Connect Vehicle Pilot Success in Ottawa

Eco Drive I2V Proof of Concept Project

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Thompson Technologies / City of Ottawa

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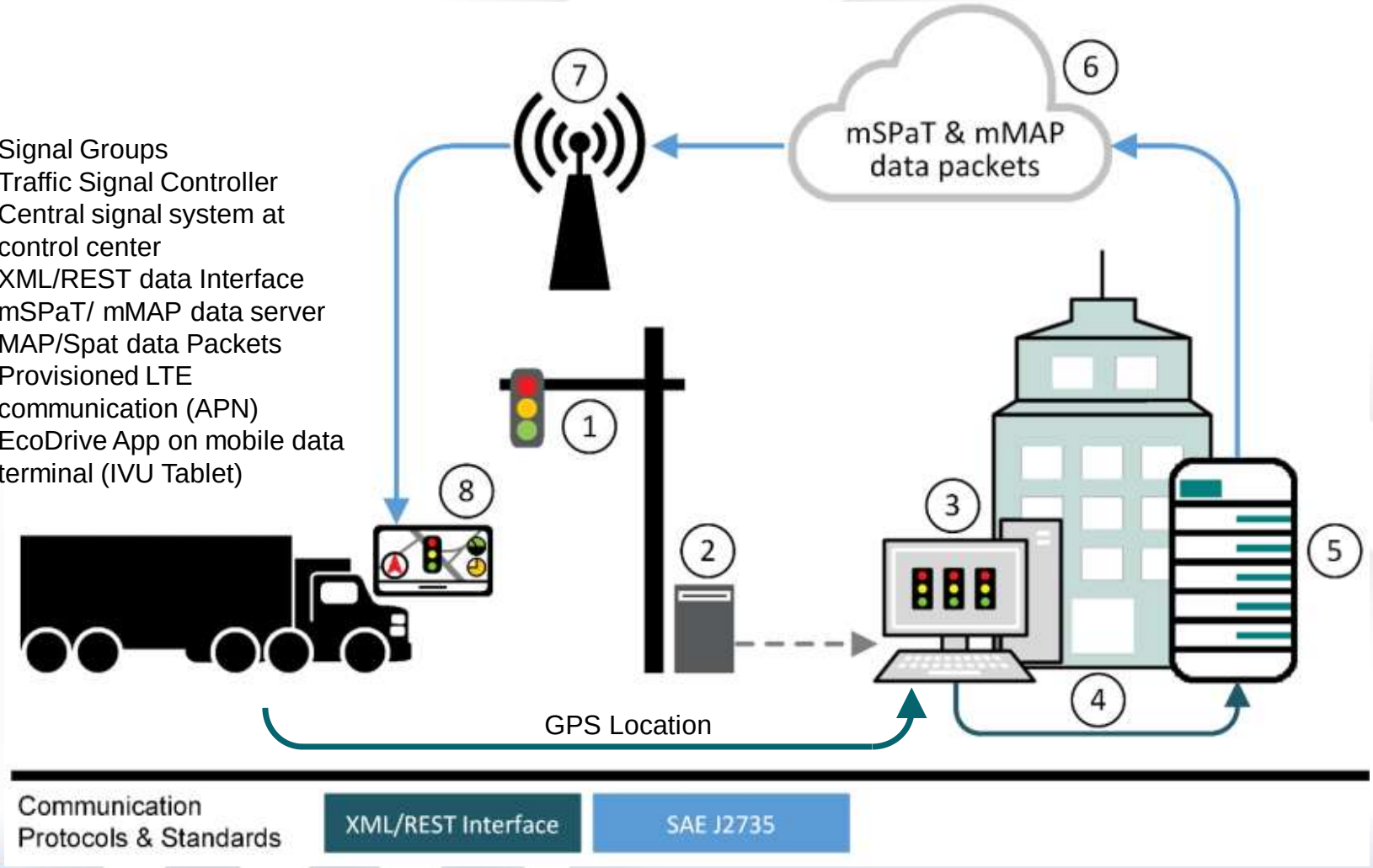
Overview

- A Clean Transportation, Connected Vehicle project
  - Federal and Provincial funded program
- Proof of Concept Initiative
  - Environmental and Economic benefits via I2V technology
  - Urban Freight Movement Environment
  - US DOT/FHWA GlidePath Project framework application
  - Scalable
- Joint partnership - $300k
  - Transport Canada / MTO / City of Ottawa

I2V Connection

1. Signal Groups
2. Traffic Signal Controller
3. Central signal system at control center
4. XML/REST data Interface
5. mSPaT/ mMAP data server
6. MAP/Spat data Packets
7. Provisioned LTE communication (APN)
8. EcoDrive App on mobile data terminal (IVU Tablet)



