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**ISO/IEC JTC1/SC29/WG11 MPEG2018/M44762**

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| **Source** | **Philips** |
| **Status** | **Input contribution** |
| **Title** | **ClassroomImage: A frame of ClassroomVideo with less noise and more views** |
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# Introduction

This document describes a single frame with less noise and extra views for the Philips sequence *ClassroomVideo* [1]. To avoid confusion we call this test material *ClassroomImage*. Please do not refer to this contribution as ClassroomVideoalthough some viewpoints are shared.

During the discussion of m42944 [2] it was requested to have a single frame of the same scene but “without” noise, as recorded in AHG report [3]. We have recreated frame 119 using 5000 samples/pixel. For comparison, ClassroomVideo was created using 600 samples/pixel. When the noise would be i.i.d. then this would be a 3.1-bit noise reduction.

Later in the week during the Video plenary, Gun Bang (ETRI) requested a single frame with more views for Omnidirectional 6DoF depth estimation and view synthesis experiments. Today Gun Bang requested an even larger viewing zone. We have created three sets: two increase the viewing zone and the other the view density. In total this gives three sets of views:

|  |  |  |
| --- | --- | --- |
| Views | Samples/pixel | Purpose |
| v0…v14 | 5000 | Lower noise |
| v15…v32 | 1000 | Larger viewing zone |
| h0…h29 | 1000 | Larger view density |
| g0…g32 | 500 | >1 m² viewing zone |

# Viewpoints

The viewpoints are visualized in Figure 1. Apart from v7 and v8, the viewpoints of ClassroomVideo form a hexagonal lattice. Making use of Eisenstein integers:

For integers *i* and *j*. The set of views v0…v6, v9…v14 corresponds to a maximum norm *N* = 3 and a grid spacing *r =* 60 mm. This results in a horizontal viewing radius of.

The set v15…v32 is created by increasing *N* to 7. This extends the hexagonal lattice to a horizontal viewing radius of.

The set h0…h29 is created by including half-integers in *i* and *j*. Please notice that the union of v0…v14 and h0…h29 is also a hexagonal lattice with viewing radius 104mm. To support future extension of the integer lattice we have named these views h0, h1, etc. with ‘h’ for half.

