INTERNATIONAL ORGANISATION FOR STANDARDISATION
ORGANISATION INTERNATIONALE DE NORMALISATION
ISO/IEC JTC1/SC29/WG11
CODING OF MOVING PICTURES AND AUDIO

ISO/IEC JTC1/SC29/WG11
MPEG/M16460
April 2009, Maui, Hawaii

Title	**Additional results of Exploration Experiments in 3D Video Coding, described in w10360, for Alt Moabit sequence.**
Sub group	**Video**
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1 Introduction

This document presents additional results of Exploration Experiments (EE1,EE2) performed on “Alt Moabit” sequence [2] and is in response to w10360 "Description of Exploration Experiments in 3D Video Coding" [1]. In particular, segmentation improvements for DERS, which were omitted [4] due to time limitations, are presented.

2 Experiments conditions

Experiments were performed basing on w10360 [1] guidelines (Figure 1):

- **Select stereo pair** from data set, i.e. an original left view OL and an original right view OR (OL=8, OR=9)
- **Estimate depth** corresponding to neighboring original views NL (left) and NR (right) (NL=7, NR=10), using any available camera
- **Synthesize views** (synthesized left SL and synthesized right SR) at positions of OL and OR from NL+D and NR+D
- Bring synthesized video to the meeting
- **Compare OL-OR with SL-SR** subjectively

The test were performed on ‘Alt Moabit’ [2] sequence with following views selected as OL-OR and NL-NR.

Table 1. The specification of view for EE experiment.

Data set	OL-OR	NL-NR
Alt-Moabit	8-9	7-10

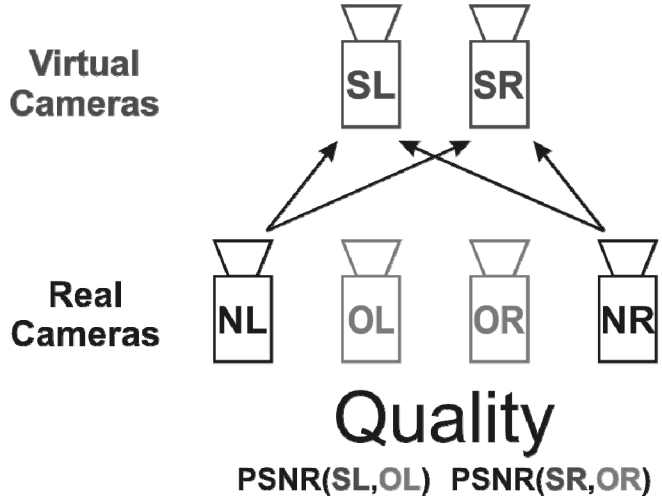
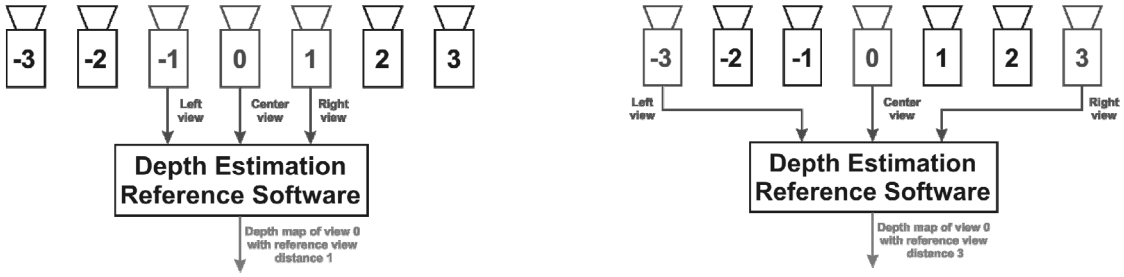


Figure 1. Setup of experiments for depth-estimation/view-synthesis software evaluation.

The depth estimation was performed with various Camera Distance (Figure 2) parameters– from distance 1 to distance 5.



a) Camera distance 1 b) Camera distance 3

Figure 2. Setup of experiments for depth-estimation/view-synthesis software evaluation.

