Standards Quarterly Report
September 2015

Result of SMPTE® Standards Committee Meetings
16-19 September 2015 in Paris, France

Hosted by CST and Eutelsat

Society of Motion Picture and Television Engineers®
3 Barker Avenue
White Plains, NY 10601 USA
www.smpte.org

Thanks to our Sponsors for Making the September Standards Committee Meetings Possible:

COMMISSION SUPÉRIEURE TECHNIQUE DE L'IMAGE ET DU SON

eutelsat

Society of Motion Picture and Television Engineers®
3 Barker Avenue
White Plains, NY 10601 USA
www.smpte.org

SMPTE Standards Quarterly Report: Executive Summary

As a result of SMPTE Standards Committee Meetings
16-19 September 2015
Eutelsat, Paris, France
Hosted by CST and Eutelsat

Nine SMPTE Technology Committees and thirteen subgroups scheduled meetings at this round, hosted by CST and Eutelsat, 16-19 September. There was also an update report from the Joint Task Force on Networked Media.

Around 64 members attended in person over the 4 days, and there was additional participation by remote access. This Executive Summary captures some of the more notable project developments. More information on the current status of the 120+ active projects can be found in the detailed account, below.

New Projects started in the last quarter

This list is shorter than usual, but it has been a short "quarter" since the Sydney meeting round.

Revision of ST 428-7: Digital Cinema Distribution Master — Subtitle **Details**

New Standard: Open transport over AES3 of dynamic audio metadata Details

New Standard: Digital Cinema XML Constraints Details

New Recommended Practice: Digital Cinema Immersive Audio Renderer Baseline Expected Behavior Details

New Standard: Multi-link SDI data streams over a single fiber using CWDM Details

New Recommended Practice: On-screen Light Measurement RP (cinema applications, not covered in this report)

"Better Pixels" projects: There is growing recognition that the next step beyond HDTV requires improvement in more than just pixel-count. Improvements to parameters such as color gamut, displayed dynamic range, frame rates, and electro-optical transfer function all contribute to the improved viewing experience that is needed to justify the launch of new services.

High Dynamic Range / Wide Color Gamut / EOTF

SMPTE has a Study Group that has just completed its report on the High Dynamic Range Ecosystem. The aim is to release the report before the SMPTE 2015 Annual Technical Conference at the end of October.

SMPTE has another project defining Dynamic Metadata for Color Volume Transformation of High Luminance and Wide Color Gamut Images. A document suite is underway, comprising parts on Core Components, Syntax and Carrier and four parts documenting individual application schemes. The first two of these are expected to be ready for ballot in 3-4 weeks.

Three SMPTE HDR/WCG standards have recently published:
- ST 2084 - High Dynamic Range Electro-Optical Transfer Function of Mastering Reference Displays
- ST 2086 - Mastering Display Color Volume Metadata Supporting High Luminance and Wide Color Gamut Images
- ST 2085 - Color Differencing for High Luminance and Wide Color Gamut Images

Details of all HDR/WCG/EOTF projects.

Higher Frame Rates

Provision for 100 and 120 fps (nominal) has already been added to SMPTE's ST 2036-1 UHDTV standard. Associated transport documents have also been introduced to cope with the extra bandwidth demands: 10Gb/s family 6, 12, 24 Gb/s family

A project to extend SMPTE ST 12 timecode to cover higher frame rates completed comment resolution at this meeting round. Details

Network – based Synchronization for the Professional Broadcast Environment

Two key documents defining a system for using synchronization packets on a data network to achieve media synchronization published earlier this year:

"ST 2059-2: Precision Time Protocol SMPTE profile for time and frequency synchronization in a professional broadcast environment" defines the behavior of the master.

"ST 2059-1: The SMPTE Epoch and generation and alignment of interface signals" defines the behavior of the slaves, allowing them to create any synchronized video, audio or time code signal.

The system provides acceptable lock-up time, jitter and accuracy while providing metadata to cope with time discontinuities such as drop frame, leap seconds and daylight saving.

Attention has now turned to Interoperability Testing and drafting Engineering Guidelines that assist with implementation of systems. Details of both

Time Labels

There are two projects defining Time Labels that are more suited to the current media environment than the ubiquitous ST 12 Timecode.

One project is defining a 5-Part "Generic Time Label" suite, and this has just completed FCD ballot.

Another project is defining a 9-Part "Full-featured Time Label" suite that has been submitted for working group review.

Associated with this work is the development of a Recommended Practice on Date-Time Terms and Definitions.

Details of all projects

SMPTE Compression Standards SMPTE has standardized five compression standards – VC-1 to VC-5. Current work on video compression standards comprises:

- Development of a suite of documents defining the VC-5 compression system (developed from a GoPro system). Two Parts of the suite are published, two more are ready for publication, and two more have Draft Publication status. Details.
  A Standard to define VC-5 mapping in the MXF Generic Container is well advanced. Details
- Amendment of a suite of documents defining the VC-3 compression system in order to add Image Resolution Independence and some other improvements (Developed from Avid DNxHD). Details
  The MXF container document for VC-3 is also being amended. Details
- Amendment and revision to two VC-2 documents (developed from BBC's Dirac pro system). One project adds a high quality profile for Archive and Production, the other is a clarification of a published VC-2 document. Details of both

Cinema Projects

Cinema Sound Systems

This Technology Committee has projects aimed at improving the quality of sound in conventional movie theaters, as well as standardization of new immersive, 3D, systems.

Current work on Cinema Sound Systems comprises:

- A project group developing a Recommended Practice "Digital Cinema Sound System Setup and Calibration". Details
- A draft standard "Calibration Reference Wideband Pink Noise Signal and Test File" has been completed and awaits publication. The aim is to have a consistent pink noise signal for applications including theater testing. Details
- A Working Group on Interoperability of Immersive Sound Systems in Digital Cinema. Its goal is to standardize a single object-based distribution file format and related protocols for interoperable playback into a variety of theater speaker configurations. Details

Digital Cinema

This Technology Committee has published three multi-part document suites dealing with the topics D-Cinema Distribution Master, D-Cinema Packaging and D-Cinema Operations.
Current projects are mainly about incorporating provisions for stereoscopic subtitles into existing D-Cinema documents, updating encryption documents and updating facility list management documents. **Details**

Transport of Compressed Audio and other Data over AES3

SMPTE has a number of Standards that define how compressed audio and other data is transported over the AES3 interface.
ST 337 "Format for Non-PCM Audio and Data in an AES3 Serial Digital Audio Interface" is the key standard, defining the method that applies to all data types. ST 338 is a register of allocated data types and the Standards that define their packaging. These documents were revised last year to define an extension mechanism to overcome the limited number of data types that were previously supported. As new compression types and other applications come along, the family grows. Current documents in development define carriage of AC-4, carriage of MPEG-H audio, carriage of DTS audio. A new project has been started to define carriage of Audio Metadata.
Details
Another data type that will be carried over AES3 is "haptic-tactile" essence. It is not clear yet whether this will use the ST 337 method, or define its own. Details
For information on a project defining haptic-tactile essence, see here.

Material Exchange Format – MXF This widely-used file-based media format does not stand still and there are always projects adding features and mappings to this suite of standards or creating constraints for improved interoperability in a variety of application areas. There are currently 9 MXF projects in process. Details

Society of Motion Picture and Television Engineers®
3 Barker Avenue
White Plains, NY 10601 USA
www.smpte.org

SMPTE Standards Quarterly Report: Detailed Account

As a result of SMPTE Standards Committee Meetings
16-19 September 2015
Eutelsat, Paris, France
Hosted by CST and Eutelsat

The Society of Motion Picture and Television Engineers is the world leader in motion-imaging standards for the communications, media, and entertainment industries – and the only organization to connect the areas of motion-imaging research, standardization, education, and business success.

We encourage interested parties to contact SMPTE Standards to learn more about specific activities. Go to www.smpte.org/standards for more information.

If you are interested in learning more about the SMPTE Standards program, please contact Peter Symes, Director of Standards and Engineering, at psymes@smpte.org.

If you need help getting started with the SMPTE Standards process and some of the conventions / acronyms used in this report, please jump to the Annex.

This report is a snapshot in time and should not be regarded as formal minutes, a positioning statement or an analysis piece. Please provide your comments or suggestions at standards@smpte.org

Future Meetings
The next quarterly Standards meeting round will be held 7-10 December 2015 in Atlanta, GA, USA and will be hosted by Turner.

