



SINCE 1916

STANDARDS QUARTERLY REPORT March 2018

Result of SMPTE® Technology Committee
Meetings
12-15 March 2018

Hosted by
SMPTE Headquarters
White Plains, NY, USA

THE NEXT CENTURY



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

12-15 Mar. 2018

White Plains, NY, USA

Hosted by SMPTE HQ

Nine SMPTE Technology Committees and 12 subgroups scheduled meetings at this round.

53 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 160 active projects can be found in the [detailed account](#), after this summary.

New Projects that began in the last quarter

(Project Name links to online project overview, "Details" links to this report)

<u>VC-6 Conformance</u>	Project proposal
<u>VC-6 Picture Compression Format</u>	Project underway
<u>ST 428-1 Revision - Frame Rate Integration</u>	<u>Details</u>
<u>ST 429-4 Revision - Frame Rate Integration</u>	<u>Details</u>
<u>Revision of SMPTE RP 2079:2017</u>	<u>Details</u>
<u>ST 2036-4 Constrained Revision</u>	<u>Details</u>
<u>ST 2108-1 HDR SEI message on streaming interfaces</u>	<u>Details</u>



<u>ST 2108-2 HDR KLV message on streaming interfaces</u>	<u>Details</u>
<u>ST 425-3 Constrained Revision</u>	<u>Details</u>
<u>ST 425-5 Constrained Revision</u>	<u>Details</u>
<u>Multi-port transport of higher-than-port-speed signals using ST 2110</u>	<u>Details</u>
<u>Studio Video over IP (SVIP): Compressed Video including VC-2</u>	<u>Details</u>
<u>Deterministic SMPTE Timecode from Date and Clock Time</u>	New Project
<u>Media Microservices Overall Architecture</u>	<u>Details</u>
<u>Revision of EG2021-4 Schema Documentation (BXF 6.0)</u>	<u>Details</u>
<u>Revision of ST 2067-21:2016</u>	<u>Details</u>

Professional Media over IP Projects

Professional Media over Managed IP Networks

This project is developing the ST 2110 suite that standardizes an interoperable system for media IP networks to transport separate video, audio, and ancillary data streams.

The first four parts of the suite (the core parts) - System Timing and Definitions, Uncompressed Active Video, PCM Digital Audio, Traffic Shaping and Delivery Timing for Video – are published. There are also parts still in development on transport of Ancillary Data (close to publication), Transparent AES3 Data, Compressed Video and a new project to support multiple video streams that represent either one higher resolution signal, or one higher frame rate signal.

[Details](#)



Network-Based Synchronization for the Professional Media Environment

Following the publication of two key documents (core parts of the ST 2059 suite) defining a system for using media synchronization packets on an information technology (IT) network, there are ongoing projects in support of the technology:

- A SMPTE group is organizing ST 2059 “plugfests”. [Details](#).
- A set of Engineering Guidelines for the use of this system is being drafted. The first, “Introduction to the New Synchronization System” has been published. [Details](#)
- One-year reviews of the two standards in the light of plugfest experience and implementations. [Details](#)

Media Device Control over IP

This project has developed a suite of documents for the control of media-centric devices and services utilizing Internet Protocol (IP). [Details](#)

Interoperable Mastering Format (IMF)

IMF is a file-based mastering framework designed to support multiple high-quality content versions of a finished work destined for distribution channels worldwide. The suite ([details](#)) comprises 12 published documents together with some current projects (noted below) to create additional IMF documents or revise existing ones. There is also SMPTE work outside the Standards Community to produce an [IMF Specification for Broadcast and Online](#) .

IMF Application #5 ACES

The Academy Color Encoding Specification (ACES, ST 2065-1), published in 2012, supports HDR / WCG. A new project extends its use as an application format in the Interoperable Mastering Format (IMF).

[Details](#)

IMF Output Profile Lists

Projects are underway to revise IMF Common Image Definitions and Macros, and create new standard Dynamic Metadata for Color Volume Transform for IMF Applications. A project to amend IMF Common Image Pixel Color Schemes published Q4 2017.

[Details](#)

IMF Audio Essence Projects

Projects are underway on IMF Audio Content and Element Kind Definition and IMF Immersive Audio Bitstream Level 0 Plug-In. [Details](#)



There are also projects to introduce a new standard “IMF Sidecar Composition Map” and to revise the IMF standard on Application #2E. [Details](#)

SDI Interfaces

Work continues on the development of SDI interfaces:

- Suites of documents defining 6Gb/s, 12Gb/s and 24Gb/s electrical and optical interfaces target UHD applications and multi-stream HD applications. [Details](#)
- Projects defining a ruggedized optical SDI connector and its applications [Details](#)
- An SDI interfaces Working Group is managing a number of other SDI projects [Details](#)

HDR and WCG Signaling on Streaming Interfaces

This group is defining signaling for the carriage of high-dynamic-range (HDR) and/or WCG essence on streaming interfaces; both in the production and distribution environments.

It has added details to the SDI Payload ID for HDR / WCG signaling and is working through the revision of the set of SDI standards that it has identified.

The group is also drafting two standards on Extended HDR/WCG Metadata Packing and Signaling for Serial Digital Interfaces. [Details](#)

SMPTE Video Compression Standards

SMPTE has standardized five video compression standards – VC-1 to VC-5 - and has started work on VC-6. 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 ready for publication when revision of the Conformance Specification is complete. One part of the suite defines VC-5 mapping in the MXF Generic Container. [Details](#).
- Projects on the VC-2 document suite (developed from BBC’s Dirac Pro). This includes the addition of a new profile for ultra-high-definition (UHD) video sources carried on high-definition (HD) infrastructure as well as amendments and revisions to existing VC-2 documents. [Details](#)
- A new project to standardize VC-6, a picture compression scheme based on “deep learning”. [Details](#)

Cinema Projects

Cinema Sound Systems

This Technology Committee (TC) has work 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 comprises:

- 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](#)
- A Study Group on Immersive Audio Implementation, set up to identify any additional work that is needed to ensure interoperable immersive sound distribution. [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
- D-Cinema Operations

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

Constrained Application of ST 268 - HDR DPX

Drafting of this standard to create a profile of the DPX file format standard (that will be ST 268-2) to carry HDR / WCG is well-advanced. [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 the MXF suite of standards or creating constraints for improved interoperability in a variety of application areas. There are currently 4 MXF projects in process with 2 others published in the last quarter. [Details](#)

Extensible Time Label A new project is underway to create a Standard for a time label that overcomes the shortcoming of SMPTE ST 12 (higher frame rate support, time values greater than 24 hours) as well as supporting other requirements of current systems and workflows. [Details](#)

Microservices for Media A new project proposal was presented at this meeting round to define a framework for media-related microservices as well as documents defining each microservice.



