**Draft UN Regulation**

**Uniform provisions concerning the approval of motor vehicles with regard to their [Advanced Driver Assistance Systems] ([ADAS])**

|  |  |
| --- | --- |
| **Legend:** Initial text, not agreed after the end of the actual TF on ADAS session;Agreed text.**OICA/CLEPA amendments or new proposals****OICA / CLEPA additional amendments or new / revised proposals****OICA / CLEPA: ODD replaced by system boundaries**  | **Note:**UN Regulation No. 157 (ALKS) was used as the base text.This document is the next version of ADAS-06-03. |

| **Draft regulatory text** | **Comments, Remarks, Justification** |
| --- | --- |
| **Uniform provisions concerning the approval of motor vehicles with regard to their Advanced Driver Assistance Systems ([ADAS])** |  |
| Contents |  |
|  |  |
| **Introduction** |  |
|  | Advanced Driver Assistance Systems ([ADAS])addressed in this UN Regulation can be defined as electronically controlled vehicle systems aimed at assisting a human driver in performing the dynamic driving task (DDT) through information support (e.g., warnings in safety-critical situations) and assisting in executing the lateral and/or longitudinal control of the vehicle temporarily or on a sustained basis, but which require the human driver to permanently monitor the environment and vehicle/system performance.Thus, [ADAS] may not be capable to support in performing the entire DDT as they are limited in Object and Event Detection and Response (OEDR) and Operational Design Domain (ODD), and may not be capable to recognize certain environmental conditions. [ADAS] is intended to assist the human driver, who remains responsible for the entire DDT as well as OEDR. [ADAS] provide assistance at the tactical and operational driving levels.From SAE J3016 (2021): Level 1 (*driver* assistance) and Level 2 (partial automation) *features* are capable of performing only part of the *DDT*, and thus require a *driver* to perform the remainder of the *DDT*, as well as to supervise the *feature’s* performance while engaged. As such, these *features*, when engaged, support—but do not replace—a *driver* in performing the *DDT*.Implementation of [ADAS] requires appropriate understanding by the human driver of the performance capabilities of the [ADAS] in the vehicle. The appropriate information provision and interaction with the driver is required to ensure that the human driver is fully engaged in the DDT, and to avoid potential human driver’s misinterpretation, overestimation, or difficulty with [ADAS]/vehicle control.Comment AVERE: Ideally focus on outlining testing requirements and related scoring evaluating behaviour, comfort, smoothness, etc. Priority topics could include sensor performance, sensor blindness, comfort, safety, predictable/humanlike behaviour. |
| **1. Scope** |  |
| 1.1. This UN Regulation applies to the type approval of vehicles of Categories [M and N[[1]](#footnote-1)]with regards to their [Advanced Driver Assistance Systems] ([ADAS]) capable of assisting the human driver in controlling the longitudinal and lateral motion of the vehicle on a sustained basis.1.2. This UN Regulation applies only to [ADAS] meeting the general operational principles set out in paragraph 5.1.1. 1.3. This UN Regulation does not apply to [ADAS]:1.3.1. which are already subject to other UN Regulations;1.3.2. which provide information support only;1.3.3. which provide momentary intervention during potentially hazardous situations (e.g., Advanced Emergency Braking System - AEBS).1.4. This UN Regulation does not apply to Automated Driving Systems (ADS) capable of performing the entire dynamic driving task (DDT) and which thus replacing the human driver. | Cat. O should be added in the scope, to be consistent with both R79 scope and the TORs of the TF-ADAS |
| **2. Definitions**For the purposes of this Regulation: |  |
| 2.1. *[“Advanced Driver Assistance Systems] ([ADAS”]) / [“Dynamic Control Assistance Systems (DCAS)] / [“Continuous Driving Assistance Systems (CDAS)”]* – hardware and software collectively capable of assisting a human driver in performing the dynamic driving task (DDT) by influencing the lateral and/or longitudinal control of the vehicle [temporarily or] on a sustained basis, [but which require the human driver to permanently monitor the environment and vehicle/system performance].2.2. *Dynamic Driving Task (DDT)”* – in the context of an [ADAS]-equipped vehicle, means all of the real-time operational and tactical functions required to operate the vehicle and performed by a human driver. DDT functions can logically be grouped into three general categories: sensing and perception; planning and decision; control. The sensing and perception category includes: monitoring the driving environment via object and event detection, recognition, and classification, which includes: perceiving other vehicles and road users, the roadway and its fixtures, objects in the vehicle’s path, and relevant environmental conditions; positional awareness. The planning and decision category includes: prediction of actions of other road users; response preparation; manoeuvre planning. The control category includes: object and event response execution; lateral vehicle motion control; longitudinal vehicle motion control; enhancing conspicuity via lighting, signalling and/or gesturing, etc. *(FRAV-14-07-Rev.1)*2.3. [*“Driver”* – an in-vehicle positioned human being who performs in real-time all of the DDT by manually exercising braking, accelerating, steering, and transmission gear selection input devices to operate a particular vehicle from the designated seating position that makes in-vehicle input devices (steering wheel, brake and accelerator pedals, gear shift) accessible to a driver.]*Submitted by AAPC*2.3. [*“Driver”* – means a human being engaged in dynamic control of the vehicle] 2.4. *“Dynamic Control”* – [means performance of real-time operational and tactical functions required to navigate a vehicle through prevailing traffic conditions]2.4. *“[Road] Safety”* is a state of the vehicle, which can reduce and maintain the risk of personal injury or property loss at an acceptable level or below through the continuous hazard identification and risk management process.2.5. *“Object and Event Detection and Response (OEDR)”* – the subtasks of the DDT that include monitoring the driving environment (detecting, recognizing, and classifying objects and events and preparing to respond as needed) and executing an appropriate response to such objects and events.2.6. *“Use case”* – a specific application of [ADAS] designated to assist a driver in executing the specific portion of the DDT.~~2.7. “~~*~~Operational design domain (ODD)”~~* ~~– Operating conditions under which [ADAS] or the specific use case of [ADAS] is specifically designed to function, including, but not limited to, environmental, geographical, and time-of-day restrictions, and/or the requisite presence or absence of certain traffic or roadway characteristics.