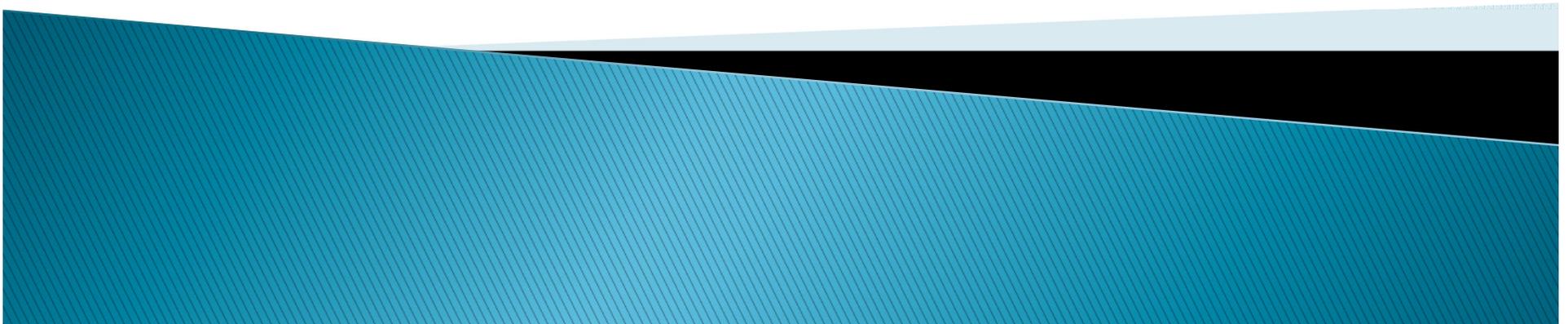


Idaho's Winter Operations Systems

Dennis Jensen
Idaho Winter Operations Coordinator



Overview

- ▶ Systems
- ▶ Data Collection
- ▶ Operations Analysis
- ▶ Performance Measures

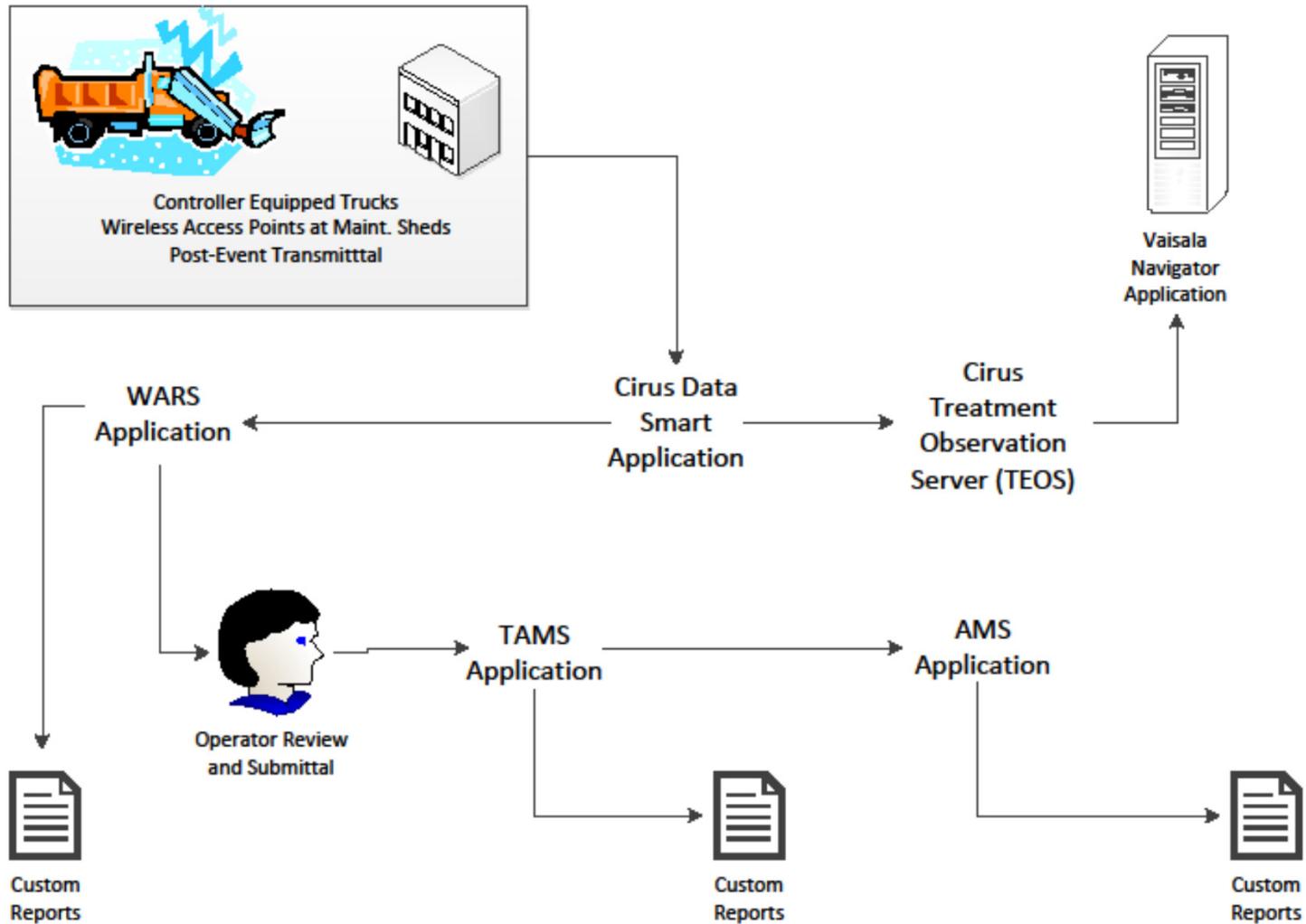


Winter Operations Systems

- ▶ Vaisala Navigator/RWIS
- ▶ Snowplow Mobile Data Collection (MDC)
 - Cirrus Data Smart
 - Winter Automated Reporting System (WARS)
- ▶ Agile Assets Transportation Asset Management System (TAMS) – Fleet Module

