



STANDARDS QUARTERLY REPORT DECEMBER 2020

Result of SMPTE® Technology Committee
Meetings
07-10 December 2020

Hosted virtually by
SMPTE
(was planned to be Disney, Burbank, CA,
USA)

THE NEXT CENTURY

SMPTE® Standards Quarterly Report

Executive Summary

SMPTE Standards Committee Meetings 7-10 December 2020

Host: Originally Disney, Burbank now Online Meeting

This Executive Summary lists the new projects this quarter and gives a high-level view of project developments. More information on the 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.

xx 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)
<i>Metadata and Registers</i>	<i>RDD Revision</i>	RDD-18-Acquisition Metadata	<i>2020-09-30</i>
<i>File Formats and Systems</i>	<i>Amendment</i>	RDD-48-MXF Archive and Preservation Format	<i>2020-09-25</i>

Network/Facilities Architecture	New Standard	<u>ST 2110-43 Timed Text Markup Language</u>	2020-10-09
Network/Facilities Architecture	New Recommended Practice	<u>Inter Entity Trust Boundary</u>	2020-11-12
Digital Cinema	New RDD	<u>RDD 57 ST 2098-2 Immersive Audio Bitstream and Packaging Constraints: IAB Application Profile 1</u>	2020-11-13
Media Packaging	RDD	<u>IMF Track File for JPEG 2000 Codestreams with Time-Synchronous Metadata</u>	No approval date
File Formats and Systems	New Standard	<u>Mapping Next Generation Audio (NGA) Signals with S-ADM metadata into the MXF Generic Container</u>	2020-12-03
File Formats and Systems	New Standard	<u>ST2117-10- Mapping ST 2117-1 into the MXF Generic Container</u>	2020-12-09

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 *
- Constant Bit Rate Compressed Video



- Single Video Essence Transport over Multiple ST 2110-20 Streams (to support high bitrate streams)
- PCM Digital Audio
- Transparent AES 3 Data *
- ST 291 Ancillary Data *

* 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 been exploring prospective Media Industry stack 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.

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 work [Details](#) and VC-6 mapping into MXF [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 SMPTE 2098 document suite. 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

[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 15 MXF-related projects in process. [Details](#) They include:

- 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)
- Mapping ACES Image Sequences in to the MXF Generic Container (revision)
- Mapping ST 2117-1 into the MXF Generic Container

Media Microservices This group has advanced two projects to the public Committee Draft stage - 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 been formed to study this topic. It has sent liaisons to several industry groups known to be working in this area.



SMPTE® Standards Quarterly Report:

[Detailed Account](#)

SMPTE Standards Committee Meetings 7-10 December 2020

Host: Originally Disney, Burbank now Online Meeting

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 some training on migration to SMPTE's new tools to support Standards development work.

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

Future Meetings

Quarterly Standards meeting rounds are planned for:

March 2021 Virtual

July 2021 Virtual

Sept. 2021 Virtual

Dec. 2021 Virtual

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 face-to-face rounds. However it did meet this time as the meeting was online, see [here](#).

Note: In the remaining sections there are links to online SMPTE resources like this:

New document [Drafting Project](#)

These links will work until 31 Jan 2021 and efforts are underway to make them work long-term, but that is not certain at the moment.

The system that supports SMPTE Standards workflow has become progressively less useful. SMPTE is installing replacement tools to support its Standards work.

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 anticipates making progress on this RP in Q1 2021.

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 and it is possible that a second FCD ballot will be the best way forward.

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

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 passed ST Audit 2020-12-02 and will be prepared for publication. The DG will also start a revision project for ST 2094-2 to revise normative references and examples.

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 ST Audit; Revised 2065-2 was published in the last quarter; Revised ST 2065-3 is in the publication queue. The DG will close after publication of all three documents.

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 2128 - IPT-PQ color representation in two variants.

New document [Drafting Project](#)

Status: A WD is in development.

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. [Project here](#)



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: Pre-DP-ballot review will start in a couple of weeks.

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 is in progress. Test cases for verifying compliance with ST 2073-7 are well-advanced with Python scripts and small C programs for testing.

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: Aiming to get both to ballot in Q1 2021

Revision RP 2042-3 - VC-2 Conformance Specification

- *Software and associated materials for conformance testing are largely complete.*
- *The software has been extensively tested.*
- *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 will correct errors in pseudocode and add some clarifications.*
- *Changes needed have been documented; editing of document not yet started.*

Revision to SMPTE 2046 Suite

Current projects:

ST 2046-1 - Specifications for Safe Action and Safe Title Areas for Television

Revision [Drafting Project](#)

RP 2046-2 - Safe Areas for Protection of Alternate Aspect Ratios

Revision [Drafting Project](#)

Status: These projects have been dormant for a while but are expected to restart shortly.