SMPTE® Standards Quarterly Report: **Detailed Account**

As a result of SMPTE Standards Committee Meetings

12-15 Mar. 2018

White Plains, NY, USA

Hosted by SMPTE HQ

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 our Standards activities at www.smpte.org/standards.

This report is a snapshot in time and should not be regarded as formal minutes, a positioning statement or an analysis piece.

If you are interested in learning more about the SMPTE Standards program, or would like to submit comments, please contact the [Director of Engineering & Standards](#)

Introduction

The quarterly SMPTE Standards meeting rounds are led by the SMPTE Standards VP, a voluntary post, and the SMPTE Director of Engineering & Standards, a staff post. These posts are currently filled by Bruce Devlin and Howard Lukk respectively.

Each round comprises meetings of nine Technology Committees (detail below) as well as subgroups whose work will benefit from face-to-face meetings; their work proceeds between the quarterly meetings using teleconferences.



If you need some help getting started with the SMPTE Standards process and some of the conventions / acronyms used in this report, please take a look at the [Annex](#).

Future Meetings

Further quarterly Standards meeting rounds are planned for:

June 2018	SMPTE Toronto Section, Ryerson University, Toronto, CA
Sept. 2018	EBU, Geneva, CH
Dec. 2018	Dolby Labs., San Francisco, CA, USA
Mar. 2019	TBA

This Quarterly Report provides a detailed account of the meetings of the following SMPTE Standards 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 to each TC's report are also provided in the footer of each page to assist with navigation.

There was also a Q and A session and a Standards Community meeting that included some document preparation training.

SMPTE also has a Film Technology Committee (20F), but it does not meet during these rounds.

Documents published in the last quarter from the work of each TC are listed on [this page](#).



Details From Each Technology Committee (TC) Meeting

Essence Technology Committee (TC-10E) chaired by John Snow and Michael Zink

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

Video compression standards in SMPTE

The currently-active video compression projects are:

SMPTE Document Suite: VC-6 Picture Compression

This project will document the syntax and semantics of a high efficiency compressed, hierarchical, VC-6 bytestream.

[DG Project](#)

Status: This project was approved 2018-02-06. The group met during the March round and reviewed a WD of Part 1 of the suite, currently titled Elementary Byte Stream. The group also gave a presentation on the key VC-6 features to the TC-10E plenary.

RP on VC-6 Conformance

This Recommended Practice will define the VC-6 file based conformance criteria.

[Drafting Project](#)

Status: This project was approved 2018-02-06.

SMPTE 2073 Document Suite: VC-5 Video Essence

[DG Project](#)

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

- ST 2073-0 - VC-5 Suite Overview (Published)
- ST 2073-1 - VC-5 Elementary Bitstream (Published Q2-2014, revision published Q2-2017)
- RP 2073-2 - VC-5 Conformance Specification (Published Q2-2014, revision to cover additional Parts published Q1-2018). 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) (Published Q1-2018)



- 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) (Published Q1-2018)
- 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).
- ST 2073-10 - VC-5 Mapping into the MXF Generic Container – this TC-31FS work was published Q2-2017.

Status: All parts except Part 7 are published; a revised Part 2 together with Parts 5 and 6 were published in the last quarter.

All test materials are on a SMPTE “bitbucket” repository.

Work on Part 7 ([Drafting Project](#)) is close to completion. The group is resolving issues of citations and vendor names. The test materials will require addition of metadata, so that Part 2 will need additional revision when Part 7 is finished.

The VC-5 group continues to hold 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). VC-2 documents comprise:

- ST 2042-1: VC-2 Video Compression Standard (latest revision published Q3 2017)
- ST 2042-2: VC-2 Level Definitions
- RP 2042-3: VC-2 Conformance Specification
- ST 2042-4: Mapping a VC-2 Stream into the MXF Generic Container
- RP 2047-1: VC-2 Mezzanine Level Compression of 1080P High Definition Video Sources
- ST 2047-2: Carriage of VC-2 Compressed Video over HD-SDI
- RP 2047-3: VC-2 Level 65 Compression of High Definition Video Sources for Use with a Standard Definition Infrastructure
- ST 2047-4: Carriage of Level 65 VC-2 Compressed Video over the SDTV SDI
- RP 2047-5: VC-2 Level 66 Compression of UHD for use with HD Infrastructure

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

[Drafting Project](#)

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

Status: ST 2042-2 was published in the last quarter.

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



[Drafting Project](#)

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

Status: No report at this meeting round.

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

[Drafting Project](#)

This document was published in Q3 2017. This amendment proposal is to correct an error regarding filter type.

Status: The amendment completed pre-FCD review 2018-02-06 and closes FCD ballot 2018-03-18 (the ballot passed without comment, meaning that the document is automatically elevated to DP status).

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-y: Engineering Guideline to provide context and background

Status:

Part 1 is published (and ready for its one-year review).

Part 2 is published (and ready for its one-year review). A revision [Drafting Project](#) is underway. It will clarify line numbering conventions, define D93 white point more correctly and fix other minor issues. The group is considering a small relaxation of meter specifications to allow some lower cost meters to be used.

Part 3 was published in Q2 2017.

Part 4 is nearly ready for pre-FCD-ballot review.



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

New Recommended Practice: RP 2093 - Television Lighting Consistency Index (TLCI)

[DG Project](#)

The project scope is to document “Television Lighting Consistency Index (TLCI)” and “Television Lighting Matching Factor (TLMF)”. The introduction of light emitting diode (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: The DG continues to work on comment resolution from pre-FCD-ballot review. The document will include spreadsheet elements for easy extraction of parameter values.

Revision: ST 2086 - Mastering Display Color Volume Metadata Supporting High Luminance and Wide Color Gamut Images

[DG Project](#)

This project will add recommendations on value ranges and minimum precisions for metadata items as well as a means to signal unknown values and update a normative reference.

