

MDSS and Mobile Data Collection as an Integrated ITS Technology

Michael Howarth

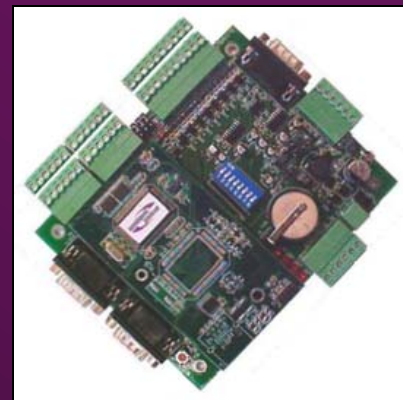
Intelligent Devices, Inc.

VP Business Development



Intelligent Devices, Inc.

- Leader in NTCIP technology
- Legacy protocol translators
- Provider of NTCIP central software
- translators



MDC and Maintenance Decision Support

If you know...

- Road characteristics
- Current conditions
- Weather forecast
- Physics & chemistry of snow, ice, chemicals
- Available resources (material, equipment, schedule)

...then you can recommend...

- Treatment type
- Application rate
- Optimal timing

...and predict

- Future road conditions with or without treatments

SDDOT Pilot Project

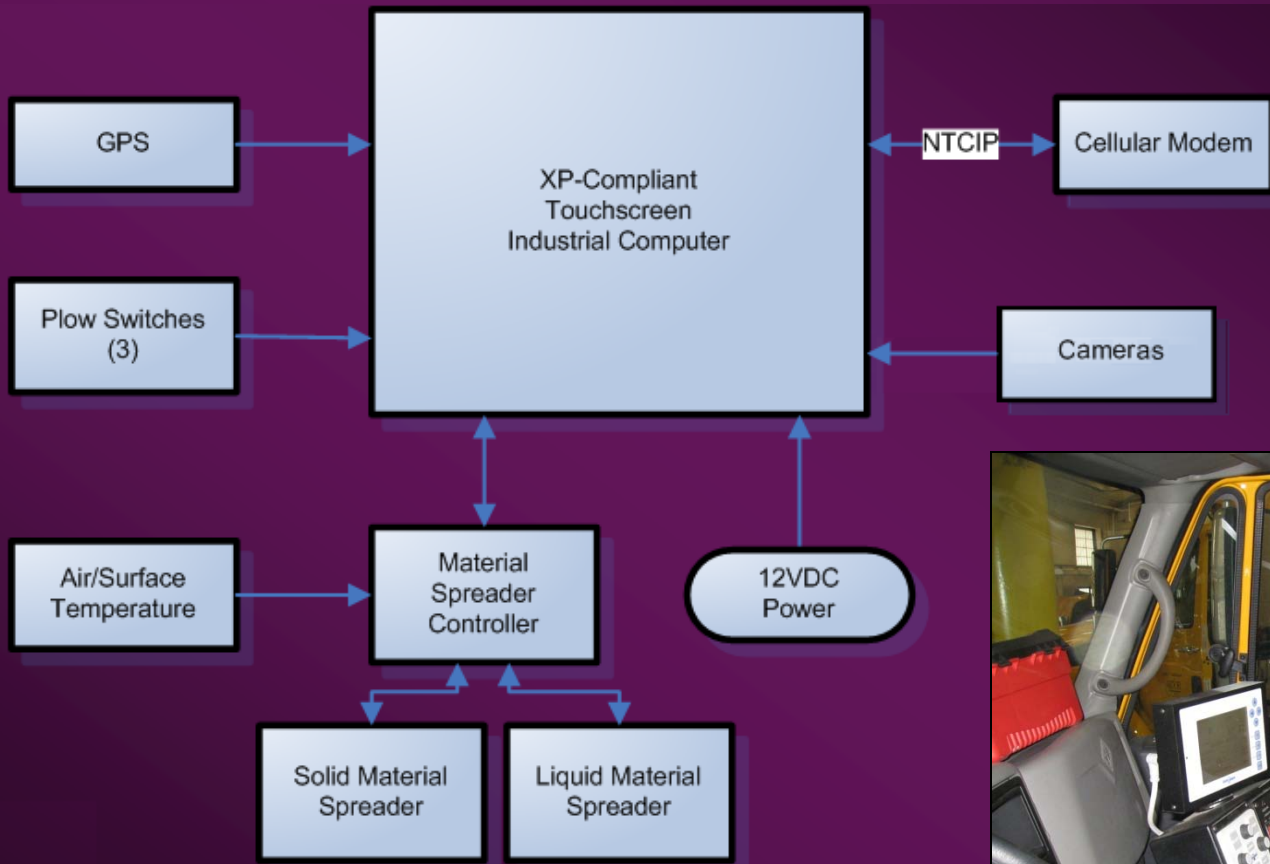
- Assess suitability of SDDOT fleet for MDC
- Develop functional and physical specifications for MDC
- Define NTCIP-based protocols for truck-to-center communications
- Build & evaluate a functioning field controller
- Recommend a cost-effective deployment strategy

