Submitted by the IWG on ACSF

Status of the Informal Working Group on ACSF

Summary ACSF IWG Meeting – 16th Session

Terms of Reference

- As a first step, the target completion date for the informal group's work for **less complex ACSF categories** shall be the 82nd session of GRRF in 09/2016 (See ECE/TRANS/WP.29/GRRF/2016/45 as amended). Note: Corrective Steering Function (CSF), ACSF of Categories A and B1 were adopted by WP.29 in 03/2017.
- As second step the target completion date for the IWG work on the ACSF category which includes a function of a single manoeuver **(C1 and ESF)** when commanded by the driver shall be the 85th GRRF (special session) in 12/2017.
- And then the target completion date for the IWG work **[on ACSF Category B2 and on further consideration whether ACSF Category C2 is necessary]** shall be the 88th session of GRRF in February 2019.

ECE/TRANS/WP.29/GRRF/84

Report of GRRF 84 and of WP29 of Nov 2017

- ECE/TRANS/WP.29/GRRF/84:
  53. GRRF agreed to recommend to WP.29 the extension of the Terms of Reference of the IWG on ACSF as reproduced in Annex VI and to work in parallel on provisions related to ACSF of Category E, **SAE Level 3 and 4**, taking into account the future recommendations of the IWG on ITS/AD Task Force on the testing of automated/autonomous vehicles.

- ECE-TRANS-WP.29-1135e:
  39. The representative from the United Kingdom, on behalf of the GRRF Chair, reported on the results achieved by GRRF during its eighty-fourth session (ECE/TRANS/WP.29/GRRF/84).
  41. He also informed that GRRF updated the Terms of Reference of the IWG on ACSF as reproduced in Annex VI to the GRRF report. **WP.29 gave its consent for this update.**
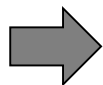
Status of IWG on ACSF

- 16th session of ACSF IWG was held on 23-25.01.2018 in Tokyo (J)

- Matters of discussion throughout 16th session:
  - General need of ACSF of Category C2?
  - Concept for ACSF of Category B2 – SAE Level 2 or Level 3?

- ACSF of Category B2 – SAE Level 3
  - Common agreement to begin with a first brainstorming on general scope of requirements
  - Aim was to create a basic "framework" for requirements, which shall be supplemented and detailed in the future
  - Results drafted in informal document ACSF-16-11 (summary enclosed in this presentation)

General need of ACSF of Category C2?

- Contracting Parties acknowledge industry's inquiry for ACSF of Category C2 systems
- Contracting Parties generally willing to discuss ACSF of Category C2, if requirements (in particular with regard to sensor performance) are essentially same as ACSF of Category C
    - Main functional difference between (proposed) ACSF of Category C2 system to (consolidated) ACSF of Category C system: lateral movement towards lane marking and lane change maneuver (as one continuous movement) initiated by further (2nd) deliberate action by the driver (ACSF of Category C: automatic initiation)
    - Industry will develop proposal for ACSF of Category C2 as amendment to ACSF of Category C

Concept ACSF of Category B2 - SAE Level 2 or 3?

- Some Contracting Parties showed preference to develop technical requirements for ACSF of Category B2 on basis of SAE Level 3, while some other CPs had no fixed position or showed interest for level 2 systems as well.
- Industry favored an approach where level 2 and level 3 would be considered in parallel by the informal group.
- Some Contracting Parties showed concern on side activities / driver monitoring with ACSF of Category B2 systems on basis of SAE Level 2.
- Some Contracting Parties showed concern on "mode confusion issue" associated with having ACSF of Category B2 system on basis of both SAE Level 2 and 3 systems on the market.
- Contracting Parties agreed to start working for ACSF of Category B2 on basis of SAE Level 3.

IWG on ACSF seeks guidance on further procedure from GRRF

ACSF of Category B2 as SAE Level 3
Scope of requirements – First brainstorming

1. General considerations
2. Operational design domain (ODD)
3. Dynamic driving tasks
4. Traffic rules
5. Manual override
6. Transition period
7. Minimal risk maneuver
8. Information to the driver
9. Driver availability recognition
10. System reliability
11. Recording of information
12. Cyber-security
13. Periodical technical inspection (PTI)

1. General considerations

- Which traffic situations does the system have to master?

