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

Automated Commercial Motor Vehicles:
Implications to FMCSA Regulations and Potential Driver and Vehicle Safety Impacts

FHWA Talking Freight Webinar

July 19, 2017

Overview

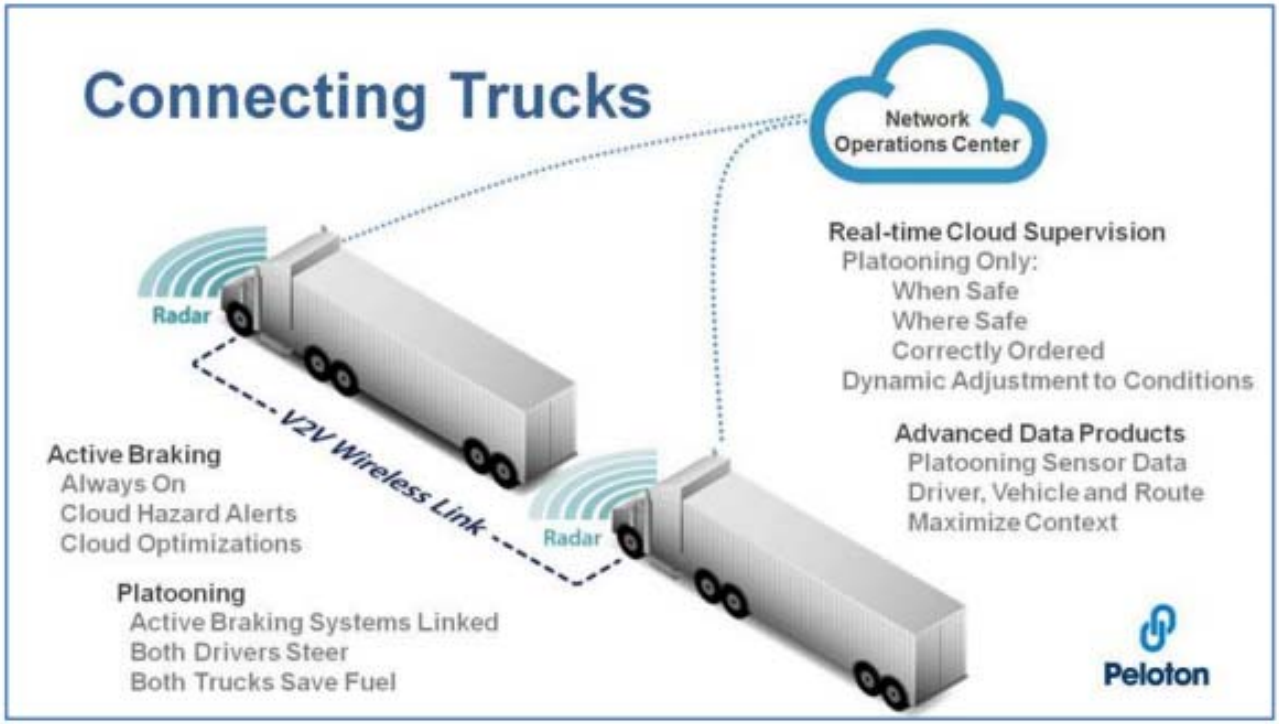
- Industry Activities
- Research
- Challenges

Industry Demonstrations of HACVs

- Freightliner
  - Testing in Nevada
- Uber ATG (Otto)
  - Over-the-road demonstrations
  - Promotional video
- Mobile Eye / Delphi
  - AV package for OEMs
- Google
  - Patent for self-delivery truck
- Starsky Robotics
  - Testing in Nevada
  - Promotional video
- Embark
  - Testing in Nevada
  - Promotional video

