Welcome!

Your Host

Joel E. Welch

Director of Education

SMPTE
SMPTE Technology Committee Meeting Outcome Summary

- Quarterly Series of interactive webcasts summarizing activities of the most recent SMPTE Technology Committee meetings
- Complimentary for everyone
- Sessions are recorded and published for on-demand viewing on https://www.smpte.org/standards-webcasts-on-demand and YouTube

Today’s Speakers

Bruce Devlin
Standards Vice President

Howard Lukk
Director of Engineering and Standards
December 2017 Standards Committee Meetings

- Nine SMPTE Technology Committees and 12 subgroups met
  - 4-8 December 2017, in Santa Clara, California, USA
  - Hosted by Arista Networks
  - Meeting Outcome Report: [https://www.smpte.org/standards/meeting-reports](https://www.smpte.org/standards/meeting-reports)

Numbers:
- 62 published documents in 2017
- 4.5 days
- 69 in the room
- 2 streams
- 182 active projects
- 100+ attendees
- 100+ attendees
- 2 streams

Applications:
- 20F Film
- 21DC Digital Cinema
- 24TB Television & Broadband
- 25CSS Cinema Sound Systems

Essence & Metadata (Content):
- 10E Essence
- 30MR Metadata Registry

Infrastructure & Media Management:
- 31FS File Structures
- 32NF Network & Facilities Infrastructure
- 34CS Media Systems Control & Services
- 35PM Media Packaging for Interchange
Making a Standard (or RP or EG)

1. Start a Project
2. Create a Group
3. Write a Project Draft Doc.
4. Review WD in a TC
5. Fix document

CD
6. Vote on Committee Draft
7. Fix document

FCD
8. Review Final Committee Draft
9. Vote on FCD

DP
10. Audit the Process
11. Publish

SMPTE Technology Committees
- TC10E Essence
- TC20F Film
- TC21DC Digital Cinema
- TC24TB Television and Broadband Media
- TC25CSS Cinema Sound Systems
- TC30MR Metadata and Registers
- TC31FS File Formats and Systems
- TC32NF Network and Facilities Architecture
- TC34CS Media Systems, Control and Services
- TC35PM Media Packaging and Interchange
### A question for the Audience

- What do you want from these webcasts?

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| **1** | An exhaustive list of activities?  
(like this presentation) |   |
| **2** | More in-depth discussion of key topics?  
(e.g. deep dive into SMPTE’s standards work on timing) |   |
| **3** | Higher level overview of SMPTE’s work in some area?  
(e.g. overview of SMPTE’s standards work in HDR) |   |
| **4** | Something else?  
(let us know) |   |

### TC10E Essence Technology Committee

- **Chair:** Ed Reuss
- **Chair:** Michael Zink

*The application of the general scope as it applies to electronic capture, generation, editing, mastering, archiving, and reproduction of image, audio, subtitles, captions, and any other master elements required for distribution across multiple applications*
Projects (1)

- Video compression standards in SMPTE
  - SMPTE 2073 Document Suite: VC-5 Video Essence – Parts 0-4,10 published, part revision is in DP vote.
  - Revision of SMPTE 2042 and 2047 Document Suite: VC-2 video compression
  - New Standard SMPTE RP 2047-5: VC-2 Level 66 Compression of UHD for use with HD Infrastructure – Published (Q3, 2017)
  - VC-x – new project proposal for a hierarchical compression format
- SMPTE 2080 Document suite: Reference Display and Environment for Critical Viewing of Television Pictures
  - Part 1 & 2 published & undergoing 1 year review
  - Part 3 – Reference viewing environment - published Q2, 2017
  - Part 4 – Full Measurement/ Calibration – ready for pre-FCD review

Projects (2)