3 Results –EE1 – Depth Estimation segmentation improvement – method 1 - mean shift algorithm.

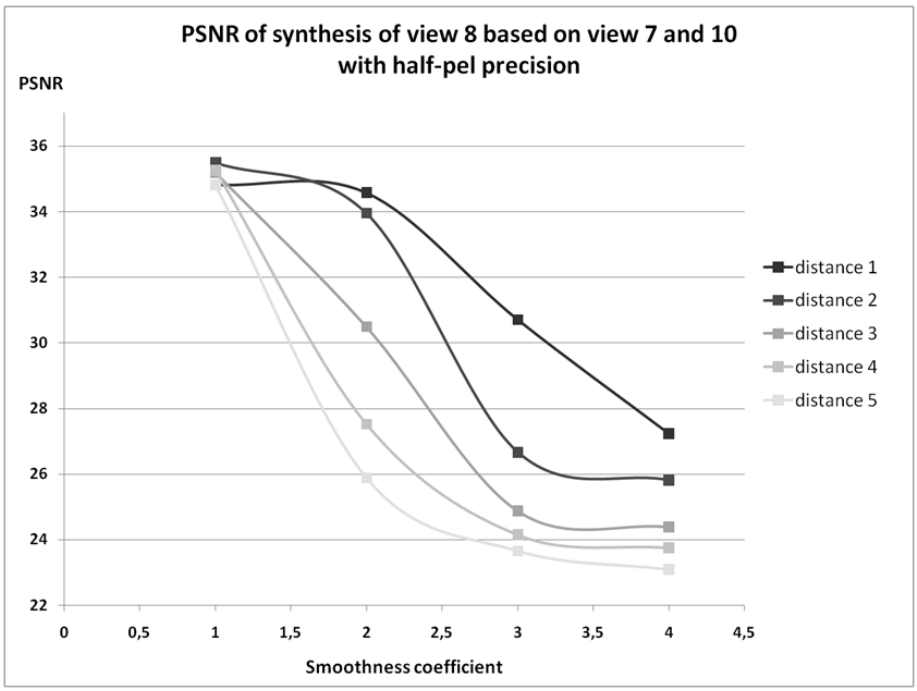


Figure 3. Results of segmentation depth estimation improvement – method 1 - mean shift algorithm, DERS 3.0, VSRS 3.0, half-pixel-precision, various options.

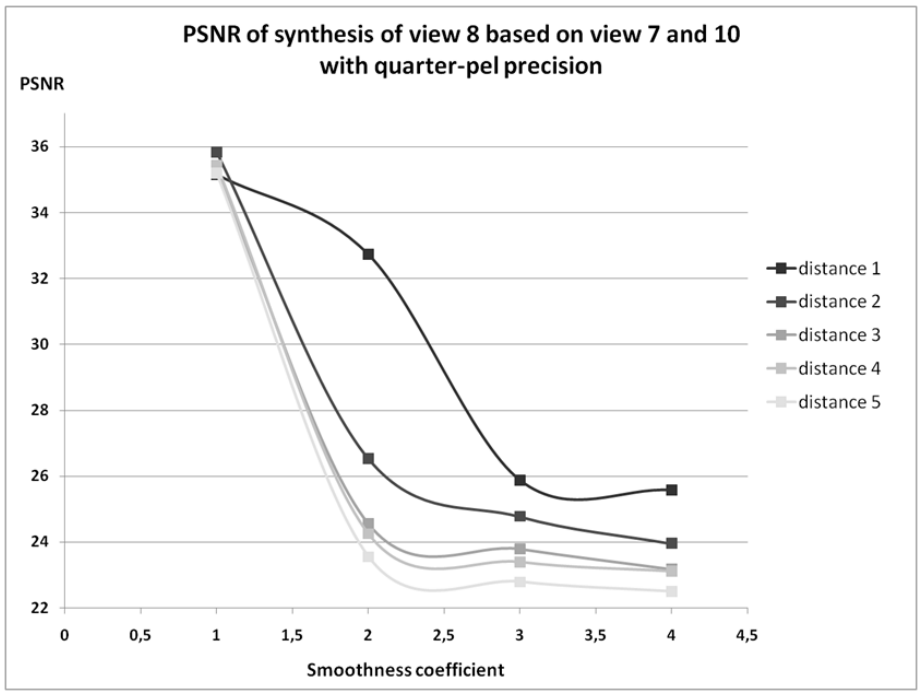


Figure 4. Results of segmentation depth estimation improvement – method 1 - mean shift algorithm, DERS 3.0, VSRS 3.0, quarter-pixel-precision, various options.

