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BUSINESS PLAN FOR JTC 1/SC 29

PERIOD COVERED: 2007/10-2008/10

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

1.0 MANAGEMENT SUMMARY

SC 29 has been working under the title:

Coding of Audio, Picture, Multimedia and Hypermedia Information.

SC 29 has two active Working Groups below and Advisor Group on Management.

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: 21st SC 29 Plenary meeting (12)
- WG 1: 43rd meeting (61), 44th meeting (58), 45th meeting (49)
- WG 11: 82nd meeting (355), 83rd meeting (267), 84th meeting (219), 85th meeting (272)

SC 29 had more than 90 Ballots* in this period and had sufficient number of participation of P-members.

95 International Standards* developed by SC 29 were published in this period.

The operation in this period was good and supported by significantly active participation of the members. The standards developed by SC 29 have been deployed in many applications such as digital broadcasting, communication, recorder, viewer/player and packaged content. SC 29 is continuing its work on the development of standards to maximize the possibilities of digital media information.

(* at the time of October 8, 2008)

1. 1 CHAIRMAN'S REMARKS

In this period, the market of multimedia industry has been growing such as digital broadcasting receivers, 3G mobile phones equipped with multimedia functionalities, digital still cameras and camcorders. Moreover new services based on streaming technologies over IP network have been emerging. The standards developed by SC 29 have been the core technology of the industry. With regard to SC 29 itself, there has been much progress in the work of WG 1 and WG 11. Major achievements are described below. More detailed description and other noteworthy items are described in 2.0 PERIOD REVIEW.

One of the results from WG 1, JPSearch (ISO/IEC 24800, Still Image Search) Part 1 Technical Report has been officially published. It covers the Framework and System Components of the standard. Committee Drafts and Working Drafts were made regarding other parts of JPSearch.

Following the launch of Digital Cinema employing JPEG 2000, the Digital Cinema ad hoc group has been working on archival profiles for Digital Cinema movies. These profiles will allow both long-term storage of content using lossless compression and fast scalable access to archives with lossy compression. Another ad hoc group has initiated an effort to develop specifications for broadcast backhaul applications, covering the post-production and taped-delayed needs of the broadcast industry.

JPEG XR image coding system is a new project. It aims to leverage the rich array of tools developed in and around JPEG XR image coding. The specification of the image coding is Part 2 of the standard. It aims to bring JPEG-standardized high dynamic range imaging and compression to a new generation of digital cameras. JPEG XR Part 2 is now at the stage of Final Committee Draft. Additional work including a Box-based File Format that will enable interoperability between JPEG XR and components of the JPEG 2000 family of imaging systems standards has been initiated.

WG 1 has issued a request for a new work item to standardize the next generation of JPEG image compression called AIC. WG 1 has also issued a call for proposal on evaluation methodologies and compression technologies.

One of the results from WG 11 is the Final Draft Amendment of MVC (Multiview Video Coding). MVC enables new applications such as high-quality stereo and 3D video, by exploiting the similarities between

multiple-camera video captures of a scene. MVC achieves a reduction in bit rate of approximately 20% on average, when compared to the more traditional method of encoding views from each camera separately. MVC is backwards compatible in the sense that one view can be decoded from a part of the MVC stream by using an existing AVC (Advanced Video Coding) High Profile decoder, which could then be output on a conventional monoscopic display. An MVC decoder would generate multiple output views from the full stream and forward them to a stereoscopic or multiscopic display. MVC has been developed by JVT (joint Video Team) which is a joint group with ITU-T.

FTV (Free viewpoinT Video) is a new and very broad type of audio-visual system that allows each user to view the real 3D space from different user viewpoints. In FTV, a user can set the viewpoint to an arbitrary location and direction, which can be static, change abruptly, or vary continuously within certain limits determined by the particular application. FTV can potentially offer high quality, real or virtual, viewpoint control with applications ranging from hand-held 3-D television to navigation through dynamic virtual worlds. The first phase of standardization for FTV is expected to be 3DV (3D Video), which is video for 3D displays.

