U.S. Department of Transportation
Federal Motor Carrier Safety Administration

Truck Platooning

The State of the Industry and Future Research Topics

Jeff Loftus, Technology Division Chief
Robert Tershak, Master Trooper, Virginia State Police

2018 Transportation Research Board 97th Annual Meeting
Federal Motor Carrier Safety Administration
Analysis, Research, and Technology Forum
January 9, 2018



Office of Research and Information Technology

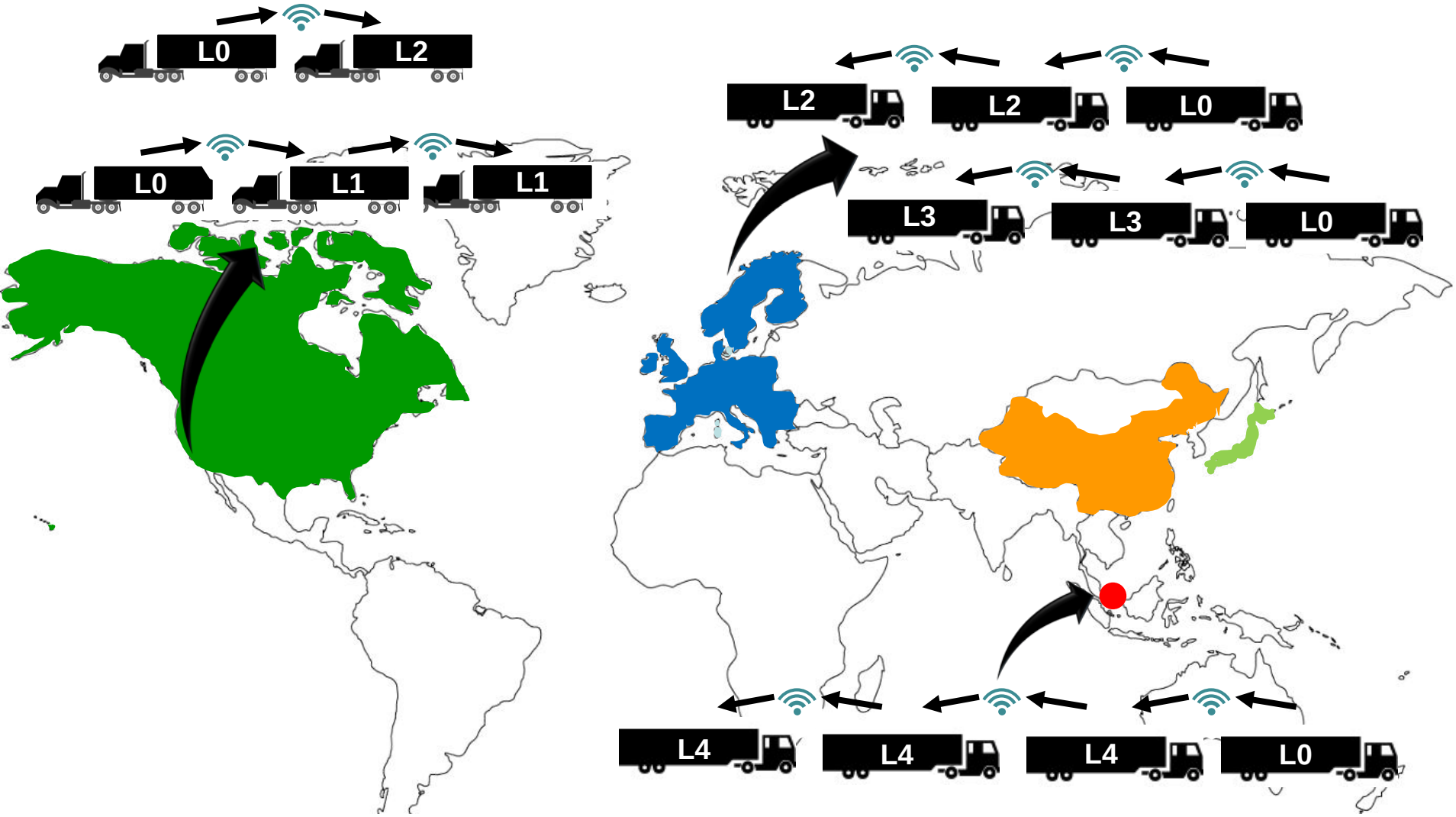
Overview

- Background
- International Truck Platoon Testing and Demonstrations
- U.S. Truck Platoon Activities
- Safe Truck Platooning Deployment – Traffic and Roadside Enforcement Perspective
- Future Research Topics

