

FMCSA Automated CMV Evaluation (ACE) Program Emergency Response and Work Zone Research

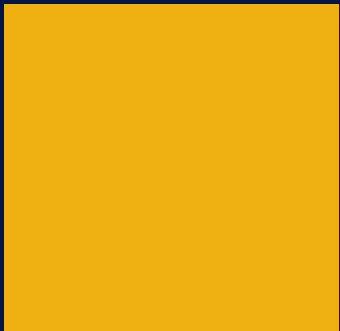
2022 Western Commercial Vehicle Safety Summit

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U.S. Department
of Transportation

Federal Motor
Carrier Safety
Administration



November 30, 2022

FMCSA's Automated Driving System (ADS) Research Scope

- **Conduct research** to inform safety equivalency decisions for waivers, exemptions, and pilot programs
- **Focus efforts** on the intersection of automated CMVs and public safety officials
- **Identify and promote best practices** for industry's use of automated CMVs

Automated CMV Evaluation (ACE) Program Overview

Focus Application Areas

- Multi-faceted research, development and test program focused on understanding how ADS-equipped trucks will interact with public safety officials and facilities
- Utilization of FHWA-developed open-source software
- Testing using ADS-equipped prototype vehicles at various locations
- Government, academic and industry partnerships



**Roadside
Inspections/
Enforcement**



Port Drayage



**Emergency
Response**



