



STANDARDS QUARTERLY REPORT SEPTEMBER 2020

Result of SMPTE® Technology Committee
Meetings
03-06 September 2020

Hosted virtually by
SMPTE
(was planned to be EBU, Geneva, CH)

THE NEXT CENTURY



SMPTE® Standards Quarterly Report:

Executive Summary

SMPTE Standards Committee Meetings 14-17 September 2020

Hosted by Online meeting (was planned to be EBU, Geneva, CH)

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.

Nine 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.

62 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

<i>TC</i>	<i>Type</i>	<i>Project (links to online project overview)</i>	<i>Approval Date (links to this report)</i>
<i>Metadata and Registers</i>	<i>Revision</i>	<i>RDD-18-Acquisition Metadata</i>	<i>2020-09-30</i>
<i>Essence</i>	<i>New Registered Disclosure Document</i>	<i>Live Production Metadata</i>	<i>2020-09-17</i>



Essence	New Standard	<u><i>IPT-PQ in two variants</i></u>	<u><i>2020-09-07</i></u>
Essence	Revision	<u><i>VC-2 - ST 2042-1:2017</i></u>	<u><i>2020-07-30</i></u>
Media Packaging	New RDD	<u><i>IMF Track File for JPEG 2000 Codestreams with Time-Synchronous Metadata</i></u>	Approval not started
File Formats and Systems	New Standard	<u><i>Mapping Next Generation Audio (NGA) Signals into the MXF Generic Container</i></u>	<u><i>2020-07-17</i></u>
File Formats and Systems	New Standard	<u><i>MCA Label Controlled Vocabulary</i></u>	<u><i>2020-07-23</i></u>
File Formats and Systems	Revision	<u><i>ST 2065-4 ACES Image Container File Layout</i></u>	<u><i>2020-08-06</i></u>
File Formats and Systems	Revision	<u><i>ST 2065-5 Mapping ACES Image Sequences into the MXF Generic Container</i></u>	<u><i>2020-08-06</i></u>
File Formats and Systems	Amendment	<u><i>Amendment to RDD 48 - Mapping FFV1 Essence Stream to MXF</i></u>	<u><i>2020-09-25</i></u>
Network/Facilities Architecture	New Recommended Practice	<u><i>RP 2110-25 Video Measurements for parts 20, 21</i></u>	<u><i>2020-08-14</i></u>



Network/Facilities Architecture	Revision	<u>ST 2110-31 AES3 Transport</u>	<u>2020-06-26</u>
Media Systems, Control, Services	New Standard	<u>Microservices - IMF Registration Service API</u>	<u>2020-06-24</u>
Media Systems, Control, Services	New Standard	<u>Microservices – Status Reporting</u>	<u>2020-06-24</u>
Media Packaging	Study Group	<u>Immersive Audio Bitstream in OPL</u>	<u>2020-06-11</u>
Media Packaging	Revision	<u>ST 2067-103:2014 OPL-Common Audio Definition and Macros</u>	<u>2020-07-03</u>
Media Packaging	Revision	<u>ST 2067-201:2019 Immersive Audio Bitstream Level 0 plug-in</u>	<u>2020-06-18</u>
Media Packaging	New Standard	<u>ST 2067-xx IMF Application X UHDTV program workflow (AVC)</u>	<u>2020-07-28</u>
Media Systems, Control, Services	Study Group	<u>Required application protocol standards for IP-based media production</u>	<u>2020-07-02</u>
Joint Task Force	with Entertainment Technology Center	<u>Artificial Intelligence and Media</u>	<u>2020-07-07</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](#)

Eight parts of the suite (including the essential core parts) are published.

- System Timing and Definitions *
- Uncompressed Active Video *
- Traffic Shaping and Delivery Timing for Video *
- ST 291 Ancillary Data *
- Transparent AES 3 Data *
- Single Video Essence Transport over Multiple ST 2110-20 Streams (to support high bitrate streams)
- Constant Bit Rate Compressed Video
- PCM Digital Audio

* These parts are in revision from one-year review:

There are also parts in development on:

- Two 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
- Measurement considerations for 2110-20 streams
- A project to develop 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 precision time protocol (PTP) packets on an IT network. There are ongoing projects in support of the technology:

- A group is organizing ST 2059 “plugfests” and considering what can be done virtually. [Details](#).
- Revisions of the two foundational standards are close to publication. [Details](#)
- A Study Group is producing reports on Security in ST 2059 Networks [Details](#)
- A recommended practice on PTP Device Monitoring Capabilities will 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](#)

Required Application Protocol Standards for IP-Based Media Production

A study group within the Media Systems, Control and Services TC has just been formed. It will explore prospective Media Industry layering models and standards requirements for interoperability of production applications. [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 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](#)

IMF Plugfests, now conducted virtually, are held regularly. [Details](#)

There are two new IMF applications in development. [Details](#)

SMPTE Video Compression Standards

SMPTE has standardized six video compression standards – VC-1 to VC-6.

