



SINCE 1916

STANDARDS QUARTERLY REPORT June 2020

Result of SMPTE® Technology
Committee Meetings
1-4 June 2020

Hosted by
SMPTE VIRTUALLY
(was planned to be AWS,
Portland, OR, USA)

THE NEXT CENTURY



SMPTE® Standards Quarterly Report:

Executive Summary

SMPTE Standards Committee Meetings 1-4 June 2020

Hosted by Online (was planned to be AWS, Portland, OR, USA)

This Executive Summary lists the new projects this quarter and gives a high-level view of project developments. More information on the current status of the 150 active projects can be found in the [detailed account](#), after this summary.

Ten SMPTE Technology Committees (TCs) and no subgroups scheduled meetings at this round (the subgroups normally meet by telecon, so their normal cadence was able to continue through the meeting week.

80 members attended by remote access over the four days.

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

TC	Type	Project (links to online project overview)	Approval Date (links to this report)
Cinema Sound Systems	(Constrained) Revision	ST 2098-2 - Immersive Audio Bitstream Specification	2020-06-18
Media Control, Services	Study Group / Engineering Report	Industry IP Requirements for Non-Transport Layers	2020-06-17



Media Packaging	Revision	<u>ST 2067-201 - IAB Level 0 Plug-in</u>	<u>2020-06-18</u>
Media Packaging	Study Group	<u>Immersive Audio Bitstream in OPL</u>	2020-06-11
Essence	Revision	ST 2094-10:2016 Dynamic Metadata for Color Volume Transforms – Application 1 Manual form; not online	<u>2020-06-09</u>
Network/Facilities Architecture	Revision	<u>ST 2082-1 12G-SDI Electrical 5 year review</u>	<u>Approval not started</u>
File Formats and Systems	New RDD	<u>Mapping ARRIRAW Essence into the MXF Generic Container</u>	<u>2020-05-29</u>
File Formats and Systems	New RDD	<u>MXF Carriage of ARRI Camera System Metadata</u>	<u>2020-05-29</u>
Network/Facilities Architecture	Revision	<u>ST 2081-1 6G-SDI Electrical 5 year review</u>	<u>Approval not started</u>

Professional Media over IP Projects

Professional Media over Managed IP Networks

This project group has developed the ST 2110 suite that standardizes an interoperable system for media IP networks to transport separate video, audio, and ancillary data streams. [Details](#)

The first eight 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 (about to start revision following one-year-review and interop. results)
- Single Video Essence Transport over Multiple ST 2110-20 Streams (to support high bitrate streams)

There are also parts in development on:

- 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)

Network-Based Synchronization for the Professional Media Environment

The ST 2059 suite defines a synchronization system for media using 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 and are close to completion of comment resolution. [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 a report “Using ST 2059 in ST 2110 Networks with ST 2022-7 Redundancy” [Details](#)
- PTP Engineering Guidelines are being drafted. [Details](#)

Industry IP requirements for non-transport layers

An Ad-Hoc group within the Media Systems, Control and Services TC was recently formed to identify media control requirements in IP networks and the network layers required. It has decided that a Study Group is needed. [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, some related SMPTE Technical Specifications (TSP) are publicly available [here](#).

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

Two IMF documents are available as public Committee Draft documents. [Details](#)

IMF Plugfests, including virtual sessions, are held regularly. [Details](#)

SMPTE Video Compression Standards

SMPTE has standardized five video compression standards – VC-1 to VC-5 - and is well-advanced on work on VC-6. Current work on video compression standards comprises:

- A project to standardize VC-6, a picture compression scheme. [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 incorporating the final part on Metadata. [Details](#).
- Projects to revise SMPTE VC-3 documents 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 is working on 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 10 MXF-related projects in process. [Details](#) They include:

- Mapping JPEG XS into the generic container
- MXF Multichannel Audio Labeling Framework (revision) and Multichannel Audio Controlled Vocabulary
- Mapping VC-3 Coding Units into the MXF Generic Container (amendment)
- Two new ARRI Registered Disclosure Documents

Microservices for Media This group will define a framework for media-related microservices. [Details](#)
The group has worked on ways to get more engagement from industry and an organization – the Open Services Alliance, OSA -was formed towards the end of 2019.

