

**Minutes first meeting IGCMS working group
(24+25 February 2009)**

Place: Soesterberg, the Netherlands

Minutes by: Maarten Hogervorst

Date draft: 09/03/2009

Approved on:

Attended by: Josef Krotil (Opel), Rudolf Gerlach (TUV), Markus Meyer (Mekra),
Stephan Scheuer (TRPS; only the first day), Stuart Matthews (Brigade),
Dilip Kerai (Brigade), Philip Hanson-Abbott (Brigade), Krzysztof Olejnik
(MTIVAT), Maarten Hogervorst (TNO), Harry Jongenelen (RDW)

Agenda

1. Welcome and introduction of the participants
2. Approval of the agenda
3. Justification for establishing the informal group by GRSG
4. Terms of Reference
5. Available documents
 - a) from GRSG
 - b) study by TNO
6. Publication of working documents on UNECE website
7. Presentation on the the testing of camera-monitor systems by TNO
8. Testing of CMS
9. Replacement of mirrors by CMS
10. Points for attention
11. Any other business
12. Draft agenda for the next meeting
13. Next meeting, date and venue.

1. Introduction

The chairman (HJ) thanks TNO for offering the facilities for this first meeting of the informal group. All participants introduced themselves.

2. Agenda (IGCMS-01-01)

On request of PHA a new point 8a, “definitions”, is added to the agenda.

3. **Justification for establishing the informal group by GRSG**

The chairman clarified the justification of this informal group by GRSG.

Discussion about ISO follows:

Current ISO standards do not cover the tests required. So, a new ISO standard is wanted.

However, the expectation is that it will take a long time to arrive at such a standard.

Therefore, a revision of the ECE is required that includes information about the requirements and the tests. Later on, when a new ISO standard(s) is available, the ECE regulation can refer to the ISO standards.

4. **Terms of reference (IGCMS-01-02)**

Terms of reference are rewritten and agreed upon. There will be a differentiation between a primary task, dealing with the testing of camera-monitor systems, and a secondary task, concerning the replacement of mirrors by CMS. The IG will present proposals to GRSG in April 2010.

All participants are requested to verify the latest version of the ToR, so the text can be approved in the next meeting and offered to GRSG in April 2009.

TASK (all): check the revised document and report proposed changes to HJ

5. **Available documents**

The available documents for the IG are at the moment:

i) the Dutch proposal ECE/TRANS/WP.29/GRSG/2008/3,

ii) the German proposal ECE/TRANS/WP.29/GRSG/2008/10 and

iii) the report by TNO, that was the basis of the Dutch document; since not all participants seem to have the TNO report it will be sent once again:

TASK (HJ): send the TNO report around.

6. **Working documents**

The distribution list of IGCMS includes the participants to the meeting plus:

- representatives of technical services of France and the Russian Federation,

- two representatives of OICA,

- one representative of Clepa and

- one manufacturer of replacements parts.

7.+8 **Presentation on the testing of camera-monitor systems by TNO**

All agree that the main focus of the group should be on the primary task (see “Terms of reference”).

MH proposes to use functional requirements whenever possible. This makes the requirements independent of the actual device that is used for indirect vision.

Also, the functional requirements should be put onto the total human-in-the-loop system.

In some cases (possibly not all) requirements can be formulated for the individual components of the total system in a way that guarantees that a system consisting of parts

that fulfill the individual requirements will pass the requirements of the complete system (see e.g. the TNO report). In such cases, this may sometimes mean that the requirements for the individual parts are tougher than when the complete system would be tested. MM remarks that there is the need for separate tests for the camera and the monitor.

A discussion is held about the use of the TNO method vs. the use of a real critical object. In the TNO method the detect ability of the critical object is inferred from the smallest discernable detail in the centre of the monitor and the image distortion. Not all participants are convinced that this gives the same results as a more direct test using the critical object. The advantage of the TNO method is that the method gives quantitative predictions for different situations, so not every situation needs to be tested explicitly. Another advantage is that the method is objective whereas a judgment of the critical object is subjective (i.e. subject to interpretation differences between different observers). MM points out that an even more objective method would be to use a computer algorithm to derive the smallest detail. MH agrees but remarks that this relies on a very good human vision model, since the algorithm needs to predict human visual perception.

PHA states that he likes the comparison between viewing with a mirror and with a CMS: the requirements for CMS should not be stricter than for mirrors.

SS gives a presentation in which he explains his views on the matter and gives comments on the TNO proposal, such as the use of another contrast measure in the blooming test, the specification of various parameters such as viewing distance, distance from object to camera, distance from observer to monitor, the size of the light source, spectral distribution, homogeneity of the light source, etc. It is decided that SS and MH work on this bilaterally and come with a proposal at the next meeting.

