Idaho Transportation Department’s Snowplow AVL System and Data Uses

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AVL System

- Certified Cirus Controls
  - SpreadSmart RX™ Spreader Controllers
  - DataSmart™ Reporting System
- 409 Single/Tandem Axle Plow/Spreader Trucks
- WiFi Communication
Snowplow AVL Data Systems

- Road Weather Information System (RWIS)
  - Vaisala Navigator
- Road Maintenance Management System (MMS)
  - Agile Assets
- Snowplow Operations Assessment
  - Winter Automated Reporting System (WARS)
AVL Data Flow
Integrating RWIS & AVL Data
RWIS Data Collection

- 128 RWIS Sites Statewide
  - Non-Invasive Pavement Sensors
  - Atmospheric & Roadway Data
- Data Polled @ 15 Minute Intervals
- Data and Images Displayed on the Vaisala Navigator Website
Vaisala Navigator

- Direct Observation of Roadway by Operators
- Weather Trends
- Establish Schedules
- Continuous Evaluation of Winter Operation Best Management Practices (BMPs)
Vaisala Navigator/AVL Data Integration
Vaisala Navigator/AVL Data Integration
Vaisala Navigator/AVL Data Integration
Progress from Data Analysis
AVL Data for Accurate MMS Data Input
Typical Manual Entry of MMS Winter Data

- Cumbersome Data Entry
  - Create Work Orders
  - Up to Five (5) Day Card Screens
- Highly Summarized Data
  - Single Work Order per Day
  - Single Activity per Day
- Data Errors
  - Equipment Hours/Miles
  - Material Quantities
  - Accomplishments
- Missing Data
  - Location Day Cards
Winter Automated Reporting System (WARS)

- Imports Data from Cirus Controls, GPS DataSmart™ System
- Creates Operator Daily Summary
  - Derives Maintenance Activities Based on Truck Sensors
  - Calculates/Summarizes Equipment and Material Usage
  - Allows for Operator Edit and Approval
- Auto Creates Work Orders
  - Unique Work Order for each Activity and Route
- Auto Input of Data to Daycards
  - Employee Hours Based on Employee ID
  - Truck Hours/Miles
  - Materials Gallon/Tons
  - Accomplishments
  - Route/Milepost Range
WARS Operator Daily Summary

[Image of WARS Operator Daily Summary screen]

- **Name:** JENNY SMITH (86599)
- **Date:** 2/16/2016
- **Submitted:**
  - Total Labor Hours: 9.5

**Activity Summary**:
- M331 - Flooding and/or Applying Abraision change to Flooding
  - Route: OR System
  - Begin Mile: 344.540
  - End Mile: 350.819
  - Begin Time: 7:07 AM
  - End Time: 12:10 PM
  - Hours: 3
  - MILES: 3.3
  - Equipment: T3103

- M331 - Flooding and/or Applying Abraision change to Flooding
  - Route: US90
  - Begin Mile: 306.317
  - End Mile: 347.737
  - Begin Time: 7:20 AM
  - End Time: 11:52 AM
  - Hours: 3.4
  - MILES: 41.46
  - Equipment: T3103

- M333 - Winter Storm Event Patrol
  - Route: US90
  - Begin Mile: 332.216
  - End Mile: 356.761
  - Begin Time: 8:26 AM
  - End Time: 12:17 PM
  - Hours: 1.0
  - Equipment: T3103

- M334 - Other Snow and Ice Control
  - Route: OR System
  - Begin Time: 6:24 AM
  - End Time: 2:03 PM
  - Hours: 3.1
  - MILES: 3.3
  - Equipment: T3103

- M335 - Other Snow and Ice Control
  - Route: US90
  - Begin Time: 8:26 AM
  - End Time: 12:17 PM
  - Hours: 1.0
  - Equipment: T3103

- M336 - Preparation and Cleanup Associated with Winter Maintenance
  - Route: None
  - Begin Time: 8:00 AM
  - End Time: 8:00 AM
  - Hours: 0.5
  - MILES: 9.6
  - Equipment: T3103

**Legend**:
- Red Cross Points
- Activity Mile Points
- Activity Segments
WARS Daily Summary Point Data
## Work Order Granularity

<table>
<thead>
<tr>
<th>ID</th>
<th>Activity Code</th>
<th>Route / Asset</th>
<th>Begin MP</th>
<th>End MP</th>
<th>Begin Time</th>
<th>End Time</th>
<th>Labor Hours</th>
<th>TRC</th>
<th>Accomplishment</th>
<th>Equip #</th>
<th>Equip Hits</th>
<th>Equip Miles</th>
<th>Total Granular</th>
<th>Total Prevet</th>
<th>Total Liquid</th>
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<tbody>
<tr>
<td>A204705</td>
<td>M332</td>
<td>SH003</td>
<td>01.401</td>
<td>04.556</td>
<td>03:02 AM</td>
<td>03:12 AM</td>
<td>0.2</td>
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<td>01. REG - Base Pay</td>
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<td>T32112</td>
<td>0.4</td>
<td>12</td>
<td>2.22</td>
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<td>A204708</td>
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<td>4.051</td>
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<td>12:04 AM</td>
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<td>A204775</td>
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<td>1:25 AM</td>
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# Activity, Equipment, Material Detail

<table>
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<tr>
<th>ID</th>
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<th>End MP</th>
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<th>End Time</th>
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<th>Accomplishment</th>
<th>Equip #</th>
<th>Equip Hrs</th>
<th>Equip Miles</th>
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<th>Total Liquid</th>
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<tr>
<td>E600798</td>
<td>E60287</td>
<td>M331 - Plowing and / or Applying Abrasives change to Plowing</td>
<td>Off-System</td>
<td>Off-System</td>
<td>7:37 AM</td>
<td>7:38 AM</td>
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Snowplow Operations Assessment
Storm Summary Report

- **Report Parameters**
  - Date
  - Operator
  - Equipment Number
  - District
  - Foreman
  - Maintenance Shed
  - Route or Combination of Routes

- **Report Outcomes**
  - Crew Efficiency
  - Consistency of Applications Across Routes
Operator Exception Reporting

• Defined Exceptions
  ▫ Plowing Speed (MPH)
  ▫ Spreading Speed (MPH)
  ▫ Spinner Speed (Lanes)
  ▫ Blasting
  ▫ Pre-Wet Use
  ▫ Application Rates by Material Type

• Efficiency Through Material Savings
• Correct Application Rate Based on Conditions
Mobility Cost Efficiency Index

- Cost of Effort
  - Labor
  - Equipment
  - Material
    - Type
    - Application Rate
- Accomplishment
  - Mobility Score Achieved
- MCE Index
  - Cost of Effort/Accomplishment
- Minimize Cost While Meeting Mobility Goals
Thank You