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| **Radiocommunication Study Groups** |  |
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| VISUAL FATIGUE AND OTHER POSSIBLE HEALTH HAZARDS DUE TO PROLONGED VIEWING OF STEREOSCOPIC TELEVISION PRESENTATIONS | |

It will be recalled that we had expressed a negative opinion (our Document 6C/155 of April 14, 2009) on the proposal to initiate work on a new Recommendation on stereoscopic television. Our negative opinion was based on our view that stereoscopic television would have a chance of becoming a long-lasting broadcasting success, only if its current limitations were overcome.

Since the technology required to capture, process and display full-quality stereoscopic television programming on large screens of HDTV resolution is currently under study but not yet available, and since the choice of the technology might influence the main parameters to be specified for a stereoscopic television broadcast service, we felt that it would be premature to develop a new Recommendation on the subject at this time.

We are pleased that Working Party 6C has taken our advice and has prepared a new Report on 3DTV (document 6/177 “Features of Three-Dimensional Television (3DTV) video systems for broadcasting”), deferring the preparation of a new Recommendation.

Our contribution 6C/155 pointed out that an important problem of current stereoscopic television, which is common to all the approaches currently implemented, is that they present stereoscopic images on a single surface (the display screen), giving raise to a potential conflict between “vergence” (the eye movement to point both eyes to the same point on the screen) and “accommodation” (the action by which the “lens” in the viewer’s eye focuses on that point). It has been documented in the medical literature that this conflict can cause viewer’s discomfort, eye fatigue, headache and possibly other health hazards notably if the viewing continues for an extended period of time[[1]](#footnote-1).

Thus, it could be expected that the presentation of stereoscopic programs on television, for the extended periods of time that are typical of television viewing would cause visual fatigue and other possible health hazards. By contrast, cinema presentations of stereoscopic movies would likely be limited to viewing periods of perhaps one or two hours per week and the attendant visual fatigue and other possible health hazards would be smaller[[2]](#footnote-2).

Obviously, visual fatigue and other possible health hazards would be reduced if stereoscopic programming on television were limited to a suitable number of hours per week, to be further investigated.

Similarly, they would be reduced if an approach were adopted for stereoscopic program production, which displays the majority of persons and objects in the program as placed at an apparent distance from the viewer that is close to his distance from the screen, particularly avoiding the presentation of objects that “come out of the screen”, since this would limit the occurrence of conflicts between “vergence” and “accommodation”. It must be recognized however that broadcasters will have little control on the size of stereoscopic consumer displays and on the distance at which consumers will watch them.

In conclusion, we believe that the issue of visual fatigue and other possible health hazards due to prolonged viewing of stereoscopic television presentations deserves a detailed analysis, and a detailed ITU-R Report on the best practices to avoid such problems should complement and support any future stereoscopic television Recommendation.

We would thus be pleased if the issue of visual fatigue and other possible health hazards were satisfactorily resolved before Working Party 6C will turn its attention to the production of a new Recommendation on stereoscopic television based on the use of presentation methods currently available or proposed.

As a step towards clarifying the issue of visual fatigue and other possible health hazards, we propose that Study Group 6 should solicit its members to submit contributions on the extent and likelihood of visual fatigue and other possible health hazards due to prolonged watching of stereoscopic television programs displayed according to the various presentation methods currently proposed.

We also propose that the ITU-R should inform the WHO of its activity on this topic and should ask the WHO to provide any information or guidance on it, that they may have available.

The Attachment offers a possible draft for such a liaison statement to be addressed to the WHO.

Attachment

Possible communication of ITU-R Study Group 6 to the WHO

visual fatigue and other Possible Health hazards due to prolonged viewing of stereoscopic television presentations

Some ITU members have proposed that ITU-R Study Group 6 (“Broadcasting Service”) should initiate studies on the specifications to be recommended for stereoscopic television for broadcast use, which is currently attracting some interest on the part of some broadcasters and of their audiences.

Some other ITU members however have pointed out that there are indications in the medical literature to the effect that extended viewing of stereoscopic television, as displayed on currently available presentation devices, can cause viewers’ eye fatigue, discomfort, headache and other possible health hazards.

We ask the World Health Organization to kindly advise us on any evidence that they may have available, on whether viewing stereoscopic television presentations on currently available displays for the extended periods of time that would be typical of television home viewing, may cause visual fatigue and other possible health hazards and to which extent.

We look forward to the WHO kind reply and we thank them for their help on this matter.

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1. See for instance: K.Ukai & P.A.Howarth “Visual fatigue caused by viewing stereoscopic motion images: background, theories and observations” – Elsevier B:V., 2007, which states, inter alia,

   “Viewers should be careful to avoid viewing stereoscopic images for extended durations because visual fatigue might be accumulated.

   They should be ready to stop immediately if fusion difficulties are experienced.

   Hardware/software manufacturer should avoid unnatural image presentations, such as images that diverge further than infinity, large binocular disparity in the central visual field or around the objects that are the centre of the viewer’s attention, difference of size and colour, unequal distortion between binocular images since they may cause fusion difficulty”. [↑](#footnote-ref-1)
2. Visual fatigue and other possible health hazards due to prolonged viewing of stereoscopic television presentations suggest that any stereoscopic television systems for broadcast use should provide 2D compatibility, in the sense that, if a consumer chooses to watch a stereoscopic television programme as a conventional (bidimensional) presentation, his television display should allow him to do so. [↑](#footnote-ref-2)