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DRAFT BUSINESS PLAN FOR JTC 1/SC 29 (as of September 2009)

PERIOD COVERED: October 2008 – October 2009

SUBMITTED BY: ISO/IEC JTC 1/SC 29 Chairman

1.0 MANAGEMENT SUMMARY

SC 29 has been working on: **Coding of Audio, Picture, Multimedia and Hypermedia Information.**

SC 29 has Advisory Group on Management, Maintenance Task Force and two active Working Groups below.

WG 1: Coding of Still Pictures

WG 11: Coding of Moving Pictures and Audio

SC 29 has 27 P-members and 16 O-members.

In this period, SC 29 held one SC Plenary meeting, WG 1 held three WG meetings, and WG 11 held four WG meetings. The numbers of participants are shown below.

- SC 29: 22nd SC 29 Plenary meeting (12)
- WG 1: 46th meeting (42), 47th meeting (43), 48th meeting (40) and 49th meeting (35)
- WG 11: 86th meeting (353), 87th meeting (221), 88th meeting (245) and 89th meeting (296)

Since November 2008, SC 29 had 111 ballots* (2 for NP, 37 for CD, 35 for FCD, 1 for PDTR, 34 for FDIS and 2 for DTR) in this period and had sufficient number of participation of P-members. 58 International Standards (1 for TR and 57 for IS/AMD/COR) were published.

(* as of 2009-08-31)

1.1 CHAIRMAN'S REMARKS

The operation in this period was good and supported by significantly active participation and work by the members. The standards developed by SC 29 have been widely deployed in many services such as digital broadcasting, communication, content production, delivery, audio-visual archive as well as commercial products such as broadcasting receiver, mobile phone, camera, recorder, viewer/player and packaged content. SC 29 is continuing its work on the development of standards to serve the industry and to provide widest use of digital media information.

One noteworthy feedback to SC 29 work in this period is two Emmy awards for Advanced Video Coding (AVC) standard (ITU-T H.264 | ISO/IEC 14496-10). A "Technology and Engineering Emmy Award 2007-2008" has been awarded for the development of the standard to WG 11 (known as MPEG) and the ITU-T/SG16's Video Coding Experts Group (VCEG) by the U.S. National Academy of Television Arts and Sciences (NATAS). The award ceremony was held as part of the International CES trade show in Las Vegas on 7 January, 2009. This is the second Emmy awarded for the development of the AVC standard, after the 2008 Primetime Emmy Engineering award that was given to the Joint Video Team (JVT) by the Academy of Television Arts and Sciences (ATAS) for the development of the High Profile on 23 August, 2008. This case of a technology receiving both types of engineering Emmy awards, which is an indication of the excellent acceptance of the AVC standard in the market.

Two articles from SC 29 have appeared in "ISO Focus" April issue of 2009 as listed below.

"And the Emmy goes to ... The MPEG story"

http://www.iso.org/iso/p.11_main_focus.pdf

"JPEG – still photography brought to life"

http://www.iso.org/iso/p.15_main_focus.pdf

Other achievements in this period are described in 2.0 PERIOD REVIEW.

1.2 JTC 1/SC 29 STATEMENT OF SCOPE

There is no change of the SC 29 title and scope. The current title and scope of work are:

Title: Coding of Audio, Picture, Multimedia and Hypermedia Information

Scope: Standardization of coded representation of audio, picture, multimedia and hypermedia information - and sets of compression and control functions for use with such information - such as

- Audio information
 - Bi-level and Limited Bits-per-pixel Still Pictures
 - Digital Continuous-tone Still Pictures
 - Computer Graphic Images
 - Moving Pictures and Associated Audio
 - Multimedia and Hypermedia Information for Real-time Final Form Interchange
 - Audio Visual Interactive Script ware
- Excluded: Character Coding

1.3 PROJECT REPORT

Detailed Programme of Work is available on the SC 29 web site (<http://www.itscj.ipsj.or.jp/sc29/>).

