

South Dakota

DOT

Connecting South Dakota and the Nation

Weather-Responsive Regional Traveler Information System

David Huft, Research Program Manager
2014 Road Weather Stakeholders Meeting
Salt Lake City, Utah August 13, 2014

Project Origin & Team

- FHWA Road Weather Program
- “Weather Responsive Travel Management Implementation”
- Start October 2013
- End October 2015

■ Work by Iteris

- Operates SDDOT’s
 - ✧ 511 telephony , web site, mobile apps
 - ✧ Road condition reporting system (IRIS)
 - ✧ Maintenance Decision Support System (MDSS)
- Compiles SDDOT mobile data
- Developed and executed related *Clarus* Regional Demo



Where We Are Now— Traveler Information Media



Where We Are Now— Traveler Information Content

- Current road conditions
- Forecast weather conditions
- Camera images
- ClearPath511 road alerts
- Weather overlays
- Severe weather alerts
- Commercial Vehicle restrictions
- Traffic Incidents
- Congestion



Where We Are Now— Limitations

- Road conditions reported by maintenance staff, not 24/7
- Off-hours info can be outdated or misleading
- Input effort duplicated between IRIS and MDC
- MDC observations not used for travel info
- MDSS forecasts not used for travel info
- No detail on effect of forecasted weather on roads
- Severe weather info could be more extensive
- Weather-related travel info does not get to DMS

Where We Want to Be— Available Data Sources

■ MDSS

- Detailed analyses and forecasts of road and weather conditions

■ National Weather Service

- Weather watch, warning, and advisory messages

■ SDDOT

- IRIS: Current road condition reporting system
- ESS: Source of near-real-time observations 24/7
- MDC/AVL: Snowplow operators most informed resource during and after winter weather events

Where We Want To Be— Current Traveler Information Services +

- Expand 24/7 road weather information
- Combine IRIS/MDC road reporting
- Forecast road conditions
- Expand severe weather information
- Use DMS to convey critical traveler alerts
- Leverage MDSS
 - particularly off-hours
 - on potentially bad road/weather conditions
- Display forecast weather and adverse road conditions
- Enhance content and display of severe weather advisories
- Show ESS weather info with camera images

MDSS →

511/Website/Apps/DMS



Opportunities

- Highlight roads or areas with potential for hazardous road or weather conditions
- Segment-specific text or voice messages
- DMS-specific messages impacting road ahead

Issues

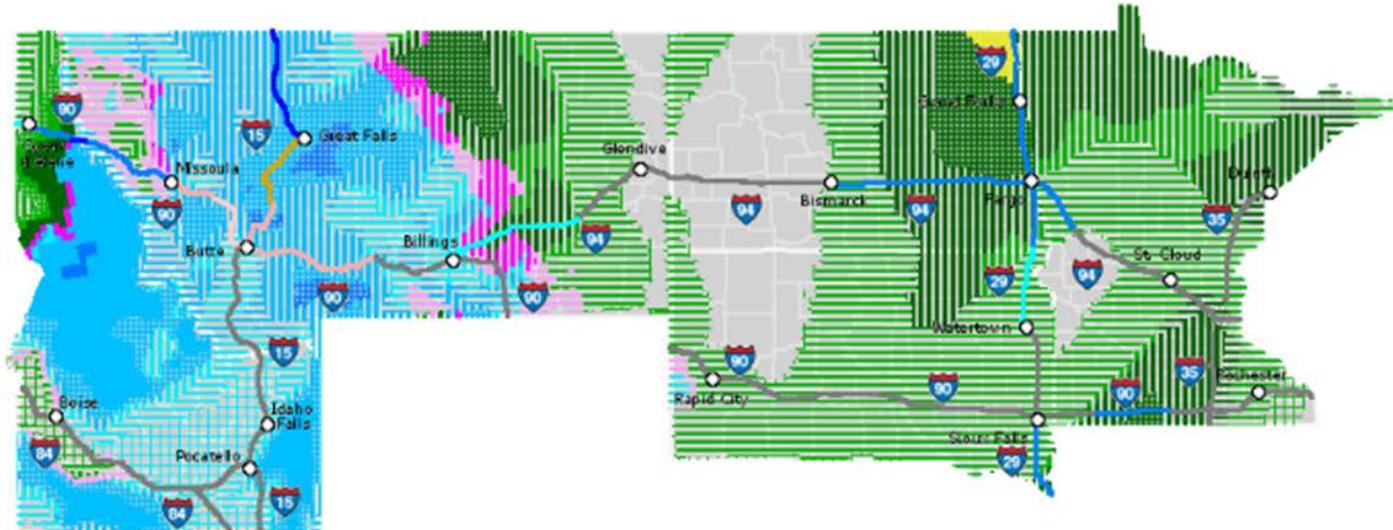
- Configuration effort
- Condensing data into easily consumable info
- Presentation format
- Trade-off between actionable information and liability concerns
- Deferring to official observations from SDDOT personnel

