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

The Institute of Electrical and Electronics Engineers, Inc.
Communications and Vehicular Technology Societies
February 20, 2018

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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

Least Common Denominator

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
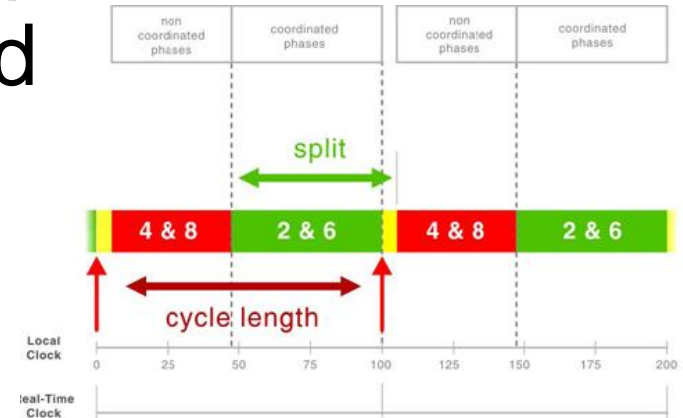
Traffic Signal Data Uses

- 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

The future is here now. Testing out some technology that marries infrastructure to vehicle with Audi.#friscomayor

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 To Dispatching

- 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

https://www.youtube.com/watch?v=0Q9HmLNOJI4&t=1s

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
  - ThomasBamonte@TomBamonte
- Contact me if you want to tour our operations Center

Questions

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