

FMCSA's Automated CMV Evaluation (ACE) Program Update

MD CAV Working Group Hybrid Meeting

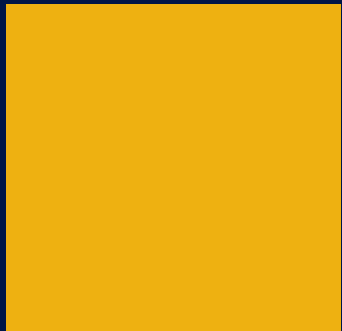
Building Safety into Connected and Autonomous Vehicles Panel

December 14, 2021



U.S. Department
of Transportation

Federal Motor
Carrier Safety
Administration

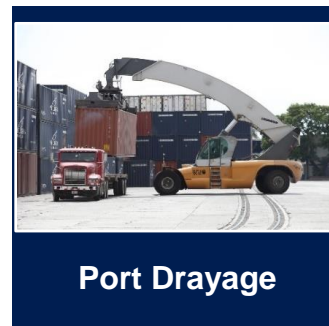


FMCSA's Role in Automated CMVs

- **Conduct research** to inform safety equivalency decisions for waivers, exemptions, and pilot programs
- **Identify best practices** for industry's use of automated CMVs
- **Remove regulatory barriers** to the operation of automated CMVs
- **Promote safe operation** of automated CMVs

FMCSA's Automated CMV Evaluation (ACE) Program Overview

- Multi-faceted research, development and test program
- Utilizing FHWA-developed open-source software and tools
- Testing actual vehicles at various locations
- Partnering with Government, academic, and industry stakeholders



