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Title	Coding results for Poznan Fencing 2 and Poznan Blocks 2 test sequences in Free Navigation scenario.
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1 Introduction

During 115th MPEG meeting in Geneva two new sequences has been introduced by Poznan University of Technology: Poznan Blocks 2 and Poznan Fencing 2. Those sequences have been acquired with the use of pairs of cameras, which allowed for high quality depth maps estimation. In this document we present results of coding of the new test sequences, performed with standardized 3D-HEVC MPEG technology and Poznan University of Technology codec. Results attained with use of 3D-HTM can be consider as anchors and used for future experimentation within FTV ad-hoc group.

2 Test conditions and coding configuration

The setting used for both Poznan Blocks 2 and Poznan Fencing 2 sequences are based on those which have been used in "Call for Evidence" [1] (CfE) for Poznan Blocks sequence. In particular:

- 7 views were used, corresponding to view numbers from 2 to 8,
- QP values for texture: 30,35,40,45 and for depth: 39 42 45 48.
- Central view (view number 5) has been selected as the base view, while other views are coded as subsequent layers, with order corresponding to distance from the base view (Fig. 1). Therefore, the view coding order is: 5, 4,3,2, 6,7,8.
- Intra period was set to 24, and GOP size was 8.
- 8-bit input data and 8-bit internal processing

Fig. 1. Inter-view prediction structure used for coding.

For the sake of subjective evaluation, also sweeps were prepared (fig 2). We have used the same methodology which has been used during the CfE. The speed of the sweep was set to 1 view per frame. As starting position we have used view number 2.

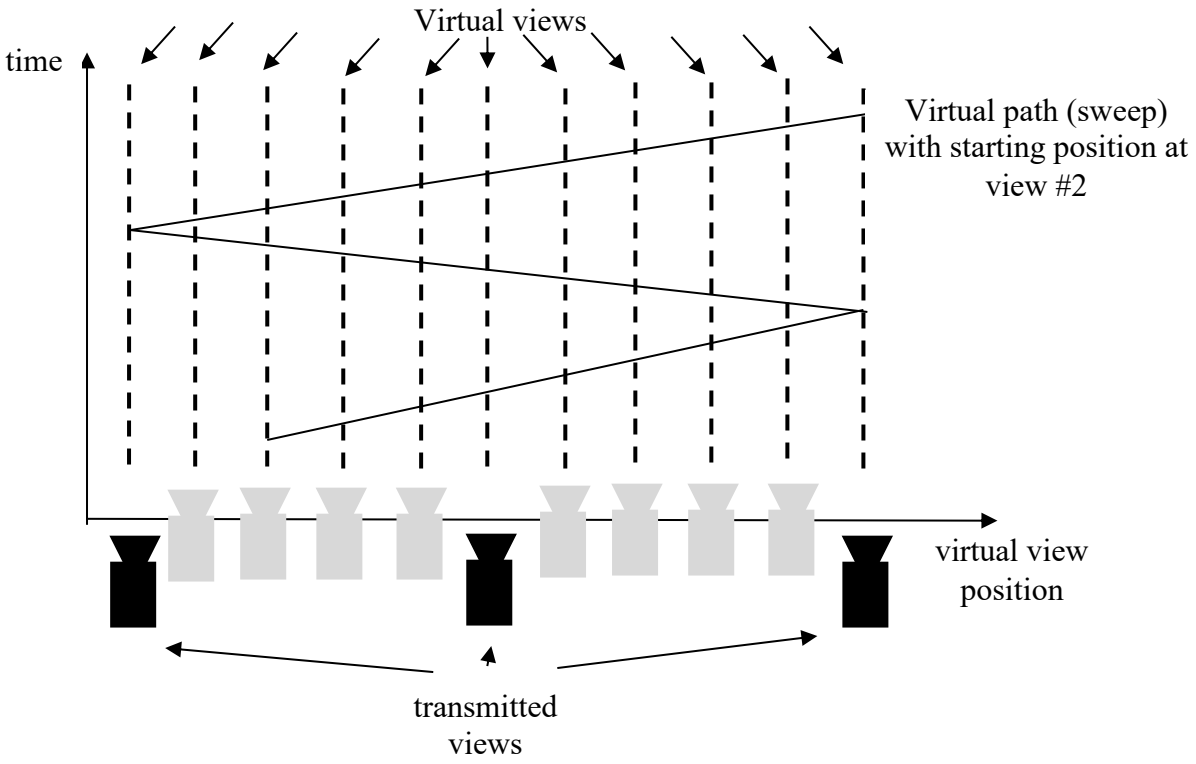

Fig. 2. Sweep generation procedure.

3 Coding results

The proposed anchors were attained with the use of standardized 3D-HEVC MPEG technology implemented in HTM 13. The coding results are presented in Table 1. The attained bitrates for particular rate-points RP1-RP4 are proposed to be used in further experiments.

The new test sequences have also been coded with the use of compression technology submitted in response to "Call for Evidence" by Poznan University of Technology [3]. The results attained on new test sequences are presented in Table 2.

Figure 3 presents comparison of coding results attained with 3D-HEVC and the proposed codec from Poznan. As it can be seen, in most of the cases, 3D codec from Poznan University of Technology outperforms 3D-HEVC. Only at very low bitrates of Poznan Fencing 2 sequence the curves overlap. This probably comes from the fast that at such low bitrates (and in fact, unacceptable viewing quality) sophisticated coding tools are unable to bring considerable gains, while the bitstream is extended with 3D camera parameters. Table 3 summarized the results with Bjøntegaard deltas.