Mobile Data Collectors

- Light Weight
- Durable
- Remotely Updateable
- Windows Based
- Expandable
- Easy to Install in Vehicle



MDC Truck Configuration



Mobile Data Collection

The screenshot displays the 'Mobile Data Collector' interface with the following sections:

- Header:** NDOR logo, 'Mobile Data Collector', 'Dim', 'Settings', '03/11/10 2:26:21', 'MAIN MENU', and 'v3.0.2'.
- Top Left:** DOT 135, **TRUCK**, FRONT: (down arrow), WINGS: (up and down arrows), UNDER: (up arrow), NO ERROR.
- Top Middle:** NaCl / Gravel 30/70%, Solid Rate: 350 lb/mi, **MATERIAL**, Prewet Rate: OFF, Direct Rate: OFF.
- Top Right:** DIRECTION: EAST, Plow: (four up arrows), Treat: (down, left, up, up arrows), **HIGHWAY**, Speed: 0 mph, GPS: 34.066097°N, 84.075128°W.
- Bottom Left:** SNOW <1/4 mile, **WEATHER**, AIR TEMP 34°, ROAD TEMP 31°.
- Bottom Middle:** **ROAD** SNOW, **SNOW ACCUMULATION**.
- Bottom Right:** **MDSS**, **DIAGNOSTICS**.

- Automatically Collected:
 - Vehicle Location
 - Speed
 - Direction
 - Material Application Rate
 - Solid
 - Pre-Wet
 - Liquid
 - Plow Blade Position
 - Road Temperature
 - Air Temperature

Mobile Data Collection

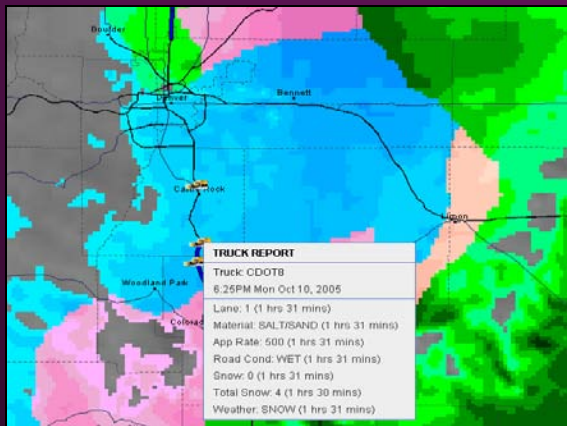
- Operator Enters:
 - Plow/Treat Lanes
 - Material Application
 - Visibility
 - Precipitation
 - Road Condition
 - Snow Accumulation

ROAD CONDITIONS			↪ MAIN MENU	
ROAD CONDITION	DRY	DAMP	WET	FROST
	SNOW	DRIFTED SNOW	SLUSH	ICE
SURFACE TEMP	27°F			

WEATHER CONDITIONS			↪ MAIN MENU	
PRECIP TYPE	NONE	DRIZZLE	RAIN	SLEET
	HAIL	SNOW FLURRIES	SNOW	
VISIBILITY	CLEAR	FOG	SMOKE	BLOWING SNOW
DISTANCE	NEAR ZERO	<1/4 mile	>1/4 mile	
WIND (mph)	CALM <10	LIGHT 10-20	MEDIUM 20-30	STRONG >30