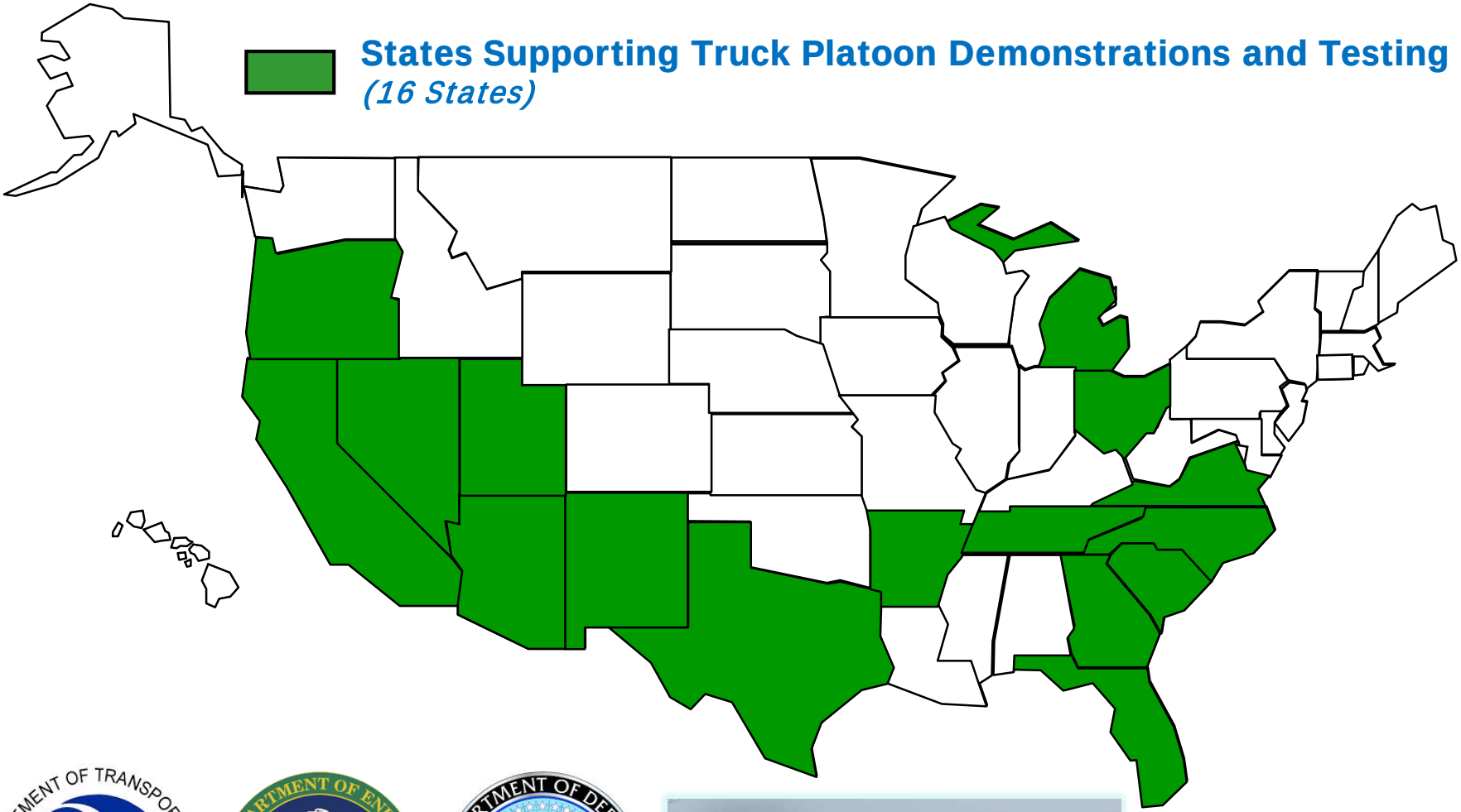
Truck Platooning

- Definition:
  - Coordinated operation of two or more trucks via cooperative adaptive cruise control (CACC).
  - With CACC, the lead truck is wirelessly connected to following trucks and sending messages that affect throttle, brakes, and brake lights (longitudinal control).
  - Drivers are still behind the wheel to steer and identify hazards (lateral control).
  - Following trucks automatically increase separation if another vehicle intersects platoon.
- Platooning potential benefits:
  - Energy savings from aerodynamic drag reduction.
  - Potential for reduced highway congestion (shorter following distance.
  - Possible safety improvements from faster reaction times and supporting systems (e.g., AEB, air-disc brakes).

International Truck Platoon Testing & Demonstrations



U.S. Truck Platoon Activities—Public Sector



U.S. Truck Platoon Activities—Private Sector

Several entities conducting truck platoon demonstrations and testing:

- Daimler—Freightliner/Western Star
- Peloton
- PACCAR—Kenworth/Peterbilt
- Volvo (Caltrans, UC-Berkley PATH)
- Navistar—International (TxDOT, Texas A&M Trans. Inst.)
- TuSimple
- Tesla

Photo courtesy of Daimler Trucks North America

Photo courtesy of Texas A&M Transportation Institute

Joint FHWA-FMCSA Truck Platoon and Inspection Demonstration

- FHWA-Caltrans-PATH-Volvo team used three specially equipped tractor semi-trailers and demonstrated cooperative adaptive cruise control.
- Demo consisted of 3-5 mile loop on Interstate 66 in Northern Virginia in September 2017.
- FMCSA field staff and the Virginia State Police conducted inspection demonstrations.
- Virginia Department of Motor Vehicles (DMV) demonstrated infrared inspection system van for demonstration of tire, brake, and wheel hub nspection.

Photo courtesy of FHWA

FMCSA photo

FMCSA photo

