

## A human-centred approach to truck platooning

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### Abstract

The concept of truck platooning comes from the linking of two or more trucks driving on the road very closely in convoy. The first truck is the leader and the following truck(s) react and adapt their speed and lane position without human action, using driving automation and vehicle-to-vehicle communication. This coordinated movement reduces fuel consumption, CO2 emissions and traffic jams, but most important, improves road safety and drivers' working conditions. However, during the transition to full automation, the driver will still be kept "on the loop", as he/she will still be responsible for supervising the driving task. Therefore, truck platooning is a totally new technology that requires deep human factors research to avoid compromising road safety by the introduction of new and unexpected risks.

The project TRAIN will identify the risks and requirements for a human-centred development of truck platooning technology. First, TRAIN will engage professional truck drivers and freight companies in focus groups interviews and in nationwide questionnaires to identify their mental representations about truck platooning and to develop a technology acceptance model.

Then, driving simulations will be conducted to assess the main risks associated with truck platooning under automation levels 2-3. The simulations will be designed to (i) evaluate drivers' understanding of the system and their situation awareness, and (ii) test safe following distances, considering the trade-off between safe takeover and the probability of platoon disruption by a car cutting into the gap between trucks. The data collected will allow predicting the evolution of drivers' alertness across time and to derive safe and efficient thresholds for takeover and following distances.

In the end, TRAIN will deliver essential guidelines to the truck platooning industry, operators and authorities, centred on the training needs and risk factors associated with a safe and acceptable deployment of truck platooning on public roads.

**Author Keywords.** Truck platooning, Road safety risks, user acceptance, driving simulator.

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