



SINCE 1916

STANDARDS QUARTERLY REPORT December 2019

Result of SMPTE® Technology
Committee Meetings
9-12 December 2019

Hosted by
Arista
Santa Clara, California, United States

THE NEXT CENTURY



Society of Motion Picture and Television Engineers®

445 Hamilton Avenue

White Plains, NY 10601 USA

www.smpte.org

**Thanks to Our Sponsor for Making the
December Technology Committee Meetings
Possible: Arista**

ARISTA



SMPTE® Standards Quarterly Report:

Executive Summary

SMPTE Standards Committee Meetings 9-12 December 2019

Hosted by *Arista Networks, Santa Clara, CA, US*

This Executive Summary lists the new projects this quarter and captures the more notable project developments. More information on the current status of the 150 active projects can be found in the [detailed account](#), after this summary.

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

51 members attended in person over the four days, and there was additional participation by remote access.

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

New Projects that Began in the Last Quarter

(Project Name links to online project overview, "Date approved" links to this report, if discussed in meeting)

TC	Type	Project	Approval Date (mm/dd)
<i>D-Cinema</i>	<i>New RDD</i>	<i>RDD 52 - SMPTE DCP Bv2.1 Application Profile</i>	<i>12/27</i>
<i>Network</i>	<i>Revision</i>	<i>Scope-Limited one-year review of 2110-40</i>	<i>11/15</i>
<i>Essence</i>	<i>Amendment</i>	<i>Add Alpha support for HD profiles in VC-3</i>	<i>11/23</i>

SMPTE® Standards Quarterly Report, December 2019, Page 2

© 2019 by Society of Motion Picture and Television Engineers® (SMPTE®) – All Rights Reserved [ExecSum](#)

^ [Essence](#) [D-Cinema](#) [TV-Broadband](#) [CinemaSound](#) [Metadata](#) [FileSystems](#) [Network](#) [MediaSystems](#) [MediaPackaging](#)



File Systems	Amendment	<u>Add Alpha support for HD profiles in VC-3 MXF</u>	<u>11/23</u>
Packaging	Revision	<u>ST 2067-40 IMF App#4 Cinema Mezzanine</u>	<u>10/26</u>
File Systems	New Document	<u>Controlled audio vocabulary containing registered values and encoding rules for MCA Label Subdescriptor properties in SMPTE ST 377-4</u>	<u>10/23</u>
Packaging	New Study Report	<u>Examine technical requirements of transforming IMF Application DPP Compositions to flat AMWA AS-11 MXF files.</u>	10/07
Metadata	Revision	<u>ST 2003 to normalize the document with AG-18.</u>	<u>Not Set</u>
Metadata	Revision	<u>ST 335 to normalize the document with AG-18.</u>	
Metadata	Revision	<u>ST 395 to normalize the document with AG-18.</u>	
Metadata	Revision	<u>ST 400 to normalize the document with AG-18.</u>	
Network	Study Group	<u>Study worldwide SDO needs in the content delivery space for</u>	Not Set



		<u><i>essence and metadata from systems within the SMPTE scope.</i></u>	
<i>TV/Broadband</i>	<i>Revision</i>	<u><i>EG 2112-2, Audience Measurement Ecosystem</i></u>	<u><i>Not Set</i></u>
<i>TV/Broadband</i>	<i>Revision</i>	<u><i>RP 2112-1, Audience Measurement Using OBID and OBID-TLC</i></u>	
<i>Cinema Sound Systems</i>	<i>New Standard</i>	<u><i>B-chain characteristics to play back modern, digital, full dynamic-range movie soundtracks</i></u>	<u><i>10/15</i></u>
<i>File System</i>	<i>New Standard</i>	<u><i>Wrapping ISO/IEC 21122 (JPEG XS) codestreams in the MXF Generic Container.</i></u>	<u><i>10/10</i></u>

Professional Media over IP Projects

Professional Media over Managed IP Networks

This project has been 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 seven parts of the suite (including the essential core parts) are published:

- System Timing and Definitions (now in revision following one-year-review)
- Uncompressed Active Video (now in revision following one-year-review)
- PCM Digital Audio
- Traffic Shaping and Delivery Timing for Video (now in revision following one-year-review)
- ST 291 Ancillary Data (now in revision following one-year-review)



- Constant Bit Rate Compressed Video
- Transparent AES 3 Data

There are also parts in development on:

- Single Video Essence Transport over Multiple ST 2110-20 Streams (to support high bitrate streams)
- Two new projects related to transport of metadata that has not been derived from ST 291 packets
- A document tying down some additional parameters for streaming standard definition video
- A project to develop a set of ST 2110 Protocol and Implementation Conformance Statements (PICS)

[Details](#)

Network-Based Synchronization for the Professional Media Environment

The ST 2059 suite defines 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](#).
- Revisions of the two standards have been balloted following one-year review of feedback from plugfests and implementations. [Details](#)
- A Study Group is producing reports on Security in ST 2059 Networks [Details](#)
- A recommended practice is being developed on PTP Device Monitoring Capabilities to provide interoperability in network monitoring and diagnostics. [Details](#).
- A Drafting Group will create report “Using ST 2059 in ST 2110 Networks with ST 2022-7 Redundancy” [Details](#)
- Engineering Guidelines are being drafted. [Details](#)

IP Control Roadmap Group

This new Ad-Hoc group within the Media Systems, Control and Services TC was formed this meeting round to identify media control requirements in IP networks and the network layers required. [Details](#)



Interoperable Master Format (IMF)

IMF is a file-based framework designed to support multiple high-quality content versions of a finished work destined distribution channels worldwide. The suite ([details](#)) currently comprises 16 published SMPTE Engineering Documents. Additionally, a number of related SMPTE Technical Specifications (TSP) is publicly available [here](#).

