IGCMS-01-03 Rev.2

2nd meeting IGCMS
20 and 21 April 2009
Agenda item 5d

**Points for attention for IGCMS**

The German proposal (ECE/TRANS/WP.29/GRSG/2008/25) introduces the possibility for replacing mirror by Camera Monitor Systems. Even when the requirements for the use of CMS as replacement of mirrors of class VI and/or class V are very limited, I think that the informal group should discuss whether additional provisions might be necessary. The list below, without being exhaustive, gives some first topics that could be discussed; other topics can be added.

Informal group
Test metrology

ISO
**General topics**

1. Should IGCMS only define performance requirements? Yes
2. What to do in case of a failure of the system? Same as a broken mirror, but additional aspects should be raised in standardisations (ISO)
3. Do we need an approval of CMS for the relevant classes? Yes
4. Is it necessary to amend other UNECE regulations? Eg. ECE-R26, -21, -125?
5. Should CMS be approved for EMC? Yes, also for the after market
6. Should the requirements provide the same minimum level of performance requirements as mirrors? Yes
7. Are additional functions, under certain conditions, permitted? Yes
8. Should the IG consider other systems like radar systems, detection of bio mass, etc? No
9. Should the IG consider inclusion of other systems, like those verifying the out-swing of trailers? No
10. The mounting of the camera; should it be adjustable or adjustment be forbidden? Up to the manufacturer design solution and performance requirements
11. The mounting of the monitor; should it be adjustable or adjustment be forbidden? Up to the manufacturer design solution and performance requirements
12. Should specific precautions have to be considered for wireless technology (ISO item)

**Performance related topics**

13. What about “night sight”, are there any experiences available? Same level of performance as mirrors,(consider minimum illumination level?)
14. Is a colour CMS necessary or is black and white or mono-colour also sufficient? Same performance as mirrors, that means a colour CMS (as for other devices for indirect vision)
15. Adaptation of the light intensity during the night? Yes, according to ISO 15008 No, according to existing type approval regulations.
16. Do we need different dimensions of the critical object for different classes of devices for indirect vision. Yes, for class VI already in the regulation
17. Is there a need to have different fields of vision and detection distances for other devices for indirect vision other than for the front mirror and close proximity mirror. Yes
18. Is there a need to have a bigger field of visions for a CMS than a mirror of the same class to take into account the drivers movement in case of mirrors? No
19. Should the CMS be capable to detect motions in real time? Delay (image information time) and number of frames per second (image refresh rate), image moving artefacts

(motion blur, compression) close to the same level of the performance of mirrors (ISO item)

20. Do we need a blooming requirements? If yes, for all classes of mirrors?
21. Do we need special installation/mounting requirements integrated in the system approval? Yes
22. Do we have to investigate glare in the windscreen caused by the monitor? No

**Weathering related topics**

23. Do we discuss topics like heating, mud, etc? No, this topic is under the law of behaviour and the responsibility of the manufacturer
24. Is a coatings necessary with regard to rain, snow and dirt? ISO item
25. Should the sensitivity for rain be covered by the regulation? ISO item
26. Which field of vision can be combined on one monitor? Split-screen is permitted, sequence of the displayed classes should be not regulated, critical perception in the whole field of view must be fulfilled
27. Would the mounting of several monitors in a vehicle lead to an increase of burglary in the cars and theft of the monitors? Not a significant issue

**Other topics.**

28. Would it be possible to get a presentation by a manufacturer of CMS to show the experts what the possibilities are? Brigade, Motec and Mekra will support the group with a video presentation during the next meeting

**General question on document ECE/TRANS/WP.29/GRSG/2008/25:**

29 Where does this proposal originate from? Germany. Is the primary use intended for passenger cars? No. Or were trucks the primary focus? All vehicle categories.

30 And what is the primary intention? Safety (better vision), or Environment (CO2 reduction), or copy from GRSG informal ??

Performance requirements:

31 As the proposal does not contain any performance requirements, apparently the general camera/monitor requirements as already included for providing the front field of view are intended to be used. Are these indeed suitable for main mirror and wide angle mirror vision? No, appropriate requirements still have to be defined by this group or ISO

Benefits of using camera's instead of monitors

31 Opportunity to provide more direct vision; monitor and camera can be placed without with less blocking of direct vision. Yes

32 As camera's can be much smaller than mirrors, fuel consumption and thus CO2 emission can be reduced Yes

33 Larger vision angles are principally possible, thus eliminating all blind angles. Yes

34 Field of vision of camera is not dependent on driver position. Camera adjustment thus not directly necessary, can be fixed position. Yes

35 Side and front proximity field of view can better be caught in 1 camera image, as the blocking of the view by the main mirror and wide angle mirror is eliminated. Yes

36 The camera can provide better vision in dusk/dark, due to infrared sensitivity. Yes

37 Camera / monitors offer the possibility to add driver assistance by including image interpretation, thus highlighting important objects and/or warning the driver. Yes

Potential drawbacks / questions / points of attention

38 Monitors: will it be necessary to provide a dedicated display for each camera / field of view? Or is it intended to allow that 1 monitor covers the whole surroundings of the vehicle? How would that cover the detection quality requirements? See above

39 Freeze-risk: some processing of image information is necessary between camera and monitor; it can only be expected to become more and more, thus requiring some 'computing power'. What demands are imposed on such systems, in order to avoid e.g. freezing risks? (example: driving rearward, camera image freezes for just 1 or 2 seconds, driver relies on the camera image and may still hit a pedestrian that just came behind the truck. In the same line of thinking, who would be liable then? The truck manufacturer, the camera/monitor system supplier, or …., not part of the mirror type approval, should be part of ISO TC22/SC13

40 Redundancy requirements? Especially if a camera / monitor would fail, what redundancy should be required? See above

41 Night vision: in tests we found that many monitors still emit a perceivable amount of light even when they are not displaying any picture. This is a nuisance in the cab, and limits direct vision (eye pupils remain too small). See above ISO topic

42 Monitor image interpretation: how easy will images be interpretable when used as main or wide angle mirror? Mirrors images can be read with a glance, are monitor images equally easy interpretable? Or does the human brain need more time to process the 'pixels'? Yes, this is an important topic for ISO

43 Monitor location: Due to the physical characteristics of mirrors, their location is rather well prescribed due to the field of vision they need to provide. For camera-monitor systems, the monitor can be anywhere. Should demands on monitor location be formulated, and if so, based on which criteria? See above (decision of manufacturer)

44 When should the CMS-image be available for the driver? At latest just before the driver starts to move the vehicle.

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Next meeting:
Retrofit, part of the regulation? Yes?