



Federal Ministry
of Transport and
Digital Infrastructure

Informal Document **GRRF-81-32**
81st GRRF, 1-5 February 2016
Agenda item 9(c)

Status Report of the Informal Working Group ACSF

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81st GRRF
Geneva, 1 – 5 February 2016



Federal Ministry
of Transport and
Digital Infrastructure

Time schedule



Timeline

- | | |
|-----------------------|--|
| Feb. 2015 | Proposal to establish an Informal Working Group for ACSF in the 79 th meeting of GRRF |
| Mar. 2015 | WP29 endorsed the creation of the Informal Working Group in the 165 th session |
| Apr. 2015 – Jan. 2016 | 5 meetings of the Informal Working Group ACSF |
| Sept. 2016 | Draft proposal to amend UNECE R-79 shall be presented in the 82 nd meeting of GRRF |



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Next meetings

6th meeting

19th – 21st April 2016,
Tokyo

7th meeting

28th – 30th June 2016,
venue t.b.c. (London, Gothenburg)



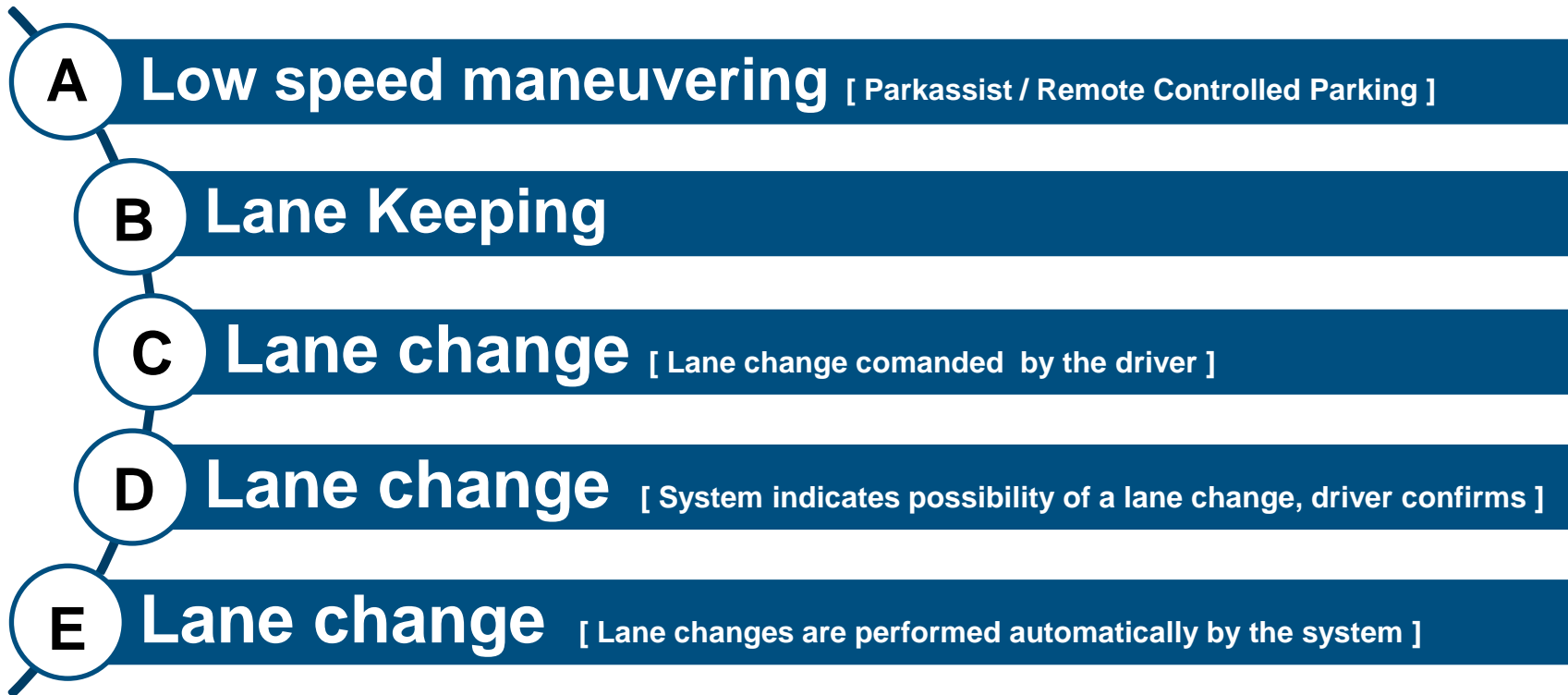
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Categories of ACSF



