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**MPEG Video Coding promotes MPEG Immersive Video to the FDIS stage**

The 135th MPEG meeting was held online, 12 – 16 July 2021

# MPEG Video Coding promotes MPEG Immersive Video to the FDIS stage

At the 135th MPEG meeting, *MPEG Video Coding* has promoted the **MPEG Immersive Video (MIV)** standard to the Final Draft International Standard (FDIS) stage. MIV was developed to support compression of immersive video content in which multiple real or virtual cameras capture a real or virtual 3D scene. The standard enables storage and distribution of immersive video content over existing and future networks for playback with 6 Degrees of Freedom (6DoF) of view position and orientation.

MIV is a flexible standard for multiview video with depth (MVD) that leverages the strong hardware support for commonly used video codecs to code volumetric video. Views may use equirectangular, perspective, or orthographic projection. By packing and pruning views, MIV can achieve bit rates around 25 Mb/s and a pixel rate equivalent to HEVC Level 5.2. The MIV standard defines multiple profiles: *(i)* the MIV Main profile for MVD, *(ii)* the MIV Geometry Absent profile targeting cloud-based and decoder-side depth estimation, and *(iii)* the MIV Extended profile enabling the coding of multi-plane images (MPI).

The MIV standard is designed as a set of extensions and profile restrictions for the Visual Volumetric Video-based Coding (V3C) standard (ISO/IEC 23090-5). The main body of this standard is shared between MIV and the Video-based Point Cloud Coding (V-PCC) standard (ISO/IEC 23090-5 Annex H). It may potentially be used by other MPEG-I volumetric codecs under development. The carriage of MIV is specified through the Carriage of V3C Data standard (ISO/IEC 23090-10).

The test model and objective metrics are publicly available at <https://gitlab.com/mpeg-i-visual>.

# Verification tests for more application cases of Versatile Video Coding (VVC)

The third round of verification testing for VVC (ISO/IEC 23090-3 and Rec. ITU-T H.266) has been completed. This includes the testing of High Dynamic Range (HDR) content of 4K ultra-high-definition (UHD) resolution using the Hybrid Log-Gamma (HLG) and Perceptual Quantization (PQ) video formats. The test was conducted using state-of-the-art high-quality consumer displays, emulating an internet streaming-type scenario.

On average, VVC showed on average approximately 50% bit rate reduction compared to the previous major generation of MPEG video coding standard known as High Efficiency Video Coding (HEVC), published in 2013.

A previous set of tests for 4K UHD content completed in October 2020 had showed similar bit rate reductions. These verification tests used formal subjective quality testing with “naïve” human viewers. The tests were performed under a strict hygienic regime in two test laboratories to ensure safe conditions for the viewers and test managers despite the adverse conditions of the ongoing COVID-19 pandemic.

# MPEG Systems reaches first milestone for Video Decoding Interface for Immersive Media

One of the most distinctive features of immersive media compared to 2D media is that only a tiny portion of the content is presented to the user. Such a portion is interactively selected at the time of consumption. For example, a user may not see the same point cloud object’s front and back sides simultaneously. Thus, depending on the users’ viewpoint, only the front or back sides need to be decoded and presented. Similarly, parts of the scene that are behind the observer may not need to be accessed.

*MPEG Systems* has begun developing the **Video Decoding Interface for Immersive Media (VDI)** standard (ISO/IEC 23090-13) for a video decoders’ input and output interfaces to provide more flexible use of the video decoder resources for such applications. The VDI standard allows for dynamic adaptation of video bitstreams to provide the decoded output pictures in such a way so that the number of actual video decoders can be smaller than the number of the elementary video streams to be decoded. In other cases, virtual instances of video decoders can be associated with the portions of elementary streams required to be decoded. With this standard, the resource requirements of a platform running multiple virtual video decoder instances can be further optimized by considering the specific decoded video regions that are to be actually presented to the users rather than considering only the number of video elementary streams in use.

At the 135th MPEG meeting, *MPEG System*s has reached the first formal milestone of developing the ISO/IEC 23090-13 standard by promoting the text to Committee Draft ballot status. The standard defines the basic framework and specific implementation of this framework for various video coding standards, including support for API standards that are widely used in practice. This standard is expected to reach its final development milestone (Final Draft International Standard, FDIS) in mid-2022.