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](#)

Metadata and Registers This TC (and its predecessor) has been maintaining metadata ULs on behalf of other SMPTE TCs and industry organizations for the last 20+ years. But its systems have recently been



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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 1-4 June 2020
Hosted by Online (was planned to be AWS, Portland, OR, USA)*

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. There are three Standards Directors, currently Pierre Lemieux, Chris Lennon and Paul Treleven.

Each round comprises meetings of Technology Committees (detail below) as well as any 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 provided future meeting details and that presented some plans for “reimagining SMPTE”.



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:

- Sept. 2020 Online
- Dec. 2020 Disney, Burbank, US (could be online)
- March 2021 TBA
- July 2021 Australia

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; however it did meet for [this](#) online session, [see here](#).

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

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 subgroup drafting the WD has been unable to complete the first draft due to the COVID-19 pandemic. Hopefully they will be able to make progress over the next couple of months.

A liaison to ARIB will be written officially confirming the start of this project.

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.

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 pre-DP-vote review.

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.

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: A (second) DP ballot was underway at the time of the meeting, closing 2020-06-05.

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: ST 2094-40 was published 2020-05-16. As a separate project, it will be necessary to update the normative reference in ST 2094-2 (the new revision project for ST 2094-10 will also need a change to ST 2094-2 reference).

Proposed New Revision – ST 2094-10 Dynamic Metadata for Color Volume Transform — Application #1

A project proposal will be launched for approval.

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: Revised ST 2065-2 is in the publication queue.

Revised draft for ST 2065-1 is in pre-FCD review (closing 2020-06-04) and revised draft ST 2065-3 passed FCD ballot 2020-05-19 with 12 comments to resolve.

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 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 was published in the last quarter. The project and DG will be closed.

SMPTE Video Compression Standards

The current video compression projects are:

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 was published in the last quarter. The project will close.

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: VC-6 Multiplanar Picture Format Part 1. Elementary Bitstream

Status: ST 2117 Part 1 is in the publication queue.

RP 2117-2 VC-6 Conformance

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

New document [Drafting Project](#)

Status: This work was deferred until the Part 1 work was completed. However, the group also wants to create a TC-31FS standard on VC-6 wrapping in MXF and it is currently considering which work to do next.

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: There have been small changes to the document and it will be held for a week for further review before it is sent for FCD ballot. It went through pre-ballot review without comments.

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)

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; being held until Part 2 catches up.

Part 2 Third revision in progress to add coverage for VC-5 Part 7. The group holds biweekly teleconferences (for now, weekly). Work is underway on XML Schema to define the test vectors, as well as Python scripts and small C programs for verifying conformance to ST 2073-7 Metadata. The final step will be to integrate working code into the VC-5 reference codec to support the XML representation of metadata.

The ST 2073 overview document is also being updated.

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 (Published)

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 (Published)

RP 2047-1: VC-2 Mezzanine Level Compression of 1080P High Definition Video Sources (Published)

ST 2047-2: Carriage of VC-2 Compressed Video over HD-SDI (Published)

RP 2047-3: VC-2 Level 65 Compression of High Definition Video Sources for Use with a Standard Definition Infrastructure (Published)

ST 2047-4: Carriage of Level 65 VC-2 Compressed Video over the SDTV SDI (Published)

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

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

Work is underway on new conformance materials:



- *Software and associated materials for conformance testing are largely complete.*
- *Work remains to be done on integration and testing.*
- *A draft revision of RP2042-3 has just been shared with the DG.*
- *Estimate FCD ballot around September 2020.*

Tools comprise a bitstream validator, test case generator, reference decoder, bitstream viewer, picture comparison tool, picture explanation tool.

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

Film Technology Committee (20 F) Chaired by John Miller and Dave Schnuelle

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

WG20F-10 Production Technology

ST 271- Motion-Picture Film (16-mm) -- Manufacturer-Printed Latent Image Identification Information

Status: 5 year review group recommended stabilize – confirmed by TC vote.

WG20F-20 Laboratory Practices

Status: The WG Chair has retired; a new Chair is sought.

WG20F-30 Audio

RP 2054- Method of Measurement of perceived loudness of short-duration motion picture material

Status: A 5 year review group was formed to recommend action.

Revision: RP 200 – Relative and Absolute Sound Pressure Levels for Motion-Picture Multichannel Sound Systems — Applicable for Analog Photographic Film Audio, Digital Photographic Film Audio and D-Cinema



Revision to accommodate immersive sound system surround speaker levels.

