



U.S. DOT Truck Platooning Research

2015 Florida Automated Vehicles Summit

December 1, 2015

Kevin Dopart, U.S. Department of Transportation



Beyond Traffic 2045

TRENDS AND CHOICES



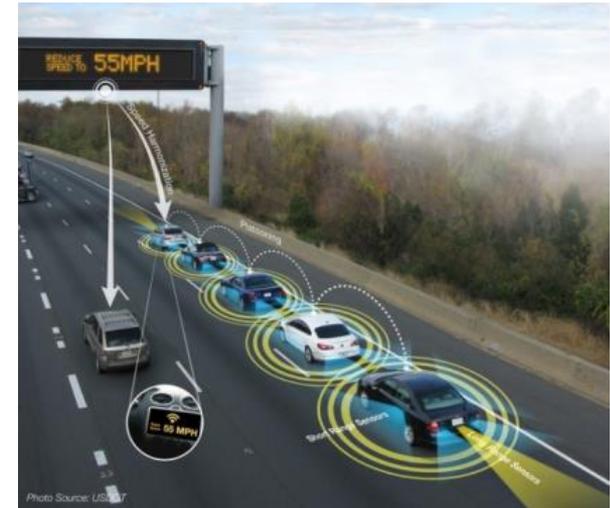
Context: Automation in Beyond Traffic

Automation will have a potentially transformative impact across all transportation modes, increasing productivity, improving safety, and enhancing the capacity of existing infrastructure. It may also have a profound impact on the transportation workforce, changing the skills required to manage, operate, and maintain transportation vehicles and systems.



Automation Can Be a Tool for Solving Transportation Problems

- **Improving safety**
 - Reduce and mitigate crashes
- **Increasing mobility and accessibility**
 - Expand capacity of roadway infrastructure
 - Enhance traffic flow dynamics
 - More personal mobility options for disabled and aging population
- **Reducing energy use and emissions**
 - Aerodynamic “drafting”
 - Improve traffic flow dynamics