Further quarterly Standards meeting rounds are planned for:
March 2016 – Host and venue TBA.
June 6-10, 2016 – Singapore. Hosted by Xilinx.
September 14-17, 2016 – Geneva, Switzerland. Hosted by European Broadcasting Union.
December 5-9, 2016 – Burbank, California, USA. Hosted by Disney.

In addition to the meetings of SMPTE Technology Committees, detailed below, there was an update report from the Joint Task Force on Networked Media. SMPTE is a member of this task force, together with the EBU and VSF. As well as explaining some of the Task Force Work, the presentation announced release of the group's "reference architecture V1.0". The document is available at: www.smpte.org/standards/reports

This Quarterly Report provides a detailed account of the meetings of the following Technology Committees and their sub-groups:

Details from each Technology Committee meeting

Society of Motion Picture and Television Engineers®
3 Barker Avenue
White Plains, NY 10601 USA
www.smpte.org

Essence Technology Committee (TC-10E) chaired by Ed Reuss and Paul Gardiner

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

Topic: TC-10E documents published in the last quarter

None

Topic: Video compression standards in SMPTE

DG Project: Revision of SMPTE ST 2019 VC-3 Video Compression Documents to add Resolution Independence

VC-3 is a compression format based on Avid's DNxHD video codec, defined in a suite of documents:
ST 2019-1:2014 – VC-3 Picture Compression and Data Stream Format
RP 2019-2:2014 – VC-3 Decoder and Bitstream Conformance
ST 2019-3:2008 – VC-3 Type Data Stream Mapping over SDTI
ST 2019-4:2014 – Mapping VC-3 Coding Units into the MXF Generic Container
This project adds "image resolution independence" - 1x1 to 16384x16384 - to the list of VC-3 capabilities by revising ST 2019-1 and includes new bit patterns for conformance testing in RP 2019-2. It also adds support for 12 bits and Rec. ITU-R BT.2020 color space.
The additions are backwards compatible and no current features are deprecated.
Note: A separate project is underway in TC-31FS to update ST 2019-4 to support this feature in MXF.

Status: A vote was held at the meeting to raise ST 2019-1 to DP status; the vote passed. The document will proceed to ST Audit, but will be held back from publication until the revision of RP 2019-2 is ready.

Business Impact: Interoperability between systems

DG Project: **SMPTE 2073 Document Suite: VC-5 Video Essence**

This project standardizes the CineForm / GoPro video compression system. The planned document suite comprises:

- ST 2073-1 - VC-5 Elementary Bitstream (Published Q2-2014)
- RP 2073-2 - VC-5 Conformance Specification (Published Q2-2014, in revision) Includes Reference Decoder, Sample Encoder, sample bitstreams
- ST 2073-3 - VC-5 Image Formats
- ST 2073-4 - VC-5 Subsampled Color Difference Components
- ST 2073-5 – Layers (this allows embedding multiple images in a single bitstream; used for stereoscopic, HDR and interlaced frames)

- ST 2073-6 - Sections (this mechanism allows implementation of special functions without disturbing standard decoders; it delineates contiguous portions of the bitstream and allows seeking and error detection)
- ST 2073-7 – Metadata (this will provide a basic set of metadata for input image format and also facilitate embedding metadata from other standards)

Status: Parts 1 and 2 are published, but Part 2 has been revised to add test materials to support content defined in Parts 3 and 4 – it is at ST audit, closing 2015-10-08. A repository for the software and test materials is being developed with SMPTE HQ.
Parts 3 and 4 are ready for publication, awaiting completion of the Part 2 revision.
Parts 5 passed FCD Ballot 2015-07-24 and Part 6 passed FCD Ballot 2015-06-05. Both Parts completed pre-DP review and DP elevation votes were held at the meeting. Both votes passed.
Part 7 is at the Working Draft stage.
The work on an MXF wrapper for VC-5 is progressing in TC-31FS.
The VC-5 group is holding joint TC-10E and TC-31FS meetings every 2 weeks.

Business Impact: Interoperability between systems

DG Project: Amendment of ST 2042-1: VC-2 Video Compression Standard and RP 2042-3: VC-2 Conformance Specification
This amendment of the SMPTE mezzanine video compression standard (based on BBC's DIRAC pro) adds a high quality profile to support Archiving and Production applications.

Status: The Part 1 revision was published 2012-08-30.
For Part 3, the proponent reported that sample encoder and reference decoder software has been uploaded to an open source repository (github). Bitstreams are not yet completed.

Business Impact: Interoperability between systems

DG Project: Revision of SMPTE RP 2047-3: VC-2 Level 65 Compression of High Definition Video Sources for use with a Standard Definition Infrastructure
The revision will correct errors that have been identified with "override" operation. It is necessary to specify overriding the pixel aspect ratio and the clean area as well as the base video format, together with consequent adjustments to informative Annex A.

Status: Work is still pending following a reassignment of the proponent's staff.

Business Impact: Interoperability between systems

DG Project: SMPTE 2080 Document suite: Reference Display and Environment for Critical Viewing of Television Pictures

This project group will draft the following suite of documents dealing with the use of fixed pixel matrix reference displays:

ST 2080-1: Reference White Luminance Level and Chromaticity (published)
RP 2080-2: Measurement and Calibration Procedure for HDTV Displays (deals with parameters that can be regularly adjusted - published)
ST 2080-3: Reference Viewing Environment Characteristics
RP 2080-x: Full Measurement / Calibration
ST 2080-x: Reference Display Characteristics
EG 2080-x: Engineering Guideline to provide context and background

Status: Part 1 and Part 2 have been published.
Part 3 passed FCD ballot on 2015-06-12 with 13 comments to resolve. 2 comments remain unresolved, regarding the level of surround illumination that should be specified. This was discussed. The next Parts to be worked on will be the Full Measurement / Calibration RP and the EG.

Business Impact: Users and industry have common standards to assess image quality on a reference display.

DG Project: **New Document: ST 2087 - Depth Map Representation**
This project will define a standard for a data representation of depth maps in multi-view production and post-production.

Status: The document passed FCD ballot on 2014-10-28 with 11 comments to resolve. All comments have been addressed by the DG and the DG Chair anticipates comment resolution will be complete shortly.

Business Impact: to support interoperability and exchange between relevant processes

DG Project: **Revision of RP 173: Loudspeaker Placements**
This project will update the Recommended Practice in line with techniques adopted by the broader recording industry, as embodied by AES and ITU standards.

Status: At the previous TC meeting, it was decided that this revision project will be closed. The status of the published document will be considered again during the next round of 5-year-reviews, anticipated at the December meeting.

Topic: Projects on Systems for High Dynamic Range and Wide Color Gamut

SG Project: Study Group on HDR Ecosystem
Scope: To identify the specific parameters and respective ranges that constitute “High Dynamic Range” (HDR). Based on the agreed definitions, review the impact to form a complete ecosystem for the

creation, delivery and playback of HDR content across both linear and home entertainment distribution platforms. Deliverable is a report on existing standards that are impacted; identifying standards gaps which should be addressed, and recommendation on methodology and priority.

Status: The SG has completed its report, and the TC agreed that it should be forwarded to the Standards VP with a recommendation that it be taken forward to publication. The publication target is the SMPTE 2015 Annual Technical Conference in October. There was discussion at the meeting about the possibility of reproducing the glossary in the report as an EG.

DG Project: New Standard (suite): ST 2094: Content-Dependent Metadata for Color Volume Transformation of High Luminance and Wide Color Gamut Images

This project will develop a suite of standards for specifying the semantics and representation of content-dependent metadata needed for color volume transformation of high dynamic range and wide color gamut imagery to smaller color volumes (e.g. BT.709 or Digital Cinema) in mastering applications.
Initial document set (further Parts will be added if more proponents submit disclosures):

ST 2094-1 Core Components
ST 2094-2 Syntax and Carrier
ST 2094-10 Application #1
ST 2094-20 Application #2
ST 2094-30 Application #3
ST 2094-40 Application #4

This reflects the four detailed method disclosures received from Dolby, Philips, Technicolor, Samsung that are considered sufficiently different to make it impossible to rationalize into a single method. Drafts exist for all Parts except Part 2.