Components of Platooning

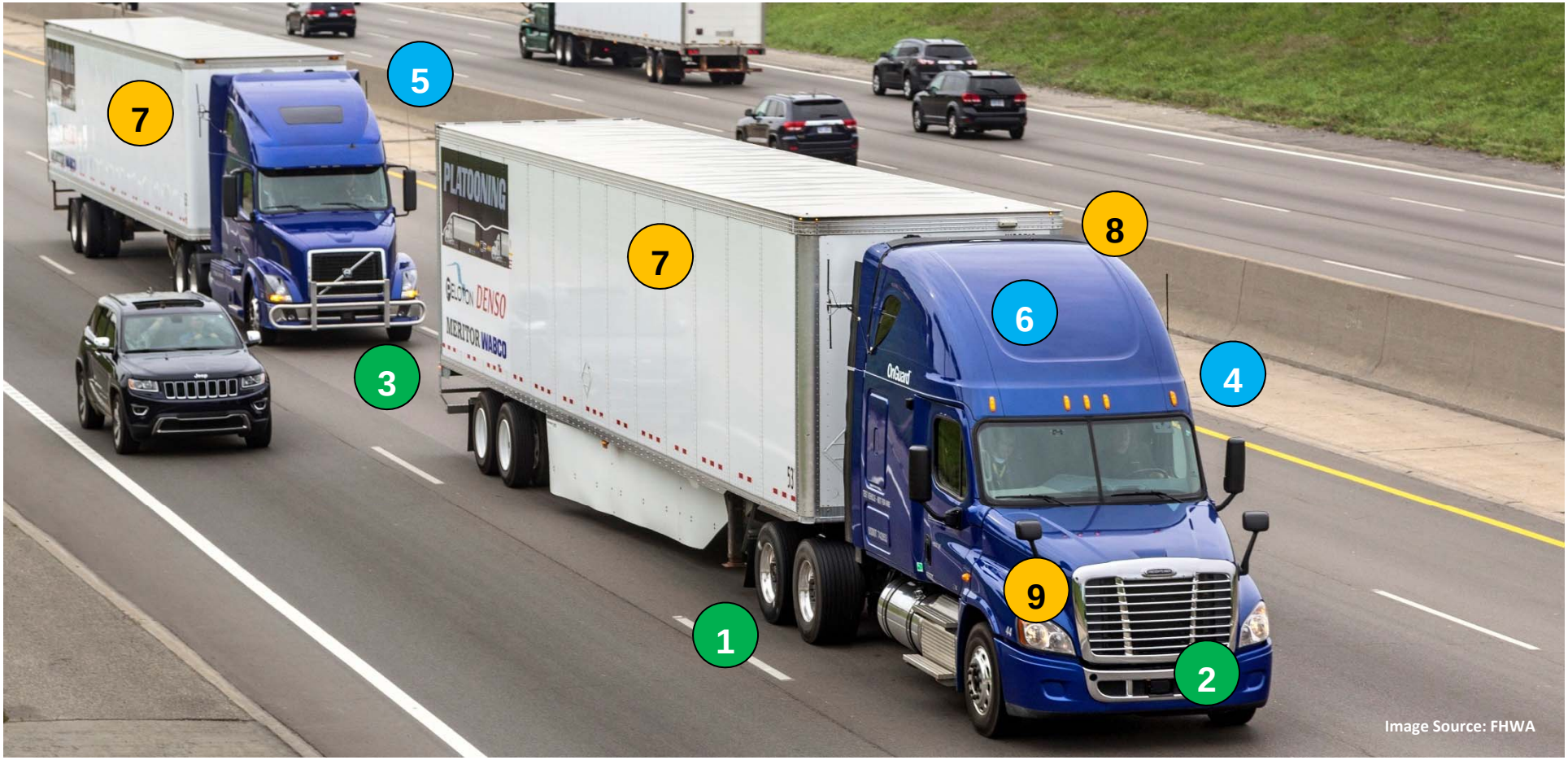
- Vehicle-to-Vehicle (V2V) connection
- Vehicles are driver-operated
- Following drivers have lateral control
- Hazard alerts
- Active braking



Platooning

- Following Drivers have lateral control.
  - Driver are “engaged”
- Under ideal conditions, platooning trucks can travel as close as (36, 50, 100 ??) feet from each other.
- What about the brake health of each truck?

