Committee on Transportation and Infrastructure
U.S. House of Representatives
Washington DC 20515

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December 1, 2017

BACKGROUND MEMO

TO: Members, Subcommittee on Highways and Transit
FROM: Staff, Subcommittee on Highways and Transit
RE: Subcommittee Roundtable on "Emerging Technologies in the Trucking Industry"

PURPOSE

The Subcommittee on Highways and Transit will meet on Thursday, December 7, 2017, at 10:00 a.m. in 2167 Rayburn House Office Building, to hold a roundtable discussion on the "Emerging Technologies in the Trucking Industry". The participants include representatives of American Trucking Associations, Volvo Group North America, the National Safety Council, and the Transportation Trades Department, AFL-CIO.

BACKGROUND

Background on the Trucking Industry

Economic Data

Our Nation's transportation infrastructure is the backbone of the U.S. economy. In 2015, all modes of transportation moved an estimated 18.1 billion tons of goods worth about $19.2 trillion (in 2012 dollars) on our Nation's transportation network. On a daily basis, 49 million tons of goods valued at more than $53 billion are shipped throughout the country on all transportation modes.[1] Trucks moved 10.42 billion tons of freight or 70.6 percent of all domestic freight tonnage in 2016.[2]

Operating on the Nation's roadways are 8,456,302 single-unit trucks (straight trucks) and 2,746,882 combination trucks (tractor-trailers) making them a large part of the 263,610,219 total registered vehicles in the United States.[3] The trucking industry also has a huge impact on

[1] U.S. Department of Transportation, Bureau of Transportation Statistics, DOT releases 30-Year Freight Projections, March 3, 2016.
[2] American Trucking Associations, Trucking Industry Revenues Were $676.2 Billion in 2016, August 14, 2017.
[3] U.S. Department of Transportation, Federal Motor Carrier Safety Administration, 2017 Pocket Guide to Large Truck and Bus Statistics.

employment with 5.9 million Commercial Driver's License (CDL) drivers, who operate both interstate and intrastate in the United States.[4]

Safety Data

In 2015, there were 279.8 billion miles traveled by large trucks, which represents approximately nine percent of the overall total vehicle miles traveled by all motor vehicles. Of the 32,166 fatal crashes on the Nation's roadways in 2015, 3,838 of those involved at least one large truck or bus. That year, 4,067 people were killed in accidents involving large trucks.[5] There were an estimated 476,000 additional large bus or truck crashes that did not involve a fatality.[6] Data from the National Highway Traffic Safety Administration (NHTSA) states that 94 percent of all serious crashes are due to dangerous choices or errors people make behind the wheel.[7]

Select Emerging Trucking Technologies

A number of emerging trucking technologies and developments are currently being utilized or explored within the trucking industry. These technologies have the potential to improve the safety and productivity of the industry. While not an exhaustive list, below are some of the technologies and developments that are relevant to this roundtable discussion.

Automatic Emergency Braking (AEB) Systems

AEB systems detect an impending forward crash with another vehicle in time to avoid the crash or mitigate its impacts. These systems first alert the driver to take corrective action to avoid the crash. If the driver's response is not sufficient to avoid the crash, the AEB system may automatically apply the brakes to assist in preventing or reducing the severity of a crash.[8]

Forward Collision Warning (FCW)

FCW is an advanced safety technology that monitors a vehicle's speed, the speed of the vehicle in front of it, and the distance between the vehicles. If vehicles get too close due to the speed of the rear vehicle, the FCW system of the vehicle will warn its driver of an impending crash.[9]

[4] U.S. Department of Transportation, Federal Motor Carrier Safety Administration, 2017 Pocket Guide to Large Truck and Bus Statistics.
[5] U.S. Department of Transportation, Federal Motor Carrier Safety Administration, 2017 Pocket Guide to Large Truck and Bus Statistics.
[6] U.S. Department of Transportation, Federal Motor Carrier Safety Administration, 2017 Pocket Guide to Large Truck and Bus Statistics.
[7] U.S. Department of Transportation, National Highway Traffic Safety Administration, Automated Vehicles Safety
[8] U.S. Department of Transportation, National Highway Traffic Safety Administration, Safety Technologies.
[9] U.S. Department of Transportation, National Highway Traffic Safety Administration, Safety Technologies.

Lane Departure Warning (LDW)

LDW is an advanced safety technology that alerts drivers when they unintentionally drift out of their lanes without a turn signal. LDW systems use a camera to monitor lane markings and detect when a vehicle is drifting out of its lane of traffic.[10]

Lane Keeping Support (LKS)

Similar to LDW, LKS is an emerging safety technology that prevents drivers from unintentionally drifting out of their lanes. LKS systems use information provided by sensors in a lane departure warning system (LDW) system to determine whether a vehicle is about to move out of its lane of travel. If so, LKS activates by correcting the steering, braking, or accelerating one or more of the wheels, or a combination of both, resulting in the vehicle returning to its intended lane of travel.[11]