- RP 2093 - Television Lighting Consistency Index
  - How to quantify quality of lighting?
  - Review of pre-FCD comments under way
- Revision of ST 2086 - Mastering Display Color Volume Metadata
  - Supporting High Luminance and Wide Color Gamut Images
  - FCD Ballot complete, pre-DP review under way
- New Document: P3 Colorimetry
  - will produce a normative reference document for the colorimetric attributes of P3
  - work just beginning
Projects (3)

- FS-Gamut and FS-Log Characteristics of Camera Systems
  - Free Scale Gamut and Free Scale Log for professional camera systems
  - First meeting scheduled for January

Any Questions
• The application of the general scope as it applies to application of mastered essence to theatrical film distribution, including, media and component creation, marking, laboratory methods, reproduction, packaging, projection, and related topics. Additionally film capture, editing and recording.

• 20F met during the SMPTE annual Technical Conference in Hollywood, October 2017. No report available at this meeting.

• The application of the general scope as it applies to application of mastered essence to theatrical digital distribution, including compression, encryption, wrapping, marking, packaging, media, logging, playout, projection, reproduction, and related topics.

Chair: John Miller

Chair: Dean Bullock
Chair: Chris Witham
Projects (1)

- Stereoscopic Subtitle / Timed Text projects
  - Revision of ST 429-2: Digital Cinema Packaging - DCP Operational Constraints – waiting on Metadata register submissions to be mature
    - Revision of ST 429-5: Digital Cinema Packaging - Timed Text Track File – in ST Audit
    - New Standard ST 429-17: Digital Cinema XML Constraints – in ST Audit
  - D-Cinema Operations; Encryption projects
    - Amendment to ST 429-6: Digital Cinema Packaging - MXF Encryption – in ST Audit
  - Additional Frame Rates
    - Working Group to integrate the separate documents for Additional Frame Rates into the main documents 428-1 and 428-2 (DCDM) and 429-2 (DCP), add HFR to DCP
    - Scope of work has been identified. Separate projects being created for the revisions of affected standards

Projects (2)

  - Differences between this RDD and actual implementations have been discovered. This document will be updated to reflect those differences.
- Compliance to NIST SP800-56B
  - Investigate requirements for compliance to NIST SP800-56B
  - Identify any impact to SMPTE standards.
  - Status: The group has completed a report. No SMPTE standards are impacted and it was decided at this meeting that the group will be disbanded.
Projects (3)

- Object Based Audio Essence (OBAE) in Digital Cinema Packaging
  - New standard to define the protocol between a Screen Management System (SMS) and an Outboard Media Block (OMB) supporting immersive audio track file containing a ST 2098-2 Immersive Audio Bitstream – project recently approved
  - New Recommended Practice - documents an existing method for communication between a SMS and an OMB to convey an Immersive Audio Track File containing a ST 2098-2 bitstream and to synchronize the OMB.
  - New standard - DCP Operational Constraints for Immersive Audio – draft document submitted
  - New standard – Immersive Audio Track File specification for use with ST 2098-2 Bitstream and specify how to use the track file in an ST 429 - 7 CPL – draft document submitted
• The General Scope as applied to mastered essence for television and broadband distribution (both separately and for hybrid television/broadband environments), including compression, encryption, wrapping, marking, packaging, media, tracking/control, presentation, reproduction, and related topics.

Projects (1)

• New 2112 document suite on Open binding technology for persistent content identification in A/V essence
  • RP 2112-1 - Audience Measurement Using OBID and OBID-TLC – waiting 2112-20
  • EG 2112-2 - Audience Measurement Ecosystem – waiting 2112-20
  • ST 2112-10 - Open Binding of IDs (OBID) – in FCD comment resolution
  • RP 2112-11 - OBID Reference Implementation – waiting on 2112-10
  • ST 2112-20 - OBID Time Label and Content Distribution Identifiers (OBID-TLC) – WD complete waiting on 2112-10 comment resolution
  • RP 2112-21 OBID-TLC Conformance Test Materials – WD complete waiting on 2112-10 comment resolution
Projects (2)

- RevisionsST 2016-1: AFD and Bar Data
  - being updated to add UHD formats and signaling – WD created

- New document EG 2064-x: Tutorial on A-V Sync Measurement and Assessment in preparation

Any Questions
The application of the general scope as it applies to standards for theater sound and cinema B-Chain systems, including performance, measurements, setup, calibration, acoustics and related topics.