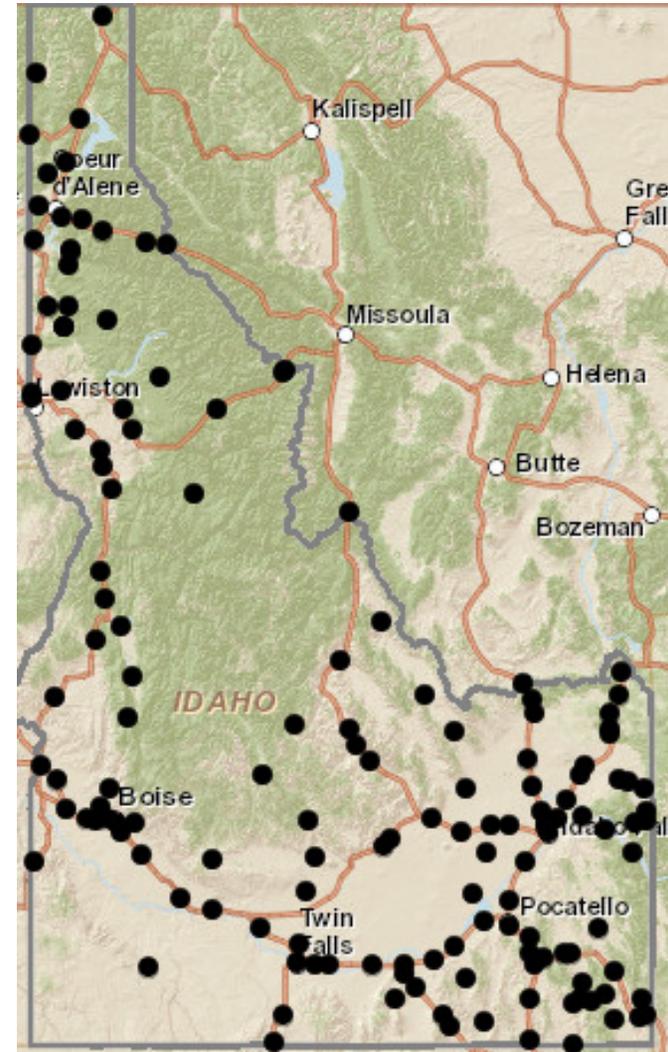


Winter Operations System Integration



Road Weather Information System (RWIS) Data Collection

- ▶ 128 RWIS sites Statewide
 - Non-invasive pavement sensors
 - Atmospheric & roadway data
- ▶ Data polled every 15 minutes
- ▶ Data and images are displayed on the Vaisala Navigator



Vaisala / Navigator

- ▶ Direct observation of roadway by operators
- ▶ Weather trends
- ▶ Establish schedules
- ▶ Improves operations
- ▶ Continuous evaluation of winter operation Best Management Practices (BMPs)

The collage displays four screenshots from the Vaisala Navigator and National Weather Service (NWS) websites. The top-left screenshot shows the Vaisala Navigator interface with a list of stations on the left and a detailed weather forecast for 'D1 - US 95 Bypass' on the right. The top-right screenshot shows a grid of camera feeds for various road locations. The bottom-left screenshot shows the National Weather Service website for Sandpoint Airport (KKSZT) with current conditions and a 7-day forecast. The bottom-right screenshot shows a map interface with a status layer for grip level status and a legend.

Navigator Site Overview

VAISALA / Navigator | Idaho | All

Map | Station Summary | Station Wall | **Stations** | Forecast | Alerts | Reports | DSP 310 | Admin

D6 - Lost Trail Pass (Show station on map)

Show metadata | Overview | Graph | Camera History | History Table | Forecast Text

Active | Snow Layer > 0.00 mm | Start time: 30.10.2015 14:15 | Trigger: Snow Layer | 0.01 mm | jeff.eagle@itd.idaho.gov, 30.10.2015 14:18 | [View alert list](#)

Current conditions | 04.01.2016 12:00

- Air Temp: **27.0 °F**
- Dew Temp: **23.7 °F**
- Visibility: **6562 ft**
- Grip Level: **0.78**
- Surf State: **wet**
- Surf Temp: **26.6 °F**