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 157:1999 – for Motion-Picture Film (8-mm Type S) — Camera Aperture Image and Usage

Status: Editorial correction has been submitted to SMPTE HQ. The corrected version has not been published yet.

WG20F-20 Laboratory Practices

Status: The WG Chair has retired; the WG20F-10 Chair volunteered to Chair this group as well.

WG20F-30 Audio

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

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



Status: A 5-year review group was formed at the last meeting to recommend action. The group requires one more meeting cycle to complete the work.

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: An earlier meeting resulted in approval to enlarge scope to include harmonization with ST 2095-1. It was also agreed to delay work on RP 200 until ST 2095-1 has been revised, however there has been no work to launch that project in TC-25CSS. There has been no progress since the last meeting, but it was decided to keep the project open.

WG20F-40 Projection

Status: No work required.

RP xxxx - On-screen Light Measurement

New Recommended Practice [Drafting Project](#)

Status: A Working Draft for 2nd FCD ballot is available. The remaining sticking point is that there are two proposals for scope sizing. A straw poll was held to determine which proposal goes into the FCD ballot (decided on option known as "5x3").

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.

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: A test DCP and test plan are underway and the draft document should be available in about 2 weeks. The main issues are vertical spacing, bold and italic conversion and leading white space.

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 is in the publication queue and the group will be disbanded.



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 is ready for ST Audit.

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 FCD ballot 2020-07-07 with 18 comments. Comment resolution is in progress.

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: The group has been working on an overview document that shows how all 21DC documents relate to one-another.

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 submitted 2021-01.

RDD 57 - ST 2098-2 Immersive Audio Bitstream and Packaging Constraints: IAB Application Profile 1

To document the features supported or not supported by current IAB renderers and set constraints on ST 2098-2 IAB bitstream and requirements for DCP creation. Define legacy content currently in use.

New document [RDD Project](#)

Status: The document passed RDD ballot 2020-12-08 with 9 comments.

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 published in the last quarter. The DG will be disbanded.

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: No progress in the last quarter. 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

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: ST 2035 was published in the last quarter. A vote was held to stabilize the document. The vote passed.

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. A draft liaison was approved at the meeting.

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

Lip sync standards: ST 2064-1 Fingerprint Generation and ST 2064-2 Fingerprint Transport

Status: It was intended at the meeting that votes would be held to reaffirm and stabilize these two standards. However, a member notified the TC that part 1 requires revision. So votes were held to reaffirm part 1 prior to starting a revision project and to reaffirm and stabilize part 2. The votes passed.

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.

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: 14 issues have been addressed in the group's work that has resulted in a working draft document. It will be submitted to the TC Chairs, requesting pre-FCD-ballot review.

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. Three work areas have been identified and three AHGs have been formed. The WG will resume meeting when AHG work is complete.

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: The AHG meets bi-weekly and has identified 66 research documents and papers and has brought them to the group for analysis.

Clip Analysis

Representative Clips that challenge B-chain sound systems from 14 modern movies have been identified.



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 system parameters to be measured; test signals to use; how to measure anomalies in clips; what may be best measured by listening. The first in-situ tests have been completed (Dolby, San Francisco).

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.

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 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 a decision is awaited from TC Chairs on 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 third draft revision was submitted for DG review. It includes editorial improvements as well as a refinement of "UMID Application Principles". Additional application examples will be added, including camera shooting direction and MXF, streaming media.

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.



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: The “Tabasco” release should be available in the IEEE store soon.

Metadata Registers (“Sriracha” release)

The next revision for ballot is codenamed “Sriracha”

[Sriracha Project](#)

Status: The call for submissions for the Sriracha ballot has closed. There will be 21 new entries plus the Essence keys that will be included for the first time. A new project will be required for new submissions, code-name “vindaloo”.

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: An AHG has met a couple of times. It is considering the best approach for ST 335, that can then be applied to the others.

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 was published in the last quarter 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 progress 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. A small group of experts will be formed to take this work forward a couple of weeks after the TC meeting.

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, expected start end 2021-01.