Status: The revised document was elevated to DP status at the TC meeting, and will be submitted for ST Audit.

New Document: P3 Colorimetry

[DG Project](#)

This project will produce a normative reference document for the colorimetric attributes of P3 using chromaticity coordinates and unique metadata identifiers for the combination of P3 color primaries and common white points for use in metadata structures associated with RGB streaming or file formats.

Status: The group has held some initial discussions on the accuracy required for colorimetry coordinates. It expects that this document will be a Standard. There was no report at this meeting round.

New Standard: ST 2115 - FS-Gamut and FS-Log Characteristics of Camera Systems

[DG Project](#)

Using the definitions in SMPTE ST 2048-1, this standard specifies Free Scale Gamut (FS-Gamut) and Free Scale Log (FS-Log) for professional camera systems. It also specifies the specific parameter values for FS-Gamut and FS-Log for professional cameras that make use of FS-Gamut and FS-Log.

Status: Pre-FCD review closed 2018-02-03 and the group has resolved most comments.



Study Group on Virtual Reality / Augmented Reality

[SG Project](#)

The project scope is to study the current VR and AR ecosystem for production and post production workflows and create a report documenting the current ecosystem, relevant existing standards and recommendations of new standards, recommended practices or engineering guidelines.

Status: The project was approved 2017-12-20 and the kick-off meeting was held 2018-02-28.

[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.

Stereoscopic Subtitle / Timed Text related projects

Work on this topic affects the documents below and is being handled by one DG. Until recently, there was work on revising ST 428-7 to improve rendering of Japanese subtitles; however, the proponent withdrew and the work stopped. At this meeting, a detailed presentation was given showing the issues that need to be addressed. It is likely that the presenters will help to restart the work, and there may be a new project next time.

Amendment: ST 429-2 - Digital Cinema Packaging - DCP Operational Constraints

[DG Project](#)

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

Status: This document has been held awaiting the UL value request to reach “mature” status.

Revision: 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: ST 428-5 is in the publication queue.

New Standard: ST 429-17 - 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: ST 429-17 is published and the project was closed in the TC meeting.

Business Impact of Stereoscopic Subtitles projects: Compatibility and Interoperability

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

[DG Project](#)

This project amends ST 429-6. TC-35PM has requested an amendment to ST 429-6 (MXF Track File Essence Encryption) for use by IMF by relaxing mandatory use of ST 429-3 (Sound and Picture Track File). Amendments to other TC-21DC documents are also requested to support IMF.

Status: The document has just been published and the group was closed in the TC meeting.

Additional Frame Rates 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: The group has started three document amendment projects, below, to integrate the additional frame rates currently specified in ST 428-11 and ST 429-13 and the updated ISO IEC 15444-1-2016. The three projects were approved 2018-02-19.

Revision: ST 428-1 - D-Cinema Distribution Master (DCDM) - Image Characteristics

[Drafting Project](#)

Revision: ST 429-2 - D-Cinema Packaging - DCP Operational Constraints

[Drafting Project](#)

Revision: ST 429-4 - D-Cinema Packaging - MXF JPEG 2000

[Drafting Project](#)

Immersive Audio Projects in TC-21DC

New Standard: ST-430-17 - SMS OMB Comm. Protocol

[Drafting Project](#)

This project will define the protocol between a Screen Management System and an Outboard Media



Block that supports the decryption and playback of an Immersive Audio Track File containing a ST 2098-2 bitstream from a compliant DCP.

Status: This project was approved in late Aug. 2017. It will be developed together with the project below. A number of approaches were discussed at the TC meeting.

New Recommended Practice: RP-430-18 - SMS OMB Comm. Reference Method

[Drafting Project](#)

This project will document an existing method for communication between a Screen Management System and an Outboard Media Block to convey an Immersive Audio Track File containing a ST 2098-2 bitstream and to synchronize the OMB.

Status: This project was approved in late Aug. 2017. It will be developed together with the project above. This RP is lagging slightly behind that project.

New Standard: ST 429-19 - DCP Operational Constraints for Immersive Audio

[Drafting Project](#)

This project will define all necessary constraints for a DCP that carries ST 2098-2 essence.

Status: This project was approved in early Aug. 2017. The project has made excellent progress and is now waiting on ST 430-12 FSK sync signal amendment (see below).

New Standard: ST 429-18 - Immersive Audio Track File

[Drafting Project](#)

This project will create a track file specification for use with ST 2098-2 Immersive Audio Bitstream and specify how to use the track file in an ST 429-7 CPL and how to deliver the Immersive Audio Key in a KDM.

Status: This project was approved in early Aug. 2017. The project is waiting for a problem with the structure of a Universal Label to be solved.

Revision : RDD 29 - Dolby Atmos® Bitstream Specification

[Drafting Project](#)

Since RDD29 was published in 2014, differences between this RDD and actual implementations have been discovered. This document will be updated to reflect those differences.

Status: This project was approved 2017-08-01. Work is awaiting completion of ST 2098-2.



Amendment: ST 430-12 - FSK Sync Signal

Proposed [Drafting Project](#)

Status: The project was assigned to TC-21DC and will be posted for 2 week approval. The amendment will add a UL and Label.

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.

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, “Audio to Video Synchronization Measurement”:

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

Status: Parts 1 and 2 are published and are now undergoing their 1-year review. The draft of the Engineering Guideline is almost complete.

Business Impact: Improved quality of experience and interoperability between systems

New SMPTE 2112 Document Suite on Open Binding Technology for Persistent Content Identification in A/V essence

[DG Project](#)

This project group is developing a suite of standards 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 was 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)”. Both types of watermark may be carried simultaneously and independently decoded (including up to four separate TLC’s).

Status: In addition to document drafting, detailed below, the group is undertaking Proof-of-Concept testing.



RP 2112-1 - Audience Measurement Using OBID and OBID-TLC

[Drafting Project](#)

Status: The document is at pre-FCD-ballot review, closing 2018-03-21.

EG 2112-2 - Audience Measurement Ecosystem

[Drafting Project](#)

Status: The document is at pre-FCD-ballot review, closing 2018-03-21.

ST 2112-10 - Open Binding of IDs (OBID)

[Drafting Project](#)

Status: The document is at ST Audit, closing 2018-03-16.

RP 2112-11 - OBID Conformance Test Materials

[Drafting Project](#)

Status: The document is at ST Audit, closing 2018-03-21.

