



TRANSPORTATION • INFORMATION TECHNOLOGY • WATER



# NETworks<sup>®</sup> ATMS

California 511 Workshop #8  
Acquiring Flow Data for  
Urban Arterials, Rural Highways

*Presented by:*  
*Dan Lukasik, P.E.*  
*Delcan Corporation*

*October 27, 2008*



# Presentation Overview

- ▶ NETworks® Description
- ▶ Where is it being used?
- ▶ System Modules
- ▶ Data Collection
- ▶ Data Dissemination



# Description

- ▶ Delcan's custom developed software application used for Advanced Transportation Management
  - Web-based, Customizable Application
  - Collects data from numerous different sensors and sources
  - Operates as freeway, arterial/signal, transit, emergency operations, and ATIS/511 system
- ▶ Interfaces and Integrates multiple transportation systems
  - Freeway, Arterial, Transit, Emergency and Weather Management Systems



networks

# Who is using NETworks®?

## NETworks R5

OCTA 91 Express Lanes

Caltrans District 10

Southbay Expressway

Caltrans D4 (C2C/511)

Nebraska Statewide ATMS

NHDOT Statewide ATMS

Michigan Statewide ATMS

Illinois AMBER Alert

MoDOT Statewide

East St. Louis

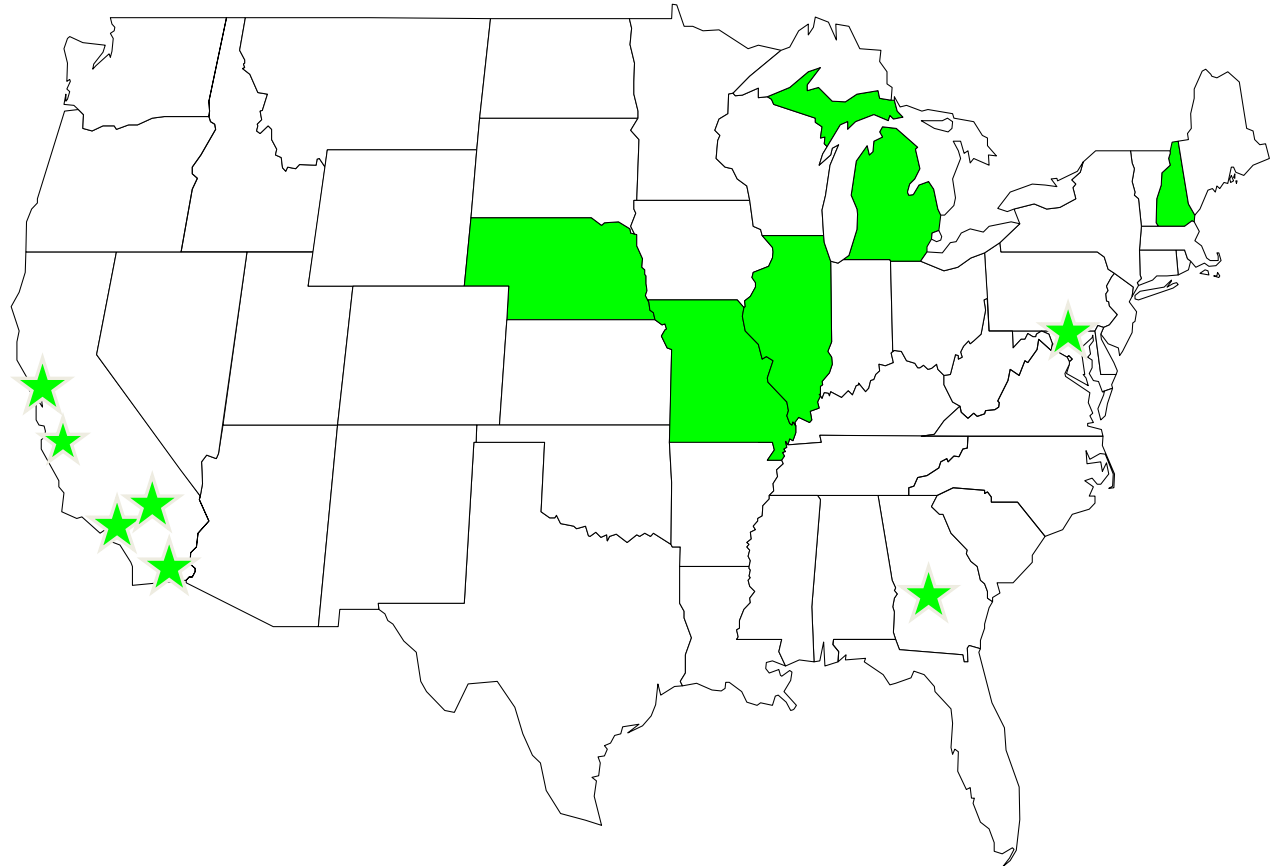
Greece (Thessaloniki)

