USDOT – FHWA Truck Platooning

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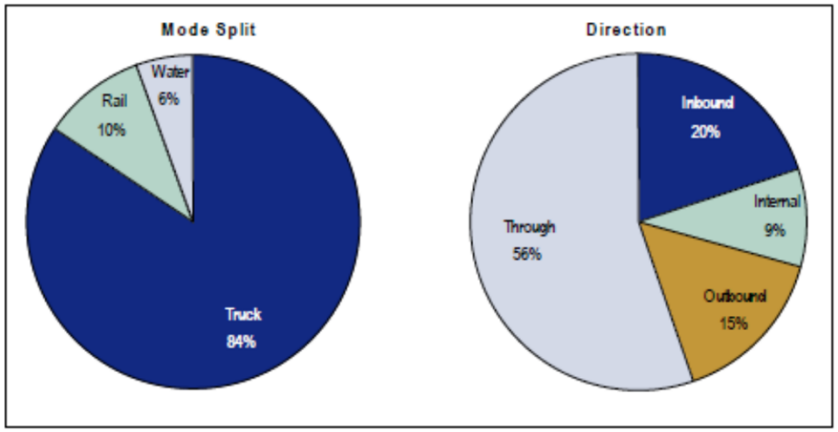
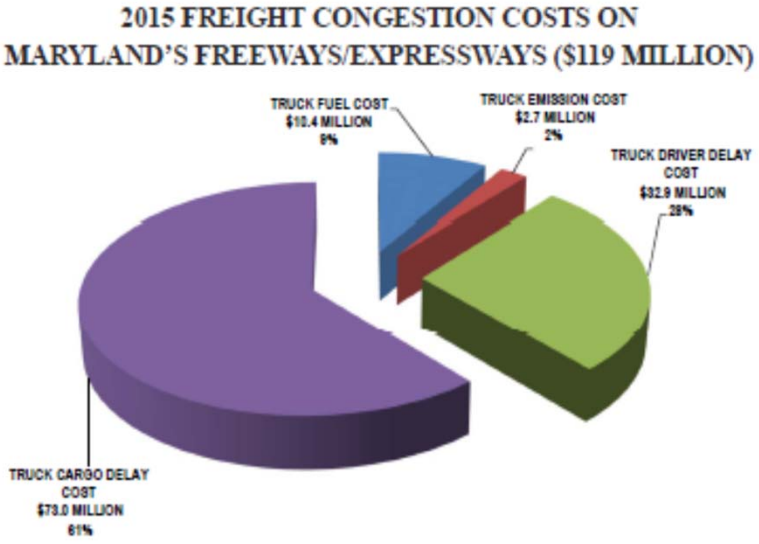
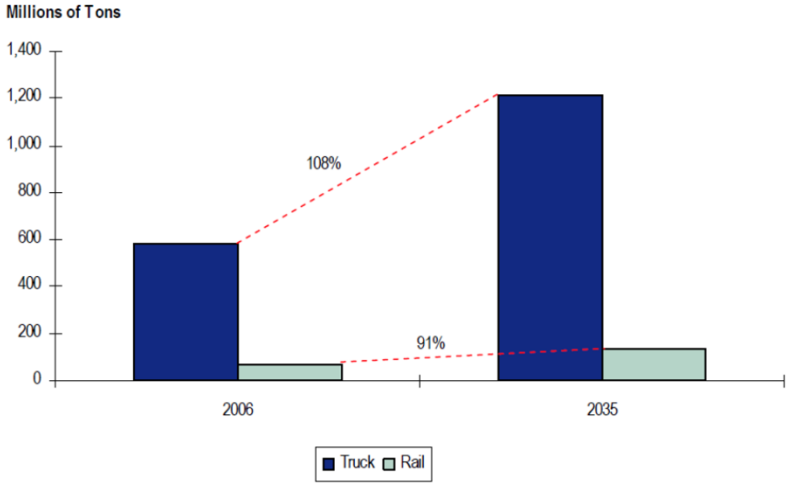
Why Do It?

- Freight tonnage moving on the Nation's transportation network will grow 40 percent in the next 25 years and the value of the freight will double. Freight delays impact economic competitiveness.
- Safety is the priority.
- Platooning helps alleviate the looming problem posed by increasing demand for highway freight capacity by allowing long-distance trucks to travel together more efficiently and safely.







What is Truck Platooning?