Projects

- 2098 Document suite for Immersive Sound Model & Bitstream
  - ST 2098-1 Metadata Definitions – draft complete, harmonizing with ST 2098-2 and other standards
  - ST 2098-2 Bitstream Specification – draft complete, clean up & formatting in progress
  - EG 2098-3 Immersive Audio Renderer Expectations – near complete
  - RP 2098-4 Immersive Audio Renderer Interoperability Testing
  - ST 2098-5 Audio Channels and Soundfield groups – at ST Audit over language issues

- Study Group – Immersive Audio Implementation
  - Looking at overall requirements for interoperable Immersive audio
    - Looking at DCP interoperability & Exhibition equipment interoperability
    - Report expected in the TC Jan 2018

- Interoperability Testing
  - An AHG will be formed to consider how to take this forward
• The application of the general scope as it applies to definition and implementation of the SMPTE Registration Authority, used to identify digital assets and associated metadata. Additionally, the common definition of metadata semantic meaning across multiple committees.
Projects (1)

- Publication of ‘Brown Sauce’ revision of registers
- The Metadata Registers area on SMPTE-RA.org has been completely updated to a new web interface. It is accessible from http://www.smpte-ra.org
- Clicking the link takes you to the actual site https://registry.smpte-ra.org/apps/pages/
  - Provides a single source of information for SMPTE metadata registers
    - Registers – provides different views of all published registers along with online tools
    - Submissions – resources available for creating and analyzing new submissions to the registers – helps to eliminate errors before the requests are made
    - Documentation – technical documentation for the SMPTE metadata registers – how the registers and online tools are designed and operated
- Special thanks to BBC R & D, and a shout out to Thomas Heritage & Phil Tudor
Projects (2)
- Application of the Unique Material Identifier (UMID) projects
  - UMID report here: [https://www.smpte.org/standards/reports](https://www.smpte.org/standards/reports)
  - New Standard - UMID Resolution Protocol
    - Converts UMID → URL of its audiovisual material
  - ST 330 Revision
    - New methods for generating UMIDs & time related issues
    - Final draft revision almost complete
  - RP 205 Revision
    - UMID applications
    - Changes to make it compliant with the revised ST 330 – not started
- New Standard ST 2102:
  - SMPTE Core Metadata Set - minimum core set of metadata
  - Published

Projects (3)
- New Standard ST 2088:
  - SMPTE Essence Element Key Register Structure – still in comment resolution
- Essence Element Register
  - Temporary work item while waiting for ST 2088 to publish
- Amendment of ST 335
  - Element Dictionary structure – in FCD ballot closing Jan 2018
- Metadata Definition
  - WG30MR10
    - Coordinates the process for adding & maintaining metadata
    - Next revision of the four registers is in preparation
    - AG18 defines the process
The application of the General Scope as it applies to definition of common wrappers, file formats and file systems for storage, transmission, and use in the carriage of all forms of digital content components.
MXF Projects

  - Provide a stable base documents by combining the two amendments to the primary MXF specification to create a last version referencing the old register structures
  - Separate project to deal with more difficult issues will be done in a later revision
  - First phase in FCD ballot
- New Document: ST 377-2 - KLV-encoded extension syntax (KXS) – ready for DP vote
- Revision ST 380: MXF Descriptive Metadata Scheme 1 – in second FCD ballot
- Revision: RP 2057 - Text–based metadata carriage in MXF – in FCD Ballot
- Revision RDD 44: Apple ProRes in MXF – published
- Revision: ST 381-2 - Material Exchange Format (MXF) - Mapping MPEG Streams into the MXF Constrained Generic Container – ST Audit

