

# NV IMO Project Summary

August 8, 2012

Snowplows



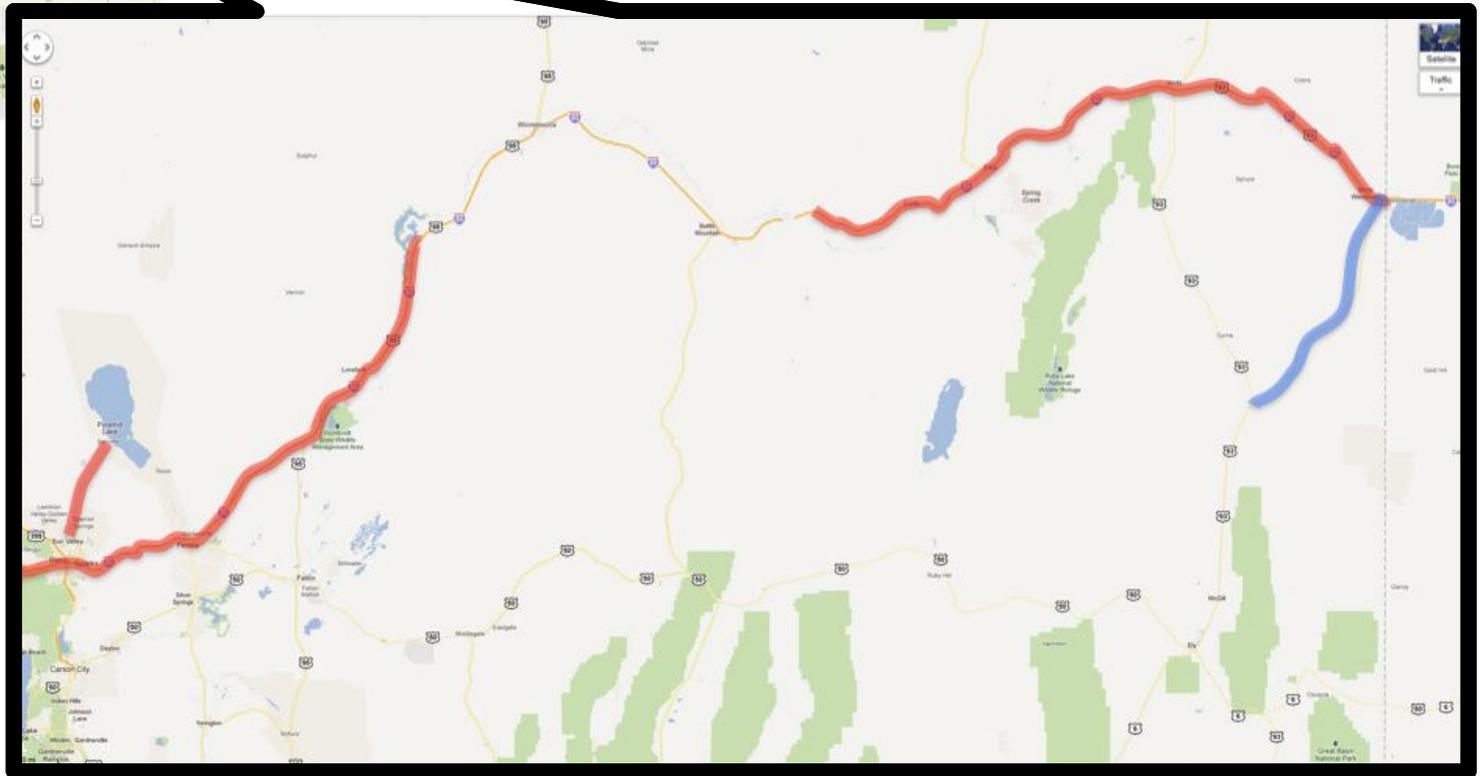
**Two Vehicle Types  
Based in along I-80 Corridor**

- Vehicles with winter assignments along I-80 were selected.
- Makes & models are presently limited to vehicles with compatible CANBus or OBDII vehicle data formats.

Light Duty Vehicles (Crew, general purpose)



# Nv IMO Coverage Areas via EDACS



# Various Weather & MDSS Data Parameters



Collaborative NDOT & UNR  
Installation teams

- Numerous sensors and devices are controlled or monitored by a vehicle-mounted computer.
- Data is logged in-vehicle as well as sent via radio to UNR in near-real-time using the NV EDACS radio network.
- All instrument and equipment installations are being done by UNR & NDOT personnel who are familiar with the vehicles (NDOT) and instrumentation (UNR).