~~ 2.7. “System Boundaries” – are those limits or conditions up to or within which [DCAS] or a subfunction of [DCAS] is designed to function. These may include, but is not limited to, environmental, geographical, and time-of-day restrictions, and/or the requisite presence or absence of certain traffic or roadway characteristics.2.8 *“Driver engagement”* – The driver’s involvement in the execution of the DDT and the driver’s availability to intervene immediately, as needed.2.9. *"Lane Change Procedure"* – The sequence of operations aimed at performing a lane change of a vehicle. The sequence starts from the activation of the direction indicator lamps and ends when the direction indicator lamps are deactivated. It comprises the following operations: (a) Activation of the direction indicator lamps; (b) Lateral movement of the vehicle towards the lane boundary;  (c) Lane Change Manoeuvre; (d) Resumption of the lane keeping function; (e) Deactivation of direction indicator lamps.2.10. "Lane Change Manoeuvre" – The part of the Lane Change Procedure which: (a) Starts when the outside edge of the tyre tread of the vehicle front wheel closest to the lane markings touches the inside edge of the lane marking to which the vehicle is being manoeuvred; (b) Ends when the rear wheels of the vehicle have fully crossed the lane marking. | 6th Session: Preference for ‘Dynamic Control Assistance Systems (DCAS)’. Japan maintained preference for ‘Continuous Driving Assistance Systems (CDAS)’. The definition of [ADAS] shall correspond to the text agreed at the 4th ADAS TF session.Note: the terms “temporarily” and “sustained” can be derived from SAE J3016 (2021), term 3.28, as below:3.28 SUSTAINED [OPERATION OF A VEHICLE]: Performance of part or all of the DDT both between and across external events, including responding to external events and continuing performance of part or all of the DDT in the absence of external events. NOTE 1: External events are situations in the driving environment that necessitate a response by a driver or driving automation system (e.g., other vehicles, lane markings, traffic signs). NOTE 2: Sustained performance of part or all of the DDT by a driving automation system changes the user’s role. (See scope for discussion of roles.) By contrast, an automated intervention that is not sustained according to this definition does not qualify as driving automation. Hence, systems that provide momentary intervention in lateral and/or longitudinal vehicle motion control but do not perform any part of the DDT on a sustained basis (e.g., anti-lock brake systems, electronic stability control, automatic emergency braking) are not classifiable (other than at Level 0) under the taxonomy. NOTE 3: Conventional cruise control does not provide sustained operation because it does not respond to external events. It is therefore also not classifiable (other than at Level 0) under the taxonomy.OICA-CLEPA: There may not be a need to define the driver, similar to R79. Definitions should be checked to be aligned to one another. I.e. ‘engaged’ in dynamic control, while dynamic control is defined as ‘performance of real-time operational and tactical functions’. Suggest simplificationOICA-CLEPA (2.4): Define ‘dynamic control’ to confirm continuous rather than temporary functions.AAPC: Agree. Need to define dynamic control and ‘DCAS’. |
| **3. Application for approval** | From UN R157 |
| 3.1. The application for approval of a vehicle type with regard to the [ADAS] shall be submitted by the vehicle manufacturer or by the manufacturer’s authorized representative.3.2. It shall be accompanied by the documents mentioned below in triplicate:3.2.1. A description of the vehicle type with regard to the items mentioned in paragraph 2.1.1., together with a documentation package as required in Annex 1 which gives access to the basic design of the [ADAS] and the means by which it is linked to other vehicle systems or by which it directly controls output variables. The numbers and/or symbols identifying the vehicle type shall be specified.3.3. A vehicle representative of the vehicle type to be approved shall be submitted to the Technical Service conducting the approval tests. |  |
| **4. Approval** | From UN R157 |
| 4.1. If the vehicle type submitted for approval pursuant to this Regulation meets the requirements of paragraph 5 to 9 below, approval of that vehicle shall be granted.4.2. An approval number shall be assigned to each type approved; its first two digits (at present 00 corresponding to the 00 series of amendments, its original version) shall indicate the series of amendments incorporating the most recent major technical amendments made to the Regulation at the time of issue of the approval. The same Contracting Party shall not assign the same number to another vehicle type.4.3. Notice of approval or of refusal or withdrawal of approval pursuant to this Regulation shall be communicated to the Parties to the Agreement which apply this Regulation by means of a form conforming to the model in Annex 1 and documentation supplied by the applicant being in a format not exceeding A4 (210 x 297 mm), or folded to that format, and on an appropriate scale or electronic format.4.4. There shall be affixed, conspicuously and in a readily accessible place specified on the approval form, to every vehicle conforming to a vehicle type approved under this Regulation, an international approval mark conforming to the model described in Annex 2, consisting of:4.4.1. A circle surrounding the letter "E" followed by the distinguishing number of the country which has granted approval;[[2]](#footnote-2)4.4.2. The number of this Regulation, followed by the letter "R", a dash and the approval number to the right of the circle prescribed in paragraph 4.4.1. above.4.5. If the vehicle conforms to a vehicle type approved under one or more other Regulations, annexed to the Agreement, in the country which has granted approval under this Regulation, the symbol prescribed in paragraph 4.4.1. above need not be repeated; in such a case, the Regulation and approval numbers and the additional symbols shall be placed in vertical columns to the right of the symbol prescribed in paragraph 4.4.1. above.4.6. The approval mark shall be clearly legible and be indelible.4.7. The approval mark shall be placed close to or on the vehicle data plate. |  |
| **5. Specifications** |  |
| **5.1. [ADAS] Functionality** |  |
|  The fulfilment of the provisions of this paragraph ~~5.~~ [and its subparagraphs] shall be demonstrated by the manufacturer to the technical service during the inspection of the safety approach as part of the assessment to Annex [X] ~~3~~. | Co-Chair: This statement cannot be extended to all paragraph 5, as we will have the provisions subject to tests, etc. OICA-CLEPA: All provisions are subject to audit irrespective of whether requirements would be subject to tests or not. Chair: Confirmed this interpretation |
| 5.1.1. General operational principles of [ADAS] ~~The following principles set the framework for [ADAS] operation. Deviation from these principles shall mean that the considered electronically controlled vehicle system is not [ADAS] and such system shall not be approved pursuant to this UN Regulation.~~ **The manufacturer shall demonstrate to the satisfaction of the Technical Service that the system is designed to fulfil the following principles:**5.1.1.1. [ADAS] shall be designed in such a way that it ensures the driver to remain engaged with the driving task**.** ~~and that the driver can always override [ADAS].~~**5.1.1.x. [ADAS] shall be designed to enable override by the driver at any time.** ~~5.1.1.2. [ADAS] shall require the human driver to permanently monitor [ADAS] performance.~~5.1.1.3. [ADAS] shall be designed according to the following principles:1. ~~The human driver permanently monitors the driving environment and responds if necessary;~~
2. ~~The system shall be designed to ensure that the human driver remains fully engaged with the dynamic driving task, at least mentally, although he/she may be temporarily disengaged from some physical aspects of driving;~~
3. ~~The human driver immediately intervenes and overrides [ADAS] when required by [ADAS], or other vehicle systems, or the environment;~~
4. ~~The human driver determines when activation or deactivation of [ADAS] is appropriate and can deactivate [ADAS] immediately when needed;~~

