

Standards Quarterly Report June 2016



Result of SMPTE® Standards Committee Meetings

7- 10 June 2016

Hosted by CBS
New York, NY, USA



Society of Motion Picture and Television Engineers®

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SMPTE® Standards Quarterly Report: **Executive Summary**

As a result of SMPTE Standards Committee Meetings

7-10 June 2016

New York City, USA

Hosted by CBS

Nine SMPTE Technology Committees and 11 subgroups scheduled meetings at this round.

Over 70 members attended in person over the four 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 one hundred ninety active projects can be found in the [detailed account](#), below.

New Projects started in the last quarter

Amendment: ST 335:2012 Metadata Element Dictionary Structure (label length clarification) [Details](#)

Revision: ST 2084 High Dynamic Range Electro-Optical Transfer Function of Mastering Reference Displays (Project not yet started)

Revision: RP 2073-2 VC-5 Conformance (to accommodate new Parts 5 and 6) [Details](#)

New Recommended Practice: IMF Audio Content and Element Kind Definition [Details](#)

New Registered Disclosure Document: MXF Generic Container mapping for Apple ProRes [Details](#)

Amendment: RP2092-1 Advertising Digital Identifier (Ad-ID®) Representations [Details](#)

Revision: ST 330 UMID Applications [Details](#)

New Standard Suite Parts: ST 2081-30 and ST 2082-30 6G and 12G multi-stream standards [Details](#)

New Registered Disclosure Document: DTS MDA (These four RDD projects are not yet started)

New Registered Disclosure Document: DTS MDA Bitstream Specification

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New Registered Disclosure Document: DTS MDA Program Specification

New Registered Disclosure Document: DTS MDA Cinema Application

New Standard: HDR and WCG Signaling on Streaming Interfaces [Details](#)

New Standard: Studio Video over IP (SVIP) Part 1: System [Details of these five Parts](#)

New Standard: Studio Video over IP (SVIP) Part 2: Uncompressed Video

New Standard: Studio Video over IP (SVIP) Part 3: PCM Audio

New Standard: Studio Video over IP (SVIP) Part 4: Ancillary Data

New Standard: Studio Video over IP (SVIP) Part 5: SMPTE 2022-6 as an Essence Format

“Better Pixels” projects: There is general recognition that the next step beyond high-definition television (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 (HDR) / Wide Color Gamut (WCG) / Electro-Optical Transfer Function (EOTF)

SMPTE has a project defining Dynamic Metadata for Color Volume Transformation of high luminance and wide color gamut (WCG) Images. A document suite is underway, currently comprising six parts on core components, syntax and carrier as well as four parts documenting individual application schemes. Five of these parts are well-advanced in the process towards publication [Details](#). The remaining part on Encodings is underway. [Details](#)

A project to define a mechanism for signaling the carriage of HDR and/or WCG essence has just been approved. [Details](#)

Still relevant, the SMPTE Study Group on the High-Dynamic-Range (HDR) Imaging Ecosystem released its report in Oct. 2015 and it is available [here](#).

A presentation was given on a project proposal to amend ST 2084 High Dynamic Range Electro-Optical Transfer Function of Mastering Reference Displays.

Higher Frame Rates (HFR)

A project to extend SMPTE ST 12 timecode to cover higher frame rates (HFR) has published in the last quarter:

ST 12-3: Time Code for High Frame Rate Signals and Formatting in the Ancillary Data Space.



There are also two projects defining new time labels, see “Time Labels” below. As these are both new designs, there are no frame-rate constraints on them.

Professional Media over IP

A new project was launched at the beginning of 2016, “IP Media Inter-Networking with Separate Essence Flows”.

This project is developing a five part suite of standards on Media Networking with Coordinated Essence Flows. The starting point for these standards were VSF Technical Recommendations TR-03 and TR-04.

[Details](#)

There is also a Study Group preparing a report on Flow Control in Professional Media Networks. [Details](#)

SDI Interfaces

Work continues on the development of SDI interfaces alongside the IP-transport projects.

A suite of documents defining 6Gb/s, 12Gb/s and 24Gb/s electrical and optical interfaces targets UHD applications. [Details](#)

There are projects defining ruggedized optical SDI connectors [Details](#) and coarse wavelength division multiplexing for SDI interfaces [Details](#).

There is an SDI interfaces working group managing a number of other SDI projects [Details](#)

Network-Based Synchronization for the Professional Media Environment

Two key documents defining a system for using media synchronization packets on an information technology network were published in 2015:

“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 slaves, allowing them to create any synchronized video, audio or time code signal.

A SMPTE group is organizing ST 2059 “plugfests”. A plugfest is scheduled for the week of 13 June 2016 and it will include tests with AES67 audio networking equipment [Details](#).

A set of Engineering Guidelines for the use of this system is being drafted. The first, “Introduction to the New Synchronization System” is at Draft Publication status. [Details](#)

Time Labels

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

- A project defining a 5-part “Generic Time Label” suite.



- A project defining a 9-part “Full-featured Time Label” suite has been submitted for Technology Committee (TC) review. [Details of these projects](#)

SMPTE Video Compression (VC) Standards

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

- Development of an eight-part suite of documents defining the VC-5 compression system (developed from GoPro’s Cineform codec). Four parts of the suite are published and two more are awaiting publication. [Details](#).
A related Standard to define VC-5 mapping in the MXF Generic Container is well advanced. [Details](#)
- A project that completed its work this meeting round, to amend 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 Material eXchange Format (MXF) container document for VC-3 has also completed amendment. [Details](#)
- Amendment and revision to VC-2 documents (developed from BBC’s Dirac Pro). This work took a new direction at the last meeting round, including the addition of a new profile for ultra-high-definition (UHD) video sources for use with a high definition (HD) infrastructure. [Details](#)
- A Registered Disclosure Document on the IntoPIX TICO lightweight codec has just been published [Details](#).