Durban South Africa

Cyprus ATMS

Baltimore MMTIS

Georgia



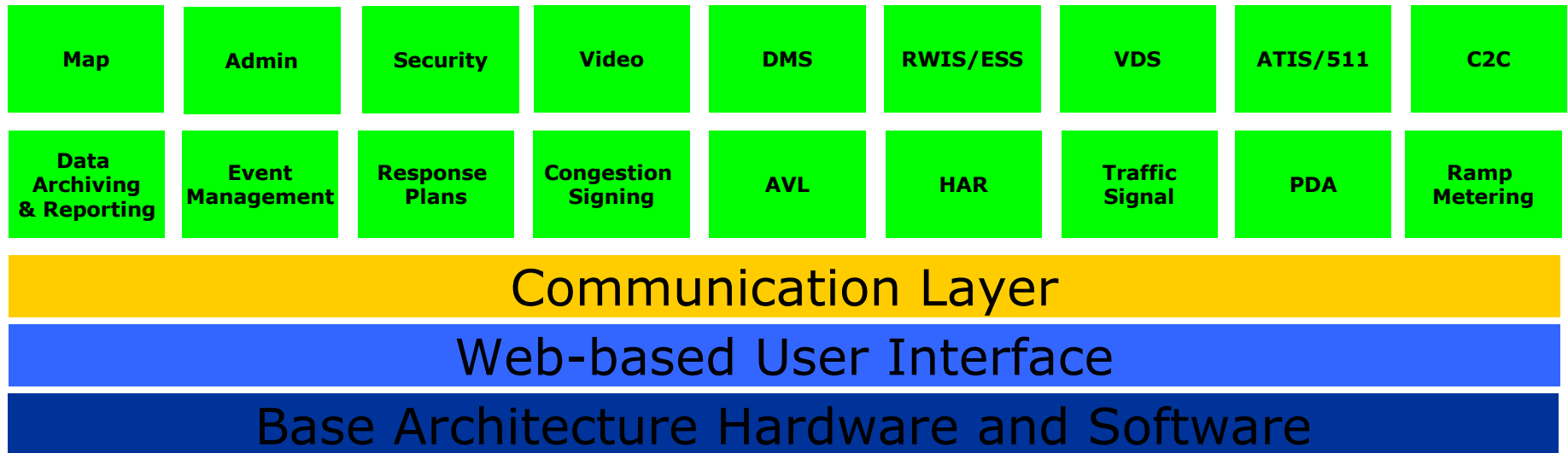
Delcan Proprietary

**Delcan**  
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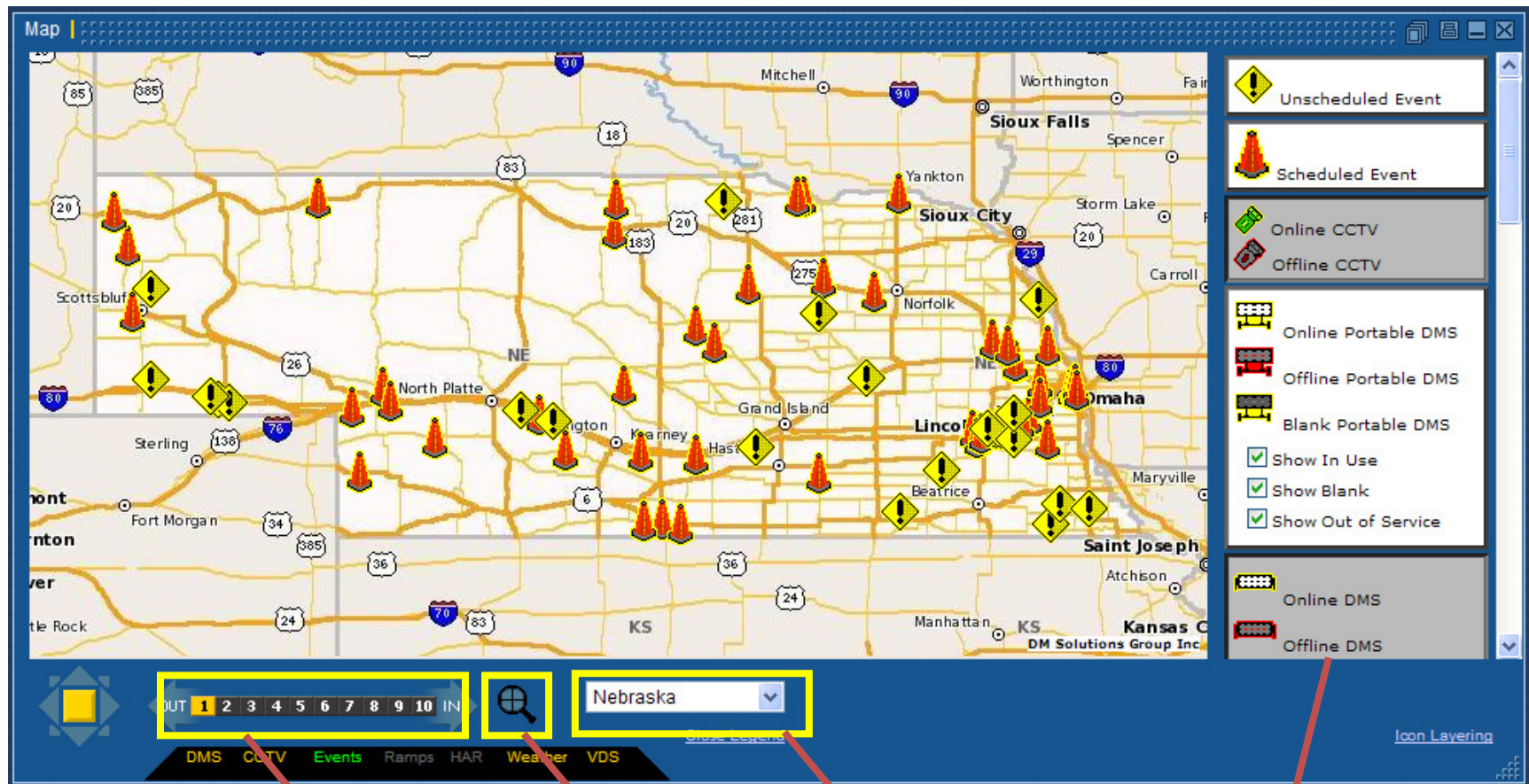
# Modules

NETworks<sup>®</sup> is purchased and deployed in a modular fashion. Users can purchase a license with one or more modules and have it customized to their specific needs.





# Map/GUI



Ten (10)  
Selectable  
Zoom Levels

Rectangle  
Zoom

Preset Zoom  
Levels

Hideable  
Legend with  
Icon Layer  
Selection

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# CCTV Control

View and control 8+ CCTV cameras simultaneously via web

- Set presets
- Video Wall Control

- Image Hover/Drag/Slide CCTV Control

http://10.87.0.101 - ATMS - Microsoft Internet Explorer

**NETworks ATMS**    New | Map | Viewer | List | Library | Inventory | Video Wall | Reporting | Administration | About | Logout

Map |

DM Solutions Group Inc

OUT 1 2 3 4 5 6 7 8 9 10 IN

91 Express Lanes

Viewer |

CCTV ID# CAM-29

Status: OK    Location: 91 West at Gypsum Cyn

Zoom Focus Iris    Open Presets

Select a CCTV

DMS CCTV Events Ramps HAR Weather

Viewer |

CCTV ID# CAM-04

Status: OK    Location: 91 West at Rte. 55 Co

Zoom Focus Iris    Open Presets

Select a CCTV

DMS CCTV Events Ramps HAR Weather

List |

Type	ID	Roadway	Cross Street	Mile Marker	City
	CAM-01	91 East	Tustin Ave.	8.36	Anahei
	CAM-02	91 East	Rte. 55 Connector	8.6	Anahei
	CAM-03	91 West	Rte. 55 Connector	8.8	Anahei
	CAM-04	91 West	Rte. 55 Connector	8.8	Anahei
	CAM-05	91 West	somewhere	17.0	Anahei

All DMS CCTV Events Ramps HAR Weather

Viewer |

CCTV ID# CAM-33

Status: OK    Location: 91 East at 1

Zoom Focus Iris    Open Presets

Select a CCTV

DMS CCTV Events Ramps HAR Weather

Viewer |

CCTV ID# CAM-15

Status: OK    Location: 91 East at 1

Zoom Focus Iris    Open Presets

Select a CCTV

DMS CCTV Events Ramps HAR Weather



# DMS Control

DMS Control and DMS message library screens

Viewer | [Grid Icon] [Min Icon] [Max Icon] [Close Icon]

DMS ID# 13

ROADWORK CONSTRUCTION  
TEST MESSAGE 10 P2

Status: OK      Location: I-5 North at Westcheste

**Phase 1**

**Phase 2**

**Phase 3**

Phase Timer [v]    Send    Blank    Multiple DMS    Clear

16: I-2 South at Elm [v]

DMS   CCTV   Events   Ramps   HAR   Weather

Library | [Grid Icon] [Min Icon] [Max Icon] [Close Icon]

DMS Messages Edit Privilege

	Message Title	Last Modified	Username
	DETOUR AHEAD	03/23/2007	
	EXPECT DELAYS	03/23/2007	
	LANES CLOSED AHEAD	03/23/2007	