Current work on video compression standards comprises:

- VC-6 continuing work. [Details](#)
 - 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.

Its Working Group on Interoperability of Immersive Sound Systems in Digital Cinema has just completed its work. It has 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 14 MXF-related projects in process. [Details](#) They include:

- Mapping JPEG XS into the generic container
- MXF Multichannel Audio Labeling Framework (revision) and two new associated documents
- Mapping VC-3 Coding Units into the MXF Generic Container (amendment)
- Two new ARRI Registered Disclosure Documents
- Mapping Next Generation Audio (NGA) Signals into the MXF Generic Container
- Mapping FFV1 essence into the MXF Generic Container (amendment)

Media Microservices This group has two projects - IMF Registration Service API and Status Reporting and logging [Details](#)

The group works closely with the Open Services Alliance, OSA - formed towards the end of 2019 to fast-track applications.

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](#)

AI and ML in Media A joint task force with the Entertainment Technology Center has just been formed to study this topic. There should be some activity to report by the next meeting round in December.



SMPTE® Standards Quarterly Report:

[Detailed Account](#)

SMPTE Standards Committee Meetings 14-17 September 2020

Hosted by Online (was planned to be EBU, Geneva, CH)

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 (current covid19 situation excepted, of course). Subgroup work proceeds continuously between the quarterly meetings using teleconferences.



There was also a Standards Community meeting that provided details of future meeting arrangements, webinars and courses as well as the virtual Annual Technical Conference. It also outlined the publishing workflow for SMPTE documents.

At the meeting, the HDBaseT Alliance gave a presentation on their work and a planned project with 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:

Dec. 2020 Virtual; was planned for Disney, Burbank, US

March 2021 TBA

July 2021 Sydney, Australia

Sept. 2021 Milan

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

DG: Measurement Methods for Resolution Characteristics of Camera Systems

Current 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 DG is at work on the draft document. It will also draft liaisons to ARIB and to ISO TC-42 informing them of this work.

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

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

Published documents:

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

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

ST 2080-3: Reference Viewing Environment Characteristics

Current projects:

RP 2080-4 - Measurement Procedures for Characterization of HDTV Displays

Defines the procedures, conditions and rules applicable for measuring the parameters of an HDTV Reference Display.

New document [Drafting Project](#)

RP 2080-2: Measurement and Calibration Procedure for HDTV Displays

During development of RP 2080-4, errors in the line numbers of the test patterns in RP 2080-2 were noticed. The patterns also need to be modified to add copyright notices and define risetimes. The



specified alternate white point for certain regions (9300K) should be changed to D93 and the x,y coordinates changed.

Revision [Drafting Project](#)

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.

DG: Academy Spectral Similarity Index (SSI)

Current project:

ST 2122 - Academy Spectral Similarity Index (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: ST 2122 has been published in the last quarter and the project and group will close.

DG: Dynamic Metadata for Color Transforms of HDR and WCG Images (ST 2094 suite)

Published documents:

ST 2094-1 - Dynamic Metadata for Color Volume Transform — Core Components

ST 2094-2 - Dynamic Metadata for Color Volume Transform — KLV Encoding and MXF Mapping

ST 2094-10 - Dynamic Metadata for Color Volume Transform — Application #1

ST 2094-20 - Dynamic Metadata for Color Volume Transform — Application #2

ST 2094-30 - Dynamic Metadata for Color Volume Transform — Application #3

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

Current project:

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

In deployment of ST 2094-10, optimal performance has been obtained with an adjustment of the computation for a metadata item. ST 2094-10 will be aligned with deployed industry practice.

Revision [Drafting Project](#)



Status: The revised draft is in FCD ballot, closing on the day of the meeting. The ballot passed with 9 comments to resolve.

DG: ACES suite (ST 2065)

Published documents:

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

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

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

Current projects:

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. Bug and issue tracking for all 3 documents is in place on GitHub. There is also work to revise Parts 4 and 5 in the [File Systems TC](#).

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](#)

Status: Revised ST 2065-1 has passed Pre-DP review; Revised 2065-2 is in publication queue; Revised ST 2065-3 has been submitted for ST Audit

DG: IPT-PQ in two variants

Prior to standardization of color representation ICtCp in ITU-R BT.2100, an alternative – IPT-PQ - was used by many major OTT distributors. It is important to these OTT distributors that these assets are labeled as utilizing the IPT-PQ color representation in two variants, and that the characteristics of the variants are standardized.

Current project:

ST xxxx - IPT-PQ color representation in two variants.

New document [Drafting Project](#)

Status: This is a new project and the DG resources will be set up shortly.



SMPTE Video Compression Standards

The current video compression groups are:

DG: VC-6 Picture Compression

Published documents:

ST 2117-1: VC-6 Multiplanar Picture Format Part 1. Elementary Bitstream

Current projects:

RP 2117-2 VC-6 Conformance

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

New document [Drafting Project](#)

Status: The group has decided to put this work on hiatus until it has completed a TC-31FS standard on VC-6 wrapping in MXF; to be started shortly.

