Vehicle Infrastructure Integration Update

2007 MDSS Annual Meeting
Session 8

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Vehicle Infrastructure Integration (VII)

DEFINITION: Vehicle to Infrastructure (V-I) and Vehicle to Vehicle (V-V) communication through Dedicated Short Range Communications (DSRC-wireless radio comm. 5.9 GHz)

- 38°F Wipers: High
- 36°F Wipers: Int.
- 36°F Wipers: High
- 35°F Wipers: Low
- RSU
VII Test Bed – Detroit Metro

Air Temperature

Pressure

22:20 UTC
PoC Test Environment - Detroit
Test Bed Layout

- 57 Roadside Units (RSUs) to be installed
- 13 along Interstates (I-96/I-275)
- 44 along arterial routes
- Most RSUs will be located at signalized corners
- Interstate RSE’s on CCTV masts or 25’ steel towers in medians
PoC Testing

- PoC Start: 1 Nov 2007
- PoC End: Jan 2008
- Fleet of 25 VII-enabled vehicles
- Operated by professional drivers
- All data to be archived
- Each public application to direct fleet for one week
- Michigan DOT may run SEMSIM trucks along routes to gather data
Potential Vehicle-based Elements

- Hours of operation
- Elevation
- Accelerometer data
- Vehicle speed
- Heading
- Steering wheel rate of change
- Exterior temperature
- Windshield wiper rate
- Rain sensor
- Sun sensor
- Adaptive cruise control radar

- Impact sensor
- Barometric pressure
- Fog lights
- Headlights
- Relative humidity
- Anti-lock braking system
- Traction control
- Stability control
- Pavement temperature
- Brake boost
- Wiper status
Elements Available in PoC

- Hours of operation
- Elevation
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Data Analysis

- Hoping to collect a diverse dataset (e.g. day, night, rain, snow, etc)
- Statistical Analysis
  - Compare vehicle data to fixed & mobile data
  - Determine if there are biases, quality errors, outliers, etc
  - Estimate minimum number of samples required to result in quality data
Data Integration

• Integrate VII-based data with other weather data sets
  - Determine correlation of weather radar reflectivity data and wiper status/rate
  - Determine correlation of ABS/VTC/VSC activation with slippery road surfaces
  - Correlate air temperature with ABS/VTC/VSC events
Dealing with a fire hose of data...

- Potentially there could be
  - millions of vehicles providing data
  - 10’s to 100’s of millions of probe messages
  - available 24/7/365
  - on both interstates and arterials

- How do we deal with all of the data?
  - Weather Data Translator (WDT)
  - Data segmentation
Weather Data Translator (conceptual)

More Info at Session 6 of Clarus!
Upcoming VII Workshops

- Real-time System Mgmt. Information Program
  - Section 1201, SAFETEA-LU
  - Identify approaches for public & private sectors to attain possible quality benchmarks
- Transp. Information Management Data Quality Wkshps.
  - Review quality metrics identified in 2006 Request for Comments
- Explore VII data with respect to "Day One" Applications
  - Road Weather
  - Traveler Information
  - Signal Operations/Ramp Metering
  - Integrated Corridor Management
- Workshops to be held Fall, 2007 - Spring, 2008
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