

REPORT

18th meeting of the GRRF informal working group on Automatically Commanded Steering Function (ACSF)

Venues: Den Haag (Netherlands) – for details see ACSF-18-01
Chairman: Mr. Hiroshi Morimoto (Japan) and Mr. Christian Theis (Germany)
Secretariat: Mr. Rudolf Gerlach (TÜV Rheinland)
Duration of the sessions:
Wednesday 06. June 2018: starting at 10:00
Friday 08. June 2018: ending at 12:00

1. Welcome and Introduction

Mr. Theis proposed to reduce the number of participants to 10 from OICA and 5 participants from CLEPA. The reason is, that it becomes more and more difficult to find a venue with a room capacity for the IWG (currently 55 participants).

2. Approval of the agenda

Document: ACSF-18-02 (Chair) Draft Agenda of the 18th session

New documents have been added under point 4. of the agenda (see point 4. of this report). Beside that the draft agenda has been adopted as agenda for the 18th session.

3. Adoption of the report of the 17th meeting of the ACSF IWG

Document: ACSF-17-11 (Secretary) Draft report 17th meeting

With regard to the new General Data Protection Regulation (GDPR) the Secretary asked all participants to confirm the use of names and email addresses for the purposes of the IWG on ACSF. The participants had no objection. The signature on the “list of participants” of the meetings is therefore the confirmation that the data can be used for this purpose.

Due to the fact that the report of the 17th session has been published by the secretary on the ACSF website just some hours prior to this meeting, Mr. Theis asked the participants to read the report during the week and proposed to discuss and adopt it on Friday 8th of June. In the course of the week it has been decided to have two parallel meeting: one meeting for CPs and one for Industry members. Therefore, the adoption of the report of the 17th session is postponed to the 19th session.

After comments from UK and Germany the report has already been revised and published (see document ACSF-17-11-Rev.1).

4. Discussion on requirements of ACSF of Category B2

Documents:
ACSF-18-03 (Japan)
ACSF-18-04 (Germany)

ACSF-18-05 (Industry)
ACSF-18-06 (Industry) comments on ACSF-18-03 (Japan)
ACSF-18-07 (Industry) comments on ACSF-18-04 (Germany)
ACSF-18-08 (F) Results of the study
ACSF-18-09 (ROK) Take over time comparison

Mr. Theis explained that during the CP meeting before the 18th session of the IWG-ACSF the decision has been taken to use document ACSF-18-05 (Industry) as a basis for the discussion during the ACSF session and integrate document ACSF-18-03 (Japan) and document ACSF-18-04 (Germany) into ACSF-18-05 step by step.

He furthermore explained that instead of complicated and extensive modification of the scope, the definitions and requirements in UN Regulation No. 79, Germany is in favor to make a clear separation between systems with functions up to “SAE Level 2” and those of “SAE Level 3 or higher” and to setup a new regulation for the currently discussed ACSF of Category B2 system. EC, UK and Japan support a clear separation between systems of Level 2 and Level 3.

Industry is not in favor to setup a new regulation for ACSF B2, because it could delay the work and pointed out that the TOR includes this systems but not the task to develop a new regulation. The industry proposal is to modify paragraph 2.3.4 of UN Regulation No. 79 as shown in document ACSF-18-05.

EC does not see a difference in timing because the procedures for a new regulation and a modification are the same, but pointed out that UN-Regulation No. 79 already has a definition for autonomous steering where B2 could fit in.

Industry proposal is to put requirements for different levels if necessary in separate annexes of UN-R 79. Functional safety annex and PTI are currently drafted for B1 and B2 in the same document.

J, UK and Germany are clearly in favor to have a clear separation between Level 2 and Level 3 and to start with a new regulation. Mr. Theis mentioned that all 10 subgroups working under GRRF could deliver their input for a new regulation.

Review of document ACSF-18-05 doc, final wording after the meeting see ACSF-18-10

Paragraph: Additional definitions (taken - and modified - from document ACSF-06-28):

Use always “minimum” instead of “minimal” risk manoeuvre.