DG: Amendment VC-3 Picture Compression and Data Stream Format

There is an [associated DG](#) to revise the ST 2019-4 MXF mapping document in the file systems TC.

Current project:

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

This project will extend the VC-3 standard to include carriage of Alpha channel.

Amendment [Drafting Project](#)

Status: FCD Ballot passed on July 21st with 6 comments to resolve. Four comments have been resolved.

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

This group standardizes the CineForm / GoPro video compression system.

Published documents:

ST 2073-1 - VC-5 Elementary Bitstream

RP 2073-2 - VC-5 Conformance Specification

ST 2073-3 - VC-5 Image Formats

ST 2073-4 - VC-5 Subsampled Color Difference Components

ST 2073-5 - VC-5 Layers (this allows embedding multiple images in a single bitstream; used for stereoscopic, HDR and interlaced frames)

ST 2073-6 - VC-5 Sections

ST 2073-10 - VC-5 Mapping into the MXF Generic Container – this was work in TC-31FS

Business Impact: Interoperability between systems



Current Projects:

ST 2073-7 – VC-5 Metadata

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](#)

RP 2073-2 - VC-5 Conformance Specification

Revision to add material for Part 7 items

Revision [Drafting Project](#)

Status of projects:

Part 7 has been prepared and approved for publication; being held until Part 2 catches up.

Part 2 Third revision in progress. Finished test cases for verifying compliance with ST 2073-7, several drafts of the third revision of RP 2073-2 for specifying conformance have been reviewed by the VC-5 DG.

The ST 2073 overview document is also being updated.

DG: VC-2 video compression suite

VC-2 is a SMPTE mezzanine video compression standard (based on BBC's DIRAC pro).

Published documents:

ST 2042-1: VC-2 Video Compression Standard

ST 2042-2: VC-2 Level Definitions

RP 2042-3: VC-2 Conformance Specification

ST 2042-4: Mapping a VC-2 Stream into the MXF Generic Container

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

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

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

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

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

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

Current projects:

RP 2042-3 - VC-2 Conformance Specification



Will add specification of a reference encoder and test materials supporting the last revision of ST 2042-1.

Revision [Drafting Project](#)

ST 2042-1 - VC-2 Video Compression

Will fix errors in pseudocode and elsewhere. Incorporate clarifications. Update boilerplate text and references.

Revision [Drafting Project](#)

Status:

Revision RP 2042-3 - VC-2 Conformance Specification

- *Software and associated materials for conformance testing are largely complete.*
- *Testing of the tools is underway.*
- *Some work remains to be done on the RP.*
- *Awaiting conclusions of Software SG and ST regarding licensing of contributed software.*

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

Revision ST 2042-1 – VC-2 Video Compression

- *Project just started*

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, layout, projection, reproduction, and related topics.

DG: Stereoscopic Subtitling

Business Impact of Subtitles projects: Compatibility and Interoperability

Current projects:

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

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 slowed by the pandemic preventing access to projectors and servers and code. A test DCP and test plan is being developed. It was decided that the DCP will be shared with ISDCF and EDCF to test.

WG: Additional Digital Cinema Frame Rates

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.

Published documents:

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

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

Current projects:

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

Integrate additional frame rates

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. At this meeting a vote was held to raise the document status to DP. The vote passed.

DG: SMS-OMB Communication

Work related to communication between a Screen Management System and an Outboard Media Block.

Current projects:

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 DP ballot 2020-07-08. In comment resolution. Larger issues around TLS version requirements still unresolved. Have reached out to manufacturers to survey TLS compatibility and requirements.

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 passed DP ballot 2020-07-08. In comment resolution.

DG: 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: No work in the last quarter.

DG: RDD 53 Hybrid Tone Mapping

Current project:

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.

New document [RDD Project](#)

Status: The group has reviewed all comments received and the RDD has been rewritten to resolve them. It is hoped that the new draft will be available by the beginning of October.

[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.

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

This 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.

Published Documents:



- RP 2112-1 - Audience Measurement Using OBID and OBID-TLC
- EG 2112-2 - Audience Measurement Ecosystem
- ST 2112-10 - Open Binding of IDs (OBID)
- RP 2112-11 - OBID Conformance Test Materials
- ST 2112-20 - OBID Time Label and Content Distribution Identifiers (OBID-TLC)
- RP 2112-21 - OBID TLC Conformance Test Materials

Status: The group has completed processing 1 year reviews for all 6 documents as they came due. The last two revisions, for Part 10 and Part 1 were completed in the last quarter. The DG will be suspended until further work is required.