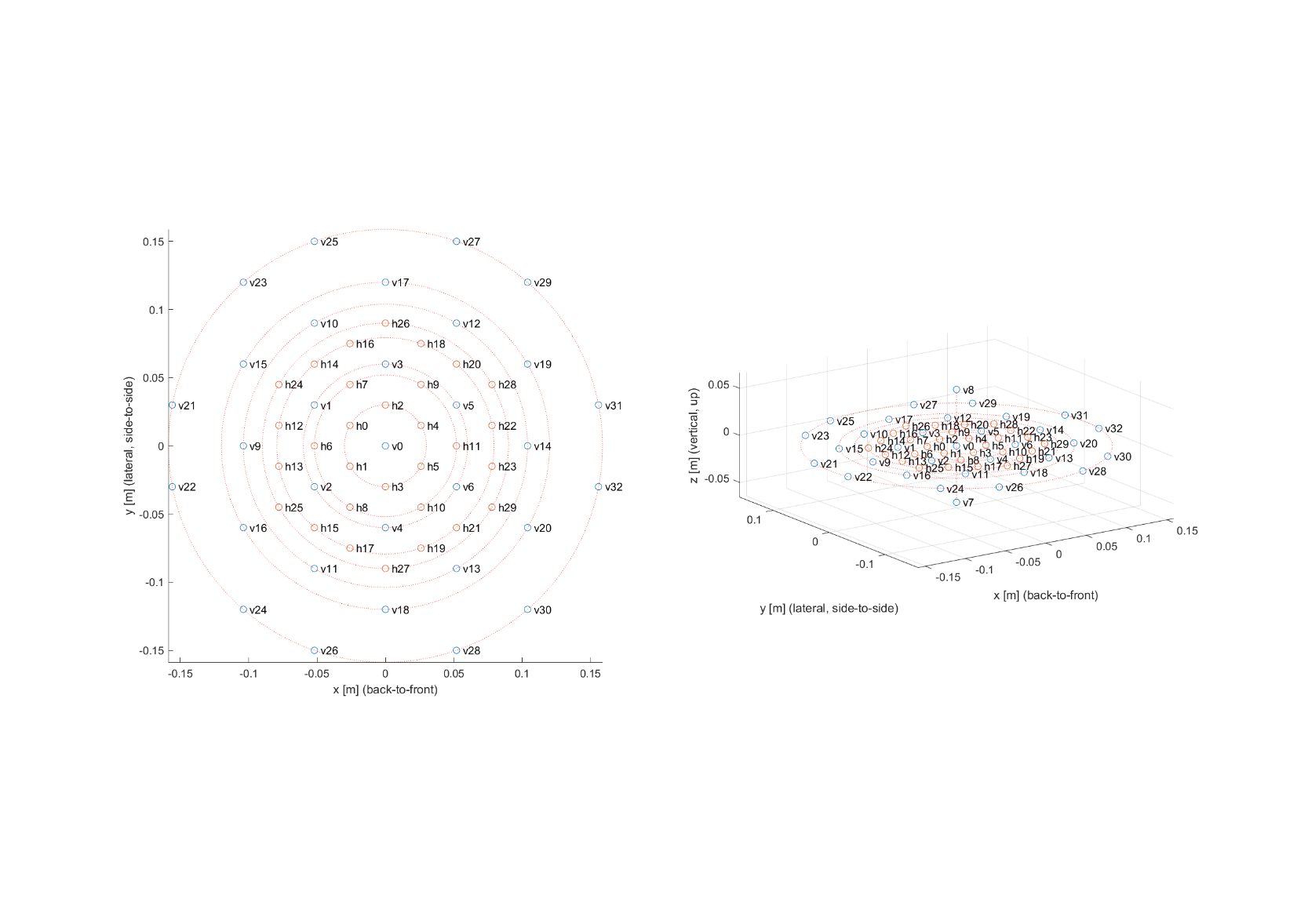


Figure 1: Viewpoints of ClassroomImage. The viewpoints v0…v14 are shared with ClassroomVideo, the v15…v32 viewpoints continue the hexagonal lattice, and the viewpoints h0...h29 add intermediate viewpoints.

The set g0…g32 (Figure 2) is designed to enclose a 1 m² area after e-mail discussion with Gun Bang. For this set and N = 7. Like with ClassroomVideo, g7 and g8 stick out of the horizontal plane by a distance *r*. All other views form a hexagonal lattice within the horizontal plane. Notice how the inner ring of the g-set surrounds the outer ring of the v-set. Depth estimation and view synthesis on this set will be a large challenge. The depth range of this set has been enlarged from to .