EcoDrive I2V CV Project

Corridor

- Arterial Road – 4 Lane Div.
- 5.75 km
- 12 traffic signals- actuated
- Signals 200m – 1,250m apart
- 60km – 80km
- Trucks 1000-2000/day (4%)

Land Use

- Residential (reverse frontage)
- Commercial
- Light industrial
- Airport

Fleet

- 4 Purolator Vans

- Tandem Dump Truck

- Carleton U Research Van

Results and Findings

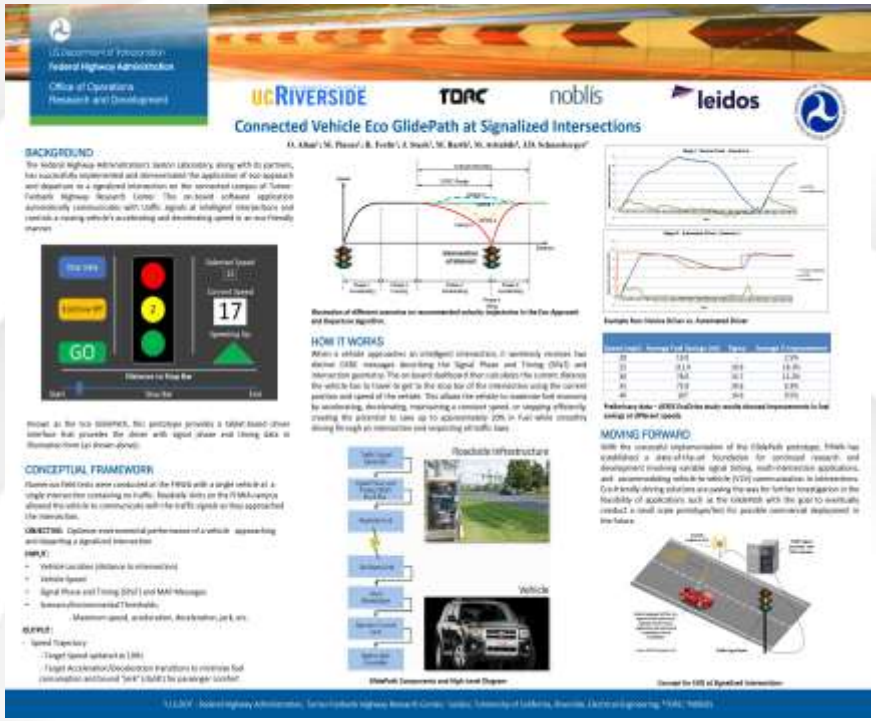
- Proof of Concept was verified
  - Reliable real time data shared between infrastructure and vehicle
  - Economic and environmental benefits realized
- Sample results
  - Crepin Dump Truck (no load) : 8.53% fuel reduction
  - Purolator Vans : 16.2% fuel cost reduction
  - Carleton Van : 9.47% reduction in CO2
- System had limitations when vehicles were traveling in congestion where average speeds were 25 km/h or lower.

How we got Here

FHWA GlidePath Project

Framework

- Closed private road test facility
- One traffic signal, one vehicle
- GPS locator
- Fixed time phasing
- Simple intersection layout
- DSRC Communication
- SPaT/MAP data sharing
- IVU with driver information / vehicle control information



What was possible

- Signal System-to-Vehicle Connection (I2V)
  - Cellular 
  - DSRC
  - Lidar/Radar/Video
- Advantages
- Disadvantages