Collaborative Multi-Modal Automated CMV Research



FMCSA projects

1. AV Brake Research
2. AV Sensor Research
3. Accelerating Automatic Emerg. Braking Deployment

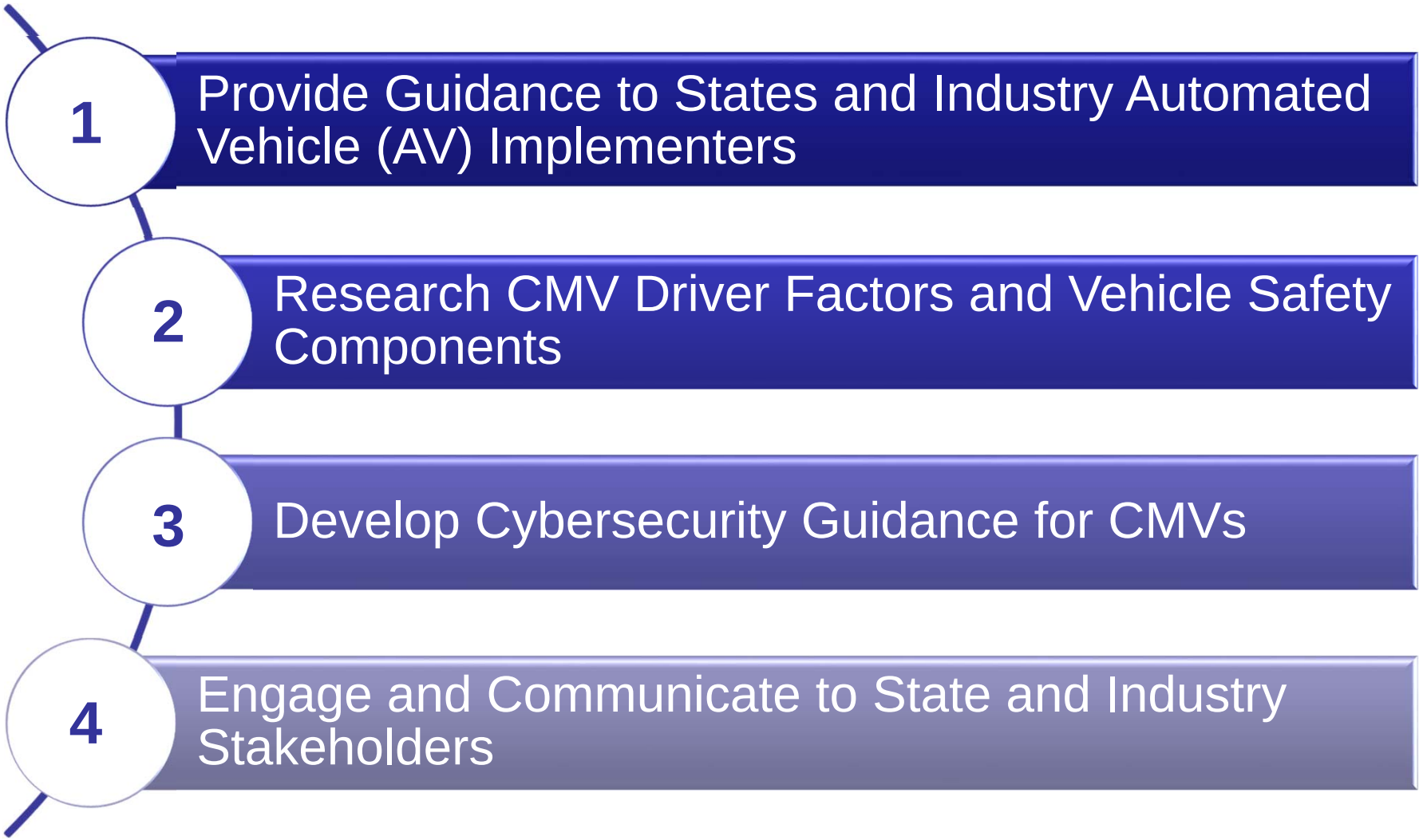
Multi-modal projects

4. CMV Driver Factors
5. Data Sharing Research
6. Cybersecurity for CMVs

Related projects

7. Truck Platoon Field Tests
8. Pilot Testing Guidance
9. Work Zone Field Tests

FMCSA Automated CMV Program Tracks



FMCSA Automated Vehicle Program

Three-pronged approach

- Data Sharing
- Pilot Programs/Exemptions
- Policy Guidance/Interpretive Rules

Key Research Themes

- Human factors for CMV drivers
- CMV components (e.g., brakes) and sensors
- Cybersecurity
- Cross-agency collaboration (NHTSA, FHWA, OST-R, MARAD)

FMCSA Projects - Active

- Review of Existing FMCSA Regulations for Potential Challenges with Automated Commercial Motor Vehicles
- Low-Speed Automated Truck Queue at Ports and Warehouses: (with MARAD)
- Updates to FMCSRs Due to NHTSA's Electronic Stability Control (ESC) Mandate

FMCSA Projects - Complete

- Review of FMCSRs potentially impacted by Highly Automated Commercial Vehicles (HACV)
- Multi-Modal Driver Distraction and Fatigue Detection and Warning System
- Evaluation of Research on CMV Drivers with Moderate to Severe Obstructive Sleep Apnea
- Naturalistic Driving Research on Driver Fatigue
- Advanced Fatigue Modeling for Individual Differences

FMCSA Projects – Planned

- Development of brake performance guidelines for safe truck platoons
- Sensor performance guidelines
- ITS JPO Candidate Projects
  - Monitor/operator fatigue study
  - Human Factors
  - Data Collection and Sharing

Challenges

- Public perception
  - Acceptance of an AV Truck (or *Multiple)*
- Human factors
  - Work load, distraction, re-engagement
- Licensing
  - More or less training required?
- Safety
  - Driver in seat and monitoring
  - Must be no degradation in safety
  - Baseline Data is needed to support safe over-the-road trials
- What's the Cost/Benefit For Fleets

Driver Re-Engagement

- When the system has to re-engage the driver…
- How quickly can a driver re-enter the dynamic situation?
  - 2 seconds? 4 seconds? 8 seconds?

>>>@ 88 Feet per Second<<<

- We need to understand what cognitive state the driver is in at any given time.
- Does the driver need “alertness assistance”?

Technical and Policy Challenges - Continued

- Testing and certification complexity
- Harmonizing State and local regulations
- National Highway Traffic Safety Administration (NHTSA) mandates
- Federal Motor Carrier Safety Regulations (FMCSRs)
- HOS

State Perspectives

- States with AV regulations
- Allowing trials

FMCSA Policy Work and Stakeholder Interaction

- Draft to supplement NHTSA AV Guidance
- Outreach and feedback with technology providers
- ITF Forum Jan 2017
- Automation meeting Jan 2017
- CVSA Session April 2017
- AUVSI July 2017 – panel members

How Do We Inspect Advanced Technology?

VISUAL INSPECTION?

FMVSS Updates → Part 393
- **ABS**
- **ESC**
- **What's next?**

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