Fourth session of the IG CMS-II in the “Palais des Nation” in Geneva

29.-30.09.2014

Aspects covered:

- Point light sources
- Grey scale rendering
- Color noise
- Gloss of monitor housing

By:
Stephan Scheuer
Hans-Jürgen Herrmann



TÜVRheinland®

# Point light sources – 1

Why is rendering of point light sources (PLS) as point light sources so important?

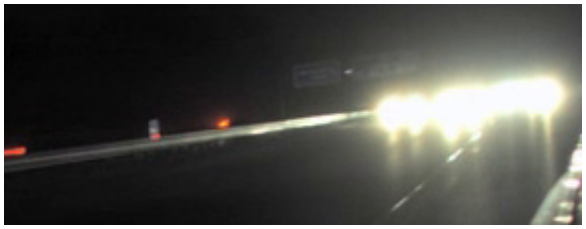
e.g. drive on a Motorway:
Observation of the traffic behind. Make a decision on how many vehicles are in behind and on which lane does they drive.

→

safety aspect for judgements in traffic situations to decide on e.g. merge lane, change lane

[Physiological processes considered: perceiving – detection – analysing – judgement – decision]

Low beam headlights are rendered as a more or less large "light cloud" on the monitor →
it is not possible to decide on the number of vehicles in behind and on their location, neither to decide if a car or a motorbike is behind



A mirror renders PLS as PLS and delivers a real image for judgement!

# Point light sources – 2

Proposed requirement – Alternative 1:

For safety reasons point light sources (e.g. low beam headlights) shall be rendered as point light sources and be distinguishable.

When tested according to Annex x [tbd] a point light source detection factor of PLSDF = 2,5…6 [tbd] *) shall be reached at an angle αPLS [tbd] and a luminance of the point light source of [tbd] cd/m².

$$\alpha_{PLS} = \min\left[\frac{5[tbd]\times\alpha_{system,/hor}}{1{,}5\times MTF_{hor/\min}};\frac{5[tbd]\times\alpha_{system/ver}}{1{,}5\times MTF_{ver/\min}}\right]$$

*)
PLSDF = 2,5 (Proposal by Japan) may be ok for young people. Older people need higher contrast!

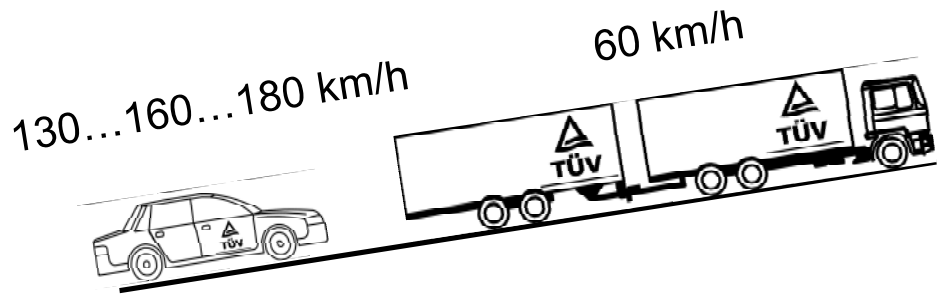
# Point light sources – 2

Proposed requirement – Alternative 2:

For safety reasons point light sources (e.g. low beam headlights) shall be rendered as point light sources and be distinguishable.

Two point light sources having a luminance of x cd/m² [tbd] and which are seperated by 1 m [tbd] at a distance of 250 m [tbd] away from the camera shall be distinguishable, when tested according to Annex x [tbd].

NOTES:
The distance of 250 m is based on a velocity difference of 70…120 km/h between two vehicles.
Physiological process (perceiving – detection – analysing – judgement – decision) for:
young people ≈ 3 s
older people ≈ 7 s






TÜVRheinland®

# Grey scale rendering – 1

Why is grey scale rendering important?

Grey scale rendering prevents from losing information, e.g. traffic sign, PLS, which is a safety aspect.

with grey scale rendering

without grey scale rendering (black – white)

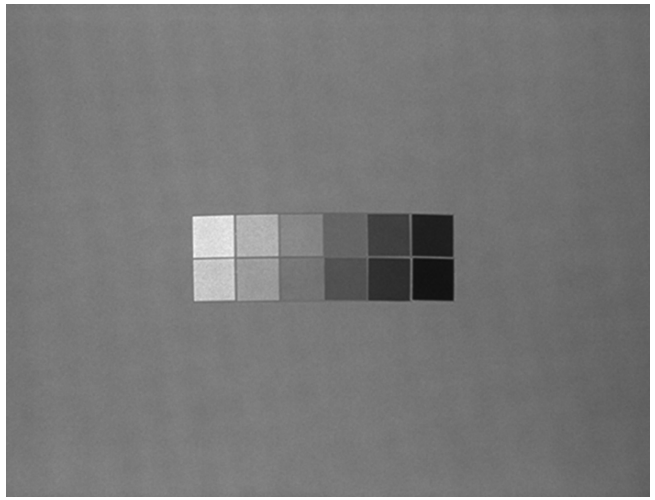
A mirror renders object luminances according to its reflectance – there is no loss of grey scale.

