

**INTERNATIONAL ORGANISATION FOR STANDARDISATION  
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ISO/IEC JTC 1/SC 29/WG 4  
MPEG VIDEO CODING**

**ISO/IEC JTC 1/SC 29/WG 4 m 59518**  
**April 2021, Online**

**Title:** EE-1: IVDE depth map generation  
**Source:** Dawid Mieloch (Poznań University of Technology)

## **Abstract & Recommendations**

The document presents the results of Exploration Experiment 1 – IVDE depth map generation. The results include a description of conducted experiment and result of the crosschecks. The recommendations are:

- Change CTC depth maps if A97 posetraces will show improvement of the quality.
- EE1 should be continued to test the performance of the new TMIV.

## **1 Introduction**

**Owner:** Dawid Mieloch (PUT)

**Description:** This experiment generates a MIV anchor (A17) based on depth maps obtained with IVDE 6.0.

**Participants:** Jun Young Jeong (ETRI-IM), Dawid Mieloch (PUT), Yupeng Xie (ULB), Eduardo Juarez (UPM)

## **2 Results**

Only the cross-check of TMIV encoding was performed. The results of the cross-check showed significant differences for the Hijack sequence, the issue will be investigated. For the rest of the omnidirectional sequences, the differences were also reported but were not significant. For most perspective sequences the cross-check was close to being exact.

All results are available in reporting template included with this document. The table below shows the comparison of MIV A17 anchor with CTC depth maps and with depth maps estimated in this EE:

**Mandatory content - Proposal vs. Low/High-bitrate Anchors**

Sequence		High-BR	Low-BR	High-BR	Low-BR
		BD rate	BD rate	BD rate	BD rate
		Y-PSNR	Y-PSNR	IV-PSNR	IV-PSNR
ClassroomVideo	A	789.4%	224.6%	194.6%	158.0%
Museum	B	---	---	---	480.2%
Fan	O	-74.2%	-68.0%	-47.9%	-43.2%
Kitchen	J	175.0%	78.4%	137.8%	59.0%
Painter	D	-1.2%	1.3%	1.8%	3.3%
Frog	E	-19.3%	-10.8%	-9.9%	-5.3%
Carpark	P	-0.9%	2.9%	1.6%	4.3%
Chess	N	---	---	---	---
Group	R	---	---	---	183.3%
<b>MIV</b>		---	---	---	---

**Runtime ratio (%)**

Atlas encoding	Video encoding	Decoding & Rendering
137.8%	92.7%	113.0%
85.5%	197.9%	129.3%
86.3%	90.6%	116.4%
103.1%	71.7%	114.9%
108.7%	104.3%	113.5%
124.0%	107.9%	103.6%
171.6%	110.3%	112.3%
173.5%	120.5%	102.1%
<b>123.6%</b>	<b>120.9%</b>	<b>113.2%</b>

**Max delta Y-PSNR [dB]**

MIV Anchor	EE1	Difference [%]
0.99	2.63	165.9%
9.45	18.39	94.7%
8.02	6.11	-23.7%
14.67	15.00	2.2%
7.94	7.28	-8.3%
7.39	6.43	-12.9%
7.05	6.95	-1.4%
13.60	28.19	107.3%
12.89	22.02	70.8%
<b>9.11</b>	<b>12.56</b>	<b>43.8%</b>

**Max delta IV-PSNR [dB]**

MIV Anchor	EE1	Difference [%]
0.76	1.01	33.3%
5.35	15.85	196.1%
7.24	6.75	-6.7%
11.19	11.80	5.4%
5.26	5.48	4.2%
7.21	5.92	-17.9%
5.01	4.95	-1.2%
12.44	27.40	120.2%
10.30	20.48	98.8%
<b>7.20</b>	<b>11.07</b>	<b>48.0%</b>

Pixel rate [%]	Pixel rate [GP/s]	Frame rate [Hz]
0%	0.00	30
0%	0.00	30
0%	0.00	30
0%	0.00	30
0%	0.00	30
0%	0.00	30
0%	0.00	25
0%	0.00	30
0%	0.00	30
0%	0.00	30
<b>0%</b>	<b>0.00</b>	

**Optional content - Proposal vs. Low/High-bitrate Anchors**

Sequence		High-BR	Low-BR	High-BR	Low-BR
		BD rate	BD rate	BD rate	BD rate
		Y-PSNR	Y-PSNR	IV-PSNR	IV-PSNR
Fencing	L	6.7%	14.2%	-17.0%	6.3%
Hall	T	-63.4%	-50.5%	-47.2%	-42.5%
Street	U	-5.4%	-5.6%	-10.6%	-7.1%
ChessPieces	Q	---	---	---	---
Hijack	C	---	---	---	---
Mirror	I	-10.0%	-17.5%	-9.3%	-17.1%
Cadillac	G	5.0%	-12.2%	24.5%	3.0%
<b>MIV</b>		---	---	---	---

Pixel rate [%]	Pixel rate [GP/s]	Frame rate [Hz]
0%	0.00	25
0%	0.00	25
0%	0.00	25
0%	0.00	30
0%	0.00	30
0%	0.00	30
0%	0.00	30
0%	0.00	30
<b>0%</b>	<b>0.00</b>	

Atlas encoding	Video encoding	Decoding & Rendering
110.5%	80.5%	112.4%
121.0%	54.2%	86.2%
96.9%	65.4%	93.6%
120.4%	99.1%	86.9%
137.1%	93.2%	113.8%
96.8%	62.4%	88.3%
86.8%	80.3%	98.4%
<b>109.9%</b>	<b>76.4%</b>	<b>97.1%</b>

MIV Anchor	EE1	Difference [%]
10.37	9.81	-5.3%
11.67	10.20	-12.6%
8.48	8.58	1.1%
14.44	33.51	132.1%
7.98	21.60	170.7%
8.76	9.56	9.2%
12.08	12.98	7.4%
<b>10.54</b>	<b>15.18</b>	<b>43.2%</b>

MIV Anchor	EE1	Difference [%]
7.60	4.33	-43.1%
8.27	7.81	-5.5%
4.54	4.51	-0.9%
15.29	33.50	119.1%
5.70	20.11	252.8%
5.23	6.09	16.5%
11.16	11.31	1.4%
<b>8.26</b>	<b>12.52</b>	<b>48.6%</b>

### 3 Recommendations:

- Change CTC depth maps if A97 posetraces will show improvement of the quality.
- EE1 should be continued to test the performance of the new TMIV.

### Acknowledgement

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