INDOT 2017 Connected Vehicle Deployments on US 30 and US 31

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Outline

• The AASHTO SPaT Challenge
• Purdue partnering with INDOT
• Denver/Econolite Partnerships
• Equipment Overview
• INDOT deployments statewide
• Q&A
AASHTO SPaT Challenge

Challenge state and local public sector transportation Infrastructure Owners and Operators (IOOs) to deploy DSRC infrastructure with SPaT in all 50 states by January 2020

- At least one coordinated corridor
- 20 intersections

*DSRC:* Dedicated Short Range Communication

*SPaT:* Signal Phase and Timing
May 4 workshop, Traffic Management Center, Indianapolis
Onboard Equipment (OBE)

Messages transmitted at 10Hz

Source: Crash Avoidance Metrics Partnership and GAO
Roadside Equipment (RSE)

- **GPS, Wireless Antenna**
  - Cellular Antenna atop of Cabinet to connect to the TMC

- **CABINET**
  - **Wireless Communications Device**
    - Receives and transmits data through an antennae
  - **GPS Receiver**
    - Provides position and time
    - Provides timekeeping signal for applications
  - **Memory**
    - Stores security certificates, application data, and other information
  - **Application Processing Unit**
    - Processing unit that runs the applications
  - **Backhaul Modem Device**
    - Receives and transmits data with a center

- **Wireless communication device**
- **Backhaul modem**
Deployed Infrastructure Vision

**Example Infrastructure Data:**

- Signal Phase and Timing,
- Drive 35 mph,
- 50 Parking Spaces Available

**Example Vehicle Data:**

- Latitude, Longitude, Speed, Brake Status, Turn Signal Status, Vehicle Length, Vehicle Width, Bumper Height

*Source: US Department of Transportation*
Standards

SAE J2735 Data Elements

- BasicSafetyMessage
- MapData
- SPaT
- CommonSafetyRequest
- EmergencyVehicleAlert
- IntersectionCollision
- NMEAcorrections
- ProbeDataManagement
- ProbeVehicleData
- RoadSideAlert
- RTCMcorrections
- SignalRequestMessage
- SignalStatusMessage
- TravelerInformation
- PersonalSafetyMessage
Deployment Locations

- US-30 in Merrillville
- US-231 in W. Lafayette
- US-31 in Greenwood
Deployment Locations

US-30 in Merrillville

8 intersections
Deployment Locations

- US-30 in Merrillville
- US-231 in W. Lafayette
- US-31 in Greenwood

2 intersections
Deployment Locations

US-30 in Merrillville

US-231 in W. Lafayette

US-31 in Greenwood

6 intersections
Conclusions

• INDOT is rolling out RSEs at 3 strategic locations throughout the state to take on the SPaT challenge.
• Retrofitting OBE will allow INDOT and Purdue to generate data for testing and research.
• Deployments will leverage OEM connected vehicles around dealerships to get more probes.
• Emerging big data challenge/opportunity that is ripe for a few research papers.