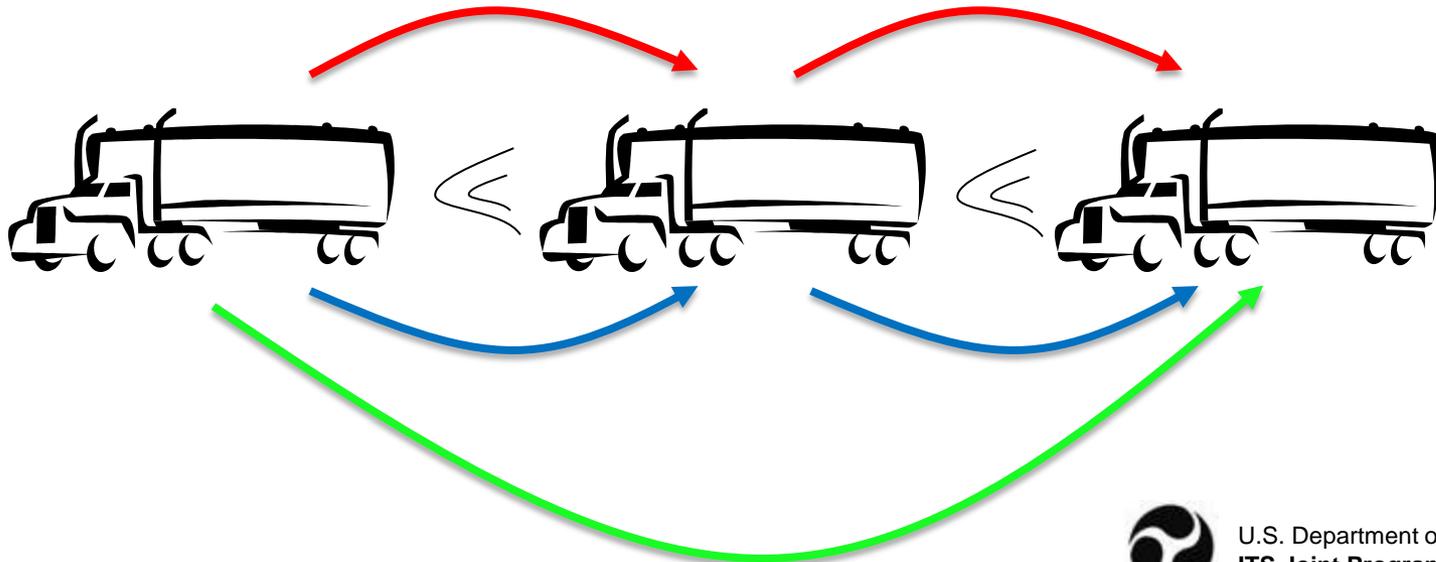


...but connectivity is critical to achieving the greatest benefits



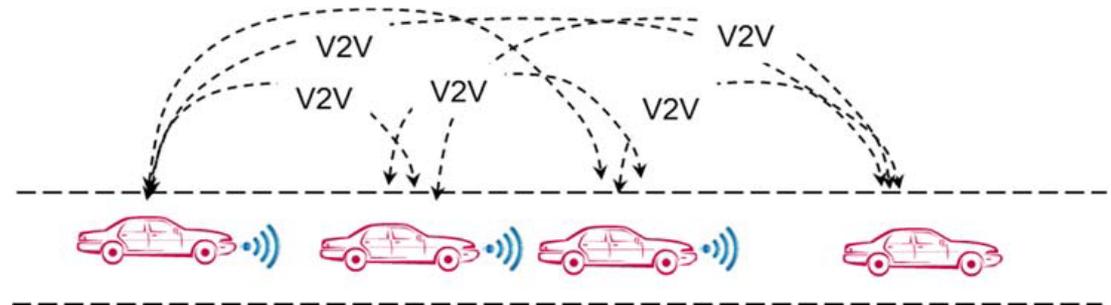
Current L1 Connected Automation R&D

- Cooperative Adaptive Cruise Control (CACC) development
- Traffic Operations Applications
- Eco-Approach and Departure from Signals
- Truck Platooning



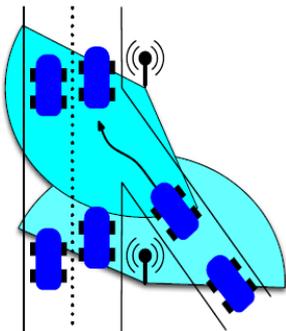
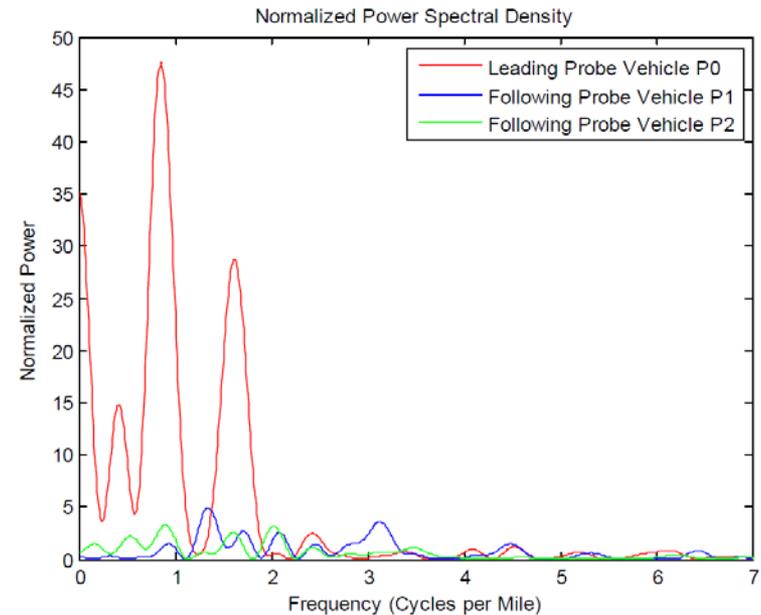
CACC Development Projects

