Truck Platooning Early Deployment Assessment Phase II

Identifying the Need

California Partners for Advanced Transportation Technology (PATH) and its partners are conducting a truck platooning early deployment assessment project for the Federal Highway Administration (FHWA) with a primary goal of better understanding the impacts of truck platooning on long-haul truck fleet drivers and operations.

What is the goal?

The Truck Platooning Early Deployment Assessment Phase II Project aims to accomplish the following high-level goals:

- Assess platooning technology readiness and driver acceptance for field operations
- Determine truck driver preferences for automatic following gap and implications for fuel savings
- Assess impacts on driver performance and alertness over an extended period of usage in traffic
- Better understand the impacts of truck CACC or platooning on safety, fleet operation logistics and truck operating costs in typical long-haul trucking
- Assess interactions between platooned trucks and other drivers in freeway traffic.

Project Description

For the initial phase this project, California PATH and its partners developed a concept and proposal for a truck platooning field operational test (FOT) on a corridor between California and Texas. The FOT phase, which was awarded in July 2020, aims to conduct live truck platooning along the corridor with fleet partner Roly's Trucking, based in Southern California.

PATH and its team are building upon previous truck platooning efforts funded under the FHWA Exploratory Advanced Research (EAR) Program. This coalition comprises the departments of transportation (DOT) of California, Arizona, New Mexico, and Texas, and is also supported by the trucking associations of each state. The coalition includes defined leaders at the DOT technology/operations levels in each state, who will be asked to collaborate with the California PATH team in conducting multi-state operations and facilitate any necessary agreements and outreach efforts necessary to support operations in each state along the test corridor.

The PATH team is leasing four new Volvo trucks and equipping them with Cooperative Adaptive Cruise Control (CACC) technology and a suite of data collection equipment. CACC is a level 1 driving automation system that controls braking and acceleration to maintain proper separation behind the preceding truck when it is engaged, while the driver still steers.

The lead truck will always drive in Adaptive Cruise Control (ACC) mode and the trucks will be limited to driving at 65 mph or less in platooning mode. The other drivers can decide when to drive in CACC mode and set a desired time gap between trucks, which is a minimum of 0.6 seconds (or 57 feet at top speed). Roly's Trucking will integrate the four trucks into their daily fleet operations between terminals in Rancho Cucamonga, California and Fort Worth, Texas (see map below). Up to three of the trucks will operate in platoon formation and the fourth will drive separately to serve as a reference truck for comparison during each run. A purple 3-LED bar installed on the side of each truck will illuminate to indicate when a truck is in platooning mode.

The field test will run for 12 consecutive months and data will be continuously collected and shared with USDOT and their Independent Evaluator during the test. California PATH serves as the 'prime' contractor for the Truck Platooning Early Deployment Assessment project. They are supported by a team of industry experts including Westat (experts in human factors research), Cambridge Systematics, and fleet partner Roly's Trucking. Volvo Group and Bendix are providing technical support and Caltrans is providing the project with matching funds and organizational support.

Projected Benefits to California

This project aims to better understand the impacts of truck platooning on driver behavior, safety, energy consumption,

public policy, and other traffic, as well as accelerate the deployment of CAV technologies for freight.

What is the progress to date?

PATH will complete the system development phase in mid-2021 and begin CACC system readiness testing in the summer of 2021. The FOT and data collection are expected to start in late 2021 and run for 12 months.

Images

A truck used in the field operational test

Final Report

This project is ongoing. The final report will be ready in early 2023.

About the Authors

Xiao-Yun Lu is a Research Engineer at California PATH. He has over 30 years experiences in systems modeling, measurement, estimation, simulation, real-time implementation, vehicle and highway automation, automated vehicle (passenger cars and heavy-duty vehicles) dynamics modeling, and implementation. He is a Principal Investigator/Researcher of multiple PATH projects, including this project.

Ben McKeever is a Program Manager at California PATH and is the project manager for this research. He is responsible for the development and growth of a robust and coherent program in the area of Connected and Automated Vehicle (CAV) research, currently focused on advancing CAV technology and applications from research to deployment throughout the United States.

Steven Shladover is an internationally recognized transportation Research Engineer who pioneered the study of cooperative ACC while working at PATH, and the Senior Advisor on this project. He combines hard-core engineering expertise in dynamic systems and control with knowledge of transportation system policy, planning, and economics, which enables him to effectively apply rigorous analysis methods to complicated transportation problems.

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