4 Results –EE1 – Depth Estimation segmentation improvement – method 2 - pyramid segmentation.

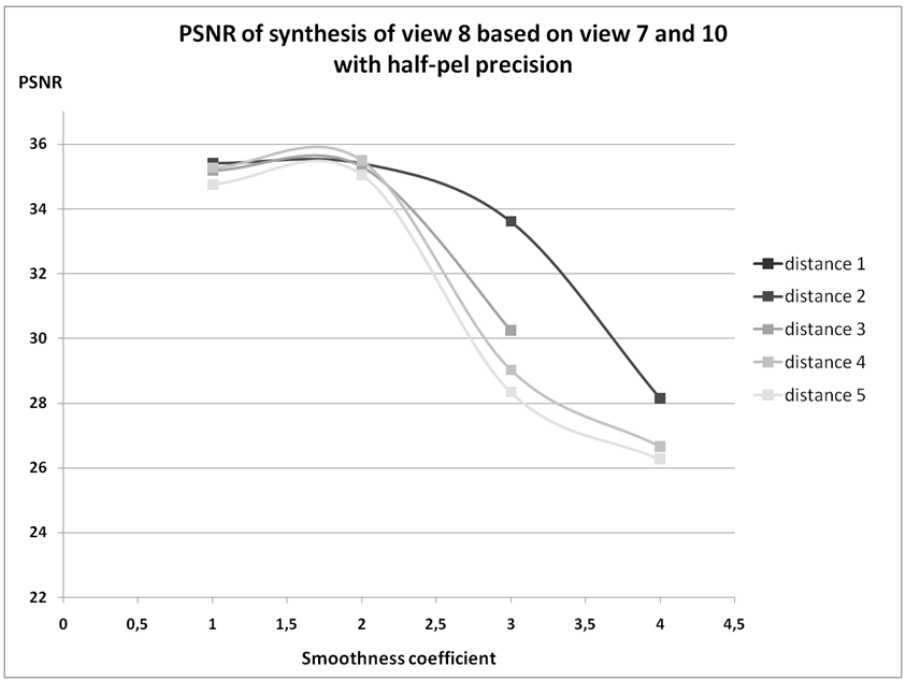


Figure 5. Results of segmentation depth estimation improvement – method 2 – pyramid segmentation algorithm, DERS 3.0, VSRS 3.0, half-pixel-precision, various options.