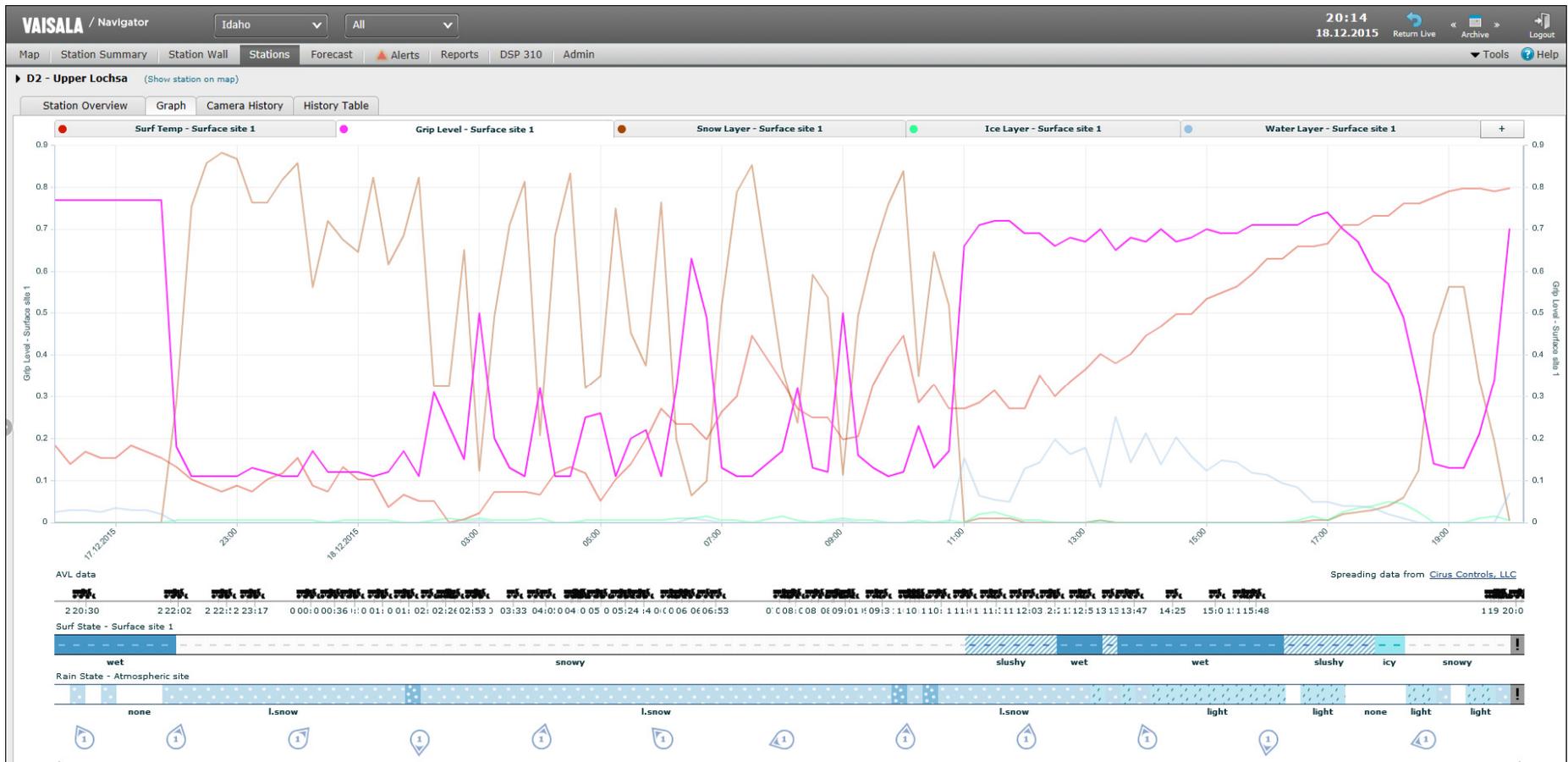
Wind | 04.01.2016 12:00

Wind rose diagram showing wind direction and speed: **141°** wind, **6.7 mph**

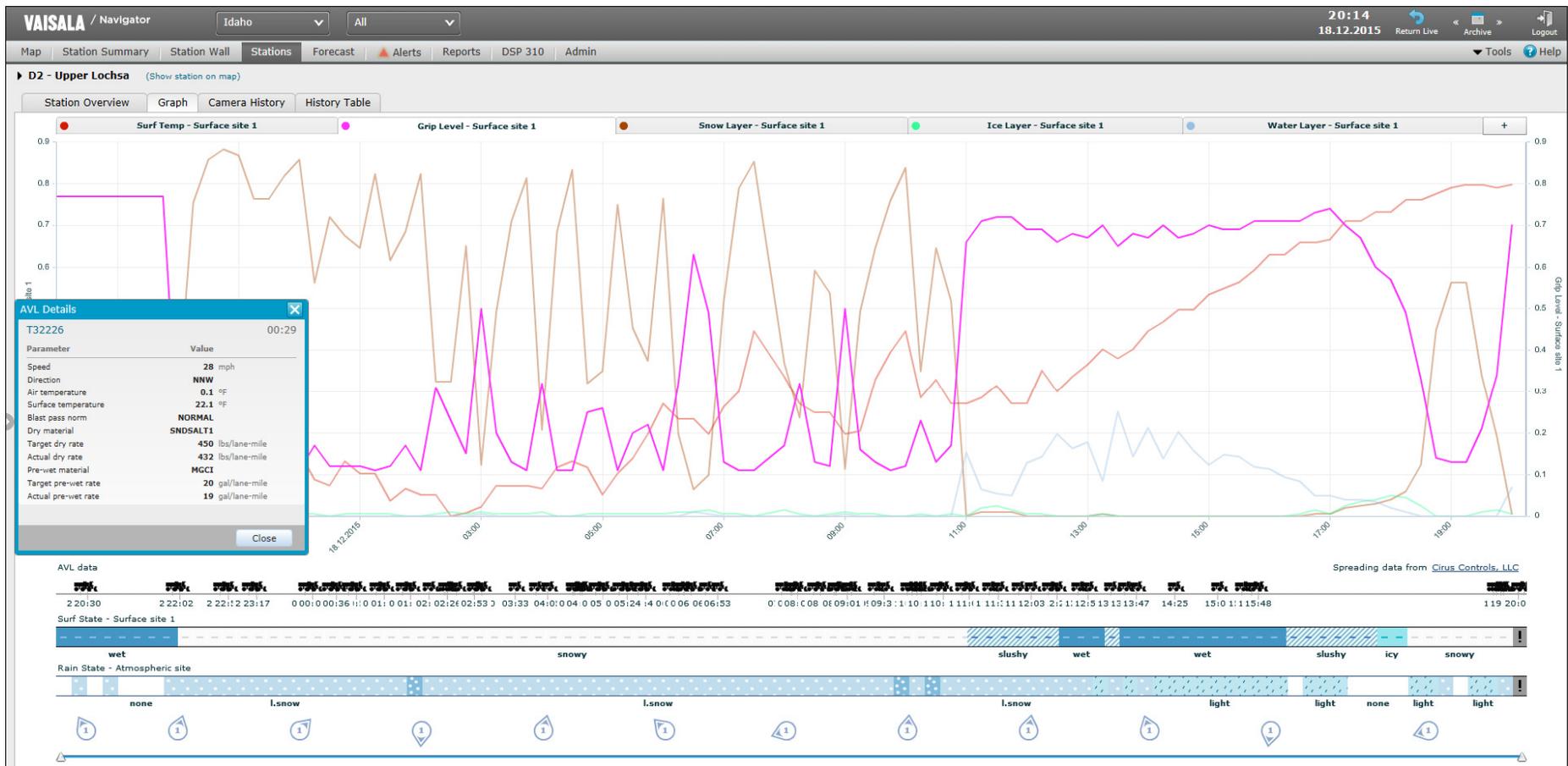
Roadside camera | 04.01.2016 11:52

Roadside camera feed showing a snowy road with a sign for IDVHO.