- Enabling CACC High Performance Vehicle Streams
- CACC Field Tests
- OEM Assessment of CACC concepts and prototype
- Driver Acceptance of L1 Applications

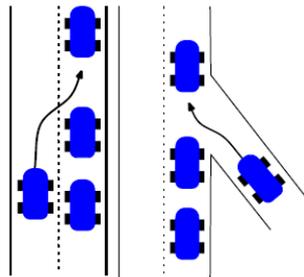


Freeway Traffic Operations Applications

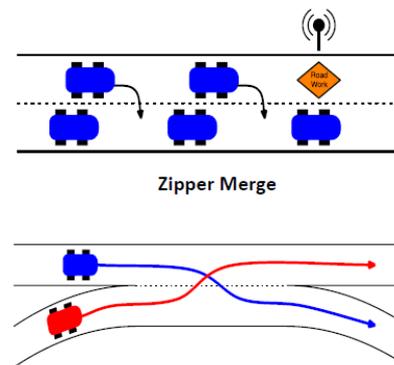
- Freeway Speed Harmonization
- Lane Change/Merge Operations



Freeway Entrance with Infrastructure Support



Joining into Car Convoy - Lane Change/Merge

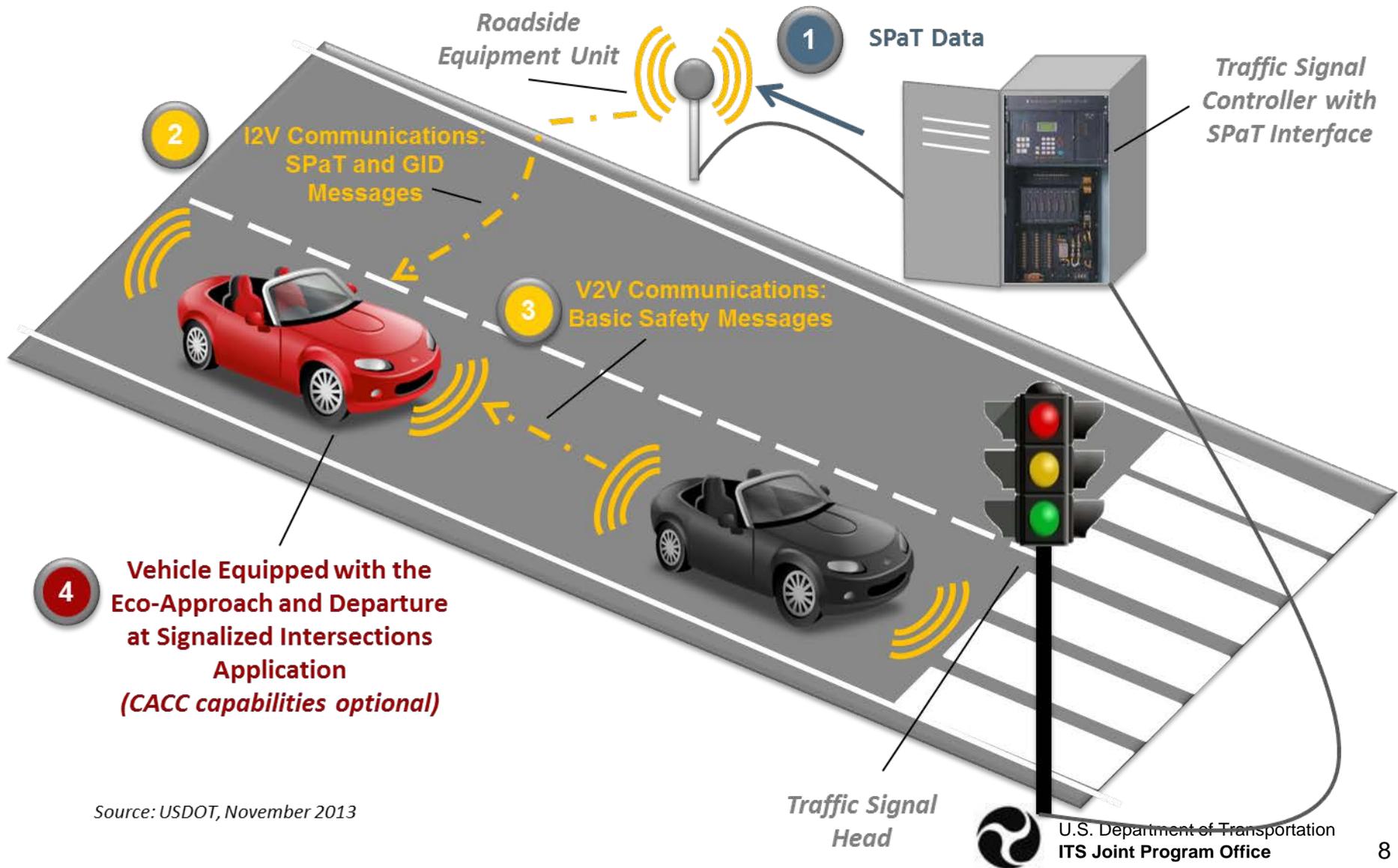


Weaving (Cloverleaf Enter/Exit Lane)

