LOUISIANA DEPARTMENT OF TRANSPORTATION & DEVELOPMENT

CONNECTED & AUTONOMOUS VEHICLES (CAV) TECHNOLOGY TEAM

CAV Technology Team Members
30 Members, 25 Sections and Districts, Multidisciplinary

Working Group	Members	Group Leader
Highway Technology & Infrastructure	9	Erik Smith
Multimodal Transportation Technology & Infrastructure	7	Joshua Duplantis
Agency Role Definition & Policy Formulation	7	Steve Glascock
Departmental Applications	7	Kirk Zeringue

CAV Technology Team Mission

- ✓ Develop and maintain a working knowledge of advancements in CAV technology,
- ✓ Monitor and share industry activity,
- ✓ Determine state and local transportation agency roles in supporting CAV technology,
- ✓ Formulate DOTD policy,
- ✓ Advise local governments of what we believe their roles and responsibilities are, and
- ✓ Identify CAV applications for use within DOTD.

Transportation Challenges

Safety

40,200 highway deaths in 2016
6,296,000 crashes in 2015
Leading cause of death for ages 4, 11-27

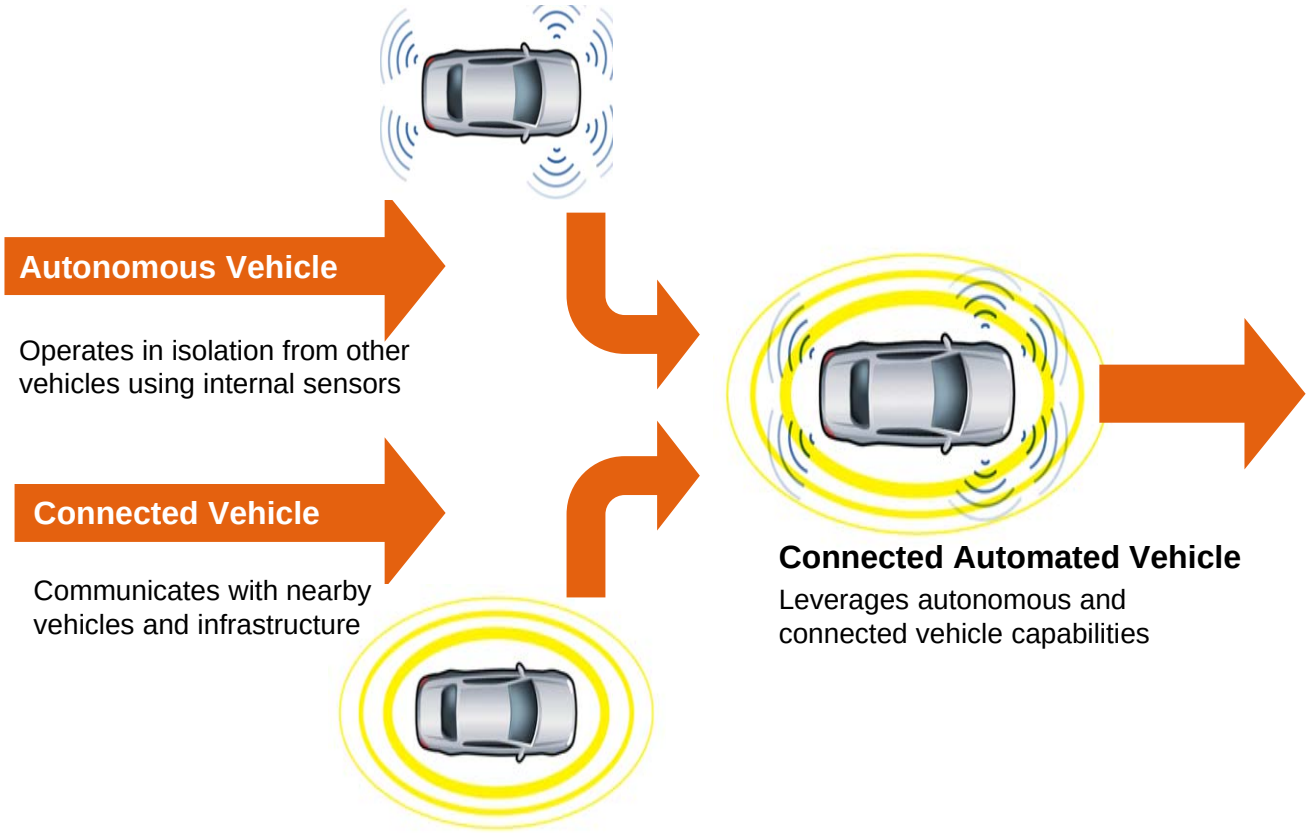
Mobility

5.5 billion hours of travel delay
$121 billion cost of urban congestion

Environment

2.9 billion gallons of wasted fuel
56 billion lbs. of additional CO_2

CAV – Maximizing Benefits



Autonomous Vehicle

Operates in isolation from other vehicles using internal sensors

Connected Vehicle

Communicates with nearby vehicles and infrastructure

Connected Automated Vehicle

Leverages autonomous and connected vehicle capabilities

Vehicle to Vehicle (V2V)