Status: The previous meeting resulted in approval to enlarge scope to include harmonization with ST2095-1. It was also agreed to delay work on RP-200 until ST2095-1 has been revised, however there has been no work to launch that project in TC-25CSS.

WG20F-40 Projection

Status: 5 year reviews are required of the following 5 documents. It was recommended that they should be reaffirmed (awaiting completion of RP 2117, below). Reaffirmation was confirmed by TC vote.

ST 196M- Motion-Picture Film -- Indoor Theater and Review Room Projection -- Screen Luminance and Viewing Conditions

RP 12- Screen Luminance for Drive-In Theaters – Film

RP 94- Gain Determination of Front Projection Screens

RP 95- Installation of Gain Screens

RP 98- Measurement of Screen Luminance in Theaters

RP 2117 - On-screen Light Measurement

New Recommended Practice [Drafting Project](#)

Status: A Working Draft for 2nd FCD ballot is available. Further discussion is required for some charts.

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

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 is published. Note that there is [other current work](#) on additional frame rates that further amends ST 429-2, and will need integration. The publication date of 2020 in the store needs correction to 2019. This project will close.

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

Project Scope: To revise ST 428-7 to improve rendering of Japanese timed text subtitles. The standard normatively references ISO/IEC 10646-1, which defines font files. These files provide the information to properly render horizontal and vertical text. However, 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.

Revision [Drafting Project](#)

Status: Progress in the last quarter has been hampered by the pandemic preventing access to projectors and servers. Some work-around rules have been developed to allow authors to improve rendering consistency when font file metrics are not used. Project completion has been put back to the end of 2020.

Business Impact of Subtitles projects: Compatibility and Interoperability

Additional Digital Cinema Frame Rates

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. The way forward was complicated by the fact that [other revision work](#) on ST 429-2 for stereoscopic subtitles was underway. That work is published and this amendment has reverted to FCD status to correct the reference and DP ballot will follow shortly.



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

Revision [Drafting Project](#)

Status: This document is now published.

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 is at DP ballot, closing 2020-07-07.

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 a decision has been made in the DG that this document is no longer needed. The project will be closed.

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: The draft document is at FCD ballot, closing 2020-07-07.

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 TC reviewed the report submitted by this group and voted to approve the recommendations:

Reaffirm ST 429-18:2019

Revise ST 429-19:2019

Reaffirm ST 430-12:2014 AM1:2019

New Registered Disclosure 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 RDD passed ST Audit 2020-05-18 and is in the publication queue.

New Registered Disclosure Document - RDD 53 - Transport of digital cinema content with multiple dynamic range

This RDD is intended to support the development of applications that create, read and process Hybrid Tone Mapping content for cinema distribution.

[RDD Project](#)

Status: This project completed approval 2020-03-13. The group is reviewing all comments received to resolve them.

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

The application of the General Scope as it applies 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)

Revision [Drafting Project](#)



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

Revision [Drafting Project](#)

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, revision published Q2 2020)

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](#) was set up for this purpose.
Parts 2,11, 20 and 21 revision have been published.
Part 10 revision is in DP ballot following a substantive change. Ballot closes June 30.
Part 1 revision passed FCD ballot 2020-03-05 with 2 comments. Comment resolution is complete.*

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 to be completed. ST 2016-3 is being reviewed to determine whether it needs revision to support these changes.

ST 2035 - Audio Channel Assignments for Digital Television Recorders

The revision rolls up Amendment 1 into the revised document.

Revision [DG Project](#)

Status: The roll up is done, review is complete and the revision is in draft in the project group.



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

The application of the General Scope as it applies to standards for cinema 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, in one-year review)

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

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 following two drafting groups. When the work of these DGs completes, possibly by the next meeting round, this Working Group is expected to close.

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.

An AHG has completed one-year review on ST 2098-2 with the recommendation to revise. The TC



voted to accept the recommendation to revise. A Github tracker has 13 issues to resolve on ST 2098-2. It is intended that the work will be done in a new DG and the TC Chair will post a project proposal.

An AHG has completed one-year review on ST 2098-1 with the recommendation to reaffirm. The TC voted to accept the recommendation to reaffirm.

At this meeting, it was agreed that this DG should be closed.