General system classification:

Mr. Theis remembers that during the 17th session of the IWG it was proposed by the CP's to have different classes of systems for different environments (see ACSF-17-03-Rev1). Also sub-classes for different speed ranges could be a possible solution. On one hand such fixed speed classes could help to make it easier for the users to understand the new systems, on the other hand the requirements could be easier to fulfill, if a system does not need ~~not~~ to cover all environmental conditions and all speed classes. EC doesn't see a problem to use classes and explained, that without classes, it could take years before already existing systems could come on the market, because current systems are not able to cope with all situations. Industry is of the opinion that classes could only be decided after the requirements are known. Chair reminds of the agreement saying that systems have to cope with all situations and the traffic regulations of the country in which the vehicle is ~~sold~~used. UK pointed out, that the group has also the responsibility to make sure that the consumer is able to understand what the system is able to do and that a classification could help to harmonise systems. Beside classes J explained, that during the CP

meeting it was discussed to add in addition to roads with two lanes in one direction also highways with a single lane in one direction as environment for the systems. Industry supports this.

Homework for UK, Japan and Germany to define “General system classification (Activation / Operation)” for next session.

Dynamic driving task and headway control

UK pointed out that the systems shall have a minimum performance and a kind of harmonisation because the consumer should be able to understand, what a system can cope with and when a transition demand will be issued. We need to define situations in which the vehicle will generate a transition demand. Mr. Theis is of the opinion any situation which cannot be handled by the system shall result in a transition demand and that a list could only contain examples.

UK agrees, but pointed out that it has to be tested in practical and shall not just a be part of an “annex 6” audit.

Lateral control

Paragraph 1:

Germany: Requirement for maintaining the vehicle in the center of the lane needed. OICA disagreed, vehicle needs to be flexible inside the lane in case urgent situation. UK: Stay in the center of the lane is probably not the right approach (road damage). Industry: We don’t have such “centering” in B1, why requiring in B2? Do we need the criteria in which situations it is needed to center the vehicle or not needed? This could also be endless list.

CLEPA pointed out, that if the vehicle in front in not centered, than other vehicle will use this position as target and follow the vehicle. Aim of the proposal “vehicle shall aim to center the lane” is to avoid an unnatural movement of the vehicle in the lane. A better wording addressing the necessity of the vehicle to maintain a stable lateral position within the lane of travel shall be found.

Paragraph 2:

Mr. Theis asked, why it is only required to detect a vehicle driving beside and not in the rear? Industry explained, that there is no need to detect vehicles in the rear because the B2 system has always to stay in the same lane.

Longitudinal/Headway control

Paragraph 2:

Sweden: Why just curve radius included? ACSF vehicle shall adopt the speed in accordance with weather conditions for example.

Industry: Other conditions are covered by the other part of this document, but ready to amend (Industry homework).

Paragraph 6:

Industry: [xx] because figures are different in each country. To be defined on the base of national law of CP.

Mr. Theis: We can put general sentence here and add that safety distance will be checked by the technical service of each country.

Paragraph 7: Max operational speed

UK: What about icy roads? Can we have 3.7 m/s² for all conditions?

Industry: The best is to hand over to the driver in such a situation.

CLEPA: We don’t have sensors that 100% predict road conditions (friction). Industry: Need to keep it flexible, technology will be more advanced within the next years.

UK: than we have to be conservative and say systems should not be active at a temperature below x °C.

UK: Why is S_{front} **declared** by the manufacturer?

Industry : The manufacturer has to declare it according to sensors capabilities. 46 m is for 60km/h.

UK: This value has to be tested on type approval. Sensors are affected by rain, fog, aging etc. We should test sensors in best condition and then multiple the result with **0.6** to get real world number (due to aging and environmental conditions).

CLEPA: Aging will be taken into account by the suppliers before selling to the OEM's. This is covered by the lifetime testing. We can explain what we are doing and how we are doing that. The most important issue are environmental conditions, heavy rain heavily influences radar detection. We propose to detect the environment conditions and then issue a transition demand if the system cannot cope with the situation.

Mr. Theis: Is there any difference between front and rear sensors capabilities?

CLEPA: Front sensors have smaller opening and range is higher.

Industry: Agreed, S_{front} value has to be tested. It is written in the doc when mentioning "shall be tested"..

