FMCSA ADS Safety Research
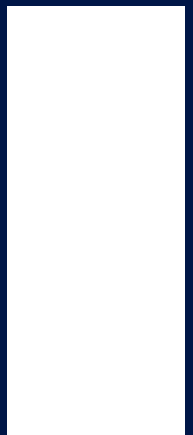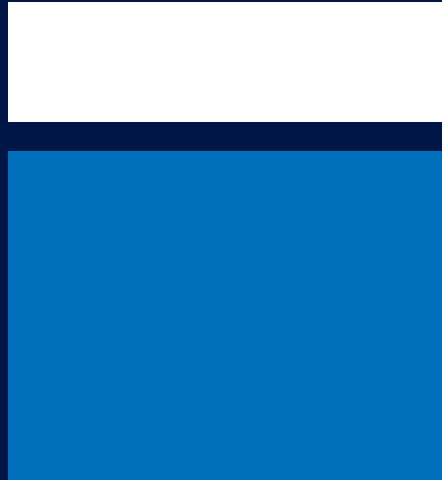
North Dakota Autonomous Truck Conference

October 17, 2024

U.S. Department of Transportation

Federal Motor Carrier Safety Administration
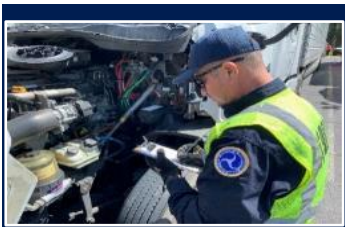
FMCSA ADS Research

FMCSA Automated CMV Evaluation (ACE) Program

How will public entities interact with ADS-equipped CMVs?
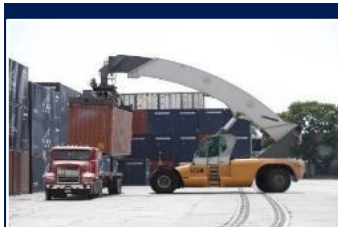
- *Test various use cases*
- *Support industry standards and best practices development*
- *Inform regulatory activities and policy decisions*

ADS testing

Roadside Inspection / Enforcement	**Port Drayage**	**Work Zones**	**Emergency Response**	**Smart Trailers**	**Vulnerable Road Users**

2020 ➔ **2025**

Examples of Relevant FMCSA ADS Research

- **ADS Safety Metrics Project**
  - **Goal:** Evaluate the safe driving performance of an ADS-equipped CMV
  - **Contractor:** Virginia Tech Transportation Institute

- **Teleoperations Cybersecurity Project**
  - **Goal:** Identify the cybersecurity risks associated with teleoperated automated CMVs
  - **Contractor:** Volpe

- **Model Operational Safety Plan for Motor Carriers**
  - **Goal:** Develop a model operational safety plan for motor carriers operating automated CMVs
  - **Contractor:** Volpe

Mike Lukuc PM

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**Federal Motor Carrier Safety Administration**
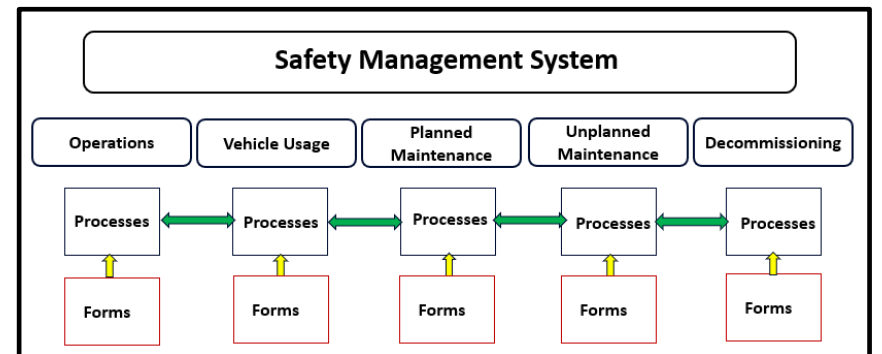
Examples of Relevant FMCSA ADS Research cont...

