

Atlanta November 2016

Almost 60 industry professionals gathered on 14 November for a meeting at Turner Broadcasting on “The Move from Hardware to Software and the Transition to IP.” The program was a panel discussion, presented by Rick Ackermans, a SMPTE Fellow, who has been associated with the SMPTE Standards Committees for many years; Brad Gilmer, executive director for the Video Services Forum (VSF) and executive director for the Advanced Media Workflow Association (AMWA), and Luann Linnebur, who heads the Broadcast Development Group for Neveon.

Gilmer began by giving some history of the Joint Taskforce for Networked Media (JT-NM). A few years ago, the JT-NM began at Turner with 2 1/2 days of meetings to discuss some of the limitations of the proposed systems to date. What has developed is a roadmap for the evolution of video over IP. It begins with ST 2022-6, which defines mapping a serial digital interface (SDI) signal into an Internet Protocol (IP) stream. While useful as a transport, the ability to do audio breakaway and other seemingly simple tasks is fairly involved. The second stage involves transporting individual elements in a way that makes them more accessible. This is defined by ST 2110. The third stage involves auto provisioning. This enables connected devices to discover each other. The final stage is virtualization.

Ackermans listed a number of advantages of using IP to transport audio and video, which included: (1) COTS—Commercial, off-the-shelf



Brad Gilmer gives a brief history of JT-NM at the Atlanta Section meeting.

hardware offers the advantage of lower prices for hardware. (2) Multiple signals per port are possible. (3) Bidirectional signals on the same cable. (4) Regular increases in transport speed due to technology development. (5) Not format specific. (6) Not connector or cable specific—very adaptable to different transport mediums. (7) Scalable. (8) Extremely flexible. (9) No limits on the type of data. (10) Enables virtualized hardware.

Historically, the first successful, non-proprietary attempt to transport SDI over IP was ST 2022-6. It was designed to be a long-haul transport for audio and video; it was not designed to be a production standard. For production use, a much more useful method is to transport elementary streams. The first attempts were proprietary (NMI and ASPEN). At that point, the VSF entered the picture with TR-03 and TR-04. In November 2015, they were submitted to SMPTE as a candidate for standardization. ST 2110 is the result and it contains the following sections:

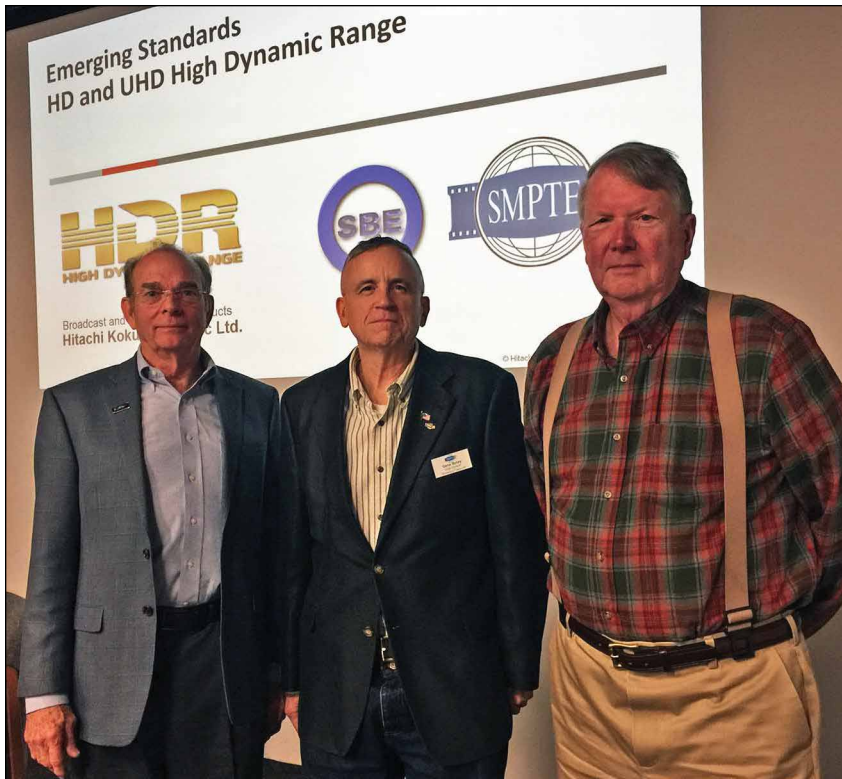
- System Overview
- Uncompressed mapping

- PCM Digital audio
- Ancillary data mapping
- 2022-6 mapping

The following sections have been suggested:

- Compressed video
- Compressed audio

The core of ST 2110 is strongly related to TR-03. Another key component is Precision Time Protocol (PTP) ST 2059, which is used for synchronization of signals. Other details include the following: Video is based on IETF RFC 4175. Support for 4:2:0, 4:2:2, and 4:4:4 chroma sampling. Video can be 8, 10, 12, or 16 bits. Color samples can be YPrPb, RGB, R'G'B', or ICtCp (Dolby). Support for linear or “gapped” transmission (linear means just video whereas gapped transmission means that the horizontal and vertical blanking intervals are included). Video blocks are defined—not specific resolutions. Audio is based on AES67. There is support for PCM Audio only (not PCM Data—so Dolby E, for example, cannot be carried). Audio samples can only be 24 bits. Ancillary data are carried per the IETF RFC on payloads.