**The manufacturer shall make information available in an appropriate way about the conditions which are suitable for the operation of the system, so that the driver can reasonably be expected to determine when activation or deactivation of the system is appropriate.** 1. ~~The human driver shall not perform non-driving related tasks beyond those permitted during normal driving and remains responsible for the correct execution of the integral dynamic driving task.~~

**The system shall be designed to prevent misuse by the driver (e.g. performing non-driving related tasks beyond those permitted during normal driving).**1. ~~The system shall propose the driver to refresh driver education when abnormal use in conflict with a-e is detected by system.~~

**The manufacturer has implemented strategies to disable activation of the system for the duration of the start/run cycle when the driver is detected to repeatedly demonstrate prolonged insufficient engagement with the driving task while the system is active.**  | System operational frameworks associated with the [ADAS] definition. Include description of [ADAS] functionality.OICA-CLEPA comment: 5.1.1 provision may be not be required (general principle of regulatory compliance). Move to the introduction/scope?Co-Chair: These principles are here as the manufacturers should declare in the documentation that a vehicle complies with those principles.Japan: Reflect documentation requirements further down in the document.NL (5.1.1.1): The intention of this requirement is to assure pro-active driver engagement5.1.1.2. is already covered by 5.1.1.1.Turn a-f into separate paragraphs, as 5.1.1. is identical to 5.1.1.3.5.1.1.3. (a) is already addressed by 5.1.1.2./5.1.1.1.5.1.1.3. (b) is addressed by 5.1.1.1.5.1.1.3. (c) should be moved to the introduction, as this cannot be turned into a requirement to the system, but is an assumption about the driver. 5.1.1.3. (d) (e): reformulation into requirements applicable to the system, not to the driver |
| 5.1.1.4. ~~The main purpose of the [ADAS] is to improve road safety and/or driving efficiency without compromising road safety. Road safety shall not only focus on whether the vehicle can adopt corresponding measures to minimize the risk of the vehicle, but also whether the corresponding measures of the vehicle will cause other traffic participants in danger.~~ **The system shall not create unreasonable risks for the vehicle occupants or any other road users.**~~5.1.1.5. The application of [ADAS] shall ensure that the vehicle can assist the driver in performing the DDT~~ ~~without causing excessive impact or even collisions on other traffic participants~~. ~~5.1.1.6. The design of [ADAS] shall be such that driving manoeuvres assisted by the system will not pose an undue risk to the safety of the vehicle occupants and other road users.~~ | OICA-CLEPA: Suggest to move 5.1.1.4 to introduction, because it is not really a requirement. Not a safety requirement. 5.1.1.7 - It is not Safety requirement. How often a system disengages depends on many external conditions. We have not even regulated this aspect for ALKS, so why introduce it here? Provisions introducing expectations of other traffic provisions are not appropriate. 5.1.1.5. “excessive impact” etc is already addressed by 5.1.1.4.Japan: ADAS should not negatively affect traffic flow, which may be of particular importance for ADAS.Check/align with the items elaborated by FRAV IWG.Co-Chair: not yet addressed. |
| **5.1.2. Assistance to a driver ~~in executing the DDT~~.** The manufacturer shall describe in detail~~s~~ [in the documentation] ~~the role of each [use case]/[functionality]/[systems and subsystems] of [ADAS] in executing the DDT functions by the driver and~~ **the [situations/scenarios] in which the system operates and** the assistance provided **to the driver by the system**. | FRAV-14-07-Rev.1 – Description of DDT elements (to review)Co-Chair: added to the definition.AAPC: There should not be a section for DDT in an ADAS regulation.OICA-CLEPA; Support AAPC concern. Replace DDT with Control Assistance or Vehicle Dynamic Behavior? Co-Chair: Vehicle Dynamic Behavior listed in 5.4.3.Co-Chair: This section is for a manufacturer to describe the assistance of [ADAS] in executing the DDT. Based on ADAS-05-03. |
| **5.1.3. ~~Specific~~ General provisions to OEDR** |  |
| 5.1.3.1 [ADAS] shall be able to assess its surroundings **(e.g. road markings, other road users)** as required **~~for its functions according to par. 5.3.1.~~** ~~by the [ODD]/[system boundaries] for each [system]/[function]~~**, to implement the assistance to the driver described in paragraph 5.1.2, within the system boundaries described in paragraph 5.1.4**~~5.1.3.2 If [ADAS] is used in environments where vulnerable road users (such as pedestrians and cyclists) are present, [ADAS] shall be able to adequately detect such vulnerable road users.~~ | NL: We should be careful not to end-up with systems where the driver would only require to supervise the system and just monitor the environment, while the DDT is effectively performed by the system, i.e. the system behaving as an ADS-like system.FIA (5.1.3.2): The System should be able to detect VRUs in any environment, even if the road is not dedicated to be used by VRUs in normal circumstances (eg highways). This could occur eg after an accident. |
|  |  |
| **5.1.4. ~~[System boundaries] / ODD~~ System boundaries** The manufacturer shall establish and describe in details [in the documentation] [to the Technical Service] ~~the ODD~~**boundary conditions of each function of the system** ~~for each use case of [ADAS]~~ and indicate which ~~ODD conditions and boundaries (measurable limits)~~ **of these** can be recognized automatically by [ADAS] and by which means. The manufacturer shall describe the **behaviour** ~~performance~~ of ~~[ADAS]~~ **the system** when the vehicle is **reaching these boundaries** ~~about to leave the ODD~~ and **the effect on the performance when operated** outside ~~ODD~~ **these boundary conditions**. As a minimum, ~~ODD~~ **the** conditions **to be described** include:1. Road: type (highway, rural, etc.), surface (type, adhesion), geometry, lane characteristics, availability of lane markings, edge of road, road crossings;
2. Road facilities (traffic control facilities, special facilities (road construction markings, etc.), other facilities;
3. Other road users, which [ADAS] is capable to recognize;
 | ODD is something the system is designed to detect, when the list includes detectable and non-detectable conditions we should use system boundaries. OICA-CLEPA: Experience of system boundaries could be relevant as a strategy to keep the driver in the loop. Should take care in defining such requirements.The Operational Design Domain is equivalent to the activation condition of the system. For this we recommend considering ODD according to the following table:

|  |  |  |
| --- | --- | --- |
| ODD | Road | Road type |
| Road surface |
| Road geometry |
| Lane characteristics |
| Edge of road |
| Road crossing |
| Road facilities | Traffic control facilities |
| Special facilities |
| Temporary facilities |
| Fixed facilities |
| Target object | Vehicle |
| Non-Motor Vehicle |
| Pedestrian |
| Animal |
| Others |
| Weather related environmental conditions | Weather |
| Illumination |
| Temperature |
| Digital information | High precision map |
| Communication type |
| Positioning type |

OICA-CLEPA: The above table is not adequate for ADAS. Not all environmental elements as listed could be detected or are appropriate. Should be included in detailed description of system. Chair: Can be deleted if it is ensured relevant information is required to be provided by manufacturer by a provision elsewhere.Other road users as defined by FRAV IWG.FIA (5.1.5): List in the column “comments” should be clarified that the category ‘Target object – vehicles’ also have to include Powered Two Wheelers and any kind of heavy vehicle.ITU: Should ensure consideration of interface in HMI, and any confusion about what is handled or not handled. Secretary: Clarify that these provisions are relevant with respect to the documentation to be provided to the Technical service. Requirements regarding driver information are handled below. |
| **5.1.5. [ADAS] modes of operation [review of this section still needed, as names of actions (e.g. “activate” might be inconsistent with other paragraphs of this regulation)]**5.1.5.1. [ADAS] in operable condition shall have the following modes: “Off”, “Standby” and “Active”. The relationship between modes is shown on the drawing below.5.1.5.1.1. When [ADAS] is in "Off” mode (or switched off), [ADAS] shall not assist the driver in executing **the** DDT. 5.1.5.1.2. When [ADAS] is in "Standby" mode, [ADAS] is switched on, but its operating conditions are not all met. [ADAS] shall not assist the driver in executing **the** DDT.5.1.5.1.3. When [ADAS] is in "Active" mode, [ADAS] is switched on, and its operating conditions are met. [ADAS] shall assist the driver in executing DDT.5.1.5.2. The manufacturer shall specify [in the documentation] [ADAS] operating conditions enabling [ADAS] to be in "Active" mode**.** | In addition to the failure state, the system state can be mainly divided into the four categories-on/off/active/standby, and the transition conditions and modes among them are as follows:1. The system starts automatically after the vehicle is powered on or the driver starts on his own initiative;
2. The driver can actively switch on/off the system, and when the system is actively switch off a prompt message will be sent;
3. When the system meets the activation condition, it switches from the standby state to the activation state. The activation condition can be understood as that the system is in its ODD;
4. When the activation condition is not satisfied, the system exits from the activation state to the standby state;
5. The system does not execute DDT when the system is in standby or off state.