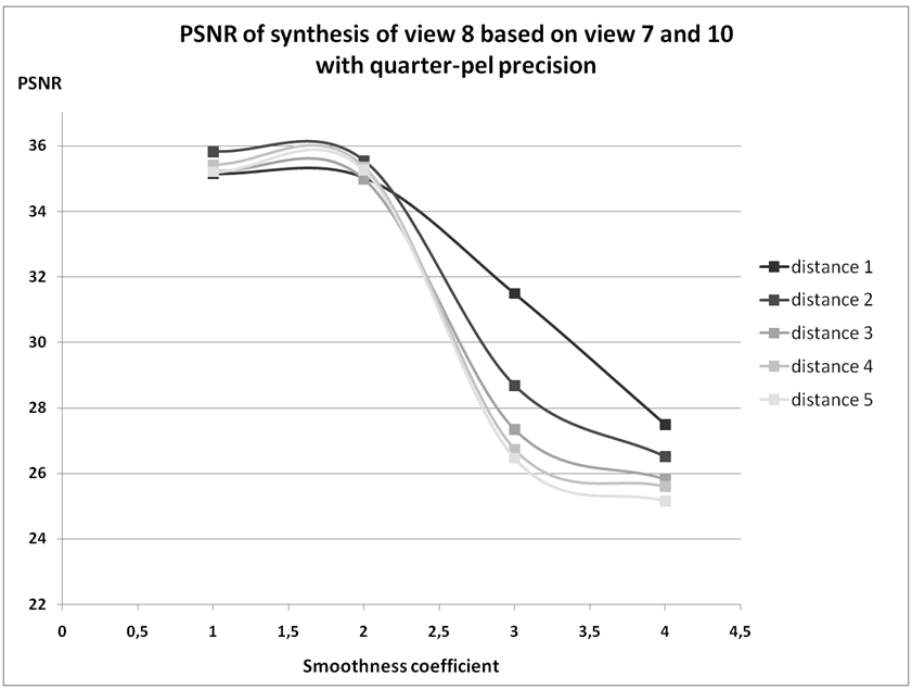


Figure 6. Results of segmentation depth estimation improvement – method 2 – pyramid segmentation algorithm, DERS 3.0, VSRS 3.0, quarter-pixel-precision, various options.

5 Results –EE1 – Depth Estimation segmentation improvement – summary

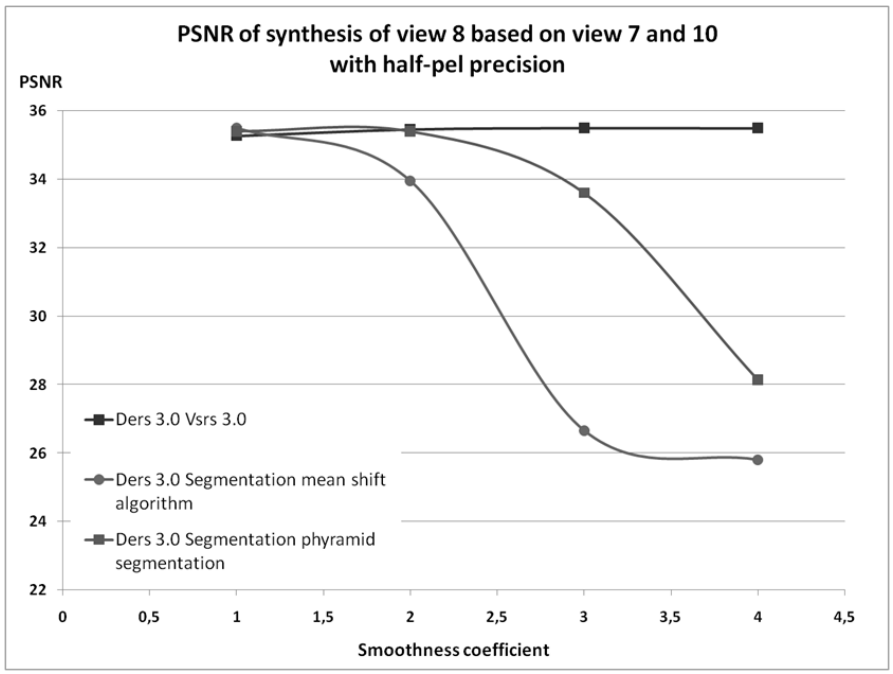


Figure 7. Summary of the best synthesis results (for the best camera distance), DERS 3.0 – segmentation improvement, VSRS 3.0, half-pixel-precision, various options.

