

# A PERSPECTIVE OF RURAL CONNECTED VEHICLE

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# Traffic Safety Facts (NHTSA)

- 23% of US Population live in rural areas
- 57% of highway fatalities occur on rural roads
- Fatality rates (based on VMT) in rural areas **2.7** times higher than urban areas
- 81% of rural crashes are run off the road crashes; factors:
  - Curved roads
  - High speed limits
  - Fewer lanes
  - Young drivers
  - Speeding
  - Alcohol use
  - Driver performance issues
  - Adverse weather conditions

# ENTERPRISE PROJECT 12

- Cogenia Partners LLC was consultant
- Purpose: examine the specific rural factors affecting connected vehicle deployment
  - Literature review
  - Survey some state DOTs-needs assessment
  - Web survey
  - High level systems design
  - Conclusions

# Literature Review

- Systems Engineering Guidebook for ITS, Version 3
- Rural ITS Preliminary Planning: The Montana Experience; Western Transportation Institute and Montana DOT; 1997
- Western States Rural Transportation Consortium- an implementers Pooled Fund to Tackle the Challenges of Rural ITS; NRITS 2012
- AASHTO Connected Vehicle Footprint Analysis, 2013

# State DOT Survey

- Jon Jackels - Minnesota
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- Bill Legg - Washington
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- Mark Demidovich - Georgia
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- Ian Turnbull – California (northeastern area)
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- Elizabeth Birriel and Kevin Chang - Florida

# Web Survey

- Invited participation using the NRITS mailing list
- 8 Respondents
- Rural and Urban ITS issues are different
- Significant difference in rural needs by geography (e.g. mountains/plains)
- Mayday is NOT generally considered a DOT application (not primary responsibility)
- Issues around supporting deployment
- Some mix of cellular/DSRC technology expected.

## Assumptions-Rural Connected Vehicle

- In the future there will be a low density deployment of DSRC in rural areas
- Recurring congestion not a significant issue
- Rural safety and mobility are priorities
- Rural road intersections and some curves are important
- Cellular coverage is incomplete on rural highways
- Low traffic volumes
- Disproportionate high crash and fatality rates on rural highways
- Smart phone usage is high where coverage is available

# Possible Applications

- Provide traveler information
  - Road weather updates-RWIS, probe vehicles
  - Detours, closures, incidents-511 events
- Mayday
  - Data relay
  - Link Monitoring
  - EMS notification
- Winter Maintenance Operations
  - Road treatment timing, amount, product
  - Fleet management
- Freight Operations
  - e-clearance
  - platooning



# High Level Systems Design

- Short range communications must include non-DSRC spectrum (cellular, WiFi, LTE Direct, Bluetooth or ?)
- Provisions for data caching are needed due to the geographic gaps in network access
- Data provisioning is needed, either by public or private entities
- Commercial networks are utilized-Connections of opportunity
- Smart phone/tablet functions as OBE (legacy vehicles), or integrated cell/WiFi connection (new vehicles)
- Data relay and link monitoring are important
- Add short range communications to existing ITS locations, rest areas, fuel stops,...

# Conclusions-Recommendations

- Rural limitations need to be considered for on-board equipment
- Commercial communications needs to supplement/replace DSRC (cellular, WiFi, LTE Direct, Bluetooth)
- Privacy needs to be revisited vis-à-vis non-DSRC communications
- Some urban applications may need to be adapted to address rural limitations (communications, vehicle density, geography)
- Some applications may be unique to the rural environment

## Panel Discussion-Topics

1. What can we do now to prepare for a Rural Connected Vehicle future and improve rural safety?
2. Evolutionary steps to rural Connected Vehicle?
3. What barriers do we need to overcome?
4. What do we need from USDOT and AASHTO?
5. How can the Connected Vehicle Pilot program provide guidance for the rural environment?
6. What partnerships will be important?
7. How is the freight industry impacted by rural Connected Vehicle?