Status: This group held a meeting during this round, and made some changes to the distribution of information between the documents in the suite.
ST 2094 Parts 1 and 30 went to pre-FCD-ballot review and the comments are being worked on; expect FCD ballots 3-4 weeks.
ST 2094 Parts 10, 20, 40 will be updated to track the changes in Parts 1 & 30; expect pre-FCD-ballot reviews 3-4 weeks.
Initial discussions on ST 2094 Part 2 were held.

DG Project: New Document: RP 2093 - Television Lighting Consistency Index

The project scope is to document “Television Lighting Consistency Index (TLCI)” and “Television Lighting Matching Factor (TLMF)”. The introduction of LED lighting technologies is leading to unintended and possibly expensive consequences, including poor color matching between different light sources, and very hard-to-correct color reproduction. There is currently no standard method to quantify the quality of lighting with regard to color reproduction for Television.

Status: Drafting of the RP 2093 document is progressing and expected to be ready for pre-FCD ballot review shortly. There was an enquiry about whether it covered UHDTV applications. Currently, it is based on BT.709 colorimetry, but could be extended to BT.2020 colorimetry quite easily.

DG Project: New Document: ST 2100-1 - Definition and Representation of Haptic-Tactile Essence
This project deals with technology to allow a remote viewer to receive and experience not only audio and video, but also the haptic or tactile "feeling" and "impact" of an event, regardless of the transmission means. There is an associated transport project in TC-32NF.

Status: The draft ST 2100-1 passed FCD-ballot on 2015-06-05 with 88 comments to resolve. At the time of the meeting, 3 comments remained unresolved.

DG Project: New Document: RP 219-2 - UHDTV Color Bar Signal
RP 219-2 will specify the parameters needed to apply color bars to UHDTV and 2k, 4k production image formats (per ST 2048-1). It will scale the spatial parameters from the HDTV spatial parameters of RP 219-1.
The intent is to have a test signal for use on interfaces, not to design the best possible test signal for critical examination of the production chain.

Status: The draft RP 219-2 passed FCD ballot 2015-09-18, with 22 comments to resolve.

DG Project: Amendment ST 2048-1: 2160-line and 1080-line Production Image Formats for Digital Cinematography
This project adds additional frame rates (nominal 96, 100, 120 fps) to ST 2048-1 to satisfy user requirements and bring production image formats in line with existing distribution formats.

Status: The amendment passed FCD ballot 2015-08-28 with 5 comments to resolve. Comment resolution has started.

RDD Project: New RDD 36: Apple ProRes Decoder
This project will produce an RDD that documents Apple ProRes decoding functionality and Apple ProRes video bitstream. It will contribute sample ProRes bitstreams and the resulting images, as well as a reference decoder.
The reference decoder is C code and it will be part of the balloted RDD as a zipped SMPTE Element. This software decodes ProRes elementary streams.

Status: The RDD passed ballot on 2015-06-26 with 14 comments to resolve. Comment resolution is underway.

RDD Project: Draft RDD 34: Sony Low Latency Video Codec within an IP Network Environment
This RDD describes a codec scheme implemented in Sony equipment that supports a degree of compression whilst providing low latency and high picture quality.

Status: The RDD passed ST Audit on 2015-08-31. The document is in the publication queue.

RDD Project: IntoPIX TICO lightweight Codec used in IP Networked or SDI infrastructures
This document defines a lightweight compression scheme to support multiple HD and UHD streams on 10G IP networks or 3G-SDI infrastructure. A 2-part document is proposed:
PART 1: TICO lightweight compression
PART 2: TICO mapping for SDI & IP infrastructures

Status: At the meeting, it was reported that the draft is being updated following comments from TICO implementers. It will be submitted to the DG early in October for 2 weeks of informal review.

Film Technology Committee (20F) chaired by David Schnuelle

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.

This group does not meet during the quarterly sessions.

Topic: TC-20F documents published in the last quarter

None

Digital Cinema Technology Committee (21 DC) chaired by Dean Bullock and Mike Radford

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.

Topic: TC-21DC documents published in the last quarter

None

Topic: Facility List Management projects
These two projects are being managed in one DG

DG Project: Revision of ST 430-7 – Facility List Message
Add the Extended Facility List Message with the objective of minimizing changes over current practice, while simplifying extensibility and introducing additional features as required.

Status: The document's example schema is almost complete and the document should be ready for pre-FCD-ballot review following the 2015-09-24 meeting.

DG Project: New Document - Facility List Message Exchange Protocol
Project scope: Specify a protocol to efficiently publish, retrieve, synchronize and submit aggregate FLM instances over the web, based on current industry practices.

Status: The document should be ready for pre-FCD-ballot review following the 2015-09-24 meeting.

Topic: Stereoscopic Subtitle / Timed Text projects

Drafting Project Proposal: Revision of ST 428-7: D-Cinema Distribution Master - Subtitle
This revision results from a request from Japan Digital Cinema Forum (JDCF). The work involves clarification of ST428-7 provisions and revision to better match Japanese content creator requirements.

Status: The project was approved during the meeting round.

Drafting Project: Revise ST 429-2: DCP Operational Constraints
This revision project will address issues that arose during the ST 428-7 revision.

Status: The revised draft is ready for pre-FCD-ballot review, but will be held until the ST 429-5 revision is also ready. There is consideration of changing the scope of this project to integrate ST 429-13 into ST429-2 and add the "HFR" framerates. Still under discussion.

Drafting Project: Revise ST 429-5: Timed Text Track File
This revision project will address issues that arose during the ST 428-7 revision.
The scope has been expanded to include IMF application, references to MXF now allow different Generic Containers, optional Timed Text Descriptor items have been added (including Stereoscopic Subtitles).

Status: The revision has progressed over the last quarter, but there is more to do before it will be ready for pre-FCD-ballot review.

Business Impact: Compatibility and Interoperability

SG Project: D-Cinema Crypto Evaluation (FIPS Revisions)
This project examines the impact of changes to the FIPS encryption algorithm (deprecation of old random number generator).

Status: A document proposing a method to deal with the transition "DCI Proposal: KDM-Borne Message Integrity Code (MIC) Keying" was submitted to the group 2015-06-04. A new project proposal has been introduced to implement the system (see below).

Proposed DG Project: **Revision of ST 430-1: Key Delivery Message**
This project will amend ST 430-1 to support delivery of MIC payloads in KDMs and cryptographic keys for AuxData essence.

Status: Awaiting project approval

New 21DC Business
Proposed DG Project: **Amendment to ST 429-6 MXF Encryption for TC-35PM**
This project will amend ST 429-6 to incorporate requests from TC-35PM for use by IMF. Amendments to other TC-21DC documents are also required to support IMF.

Status: The DG has received an additional request from US Library of Congress to make changes to support AS-07 (archive format). After discussion it was decided that this request is not about Digital Cinema and that the SVP should be asked to consider other TCs for the requested work.

Proposed DG Project: **Digital Cinema XML Constraints**
This project will draft a Standard containing the XML constraints already reviewed by the Stereoscopic Subtitle and Timed Text Rendering drafting group.

Status: A SMPTE Administrative Guideline AG05 "XML Schemas" is being revised and it was decided to wait for the outcome of a meeting of that group the following week before taking this project further.

Television and Broadband Media Committee (24TB) chaired by Michael Dolan

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.

Topic: TC-24TB documents published in the last quarter

None

DG Project: Draft ST 2064 suite of documents on A-V Sync Measurement and Assessment

The scope of this group is "Define recommended techniques for audio-video synchronization error measurement, and techniques and environment for synchronization assessment". It is developing a document suite based on audio and video fingerprints:

- Part 1: Fingerprint Generation
- Part 2: Fingerprint Stream Transport (includes VANC in SDI/HD-SDI, IP, MPEG)
- Part 3: Fingerprint File Binding
- Part x: Engineering Guideline

Status: Parts 1 and 2 are at ST Audit, closing 2015-10-08. The DG has decided that the next work will be an EG on this technology, to be followed by Part 3.

Business Impact: Improved quality of experience and interoperability between systems

DG Project: New Document: Open binding technology for persistent content identification in A/V essence

This project will develop an open binding technology standard (e.g., watermarks, fingerprints, metadata sidecars, etc.) for embedding end-to-end persistent content identifiers into audio/video essence in a way that survives processing, compression and distribution. This work had its foundations in a Technology Committee report, "Open Binding of IDs to Audiovisual Essence Report", available here. The group's focus is on carrying Ad-ID and EIDR identifiers, though it might be possible that others could be added later.