# MPEG Systems further enhances the extensibility and flexibility of Network-based Media Processing

At the 135th MPEG meeting, *MPEG Systems* has completed the 2nd edition of ISO/IEC 23090-8 **Network-based Media Processing (NBMP)** by promoting it to Final Draft International Standard (FDIS).

The new edition of NBMP adds a mechanism to use function templates, which defines common references of the functions to be used by the NBMP framework. Various implementations of the already deployed functions can be used without modifications. The function templates define an NBMP brand name, a description of the normative function behaviour, a function description template, and a configuration parameter definition. The NBMP framework can utilize any implementation of functions already deployed in the market by providing definitions according to this template.

The standard currently provides function templates for 360° stitchers, FIFOs, OMAF packagers, splitters, mergers, intelligent video croppings, selectors, and compositors.

# MPEG Systems completes support of Versatile Video Coding and Essential Video Coding in High Efficiency Image File Format

One of the most widely implemented standards developed by *MPEG Systems*, ISO/IEC 23008-12 **Image File Format**, has been amended to support images coded using the recently completed Versatile Video Coding (VVC) and Essential Video Coding (EVC) standards. The 2nd edition of the Image File Format standard has reached the final milestone of development at the 135th MPEG meeting through its promotion to Final Draft International Standard (FDIS).

This edition adds definitions of brands and their constraints for VVC images, VVC image collections, EVC images, and EVC image collections:

* For VVC, support of operation points and subpictures have been defined to extract a subset of a picture in a flexible way.
* For EVC, different brands specific for the EVC Baseline profile and EVC Main profile have been defined so that the industry can choose a profile of EVC according to the technical capabilities and licensing conditions suitable for the application.

In addition to the support of new video codecs, this edition also adds capabilities for presenting a slideshow with the images included in a file and a mechanism for defining various types of regions of a picture and annotating them. One important aspect added in this edition is a discussion of the privacy and security considerations for an image file. It has been clarified that the standard relies on external integrity or confidentiality protection tools, as the standard only defines a static data storage format that can hold many types of data. In addition, the standard now provides a list of some types of data that implementers should consider removing in order to protect privacy when a file is shared publicly.

# MPEG White Papers

At the 135th MPEG meeting, *MPEG Liaison and Communication* approved the following MPEG white papers.

Versatile Video Coding (VVC)

The Versatile Video Coding (VVC) standard (ITU-T H.266 / ISO/IEC 23090-3) delivers improved compression and broader range of effective application than prior video coding standards. This includes providing approximately 50% bit-rate savings over its predecessor, the High Efficiency Video Coding (HEVC) standard. In developing the VVC standard, the applications specifically targeted for the standard included video with high- and ultra-high-definition resolutions (HD and UHD) and beyond, High Dynamic Range (HDR), Wide Colour Gamut (WCG), 10-bit sample precision per colour component, resolution-adaptive bit rate streaming, 360° immersive video with projection mapping and viewport-dependent, ultralow-delay scenarios, and bitstream extraction and merging. Thus, this white paper has been written to briefly introduce the standard and provide guidance to readers on where to find additional resources.

MPEG-G and its application of regulation and privacy

The current MPEG-G standard series (ISO/IEC 23092) addresses the representation, compression, and transport of genome sequencing data to support annotation data under development. Across the genomics workflow, currently existing genomics data representation methods do not support privacy and security at the data level. In contrast, MPEG-G will support application requirements that include those driven by privacy and security regulations. This white paper provides a survey of the regulations of genomic information in different countries, demands of security and privacy, and technological tools for further standard development.

# How to contact MPEG and further information

Journalists that wish to receive MPEG Press Releases by email should contact Dr. Christian Timmerer at [christian.timmerer@aau.at](mailto:christian.timmerer@aau.at) or subscribe via <https://lists.aau.at/mailman/listinfo/mpeg-pr>. Further information can be found on the MPEG Website: <http://www.mpeg.org/>.

Future MPEG meetings are planned as follows:

No. 136, Online, 11 – 15 October 2021

No. 137, Online (possibly mixed mode with physical facilities available), 17 – 21 January 2022

No. 138, Alpbach, AT, 25 – 29 April 2022

No. 139, Cologne, DE, 18 – 22 July 2022

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