UN R 79, paras. 2.4.13. – 2.4.15., 5.6.2.1.2., 5.6.2.2.2., 5.6.4.2.4. modified.OICA-CLEPA: Differentiation between systems and subsystems to be considered! What if just one part (longitudinal or lateral control) of a system is deactivated? |
| **5.1.6. [ADAS] interactions with other vehicle systems****5.1.6.1. While the system is active, its operation shall not unreasonably deactivate or suppress the functionality of activated assistance systems (e.g. AEBS).**  | OICA-CLEPA: Section may be used in case that pre-conditions would be defined in system operation. Maintain as placeholder. |
|  |  |
| **5.2. [ADAS] interaction with the human driver** | HMI moved to functional requirements. |
|  The fulfilment of the provisions of this paragraph shall be demonstrated by the manufacturer to the technical service during the inspection of the safety approach as part of the assessment to Annex [X]. |  |
| **5.2.1. Measures addressing the human driver’s awareness of [ADAS] capabilities and performance** |  |
| **5.2.1.1. Estimation of change of the human driver’s behaviour due to [ADAS] operation** **[**The manufacturer shall [take into account] how [ADAS] change the driver’s workload. The manufacturer shall estimate possible driver’s expectations, misinterpretations, overreliance, difficulties with vehicle control when [ADAS] assists the driver in executing DDT. The manufacturer shall explain measures addressing full driver’s engagement in vehicle control.] | This section should predict the change of the human driver’s workload and address ensuring that the driver is fully engaged in performing DDT, possible human driver’s expectations, misinterpretations, overestimations, difficulties with [ADAS]/vehicle control.Chair (5.2.1.1): Introduced to ensure a preliminary assessment is made of changes in driver behaviour when using the system. Manufacturer to explain how the system assist the driver and does not mislead, ensuring appropriate use.OICA-CLEPA: Not sufficiently covered elsewhere? Unclear how ‘estimations’ would be made. May be sufficient to base the provisions of the CEL annex and to expand when it comes to avoiding driver abuse of the system. Suggest removal. |
| **5.2.1.2. Human driver education and marketing of [ADAS]**5.2.1.2.1. Manufacturer must provide the driver with clear and **easily** accessible information ~~or training~~ about how the particular ADAS has to be operated by the driver. The information must contain information on the driver’s responsibility, the limitations of the ADAS and demonstrate how different warning signals are to be interpreted**, to cover at least the following aspects:** ~~5.2.1.2.1.~~ **~~[~~**~~The manufacturer shall develop and present at the time of type-approval the educational course for drivers and ensure (e.g., by the means of registration) that the consumers will take this educational course either via the dealers’ network or via publicly available manufacturer’s Internet resource. The educational course shall consist of printed guidelines for the desirable driver’s behaviour and at least a 30-minute video with voice and/or printed comments containing educational examples of good and poor driving practices involving [ADAS] subject to type approval. At least, the educational course shall include:~~1. Explanation of DDT, The driver’s responsibility;
2. The role of each use case of [ADAS] in executing the DDT functions by the driver and the assistance provided;
3. [ADAS] OEDR capabilities and limitations;
4. [ADAS] ~~ODD~~;System boundaries
5. [ADAS] modes of operation and switching between modes;
6. [Measures ensuring the human driver’s [ADAS] mode awareness];
7. Driver Engagement Detection;
8. Possibility of [ADAS] overriding;
9. Human-machine interface (HMI):
	* 1. [ADAS] activation and deactivation;
		2. [ADAS] status indication;
		3. [ADAS] messages to the human driver and their interpretation;
		4. Vehicle behaviour when reaching [ADAS] ~~ODD~~;System boundaries;
		5. Vehicle behaviour when exceeding [ADAS] ~~ODD~~;System boundaries;
		6. Information on [ADAS] failures;
10. ~~Good driving examples (video);~~
11. ~~Poor driving examples (video).]~~

~~5.2.1.2.2.a [If [ADAS] is item for marketing the vehicle, the manufacturer must not use illustrations or special product naming that give the customer an impression that the system has other or more advanced capabilities than stated in the driver education.~~~~5.2.1.2.2.b [The naming of the system shall not mislead the customer that the system has other or more advanced capabilities than stated in the driver education.]~~ | Description of the driver information, engagement and possibly educational approach.Norway*:* The education could be a video or practical training. We believe that a higher awareness and knowledge of how the ADAS works will contribute to higher mentally engagements and reduce risk of missuses ref. 5.1.1.5.Experience so far has shown that many users have too high expectations about ADAS (ODD) and do not read the comprehensive and complex user manual. This is also related the gap between how the vehicle is marketed and the manufacturer’s statements of WARNINGS and LIMITATIONS in the user manual. Wrong naming of ADAS increase the risk of mode confusion (ADAS versus ADS)NL: it is useful to introduce such a chapter. There will be a challenge how to address the transfer of driver information when the vehicle ownership changes NL: this section could also provide information how the control is shared between the human (driving subtask performed by human) and the system (driving subtask performed by ADAS)6th Session: Legality to be checked.AAPC: Provisions may not be appropriate within the context of the WP.29 scope of activities. Supportive of general intent but specific provisions require review.OICA-CLEPA: Concerned with these provisions. Provide evidence of driver confusion. May not fit in WP.29 scope. Manufacturer cannot be held accountable for the forced education of the driver in order to use the system. Supports appropriate marketing, but this would fall outside of the scope of type-approval. The issue could be addressed through appropriate definitions. AVERE: Statements regarding driver overreliance and misunderstanding should be balanced with recognition of safety benefit of ADAS. Agree with OICA-CLEPA/AAPC. False advertisement is already prohibited by existing law and does not need to be addressed in a type approval regulation.  |
| **5.2.2. Measures ensuring the human driver’s [ADAS] mode awareness**  | Alliance for Automotive Innovation: Level 2 Driver Monitoring Principles (<https://www.autosinnovate.org/about/advocacy/L2%20Driver%20Monitoring%20Principles.pdf>)6th Session: Sufficiently covered by the section on HMI in 5.6? |
| **5.3. Functional requirements** | NL: Might be worth discussing whether e.g. ASIL levels for Functional Safety could also be introduced? |
| **5.3.1. OEDR ~~sensor~~ requirements**  | General plus function-specific requirements, if appropriate. |
| **5.3.1. The system shall be able to detect the driving environment, other road users and traffic dynamics according to the support functions provided to the driver as described in paragraphs 5.1.2. and 5.1.4.****5.3.1.1. OEDR requirements for lane keeping** **5.3.1.1.1. The system shall ~~be able to appropriately respond to vehicles and other road users ahead according to its ODD~~ at least detect the border of the lane (e.g. lane markings, road edge) [where the function operates, within the system boundaries of paragraph 5.1.4.] The system may also secure the detection of the lane with other means like e.g. an assessment of traffic flow around, map data.****5.3.1.2. OEDR requirements for lane changing** **5.3.1.2.1. The system shall be able to appropriately respond to vehicles and other road users*** **ahead within its own and the left and right adjacent lane of travel and**
* **driving beside [in the adjacent left or right lane of travel]**
* **driving behind or approaching in the left and right adjacent lane of travel**

