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Title	**Results of 3DV/FTV Exploration Experiment 4 (EE4) for Newspaper sequence**
Sub group	**Video**
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1   Introduction

This document presents results of Exploration Experiment (EE4) performed on "Poznan street" sequence [2] and is in response to W11095 "Description of Exploration Experiments in 3D Video Coding" [1].

2   Experiments conditions

Experiments were performed basing on W11095 [1] guidelines:

Two view case:

- Original reference texture data for views 4 and 6 of "Newspaper" sequence were compressed using JMVM software version 5.0.6 with different QP values. GOP length was set to 16 frames, to comply with the requirement of at least 0.5 second GOP length (Newspaper is a 30 fps sequence).
- New depth maps provided by GIST were used [3].
- Depth maps for views 4 and 6, provided for the purpose of this experiment, were compressed using JMVM software version 5.0.6 with different QP values. GOP length was set to 16 frames.
- Appropriate depth and texture data were selected to meet the 0.375, 0.5, 0.75, 1.25 Mbps stream requirement.
- Reconstructed texture and depth data were fed to the view synthesis software VSRS version 3.0.1, together with camera system parameters and Znear, Zfar values to recreate view 5.

- Synthesized view 5 was compared in terms of PSNR with original view 5 as well as with view 5 synthesized using uncompressed data.

The test were performed on 'Newspaper' [2] sequence with following views selected as synthesized view S and reference views NL-NR.

Table 1. The specification of views for EE experiment.

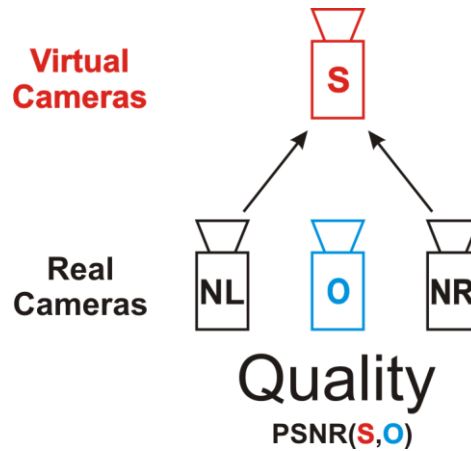| Data set	Two cameras case	
	S	NL-NR
Newspaper	5	4 - 6

Figure 1. Two cameras case – test setup.

3   Results

3.1   Two view case:

To meet the requirements imposed on bitstream size, the following pairs of QP and QD (QP index for depth encoding) were selected:

Table 2. Selected QP-QD pairs for synthesis

Bitrate	QP-QD pairs selected
375 kbps	36-39, 51-30, 48-30, 39-33, 45-30, 36-36, 33-51
500 kbps	48-27, 33-36
750 kbps	30-33, 42-24, 33-27
1.25 Mbps	24-42, 33-21, 42-19, 24-39
2 Mbps	33-16, 21-33, 24-21, 21-30

With selected pairs, view 5 was synthesized and its quality was measured:

Table 3. Quality of synthesized views, 375 kbps case

Bitrate [kbps]	QP	QD	PSNR [dB] against uncompressed synthesis	PSNR [dB] against original view
360	36	39	34,81	31,59
372	51	30	27,13	26,39
378	48	30	28,58	27,54
390	39	33	33,73	30,95
395	45	30	30,36	28,85
399	36	36	35,03	31,65
404	33	51	33,63	30,91

Table 4. Quality of synthesized views, 500 kbps case

Bitrate [kbps]	QP	QD	PSNR [dB] against uncompressed synthesis	PSNR [dB] against original view
503	48	27	28,60	27,53
507	33	36	36,30	32,16

Table 5. Quality of synthesized views, 750 kbps case

Bitrate [kbps]	QP	QD	PSNR [dB] against uncompressed synthesis	PSNR [dB] against original view
728	30	33	37,65	32,54
729	42	24	32,22	30,00
775	33	27	36,98	32,20