Port Drayage



Emergency Response



Work Zones



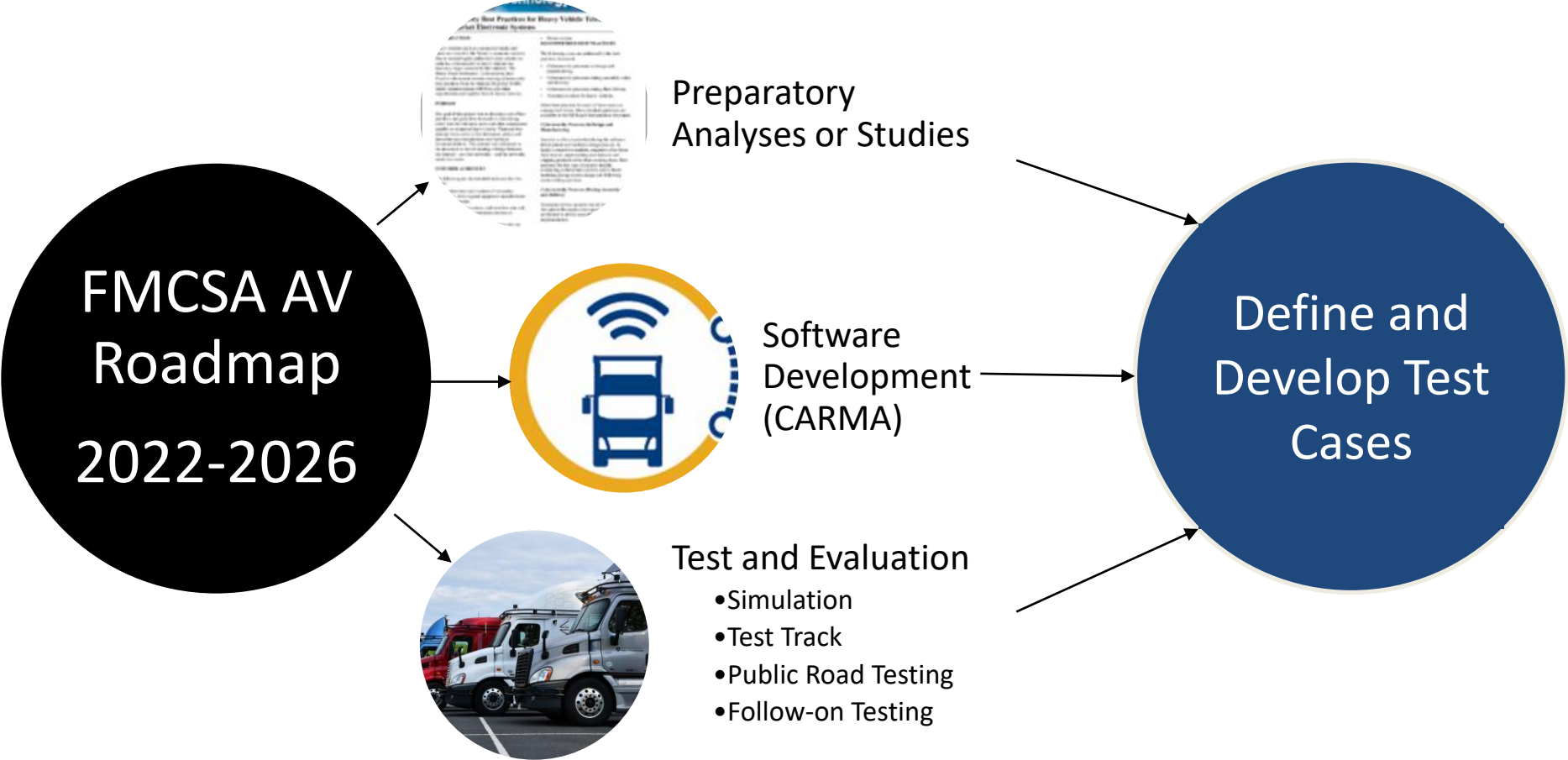
Roadside Inspection / Enforcement

FY21

FY22

FY23

Developing a Comprehensive Test plan



ACE Accomplishments and Ongoing Efforts

FMCSA developed an “Automated Truck Safety Research Plan” to guide the ACE efforts

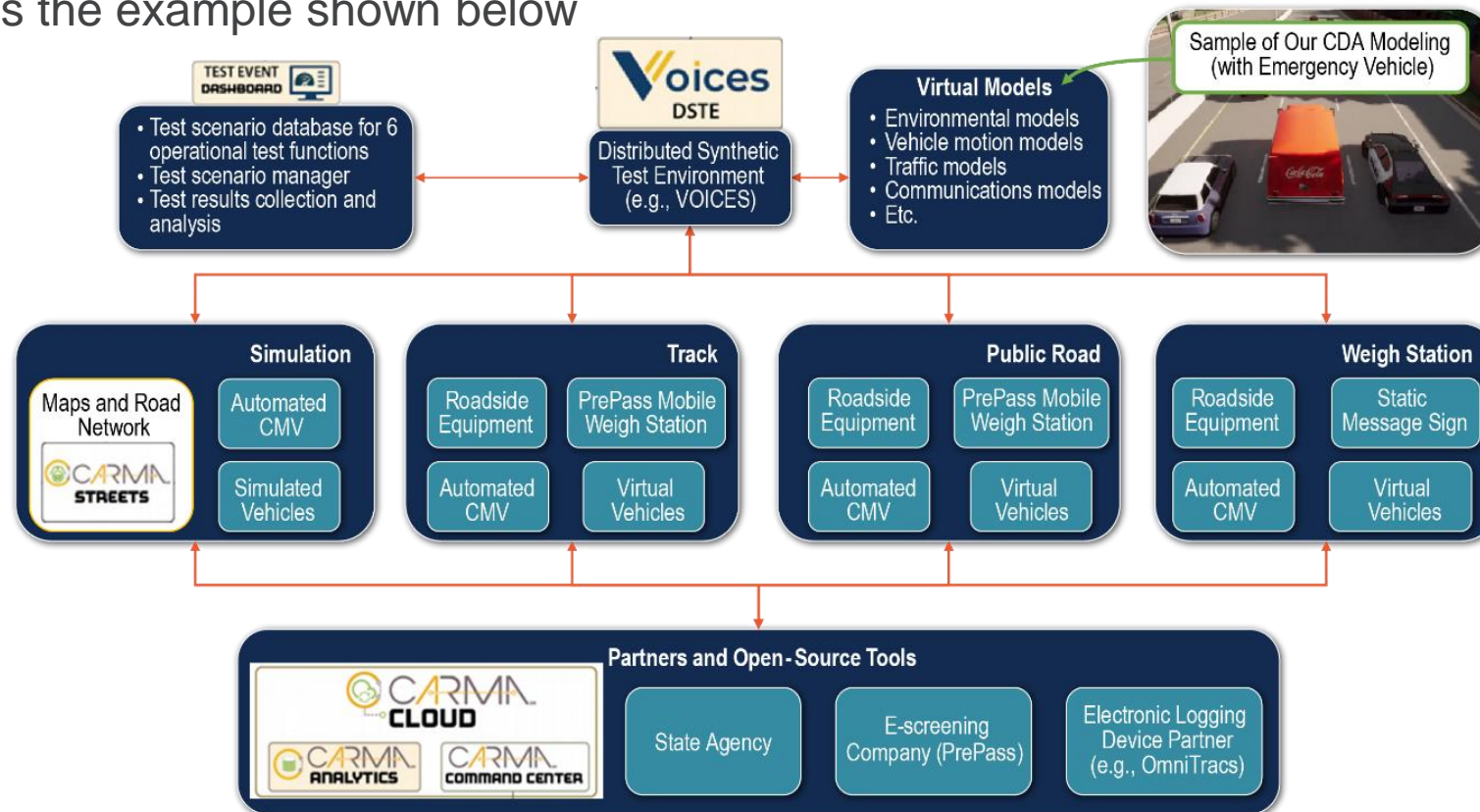
- 2018 – 2020: Vehicle up-fit with foundational hardware and software
- 2021 accomplishments:
 - Verified and demonstrated the basic C-ADS functionality of trucks
 - Demonstrated of sensor failure and redundancy needs in automated CMVs
 - Demonstrated basic in-motion interactions with automated CMVs and law enforcement
 - Completed a draft cybersecurity reference test plan for CMVs
 - Supported joint work with MARAD and FHWA on port drayage scenarios
 - Initiated research focused on testing and demonstration of initial emergency response and work zone scenarios involving automated CMVs
- 2021 New Awards:
 - Developing automated electronic inspection capabilities – Aug 2021
 - Assessing the safety human and ADS team driving applications – Oct 2021
 - Examining Human Factors in ADS-equipped CMVs – Oct 2021
 - Expanded testing and demo support capabilities – Oct 2021

