Automated CMV Evaluation - Inspection Demonstrations

Eastern CMV Safety Summit

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NDSU UPPER GREAT PLAINS
TRANSPORTATION INSTITUTE

Background

- Industry continues to move aggressively forward on "highly automated trucks"

- Multiple task forces and committees are discussing the interactions with regulations and inspections

- Little to no field testing has been conducted

- FMCSA-ACE Program
  - Hands-on research for safe deployment

- Study Team
  - Toxcel, eScience & Technology Solutions, JFL Solutions, EY-Parthenon, ATRI, ATA, PrePass Safety Alliance, and NDSU-UGPTI

Automated Inspection Procedures

- Commercial Vehicle Safety Alliance - Enforcement and Industry Modernization Committee
  - Established an Automated CMV Working Group
  - Vehicle would be required to communicate to enforcement while in-motion
    - It had passed an enhanced pre-trip inspection
    - Its automated driving systems are functioning
    - It is operating within its Operational Design Domain

- American Trucking Associations - Technology and Maintenance Council
  - Worked with CVSA and FMCSA to operationalize CVSA recommendations
  - Recommended a specific safety data message set to be transmitted
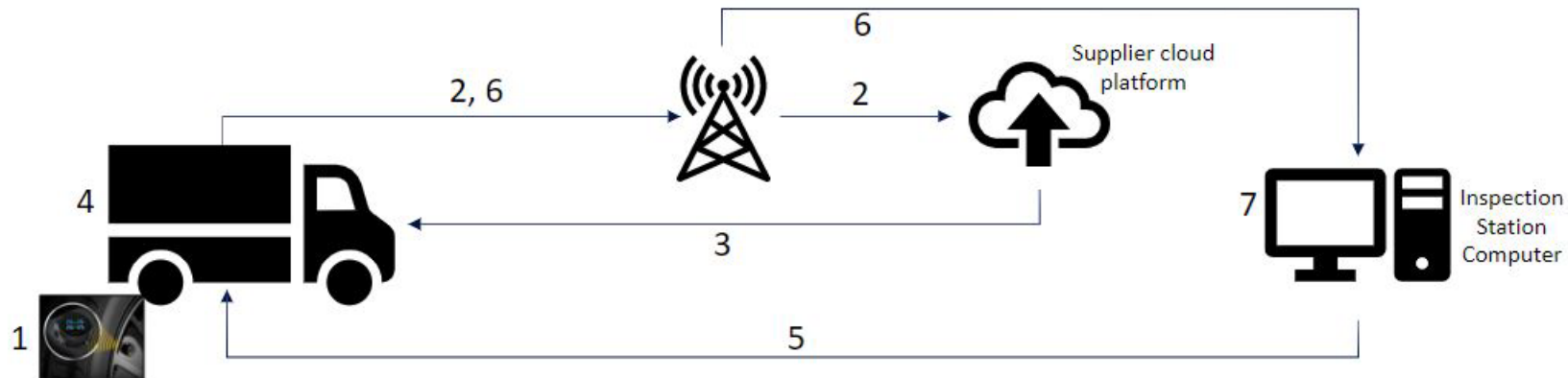
Operational Test Scenarios

- Electronic confirmation and communication of ADS health and status
- Communication of enhanced pre-trip inspection status, certification, data elements
- Populate available data elements into an inspection application
  - Computer at roadside pings truck (while in motion) and truck sends health and status data (i.e., safety data message) and/or pre-trip inspection data
  - Applicable data is displayed in inspection application
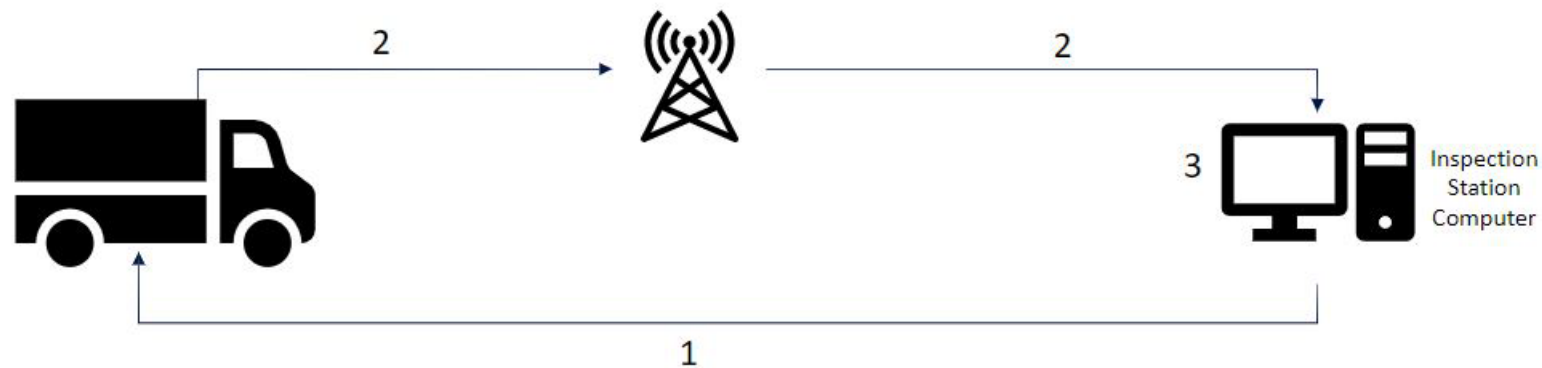
Operational Test Scenarios (continued)

- Evaluate and test predictive algorithms, analytics, and preventive maintenance data (example with tire pressure data)
  - Sensors perform tire pressure measurement, and analytics determine if readings are nearing out-of-service criteria
  - Computer pings truck (while in motion) and truck sends tire pressure data
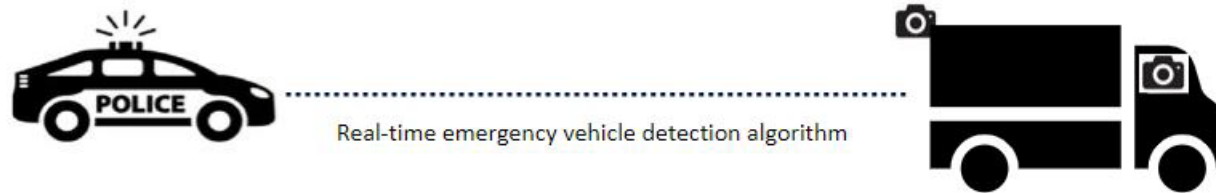
Operational Test Scenarios (continued)

- React and comply with law enforcement electronic messaging or static signs to "Pull-in or Bypass" an inspection/weigh station
  - Vehicle equipped with RFID transponder approaches weigh station and is identified by bypass system
  - The system executes clearance algorithm and signals the transponder to bypass or pull-in based on state criteria, final decision is sent to the truck

Operational Test Scenarios (continued)

- Reaction to emergency lights and siren to either pull over or move over in compliance with State "Move Over Laws"
  - Truck detects via camera (forward and rearward) whether the emergency vehicle light is on/off using a real-time emergency vehicle detection algorithm
  - Truck stops at a desired location (pull-over) or continues on the left lane (move-over) if the emergency vehicle light is on

Real-time emergency vehicle detection algorithm

Timeline

- Project started August 2021
- Operational test scenarios have been developed and initial testing has been completed this month (October 2022)
- Final execution of the operational test scenarios is scheduled for January 2023
- Final report and briefings anticipated be completed by July 2023

Questions / Discussion

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