Roadwork/Construction [v] 3 of 20

---

**Message Title**

**Phase 1**

**Phase 2**

**Phase 3**

**Phase Timer** 2 Seconds [v]    New    Save    Delete

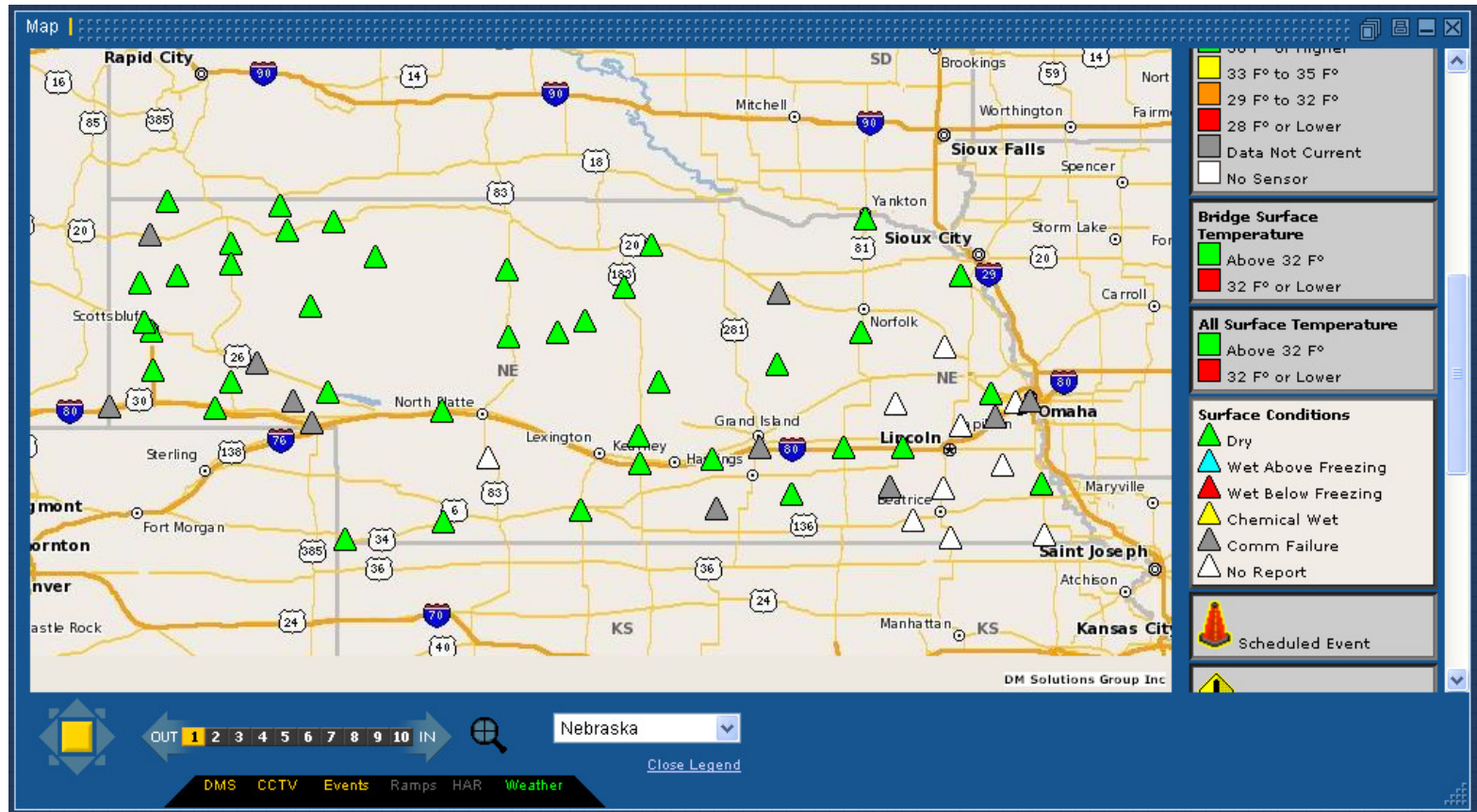
DMS   HAR   ResponsePlan





# Weather Monitoring

- Polls data from weather sensors
- Monitors weather alarms
- Anti-icing control



Nebraska Weather Sensors (Surface Conditions Icons)



# Weather Forecasting

Obtains weather information from the National Weather Service and other sources

Viewer | WEATHER FORECAST #20 Concord 2008-04-11 10:35:12.0

Forecast [v]  
 NWS Zones [v]  
 Concord (Forecast) [v]

Today	Tomorrow	Sunday	Monday	Tuesday	Wednesday	Thursday
<b>Rain</b> Hi: 50° Wind: South East Min: 2 mph Max: 2 mph Gust: 3 mph	<b>Rain</b> Hi: 45° Wind: Variable Min: 2 mph Max: 6 mph Gust: 6 mph	<b>Chance Rain/Snow</b> Hi: 51° Wind: North West Min: 6 mph Max: 13 mph Gust: 16 mph	<b>Chance Rain/Snow</b> Hi: 47° Wind: North Min: 7 mph Max: 10 mph Gust: 8 mph	<b>Mostly Sunny</b> Hi: 52° Wind: North Min: 6 mph Max: 10 mph Gust: 0 mph	<b>Mostly Sunny</b> Hi: 61° Wind: West Min: 5 mph Max: 14 mph Gust: 0 mph	<b>Partly Cloudy</b> Hi: 64° Wind: West Min: 4 mph Max: 12 mph Gust: 0 mph
Tonight	Tomorrow Night	Sunday Night	Monday Night	Tuesday Night	Wednesday Night	Thursday Night
<b>Rain</b> Low: 37° Wind: South East Min: 1 mph Max: 2 mph Gust: 3 mph	<b>Chance Rain/Snow</b> Low: 32° Wind: North Min: 3 mph Max: 4 mph Gust: 5 mph	<b>Mostly Cloudy</b> Low: 30° Wind: North Min: 4 mph Max: 10 mph Gust: 13 mph	<b>Slight Chance Snow Showers</b> Low: 26° Wind: North Min: 4 mph Max: 6 mph Gust: 5 mph	<b>Mostly Clear</b> Low: 28° Wind: North West Min: 3 mph Max: 7 mph Gust: 0 mph	<b>Partly Cloudy</b> Low: 35° Wind: South West Min: 3 mph Max: 7 mph Gust: 0 mph	<b>null</b> Low: null° Wind: North West Min: 7 mph Max: 7 mph Gust: 0 mph
<a href="#">View Detail</a>	<a href="#">View Detail</a>	<a href="#">View Detail</a>	<a href="#">View Detail</a>	<a href="#">View Detail</a>	<a href="#">View Detail</a>	<a href="#">View Detail</a>

DMS CCTV Events HAR Contacts Weather VDS Gates

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# Event Management

The screenshot displays a software interface for event management. The main area is a map of Nebraska, showing major cities like Rapid City, Sioux Falls, Lincoln, and Omaha. The map is populated with various colored icons representing different types of events, such as red squares for incidents, red crosses for closures, and green 'R' symbols for conditions. A legend on the right side of the map lists these event types with their corresponding icons: Incident Event (red square), Closure Event (red cross), Events/Info Event (green square), Construction Event (orange square), Congestion Event (red square with 'C'), Restriction Event (yellow square with 'R'), Conditions Event (green square with 'R'), Hazard Event (yellow triangle), Online CCTV (green square with camera icon), and Offline CCTV (red square with camera icon). The interface also includes a search bar at the bottom with 'Nebraska' entered, a zoom control, and a menu bar at the bottom with options like DMS, CCTV, Events, Weather, VDS, AVL, and Gates.