1.4 CO-OPERATION AND COMPETITION

SC 29 has many liaisons with other organizations. This means that it can meet the requirements and expectations of the standards users from the other communities better through regular communication and the exchange of documents. SC 29 has 5 internal Liaisons in JTC 1, 8 internal Liaisons within ISO/TC and IEC/TCs. In addition, 17 Category A Liaisons, 3 Category B Liaisons, and 34 Category C Liaisons have been established. Especially SC 29 has long and productive collaboration with ITU-T, which can be seen in the activities of JPEG (Joint Photographic Experts Group) under WG 1 and of MPEG-2 Video and Systems, and JVT (Joint Video Team) under WG 11 for AVC (Advanced Video Coding) including SVC (Scalable Video Coding) and MVC (Multi-view Video Coding). SC 29 will endeavor to even further improve collaboration with ITU-T in future opportunities. Currently the schemes of collaboration are considered for HVC (High-performance Video Coding) and AIT (Advanced IPTV Terminal) between WG 11 and ITU-T/SG16.

See SC 29 Web site (<http://www.itscj.ipsj.or.jp/sc29/29w2l.htm>).

2.0 PERIOD REVIEW

WG 1 conducts six active projects: JPEG, JBIG-2, JPEG2000, JPEG XR, JPSearch and AIC.

Regarding JPEG, WG 1 has created a Committee Draft of JPEG part 5 which officially standardizes JFIF (JPEG File Interchange Format). This standard is expected to provide an opportunity to include new developments relating to image metadata such as JPSearch metadata into the JFIF file format.

WG 1 is working on the color amendment to JBIG-2. This will allow images of office documents which contain only "spot" color to be more efficiently compressed than by the use of standard baseline JPEG.

JPEG 2000 is a family of standards which provide highest compression and usability of images. JPEG 2000 Part 13 (ISO/IEC 15444-13:2008), "JPEG 2000 image coding system: An entry level JPEG 2000 encoder" has been published. This standard defines an entry level JPEG 2000 encoder providing one or more optional complete encoding paths that use various features defined in the JPEG 2000 standards.

JPEG 2000 Part 9, JPIP, provides a protocol for flexible network access to images via progressive quality and region-based requests, allowing access to large images from limited capability devices such as cell phones and mobile internet devices. JPIP standard has passed through interoperability testing between several vendors using different implementations.

Part 10 of JPEG 2000, JP3D, was published as an International Standard in December 2008. This provides excellent coding performance and functionality for representation of three dimensional volumetric data sets such as medical diagnostic images, biological data, weather and scientific data.

JPEG XR is another compression format supporting high dynamic range and promises to bring a new level of user experience to users of digital cameras. JPEG XR advanced to draft international standard balloting in January, entering the final phases of standardization and freezing the specification for implementers. JPEG-XR coding specification is now an International Standard.

JPSearch (ISO/IEC 24800, Still Image Search) is a project that aims to develop a standard framework for searching large collections of images. Part 2 (Registration, identification and management of schema and ontology), Part 3 (JPSearch Query Format) and Part 4 (File format for metadata embedded in image data) are at their Committee Draft stages.

AIC is a project for Advance Image Coding and Evaluation Methodologies. This standard will offer both evaluation methodologies for assessment of image compression systems and specifications for a future generation of image compression system. The AIC ad hoc group issued two calls for requirements and technologies: one for medical imaging and one for camera sensor data interchange and archival applications.

WG 11 conducts many projects such as MPEG-2, MPEG-4, MPEG-7, MPEG-21, MPEG-A to MPEG-E, MPEG-V, MPEG-M and MPEG-U. Some of notable results are described below.