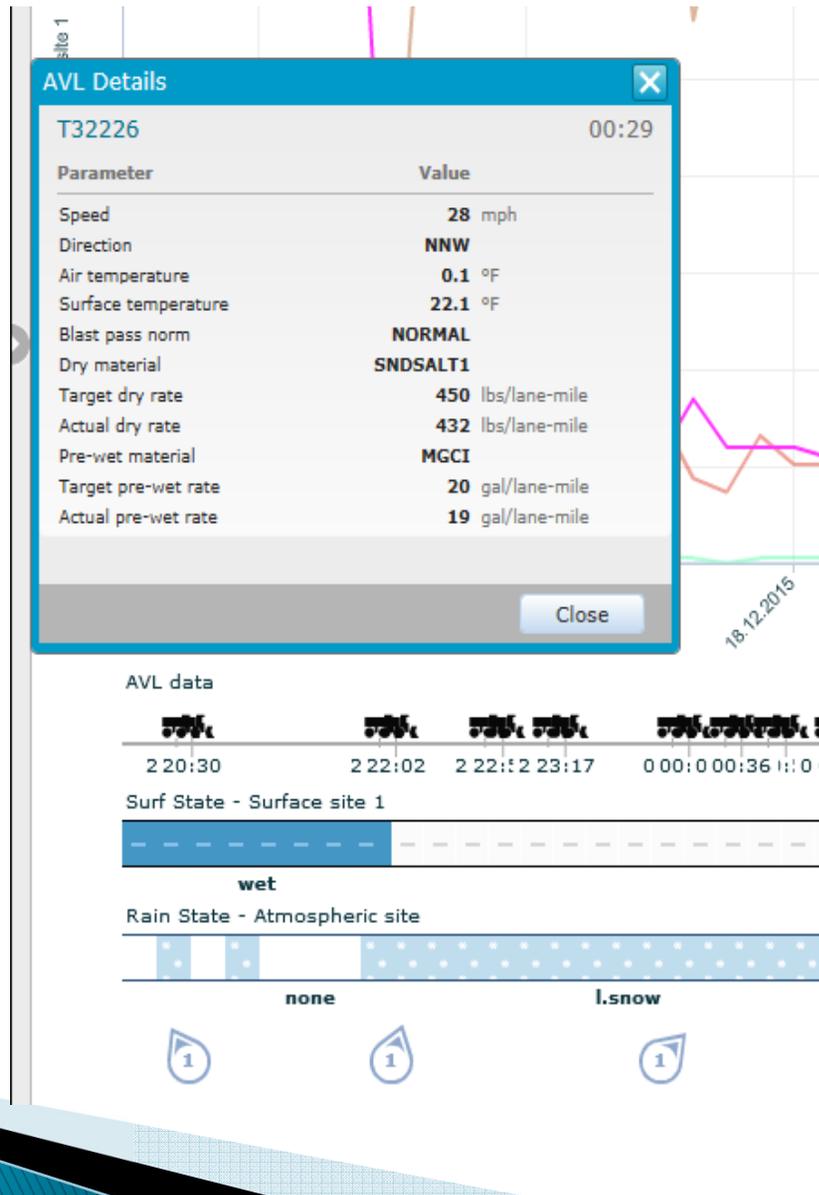
Vaisala Navigator/Cirus Display



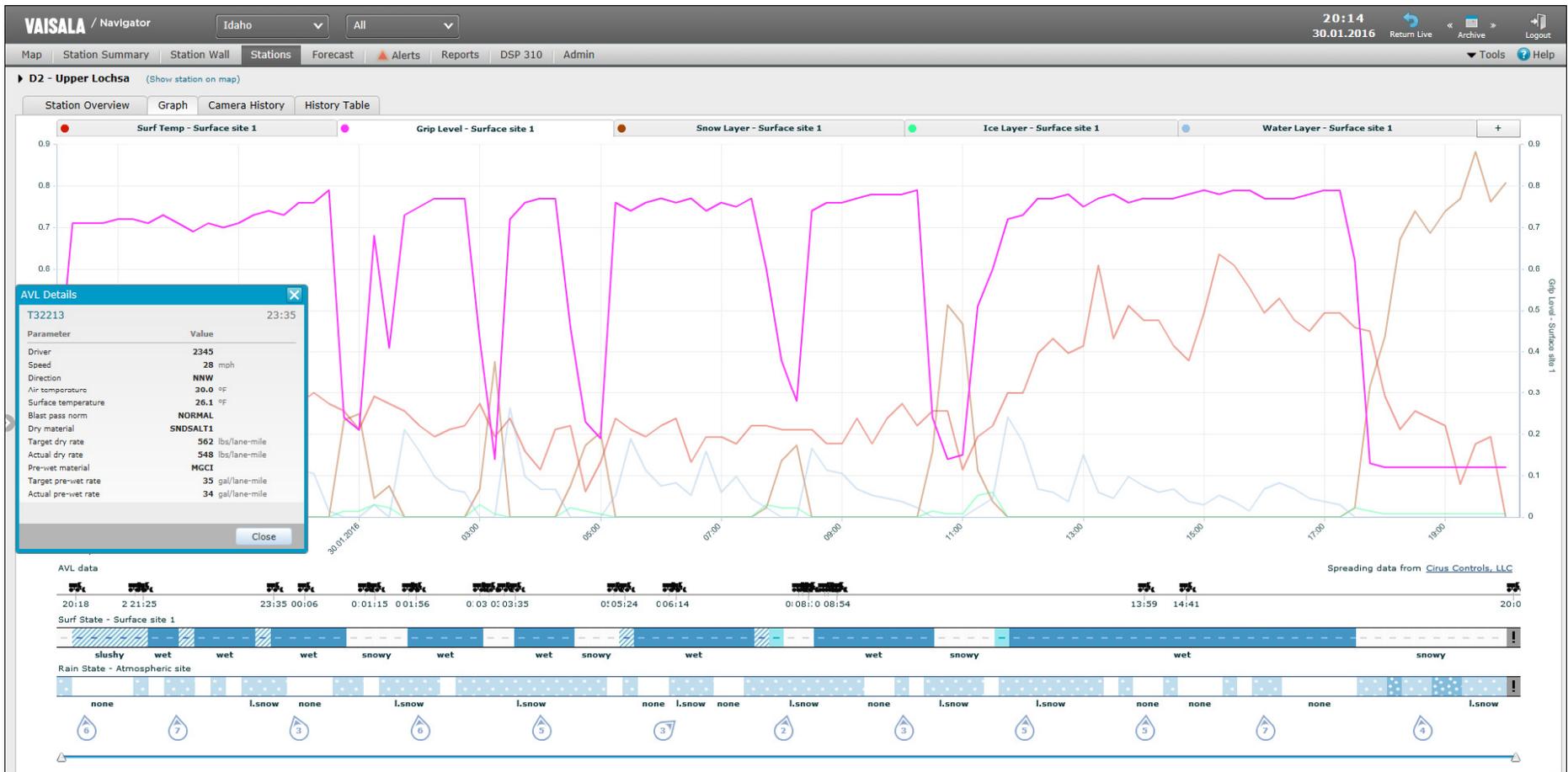
Vaisala Navigator/Cirus Display



