting travelers to imminent travel problems than for predicting the return of good travel conditions
 - Early sensor- or model-based detection
 - Forecast conditions

DOT Perspectives

- The concepts have been well-received by both the participating DOTs and public evaluators
- Reducing liability, rather than increasing it, is a major consideration in deciding whether or not to implement
- The system would potentially benefit from more detailed agency data (e.g., IT-equipped snowplows)
- Agreement on conditions and color schemes elusive

Research Needs/Gaps

- There could be considerable benefit to closing more of the ‘loops’ in the system
 - Assimilate DOT road condition reports into pavement model
 - Track and apply data on maintenance activities
- The concept may be more amenable to smartphone applications than to telephony-based traveler information

Contact Information



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