Table 1. Results attained for the proposed anchor sequences (HTM13) for rate-points RP1-RP4.

Sequence	Rate-point	Bitrate [kbps]	Texture luminance PSNR [dB]
Poznan Blocks 2	RP1	2355.212	38.48249
	RP2	1164.734	36.63383
	RP3	607.407	34.54164
	RP4	324.620	32.28557
Poznan Fencing 2	RP1	3699.286	38.54839
	RP2	1866.632	36.41876
	RP3	945.827	34.03049
	RP4	482.839	31.47044

Table 2. Results attained with coding technology from Poznan University of Technology [3] for rate-points RP1-RP4.

Sequence	Rate-point	Bitrate [kbps]	Texture luminance PSNR [dB]
Poznan Blocks 2	RP1	2176.739	38.8697
	RP2	1083.214	37.0964
	RP3	600.226	35.1001
	RP4	298.785	32.4391
Poznan Fencing 2	RP1	3311.238	38.6052
	RP2	1776.181	36.5032
	RP3	989.106	34.1274
	RP4	483.725	31.0928

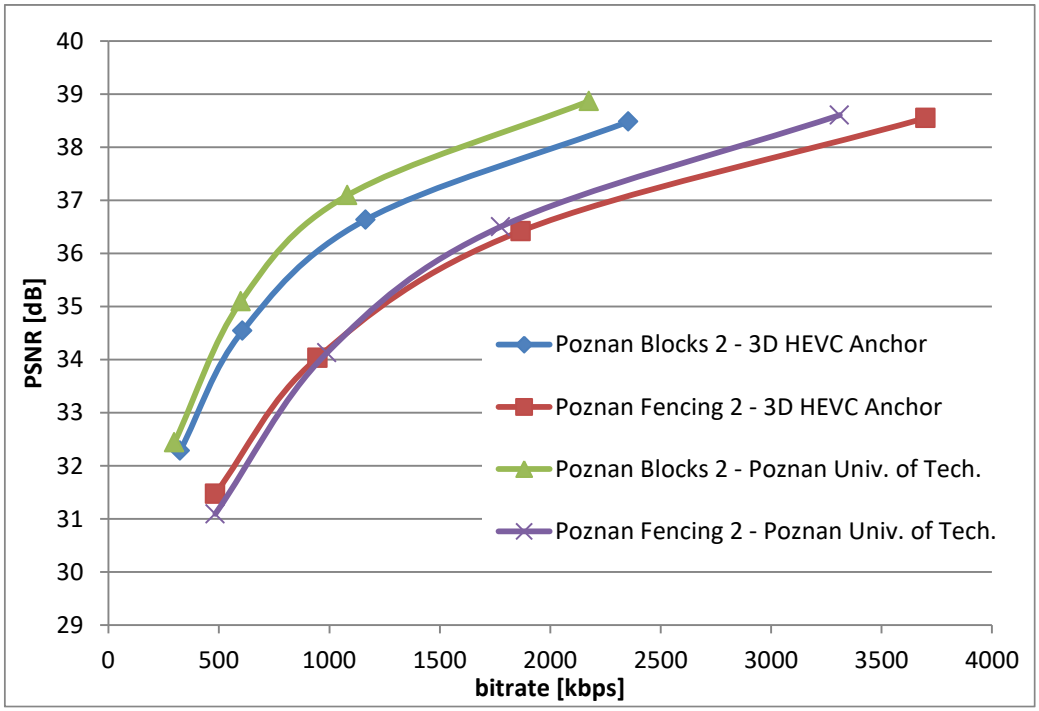

Fig. 3. Comparison of coding efficiency of anchors (3D-HEVC HTM13) with coding technology from Poznan University of Technology.

Table 3. Bjøntegaard deltas (Poznan vs 3D-HEVC)

Sequence	BD-RATE [%]
Poznan Blocks 2	-17.31%
Poznan Fencing 2	-1.83%
Average	**-9.57%**

4 Conclusions

In this document we have presented coding results for two new test sequences: Poznan Blocks 2 and Poznan Fencing 2. The compression performance was assessed for standardized 3D-HEVC MPEG technology and codec from Poznan University of Technology. From the results it can be seen that general outcome of the CfE holds also for the new test sequences: significant gains can be attained with respect to 3D-HEVC coding technology.
Moreover coding results attained with use of 3D-HEVC can be considers and anchors bitstream for those too new sequences. We recommend to use them for future experimentation within FTV ad-hoc group.

Acknowledgement

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References

[1] "Call for Evidence on Free-Viewpoint Television: Super-Multiview and Free Navigation", ISO/IEC JTC1/SC29/WG11 MPEG2015/N15348, Poland, Warsaw, June 2015.

[2] Marek Domański, Adrian Dziembowski, Adam Grzelka, Dawid Mieloch, Olgierd Stankiewicz, Krzysztof Wegner, "Multiview test video sequences for free navigation exploration obtained using pairs of cameras" ISO/IEC JTC1/SC29/WG11 MPEG2016/m38247, Switzerland, Geneva, May 2016.

[3] Marek Domanski, Adrian Dziembowski, Adam Grzelka, Łukasz Kowalski, Dawid Mieloch, Jarosław Samelak, Olgierd Stankiewicz, Jakub Stankowski, Krzysztof Wegner, „Technical Description of Poznan University of Technology proposal for Call for Evidence on Free-Viewpoint Television", ISO/IEC JTC1/SC29/WG11 MPEG2016/ m37893, San Diego, USA, January 2016.