Table 6. Quality of synthesized views, 1250 kbps case

Bitrate [kbps]	QP	QD	PSNR [dB] against uncompressed synthesis	PSNR [dB] against original view
1222	24	42	37,48	32,61
1226	33	21	37,26	32,21
1245	42	19	32,26	29,98
1252	24	39	38,31	32,82

Table 7. Quality of synthesized views, 2000 kbps case

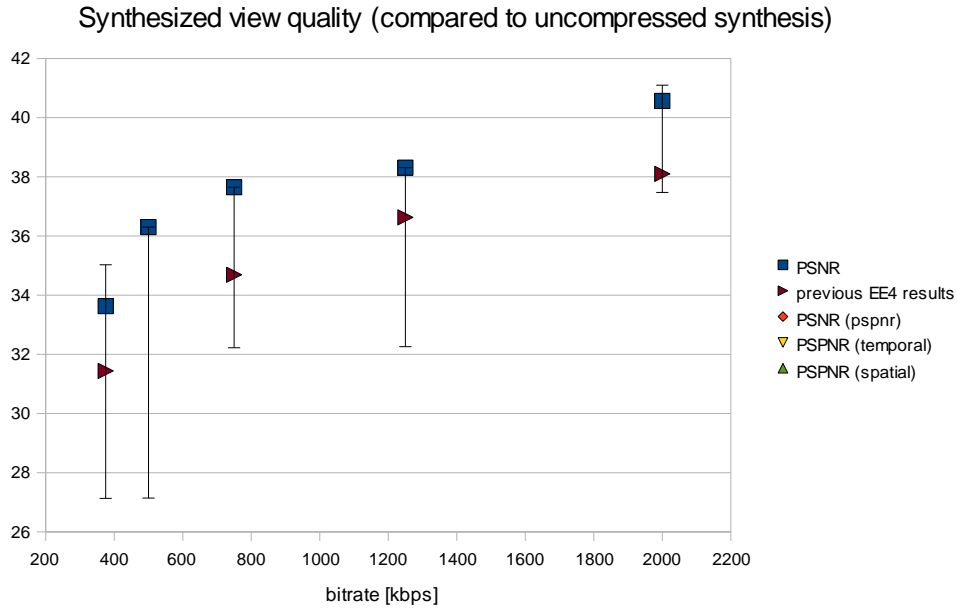| Bitrate [kbps]	QP	QD	PSNR [dB] against uncompressed synthesis	PSNR [dB] against original view
1940	33	16	37,47	32,18
1954	21	33	39,96	32,97
2009	24	21	41,10	32,96
2038	21	30	40,56	33,00