Status: The group issued a Request for Proposals (RFP). It has also developed a Test Plan. There is currently a pause whilst requirements are reconsidered. Drafting of the Standard is due to start in the New Year. It has been identified that an RP dealing with utilization of the ID will also be needed.

DG Project: Revision of Closed Captioning suite documents

This project is a straightforward updating of references for documents ST 333:2008, ST 334-1:2007, ST 334-2:2007, and RP 2007:2007 that cover carriage of CEA-708 (and CEA-608) closed caption data over various interfaces.

Status: ST 334-1 and ST 334-2 are published.
Revised ST 333 and RP2007 working drafts are expected before the December meeting round.

DG Project: Revision ST 2010: VANC Data Mapping of ANSI/SCTE 104 Messages

This project is a straightforward updating of references.

Status: A working draft revision was posted for pre-ballot review some while ago and comments were received. Additional detailed comments have recently been received and they will be addressed in an update to the working draft.

DG Project: Revision of ST 96: 35- and 16-mm Motion-Picture Film — Scanned Image Area

Status: This project will be completed when time permits, and will be removed from future Technology Committee agendas.

Cinema Sound Systems (25CSS) chaired by Brian Vessa and Kurt Graffy

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.

The TC is maintaining a workflow chart, identifying how its projects link up and where other work is needed. A regular feature of the meetings is a set of rapporteur reports from related organizations – MPEG, AES, EBU, InfoComm, ITU, ASA.

DG Project: New Standard ST 2095-1: Calibration Reference Wideband Pink Noise Signal and Test File
Examination of various "reference" noise files has revealed inconsistency in both RMS and Peak amplitude values. This group will create a pink-noise calibration Standard, and produce a reference pink-noise .wav file and a DCP containing the file. The pink noise characteristics defined in ST 202:2010 and RP 200:2012 will be used as a basis, and the algorithm used to generate the pink-noise file will be specified.

Status: ST 2095-1 is in the publication queue, expected shortly. The group still needs to determine the specifics of the test DCP file for distribution.

DG Project: Draft RP xxxx: Digital Cinema Sound System Setup and Calibration ("B-chain Modern Calibration Procedure")
This group will create a Recommended Practice that codifies and expands currently-practiced measurement methodology using today's technology and analyzers into step-by-step procedure(s) for measuring and calibrating the frequency response and sound pressure levels of the B-chain sound system in indoor theater spaces. A major rewrite was completed and submitted to the DG in early 2015-02.

Status: The DG decided in a meeting on July 30, 2015 that the section on microphone placement needed further revision before release to real world testing. An ad hoc group was tasked with revising this section.

It is planned that the completed document will go for "real world" testing by commercial technicians (predicted to be October / November 2015). Any comments received will be addressed in a final editorial pass before the document goes to ballot in 2016.

WG Project: Interoperability of Immersive Sound Systems in Digital Cinema
This working group is charged with identifying areas of the D-Cinema architecture that require standardization to achieve interoperability of audio for systems with capability greater than 7.1. It will create engineering documents as needed, including standardizing a single object-based distribution file format and related protocols for interoperable playback into a variety of theatrical speaker configurations.
The group is also considering recommended calibration methods for these audio playback systems as well as any other standards the group determines to be necessary to achieve D-Cinema interoperability. A suite of documents is anticipated.

Status: This WG (25CSS-10) is currently concentrating on the work of the following drafting groups:

DG Proposed Project: Digital Cinema Immersive Audio Renderer Baseline Expected Behavior
This new project has been set up to develop an EG on the baseline expected renderer behavior, followed by an RP defining a testing procedure.

DG on Immersive Sound Model & Bitstream
This group's initial focus, on Metadata Definitions, is near completion and a candidate WD will be reviewed at its next meeting. Work is now underway on a Bitstream Specification. Three input documents were submitted – Dolby Immersive sound bitstream, DTS MDA bitstream and a Dolby Lossless Audio codec.

Other 25CSS Business
The TC Chair mentioned the importance of Next Generation Cinema Sound work and anticipates project proposals on this subject, perhaps by the December meeting round.

Metadata and Registers Committee (30MR) chaired by John Hurst

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.

Topic: TC-30MR documents published in the last quarter

None

DG Project: EG 2061: Glossary of Stereoscopic 3D Terms
This project takes as its starting point the glossary developed by the 3D Home Master project in TC-35PM.

Status: Pre-DP-ballot review is in progress.

Business Impact: Understanding and common use of terms

Topic: UMID Projects

The Chair of the following closely related projects gave a status report. Note that a third project in this set, revision of RP 205, has published and the DG is disbanded.

SG Project: Application of the Unique Material Identifier (UMID)
The UMID is standardized in ST 330 and RP 205 covers application of UMIDs in Production and Broadcast Environments. This SG is studying ways to make the UMID more useful, particularly in Material location across various systems. The SG is preparing two reports:
- Study Report on UMID Applications Part 1 (UMID Application Principles, Best Practices) - complete and submitted to HQ.
- Study Report on UMID Applications Part 2 (Additional Technology that needs Standardization)
  - Part 2.1: UMID Resolution Protocol, UMID-based Program Package Exchange – approved 2014-06
  - Part 2.2: UMID Applications in MXF

Status: Part 2.2 of the report has been posted by the TC Chair for 2-week review, closing 2015-09-24, prior to making a recommendation to the SMPTE Standards VP to publish. After TC approval of the report, projects will be initiated for an RP on "The Domains of Media Identity" and on ST 330 extensions.

DG Project: UMID Resolution Protocol
This project will draft a new SMPTE standard that specifies an industry-standard method for a given UMID to be converted into the corresponding URL of its audiovisual (AV) material. It follows from SG report Part 2.1.

Status: An initial strawman draft was submitted to the DG on 2014-12-05. Drafting work is expected to resume in the next quarter.

DG Project: New Standard ST 2102: SMPTE Core Metadata Set
This group's scope is to define an interoperable minimum core set of descriptive metadata for professional motion imaging applications and users.
Existing SMPTE metadata is application-specific and is not supported right through media workflows.

Status: The draft Standard (together with associated schema) has been submitted for informal review. The TC Chair will initiate formal pre-ballot review.

Business Impact: Potential foundation for Metadata

SG Project: Metadata Strategy
This review of the role of the TC started in the 2012-03 meeting round, examining how the focus of the TC should expand beyond the registration of metadata and towards standardizing metadata schemes and XML projects.

Status: No progress; effort devoted to intensive 30MR10 register cleanup work and register ballot comment resolution.

Topic: Register Structure Document Projects

There are several SMPTE standards defining the structure of various metadata registers defined by ST 336: Data Encoding Protocol Using Key-Length-Value. They are all being updated to include new requirements such as including xml symbols. Four of these updates are now published:
- ST 335:2012 Metadata Element Dictionary Structure
- ST 400:2012 SMPTE Labels Structure
- ST 2003:2012 Types Dictionary Structure
- ST 395:2014 Groups Register Structure

DG Project: Draft ST 2088: SMPTE Essence Element Key Register Structure
This project creates a controlling standard for SMPTE ULs used as essence keys in MXF standards.

Status: The draft has been revised to address DG comments and submitted to the TC Chair to initiate 2 week pre-FCD-ballot review.

DG Project: Revision ST 336: Data Encoding Protocol Using Key-Length-Value
Revise ST 336 to update references and review whether its provisions reflect current register operation.

Status: The DG has reviewed a draft incorporating comments from the previous telecon. One further comment was received. It was part of a proposal to change a number of 30MR documents to permit 12-byte labels as well as 16-byte labels.

WG Project: Metadata Definition
This Working Group (30MR10) co-ordinates a number of DG projects for adding or maintaining metadata items in registers. Because the registers are updated frequently, a version number identifies each revision.

Experts within the WG have been working on a cleanup of the register data, in particular the removal of redundancy. There has been a move to the use of xml to represent the registers.

Status: The four registers in xml form (for the first time) passed FCD ballot on 2015-05-18 with 13 comments to resolve. At the time of the meeting, one comment remained unresolved. A Disposition Vote was held, but did not gain consensus, so it was decided that comment resolution will continue for a further 30 days.

The individual register projects below will not be updated while the transition work is in process, and it is likely that they will be replaced or amended by the new process.

DG Project: Update Metadata Element Dictionary Contents (RP 210)

DG Project: Update Metadata Labels Register Contents (RP224)

DG Project: Create and Update Groups Register Contents
For some while, an informal Groups Register has being maintained.