TASK (SS and MH): work out a common proposal for dealing with the TNO proposal.

8a. Definitions

PHA proposes to replace “mirror” at several places throughout the document with “devices for indirect vision”. Since this is related to the German proposal it is decided that the German proposal is discussed first.

9. Replacement of mirrors by CMS, German proposal discussion

9.1 General

RG introduces the proposal. The idea is by replacing “mirror” with “devices for indirect vision” industry will be given the opportunity to develop systems for other classes. This means that the advantages of CMSs can be used in future systems. Before this can be implemented specifications are required.

HJ expresses that the Dutch government is in principle in favor of this idea, but that good provisions are needed. Contact with the GRSG reveals that the European Commission has still considerable doubts whether this is feasible.

All agree that a first step towards this can be made in this working group, advise the GSRSG and possibly advice on the formation of an ISO group for working out the details.

IGCMS discusses several topic related to the German proposal. The suggestions to amend the German proposal as result of the discussions are given in the annex to this report.

9.2 *Use of split-screen*

PHA agrees that the secondary task of the group should be investigated, but remarks that the focus of the working group should be on the primary task. There are especially many questions in the field about the use of split screen and how V and VI can be displayed best. He points out that when 2 cameras are used for displaying the separate fields of view the image quality is better than when one camera displays both areas. At the moment it is not clear whether split-screen is allowed.

The discussion in the group shows that there are different views on whether split-screen is allowed under the existing regulations. Another matter is whether this should be allowed in the future, i.e. what should be the advice on this from the working group. MH: a minimum requirement is that the image quality should be such that the different parts of the CMS fulfill the requirements. RG points out that also ergonomic issues come into play. JK indicates that the same applies to mirrors.

According to PHA split-screen is allowed in the UK. RG: the text is not really clear on this (15.2.1.1.2). PHA: split-screen works well in practice, and has several advantages over the use of multiple mirrors (also possibilities for warping and stitching). HJ: this issue is open for discussion, but according to HJ it is not permitted according to the existing regulations. MM: studies show that some drivers use only one mirror anyway. Mekra is also investigating the use of an a-spherical mirror.

All agree that when allowing split-screen there should be restrictions on the areas displayed. RG: limit the split-screen to neighboring areas. MM: the content should be intuitive (HMF). PHA points out that in practice the two-split is most needed and mostly concerns a split with the rear-view, which turns out to be very important for safety (even though it is not included in the current regulations). So, the question is how to integrate the rear view. PHA: what is required is split-screen with V permanently on display and the second part switching between VI and rear. In Spain people have experience with split-screen situations on e.g. school busses. PHA declares that Brigade is happy to participate in trials investigating the use of split-screen.

9.3 *Monitor size*

KO presents his ideas on monitor size in a presentation using simulations. The idea of KO is to mimic the mirror by a CMS. This means that the monitor should be the same size as the mirror, display the same outdoor area and be put in the same position as the mirror.

MM indicates that a monitor could be smaller than a mirror. KO points out that this could be a starting point for developing the requirements. According to MM it's not necessary that the monitor is in exactly the same position as the mirror. What is required for good intuition is that the monitor should be in the same "general" direction.

PHA highlights the differences between mirrors and CMSs. Also, often it is required that the monitor is integrated into the dashboard. Advantage of a CMS is that mirrors create a blind spot and a CMS doesn't. According to PHA a CMS is also more intuitive.

MH: the concept of the critical viewing distance can be used to assure that the monitor size is sufficient. The critical viewing distance is the distance at which the resolution of the complete human-in-the-loop system starts to degrade due to the limited (but high) resolution of the human visual system. This distance will approximately scale with monitor size. Therefore, the critical viewing distance of a small monitor is smaller than that of a large monitor. The same hold for the situation in which only part of the display is used (i.e when used in split-screen mode).

MM: when using split-screen, the different images should be clearly separated.

PHA: it should be noted that mirrors are also not ideal or intuitive.

According to RG showing VI at high speeds is not very useful (given the reaction time of the driver), instead it may be distracting. Therefore, the speed below which VI should be displayed can be lowered. PHA disagrees: at higher speeds VI can be very useful when turning. Most accidents happen at the corner.

MH: it should be taken into account that the mirrors are not only used for detecting an object. This is especially the case for the main mirrors. It is also important to judge the speed and location of things.

TASK (HJ): HJ will distribute the attendants list and all other relevant documents.

PHA proposes to define what should be achieved, not how. HJ: functionality counts. Discussion about changes to the regulations starts. The consensus is to change as little as possible.