(L-R) John Humphrey, guest presenter; Gene Batey, Ohio Section Secretary/Treasurer; Ralph Hoffman, SBE Chapter 52 Officer.

Gilmer discussed the AMWA Networked Media Open Specification. IS-04 refers to the specification that allows devices to discover the identity of other attached devices. More on NMOS

can be found at www.github.com/amwa-tv/nmos.

Networked Media Open Specifications (NMOS) leverages Domain Name System (DNS) methodology for device discovery. IP addresses

for devices are assigned by link-local protocol (RFC 3927). Endpoint discovery occurs using DNS-SD (RFC 6763) via the mDNS protocol (RFC 6762) or by unicast DNS (RFC 1035). For larger systems, a Registry is maintained. This is a database of resources, which is updated when devices join or leave the network. In the future, the user will assign a task to the system. The system will assign available resources automatically. When the task ends, the resources will fold back into the system.

Linnebur was the final panelist to talk. Her company, Neveion, was one of the sponsors of a project called "Live IP On-Air," which started in April 2015. It involved a rack of equipment that traveled to different venues to record a talk show. The connectivity (including cameras) was all IP-based. ST 2022-6 was the foundation and they used OpenFlow switches, unicast sources, and Neveion VideoIPath. With this system, all the shows went flawlessly for a year and the setup and teardown times were greatly reduced because of IP technology.

—Richard Perin
Secretary/Treasurer

HDA
TECH RETREAT
20 - 24 February 2017
Hyatt Regency, Indian Wells, CA

**Ohio
December 2016**

The meeting on 8 December took place at the Mills-James production lot in Columbus, combined with the local SBE Chapter 52. Approximately 40 members and guests were in attendance to view a very interesting and informative slide presentation from John Humphrey, Vice President, Business Development at Hitachi Kokusai Electric America. His technical presentation/discussions centered around various HDR video/broadcast industry technologies (HDR) available now, and into the future. Humphrey covered 10 HDR subtopics, which included Why HDR? What is HDR? HDR standards for UHD and HD; History of standard dynamic range; TV screen brightness; HDR for HDTV; Transfer curves; Hitachi's implementation of HDR for HDTV; Simulation comparing SDR and

HDR; and Compatibility with SDR and consumer adoption of 4K HDR TVs.

A lively question and answer session followed Humphrey's very well received presentation.

—Gene Batey
Secretary/Treasurer

**Washington, DC
October 2016**

The Washington, DC, Section meeting on 20 October featured a presentation about events leading up to the unveiling of the world's first successful videotape recorder 60 years ago, at what is now the NAB Show.

The meeting at the headquarters of the National Association of Broadcasters in downtown Washington, DC, began with refreshments and networking among attendees and then transitioned to a short business meeting before the evening's presenter and DC Section



James O'Neal, presenter at the Washington, DC, October meeting.

Manager, James O'Neal, was introduced.

O'Neal began his presentation by describing the rapid growth of broadcast television in the late 1940s and early 1950s, and the equally expanding need for quality programming to fill the broadcast day.

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He observed that connectivity of networks with their affiliated stations was in its infancy and that the only means for preserving television content then was via rather poor quality “kinescope” film recordings.

He described the efforts of four different groups (the BBC, RCA, Bing Crosby Enterprises, and Ampex) in developing practical methodology for high-quality capture of video on magnetic tape, and then described the challenges of recording wide bandwidth (18 octave) signals on tape, especially when using conventional longitudinal tape recording technology.

O’Neal then provided information about the rotary head approach taken by Ampex, and showed historical screen-capture pictures of the varying levels of success attained during the company’s five-year VTR development program, which culminated with the “secret” unveiling of the machine

at the 1956 NARTB (National Association of Radio and Television Broadcasters) show in Chicago. He described the pandemonium associated with that unveiling and the unexpected large volume of sales orders it generated.

The presentation concluded with a question and answer session and an opportunity for close-up look by attendees at an early video recording head assembly and sample of the two-inch-wide video tape used in conjunction with it.

—James E. O’Neal
Section Manager

Washington, DC November 2016

The American Association of Retired Persons (AARP) in downtown Washington, DC, hosted the Section meeting on 17 November, with Nephi Griffith, a DC Section Manager and television production, post-production and broadcast engineer at the



Washington, DC, Section Manager Nephi Griffith hosted the November meeting and provided the program.



AARP television facility, providing the program.

The event began with refreshments and an interval set aside for socializing and networking among attendees. Section Manager Eric Wenocur called the meeting to order in the absence of Section Chair Tom Hackett, and conducted a short business session before introducing Griffith.


Griffith, who had attended the 9–10 November NAB New York Show, described to meeting attendees some of the technical presentations and exhibits that he encountered at the NAB event, including next-generation television imaging, and took an especially “deep dive” into the area of high-dynamic-range (HDR) video. Griffith provided information about the various methodologies in use for the implementation of HDR, as well as some of the associated difficulties, and presented several graphics and a short demonstration video clip to illustrate to his audience how the technology is able to preserve detail in both very light and very dark picture areas.

Griffith concluded his presentation with a question and answer session. Following the formal program, attendees were given a tour of the AARP video production facility.

—James E. O’Neal
Section Manager

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