MDSS → 511/Website/Apps/DMS



Precipitation & Road Condition Forecast
2010/04/29 21:00 CDT (20:00 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
 - 1-19% Prob.
 - 20-39% Prob.
 - 40-59% Prob.
 - 60-79% Prob.
 - 80-100% Prob.



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

NWS →

511/Website/Apps/DMS

SEVERE T' STORM

WARNING

IN EFFECT

Opportunities

- Overlay NWS products with potential travel impact on maps
- Segment-specific text or voice messages
- DMS-specific messages impacting road ahead

Issues

- NWS Products not ideal for text-to-speech
- Select products with significant travel impact
- Condense into DMS-appropriate format
- Determine impact area for each DMS

MDC/AVL → 511/Website/Apps/DMS



Opportunities

- Feed road condition from snowplows
 - Eliminate redundant effort, expedited updates
- Snowplow locations on website & apps
- Advise of plowing activity ahead on DMS

Issues

- Common dictionary of road conditions for MDSS & travel info
- Map MDC/AVL road conditions to IRIS reporting segments
- Ensure diligent reporting
- Resolve conflicts between MDC/AVL and IRIS

SDDOT ESS → 511/Website/Apps/DMS



Opportunities

- On-road observations while maintenance staff are off-shift
- Use with other networks, remotely-sensed and modeled data to infer conditions

Issues

- Sensors must be well-maintained
- Current sensor suite lacks road surface information
- Cameras provide road condition information, but difficult to automate

SDDOT ESS → 511/Website/Apps/DMS

Full-Size View: Camera Images at SDWOL - Wolsey (click thumbnail for larger view)



SDWOL (South)
4 miles north of town at junction US-14 & US-281

SDWOL (North)
4 miles north of town at junction US-14 & US-281

SDWOL (West)
4 miles north of town at junction US-14 & US-281

Location	Wolsey (SDWOL) Camera Looking North
Description	4 miles north of town at junction US-14 & US-281
Image Time	Thursday, Apr 3 at 4:36 PM CDT
Weather	Temperature: 33F , Wind: NE 5mph , Slight Snow , Apr 3 4:39pm CDT

Schedule & Deliverables

Task	2013	2014				2015			
	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	Oct-Dec	Jan-Mar	Apr-Jun	Jul-Sep	
1. Convene oversight panel	■								
2. Develop detailed project statement	■								
3. Establish contract for services	■								
4. Develop concept of operations		■							
5. Define requirements		■							
6. Build & test system enhancements			■						
7. Deploy enhancements				■	■	■	■	■	
8. Evaluate performance and value					■	■	■	■	
9. Prepare final report								■	
10. Make executive presentation								■	

■ Progress reports

■ ConOps

■ Requirements

■ Statewide operation

■ Final report

■ Formal evaluation

Questions?



■ Contact

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Thank You!!