2.1.4. PHA: is the range of vision defined? JK: installation requirements should be put somewhere else.

After some discussion JK proposes that Brigade proposes changes to the text.

TASK (PHA): makes a proposal for changes in the text.

9.4 *How many parts should be handed over to the test laboratory?*

At the moment TNO requires two samples, sends one sample back after the tests and keeps one sample. Why is not fully clear. TUV does not keep any sample.

TASK (MH): investigates why 2 samples are required by TNO.

9.5 *Where to put the markings?*

Section 4.2

RG: first step is to improve get a good system for testing the complete system. At a later stage separate parts might be tested.

MM points out that it is difficult to add a marking to a camera. The prescribed marking is too large.

HJ: the markings should one to check whether different parts fit together.

PHA: but, when integrated, how to make the markings visible>

MM: only identification is needed, i.e. suffices.

TASK (All): everyone thinks of how to change the wording considering markings.

PHA: this is only a problem when the parts are approved separately.

HJ stops the discussion and proposes to finish it at the next meeting.

10. Point of attention

This agenda point has not been discussed; the chairman requests all to think about which items are associated with the replacement of mirrors and requires amendments of the regulation or be taken into account when developing an ISO standard.

11. Any other business

MM has an additional question: is a CMS required for hooded trucks? There seems to be a discrepancy between the German and the English text on this.

12. Next meeting

Next meeting will be hosted by the TUV in Cologne on 20+21 April, starting at 11:00 and finishing 15 or 16:00 the next day.

TASKS LIST:

- **TASK (all):** check the revised document and report proposed changes to HJ
- **TASK (HJ):** send the TNO report around.
- **TASK (SS and MH):** work out a common proposal for dealing with the TNO proposal.

- **TASK (HJ):** HJ will distribute the attendants list and all other relevant documents.
- **TASK (PHA):** makes a proposal for changes in the text.
- **TASK (MH):** investigates why 2 samples are required by TNO.
- **TASK (All):** everyone thinks of how to change the wording considering markings.

Amendments to ECE/TRANS/WP.29/GRSG/2008/10 agreed during the 1st meeting of IGCMS

- 2.1.1 "Mirror" means ~~any~~ device, excluding devices such as periscopes, intended to give a clear view to the rear, side or front of the vehicle within the fields of vision defined in paragraph 15.2.4. by means of a reflective surface.
- 2.1.1.13. "Class of device for indirect vision mirror" means all devices having one or more common characteristics or functions. They are classified as follows:
- Class I: "Interior rear-view ", giving the field of vision defined in paragraph 15.2.4.1.
 - Class II and III: "Main ~~exterior~~ rear-view ", giving the fields of vision defined in paragraphs 15.2.4.2. and 15.2.4.3.
 - Class IV: "Wide-angle view ~~exterior~~ ", giving the field of vision defined in paragraph 15.2.4.4.
 - Class V: "Close-proximity view ~~exterior~~ ", giving the field of vision defined in paragraph 15.2.4.5.
 - Class VI: "Front view ", giving the field of vision defined in paragraph 15.2.4.6.
- "2.1.4. "Type of device for indirect vision" means devices that do not differ on the following essential characteristics:
- (a) design of the device inclusive, if pertinent, the attachment to the bodywork;
 - (b) in case of mirrors the class, the shape, the dimensions and radius of curvature of the mirror's reflecting surface;
 - (c) in case of camera-monitor devices **the class the detection distance and the range of vision.** "
- 3.3 For each type of device for indirect vision the application shall be accompanied by one sample of ~~all~~ the parts:
- 3.3.1. in case of mirrors, four samples: three for use in the tests and one to be retained by the laboratory for any further examination that might subsequently prove necessary.
- 3.3.2. Additional specimens may be called for at the request of the laboratory.
- ~~3.3.2. in case of other devices for indirect vision: one sample of all the parts.~~
- "4.2. Every device **for indirect vision** shall possess ~~on its protective housing~~ a space large enough to accommodate the approval mark, which ~~must~~ **shall**

be legible when the device has been mounted on the vehicle; this space shall be shown on the drawings referred to in Annex 1. "

4.3 (new): In case of limited space for the approval mark(s) other means of identification that tie it to the approval number mark shall be provided.

5.4.3. ~~An additional~~ **Additional** symbol(s) I or/**and** II or/**and** III or/**and** IV or/**and** V or/**and** VI, specifying the class to which the type of the ~~mirror~~ devices for indirect vision belongs or the symbol S in case of any device for indirect vision other than a mirror. ~~The additional symbol shall be placed in any convenient position in the vicinity of the circle containing the letter "E".~~