Another result from WG 11 is the validation of SVC (Scalable Video Coding). The results of verification tests indicate that for an increase of less than or equal to 10% of bit rate overhead for equivalent quality, scalability can be achieved for various types of applications. SVC is an extension to AVC and was developed by JVT as well as MVC.

WG 11 has additionally defined new levels (higher resolutions) to MPEG-2 video and MPEG-4 visual coding standards based on the requests from industry.

WG 11 has issued the verification test report for AAC-ELD (Advanced Audio Coding - Enhanced Low Delay) standard which has been published. This technology supports high-quality yet low delay coding of speech and music signals. Compressed signals have, with full audio bandwidth (e.g. 20 kHz) and encoding and decoding entails, no more than 32 ms of latency. The verification test report shows that the AAC-ELD provides quality and compression performance that is superior to all competing technologies. Wide application areas are expected such as voice over IP, broadcasting equipment for live streaming, and super wideband mobile and fixed video and audio conferencing.

WG 1 and WG 11 have completed a new 3rd edition of the ISO Base Media File Format. This specification underlies the MP4 file format, Motion JPEG 2000, 3GPP, 3GPP2 and other file format standards and has provided an important underlying layer of cohesion in international multimedia.

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

We have many liaisons with other organizations. This means that we can meet the requirements and expectations of the standards users from the other communities better through regular communication and the exchange of documents. We have 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 excellent collaboration with ITU-T, which can be seen in the activities of Joint Photographic Experts Group (JPEG) under WG 1 and of Joint Video Team (JVT) under WG 11. SC 29 will maintain the current relationship with ITU-T as far as SC 29 can find the mutual benefits of such collaboration.

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

2.0 PERIOD REVIEW

WG 1 ad hoc group on digital cinema has been working on a set of Amendments to JPEG 2000 related to digital cinema. An Amendment on extended profiles for digital cinema applications has reached PDAM status. Another Amendment on guidelines for digital cinema applications is at the level of Working Draft.

WG1 has completed the work on JPEG 2000 Part 10, known as JP3D. JP3D is an extension of JPEG 2000 to 3D images such as Computer Tomography scans or scientific simulations. JPEG 2000 Part 11, known as JPWL has reached IS status. JPWL standardizes tools and methods to achieve the efficient transmission of JPEG 2000 images over an error-prone wireless system. JPEG 2000 Part 13, entry level JPEG 200 encoder, was published.

Amendment to JPEG 2000 Part 6, known as JPM, has been published. It standardizes the file format for document images incorporating multiple layered compression formats and it covers a hidden text XML data format to store OCR results in image files.

WG11 collected the responses to the call for proposals on Unified Speech and Audio Coding. The call is for technology that permits coding of signals having an arbitrary mix of speech and audio content, and that performs comparable to or better than the best coding technology that might be tailored specifically to coding of either speech or general audio content. The bitrates of greatest interest are 16 kb/s through 24 kb/s. Through the evaluation of the submissions, the Reference Model has been defined. It has performances better than either of two state-of-the-art codecs (for speech and audio) at every operating point tested.

WG 11 has completed the standardization of “MPEG Query Format”. Essentially, the MPEG Query Format (MPQF) defines an XML-based query language for the format of queries and replies exchanged between clients and repositories in a distributed multimedia search and retrieval environment. Extended functionalities for service discovery, selection and capability description are also key features of this standard.

As a new amendment to the MPEG-7 Visual standard, a call for proposal on Video Signature has been issued. The purpose of this standard is to describe video data by very compact, unique and quickly searchable signature description. It is expected to support the finding of identical video content, even when a copy has been modified, for example, re-encoding, and change of color or size, editing operations and so on.

One part of MPEG-A, media streaming application format protocol has been published. This standard is aimed at distribution of governed media resources, metadata and related information over streaming channels, such as IPTV and digital broadcasting, to receiver devices, in which the received content can be played in real time or stored in a file for possible further secure distribution.