DG Project: Create and Update Types Register Contents
For some while, an informal Types Register has being maintained.

DG Project: Create and Update Essence Element Register Contents
The group will create a register of SMPTE ULs for use as essence keys and process requests for register additions, modifications and deprecations.

File Formats and Systems Committee (31FS) chaired by Thomas Bause Mason and Pierre Lemieux

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.

Topic: 31FS Publications in last quarter

SMPTE ST 434:2014, Material Exchange Format — XML Encoding for Metadata and File Structure Information

---

Topic: Material Exchange Format (MXF)

MXF defines a file format for Video, Audio and Data essence along with associated Metadata, for use in production systems (rather than final delivery).
There are several MXF projects under way. Some define new MXF features / applications, others revise existing documents for better interoperability.

Business Impact of all MXF-related work items: Interoperability between systems in file-based production

DG Project: New Document: ST 377-2 - KLV-encoded extension syntax (KXS)
This work specifies an alternative approach to the 'Application Metadata Plug-ins' specified in SMPTE 377-1.

Status: The document passed a second FCD ballot on 2013-11-17 with 70 comments. All comments had been resolved by the last meeting and the DG Chair had uploaded the revised draft for pre-DP review. However, there is dialog with the TC-20MR register editor regarding the ULs; when this is resolved, the document can proceed to pre-DP-ballot review.

DG Project: Revision ST 380: MXF Descriptive Metadata Scheme 1
The current document has been reviewed and it was identified that some changes are required.

Status: This project was only agreed at the 2015-07 meeting, and work has not yet started.

DG Project: Revision EG 42: MXF Descriptive Metadata
Changes that arose during ST 380 revision have been incorporated in the EG 42 draft.

Status: This revision closed ST Audit on 2015-07-26 and is in the publication queue.

DG Project: New Document: ST 2042-4 - Wrapping VC-2 Video Essence in the MXF Generic Container

Status: This document passed FCD reballot on 2015-08-13 with 10 comments to resolve. All have been addressed, awaiting commenter response.

DG Project: New Document: ST 381-4: AAC Family Compressed Digital Audio in MXF
This new MXF mapping document will cover all the variants of AAC that are used in broadcast applications.

Status: The DG Chair reported that the document is ready for FCD ballot, and the ballot package will be assembled.

SG Project: MXF Timecode Mapping and Labeling
It has been identified that a number of topics on the use of timecodes in MXF require additional guidance or definition. This project will review requirements, existing techniques and documents, and if necessary propose revision or new documents.

Status: The SG is ready to start its documentation. The first item will be a glossary, so that all terms relating to timecode in MXF will be consistently used.

DG Project: New Document: RP 2092-2 - Ad-ID Digital Ad Slate for MXF
The group will develop a Recommended Practice, with principal input document being AMWA AS-12 (which this document will ultimately replace). An associated Ad-ID representation project is complete in TC-30MR.

Status: The document passed FCD reballot on 2015-08-05 with 37 voter comments; all have been resolved. Some pre-DP-ballot review comments from the TC-30MR registry editor are being worked on, then the document can proceed to DP ballot.

DG Project: New Standard ST 2073-10: VC-5 Mapping into the MXF Generic Container
This project creates a standard for mapping a VC-5 bitstream into the MXF Generic Container, supporting the VC-5 Image work in TC-10E.

Status: The draft Standard passed FCD ballot 2015-06-08 with 8 comments to resolve. All comments are resolved; when the requested ULs are confirmed, the document will be ready for pre-DP review.

DG Project: Revision of ST 2019-4:2014 (Mapping VC-3 into the MXF Generic Container)
This project will add support for image resolution independence.

Status: The document was elevated to DP status at the previous TC meeting, however ST Audit has not yet started; the TC Chair will investigate.

Society of Motion Picture and Television Engineers®
3 Barker Avenue
White Plains, NY 10601 USA
www.smpte.org

Topic: Archive Exchange Format (AXF)

This Working Group (31FS-30) will define an archive format that will promote interoperability between all forms of archive media. A multipart suite of documents is planned:
Part 1 deals with 'AXF Structure and Semantics' and includes an XML schema.
Part 2 will cover "External Uses of XML Schema".

Business Impact: Interoperability and more cost effective handling of technology migration issues in archives

WG Project: ST 2034-1: Archive eXchange Format (AXF) - Part 1: Structure & Semantics
The Part 1 document is published. However, initial implementation work has shown up some inconsistencies between the prose and the XSD file and a revision project has been started.

Revision Project Status: Revision is believed complete, but new input has been received and it will be decided whether further revision should be incorporated.

WG Project: New Document: ST 2034-2 - Archive eXchange Format (AXF) - Part 2: External Uses of XML Schema
Part 2 covers the use of AXF Structures in "Unwrapped" form, enabling aggregation of files into a "Bundle". The schema can serve as a manifest and it can apply hierarchical structure to files. It is intended for use from file capture on set through to archive input. There was a strong end-user demand for this work.

Status: Drafting has begun. The group is still deciding exactly what is needed. A new document editor is required.

DG Project: ST 2001: XML Representation of SMPTE-registered Data (Reg-XML)
ST 2001 is about representing instances of SMPTE-registered data in XML.
There are two Parts: ST 2001-1: Mapping Rules (includes 2 schemas)
ST 2001-2: AAF and MXF data (includes an XML meta-dictionary and schema)

Status: Part 1 was published 2014-Q2. An issue about missing xml elements was discovered soon after publication. The corrected draft of Part 1passed ST Audit on 2015-07-26 and the document is being proof-read for publication.
Part 2 was published 2014-Q3.

Other TC-31FS Business

ST 382: Material Exchange Format — Mapping AES3 and Broadcast Wave Audio into the MXF Generic Container

Existing amendments will be rolled-up into ST 382 and there will be a vote to reaffirm when this is done.

Network and Facilities Architecture Committee (32NF) chaired by Friedrich Gierlinger and John Snow

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.

Topic: 32NF Publications in last quarter

SMPTE ST 318:2015 (Revision of SMPTE 318M-1999), Synchronization of 59.94- or 50-Hz Related Video and Audio Systems in Analog and Digital Areas — Reference Signals

SMPTE ST 425-3:2015 (Revision of SMPTE ST 425-3:2014), Image Format and Ancillary Data Mapping for the Dual Link 3 Gb/s Serial Interface
And:
Amendment 1:2015 to SMPTE ST 425-3:2014, Image Format and Ancillary Data Mapping for the Dual Link 3 Gb/s Serial Interface — Amendment 1

SMPTE ST 425-5:2015 (Revision of SMPTE ST 425-5:2014), Image Format and Ancillary Data Mapping for the Quad Link 3 Gb/s Serial Interface
And:
Amendment 1:2015 to SMPTE ST 425-5:2014, Image Format and Ancillary Data Mapping for the Quad Link 3 Gb/s Serial Interface — Amendment 1

SMPTE OV 2036-0:2015 (Revision of SMPTE 2036-0:2013), Ultra High Definition Television — Overview for the SMPTE ST 2036 Document Suite

SMPTE ST 2036-4:2015, Ultra High Definition Television — Multi-link 10 Gb/s Signal/Data Interface Using 12-Bit Width Container

---

WG Project: SDI Interfaces

This Working Group (32NF40) scope is:

Manage Engineering Documents dealing with electrical and optical SDI interfaces with nominal link rates up to 3Gb/s as well as a 10
Gb/s optical interface including the mapping of essence, data, and metadata and the details of the physical interfaces.

Status: The WG Chair gave a report on its projects, detailed below.

The **business impact** of all WG 32NF40 work items concerns interoperability between systems.

DG Project: New document suite SMPTE 2076: Stereoscopic 3D (S3D) Production Timing and Synchronization
The suite of four documents that were FCD balloted (ST 2071-1 Camera Systems, ST 2071-2 Live Production Systems, ST 2071-3 Physical Layer for Video Transport, EG 2071-4 Physical Layer and System Guidance have been reorganized in line with ballot comments as:
RP 2076-1, "Production Timing and Synchronization – for S3D or Multi-View Camera Systems"
EG 2076-2, "Synchronization for Stereoscopic 3D (S3D) or Multi-view Images- Alignment, Transport and System Guidance". They will be reballoted.

Status: RP 2076-1 passed FCD ballot 2015-04-09 with 33 comments; work continues on the 3 remaining unresolved comments.
EG 2076-2 is almost complete and the document will go to FCD ballot shortly.