IMF Document Maintenance

A number of documents in the IMF suite are currently being revised. [Details](#)

An Amendment to ST 2067-21 IMF Application #2E is offered for public review [here](#). Comments and implementation reports are requested

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:

- A new project to standardize VC-6, a picture compression scheme based on “deep learning”. [Details](#)
- A new Registered Disclosure Document (RDD) for a very specialized compression application of RAW Bayer sensor data. [Details](#)
- Development of an eight-part suite of documents defining the VC-5 compression system (developed from GoPro’s Cineform codec). Seven parts of the suite are published and work is well-advanced on the final Metadata part. [Details](#).
- Projects to revise SMPTE VC-3 to add Alpha channel – [Essence](#) – [MXF file](#)
- Projects on the VC-2 document suite (developed from BBC’s Dirac Pro). [Details](#)

Cinema Projects

IMF, above, is also highly relevant to the Cinema community

Cinema Sound Systems

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

It has a Working Group on Interoperability of Immersive Sound Systems in Digital Cinema and a working group on B-Chain Characteristics and Expectations.

[Details](#)



Digital Cinema (D-Cinema)

This TC has published four multi-part document suites dealing with these topics:

- D-Cinema Distribution Master
- D-Cinema Packaging
- D-Cinema Operations
- D-Cinema Quality

Current projects deal with:

- incorporating provisions for stereoscopic subtitles into existing D-Cinema documents
- projects for immersive audio in D-Cinema
- integration of D-Cinema additional frame rate documents.

[Details](#)

Reference Materials for DPX V2.0 HDR Implementations

The HDR DPX standard was published in Q1 2019. This project has started to produce a reference implementation and tools. [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 9 MXF-related projects in process. [Details](#) They include two new projects:

- Mapping JPEG XS into the generic container [Details](#)
- Mapping high throughput JPEG 2000 in the MXF generic container [Details](#)

Microservices for Media A project is underway to define a framework for media-related microservices as well as documents defining each microservice. [Details](#)

The group has worked on ways to get more engagement from industry and has formed an organization – the Open Services Alliance, OSA - in the last quarter.

Serial Audio Definition Model (ADM) over AES3

This standard specifies a method for transporting 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. [Details](#)

Extensible Time Label A project is underway to create a Standard for a time label that overcomes the shortcomings of SMPTE ST 12 (support for today's higher frame rates, time values greater than 24 hours) as well as supporting additional requirements of current systems and workflows with extensibility for future requirements. A "Digital Birth Certificate" will be defined including a Source Ident. [Details](#)



Society of Motion Picture and Television Engineers®

445 Hamilton Avenue

White Plains, NY 10601 USA

www.smpte.org

Metadata and Registers This TC has been maintaining metadata ULs on behalf of the other SMPTE TCs for the last 20+ years. But its systems have recently been upgraded to use xml rather than spreadsheets and an additional register has been standardized for Essence elements keys. It now has tools available to check the integrity of requests for new ULs. [Details](#)



SMPTE® Standards Quarterly Report:

[Detailed Account](#)

SMPTE Standards Committee Meetings 9-12 December 2019

Hosted by Arista Networks, Santa Clara, CA, US

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 on [this website page](#).

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 Standards Development](#)

Introduction

The quarterly SMPTE Standards meeting rounds are led by the SMPTE Standards VP, a volunteer post, and the SMPTE Director of Standards Development, a staff post. These posts are currently filled by Bruce Devlin and Thomas Bause Mason respectively.

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

There was also a Standards Community meeting that introduced general updates on SMPTE HQ work and tools and a meeting to consider how SMPTE Standards could co-operate with User Groups for its standards.



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

Quarterly Standards meeting rounds are planned for:

- March 2020 SMPTE India Section, Mumbai, IN
- June 2020 AWS, Portland, OR, US
- Sept. 2020 EBU, Geneva, CH
- Dec. 2020 Disney, Burbank, US

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 \(35PM\)](#)

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

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

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 Lars Borg

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

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

This group is drafting a suite of documents dealing with the use of fixed pixel matrix reference displays.

[DG Project](#)

ST 2080-1: Reference White Luminance Level and Chromaticity (published, one year review due)

RP 2080-2: Measurement and Calibration Procedure for HDTV Displays (deals with parameters that can be regularly adjusted - published)

Revision [Drafting Project](#) has been set up. It will clarify line numbering conventions, define D93 white point more correctly and fix other minor issues.

ST 2080-3: Reference Viewing Environment Characteristics (published Q2 2017)

RP 2080-4: Full Measurement / Calibration (draft in development – see below)

ST 2080-x: Reference Display Characteristics

EG 2080-y: Engineering Guideline to provide context and background

Status: The group has not made progress in the last quarter, but meetings will restart soon.

Part 4 passed FCD rebalot 2019-01-11 with 73 comments to resolve, many of which are now resolved. Comment resolution is ongoing.

The Part 2 revision work will restart when Part 4 has completed DP.

At this meeting, there was discussion about whether the surround illumination specified in Part 3 is also suitable for HDR; there are suggestions that a lower level should be used.

It has been identified that Part 1 will also need revision in the light of the Part 4 work.

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



SMPTE Video Compression Standards

The currently-active video compression projects are:

SMPTE 2117 Document Suite: VC-6 Picture Compression

This project will document the syntax and semantics of a high efficiency compressed, hierarchical, VC-6 byte stream that uses hierarchical representation of compressed data to allow decoders to flexibly recreate uncompressed imagery.

[DG Project](#)

ST 2117-1: Multiplanar Picture Format Part 1. Elementary Bitstream

Status: ST 2117 Part 1 passed FCD ballot 2019-10-23 with 107 comments to resolve. The resolution process is estimated to be 70% complete, with a target for completion end January 2020.

RP 2117-2 VC-6 Conformance

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

New document [Drafting Project](#)

Status: A reference decoder written in Python has been developed using an external developer to test the usability and specifics of the text.

Amendment: ST 2019-1 - VC-3 Picture Compression and Data Stream Format

This project group will extend the VC-3 standard to include carriage of Alpha channel. There is [associated work](#) to revise the ST 2019-4 MXF mapping document in the file systems TC.

Amendment [DG Project](#)

Status: The project group is newly-formed and work has not yet started.

SMPTE 2073 Document Suite: VC-5 Video Essence

This project standardizes the CineForm / GoPro video compression system.

[DG Project](#)

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, revision).