Work Zones



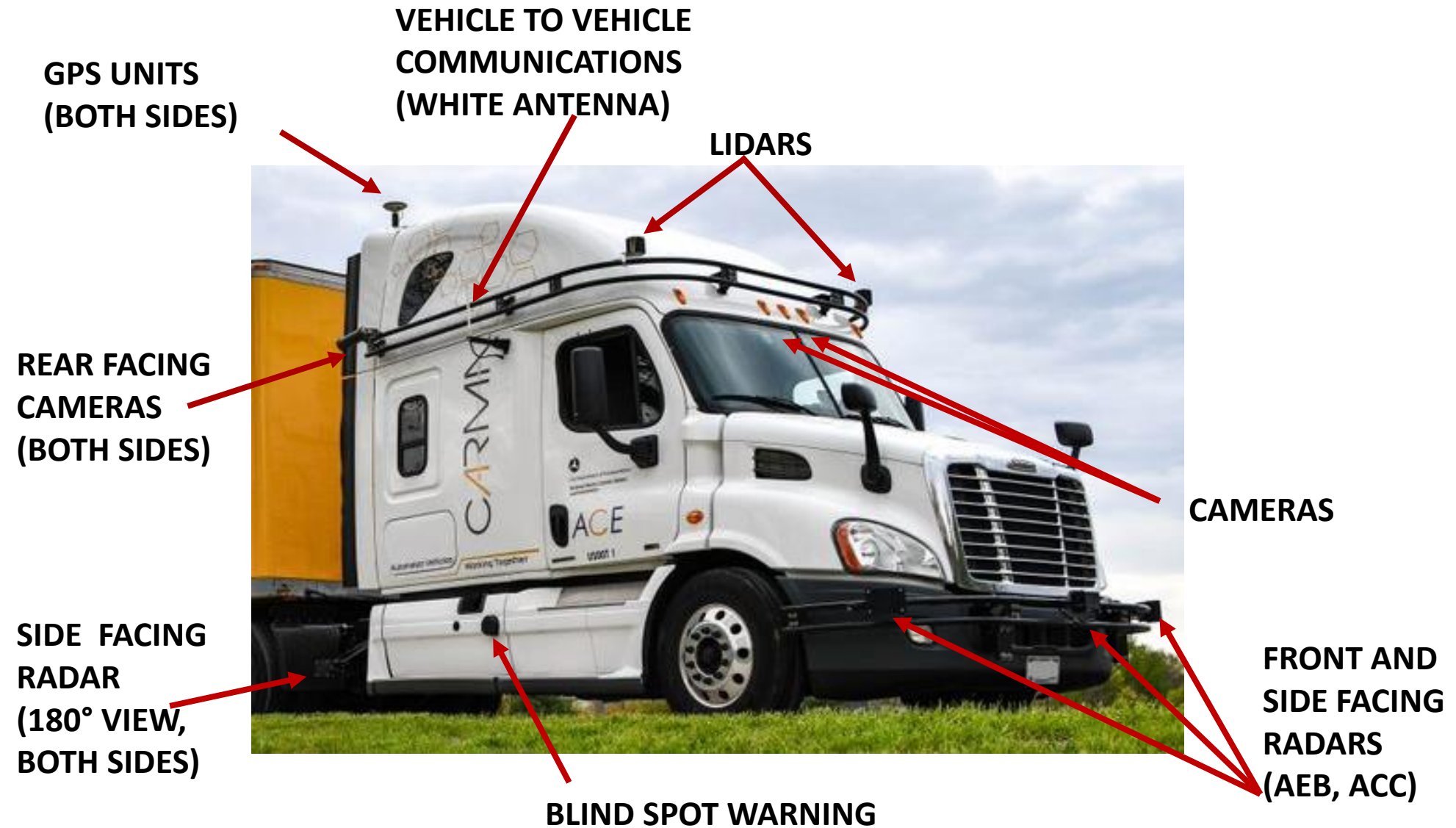
FY20

FY22

FY24



ACE Test Vehicles' Sensor Array



FMCSA & FHWA Automated Test Tractor Semi-Trailers

- Fleet of four test vehicles
 - Provided by NHTSA
 - Previously used in V2V Safety Pilot
- Tractors: 2012 Freightliners
 - Day cab
 - Mid-size cab
 - Two Sleeper Berths
- Tractor Upgrades
 - Autonomous Stuff ADS sensors and by wire system
 - FHWA CARMA hardware and software
- DOT Agency-Branded Trailers
 - Our Roads, Our Safety
 - ACE
 - Future of Transportation
 - CARMA
 - ACE Smart Trailer



Select ACE Research Program Activities

Seven Key 2022 ADS Projects:

- Work Zone Safety
- Emergency Response
- Electronic inspections
- Automated hazard triangle deployment
- Human-ADS team driving
- Human factors in ADS-equipped CMVs
- On-road driving performance evaluation

Ongoing ADS Deployment Grants:

- Trucking Fleet Concept of Operations for Managing Mixed Fleets
- Deploying Automated Technology Anywhere



ACE Program Proof-of-Concept Work Zone Safety Application Video

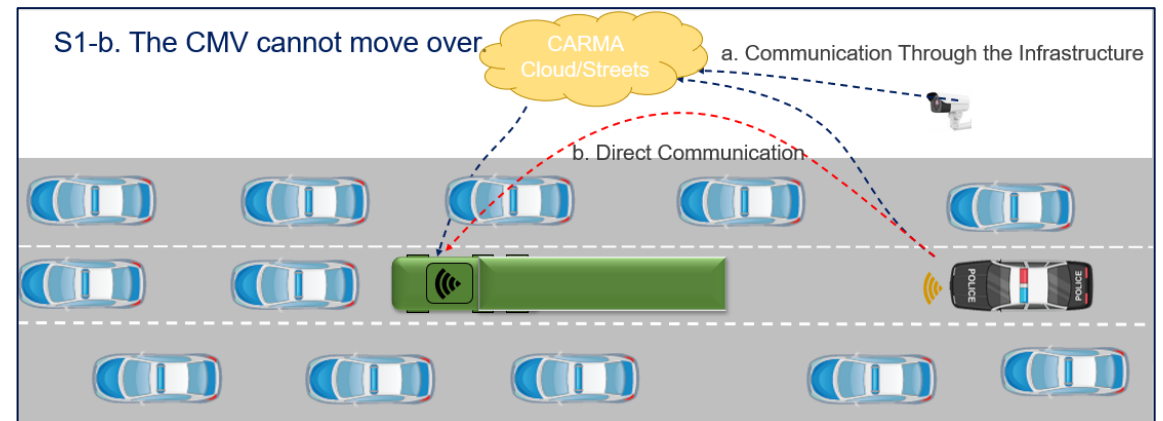
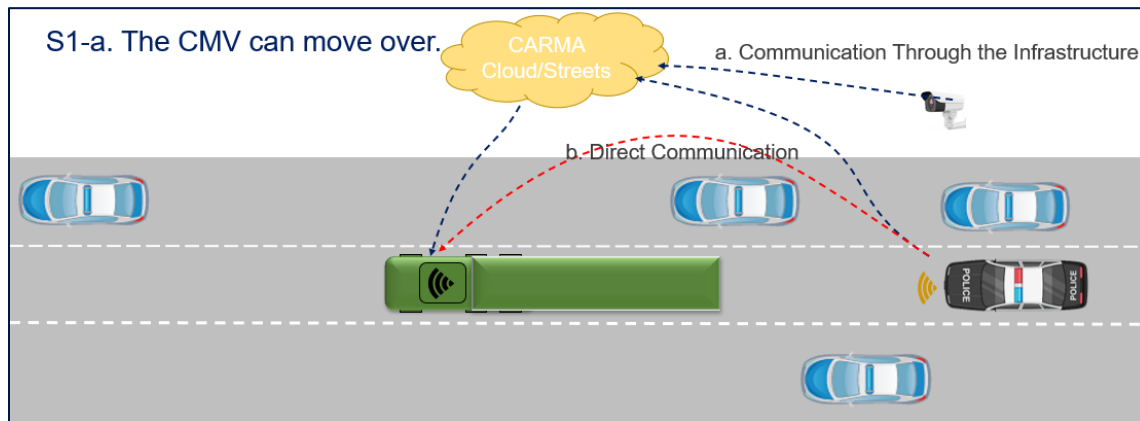
Emergency Response