- Which kind of situations result in a transition demand (depending on the boundaries of the operational design domain (ODD)?

- Which value of lead time is sufficient?

2. Operational design domain (ODD)

Highway* up to the speed defined by the vehicle manufacturer, but not exceeding 130 km/h.

* as declared in ACSF of Category C (UNECE/R79 → § 5.6.4.2.3):

"Activation by the driver shall only be possible on roads,
▪where pedestrians and cyclists are prohibited and
▪which, by design, are equipped with a physical separation that divides the traffic moving in opposite directions and
▪which have at least two lanes in the direction the vehicles are driving."

3. Dynamic driving tasks (1/2)

System can cope with all dynamic driving tasks within its ODD.

Examples of possible situations, which have to be considered (Actually, not all situations can be detected by the system):
▪Construction area,
▪Narrow lane or curve,
▪Inclement weather,
▪Low friction coefficient of road surface,
▪Obstacles/ animals,
▪Other vehicle broken down, covering lane partly (pedestrian),
▪Detection of signs of police officers,
▪Detection of emergency vehicles, …

3. Dynamic driving tasks (2/2)

System performance has to correspond to the activities which are allowed for the driver during ODD.

Regulatory provisions for longitudinal control (accelerating, braking) and lateral control (steering) are necessary.

Provisions for emergency braking measures (or even emergency steering measures) by the system, if the time for a proper transition procedure is too short.

The requirements shall define the performance of the dynamic driving task including object and event detection response (OEDR) (e.g. protective braking).

4. Traffic rules

System shall know which traffic rules apply and follow them (within its ODD).

Examples:
- Detection of relevant traffic signs and subsigns

5. Manual override

Ensure that the system deactivates immediately upon request by the driver (or delays deactivation when immediate driver takeover could compromise safety).

6. Transition period

Transition period of at least [4 s] (tbc by studies).

The system shall detect its limits and finalize the transition period before these are reached.

7. Minimal risk manoeuvre

A minimal risk manoeuvre shall start at the end of the transition period (which may be longer than the minimum required transition period) in case the driver has not resumed control.

8. Information to the driver (1/2)

The driver must be informed that he shall at any time be able to respond to transition demands from the system within the transition period.

Give information to the driver that any side task is permitted within the limits of the behavior law. The "infotainment" shall disengage as soon as a transition demand is sent.

8. Information to the driver (2/2)

The system shall inform the driver about the actual driving status.

Information given to the driver has to be designed in a way that the driver always knows:

- which part of the driving task is carried out by the system and
- which kind of behavior is expected from him and
- which tasks are expected to be carried out by him.

9. Driver availability recognition

Provide technical means to detect that the driver is in a position to take over control within the transition demand period.

For example by checking:

- driver is in the seat

- driver is showing regular activities / interactions

- head and/or eye movement

10. System reliability

The system has to be fail-operational, at least as long as the transition procedure is taking place.

The functional safety of the system shall be considered in the context of Complex Electronic (CEL) assessment.

11. Recording of information

Record the driver's operations and the system status (incl. system behavior) in the Data Storage System for ACSF (DSSA).

12. Cyber security

Depending on the outcome of the Task Force on Cyber Security and Over the Air update issues of the IWG on ITS/AD.

13. Periodical technical inspection (PTI)

Offering the possibility to carry out a beneficial periodical check of roadworthiness.

It has to be considered how to verify a correct operational status in a simple way
- by the use of a failure warning signal and
- by the use of an electronic communication interface.

How to do the confirmation of valid software version is depending on the outcome of the Task Force on Cyber Security and Over the Air update issues of the IWG on ITS/AD.

Summary

- If GRRF agrees, the IWG on ACSF will continue work within their Terms of Reference with special regard to:

  - **ACSF of Category B2**

    Requirements based on SAE Level 3,
    also requirements based on SAE level 2

  - **ACSF of Category C2**