WG 11 has completed the work on IDCT standardization as a part of MPEG-C project. The 8x8 inverse discrete transform (IDCT) is a fundamental building block of video and still-image coding technology, whose implementation is required by the MPEG-1, MPEG-2 and MPEG-4 video coding standards, the JPEG still-image coding standard and the ITU-T video coding recommendations H.261 and H.263. WG 11 has developed the standards for test metrics for IDCT precision and a single unified standard for a specific conforming fixed-point approximation of the ideal integer-output 8x8 IDCT. This design performs exceptionally well in objective accuracy, linearity, dynamic range, and drift phenomenon tests while minimizing computational resources.

RVC (reconfigurable video coding) has reached FCD level. It enables one to configure a video decoder by assembling component "toolkit" elements. From the development of such a toolkit and associated configuration descriptions, new combinations of video coding capabilities will become possible. RVC technology offers a unified framework approach that can be undertaken for support of a broad variety of video coding features in products, such as simultaneous support of multiple MPEG standards and other designs as well.

WG 11 has issued calls for proposals on MXM (MPEG eXtensible Middleware), ROSE (Representation of sensory effects), MPEG-V (Information exchange with virtual worlds) and on Media Value Chain Ontology (MVCO). MXM is aimed at enabling the easy design and implementation of media-handling value chains. Specifically, the targeted value chains are those whose devices interoperate either because they are all

based on the same set of technologies (especially MPEG technologies) or are accessible from the MXM middleware. ROSE standardization effort endeavors to augment the experiences of audio and video users. By representing sensory effects for use by other devices such as fog generators for the creation of fog, or strobe lights for the flash of lightening, the ROSE standard will lay the foundation for users to experience more realistic stimuli from otherwise ordinary audiovisual content. MPEG-V project will standardize a global framework, with associated interface and intermediate format definitions, to enable the interoperability both between virtual world applications and between the real world and virtual world applications. Media Value Chain Ontology is another new work on focused on digital rights management. The new ontology will initially focus on the areas of Intellectual Property, Authorization Models, User Role Description, Context Description, and Social Tagging.

WG 11 has initiated exploratory work on Rich Media UI Framework. Rich Media UI Framework is a new project, which aims at organizing the powerful user interface architecture of MPEG technologies specifically designed for mobile phone and consumer electronics devices. The Framework will be composed of two major entities, widget and container, and the interfaces to create and consume the widget. Widget will be the entity consisting of the rich media UI and the logic defining its behavior and the container will provide the environment widget is running on.

2.1 MARKET REQUIREMENTS

JPEG 2000 has been adopted by Digital Cinema Initiatives for future distribution of digital movies to theatres, including 3D movies. The rollout of this solution can be seen at selected theaters. The International Federation of Film Archive (FIAF) is considering JPEG 2000 as a future standard for movie archives. JPEG2000 has been used for surveillance, medical imaging, photo library and other applications.

MPEG-4 Part 2 Simple Visual Profile now has new level definitions supporting higher resolutions upon the requests from the industry. The new levels are being used in handy camcorders. MPEG-4 Part 10 AVC (Advanced Video Coding) has been used for emerging next generation video discs, digital television broadcasting systems, visual communication equipment, IPTV, digital video recorders, portable video players and so on. MP3 (MPEG-1 audio layer3), AAC (Advanced Audio Coding), HE-AAC have been used for digital broadcasting, mobile handsets and various audio players. ALS (Audio Lossless Coding) is a candidate of coding scheme for future broadcasting. ISO Base Media File Format or MP4 (MPEG-4 file format) is widely used in many PCs, recorders and players including 3G mobile phones. LASeR (Lightweight Application Scene Representation) has been adopted and used in various services for mobile phones. The set of standardized metadata from MPEG-7 is used for indexing and summarization of multimedia content and also used as the tool set for security analytics of video images. Some parts of MPEG-21 are used in deployed systems. Some of MPEG-A application formats are implemented in products domain. Binary MPEG format for XML from MPEG-B has been used in the commercial services such as Mobile TV over DVB-H and IPTV.