**~~according to its ODD~~ when operated within its system boundaries.****5.3.1.3. OEDR requirements for transitions between phases of lane keeping** **The system shall be able to appropriately respond to vehicles, road users and a blocked path ahead which are already within or may enter the planned trajectory and the corresponding driving environment in order to ensure a safe operation.** |  |
| **5.3.2. Driver Engagement Detection**5.3.2.1. General5.3.2.1.1. [ADAS] shall implement strategies to evaluate the driver's engagement. [ADAS] implemented for different use cases shall ensure that the driver remains sufficiently engaged with the DDT during [ADAS] operation according to the specific use case.5.3.2.1.2. [ADAS] shall be equipped with the means to appropriately detect driver engagement in conditions depending on [ADAS] capability, driving and environmental conditions.5.3.2.1.3. [ADAS] shall alert the driver with increasing levels of visual and audible or haptic warnings in order to request appropriate driver engagement. [ADAS] shall terminate warnings only if [ADAS] detects that the driver has appropriately re-engaged based on the [ADAS] design. 5.3.2.1.4. [ADAS] shall de-activate following a lack of driver input or engagement in accordance to the system’s driver engagement design.*Submitted by OICA-CLEPA*5.3.2.1. General provisions5.3.2.1.1. The system shall be equipped with the means to appropriately detect driver engagement depending on system capability, driving and environmental conditions. The system’s driver engagement monitoring strategy shall be demonstrated by the manufacturer to the technical service during the inspection of the safety approach as part of the assessment to Annex X and according to the relevant tests of Annex Y5.3.2.1.2. The system shall alert the driver with visual, audible or haptic warnings in order to request appropriate driver engagement. In case the driver is unresponsive the alert shall be escalated.The warnings shall remain active as long as the driver remains inappropriately disengaged from the driving task or until the system is deactivated.5.3.2.1.3. The system shall deactivate in accordance to the system’s driver engagement monitoring strategy and the provisions of par. 5.4.2.2., 5.4.2.3. and 5.4.2.4. as applicable, if the driver remains unresponsive. After automatic deactivation due to insufficient driver engagement the system shall clearly inform the driver about this status by an emergency signal which shall be different from the other warning signals for a sufficient duration or until the driver is again engaged according to the system’s driver engagement monitoring strategy.**[Alternatively, a Risk Mitigation Function may start an intervention.]**5.3.2.2. ~~Hands-on driving~~ **Basic driver engagement monitoring** 5.3.2.2.1. The system shall provide a means of detecting that the driver is holding the steering control. The system shall provide an appropriate optical Hands-On-Warning (e.g. a pictorial information showing hands on the steering control) to the driver once he is assessed to not hold the steering control as required by the system’s driver engagement monitoring strategy.The warning shall be escalated and be accompanied by an audible signal and the system shall be finally automatically deactivated if the driver remains disengaged according to the system’s driver engagement monitoring strategy.~~5.3.2.3. Hands-off driving~~5.3.2.2.2. ~~Notwithstanding the requirements of paragraph 5.3.2.2.~~ The hands-On-Warning may be suppressed ~~to allow for hands off driving~~ as long as all of the following conditions are met5.3.2.3. *Placeholder*5.3.2.4. ~~Additional measures under special conditions~~ **Extended driver engagement monitoring**~~5.3.2.4.1. If any of the criteria below are applicable to [ADAS]:~~*~~(Comment industry: equivalent to “high performing, high level of support”)~~*1. ~~[ADAS] itself initiates driving maneuvers (e.g. lane changes);~~
2. ~~[ADAS] exceeds a maximum lateral acceleration of 3,3 m/s~~~~2~~~~;~~
3. ~~…,~~

 ~~the following provisions shall apply to the system [ADAS] when it is operated in a state where any of the above criteria could apply:~~ ~~5.3.2.4.1.1. [ADAS] shall implement at least two strategies to ensure the driver remains sufficiently engaged (e.g., hands-on wheel monitoring and a required minimum steering input by the driver);~~ ~~5.3.2.4.1.2. [ADAS] shall demonstrate sufficiently robust environmental perception capabilities according to paragraphs xxx;~~~~5.3.2.4.1.3. [ADAS] shall increase the frequency of checks to ensure sufficient driver engagement in challenging driver situations. The manufacturer shall describe the relevant control strategy in the documentation.~~ 5.3.2.4.1. For highly dynamic driving manoeuvres (e.g. significant lateral accelerations) or manoeuvres automatically initiated by the system (e.g. automatic lane changes) the following provisions shall apply additionally to those of paragraph xxx:* the system shall ensure the driver is holding the steering control
* the system shall monitor at least two criteria to ensure the driver remains sufficiently engaged according to paragraph xxx
* The system shall demonstrate sufficient environmental perception capabilities according to paragraphs xxx

