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**ISO/IEC JTC 1/SC 29/WG 4**

**MPEG VIDEO CODING**

**ISO/IEC JTC 1/SC 29/WG 4 m** **56632**

**April 2021, Online**

**Title: Barn new natural content proposal for MIV**

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**Abstract**

In this contribution, Interdigital is proposing a new natural content for MIV called Barn. It is shot by a rig of 5 x 3 perspective cameras. The specificity of this content is its visual richness. The content is delivered in 2 flavors, MVD and the MPI compact format. A bug in TMIV for InvalidDepth prevents to compute TMIV objective figures.

Neither the delivered depth nor the MPI is said to have a fully satisfactory quality at this stage but this type of content is claimed to be fully representative of real life content anyway.

# Content location

The location is on MPEG database at:

*MPEG-I/part12-immersive-video/not-managed/m56632*

It includes the

* Json parameter file
* YUV files of texture and depth and the MPI file (97 frames)
* MPI file (in compact pcs format, 97 frames)
* Proposed pose traces .csv files
* 1 pose trace video at R0 (uncompressed) to have an idea of the dynamics of the content
* License file

# Capture rig

The rig is made of 3 rows of 5 Blackmagic Micro Studio co-aligned cameras:

* Spaced horizontally by 20cm, vertically by 23 cm (roughly), leading to a global dimension of 1m wide by 0.5 height
* Each with a field of view of roughly 66° by 40°
* with 1920x1080 resolution



Figure 1: 5x3 Interdigital flat Rig

# Barn scene content

The sequence is 97 frames long. The Barn scene is rich with plenty of objects chaotically disposed in the place, and occupying the whole dimension in depth. 2 persons are moving. There is no particular reflection or transparency in this scene.

For the MVD content, the depth is not exempt of defaults. It was our option to deliver it with some remaining holes rather than to try to completely fill them, since it is allowed by the Call for Visual Test Materials [1]. Our current workflow originally generates these holes when it is not sure about a depth value, and it has been followed by a process filling the holes, but not completely. We prefer to deliver the depth as it is after this process, rather than exaggerating the filling and degrading the present depth.

For the MPI version, we used the compact form [2].



Figure 2: Barn content texture view 7, frame 82

Here below is the depth. Holes are visible, typically on the periphery of the image and basically where the view overlap is minimum.



Figure 3: idem depth

# TMIV temporary results

It was the intention to apply TMIV 8.1 on Barn content. But there is a bug in TMIV8.1 which is unable to cope with invalid input depth (“[packer crashes when input MVD has invalid pixels (#498) · Issues · MPEG / MIV / RS / TM1 · GitLab (int-evry.fr)](http://mpegx.int-evry.fr/software/MPEG/MIV/RS/TM1/-/issues/498).

It is not surprising that there is a bug with invalid depth since it is the first time that this feature allowed by the Call for Visual Test Material is used. The presence of invalid depth is here caused by depth workflow, but it could also be because the content is meant to be partial, for example destinated to be integrated within a CGI environment, so the bug must be fixed.

# License

Cf annex.

# Credits

The scene has been shot in the « ferme des Tatelins » near Rennes, France : cf [Ferme, Tatelin (Cesson-Sévigné) - Inventaire Général du Patrimoine Culturel](http://patrimoine.bzh/gertrude-diffusion/dossier/ferme/4aeaace1-db9e-4b39-a377-cfeb26277a76).

# Conclusion & recommendations

* We recommend that TMIV solves the problem of the bug related to invalid input depth, which prevents to compute TMIV result on this new content.
* Once done, we recommend adding this content Barn in its MVD form within the pool of CTC contents and to register the content Barn\_MPI in its MPI compact format in the MPEG database as well.
* We invite MIV participants to try to generate a better depth or a better MPI since it would improve the TMIV results with main profile (MVD) or with MPI profile, both being currently far to be perfect. We believe that there is significant room for improvement.

# References

1. Call for Proposals on 3DoF+ Visual*, ISO/IEC* JTC 1/SC 29/WG 11 N 18145, Jan. 2019, Marrakesh, Morocco
2. Proposal for an optimized input format for MPI, ISO.IEC JTC 1/SC 29/WG w55709, Jan 2021

# Annex: Interdigital License

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