Caltrans photos by Thomas Ritter

*Three 18-wheelers that were used in the testing of the Cooperative Adaptive Cruise Control system pull out on their way to give a highway demonstration. After a successful trial period, Caltrans and other groups are recommending lawmakers authorize a new round of testing of the system.*

# Early Truck 'Platoon' Tests Show Promise

## Advanced Cruise Control Technology Could Yield Safety, Other Benefits

The latest generation of cruise control technology for commercial trucks intended to improve safety, lower vehicle emissions and save fuel has undergone successful testing by Caltrans and other groups, completing 8,000 miles without an incident. A report prepared by Caltrans on the new technology recommends that the legislation authorizing the first round of testing be extended.

Cooperative Adaptive Cruise Control (CACC) technology enables vehicles to safely travel closer together than what is normally considered safe. Caltrans recently released a report to the Legislature detailing the results of close-proximity CACC testing of heavy-duty trucks, and based on the data collected, is recommending that lawmakers extend the pilot authorized in Senate Bill 719 (Hernandez, Statutes of 2015).

California is well-suited to benefit from enhanced cruise control technology, particularly for trucks moving freight. More than 40 percent of the nation's container freight enters the United States through Southern California's ports, and trucks carry these goods across state highways to their final destinations.

According to transportation analytics researcher INRIX, Los Angeles was the global leader in urban congestion in 2016. Freight trucks contributed to that congestion as they fanned out across the state and nation from the ports of Long Beach and Los Angeles on Interstates 710, 110 and 405.

As outlined in Caltrans' 2015-20 Strategic Management Plan and the goals of Senate Bill 1, the landmark transportation funding law passed in spring 2017, the Department aims to find new ways to improve the flow of traffic, reduce greenhouse gas emissions and move freight more efficiently and safely along California highways and railways.

And CACC technologies have demonstrated that such a system could prove to be a valuable safety and traffic management tool.

CACC is the next step in the development of vehicle cruise control systems. In the trials, trucks

This technology improves traffic flow stability since trucks respond together, rather than as individual vehicles.

were equipped with state-of-the-art, vehicle-to-vehicle communication systems that shared information in live traffic conditions and on a test track. The system shared data between the trucks to automatically adjust speeds in a cooperative formation called a "truck platoon."

The lead driver in the three-truck platoon set the pace, while the two trailing drivers steered their trucks as they cruised at a controlled and mirrored speed. Radar and video sensors measured the distance between vehicles and relayed signals to maintain a pre-set safe distance. If the first truck sped up or braked, the other trucks automatically adjusted their speed accordingly within a fraction of a second — as a coordinated unit. This technology improves traffic flow stability since trucks respond together, rather than as individual vehicles.

CACC systems also improve safety through reduced reaction times. During the testing of the three-truck platoon, the trailing trucks responded to a leading truck's acceleration or braking within two-tenths of a second. Human reaction times, however, can vary greatly depending on driver attention and experience.

Truck platooning also minimizes aerodynamic drag for the trailing trucks, which saves fuel and money, and reduces emissions. The drivers remain in control at all times and steer the vehicle, but — like traditional cruise control — CACC technology can provide relief to long-haul truck operators.

The electronically tethered trucks logged more than 5,500 miles on California highways without an incident. An additional 2,500 miles were driven on a test track for fuel consumption experiments that demonstrated fuel savings ranging from 5 to 14 percent.

To evaluate CACC system performance and commercial driver acceptance, Caltrans and its partners tested heavy trucks on the state highway system with less than 100 feet separating them at 55 mph. California Vehicle Code requires a minimum spacing of 100 feet between vehicles traveling in a platoon. To address this conflict between current law and the need to test at reduced distances, SB 719 added an exemption from state law to allow testing of driver-assist technologies that enabled truck drivers to operate vehicles within shorter following distances.

Caltrans and a group of public and private partners received a Federal Highway Administration grant in 2014 to develop and test new cruise control technology for heavy trucks. Testing was conducted by Caltrans in cooperation with the California Highway Patrol.

An extension of the project would allow testing partners to incorporate commercial truck drivers' assessment of CACC technology, measure energy savings for commercial driver-preferred truck-to-truck spacing, continue testing interaction with other vehicles, and demonstrate CACC benefits to industry and public stakeholders. MM

***Source:*** *Truck Platoon Testing Allowed Under SB 719 report and Matt Hanson, Caltrans Freight Research Project Manager*

*In the cab of a truck equipped with Cooperative Adaptive Cruise Control technology, drivers monitor an interface tablet screen at left. A shut-off device, with red button, is positioned at center.*