Add any different event types or icons





# Event Notification

**Sends e-mails, text messages, pages and phone messages to the designated contact list names and/or groups**

Viewer | EVENT ID# 100063

DMS Controls    Contacts & Notifications   [Recommend](#)   [Close Response Plan](#)

**Event Type:** Accident  
**Agency:** NHDOT  
**Start Date/Time:** 09-18-2007 11:40  
**Estimated Duration:** 0 D 0 H 0 M  
**End Date/Time:** 09-18-2007 11:40  
**Severity:**  Event last 30 mins or less  
 Event last 90 mins or less  
 Event last more than 90 mins  
**Lanes Blocked:** LS 1 2 3 4 5 RS OR

**Location Information**  
**City/Town:** Acworth  
**County:** Belknap  
**State:** NH

**Primary Location**  
**Roadway Type:** Arterial  
**Direction:**  E  N  S  W  
**Mile Marker:** 0  
**Cross Street:**

**Global Messaging**  
 CARS  
 IEN

**Notifications List**

Include	Last	First	Title	Agency
<input type="checkbox"/>	Perez	Roberto	Office MGR	Delcan Corp.
<input checked="" type="checkbox"/>	Lick	Dave	Task Lead	Delcan Corp.
<input checked="" type="checkbox"/>	Clay	Hubert	PM	Delcan Corp.
<input type="checkbox"/>	Jansen	Dave	Tech Lead	Delcan Corp.
<input checked="" type="checkbox"/>	Ohman	RJ	GIS Master	Delcan Corp.

**Contact List**

Called	Ignored	Last	First	Title	Agency	Phone
<input checked="" type="radio"/>	<input type="radio"/>	Perez	Roberto	Office MGR	Delcan Corp.	404-320-1776
<input type="radio"/>	<input checked="" type="radio"/>	Lick	Dave	Task Lead	Delcan Corp.	404-320-1777
<input checked="" type="radio"/>	<input type="radio"/>	Clay	Hubert	PM	Delcan Corp.	404-320-1778
<input checked="" type="radio"/>	<input type="radio"/>	Jansen	Dave	Tech Lead	Delcan Corp.	404-320-1779
<input checked="" type="radio"/>	<input type="radio"/>	Ohman	RJ	GIS Master	Delcan Corp.	404-320-1780

**Free Form Check List**

Completed	Enter Free-Form Tasks Here	Comments
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		
<input type="checkbox"/>		

**Response Plan Action**    Activate    Terminate   [Cancel](#)   [Save](#)   [Open Geo-Locator Map](#)

DMS   OCTV   **Events**   Ramps   HAR   Weather



# Acquiring Flow and Congestion Data – Arterials and highways

## 1. Interfaces directly with Vehicle Detection Systems/Sensors (VDS)

- Inductive Loops
- Microloops (3M)
- RTMS Radar
- Wavetronix
- InfoTek ILDA
- Autoscope
- Sensys
- etc.

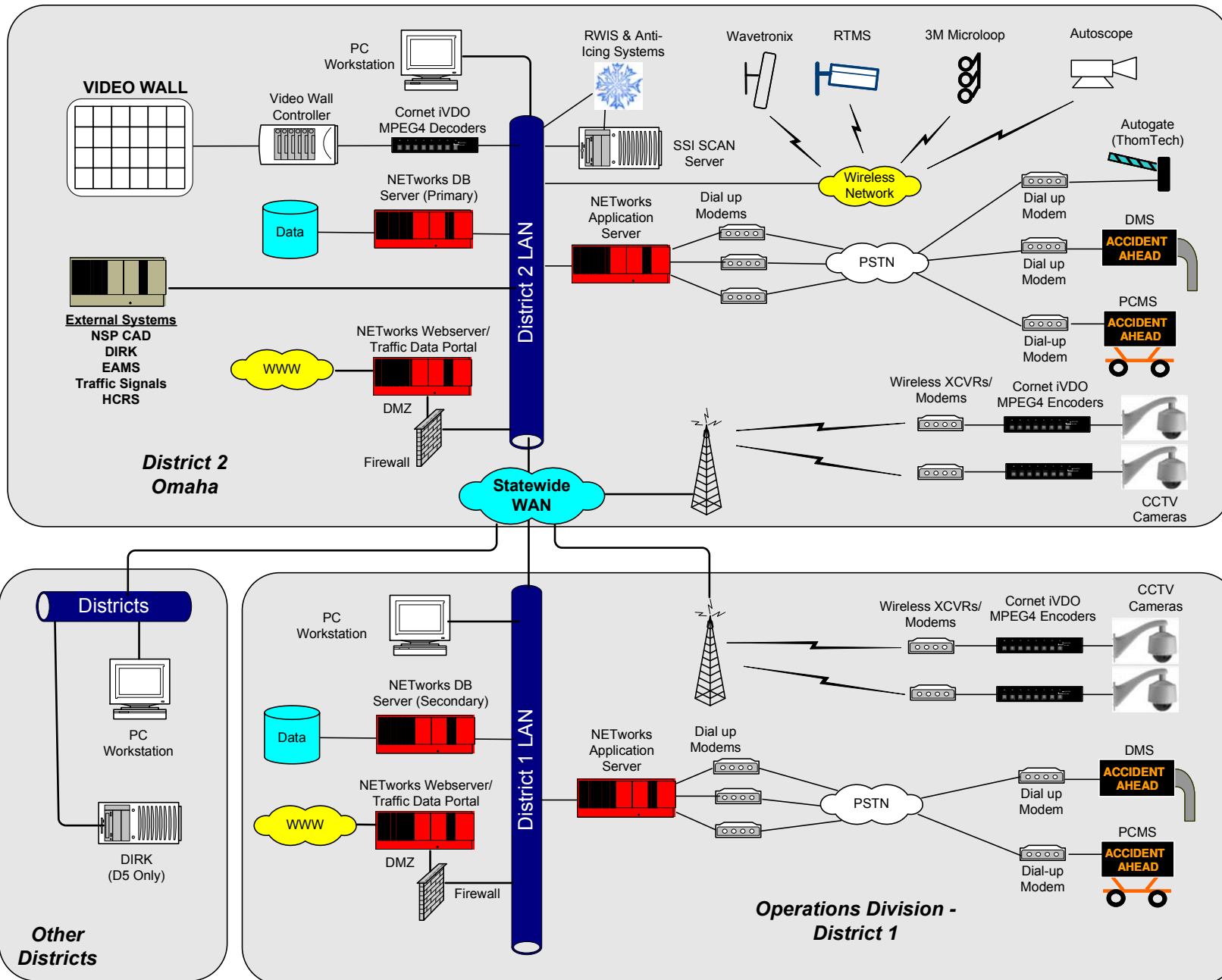
## 2. Interfaces with Sensor system via data collection subsystems (e.g. web services feeds)

- SpeedInfo
- Sensys Networks

## 3. Interfaces with vehicle probe system

- Cellular Probe Data
- Fleet Vehicle GPS Probe Data
- VII data sources (soon)
- Direct Fleet Vehicle Interfaces

# Nebraska Department of Roads





# Vehicle Detector System (VDS) Module

Interfaces with multiple vehicle detection/road way monitoring devices

- Inductive Loops
- InfoTek ILDA
- Microloops
- RTMS
- Wavetronix
- Autoscope
- Sensys
- Speedinfo
- Cell probes
- GPS Probes
- etc.

