

## Issues and Questions: Truck platooning

VW: For further discussion, a clear definition of truck platooning is required according to the different potential technical levels of platooning in order to prepare concise answers

### Following distances and headways in the Member States

#### Should platoons comply?

BE: Each vehicle has to comply with the applicable rules. In Belgium, a different regime for truck platooning will be in force, since the actual legal minimum distance in Belgium is 50 metres. The minimum distance for truck platooning still has to be tested, but the legislation could only define “a safe minimum distance” as well. Few evidence from the European Truck Platooning Challenge (ETPC) suggests that our maximum speed limit of 90 km/h for trucks is appropriate for truck platooning as well.

FI: Distances and headways should be safe. Safety depends on the technology used, and for most platoons safe following distances and headways are likely shorter than what is currently defined for human drivers.

SP: Yes

London: Technology, data sharing, advanced driver assistance / vehicle control standards and vehicle compatibility should define the safe following distance, including safety margins. It is important that systems take into account several factors to set a safe headway, including the fully laden weight and the braking ability of each vehicle. Other factors include weather conditions, tyre and brake condition, highway conditions and configuration. In some cases, the conditions may warrant setting a platooning distance greater than what an average driver would use. There may be conditions in which platooning is not advisable

Daimler: No. This does not make any sense. If we are to allow platooning, then the spacing needs to be close.

VW: YES

ETSC: No. This does not make any sense. If we are to allow platooning, then the spacing needs to be close.

ICCS: Ideally no. There should be customised distance limits for platooning vehicles depending on their speed of course

#### Are current regulations appropriate? Do we need a TTC-based regulation?

DE: These issues concern the principles of Member States highway codes and do not need to be addressed on an EU level.

SP: NO

London: There are already many initiatives looking at regulation (eg. Companion D2.2 within the Seventh Framework Programme and C-ITS initiatives)

Daimler: This needs expert input, to ensure safety in the event of sharp deceleration being required. It also on the technology being used for V2V communication. Another issue is that the spacing probably needs to be increased prior to manual takeover.

VW: This issue should be assessed in further detail, potential revisions should take the specific situation of platooning into account.

ETSC: This needs expert input, to ensure safety in the event of sharp deceleration being required. It also on the technology being used for V2V communication. Another issue is that the spacing probably needs to be increased prior to manual takeover.

ICCs: To the best of my knowledge no current regulations are not appropriate

### **How is de-platooning while in motion to be managed?**

DE: Evaluate experiences from the European Truck Platooning Challenge and related follow-up activities.

BE: It is the responsibility of the manufacturer to provide a safe system. Thus, the de-platooning will result in an increase of the distance between the trucks. Related to the driver, the system must be easy to understand and to handle. An audible signal, well in advance, is required – possibly accompanied by a visual signal. This procedure has to be thoroughly tested on closed tracks and will be part of the driver formation when implemented.

FI: It must be allowed, possible and easily implemented.

SP: NO SPECIFIC REQUIREMENTS

London: Entire platoon shares compatible vehicle to vehicle (V2V) and vehicle to infrastructure (V2I), command language, etc. Navigational system or other in-cab request to platoon control system by vehicle leaving the system. Platoon system acknowledges request, issues confirm/deny and initiates exit protocol (considers terrain, congestion, safety, other factors) which manages transfer of control. There are good process descriptions in the National Automated Highway Consortium paper. De-platooning mostly outside congested urban areas (perhaps using geofencing to enforce). Will need to consider protocols at entry and exit to motorway intersections to accommodate other traffic

Daimler: We need an agreement on this. A proper process should be part of type approval. A voluntary agreement between manufacturers with the opportunity for public input into the process might suffice. This area is especially important for multi-brand platooning.

VW: The issue deserves further elaboration, for example a truck intending to leave the platoon has to increase the distance to 50m. After this, the driver of the truck has to change the lane to leave the

platoon. After the truck has changed lanes, the following truck has to close up which may lead other cars to drive into the gap.

ETSC: We need an agreement on this. A proper process should be part of type approval. A voluntary agreement between manufacturers with the opportunity for public input into the process might suffice. This area is especially important for multi-brand platooning.

ICCS: there should be a considerable process at a safe distance before de-platooning. Driver notification and driver acknowledgement, notification of the infrastructure, V2V communication and acknowledgement at least.

### **Driver hours**

DE: Currently not applicable

BE: It will depend on the level of automation whether the driver hours can be adapted. This will not be the case while driving at SAE level 1 (as in ETPC) or 2.

Another topic is the number of hours a driver has been in training before he is allowed to drive in truck platooning. This will be a major point in driver formation.

FI: . Some kinds of changes are likely needed at some point. The impact on driver hours depends on the level and reliability of automation.

SP: AS IN OTHER COMMERCIAL VEHICLES

VW: This issue deserves further consideration, detailed discussion is needed.