DG: ST 2016 Suite on Active Format Description

Published Documents:

- ST 2016-1 - Format for Active Format Description and Bar Data
- ST 2016-2 - Format for Pan-Scan Information
- ST 2016-3 - Vertical Ancillary Data Mapping of Active Format Description and Bar Data
- ST 2016-4 - Vertical Ancillary Data Mapping of Pan-Scan Information
- ST 2016-5 - KLV Coding for Active Format Description, Bar Data and Pan-Scan Information (document withdrawn)

Current Projects:

ST 2016-1 - Format for Active Format Description and Bar Data

Add UHD formats to ST 2016-1

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. As a result of five year reviews at this meeting, Part 2 will also be checked to see if it needs revision.

ST 2035 - Audio Channel Assignments for Digital Television Recorders

Current Projects:

ST 2035 - Audio Channel Assignments for Digital Television Recorders

The revision rolls up Amendment 1 into the revised document.

Revision [Drafting Project](#)

Status: The revision passed FCD ballot 2020-08-31. It was decided at this meeting that, as the comments received were resolved without change to the document, the draft would proceed to ST Audit. There was also agreement that ST 2035 would be stabilized after publication.



Other TC-24TB business

Revision of RP 190:1996 - SMPTE Recommended Practice - Care and Preservation of Audio Magnetic Recordings

Status: The TC has consulted experts who advise that this document needs revision. It was decided that SMPTE would consult with AES over a joint effort on this subject.

Note: AES has standards AES49 and older AES22 on this subject – both stabilized.

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.

WG: Interoperability of Immersive Sound Systems in Digital Cinema

This working group is charged with identifying areas of the D-Cinema architecture that require standardization to achieve interoperability of audio systems with channel 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 further charged with recommending test procedures to assure interoperability for these audio playback systems.

Published documents:

ST 2098-1 Immersive Audio Metadata

ST 2098-2 Immersive Audio Bitstream Specification

EG 2098-3 Immersive Audio Renderer Expectations (incorporates another planned document, RP

2098-4 Immersive Audio Renderer Interoperability Testing Procedure)

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

Status: The work of this group is complete and it was announced that the WG would be disbanded. There was no objection.

DG: SMPTE 2098 Projects on Digital Cinema Immersive Audio Renderer

This DG was responsible for Parts 3, 4 - Part 4 covered the test procedure and has been merged into Part 3.



Status: As Part 3 has reached the publication queue, it was announced that this DG would be disbanded. There was no objection.

Current project:

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: The document is in the publication queue.

WG: 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.

Status: The WG Chair gave a presentation, identifying its scope in the 25CSS workflow diagram. Three work areas have been identified and three AHGs have been formed.

Ad-Hoc Groups:

Technical Reference Documents

AHG is researching existing documents, standards and research papers pertaining to sound system performance and measurements – with the goal of correlating Perception and Measurement

Status: 55 research documents and papers have been identified and brought to the group for analysis so far.

Clip Analysis

Representative Clips from a number of modern movies were identified that challenge B-chain sound systems

Status: 2-year clip licenses have been obtained and DCPs have been made of the clips which will be used in well-calibrated, capable sound systems as well as typical cinema sound systems, measured and subjectively evaluated (when cinema access returns!).

In-situ Analysis

Determine what system parameters need to be measured and what kind of measurements can be done in situ (emphasis on repeatability)

Status: The group will determine - test signals to use; how to measure anomalies in clips; what may be best measured by listening.



Current projects:

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.

DG: ST 2098-2 Constrained Revision

Current project:

ST 2098-2 Constrained Revision

Resolve the issues and clarifications requested in the 2098-2 GitHub reporting system

Revision [Drafting Project](#)

Status: There are 13 issues. 3 issues are thought to be out of scope for ST 2098-2 and should be considered for ST 2098-3. The group expects to have a draft ready for ballot soon.

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.

SG: 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.

DG: UMID-related Standards



This DG is managing the following 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 passed DP ballot 2020-06-03. However, the DG Chair But found some editorial problems in "Terms and Definitions":

- Duplicate definitions of a term
- Different wording from those to be represented in RP 205

A revised draft has been prepared and the TC Chairs will determine how to restart the approval process.

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: A second draft revision was submitted for DG review. It includes editorial improvements as well as a refinement of "UMID Application Principles". Additional application examples are invited.

DG: UUID File Naming

Current project:

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: There was no project report at this meeting and the TC Chair will contact the SG Chair for status.

WG 30MR10: Metadata Definition

This Working Group co-ordinates the process for adding or maintaining metadata items in registers. Registers are maintained and balloted in xml format. An online tool has been introduced to assist with the development of metadata entries and their validation and acceptance for batched ballots. The document is ST 2123 - SMPTE Metadata Registers. It 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 register release is available online [here](#).

Current projects:

Metadata Registers (“Tabasco” release)

This is the current ballot

[Tabasco Project](#)

Status: “Tabasco” is approved for publication.

Metadata Registers (“Sriracha” release)

The next revision for ballot is codenamed “Sriracha”

[Sriracha Project](#)

Status: The call for submissions for the Sriracha ballot will close 2020-09-28. A new project will be required for new submissions (and a code-name).

