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

Sept. 8, 2011
Leon F. Osborne
leono@meridian-enviro.com
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

Data Integration and Message Generation Engine

ESS Data

ESS QCh Data

State Road Condition Reports and Advisories

Weather / Pavement Conditions & Forecasts

Meridian Hourly Forecasts

Map Generation Software

Enhanced Traveler Information Messages

Enhanced Traveler Information Shapefiles

Multi-State Traveler Information Portal

Enhanced Traveler Information Maps

Montana 511

Idaho 511

North Dakota 511

Minnesota 511

South Dakota 511
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
ATIS Web Portal

Innovation for better mobility
Providing Tomorrow's Technology Today

ATIS Web Portal

Clarus
Clarus Enabled
511 Travel Info

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)
Innovation for better mobility
Providing Tomorrow's Technology Today

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.

No supplemental info when DOT reports poor conditions:
• limits liability
• time of improvement often depends upon maintenance
Primary benefits therefore:

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

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.
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

John Mewes - Meridian Environmental Technology, Inc.
jmewes@meridian-enviro.com

Leon Osborne - Meridian Environmental Technology, Inc.
leono@meridian-enviro.com

Julie Theisen - Meridian Environmental Technology, Inc.
theisen@meridian-enviro.com