# INTERNATIONAL ORGANIZATION FOR STANDARDIZATION

# 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 N14537**

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# Reference model for mixed and augmented reality defines architecture and terminology for MAR applications

Sapporo, JP − The 109th MPEG meeting was held in Sapporo, JP, from 7 – 11 July, 2014**.**

**MPEG collaborates with SC24 experts to develop committee draft of MAR reference model**

SC 29/WG 11 (MPEG) is pleased to announce that the Mixed and Augmented Reality Reference Model (MAR RM), developed jointly and in close collaboration with SC 24/WG 9, has reached Committee Draft status at the 109th WG 11 meeting. The MAR RM defines not only the main concepts and terms of MAR, but also its application domain and an overall system architecture that can be applied to all MAR systems, regardless of the particular algorithms, implementation methods, computational platforms, display systems, and sensors/devices used. The MAR RM can therefore be used as a consultation source to aid in the development of MAR applications or services, business models, or new (or extensions to existing) standards. It identifies representative system classes and use cases with respect to the defined architecture, but does not specify technologies for the encoding of MAR information, or interchange formats.

**2nd edition of HEVC includes scalable and multi-view video coding**

At the 109th MPEG meeting, the standard development work was completed for two important extensions to the High Efficiency Video Coding standard (ISO/IEC 23008-2, also standardized by ITU-T as Rec. H.265).

The first of these are the scalability extensions of HEVC, known as SHVC, adding support for embedded bitstream scalability in which different levels of encoding quality are efficiently supported by adding or removing layered subsets of encoded data. The other are the multiview extensions of HEVC, known as MV-HEVC providing efficient representation of video content with multiple camera views and optional depth map information, such as for 3D stereoscopic and autostereoscopic video applications. MV-HEVC is the 3D video extension of HEVC, and further work for more efficient coding of 3D video is ongoing.

SHVC and MV-HEVC will be combined with the original content of the HEVC standard and also the recently-completed format range extensions (known as RExt), so that a new edition of the standard will be published that contains all extensions approved up to this time.

In addition, the finalization of reference software and a conformance test set for HEVC was completed at the 109th meeting, as ISO/IEC 23008-5 and ISO/IEC 23008-8, respectively. These important standards will greatly help industry achieve effective interoperability between products using HEVC and provide valuable information to ease the development of such products.

In consideration of the recent dramatic developments in video coding technology, including the completion of the development of the HEVC standard and several major extensions, MPEG plans to host a brainstorming event during its 110th meeting which will be open to the public. The event will be co-hosted by MPEG's frequent collaboration partner in video coding standardization work, the Video Coding Experts Group (VCEG) of ITU-T Study Group 16. More information on how to register for the event will be available at <http://mpeg.chiariglione.org/meetings/110>.

**MPEG-H 3D Audio extended to lower bit rates**

At its 109th meeting, MPEG has selected technology for Version II of the MPEG-H 3D Audio standard (ISO/IEC 23008-3) based on responses submitted to the Call for Proposals issued in January 2013. This follows from selection of Version I technology, which was chosen at the 105th meeting, in August 2013. While Version I technology was evaluated for bitrates between 1.2 Mb/s to 256 kb/s, Version II technology is focused on bitrates between 128 kb/s to 48 kb/s.

The selected technology supports content in multiple formats: channel-based, channels and objects (C+O), and scene-based Higher Order Ambisonics (HOA). A total of six submissions were reviewed: three for coding C+O content and three for coding HOA content.

The selected technologies for Version II were shown to be within the framework of the unified Version I technology.

The submissions were evaluated using a comprehensive set of subjective listening tests in which the resulting statistical analysis guided the selection process. At the highest bitrate of 128 kb/s for the coding of a signal supporting a 22.2 loudspeaker configuration, both of the selected technologies had performance of “Good” on the MUSHRA subjective quality scale. It is expected that the C+O and HOA Version II technologies will be merged into a unified architecture.