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

There are projects to revise and simplify existing metadata Standards in line with administrative guideline AG18 that defines the process for adding new UL definitions to the metadata registers.

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](#)

Status: Some initial work has started. A TC member is assisting the TC Chair with this work.



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

DG: MXF - Mapping HEVC Streams into the MXF Generic Container

Current project:

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 Standard [DG Project](#)

Status: The document is being prepared for publication and the DG will be disbanded.

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 [Drafting 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.

DG: ST 377-1 - MXF full revision

This DG published the constrained revision, ST 377-1:2019, and is now starting the full revision.

Current project:



ST 377-1 - Material Exchange Format (MXF)

This project will catalogue issues in the document and align it with the xml-based SMPTE registers.

Revision [Drafting Project](#)

Status: 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 decompose this large document into component parts. An AHG has been formed to help with the work.

DG: Multichannel Audio Labeling

Published document:

ST 377-4 – MXF Multichannel Audio Labeling Framework

Current projects:

ST 377-4 – MXF Multichannel Audio Labeling Framework

This is a revision primarily intended to create additional MCALabelSubdescriptor properties. A controlled vocabulary was planned as part of the document but during development it was decided that the Controlled Vocabulary 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. The DG is free to continue the approval process during this period and it is considering its next steps.

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. The DG is free to continue the approval process during this period and it is considering its next steps.

ST 377-42 – MCA Label Controlled Vocabulary

Create a controlled vocabulary Standard of MCA Label values for Channels, Soundfield Groups and Groups of Soundfield Groups based on SMPTE 377-4 that are not already specified in other documents and register them with the SMPTE metadata registry.

New Standard [DG Project](#)

Status: This project was approved 2020-07-23. A draft document has been created and is being reviewed by the DG.



DG: Mapping JPEG XS Codestreams into the MXF Generic Container

Current project:

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 [Drafting Project](#)

Status: The draft document is at ST Audit closing 2020-09-29. If there are no problems, the DG work will be complete.

DG: Amendment to ST 2019-4:2016 VC-3 Mapping to MXF Generic Container

Current project:

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

This project will add support to ST 2019-4: 2016 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 [Drafting Project](#)

Status: The 2 week pre-FCD Ballot review period ended in June 19th, with no comments. The draft document will start FCD ballot shortly, but awaits completion of comment resolution on the related ST 2019-1 amendment.

RDD 54 - Mapping ARRIRAW Essence into the MXF Generic Container

New Registered Disclosure Document [Drafting Project](#)

Status: The draft is at RDD ballot, closing 2020-10-05.

MXF Carriage of ARRI Camera System Metadata

New Registered Disclosure Document [Drafting Project](#)

Status: Submissions have been made for ULs and the document will proceed to ballot when these submissions achieve “mature” status.

DG: Mapping Next Generation Audio Signals into the MXF Generic Container

Current project:

Mapping Next Generation Audio (NGA) Signals into the MXF Generic Container

Supported NGA metadata structures will include those defined in SMPTE ST 2109, S-ADM according to ITU-R BS.2125 and generic UL based structures.



New Standard [Drafting Project](#)

Status: A WD document has been submitted to the DG. The kick-off meeting will be 2020-09-21.

Amendment to RDD 48 - Mapping FFV1 Essence Stream to MXF

The project will amend tables and add an Annex K referencing the IETF work for FFV1 to accommodate community demands for using FFV1 in MXF. FFV1 is a lossless intra-frame video encoding format.

Amendment [Drafting Project](#)

Status: Project approval will complete 2020-09-25. Registration requests to WG-30MR10 are ready.

DG: ACES Revision Projects

Current projects:

ST 2065-4 ACES Image Container File Layout

Will address issues reported since publication and to prepare the document for ISO submission.

Revision [Drafting Project](#)

ST 2065-5 Mapping ACES Image Sequences into the MXF Generic Container

Will address issues reported since publication and to prepare the document for ISO submission.

Revision [Drafting Project](#)

Status (both): Input documents are being prepared. A kick-off meeting will be held 2020-09-29.

WG: Archive Exchange Format (AXF)

This Working Group (31FS-30) has defined an archive format that will promote interoperability between all forms of archive media.

Published document:

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

Part 1 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

Current projects:

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

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 prose update had been complete for some while, but the included xsd file needs to be updated to match the text. Then, the UML diagrams have to be done.

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: The group is vetting a long list of use-cases to select for inclusion in the standard.

DG: Constrained DPX for HDR

Published document:

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

Current project:

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

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

New document [Drafting Project](#)

Status: The group holds monthly meetings. The C++ library is coming together on GitHub, including three example “apps”. About 50 test images have been uploaded to GitHub. More are being developed.

Other TC-31FS business

The VC-6 group plans to introduce a project for VC-6 mapping into MXF in October. Registrations are being prepared now.



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.

WG: SDI Interfaces

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.

NOTE: At this meeting it was agreed that the work of WG-32NF70 on UHD SDI interfaces would be merged into this group.

