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Recommendations Regarding Automated Driving and Platooning Systems

Developed by the Technology & Maintenance Council's (TMC)
Future Truck Committee Automated Driving and Platooning Task Force

ABSTRACT

The development and introduction of automated vehicle technology has sparked great interest within the trucking industry. Developed by TMC's Automated Driving and Platooning Task Force under the auspices of the Council's Future Truck Committee, this Position Paper offers several recommendations regarding the development and implementation of automated driving and platooning systems. It should *not* be viewed as an endorsement of automated driving and platooning systems.

INTRODUCTION

This Position Paper offers several recommendations regarding the development and implementation of automated driving and platooning systems. It was developed by TMC's Automated Driving and Platooning Task Force under the auspices of the Council's Future Truck Committee. It should *not* be viewed as an endorsement of automated driving and platooning systems. For a comprehensive review of the intensive activity associated with the development and introduction of Automated Vehicles (AVs) and the potential issues and opportunities they pose for the trucking industry, refer to TMC's Information Report IR 2015-02, *Automated Driving & Platooning: Issues & Opportunities*.

RECOMMENDED ACTIONS FOR TMC STUDY GROUPS AND COMMITTEES

Regarding automated driving and platooning technologies, TMC's Future Truck Committee recommends that the Council:

a. Conduct a review of the benefits and impacts of near-term platooning systems to develop guidance for system developers (building on the contents of TMC IR 2015-01, *Automated Driving & Platooning: Issues & Opportunities*).
b. Assess any barriers to various forms of truck automation, particularly in terms of state/federal regulations.
c. Establish an expert consensus on the amount of fuel savings potential for various following distances, speeds and vehicle design.

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d. Assess the degree to which technicians need to be trained and/or certified to maintain Driver Assistive Truck Platooning (DATP) systems.
e. Hold discussions with the enforcement community to assess enforcement issues for near term automated driving systems.
f. Closely track industry developments to introduce Level 2 (and higher) automation systems (as defined by SAE J3016, "Taxonomy and Definitions for Terms Related to On-Road Motor Vehicle Automated Driving Systems.")
g. Develop "Guiding Principles" for near-term platooning and early forms of independent automation, building on the contents of TMC IR 2015-02, *Automated Driving & Platooning: Issues & Opportunities*.

GENERAL RECOMMENDATIONS FOR THE HEAVY-DUTY TRUCKING INDUSTRY

Regarding automated driving and platooning technologies, TMC's Future Truck Committee recommends that the heavy-duty trucking industry:

a. Prepare, as needed, model legislation for states regarding operation of near-term truck AV systems.
b. Assess current insurance approaches for suitability for increasing levels of automation. Work with insurers to develop new models as needed. Address the particular needs of self-insured fleets.
c. Assess and facilitate public acceptance of near-term truck AV systems.
d. Address specific technical and scientific evaluation tasks such as:
    - Determine the time needed for a commercial vehicle operator to re-attach to the driving task in event of a system failure in a highly automated commercial vehicle. This reattachment period could be different than the operator of a passenger car.
    - Study the truck driver's capability of controlling a vehicle with minimal following distances for long periods of time while experiencing the lack of a large field of view, especially behind a van trailer. Such studies should assess the issues and also investigate means of countering any negative effects.
    - Assess what overall vehicle design characteristics can be modified to maximize fuel savings in platooning. For example, the optimal aerodynamics package for independent operation may be different when drafting in a platoon.
    - Investigate the pros and cons of adding lateral control to near term truck platooning systems. In particular, assess the need for lateral control or lane-keeping to allow closer following distances, thereby further improving fuel economy.
    - Examine traffic impacts for near-term truck platooning across various levels of market penetration, across light and heavy truck traffic corridors, and across platoon length.
    - Conduct analyses to estimate the likelihood of passenger vehicle cut-ins between platooning trucks, for various platooning following distances.
    - Examine (once traffic impacts are understood) different rules on different corridors, if this fulfills policy goals for traffic and freight efficiency. For instance, road segments serving ports might allow longer platoons than the overall road network.
    - Determine the impact that engine de-rating due to aftertreatment/emissions systems will have on platooned vehicles, and determine what system integration is needed such that all vehicles in the platoon would match speed and power should one of the units experience a engine de-rate condition.

e. Conduct research to determine what technology is needed to control the platooning engagment/disengagement process such that corporate polices are so enforced, if so desired. Current platooning models assume the driver will make the decision as to whether to platoon or not. However, some companies may wish to restrict this decision-making to a preferred list of carriers/operators.
f. Conduct research on developing criteria for joining a platoon based on vehicle configuration, loads, weather conditions, routes, internal company cost, customer contracts , etc. This, because not all runs are profitable and not all platooning may result in economic savings even if fuel costs are reduced.
g. Assess the impact that local, state and federal government may have on regulating the distance between platooned vehicles, since size and weight regulations are often addressed at a state or local level. For example, the state of Florida requires a minimum distance of 300 feet between platooned vehicles; at this gap, there is a greatly reduced potential for fuel savings — in fact, there may be a fuel penalty because of turbulence between the first and second truck. Therefore, the impact of following distance on fuel economy needs to be studied before widespread adoption of platooning can be embraced. As mentioned previously, TMC can play a role in this research, but other segments of the industry will also need to participate in the investigation.

RECOMMENDATIONS FOR TECHNOLOGY DEMONSTRATIONS

Technology demonstrations are essential for fostering cooperation between all stakeholders, suppliers, regulators, insurance companies, states and commercial fleets. A national approach should be developed to gain experience through on-road testing and open the way for deployment of near-term platooning systems — if test results are positive. This should be done by region or state in order to foster widespread acceptance, and should include a diverse group of vehicle manufacturers, suppliers, and fleets.

It is worth noting that a growing number of states are showing strong interest in hosting demonstrations and fleet pilot programs. Several are actively working to arrange their own truck platooning projects or to host private sector demonstrations and fleet pilots. This should be encouraged.