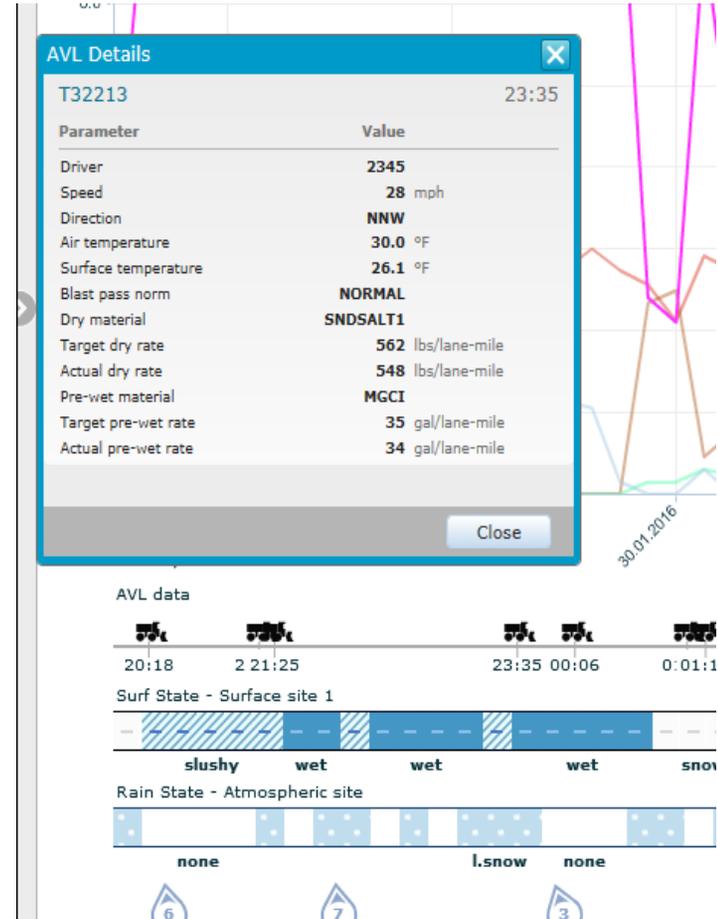
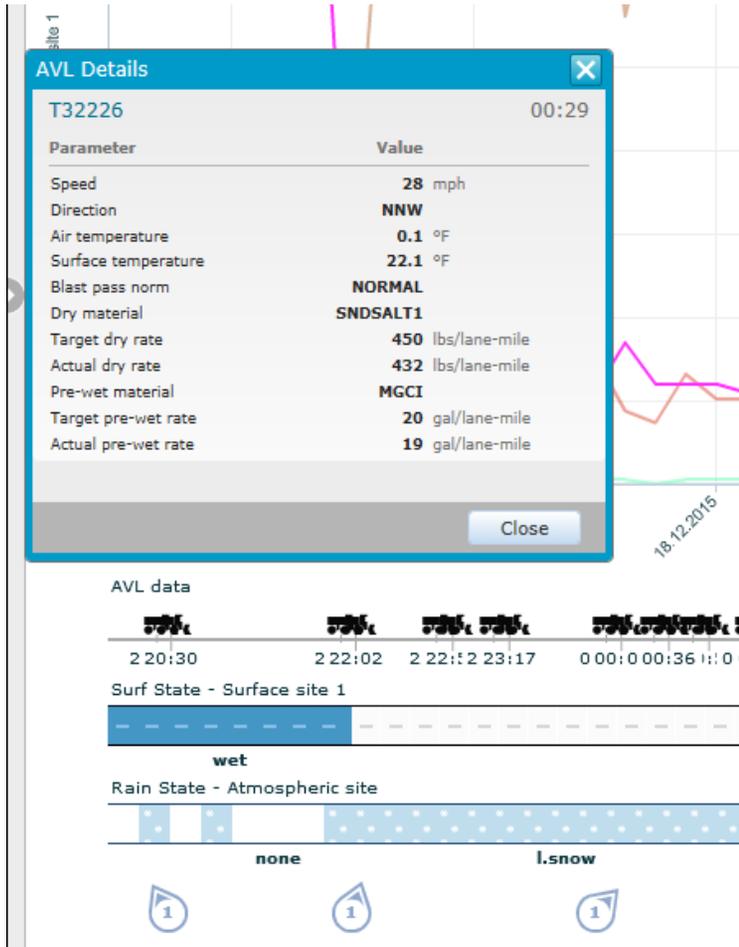
Vaisala Navigator/Cirrus Display