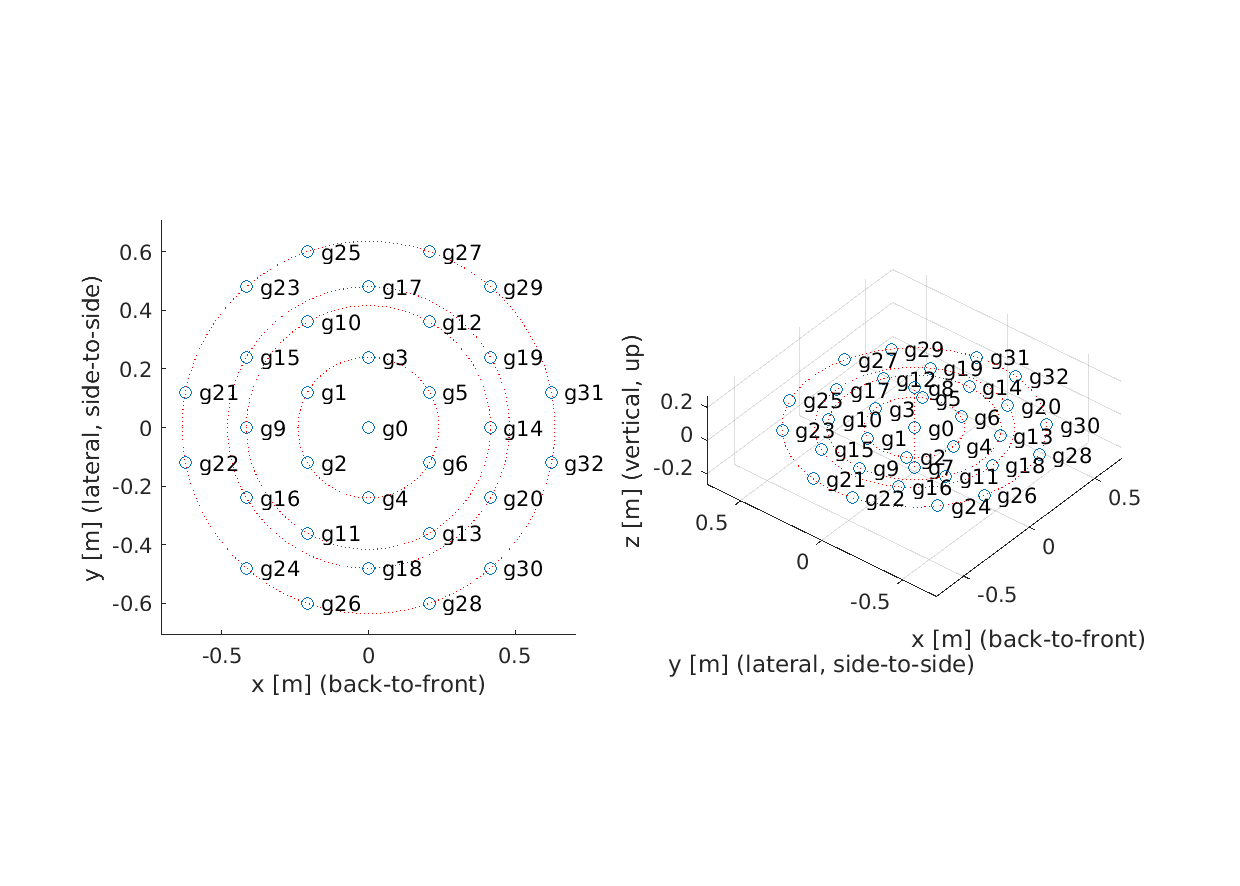


Figure 2: Viewpoints g0…g32 of ClassroomImage.

# Data formats

Camera parameters are described in a single RVS 2.0 JSON configuration file:

ClassroomImage.json

Textures are available as BT.709 limited range YUV 4:2:0 16-bit little-endian raw frames with files names:

ClassroomImage\_v0\_color\_4096x2048\_yuv420p16le.yuv

ClassroomImage\_v1\_color\_4096x2048\_yuv420p16le.yuv

…

ClassroomImage\_g32\_color\_4096x2048\_yuv420p16le.yuv

Depth maps are available as full range YUV 4:2:0 16-bit little-endian raw frames with depth encoded as normalized disparities and similar file names:

ClassroomImage\_v0\_depth\_4096x2048\_yuv420p16le.yuv

ClassroomImage\_v1\_depth\_4096x2048\_yuv420p16le.yuv

…

ClassroomImage\_g32\_depth\_4096x2048\_yuv420p16le.yuv

# Location of the dataset

(MPEG internal)

# Recommendations

When using this test material, please use the name *ClassroomImage* and cite this document.

This source format cannot be created directly from a physical camera rig although it could be composited. It would make more sense for Omnidirectional 6DoF to use a simulation of a realistic camera rig. Such a rig might for instance comprise outwards facing cameras with 190° fish eye lenses. As mentioned before, we are willing to share our Blender Python scripts in case another participant promises to contribute such a dataset to MPEG.

# Intellectual property right statement

The original source material is obtained from Christophe Seux, Class room, Blender project, url: <https://www.blender.org/download/demo-files/>, and according to that website, the Classroom material is subject to the CC0 license.

That source material has been processed by Philips. As regards the processed material, and the way the processed material is obtained from the source material, intellectual property rights are owned by Koninklijke Philips N.V. These processed materials may only be used for the purpose of developing, testing and promulgating technology standards as well as for academic purposes. Koninklijke Philips N.V. makes no warranties with respect to the processed materials and the processing method, and expressly disclaims any warranties regarding their fitness for any purpose.

There is no public document on this sequence as of today. On academic use please cite this document.

# References

[1] Bart Kroon, *3DoF+ test sequence ClassroomVideo*, ISO/IEC JTC1/SC29/WG11 MPEG2018/M42415, April 2018, San Diego, USA.

[2] Bart Kroon, *Full depth maps for ClassroomVideo*, ISO/IEC JTC1/SC29/WG11 MPEG2018/M42944, July 2018, Ljubljana, Slovenia.

[3] Lu Yu (chair), Gauthier Lafruit, Krzysztof Wegner, Joel Jung, Bart Kroon (co-chairs), *AHG on MPEG-I Visual Technologies*, ISO/IEC JTC1/SC29/WG11 MPEG2018/M42864, July 2018, Ljubljana, Slovenia.