The First Connected Vehicle to Infrastructure (V2I) Implementation Related to Signal Data Sharing in Texas

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Overview

• Connected vs Autonomous
• Traffic Signal Data Sharing
• Waze/511 DFW Data Sharing
• Closest To Dispatching
• Traffic Management Center
• What’s Next For Frisco?
Connected and Autonomous Vehicles

- Is the ultimate goal of autonomy to improve safety, efficiency, and mobility?
- Will connected vehicles be the foundation of autonomous vehicles?
- Some AV companies are trying to build systems that are not dependent on connectivity.
Connected and Autonomous Vehicles

- While lots of AV testing is currently ongoing and moving quickly, how fast will it really get into vehicle fleet?
- Likely decades
- Connected Vehicles will still flourish
Connected and Autonomous Vehicles

- If we believe that connected vehicles are a foundation of autonomous vehicles
  - Signals are important
  - Estimate of 300,000 signals in US
  - Controlled by Cities, Counties, States
  - Many different signal systems exist
Connected and Autonomous Vehicles

- What things are important to AVs with limited to no connectivity to infrastructure?
  - Good signage
  - Good pavement markings
  - Good pavement
  - Properly set up workzones
  - Something else - ????
Traffic Signal Data Sharing

- SPaT (Signal Phase and Timing) Data
- First real chance for local public agencies to join connected vehicle environment
- Many connected vehicle applications are in DOT, University, or Private Companies
Traffic Signal Data Uses

- Safety
  - Red Light Running
  - Collision Avoidance

- Efficiency
  - Engine Management
  - Energy recapture

- Driver Information
  - Can reduce stress with knowledge
Traffic Signal Data Sharing - methods

- DSRC radio - directly from controller to vehicle
- Third party - gather data from controller or signal system then send data to vehicle or phone app via cell connection
Requirements for Third Party Method

• Need a controller that is NTCIP compliant that can send standard message set
• Typically need a signal communication system but not a must
• A packet sniffer could be used in cabinet and transmit data to third party via cell connection
Frisco’s Current Traffic Signal Data Sharing

- Agreement with Traffic Technology Services (TTS)
- TTS partnered with Audi of America
  - Audi Traffic Light Information Service launched December 2016 in Las Vegas
  - Service launched in Frisco June 2017
- TTS working with other OEMs
Frisco’s Current Traffic Signal Data Sharing

- TTS gets data from Trafficware’s Connected Vehicle Module which is connected to 118 controllers in Frisco
- Produces signal prediction based on signal data
- Creates SPaT message and sends to vehicle
- 100 to 150 subscribers in area now
Traffic Signal Data Sharing
Traffic Signal Data Sharing – Future?

• Frisco purchasing Trafficware Connected Vehicle Module using NCTCOG Grant
  – Continue to send data to TTS
  – Open to other opportunities – Research? Regional portal?

• If Data not used for research/development
  – Request data exchange
Traffic Signal Data Sharing – Future?

• Other users?
  – Bikes/Peds – have app, it could confirm you are detected
  – Send data to controller, trigger a bike min green

• Ultimately replace our current detection methods all together?
Status of Other TTS Users

- Texas (onboarding)
  - Grapevine, Flower Mound, Sugar Land, and Arlington
  - Others expected before end of year

- Other Cities with live data to Audi vehicles
  - Las Vegas Metro, Portland Metro, Palo Alto, CA, Arcadia, CA, and Washington, DC
Waze/511 DFW Data Sharing

- Implementing data sharing program using NCTCOG Grant
- Waze Connected Citizen Program
  - Allows for two-way data exchange between Agency and Waze
  - TxDOT also a member along with over 100 other agencies
What do we plan to send/receive?

- Automate process to share planned road closures. Already share planned road closures through web portal.
- Automate process to share location of incident from Computer Aided Dispatch
- Receive data on crashes, stalled vehicles, hazards, pot holes
Closest ToDispatching

• Helps Fire/Police reduce response times
  – 20% time reduction for priority 1 calls
• Funded by Regional Freeway Incident Management Program
• Less time – reduce impact on traffic
• Improves safety - public and responders
Emergency Operations Center
Traffic Management Center

- Emergency operations center staff
- Police Department
- Fire Department
- Transportation (operations and maintenance) for traffic signals and traffic signs
- Public Works
- Public Information Office
- City Management
Emergency Operations Center
Traffic Management Center

• Video Management System has 500+ cameras
  – Engineers and Dispatchers
  – Video transmitted to Fire/Police vehicles
• Remote control of 134 traffic signals
• Remote control of portable message boards
• Remote control of 184 school zone flashers
• Wireless communications system
• Assist Fire/Police with incident management
What’s Next?

• Actively pursuing an AV pilot in Frisco
• Complete adaptive traffic signal control pilot
• Complete implementation of automated signal performance measures
• Work with DCTA to provide innovative demand responsive transit options
• Use Audi data for signal performance measurement
Other Information

• Follow Tom Bamonte on Twitter, NCTCOG Senior Program Manager, Automated Vehicles
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• Contact me if you want to tour our operations Center
Questions

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