Using Connected Vehicle Data for WRTM in Michigan

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Weather Response Decision Making

Common Data Sets Used

- Local weather and radar
  - Local news
  - Internet sites
  - iPhone Apps
- Communicate with adjacent agencies
- Pavement temperature (in-cab display)
- Traffic cameras (MiDrive website)
- RWIS (50 ESS)
- MDSS (if available)

Other Useful Data Sets

- Subsurface temperature
- Surface weather conditions
  - Air and pavement temp
  - Dew point
- Mobile vehicle data
  - GPS (time/location)
  - Vehicle speed
  - Vehicle dynamics
  - ABS brake activation
  - Differential wheel speeds (TCS)
  - Camera images/pictures
FHWA/MDOT Integrated Mobile Observations (IMO) Architecture
Weather Response Traffic Information (WxTINFO) Data Collection

MDOT Vehicles - FHWA Data Collection

- Vehicle Positioning GPS
- Photo Image
- Surface Temp & Atmospheric Conditions
- 3-axis accelerometer
- Road Surface Roughness and Distress
- 20 WMTs with phones & 10 with Surface Monitor Device
- 40 Ford vehicles with phones & OBD key & 10 with Surface Monitor Device

Cell Tower (4G) - Cellular Service Providers

- Fiber
- Network Operations Center
- UofM Server
- Traveler Information Systems
- Traffic Management Systems
- Winter Maintenance Operations
- ITS/CV Demonstrations

Data Users: University of Michigan, National Center for Atmospheric Research, MDOT MDSS & DUAP & TOCs/Navteq & RITIS/Atkins/MDOT User Delay Costs
Potential Applications

Time (how long?), What are my choices & the problem? Early Notification (motorist, first responders, hospitals, etc.)!!

- Data Quality checks (ground truth - RWIS stations & third party speed data)
- Targeted individual messages (augments DMS & MDOT MiDrive website)
- Provide travel times and incident updates
- Performance Measure/Management
- Regain Times or in-the-storm performance (how well are you managing the event)
- Maintenance Decision Support System
- Remote imaging and physical monitoring of environment (camera photos)
- Visibility monitoring (i.e.: snow squalls, localized lake effect white outs, fog, rain, etc.)
- Slippery surface notification (ABS lockup & differential wheel speed)
- Pin point icy road conditions (driver & maintenance staff)
- Early notification to First responders, Hospitals, Work place, Schools, Community events, etc.
- Regional and cross jurisdictional alerts (Great Lake Regional Transportation Operations Coalition ties into the Northwest Passage and other regional coalitions)
- Provide in-vehicle alerts
- Vehicle/device health monitoring (are devices installed on vehicles working?)
- Vehicle diagnostics (fleet monitoring and management (miles, hours, routine maintenance, etc.)
Potential Motorist Advisory Warning Messaging

- **Travel Times**

- **Visibility reduced next 5 miles**

- **Road icy next 3 miles**

- **Heavy rain reduced visibility next 2 miles**

- **Maintenance trucks next 10 miles – Drive with care**

- **High Wind Warning**

- **Road closed ahead – use alternate route**
Performance Measures – User Delay Costs

- User Delay Cost
- Performance Measures
- Congestion Scan
- Bottleneck Ranking
- Compelling Scoreboard
- Create a Cadence of Accountability

Third Party Data Provider
RITIS – Congestion Scan

Speed on I-94 between ROTUNDA DR/EXIT 209 and I-75/CHRYSLER FWY/EXIT 216

Data shown is averaged on Nov 29, 2012 at 10 minute intervals.

Westbound

Eastbound

Raw speed

0 mph 10 mph 20 mph 30 mph 40 mph 50 mph
Thank You

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