

Section Meetings

Hong Kong— March 2008

The SMPTE Hong Kong Section and the Hong Kong Institute of Vocational Education (IVE) organized the third in a series of training courses, which was held on March 1. The seminar, conducted by Oscar Au, director of the Multimedia Technology Research Centre at the Hong Kong University of Science and Technology (HKUST) and Huang Tiejun, associate professor and vice director of the Institute of Digital Media, Peking

University, focused on standards for video and audio coding technologies.

Au covered the motive of source coding and compression and explained various coding schemes such as MPEG-1/2/4, H.261, JPEG 2000, and audio coding. Huang discussed the evolution of the licensing policy of the MPEG standard, the development of the AVS national standard of China, and also the implementation and applications of AVS.

Approximately 60 professionals from the motion picture and television in-



(L-R) Pete Putman, Bob Ross, and Kimberly Maki presented at the March Philadelphia Section meeting.

dustries, academics, and members of government institutions attended the event. Many expressed interest in attending similar courses organized by SMPTE in the near future.—Tony Ngai, Section Chair

SECTION MEETINGS

Philadelphia— March 2008

The Section meeting titled “One Year to Go... (to the shutdown of analog broadcast)” was held on March 11 at the New Jersey Network facility in Trenton, with approximately 50 members and guests in attendance. This facility, along with a studio in Newark, provides the programming for New Jersey’s four National Television System Committee (NTSC) and four Advanced Television Systems Committee (ATSC) transmitters.

Bob Ross, senior vice president, East Coast Operations, CBS, presented an update from a paper he had previously written and listed the concerns broadcasters face with regard to the shutdown of NTSC in 2009. He covered transmitter, microwave, converters, PSIP, V Chip, captioning, and other topics.

Pete Putman, Roam Consulting, demonstrated several of the set-top box converters now available to consumers and spoke about the government’s \$40 coupon program. He also expounded on the need for broadcasters to effectively utilize their entire allocation of bandwidth. Many attendees were concerned as to whether the February 2009 deadline will be met and if consumer education is finally taking hold.

The program also featured a special presentation from SMPTE Executive Director Kimberly Maki, who dis-

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The introduction of HDTV and wide screen 16:9 aspect ratio images into the video world has brought a number of challenges for production, distribution, and displays. This applies particularly where 4:3 and 16:9 formats and images have to coexist in a broadcast facility or within a program. This SMPTE PDA Now session will cover Active Format Description (AFD) and how it may be used to manage 4:3 and 16:9 images in the broadcast studio environment and to optimize images for display on consumer televisions. It also covers some recommended techniques for downconversion of HD signals for distribution to NTSC receivers via cable and satellite. The SMPTE, ATSC and CEA standards relating to AFD and Bar Data will be explained, and experience gained in practical implementation in a broadcast facility will be shared.

Guest speakers: Graham Jones, National Association of Broadcasters
Larry Thaler, VP Distribution, NBC Universal

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cussed the history and current activities of the Society. She introduced the new member recruitment program, which includes rewards for members and Sections who recruit the most members.—David Horowitz, Past Governor, Eastern Region

Rochester— March 2008

The meeting on March 20, which was held at St. John Fisher College in Rochester, NY, included a media technology demonstration and facility tour. Media specialists Nathan Sunseri and Matthew Miller demonstrated Extron's switching equipment, IP link products, and its web-based Global Viewer control software, as well as network-controllable data projectors from Epson. The media tour included the newly completed Wegmans School of Nursing building, recently refurbished media lab (Mac), and TV studio.



Edward E. Stratmann of George Eastman House introduces the screening of historical films of Kodak and Rochester.

The core of the media technology at the college revolves around the Extron's IP/web-based control system. The entire campus is outfitted with IP-controllable Epson data projectors; using the Global Viewer software, media specialists can see the status of each projector in each room; they can program the on/off time, shutdown the projector, and perform a diagnostic test from any computer on or off campus. If there is a problem with a projector, specialists are often notified via the alert notification feature, by e-mail or cellphone, before the user even notices.