Maintenance Decision Support

- Driver receives MDSS recommendation
- Driver receives regional weather



MDSS DISPLAY
CHANGE SITE
↶ MAIN MENU

Zoom: 1 3 5 7 9

Recommended Actions

Road Start Practice Rate
 Cond. Time

For Hwy93A, MP 11.8 to 15:
 - - None -

For US287, MP 304.24 to 318.32, Driving:
 - - None -

For Hwy7C, MP 55.3 to 60.8:
 - - None -

For US36, MP 37.60 to 48.1, Driving:
 - - None -

Forecast

Time	Wind speed (miles/hour)	Wind Direction	Precip Type	Precip Prob (%)	Snow Rate (in/hour)	Cloud Cover (%)
Mon 01:00 PM	7	N	TS	30	0.00	40
Mon						

Configurability

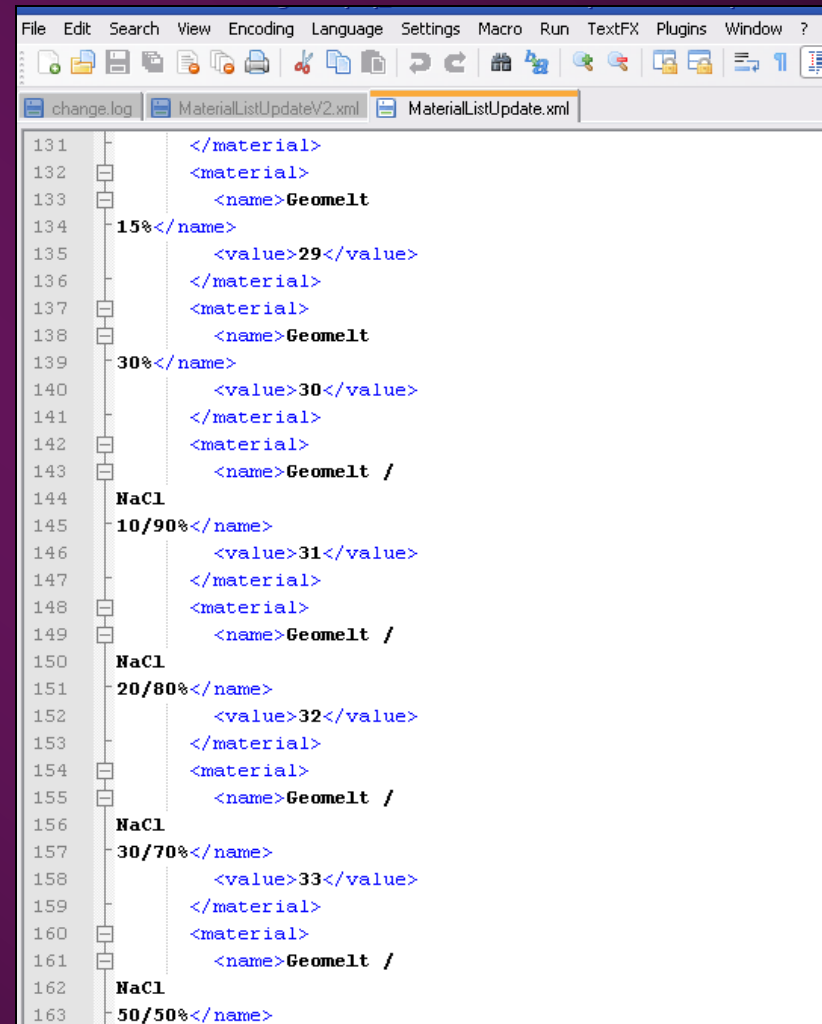
- Screen brightness
- Plow blade
 - Automatic monitoring
 - Manual monitoring
- Device password
- Device settings
- On board camera