Cinema Projects

Cinema Sound Systems

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

Current work on Cinema Sound Systems (CSS) comprises:

- A project group developing a Recommended Practice (RP) “Digital Cinema Sound System Setup and Calibration.” [Details](#)
- A standard “Calibration Reference Wideband Pink Noise Signal and Test File.” The document is published. The aim is to have a consistent pink noise signal for theater calibration. [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 (D-Cinema)

This TC has published three multi-part document suites dealing with the topics D-Cinema Distribution Master, D-Cinema Packaging and D-Cinema Operations.

Current projects focus on incorporating provisions for stereoscopic subtitles into existing D-Cinema documents, updating encryption documents and updating facility list management documents. A Working Group is also considering integration of D-Cinema additional frame rate documents. [Details](#)

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 12 MXF projects in process. [Details](#)



SMPTE® Standards Quarterly Report: Detailed Account

As a result of SMPTE Standards Committee Meetings

7-10 June 2016

New York City, USA

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

We encourage interested parties to learn more about specific activities.

Go to www.smpte.org/standards for more information.

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

If you are interested in learning more about the SMPTE Standards program, please contact the [Director of Standards and Engineering](#)

If you need assistance getting started with the SMPTE Standards process and some of the conventions / acronyms used in this report, please jump to the [Annex](#).

Future Meetings

The next quarterly Standards meeting round will be held 14-17 Sept. 2016 in Geneva, Switzerland and will be hosted by EBU.

Further quarterly Standards meeting rounds are planned for:

5-8 Dec. 2016 – Burbank, California, USA. Hosted by The Walt Disney Studios.



March 2017 – North America, precise location TBA

June 2017 – North America, precise location TBA

September 2017 – Europe, precise location TBA

In addition to the meetings of SMPTE Technology Committees (TCs) and their sub-groups, detailed below, some tutorial material was presented on the activities of the Standards Committee (ST) including the suite of Administrative Guidelines that it writes.

There was also a report on the Joint Task Force on Networked Media and a training session on SMPTE Standards development.

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

[Essence \(10E\)](#)

[Digital Cinema \(21 DC\)](#)

[Television and Broadband Media \(24TB\)](#)

[Cinema Sound Systems \(25CSS\)](#)

[Metadata and Registers \(30MR\)](#)

[File Formats and Systems \(31FS\)](#)

[Network and Facilities Architecture \(32NF\)](#)

[Media Systems, Control and Services \(34CS\)](#)

[Media Packaging and Interchange \(35PM\)](#)

Links are also provided in the footer of each page to each TC's report to assist with navigation.



Details from each Technology Committee (TC) meeting

Essence Technology Committee (TC-10E) chaired by Ed Reuss and Annie Chang

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

SMPTE RDD 35:2016, TICO Lightweight Codec Used in IP Networked or in SDI Infrastructures

Amendment 1:2016 to SMPTE ST 2048-1:2011, 2048 x 1080 and 4096 x 2160 Digital Cinematography Production Image Formats FS/709 – Amendment 1

SMPTE OV 2073-0:2016, VC-5 Video Essence – Overview for the SMPTE 2073 Document Suite

SMPTE RDD 36:2015, Apple ProRes Bitstream Syntax and Decoding Process

Topic: Video compression standards in SMPTE

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

DG Project

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: There is a [separate project](#) in TC-31FS to update ST 2019-4 to support this feature in MXF. That document is also now being prepared for publication.



Status: ST 2019-1 and RP 2019-2 have passed the ST audit process and are being prepared for publication.

Business Impact: Interoperability between systems

SMPTE 2073 Document Suite: VC-5 Video Essence

DG Project

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 to cover additional Parts; only Part 6 left to do) Includes Reference Decoder, Sample Encoder, sample bitstreams
- ST 2073-3 - VC-5 Image Formats (Published)
- ST 2073-4 - VC-5 Subsampled Color Difference Components (Published)
- 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 round-tripping embedded metadata from other standards by use of identifiers – ACES, XMP, DPX, MXF, ALE and vendor-specific).

Status: Parts 1-4 are published, but Part 2 is being further revised to add test materials to support content defined in Parts 5 and 6 (which are ready for publication when Part 2 is ready). Part 2 is ready for pre-FCD review. The test materials that form “elements” of Part 2 are also ready. A SMPTE repository for the software and test materials on “bitbucket” is being used.

Work on Part 7 will now resume, a [new project](#) formalizes this work.

A Part 0 overview document is in the SMPTE store.

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

VC-2 video compression projects VC-2 is a SMPTE mezzanine video compression standard (based on BBC’s DIRAC pro). Further development of VC-2 has recently been rationalized into one drafting group with the following projects:



Revision of ST 2042-1: VC-2 Video Compression Standard

[DG Project](#)

This revision adds a high quality profile to support Archiving and Production applications.

Status: Part 1 revision drafting is well-advanced.

Revision of ST 2042-2: VC-2 Level Definitions

[DG Project](#)

Revision needed to cover ST 2042-1 Revision and new RP 2047-5

Status: Part 2 revision drafting is well-advanced.

Revision of RP 2042-3: VC-2 Conformance Specification

[DG Project](#)

This revision will specify test materials supporting ST 2042-1.

Status: No progress; this work will follow the revision work in ST 2042-1.

Revision of SMPTE RP 2047-3: VC-2 Level 65 Compression of High Definition Video Sources for use with a Standard Definition Infrastructure

[DG Project](#)

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: This document was elevated to DP status by a vote at the meeting.