MPEG-E multimedia middleware as well as MPEG media coding standards are considered by the IPTV Global Standards Initiative within ITU-T.

2.2 ACHIEVEMENTS

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

2.3 RESOURCES

Sufficient resources are available for JPEG 2000, JPSearch, AIC, JPEG XR, MPEG-2, MPEG-4, MPEG-7, MPEG-21, MPEG-A to MPEG-D and MPEG-V projects.

2.4 ENVIRONMENTAL ISSUES

SC 29 has been working on standardization of efficient representation and control of multimedia information with compression. 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 NEXT WORK PERIOD

In WG 1, the digital cinema ad hoc group has been working on the archival of motion pictures and related contents.

JPSearch Parts 2 and 5 are currently at the Working Draft level while Parts 3 and 4 are at the Committee Draft level. Part 2 is focused on schema and ontology registration and identifications. Part 3 standardizes JPSearch query format and the group works closely with MPEG query format. Part 4 standardizes on metadata embedded in image data file formats (JPEG and JPEG 2000). Part 5 standardizes the data interchange format between image repositories.

JPEG XR image coding system Part1 system architecture and Part 2 JPEG XR image coding specification are expected to reach FDIS level in the next period. Part 3 Motion JPEG XR has been just initiated. The work on both conformance testing and reference software for JPEG XR is ongoing.

The work on AIC (Advanced Image Coding) will be continued after collecting the responses to the call for proposals.

In WG 11, future directions of audio and video coding are being discussed. Through the internal discussion and hearing from the industry, WG 11 will focus on the most promising directions. Current observation of both technology and market trends tells that higher levels of video applications need further compression and optimization. In fact, WG 11 has additionally defined new levels to the existing video coding standards in this period. The industry needs even greater capabilities for the most demanding applications that require high fidelity and high picture resolutions. One can purchase palm-size HDTV camcorders and still cameras with more than 10 million pixels as well as capturing capabilities in rapid succession. And one can see some display sets already support 4K samples in horizontal direction (twice as HDTV) and some cameras which claim capturing capabilities of 4K video. There are continuing studies of ultra high definition television with even higher (8K) resolution. 4K video is a candidate for digital broadcasting after analog broadcasting will be ceased. Further quality-preserving-compression is needed for these high-level applications, which could not be fulfilled by the straightforward extension of the existing standards. WG 11 should work on this issue.

Another promising work on Unified speech and audio coding is ongoing. The Working Draft text and reference software source codes will be available in early time of the next period.

Many parts of MPEG-A such as professional archival application formats, video surveillance application format and stereoscopic video application format are scheduled to reach Amendment level in the next period.

RVC (Reconfigurable Video Coding), which consists of MPEG-B Part 4 (Codec Configuration Representation) and MPEG-C Part 4 (Video tool library), is going to be finalized. Extended work to define new coding tools is expected.

Further progresses are expected for FTV/3DV, MXM (MPEG eXtensible Middleware), ROSE (Representation of Sensory Effect), MPEG-V (Information exchange with virtual worlds), MVCO (Media Value Chain Ontology) and Rich Media UI Framework.

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 multimedia industry. Those requirements will be forwarded to appropriate WGs and will be studied if there will be need to work on them.

3.2.1 RISKS

SC 29 identifies three possible risks and one concern namely:

- 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. Reduction of 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.
- SC 29 requested that the JTC 1 Special Working Group on JTC 1 Directives (SWG-D) considers reducing the 5 month ISO DIS ballot period to 4 months at the last JTC 1 Plenary meeting [JTC 1 N8678], since the 5 month period would impede the process of SC 29's development of standards and have a negative impact on their competitiveness and quality. SWG-D has decided to submit a contribution on the length of the DIS ballot period, which contains SC 29's contribution, to the IEC SMB Ad Hoc Group 25 for consideration at its meeting held on 2008-05-06. SC 29 is concerned with the status of its request.

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. 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.