SETTINGS		↗ MAIN MENU
BRIGHTNESS	DEVICE SETTINGS	
PLOW BLADES	CAMERA	
LOAD APPLICATION CONFIG	LOAD USER INTERFACE CONFIG	
CHANGE PASSWORD	<div style="border: 1px solid gray; padding: 5px;"><p>Password required</p><p>Please enter password</p><p><input type="text"/></p><p><input type="button" value="OK"/> <input type="button" value="Cancel"/></p></div>	

DEVICE SETTINGS		↗ SETTINGS
TRUCK NAME	<input type="text" value="DOT 12345"/>	GPS PORT <input type="text"/>
SPREADER CONTROLLER TIMER	<input type="text" value="3000"/>	GPS TIMER <input type="text" value="3000"/>
SPREADER CONTROLLER TYPE	<input type="text" value="Force America 5100"/>	
SPREADER CONTROLLER COM PORT	<input type="text"/>	
NETWORK LISTEN PORT	<input type="text" value="300"/>	LOCAL PORT <input type="text"/>
NETWORK TRANSPORT TYPE	<input type="text" value="UDP"/>	<input type="button" value="SAVE"/> <input type="button" value="LOAD"/>

Configurability

- XML configurable
- Uses Windows XP
- Support for any NTCIP objects
- Materials list and URL list fully configurable by agency

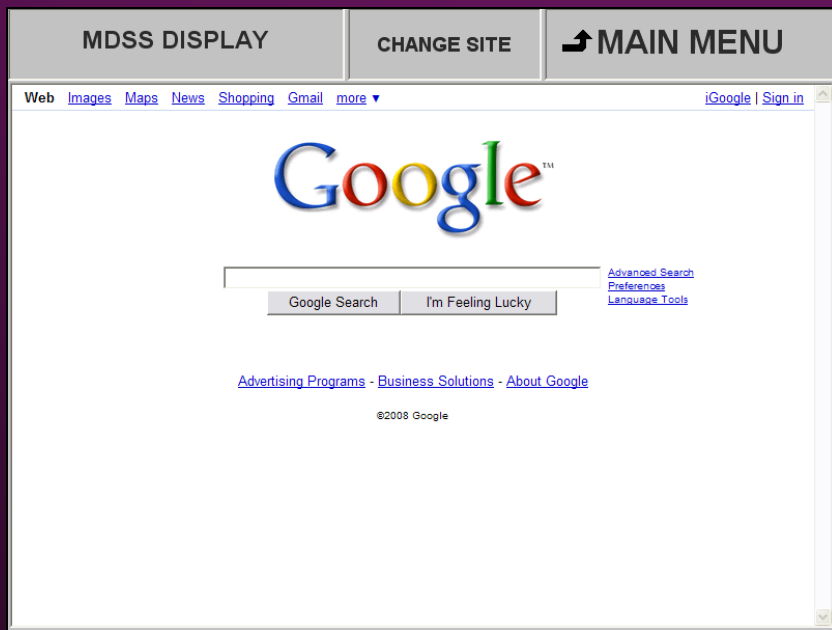


The screenshot shows an XML editor window with the following content:

```
131 </material>
132 <material>
133   <name>Geomelt
134 15%</name>
135   <value>29</value>
136 </material>
137 <material>
138   <name>Geomelt
139 30%</name>
140   <value>30</value>
141 </material>
142 <material>
143   <name>Geomelt /
144   NaCl
145 10/90%</name>
146   <value>31</value>
147 </material>
148 <material>
149   <name>Geomelt /
150   NaCl
151 20/80%</name>
152   <value>32</value>
153 </material>
154 <material>
155   <name>Geomelt /
156   NaCl
157 30/70%</name>
158   <value>33</value>
159 </material>
160 <material>
161   <name>Geomelt /
162   NaCl
163 50/50%</name>
```