ST 2112-20 - OBID Time Label and Content Distribution Identifiers (OBID-TLC)

[Drafting Project](#)

Status: The document was raised to DP status by vote at the TC meeting.

RP 2112-21 - OBID-TLC Conformance Test Materials

[Drafting Project](#)

Status: The document was raised to DP status by vote at the TC meeting.

Revision: ST 2016-1 - AFD and Bar Data

[DG Project](#)

ST 2016-1 does not currently include UHD formats. SMPTE has been requested by ATSC, and DVB to update it. Liaisons have been exchanged with them, as well as CTA to help ensure backwards compatibility.

Status: The UHD information has been added in a working draft. It has been identified that some adjustment is required to maintain compatibility with implementations in the field.



Cinema Sound Systems (25CSS) chaired by Brian Long and Bill Redmann

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.

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, requirements for backwards compatibility and other standards the group determines to be necessary to achieve D-Cinema interoperability.

Status: This WG (25CSS-10) gave a status report focusing on the work of the drafting groups (see below).

Immersive Sound Model and Bitstream

DG Project

Status: This DG is managing the following three document development projects:

New Standard: ST 2098-1 - Immersive Audio Metadata

Drafting Project

The group's initial focus was on this metadata definitions document.

Status: The draft document is at pre-FCD-ballot review.

New Standard: ST 2098-2 - Immersive Audio Bitstream Specification

Drafting Project

At a TC meeting in July 2016, a decision was taken to use a Dolby input document as the starting point for ST 2098-2.



Status: The draft document is at pre-FCD-ballot review.

New Standard: ST 2098-5 - D-Cinema Immersive Audio Channels and Soundfield Groups

[Drafting Project](#)

Status: The document was published in Q1 2018.

Digital Cinema Immersive Audio Renderer

[DG Project](#)

This DG is managing the following two document drafting projects:

New Engineering Guideline: EG 2098-3 - Immersive Audio Renderer Expectations

[Drafting Project](#)

Specifies the baseline expected behavior of a generic renderer in response to particular bitstream expressions and playback environment parameters.

Status: The document was near complete, but has been held awaiting balloting of ST 2098-2 and some plugfest considerations.

New Recommended Practice: RP 2098-4 - Immersive Audio Renderer Interoperability Testing Procedure

[Drafting Project](#)

Describes a test procedure that can be used to test the interoperability of an immersive audio renderer

Status: The document was near complete, but has been held awaiting balloting of ST 2098-2 and some plugfest considerations.

Study Group: Immersive Audio Implementation

[SG Project](#)

It has been recognized that a standardized Immersive Sound Model and Bitstream is only one part in ensuring interoperable immersive sound distribution. This SG has been formed to identify any additional work that is needed. The SG was approved 2016-11-21.

Status: The Study Group draft report is being reviewed. It covers two main areas:

- DCP creation and interoperability
- Exhibition Equipment Interoperability



SG work has resulted in the creation of two TC-21DC drafting groups working on two documents each; details [here](#). There is an additional recommendation for amendment to RP 200 to cover Audio Level in Immersive Sound System B-Chain (this has now been adopted as a project in the 20F Film TC).

The SG report final draft was posted for TC review on 2018-03-09. It received a brief review in the TC meeting.

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.

UMID Projects

The Chair of the following projects gave a status report.

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 studied ways to make the UMID more useful, resulting in a report available [here](#). The SG remains open to provide assistance to the other UMID project groups and to review any new work items.

Status: The SG Drafting Project proposal for RP 205 revision was approved in Q3 2017 (see below). There have been no other SG issues.

UMID-related Standards:

This is a DG managing the following three document development projects:

New Document: UMID Resolution Protocol

Drafting 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 UMID Related Standards DG. There has been no further progress in the last quarter.

Revision: ST 330 - UMID



[Drafting Project](#)

This project will revise ST 330 so that it additionally specifies new methods for generation of UMID Material and Instance Numbers as well as description of a camera's shooting direction in order to enhance the UMID applications. It will also consider any points needed for the 5 year review of ST 330:2011.

Status: A final draft revision is close to completion and pre-FCD-ballot review will be requested shortly.

Revision: RP 205 – UMID Applications

[Drafting Project](#)

This project will produce an updated version of RP 205 after its 1 year review and taking account of the ongoing ST 330 update.

Status: The work has not yet started.

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 passed FCD ballot 2016-10-20 with 15 comments to resolve. A Comment Resolution draft has been posted and comment resolution continues.

Amendment: ST 335 - Metadata Element Dictionary Structure

[Drafting Project](#)

This project corrects an error that was introduced in ST335:2012 table 1.

Status: The FCD ballot passed without comment on 2018-01-12, so the document is automatically at DP status.

Revision: RP 2079:2017 - Digital Object Identifier (DOI) Name and Entertainment ID Registry (EIDR) Identifier

[Drafting Project](#)

Status: The revised draft has completed pre-FCD ballot review and will be submitted for FCD ballot when the associated register submission is mature.

Metadata Definition

WG Project

This Working Group (30MR10) co-ordinates the process for adding or maintaining metadata items in registers. Registers are now maintained and balloted in xml format (spreadsheets were previously used).



An online tool has been introduced to assist with the development of metadata entries and their acceptance for batched ballots.

Status: The next revision of the four registers in xml form (code-named “Ponzu”) has completed pre-FCD-ballot review and will be sent for FCD ballot – [Drafting Project](#).

The Metadata Registers Development Area is available here: <https://registry.smpte-ra.org/pages/>
An Administrative Guideline (AG18) that defines the process for adding new UL definitions to the metadata registers has been published.

The existing Standards defining ULs for Elements, Groups, Types and Labels will be revised in line with AG18.

Create and Update Essence Element Register Contents

[DG Project](#)

This is a temporary activity to record 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 existing essence elements and is available in spreadsheet form at the above URL (login required).

[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.

Bruce Devlin has taken on the role of Standards VP and will be replaced as 31FS Chair by Fred Walls

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 2013-11-17 with 70 comments, but then went into hiatus. The work has now resumed.

Status: The DG produced a revised document for DP elevation vote at the TC meeting. However, it was noticed that one issue still has to be addressed. Then, ST 377-2 should be ready for DP vote.