DG: ST 2117-10 mapping ST 2117-1 into MXF

Current project:

ST2117-10- Mapping ST 2117-1 into the MXF Generic Container

New document [Drafting Project](#)

Status: A document has been prepared and will be shared at the first DG meeting in January.

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 was issued as a public committee draft 2020-03 here:

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

There have been no comments and the document returned to the publication process. It has now passed DP ballot and is ready for ST Audit. The ST Audit package has been sent to TC chairs.



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 was issued as a public committee draft 2020-03 here:

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

Comments were received and the document returned to the publication process. It is now in FCD ballot, closing the end of the TC meeting day. The ballot passed with 10 comments to resolve.

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 nearly ready for WD.

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 document was published in the last quarter and the DG will be disbanded.

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

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



New Registered Disclosure Document [Drafting Project](#)

Status: The draft closed RDD ballot 2020-10-05. The proponent has since identified two changes that are required in parameter ranges. The TC agreed to accept these changes as “late comments” on the ballot.

RDD 55 - 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 some time after these submissions achieve “mature” status.

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

Current project:

ST 2127-1 - 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 DG decided to introduce an additional project (now approved), ST 2127-10, that will be a specialization defining specific requirements for S-ADM (Serialized Audio Definition Model) audio metadata – see next project. Consequently, the scope of this project requires amendment to make it agnostic of audio metadata formats.

ST 2127-10 - Mapping Next Generation Audio (NGA) Signals with S-ADM metadata into the MXF Generic Container

New Standard [Drafting Project](#)

Status: The project was approved 2020-12-03.

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: The group is awaiting completion of IETF procedures on FFV1 before initiating this work.

DG: Mapping ST 2117-1 streams to MXF

The project will standardize how to map a sequence of images compressed with ST 2117-1 into the MXF Generic Container.

New Standard [Drafting Project](#)

Status: A draft has been created and will be shared with the DG during a kick-off call in January.

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): The DG has held five calls since the last TC meeting. WDs for 2065-4 and 2065-5 are being discussed. ST 2065-5 will be ready for pre-FCD-ballot review soon.

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 a need for metadata encryption is being added. When that is done, 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: 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.

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: The document has completed ST Audit and is pending publication.

EG 2111-3 10G-SDI Roadmap

New document [Drafting Project](#)

Status: The document has completed ST Audit and is pending publication.

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: The document has completed ST Audit and is pending publication.

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

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 formal acceptance is in progress.

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. Comment resolution is complete.

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 passed FCD ballot 2020-10-21 with 22 comments to resolve.

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. There is consideration of extending the scope to cover audio and ANC measurements.

ST 2110-31 - AES3 Transparent Transport

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

Revision [Drafting Project](#)

Status: The revision passed FCD ballot 2020-12-06 with 22 comments to resolve.

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

Revision following one-year review

Revision [Drafting Project](#)

Status: The revision passed FCD ballot 2020-12-06 with 11 comments to resolve.

ST 2110-41 – Fast Metadata eXpress (FMX)

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 2110-43 – Timed Text Markup Language for Captions and Subtitles

An RTP payload format has been defined in IETF RFC 8759. This Standard provides additional specifications to ensure interoperability when used for captions and subtitles in the SMPTE 2110 environment.

New Document [Drafting Project](#)

Status: Document is in pre-FCD review, closing 2020-12-10.

ST 2110-20 Protocol Implementation Conformance Statement (PICS)

This functions like a conformance checklist

New Document [Drafting Project](#)

Status: Work is expected to start 2021-01.

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: Draft revisions for ST 2081-1 and ST 2082-1 from 5-year review have been sent to the DGs for checking. When that revision work is complete, the WG will be merged into WG-32NF40 that deals with SDI interfaces generally.

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)

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, ST 2059-2, ST 2059-10

Revision in the light of interop testing and other scrutiny since the original publication. It was 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 scope has been extended for one-year review of ST 2059-10. Some changes related to insensitive language have been identified.

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

Revision [Drafting Project](#)

Status: The draft revision passed ST Audit 2020-12-09 and can proceed to publication.

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

Revision [Drafting Project](#)

Status: The draft revision passed ST Audit 2020-12-09 and can proceed to publication.



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 what testing can be conducted remotely and is looking at potential dates of virtual Q4 2021 and in-person Q1 2022. 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 11 meetings in the last quarter. The work during this period has focused on defining a “Minimum Viable Product”, MVP, that will be attractive to implementors 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 available on GitHub for a public CD period. It includes a .yang file as an element of the standard. There is also a companion survey for potential implementors.