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

Current DGs and projects:

DG: EG 2111 on SDI Interfaces

This group will draft EGs in the form of wallcharts showing roadmaps for SDI documents.

Published document:

EG 2111-2 - UHD-SDI Roadmap

Current projects:

EG 2111-1 - SD and HD-SDI Roadmap

New document [Drafting Project](#)

Status: DP ballot passed 2020-07-01. The document can start ST Audit.

EG 2111-3 10G-SDI Roadmap

New document [Drafting Project](#)

Status: DP ballot passed 2020-07-01. The document can start ST Audit.

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: DP ballot passed 2020-07-01. The document can start ST Audit.



WG: Video Over IP

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.

DG: SMPTE 2110 suite - 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 and facility interconnects.

Published documents:

ST 2110-10 - System Timing and Definitions

ST 2110-20 - Uncompressed Active Video

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

ST 2110-22 - Constant Bit Rate Compressed Video

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

RP 2110-24 – Standard Definition Video in ST 2110

ST 2110-30 - PCM Digital Audio

ST 2110-31 - AES3 Transparent Transport

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

Current projects:

ST 2110-10 - System Timing and Definitions

Revision following one-year review

Revision [Drafting Project](#)

Status: The draft revision passed FCD ballot 2020-03-26 with 59 comments. Consensus on the resolution has been reached and the formal acceptance process can start.

ST 2110-20 - Uncompressed Active Video

Revision following one-year review

Revision [Drafting Project](#)

Status: The draft revision passed FCD ballot 2020-04-27 with 19 comments to resolve. At this meeting it was decided that two comments should be overridden, completing the resolution.

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



Revision following one-year review

Revision [Drafting Project](#)

Status: The draft revision is almost ready for FCD ballot.

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; provides further definition of Pixel Aspect Ratio, Height, Alignment with SDI raster.

New Document [Drafting Project](#)

Status: The draft RP went to FCD ballot shortly after the meeting, closing 2020-10-21.

RP 2110-25 – Measurement Considerations for 2110-20 streams

This work arose out of the one-year review discussions of ST 2110-21. Rather than add this information to ST 2110-21, the DG decided that this topic should be separated into its own document. Project is underway, draft exists.

New Document [Drafting Project](#)

Status: An initial document has been drafted and the group meets bi-weekly to develop it.

ST 2110-31 - AES3 Transparent Transport

This revision adds clarifications and notes, but no substantive changes.

Revision [Drafting Project](#)

Status: The revision is at pre-DP-ballot review, closing 2020-09-30.

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

Revision following one-year review

Revision [Drafting Project](#)

Status: The revision will be posted for FCD ballot shortly.

ST 2110-41 – Fast Metadata

An RTP Payload Format for general metadata objects. Intended for transport of any metadata that did not originate as ST 291 ancillary data.

New Document [Drafting Project](#)

Status: Document is in development, draft exists. Each type of metadata needs a defining document.

ST 2110-42 – FMX Payload for ST 2110 Technical Metadata

An Object Format for Technical Metadata associated with 2110. Example usage:

-20: Carries the values of the FMTP parameters for the stream

-30/31: Carries the ptime and number of channels



-40: Carries the video format tag (VPID byte)

All: Can carry the AMWA Sender ID and/or Flow ID

New Document [Drafting Project](#)

Status: Document is in development, draft exists.

ST 2110 Protocol Implementation Conformance Statement (PICS)

This functions like a conformance checklist

New Document [Drafting Project](#)

Status: At this meeting, the scope of this project was constrained to focus on ST 2110-20.

WG: Ultra HD SDI Interfaces

This Working Group (32NF70) was established to create a hierarchy of single-link, dual-link and quad-link electrical and optical SDI interfaces with nominal link rates of 6Gb/s (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 Systems.

WG Status: At this meeting it was agreed that the work of the WG would be merged into WG-32NF40 that deals with SDI interfaces generally.

ST 2081-1 and ST 2082-1 are now up for 5-year review and revision work has been identified.

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

Published documents:

ST 2081-1: 6Gb/s Signal/Data Serial Interface – Electrical

ST 2081-10: 2160-line and 1080-line Source Image and Ancillary Data Mapping for Single-link 6G-SDI

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

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

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

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

Published documents:

ST 2082-1: 12Gb/s Signal/Data Serial Interface – Electrical

ST 2082-10: 2160-line and 1080-line Source Image and Ancillary Data Mapping for Single-link 12G-SDI

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

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



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. New document [Drafting Project](#)

Status: There has been no progress and the project will close.

WG: Time Labeling and Synchronization

This Working Group (32NF80) was established to handle projects for next-generation synchronization of systems using packetized networks and time labeling of essence.

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

Published documents:

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

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

EG 2059-10 - Introduction to the New Synchronization System

Current DGs and projects:

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

Revision 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).

DG Status: The DG has been looking for proponents to write a "PTP Lock Time" EG. It was decided at this meeting that the group scope will be extended for one-year review of ST 2059-10.