5 categories of ACSF

ACSF Category





2.3.4.1 Definitions of the ACSF Categories

- **Category A:** a function that operates at a speed no greater than 10 km/h to assist the driver, on demand, in low speed manoeuvring or parking operations.
- **Category B** [a function which is initiated/activated by the driver and which keeps the vehicle within its lane by influencing the lateral movement of the vehicle.]
- **Category C** [a Category B-System including] a function which can perform a single manoeuvre (e.g. lane change) when commanded by the driver
- **Category D** [a Category B-System including] a function which can indicate the possibility of a single manoeuvre (e.g. lane change) but performs that function only following a confirmation by the driver.]
- **Category E** a Category B-System including a function which is [initiated/activated] by the driver and which can continuously determine the possibility of a manoeuvre (e.g. lane change) and complete these manoeuvres for extended periods without further driver command/confirmation.



The IWG started to develop requirements for Cat. E



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PTI



5.5.2. Requirements for PTI

- It shall be possible to verify in a simple way the correct operational status of those Complex Electronic Systems, which have control over steering. If special information is needed, this shall be made freely available. **It shall be possible to verify the correct operational status of those Electronic Systems by a visible observation of the failure warning signal status, following a "power-ON" and any bulb check. In the case of the failure warning signal being in a common space, the common space must be observed to be functional prior to the failure warning signal status check.**
[In the case of an ACSF system able to operate at higher speed than 10km/h, it shall be possible to confirm the failure warning signal status via the use of an electronic communication interface.]



5.5.2.1 Requirements for PTI

- At the time of Type Approval the means implemented to protect against simple unauthorized modification to the operation of the verification means chosen by the manufacturer (e.g. warning signal) shall be confidentially outlined.
Alternatively this protection requirement is fulfilled when a secondary means of checking the correct operational status is available, **e.g. by using an electronic communication interface.**]



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Special Provisions for ACSF

Special Provisions for ACSF Category E





5.6.1.1 General Requirements

Main Content

- The system shall be active only after a deliberate action of the driver and if the conditions for operation of the system are fulfilled
- The system status shall be indicated to the driver
- Any change in system status shall be indicated by a visual and either an acoustic or haptic signal
- The system shall not induce in normal driving situations a lateral acceleration $> 3 \text{ m/s}^2$
- The specified max. speed shall not have a value $> 130 \text{ km/h}$
- The vehicle shall be equipped with means to monitor at any times when ACSF is active a minimum range to the front, to the right, and to the left side and behind the vehicle with the purpose to avoid or to mitigate collisions. (detailed calculation formulas included)



5.6.1.2 Operation of ACSF

Main Content

- A lane change manoeuvre shall be initiated only
 - if the vehicle is travelling on a road section not dedicated to pedestrians or bicyclists with a [physical or constructional] separation of traffic moving in opposite directions and which has at least two lanes for the direction the vehicle is driving
 - and any traffic that can affect the safe manoeuvre is identified by equipment installed on the vehicle
- Automatic activation of the direction indicator lamp before lane change
- In case of an imminent danger of a Collision with another road user ahead or beside the vehicle and the time for a safe transition procedure is too short, an emergency manoeuvre shall be carried out (e.g. by braking the vehicle and/or by steering).
- A driver availability recognition system shall be installed to detect that the driver is present in the driver seat and that he is available to take over steering.



5.6.1.3 System Information Data

Following data shall be provided together with the documentation package required in Annex 6 to the Technical Service at the time of type approval:

- The values for V_{smax} , V_{smin} and ay_{smax} .
- The conditions under which the system can be activated
- Information about system boundaries at which the activated system shall issue a transition demand.
- The specific values for time which is foreseen for safe transition to manual steering under different circumstances.
- Documentation about the chosen strategies regarding the minimal risk manoeuvre
- Documentation about the chosen strategies regarding the emergency manoeuvre
- [Information about how the driver availability recognition system detects appropriate driver activities.]



5.6.1.4 Transition Demand and system operation during transition

- If the system detects that its boundaries are reached or will be reached shortly or in case of a system failure it shall provide a transition demand
- In case of normal operation a transition demand shall be given not later than 4 s before system boundaries are reached
- In case of a sudden unexpected event with imminent danger of a collision a transition demand shall be given immediately and an emergency manoeuvre shall be initiated.
- The timing of the transition demand shall be such that sufficient time is provided for a safe transition to manual steering
- In case the vehicle is fitted with a built-in infotainment system, content visible to the driver, which is not relevant for driving, shall be deactivated as long as a transition demand is issued.