Projects

- Archive Exchange Format (AXF)
  - Revision ST 2034-1: Archive eXchange Format (AXF) - Part 1: Structure & Semantics
    - Recently published by ISO/IEC standard 12034-1
    - New Document: ST 2034-2 - Archive eXchange Format (AXF) - Part 2: External Uses of XML Schema – drafting in progress – liaison with sidecar groups e.g. IMF
    - passed FCD ballot, in comment resolution
- New project
Any Questions

• The application of the general scope as it applies to definition and control of elements supporting the infrastructures of content production and distribution facilities, including file management, transfer protocols, switching mechanisms, and physical networks that are both internal and external to the facility excluding unique final distribution methods.
Professional Media over Managed IP Networks

- Working Group on Video Over IP (32NF-60)
  - ST 2110 suite of standards specifying the carriage, synchronization and description of separate elementary essence streams over IP for the purpose of live production
  - ST 2110-10 – System Timing and Definitions - published
    - describes the system timing and how RTP packets will be used, as well as how each of the streams will be carried in the network.
  - ST 2110-20 – Uncompressed Active Video - published
    - carries only active video lines, without the burden of sync and VANC
    - resolution and frame rate independent
  - ST 2110-21 – Timing Model for Video - published
    - Two timing models (“narrow” and “wide”) offers flexibility to manage network traffic flows based on hardware or software design Senders and receivers

ST 2110-30 – PCM Digital Audio - published
- Leverages AES 67 for carriage of uncompressed Audio

ST 2110-31 – AES 3 Transparent Transport
- FCD comment resolution
- Transport of legacy AES3 non-PCM audio.
- permits transport of various data formatted into AES 3 according to SMPTE ST 337

ST 2110-40 – Ancillary Data
- FCD comment resolution
- Transport of ancillary data that was once inside the SDI VANC will be handled as a separate RTP essence that is not bound to video
- Closed captioning, timecode, AFD, and other VANC data will be separated
**Professional Media over Managed IP Networks (3)**

- Revision: ST 2022-3 - Unidirectional Transport of Variable Bit Rate MPEG-2 Transport Streams on IP Networks
  - revise bit rate abbreviations in ST 2022-3 as part of five-year review – under way
- Revision: ST 2022-7 - Seamless Protection Switching of RTP Datagrams
  - add Ultra-Low-Skew receiver class, and to make it applicable to any RTP flow
  - WD was submitted to the TC on 5 Dec. 2017 for pre-FCD-ballot review
- New standard ST 2022-8 Interoperability with ST 2022-6 Streams
  - was originally planned as ST 2110-50 - based on VSF TR-04
  - compatibility with existing ST 2022-6 streams which are widely deployed today

**HDR Signaling Projects**

- Carriage of HDR and WCG metadata.
- ST 352 Payload ID modified for static signaling
  - ST 372 revision was published Q4 2017.
  - ST 425-1 revision was published Q4 2017.
  - ST 2081-10 and ST 2082-10 are moving to ST Audit
    - ST 2081-12, ST 2082-11, ST 2082-12 will follow
  - ST 2036-3 revision posted for pre-DP-ballot review
  - ST 292-1 revision posted for pre-DP-ballot review
  - Next up for revision in this DG: ST 425-3, ST 425-5.
- Drafting a new standard ST 2108 - Extended HDR/WCG Metadata Packing and Signaling for Serial Digital Interfaces
  - draft ready for pre-FCD review
Projects (1)

- Working Group on SDI Interfaces (32NF-40)
  - New EG 2111 suite: Engineering guideline (wall charts) on SDI Interfaces
    - EG 2111-1 SD and HD-SDI roadmap
    - EG 2111-2 UHD-SDI Roadmap (published in the July Journal)
    - EG 2111-3 10G-SDI Roadmap (in development for Journal Publication)
  - Revision of RP 198: Bit-Serial Digital Checkfield for Use in High-Definition Interfaces
    - Resolving ballot comments
  - Revision of EG 34: Pathological Conditions in Serial Digital Video Systems
    - Waiting completion of RP 198
    - part 1 published Q1, part 2 – passed FCD ballot
  - New document ST 2100-2: Transport of Haptic-Tactile Essence in AES3
  - New document ST 2100-3: Transport of Haptic-Tactile Essence in VANC

