• [History of IEEE P3333.3]

• [Sangkwon Peter Jeong / JoyFun Inc.,]
Compliance with IEEE Standards Policies and Procedures

• Subclause 5.2.1 of the IEEE-SA Standards Board Bylaws states, "While participating in IEEE standards development activities, all participants...shall act in accordance with all applicable laws (nation-based and international), the IEEE Code of Ethics, and with IEEE Standards policies and procedures."

• The contributor acknowledges and accepts that this contribution is subject to
## History of IEEE P3333.3

**Date:** 2017-04-23

**Author(s):** Sangkwon Peter Jeong

<table>
<thead>
<tr>
<th>Name</th>
<th>Affiliation</th>
<th>Phone [optional]</th>
<th>Email [optional]</th>
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</thead>
<tbody>
<tr>
<td>Sangkwon Peter Jeong</td>
<td>JpyFun Inc.,</td>
<td>+82 10 8667 7329</td>
<td><a href="mailto:ceo@joyfun.kr">ceo@joyfun.kr</a></td>
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1st Considering

Hype Cycle for Emerging Technologies

VR은 사업화 성장기에 진입
High-End의 HMD 기반 VR 장치들은 대부분 2016년에 출시.
VR 서비스의 대중화가 본격적으로 시작
3rd Considering

<VR Book>

<VR Training>

<VR Game>

아... 너무 오래 봤나? 조금 어지럽네...?

<Stereoscopic 3D Human Factor>

Reset Syndrome

[Alice Syndrome]
IEEE P3333.3 Position

IEEE

IEEE-SA

IEEE Computer Society

Standard Activities Board (SAB)

HMD based 3D Content Motion Sickness Reducing Technology (P3333.3)
5.3 Is the completion of this standard dependent upon the completion of another standard? No
5.4 Purpose: This document will not include a Purpose clause

5.5 Need for the Project: HMD-based MR / VR 3D technology. Online life are merged into Facebook after a first introduction into the world of virtual reality by HMD, while Microsoft has implemented a full-scale MR services through HoloLens has attracted attention as a next generation display technology. In addition, the world's HMD-based MR / VR unit sales are expected to show an annual growth rate of at least about 30%, from 14 million in 2016 to about 38 million in 2020. In addition, the MR / VR-related H / W and S / W market is expected to grow to about $70 billion in 2020.

HMD-based demand and supply. As the increase for the MR / VR 3D technology, the development of accurate perceptual quality evaluation technique is to be carried out proactively to develop the related products and industrial applications.

5.6 Stakeholders for the Standard: Manufacturers of HMD-based MR/VR 3D content, games, display content, educational content, movie makers. HMD-based MR/VR display panel and HMD-based MR/VR devices; Service providers of HMD-based MR/VR 3D display content such as movie, TV shows, games, etc.

Intellectual Property
6.1a. Is the Sponsor aware of any copyright permission needed for this project? No
6.1b. Is the Sponsor aware of possible registration activity related to this project? No

7. Are there other standards or projects with a similar scope? No
7.2 Joint Development
Is it the intent to develop this document jointly with another organization? No

8. Additional Explanatory Notes (Item Number and Explanation):
In order to make the progress of standard activity, we need international participation and collaboration. In addition, technically, we need an associated project to work with the working group. This project will be a technical sponsor to verify whether the technical standard issues are important or not. Since this project is world-wide, we expect that a lot of industry and academia in the signal processing area will join the activity.

In Korea, we have a government organization named ‘Korea Electronics Association’ which supports such standard initiation and activity as long as the technologies are important in new future. In the 3D processing meeting group, major academy, industry, and government research institutes have been working on the preparation of coming world-wide standard activity.

(Adequate participants)
Once a WG is launched, the WG will be opened to all the people eventually. We expect that many companies including manufacturers of 3D display devices and service providers of HMD-based MR / VR 3D contents should participate the effect of this project, which may lead the HMD-based MR / VR 3D-related markets growth rapidly.

The purpose of this standard is to define quality metrics for the quality assessment, and establish guidelines for reducing risks to users entertaining HMD content over HMD displays, and HMD devices. The major parameters dealt with in this standard include viewers’ characteristics, visual contents, visual environment, display and devices described in the scope. Although metrics and methods for assessing quality of images and videos on 2 dimensional (2D) displays have been established, there has been little progress in doing so in the field of the 3D domain. This is, in part, due to the fact that 3D quality metrics need to take into account additional factors accrued from the dimension extension. Since the visual quality is eventually determined by the human eye, this standard will define how much human factors makes an effect on the visual quality over the 3D domain. This standard provides objective 3D image and video quality metrics that are in agreement with subjective human judgments and previous researched in the academy and the industry.
Thank you. Your PAR request has been submitted to the NosCom administrator and sponsor chair for review.

Submitted PARs
COMMENTS:
If comments are available regarding the PAR, you will view and respond to them here.