Lane change, merge, and weave maneuvers



Eco GlidePath at Signalized Intersections



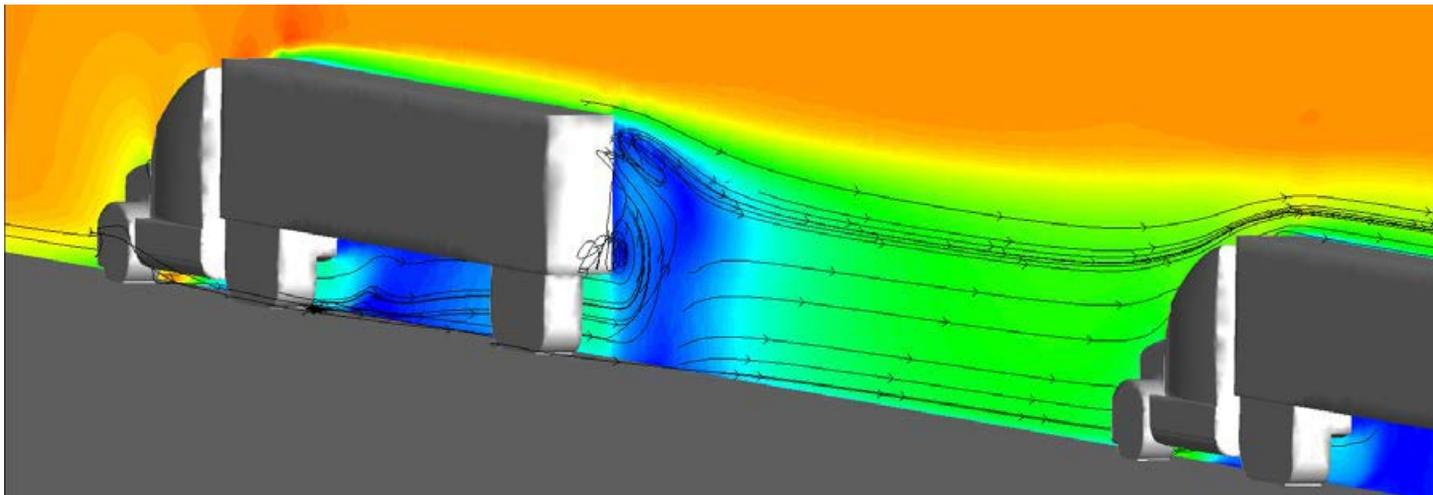