Projects (2)

- Working Group on Ultra HD SDI Interfaces (32NF-70)
  - New document ST 2081-30: Transport of Multiple 3Gb/s or 1.5Gb/s signals on a 6G-SDI link – published
  - New document ST 2082-30: Transport of Multiple 6Gb/s, 3Gb/s or 1.5Gb/s signals on a 12G-SDI link – published
Projects (3)

- Working Group on Time Labeling and Synchronization (32NF-80)
  - SMPTE 2059 Synchronization System
    - EG 2059-10 - Introduction to the New Synchronization System – published Q2
    - EG 2059-11 – Management of Time Discontinuities - paused
    - EG 2059-12 - Systemization Considerations for using SMPTE ST 2059 - paused
    - EG 2059-14 - Best Practices for Large Scale SMPTE ST 2059-2 PTP deployments - paused
    - SMPTE 2059 interoperability testing is ongoing
      - Reports available [https://www.smpte.org/standards/reports](https://www.smpte.org/standards/reports)
    - One year review (revision) of ST 2059-1 and ST 2059-2 underway to incorporate learnings from interop testing

Projects (4)

- Working Group on Time Labeling and Synchronization (32NF-80)
  - Time Labelling System
    - Two time label projects existed until June 2017
    - Feedback from Timecode Summits recommended a single Label
      - Timecode Summit report [https://www.smpte.org/standards/reports](https://www.smpte.org/standards/reports)
    - New Document: Extensible Time Label
      - Project reviewed – work to commence in 2018
    - New RP 2104-1 Date-Time terms and definitions
      - Draft posted but work is paused
Projects (5)

- ST 337 family of documents
  - New standard ST 2041-4: MPEG-H 3D Audio Streams (MHAS) in AES3
    - drafting in process
  - New standard: Multi Dimensional Audio (MDA) over AES3
    - still waiting on submission of a draft from the proponent
  - New standard: ST 2109 - Format for Non-PCM Audio and Data in AES3 - Audio Metadata
    - Updated draft reviewed for smpte-ra conformance and scope
  - New standard: Multi Dimensional Audio (MDA) over AES3
- SG on Flow Control in Professional Media Networks
  - Published https://www.smpte.org/standards/reports

Any Questions
The General Scope as applied to the implementation of media services, methods of managing and controlling hardware devices and software systems, and the management of media workflow processes, including associated signaling and control mechanisms.

Project Highlights

- BXF Suite of Documents
  - 5 documents being revised to add BXF 5.0 changes
  - New Recommended Practice RP 2021-6: BXF SDK
  - Revisions to parts 1,2,3,4,9 and the new part 6 were all were published in Q3
  - Inputs being received for BXF 6.0 – nine inputs received to date including additional NABA and DPP work in BXF schema (Library Masters, CPL/OPL, UHD Air Ready Master, IMF Broadcast Delivery Spec, Delivery of TV Programs as AS - 11 files)

- Media Device Control over IP
  - SMPTE 2071-3 and -4 (Discovery & Capability) revisions encountered irregularities in the ballot process, and will be sent back for a short FCD ballot after comments have been addressed.
Any Questions

- The General Scope as applied to the packaging of media elements, to facilitate interchange and interoperability of formats within specific integrated application ecosystems in the professional fields of media creation, production, post-production archiving and related topics.
IMF Projects (1)