Includes Reference Decoder, Sample Encoder, sample bitstreams

Revision [Drafting Project](#) to add Part 7 items underway

ST 2073-3 - VC-5 Image Formats (Published)

SMPTE® Standards Quarterly Report, December 2019, Page 12

© 2019 by Society of Motion Picture and Television Engineers® (SMPTE®) – All Rights Reserved [ExecSum](#)

[^] [Essence](#) [D-Cinema](#) [TV-Broadband](#) [CinemaSound](#) [Metadata](#) [FileSystems](#) [Network](#) [MediaSystems](#) [MediaPackaging](#)



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 (On point of publication)

This will provide a basic set of metadata for input image format and facilitate round-tripping embedded metadata from other standards by use of identifiers – ACES, XMP, DPX, MXF, ALE and vendor-specific.

New document [Drafting Project](#)

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

Status of suite: All parts except Part 7 are published.

Part 7 has been prepared and approved for publication.

Part 2 Third revision in progress to add coverage for VC-5 Part 7. The group met at this round and discussed coverage needed in the test materials. Work is underway on XML Schema and Python scripts for verifying conformance to ST 2073-7 Metadata were demonstrated.

The ST 2073 overview document is also being revised.

Business Impact: Interoperability between systems

VC-2 video compression suite

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 (latest revision published Q1 2018)

RP 2042-3: VC-2 Conformance Specification

Revision [Drafting Project](#) This revision will specify test materials supporting ST 2042-1.

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

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

Work is underway on new conformance software:

- *A bitstream validator has been produced that performs in-depth verification of bitstreams and can also act as a reference decoder.*
- *Tests for syntactic features are mostly complete.*
- *Tests to exercise wavelet transform arithmetic are also mostly complete.*

It is hoped that Part 3 will be ready for ballot by mid-2020.

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

RDD 51 - High Density Encoding – Data Encoding Specification

Losslessly reducing the footprint of large format, RAW, Bayer pattern files from ARRI ALEXA cameras.

New document [RDD Project](#)

Status: This document closed RDD ballot 2019-10-03. All comments are addressed in a revised document, awaiting commenter response.

RP 2093 - Television Lighting Consistency Index (TLCI)

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 in relation to color reproduction for television.

New document [DG Project](#)

Status: The document passed FCD ballot 2019-06-16 with 50 comments to resolve. Resolution is almost complete, awaiting one final acceptance. The document comprises the RP together with spreadsheet elements for the tabular data.

ST 2094-40 – Dynamic Metadata for Color Volume Transform — Application #4

Revision addresses these issues discovered in current published document:

- Two length specifications (DistributionMaxRGB, BezierCurveAnchors), two range specification (DistributionMaxRGB, KneePoint), one recommendation (DistributionMaxRGB), do not match actual implementations.
- One metadata item (FractionBrightPixels) is optional.



Revision [Drafting Project](#)

Status: The document is now in a second FCD ballot, closing January 15, 2020

ST 2122 - Academy Spectral Similarity Index (SSI)

This new project has been initiated to standardize SSI.

Existing color-rendering metrics were designed for human vision or for television cameras, *not* cinema cameras. Digital cinema cameras see light differently than human vision (and each other), so no metric to evaluate lighting based on a single set of spectral sensitivities will work for any camera. The problem is exacerbated by non-Planckian light sources such as LED; existing metrics are unreliable predictors of the color-rendering capability of LED lighting in cinema production.

New Standard [DG Project](#)

Status: The document is now in FCD ballot, closing January 14, 2020.

ST 2065 - ACES suite

A revision of ST 2065-1, ST 2065-2 and ST 2065-3 is necessary to address issues reported since publication and to prepare the documents for ISO submission. This project describes the overall work effort and sets forth the basis on which a single DG will work on the documents. There will also project to revise Parts 4 and 5 in the File Systems TC. Bug and issue tracking for all 3 documents is in place on GitHub.

Revision [DG Project](#)

Status: A drafting group has been set up and input documents for Parts 1 and 2 are being discussed.

ST 2065-1 – Academy Color Encoding Specification (ACES)

Revision [Drafting Project](#)

ST 2065-2 – Academy Printing Density (APD) — Spectral Responsivities, Reference Measurement Device and Spectral Calculation

Revision [Drafting Project](#)

ST 2065-3 – Academy Density Exchange Encoding (ADX) — Encoding Academy Printing Density (APD) Values

Revision [Drafting Project](#)



RP xxxx - Measurement Methods for Resolution Characteristics of Camera Systems

To facilitate the maintenance and operation of studio equipment, the purpose of this project is to document measurement methods for the spatial resolution characteristics of camera systems.

Specifically, to measure the Modulation Transfer Function (MTF).

New document [Drafting Project](#)

Status: The project was approved 2019-09-24. The work will be based on ARIB 8-TR-B41v2_0-E1. The DG Chair has just received an English translation of this document, so that work can start.

Digital Cinema Technology Committee (21 DC) Chaired by Steve Llamb 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

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

This revision addresses issues that arose during an earlier ST 428-7 revision and the development of ST 429-16.

Revision [Drafting Project](#)

Status: This document revision passed ST Audit 2019-11-28 and is being prepared for publication.

Note that there is [other work](#) on additional frame rates that further amends ST 429-2, and will need integration.

ST 428-7 - D-Cinema Distribution Master (DCDM) - Subtitle

Project Scope: To revise ST 428-7 to improve rendering of Japanese timed text subtitles. Solutions to the absence of a baseline in Japanese text are being considered.

Revision [Drafting Project](#)

Status: The group continues to meet bi-weekly. The main issues continue to be with Japanese text, especially when written vertically. Current cinema subtitle rendering implementations do not use the vertical metrics and other features of the font file resulting in improper vertical and horizontal positioning of Japanese characters within a vertical string. A discussion document on these issues has been produced.

Business Impact of Stereoscopic Subtitles projects: Compatibility and Interoperability



Additional TC-21DC Frame Rates documents

Scope of projects: 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.

Revisions [WG project](#)

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

Revision [Drafting Project](#)

Status: This document is published.

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

Amendment [Drafting Project](#)

Status: ST 429-2 amendment was published 2019-01. However, a problem with its normative reference to ST 429-4 was identified at the 2019-06 meeting and the publication was removed from the store. There was discussion at this meeting about the process for integration of this amendment with the [other revision work](#) on ST 429-2 for stereoscopic subtitles. The TC Chairs will work together to decide how the integration should be done.