Automated CMV Inspection Demonstrations and Evaluations

- In August, FMCSA awarded a 24-month research project to a team led by toXcel
 - Incorporates input from the CVSA ADS Work Group
 - Period of performance runs through July 2023
 - FMCSA Lead: Tom Kelly
- Objective:
 - Explore and prototype processes, communication methods, and inspection technologies to facilitate electronic safety inspections of C-ADS-equipped CMV operations
 - Applicable to the roadside, at borders, and in other fixed enforcement locations.
- Research Team:
 - Toxcel, eScience & Technology Solutions (eSTS), NDSU Upper Great Plains Transportation Institute (UGPTI), JFL Solutions, QS-2, ATRI, TMC, and PrePass Safety Alliance

Automated CMV Inspection Demonstrations and Evaluations

- This project is currently in the planning phase which includes evaluation of testing options
- Testing and evaluation will likely involve simulation as well as vehicle-based testing
- The team may incorporate a CDA architecture leveraging open-source resources to improve cost and efficiency, such as the example shown below



ESTS_044_v1

Toxcel Example of a Potential CDA Test Architecture

Human Factor in ADS-equipped Commercial Motor Vehicles

- FMCSA recently awarded the Virginia Tech Transportation Institute (VTTI) a 48-month research project
- Research Team: VTTI and Deloitte
- FMCSA Lead: Terri Hallquist
- Objectives:
 - Quantify the effect of distraction on CMV drivers in L2 CMVs
 - Quantify the effect of transfer of control in L3 CMVs
 - Develop and evaluate a training program to address causal factors
- Approach: Simulator-based studies and training program



Safety Impacts of Human-ADS Team Driving Applications

- Recently awarded the Virginia Tech Transportation Institute (VTTI) a 48-month research project
- VTTI Research Team: VTTI, Deloitte and Remote Operations SME Consultant
- FMCSA Lead: Brian Routhier
- Objectives:
 - Provide FMCSA data to support the analysis of HOS relief requests under 49 C.F.R. §381
 - Assess the safety benefits/disbenefits of human-ADS teaming scenarios
 - Investigate existing and future human-ADS integration models
 - driver/remote operator use workload, fatigue, alertness, and distraction during teaming
 - Driver re-engagement to the driving task during ADS disengagement or remote operator control
 - fleet acceptance
- Approach: Simulator-based studies augmented with in-vehicle testing in controlled environment



Next Steps



ACE 2.0

Thanks for your interest and time!

THANK YOU



Mike Lukuc

ACE Program Manager and Sr. Engineer

Mike.Lukuc@dot.gov

(O) 202-385-2389

(C) 202-834-6180



U.S. Department of Transportation

Federal Motor Carrier Safety Administration



ACE

Automated Commercial
Motor Vehicle Evaluation