DG Project: SDI Audio Track Allocation Signaling
This project will define a signaling mechanism, likely to be carried in Vertical Ancillary Data Space, that provides serial digital interfaces with a means to clearly identify the configuration parameters of any given SMPTE ST 299-1 or -2 embedded audio track.

Status: This work is expected to resume shortly. The DG Chair noted that the ITU-R recently published Recommendation BS.2076 – Audio Definition Model. This recommendation may prove sufficient in addressing the audio metadata 'gaps' issue raised by this Drafting Group.

DG Project: New Document: EG on SDI Interfaces
This group will draft EGs to provide a tutorial on the many SMPTE SDI interface standards and technologies, including how they relate to each other, what image formats are carried, performance. As this task is potentially large, it was decided at the 2015-07 meeting that initial focus would be on HD and UHD SDI interfaces.

Status: This group has met twice since the July Standards meetings in Sydney and plans to resume a regular bi-weekly schedule.

A set of diagrams describing the relationship between image formats, interfaces and payload rates for HD and UHD interfaces has been submitted for review. Hopefully, these diagrams will be useful in guiding the development of the EG's structure.

DG Project: Revision of RP 184: Specification of Jitter in Bit-Serial Digital Systems and Revision RP 192: Jitter Measurement Procedures in Bit-Serial Digital Interfaces

Status: Both document revisions are now in the publication queue.

DG Project: Revision of EG 34: Pathological Conditions in Serial Digital Video Systems and Revision RP 198: Bit-Serial Digital Checkfield for Use in High-Definition Interfaces
It has been agreed that RP 198 – HD Check-field – is higher priority than EG 34, in order to get 3Gb/s interfaces specified, and should be completed first.

Status: The work is being carried out using a style that should allow 6Gb/s and 12Gb/s to be added later with minimal re-work of existing content. It is hoped that a review cycle can be achieved before the next face to face meeting.

DG Project: ST 2036: UHDTV Multi-link 10Gb/s interfaces
The DG is working on 2 documents:
ST 2036-3 revision to constrain original document to UHDTV1 formats up to 60Hz carried in a 10-bit container and include colorimetry signaling.
ST 2036-4 covering UHDTV1 @ 100Hz / 120Hz and UHDTV2 24Hz to 120Hz carried in a 12-bit container.

Status: ST 2036-4 is published.
The ST 2036-3 amendment passed ST Audit 2015-08-31 and is now in the publication queue.

DG Project: New Document: ST 2091 - Broadcast and Video Serial Digital Fiber Transmission Systems – Ruggedized Connector Interfaces
This project will create a standard for a ruggedized optical connector suitable for SDI as used in HDTV and UHDTV systems. The system also has the following features: automatic dust protection, automatic laser source eye protection, high durability, low maintenance and small size.

Status: A new draft document (v1.1) has been posted to the DG for review and comment. A new section has been added on labeling requirements for improved interoperability. The document includes information on the carriage of signals defined in ST 2036-4, and that document defines its own connector. There was discussion on how this issue should be handled.

DG Project: **New ST 2100 Suite: Transport of Haptic-Tactile Essence**
This project has been split away from the **TC-10E project** on Coding of Tactile Essence in order to focus on defining the *transport* of this essence.

Status: Two Drafting Projects have been set up (both projects are the proposal stage):

Drafting Project ST 2100-2: Coding and Transport Of Haptic-Tactile Essence in AES3
At the 2015-09 meeting, it was decided that this group may also define the use of HANC space for carriage.

Drafting Project ST 2100-3: Coding and Transport Of Haptic-Tactile Essence in Ancillary Space
At the 2015-09 meeting, it was decided that this group may confine its attention to the use of VANC space for carriage.

DG Project: **CWDM optical interface for multi-link SDI**
This project will standardize a Coarse Wavelength Division Multiplex optical interface for multi-link SDI. It is proposed that this document should be ST 297-2, with ST 297 renamed to ST 297-1.

Status: At this meeting round, it was decided to add a number of other SDI standards to the scope for this work. It was clarified that the intent is to transport audio as well as video over this interface.

WG Project: Video Over IP
This Working Group (32NF60) was established to handle projects related to IP transport of media. The WG has produced the 7-Part ST 2022 suite of standards.

Status: The group currently has no projects.

WG Project: New Document suite: Ultra HD SDI Interfaces
This Working Group (32NF70) was established to create a hierarchy of single-link, dual-link and quad-link electrical and optical SDI interfaces with nominal link rates of 6Gb/s, 12Gb/s and 24Gb/s.

Status: The WG met during this meeting round. Many FCD ballot comments on Part 11 and Part 12 affected both ST 2081 and ST 2082 documents. To resolve 14 comments, a new project "**10E 2160-line and 1080-line Production Image Formats for Digital Cinematography - Additional Frame Rates**" was started.
Also, an **amendment project** to correct the jitter specification in ST 2081-1 and ST 2082-1 is underway in this DG.
2 Time code comments will be resolved by referencing the new ST 12-3 standard.
Other progress is covered in each of the projects below.

DG Project: New ST 2081 suite: 6Gb/s Signal/Data Serial Interfaces
This project is developing documents:
ST 2081-1: 6Gb/s Signal/Data Serial Interface – Electrical (published)

ST 2081-10: 2160-line and 1080-line Source Image and Ancillary Data Mapping for **Single**-link 6G-SDI (published)
ST 2081-11: 2160-line and 1080-line Source Image and Ancillary Data Mapping for **Dual**-link 6G-SDI
ST 2081-12: 4320-line and 2160-line Source Image and Ancillary Data Mapping for **Quad**-link 6G-SDI
There are also 3 documents (like -10, -11, -12) planned for stereoscopic content and a multistream mapping document (multiple 1.5G and 3G over 6G).

Status: ST 2081-11 passed FCD ballot 2015-03-09 with 13 comments to resolve.
ST 2081-12 passed FCD ballot 2015-03-09 with 26 comments to resolve.

DG Project: ST 2082 suite: 12Gb/s Signal/Data Serial Interfaces
This project is developing documents:
ST 2082-1: 12Gb/s Signal/Data Serial Interface – Electrical (published)
ST 2082-10: 2160-line and 1080-line Source Image and Ancillary Data Mapping for **Single**-link 12G-SDI (published)
ST 2082-11: 2160-line and 1080-line Source Image and Ancillary Data Mapping for **Dual**-link 12G-SDI
ST 2082-12: 4320-line and 2160-line Source Image and Ancillary Data Mapping for **Quad**-link 12G-SDI
There are also 3 documents (like -10, -11, -12) planned for stereoscopic content and a multistream mapping document (multiple 1.5G, 3G, 6G over 12G).

Status: ST 2082-11 passed FCD ballot 2015-03-09 with 19 comments to resolve.
ST2082-12 passed FCD ballot 2015-03-09 with 29 comments to resolve.

WG Project: Time Labeling and Synchronization
This Working Group (32NF80) was established to handle projects for next-generation synchronization of systems using packetized networks and time labeling of essence in both digital and analog forms.

Status: The WG met during this meeting round. The main projects discussed were the 2059 Engineering Guidelines, the Time Labels projects, the PTP interoperability group and the HFR time code project.

Business impact of WG 32NF80 work items: Network-based synchronization schemes and new functionalities for time labeling.

DG Project: Network-based Synchronization System
The main work of this group is complete, following the publication of:

ST 2059-1: The SMPTE Epoch and generation and alignment of interface signals
This document contains:

Definition of epoch used for synchronization system
Alignment of video and audio signals at the epoch
Formulas for generating video, audio, ST 12 time code and ST 309 date from TAI time via PTP and additional metadata

ST 2059-2: Precision Time Protocol SMPTE profile for time and frequency synchronization in a professional broadcast environment
This document defines the IEEE 1588 PTP profile for the SMPTE synchronization system.

DG Project: New Document ST 12-3: Time Address for High Frame Rate signals and its data structure in the ancillary data space
Project Scope: To create a standard specifying time address for HFR and its data structure in the ancillary data space. The document will specify rates of 72, 96, 100, 120 and 120/1.001 fps and it will be extensible to cover rates of up to 960 fps.

Status: Draft ST 12-3 passed FCD ballot 2015-06-19 with 26 comments to resolve. At the meeting, the one unresolved comment was withdrawn. The revised draft will now be submitted for pre-DP-ballot review.