New Standard SMPTE RP 2047-5: VC-2 Level 66 Compression of UHD for use with HD Infrastructure

[DG Project](#)

The project scope is: Specify a new level of VC-2 compression with coding constraints that enables UHDTV video to be compressed to the same bit rates as those of uncompressed HDTV signals.

Status: Drafting is underway.

Business Impact of all VC-2 projects: Interoperability between systems

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

[DG Project](#)



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 2080-4: 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 (and are approaching their one-year review).

Part 3 passed FCD ballot on 12 June 2015 with 13 comments to resolve. When the two remaining comments are resolved, a revised draft will be prepared and it will be submitted for pre-DP review.

There has been significant progress on Part 4 but it is a large task and it is not expected that the draft will be ready for ballot before the next meeting round in September.

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

New Standard: ST 2087 - Depth Map Representation

[DG Project](#)

This project will define a standard for a data representation of depth maps in multi-view production and post-production.

Status: The document has passed ST audit and will be prepared for publication.

Business Impact: to support interoperability and exchange between relevant processes

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

[DG Project](#)

This project will develop a suite of standards for specifying the semantics and representation of content-dependent metadata needed for color volume transformation of HDR and WCG 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.

Status: This group held a meeting during this round and made progress with comment resolution.

ST 2094 Part 1 is in the publishing queue.

ST 2094 Part 10 is in the publishing queue.

ST 2094 Part 20 passed DP ballot 18 May 2016 and will proceed to ST Audit.

ST 2094 Part 30 passed DP ballot 5 May 2016 and will proceed to ST Audit.

ST 2094 Part 40 passed FCD ballot on 23 May 2016 and comment resolution is complete. It can proceed to pre-DP ballot review.

ST 2094 Part 2 is being developed in a [TC-31FS project](#).

Liaison with MPEG regarding transport via MPEG SEI messages is ongoing.

Patent statements for Parts 1, 10, 30, 40 have been received.

New Document: RP 2093 - Television Lighting Consistency Index

[DG Project](#)

The project scope is to document “Television Lighting Consistency Index (TLCI)” and “Television Lighting Matching Factor (TLMF)”. The introduction of light emitting diodes (LED) 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: There was no report this time. At the last meeting, a draft RP 2093 document had been circulated for pre-FCD ballot review and comments had been received.

New Document: ST 2100-1 - Definition and Representation of Haptic-Tactile Essence

[DG Project](#)

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: There has been no progress in the last quarter, however the group plans to resume work in the coming quarter. The draft ST 2100-1 passed FCD-ballot on 5 June 2015 and all of the 88 comments were resolved. However, further comments were received at the pre-DP review.



New Document: RP 219-2 - UHD TV Color Bar Signal

[DG Project](#)

RP 219-2 will specify the parameters needed to apply color bars to UHD TV and 2k, 4k production image formats (per ST 2048-1). It will scale the spatial parameters from those of the HDTV pattern, 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 DP vote held in the TC meeting. It will now go for ST audit.

Amendment ST 2048-1: 2160-line and 1080-line Production Image Formats for Digital Cinematography

[DG Project](#)

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 has been published and the group will be disbanded.

IntoPIX TICO lightweight Codec used in IP Networked or SDI infrastructures

[RDD Project](#)

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: The document has been published and the group will be disbanded.

Other TC-10E Business

A number of documents have come up for one-year and five-year review. The TC conducted votes for reaffirmation, revision or stabilization (after reaffirmation).

Film Technology Committee (20F) chaired by John Miller

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 Chris Witham

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

Revision of ST 430-7 – Facility List Message

DG Project

The revision will 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 passed FCD ballot on 8 June 2016 with seven comments to resolve.

New Document ST 430-15 - Facility List Message Exchange Protocol

DG Project

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 passed FCD ballot on 8 June 2016 with three comments to resolve.



Topic: Stereoscopic Subtitle / Timed Text projects

The DG has held 3 telecons in the last quarter.

Revision of ST 428-7: D-Cinema Distribution Master – Subtitle

[DG Project](#)

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: Drafting of the ST 428-7 revision has continued in the last quarter, though it is currently on hold awaiting liaison with JDCF to confirm the changes implemented.

Revision of ST 429-5: Digital Cinema Packaging - Timed Text Track File

[DG Project](#)

This revision project will address issues that arose during an earlier 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 document passed FCD-ballot 16 Feb. 2016 with 16 comments to resolve. Comment resolution is in process.

Revision of ST 429-2: Digital Cinema Packaging - DCP Operational Constraints

[DG Project](#)

This revision project will address issues that arose during an earlier ST 428-7 revision.

Status: There has been some further updating to the document. It will be sent for pre-FCD ballot review when the ST 429-5 ballot comments are resolved.

Digital Cinema XML Constraints

[DG Project](#)

This project will draft a Standard containing the XML constraints already reviewed by the Stereoscopic Subtitle and Timed Text Rendering drafting group.

Status: This group has been working on an XML constraints document. Work has been on hold whilst “field issues” are investigated, but will resume at the next meeting.

Business Impact of Stereoscopic Subtitles projects: Compatibility and Interoperability



Topic: D-Cinema Operations; Encryption

D-Cinema Crypto Evaluation (FIPS Revisions)

[SG Project](#)

This project examines the impact of changes to the FIPS encryption algorithm (deprecation of old random number generator). Output from this SG initiated the ST 430-1 revision, see below. The SG is considering an expected plan from NIST to declare key transport schemes (such as KDM) that are noncompliant to SP 800-56B as “deprecated” through 2017, and “disallowed” thereafter. Non-compliance will prevent Media Block FIPS certification.

Status: At the meeting there was discussion on the best way forward; should the KDM be made compliant to SP 800-56B? What would the industry impact be? The TC identified that that more clarity is need on this issue and that the group needs to wait until NIST issues its decision (expected Q2 2016).