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

Revision [Drafting Project](#)

Status: The draft revision, which included minor replacement of culturally insensitive terms, passed DP vote 2020-08-25. It can proceed to ST Audit.



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

Revision [Drafting Project](#)

Status: The revised document passed DP ballot 2020-06-17. It has been editorially revised to replace culturally insensitive terms. It is being reviewed by the TC to ensure that the changes do not alter the intent of the standard. It can then proceed to ST Audit.

DG: 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: A list of items to test is being compiled for the next interop. The group is considering whether testing could be conducted remotely – some things can be, others can't. The DG is developing test plans.

DG: ST 2120: Extensible Time Label (TLX)

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

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 14 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. The MVP will consist of (at least) the following items:

Source ID – unique identifier denotes a “source”

Media Count – index into the media, useable even with variable rate media

Timestamp – time associated with a media unit (e.g., frame time)



DG: RP 2059-15 - ST 2059-2 PTP Device Monitoring Capabilities

Current project:

RP 2059-15 - 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 draft document is complete and it has been sent to the TC, requesting a public CD period. The document completed pre-pCD review 2020-09-15. It includes a .yang file as an element of the standard.

DG: 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.

Current project:

ERxxxx - Using ST 2059 in ST 2110 Networks with ST 2022-7 Redundancy

New report [Drafting Project](#)

Status: No progress this quarter

DG: 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.

WG: Data over AES3



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!

DG: ST 337 family of documents

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

Current projects:

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.

SG: Security in SMPTE ST 2059

This Study Group 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 7 meetings in the last quarter. The last version of the report completed TC review 2020-08-06. Sensitive terms have been replaced and the report can be published. The current version of the report will be made available to the TC for review by the end 2020-10.

Other TC-32NF Business

The TC has developed a report on replacing insensitive or culturally offensive terms used in engineering documents. The decisions will be applied to all affected documents.

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: The project Chair gave a status report presentation. A TC-34CS Drafting Group has been set up and 8 participants have joined. It is expected that work will get under way early in 2021, as the current focus is on the associated TC-30MR UMID work.

BXF Suite of Documents

Published documents:

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 7.0.

Status:

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

SG: Required Application Protocol Standards for IP-Based Media Production

This group was formed as a result of an AHG recommendation. It will explore prospective Media Industry layering models and standards requirements for interoperability of production applications running on IP-based media networks.

[SG Project](#)

Status: The SG Chair announced that the kick-off meeting is scheduled for the following week, 22 September 10:00 EDT.

DG: Media Microservices

This group is managing Microservices projects submitted to SMPTE from the Open Services Alliance, OSA.



Current projects:

ST 2125 – IMF Registration Service API

This project facilitates the use of IMF packages.

New document [Drafting Project](#)

ST 2126 – Status Reporting and logging

This project creates a standardized approach to implement status reporting to overcome the problem of multiple proprietary and non-interoperable ways.

New document [Drafting Project](#)

Status: The DG Chair gave a presentation.

The IMF Registration Service API will be proposed for CD elevation at the next DG meeting (22 September).

The Status Reporting standard was reviewed at the last DG meeting and will also be considered for CD elevation at the next meeting.

There is also work on Terms and Definitions that may be contributed later to the DG.

Further contributions are expected from the OSA.

[Media Packaging and Interchange Committee \(35PM\) Chaired by 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.

Interoperable Mastering Format (IMF)

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.

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.

DG (35PM-50): IMF Document Maintenance



Issues are continuously collected and discussed in SMPTE 35PM GitHub repository - <https://github.com/SMPTE?q=2067> - and members contribute to revision work, for both bugs and improvement requests.

Published documents:

- ST 2067-2 - Interoperable Master Format — Core Constraints
- ST 2067-3 - Interoperable Master Format - Composition Playlist
- ST 2067-5 - Interoperable Master Format - Essence Component
- ST 2067-8 - Interoperable Master Format - Common Audio Labels
- ST 2067-9 - Interoperable Master Format - Sidecar Composition Map
- ST 2067-20 - Interoperable Master Format - Application #2
- ST 2067-21 - Interoperable Master Format - Application #2E
- ST 2067-30 - Interoperable Master Format - Application #3
- ST 2067-40 - Interoperable Master Format - Application #4 Cinema Mezzanine
- ST 2067-50 - Interoperable Master Format - Application #5 ACES
- RDD 45 - Interoperable Master Format - Application ProRes
- ST 2067-100 - IMF - Output Profile List
- ST 2067-101 - IMF - Output Profile List - Common Image Definitions and Macros
- ST 2067-102 - IMF - Output Profile List - Common Image Pixel Color Schemes
- ST 2067-103 - IMF - Output Profile List - Common Audio Definition and Macros
- ST 2067-200 - IMF - Dynamic Metadata for Color Volume Transform (DMCVT) Plug-in
- ST 2067-201 - IMF - Immersive Audio Bitstream Level 0 Plug-in

Current Projects:

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

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

Amendment [Drafting Project](#)

Status: The public CD document was published on GitHub for public review until 2020-07-24. The document provisions were successfully tested during the recent SMPTE IMF Plugfest. The document is now ready for DP ballot as an amendment to ST 2067-21:2020.