WG 11 has determined that the next generation of video compression technology is needed since video bit rate will increase at a rate faster than network infrastructures will be able to economically carry. Such video technology would need to have compression capability higher than the existing AVC standard in its best configuration, the High Profile. Thus WG 11 has started a study on High-Performance Video Coding (HVC), which covers a wide range of resolutions including lightweight HD for mobile and higher to ultra HD, 4Kx2K pictures. WG 11 issued a call for evidence on HVC and evaluated responses to the call in June to July, 2009. Significant gains in compression were found when an assessment was made based on information brought by the contributors. WG 11 has therefore concluded that the development of the next generation video coding technology is to be started.

WG 11 has extended the AVC with new profiles, one of which is a special case of Multi-view Video Coding (MVC). The profile is called Stereo High Profile and it enables all of the coding tools of the High Profile along with inter-view prediction capability for two-view (stereo) video applications such as 3D entertainment video.

WG 11 is well advanced in the development of a high-quality Unified Speech and Audio Coding (USAC) standard. USAC will be able to encode an arbitrary mix of speech and audio content, and will perform comparable to or better than the best coding technology that might be tailored specifically to coding of either speech or general audio content. The experts are working together in Core Experiments.

A new amendment which defines a description technology for Image Signature has been added to the Visual part of MPEG-7. This new technology exploits a highly compact description – thereby enabling high-speed searches even in the case of very large databases. WG 11 is working on Video Signature, which is PDAM now. These amendments enable a range of new applications including semantic linking, library management, metadata association and content usage tracking.

Reconfigurable Video Coding (RVC) framework has reached the status of Final Draft International Standard (FDIS). RVC has two parts ISO/IEC 23001-4 (Codec Configuration Description) and 23002-4 (Video Tool Library). RVC provides the means to describe a generic video decoder and the corresponding bitstream syntax. It has already been shown that the description can be easily mapped onto various hardware and software platforms. RVC could, for example, be used to update existing standard devices by new, downloadable functional units, or to support multiple standards with common building blocks. Additionally the RVC framework is flexible enough to support decoders employing proprietary tools if toolboxes follow its basic design rules.

MPEG-M, the MPEG eXtensible Middleware (MXM) technology specification has been developed into the status of Committee Draft (CD). This standard is subdivided into three parts: MXM Architecture and Technologies, MXM APIs, and MXM Conformance and Reference Software. MXM specifies the means to access individual MPEG tools through standardized APIs. It is expected that MXM will help the creation of a global market of MXM applications that can run on devices supporting also the MXM APIs in addition to the MPEG technologies.

MPEG-V is a new standard initiative aimed at providing a global framework and associated data representations to enable the interoperability between virtual worlds (e.g. a digital content provider of a virtual world, a game with the exchange of real currency, or a simulator) with the real world (sensors, actuators, robotics, travel, real estate, or other physical systems).

MPEG-U (rich media user interface) is now at the Committee Draft stage. MPEG-U standardizes widget packaging, delivery, representation and communication formats. MPEG-U adopts and extends the W3C widget representation to provide a complete framework that can be used also in a non-Web based environment without a browser. Additionally, this standard enables communication among widgets on the same device or different devices, and other applications to better support connected environments.

WG 11 made progress in defining a standard for Media Value Chain Ontology. It provides a representation of a core model of a knowledge domain for which a detailed description allows for consistent and systematic specialization. The representation of ontology can be formalized for computer processing in the form of a listing of the relevant classes, object properties, data-type properties, and class individuals.

2.1 MARKET REQUIREMENTS

From WG 1, JPEG has been widely used in digital photography. Millions of JPEG-coded images are shared every day over the Internet. JPEG 2000 has been adopted by Digital Cinema Initiatives for distribution of digital movies to theatres. The Digital Cinema (DC) ad hoc group within WG 1 is developing a digital movie archive format by creating profiles via amendments to JPEG 2000 Part 1 and to Part 3, Motion JPEG 2000. The broadcast ad hoc group is also creating profiles for JPEG 2000 use in broadcast production applications such as camera to truck and truck to studio links. JPEG XR offers the potential to give cost and compression benefits to users producing high-quality, high dynamic-range images. The manufacturers of camera and printer peripherals have shown their interest in JPEG XR.