FMCSA photo

Safe Truck Platooning Deployment – Traffic and Roadside Enforcement Perspective

Master Trooper Robert Tershak

- Key takeaways from the Virginia demonstration.
- Operational safety issues.
- Deployment issues to consider.

FMCSA photo

Safe Truck Platooning Deployment – Traffic and Roadside Enforcement Perspective

- **Operational considerations to support future deployment:**
  - Number of vehicles in a platoon.
  - Best practices for safe traffic merging.
  - Driver training.
  - Consensus on vehicle markings.
  - Weather.
  - Time of day.
  - Law enforcement training.
- **Additional considerations:**
  - Legislative changes to following distance statutes.
  - Uniformity of operations to support interstate commerce.

Safe Truck Platooning Deployment – Traffic and Roadside Enforcement Perspective

- Compliance:
  - Inspector Training
  - Inspections
  - Federal Motor Carrier Safety Regulations, State & Local Laws
  - Approved Equipment
- Safety:
  - Driver Qualification & Training
  - Authorized Carriers
  - Disqualifying Violations
  - Public Education
  - Government Officials (DMV)

Future Research Topics on Truck Platooning

- Human factors:
  - Surrounding traffic (drivers in vehicles around platoons).
  - CMV drivers (lead and following CMVs).
- Best practices for fleet maintenance and inspection:
  - Critical vehicle components (brakes, tires, lights).
  - Sensors and communications (radar, dedicated short-range communications [DSRC], cameras).
  - Predictive analytics for preventative maintenance.
- Best practices for safe operations:
  - Safe following distances.
  - Cybersecurity.

Contact Information

Jeff Loftus
Chief, Technology Division
Federal Motor Carrier Safety Administration
U.S. Department of Transportation
E-mail: jeff.loftus@dot.gov

Master Trooper Robert Tershak
Virginia State Police
E-mail: Bob.Tershak@vsp.virginia.gov