Revision of ST 430-1: D-Cinema Operations - Key Delivery Message

[DG Project](#)

This project will amend ST 430-1 to support delivery of MIC (Message Integrity Code) payloads in KDMs and cryptographic keys for AuxData essence.

Status: The ST 430-1 revision is at FCD ballot, closing 27 June 2016.

Revision of ST 430-2: D-Cinema Operations - Digital Certificate

[DG Project](#)

This project will amend ST 430-2 to allow devices to identify their ability to process MIC payloads in KDMs (as required by the ST 430-1 revision).

Status: The ST 430-1 revision is at FCD ballot, closing 27 June 2016.

Amendment to ST 429-6: Digital Cinema Packaging - MXF Encryption

[DG Project](#)

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 prepared an amendment that is posted for pre-FCD-ballot review.

Integrate Additional Frame Rate documents

[WG project](#)



Project Scope: 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.

Status: This project was approved since the last meeting and the group is planning to hold its first meeting in July 2016.

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

New ST 2064 suite of documents on A-V Sync Measurement and Assessment

[DG Project](#)

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 published.

Work on the Engineering Guideline is progressing.

Business Impact: Improved quality of experience and interoperability between systems

New 2017 document suite on Open binding technology for persistent content identification in A/V essence

[DG Project](#)



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. The group's focus is on carrying Ad-ID and EIDR identifiers. More recently, the group identified the need for "Open Binding of Distributor IDs and Time Labels to Content (OBID-TLC)" and it issued a Request for Proposals. The group has developed a Self-Assessment Test Plan.

Planned documents:

ST 2017-1 Open Binding of IDs (OBID)

ST 2017-2 Open Binding of Distributor IDs and Time Labels to Content (OBID-TLC)

RP 2017-3 Audience Measurement Using OBID and OBID-TLC (this document is US-centric)

EG 2017-4 Audience Measurement Ecosystem

Status:

The group will be performing final evaluation and selection of OBID technology on July 6th.

It has received three responses to its (2nd) RFP for adding OBID-TLC technology and will review them in the week following the meeting round.

A [new document project](#) has been started to develop Part 3.

Revision of Closed Captioning suite documents

[DG Project](#)

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.

The document editor is working on higher priority projects and this work will be suspended until effort is available.

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

[DG Project](#)

This project is a straightforward updating of references.

Status: The document editor is working on higher priority projects and this work will be suspended until effort is available.

[New Project Proposal](#)

Revision of ST 2016-1: AFD and Bar Data

There have been requests from ATSC and DVB to add bar data for UHDTV (1 and 2). Additionally there has been interest from CTA related to their CEB-16 which references 2016-1. This project proposal is in the approval phase, closing 12 June 2016.



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.

Topic: TC-25CSS documents published in the last quarter

None

New Standard ST 2095-1: Calibration Reference Wideband Pink Noise Signal and Test File

DG Project

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 has been published. It includes .wav files for the noise signal. There is work underway to create a DCP containing the reference calibration noise signal. A final package has been forwarded to SMPTE HQ including read-me files which fully explain the 4 versions of DCPs and their intended usage.

When the DCP is completed and available in the SMPTE Store, this DG will be disbanded.

New document suite: Digital Cinema Sound System Setup and Calibration (“B-chain Modern Calibration Procedure”)

DG Project

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 has recently decided to split the work into:
RP on baseline calibration – work has started in a smaller group



RP on maintenance calibration – work has started in a smaller group
EG capturing the work done in this group as a knowledge document

Interoperability of Immersive Sound Systems in Digital Cinema

[WG Project](#)

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) gave a status report, focusing on the work of the drafting groups (see below). There is a new WG activity to form a SG to analyze the submitted Simple Lossless Codec (SLC).

Digital Cinema Immersive Audio Renderer

[DG Project](#)

This project will develop an EG on the baseline expected renderer behavior, followed by an RP defining a testing procedure.

Status: The draft EG “Immersive Audio Renderer Behavior” is under review by the DG. There has been a lot of work in this group, but finalization of the document is still a long way off. There is a new draft of the RP “Immersive Audio Renderer Testing” that incorporates input documents from DG members.

Immersive Sound Model & Bitstream

This group’s initial focus is on Metadata Definitions. Work is underway on a Bitstream Specification. Three input documents were originally submitted – Dolby Immersive sound bitstream, DTS MDA bitstream and a Dolby Lossless Audio codec. More recently, a document from Blue Ripple Sound has been submitted.

Status: The group has completed its Metadata Specification Working Draft; it is being held from progressing to Committee Draft pending harmonization with the Bitstream Specification and Renderer EG and RP work.

The Bitstream Specification group based its first draft on a contribution from Blue Ripple Sound. The group has a large number of topics under discussion and there is concern about the amount of time



it will take. The TC will hold a meeting to consider whether it would be more practical to standardize one of the two deployed bitstreams instead.

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

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

EG 2061: Glossary of Stereoscopic 3D Terms

DG Project

This project takes as its starting point the glossary developed by the 3D Home Master project in TC-35PM.

Status: The document passed DP ballot on 2016-03-17. ST audit will now be initiated.

Business Impact: Understanding and common use of terms

Topic: UMID Projects

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

Application of the Unique Material Identifier (UMID)

SG Project

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 June 2014



- Part 2.2: UMID Applications in MXF

Status: Part 2.2 of the report was published in December 2015 – it is available [here](#). The SG remains open to provide assistance to the other UMID project groups (see below) and to review any new work items.

UMID Resolution Protocol

[DG Project](#)

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 5 Dec. 2014. There has been no progress in the last quarter, but the DG Chair will try to update the draft in the next quarter.