SMPTE 2098 Projects on Digital Cinema Immersive Audio Renderer

This DG is responsible for Parts 3, 4 – Part 4 covered the test procedure and has been merged into Part 3. [DG Project](#)

Status: At the 2019-09 meeting, the DG decided to merge Part 4 into Part 3. The proposal for scope change of Part 3 was approved. At this meeting, it was agreed that the DG will close when EG 2098-3 is published.

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 Engineering Guideline [Drafting Project](#)

Status: The document was raised to DP status at the last meeting. However, it was noticed that one comment had not been resolved. The commenter had been non-responsive and a vote was held at this meeting to dispose of the comment. The vote passed, as did a second vote to raise the document to DP status.

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 AHG work areas have been identified: Clip Analysis, In-situ Measurements, Technical Reference Documents. Chairs have been appointed for each of these. The WG has suspended meetings until the AHGs have completed their work

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. Work can start after the AHGs have reported back.

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

The application of the General Scope as it applies to the definition and implementation of the SMPTE Registration Authority, used to identify digital assets and associated metadata such as the definition of shared metadata semantics 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. 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 document development projects (a third one, UMID Resolution Protocol, is moved to TC-34CS [here](#)):

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 draft revision ST 330 is at DP ballot, closing the day after this meeting. Result: Passed, will proceed to ST Audit.

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 was submitted for DG review and an updated version will be submitted shortly. The DG Chair called for additional UMID application examples to be submitted.

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: A group has been set up for this SG. There was no project report at this meeting.

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](#).

ST 2123 - SMPTE Metadata Registers

ST 2123 contains a prose document and elements containing the individual registers in xml form. Requests for changes to the registers are processed and collected into batches for balloting.

The current ballot is codenamed “Tabasco”

[Tabasco Project](#)

Status: “Tabasco” closed DP ballot the day after the meeting. Result: Passed with one comment to resolve.

The next revision for ballot is codenamed “Sriracha”

[Sriracha Project](#)

Status: 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. The Essence Elements register will be included in ST 2123 for 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.

Status: 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 Tatsuji Yamazaki

The application of the General Scope as it applies to definition of common wrapper and file structures 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

SMPTE® Standards Quarterly Report, June 2020, Page 24

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



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 Standard [DG Project](#)

Status: The document passed FCD ballot on 2020-02-06 with 9 comments to resolve. All comments are resolved and the draft is ready for pre-DP-vote review.

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 further action this quarter.

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.

ST 377-1 - Material Exchange Format (MXF)

This project will catalogue issues in the document and align it with the new SMPTE registers. It follows a revision project that did an amendment roll-up to create a clean starting document – ST 377-1:2019

Revision [Drafting Project](#)

Status: The previous revision project has only just completed. This revision will reflect how MXF is used in the field as well as adopt a consistent formatting for registers. The proponent has outlined a proposal to split this large document into component parts.

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: This document has been issued as a public committee draft here:

<https://www.smpte.org/public-committee-drafts>

It will remain as a public committee draft until 2020-07-24 minimum, 2021-01-25 maximum.

ST 377-41 – Multichannel Audio Controlled Vocabulary

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

New Standard [DG Project](#)



Status: This document has been issued as a public committee draft here:

<https://www.smpte.org/public-committee-drafts>

It will remain as a public committee draft until 2020-07-24 minimum, 2021-01-25 maximum.

ST 2124 - 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 Standard [DG Project](#)

Status: The draft document is at FCD ballot closing 2020-06-08. At the time of the meeting there were 14 comments to resolve.

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: The proponent presented the changes involved and requested that the document proceed to pre-FCD-ballot review.

RDDxx - Mapping ARRIRAW Essence into the MXF Generic Container

New Registered Disclosure Document [Drafting Project](#)

Status: The proponent anticipates the document will be ready for ballot by end 2020-07.

RDDyy - MXF Carriage of ARRI Camera System Metadata

New Registered Disclosure Document [Drafting Project](#)

Status: The proponent anticipates the document will be ready for ballot 6-8 weeks after the mapping RDD (above).

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. This function requires a namespace and has the capability to define any attribute within the namespace.

The included xsd file needs to be updated to match the text.

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 has been 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 group holds monthly meetings. The C++ library is coming together on GitHub. The project will also include DPX files that can be used to test reader implementations.

