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| **Joint Collaborative Team on 3D Video Coding Extension Development**  **of ITU-T SG 16 WP 3 and ISO/IEC JTC 1/SC 29/WG 11**  5th Meeting: Vienna, AU, July 27– Aug. 2, 2013 | Document: JCT3V-E1104 |

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| *Title:* | **Description of Core Experiment 4 (CE4) on Residual Prediction** | | |
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# Abstract

This document defines Core Experiment (CE) 4 on residual prediction to be performed for the 6th JCT-3V meeting.

# Introduction

The goal of this CE is to investigate the methods for residual prediction proposed at the 5th JCT-3V meeting. Tools under test will be evaluated according to their impact on both compression efficiency and implementation complexity.

# Participants

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(P=proponent, C=crosss checker)

# Tools under Investigation

## Further improvements on advanced residual prediction [JCT3V-E0124]

In this proposal, several aspects are proposed to further improve the coding efficiency of ARP. Firstly, the ARP is extended for inter-view residue, when the current block utilizes inter-view prediction from an inter-view reference picture, in a similar way as current design. Secondly, a disparity motion vector associated with the reference block of current block, if available, is used during ARP, to replace the derived disparity vector. Thirdly, the signalling of Illumination Compensation (IC) flag and ARP weighting factors are jointly considered wherein the ic\_flag is not signalled when the ARP weighting factor is unequal to 0.

## Advanced temporal residual prediction [JCT3V-E0185]

An advanced temporal residual prediction (ATRP) method is proposed for the disparity compensated prediction. In ATRP, the disparity parameters of the current PU are applied to the corresponding block in a temporal reference picture in the same view to generate the reference residual in temporal direction. The corresponding block in the temporal reference picture is located by a derived motion vector, which is the motion vector of the block which the current DV is pointing to in the reference view.

## An adaptive disparity vector derivation method for ARP in 3D-HEVC [[JCT3V-E0175](http://phenix.it-sudparis.eu/jct3v/doc_end_user/current_document.php?id=1158)]

An adaptive disparity vector derivation (ADVD) method is proposed to improve ARP coding efficiency. The first three unique DVs in the NBDV procedure are treated as DV candidates used by ARP. The encoder can find the best DV candidate used in ARP according to RDO criterion, and signal the index to the decoder.

## Simplification and improvement of ARP for 3D-HEVC [[JCT3V-E0144](http://phenix.it-sudparis.eu/jct3v/doc_end_user/current_document.php?id=1158)]

It is proposed that ARP is only applied to merge mode, and therefore, the DV derivation process is only performed in merge mode.

# Mandates

Mandates for the CE are as follows:

1. To study the coding efficiency improvement as in JCT3V-E0124, JCT3V-E0185 and JCT3V-E0175 in 3D-HEVC.
2. Coding efficiency tools may be jointly tested to provide the best overall performance and complexity tradeoff.

# Software, Configuration and Evaluation

## Software

Experiments in CE4 will use the HTM version 8.0 software that is recommended in JCT3V-E1100. 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-E1100.

## 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:** For the complexity measurement, the reference software and the reference software with the proposed method implemented will be executed on the same machine with the same configuration and the computational time will be measured. A time ratio will then be calculated between the reference software and the reference software with the proposed method implemented.

# Timelines

2013/08/31 Release HTM version 8.0

2013/10/11 Make source code, simulation results and draft text available for all proponents and cross-checkers.

2013/10/18 Register documents for the 6th JCT-3V meeting

2013/10/18 Upload contributions to 6th JCT-3V meeting

2013/10/26-2013/11/01 The 6th JCT-3V meeting