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

Revision [Drafting Project](#)

Status: This document passed DP vote 2019-11-22. It will be submitted for ST Audit.

Immersive Audio Projects in TC-21DC

ST 430-17 – SMS-OMB Communication Protocol

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.

New document [Drafting Project](#)

Status: The draft document passed FCD ballot 2019-11-29 with 4 comments to resolve. Comment resolution is in progress.

RP 430-18 - SMS OMB Comm. Reference Method

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.

New document [Drafting Project](#)

Status: The draft document completed pre-FCD-ballot review but has not progressed to FCD ballot. However, it was reported at an earlier meeting that this document may not be needed as the Protocol document itself is being made clearer.



ST 430-14 Digital Sync Signal and Aux Data Transfer Protocol

Revise ST 430-14 to:

- allow the client to indicate that it accepts both plaintext or encrypted data items;
- correct selected outstanding issues identified through implementation experience, as captured at <https://github.com/SMPTE/st430-14/issues>

Revision [Drafting Project](#)

Status: All GitHub comments have been addressed and pre-FCD ballot review can commence when DG review is completed.

21DC Document Maintenance

General document maintenance, document issue tracking, 1-year & 5-year reviews of documents, project proposals for revisions/amendments as required.

[DG Project](#)

Status: The group has reviewed the one-year and five-year document list and produced a report. It is also working on the issue of TC-21DC documents that reference older versions of ST 377 and ST 379.

New Document - RDD 52 - SMPTE DCP Bv2.1 Application Profile

This RDD constrains the implementation of Digital Cinema Composition mastering, as determined by proponent consensus based upon real world industry requirements and practices

[RDD Project](#)

Status: This is a new project that will complete the approval process 2019-12-27.

Television and Broadband Media Committee (24TB) Chaired by Bill Miller

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.

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

This project group has developed a suite of standards for embedding end-to-end persistent content and distributor identifiers into audio/video essence in a way that survives processing, compression and distribution.



RP 2112-1 - Audience Measurement Using OBID and OBID-TLC (published Q3 2018)

EG 2112-2 - Audience Measurement Ecosystem (published Q3 2018)

ST 2112-10 - Open Binding of IDs (OBID) (published Q2 2018)

RP 2112-11 - OBID Conformance Test Materials (published Q2 2018)

ST 2112-20 - OBID Time Label and Content Distribution Identifiers (OBID-TLC) (published Q2 2018)

RP 2112-21 - OBID TLC Conformance Test Materials (published Q2 2018)

Status: The group has been processing 1 year reviews as they come due. A [DG project](#) has been set up for this purpose. Parts 10, 11, 20, 21 were at DP status at the time of the meeting, and the document packages will be sent for ST Audit. Revision to the remaining documents [RP 2112-1](#) and [EG 2112-2](#) is under way, both documents completed pre-FCD review 2019-12-10 and initiation of FCD ballots has been requested.

Revision: ST 2016-1 - AFD and Bar Data

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.

Revision [DG Project](#)

Status: The document revision needs completion. ST 2016-3 is being reviewed to determine whether it needs revision to support these changes.

Other TC-24TB business

The following document review actions are under way:

- ST 2035 Amendment 1 has been rolled up into ST 2035 by the Chair.
- SMPTE 2052 – it was agreed that Parts 1, 10, 11 of this document suite on SMPTE Timed Text will be revised in a constrained revision project. A GitHub repository has been opened for issue tracking on these documents.

[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.

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.

Working Group Documents

ST 2098-1 Immersive Audio Metadata (Published)

ST 2098-2 Immersive Audio Bitstream Specification (Published, revision published Q2 2019)

EG 2098-3 Immersive Audio Renderer Expectations

RP 2098-4 Immersive Audio Renderer Interoperability Testing Procedure (being merged into Part 3 and then discontinued)

ST 2098-5 D-Cinema Immersive Audio Channels and Soundfield Groups (Published, reaffirmed)

Status: Document work in this WG (25CSS-10) is carried out by the drafting groups (see below).

SMPTE 2098 Projects on Immersive Sound Model and Bitstream

This DG is responsible for Parts 1, 2 and 5.

[DG Project](#)

Status: There is currently no project work for the group. However, a presentation was given on issues that may result in a revision of ST 2095-1.

SMPTE 2098 Projects on Digital Cinema Immersive Audio Renderer

This DG is responsible for Parts 3, 4 – Part 4 was later merged into Part 3.

[DG Project](#)

Status: At the last meeting, the DG decided to merge Part 4 into Part 3. The proposal for scope change of Part 3 was approved.



EG 2098-3 - Immersive Audio Renderer Expectations

Specifies the baseline expected behavior of a generic renderer in response to particular bitstream expressions and playback environment parameters and describes a test procedure that can be used to test the interoperability of such renderers.

New document [Drafting Project](#)

Status: Final edits to 2098-3, including merging RP 2098-4, are complete and the draft document has completed pre-FCD-ballot review.

The final issue is logistics for making available the referenced sounds files for testing purposes.

RP 2098-4 - Immersive Audio Renderer Interoperability Testing Procedure

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

New document [Drafting Project](#)

Status: This project will be closed.

Working Group on B-Chain Characteristics and Expectations

Create recommended practices and engineering guidelines for cinema sound systems to ensure they faithfully play back modern, digital, full dynamic-range movie soundtracks.

[Working Group Project](#)

Status: The WG Chair gave a presentation, identifying its scope in the 25CSS workflow diagram.

Three work areas have been identified: Clip Analysis, In-situ Measurements, Reference Documents.

Chairs have been appointed for each of these.

RP xxxx - B-chain characteristics and expectations required to play back modern, digital, full dynamic-range movie soundtracks

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

New document [Drafting Project](#)

Status: This project completed approval 2019-10-15.



Metadata and Registers Committee (30MR) Chaired by Dean Bullock and Phil Warren

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)

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 for assistance to the other UMID project groups and to review any new work items.
[SG Project](#)

Status: Nothing to report.

UMID-related Standards:

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

ST 330 - UMID

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.

Revision [Drafting Project](#)

Status: The ST 330 Committee Draft has been submitted to the TC Chairs for FCD Ballot. The Standards Committee has given formal approval for use of an ICAO reference in this standard and the TC Chairs will post the draft ST 330 for FCD ballot..