Other TC-31FS business

The VC-6 group plans to introduce a project for VC-6 mapping into MXF.



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, time labelling of essence, synchronization of systems, 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: Pre-DP-vote review closed 2020-04-02. The document will now proceed to DP vote.

EG 2111-2 UHD-SDI Roadmap

Status: Published in Q1 2020.

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

New document **[Drafting Project](#)**

Status: Pre-DP-vote review closed 2020-04-02. The document will now proceed to DP vote.



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: Pre-DP-vote review closed 2020-03-28 with no comments. The document will now proceed to DP vote.

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 responsible for a suite of standards specifying the carriage, synchronization and description of separate elementary essence streams over IP for the purpose of live production.

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. No one-year revision required.

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

Published

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. No one-year revision required.

ST 2110-31 - AES3 Transparent Transport

Published. A one-year revision required.

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

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

ST 2110-41 – Fast Metadata

Intended for the transport of any metadata that did not originate as ST 291 ancillary data.

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](#) (will not start until -41 is going through the ballot process)

ST 2110 Protocol Implementation Conformance Statement (PICS)

This functions like a conformance checklist

New Document [Drafting Project](#)

Status of SMPTE 2110 projects: The DG has held weekly meetings through the last quarter.

- *RP 2110-24 - this project was approved 2019-09-26. Document drafting continues.*
- *ST 2110-10 draft revision passed FCD ballot 2020-03-26 with 59 comments to resolve.*
- *ST 2110-20 draft revision passed FCD ballot 2020-04-27 with 19 comments to resolve. The DG is close to consensus on comment resolution.*
- *ST 2110-21 Document revision is proceeding and pre-FCD-ballot comments are being addressed. The group had intended to use data gathered at interops to create an Annex – however, it is now thought more suitable for a separate RP document.*
- *ST 2110-31- AES3 Transparent Transport will be revised using feedback from interops; project proposal sent to TC.*
- *Protocol Implementation and Conformance Statement – the proponents have developed a plan to move forward.*
- *ST 2110-40 – Items were identified from one-year review. A revised draft has been sent to the TC for pre-FCD-ballot review.*
- *ST 2110-41 – a draft document was submitted to the DG 2020-02-13 and reviewed. The draft will be reviewed in the light of comments received.*
- *Documents reaffirmed at this meeting:*
 - ST 2022-8 - Timing of ST 2022-6 Streams in ST 2110-10 Systems was developed in this group.*
 - ST 2110-22 - Constant Bit-Rate Compressed Video*



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: The WG Chair reviewed the group's remaining work, now that all published documents have undergone 1-year review with addition of HDR and WCG transport and signaling.

ST 2081-1 and ST 2082-1 are now up for 5-year review and revision work has been identified. Intended work on Stereoscopic parts and a 24 Gb/s ST 2083 suite will be deferred until/unless an industry requirement arises.

It was proposed that the WG should become dormant. However, the diminished workload of the SDI WG 32NF-40 prompted the suggestion that this WG should be merged into 32NF-40. The TC Chairs will investigate doing this.

A further project on UHD stress pattern (see below) will be closed.

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)



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)

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 and the project will close.

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. The DG has reached consensus on comment resolution. The consensus includes a number of comments whose resolution is not accepted by the commenter. TC comment disposition votes will be held to resolve the issue.

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

Revision [Drafting Project](#)

Status: The revised document is at DP ballot, closing 2020-06-17.

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: Planning is under way for the next interop. The potential location is Disney, Houston, Texas and the group is considering whether testing could be conducted remotely (with hardware located and connected at Disney). The target timeframe is Fall 2020.

A list of items to test is being compiled.

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](#)

Three documents are currently in development:

ST 2120-1 – Extensible Time Label – TLX Structure

New Standard [Drafting Project](#)

ST 2120-2 – Extensible Time Label – TLX Items

New Standard [Drafting Project](#)



ST 2120-3 – Extensible Time Label – TLX Profiles

New Standard [Drafting Project](#)

Status: The DG has held 12 meetings in the last quarter. The work during this period has focused on defining a “Minimum Viable Product”, MVP, rather than permitting the extensibility to lead to a lot of non-interoperable systems. Next steps:

- Formalize structure in the ST 2120-1 draft, JSON as human readable
- Propagate MVP items in ST 2120-2 draft (mostly redaction)
- Propagate MVP capabilities into ST 2120-3 draft
- Determine if/how/where use case solutions are documented.
- Determine if/how/where carriage is documented

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. It has created a data model that expands on IETF RFC 8575 to include GNSS and Grand Master parameters, ST 2059-2 specific parameters, RFC 8173 PTP MIB specific parameters. Next steps:

- Review of YANG model with IEEE 1588 contributor(s)
- Finalize the data model
- Finalize the draft RP into the SMPTE template
- Complete Candidate Draft

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

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. No progress this quarter.