Proposed ST 330 Revision Project

Project approval is complete in the TC and closes in ST 10 June 2016.

New Standard ST 2102: SMPTE Core Metadata Set

[DG Project](#)

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 ST 2012 was posted for pre-FCD-ballot review and there have been two rounds of comment resolution. It is expected that the document will soon be ready to submit to the TC Chairs requesting FCD ballot.

Business Impact: Potential foundation for Metadata

Metadata Strategy

[SG Project](#)

This review of the role of the TC started in the March 2012 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: The SG Chair reported that the work of the group is complete and requested the TC to close the group.



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. Four of these documents have been updated to include new requirements such as including xml symbols and are now published:

- ST 335:2012 Metadata Element Dictionary Structure (see new amendment project, below)
- ST 400:2012 SMPTE Labels Structure
- ST 2003:2012 Types Dictionary Structure
- ST 395:2014 Groups Register Structure

New Standard ST 2088: SMPTE Essence Element Key Register Structure

[DG Project](#)

This project creates a controlling standard for SMPTE ULs used as essence keys in MXF standards.

Status: The document is at 2-week pre-FCD-ballot review. Some comments have been received and are being reviewed.

Revision ST 336: Data Encoding Protocol Using Key-Length-Value

[DG Project](#)

Revise ST 336 to update references and review whether its provisions reflect current register operation.

Status: The draft has completed its pre-FCD-ballot review. Comments have been received and a way forward to resolve them has been agreed.

Metadata Definition

WG Project

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) have been published on smp-te-ra. It was agreed that some issues raised during the ballot for these documents would be deferred until the next release. Work has started on that release and a call to publish the next contents for ballot is planned for 2 weeks from the TC meeting.

The contents of the online tool's metadata registers development area were reviewed in the TC meeting.



Create and Update Essence Element Register Contents

[DG Project](#)

The group will create a register of SMPTE ULs for use as essence keys and process requests for register additions, modifications and deprecations. When ST 2088 publishes, this group will be closed and the work will pass to the WG.

Status: A draft register has been compiled for exiting essence elements.

Amendment of RP 2092-1 Advertising Digital Identifier (Ad-ID®) Representations

[DG Project](#)

This is a new amendment project and it is in the approval phase (TC completed, ST in process).

Other 30MR Business

[ST 335 Amendment project](#)

This project is in the approval stage that ends 23 June 2016.

[ST 2003 Amendment project](#)

Approval of this amendment project has been deferred with the agreement of the proponent.

File Formats and Systems Committee (31FS) chaired by Bruce Devlin and Paul Gardiner

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 2001-1:2015 (Revision of SMPTE ST 2001-1:2013), XML Representation of SMPTE Registered Data (Reg-XML) – Mapping Rules



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

New Document: ST 377-2 - KLV-encoded extension syntax (KXS)

[DG Project](#)

This work specifies an alternative approach to the 'Application Metadata Plug-ins' specified in SMPTE 377-1. The document passed a second FCD ballot on 17 Nov. 2013 with 70 comments, but then went into hiatus. The work has recently resumed.

Status: A revised draft for pre-DP review has been created. It should be fairly straightforward to finish this project now.

Revision ST 380: MXF Descriptive Metadata Scheme 1

[DG Project](#)

The current published document was reviewed and some required changes were identified.

Status: The draft revision document has been updated to address a number of comments. When the continuing dialog between the DG Chair and commenter is complete, re-ballot of ST 380 will be initiated.

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

[DG Project](#)

Status: This document passed FCD rebalot on 13 Aug. 2015 with 10 comments to resolve. All have been resolved and pre-DP review of the document will be initiated.

New Document: ST 381-4: AAC Family Compressed Digital Audio in MXF

[DG Project](#)

This new MXF mapping document will cover all the variants of AAC that are used in broadcast applications.

Status: The draft document failed FCD ballot through lack of numeric consensus on 23 Oct. 2015. It has 11 comments to resolve. There has been no progress in the last quarter.

MXF Timecode Mapping and Labeling

[SG Project](#)



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: A draft of the SG report was submitted to the TC for review. Some text from one contributor is awaited and the report should then be complete.

New Document: RP 2092-2 - Ad-ID Digital Ad Slate for MXF

[DG Project](#)

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: There was no report at this meeting round. The document passed FCD rebalot on 5 Aug. 2015 with 37 voter comments; all were resolved. Some pre-DP-ballot review comments were received.

New Standard ST 2073-10: VC-5 Mapping into the MXF Generic Container

[DG Project](#)

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 8 June 2015 with 8 comments to resolve. All comments are resolved. The request for ULs to the SMPTE registry is being rewritten and a clarification has been added to a table in the document.

Revision of ST 2019-4:2014 Mapping VC-3 into the MXF Generic Container

[DG Project](#)

This project will add support for image resolution independence.

Status: The document is in the publication queue now that associated documents in [TC-10E](#) are complete.

New document: ST 2065-5 ACES Codestreams in MXF

[DG Project](#)

An ACES file container exists (SMPTE ST 2065-4), but no code stream wrapper, or other supporting data structure exists. This project will specify descriptive metadata items for correctly processing and transforming ACES codestreams.

Status: The document is at FCD ballot, closing 5 July 2016.



New RDD 39: MXF OP-1a Interoperability Specification for Panasonic AVC-ULTRA Codec

[RDD Project](#)

This RDD provides the specification for implementing an MXF OP-1a file that encapsulates AVC-ULTRA video essence, uncompressed PCM audio essence, and data essence originally carried in ancillary packets.

Status: The document passed RDD ballot on 4 April 2016 with 15 comments. All comments are resolved and ST audit will be initiated.

New ST 2094-2: Dynamic Metadata for Color Volume Transformation – Encodings

[DG Project](#)

Status: The document was posted for pre-FCD-ballot review and was simplified in the light of comments received.