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

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

Revision [Drafting Project](#)



Status: The document was published as a public CD and feedback has been incorporated, resulting in a second public CD, available [here](#).

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

Updates related to Revision of 2067-21

Amendment [Drafting Project](#)

Status: Project draft under consideration by the DG.

ST 2067-103: IMF OPL Common Audio Definition and Macros

Amended to Use the correct symbol “MCALabelDictionaryID”

Amendment [Drafting Project](#)

Status: FCD ballot started, closing 2020-10-06.

ST 2067-201 - IMF - Immersive Audio Bitstream Level 0 Plug-in

Modified to avoid conflict with ST 377-1 MXF, corrected section reference to ST 2098-2.

Revision [Drafting Project](#)

Status: FCD ballot started, closing 2020-10-05.

DG: IMF Plugfests

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

Current projects:

IMF Plugfests

Maintains a forum for the interchange of sample IMF material for interoperability testing.

[Drafting Project](#)

Status: The report from the 2020-02 plugfest has been submitted to the DG. Plugfest testing is now occurring in a virtualized environment. 3 test vectors related to HTJ2K have been submitted and are in review on GitHub available. Virtual testing timeline will be established when review is complete.

DG: IMF Output Profile List

The group created parts 100, 101, 102, 103 of the IMF suite.

Current projects:

SG: AMWA AS-11 OPL

To examine the technical requirements of transforming IMF Application DPP Compositions to flat AMWA AS-11 MXF files.



[Study Project](#)

Final editing on report under way. Report will then be submitted to TC-32PM.

SG: Immersive Audio Bitstream in OPL

Examine use cases and technical requirements of generating deliverables from Immersive Audio Bitstream (IAB) track files.

[Study Project](#)

Status: The report is under way. Significant work has been done on terminology for Immersive Audio.

WG: IMF Application DPP

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

Status: All the WG's documents are published. The WG remains open for any issues that may arise.

DG: IMF Application VC-3

Current project:

STxxxx - IMF Application of ST 2019-1 (VC-3)

To define a mastering workflow using VC-3 family of codecs in IMF, focused on broadcast post-production.

New document [Drafting Project](#)

Status: The project was approved 2020-07-15. The kick-off meeting was 2020-09-10 and a strawman draft was discussed and revised. The group meets bi-weekly and hopes to complete the draft for ballot in Q1 2021.

DG: IMF Application UHDTV Program Workflow (AVC)

Current project:

ST 2067-XX IMF Application X UHDTV program workflow (AVC)

IMF Application to improve the efficiency of UHDTV program workflows in broadcasting stations mainly in terms of processing time and storage capacity.

New document [Drafting Project](#)

*Status: Project was approved 2020-07-28 and Drafting Group has been set up. Proponents are preparing a draft. The DG will request a public CD phase in the document development.
Kick-off meeting 2020-09-30.*



SMPTE Standards Publications in the Last Quarter

10E Essence:

[ST 2117-1:2020 - SMPTE Standard - VC-6 Multiplanar Picture Format — Part 1. Elementary Bitstream](#)

[ST 2122:2020 - SMPTE Standard - Spectral Similarity Index \(SSI\)](#)

20F Film:

21DC Digital Cinema:

[RDD 52:2020 - SMPTE Registered Disclosure Doc - D-Cinema Packaging — SMPTE DCP Bv2.1 Application Profile](#)

24TB Television & Broadband Media:

[EG 2112-2:2020 - SMPTE Engineering Guideline - Audience Measurement Ecosystem](#)

[RP 2112-11:2020 - SMPTE Recommended Practice - Open Binding of Content Identifiers \(OBID\) — Conformance Test Materials](#)

[RP 2112-21:2020 - SMPTE Recommended Practice - Open Binding of Distribution Channel IDs and Timestamps \(OBID-TLC\) - Conformance Test Materials](#)

25CSS Cinema Sound Systems:

30MR Metadata & Registers:

31FS File Formats & Systems:

32NF Network & Facilities Architecture:

34CS Media Systems, Control & Services:

[OV 2021-0:2020 - SMPTE Overview Document - Broadcast Exchange Format — Roadmap for the 2021 Document Suite](#)

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 inc. **pCD** for public exposure **FCD** = Final Committee Draft
DP = Draft Publication, which initiates..... **ST Audit** - a due-process check by the Standards Committee

SMPTE Document-Type Abbreviations

ST = Standard **RP** = Recommended Practice **EG** = Engineering Guideline

RDD = Registered Disclosure Document

OV = Overview, usually used with multipart document suites to explain the structure

SMPTE Document Review

The SMPTE Operations Manual calls for review of published documents:

- One Year after original publication - to check whether comments have been received during initial implementations and 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.*