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 documents ST 2116: Format for Non-PCM Audio and Data in AES3 — Carriage of Metadata of Serial ADM (Audio Definition Model) and ST 338 Data Types were published in Q1 2020 and their projects closed.

ST 337 family of documents

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

[DG Project](#)

DG Status: At this meeting, 5 year review of some group documents decided to Reaffirm and Stabilize:

ST 337:2015 - Format for Non-PCM Audio and Data in an AES3 Serial Digital Audio Interface

ST 339:2015 - Format for Non-PCM Audio and Data in AES3 — Generic Data Types

ST 340:2015 - Format for Non-PCM Audio and Data in AES3 — ATSC A/52 Digital Audio Compression Standard for AC-3 and Enhanced AC-3 Data Types

This group is just responsible for the following project, 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: There has been no progress on the WD document for several quarters; it is still intended to complete the work.

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 (in a “backlog”) for future reports.

[SG Project](#)

Status: The SG has held 5 meetings in the last quarter. A new Chair has been appointed and the group plans to return to bi-weekly telecons.

The current version of the report completed its review 2020-05-11; comments will be addressed in the next meeting. It focuses on background info, architecture diagram and it lists and describes PTP threats. The scope of the next report:

- *Studies detection and mitigation available for PTP threats identified in the Current Report.*
- *Deciding if group shall add recommendations in the report as well.*

Other TC-32NF Business

A presentation was given on work that is anticipated as a new RP “Inter-Entity Trust Boundary”.

[Media Systems, Control and Services Committee \(34CS\) Chaired by John Footen and Paul Gardiner](#)

The application of the General Scope as it applies 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 signalling and control mechanisms.

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.

New document [Drafting Project](#)

Status: This project was transferred from TC-30MR during the 2020-03 meeting round. The project Chair gave a presentation explaining the UMID resolution principle. Some participants expressed interest in joining this group and a TC-34CS Drafting Group will be set up.



BXF Suite of Documents

The Broadcast Exchange Format document suite (all published) comprises:

RP 2021-1: General Information and Informative Notes

ST 2021-2: Protocol

EG 2021-3: Use Cases

ST 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 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 were published in early 2020. That completes BXF 7.0.

The group is on hiatus before it starts to collect work items for BXF 8.0 (new work proposals are invited).

AHG: Industry IP requirements for non-transport layers

This group was set up shortly after the previous meeting. As an AHG, it is expected to complete its work by the next meeting round in June. It is intended that the group will identify requirements, including any SGs or DGs that would be required to take this work forward.

Status: The AHG met and decided that an SG should be formed. A project proposal has been submitted and will go for approval shortly after the meeting.

SMPTE xxxx - Media Microservices Overall Architecture

Project scope: *This scope will change when OSA work is factored in.* 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.

New document suite [DG Project](#)



Status: The DG Chair gave a presentation that covered work in the Open Services Alliance (OSA). A well-attended OSA plenary meeting was scheduled during this SMPTE Standards round. The OSA has selected pilot projects and it anticipates feeding documents to SMPTE as soon as they are deemed “ready”. Pilot projects are (selected from original list of 50 -60):

- IMF Registration Service API
- Standardized Status Reporting
- Real-time Device Control
- Terms and Definitions

The OSA stressed that it is keen to use any existing work and is looking at work from IETF, EBU and OCA.