New RDD 44: Mapping Apple ProRes into the MXF Generic Container

[DG Project](#)

Status: The draft RDD requires some clean-up and will then be submitted for RDD ballot.

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

ST 2034-1: Archive eXchange Format (AXF) - Part 1: Structure & Semantics

[WG Project](#)

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:** The revised draft Standard has been posted for pre-FCD-ballot review.

New Document: ST 2034-2 - Archive eXchange Format (AXF) - Part 2: External Uses of XML Schema

[WG Project](#)



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: Work is proceeding on the document. A feature for capturing metadata much earlier in the process has been added at the request of the Hollywood community.

Other TC-31FS Business

Proposed new project: Constrained Application of ST 268:2014 - HDR DPX

A presentation was given on this proposal to create a new document constraining DPX specifically for the HDR application.

Proposed new project: Mapping HEVC streams into MXF GC

A presentation was given on this proposal to create a new document defining the mapping of HEVC into the MXF Generic Container.

One Year and Five Year Document Reviews

The TC had a number of documents due for one year and five year review. Recommendations were made to reaffirm a number of documents and to reaffirm and stabilize others. The TC voted in favor of those recommendations.

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 12-3:2016, Time Code for High Frame Rate Signals and Formatting in the Ancillary Data Space

SMPTE RDD 37:2016, Uncompressed Video Transport Over MPEG-2 Transport System



Working Group on SDI Interfaces

[WG Project](#)

The 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 10Gb/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.

New Document suite SMPTE 2076: Stereoscopic 3D (S3D) Production Timing and Synchronization

[DG Project](#)

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 a DP elevation vote in this TC meeting.

EG 2076-2 has completed FCD ballot comment resolution and will now be posted for 2 week pre-DP review.

New Document: EG on SDI Interfaces

[DG Project](#)

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 July 2015 meeting that initial focus would be on HD and UHD SDI interfaces.

Status: This group has met 4 times in the last quarter. The draft EG is in progress, the pre-FCD review is expected until or shortly after the next face to face meeting.

Revision of EG 34: Pathological Conditions in Serial Digital Video Systems and

Revision of RP 198: Bit-Serial Digital Checkfield for Use in High-Definition Interfaces

[DG Project](#)

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: A new draft of RP 198 was posted to the DG in the last quarter. One issue has arisen that needs to be resolved: whether only flat-fields are permitted or fields with alternating line patterns.

New Document: ST 2091 - Broadcast and Video Serial Digital Fiber Transmission Systems – Ruggedized Connector Interfaces

[DG Project](#)

This project will create a standard for a ruggedized optical connector suitable for SDI as used in HDTV and UHD TV systems. The system also has the following features: automatic dust protection, automatic laser source eye protection, high durability, low maintenance and small size. The document will include a section on labeling requirements for improved interoperability.

Status: ST 2091 is now at FCD ballot. It was decided that connectivity requirements for the ST 2036-4 interface would be removed from this draft standard and moved to a new RP. So it is expected that the standard will become ST 2091-1 and the recommended practice RP 2091-2.

New ST 2100 Suite: Transport of Haptic-Tactile Essence

[DG Project](#)

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: This group has been on hiatus for the last two quarters to focus effort on the 10E project. Two Drafting Projects were set up (both projects are still at the proposal stage):

[Drafting Project ST 2100-2: Coding and Transport Of Haptic-Tactile Essence in AES3](#)

At the Sept. 2015 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 Sept. 2015 meeting, it was decided that this group may confine its attention to the use of VANC space for carriage.

New Standard: ST297-2 CWDM optical interface for multi-link SDI

[DG Project](#)

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: The group held a meeting during this round at which a way forward for this document was agreed. A new draft will be posted to the DG shortly and ITU-R will be requested to harmonize their BT.2077-1 Part 3 document with the wavelengths selected in this document.

New Standard: HDR and WCG Signaling on Streaming Interfaces

[DG Project](#)

This project will define an HDR and WCG carriage mechanism representation which can be used to provide information essential to insure that content is correctly processed in a production facility as well as correctly displayed on professional reference displays using SMPTE interface standards. It is expected that SMPTE interface standards will require amendment as part of this work.

Status: This project was approved in the last quarter and resources for the group have been set up.

Working Group on Video Over IP

[WG Project](#)

This Working Group (32NF60) was established to handle projects related to IP transport of media. The WG has produced the seven-part ST 2022 suite of standards.

Status: The WG is waiting for expected assignment of ST 2022-x family 5-year reviews. It is also managing the DG project below that was approved Jan. 2016.

New document suite: ST 2110 Media Networking with Coordinated Essence Flows

[DG Project](#)

This project will develop a set of standards specifying the carriage, synchronization and description of separate elementary essence streams over IP for the purposes of live production. The resulting standards will be based on VSF Technical Recommendations TR-03 and TR-04.

The suite of ST 2110 documents are (at present):

Part 1: System

Part 2: Uncompressed Active Video

Part 3: PCM Audio

Part 4: Ancillary Data

Part 5: SDI as an Essence

Status: Drafts for Parts 1-5 have been submitted and are being developed. The DG has also received a corrigendum from VSF and a proposal for harmonizing TR-03 and SMPTE RDD 37 packet structure.



Additional work to cover compressed audio and compressed video is also being considered. A more flexible Part numbering scheme is being considered.

Ultra HD SDI Interfaces

[WG Project](#)

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 (ST 2081 suite), 12Gb/s (ST 2082 suite) and 24Gb/s (TBA). See below for the individual documents in each suite.

Status: Part 11 and Part 12 of both ST 2081 and ST 2082 are at ST audit

An [amendment project](#) to correct the jitter specification in ST 2081-1 and ST 2082-1 is underway in the ST 2081 suite DG; the amendments are at FCD ballot .