In JPSearch (24800) the standard addresses the limitations of current search engines in image search. The limitations are partly due to lack of standardization in the following areas: ability to reuse metadata (lack of interoperability of metadata), a common query format and search semantics for image search and a common format for handling context in image search. Other aspects that need to be standardized include how metadata can be created, modified and stored, and also how image collections can have metadata different from that of a single image. JPSearch aims to address the above needs and requirements.

From WG 11, MPEG-4 Part 10 Advanced Video Coding (AVC) has been widely used for digital broadcasting systems, visual communication equipment, IPTV servers and terminals, optical video discs, surveillance systems, digital video recorders, portable video players and so on. Scalable Video Coding (SVC), an extension to AVC is used for teleconferencing system with robust features. Multi-view Video Coding (MVC), another extension to AVC is eagerly considered by video disc community for stereoscopic applications.

MP3 (MPEG-1 audio layer3), Advanced Audio Coding (AAC), HE-AAC have been used for digital broadcasting, mobile handsets and various audio players. Audio Lossless Coding (ALS) is used for high quality applications.

MPEG-7 is expected to provide an excellent solution to search, detection and retrieval over large scale databases and resources on the web. Several examples can be observed. Lightweight Application Scene Representation (LAsER) has been adopted and used in various services for mobile phones. LAsER and other MPEG standards such as Rights Expression Language and MPEG Multimedia Middleware are considered for advanced features of IPTV terminals with ITU-T. WG 11 defined a new interactive Binary Format for Scenes (BIFS) profile. This new profile is expected to provide the capability of presenting supplemental information like EPG to digital radio or mobile television.

In the market, we see emerging trends of high-quality advancement as seen in camera and display with high resolution beyond HDTV, wide color space, high dynamic range and high frame rate capabilities. New type of displays such as Organic Light Emitting Diode (OLED) seems promising for its brightness, thinness, high pixel density and low power consumption. Large-volume memory and high-speed transmission line also support the storage and transport of high-quality materials. HVC should provide further efficient coding and decoding performances for these materials. Another trend is high functionality with interactive and bidirectional features. More dynamic, manipulatable and annotated media representation supported by metadata is expected. SC 29 should work to fulfill such requirements.

2.2 ACHIEVEMENTS

See SC 29 Web site (<http://www.itscj.ipsj.or.jp/sc29/>).

2.3 RESOURCES

Sufficient resources are available for JPEG, JBIG-2, JPEG 2000, JPSearch, AIC, JPEG XR, MPEG-2, MPEG-4, MPEG-7, MPEG-21, MPEG-A to MPEG-E, MPEG-M, MPEG-V and MPEG-U (rich media user interface) projects.

2.4 ENVIRONMENTAL ISSUES

SC 29 has been working on standardization of efficient representation and control of multimedia information. The standards should provide the most cost-effective, energy-effective and quality-preserving ways to handle that information. SC 29 therefore believes that the standards can contribute to environmental protection by saving storage capacity, transmission bandwidth and so on. SC 29 will encourage its WG members to choose tools and schemes for their work, which have less negative impact on environments, as far as the consensus of the members is reached.

2.5 PARTICIPATION METRICS

Meeting: <http://www.itscj.ipsj.or.jp/sc29/29w2meet.htm>

Ballot: <http://www.itscj.ipsj.or.jp/sc29/29w2ballot.pdf>

3.0 FOCUS OF NEXT WORK PERIOD

WG 1 expects progress in study of raw file compression employing JPEG XR. This functionality should offer even higher compression benefits to users producing high-quality, high dynamic-range images in digital photography. Collaboration with camera manufacturers and other stakeholders is expected.

JPSearch work on Social Tagging as part of the JPSearch metadata support is ongoing. With this functionality with Social Tagging, people can add their own metadata such as key words or text description to existing images and share them with the associated metadata.