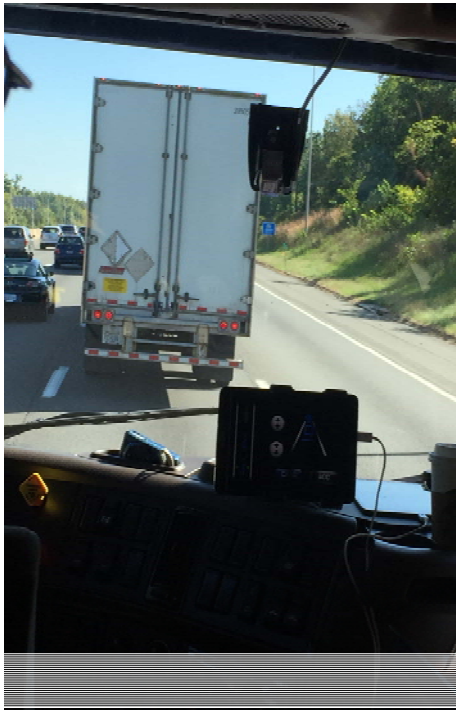
- Allows two and three trucks to travel close together in “platoons,” using advanced sensors and connected vehicle technologies (V2V and V2I) to maximize efficiencies.
- Cooperative adaptive cruise control (CACC) enables heavy trucks to drive safely and smoothly at significantly shorter gaps than they can under conventional manual driving today.
  - Enhance safety
  - Save energy
  - Reduce emissions
  - Significantly increase the capacity of a dedicated truck lane facility
- Significant benefits for goods movement to and from the major ports, as well as long-haul cross-country routes
- CACC is an enhancement to Adaptive Cruise Control (ACC) technology that provides
  - Closer and more accurate control of the gap and speed differences between the trucks than conventional ACC
  - Coupling is not as tight as it would be in a formally- structured platoon
  - CACC system uses forward- looking radar sensors and electronic actuation of engine and brakes of the conventional ACC system but adds 5.9 GHz Dedicated Short Range Communications (DSRC) vehicle-to-vehicle (V2V) communications, enabling the implementation of a higher performance vehicle- following controller.

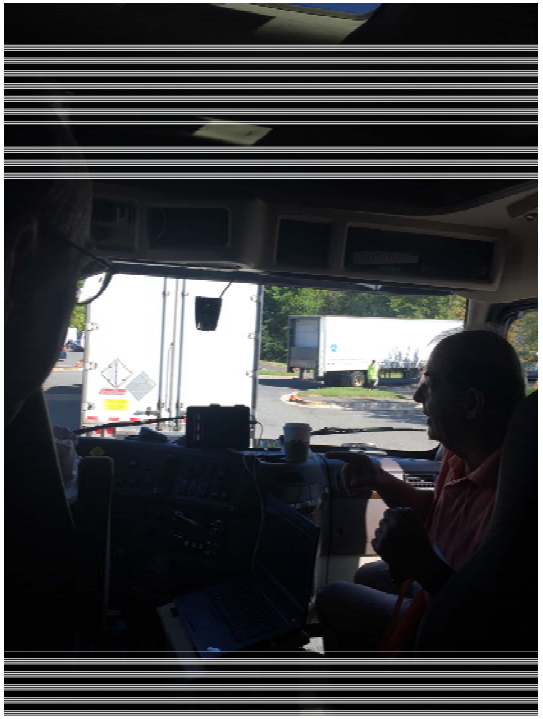
Current Projects

- “Partial Automation for Truck Platooning” - Auburn University (in partnership with Peterbilt Truck, American Transportation Institute, Peloton Technology, and Meritor, Inc.)
- “Cooperative Adaptive Cruise Control” - University of California, Berkeley’s Partners for Advanced Transportation Technology program (in partnership with Volvo Technologies of America and Cambridge Systematics).