Vehicles communicating with each other

Vehicle to Infrastructure (V2I)

Vehicles communicating with infrastructure

Vehicle to Everything Technology (V2X)

Vehicles communicating to all technologies

Communications Technology

- Dedicated Short-range Communications (DSRC) at 5.9GHz
- Cellular networks provide high-bandwidth data communications – *4G* and *5G* (future)
- Other wireless technologies such as Wi-Fi, satellite, and HD radio may have roles to play

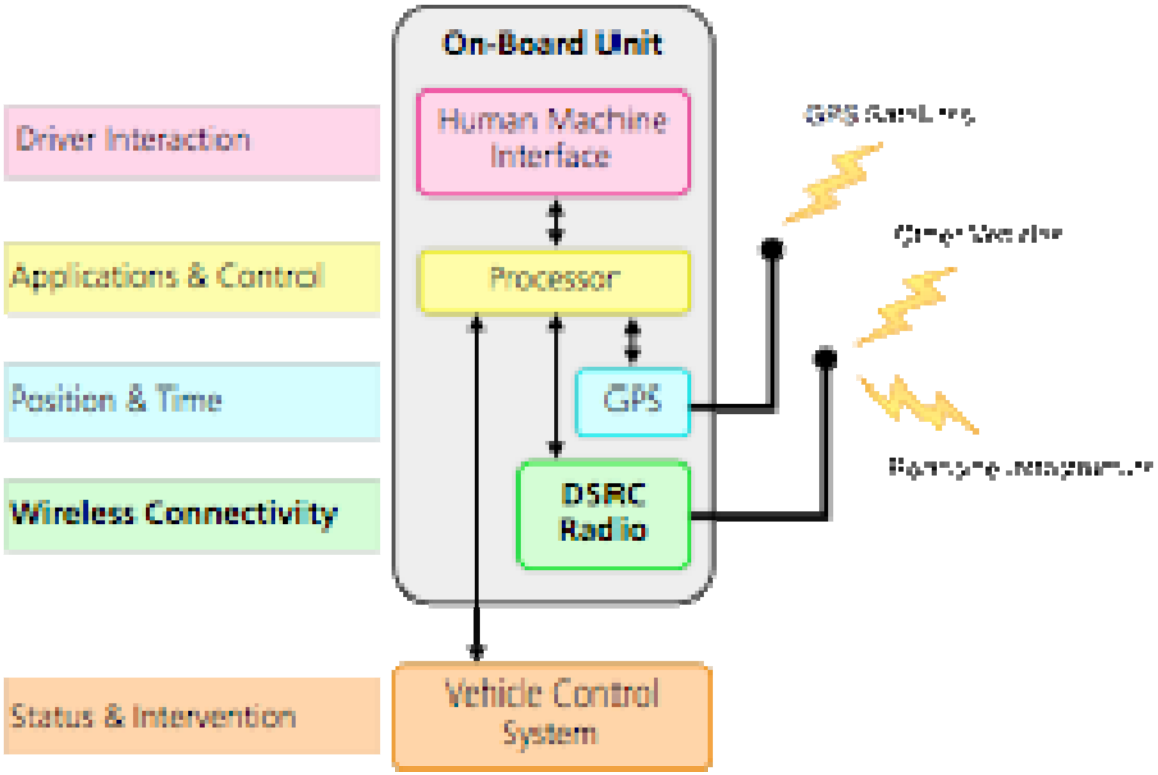
'Connectedness' using Wireless Communications

DSRC Technology: How it Works

Data is transmitted
10 times/sec
(300m range)

Wi-Fi adapted for
vehicle environment

Privacy built-in
(vehicle location
NOT intended to be
recorded or tracked)



US: FCC originally allocated spectrum
at 5.9 GHz for vehicle communications

DSRC Benefits

- Low latency compared to other wireless options, thus well-suited for safety / emergency messaging
- Reduces/eliminates potential interference compared to privatized wireless options

DSRC Challenges

- All vehicles and all roadside infrastructure need to be equipped and standardized to gain maximum benefit
- Cost of infrastructure installation and management expected to be mainly public sector
- Limited private acceptance (i.e., Cadillac, BMW)

Where are we headed with wireless?

- USDOT, AASHTO and states currently demonstrating and testing *DSRC* with focus on safety and direct traffic management applications
- Private communications entities see a much broader market in providing services to vehicles
- 5G has *potential* to support low-latency data, but not yet demonstrated

SPaT Challenge

AASHTO – 20 by 2020

- Overcome “Chicken and Egg” problem
  - Vehicles need equipped infrastructure
  - Infrastructure needs equipped vehicles
  - Signals are early opportunity
- Deploy DSRC (V2I) with SPaT in at least one corridor or network (approximately 20 signalized intersections) in each of the 50 states by January 2020

https://www.transportationops.org/spatchallenge/resources

SPaT Challenge

- Design & Deploy RSUs, connect to signals
- Typical applications
  - Adaptive signal operations
  - Transit signal priority
  - Signal performance measures

Questions/Comments

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