Sweden: This formula presents ideal conditions, we need to include control strategies on top of this.

Industry: This calculations in based on **wet** road and this looks reasonable. There is no formula to solve icy conditions. It is not the purpose of this formula to solve worst case scenario. We also have to find the way of recognizing different conditions (icy). There are many ways to ensure safety, not only sensor range. It could be system redundancy, speed, et cetera.

Mr. Theis: I have a problem, why we refer to ideal conditions in this formula? We would have to refer to worst case scenario.

UK: If there is evidence there is deterioration factor included, no problem (aging of sensors). Regarding icy roads, if we cannot observe conditions, we should take temperature limits into account.

Industry: We should declare value (for all conditions), and annex 8 will confirm it.

UK: It is important technical service will be able to test it, as part of type approval!

Mr. Theis supports UK.

Industry: again says there is no contradiction, it is written here and in annex 8, which is about test procedures.

Mr. Theis: We need to define minimum distance (S_{front} value), not the manufacturer can declare a distance!

UK: If you declare something, this is self-certification, not type approval.

Additional remark by Mr. Theis: Manual driver can see 200-300 m, 46m is ridiculous according to this!

Discussion has to be continued later → Move paragraph to the test section.

Transition demand studies

French study: ACSF-18-08 (F) Results of the study

- Total time budget = Take over time + intervention time
- Total time budget 4s → 26% of crashes
- Total time budget 8s → only 1 crash out of 98
- The shorter the time budget, the shorter the mean take over time

Questions:

CLEPA: Do you have figures if we increase speed to 130km/h? Author: Yes, we did a lot of experiments in various speeds.

Industry: Accident avoidance only by braking? Author: No, changing the lane was possible.

UK: How did you know the durability of intervention time? Answer: Taken from ISO.

Japan: Secondary activity? Author: Yes, they were playing games.

The Netherlands: 3 trials, what does it mean? Author: Different HMI.

Question by someone The Netherlands: How long driver drove autonomously before Transition demand?
Author: 8 min.

The Netherlands: Were there also experiments with longer automated driving before transition demand?
Author: yes, transition times were longer.”

Japan: What was the obstacle? Author: Car stopped in the lane.

Industry: 26% accidents by drivers, who decided to brake or to steer? Author doesn't know the answer.

Mr. Theis: What is Total time budget? Author: Time to avoid collision.

Korean study: ACSF-18-09 (ROK) Take over time comparison

- Suggests 8s transition demand

Industry stated this study confirms French study. Ask why they suggest transition demand time from max result (7.731).

Seems participants were obliged to do side task, ~~the result is questionable~~.

Review of Japanese document ACSF-18-03 doc, final wording after the meeting see ACSF-18-10

Paragraph: Driver not present in the driver seat

Industry: Is distinctive warning aiming to be acoustic? Japan: Yes, should add acoustic warning.

Interaction with UN R16 – safety belt reminder!

UK: Why 15 sec acoustic warning before transition demand in this case. Minimum risk manoeuvre should be initiated the same moment system realizes driver is not present in the driver seat.

Mr. Theis: Transition demand should appear immediately, not after 15 sec. **Japan agrees!**

Paragraph: Driver not available to take over the driving task

Industry: Concerned on 3 min timespan, driver can watch movie and then he certainly will not touch board more than 3 min! We shouldn't force driver to touch board every 3 min. We should monitor that the driver is not sleeping!

Netherland: What will you use for recognition systems?

Industry: Camera, if inactive more than 10,15 or 20 sec, than transition demand. If sunglasses, then transition demand. Industry continues: Why two technical means? Camera is enough, what does two means represent? Two cameras?

UK: What is appropriate mean? Industry has to say which technologies are available. How do we know camera is appropriate? Must be studies already developed with regard to driver monitoring. If using camera, we have to elaborate why.

Japan: We proposed two means as system is not 100% sure with one mean. Also, 3 min is based on our study developed 2 years ago.

Industry: 3 min is very conservative. In case of cameras, 3 min requirement is not needed. For next meeting we can check what we are able to provide as the best technology solution.

EC: As Japan proposed, alternative means needed.

Task for Industry given by Mr. Theis: Input on this driver monitoring technologies.

