

## Proposal for amendments to UN Regulation No. xxx (ALKS)

This document proposes amendments to the original series of Regulation xxx (ALKS) aiming at introducing provisions allowing the system cross lane markings during an Emergency Manoeuvre.

Proposed changes to the current text of the regulation are marked in **bold** for new text.

### I. Proposal

*Paragraph 5.3., amend to read*

“2.6. “*Imminent collision risk*” describes a situation or an event which leads to a collision of the vehicle with another road user or an obstacle which cannot be avoided by a braking demand with lower than  $5 \text{ m/s}^2$ .”

*Paragraph 5.3., amend to read*

“2.8. “*Emergency Manoeuvre (EM)*” is a manoeuvre performed by the system in case of an event in which the vehicle is at **imminent risk of a collision risk** and has the purpose of avoiding or mitigating a collision. **This includes manoeuvres when a collision is already imminent as well as [those where evasive steering needs to be performed by the system in order to keep the risk of a collision at a low level. / evasive steering maneuvers that aim to avoid a collision to become imminent. ]**”

*Paragraph 5.3., amend to read*

“5.3. Emergency Manoeuvre (EM)

5.3.1. An Emergency Manoeuvre shall be carried out in case of an imminent collision risk **or when the vehicle needs to cross lane markings to mitigate the risk of a collision.**

5.3.1.1. Any longitudinal deceleration demand of more than  $5.0 \text{ m/s}^2$  of the system shall be considered to be an emergency manoeuvre.

**5.3.1.2. Any lateral manoeuvre that leads the ALKS vehicle to cross lane markings in response to a risk of collision and that is not considered a lane change according to paragraph 5.2.6. shall be considered to be an emergency manoeuvre.**

5.3.2. This manoeuvre shall decelerate the vehicle up to its full braking performance if necessary and/or may perform an automatic evasive manoeuvre, when appropriate.

If failures are affecting the braking or steering performance of the system, the manoeuvre shall be carried out with consideration for the remaining performance.

During the evasive manoeuvre the ALKS vehicle shall not cross the lane marking (outer edge of the front tyre to outer edge of the lane marking)

unless the system is capable of fulfilling the provisions of paragraph 5.3.5.

After the evasive manoeuvre the vehicle shall aim at resuming a stable position.

- 5.3.5. Lateral manoeuvre crossing lane markings to minimize the risk of a collision**
- 5.3.5.1. The vehicle shall only cross lane markings in response to a risk of collision if the system has sufficient information about its surrounding to the front and side (as defined in paragraph 7.1.) and to the rear (according to the following paragraphs) in order to assess the criticality of crossing the lane markings.**
- 5.3.5.2. The activated system shall not cause a collision with another vehicle or road user in the predicted path of the vehicle when crossing lane markings in response to a risk of collision.**
- 5.3.5.3. The vehicle shall only cross lane markings in response to a risk of collision if another vehicle in the evasive lane is not forced to unmanageably decelerate due to that manoeuvre.**
- 5.3.5.3.1. When crossing the lane markings by not more than [30]cm, it shall be ensured that**
- the distance to a vehicle following behind in the evasive lane at equal or lower speed is greater than that which the following vehicle travels in 0.5s.
  - a minimum lateral distance of 1m to vehicles travelling in the evasive lane is ensured.
- 5.3.5.3.2. When crossing the lane markings by more than [30]cm up to [half the vehicle's width], it shall be ensured that**
- An approaching vehicle in the evasive lane shall not have to decelerate at a higher level than  $4 \text{ m/s}^2$ , 0,4 seconds after the ALKS vehicle starts crossing the lane markings, to ensure collision avoidance between the two vehicles, and
  - the distance to a vehicle following behind in the evasive lane at equal or lower speed is greater than that which the following vehicle travels in 0.5s.
  - the evasive lane is unoccupied across the length of the ALKS vehicle
- 5.3.5.3.3. When crossing the lane markings by more than [half the vehicle's width], the criticality of the situation shall be assessed according to the corresponding provisions for a regular lane change in paragraphs 5.2.6.x, 5.2.6.y and 5.2.6.z.**
- 5.3.5.4. The vehicle shall aim at returning to its original lane of travel once the situation that required the lateral manoeuvre has passed.**

## **II. Justification**

### **A. Paragraph x.x.x., xxx**

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