Connected Vehicle Applications for Rural Areas

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Topics

• Connected Vehicle Overview
• FDOT’s Program Highlights
• Vehicle to Infrastructure Rural Applications
• Vehicle to Vehicle Rural Applications
Connected Vehicle Overview

- Vehicle to Vehicle (V2V) Communications
- Vehicle to Infrastructure (V2I) Communications
FDOT’s Program Highlights

- World Congress Technology Showcase
- Production Deployment
- Integrated with Traffic Management Center Software – SunGuide®
- Connected Vehicle Data Assists in Managing Roadways
V2I Applications

- Signal Phase and Timing
- Emergency Response Preemption
- Curve Warning
- High Speed Intersection Warning
- Construction Warning
- Vehicle Leaving Roadway
- Pavement Conditions
- CVO Warnings
- Weather Conditions
Signal Phase and Timing

- Provide Green/Yellow/Red Time to Approaching Vehicles
- Uses Dedicated Short Range Communications (DSRC) 5.9 Ghz
- Demonstrated at 2011 World Congress for Intelligent Transport Systems
- USDOT Developing Concept of Operations and Requirements
Emergency Response Preemption

- Emergency Vehicle Requests Preemption from Signal Controller
- Uses DSRC 5.9 Ghz
- Prototype Implementation in Maricopa County
Curve Warning

- Roadside Equipment (RSEs) Periodically Broadcast Speed Curve Warning
- Uses DSRC 5.9 Ghz
- Being Demonstrated as Part of Safety Pilot Model Deployment
High Speed Intersection Warning

- Signal Controller Communicates with Approaching Vehicles to Determine Green Length
- Augment/Replace Rural Intersection Warning Systems
- Likely DSRC Based
Construction Warning

- RSE Broadcasts Construction Information to Approaching Vehicles
- RSE
  - Send Automated Message as Part of Construction Site
  - Transmit Traveler Advisory Messages with Construction Updates
- Likely DSRC Based
Vehicle Leaving Roadway

- On Board Equipment Detects Vehicle Leaving Roadway
- OBE Broadcasts Basic Safety Message (BSM) with Critical Location Data
- RSE Receives BSM and Passes to Traffic Management Center
- Likely DSRC Based
Pavement Conditions

- RWIS Integrated with RSE
- RSE Broadcast Pavement Conditions
- Vehicle Receive Pavement Conditions
- Likely DSRC Based
CVO Warnings

• RSE Broadcast Grade and Curve Warnings
• Commercial Vehicle (All Equipped Vehicles) Receive Warnings
• Likely DSRC Based
• Similar to Curve Speed Warnings
Weather Conditions

- Traffic Management Center Transmits Weather Conditions to RSE
- RSE Broadcasts Weather Conditions
- Vehicles Receive Weather Conditions
- Likely DSRC Based
V2V Applications

- Slow Vehicle Warning
- Lane Departure Warning
- Unsafe to Pass Warning
- Intersection Collision Avoidance
- Disabled Vehicle Warning
- Blind Spot Warning
- Approaching Vehicle Warning
Slow Vehicle Warning

• Application Developed by the Collision Avoidance Metric Partnership (CAMP)
• Slow Vehicle Broadcasts BSM
• Approaching Vehicles Receive BSM and Aware of Slow Vehicle
• DSRC Based
• Being Demonstrated as Part of Safety Pilot Model Deployment
• Applicable to Farm Equipment
Lane Departure Warning

- Application Developed by the CAMP
- Vehicle Detects its Leaving Current Lane
- Vehicle Broadcasts BSM to Surrounding Vehicles
- Driver Alerted
- DSRC Based
- Being Demonstrated as Part of Safety Pilot Model Deployment
Unsafe to Pass Warning

- Application Developed by the CAMP
- Passing Vehicle Receives BSM from Approaching Vehicle
- Passing Vehicle Determines No Passing
- Driver Alerted
- DSRC Based
- Being Demonstrated as Part of Safety Pilot Model Deployment
Intersection Collision Avoidance

- Application Developed by the CAMP
- Vehicles Approaching Intersection Broadcast BSMs
- Vehicles Determine Collision Possible
- Driver Alerted
- DSRC Based
- Being Demonstrated as Part of Safety Pilot Model Deployment
Disabled Vehicle Warning

- Application Developed by the CAMP
- Disabled Vehicle Broadcasts BSM
- Approaching Vehicles Receive BSM
- Driver Alerted
- DSRC Based
- Being Demonstrated as Part of Safety Pilot Model Deployment
Blind Spot Warning

- Application Developed by the CAMP
- Vehicle Initiates Lane Change
- Blind Spot Vehicle Broadcasts BSM
- Vehicle Changing Lane Receives BSM
- Driver Alerted
- DSRC Based
- Being Demonstrated as Part of Safety Pilot Model Deployment
Approaching Vehicle Warning

• Application Developed by the CAMP
• Approaching Vehicles Broadcasts BSM
• Vehicles Receive BSM
• Driver Alerted
• DSRC Based
• Being Demonstrated as Part of Safety Pilot Model Deployment
• Similar to No Passing Warning
Conclusion

• Application Development Needed to Meet Rural Safety Issues
• Current “Urban” Applications are Applicable to Rural Settings
• Rural Applications Need a Champion (Test Bed Deployment)
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Questions