Figure 2. Quality of synthesized view as defined in [1] for 2 camera case. View synthesized with uncompressed data is used as reference. Points mark results for the pairs with minimal QP (and minimal QD, if more than one pair has the same QP). The bars show quality range from the best to the worst pair for each bitrate.
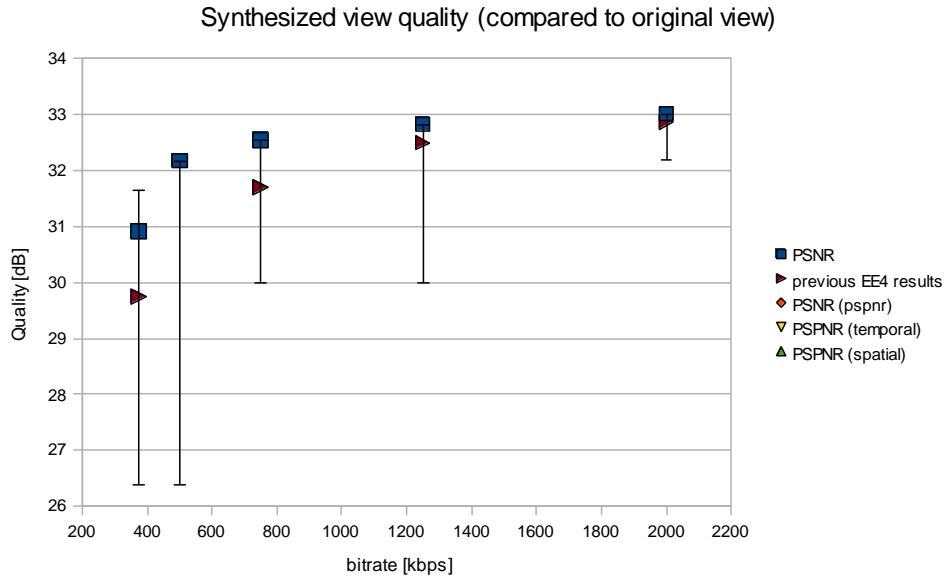
Figure 3. Quality of synthesized view as defined in EE4 for 2 camera case. Real view from camera 5 is used as a reference. Points mark results for the pairs with minimal QP (and minimal QD, if more than one pair has the same QP). The bars show quality range from the best to the worst pair for each bitrate.
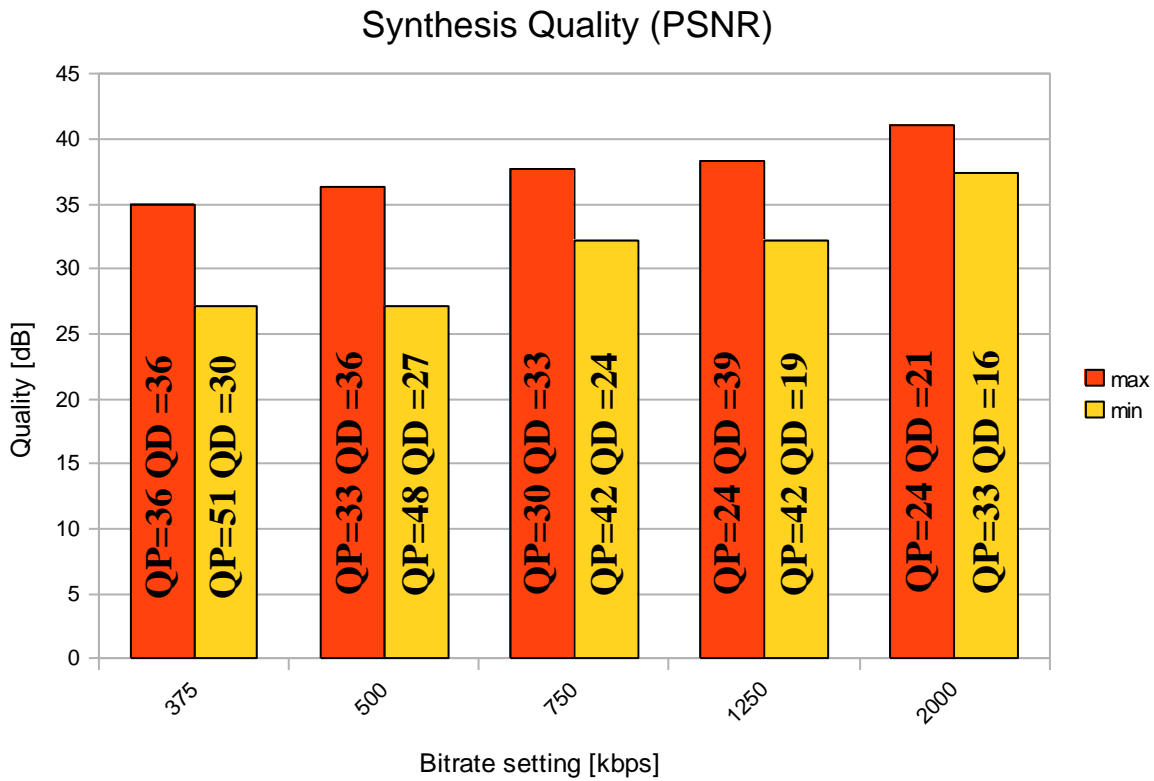