Progress from Data Analysts



Continuous process improvement through critiques



Performance Measures

- ▶ **Winter Mobility Index (*Ice/Snow Prevention*)**
 - Percent of time road condition is safe to drive on
- ▶ **Winter Performance Index (*Ice/Snow Reduction*)**
 - How well treatment was at restoring the hazardous road condition to safe condition



Vaisala Navigator

- ▶ Provides individual storm details
- ▶ Identifies the Mobility and Performance Index levels
- ▶ Tracks State Wide progress

VAISALA Winter Performance Index Report
 Generation date 10.02.2016 07:35
 25.01.2016 15:03 → 01.02.2016 15:03
 Time zone: America/Shiprock

Winter Performance Index Legend (Advanced scale)

Performance Index Range	Description
0.0	Successfully treated
0.00 - 0.20	Significantly accelerated grip recovery
0.21 - 0.40	Some success at grip recovery
0.41 - 0.69	Very little success at deicing
0.70 -	Limited maintenance or no deicer success

Observation data / parameter missing or temp is below threshold

Station	Date	Time Range	Event	Duration (hours)	Max Wind Speed (mph)	Max Ice Layer (mm)	Max Snow Layer (mm)	Max Water Layer (mm)	Min Surface Temp (°F)	Severity Index	Performance Index	Mobility Index
D2 - Upper Lochsa												
	25.01.2016	15:03 - 15:16	DATA MISSING	96.22								
	29.01.2016	15:16 - 17:30	TREATED	2.23	6.49	0.04	0.00	0.46	29.48	17.12	0	
	29.01.2016	17:30 - 20:15	GRIP<6	2.75	6.04	0.11	0.65	0.09	27.68	17.53	0.16	
	29.01.2016	20:15 - 00:45	TREATED	4.50	6.49	0.04	0.31	0.42	25.70	18.58	0	
	30.01.2016	00:45 - 05:15	GRIP<6	4.50	5.59	0.04	0.50	0.35	23.54	18.84	0.24	
	30.01.2016	05:15 - 08:00	TREATED	2.75	2.68	0.04	0.18	0.25	24.26	15.30	0	
	30.01.2016	08:00 - 08:30	GRIP<6	0.50	1.79	0.03	0.23	0.00	25.16	13.94	0.04	
	30.01.2016	08:30 - 10:30	TREATED	2.00	2.46	0.02	0.21	0.22	24.80	14.78	0	
	30.01.2016	10:30 - 11:30	GRIP<6	1.00	2.91	0.07	0.68	0.03	24.08	16.05	0.06	
	30.01.2016	11:30 - 17:30	TREATED	6.00	6.49	0.08	0.05	0.32	25.34	18.65	0	
	30.01.2016	17:45 - 20:30	GRIP<6	2.75	3.58	0.04	1.17	0.02	22.82	17.90	0.15	
	30.01.2016	20:30 - 04:00	TREATED	7.50	1.34	0.02	0.75	0.51	21.20	16.24	0	
	31.01.2016	04:00 - 04:45	GRIP<6	0.75	0.67	0.02	0.93	0.00	22.28	15.07	0.05	
	31.01.2016	04:45 - 06:45	TREATED	2.00	1.12	0.04	0.46	0.42	20.84	15.97	0	
	31.01.2016	06:45 - 09:30	GRIP<6	2.75	1.79	0.08	0.55	0.22	21.56	16.25	0.17	
	31.01.2016	09:30 - 16:15	TREATED	6.75	6.04	0.07	0.07	0.24	22.10	19.85	0	
	31.01.2016	16:15 - 17:30	FROST treated	1.25	3.58	0.00	0.00	0.03	25.88	15.20	0	
	31.01.2016	17:30 - 18:00	TREATED	0.50	1.79	0.00	0.00	0.05	26.78	13.04	0	
	31.01.2016	18:15 - 20:00	GRIP<6	1.75	1.34	0.04	0.58	0.00	24.62	14.11	0.12	
	31.01.2016	20:00 - 23:15	TREATED	3.25	1.34	0.00	0.00	0.23	23.18	14.51	0	
	31.01.2016	23:15 - 01:00	FROST treated	1.75	0.89	0.00	0.00	0.03	22.82	14.07	0	
	01.02.2016	01:00 - 09:30	TREATED	8.50	1.34	0.05	0.41	0.09	21.74	15.55	0	
	01.02.2016	09:30 - 10:30	GRIP<6	1.00	1.34	0.03	0.50	0.00	22.10	15.42	0.06	
	01.02.2016	10:30 - 14:15	TREATED	3.75	3.36	0.02	0.11	0.33	22.28	17.15	0	
	01.02.2016	14:15 - 14:45	GRIP<6	0.50	2.24	0.02	0.47	0.00	25.34	14.55	0.03	

