

Submitted by the Chair of the Special Interest Group
on Lane Keeping Assist Systems (LKAS)

Informal document **GRRF-79-29**

(79th GRRF, 16 – 20 February 2015,
agenda item 9(b))

Proposal of Automated Driving from Ad-hoc group on LKAS/RCP

1. Intention of proposal

- Recent progress in driver assistance systems (AEBS, LKAS, etc.) are remarkable. While current driver assistance systems show no danger and benefit of design flexibility due to the lack of regulatory requirements, some parties found necessary to guarantee a certain level of safety via regulation
 - ➡ Necessity to guarantee a minimum level of safety without preventing progress of technology.
- In case of remote control operation (e.g. RCP), necessity to clarify that the system relies on the driver for what regards safety
 - ➡ Necessity to prescribe basic guidelines for these systems without jeopardizing their good introduction in the market.

2. Summary of the proposal

(1) LKAS


Although LKAS is already present in the market, there are currently no requirements which cover safety (as for AEBS and LDWS), some parties were keen to guarantee that:

⇒ the drivers are not confused by the variety of system behaviours offered on the market.

⇒ the principles of the Vienna Convention are respected

2. Summary of the proposal

(2) RCP

- The operator of a remote control device has the obligation of safe driving.
 - Some regulatory act must describe the requirements ensuring safe remote control driving.
-  Legislation supports RCP .

3. Discussion of meeting

Year	Month	Meeting
2013	September	75 th GRRF
	November	1 st Ad-hoc meeting
2014	February	76 th GRRF
	May	Small Drafting meeting
	September	78 th GRRF
	October	2 nd Ad-hoc meeting
	December	3 rd Ad-hoc meeting

Attendance list:

CLEPA, EC, France, Germany, Japan, Korea, Netherland, OICA, Sweden

4. Proposal items

(1) Prescribing minimum requirement of LKAS (prevent the design restriction)

→ Documents GRRF/2015/02 and GRRF-79-04

(2) Prescribing technical guidelines assuring safe remote-controlled systems.

→ Document GRRF-79-15 (Germany and Japan)*

*:RCP was discussed in the 3rd LKAS ad-hoc meeting, where Germany and Japan committed to provide a new proposal at 79th GRRF.

5. Contents of each proposal

5-1.LKAS

1. Definition of LKAS

2.3.4.2.1. "Lane Keeping Assistance System (LKAS)" means a system which assists the driver in keeping the vehicle within the chosen lane, by influencing the lateral movement of the vehicle.

2. Requirements preventing driver's confusion by abrupt steering control and termination of steering control remain unchanged

5.1.6.1. Whenever the Automatically Commanded Steering function becomes operational, this shall be indicated to the driver and the control action shall be automatically disabled if the vehicle speed exceeds the set limit of 10 km/h by more than 20 per cent or the signals to be evaluated are no longer being received. Any termination of control shall produce a short but distinctive driver warning by a visual signal and either an acoustic signal or by imposing a ~~tactile~~ haptic warning signal on the steering control.

5-1.LKAS

3. LKAS as “if fitted” system

- 5.1.6.2. If an LKAS is fitted on the vehicle, then the LKAS shall meet the requirements contained in paragraphs 5.1.6.3. to 5.1.6.6. of this Regulation.

4. Requirements for easy and safe handling, and smooth fade out of assistance effort

- 5.1.6.3. The LKAS shall be designed so that excessive intervention of steering control (e.g. an excessive steering torque) is suppressed to ensure the steering operability by the driver and to avoid unexpected vehicle behaviour, during its operation.

The end of the intervention shall be such that the LKAS reduces its directional control to zero in a progressive manner, to ensure easy and safe handling of the vehicle, as defined in paragraph 5.1.1. The directional control fade-out strategy shall be at the discretion of the vehicle manufacturer.

The steering control effort necessary to override the directional control provided by the LKAS shall not exceed the value specified in paragraph 6.2.4.2. for an intact steering equipment.

5-1.LKAS

5. Warning requirements in case of functional limitation (ex. Bad weather condition)

- 5.1.6.4. When the LKAS is temporarily not available, for example due to inclement weather conditions, the system shall clearly inform the driver about the system status, except if the system is in the OFF mode, e.g. switched off. This exception does not affect the required warning in the case of a system malfunction.

6. ON/OFF manual control

- 5.1.6.5. The vehicle may be equipped with a means for the driver to activate or deactivate the LKAS.

5-1.LKAS

7. Driver inattention detection and warning strategies

- 5.1.6.6. When the LKAS is available (i.e. ready to intervene or intervening), it shall provide a means of detecting that the driver is in control of the vehicle. In the event that the LKAS has detected that the driver is likely to be no longer in control of the vehicle, distinctive warning shall be provided until the driver is detected to be in control of the vehicle again (e.g. via input on the steering wheel, brake pedal actuation) or until the LKAS is deactivated, either automatically or manually. When the LKAS is automatically deactivated, the system shall clearly inform the driver about the system status.
- The LKAS warning shall be provided by at least two means out of optical, acoustic and haptic given simultaneously or in a cascade.

5-1.LKAS

7. Transitional provisions: text in [] reflects lack of consensus at adhoc group.

- 12.1. As from the official date of entry into force of the 02 series of amendments, no Contracting Party applying this UN Regulation shall refuse to grant or refuse to accept UN type approvals under this UN Regulation as amended by the 02 series of amendments.
- 12.2. For vehicles of categories M1 and N1, as from [1 September 2016/2017/2018/2019 (00/12/24/36 months)], Contracting Parties applying this UN Regulation shall grant UN type approvals only if the vehicle type to be approved meets the requirements of this UN Regulation as amended by the 02 series of amendments.
- 12.3. For vehicles of categories M2, M3, N2 and N3, as from 1 September 2020 (48 months), Contracting Parties applying this UN Regulation shall grant UN type approvals only if the vehicle type to be approved meets the requirements of this UN Regulation as amended by the 02 series of amendments.
- 12.4. For vehicles of categories M1 and N1, as from [1 September 2019/2021 (36/60 months)], Contracting Parties applying this Regulation shall not be obliged to accept, for the purpose of national or regional type approval, a vehicle type approved to the preceding (01) series of amendments to this Regulation.

5-1.LKAS

7. Transitional provisions (continued)

- 12.5. For vehicles of categories M2, M3, N2 and N3, As from [1 September 2021 (60 months)], Contracting Parties applying this Regulation shall not be obliged to accept, for the purpose of national or regional type approval, a vehicle type approved to the preceding (01) series of amendments to this Regulation.
- 12.6 Contracting Parties applying this UN Regulation shall not refuse to grant extensions of UN type approvals for existing types which have been granted according to the preceding series of amendments to this UN Regulation.

5-2. RCP (J – D joint proposal for amendments to RE.3)

The drivers close proximity to the vehicle and a continuous activation of a remote control device by the driver during the parking maneuver has to be ensured by technical means. If the activation-button is released, the vehicle shall stop safely and immediately.

System design shall prevent the activation and operation of the RCP system or interventions into the RCP system by unauthorized remote control devices.

5-2 RCP (J – D joint proposal for amendments to RE.3)

Explanation: The driver has to push the activation-button of the remote control device continuously in order to ensure that he is attentive and the parking maneuver can be aborted immediately in case of unforeseen circumstances without undue delay. It is necessary to ensure that the driver is always in close proximity to the vehicle, so that he is able to monitor the parking maneuver and the vehicle`s surroundings by his own immediate perception.