RP 205 – UMID Applications

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

Revision [Drafting Project](#)

Status: An initial draft revision has been submitted for DG review. Another application example will be added after the ST 330 FCD ballot is complete.

New Document: UMID Resolution Protocol



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

New document [Drafting Project](#)

Status: Nothing to report.

ST 2088 - SMPTE Essence Element Key Register Structure

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

New document [DG Project](#)

Status: This document is published. Attention has now turned to Essence Element contents and these are being formatted in xml, consistent with the existing four registers. This DG and project will be closed.

UUID File Naming

This project will explore ways to unify the application of UUIDs to files, primarily as file names, but respecting whatever UUIDs already have been assigned to files.

New [SG Project](#)

Status: The SG Chair will soon send out first meeting call. There has been some initial contact with HQ to discover how SMPTE documents can be searched for UUID-related terms.

Metadata Definition

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 validation and acceptance for batched ballots. The current register release is available [here](#).

Status: The next release will be “Tabasco”, due to start FCD ballot in the week following the meeting round. The ballot will comprise a simple prose document and the set of xml documents will be treated as elements of the ballot document.

The entries currently being processed will be frozen in the next few weeks. Approved items will be included in the “Sriracha” release for subsequent FCD ballot. It is intended that the Essence Elements register will be added to this ballot.

The Metadata Registers Development Area is available here: <https://registry.smpte-ra.org/pages/>

The existing Standards defining ULs for Elements, Groups, Types and Labels will be revised and simplified in line with administrative guideline AG18 that defines the process for adding new UL



definitions to the metadata registers. The projects below, which will be sent for approval shortly, will implement this work:

ST 335 Metadata Element Dictionary Structure

Normalize to AG18

Revision [Drafting Project](#)

ST 395 Metadata Groups Register Structure

Normalize to AG18

Revision [Drafting Project](#)

ST 400 SMPTE Labels Structure

Normalize to AG18

Revision [Drafting Project](#)

ST 2003 Types Dictionary Structure

Normalize to AG18

Revision [Drafting Project](#)

File Formats and Systems Committee (31FS) Chaired by Fred Walls 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.

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

ST 381-5: Mapping HEVC Streams into the MXF Generic Container



This standard specifies the mapping of HEVC coding data into the MXF Generic Container (MXF-GC) based on the MXF MPEG mapping standard (SMPTE ST 381-2).

New document [DG Project](#)

Status: Document drafting is complete and FCD ballot will commence when the UL submission is declared “mature” by TC-30MR.

ST 380 - MXF Descriptive Metadata Scheme 1

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.

Revision [DG Project](#)

Status: FCD ballot comment resolution is complete. There has been no action this quarter, in favor of moving other MXF documents forward.

RP 2057 - Text-based metadata carriage in MXF

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

Revision [Drafting Project](#)

Status: The draft revision of RP 2057 passed FCD ballot on 2018-02-09 with 5 comments to resolve. The document is also being revised in line with AG24 – MXF Style Guide; this is about 50% complete.

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

This is a constrained revision to roll-up two amendments and check Normative References. Note that a follow-on [additional project](#) will deal with substantive issues that may be more complicated to implement. An advisory note will explain this approach.

Revision [DG Project](#)

Status: This revision is at ST Audit. The follow-on revision project, mentioned above, can now start.

ST 377-4 – MXF Multichannel Audio Labeling Framework

This is a revision primarily intended to create additional MCALabelSubdescriptor properties and a controlled vocabulary. During the development project, it was decided that the Controlled Vocabulary would be removed and that it would be a separate document, encouraging use outside of MXF.

Revision [DG Project](#)

Status: The draft document has been submitted to the TC Chairs to initiate FCD ballot.

ST xxxx - Audio Controlled Vocabulary

This document is “broken out” from the revision of ST 377-4 MXF Audio Labeling Framework.

New document [DG Project](#)



Status: This project was approved in the last quarter and a draft document is under review. The group welcomes participation from other industry sectors.

ST 422:2014: Mapping JPEG 2000 Codestreams into the MXF Generic Container

This project adds support for the wrapping of codestreams that conform to ISO/IEC 15444-15 (High-throughput JPEG 2000, HTJ2K).

Revision [DG Project](#)

Status: The revised document has passed ST Audit and is being prepared for publication.

New Standard: Mapping JPEG XS Codestreams into the MXF Generic Container

This project specifies the mapping of JPEG XS codestreams conforming to ISO/IEC 21122-1 (JPEG XS Core Coding System) into the MXF generic container.

New document [DG Project](#)

Status: This new project was approved in October 2019. A strawman document has been submitted and the DG's first meeting will be 2019-12-19.

Amendment: ST 2019-4 - Mapping VC-3 Coding Units into the MXF Generic Container

This project will add support for mapping a VC-3 bitstream carrying an Alpha channel into MXF, using the pre-defined HD raster profiles. There is a [related project](#) in the Essence TC.

Amendment [DG Project](#)

Status: This project was approved in November 2019. The Drafting Group has been formed.

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. Part 1 has been published for some while and deals with 'AXF Structure and Semantics' and includes an XML schema. 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.

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

There are 2 current projects:

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

Project Scope: Revise ST 2034-1 to correct syntax errors in XSD file, edit text document to support XSD changes, prepare a readme file to accompany the XSD file. It was intended to remove UML diagrams from the text document, but a means has been found to edit them.

Revision [Drafting Project](#)



Status: The text update had been complete for some while, but a requirement arose to add a “conditional any” function for extensibility that was identified in the development of Part 2. The group is finalizing the xml for this addition and will update affected UML diagrams.

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

Part 2 covers the use of AXF Structures in “Unwrapped” form, enabling aggregation of files into a “Bundle”. The schema can serve as a manifest and it can apply hierarchical structure to files. It is intended for use from file capture on set through to archive input. There was a strong end-user demand for this technique that gathers metadata as material passes along the workflow. Use of IMF metadata is being considered to avoid reinvention.

New document [Drafting Project](#)

Status: Work is on hold until the “any” data type in Part 1 is completed.