Revision: ST 380 - MXF Descriptive Metadata Scheme 1

[DG Project](#)

Revise as part of the 5-year review in coordination with the revision of EG42. In addition ensure that the labels in ST 380 are consistent with the new 30MR xml representations.

Status: There was one comment awaiting acceptance and the commenter agreed to accept the resolution during the TC meeting. ST 380 revision can now proceed to pre-DP-vote review.

Revision: RP 2057 - Text-based metadata carriage in MXF

[Drafting Project](#)

This is a constrained revision to roll-up an amendment and check Normative References.

Status: The draft revision of RP 2057 passed FC ballot on 2018-02-09 with 5 comments to resolve. At the meeting, an estimate of one month for completion of comment resolution was given.

Revision: ST 377-1 - Material Exchange Format (MXF) - File Format Specification (and Amendments)

[DG Project](#)

This is a constrained revision to roll-up two amendments and check Normative References and deal with any consequences arising. Note that an [additional project](#) will deal with substantive issues that may be more complicated to implement.

Status: The draft ST 377-1 passed FCD ballot 2018-01-05 with 7 comments to resolve. Comment resolution is complete and the draft is ready for pre-DP-vote review.

Revision: ST 381-2 - Material Exchange Format (MXF) - Mapping MPEG Streams into the MXF Constrained Generic Container

[Drafting Project](#)

This is a constrained revision to update references and bibliography.

Status: The revised document was published in the last quarter.

Revision: RDD 44:2017 - Apple ProRes in MXF

[Drafting Project](#)

Add provisions needed for IMF and clarify the usage of these provisions for other applications.



Status: The revised document was published in the last quarter.

Working Group on Archive Exchange Format (AXF)

This Working Group (31FS-30) has defined 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. This document is published. A revision to the Part 1 document was published in Q2 2017. It has been published by ISO as a Publicly Available Specification, ISO/IEC DIS 12034-1.

Status: At the TC meeting, it was noted that an xml analysis tool has identified some corrections that are required to the schema.

Part 2 will cover "External Uses of XML Schema".

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

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 technique that gathers metadata as material passes along the workflow.

Status: Work is progressing; the use of URLs rather than URIs to allow material to be obtained rather than just identified has proved more difficult to implement than originally expected.

New Standard: ST 268-2 - Constrained Application of Digital Moving-Picture Exchange (DPX) Format for High Dynamic Range

[DG Project](#)

This project will develop a new constrained standard for DPX for the application of high dynamic range (HDR) and wide color gamut (WCG) pictures. This is a new engineering document and not a revision of ST 268. It is intended to be as constrained as possible to achieve the best interoperability.

Status: The DG decided that the document should have a second FCD ballot in view of the extensive changes during comment resolution. The second FCD ballot closes 2018-03-22.



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

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.

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.

Business Impact of all WG 32NF40 work items concerns interoperability between systems.

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

New Document Suite: EG 2111 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: Three EGs, in the form of posters, are well-advanced covering:

EG 2111-1 SD and HD-SDI Roadmap

EG 2111-2 UHD-SDI Roadmap

EG 2111-3 10G-SDI Roadmap

The first of the SMPTE wall charts (proposed EG 2111-2 UHD-SDI Roadmap), was published in the July edition of the SMPTE journal and is being updated to make it more suitable as an EG. Editorial corrections are still required prior to sending for pre FCD review in TC 32NF.



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

[DG Project](#)

This project is creating 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.

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.

Status: ST 2091-1:2017 published on 2017-02-13.

RP 2091-2 has completed Pre DP review with no comments and the document was elevated to DP status by vote in the TC meeting.

New Standard Suite: ST 2108 - Extended HDR/WCG Metadata Packing and Signaling for Serial Digital Interfaces (and associated document revisions)

[DG Project](#)

This project will define an HDR and WCG carriage mechanism to provide information to ensure that content is correctly processed in a production facility as well as correctly displayed on professional reference displays using SMPTE interface standards.

Many SMPTE interface standards will require amendment as part of this work. The plan is to put static HDR/WCG signaling parameters in the Payload ID (ST 352), and all other HDR-related metadata in a **new** “HDR/WCG Ancillary Data Packet”, documented in ST 2108.

Status:

ST 372 revision was published Q4 2017.

ST 425-1 revision was published Q4 2017.

ST 2081-10 and ST 2082-10 are moving to ST Audit in WG 32NF-70 and ST 2081-11, ST 2081-12, ST 2082-11, ST 2082-12 will follow; see [below](#).

ST 2036-3 revision was elevated to DP status by vote in the TC meeting. [Drafting Project](#)

ST 292-1 revision was elevated to DP status by vote in the TC meeting. [Drafting Project](#)

ST 2036-4 revision was posted for pre-FCD-ballot review to the TC 2018-03-12. [Drafting Project](#)

Next up for revision in this DG: ST 425-3 (dual link), ST 425-5 (quad link).

Since the last meeting, it has been decided that the ST 2108 document should actually be two documents:

- ST 2108-1, based on SEI messages for the distribution environment, which cover static metadata and constrained sets of ST 2094-x metadata. Proposed [Drafting Project](#)



- ST 2108-2, based on a KLV format as specified in ST 2094-2 for the production environment, which includes all parameters in the ST 2094 suite of standards. Proposed [Drafting Project](#)

New ST 2100 Suite: Transport of Haptic-Tactile Essence

[DG Project](#)

This project was split away from the [TC-10E project](#) on *Coding* of Tactile Essence some while ago in order to focus on defining the *transport* of this essence. The DG is reviewing the suitability of draft ST 2109 as a framework for carriage in AES3.

Status: The work of this group has been placed on hiatus, but there is intent to resume work in the future. Two Drafting Projects are set up:

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

Proposed [Drafting Project ST 2100-3: Coding and Transport Of Haptic-Tactile Essence in Ancillary Space](#)

Revision: EG 34 - Pathological Conditions in Serial Digital Video Systems

and

Revision: 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: The WG made a recommendation that TC chairs terminate the RP 198 ballot, close the RP 198 project and reaffirm / stabilize the current document. The TC agreed this course of action. EG 34 revision will continue.

Revision: ST 2038 - Carriage of Ancillary Data Packets in an MPEG-2 Transport Stream

[Drafting Project](#)

This revision adds a note describing limitations of usage with low-frame-rate 720p transports.

Status: The revised text is complete and the document will be posted for 2 week pre-FCD-ballot review when the status of Normative References has been checked.