5.6.1.4 Transition Demand and system operation during transition

- In case of a sudden unexpected event without imminent danger of a collision a transition demand shall be given immediately and the system shall follow the initial path for at least [4 s] after the transition demand, in the following cases:
 - if the speed of the vehicle with activated ACSF exceeds v_{smax} or
 - if the vehicle with activated ACSF reaches a lateral acceleration of more than ay_{smax} or
 - if a system boundary is reached due to a missing lane marking, or
 - if a single sensor failure occurs.
- If a driver availability recognition system detects that the driver is not available and if a transition demand is given, the system shall not cross any lane marking for at least [4 s] after the transition demand.



5.6.1.4 Transition Demand and system operation during transition

- The system shall provide a transition demand if the driver's seatbelt is unfastened or if the driver's seat is left by the driver. In this case the system shall follow the initial path at least 4 s after the transition demand.
- In case of other failures than a single sensor failure a transition demand shall be given immediately and the system shall initiate the fail-safe strategy as declared by the manufacturer in Annex 6 of this regulation, as soon as the failure is detected.
- The transition demand shall be provided by a visual warning signal and either an acoustic warning signal or by imposing a haptic warning signal. The warning shall be escalating with time in terms of enlarging the intensity of the warning and/or in terms of adding and/or changing the warning means, or start immediately with the highest intensity level.



5.6.1.5 Minimal Risk Manoeuvre

- If the system detects that after a transition demand the driver does not take over manual control of the steering again the vehicle shall carry out a minimum risk manoeuvre. Alternatively the minimal risk manoeuvre may start at the beginning of the transition demand.
- It shall at any time be possible to override the minimal risk manoeuvre by the driver. System may be designed to exclude unintended override.
- With the start of the minimal risk manoeuvre the hazard lights shall be activated automatically. Additionally, an acoustic warning device may be permitted to warn the other road users.



5.6.1.6 Protective Braking

Any vehicle equipped with an ACSF of category E shall meet the following requirements for protective braking:

- If the activated system detects that the distance to other road users in front is less or will shortly be less than the foreseen safety distance a protective braking shall be carried out.
- If the activated system detects that due to a sudden unexpected event the vehicle is in imminent danger to collide with another road user in front and that the time for a safe transition procedure is too short, a protective braking as emergency manoeuvre shall be carried out. Alternatively a lane change manoeuvre can be carried out to prevent the collision.
- The protective braking must be able to deliver full braking force of the vehicle in order to achieve a maximum deceleration.



5.6.1.7 Data Storage System for ACSF (DSSA)

- [The DSSA shall record the data for situations of driving, ACSF status, the failure and the driver's operation in order to demonstrate that the ACSF had operated properly in align with the relevant requirements, when a vehicle fitted with Advanced Driver Assistance Steering System having ACSF is involved in a road accident. [A video signal that is monitoring the driver shall be included in the recorded data.]
- [It shall be possible that the drivers may switch off the function of recording video signal by driver's intention.]
- The recorded data shall not be volatilized in the DSSA without any deterioration [for at least [6] months].
- The special tools to get access to recorded data shall be specified by the manufacturer.
- The DSSA shall record at least for [5] seconds prior to and [1] second(s) [after an accident.]

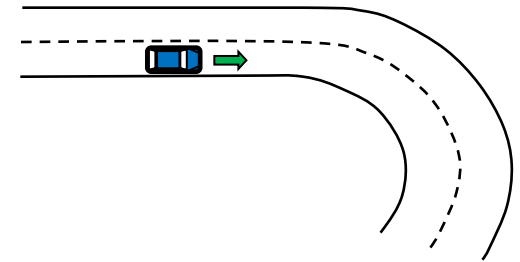
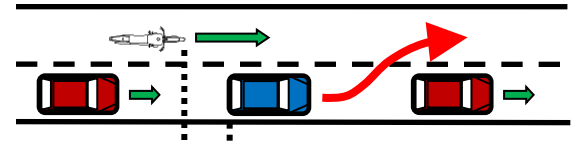


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Test Requirements

Test requirements for ACSF Category E (Annex 7)

- Functionality Tests
 - FU 1 - Lane Keeping
 - FU 2 - Abort of Lane change
 - FU 3 - Lane Change
- Transition Tests
 - TR 1 - Max. lateral acceleration
 - TR 2 - Missing Lane Marking
 - TR 3 - Driver not available (unfasten seat belt)
 - TR 4 - Sensor Failure
 - TR 5 - Overriding the Minimal Risk Manoeuvre
- Emergency Tests
 - EM 1- Braking behind moving target
 - EM 2 - Braking behind stationary target



Thank you for your attention!

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