Source: USDOT, November 2013



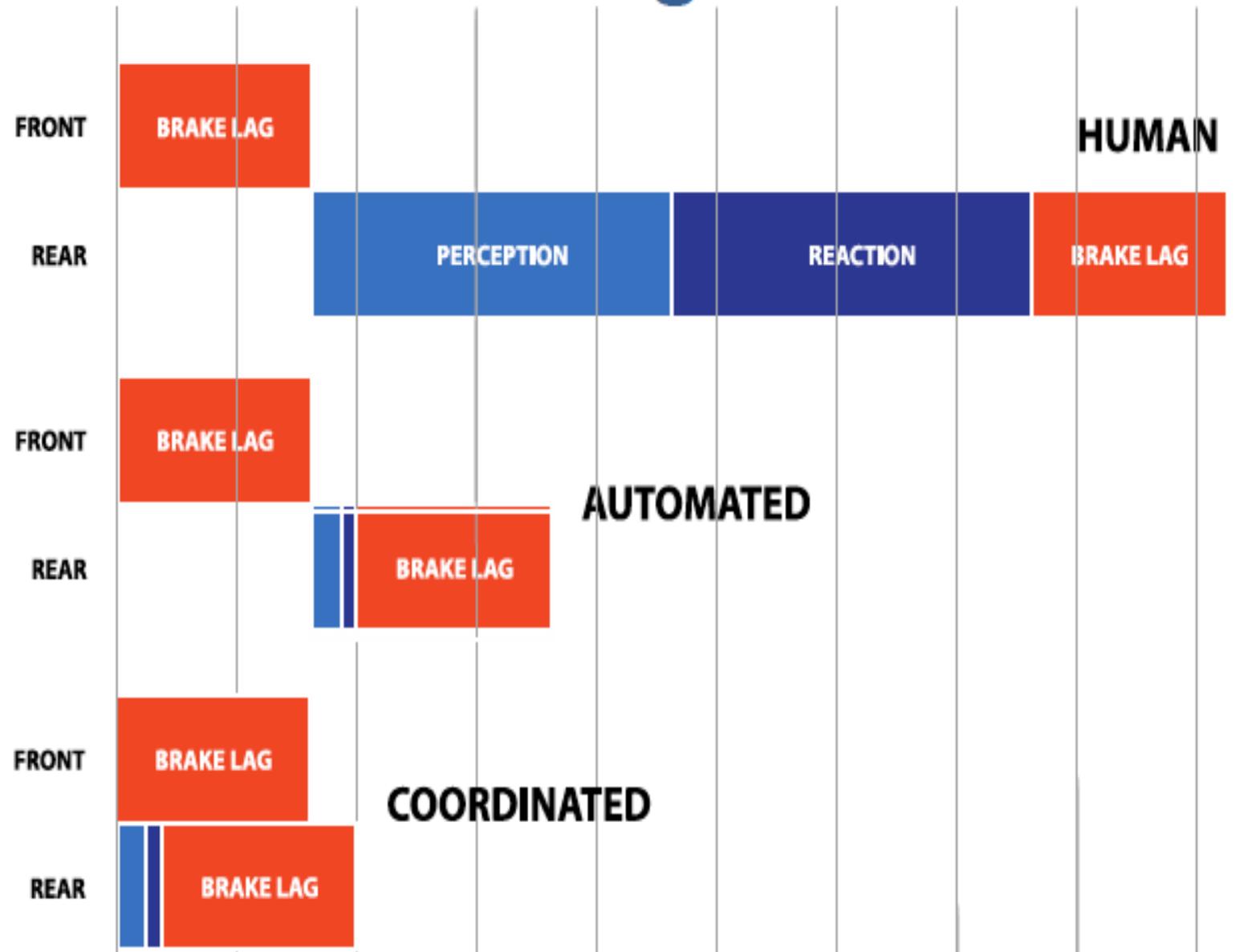
U.S. Department of Transportation
ITS Joint Program Office