- **Safety Impacts of Human-ADS Team Driving Applications**
  - **Goal:** Study the safety implications of interactions between humans and automated driving systems (ADSs) in emerging trucking operational scenarios.
  - **Contractor:** Virginia Tech Transportation Institute

- **Human Factors in ADS-equipped Commercial Motor Vehicles**
  - **Goal:** The objective of the project is to conduct research on human factors related to automated driving systems (ADS)- equipped commercial motor vehicles (CMVs).
  - **Contractor:** Virginia Tech Transportation Institute

-

- **Motor Carrier Operation of Automated Driving Systems (ADS)-Equipped Commercial Motor Vehicles**
  - ANPRM out now   (See QR Code) >>
  - NPRM forecasted for December 2024

U.S. Department of Transportation
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ADS Trucking Conops Grant

Funded by U.S. DOT's Automated Driving System (ADS) Demonstration Grant, 2020-2024

Performed by:

VIRGINIA TECH
**TRANSPORTATION
INSTITUTE**

PRONTO

**Texas A&M
Transportation
Institute**
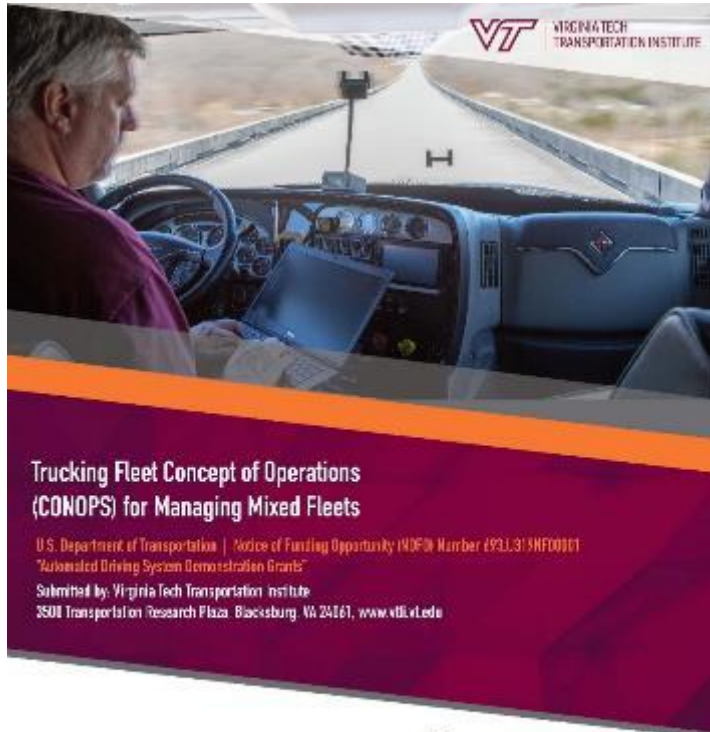
Managed by:

William (Bill) Anderson, VA – FMCSA

Thomas (Tom) Kelly, US DOT – FMCSA

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Support provided by:
- Travelers Institute
- Commercial Vehicle Safety Alliance
- Kodiak Robotics
- Drivewyze
- Texas Department of Public Safety
- Florida Department of Transportation