<table>
<thead>
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<th>Submission Status</th>
<th>Committee</th>
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<td>Submitted by SangKwan Jeong 17-Aug-2016</td>
<td>P3333.3</td>
<td>PAR Request</td>
<td>HMD based 3D Content Motion Sickness Reducing Technology</td>
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## History of IEEE P3333.3

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<th>Description</th>
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<td>Email: <a href="mailto:cco@skybus.kr">cco@skybus.kr</a></td>
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<td><strong>Type of Project</strong></td>
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<td><strong>PAR Request Date</strong></td>
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<td><strong>Status</strong></td>
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### 1.1 Project Number: P3333.3
1.1.1 Title: HMD based 3D Content Motion Sickness Reducing Technology

#### 3.1 Working Group: Working Group of Technology for 3D Sickness protection based on HMD (C/SAB/P3333.3_WG)

- **Name:** Dongun Seo
- **Email Address:** dillon@olecreative.com
- **Phone:** +82-10-3133-3154

#### 3.2 Contact Information for Working Group Vice-Chair

- **Name:** Sangkwan Jeong
- **Email Address:** cco@skybus.kr
- **Phone:** +82-10-8007-5258

### 3.2 Sponsoring Society and Committee: IEEE Computer Society/Standards Activities Board (C/SAB)

#### 3.2.1 Contact Information for Sponsor Chair

- **Name:**
- **Email Address:**
- **Phone:**

#### 3.2.2 Contact Information for Standards Representative

- **Name:**
- **Email Address:**
- **Phone:**

### 4.1 Type of Ballot: Individual

### 4.2 Expected Date of submission of draft to the IEEE-SA for Initial Sponsor Ballot: Dec / 2016

### 4.3 Projected Completion Date for Submittal to RevCom: Oct / 2018

5.5 Need for the Project: HMD based 3D content is being used in various fields such as games, medical, education and art through Mixed Reality (VR and AR included) technology. However, a motion sickness, known as a 3D sickness and considered as one of the most critical problems, has not been resolved even though it is highly utilized. Major companies from various regions such as the United States, Europe, Japan, China and Taiwan are releasing many devices and commercializing them but the industrial expansion will reach its limit if this 3D sickness problem is not resolved. To overcome this limit, we are suggesting a minimum guideline as a standard by studying some of the 3D sickness originating factors such as focal distortion, lens material, lens refraction and frame rates per second. Moreover, our attempt to resolve this 3D sickness problem will facilitate the development of HMD based 3D content and will influence the 3D content developers, service providers, HMD manufacturers, HMD based content service providers and 3D display panel manufacturers very positively in developing a healthy ecosystem. Therefore, a standard to reduce the motion sickness caused by HMD based 3D content needs to be established in order to protect the user’s health and safety and develop the ecosystem.

6.6 Stakeholders: For Standards: 3D Content, 3D Games, 3D Display Content, 3D Educational Content, 3D Movie Producers, 3D Animators, 3D Display Panel and 3D Device Manufacturers;

#### Intellectual Property

6.1 Are the members of any copyright permissions needed for this project?: No

6.2 Is the Sponsor aware of possible registration activity related to this project?: No

7.1 Are there other standards or projects with a similar scope?: No

7.2 Joint Development

Is it the intent to develop this document jointly with another organization?: No

8.1 Additional Explanatory Notes (Item Number and Explanation):

In order to support this research, we need to collaborate with many International Experts. Technically, we also need a working group and a project related to this group. This project will be a technical sponsor that determines the importance of this technology standard problem. This project will be available worldwide so many industrial circles and academia are expected to participate.

In Korea, HMD based 3D content developers consider this 3D sickness as a serious problem and many research projects are being conducted to resolve this. Also, it is known that many global companies are conducting the same research. When WG starts, this will open to everyone. We will encourage many companies related to MR, VR service as well as many R&D centers from academia to participate and expect them to join this project.

The main objective for this standard is to establish a minimum guideline that can create an environment for users to use the HMD based MR, VR service 3D content safely.

The variables this standard include focal distortion, lens materials, lens refraction and FPS. Also, the project will provide the minimum guideline for these variables.
Sponsor Acceptance

To: "PAR Request Submitter" <coo@joyn.kr>, "C/SAB Chair" <eastman@cox.net>, "C/SAB Chair" <p.eastman@computer.org>
Cc: "C/SAB Standards Representative" <mark.paulk@utdallas.edu>, "C/SAB Project Staff Liaison" <s.h.krn@ieee.org>, "Dave Ringle" <d.ringle@ieee.org>, "Gregory Marchini" <g.marchini@ieee.org>, "Lisa Weisser" <l.weisser@ieee.org>, "Nicholas Nalywayko" <n.nalywayko@ieee.org>
Subject: Sponsor Acceptance of PAR Submittal for P3333.3

The Project Authorization Request (PAR) that you have submitted for P3333.3 has been accepted by the Sponsor and will be considered at the 6-Dec-2016 NesCom meeting.

If you should have any questions, please contact the NesCom Administrator via e-mail at nescom-admin@ieee.org.

Copyright 2013 IEEE-SA
### Sponsor Acceptance

**IEEE STANDARDS ASSOCIATION**

#### myProject™

**Submitted PARs**

**COMMENTS:**

If comments are available regarding the PAR, you will view and respond to them here.

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**Sponsor Authorized 21-Aug-2016**
### PAR Approved

**MyProject™ >> PAR/Standard Report**

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<td>Head Mounted Display (HMD) Based 3D Content Motion Sickness Reducing Technology</td>
<td>This standard is setting a technical guidance to resolve Virtual Reality (VR) sickness caused by the visual mechanism set by the HMD based 3D content motion sickness through the study of visual more...</td>
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<td>7-Dec-2016</td>
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Thank You