The AIC ad hoc group within WG 1 defined subjective tests for JPEG XR and designed test criteria for evaluation of several objective metrics and expects to develop objective metrics for general testing of compression algorithms.

WG 11 expects active work on HVC standardization. A Call for Proposal for new compression technology is soon to be issued. This work is expected to be carried out jointly with ITU-T/SG 16 as AVC has been done so. The next video coding technology should provide sufficient compression with high quality and reasonable complexity for higher resolution video beyond HDTV or HDTV-class video for mobile devices.

Another promising work on Unified speech and audio coding is expected to make good progress in the next period supported by collaborative development of reference software source codes.

Many parts of MPEG-A such as musical slide show application formats, stereoscopic video application format and interactive music application format are scheduled to reach Final Draft International Standard level in the next period.

Further progresses are expected within WG 11 for FTV/3DV, MPEG-M, MPEG-V and MVCO.

In summary, SC 29 works on coding of rich media contents with the set of tools to support the production, circulation, access and consumption of such contents. Further work on coding is under way to continue to serve industry needs as application requirements move forward into supporting ever higher levels of image/video resolution, fidelity and quality.

3.1 DELIVERABLES

See SC 29 Web site (<http://www.itscj.ipsj.or.jp/sc29/>).

3.2 STRATEGIES

SC 29 will continue to provide information on the progress of standardization work to the public through SC's and WGs' web sites below as well as press releases or awareness events in order for attention to be paid to the area of the multimedia information technology.

SC 29: <http://www.itscj.ipsj.or.jp/sc29/>

SC 29/ WG 1: <http://www.jpeg.org/>

SC 29/WG 11: <http://www.chiariglione.org/mpeg/>

SC 29/WG 11 (for meeting): <http://wg11.sc29.org/>

SC 29 will continue the practice of making their standards containing conformance testing bitstreams and reference software accessible as the freely available standards from ISO/IEC. SC 29 is pleased to hear the requirements from the industry, so that appropriate WG under SC 29 would work to deliver the standards which meet the requirements.

3.2.1 RISKS

SC 29 identifies three possible risks:

- Lack of participants: Two working groups currently have enough resources (WG 1: 50, WG 11: 300 people), however SC 29 should constantly monitor attendance of WGs.
- Management of documents: The WGs depend on having good electronic document repositories and systems and the maintenance of these is important for the efficient working of the WGs. Currently such repositories and systems are operated and maintained by the WG members and SC 29 Secretariat.
- Risk associated with the uncertain presence of applicable patents: Parties attempting to implement the standards may find that patents owned by parties that have not participated in the development process are not available on RAND terms. They may also find that the licensing conditions of the standards that they expected to use in their products are unsuitable to their needs and hence they may feel to be "discriminated" in the use of the standards. These risks is outside the control of SC 29, however SC 29 and WGs continue to encourage their members to submit patent statements expecting that it helps to clarify the potential licensors of applicable patents and to increase the opportunities of licensing under reasonable conditions.

3.2.2 OPPORTUNITIES

Coding of audio, picture, multimedia and hypermedia information provides the most efficient way to represent, preserve and convey entertainment, art, news, education and so on with high appeal. The coding technologies have a significant role in any service employing media information. SC 29 has been working to standardize coded representation of multimedia and their control function, interface with other elements, middleware for general/specific applications. So far many international standards from SC 29 have been adopted and used for multimedia packaging, broadcasting and communication, and those standards have been contributing to the industry. There are still emerging needs for digital media representation with higher resolutions, higher sampling density, higher dynamic range and higher dimensions such as stereoscopic and three-dimensional visions. Regarding these emerging media, the industry requires further efficiency in compression and access. Thus, we have a lot of opportunities to fulfill such requirements.

3.3 WORK PROGRAMME PRIORITIES

All items are equally important.

3.3.1 Archival Policy

SC 29 complies with subclause 4.6 "Responsibility For the Archiving of Documents" and Annex H, the JTC 1 Directives.