5.3.2.4.2. The driver shall be deemed to be sufficiently engaged if hands-on-wheel confirmation and at least ~~two~~ one other engagement criteria (e.g. steering input, gaze direction, absence of input to driver-exclusive vehicle controls) have individually determined that the driver is engaged with the driving task in the last [30] seconds. As soon as the driver is deemed to be not sufficiently engaged, or fewer than two availability criteria can be monitored, the system shall give a warning to the driver and if no appropriate response to that warning is detected, revert back to basic support.**5.3.2.4.3. The manufacturer shall demonstrate to the technical service the strategies implemented in the system to comply with par. 5.3.2.4.2. Alternatively and in agreement with the Technical Service conformity may be met through compliance with an equivalent regulation.**  | The system shall implement strategies to evaluate the driver's involvement in the dynamic driving task and his availability to intervene immediately, as needed.The Driver Engagement definition added.Maybe this should be moved partly to the HMI section.NL: Just ‘detecting’ driver engagement is too shallow, ADAS shall implement strategies to assure the driver engagement in a proactive manner. Such will probably have to include a combination of several measures.FIA (5.4.2.1): Data protection has to be guaranteed, no storage or transmission of personal data without the consent of the driver!Definition for RMF/link to ECE R79? More general description of RMF-like systems?NL: Hand-off driving is a clear example of a system that can easily lead to ‘mode confusion’ and should not be allowedOICA-CLEPA: Hands-off would not be applicable for more complex systems. Alternative monitoring options may allow for various strategies to improve driver comfort. Category 2B in ECE/TRANS/WP.29/1140 reflects these systems.Co-Chair: Industry should respond to issue of maintaining the driver in the loop during short/long periods during hands-off. Is both being asked for? How would a driver practically be kept in the loop?Section consolidated: 5.3.2.4.1.1. is covered by the second bullet of 5.3.2.4.1. 5.3.2.4.1.2. is covered by the third bullet of 5.3.2.4.1. 5.3.2.4.1.3. is in contradiction to the approach to monitor additional criteria, as increasing the frequency of checks might not work for all criteria, e.g. when using gaze direction monitoring additionally. UK: As one gets closer to automation, the more the driver would be inclined to be distracted. Concern of mode confusion is often mentioned. Intent is not to restrict capability, but to ensure appropriate driver engagement as systems become more capable.AAPC: If a system requires a driver to be attentive and to supervise the system, it’s ADAS. If it does not, it’s ADS. Under this regulation, the intent is to ensure that the driver appropriately treats the system as an ADAS even though capability may be extended.Chair: May need better clarification to better refer to the deactivation of control.UK: Agreed that inspiration from ALKS should be taken, however may need to go beyond as drivers would be required to immediately intervene at any point. Careful consideration of the approach taken required to ensure driver actions do not lead to the assumption of continued automated control.OICA-CLEPA: Driver does not need to ‘take back control’ because he was never out of it. These provisions aim to take steps in order to alleviate some of these concerns. |
| **5.3.3. Vehicle dynamic behaviour***Submitted by OICA-CLEPA*5.3.3.1. Dynamic behavior of the vehicle when executed by ~~[ADAS]~~ **the system** shall be controllable for the driver. 5.3.3.2. Dynamic behavior of the vehicle when executed by ~~[ADAS]~~ **the system** shall be predictable and shall not lead to uncontrollable situations for other road users.**5.3.3.2.1. When changing lanes**5.3.3.2.**1.x. During the lane change manoeuvre, the system shall aim to avoid inducing a longitudinal deceleration of more than 3.7 m/s2 for a vehicle approaching from the rear.**5.3.3.2.**1.x. During a lane change manoeuvre, the system shall aim to avoid a lateral acceleration of more than 1 m/s2 in addition to the lateral acceleration generated by the lane curvature.****5.3.3.2.2. When decelerating****5.3.3.2.2.1. When operated by the system the vehicle shall slow down with a deceleration demand not greater than 4m/s², unless required by the surrounding traffic (e.g. a decelerating lead vehicle).** | Dynamic behavior of the vehicle when executed by the system shall be controllable for the driver. Dynamic behavior of the vehicle when executed by the system shall be predictable and shall not lead to uncontrollable situations for other road users. Dynamic behavior of the vehicle when executed by the system shall appropriately account for changing environmental and traffic conditions.* How to establish assumptions about a vehicle approaching from the rear in this structure? Maybe a link to the high-level principles could work.
 |
| **5.3.4. Function-specific requirements** |  |
| **5.3.4.1. Lane keeping***Submitted by OICA-CLEPA*5.3.4.1.1. The activated ~~[ADAS]~~ **system** shall keep the vehicle in lane when operated within the system boundaries. 5.3.4.1.2. The activated ~~[ADAS]~~ **system** shall keep the vehicle in a stable position within its lane. | An activated system shall keep the vehicle in lane when operated within the system boundaries. An activated system shall keep the vehicle in a stable position within its lane.  |
| **5.3.4.2. Lane changing***Submitted by OICA-CLEPA*5.3.4.2.1. A lane change procedure can be initiated by the driver or ~~[ADAS]~~ **the system**. 5.3.4.2.1.1. Initiation of a lane change procedure by ~~[ADAS]~~ **the system** shall only be permitted in situations where it is justified per the traffic environment and the general safety principles.**xxx. The system shall only be permitted to change lanes, if the vehicle is equipped with detection capabilities to the front, side and rear to assess the criticality of that lane change.****xxx. Lane change procedures shall only be performed in an uncritical way.**5.3.4.2.2. A lane change procedure shall be indicated to other road users. 5.3.4.2.3. A lane change procedure shall be completed without undue delay. 5.3.4.2.4. After the initiation of the lane change procedure the ~~LCM~~ lane change maneuver shall commence in accordance with traffic rules in the country of operation (i.e., with regard to minimum indication time before a lane change maneuver is started).**xxx.[DCAS shall not perform a lane change towards a lane intended for traffic moving in the opposite direction.]****[xxx.A lane change performed by the system shall not cause a collision with another vehicle or road user in the predicted path of the vehicle during a lane change.]** 5.3.4.2.5. A lane change maneuver shall be predictable and manageable to other road users (i.e., shall not force other vehicles to unmanageably decelerate).**xxx A lane change manoeuvre shall only be started if a vehicle in the target lane is not forced to unmanageably decelerate due to the lane change of the vehicle.****xxx A lane change manoeuvre shall only be started if there is sufficient space to a vehicle following behind or approaching from the rear in the adjacent lane.****xxx In case the DCAS decelerates the vehicle during a lane change procedure, this deceleration shall be factored in when assessing the distance to a vehicle approaching from the rear, and the deceleration shall be manageable for the vehicle approaching from the rear.****xxx [Where there is not sufficient headway time for the vehicle behind at the end of the lane change procedure, DCAS shall not increase the rate of deceleration for a certain period of time after the completion of the lane change procedure except for the purpose of avoiding or mitigating the risk of an imminent collision.]** | A lane change procedure can be initiated by the driver or the system. Initiation of a lane change procedure by the system shall only be permitted in situations where it is justified per the traffic environment and the general safety principles.A lane change procedure must be indicated to other road users. A lane change procedure must be completed without undue delay. After the initiation of the LCP the LCM shall commence in accordance with traffic rules in the country of operation (i.e., with regard to minimum indication time before a LCM is started).A lane change maneuver shall not force another vehicle to unmanageably decelerate / be predictable and manageable to other road users.Impact on operations in specific environments (lane change due to blocked path, overtaking, etc.) |
| **5.3.4.3. Other transitions between lane-keeping phases***Submitted by OICA-CLEPA*5.3.4.3.1. The provisions of this paragraph apply for manoeuvres that:1. lead the vehicle to follow a trajectory when there is no dedicated lane (e.g., while turning at an intersection);
2. lead to an interaction with other road users while following a dedicated lane (e.g., when driving through a roundabout);
3. lead the vehicle to leave its lane of travel when this manoeuvre is not a lane change (e.g., in order to drive around a parked vehicle on the side of the road).