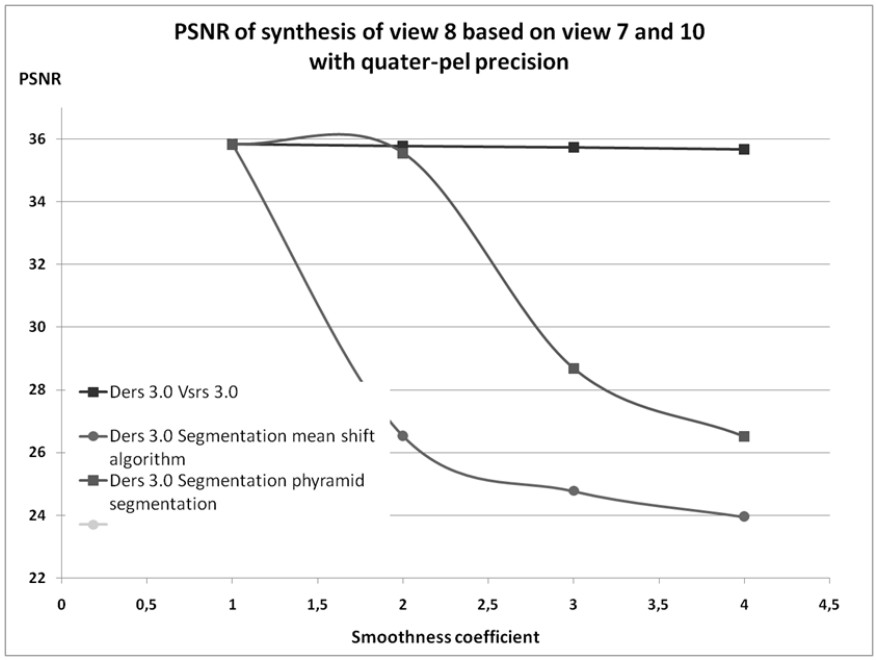


Figure 8. Summary of the best synthesis results (for the best camera distance), DERS 3.0 – segmentation improvement, VSRS 3.0, quarter-pixel-precision, various options.

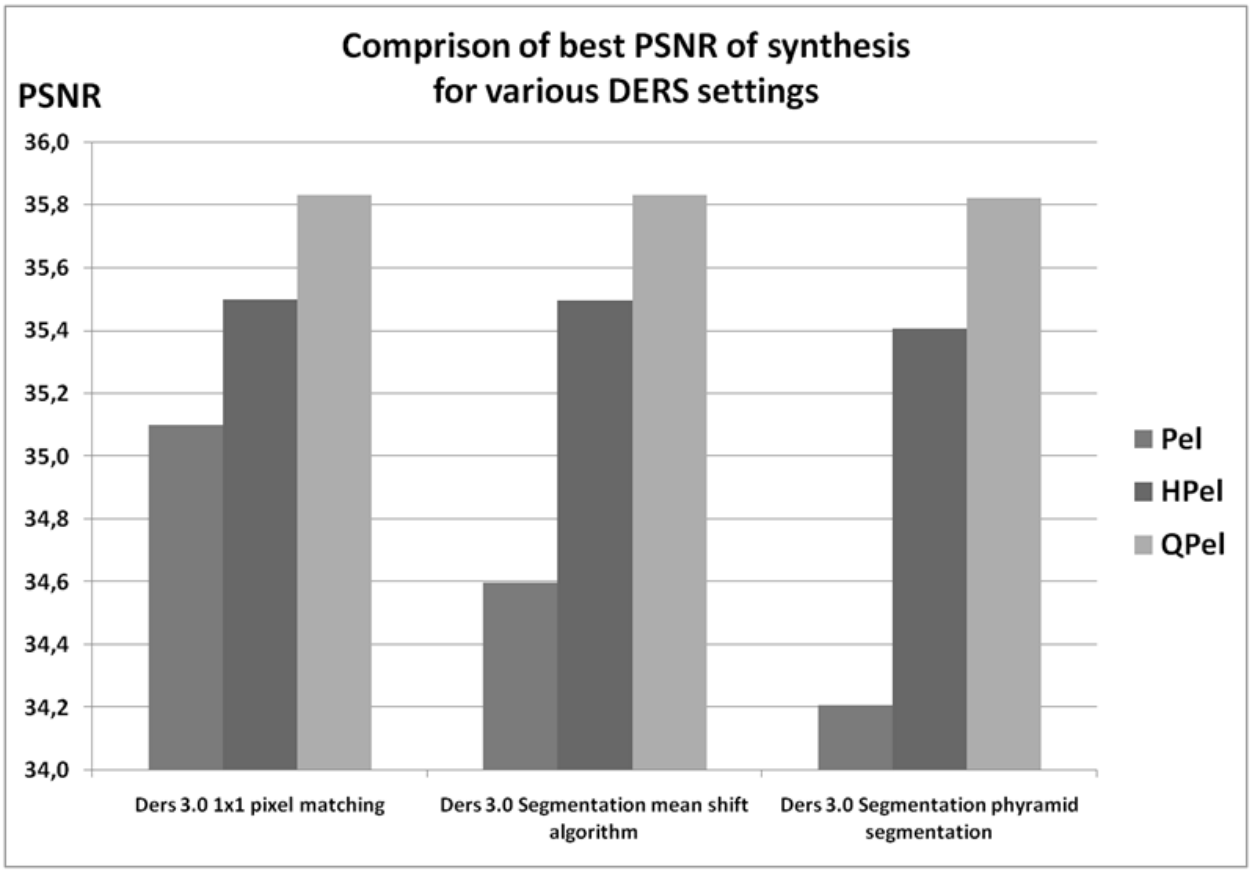
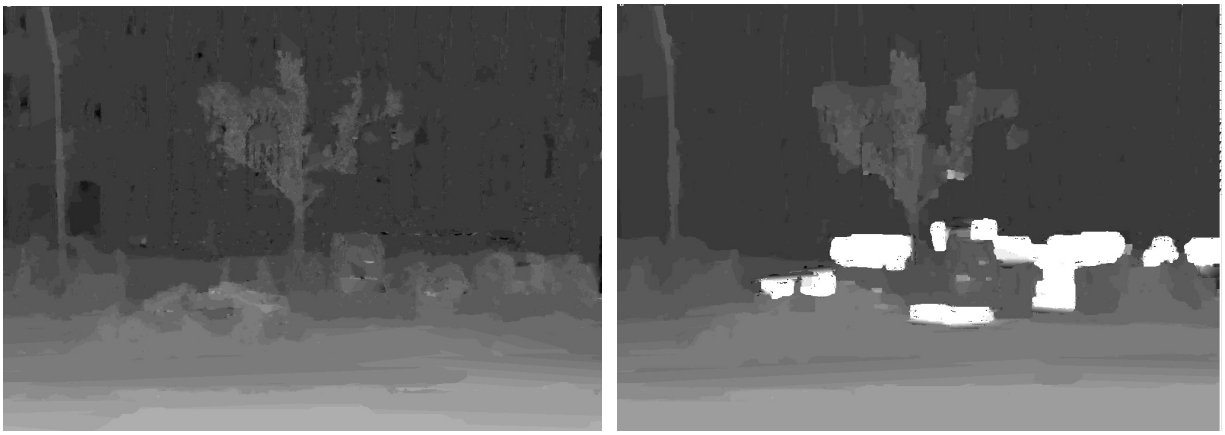