Work has begun on new parts ST 2081-30, ST 2082-30 that standardize multi-stream mapping (multiple HD, 3G or 6G streams into single 6G or 12G streams to reduce cabling).

Following on from that will be stereoscopic image mappings and 24Gb/s interfaces.

There is additional detail in each of the projects below.

New ST 2081 suite: 6Gb/s Signal/Data Serial Interfaces

[DG Project](#)

This project is developing documents:

ST 2081-1: 6Gb/s Signal/Data Serial Interface – Electrical (published, jitter amendment underway)

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 multi-stream mapping document (multiple 1.5G and 3G over 6G).

Status: ST 2081-11 and ST 2081-12 at ST audit.

ST 2082 suite: 12Gb/s Signal/Data Serial Interfaces

[DG Project](#)

This project is developing documents:

ST 2082-1: 12Gb/s Signal/Data Serial Interface – Electrical (published, jitter amendment underway)



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 multi-stream mapping document (multiple 1.5G, 3G, 6G over 12G).

Status: ST 2082-11 and ST 2082-12 at ST audit.

Working Group on Time Labeling and Synchronization

[WG Project](#)

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 PTP interoperability group, revision of EG 40, the 2059 Engineering Guidelines and some extended deliberations on the Time Labels projects.

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

New Standard ST 12-3: Time Address for High Frame Rate signals and its data structure in the ancillary data space

[DG Project](#)

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: This document was published in the SMPTE Library on March 28, 2016 and the drafting group is now disbanded.

ST 2059 Interoperability Testing

[DG Project](#)

The aim is to confirm that the provisions of the standards are unambiguous and that the technology does, indeed, yield the intended results. The Interop DG itself is open to all SMPTE Standards Community members, but its Testing AHG and attendance at the interop meetings is subject to signing a non-disclosure agreement and memorandum of understanding.

The first round of testing was the week of 9 Nov. 2015, hosted by FOX NE&O in Houston, TX. The main



conclusion was that ST 2059-1 and -2 fundamentally work as intended; it was confirmed that goals for Lock Time and Accuracy are achievable.

Status: A second testing round is scheduled for the week after this meeting round, again at FOX NE&O. This testing round will add some tests with AES67 equipment.

Development of a set of synchronization Engineering Guidelines “EG 2059-1x”

[DG Project](#)

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: There are four EG drafting projects, see below, 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](#).

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

[Drafting Project](#)

This document will provide users of the system, both implementers and operators, to understand the context and technology of what some may see as a major technology shift.

Status: This document was elevated to DP status in at this meeting round in a TC meeting vote.

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

[Drafting Project](#)

Status: A WD was submitted 20 April 2015; no progress since.

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

[Drafting Project](#)

Status: This document had previously been called “Facility Migration Guide”. A WD was submitted 23 April 2015; no progress since.

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

[Drafting Project](#)

Status: The most recent WD was submitted 26 Nov. 2014, no progress since.

New Time Labeling System

[DG Project](#)

This is an “umbrella” project that facilitates development of documents on Time Labeling.



Status: There are currently three projects. Two projects – the Generic Time Label (GTL) and the Time Related Label (TRL) are developing labels whose data structures are not compatible. At this WG meeting, it was agreed that a “Time Labels Summit” would be held to see if either of the proposed time labels meet the requirements of the user community. Until the summit is held, no further ballots on either document suite would be held.

SMPTE 2103 Suite: Generic Time Label

[Drafting Project](#)

The following suite of documents closed FCD ballot 21 Sept. 2015:

ST 2103-1: Generic Time Label - Data Definition (passed)

ST 2103-2: Generic Time Label - Transmission in Ancillary Data Space (passed)

ST 2103-3: Generic Time Label - Character Representation (failed on numeric consensus)

RP 2103-4: Generic Time Label - Interoperation with Time and Control Code (failed on numeric consensus)

RP 2103-5: Generic Time Label - Time and Date Calculations (failed on numeric consensus and now dropped from the suite)

Status: In the process of comment resolution, it was decided to restructure the documents into four parts by dropping Part 5 and incorporating its provisions in the other parts. The resulting four-part set incorporates some comment resolution from the five-part set ballots.

SMPTE 2105 Suite: Time Related Label (TRL)

[Drafting Project](#)

The current suite comprises:

EG 2105-1: Time Related Label (TRL) – Ecosystem

RP 2105-2: Time Related Label (TRL) – Terms and Definitions

ST 2105-3: Time Related Label (TRL) – Date, Time and Media Counts

ST 2105-4: Time Related Label (TRL) – Data Objects and Container Structure

ST 2105-5: Time Related Label (TRL) – Data Format Conversions

ST 2105-6: Time Related Label (TRL) – Character Format (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

Status: The TC conducted a two-week pre-FCD ballot review for this suite of documents in the last quarter and some of the draft documents have been updated.

RP 2104 Suite: Date-Time Terms and Definitions



[Drafting Project](#)

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.

Amendment of EG 40: Conversion of Time Values Between SMPTE 12-1 Time Code, MPEG-2 PCR Time Base and Absolute Time

[DG Project](#)

This project will make small corrections to formulas. Errors had been pointed out during the 2014-06 meeting round.

Status: A DP elevation vote was held in the TC plenary. The vote passed.

ST 337 family of documents

[DG Project](#)

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 following Drafting Projects are being managed by the DG:

Amendment of ST 338: Format for Non-PCM Audio and Data in AES3 — Data Types

[Drafting Project](#)

Amendment to add AC-4 (code point 24), DTS type IV (code point 17) - see these projects below.

Status: This document is in ST audit. It will be held awaiting publication of a bibliographical reference (ST 2106).

