

Question 6/16 – Visual, audio and signal coding

(Continuation of Question 6/16)

1 Motivation

The goal of this Question is to produce Recommendations for visual, speech, audio and signal coding methods appropriate for conversational (e.g. videoconferencing and video telephony) and non-conversational (e.g. multimedia streaming, broadcast TV, IPTV, file download, media storage/playback, remote screen display, digital cinema, or virtual & augmented reality) audiovisual services and other services. The Question is to focus primarily on the coding of visual signals, including the compression of:

- video sequences;
- still images;
- graphics;
- stereoscopic, multi-view, depth maps, and free-viewpoint visual information;
- light fields, point clouds, and volumetric imagery;
- computer displays;
- medical imaging;
- 360 degree/panoramic/spherical-view video sequences;
- video and images for virtual and augmented reality.

This Question will primarily focus on the maintenance and extension of existing video and still-image coding Recommendations, and laying the ground for new Recommendations using advanced techniques to significantly improve the trade-offs between bit rate, quality, delay, and algorithm complexity. The Question will also be responsible for maintenance and further developments in speech, audio coding and other signal coding and network-based signal processing. Video, still-image, speech, audio and other signal coding standards will be developed with sufficient flexibility to accommodate a diverse number of transport types (Internet, LAN, 5G and other mobile networks, ITU-T H.222.0, etc.).

2 Study items

Study items to be considered include, but are not limited to:

- new coding methods in order to achieve the following objectives:
 - improvements in compression efficiency;
 - robust operation in error/loss-prone environments (e.g. non-guaranteed-bandwidth packet networks or mobile wireless communication);
 - reduction of real-time delay, complexity, and of channel acquisition time and random access latency;
- organization of the compressed data format to support packetization and streaming;
- development of supplemental enhancement information to accompany source data for enabling enhanced functionality in application environments;
- study and specification of data for annotation, indexing, and searching;
- techniques to permit networks or terminals to adjust bit rates efficiently;
- techniques for object coding and multi-view operation;
- techniques to permit terminals to rapidly adjust the region-of-interest and/or field of view of video stream playback;

- techniques for efficient coding of 360-degree/panoramic/spherical-view video sequences, including those formed by stitching video sequences from multiple cameras with projection/rendering warping;
- techniques for efficient coding of video, images, audio, point clouds, and other signals for virtual and augmented reality, navigation, medical, and other applications;
- techniques for efficient compressed-digital to compressed-digital processing (including transcoding);
- the impact of colorimetry, video and image quality assessment, and quality control requirements on video and image codec development;
- computer graphics compression;
- security aspects that directly affect video, speech, audio and signal coding (including watermarking techniques);
- coordination of video, still-image, speech, audio and signal coding matters not addressed in other coding Questions with other ITU study groups and other bodies;
- harmonization of video, still-image, speech, audio and signal coding activities with other standard development organizations (SDOs);
- enhancements to existing multimedia systems Recommendations including the addition of advanced audio and visual coding (e.g. ITU-T H.26x and G.72x extensions and beyond).

3 Tasks

Tasks include, but are not limited to:

- development of extensions, additional profiles, and maintenance updates for ITU-T H.266 (VVC);
- work towards development of a future video coding Recommendation with compression capability substantially beyond that of ITU-T H.266;
- address needs for signal type identification for use with video and image coding Recommendations, including extensions and maintenance for ITU-T H.273;
- conformance and reference software development and maintenance for ITU-T H.264 (AVC), ITU-T H.265 (HEVC), and H.266, including ITU-T H.264.1, H.264.2, H.265.1, H.265.2, and conformance testing and reference software for H.266 (H.266.1 and H.266.2);
- development of guidelines for effective use of video and still-image compression coding technology;
- in liaison with other ITU-T standardization groups or SDOs, recommend what video and still-image coding standards should be used in services/applications, networks, devices and specified in related ITU-T Recommendations;
- development of supplemental enhancement information to accompany video, still-image, speech, audio, and signal data, including data for image/video annotation, indexing, and searching, including maintenance and extension of ITU-T H.271 and H.274 (VSED);
- continued development of new image coding (T.8xx-sub-series) specifications;
- maintain the video, still-image, speech, and audio coding information in the ITU-T media coding database;
- maintenance of existing H-series video coding Recommendations and supplements, including ITU-T H.120, H.261, H.262 | ISO/IEC 13818-2, H.263, H.264 | ISO/IEC 14496-10, H.264.1, H.264.2, H.265 | ISO/IEC 23008-2, H.265.1, H.265.2, H.266 | ISO/IEC 23090-3, H.266.1, H.266.2, H.271, H.273, H.274 | ISO/IEC 23002-7, H-series Supplements 15, 18, and 19, and Technical Paper ITU-T HSTP-VID-WPOM;

- maintain and extend existing Recommendations and Supplements regarding still image coding, including ITU-T T.44, T.80, T.81, T.82, T.83, T.84, T.85, T.86, T.87, T.88, T.89, T.800, T.801, T.802, T.803, T.804, T.805, T.807, T.808, T.809, T.810, T.812, T.813, T.814, T.815, T.831, T.832, T.833, T.834, T.835, T.851, T.870, T.871, T.872, T.873 and T-series Supplement 2;
- maintenance of existing G-series regarding speech and audio coding and signal processing Recommendations including ITU-T G.711, G.711.0, G.711.1, G.718, G.719, G.720.1, G.722, G.722.1, G.722.2, G.723.1, G.726, G.727, G.728, G.729 and G.729.1;
- maintenance of related Recommendations to signal processing network equipment and functions: ITU T G.160, G.161, G.161.1, G.164, G.165, G.168, G.169, Q50-series, Q.115-series, G.799.1, G.799.2, G.799.3, G.776.1, G.776.4, G.763, G.764, G.765, G.766, G.767, G.768, G.769/Y.1242 and I.733.
- development of new speech and audio coding Recommendations;

An up-to-date status of work under this Question is found in the SG16 work programme (https://www.itu.int/ITU-T/workprog/wp_search.aspx?sp=17&q=6/16).

4 Relationships

Recommendations

- ITU-T H.300 sub-series systems Recommendations
- ITU-T H.241, H.245 and H.248-series

Questions

- Questions 1/16, 6/16, 8/16, 11/16, 13/16, 28/16

Study groups

- ITU-T SGs 9, 11, 12, 13
- ITU-R SG6

Other bodies

- ISO/IEC JTC 1/SC 29 WG 1 (JPEG, JBIG) and WG 11 (MPEG) on video, image, speech, and audio coding
- IETF, DVB, ATSC, ARIB, 3GPP, EBU, SCTE, SMPTE, MC-IF, MEF, VESA, W3C, CTA, IEC TC 100