FHWA's Platoon Demo – Centreville, Virginia

Platooning In Action





Accommodating Traffic – Faster Than Humans

Army Platooning Development

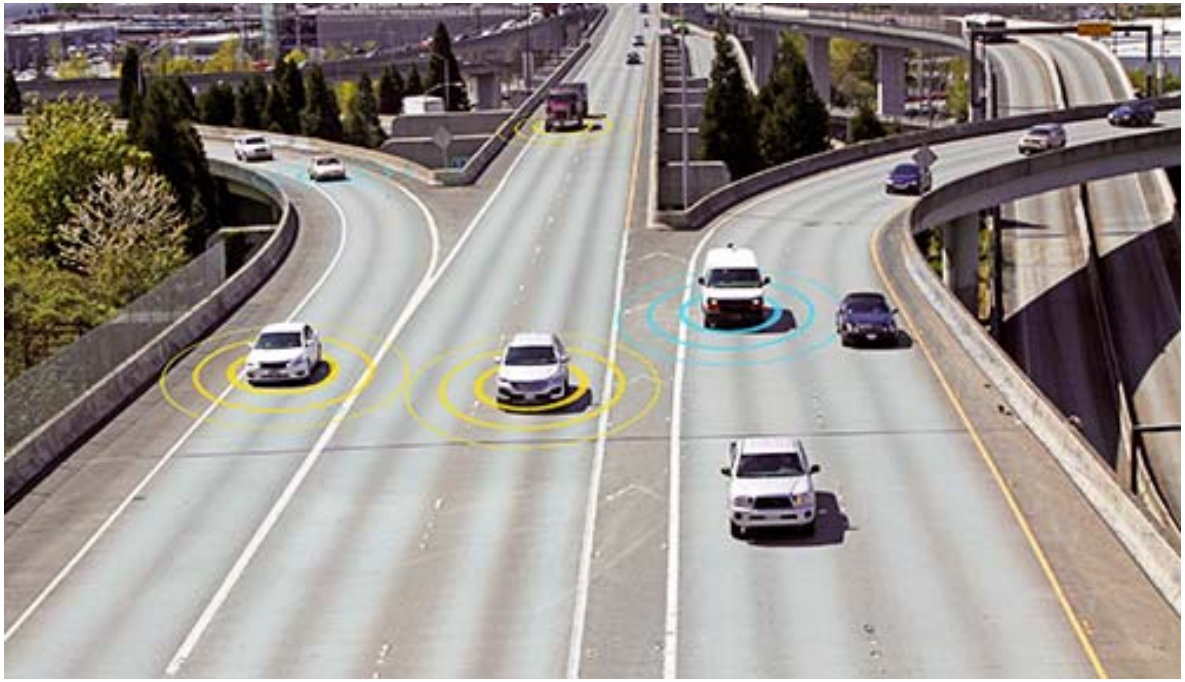
- US Army has been involved in the development of autonomous trucks and platooning since the earliest self-driving vehicle research began over two decades ago.
- Tank Automotive Research and Development Engineering Center(TARDEC) in Warren, MI.
- The Autonomous Mobility Applique System (AMAS) Program - demonstrated a 3 truck platoon at up to 25 mph, followed by a 7 truck platoon at up to 40 mph. The AMAS program at TARDEC developed out of the Convoy Active Safety Technology (CAST) System , which in turn had developed from the Autonomous Land Vehicle (ALV) project funded by DARPA in 1985.
- Kits - The kits would include components such as Global Positioning System (GPS), Light Detecting Radar (LIDAR) systems, automotive Radio Detection and Ranging (RADAR) and commercially available automotive sensors in order to make the system affordable.
- July 2016 - Texas A&M Texas Transportation Institute (TTI) demonstrated a two-truck platooning. The two Navistar tractor-trailers first traveled in a figure 8 at about 40 mph, followed by an increased gap distance and ended with left and right lane changes in both directions. The TTI project was unique in that it examined combining lateral and longitudinal control through automated steering, acceleration, and braking with no driver in the loop. Partners in the work besides TARDEC were: Ricardo, Navistar, TRW, Denso, Bendix, Great Dane Trailer, Lytx, and Argonne National Laboratory.
- Also in July 2016, TARDEC conducted a demonstration on I-69 in Michigan. The Dedicated Short-Range Communications(DSRC) radios inside the 4-truck platoon were they key components of the project. The Michigan Department of Transportation has equipped a section of the I-69 with infrastructure to transmit and receive DSRC signals, enabling Vehicle-to-Infrastructure (V2I) communications. As a first test of platooning trucks using V2I on a public roadway, this demonstration of DSRC for vehicle to vehicle (V2V) and V2I communication was an important advance in truck platooning technology.
- One of the primary goals of these TARDEC efforts is harmonization of the DSRC messages used to enable platooning. Such compatibility is essential to enable mixed platoons of civilian and military vehicles, under the expectation this could happen quite often, as in the case of a natural disaster or other homeland security event.
- The collaboration between military and commercial developers and users of ADAS, Platooning, and Self-Driving trucks will be critical for the advancement of these systems. TARDEC and the military are open to working with all new technologies in this arena, to benefit both civilians and warfighters.
- Aberdeen Proving Ground ATEC Testing.

Testing Pictures

Opportunities for Maryland

- FHWA/Army at Aberdeen Proving Ground
- Support US 1 Connected Vehicle Corridor to improve V2I and V2V technology
- Maryland is a major freight through state
  - Platooning reduces congestion
  - Efficiencies in intermodal connections improve economic opportunity
  - Advance truck CAV puts Maryland ahead (business development)
- Drayage pilots/Port area congestion and safety

Platooning Needs



"For automated driving systems to form a platoon, they need a special computer onboard that's connected to a vehicle-to-vehicle communications device. This device receives and transmits data from one car to another using Dedicated Short-Range Communications." – FHWA

Maryland is preparing by:

1. US 1 Pilot Project to evaluate telecommunications technology and provide a testing apparatus
2. Strategic (dynamic) CAV planning
3. Working with ATEC on DSRC discussions, participating with FHWA.

Questions?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