New document ST 2041-4 (proposed): MPEG-H in AES3

[Drafting Project](#)

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. No further progress this quarter.

New Standard ST 2106: DTS Audio over AES3

[Drafting Project](#)

Status: The document closed pre-DP-ballot review 26 May 2016 with no comments. It passed a DP elevation vote held during the TC plenary.

New document Audio Metadata over AES3

[Drafting Project](#)

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: A WD has been submitted to the DG together with a requirements document. Liaison notices have been sent to EBU (for the carriage of ADM) and to ITU-R.

Flow Control in Professional Media Networks

[SG Project](#)

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 has held seven meetings in the last quarter including a meeting during this round. The two main tasks are:

- Integrating contributions into the draft report. A submission on a new topic “SDN Control Protocol” is expected.
- Surveys for users and technology providers. Deadline for responses is 1 July 2016.

[Media Systems, Control and Services Committee \(34CS\) chaired by Chris Lennon and Karl Paulsen](#)

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: 34CS Publications in last quarter

None

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 instructions. 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 4.0 (recently published, as noted above).

BXF 5.0

[DG Project](#)

BXF 5.0 introduces new components and improvements to extend BXF functionality. There is work on Program Synopsis Support, QC Node, Point of Interest, Graphic Slate Template Support, NABA DPP Content Delivery Specification Schema, BXF SDK. There are also various small improvements to the suite of documents.

Status: The DG is meeting regularly to advance this work. The first four items in the above list are complete. The BXF SDK is a new proposed project (see below). The target is to complete all contributions, document editing, and schema editing by mid-August in order to be in pre-FCD ballot review by the September block meetings.

BXF SDK

Proposed [DG Project](#)

Draft new BXF RP – RP 2021-6 suggested - for BXF SDK documentation as part of BXF 5.0.



Media Device Control over IP

[DG Project](#)

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.

(Proposed) 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:

Parts 1-3 are revisions of the published documents.

Part 1 passed ST Audit 19 May 2016 (comment has been resolved).

Part 2 passed ST Audit 19 May 2016 (2 comments have been resolved).

Part 3 closed FCD ballot 16 July 2015 with nine comments. All comments are resolved.

Part 4 closed FCD ballot 15 July 2015 with three comments. All comments are resolved.

Parts 3 and 4 can proceed to DP ballot.



Part 5 [project proposal](#) exists. However, there are no standards for RESTful protocol that could be referenced. The group is therefore considering a new approach based on ST 2071-4 that allows for many Interface Definition types to be defined, allowing the market to select the best.

Business Impact: Interoperable Media Device Control

New Registered Disclosure Document: RDD 38 Sony Lightweight Networked Device Control Protocol Drafting Project

Status: RDD 38 is at ST Audit, closing 30 June 2016.

Media Packaging and Interchange Committee (35PM) chaired by Pierre Lemieux

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.

Since the March 2016 plenary meeting, TC-35PM adopted a new structure now that most of the ST 2067 IMF suite is mature. The Working Group will now focus on Sample Material Interchange (SMI, which includes plugfest activities) as well as IMF document maintenance.

Other projects developing new IMF features will report directly to the TC.

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 – Output Profile List - Common Image Pixel Color Schemes

ST 2067-103:2014, Interoperable Master Format – Output Profile List – Common Audio Definition and Macros

Topic: 35PM Publications in last quarter

None

WG 35PM50: IMF Document Maintenance and Sample Material Interchange

[IMF Plugfest Project](#)

The next IMF plugfest is planned for 29 June at Sony Pictures, CA, USA - mainly for ST 2067-21 IMF App2e.

A further plugfest is being planned for 13/14 September 2016 at the EBU, Geneva, CH. An IMF bug tracker (used for both bugs and improvement requests) is in operation at:

<https://standards.atlassian.net/projects/IMF/issues/IMF-1?filter=allopenissues>

Document Maintenance Status: The WG has designated documents that are being amended / revised at one-year review as “IMF 1.1”. The objective is to advance the set of documents to DP ballot simultaneously. Current IMF 1.1 documents are:

Amend/Revise ST 2067-2: IMF Core Constraints

[DG Project](#)

Status: ST audit passed and in publication queue.

Amend/Revise ST 2067-3: IMF Composition Playlist

[DG Project](#)

Status: ST audit passed and in publication queue.

Amend/Revise ST 2067-5: IMF Essence Component

[DG Project](#)

Status: ST audit passed and in publication queue.

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



[DG Project](#)

Status: ST audit passed and in publication queue.

Amend/Revise ST 2067-21: Application #2E

[DG Project](#)

This extension supports higher JPEG 2000 specifications including resolution, frame rates and multiple color space encodings.

Status: ST audit passed and in publication queue.

IMF Output Profile Lists

[DG Project](#)

Project to develop IMF Output Profile Lists (OPL). An OPL defines the transformation of a single IMF Composition into deliverables appropriate for downstream distribution channels. This transformation consists of a sequence of parameterized steps, called Macros.

Status: The project has been temporarily suspended whilst the SMI group carries out validation. At this TC meeting, it was announced that work will resume soon on a number of OPL documents.

IMF Audio Essence

[DG Project](#)

A presentation was given on a new project for the Audio Essence group that completed its approval 17 May 2016:

New Document: IMF Audio Content and Element Kind Definition

[DG Project](#)

New Document ST 2067-40: IMF Application #4 Mezzanine Film Format

[DG Project:](#)

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: ST 2067-40 passed FCD ballot 4 April 2016. Comments are resolved and 2 week pre-DP-ballot review will be initiated.



Notes on this report and the SMPTE Standards Process

All trademarks appearing herein are the property of their respective owners.

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](#). 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.*