FMCSA ACE Inspection Demonstrations and Evaluations – Demo Overview

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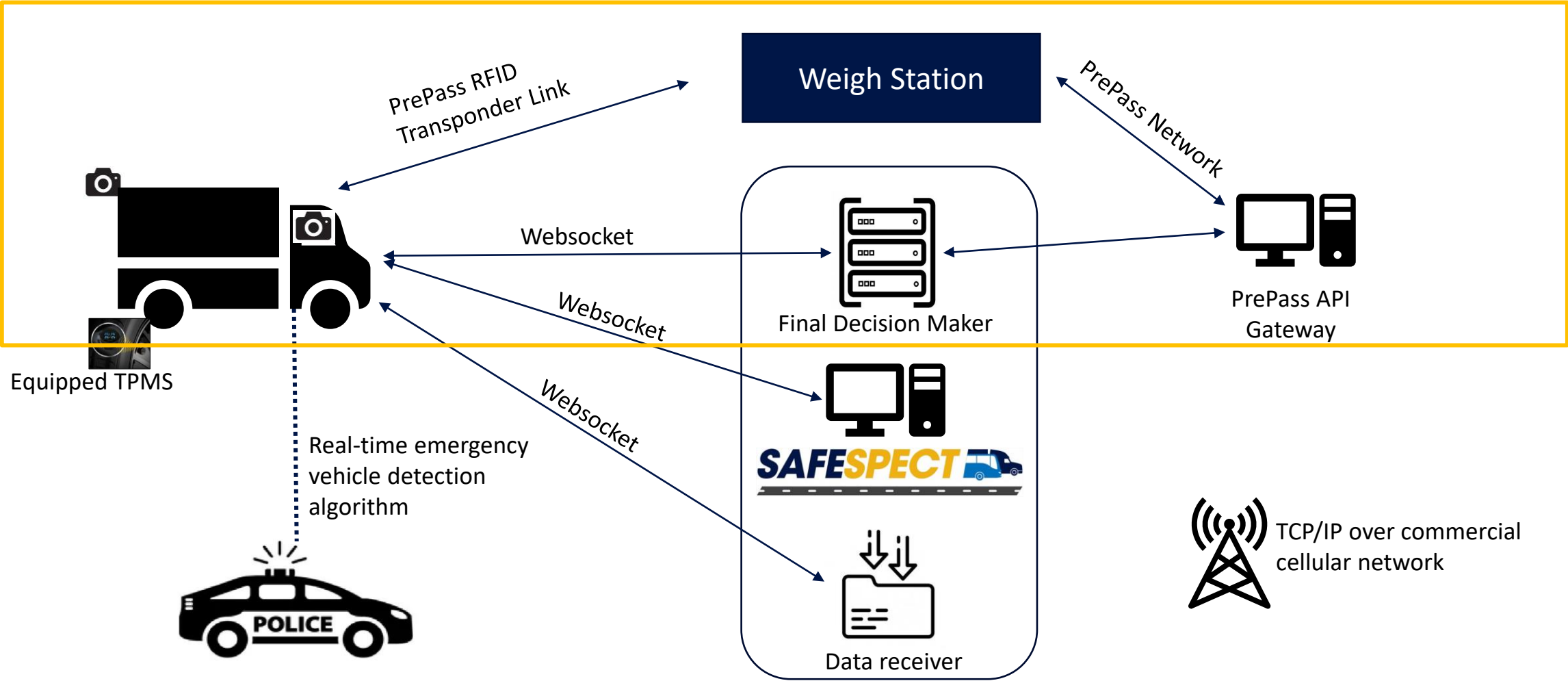**Federal Motor Carrier Safety Administration**

Project Overview

- Explore and prototype processes, communication methods, and inspection technologies to facilitate electronic safety inspections of Automated Driving Systems (ADS)-equipped CMV operations at the roadside, at borders, and in other fixed enforcement locations.
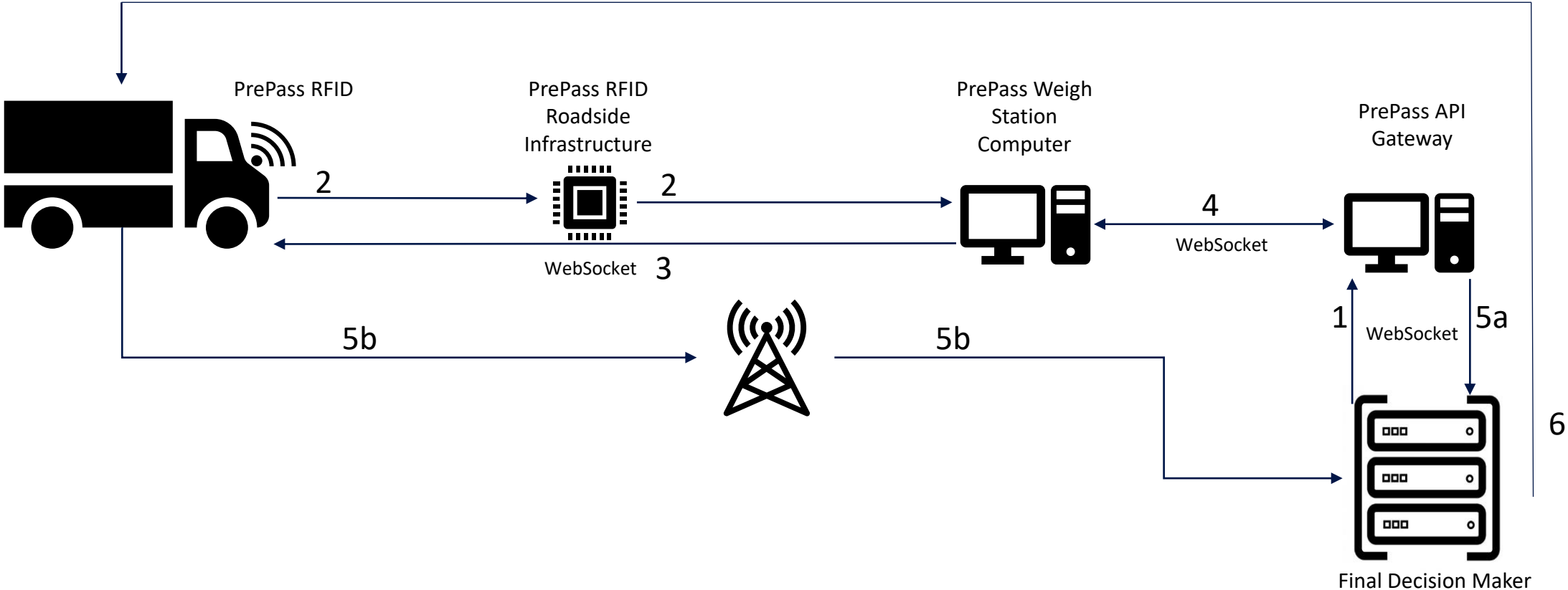
Operational Test Scenario	Operation Summary
#1 ADS Health & Status	Electronic confirmation and communication of ADS health and status on equipped CMVs
#2 Predictive algorithms, analytics, and preventive maintenance data	Evaluate and test predictive algorithms, analytics, and preventive maintenance data (e.g., fleet management systems, total asset visibility systems) that would provide value to a roadside inspector for inclusion into their inspection application and electronic screening decision tools
#3 Enhanced pre-trip inspection communication	Communication of an enhanced pre-trip inspection status, certification, & data elements
#4 Inspection/weigh station "Pull-in or Bypass"	React and comply with law enforcement electronic messaging or static signs to "Pull-in or Bypass" an inspection/weigh station
#5 Populate roadside inspection application	Populate available data elements into a roadside inspection application when prompted or automatically
#6 Emergency lights/siren pull over or move over	Reaction to emergency lights and siren (SAE J3216 NO COOPERATIVE AUTOMATION) to either pull over or move over in compliance with State "Move Over Law".

