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| *Title:* | **Description of Core Experiment 2 (CE2): Disparity Vector Derivation** | | |
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# Abstract

This document defines Core Experiment (CE) 2 on disparity vector derivation to be performed for the 4th JCT-3V meeting.

# Introduction

The goal of this CE is to further investigate the methods for disparity vector derivation in both ATM and HTM at the 3rd JCT-3V meeting. Tools under test will be evaluated according to their impact on compression efficiency and implementation complexity.

# Participants

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# Tools under test

## CE2.a: Disparity Vector Derivation in ATM

The scope of this CE for 3D-AVC is to simplify the disparity vector derivation process by e.g., less memory access to the depth map and to potentially improve the coding efficiency.

It was suggested that the impact of the proposed method on B-VSP should also be studied under this CE.

### JCT3V-C0122: Simplification of disparity vector derivation

This contribution proposes a simplified disparity vector derivation method for saving the memory access bandwidth. The implementation of the proposed process can be achieved with sharing a depth sample to derivate the disparity vector in all sub-blocks inside each MB. It is indicated that the proposed approach reduces searching and comparison operations to find maximum depth samples in every sub-blocks and additionally reduces of the encoder complexity.

Negligible coding loss was observed by changing the disparity vector value from the maximum value of the four corners of the depth map to the value of one corner (e.g., bottom-right).

### JCT3V-C0134: MB-level depth-to-DV conversion in ATM

In this document, it is proposed that all partition blocks of Inter mode within the same MB share the same DV as the one used for the inter-view MVP derivation in Skip/Direct mode. Therefore, the disparity derivation can be done in the MB-level instead of block-level.

The depth-to-DV conversion is still performed once by deriving the DV from a maximum depth value of four corner samples of the associated depth block.

## CE2.h: Disparity Vector Derivation in HTM

Several proposals are targeting at further improvement of the coding efficiency of the current NBDV design. For coding efficiency related proposals, it is suggested that results with JCT3V-C0141 turned off should be additionally provided.

#### JCT3V-C0050: Enhanced disparity vector derivation

Multiple disparity candidates based derivation: this document proposes a solution which improves the coding efficiency of the NBDV. Instead of always getting the first available disparity vector, multiple (up to three) disparity vector candidates can be generated and used to derive the final disparity vector. Depending on the number of candidates, the mathematical function to derive the final disparity vector can be either maximum or median operation.

#### JCT3V-C0117: Motion Aware Temporal Disparity Vector Derivation

Temporal neighbor blocks adaptive changing in NBDV: It is proposed that when one of the spatial neighbour blocks is referencing the candidate picture (a temporal reference picture used for disparity vector derivation), the locations of the temporal neighbour blocks are changed by the amount of motion vector.

# Mandates

Mandates for the CE are as follows:

1. To target at a simplified, mature and robust solution for disparity vector derivation and inter-view motion vector prediction in skip mode for ATM. The solutions proposed in JCT3V-C0122 and JCT3V-C0134 are to be studied in this CE. The SW implementations of the relevant methods will be provided in ATM. The experimental results and additional evidence should be provided under CTC.
2. To study the benifits of modifiying the NBDV process as proposed in both JCT3V-C0050 and JCT3V-C0117 in comparison with JCT3V-C0141. The SW implementations of these methods will be provided in the HTM.

# Software, Configuration and Evaluation

## Software

Experiments in CE2.a will use the ATM 7.0 software and experiments in CE2.h will use the HTM 6.0 software, as recommended in JCT3V-C1100.

Proponents are requested to provide software that can be compiled under Windows and Linux platforms.

## Test Sequences, Bit Rates and Coding Conditions

The CE will use the test sequences, configuration and conditions that are recommended in JCT3V-C1100. Moreover, proponents and cross checkers are required to provide simulation results for the random access configuration as specified in JCT3V-C1100.

## Evaluation of CE Results

The performance measurements are evaluated by switching on and off individual tools to identify their relative performance. The following measurements are considered to be used in this core experiment.

1. **Coding performance measurements:** Measure impact on bitrate/PSNR. PSNR shall be calculated for the decoded texture views, relative to original texture views and for the synthesized views relative to uncompressed synthesized views. Use 4-point BD-PSNR and BD-Rate according to common conditions. The anchors will be generated according to common test conditions.
2. **Complexity measurements:** Measure impact on encoding and decoding runtimes for all test cases relative to the unmodified test model software.

# Timelines

**2013/04/06** Make source code, simulation results and draft text available for all proponents and cross-checkers.

**2013/04/13** Register documents for the JCT-3V 4th meeting.

**2013/04/13** Upload contributions to JCT-3V 4th meeting.