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Proposal for amendments to FRAV 32-04

Submitted by the expert from the United Kingdom

The text reproduced below was produced by experts from the United Kingdom. The modifications to the existing text of the Regulation are marked in bold for new or strikethrough for deleted characters. It contains suggested amendments to the FRAV document.

United Kingdom amendments to the Recommendations concerning Safety Requirements for the Assessment of Automated Driving Systems and ADS Vehicles

Proposal I

5.12.1.7. Remote termination of the availability of the ADS or its feature(s) to the user by an authorized entity shall be possible in ADS vehicles ~~equipped with wireless connectivity enabling access to the ADS (e.g., over the air software update capability).~~

Justification I

Unsure why such a feature should just be limited to connected vehicles. Whilst it might necessitate that all ADS are connect there needs to be a means of disabling ADS features if problems arise.

Proposal II - definitions

- 3.12. “Minimal Risk Condition (MRC)” means a stable and stopped state of the vehicle that reduces the risk of a crash for the ADS users and other road users.

Justification II

MRC is not just about the potential for a crash it is the safety of the ADS users and other road users in general.

Proposal III – shall and may

- 2.2. Usage of the verbal forms “shall” **indicating an obligatory provision** and “may” **indicating a permissive provision**, should be understood within the context of providing recommendations per the preceding paragraph.

Justification III

Clarifying the intent of the use of “may” and “shall” in the context of the provisions so there is no confusion regarding the differing use of the terms. The use of “shall” is to be seen as something that is expected of the ADS whereas the use of “may” is something that the ADS is allowed to do but there is no expectation.

Proposal IV – traffic rules

- 5.8.5.9. The ADS shall ~~yield the right of way~~ **detect and respond** to priority vehicles in service in accordance with the relevant traffic law(s).

- 5.8.5.10. ADS shall comply with the traffic laws in ~~nominal~~ **critical and failure** conditions, except when in specific circumstances or when necessary to enhance the safety of the vehicle’s occupants and/or other road users.

Justification IV

“Yield the right of way” is not a widely-used term and it only deals with one approach in responding to priority vehicles, detect and respond is more general and should cover all varying traffic rules.

The ADS should be complying with all traffic laws in nominal conditions as circumstances where the vehicle’s occupant’s safety is in question could not be described as nominal. This could potentially be the case in critical and failure conditions. However, under those circumstances the vehicle should continue to obey traffic rules unless there was a safety need not to.

This requirement would also need to move to the critical or failure section.

Proposal V – subcategories of fallback user

- 3.10. “*Fallback user*” means a user designated to assume the role of driver upon completion of a transition of control.
- 3.10.1. “*Compulsory fallback user*” means a fallback user who must take control of the vehicle and assume the role of a driver when an ADS requests a transition of control.
- [3.10.2. “*Discretionary fallback user*” means a fallback user who may take control of the vehicle through a user-initiated transition of control.]
- 3.11. “*Fallback-user response*” means the response of a **compulsory** fallback user to a request for fallback-user intervention in vehicle control by the ADS.
- 3.22. “*Transition of control (TOC)*” means a procedure by which the ADS hands over dynamic control of the vehicle to the fallback user such that the fallback user is given the role of driver upon completion.
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- 1.5.5. Roles may change during the course of a trip. For example, in some configurations, when a driver activates the ADS while the vehicle is moving, the ADS becomes ~~the sole vehicle operator~~ **responsible for the operation of the vehicle** (i.e., performing the DDT) and the driver shifts to the role of fallback user. For safety reasons **with certain ADS, this a compulsory** fallback-user role entails an obligation to remain receptive and responsive to ADS requests to assume control over the vehicle (i.e., to return to the role of driver).
- 1.5.6. The requirements recommended in this document address misuse prevention and the safety of user interactions such as transitions of vehicle control; however, the **compulsory** fallback-user role also **indicates the necessity of** ~~suggests~~ traffic laws to codify obligations of **compulsory** fallback users to maintain their readiness to drive the vehicle during a trip.
- 1.7.9.2. Trust often determines automation usage. ~~Operators–Users~~ may not use a reliable automated system if they believe it to be untrustworthy. Conversely, they may continue to rely on automation even when it malfunctions.¹ ADS should be designed to foster a level of trust that is aligned with their capabilities and limitations to ensure proper use.
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- 5.11.6. For a safe use of the ADS mode confusion needs to be avoided. Therefore, it is essential that an ADS cannot be activated by mistake within the ODD nor that it can de-activated **by mistake**. Misuse of the ADS can for example be that a **compulsory** fall-back user is sleeping while the ADS performs the driving task.
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- 5.11.8. An ADS which ~~permits~~ **may request** a transition of control shall be designed to ensure safe transitions of control **to a compulsory fallback user**.
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- 5.11.8.1 The Transition of control process shall follow a common sequence of actions and states
- 5.11.8.2 Transition of control shall return to a common default user role
 - a) The role of the user after a transition of control from the ADS to the user or after the deactivation of the ADS. This role shall normally be a fully engaged driver without any control assistance (temporarily intervening safety systems such as ESC will remain activated)
- 5.11.8.3 The ADS shall continuously verify whether the **compulsory fallback** user is available for the Transition of Control and
 - a) adapt the Transition of Control process, including the time budget where feasible, to the state of the **compulsory fallback** user and/or to the ADS.
 - b) warn the **compulsory fallback** user if not available when required
 - c) register **compulsory fallback** user response indicating readiness for transfer of control
- 5.11.8.4 The ADS shall verify that the **compulsory fallback** user is in stable control of the vehicle to complete the Transition of Control process