Connected Vehicle

Connected vehicle technologies enable cars, buses, trucks, trains, roads, infrastructure, bicyclists, and pedestrians to communicate through wireless technology.[12] Connected vehicle technologies, which allow vehicles to "talk" with each other (as well as other modes of transportation and surrounding infrastructure), can prevent crashes by detecting when another vehicle's speed and location present a dangerous situation. For instance, if two connected vehicles approaching an intersection appear to be on a collision course, the vehicle may alert its respective driver of the hazard, and could do so even before the driver would normally be able to assess the situation. In addition, connected vehicle technologies can be integrated with other technology, such as AEB, in order to take automatic action to prevent a crash.[13]

Partially Automated Truck Platooning

Partially automated truck platooning is a connected vehicle technology that enables multiple trucks to continuously communicate and coordinate travel in order to follow each other at close proximity. The truck(s) following behind the lead truck are "partially" automated in that the vehicle controls the coordinated speed and braking with the lead truck in the platoon, but the driver maintains steering control at all times. The drivers can take over the speed and braking at any time, and the driver is expected to continually monitor the driving situation to be ready to assume full control of the truck as needed.[14]

[10] U.S. Department of Transportation, National Highway Traffic Safety Administration, Safety Technologies.
[11] U.S. Department of Transportation, National Highway Traffic Safety Administration, Safety Technologies.
[12] U.S. Department of Transportation, Federal Highway Administration., Truck Platooning "Partially-Automated Truck Platooning Demo Frequently Asked Questions (and Answers)"
[13] U.S. Department of Transportation, National Highway Traffic Safety Administration. "U.S. DOT advances deployment of Connected Vehicle Technology to prevent hundreds of thousands of crashes." December 13, 2016.
[14] U.S. Department of Transportation, Federal Highway Administration. "Partially-Automated Truck Platooning Demo Frequently Asked Questions (and Answers)"

Autonomous Vehicle (AV)

AVs are motor vehicles capable of operating without any direct human input or control over a vehicle's safety-critical functions, such as steering, acceleration, and braking. These vehicles generally work by using a combination of three systems:

- A global positioning system (GPS) or other mapping system that defines the starting and ending point of the drive;
- A sensor system composed of cameras, lasers, radar, or lidar (a technology that measures distance using laser light) that detects dynamic and variable roadway conditions; and
- A computer system that can turn the information from the mapping system and sensor systems into a driving action, which is typically executed by the vehicle's internal electronic network.[15]

Levels of Automation - The Society of Automotive Engineers International developed six standardized, internationally adopted definitions to describe levels of automation in motor vehicles:

Level 0	The human driver does all the driving.
Level 1	An advanced driver assistance system (ADAS) on the vehicle can sometimes assist the human driver with either steering or braking/accelerating, but not both simultaneously.
Level 2	An ADAS on the vehicle can itself actually control both steering and braking/accelerating simultaneously under some circumstances. The human driver must continue to pay full attention ("monitor the driving environment") at all times and perform the rest of the driving task.
Level 3	An Automated Driving System (ADS) on the vehicle can itself perform all aspects of the driving task under some circumstances. In those circumstances, the human driver must be ready to take back control at any time when the ADS requests the human driver to do so. In all other circumstances, the human driver performs the driving task.
Level 4	An ADS on the vehicle can itself perform all driving tasks and monitor the driving environment – essentially, do all the driving – in certain circumstances. The human need not pay attention in those circumstances.
Level 5	An ADS on the vehicle can do all the driving in all circumstances. The human occupants are just passengers and need never be involved in driving.[16]

[15] U.S. Department of Transportation, National Highway Traffic Safety Administration, Automated Vehicles Safety
[16] U.S. Department of Transportation, National Highway Traffic Safety Administration, Automated Vehicles Safety

PARTICPANT BIOGRAPHIES

Mr. Greer Woodruff, Senior Vice President of Safety, Security, and Driver Personnel, J.B. Hunt, on behalf of the American Trucking Associations

- Mr. Greer joined J.B. Hunt as a management trainee in 1987 and has spent the last 30 years working his way through the business and into his current role where he leads the company's safety and driver recruitment efforts.
- He also serves as the chairperson of the Technology Advisory Committee for the Alliance for Driver Safety and Security, also known as the Trucking Alliance, and serves on FMCSA's Safety Advisory Committee (MCSAC).

Ms. Susan Alt, Senior Vice President of Public Affairs, Volvo Group North America

- Ms. Alt has been with Volvo for 29 years and has held several senior roles for Volvo and Mack Trucks in Marketing, Strategy and Business Development.
- She was also the President of Volvo Logistics of the Americas, and as such, the first woman to manage a division for Volvo in North America.

Ms. Jane Terry, Senior Director of Government Affairs, National Safety Council

- Ms. Terry has nearly 20 years of experience working with local, state, and federal government officials on transportation, telecommunications, workplace safety, community development, and healthcare initiatives.
- Prior to joining the National Safety Council, Ms. Terry served as the director of government affairs at the National Transportation Safety Board.

Mr. Larry Willis, President, Transportation Trades Department (TTD), AFL-CIO

- Mr. Willis leads and oversees TTD's policy, legislative, and legal activities, representing the interests of TTD and its affiliate unions before Congress and among key Executive Branch officials.
- He started at TTD in 1996 and has held various positions since that time, including as General Counsel and Secretary-Treasurer. He also served as Director of Legislation and as Associate at Weil, Gotshal & Manges LLP.