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 4 meetings in the last quarter. Version 1 of the report has been approved for release. Version 2 adds discussion of threat detection and mitigation strategies and is in final stage of release for 2-week review by TC.

Other TC-32NF Business

A new project [Inter Entity Trust Boundary](#) was described.

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. It is expected that work will get under way in 2021, after the associated TC-30MR UMID work is closer to completion.

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 short hiatus before it starts to collect work items for BXF 8.0 (new work proposals have been submitted informally; more 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 has held several meetings and developed a Media Production Network Stack. It will now start to identify items for standardization in the target layer.

DG: Media Microservices

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

Projects underway in the last quarter:

ST 2125 – IMF Registration Service API

This project facilitates the use of IMF packages.

ST 2126 – Microservices 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.

Status: The DG Chair gave a presentation.

The two documents above were both issued as public CD documents in the last quarter. The DG will remain on hiatus until comments need to be addressed or new projects started.

There is work on Terms and Definitions in the OSA 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 and Mitch Jacobs

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 amendment passed ST Audit 2020-10-14 with 2 comments.

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](#). A third public CD is under development.

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

Updates related to Revision of 2067-21, support for out-of-range YCbCr code values, normative references.

Amendment [Drafting Project](#)

Status: FCD ballot passed 2020-12-07 with one comment to resolve.

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

Amended to Use the correct symbol “MCALabelDictionaryID”

Amendment [Drafting Project](#)

Status: ST Audit passed 2020-11-09.

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: ST Audit passed 2020-11-09.

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: Proponents continue testing Application 2e test vector j2k (though not yet formally submitted), also Application 4 test vector. Brainstorming for next interop. is underway.

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](#)

The final report will be presented to the TC shortly.

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 being reviewed by the TC, one comment has been received so far.

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: The SMPTE processes for Technical Specifications (TSPs) and public CD release are being merged. Consequently, the two TSP's from this group are going to be issued as public CD as parts of document suite RDD 59.

DG: IMF Application VC-3

Current project:

ST 2067-70 - 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 pre-FCD review will complete 2020-11-20. Comments have been received and will be resolved. The document will then proceed to FCD ballot.

DG: IMF Application UHD TV Program Workflow (AVC)

Current project:

ST 2067-60 IMF Application 6 UHD TV program workflow (AVC)

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

New document [Drafting Project](#)



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Status: The pre-FCD review was completed 2020-11-20. All comments received have been addressed and the resulting document is being reviewed in the DG, closing 2020-12-11, when CD elevation is requested. A period of public CD release is intended.



SMPTE Standards Publications in the Last Quarter**10E Essence:**

[ST 2065-3:2020 - SMPTE Standard - Academy Density Exchange Encoding \(ADX\) — Encoding Academy Printing Density \(APD\) Values](#)

[ST 2065-2:2020 - SMPTE Standard - Academy Printing Density \(APD\) — Spectral Responsivities, Reference Measurement Device and Spectral Calculation](#)

[ST 2115:2020 - SMPTE Standard - Free Scale Gamut and Free Scale Log Characteristics of Camera Signals](#)

20F Film:

[RP 141:2020 - SMPTE Recommended Practice - Background Acoustic Noise Levels in Theaters and Review Rooms](#)

21DC Digital Cinema:**24TB Television & Broadband Media:**

[ST 2035:2020 - SMPTE Standard - Audio Channel Assignments for Digital Television Recorders \(DTRs\)](#)

[RP 2112-1:2020 - SMPTE Standard - Audience Measurement Using OBID and OBID-TLC](#)

[ST 2112-10:2020 - SMPTE Standard - Open Binding of Content Identifiers \(OBID\)](#)

25CSS Cinema Sound Systems:

[EG 2098-3:2020 - SMPTE Engineering Guideline - Immersive Audio Renderer Expectations and Testing Recommendations](#)

30MR Metadata & Registers:**31FS File Formats & Systems:**

[ST 2124:2020 - SMPTE Standard - Material Exchange Format — Mapping JPEG XS Codestreams into the MXF Generic Container](#)

[ST 381-5:2020 - SMPTE Standard - Material Exchange Format—Mapping HEVC Streams into the MXF Generic Container](#)

32NF Network & Facilities Architecture:**34CS Media Systems, Control & Services:****35PM Media Packaging & Interchange:**

[ST 2067-21:2020 Am1:2020 - SMPTE Amendment - Interoperable Master Format — Application #2E Amendment 1](#)

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.*