Many attendees were interested in the Global Viewer software and its capabilities. Attendees also questioned how a typical instructor conducts classes using the available media technology, including use of streaming video, digital audio, PowerPoint, and document camera, as well as specialty software/hardware used by the nursing faculty.—Barry Chow, Section Manager

Rochester— April 2008

A record attendance of over 50 people were present at a screening of historical 35mm and 16mm films of Eastman Kodak Co. and the city of Rochester, in the Curtis Theatre at the George Eastman House (GEH). Edward E. Stratmann, a senior preservation officer at GEH and a manager of the Rochester Section, selected films from the many that were preserved by his department. The titles included, *The Dedication of the Kodak Research Laboratory* (1912), *Lindbergh in Rochester* (1927), *Rochester Baseball Team* (1923), *Roches-*

ter-Cobourg Ferry (ca. 1920), *Marcus Loew & Stars in Cleveland and Rochester* (ca. 1925), *Rochester War Industries* (ca. 1941), *USS Rochester Launched at Quincy, Mass.* (1945), *The Kodak Park Superintendents Club* (1949), and *Community War Memorial Drive—Rochester* (1950). This event has become an annual tradition in the Rochester Section.—Alan Masson, Section Chair

Washington, D.C.— January 2008

The January meeting was held at the studios of WETA-26, Washington's PBS station, home of "The Newshour with Jim Lehrer," and other television programs. The station recently completed a major upgrade to HD with the help of integrator, Communications Engineering, Inc. (CEI).

Chris Lane, the station's vice president of engineering, began with an overview of the transition requirements and gave an account of the difficulties encountered in keeping the nightly live show on the air during the upgrade in the 40-year-old building. The unexpected discovery of a critical roof water drain in a wall, and the need to run HVAC ducts through a second-floor office, added to the installation challenges. In addition, some of the equipment being replaced was many decades old and the new gear required extra adaptation time for operators.

CEI engineers Joe Strobel and Tom Hackett then described the physical process of building the new HD control room and shuffling equipment within a central machine room that was already well filled. Floorplans and a 3-D archi-



Chris Lane describes WETA's long-term upgrade strategy.

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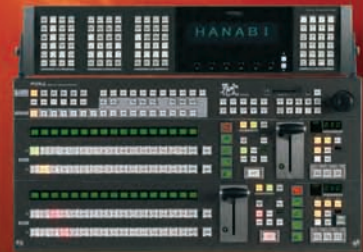
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tectural “walk-through” were shown and participants were able to tour the new control room and the rest of the facility. Extensive pre-planning by WETA and CEI, as well as the ability to have production staff practice with the new equipment by “mirroring” the live production, resulted in a transition with no disruptions to the on-air experience.—*Eric Wenocur, Section Manager/Program Chair*

Washington, D.C.— February 2008

In February, approximately 20 members and guests gathered at Henninger Media Services to be edified by Thomson senior account executive and SMPTE D.C. Section Manager Rudy Niznansky on the benefits of MPEG-4 AVC and the enhancements Thomson is bringing to its implementation.

Uncompressed motion images require huge files and need distribution bit rates much too high for acceptably priced consumer equipment and media. Therefore, it is necessary to compress files and reduce bit rates to get the programs to homes.

Enter the Moving Picture Experts Group (MPEG) an ISO/IEC working group that develops open international families of video and audio standards, including those for codecs (enCOder/DECOder), for the delivery of multimedia. MPEG continues to have a profound impact on moving-picture content distribution via satellite, over-the-air (OTA) terrestrial broadcast, physical media, and cable/optical-fiber/internet

streaming. There are currently five categories: MPEG-1—the video CD format; MPEG-2—adopted for OTA broadcast, cable, and DVD; (there is no MPEG-3); MPEG-4—a more efficient algorithm for multimedia applications; MPEG-7—focusing on multimedia content metadata; and MPEG-21—concentrating on interactivity.

When DVD and OTA DTV standards and procedures were being developed, the most advanced video codec that was adequately developed, standardized, and implemented was MPEG-2, leading to its adoption.

The rapid growth in demand from suppliers and consumers for SD and HD programs to be wired/wirelessly downloaded via the internet to homes and mobile devices, and transferred across home networks, has challenged the bandwidth of distribution paths, driving the need for more efficient video compression codecs. As Niznansky pointed out, “The formula for the digital age: Bits = \$\$\$. No bits = No Bucks.”