RP xxxx - Reference Materials for DPX V2.0 HDR Implementations

This project follows hot on the heels of publishing ST 268-2 - Constrained Application of Digital Moving-Picture Exchange (DPX) Format for High Dynamic Range.

Project scope: Generate a reference model and test materials that implement the essential features of HDR DPX workflows.

New document [DG Project](#)

- *Status: The API has been rewritten in C++ . A basic reader and writer have been implemented. The project also includes DPX files that can be used to test reader implementations.*



Network and Facilities Architecture Committee (32NF) Chaired by Leigh Whitcomb and Thomas Kernen

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 is responsible for the following projects:

New Document Suite: EG 2111 on SDI Interfaces

This group will draft EGs to provide a tutorial on the many SMPTE SDI interface standards and technologies, including how they relate to each other, what image formats are carried, performance. It was established at the 2018-12 meeting that pdf can be considered an “editable format” for these documents.

New document suite [DG Project](#)

Three EGs, in the form of posters, are being produced:

EG 2111-1 - SD and HD-SDI Roadmap

New document [Drafting Project](#)

Status: Passed FCD ballot 2019-09-23 with 21 comments to resolve. The WG considered one comment proposing splitting the diagram into four sheets, but the consensus was to keep as one sheet. The remaining comments are considered straightforward to resolve.

EG 2111-2 UHD-SDI Roadmap

Status: Published in last quarter

EG 2111-3 10G-SDI Roadmap - ready for ballot, though project needs to be set up



New document [Drafting Project](#)

Status: Passed FCD ballot 2019-09-23 with 17 comments to resolve. The WG considered one comment proposing splitting the diagram into four sheets, but the consensus was to keep as one sheet. The remaining comments are considered straightforward to resolve.

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

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

Revision [Drafting Project](#)

Status: FCD ballot closed 2019-08-26 with 9 comments to resolve; resolution continues.

Working Group on Video Over IP

[WG Project](#)

This Working Group (32NF60) was established to handle projects related to IP transport of media.

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

Document Suite: SMPTE 2110 - Professional Media over Managed IP Networks

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 used VSF Technical Recommendations TR-03 and TR-04 as their starting point.

Document suite [DG Project](#)

The suite currently consists of:

ST 2110-10 - System Timing and Definitions

Published and a Revision [Drafting Project](#) from one-year review is underway.

ST 2110-20 - Uncompressed Active Video

Published and a Revision [Drafting Project](#) from one-year review is underway.

ST 2110-21 - Traffic Shaping and Delivery Timing for Video

Published and a Revision [Drafting Project](#) from one-year review is underway.

ST 2110-22 - Constant Bit Rate Compressed Video

Published

RP 2110-23 - Single Video Essence Transport over Multiple ST 2110-20 Streams

New Document [Drafting Project](#)



RP 2110-24 – Standard Definition Video in ST 2110

Recommended Practice for transporting the standard-definition television signals described in SMPTE ST 125 within the SMPTE ST 2110-20 payloads; to overcome some items that need further definition.

New Document [Drafting Project](#)

ST 2110-30 - PCM Digital Audio

Published.

ST 2110-31 - AES3 Transparent Transport

Published

ST 2110-40 - SMPTE ST 291-1 Ancillary Data

Published

ST 2110-41 – Fast Metadata

New Document [Drafting Project](#)

ST 2110-42 – Formatting an ST 2110 Sender SDP Object for Transport using ST 2110-41 Fast Metadata (FMX)

New Document [Drafting Project](#)

Status of SMPTE 2110 projects: The DG has held 11 meetings in the last quarter.

- *RP 2110-23 is at ST Audit, closing 2019-12-13 (the document passed ST Audit with one editorial comment that should be easily resolved).*
- *RP 2110-24 - this project was approved 2019-09-26. There has been preliminary work and input from Library of Congress.*
- *ST 2110-10 Items identified at one-year-review (definitions of syntax for asynchronous operation, definition of Reconstruction Delay and improvement to RTP timestamp definitions) are largely complete. The draft may also require a small addition related to clock accuracy.*
- *ST 2110-20 Items were identified from one-year-review and a draft revision has been sent to the TC for pre-FCD-ballot review. Consideration of monochromatic uses has recently arisen.*
- *ST 2110-21 Items were identified from one-year review. The group will use data gathered at interops to help revise document.*
- *ST 2110-30 one-year review and revision. It has been agreed that no action is required.*
- *A [Project](#) has been approved “Protocol Implementation and Conformance Statement” (like a conformance checklist) for each of the documents in the ST 2110 suite.*
- *ST 2110-40 – Items were identified from one-year review and revision work continues.*



- *ST 2110-41 work has been slow due to other ST 2110 priorities. The AES has requested that a draft document be available by February 2020 to help their audio metadata group decide whether to harmonize with ST 2110-41.*

Planned Project

EG on migrating from SDI and Black/Burst to 2110 and PTP. This was originally planned to just deal with synchronization, but it is felt that combining the topics could be better.

Project proposal awaited.

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: There has been nothing to report in the last quarter. 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 revision work to include HDR signaling over these UHD-SDI standards is complete.

The next documents to be developed will be the ST 2083 suite.

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

[DG Project](#)

This group 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 and HDR revision published Q2 2018)

ST 2081-11: 2160-line and 1080-line Source Image and Ancillary Data Mapping for Dual-link 6G-SDI (published, and HDR revision published Q3 2019)

ST 2081-12: 4320-line and 2160-line Source Image and Ancillary Data Mapping for Quad-link 6G-SDI (published, and HDR revision published Q3 2019)

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

Status: 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 and HDR revision published Q2 2018)

ST 2082-11: 2160-line and 1080-line Source Image and Ancillary Data Mapping for Dual-link 12G-SDI (published, and HDR revision published Q3 2019)

ST 2082-12: 4320-line and 2160-line Source Image and Ancillary Data Mapping for Quad-link 12G-SDI (published, and HDR revision published Q3 2019)

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

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

UHD-SDI Stress Pattern and Check Signal

At the June 2018 meeting, a technical presentation was given describing the requirements for a new test signal / pattern that could be used for UHD-SDI system testing. The project will create a recommended practice that defines a test signal that can be used for debug and acceptance testing of UHD-SDI systems.

[DG Project](#)

Status: There has been no progress for some while.