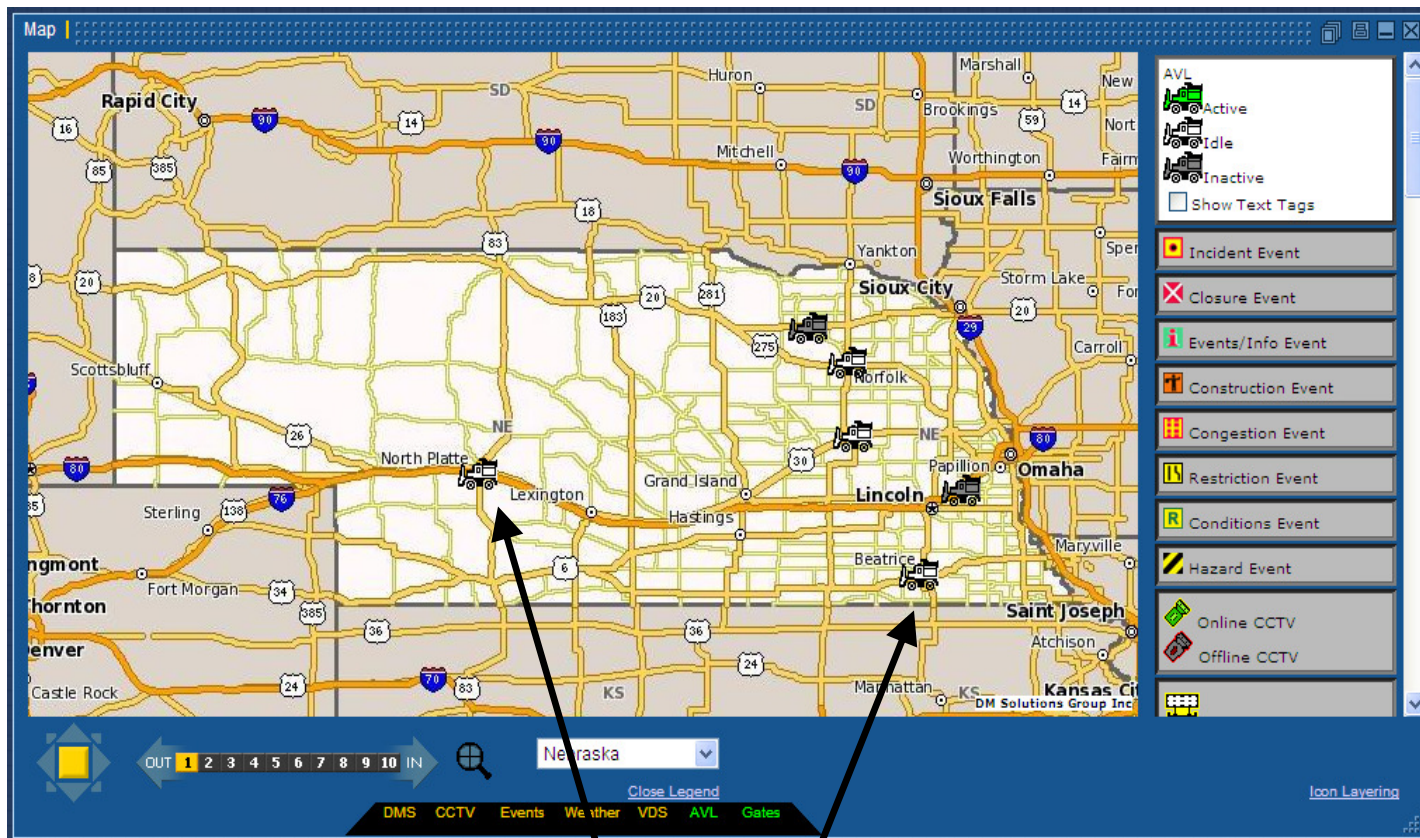
The screenshot displays the VDS software interface. The main window shows a map of a road network with various colored markers (green, red, yellow) indicating detector locations. A 'Viewer' window is open, showing real-time data for 'VDS ID# SmartSensor 1-3' at 'I-80 E at S 126 St' on '2007-12-05 04:12:00'. The viewer displays a speed of 61 mph and a 'STATUS: OK'. Below this, a 'Lane-by-Lane' table provides detailed traffic data for three lanes.

Lane	Status	Volume	Occupancy	Estimated Speed
2	OK	7.0	6.0	63
1	OK	3.0	2.0	60
3	OK	1.0	0.0	60
Average:		4	3	61
Total:		11	8	





# Fleet Vehicle Tracking/AVL



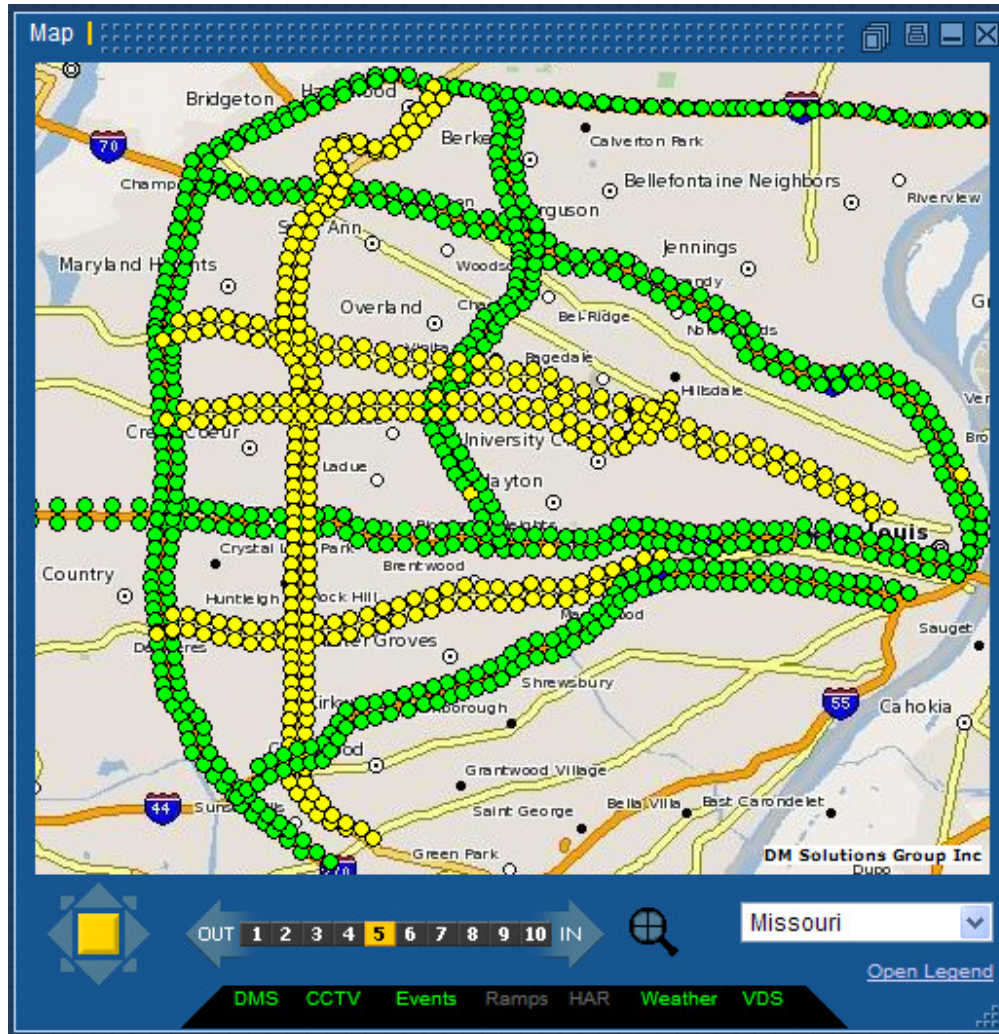
**Track locations of fleet vehicles and their status information**