How we did it / How it works

1. Signal Groups
2. Traffic Signal Controller
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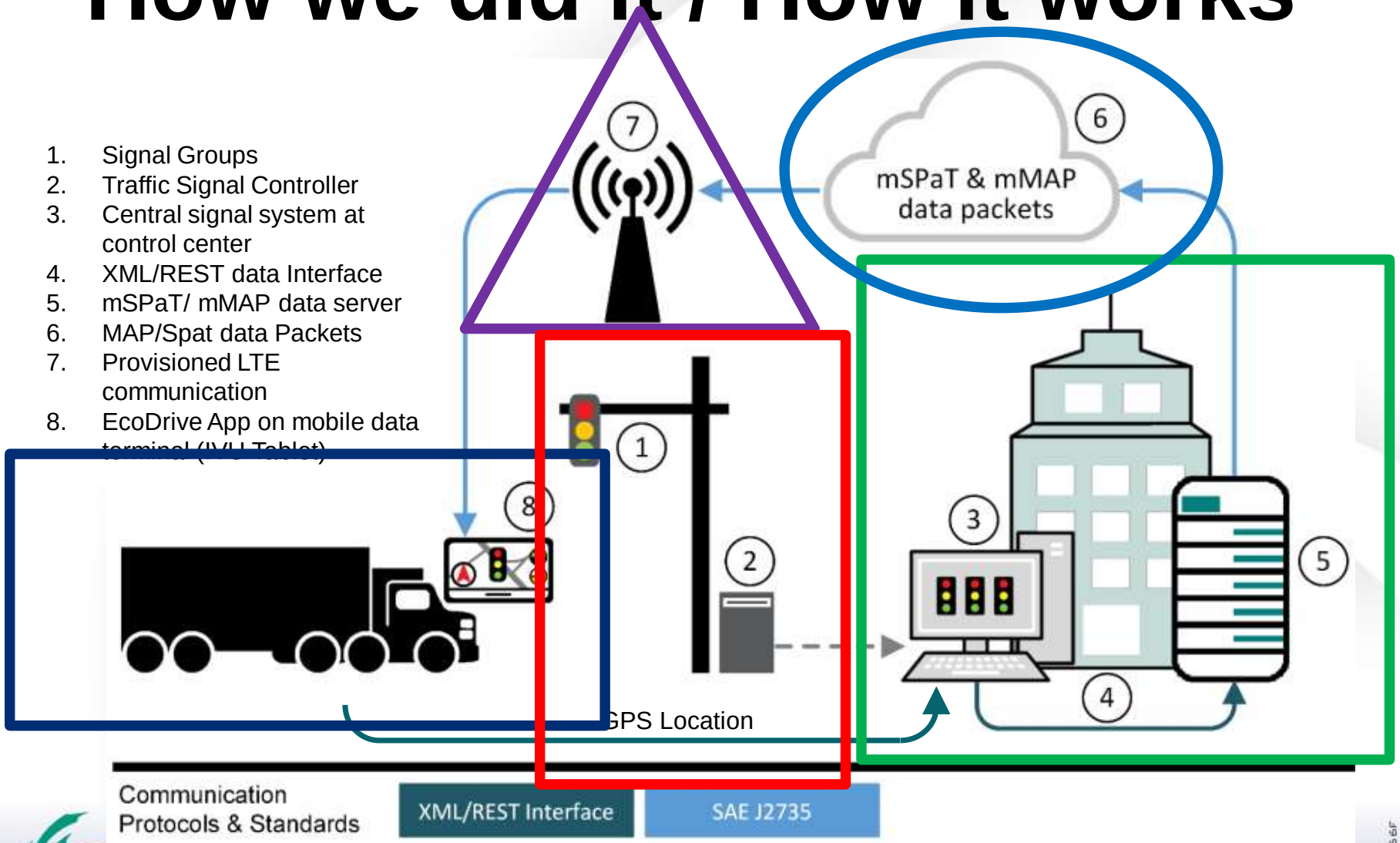

Where we go from here

- Expand the application
- Scale the system - # of signals, # and type of vehicles, area of coverage, data availability
- Extension of predictability application to DSRC for more localized applications

Where we go from here

- Reduce latency, improve responsiveness
- Further development of predictability app though improved signal system data and its transfer.
- Further development of IVU
- More research in practical applications

Acknowledgements

- Transport Canada
- MTO
  - Roy Hulli, Fernando Chua, Angelo Pilla
- TTS – Traffic Technology Solutions
  - Thomas Bauer / Tom Cooper
- TT – Thompson Technologies
- Carleton University – Prof Ata Khan
- City of Ottawa Staff
- Purolator, Crepin Cartage

Questions?

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Ottawa - Audi Demonstration

Live event

- Nov 2017, Ottawa Hunt Club Road test corridor
- TTS EcoDrive I2V Pilot signal application utilized
- Audi Equipped vehicles with IVU support (current production vehicles)
- Replicate City of Las Vegas current operation (LV went from research to near full city application in 2 years)

Michael Zweck, Audi Connected Systems Developer, Karen McCrimmon, MP, Kanata-Carleton, and Parliamentary Secretary to the Minister of Transport, Mayor Jim Watson and Coun. Marianne Wilkinson pose with a fully connected Audi during a test drive held at Mark Motors on Thursday, Nov. 16. - Jake Davies/Metroland

Various Audi equipped vehicles such as the Q5 present real time signal information on their main instrument cluster.

Ottawa - Audi Demonstration

Live event Links to Media articles and news releases

- https://intelligent-transportation.govciooutlook.com/vendor/traffic-technology-services-making-vehicles-smarter-and-safer-cid-119-mid-16.html
- https://www.toronto.com/news-story/7933426-vehicles-to-save-time-energy-connected-to-the-city-traffic-light-system/
- https://ottawa.ca/en/news/city-infrastructure-connects-vehicles-traffic-signals-safer-smoother-greener-trip

Spring 2018 TAC Session Demo

Courtesy of Michael Parks,
City of Brampton