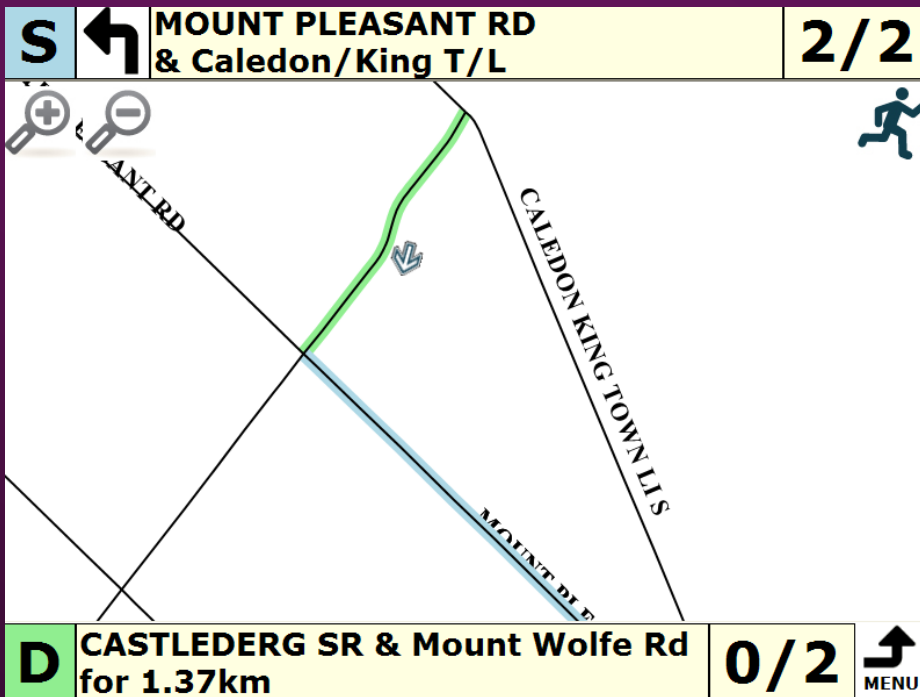
Web Services

- Limited or full web browser
- Ease of navigation through touch screen



SELECT WEBSITE		BACK
Main Page	Plow DT099	
Local Radar	Google	
Regional Radar		
Weather Forecast		
Plow DT102		

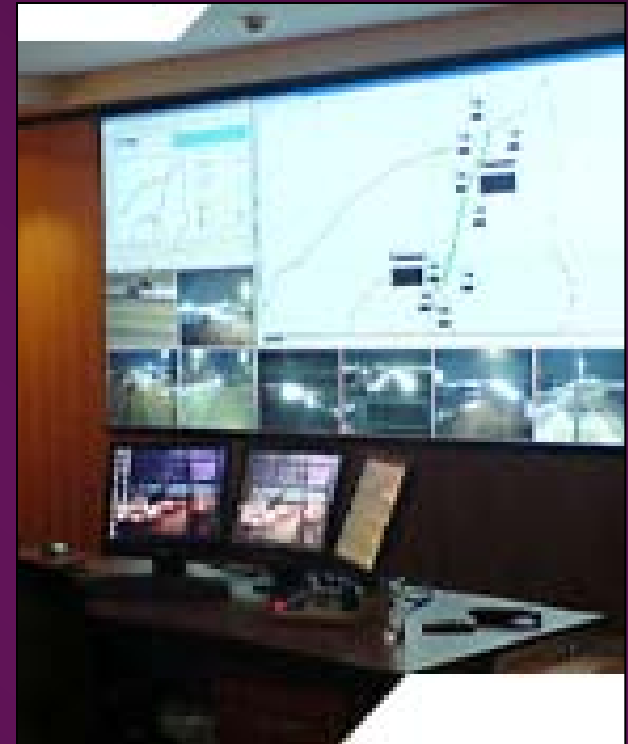
Route Optimization – Map View



- Displays turn by turn instructions for full route
- Color coded actions
 - Blue – Spreading
 - Green – Deadheading
 - Red – Plowing
- 7 Zoom Levels
- Text to Speech

MDSS and MDC as an Integrated ITS Technology

- Open standard
- Integration with TMC
- Combined fleet and traffic management
- Works with any NTCIP-compliant central software
- Motorists are provided more information on current driving conditions
 - DMS Signs
 - Highway Advisory Radios (HAR)
 - Public Website



Questions?

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