High-level Logical Architecture

PrePass RFID Transponder Link

Weigh Station

PrePass Network

Equipped TPMS

Websocket

Final Decision Maker

PrePass API Gateway

Real-time emergency vehicle detection algorithm

Websocket

SAFESPECT

Websocket

Data receiver

TCP/IP over commercial cellular network

Demo 1 – ADS Electronic Inspection – Bypass/Pull-in

PrePass RFID

PrePass RFID
Roadside
Infrastructure

PrePass Weigh
Station
Computer

PrePass API
Gateway

2

2

4

WebSocket

WebSocket

3

1

5a

WebSocket

5b

5b

6

Final Decision Maker

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Demo 2 – Law Enforcement Emergency Pullover

Real-time emergency vehicle detection algorithm
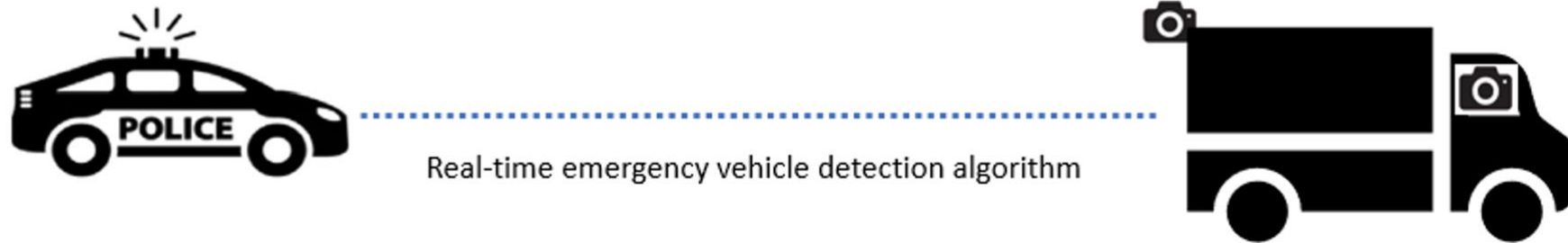
Demo 3 – ADS Truck Moveover

Real-time emergency vehicle detection algorithm

Thank you!

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Thomas Kelly
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https://www.fmcsa.dot.gov/safety/research-and-analysis/active-research-projects