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.

Business Impact of all WG 32NF60 work items concerns interoperability between IP - based media systems.

New Document Suite: ST 2110 - Professional Media over Managed IP Networks

[DG Project](#)

This group is developing a suite of standards specifying the carriage, synchronization and description of separate elementary essence streams over IP for the purpose of live production. The resulting standards use VSF Technical Recommendations TR-03 and TR-04 as their starting point.

The suite of ST 2110 documents currently comprises:

New Standard: Part 10 - System Timing and Definitions

Published

New Standard: Part 20 - Uncompressed Active Video

Published

New Standard: Part 21 - Traffic Shaping and Delivery Timing for Video

Published

New Standard: Part 22 - Compressed Video

Proposed [Drafting Project](#)

This project was started to standardize VC-2 HQ Profile Video ([Drafting Project](#)), but was extended to cover the use of all compression formats in the ST 2110 environment.

New Document: Part 2x - Multi-port transport of higher-than-port-speed signals using ST 2110

Proposed [Drafting Project](#)

Scope: Develop an engineering document for the grouping and signaling of multiple ST 2110-20 streams which represent either one higher resolution signal, or one higher frame rate signal.

New Standard: Part 30 - PCM Digital Audio

Published

New Standard: Part 31 - AES3 Transparent Transport

[Drafting Project](#)

New Standard: Part 40 - Ancillary Data

[Drafting Project](#)



The group is also developing this document that defines constraints on ST 2022-6 streams for interoperation with ST 2110 streams:

New Standard: ST 2022-8 - Timing of ST 2022-6 streams in ST 2110-10 Systems (originally planned to be ST 2110-50)

[Drafting Project](#)

Status of Suite: ST 2110 Parts 10, 20, 21 and 30 are published.

Part 40 was raised to DP status by vote at the TC meeting.

Part 31 is ready for pre-DP-vote review.

ST 2022-8 is ready for FCD ballot.

The multi port document project has just been submitted and has yet to go through project approval.

Revision: ST 2022-7 - Seamless Protection Switching of RTP Datagrams

[Drafting Project](#)

A revision to SMPTE ST 2022-7 to add a Ultra-Low-Skew receiver class, and to make it applicable to any RTP flow (rather than just ST 2022 flows). This is based on a one-year review. The project scope was amended at the March 2017 meeting to extend ST 2022-7 to provide seamless protection switching of a range of professional media RTP streams, including AES67 and ST 2110, hence the new title above.

Status: The document is ready for FCD ballot.

Revision: ST 2022-3 - Unidirectional Transport of Variable Bit Rate MPEG-2 Transport Streams on IP Networks

This is a project to improve bit-rate abbreviations in ST 2022-3 as part of five-year review

[Drafting Project](#)

Status: The revised draft is ready for pre-FCD-ballot review in the TC.



Working Group on 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 (ST 2083 suite). See below for the individual documents in each suite. The optical interface parameters supporting these standards have been added to ST 297-1: Serial Digital Fiber Transmission System for ST 259, ST 344, ST 292-1/2, ST 424, ST 2081-1 and ST 2082-1 Signals.

WG Status: Although there are separate drafting groups for 6Gb/s and 12Gb/s (see below), the WG generally develops its documents so that the two are kept “in step”. Additional work has been passed to this WG from the [SDI WG HDR signaling project](#) to include HDR signaling over these UHD-SDI standards. A project to cover this work in this suite of interfaces is [here](#). The next documents to be developed will be the ST 2083 suite.

ST 2081 Suite - 6Gb/s Signal/Data Serial Interfaces

[DG Project](#)

This project is responsible for the following 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) A [one-year review project](#) is underway.

ST 2081-11: 2160-line and 1080-line Source Image and Ancillary Data Mapping for **Dual-link** 6G-SDI (published)

ST 2081-12: 4320-line and 2160-line Source Image and Ancillary Data Mapping for **Quad-link** 6G-SDI (published)

ST 2081-30: Transport of Multiple 3Gb/s or 1.5Gb/s signals on a 6G-SDI link (published)

Status: ST 2081-30 was published in Q4 2017.

The one year review revision of ST 2081-10 has been approved for publication. It includes additions to signal HDR/WCG.

The one year review revisions of ST 2081-11 and -12 include the additions to signal HDR/WCG and are being reviewed in the DG.

There are a further 3 documents (like -10, -11, -12) planned for stereoscopic content.

ST 2082 Suite - 12Gb/s Signal/Data Serial Interfaces

[DG Project](#)

This project is responsible for the following 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) A [one-year review project](#) is underway.

ST 2082-11: 2160-line and 1080-line Source Image and Ancillary Data Mapping for **Dual-link** 12G-SDI (published)

ST 2082-12: 4320-line and 2160-line Source Image and Ancillary Data Mapping for **Quad-link** 12G-SDI (published)

ST 2082-30: Transport of Multiple 6Gb/s, 3Gb/s or 1.5Gb/s signals on a 12G-SDI link (published)

Status: ST 2082-30 was published in Q4 2017.

The one year review revision of ST 2082-10 has been approved for publication. It includes additions to signal HDR/WCG.

The one year review revisions of ST 2081-11 and -12 include the additions to signal HDR/WCG and are being reviewed in the DG.

There are a further 3 documents (like -10, -11, -12) planned for stereoscopic content.

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.

WG Status: The WG met during this meeting round to discuss its projects, noted below.

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

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.

There have been four rounds of testing, all hosted by FOX NE&O in Houston, TX, USA:

- Nov. 2015
- June 2016
- March 2017



- Feb. 2018

Reports (where available) are on this SMPTE [website page](#).

- **Status:** The group has been busy since the February plugfest with some further testing in a broader JT-NM plugfest, as well as preparing to participate in demos at NAB and then IBC and the SMPTE ATC. Completion of the plugfest report will therefore take a little while. The group has also produced an additional set of comments on ST 2059-1 and -2 beyond their initial set from 2017 (project below).

One-year reviews of ST 2059-1 and ST 2059-2

[DG Project](#)

This DG will revise these two PTP standards in the light of interop testing and other scrutiny since the original publication.

- **Status:** The DG has worked through a number of comments received from the PTP Interop. DG along with others. The group has held 19 meetings and has worked through most issues submitted so far. It has been decided that mention of a 5 second lock time will be removed from the Introduction of ST 2059-1 as lock time is a complex parameter to define (a new 2059 family document on this subject may be drafted).