5.3.4.3.2. If [ADAS] is designed to following a trajectory on the basis of other sources of information than lane markings (e.g., when turning at an intersection), ~~[ADAS]~~ **the system** shall be equipped with adequate measures to robustly determine the appropriate trajectory **in accordance with traffic rules and in respect of other road users**. 5.3.4.3.3. [ADAS] shall indicate driving manoeuvres **controlled by the system** (e.g. turn) to other road users **as required by traffic rules**.5.3.4.3.4. Crossing into another lane is permissible when: 1. forming an access corridor for emergency and enforcement vehicles;
2. driving around a stationary obstacle in the lane;
3. passing a slower moving vehicle or road user on the side of the lane with sufficient lateral distance.

5.3.4.3.5. Crossing into another lane shall only be permissible if [ADAS] is able to determine the position and movement of other road users. | If following a trajectory on the basis of other sources of information than lane markings (e.g. when turning at an intersection), the system shall be equipped with adequate measures to robustly determine the appropriate trajectory. The system shall indicate driving manoeuvres (e.g. turn) to other road users.Crossing into another lane is permissible when …Crossing into another lane shall only be permissible if the system is able to determine the position and movement of other road users.  |
| **5.3.4.4. Risk Mitigation Function** |  |
|  |  |
| **5.3.4.5. Low-speed manoeuvring** |  |
|  |  |
| **5.4. [ADAS] overriding by the human driver***Submitted by OICA-CLEPA*5.5.1. It shall be possible for the driver to intervene at any time. |  |
|  |  |
| **5.5. Human-machine interface (HMI)** |  |
| **5.5.1. [ADAS] activation and deactivation***Submitted by OICA-CLEPA*5.5.1.1. [ADAS] shall be off at the initiation of each new ~~ignition~~ **start/run** cycle, regardless of what mode the driver had previously selected. 5.5.1.2. [ADAS] shall become active only upon a deliberate action of the driver. 5.5.1.3. It shall be possible to deactivate ~~the~~ ~~system~~ [ADAS] with a deliberate action of the driver.*Alternative:**Submitted by the Co-Chair:*~~5.5.1.1. [ADAS] shall automatically switch to "Standby" mode immediately after the vehicle is powered on.~~ 5.5.1.2. [ADAS] shall automatically switch from "Standby" mode to "Active" mode, if [ADAS] operating conditions allow so. [ADAS] shall automatically switch from "Active" mode to "Standby" mode, if [ADAS] operating conditions do not allow to be in “Active” mode, or if [ADAS] **boundaries** ~~operating target had been reached~~ **are detected to be reached**.~~5.5.1.3. The vehicle shall be equipped with a means for the driver to switch [ADAS] to “Off” mode at any time by a single action of the driver. Following this action, [ADAS] shall only return to “Standby” mode again as a result of a deliberate action by the driver.~~5.5.1.4. The provisions of paragraph 5.6.1.3. shall not apply to [ADAS] designated for emergency operation in the event, when the driver becomes unresponsive. | System shall be off at the initiation of each new ignition cycle by default, unless specifically selected as a mode by the driver. By default, the system will require an activation of the system by a deliberate action of the driver, unless specifically selected as a mode by the driver. FIA (5.6.1.1): Text conflicts with 5.1.6. The system starts automatically after the vehicle is powered on.It shall be possible to deactivate the system with a deliberate action of the driver. OICA-CLEPA: 5.6.1.1 may depend on the scope, could not be applicable to e.g. RMF. Needs further review as we go along.NL: ADAS ADS features should be designed according to harmonized / common HMI principles to support smooth switching from one vehicle to another. NL: The information presented to the driver / user should be organized according to saliency principles, shall prevent from unintended/inadvertent activation or activation outside the ODD and provide information on the system capabilities/ODD.OICA-CLEPA/AVERE (on 5.6 overall): May be more valuable to consider a more general thinking of what should be indicated to the driver in view of the flux of different signals and warning requirements in other regulations.  |
| **5.5.2. [ADAS] status indication**5.5.2.1. When [ADAS] is in "Standby" mode or "Active" mode, an optical signal shall be provided to the driver.[5.5.2.2. [ADAS] shall inform the driver clearly about any system initiated driving manoeuvres (e.g., system-initiated lane change).] | Relevant system states when the system is activated shall be indicated to the driver. The status indication shall be suitable to ensure mode awareness.6th Session: Do we need 5.6.2.2.? |
| **5.5**.**3. [ADAS] messages/signals to the human driver**5.5.3.1. [ADAS] messages/signals shall inform/warn the driver ~~only~~ about:1. [ADAS] status: either “Off” or “Standby”/”Active”;
2. [ADAS] request of the driver’s engagement to vehicle control;
3. [ADAS] **has detected to have** ~~had~~ reached or exceeded its ~~[ODD~~]/ system boundaries;
4. [ADAS] failures.

5.5.3.2. [ADAS] messages/signals shall be clear, timely and noticeable and shall not lead to confusion. In the case of multiple messages, they shall be prioritized. ~~Voice or textual messages shall not be used.~~5.5.3.3. The manufacturer shall list and explain all [ADAS] messages/signals in the type-approval documentation and in the vehicle operation manual.~~[5.5.3.4. To avoid driver informational overload and keep the driver promptly engaged to vehicle control, the manufacturer shall apply measures restricting communications between the vehicle and the driver, specifically by reducing the number of voice or textual messages and avoiding video effects attracting the driver’s attention.]~~  | * Message classification
	+ Fault indication
	+ Information prompt
	+ Status prompt
* Warning messages
* Measures to avoid driver informational overload