*Delcan Proprietary*





# VDS Probe Point Data



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# VDS Probe Point Data

NETWORKS ATMS [New](#) | [Map](#) | [Viewer](#) | [Tiling](#) | [List](#) | [Library](#) | [Inventory](#) | [Video Wall](#) | [Reporting](#) | [Administration](#) | [Profile](#) | [About](#) | [Lo](#)

Map |

Viewer |

● VDS ID# SL-AN48 2007-12-09 19:40:00

66 mph

Viewer |

● VDS ID# SL-EN14 2007-12-09 19:40:00

45 mph

Viewer |

● VDS ID# SL-BN14 2007-12-09 19:40:00

67 mph

STATUS: OK Location: Road\_64 W at

Lane-by-Lane

Select a VDS

DM Solutions Group Inc

OUT 1 2 3 4 5 6 7 8 9 10 IN

Missouri

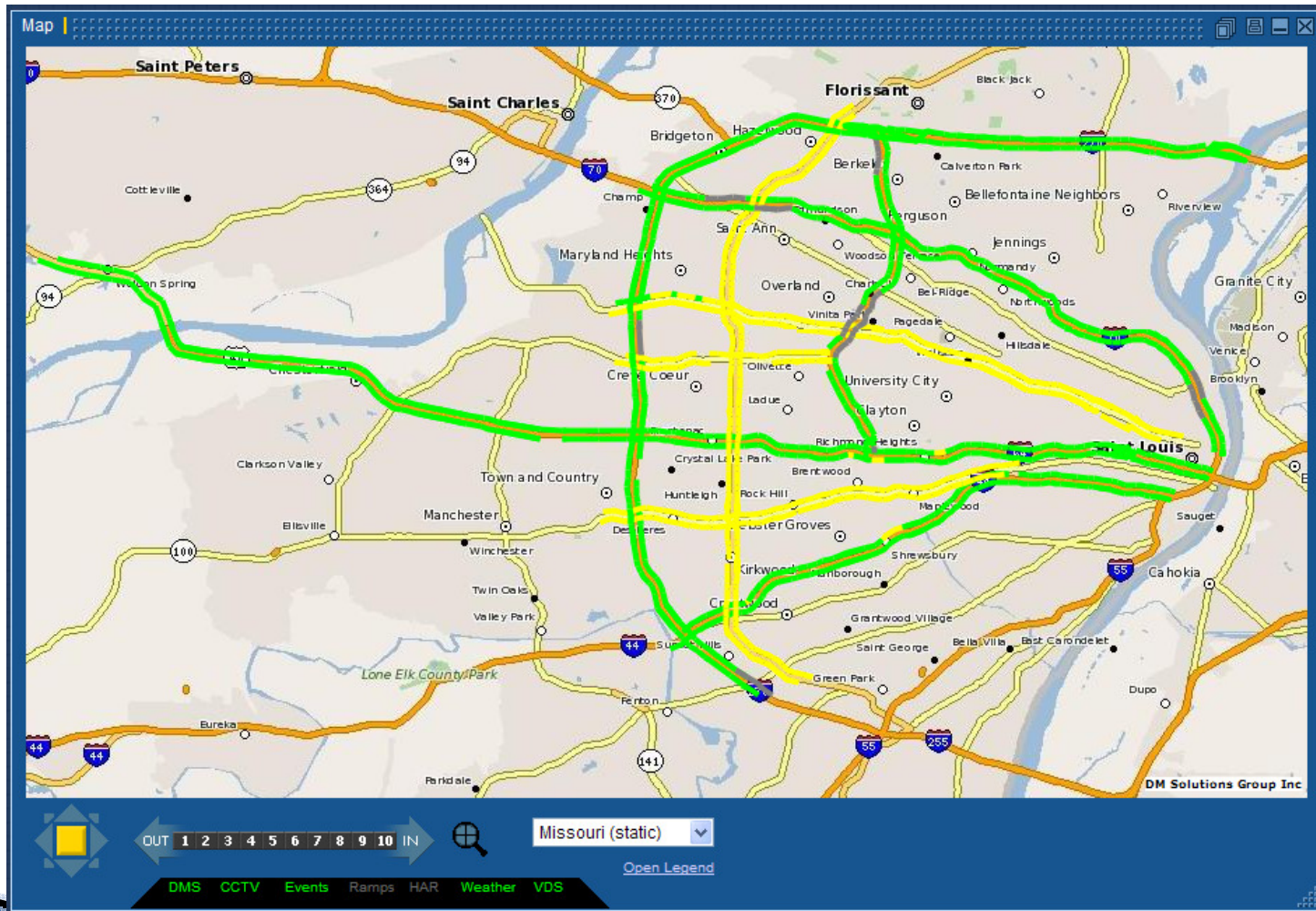
Open Legend

DMS CCTV Events Ramps HAR Weather VDS

DMS CCTV Events Ramps HAR Weather VDS



# VDS Probe Segment Data (St. Louis)

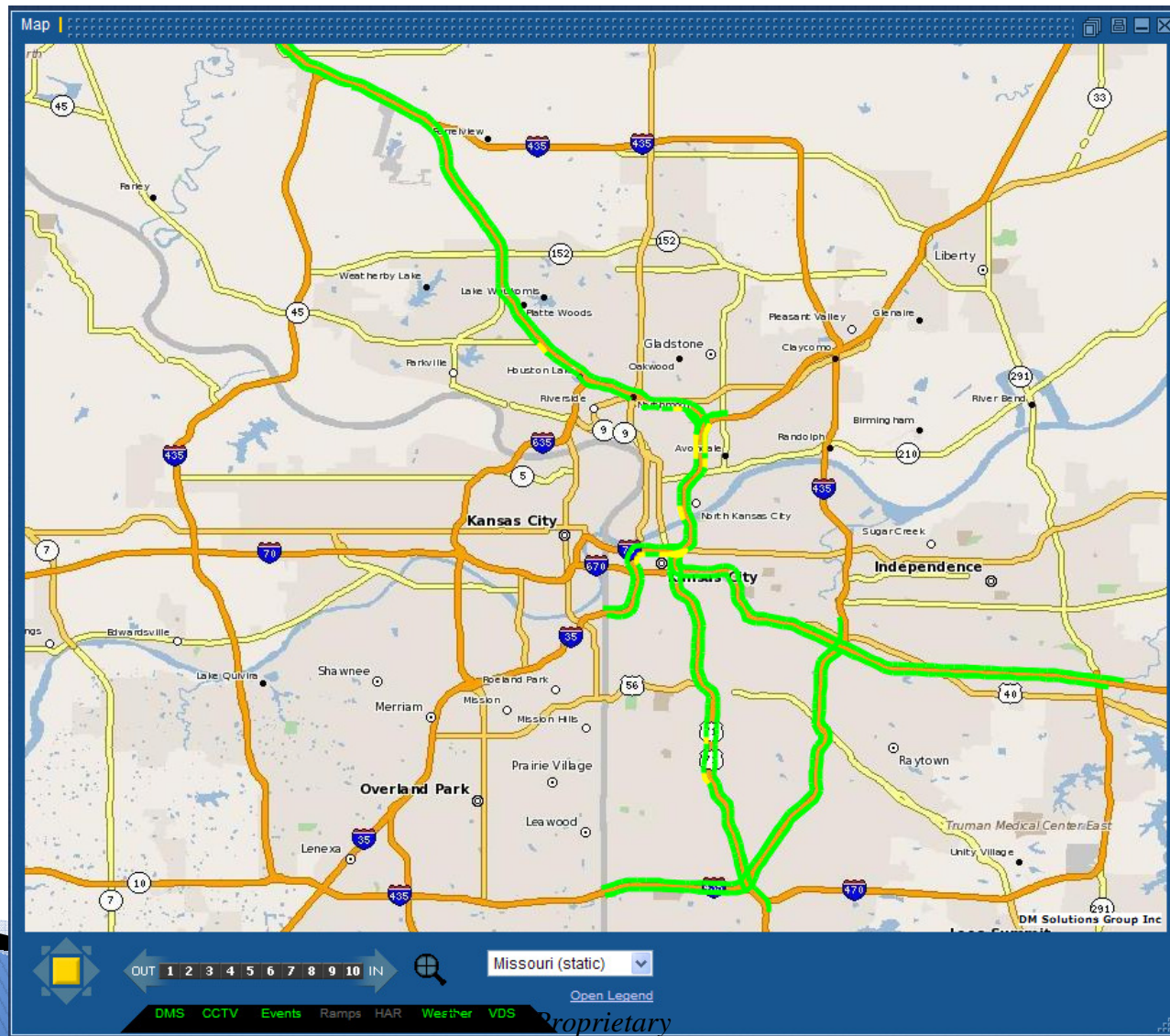


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# VDS Probe Segment Data (KC)





# VDS Probe Segment Data (KC)

The screenshot displays the ATMS (Automated Traffic Monitoring System) interface within a Windows Internet Explorer browser. The browser address bar shows the URL <http://www.modot-networks.com/atms/atmslite.jsp>. The interface includes a navigation menu with options like New, Map, Viewer, Tiling, List, Library, Inventory, Video Wall, Reporting, Administration, Profile, and About. A central map shows Kansas City, Missouri, with various roads and highways. Overlaid on the map are several colored lines representing VDS probe segments, with colors ranging from yellow to red, indicating different traffic conditions. On the right