DG: PTP Interoperability Testing
The aim is to confirm that the provisions of the standards are unambiguous and that the technology does, indeed, yield the intended results. Interested parties may join the group, subject to signing an agreement.

Status: The group has met several times since its formation at the 2015-03 meeting round. It has agreed an overall approach and drafted a Memorandum of Understanding under which the testing will be done, currently being reviewed by the SVP and HQ.
The first round of testing will be the week of 2015-11-09, hosted by FOX NE&O in Houston, TX.

AHG: Golden test vector for ST 2059-1 creation
This group has been developing a set of "Golden" test vectors with known results for testing implementations. The AHG Chair reported that the group aims to round out this work before the first interoperability meeting.

DG Project: Development of a set of synchronization Engineering Guidelines "EG 2059-1x"
This is an "umbrella" project. The group facilitates development of a suite of Engineering Guidelines related to the ST 2059-1 and ST 2059-2 Synchronization documents in the drafting projects below. These documents are an important way to ensure that new implementers, who may not have been part of the development, will correctly implement the system.

Status: A Chair for this DG is sought. The four EG drafting projects below have been set up, and a draft exists for a possible fifth one on "Local Time" – now likely to be a recommended practice, RP

2059-20 – see project proposal. At the TC meeting, the possibility of another EG on interoperation with AES67 was mentioned.

Drafting Project: New Document: EG 2059-10 - Introduction to the New Synchronization System

Status: At the time of the meeting, this document was at FCD ballot, closing 2015-10-16.

Drafting Project: New Document: EG 2059-11 – Management of Time Discontinuities

Status: A WD was submitted 2015-04-20.

Drafting Project: New Document: EG 2059-12 - Systemization Considerations for using SMPTE ST 2059

Status: This document had previously been called "Facility Migration Guide". A WD was submitted 2015-04-23; an updated version is expected soon.

Drafting Project: New Document: EG 2059-14 - Best Practices for Large Scale SMPTE ST 2059-2 PTP deployments

Status: The most recent WD was submitted 2014-11-26, but it is understood that the co-authors are developing an updated version that will be posted very soon.

DG Project: New Time Labeling System

This is an "umbrella" project. The group facilitates development of a suite of Time Labeling documents.

Status: A Chair for this DG is sought (the pro-tem Chair is unable to devote enough time to get the work moving). There are currently three label document suites being developed:

Drafting Project: SMPTE 2103 Suite: Generic Time Label

Status: An updated suite of documents was uploaded 2015-07-08:
ST 2103-1: Generic Time Label - Data Definition
ST 2103-2: Generic Time Label - Transmission in Ancillary Data Space
ST 2103-3: Generic Time Label - Character Representation
RP 2103-4: Generic Time Label - Interoperation with Time and Control Code
RP 2103-5: Generic Time Label - Time and Date Calculations
The suite of documents was at FCD ballot at the time of the meeting. Update: The ballots closed 2015-09-21.
Part 1 passed with 55 voter comments to resolve. Part 2 passed with 47 voter comments to resolve. Parts 3, 4 and 5 failed to achieve numeric consensus and received 56, 44, 73 comments respectively.

Drafting Project: SMPTE 2105 Suite: Full-featured Time Labels (aka "TRL")

Status: The current suite comprises:
EG 2105-1: Time Related Label (TRL) – Ecosystem
RP 2105-2: Time Related Label (TRL) – Terms, Definitions and Timescales
ST 2105-3: Time Related Label (TRL) – Media Index Counts
ST 2105-4: Time Related Label (TRL) – Data Objects and Container Structure
ST 2105-5: Time Related Label (TRL) – Conversions
ST 2105-6: Time Related Label (TRL) – Character Format Encoding (TCF)
ST 2105-11: Time Related Label (TRL) – Ancillary Data Mapping
ST 2105-21: Time Related Label (TRL) – Legacy Timecodes
RP 2105-31: Time Related Label (TRL) – Profiles

The WG has been asked to review this suite of documents by 2015-10-31.

Drafting Project: RP 2104 Suite: Date-Time Terms and Definitions
It has been agreed that this document will comprise two Parts.
Part 1 will be Date-Time Terms and Definitions; this is required urgently so that it can be a Normative Reference for the other time / sync documents.
Part 2 will be other Media Terms and Definitions.

Status: A draft of RP 2104-1 has been posted for review and comment.

DG Project: **Amendment EG 40: Conversion of Time Values Between SMPTE 12-1 Time Code, MPEG-2 PCR Time Base and Absolute Time**
This project will make small corrections to formulas where errors had been pointed out during the 2014-06 meeting round.

Status: No progress in last quarter.

DG Project: Code-point Extension Mechanism for the ST 337 family
Originally, this "umbrella project" was set up to manage individual drafting projects needed to introduce a code-point extension mechanism for documents in the ST 337 family; the extension mechanism in ST 337 and the extended data types in ST 338 as well as revising or adding any other documents as required. Now, that the extension mechanism is done, the DG is being used to document other formats for encapsulation in AES3.

Status: The revised ST 337, ST 338, ST 339 and ST 340 documents are published. New Document "RDD 33 - Mapping of Dolby-E over AES3" has also published. The following Drafting Projects remain:

Drafting Project: Amendment of **ST 338: Format for Non-PCM Audio and Data in AES3 — Data Types**
Amendment to add AC-4 (code point 24), MPEG-H (code point 25), DTS type IV (code point 17) see these projects below.

Status: An updated WD is in DG review.

Drafting Project: New Document ST 2101 - AC-4 Data Type
A new document will be drafted and ST 338 data-type 24 will be requested.

Status: This document has passed DP vote and ST Audit will start.

Drafting Project: New document ST 2041-4 (proposed): MPEG-H in AES3
MPEG-H provides for carriage of immersive and interactive audio in the form of channels and objects and also in the form of Higher Order Ambisonics (HOA). The project will develop a standard to specify the format for carriage of MPEG-H data for professional applications as Non-PCM audio using the AES3 serial digital audio interface defined by ST 337.

Status: The project is approved. A draft document is awaited.

Drafting Project: New document DTS Audio over AES3

Status: The document is at FCD ballot, closing 2015-10-16.

Drafting Project: New document Audio Metadata over AES3
Develop new documents for the open transport over AES3 of real-time, dynamic (time synchronous) audio metadata. The use of the KLV data type, defined in ST 355, is being considered.

Status: The project was approved 2015-09-03. A presentation was given to the TC to introduce the planned approach.

SG Project: Flow Control in Professional Media Networks
This SG will investigate current and future professional media network management technologies, determine user requirements, transmission methods for management commands and provide background information. It will review existing standards and specifications and identify gaps / recommendation standards development.

Status: This SG held a meeting during this round. It has identified a set of initial tasks including the creation of a glossary (synchronized to terms used in the JT-NM task force), creating a questionnaire / questionnaires for users and suppliers and working on report structure.

DG Project: RDD Carriage of uncompressed video via MPEG Transport Stream over IP (Evertz)
The (abridged) project scope is: Outline the architecture and structure of small, simple changes to the existing broadly-used mpeg2 transport stream specification to accommodate transmission of uncompressed video over IP.
Provide details on how the separate elements are launched into the network and how they are re-aligned at destination locations.

Status: A draft of the RDD has been posted for pre-ballot review.

Media Systems, Control and Services Committee (34CS) chaired by Chris Lennon and John Footen

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.

Topic: BXF Suite of Documents

This TC is responsible for the suite of documents defining the Broadcast Exchange Format, comprising:
ST 2021-1: General Information and Informative Notes
ST 2021-2: Protocol
EG 2021-3: Use Cases
EG 2021-4: Schema Documentation
RP 2021-5: Ad-ID / EIDR in BXF
RP 2021-9: Implementing BXF
It is primarily an XML-based system that standardizes exchange of Schedule, As-run, Content Transfer instructions, Content-related metadata, and Agency instrutions. The group has an XML AHG which manages schema enhancements.
Features are steadily being added to BXF and these are batched into versions. The current published suite includes features introduced in versions up to BXF 3.0.

WG Project: BXF 4.0
The bulk of BXF 4.0 is schema work. The document suite (Parts 1, 2, 3, 4, 9) has been revised to add BXF 4.0 features such as:
Live Schedule Files – OATC support; Addition of Backup Events; Ability to Exclude From EPG;
Time Code In/Out Option; Low Res Proxy URL; Format sub element definitions;
Multiple episode support; Schedule Episode number; etc.