This has led to the MPEG-4 family of standards, designed for multimedia and IP streaming applications. It is generally acknowledged to be superior to MPEG-2. MPEG-4 compression yields file sizes and bit rates less than half those resulting from MPEG-2 encoding of the same sources for a given image quality; from another perspective, MPEG-4 delivers much higher image quality than MPEG-2 for the same file size and bit rate. With other parameters held constant, MPEG-4 “delivers content faster, cheaper, and/or of higher quality” than MPEG-2. It is not atypical for a program encoded in MPEG-4 to offer the same, or sometimes higher, image

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quality at less than half the bit rate of the same program encoded in MPEG-2. Direct-broadcast satellite providers have been migrating from MPEG-2 to MPEG-4 over the past several years. The movie mode on some consumer camcorders uses MPEG-4, which is one of the codecs supported by the Blu-ray and the HD DVD formats. Everyone wants more channels of the same video quality in the same bandwidth.

Niznansky explained that the MPEG-4 family tool kit includes standards for AVC (ITU H.264) video compression, 2-D/3-D graphics, Advanced Audio Codec (AAC), Java script interactivity, XMT authoring, and the *.mp4 transport.

MPEG-4 is object-based compression (the image is broken down into various parts, or objects), which offer higher compression efficiency to objects that allow it. The composite image is created in the receiver, which puts the objects back together. This is in contrast to the MPEG-2 image-frame-based concept, in which the entire image is compressed as a single entity. MPEG-4's object-oriented nature facilitates easier switching between broadcast and IP distribution of compressed content.

All the MPEG video algorithms result in lossy compression—data that (hopefully) is not visible is discarded, never to be recovered. MPEG algorithms are also asymmetric—the encoder is much more complex than the decoder; encoders (of which there will be relatively few) are expensive; decoders (in every playback device) are relatively inexpensive. In addition, the standards are playback standards, implemented in the decoder. Encoders can incorporate any algorithm, any

philosophy, and any technology, as long as the resultant file/bit stream can be properly decoded by an MPEG-compliant decoder. “Speed, quality, tricks, and cost are up to the encoder manufacturer.”

MPEG video algorithms are scalable—any MPEG algorithm can deliver various levels of image quality depending on how aggressively it's applied. Any program in 1080i30 or 720p60 can be called HD, even if the number of pixels per row is reduced or the image quality is execrable; it's only the number of rows of pixels that defines HD, according to the Consumer Electronics Association.

The viewer will see less objectionable image degradation, as the decoder is bit-starved. With MPEG-2, a bit-starved decoder will quickly be revealed in macroblocking, whereas with MPEG-4 a decoder under the same condition will first deliver a softened picture, and only when the bit rate is reduced much further will blocking occur.

Encoder implementations vary widely. For example, Thomson's professional-grade ASIC-based (application-specific integrated circuit) encoders yield about 30% lower bit rates for the same source program as their consumer-grade ASIC-based encoders. This is because some of the MPEG-4 AVC encoding tools that Thomson has developed are reserved for professional encoders, which cost more—reasonable for a device that delivers higher performance. It requires Thomson's entire AVC tool set to deliver the maximum MPEG-4 rate advantage over MPEG-2. Implementations also affect latency, a factor in near-realtime processing.



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MPEG-4's efficiency also means that with less aggressive compression, while still yielding a lower bit rate than MPEG-2, it can more easily retain satisfactory image quality while being concatenated through multiple encode-decode cycles and transcoded from MPEG-4 to MPEG-2 encoding. It helps that because MPEG-4 has MPEG-2 in its heritage, the MPEG-2 tool set is a subset of the MPEG-4 tool set, making transcoding easier.

SMPTE VC-1, based on Microsoft's Windows Media video codec, is a competitive video compression algorithm standard that is considered approximately equal in efficiency to MPEG-4, with performance differences dependent on image content and the degree of data rate reduction desired. VC-1 and MPEG-4 are each subject to their separate royalty and licensing requirements.

For further details, refer to the MPEG Industry Forum's 2005 white paper "Understanding MPEG-4: Technologies, Advantages, and Markets" (www.MPEGIF.org). Note that www.MPEG.org is not an official MPEG organization site.—David Weinberg, Section Manager

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