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Title **Proposal of changes to Applications and Requirements on 3D Video Coding**
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1. Introduction

In this document, we propose some principles to be addressed in the Applications and Requirements on 3D Video Coding. These mainly focus on:

- backward compatibility with MVC,
- some definition extensions and clarifications.

2. Application Scenarios

We propose some minor changes to section 2.

- *Support for high-quality auto-stereoscopic displays, in such a way that the new format enables generating many high-quality views from a limited amount of input data, e.g. stereoscopic video and respective depth maps*

3. Video data

We propose to distinguish directly and clearly texture data form depth data by adding word "texture" to the following section

3.1.1 Video texture data

The uncompressed data format shall support stereo video, including samples from left and right views as input and output. The source video data should be rectified to avoid misalignment of camera geometry and colors. Other input and output configurations beyond stereo should also be supported.

4. Backward compatibility

Document [2] presents our study on MPEG-4 MVC vs prospective HVC technology performance. As shown, even some preliminary experiments provide evidence that HVC technology (even without use of potential inter-view prediction tools) outperforms MPEG-4 MVC. Therefore, **we suggested that MPEG-4 MVC backward compatibility should be removed from requirements [1]**.

On the other hand, although HVC is expected to be finalized before 3DV, a hypothetical HVC compatibility would delay launching 3DV into the market. Instead of that, we propose to define 3DV on top of **any core video compression technology.** We think that 3DV standard should be independent from specific video texture data compression technology and define only how to use inter-view correlation to improved coding efficiency. Thus we proposed following modification:

3.2.3. Backward compatibility

The compressed data format shall include a mode that is backward/forward compatible with MPEG coding standards. In particular, it should be possible to transmit some of views transparently with use of any MPEG standard, independently from 3DV- specific data format. It is desired that in such scenario, 3DV would allow efficient usage of such independently coded video e.g. as a reference for 3DV inter-view prediction mechanisms.

5 Stereo/Mono compatibility

We propose to align section 3.1.1 to section 3.2.4:

3.2.4 Stereo/Mono compatibility

The compressed data format shall enable the simple extraction of bitstreams for stereo and mono output, and ***support high-fidelity reconstruction of samples from the left and right views of the stereo video.*** *Solutions that do not enable simple extraction of bitstreams for stereo and mono output must demonstrate a significantly higher performance in terms of both: coding efficiency and rendering capability.*

3.1.1 Video texture data

The uncompressed data format shall support stereo video, including samples from left and right views as input and output. The data format shall enable reconstruction of the input stereo video with high fidelity. The source video data should be rectified to avoid misalignment of camera geometry and colors. Other input and output configurations beyond stereo should also be supported.

6 Supplementary Data

Currently, the document [1] seems to limit means of generation supplementary data to those generated only **from set of input videos**. It is unclear, whether supplementary data can be obtained by another means. For example it has been found that depth maps can be efficiently obtained with the use of specialized depth ToF camera, while current version seem to forbid usage of depth maps obtained in such a way. To allow such a supplementary data we propose to extend the definition as follows:

3.1.2 Supplementary Data

Supplementary data shall be supported in the data format to facilitate high-quality intermediate view generation. Examples of supplementary data include depth maps, segmentation information, transparency or specular reflection, occlusion data, etc. Supplementary data can be obtained by any means from a predetermined set of input video: depth and/or texture.

7 Low complexity for editing

Section 3.1.4 specifies requirement for low complexity for editing, but does not provide any details.

8 Low complexity rendering

Point 3.3.2 should mention range of views to be synthesized:

3.3.2 Low complexity

The data format shall allow real-time synthesis of views positioned in a predefined range.

9 Depth Range

We presume that point 3.3.5 should be moved from section 3.3 (Requirements for Rendering of 3DV Data Format) to section 3.1 (Requirements for Data Format).

10. Transparency

Further 3DV standard should be general and support various 3D scene representations. Such a representation can be:

- MultiView
- MultiView + MultiDepth
- Layer Depth Video
- Light field
- Etc.

We proposed to add the following constrain:

3.2.7 3D scene representation

Data format should be general and support various 3D scene representations, e.g.
- MultiView + MultiDepth,
- Layer Depth Video.

11 References

[1] Video and Requirements Group, "Applications and Requirements on 3D Video Coding," ISO/IEC JTC1/SC29/WG11 N11061, Xian, China, October 2009.

[2] K. Wegner, O. Stankiewicz, K. Klimaszewski, M. Domański, "Comparison of multiview compression performance using MPEG-4 MVC and prospective HVC technology" ISO/IEC JTC1/SC29/WG11 M17913, Geneva, Switzerland, July 2010.