Rural Connected Vehicle Gap Analysis
Preliminary Findings

NRITS Conference
Chattanooga, TN
October 3\textsuperscript{rd}, 2016

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OBJECTIVES

- Determine factors impeding deployment of connected vehicles in rural areas
- Provide recommendations to inform rural CV deployment
METHODOLOGY

- Workshop held at NRITS 2015
- Interviews with practitioners
CONNECTED VEHICLE PROGRAM

Image: USDOT
WHAT IS RURAL?

- Traditionally defined by population size
- For CV purposes, important characteristics include:
  - Low traffic volume
  - High travel speeds
  - Varied, remote terrain
  - Heavy freight traffic
  - Resource scarcity

Image: [https://en.wikipedia.org/wiki/Rural_America](https://en.wikipedia.org/wiki/Rural_America) [Marshal County, Indiana]
BENEFITS

- Safety
- Road data & operational efficiency
- Incident & event management
- Freight
Benefits
SAFETY

Fatality Rates per 100 Million Vehicle Miles Traveled in Rural vs. Urban, 2005-2014

- **Rural**
- **Urban**
- **Overall**
Benefits
SAFETY

URBAN vs. RURAL
37% 63%
of fatal truck accidents occur in
URBAN AREAS
of fatal truck accidents occur in
RURAL AREAS

Benefits
SAFETY

CV Applications:

- Curve Speed Warning
- Work Zone & Queue Warning
- Animal Detection Warning

Benefits
ROAD DATA & OPERATIONAL EFFICIENCY

Problem:
- Currently difficult to collect road and traveler data across large areas
- Equipped vehicles can serve as probes
- Practical and cost-efficient

CV Applications:
- Decision Support Systems (DSS)
- Advanced traveler information
- Targeted maintenance
- Weather warnings

Problem:
- Longer emergency response times in rural areas
- Non-recurring congestion caused by special events and incidents
- Lack of alternate routes and long closure times

CV Applications:
- CV can provide advanced alternative routing, incident zone warnings, etc.
- R.E.S.C.U.M.E. for emergency responders
Problem:
- High percentage of freight traffic on rural roads
- Vulnerable to extreme weather and difficult road conditions

CV Applications:
- CV applications for freight can improve safety and mobility
- Blind spot monitoring, wireless inspection, smart truck parking, platooning
- Weather and road warnings

CHALLENGES

- Difficult to justify investments in CV
- Lack of resources
- Infrastructural challenges
- Cultural barriers
Challenges
DIFFICULT TO JUSTIFY INVESTMENTS IN CV

- Misperceptions of V2V and V2I
  - V2I is not just for congestion!
- Few real-world demonstrations of benefits
  - Wyoming pilot
- General skepticism about DSRC
  - Expensive
  - 5G? Autonomous vehicles? etc.
Challenges
LACK OF RESOURCES

- Funding constraints
- Inability to maintain technological infrastructure
- Workforce
Challenges

INFRASTRUCTURE

- Communication & power
- Backhaul
- 5G vs. DSRC
Challenges

CULTURAL BARRIERS

- Lower technology adoption
- Slower vehicle and gadget turnover
- Tendency to be more skeptical of government mandates
RECOMMENDATIONS

- Outreach & education
- Trial deployments
- Innovative approaches to funding
- Communications
- Preparation for the future
Recommendations
OUTREACH & EDUCATION

- Need a dedicated, well-funded outreach campaign to target decision makers and rural communities
- Clearly articulate the improvements possible with CV technology (fewer crashes, better emergency response, weather info, etc.)
- Demonstrate tangible benefits through “Trial Deployments” building on Wyoming Pilot
  - Focusing on freight supply chain can provide quick and significant benefits
Recommendations

TRIAL DEPLOYMENTS

- Show benefits and obtain buy-in by choosing deployment locations with high impact
  - Remote and high speed curves
  - Turns across non-signalized, high-speed intersections
  - Rural signalized intersections
  - Freight routes and rural highways
  - Remote roadways prone to extreme weather
  - High animal collision areas
Recommendations

INNOVATIVE approaches to financing

- Public-private partnerships (P3s)
  - Leverage freight industry
  - FHWA encourages P3s for transportation improvements

- Resources:
  - Build America Bureau
  - FHWA Center for Innovative Finance Support
  - FAST Act
Recommendations

COMMUNICATIONS

- Explore dedicated communications network for transportation, along the lines of FAA
  - Could be aligned with National Highway System
- Incentivize telecommunications providers to roll out coverage in rural areas through public-private partnerships
Recommendations
PREPARATION FOR THE FUTURE

- Assess workforce skill needs
- Assess equipment needs
- Identify a ‘champion’ to lead efforts
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