- Current IMF documents:
  - ST 2067-2, Interoperable Master Format — Core Constraints
  - ST 2067-3: Interoperable Master Format — Composition Playlist
  - ST 2067-5: Interoperable Master Format — Essence Component
  - ST 2067-8, Interoperable Master Format — Common Audio Labels
  - ST 2067-20, Interoperable Master Format — Application #2
  - ST 2067-21, Interoperable Master Format — Application #2E (previous title Application #2 extended)
  - ST 2067-30, Interoperable Master Format — Application #3
  - ST 2067-40, Interoperable Master Format — Application #4 Cinema Mezzanine
  - ST 2067-100, Interoperable Master Format — Output Profile List
  - ST 2067-101, Interoperable Master Format — Output Profile List – Common Image Definitions and Macros
  - ST 2067-102, Interoperable Master Format — Output Profile List - Common Image Pixel Color Schemes
  - ST 2067-103, Interoperable Master Format — Output Profile List – Common Audio Definition and Macros

IMF Projects (2)

- Document Maintenance & Plug Fests
  - Potential Plugfest before March meetings

- OPL
  - Revision of ST 2067-101 IMF Common Image Definitions and Macros
    - FCD ballot shortly
    - Amendment: ST 2067-102 - IMF Common Image Pixel Color Schemes
      - published and the project closed

- New Standard: ST 2067-9 - Sidecar Composition Map
  - Defines an XML document that (a) can be carried as an IMP asset and (b) associates other selected IMP assets (called Sidecar Assets) with one or more IMF Compositions
  - In FCD ballot
IMF Projects (3)

- Plugins
  - New Standard: ST 2067-200 - Dynamic Metadata for Color Volume Transform for IMF Applications
    - allows Dynamic Metadata for Color Volume Transform (as specified in ST 2094-2) for IMF Applications.
    - WD expected before December meetings
  - New Document: IMF Immersive Audio Bitstream Level 0 Plug-In
    - Specify a plug-in for the carriage of (draft) ST 2098-2 Immersive Audio bitstream in IMF
    - Waiting on TC 25CSS to finish ST 2098 work
  - New Document: IMF Audio Content and Element Kind Definition

- Applications
  - New Standard ST 2067-50: IMF Application #5 ACES
    - will specify an application of the IMF framework that uses image essence conforming to SMPTE ST 2065-4 (ACES)
    - In pre-DP ballot review
  - Amendment: ST 2067-40 - IMF Application #4 Cinema Mezzanine
    - In ST Audit
  - New Registered Disclosure Document: RDD 45 - IMF Application for ProRes format
    - IMF application based on Application #2E (SMPTE ST 2067-21) that uses Apple ProRes image essence
    - Published

IMF User Group

- The Interoperable Master Format (IMF) User Group (UG) is a forum for the worldwide community of end-users and implementers of the IMF family of standards. [https://imfug.com/](https://imfug.com/)
  - The IMF UG brings together content owners, service providers, retailers and equipment/software vendors to enhance and promote the use of IMF globally.
  - The IMF UG discusses technical & operational issues that arise in practical implementation, conducts interoperability testing, develops best practices, and seeks to broaden the awareness of IMF.

- Next meetings:
  - Geneva 2nd Feb 2018
  - NAB - TBA
Any Questions

Upcoming Standards Meetings

• March 12-15 (maybe 16), 2018
  White Plains, NY, USA – at new SMPTE Headquarters bldg.

• June 18-21 (maybe 22), 2018
  Ryerson University, Toronto, Canada – Hosted by SMPTE Toronto Section

• September 19-22, 2018 (Immediately following IBC)
  Geneva, Switzerland – Hosted by EBU

• December 03-06 (maybe 07), 2018
  San Francisco, CA, USA – Hosted by Dolby Labs
Meeting Outcome Reports

- To learn more about the Standards activities see: 
  https://www.smpte.org/standards/engineering-committees.

- To download the most recent meeting outcome report: 
  https://www.smpte.org/standards/meeting-reports

- For standards participants – see the master calendar: 
  https://kws.smpte.org/higherlogic/ws/groups/stds_comm/calendar

Thank You

Questions?
Questions & Answers

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