Effects of 3D display characteristics on visual perception and on 3D Image Safety

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collaborated with
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3D Image Safety

Purpose:
To provide and promote an environment in which viewers can enjoy the benefits of stereoscopic images without adverse effects, such as 3D visual fatigue and 3D motion sickness.
Researches and standardization

ISO technical committee discussing 3D Image Safety

TC 159

SC 4

WG 1

WG 2

WG 12

Ergonomics of human-system interaction

WG 2: Visual display requirements

WG 12: Image Safety

* established in May, 2010

*WG 2 has been standardizing requirements for displays including FPD in ISO 9241-300 subseries.

Scientific researches

AIST works on biomecial effects

AIST-NIST collaboration

Discussions and planning experiments

Optical measurements

Visual performance

ISO standardization works

ISO 9241-392

Ergonomic recommendations for the reduction of visual fatigue from stereoscopic images

Approved

ISO 9241-391

FY 2009

FY 2010

FY 2011

FY 2012

FY 2013

FY 2014
Researches on biomedical effects

Interocular differences

- Vertical misalignment
- Rotational misalignment
- Magnification difference
- Interocular crosstalk

Making clear the relations between physical parameters and visual fatigue
- visual performance
- comfortability

Left eye image

Right eye image

AIST-NIST collaboration
Collaboration: NIST and AIST in this project period

NIST
- 3D display’s crosstalk

AIST
- Human depth perception

Background data for ISO Document
Collaboration: NIST and AIST in the future

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HMD, VR, AR-Glasses, 4K/8K
Summary

1. On the issue of 3D Image Safety, AIST and NIST have collaborated from each of their view points, such as biomedical effects and device characteristics, respectively.

2. International standardization on 3D Image Safety has been done in the relevant working groups, in which both AIST and NIST participate, in ISO.

3. Further collaboration is necessary, especially on the innovatively developing display technologies.
Acknowledgement

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We sincerely appreciate the collaborative supports of both AIST and NIST.