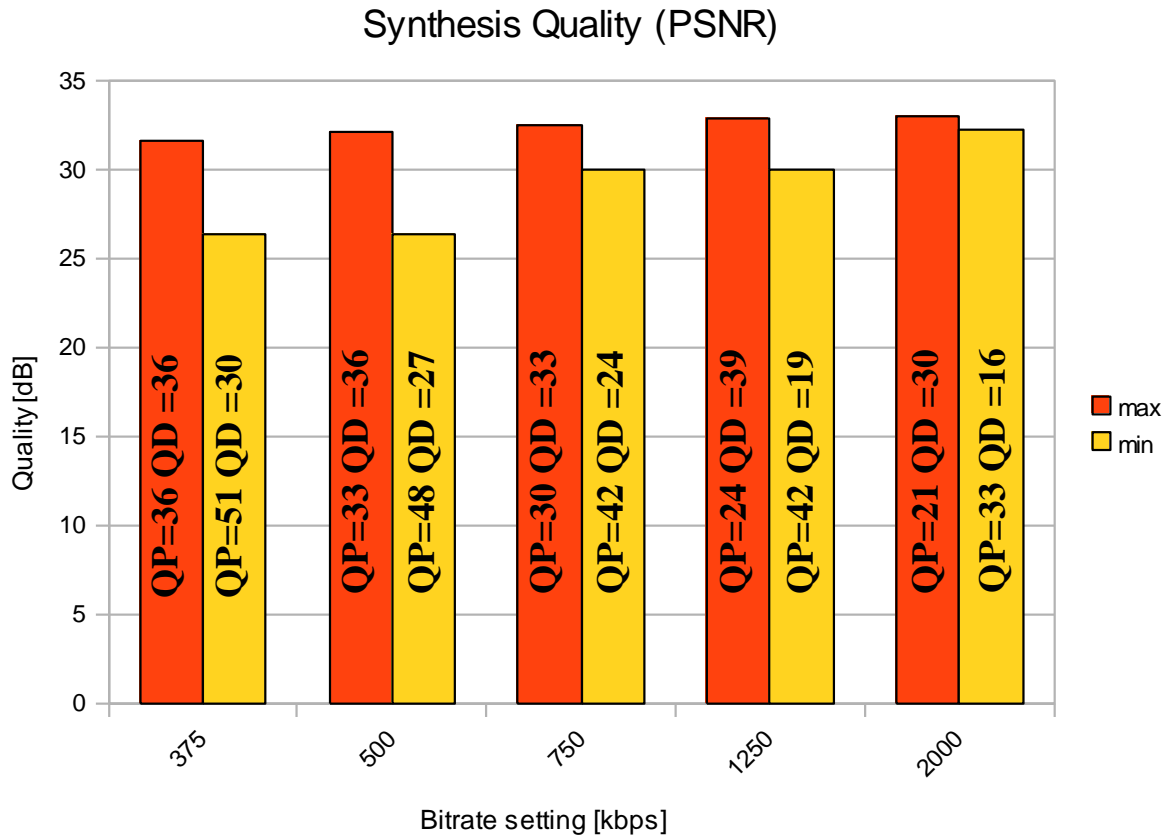Figure 4. Best and worst results of synthesis in case of comparison against uncompressed synthesis

Synthesis Quality (PSNR)

Figure 5. Best and worst results of synthesis in case of comparison against original view

4   Conclusions

4.1.Two view case
-    Quality of synthesized view is better than for the depth maps used in the previous results,
-    all the other observations remain.

5   References

[1] "Description of Exploration Experiments in 3D Video Coding" MPEG 2009/W11095, Kyoto, Japan January 2010.
[2] Yo-Sung Ho, Eun-Kyung Lee, and Cheon Lee , „Multiview Video Test Sequence and Camera Parameters", MPEG 2008/M15419, Archamps, France, April 2008.
[3] Cheon Lee, Yo-Sung Ho, "Modified Depth Data of Newspaper Sequence", MPEG 2010/M17490, Dresden, Germany, April 2010