side, there are three viewer panels, each displaying real-time data for a specific VDS probe. The top viewer shows VDS ID# KC-CN26 with a speed of 11 mph. The middle viewer shows VDS ID# KC-BN48 with a speed of 24 mph. The bottom viewer shows VDS ID# KC-DS26 with a speed of 21 mph. Each viewer panel includes a 'Lane-by-Lane' button and a 'Select a VDS' dropdown menu. A legend on the right side of the map lists various weather and traffic conditions, such as Rain Light, Snow Heavy, and Freezing Rain Heavy, each represented by a colored circle. The bottom of the browser window shows the taskbar with the Internet Explorer icon and a 100% zoom level.

# MARYLAND DOT CAMERAS SHOW ACCURACY OF TRAFFIC INFORMATION BEING CAPTURED USING CELL PROBES

**NETworks** | Map | Event | Camera | CMS | Log Out

Baltimore Overview | I-95 Balt / Tunnels | I-95 - NE Balt | I-95 / I-695 NE | I-695 - NW Balt

## Map

**I-695 AT HARFORD ROAD**

**Legend**

<b>Traffic QoS:</b>	<b>Devices:</b>	<b>Events:</b>
A > 90%	Changeable Message Sign (CMS)	Incident
B 80 - 89%	Camera	Construction
C 70 - 79%		
D 60 - 69%		
E 50 - 59%		
F < 50%		
No information		

**I-695 at HARFORD ROAD**  
**Monday, June 6<sup>th</sup> 2005**  
**9:02:18 am**

**Last Speed Update**  
 Mon, Jun 6 9:02:18 AM

**Zoom Control**

[-] | | [+]

0 2 4 miles

**View Choices**

Save View  CMS  Cameras

# CELL PROBES ACCURATELY UPDATE TRAFFIC CONDITIONS AS CHANGES OCCUR



**NETWORKS**

Map

Event

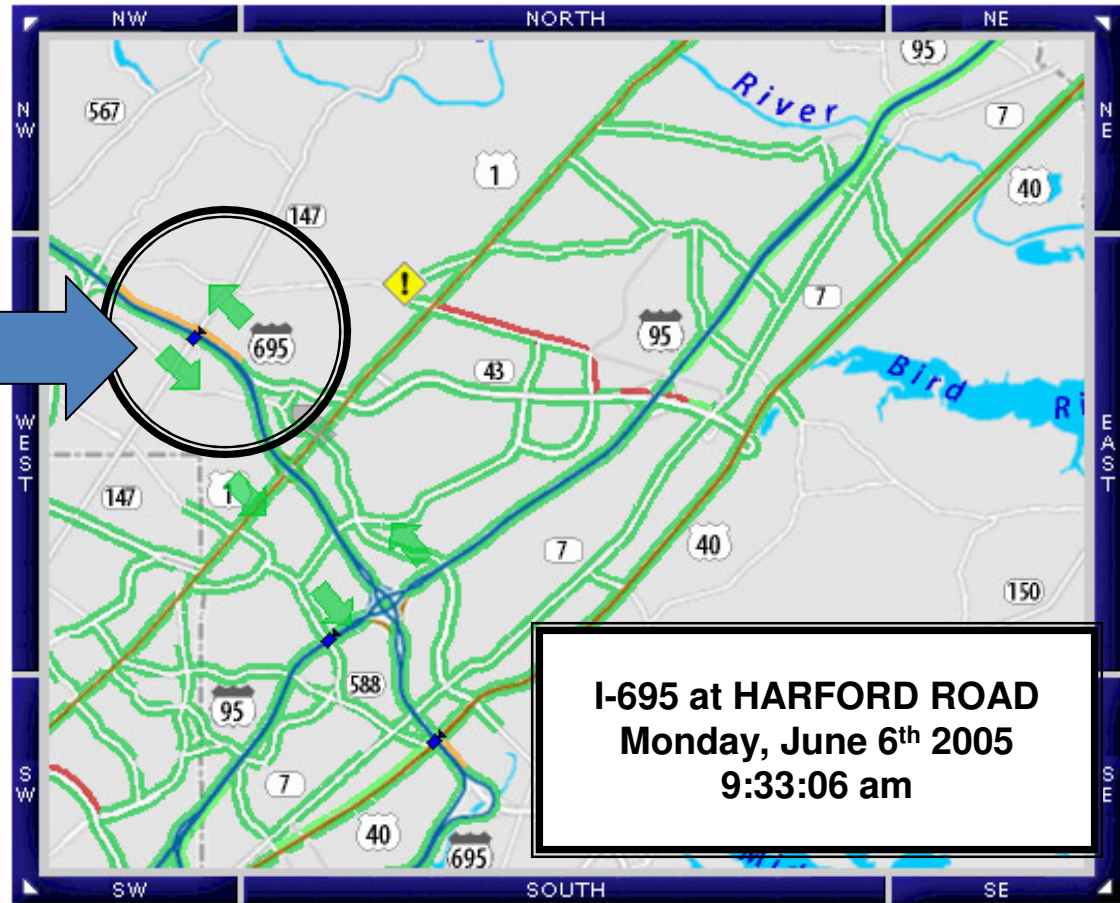
Camera

CMS

Log Out

Baltimore Overview | I-95 Balt / Tunnels | I-95 - NE Balt | I-95 / I-695 NE | I-695 - NW Balt