This MPEG-H 3D Audio Version II is expected to reach Draft International Standard by June 2015.

The 109th meeting also saw the technical completion of Version I of the MPEG-H 3D Audio standard and is expected to be an International Standard by February, 2015.

**Public seminar for media synchronization planned for 110th MPEG meeting in October**

A public seminar on Media Synchronization for Hybrid Delivery will be held on the 22nd of October 2014 during the 110th MPEG meeting in Strasbourg. The purpose of this seminar is to introduce MPEG’s activity on media stream synchronization for heterogeneous delivery environments, including hybrid environments employing both broadcast and broadband networks, with existing MPEG systems technologies such as MPEG-2 TS, DASH, and MMT. The seminar will also strive to ensure alignment of its present and future projects with users and industry use-cases needs.

Main topics covered by the seminar interventions include:

* Hybrid Broadcast - Broadband distribution for UHD deployments and 2nd screen content
* Inter Destination Media Synchronization
* MPEG Standardization efforts on Time Line Alignment of media contents
* Audio Fingerprint based Synchronization

You are invited to join the seminar to learn more about MPEG activities in this area and to work with us to further develop technologies and standards supporting new applications of rich and heterogeneous media delivery.

The seminar is open to the public and [registration](http://mpeg.chiariglione.org/meetings/110) is free of charge.

**First MMT Developers’ Day held at MPEG 109, second planned for MPEG 110**

Following the recent finalization of the MPEG Media Transport standard (ISO/IEC 23008-1), MPEG has hosted an MMT Developers' Day to better understand the rate of MMT adoption and to provide a channel for MPEG to receive comments from industries about the standard. During the event four oral presentations have been presented including "Multimedia transportation technology and status in China", "MMT delivery considering bandwidth utilization", "Fast channel change/ Targeted Advertisement insertion over hybrid media delivery", and "MPU Generator." In addition, seven demonstrations have been presented such as Reliable 4K HEVC Realtime Transmission by using MMT-FEC, MMT Analyzer, Applications of MMT content through Broadcast, Storage, and Network Delivery, Media Delivery Optimization with the MMT Cache Middle Box, MMT-based Transport Technology for Advanced Services in Super Hi-Vision, target ad insertion and multi-view content composition in broadcasting system with MMT, and QoS management for Media Delivery. MPEG is planning to host a 2nd MMT Developer's Day during the 110th meeting on Wednesday, Oct 22nd.

**Seminar at MPEG 109 introduces MPEG’s activity for Free Viewpoint Television**

A seminar for FTV (Free Viewpoint Television) was held during the 109th MPEG meeting in Sapporo. FTV is an emerging visual media technology that will revolutionize the viewing of 3D scenes to facilitate a more immersive experience by allowing users to freely navigate the view of a 3D scene as if they were actually there. The purpose of the seminar was to introduce MPEG’s activity on FTV to interested parties and to align future MPEG standardization of FTV technologies with user and industry needs.

**Digging Deeper – How to Contact MPEG**

Communicating the large and sometimes complex array of technology that the MPEG Committee has developed is not a simple task. Experts, past and present, have contributed a series of tutorials and vision documents that explain each of these standards individually. The repository is growing with each meeting, so if something you are interested is not yet there, it may appear shortly – but you should also not hesitate to request it. You can start your MPEG adventure at <http://mpeg.chiariglione.org/>

**Further Information**

Future MPEG meetings are planned as follows:

No. 110, Strasbourg, FR, 20 – 24 October 2014

No. 111, Geneva, CH, 16 – 20 February 2015

No. 112, Warsaw, PL, 22 – 26 June 2015

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The MPEG homepage also has links to other MPEG pages that are maintained by the MPEG subgroups. It also contains links to public documents that are freely available for download by those who are not MPEG members. Journalists that wish to receive MPEG Press Releases by email should contact Dr. Arianne T. Hinds at [a.hinds@cablelabs.com](mailto:a.hinds@cablelabs.com)