Figure 9. Comparison of the best synthesis results (for the best camera distance), DERS 3.0 – segmentation improvement, VSRS 3.0, various options.

6 Results –EE1 – Depth Estimation segmentation improvement – artifacts with Smoothing Coefficient greater that 1.0



a) Smoothing Coefficien=1 b) Smoothing Coefficien=2

Figure 10. Artifact in depth maps, with Smoothing coefficient greater than 1.0.

7 Conclusions for segmentation improvement

- use of smoothing coefficient greater than 1.0 introduces artifacts in resultant depth map,
- segmentation algorithms don't bring any PSNR gain,
- the computation time is about 10x longer than in case of regular depth estimation.

8 References

[1] "Description of Exploration Experiments in 3D Video Coding" MPEG 2008/W10173, Busan, Korea, October 2008.

[2] Feldmann, M. Mueller, F. Zilly, R. Tanger, K. Mueller, A. Smolic, P. Kauff, T. Wiegand „HHI Test Material for 3D Video", MPEG 2008/M15413, Archamps, France, April 2008.

[3] O. Stankiewicz, K.Wegner, "Results of 3DV/FTV Exploration Experiments, described in w10173, or Alt Moabit sequence" MPEG 2008/M16026, Lausanne, Switzerland, February 2009.

[4] O. Stankiewicz, K.Wegner, K.Klimaszewski, "Results of Exploration Experiments in 3D Video Coding, described in w10360, for Alt Moabit sequence." MPEG 2008/M16328, Maui, Hawaii, April 2009.