AVERE (5.6.3.4): Need to take extreme caution with this provision. Driver information provision should be balanced against concerns of driver information overload. User interface can play an important role in ensuring that the driver is appropriately aware of the factors influencing ADAS intent. |
| **5.5.4. [ADAS] fallback special cases***Submitted by OICA-CLEPA / Co-Chair* |  |
| **5.5.4.1. [System behaviour when detecting that boundaries have been reached ~~rReaching the [ADAS] boundaries] [ADAS] behaviour when reaching the ODD boundaries~~**~~[ADAS], which had detected ODD boundaries, shall inform the driver by the means of the blinking status signal. [ADAS] shall retain in “Standby” mode and shall not automatically switch to "Active" mode until returning to ODD conditions.~~ **Upon detection that its boundary conditions are met, the activated system shall switch to “standby” [or “off”] mode.**  **Termination of assistance shall be such that sudden loss of steering support is avoided.**  **The system shall only change from “standby” mode to “active” mode when all operating conditions are met again.**  **Termination of assistance shall be indicated to the driver by at least an optical signal (i.e. the change from the “active” status indication to the “standby” status indication).**  |  |
| **~~5.5.4.2. [System behaviour when eExceeding the [ADAS] boundaries] [ADAS] behaviour when exceeding the ODD boundaries~~** ~~[ADAS], which had detected occasional or sudden exit the ODD boundaries, shall inform the driver by the means of the blinking status signal. [ADAS], which was in “Standby” mode, shall retain in that mode. ADAS], which was in “Active” mode, shall immediately terminate its control assistance and return to “Standby” mode, unless [ADAS] operating algorithm is capable of completing the current [ADAS] operating target. In the latter case [ADAS] shall return to “Standby” mode after completing the current [ADAS] operating target.~~ |  |
| **5.5.4.3. [ADAS] failures**~~5.6.4.3.1. [ADAS] must be designed to detect sensor malfunctions or degradations which may affect the safe performance of [ADAS]. A failure of the [ADAS] perception system shall be indicated by a fault signal (optical/audible) to the driver. Following an indication of the fault signal to the driver, [ADAS] shall immediately terminate its control assistance and turn to “Off” mode, unless [ADAS] operating algorithm is capable of completing the current [ADAS] operating target. In the latter case [ADAS] shall turn to “Off” mode after completing the current [ADAS] operating target.~~~~5.5.4.3.2. A failure of the [ADAS] decision-making system shall result in an immediate fault signal (optical/audible) to the driver and abort of control assistance. [ADAS] shall turn to “Off” mode.~~~~5.5.4.3.3. A failure of the [ADAS] execution system should shall result in an immediate fault signal (optical/audible) to the driver and abort of control assistance, unless [ADAS] operating algorithm is capable of completing the current [ADAS] operating target. In the latter case [ADAS] shall turn to “Off” mode after completing the current [ADAS] operating target.~~ **The activated system shall respond to detected failures affecting the operation of the system appropriately.**  **Upon detection of a failure affecting the safe operation of the system, the system shall immediately terminate its control assistance in a safe manner in accordance with the safety concept and turn to “Off” mode, and provide at least an optical failure warning signal to the driver [for an appropriate period / [x] s].**  | Timing question: on the ODD boundary or before the ODD boundary?In fact, there are still doubts about whether the fallback of the [ADAS] system occurs near the boundary of the ODD or on the boundary of the ODD. For the fallback that occurs on the ODD boundary, we think this can effectively remind the driver that the current external environment has affected the driving, and remind the driver that the system cannot perform the driving task normally in the current state; For the fallback that occurs within the ODD boundary, it can leave more reaction time for the driver to ensure the safety of driving, but it is difficult to confirm whether the current status prompt is reasonable from the test method. At the same time, we believe that the fallback cannot be issued later than the ODD boundary.

|  |  |  |
| --- | --- | --- |
| Number | Faulty subsystem | System response |
| 1 | Perception system | The system control should first send out the fault signal and then exit smoothly instead of ending suddenly. |
| 2 | Decision system | The system control should be stopped and a fault signal should be issued. |
| 3 | Execution system | The system control should be stopped. If the system can still complete the current dynamic driving task or exit smoothly, the corresponding operation can be performed before the system control is completely stopped. |

OICA-CLEPA: Is it necessary to set the requirements considering Perception, Decision and Execution individually? Is it really wise from a driver perspective that the system behaves differently in these scenarios?FIA: Agree to the basic idea, but how should control be given ‘gradually’ to the driver if the system fails. This then gives a minimum risk of incorrect maneuvers on the part of the system: it must be defined. We need to decide what a failure is, i.e. out of calibration including the non-monitored parts that are allowed. |
|  |  |
| **6. Modification of vehicle type and extension of approval** |  |
| 6.1. Every modification to an existing vehicle type shall be notified to the Type Approval Authority which approved the vehicle type. The Authority shall then either: (a) Decide, in consultation with the manufacturer, that a new type-approval is to be granted; or (b) Apply the procedure contained in paragraph 6.1.1. (Revision) and, if applicable, the procedure contained in paragraph 6.1.2. (Extension).6.1.1. Revision When particulars recorded in the information documents have changed and the Type Approval Authority considers that the modifications made are unlikely to have appreciable adverse effects and that in any case the foot controls still meet the requirements, the modification shall be designated a "revision". In such a case, the Type Approval Authority shall issue the revised pages of the information documents as necessary, marking each revised page to show clearly the nature of the modification and the date of re-issue.  A consolidated, updated version of the information documents, accompanied by a detailed description of the modification, shall be deemed to meet this requirement.6.1.2. Extension The modification shall be designated an "extension" if, in addition to the change of the particulars recorded in the information documents, (a) Further inspections or tests are required; or (b) Any information on the communication document (with the exception of its attachments) has changed; or (c) Approval to a later series of amendments is requested after its entry into force.6.2. Confirmation or refusal of approval, specifying the alteration, shall be communicated by the procedure specified in paragraph 4.3. above to the Contracting Parties to the Agreement applying this Regulation. In addition, the index to the information documents and to the test reports, attached to the communication document of Annex 1, shall be amended accordingly to show the date of the most recent revision or extension.6.3. The competent authority issuing the extension of approval shall assign a serial number to each communication form drawn up for such an extension. |  |
| **7. Conformity of production** |  |
| 7.1. Procedures concerning conformity of production shall comply with those set out in the 1958 Agreement, Schedule 1 (E/ECE/TRANS/505/Rev.3) and meet the following requirements: 7.2. A vehicle approved pursuant to this Regulation shall be so manufactured as to conform to the type approved by meeting the requirements of this regulation; 7.3. The Type Approval Authority which has granted approval may at any time verify the conformity of control methods applicable to each production unit. The normal frequency of such inspections shall be once every two years.  |  |
| **8. Penalties for non-conformity of production** |  |
| 8.1. The approval granted in respect of a vehicle type pursuant to this Regulation may be withdrawn if the requirements laid down in paragraph 8, above are not complied with.8.2. If a Contracting Party withdraws an approval, it had previously granted, it shall forthwith so notify the other Contracting Parties applying this Regulation by sending them a communication form conforming to the model in Annex 1 to this Regulation.  |  |
| **9. Production definitively discontinued** |  |
| 9.1. If the holder of the approval completely ceases to manufacture a type of vehicle approved in accordance with this Regulation, he shall so inform the Type Approval Authority which granted the approval, which in turn shall forthwith inform the other Contracting Parties to the Agreement applying this Regulation by means of a communication form conforming to the model in Annex 1 to this Regulation.9.2. The production is not considered definitely discontinued if the vehicle manufacturer intends to obtain further approvals for software updates for vehicles already registered in the market. |  |
| **10. Names and addresses of technical series responsible for conducting approval tests and of Type Approval Authorities** |  |
|  The Contracting Parties to the Agreement applying this Regulation shall communicate to the United Nations Secretariat[[3]](#footnote-3) the names and addresses of the Technical Services responsible for conducting approval tests and of the Type Approval Authorities which grant approval and to which forms certifying approval or extension or refusal or withdrawal of approval are to be sent. |  |

1. As defined in the Consolidated Resolution on the Construction of Vehicles (R.E.3.), document ECE/TRANS/WP.29/78/Rev.6, para. 2 - [www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html](http://www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html) [↑](#footnote-ref-1)
2. The distinguishing numbers of the Contracting Parties to the 1958 Agreement are reproduced in Annex 3 to the Consolidated Resolution on the Construction of Vehicles (R.E.3), documentECE/TRANS/WP.29/78/Rev. 6 - [www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html](http://www.unece.org/trans/main/wp29/wp29wgs/wp29gen/wp29resolutions.html) [↑](#footnote-ref-2)
3. Through the online platform (“/343 Application”) provided by UNECE and dedicated to the exchange of such information: https://www.unece.org/trans/main/wp29/datasharing.html [↑](#footnote-ref-3)