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.

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.

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

This DG will revise these two PTP standards in the light of interop testing and other scrutiny since the original publication. 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 project for a 2059 family



document on this subject is planned).

Revision [DG Project](#)

DG Status: The DG has been looking for proponents to write a "PTP Lock Time" EG.

ST 2059-1 - Generation and Alignment of Interface Signals to the SMPTE Epoch

Revision [Drafting Project](#)

Status: The draft revision passed FCD ballot 2019-09-03 with 56 comments to resolve. Comment resolution is down to a couple of comments following work at this meeting round.

ST 2059-2 - SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications

Revision [Drafting Project](#)

Status: The document passed FCD ballot 2019-07-29 with 29 comments to resolve. Comment resolution is down to one comment and text is being drafted to resolve the comment.

ST 2059 Interoperability Testing

The purpose is to confirm that the provisions of the standards are unambiguous and that the technology yields 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.

Interoperability [DG Project](#)

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

2015-11, 2016-06, 2017-03, 2018-02, 2019-02.

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

Status: The group is still analyzing the results of the 2019-02 interop, in particular:

- *Power-on Test*
- *Management Message Storm*
- *GM Failover*

Planning is under way for the next interop that will be held in May at Disney, Houston, Texas. 11 topic areas have been shortlisted for testing.

ST 2120: Extensible Time Label (TLX)

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

New document suite [DG Project](#)

Status: The DG has held 7 meetings in the last quarter. The work during this period has been directed to:



- *Formally organized requirements for the TLX.*
- *Developed a WD for ST 2120-2 “TLX Items”, in discussion.*
- *Beginning to draft ST 2120-1 “TLX Structure”*

Three documents are currently in development:

ST 2120-1 – Extensible Time Label – System

New Standard [Drafting Project](#)

ST 2120-2 – Extensible Time Label – Items

New Standard [Drafting Project](#)

ST 2120-3 – Extensible Time Label – Profiles

New Standard [Drafting Project](#)

RP xxxx - ST 2059-2 PTP Device Monitoring Capabilities

The project will create a reference model containing a set of parameters to query the status of ST 2059-2 PTP devices.

New document [DG Project](#)

Status: The group holds weekly telecons and has:

- *Finalized an initial list of parameter to be monitored*
- *Cross checked with SG PTP Security to identify what parameters can be useful to protect from some attacks and identified a few gaps*
- *Followed the work of IEEE on PTP v2.1 to align our work with upcoming developments*
- *Data model: DG decided to build on IETF RFC 8575 YANG Data Model for PTP with augmentation to cover specific parameters for our use case*

ER xxxx - Using ST 2059 in ST 2110 Networks with ST 2022-7 Redundancy

The current ST 2059 documents and their underlying references (IEEE-1588:2008) do not provide sufficient clarity in regard to the behaviors of Grandmaster Candidates or Slave-only devices when operating on networks with redundant parallel infrastructures.

New report [DG Project](#)

Status: No progress this quarter - plan to ramp up in early 2020

Development of a Suite of PTP synchronization Engineering Guidelines



This group was set up to develop a suite of Engineering Guidelines related to the ST 2059-1 and ST 2059-2 Synchronization documents. EG 2059-10 - Introduction to the New Synchronization System – was published some time ago. After some pruning, the documents below remain.

Engineering Guideline [DG Project](#)

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

New document [Drafting Project](#)

Status: A new draft was posted during the 2019-03 meeting week. The document editors plan to start working on a new draft early in 2020

RP 2104-1 - Date-Time Terms and Definitions

A Part 2 document is also planned, dealing with Other Media Terms and Definitions.

New document [Drafting Project](#)

Status: No progress this quarter.

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

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

[DG Project](#)

DG Status: This group is just responsible for the following document, having recently completed ST 2109 - Format for Non-PCM Audio and Data in AES3 - Audio Metadata:

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

New document [Drafting Project](#)

Status: The WD document is in progress.

ST 2116 - Serial Audio Definition Model (ADM) over AES3



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.

New document [DG Project](#)

and related project:

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

Adds the ADM data type and adds ST 2116 to the bibliography.

Amendment [Drafting Project](#):

Status: Both draft documents completed ST Audit 2019-10-18. The DG will be closed when these two documents are published

Study Group: Security in SMPTE ST 2059

This SG will investigate vulnerabilities in ST 2059 systems, both malicious and accidental. The group has decided to issue limited-scope incremental reports each quarter, whilst collecting topics for future reports.

[SG Project](#)

Status: The SG has held 5 meetings in the last quarter.

The current report is close to completion, requiring careful review of items added in the last draft.

Media Systems, Control and Services Committee (34CS) Chaired by John Footen 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

The Broadcast Exchange Format document suite (all published, some in revision) comprises:

RP 2021-1: General Information and Informative Notes

[Drafting Project](#) for BXF7.0 revision

ST 2021-2: Protocol

EG 2021-3: Use Cases



ST 2021-4: Schema Documentation
[Drafting Project](#) for BXF7.0 revision

RP 2021-5: Ad-ID / EIDR in BXF

RP 2021-6: BXF SDK Documentation

RP 2021-9: Implementing BXF

BXF is an XML-based system that standardizes exchange of Schedule, As-run, Content Transfer instructions, Content-related metadata, and Agency instructions.

BXF incremental development.

New features are added to the suite at regular intervals and these are batched into versions using a numeric version number – current published version is BXF 6.0 and current development is BXF 7.0.

Status:

The BXF 7.0 revision drafts for Parts 1 and 4 are ready for ST Audit. Part 4 started ST Audit shortly after this TC meeting.

Summary of BXF 7.0 work included:

- *Enhancements for Viacom, FOX, etc. completed*
 - *Comprehensive HDR work (PQ and HLG) completed*
 - *J2K IMF Application Constraint completed (NABA DPP)*
 - *UHD Air Ready Master completed (NABA DPP)*
-

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 and well-established Internet / IT standards and best practices wherever possible.

Document suite [DG Project](#)

ST 2071-1: Media Device Control – Framework
Published in 2012, updated in 2014, Q4 2016.

ST 2071-2: Media Device Control - Protocol
Published in 2012, updated in 2014, Q4 2016.