# Grey scale rendering – 2

Proposed requirement:

A CMS shall have a sufficient grey scale rendering. When tested according to Annex y [tbd] at least 10 grey steps shall differ in lightness by $\Delta L^* \geq 3$ [tbd] *).

*) laboratory test TÜV Rheinland 2014, class II, III, IV CMS



proposed reflective test chart using 12 patches defined in ISO 14524 Table A.1 CR =20:1

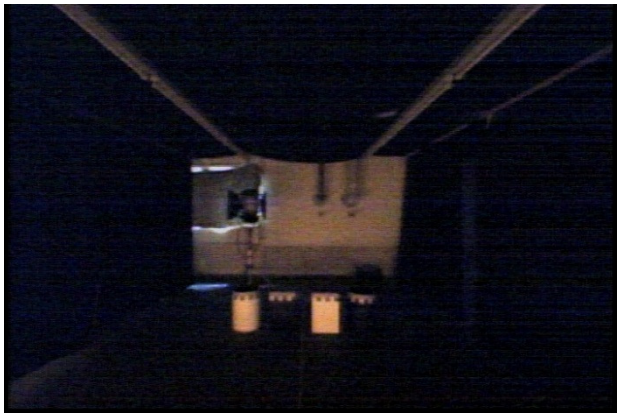
# Color noise – 1

Why is limitation of color noise important?

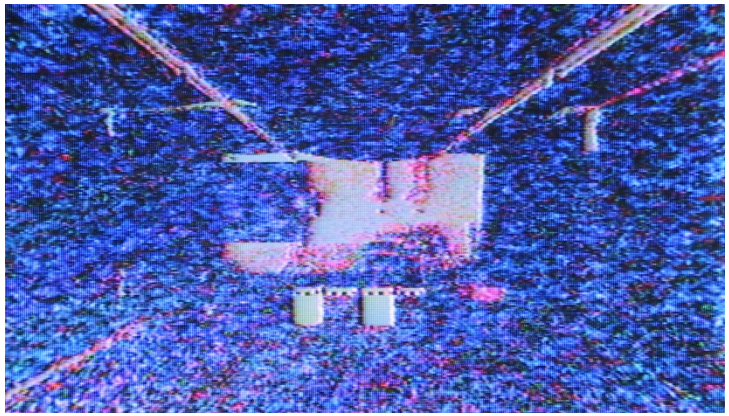
Color noise produces wrong information and is distracting. Therefore limitation of color noise is a safety aspect.

NOTE:
The aim is not minimizing the color noise that maybe is introduced by image enhancement technologies. The aim is to limit color noise that leads to wrong information and is distracting.

Should:



Is:

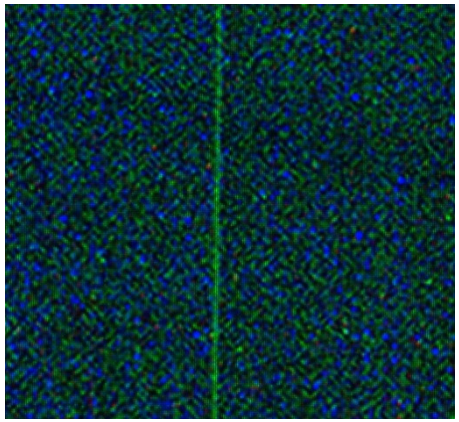


A mirror does not show color noise!

# Color noise – 2

Proposed requirement:

a)
There shall be no permanent bright row or column of pixels, when tested according to Annex z [tbd] (night condition).



[Future:
b) Visual noise shall not be distracting. The maximum visual noise shall be less than [tbd], when tested according to Annex z [tbd]. – under development]

# Gloss of monitor housing – 1

According to IGCMS-II-04-03 subclause 6.8.7.4 Gloss of the monitor housing of ISO/FDIS 16505 dated 14.04.2014 is not applicable for type approval.

We do not support this decision and remind that limiting the gloss of the monitor housing adjacent to the displayed information is a safety issue. See document IGCMS-II-02-03 - Matrix-Overview-Justification.