Map



**I-695 at HARFORD ROAD**  
**Monday, June 6<sup>th</sup> 2005**  
**9:33:06 am**

**Legend**

**Traffic QoS:**

- A > 90%
- B 80 - 89%
- C 70 - 79%
- D 60 - 69%
- E 50 - 59%
- F < 50%
- No information

**Devices:**

- Changeable Message Sign (CMS)
- Camera

**Events:**

- Incident
- Construction

**Last Speed Update**

Mon, Jun 6 9:33:06 AM

**Zoom Control**



**View Choices**

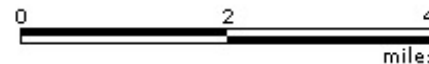
Save View



CMS



Cameras



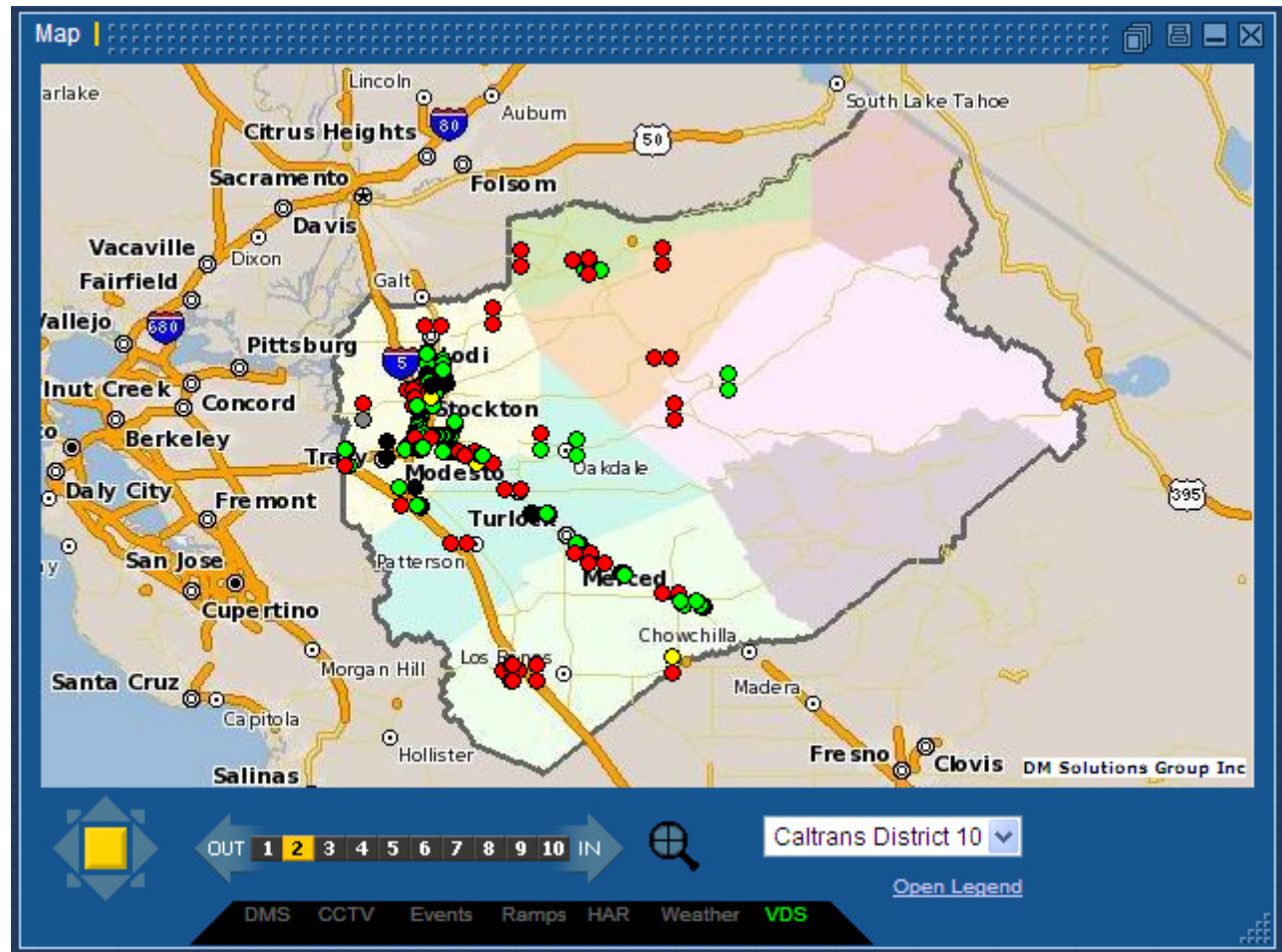




# Caltrans District 10

**Interfaces with  
190 different  
sensors using  
InfoTek Wizard**

- Inductive Loops (ILDA)
- RTMS
- Wavetronix
- TIRTL





# Flow Data Dissemination

- ▶ Three (3) means
  - ATIS/511 Websites
  - XML Web Services data feeds
    - (Delcan is doing this for San Diego, LA, Nebraska, Illinois, New Hampshire, Oregon, Georgia and soon San Francisco and Oakland)
  - Real Time Travel Time Dissemination (e.g. DMS display)



# ATIS/511 Websites

Google Maps Engine

Toggle Layers

Delcan Proprietary





# ATIS/511 Websites

Current  
Roadway  
Sign  
Messages  
and  
Status

Nebraska Department Of Roads - Mozilla Firefox

File Edit View History Bookmarks Tools Help

http://localhost:8080/atis/html/

Nebraska Department Of Roads

Official Nebraska Government Website

Nebraska Department of Roads

Traveler Information Portal

TIP Home Events Weather Featured Projects Motor Carriers Contact Us NDOR Home

Select the icons you wish to view from the list below

- Incident
- Construction
- Closure
- Events/Info
- Restriction
- Hazard
- Conditions
- Construction
- Cameras
- Signs
- RWIS

Freeway Speeds:

- 0-25 mph
- 26-50 mph
- > 50 mph
- No Data Available

Roadway Conditions:

- Normal Seasonal
- Caution
- Extreme Caution
- Closed
- No Report

Message Sign  
I-80E @ 1.6 miles West of Sidney

ACCIDENT AHEAD  
LEFT 2 LANES  
CLOSED

Updated: 10/22/2008 12:29 PM

Delcan Proprietary

Done





*Contact Info:*

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