Development of a Suite of PTP synchronization Engineering Guidelines

[DG Project](#)

This group manages the 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.

New Engineering Guideline: EG 2059-10 - Introduction to the New Synchronization System

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 has been published for some while, but kept in this report to give a clear picture of the suite.

New Engineering Guideline: EG 2059-11 – Management of Time Discontinuities

[Drafting Project](#)

Status: A WD was submitted 2015-04-20; no progress since. There is consideration of introducing an RP project for “Local Time”. There would be considerable overlap between that document and this draft EG.



New Engineering Guideline: 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 2015-04-23; no progress since.

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

[Drafting Project](#)

Status: The most recent WD was submitted 2014-11-26, no progress since.

New Time Labeling System

Until a WG meeting in June 2017, there had been two time label projects underway. At that June meeting, a decision was taken to close those projects and to entertain a single proposal to create a single new time label. This action followed strong user feedback at the Timecode Summits (report [here](#)) that SMPTE should standardize just one time label format.

A new proposal was presented at the WG meeting this round. It was reviewed and agreed that this proposal should go forward – the following project proposal was subsequently posted:

New Document: Extensible Time Label (TLX)

Create a basic Time Label with a defined mechanism for registration of additional fields

[DG Project](#)

Status: The project proposal was approved 2018-01-16. There has been much discussion of requirements and use-cases and it is likely that drafting will begin soon.

New Recommended Practice: RP 2104-1 - 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 was posted for review and comment July 2015. There has been no progress since.



Working Group on Data over AES3

[WG Project](#)

This Working Group (32NF90) was established to handle projects that standardize AES3 carriage of data streams. These streams may be compressed audio, metadata – anything other than AES3 audio itself!

WG Status: The WG met during this meeting round to discuss its projects, noted below.

ST 337 family of documents

[DG Project](#)

This group manages documents that define carriage of data formats using the ST 337 method.

Status: Projects assigned to the ST 337 family DG are:

New Standard: ST 2109 - Format for Non-PCM Audio and Data in AES3 - Audio Metadata

[Drafting Project](#)

This project will 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 draft document was posted for 2 week pre-FCD-ballot review that closed 2018-01-08. Comment resolution is in progress.

New Standard: ST 2041-4 - Carriage of MPEG-H 3D Audio Streams (MHAS) in AES3 Transport

[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: An initial draft document was submitted to the DG in Dec. 2016. A revised document is being drafted.

New Standard: Multi Dimensional Audio (MDA) in AES3 using ST 337

[Drafting Project](#)

Based on the MDA specification (ETSI TS 103 223), the project will develop a standard that describes the carriage of MDA over AES3.

Status: This project was approved in Nov. 2016. A draft document is awaited, and it is understood that the proponents are considering withdrawal of this project.

New Standard: Serial Audio Definition Model (ADM) over AES3

[DG Project](#)



This standard will specify a method of conveying a serial representation of the Audio Definition Model (ADM, Rec. ITU-R BS.2076) alongside synchronized audio signals in professional applications using AES3 serial digital audio interfaces.

Status: The project was approved 2017-12-06. A draft document has been submitted for DG review and comments have been received.

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.

BXF Suite of Documents

This TC is responsible for a 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 2021-6: BXF SDK Documentation

RP 2021-9: Implementing BXF

BXF 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 5.0.

BXF 6.0

The group has started work on some new features that will make up the “BXF 6.0” release.

Revision: EG 2021-4 - Schema Documentation (BXF 6.0)

[Drafting Project](#)

This work is managed in the TC-34CS10 BXF Drafting Group.



Status: Work is progressing at a quick pace on various items received from NABA, Extreme Reach, NBCU, Channel 4, Viacom. 39 potential items have been identified, about 15 have been tackled already. The group is hoping to get the draft revision to pre-FCD by the June meeting round.

Media Device Control over IP

[DG Project](#)

This project has developed 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, 2016.

ST 2071-2: Media Device Control - Protocol – Published in 2012, updated in 2014, 2016.

ST 2071-3: Media Device Control - Discovery – Published in 2014.

Describes an IETF Zero Configuration (ZeroConf) - compliant protocol for Device and Service discovery operations.

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.

Status:

Part 1 and Part 2 revisions were published Q4 2016.

Part 3 revision ([Drafting Project](#)) and Part 4 ([Drafting Project](#)): These documents have returned to WD status following some issues with document revision control during balloting. The DG is taking the opportunity to improve the revision to ST 2071-3. Its next telecon will be 2018-03-20.

Business Impact: Interoperable Media Device Control

New Document: Media Microservices Overall Architecture

Proposed [DG Project](#)

Status: A presentation was given at the TC meeting introducing the concept of microservices within the media industry. This project will (probably) be the first in a suite of microservices documents and it will deal with the overall architecture.



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

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: Interchange of file-based masters for current and next generation audiovisual content, including wide-color gamut (WCG) and high-dynamic range (HDR) imaging.

Overview of TC-35PM structure and IMF

This TC's work is currently about developing and maintaining the suite of Interoperable Master Format (IMF) documents.

IMF is a file-based framework designed to support multiple high-quality content versions of a finished work destined for distribution channels worldwide. It facilitates management and processing of these content versions, including playback, validation and transformation to the various master formats used by each distribution channel. IMF is intended for international use in professional applications.

Current IMF Publications

ST 2067-2; Interoperable Master Format — Core Constraints

ST 2067-3: Interoperable Master Format – Composition Playlist

ST 2067-5: Interoperable Master Format – Essence Component

ST 2067-8, Interoperable Master Format — Common Audio Labels

ST 2067-20, Interoperable Master Format — Application #2

ST 2067-21, Interoperable Master Format – Application #2E (previous title Application #2 extended)

ST 2067-30, Interoperable Master Format — Application #3

ST 2067-40, Interoperable Master Format – Application #4 Cinema Mezzanine

ST 2067-100, Interoperable Master Format – Output Profile List

ST 2067-101, Interoperable Master Format – Output Profile List – Common Image Definitions and Macros

ST 2067-102, Interoperable Master Format – Output Profile List - Common Image Pixel Color Schemes

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



WG 35PM50: IMF Document Maintenance

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>

These bug reports contribute to document revision work.

