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Chair of Multimedia Telecommunications and Microelectronics, Poznań, Poland  
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**Title** 3D-CE1h cross check of RWTH University proposal on Warping Based  
Prediction by Poznan University of Technology  
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## **1 Introduction**

This document presents Core Experiment 1 for High Efficiency Video Coding (HEVC) based 3D Video Coding [1] cross check attained by Poznan University of Technology. The tool that was investigated was proposed by RWTH University in [2]. Tool was evaluated according to the common test conditions [3]. Document provides results in terms of rate and distortion both coded and synthesized views.

## **2 Short tool description**

The Warping Based Prediction proposed by RWTH University utilize synthesized image generated from base view, at spatial position of coded view, as the reference picture.

## **3 Test Platform**

The simulation results were generated on a ~80 core cluster system. This cluster platform's processing units have the following specifications:

- Processor: Intel Xeon X5675
- Clock Speed: 3.06 GHz
- Memory: approx. 4 GB per Core
- OS: 64-bit Windows Server 2008
- Compiler: Microsoft Visual Studio 2008 (64 bit)

## 4 Results

Table 1. Simulation results in term of BD-rate.

	Texture Coding		Synthesized Views		Complexity estimate (ratio to anchor)		
	BD-rate (piecewise cubic)	BD-rate (cubic)	BD-rate (piecewise cubic)	BD-rate (cubic)	Encoder Time, [%]	Decoder Time, [%]	Rendering Time, [%]
Poznan Street	0,26%	0,24%	0,76%	0,79%	103%	140%	99%
Poznan Hall2	-0,01%	-0,01%	0,01%	0,01%	103%	138%	101%
<b>Undo Dancer</b>	<b>-1,98%</b>	<b>-2,00%</b>	<b>-1,17%</b>	<b>-1,19%</b>	109%	144%	101%
GT-Fly	-0,16%	-0,17%	0,09%	0,09%	103%	143%	100%
Kendo	1,85%	1,84%	1,29%	1,29%	104%	123%	100%
Balloons	1,66%	1,65%	0,86%	0,85%	104%	123%	99%
NewspaperCC	2,05%	2,06%	0,34%	0,34%	117%	145%	100%
<b>Average</b>	<b>0,52%</b>	<b>0,52%</b>	<b>0,31%</b>	<b>0,31%</b>	<b>106%</b>	<b>137%</b>	<b>100%</b>

Detailed results can be found in attached Excel file.

## 5 Conclusions

Attained results match those provided by RWTH University. Although exact BD-Rates are slightly differ due to different rounding of the PSNR metrics.

Obtained results shows that warping base prediction can provide gains on sequence with good depth maps.

Decoder and Renderer can be further optimized and thus current decoder time increase is not strong argument against view synthesis based prediction.

## 6 References

- [1] Anthony Vetro, Karsten Müller, "Description of Core experiments in 3D video coding", ISO/IEC JTC1/SC29/WG11 MPEG, N12561 2012.
- [2] Fabian Jäger, "3D-CE1.h Results on Warping Based Prediction by RWTH Aachen University", ISO/IEC JTC1/SC29/WG11 MPEG, M24868, Geneva, Switzerland, April 2012
- [3] Dmytro Rusanovskyy Heiko Schwarz, "Common Test Conditions for HEVC- and AVC-based 3DV," ISO/IEC JTC1/SC29/WG11 MPEG, N12560 2012.
- [3] M. Domański, T. Grajek, K. Klimaszewski, M. Kurc, O. Stankiewicz, J. Stankowski, K. Wegner, "Poznań Multiview Video Test Sequences and Camera Parameters", ISO/IEC JTC1/SC29/WG11 MPEG 2009/M17050, Xian, China, October 2009.