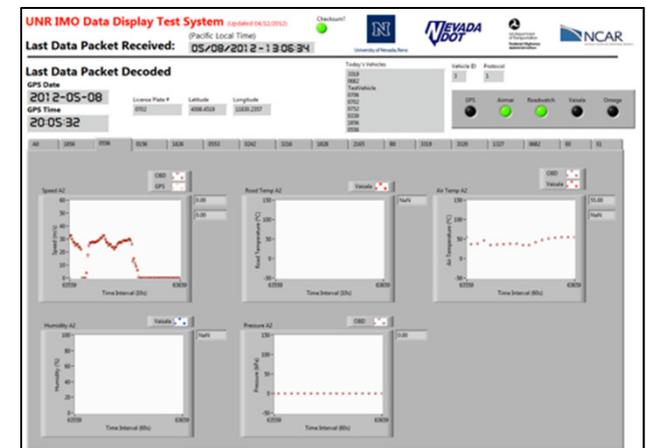
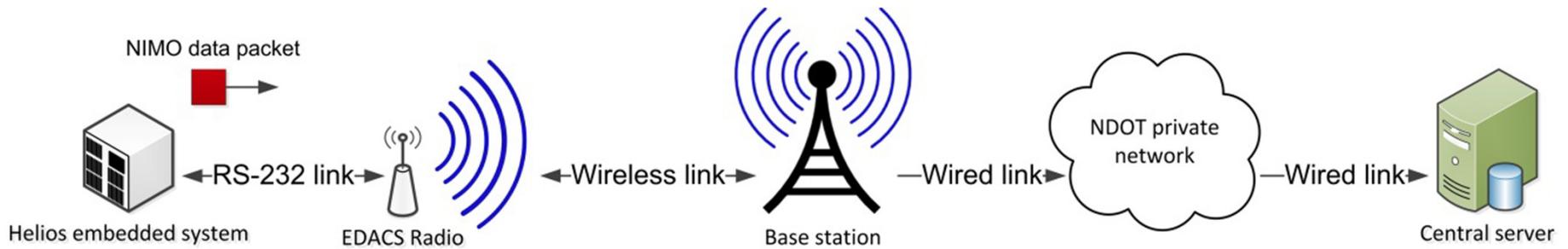
Road and weather sensors



In-vehicle computer

# Homegrown System

- Driven by need to use EDACS radio network



# Data Being Gathered

- General Data
  - GPS Date, time, location, bearing, speed, altitude, accuracy
- Road Conditions
  - Road surface temperature
- Atmospheric Conditions
  - Pressure, temperature, relative humidity, dew point
- Vehicle & Equipment Data
  - Wheel speeds, brake status, engine intake air temperature & pressure
  - Traction control, ABS, emissions data, engine data, and headlight status
  - Diagnostic trouble codes

# Applications in NV

- Equipment Maintenance
- MMS (in progress)
  - Material inventories
- MDSS (future)
  - Winter maintenance decision making
  - VDT: Vehicle Data Translator (NCAR)
  - In-vehicle data

# Equipment OBD/CanBus Trouble Codes (in Realtime)

UNR IMO LDV's TROUBLE CODES Display (Updated 04/06/2012)

(Pacific Local Time)