ST 2071-3: Media Device Control - Discovery



Published in 2014 and in revision.

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

Revision [Drafting Project](#)

ST 2071-4: Media Device Control - Capability Interface Repository

New document [Drafting Project](#)

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. WSDL & XML Schemas are included.

2071 suite status:

A special item was discussed at the last meeting that had an impact on this document suite. The discussion reviewed control requirements in the IP ecosystem and decided that an AHG on Industry IP requirements for non-transport layers would be formed. At this meeting, the TC discussed the AHG remit and decided that:

- *The published parts of ST 2071 (Parts 1,2,3) should be reaffirmed and stabilized.*
- *Work on the parts of ST 2071 in development (Part 3 revision, Part 4) should cease and their documents be preserved for future reference. These projects will be deactivated.*

The new AHG will be called IP Control Roadmap Group.

SMPTE xxxx - Media Microservices Overall Architecture

Project scope: Create a base document for a suite of documents, specifying an overall architecture enabling interoperable microservices, and manage the development of later documents in the suite. The long-term goals are to publish the suite of architectural documents and provide the ability for contributors to register microservices with SMPTE, making a functional set of interoperable media microservices available for implementers. Two “Media Microservices Summits” were held in Los Angeles and New York in May 2019.

New document suite [DG Project](#)

Status: The DG Chair gave a presentation that covered the formation of the Open Services Alliance (OSA), explaining that Microservices are an implied part of that scope. Anticipated pilot projects are:

- *Standardized services for IMF*
- *Standardized status logging and reporting for microservices for media*
- *Real-time Control*

On this topic, the hope was expressed that this effort needs to be harmonized with the real-time control efforts in AMWA, EBU, AES.



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), high-dynamic range (HDR) imaging and immersive audio.

IMF Document Maintenance DG

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.

This DG (35PM-50) maintains the currently published IMF documents. Issues are continuously collected and discussed in SMPTE 35PM GitHub repository and members contribute to revision work, for both bugs and improvement requests.

Contact TC Chairs for access to the GitHub repository:

<https://github.com/orgs/SMPTE/teams/35pm/repositories>

The work of this group initiated the following projects:

Revision: ST 2067-2: Interoperable Master Format — Core Constraints

Revision [Project](#)

Status: Passed FCD ballot 2019-10-30 with 8 comments. Comments are addressed and the draft is being updated.

Revision: ST 2067-3: Interoperable Master Format – Composition Playlist

Revision [Project](#)

Status: Passed FCD ballot 2019-10-30 with 11 comments. 9 comments are addressed, 2 need more discussion. The draft is being updated.

Revision ST 2067-5: Interoperable Master Format – Essence Component

Revision [Project](#)

Status: Passed FCD ballot 2019-10-30 with 8 comments. Comments are addressed and the draft is being updated.



Revision: ST 2067-21: Interoperable Master Format – Application #2E (was Application #2 extended)

Revision [Project](#)

Status: Passed FCD ballot 2019-10-30 with 20 comments. 9 comments are resolved. An updated draft has been posted.

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

Amendment [Project](#)

The amendment will add support for Hybrid-Log-Gamma color system as specified in ITU BT 2100.

This project is the first test for a new process that allows publication of the CD document prior to FCD ballot in order to verify independent implementations at a SMPTE IMF plugfest. When interoperability is verified, the document will proceed to FCD ballot.

Status: The CD document is published on GitHub for public review until 2020-07-24. No feedback has been received so far.

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

Scope: Incorporate Amendment 1:2017, update normative references and add support for the preservation and interchange of SDR DCDM essence and timeline.

Revision [Project](#)

Status: WD is under development and a meeting was held at this round to further discuss support for Digital Cinema DCDM.

IMF Plugfest DG

The Plugfest DG has held several plugfests, the most recent was in London, 2019-05, at Amazon HQ.

The group aims to have 2 plugfests per year, one in Europe and one in USA.

[Drafting Project](#)

Status: There is currently a plugfest underway, comprising:

- *Virtual Plugfest: 2019-11-01 through 2020-01-31*
- *Face to Face dates: 2020-02-12 & 13*
- *Location: Disney/ABC - Burbank, CA, US*
- *Registration Link (deadline 2020-01-10): <https://www.eventbrite.com/e/smp-te-tc-35pm-imf-winter-plugfest-2020-tickets-84778064473>*

From earlier in the year, the London plugfest topics were Application DPP - TSP-2121-4, Internet Media Subtitles and Captions 1.1 (IMSC1.1), Timeline Testing, IMF Application #5 (ACES) - SMPTE ST 2067-50:2018, SMPTE RDD 45:2017 (IMF Application ProRes). The report from this plugfest is under review, available soon.



Society of Motion Picture and Television Engineers®

445 Hamilton Avenue

White Plains, NY 10601 USA

www.smpte.org

IMF Audio Essence DG

Status: The group recently completed its work on the Immersive Audio Bitstream Level Plug-in, which was published as SMPTE ST 2067-201, and on the revision of SMPTE ST 377-4, which was handed-off to TC 31FS (both [here](#)).

IMF Application DPP WG

DPP is the Digital Production Partnership in the UK. This WG (35PM-60) is coordinating projects concerned with the creation of a SMPTE Technical Specification (TSP)

Status: All the WG's documents are published. There is some work to create test vectors.



SMPTE Standards Publications in the Last Quarter

10E Essence:

20F Film:

21DC Digital Cinema:

24TB Television & Broadband Media:

25CSS Cinema Sound Systems:

30MR Metadata & Registers:

ST 2088:2019 - Essence Element Key Register Structure

31FS File Formats & Systems:

32NF Network & Facilities Architecture:

34CS Media Systems, Control & Services:

35PM Media Packaging & Interchange:



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 \(OM\)](#) 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 provides access to all Technology Committees. An SC meeting is held during each meeting round to convey information that is relevant to all TC’s, such as meeting logistics and registration information.

SMPTE Document Development Process

The document stages are:

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

TSP = Technical Specification **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 to revise if 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 technology topic. In this case, those projects are grouped under a **Topic** headline.*

*SMPTE manages its standards documentation, meetings and ballots in an online system called **OLC**. 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 link [DG Project](#) or [Drafting Project](#) if there is more than one document in a DG.*