USDOT Truck Platooning Research

- Driver assistive truck platooning (DATP): two projects underway
- Concept: longitudinal control only; all drivers steer
- Combining V2V with radar
- Significant fuel savings through drag reduction



Connected Braking



Research Objectives

- Define a commercially viable DATP system
 - Technical viability
 - Operational viability for fleet operations
- Assess DATP
 - Driver preferences
 - Energy savings
- Transition research results to industry



Caltrans/Volvo Project

- Three-truck platoon
- 5.9 GHz DSRC communication
- Longitudinal control only (throttle and brakes) driver, steers the truck
- Vehicles already equipped with production ACC
- Lead truck either manually or automatically (ACC) driven
- Gap is based on time headway – consistent with driver preference



U.S. Department of Transportation
Federal Highway Administration



U.S. Department of Transportation
ITS Joint Program Office

I-710 Freight Corridor Concept

- A dedicated four-lane freight corridor parallel to the I-710 freeway is currently proposed
- 16-mile truck-only facility by 2025



Three Trucks Equipped for CACC

- ACC + DSRC + modified vehicle following control
- Supplementary Information Display for driver



Auburn/Peterbilt Project

- Two-truck platoon
- Business case analysis
- Vehicle and aerodynamics simulation/analysis
- Platoon formation modeling
- Traffic modeling



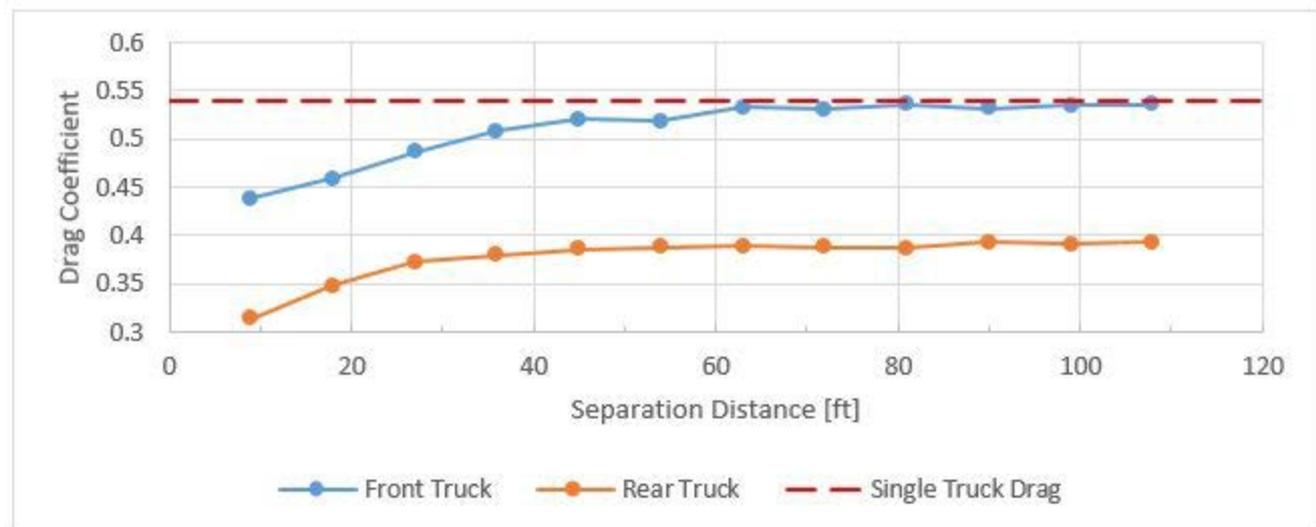
U.S. Department of Transportation
Federal Highway Administration



