

**ISO/IEC JTC 1/SC 29/WG 11**

**Coding of moving pictures and audio**

**Convenorship: UNI (Italy)**

**ISO/IEC JTC 1/SC 29/WG 11 N19364**

**Document type: Approved WG 11 document**

**Title: Description of Exploratory Experiment 13.43 for G-PCC :**

**Coordinate conversion**

**Status: Approved**

**Date of document: 2020-05-21**

**Source: 3DG**

**Expected action:**

**No. of pages:**

**Email of convenor: leonardo@chiariglione.org**

**Committee URL: mpeg.chiariglione.org**

**INTERNATIONAL ORGANISATION FOR STANDARDISATION**

**ORGANISATION INTERNATIONALE DE NORMALISATION**

**ISO/IEC JTC 1/SC 29/WG 11**

**CODING OF MOVING PICTURES AND AUDIO**

**ISO/IEC JTC 1/SC 29/WG 11 N19364**

**Alpbach, AT – April 2020**

|  |  |
| --- | --- |
| **Source:** | **3DG** |
| **Title:** | **Description of Exploratory Experiment 13.43 for G-PCC : Coordinate conversion** |

# Abstract

This document provides a description of G-PCC Exploratory Experiment 13.43 on coordinate conversion.

# Introduction

The goal of Exploratory Experiment 13.43 is to evaluate the coordinate conversion method for LiDAR captured data. The performance of the technique m53613[3] are evaluated in the scope of the EE 13.43, in terms of RD performance and computational complexity, on top of TMC13 release-v10.0[1] with CTC condition [2].

# Mandates

The mandates for EE are as follows:

1. To evaluate the coding performance of the attribute coding (i.e., Pred-Lift and RAHT) with the proposed method compared with the anchor
2. To investigate how to extend the method to apply into geometry coding

# Participants

Proponent and cross-checkers of this EE are

| **Name** | **Company** | **E-mail address** | **Type** |
| --- | --- | --- | --- |
| Sejin Oh  Hyun-Mook Oh | LG Electronics Inc. | [sjin.oh@lge.com](mailto:sjin.oh@lge.com)  [hyunmook.oh@lge.com](mailto:hyunmook.oh@lge.com) | Proponent |
| David Flynn | Apple | [davidflynn@apple.com](mailto:davidflynn@apple.com) | Cross-checker |
| Sebastien Lasserre  Jonathan Taquet | BlackBerry | [slasserre@blackberry.com](mailto:slasserre@blackberry.com)  [jtaquet@blackberry.com](mailto:jtaquet@blackberry.com) | Cross-checker |

# Methods to be evaluated

In contribution m53613[3], the coordinate conversion is proposed to improve the coding performance of the G-PCC attribute coding for LiDAR acquired data. In this method, each point position distributed in the cylindrical coordinate system is converted to the rectangular coordinate system whose axis are function of the radius, the azimuthal angle, and the elevation angle.

Given a point position (x, y, z) in XYZ coordinate system, corresponding position in cylindrical coordinate system is derived by the followings.

,

,

,

where and represent the head center position and the laser relative position, respectively. With , the coordinate conversion is conducted as follows.

,

where the parameters are derived by the maximum distances of all axis normalized by the maximum distance of each axis.

# Evaluation

## Test condition

The following test conditions will be under evaluation

1. *C1 AI, lossless geometry – lossy attribute*
2. *C2 AI, lossy geometry – lossy attribute*
3. *CW AI, lossless geometry – lossless attribute*
4. *CY AI,* *lossless geometry – near-lossless attribute*

## Test model, anchors and test condition

TMC13v10 shall be used for these experiments. The proposed tools shall be implemented on top of TMC13v10.

The point cloud test material will be tested for the test sequences of category 3 Dynamic Acquisition.

The test will be performed based on the CTC condition. Parameters and configurations for TMC13v10 software will be provided by the proponent.

# Timeline:

* 2020-05-15: Expected date for release of cross-verified TMC13v10 software and anchors
* 2020-05-29: EE Software and results are released to cross-checkers
* 2020-06-06: Preliminary feedback from cross-checkers to proponents
* 2020-07-01: MPEG document upload deadline

# References

1. “*G-PCC Test Model v10*”, ISO/IEC JTC1/SC29/WG11 Doc. N19323, Alpbach, AT, April 2020
2. “*Common Test Conditions for PCC*” ISO/IEC JTC1/SC29/WG11 N19324, Alpbach, AT, April 2020
3. “*[G-PCC] [new proposal] Coordinate conversion for attribute coding of cat3-frame data*”, ISO/IEC JTC1/SC29 WG11 (MPEG) input document m53613, Alpbach, AT, April 2020