Industry: What is a strategy, do we draft like level 3 or level 4?

Mr. Theis: Look for the perspective to develop safety requirements.

UK: Rather to proceed what is needed to have autonomous vehicle. We cannot afford to disadvantage level 4. So, we need to look further. In level 4 driver monitor system should also be introduced.

Mr. Theis: No big difference between level 3 and level 4 for B2 category systems. Driver should be in position to react in case of transition demand, that is crucial.

CLEPA: Do we have to implement brake pedals in B2 level 3? We would even consider brake pedals in level 4 also.

EC: we should come back to monitor later after we define general requirements regarding transition demand. Netherlands: Level 3 and 4 similar, driver should be monitored and present!
UK: Proceed as started. No big difference within levels.

Transition demand and system operation during transition

Paragraph 1:

OICA agrees, but questions what is meant with “system boundaries”? OICA amendments accepted by Japan.

Mr. Theis: the words “system boundaries” should be avoided. There are no system boundaries, if system cannot cope, then transition demand.

Industry agrees and proposes wording “system cannot deliver a safe operation”.

Paragraph 3:

EC: Normal B2 function shall continue during acoustic warning and transition demand. What happens if the driver doesn't take over control?

Industry: This is in minimum risk manoeuvre paragraph.

EC: We should merge it and structure the doc.

Mr. Theis: Come back later to Japans proposal on transition demand after reviewing minimum risk manoeuvre.

Paragraph: Minimal risk Manoeuvre

Industry explains both cases.

EC: Lane change in case two?

Industry: On last meeting CP's proposed lane change so here is the proposal.

UK: Grateful to OICA for bringing forward this suggestion (especially option B).

Mr. Theis: We should use option B and delete option A?

UK: If technically possible, option B. Direction indicator instead of hazard warning signal.

EC: Do we really want to go so far, are we opening pandora box with option B?

Industry: We can use sensors for category C to deliver option B. If is not enough, then delete paragraph. Regarding indicator, my opinion is, hazard warning is better.

Mr. Theis: Stay with option A. Option B to use for emergency manoeuvre. Lane changing to allow only for vehicles with category C type approved.

Industry: OK, we will draft it.

Japan: Why 4 sec for hazard warning? Is this in line with 4 sec transition demand?

Industry: No, we will re-draft this paragraph. Industry will draft according to 3 sentences in blue.

Mr. Theis: OK.

Paragraph Emergency Manoeuvre

Industry explains two options.

Sweden: Please consider criteria to override emergency manoeuvre?

Industry: Will be covered in other part of regulation.

Mr. Theis: How to signal emergency braking to the rear traffic? Can discuss later.

Japan: Imminent collision should be defined better.

Paragraph Tests for ACSF Systems of Cat B2

Mr. Theis: Details to be agreed after requirements.

Review of German document ACSF-18-04 (Germany)

ACSF-18-04 was not discussed in detail. Postponed to next session.

Germany: Text copied from B1 of the 03 version of UN-R 79

Industry: ACSF-B2 should not be in conflict with UN-R 79 and UN-R 13 resp. UN-R 13 H. Comments on ACSF-18-04 made in ACSF-18-07 are still valid

5. Other business

Information about complementary activities, if available

Annex 6:

UK reports about sub-group's work on annex 6. Group is now looking, what has to be added for ACSF. Next meeting end of July. The outcome will be presented to IWG ACSF group in September during the 19th session of the IWG on ACSF. Group has a working text but this has not been published yet.

PTI:

Sweden reports that a first telephone conference took place. ToR and scope have been presented. For the next meeting, which has still to be organised Sweden asks for more participants from Contracting Parties in this sub-group.

The 18th session was closed on the evening of the second day. On the third day of the meeting Industry and CP's had separated meetings to start with the homework for the 19th session. The outcome of these discussions will be reflected in the documents for the 19th session.

6. List of action items

Homework see document ACSF-18-10 and yellow marked areas in this document.

7. Schedule for further meetings

19. ACSF IWG Meeting: 05.09.-07.09.2018, France

20. ACSF IWG Meeting: 07.11.-09.11.2018, UK

21. ACSF IWG Meeting: t.b.d. January 2019 (before 2. GRVA)