Status: Parts 1-4 and 9 are at ST Audit, closing 2015-10-09.

Proposed DG Project: BXF 5.0

BXF 5.0 is expected to include such things as: measurement data, QC data, file delivery parameters, trading partner registry, FIMS transfer connector, traffic instruction use cases.

Status: The BXF 5.0 project proposal has been approved, and this project is expected to begin shortly.

DG Project: Media Device Control over IP

This project is developing a suite of documents for the control of media-centric devices and services utilizing Internet Protocol and well-established Internet/IT standards and best practices wherever possible.

ST 2071-1: Media Device Control - Framework - Published in 2012, updated in 2014.
2015 Revision in process to add support for FIMS v1.2

ST 2071-2: Media Device Control - Protocol – Published in 2012, updated in 2014.
2015 Revision under development to add support for FIMS v1.2.

ST 2071-3: Media Device Control - Discovery – Published in 2014.
Describes Zero Configuration (ZeroConf) and Device, Service, and Capability discovery operations for Media Device Control using well established and widely used Internet Protocol standards.

ST 2071-4: Media Device Control - Capability Interface Repository
WSDL & XML Schemas are included.
Defines the Capability Interface definitions/API and systemic requirements for a repository/registry that can contain Capability Interface definitions, their corresponding documentation, programmatic artifacts, unit tests, and test cases. Provides a common infrastructure and API with which vendors and SDOs can register Capability Interface Definitions, their documentation, unit tests, and test cases and where Developers, Customers, and Interface Consumers can query the definitions, documentation, and tests for the Capability Interfaces implemented by Devices and Services used within their systems.

ST 2071-5: Media Device Control - RESTful Protocol+HATEOAS – New intended project, proposal will be issued. HATEOAS = Hypermedia as the Engine of Application State.

Status:
All four Parts closed FCD ballot (Parts 1-3 are revisions of the published documents). Part 1 closed 2015-07-15 with no comments; automatically DP status. Part 2 closed 2015-07-15 with no comments; automatically DP status. Part 3 closed 2015-07-16 with 9 comments. Part 4 closed 2015-07-15 with 3 comments. Comment resolution for Parts 3 and 4 is under way.

The project proposal for Part 5 is awaited.

Business Impact: Interoperable Media Device Control

Media Packaging and Interchange Committee (35PM) chaired by Annie Chang

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.

Business Impact: Interoperability between systems, cost effective exchange of master formats in file form and new functionalities.

Topic: 35PM Publications in last quarter

None

WG Project: ST 2067 Suite: Interoperable Master Format (IMF)
This Working Group (35PM-50) co-ordinates the activities of a number of DGs defining various aspects of IMF. IMF comprises a master set of file-based elements for any downstream distribution using multiple composition playlists. The master set of files is used as the input to subsequent processing that creates deliverables.
Published IMF documents:
ST 2067-2:2013, Interoperable Master Format — Core Constraints
ST 2067-3: Interoperable Master Format – Composition Playlist
ST 2067-5: Interoperable Master Format – Essence Component
ST 2067-8:2013, Interoperable Master Format — Common Audio Labels
ST 2067-20:2013, Interoperable Master Format — Application #2
ST 2067-21:2014, Interoperable Master Format – Application #2E (previously titled Application #2 extended)
ST 2067-30:2013, Interoperable Master Format — Application #3
ST 2067-100:2014, Interoperable Master Format – Output Profile List
ST 2067-101:2014, Interoperable Master Format – Output Profile List – Common Image Definitions and Macros
ST 2067-102:2014, Interoperable Master Format – Common Image Pixel Color Schemes
ST 2067-103:2014, Interoperable Master Format – Output Profile List – Common Audio Definition and Macros

Status: The bulk of the IMF standardization is complete. There are 5 projects (see below) to amend / revise documents in the suite in the light of plugfests and one-year review.

Activity continues in the Mezzanine Film Format DG - see below.
A new project has been proposed for ACES in IMF – see below.

DG Project: Amend/Revise ST 2067-20: IMF Application #2, JPEG 2000

Status: Draft is ready for FCD ballot

DG Project: Amend/Revise ST 2067-21: Application #2E
This extension supports higher JPEG 2000 specifications including resolution, frame rates and multiple color space encodings.

Status: Draft is ready for FCD ballot

DG Project: Amend/Revise ST 2067-2: IMF Core Constraints

Status: Passed FCD ballot 2015-09-10 with 3 comments to resolve.

DG Project: Amend/Revise ST 2067-3: IMF Composition Playlist

Status: Passed FCD ballot 2015-09-10 with 3 comments to resolve.

DG Project: Amend/Revise ST 2067-5: IMF Essence Component

Status: Passed FCD ballot 2015-09-10 with 1 comment to resolve.

AHG Project: IMF Sample Material Interchange (SMI)
This group has been set up to facilitate interoperability testing by making sample material available online. It is also organizing IMF plugfests (previous events 2015-03-27, 2014-10-24). Bug Tracking has been implemented and bug resolution will result in edits to the IMF standards in 1 year reviews – see: dev.imfforum.com/bugs

Status: The SMI has held one meeting in the last quarter. Another plugfest is planned for2015-10-23 at Netflix in Los Angeles. A plugfest specifically for App#4 (see below) is organized for 2015-09-22/23 in Paris.

DG Project: New Document ST 2067-40: IMF Application #4 Mezzanine Film Format
This standard will extend the capabilities of IMF Application #2, JPEG2000, to include amendments to satisfy cinematographic needs including (but not limited to) resolutions up to 8K, lossless J2K, XYZ and 16 bits. Intended for film archive applications.

Status: An initial draft was posted to the WG 2014-12-19.
The group is organizing an App #4 Plugfest – September 21/22 in Paris, immediately after this Standards meeting round.

Proposed DG Project: New Document IMF App#1 ACES (for long-term archiving)
A presentation was given at the previous TC meeting for a new application document to specify ACES in IMF. At this meeting, the project proponents have requested a delay in starting this project, to allow the container to be established first in TC-31FS.

Other TC-35PM Business

Problems with JPEG2000 Revision
Some issues have been raised with the JPEG revision for IMF. The TC Chair will post details to the TC for review.

Society of Motion Picture and Television Engineers®
3 Barker Avenue
White Plains, NY 10601 USA
www.smpte.org

Notes on this report and the SMPTE Standards Process

*SMPTE Technology Committees (**TCs**) are tasked with the development and ongoing maintenance of engineering documents relevant to Television, Broadband, Film and Digital Cinema. TCs are set up by the Standards Vice President (**SVP**) and are overseen by the Standards Committee (**ST**).*

The standards process operates under the SMPTE Standards Operations Manual (this revision effective from 2015-01-31). All participants must abide by these provisions.

*Within Technology Committees, there may also be Working Groups (**WGs**), Study Groups (**SGs**) Drafting Groups (**DGs**) and Ad-Hoc Groups (**AHGs**).*

*The 'Standards Community' (**SC**) is a "parent group" that includes all Technology Committees. It is used to convey information that is relevant to all TC's, such as meeting logistics and registration information. An SC meeting is held during each meeting round.*

SMPTE document development process

The document stages are:
***PD** = Project Draft* ***WD** = Working Draft* ***CD** = Committee Draft* ***FCD** = Final Committee Draft*
***DP** = Draft Publication, which initiates* ***ST Audit** - a due process check by the Standards Committee*

SMPTE document-type abbreviations

***ST** = Standard* ***RP** = Recommended Practice*
***EG** = Engineering Guideline* ***RDD** = Registered Disclosure Document*
***OV** = Overview used with multipart document suites*

SMPTE document review

The SMPTE Operations Manual calls for review of published documents:
- One Year after original publication - to check whether comments have been received during initial implementations and revise as required
- At Five Year intervals after original publication - to check whether the provisions need to be revised
There may be proposals to Revise or Amend documents, or they may be reaffirmed, made stable or withdrawn.

Other Notes

*This report describes each active **Project** in each TC. Occasionally, there is more than one project group working on a particular technology field. In this case, those projects are grouped under a **Topic** headline.*
*SMPTE manages its standards documentation, meetings and ballots in an online system called **Kavi**.*
*Kavi has a **Project View** that includes a publicly accessible project summary page. It is used to state the project justification at the proposal stage and to track progress through to completion.*
*In this report access to the project view is via a hyperlink in the **Project** word in the title.*