- 5.11.9. An ADS which permits user-initiated takeovers of control shall be designed to ensure a safe user-initiated takeover process.
- 5.11.9.1 Such ADS shall allow the **fallback** user to ~~to~~ initiate a take-over process.
- 5.11.9.2 The deactivation shall follow a common sequence of actions and states in the transition of control (change of user roles)
- 5.11.9.3 The ADS shall momentarily delay deactivation of driving control when immediate human resumption of control could compromise safety.
- 5.11.9.4 The ADS shall provide clear, specific feedback of the completion of a user initiated take over.
- 5.11.9.5 The user initiated take over shall return to a common default user role being the driver.
 - a) The role of the **fallback** user after a transition of control from the ADS to the user or after the deactivation of the ADS. This role shall normally be a fully engaged driver without any control assistance (temporarily intervening safety systems such as ESC will remain activated)

Justification V

We propose subdividing the category of fallback user into compulsory and discretionary fallback users. The FRAV document currently does not distinguish between fallback users which the ADS may request the a transition of control to the fallback user for safe continuation of the journey in its safety concept and those which do not. ADS that do not make such requests and have the capability to drive within their ODD without the need for a compulsory fallback user may still possess vehicle controls should the user choose to drive. By utilising a single term for these two different cases there is a risk that certain requirements will be inappropriately applied.

The current definition in 3.10 does not make the distinction between discretionary or compulsory fallback user but the use in paragraphs 1.5.5 and 1.5.6 imply a compulsory case. Sections 5.11.8 and 5.11.9 describe ADS and user-initiated transitions of control respectively, with the clarified definitions it becomes clear which users the requirements refer to e.g. there is no need to constantly monitor a discretionary fallback user's readiness but there would be for a compulsory fallback user.

Language is used from paragraph 1.5.5 in 5.11.8 for consistency.

“Vehicle operator (used in 1.5.5) sounds like a role (which is undefined) that could create ambiguity so is simplified by changing it to responsible for operation of the vehicle for clarity. Removed a later reference to operators as well to avoid creating roles that are not defined.

Proposal VI – Non DDT legal requirements

5.11.12.2 ~~A dedicated ADS shall ensure that it operates within operational relevant legal boundaries.~~ **An ADS which can operate without permitting transitions of control shall only operate when it has been ensured by the ADS or by other means that relevant legal requirements which are not related to the DDT (e.g. wearing of seatbelts, maximum vehicle loading) are fulfilled.**

Justification VI

“Relevant legal boundaries” is unclear. Whilst all ADS must comply with laws relating to the DDT, in the case of vehicles with no fallback user compliance should also be ensured with laws not relating to the DDT (e.g. seatbelt wearing, loading limits). This may be achieved through technical or non technical means (e.g. onboard supervisor).

Proposal VII – Delay in transfer of control

5.11.9.3 The ADS shall **warn and** momentarily delay deactivation of driving control when immediate human resumption of control could compromise safety. **The fallback user shall have the capability to override such a delay.**

Justification VII

If a human wishes to take back control of the vehicle they should not be prevented from doing so. This is to help avoid any legal uncertainty about who is in control of the vehicle. Including a warning that can be overridden ensures the user does not accidentally take control when unaware of a danger.

Proposal VIII

4.2. The manufacturer shall describe ~~means~~ **the information and approach to be** made available to the public to promote a correct understanding of the intended uses and limitations on the use of the ADS and its feature(s).

Justification VIII

It is unclear what is meant by means. This could simply be the method being taken and does not constitute the information which is also relevant to this provision.

Proposal IX

5.8.4.7. The ADS shall detect objects in and around its path of travel that exceed a **relevant** ~~minimum~~ size

Justification IX

It is not clear how this will actually be defined. Depending on the object the minimum size that needs to be considered will vary. It would be better to remove this requirement unless it can be justified why necessary.

Proposal X

~~5.11.1. Until now it has always been clear who's driving, who is responsible for performing the driving task, not only for controlling the vehicle but also for perceiving and interpreting the environment and for choosing a cause of action. That clarity is fading with the introduction of automation in the vehicle and will become even less clear with the introduction of automated driving systems (ADSs) where it concerns vehicles equipped with ADS that can also be driven by a human being inside the vehicle.~~

Justification X

This is an inaccurate statement and is not appropriate for it to be contained in these guidelines.