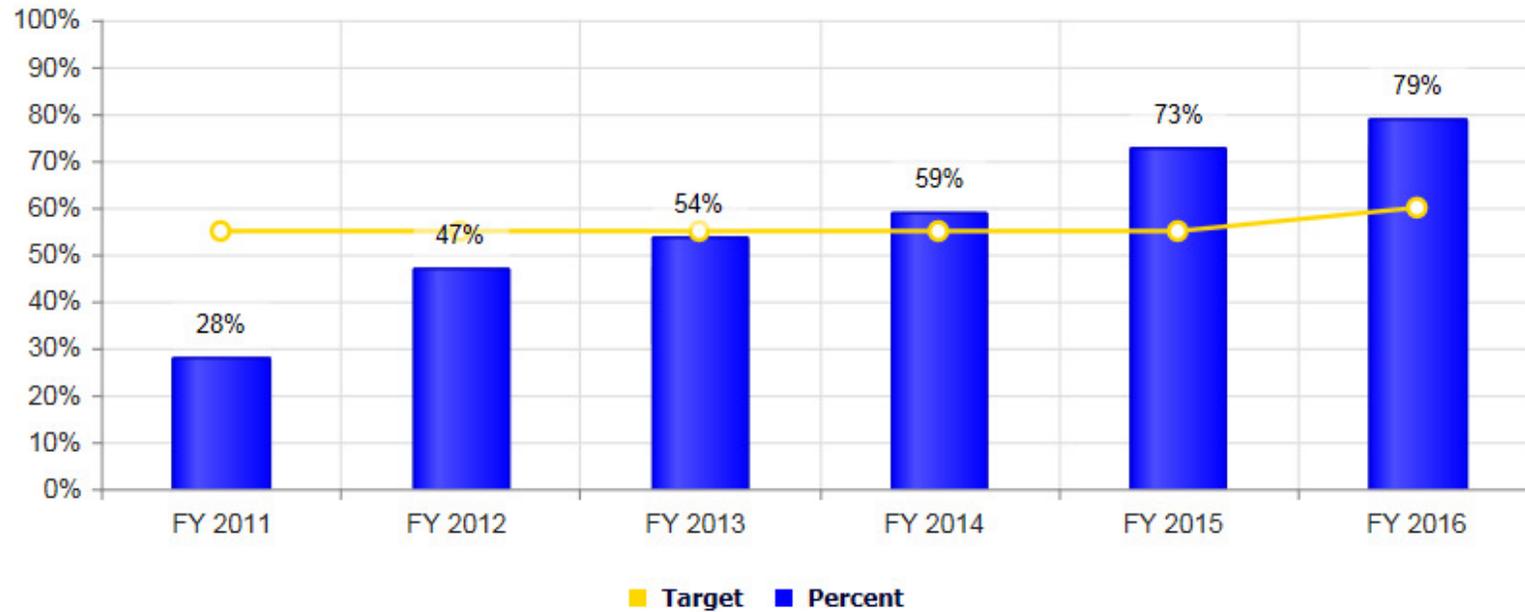
74%

Percent of Time Mobility Not Significantly Impeded During Winter Storms

Target: Maintain at least 60% unimpeded mobility during winter storms.