U.S. Department of Transportation
ITS Joint Program Office

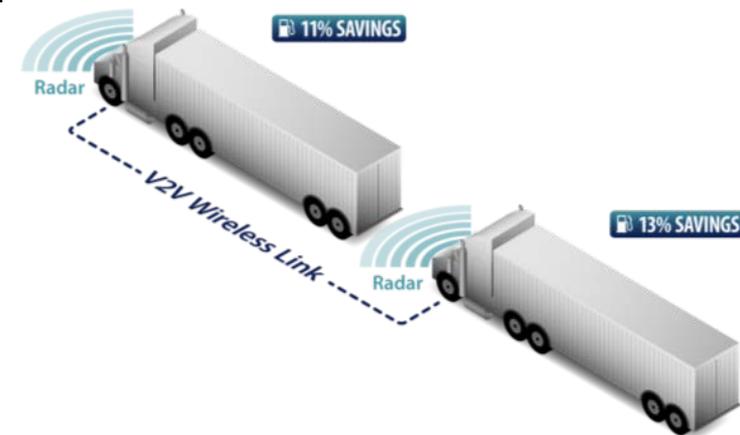
Phase I Results

- Business case analysis
 - ATRI survey; finding platoon partners
- Vehicle and aerodynamics simulation/analysis
 - Following vehicle sees large drag reduction, even at larger distances
- Traffic modeling
 - No delays; improvement at headways < 1.25 / 60% penetration
- http://eng.auburn.edu/~dmbevly/FHWA_AU_TRUCK_EAR/FHWA_AuburnDATP_Phase1FinalReport



Phase Two (Underway; Early 2016 Complete)

- Testing
 - Track; on-road; wireless performance
- Aerodynamics
 - Model refinement based on track test results
 - Effects of lateral offset by rear truck
 - Collecting data via “coast down” testing to further refine model
- Platoon Formation
 - Taking into account different fuel economy benefits for leader vs. follower
 - Examining protocols for platoon formation based on braking ability
- Traffic Impacts
 - Addressing entry/exit factors and non-interstate highways via simulation



State Roles in Truck Platooning

- Human-in-the-loop levels (L1/L2) ease the way for platooning
- State-level following distance laws are key:
 - 28 states have no minimum
 - 6 states are ready for pilot testing (UT, MI, NV, AL, TX, CA)
 - 7 states positioning for trials but early in process
- National associations involved to create model legislation



For More Information

OFFICE OF THE ASSISTANT SECRETARY FOR RESEARCH AND TECHNOLOGY
Intelligent Transportation Systems
Joint Program Office

About OST-R | Press Room | Programs | OST-R Publications | Library | Contact Us

Google™ Custom Search

About Research Tech Transfer Library Press Room Training Contact Us

ADA 25 1990-2015

AMERICANS WITH DISABILITIES ACT

Current Research

- + Strategic Plan 2015-2019
- + Safety
- + Mobility
- + Environment
- + Road Weather
- + Policy
- + Connected Vehicle Technology
- + Intermodal Research
- + Exploratory
- + ITS Cross-Cutting Support
- + Success Stories

All Research >>

Spotlight

September 8, 2015
USDOT Releases Dedicated Short Range Communications (DSRC) Spectrum Sharing Test Plan ... [Read more](#)

August 18, 2015
Report from the 2015 Automated Vehicles Symposium (AVS 2015) in Ann Arbor, Michigan ... [Read more](#)

July 14, 2015
Release 2.2 of the Research Data Exchange and New Connected Vehicle Data Sets Are Now Available. ... [Read more](#)

[More News >>](#)

FREE ITS TRAINING

Public Meetings & Webinars

Connected Vehicle Basics

CV Pilots Deployment Project

Planning for the Future of ITS

ITS 2015-2019 STRATEGIC PLAN

f t e r +

<http://www.dot.gov/>

Kevin Dopart
US DOT / ITS JPO
Kevin.Dopart@dot.gov