At the time of the meeting, 40 issues were recorded.

Revision: ST 2067-21 - Interoperable Master Format – Application #2E

Drafting Project

Project to reflect implementation and interchange experience, and to add support for the HLG color system as specified in ITU BT.2100-1.

Status: The first draft of the document revision has been posted to the WG.

IMF Plugfest DG

The SMI group has held several plugfests, the most recent was at IRT, Munich, in May 2017.

Content for IMF testing is hosted on a SMPTE resource using Signiant Media Shuttle.

There is a related activity (launched mid-2017) – The IMF Users Group. More information:

<https://imfug.com>

Status: Another plugfest at IRT is planned for 2018-05-29/30 and a 2018-10 plugfest is planned in the time frame of the SMPTE LA conference. The next meeting of the group will be 2018-03-28.

IMF Output Profile Lists (OPL) DG

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.

The following OPL projects are underway:

Revision: ST 2067-101 - IMF Common Image Definitions and Macros

DG Project

This revision addresses four bug-tracker issues: IMF-15, 16, 17, 18 as well as editorial issues.

Status: The revised document is ready for publication. Four bug-tracker issues were resolved in this revision.



New Standard: ST 2067-200 - Dynamic Metadata for Color Volume Transform for IMF Applications

[DG Project](#)

This document defines a plug-in that allows Dynamic Metadata for Color Volume Transform (as specified in ST 2094-2) to be added to compatible IMF Applications.

Status: The document passed FCD ballot on 2018-02-20 with 3 comments to resolve. It is predicted that the document will be ready for pre-DP-vote review shortly.

IMF Audio Essence Projects

New Standard: IMF - Specifying Audio Element and Content Kind in Application #2E Compositions

[DG Project](#)

This project will draft a standard for controlled vocabulary and syntax for MCA Audio Content Kind and MCA Audio Element Kind, two essential elements that describe soundfield groups in accordance with IMF Core Constraints. It will also investigate the need to define a controlled vocabulary and syntax for MCA Title and MCA Title Version, both of which are required by IMF Core Constraints.

The group has developed a draft Engineering Report “IMF – Specifying Audio Element and Content Kind in Application #2E Compositions”. The TC has reviewed and approved the Engineering Report.

Status: The group is drafting the Standard. A WD is expected by the June meeting round.

New Standard: IMF - Immersive Audio Bitstream Level 0 Plug-In

[Drafting Project](#)

Specify a plug-in for the carriage of (draft) ST 2098-2 Immersive Audio bitstream in IMF compositions for use with feature and episodic content, including:

- Mapping of ST 2098-2 bitstream into IMF Track Files

- Mapping of ST 2098-2 bitstream into the IMF Composition as Virtual Tracks

- Extension mechanisms for adding metadata to the Track File containing the ST 2098-2 bitstream

Status: A WD is in progress. The project Chair reported that the draft is close to being ready for pre-FCD-ballot review.

New Standard: ST 2067-50 - IMF Application #5 ACES

[DG Project](#)

This project will specify an application of the IMF framework that uses image essence conforming to SMPTE ST 2065-4 (ACES), and audio and subtitle essence as specified in SMPTE ST 2067-2.



Status: The Draft ST 2067-50 is in the SMPTE publication queue (published the following week). It is intended that 5 App#5 tests will be added to the 2018-10 plugfest.

New Standard: ST 2067-9 - Sidecar Composition Map

[DG Project](#)

This project will define an XML document that (a) can be carried as an IMP asset and (b) associates other selected IMP assets (called Sidecar Assets) with one or more IMF Compositions. The document defines the Sidecar Composition Map structure, which allows a Sidecar Asset to be associated with a Composition Playlist.

Status: DP elevation vote underway, closing 2018-03-23.

Amendment: ST 2067-40 - IMF Application #4 Cinema Mezzanine

[DG Project](#)

A plugfest specifically for ST 2067-40 was held in Erlangen, Germany 1-2 Mar. 2017 and some errors, including a UL error were discovered. This amendment will correct the errors. The plugfest report should be available soon.

Status: ST 2067-40 amendment1 was published 2017-12-27.

New Registered Disclosure Document: RDD 45 - IMF Application for ProRes format

[DG Project](#)

This RDD specifies an IMF application based on Application #2E (SMPTE ST 2067-21) that uses Apple ProRes image essence (as specified in SMPTE RDD 44) instead of JPEG 2000 image essence.

Status: The RDD is published and the group will be disbanded.



SMPTE Standards Publications in the Last Quarter

10E Essence:

[ST 2042-2:2017 VC-2 Level Definitions](#)

[RP 2073-2:2017 VC-5 Video Essence – Part 2: Conformance Specification](#)

[ST 2073-5:2015 VC-5 Video Essence - Part 5: Layers](#)

[ST 2073-6:2015 VC-5 Video Essence - Part 6: Sections](#)

20F Film:

21DC Digital Cinema:

[ST 429-17:2017 XML Constraints](#)

[ST 2098-5:2018 D-Cinema Immersive Audio Channels and Soundfield Groups](#)

[ST 429-6:2006 Am1:2018 D-Cinema Packaging- MXF Track File Essence Encryption](#)

[ST 429-5:2017 D-Cinema Packaging — Timed Text Track File](#)

24TB Television & Broadband Media:

25CSS Cinema Sound Systems:

30MR Metadata & Registers:

31FS File Formats & Systems:

[ST 381-2:2018 Material Exchange Format \(MXF\) - Mapping MPEG Streams into the MXF Constrained Generic Container](#)

[RDD 44:2017-11 Material Exchange Format — Mapping and Application of Apple ProRes](#)

32NF Network & Facilities Architecture:

34CS Media Systems, Control & Services:

35PM Media Packaging & Interchange:

[ST 2067-40:2016 Am1:2017 Interoperable Master Format — Application #4 Cinema Mezzanine Amendment 1](#)

[RDD 45:2017 Interoperable Master Format – Application ProRes](#)



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 concerning 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, usually used with multipart document suites to explain the structure

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

Options are: Revise; Reaffirm; Stabilize; Withdraw.

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 **SMPTE Workspace**. It has a **Project View** that includes a publicly accessible project summary page. It is used to state the project scope and details at the proposal stage and to track progress through to completion. In this report access to the project view is via a hyperlink such as [DG Project](#).*