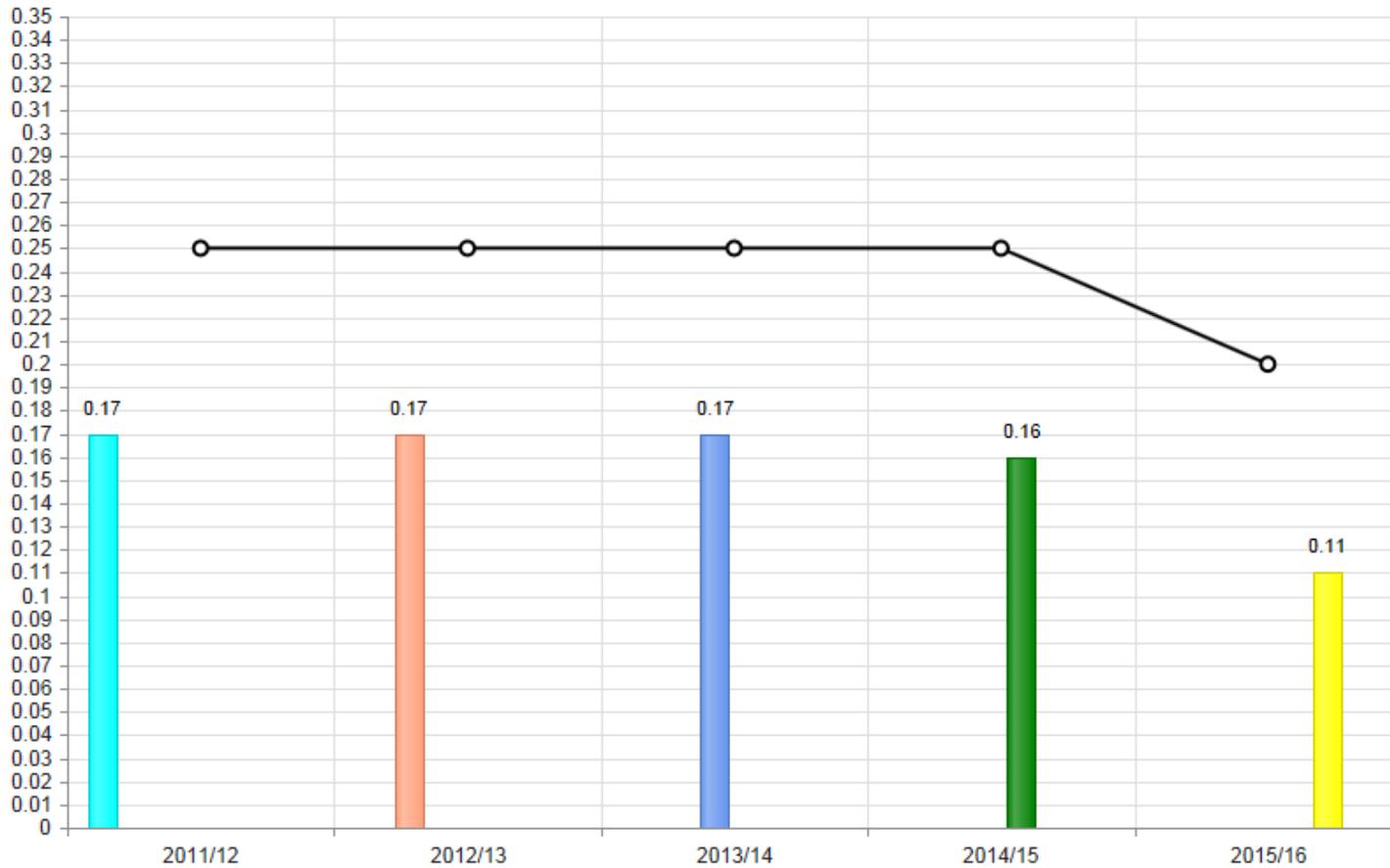
Updated 2/3/16

2,926 events recorded 2015-2016 Season



Statewide WPI annual results

FY 2015 the WPI goals were based upon typologies. FY 2016 all sites will be aggregated by foreman area and the goal will be 0.20 or less.



Updated 2/3/16

2,925 events recorded

Snowplow Mobile Data Collection (MDC) Cirrus / WARS TAMS

Snowplow MDC Objectives

- ▶ Automate the collection of vehicle data for accurate reporting of materials, labor, equipment and location to a more granular level
- ▶ Reduce operator time for reporting by integrating data information entry once
- ▶ Increase operator productivity and reduce winter operation costs through efficiency and effectiveness



Snowplow MDC Systems

- ▶ Transportation Asset Management System (TAMS)
- ▶ Cirrus Controls SpreadSmart RX™ Spreader Controllers
- ▶ Cirrus GPS DataSmart™ System
- ▶ Winter Automated Reporting System (WARS)



Transportation Asset Management System (TAMS), Road Maintenance Module

- ▶ Operational Data Warehouse
- ▶ Operations Cost Accounting System
- ▶ Provides Summary Reports of Winter Operations Efforts, (Can Only Report to the Quality of the Data Entered)
- ▶ Work Plans
- ▶ Asset Management Plans



Cirus GPS DataSmart™

- ▶ Collects Snowplow Truck Data
- ▶ Creates Data Files for Display within DataSmart™
- ▶ Data Files transferred to Navigator & WARS

The screenshot shows the web interface for the Cirus GPS DataSmart™ Winter Maintenance Reporting System. At the top, the logo for Cirus Controls is displayed alongside the product name. Below the logo is a navigation menu with links for HOME, ABOUT THIS SERVER, and USER LOGIN & ACCOUNT CREATION. The main content area features a title for the system, a brief description of its purpose, and a note about user login settings. A sample map titled "Sample Plow/Spreader Activity Map" is shown at the bottom, displaying a green line representing activity on a map of a region with various islands and airports. The map includes a scale bar and copyright information.

Cirus ONTROLS GPS DataSmart™ Winter Maintenance Reporting System

HOME ABOUT THIS SERVER USER LOGIN & ACCOUNT CREATION

Cirus GPS DataSmart™ Winter Maintenance Reporting System

This server is a tool for analyzing the activity and utilization of snow plows and spreaders, using automatically-recorded data collected from the control systems in those trucks. There are two main ways the data may be viewed: graphically on maps, and on viewable, printable performance reports.

Please note the "USER LOGIN & ACCOUNT CREATION" choice above. This server stores your most recent report settings, to make them your defaults for the next time you're here. So if, for example, you're interested in only one district's activity out of an entire state fleet, your truck selections are saved by the server. Please feel free to create an account, and start analyzing and viewing the recorded data.

For more information about the products and technologies which make this information available, please visit the Cirus Controls web site, write us at info@ciruscontrols.com, or call us at 763-493-9380.

Sample Plow/Spreader Activity Map

© 2013 CloudMade - Map data © 2013 OpenStreetMap.org contributors - Terms of Use



- ▶ Converts Truck Sensor Data to TAMS Activities
- ▶ Converts GPS Coordinates to ITD's Linear Referencing System
- ▶ Accurately Processes, Calculates and Displays Winter Operations Efforts
- ▶ Employee Interface to the Calculated Data (Daily Summary)
- ▶ Electronically Generated Material Reports



Reporting

- ▶ **Storm Summary Report**
 - Summary of Pass Miles by Route
 - Summary of Plow Down Time by Route & Employee
 - Average Application Rate by Route
 - Total Applied by Route
- ▶ **Lap Time Analysis**
- ▶ **Exception Reporting**

Future of our work force

Staffing reduction moving from shifts to swarm the storm

- FY2015 ITD had 562 Transportation Tech Operators
- FY2016 ITD down sized to 498 TTO (attrition)

ITD was allowed to keep the salary savings

- Savings used to build career paths based upon improved value of the employee to the department
- TOTL program for supervisors implemented FY2017



Questions?