Media Packaging and Interchange Committee (35PM) Chaired by Chris Witham and Florian Schleich

The application of the General Scope as it applies 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, postproduction 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>

Status: This group initiated the following revision projects that were published in the last quarter:

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



Revision [Project](#)

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

Revision [Project](#)

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

Revision [Project](#)

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

Revision [Project](#)

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 public CD document is published on GitHub for public review until 2020-07-24; [link here](#).
The document provisions were successfully tested during the recent SMPTE IMF Plugfest.
The document is now being prepared for FCD ballot as an amendment to ST 2067-21:2020 as a further ST 2067-21 revision is anticipated and roll-up can take place then.*

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: The document is published as a public CD to gather implementation experience; [link here](#).
There has already been feedback and a revised CD will be submitted to the TC shortly with the intention of posting as a second public CD version.*

Amendment: ST 2067-102: IMF OPL Common Image Pixel Color Schemes

Updates related to Revision of 2067-21

Amendment [Project](#)

Status: The amendment supports added color schemes in revised IMF Application #2E, as well as updating normative references.

IMF Plugfest DG

The Plugfest DG has held several plugfests, the most recent was at Disney/ABC - Burbank, CA, US 2020-02-12 and 13.



Drafting Project

Status: The Disney/ABC plugfest was preceded by a long virtual plugfest period - 2019-11-01 through 2020-01-31. The plugfest report is now completed. Topics tested:

- *Internet Media Subtitles and Captions 1.1 (IMSC1) - includes HLG and SRGB rendering.*
- *Sidecar Composition Map - this test was designed to include referenced PDF as sidecar in an IMP.*
- *IAB - play an Immersive Audio Bitstream track file from an IMF with a corresponding CPL per ST 2067-201.*
- *SMPTE TSP-2121 Application DPP - testing HLG functions within IMF; checking that the extra metadata does not interfere with downstream HLG usage.*
- *Interop - new design format for test vectors.*

Plugfest testing is now occurring in a virtualized environment, F2F events will happen as agreed by the group. The F2F events are now co-termed with IMFUG cadence, next event tentatively to take place in July 2020.

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 was no report at this meeting remains open for any issues that may arise.

Document review decisions

AHGs reported their recommendations:

ST 2067-102 1-year review: There is already a revision project underway.

ST 2067-201 1-year review: A new revision project has been posted.

ST 2067-20 1-year review: Proposal to withdraw this document and use ST 2067-21 instead. There was no objection and a Withdrawal ballot will be set up.

ST 2067-100 5-year review; the AHG wants further time to make a recommendation.

ST 2067-103 5-year review: Propose revise – confirmed by TC vote.

ST 2067-8 5-year review: Propose reaffirm; confirmed by TC vote.

New TC-35PM Business

The VC-3 compression proponent described plans to bring a new project for a standard on IMF Application of VC-3.



SMPTE Standards Publications in the Last Quarter

10E Essence:

ST 2094-40:2020 Dynamic Metadata for Color Volume Transform — Application #4

RP 2093:2020 Television Lighting Consistency Index (TLCI)

RDD 51:2020 High Density Image Encoding for ARRIRAW Files

20F Film:

21DC Digital Cinema:

ST 429-2:2019 D-Cinema Packaging — DCP Operational Constraints

ST 429-4:2020 D-Cinema Packaging — MXF JPEG 2000 Application

24TB Television & Broadband Media:

ST 2112-20:2020 Open Binding of Distribution Channel IDs and Timestamps (OBID-TLC)

25CSS Cinema Sound Systems:

30MR Metadata & Registers:

31FS File Formats & Systems:

ST 377-1:2019 Material Exchange Format (MXF) – File Format Specification

ST 422:2019 Material Exchange Format — Mapping JPEG 2000 Codestreams into the MXF Generic Container

32NF Network & Facilities Architecture:

ST 338:2016 Am1:2019 Format for Non-PCM Audio and Data in AES3 — Data Types

ST 2116:2019 Format for Non-PCM Audio and Data in AES3 — Carriage of Metadata of Serial ADM (Audio Definition Model)

RP 2110-23:2019 Single Video Essence Transport over Multiple ST 2110-20 Streams

34CS Media Systems, Control & Services:

ST 2021-4:2020 Broadcast Exchange Format (BXF) — Schema Documentation

RP 2021-1:2020 Broadcast Exchange Format (BXF) — Requirements and Informative Notes



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35PM Media Packaging & Interchange:

ST 2067-2:2020 Interoperable Master Format — Core Constraints

ST 2067-21:2020 Interoperable Master Format — Application #2E

ST 2067-5:2020 Interoperable Master Format — Essence Component

ST 2067-3:2020 Interoperable Master Format — Composition Playlist



Notes on this Report and the SMPTE Standards Process

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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.*