Last Data Packet Received: 04/27/2012 - 15:22:10



University of Nevada, Reno



Last Vehicle

0556

**GREEN** -> NO Trouble Codes

**YELLOW** -> One or more Trouble Codes w/ Check Engine Light (CEL) ON

**RED** -> One or more Trouble Codes with NO CEL

## Vehicles Status:

1856



0556



0242



2165

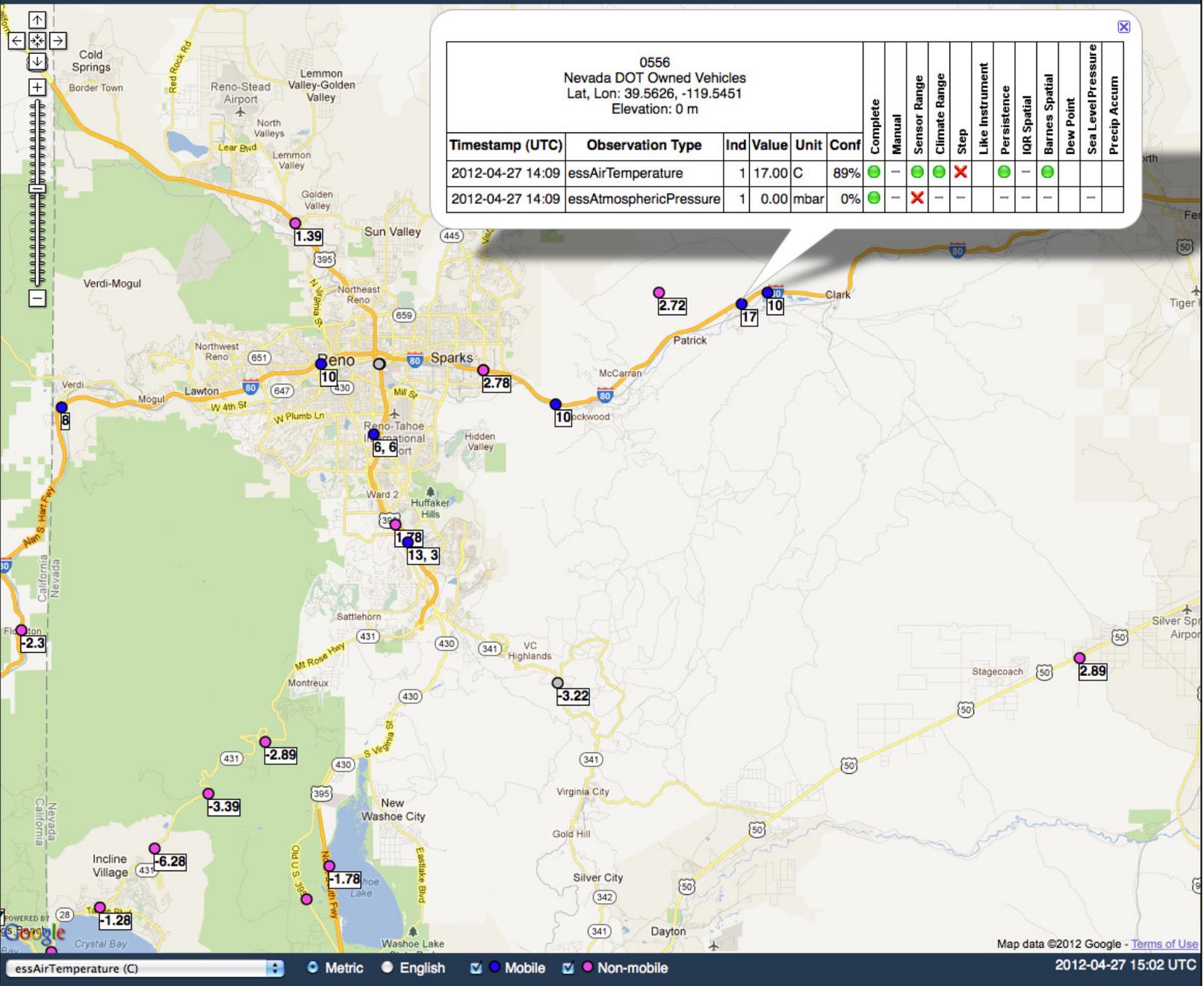


[Vehicle 1856](#)

[Vehicle 0556](#)

[Vehicle 0242](#)

[Vehicle 2165](#)



# Low Density EDACS Telemetry

- Sensor values recorded at 10sec or 60sec intervals
- Limited number of sensor fields
- Transmitted once every 5 minutes
- Posted real-time online
- Most recent data provided to Clarus

# High Density Data Logs

- Internal HDD & USB flash drive
- Raw & interpreted sensor logs
- All sensor fields
- Program & transmission logs
- Up to 5 samples/s stored
- Approx. 500-700 MB/month
- Retrieved infrequently (monthly)
- Posted online

# Lessons Learned

- Proprietary nature of OBD/CanBus data
- High equipment/radio costs
- Data transmission limitations via EDACS radio

# Value to Being “Connected”

- Real-time data will improve maintenance decisions via MDSS, MMS and in-vehicle info
- Increase reliability & mobility for drivers
- Increase efficiency
- Reduce roadway operating & maintenance costs



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