Daimler: If following drivers are required to be attentive, then it is logical to treat their hours as driving time. There is a need to consult with employers and employee organisations.

ETSC: If following drivers are required to be attentive, then it is logical to treat their hours as driving time. There is a need to consult with employers and employee organisations.

### **Following drivers — do they have to be attentive?**

DE: They should be able to take over full control of their trucks in case of a disassembly of the platoon.

BE: This depends as well from the level of automation. In short and medium terms, drivers might be disengaged from paying attention in specific circumstances. However, if any modification or risk happens, they will have to be able to take control again in just a few seconds.

The challenge is twofold: to ensure truck platooning works in all circumstances (the vehicles should always keep their connection) and to manage other road users' behaviour. In dense traffic with lots of weaving sections, as is the case in Belgium, CAV will assist the driver instead of replace him for many years to come.

FI: For current solutions, yes. Going forward, the goal is that the following drivers do not have to be continuously attentive and alert.

SP: THEY SHOULD OR THE SYSTEM MUST INCLUDE SOME FEATURES TO WARN DRIVERS TO OVERRIDE

London: Not fully attentive but aware of surroundings with full automation. Close following distances may not leave enough time to respond to external events, particularly where they have limited vision of the road ahead. Tachograph and rules around driver breaks/rest periods for commercial vehicles will need to be reviewed.

VW: In general, this depends on the exact definition of the platoon and the technical capabilities of the system

Daimler: If it's Level 3, yes. If it's Level 4, then it would be subject to Article 8, paragraph 5bis, first sentence of the March 2016 Amendment of the Vienna Convention. So a system would have to conform to UNECE technical requirements, and these would have to be agreed internationally. And then it could be no.

Tomtom: Yes

ETSC: If it's Level 3, yes. If it's Level 4, then it would be subject to Article 8, paragraph 5bis, first sentence of the March 2016 Amendment of the Vienna Convention. So a system would have to conform to UNECE technical requirements, and these would have to be agreed internationally. And then it could be no.

ICCS: Yes if not at all times then frequently - or through the existence of dedicated lanes

### **Indication to the exterior**

DE: To be harmonized at least on an European level

BE: In ETPC, we have discussed pros and cons. In principle, we are in favour. Since truck platooning neglects the legal minimum distances, an indication on the trucks to inform other road users on their permission because of the advanced technology, is important to enhance social acceptability and to avoid copycat behaviour by other truck drivers. The disadvantage is that other drivers should focus on the road instead of being attracted to other vehicles. More testing with scientific evaluation is required to build up a more solid argumentation.

FI: . In general, no special indication is needed. In cases of long platoons, however, some indication might be considered similar to overlong or overwide transports today.

SP: NO ESPECIAL INDICATION SHOULD BE REQUIRED

London: A visual indication standard should be developed across all vehicle types to indicate when vehicles are operating in an autonomous mode. Trials in the USA have included blue lighting of the number plate, radiator grill and indicators to alert other road users. However, blue lighting is also associated with EVs and blue indicators with emergency response vehicles

VW: Again, this could be helpful but further discussion and detailed assessment are required.

Daimler: Yes, this is needed. There is precedent in special conspicuity marking in several Member States for current long vehicles, and for specific indications in the case of extra-wide loads.

Tomtom: Yes- the vehicle should somehow show to all nearby drivers that automated driving is in progress (it is a matter of safety)

ETSC: Yes, this is needed. There is precedent in special conspicuity marking in several Member States for current long vehicles, and for specific indications in the case of extra-wide loads.

ICCS: Possibly. Alternatively indication through in-vehicle displays (when available) or highlight of a dedicated lane

### **Operation: disassembly around entrances and exits (weaving sections)**

DE: If disassembly is necessary or not may depend on the size of the platoon. Evaluate experiences from the European Truck Platooning Challenge and related follow-up activities.

BE: Although disassembly would cause a considerable loss of efficiency of truck platooning, it might be necessary from a road safety perspective. It is clear that road safety is our first concern.

FI: Dynamically adjusted longer headways around entrances and exits.

SP: ROUNDABOUTS, COMPLICATED MERGE SITUATIONS

London: Automated separation and even breakup and joining within individual delivery vehicles may eventually become possible, allowing almost last-mile freight distribution. For now, see de-platooning comments

VW: Again, further discussion is required but in general, this should be per request only. For this reason, platoons should not exceed 3 trucks in in one platoons as long as entries and exits occur as frequently as in Europe.

Daimler & ETSC: We need research here to determine where platoons are not allowed to operate. Examples might be around entrances and exits, through roadworks, contraflows with narrow lanes, crossovers at the beginning and end of contraflows, and for hard shoulder running.

We also need specification of minimum road type and quality for the operation of platoons. Platoons may need to be forbidden on sub-standard road sections. Link to infrastructure section in ETSC paper (3.5.2).