- FMCSA is collaborating with modal partners and external stakeholders to understand the impact of ADS-equipped CMVs vehicles on, as well as to inform, current best practices and voluntary consensus standards
- Areas of interest include ADS interactions with:
 - Law enforcement vehicles
 - Emergency response vehicles
 - Roadway incidents and hazards



Emergency Response Research with FHWA

- Initiated research with FHWA, Leidos and Volpe in late 2021 to develop a proof-of-concept application and address initial gaps for freeway scenarios
 - Focusing on identification of emergency response vehicles by ADS-equipped CMVs through wireless communications and reaction in accordance with State move-over laws.
 - ConOps complete (see illustration below)
 - Validation and demonstration in Summer 2023



Emergency Response Research with Toxcel Team

- Exploring and prototyping processes, communication methods, and inspection technologies to facilitate electronic safety inspections of ADS-equipped CMV operations
- Detection of a law enforcement vehicle based upon sensor recognition of emergency lights and responding by either pulling over or moving over in compliance with State “Move Over Law”
- Reacting and complying with law enforcement’s electronic messaging or static signs to “Pull-in or Bypass” an inspection/weigh station
- Project Status
 - Operational scenario testing underway (Oct. 2022 and Dec. 2022)
 - Validation testing and demonstration scheduled for week of Jan. 23, 2023



Emergency Response Research Goals and Next Steps

- Kicking-off a new initiative for a Multimodal Emergency Response National Framework for ADS-equipped CMVs
 - Collaborating with NHTSA and partnering with public and private sector industry organizations
 - Goal is to develop national best practices for emergency responder interactions with automated CMVs

Automated Traffic Warning Device Deployment System

- FMCSA recently completed a Phase I Small Business Innovative Research (SBIR) Project on a proof of concept of an Automated Traffic Warning Device Deployment System
 - Awarded to Creare LLC
- FMCSA Lead: Nicole Michel
- Objectives:
 - Develop an automated marker deployment system for ADS-equipped CMVs
 - Develop concept for traffic warning device (triangle) design and deployment
 - Demonstrate proof of concept for system's ability to navigate and locate trailer position, line markers, and environmental obstacles
- Status:
 - SBIR Phase I feasibility study (completed)
 - SBIR Phase II project initiated in Aug. 2022



New ACE Program Smart Trailer

- Competitively selected Stoughton Trailers as the OEM and Drōv as the supplier
 - Trailer delivered in September 2022
- Working with Drōv, VTTI, Leidos and Volpe on integration with ADS
- Research planning underway
- Initial research questions
 - How can smart trailer data be utilized for predictive/preventive maintenance?
 - How can fleets operating ADS-equipped CMVs effectively monitor regulated `trailer equipment and safety systems in the absence of smart trailer data (e.g., with a standard trailer)?
 - Research to inform communications standards and best practices for trailer-to-tractor communications and trailer (or tractor)-to-infrastructure communications.



Thank you!

THANK YOU



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