



SINCE 1916

STANDARDS QUARTERLY REPORT SEPTEMBER 2019

Result of SMPTE® Technology Committee
Meetings
18-21 September 2019

Hosted by
Fraunhofer
Erlangen, Germany

THE NEXT CENTURY



Society of Motion Picture and Television Engineers®

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SMPTE® Standards Quarterly Report:

Executive Summary

SMPTE Standards Committee Meetings 18-21 September 2019

Hosted by *Fraunhofer, Erlangen, DE*

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

Nine SMPTE Technology Committees (TCs) and 13 subgroups scheduled meetings at this round.

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

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

New Projects that Began in the Last Quarter

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

TC	Type	Project	Approval Date (mm/dd)
Metadata	Revision	<u>ST 395 Metadata Groups Register Structure - AG18</u>	Not set
Metadata	Revision	<u>ST 400 SMPTE Labels Structure - AG18</u>	Not set
Metadata	Revision	<u>ST 335 Metadata Element Dictionary Structure - AG18</u>	Not set



Metadata	Revision	<u>ST 2003 Types Dictionary Structure - AG18</u>	Not set
Television/ Broadband	Revision	<u>EG 2112-2 Audience Measurement Ecosystem</u>	Not set
Television/ Broadband	Revision	<u>RP 2112-1 Audience Measurement Using OBID and OBID-TLC</u>	Not set
Network	New document	<u>RP 2110-24 - Standard Def in 2110</u>	<u>09/26</u>
Network	Review – possible revision	<u>One Year Review of ST 2110-21 Traffic Shaping and Delivery Timing for Video</u>	<u>09/26</u>
Cinema Sound Systems	New Document(s)	<u>Cinema B-Chain Characteristics and Expectations Working Group</u>	<u>09/24</u>
Essence	New Recommended Practice	<u>Measurement Methods for Resolution Characteristics of Camera Systems</u>	<u>09/24</u>
Digital Cinema	Administration	<u>TC 21-DC Document Maintenance Project</u>	<u>08/23</u>
Network	New Standard	<u>EG 2111-3 10G-SDI Standards Roadmap</u>	<u>08/13</u>



Network	New Standard	<u>EG 2111-1 SD-SDI and HD-SDI Standards Roadmap</u>	<u>08/13</u>
Network	New Standard	<u>Extensible Time Label (TLX) -- TLX Profiles Document</u>	<u>08/12</u>
Network	New Standard	<u>Extensible Time Label (TLX) -- TLX Items Document</u>	<u>08/12</u>
Network	New Standard	<u>Extensible Time Label (TLX) -- Structure Document</u>	<u>08/12</u>
Metadata	New Document	<u>Metadata Registers (Sriracha release of register set)</u>	<u>07-02</u>

Professional Media over IP Projects

Professional Media over Managed IP Networks

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

The first seven parts of the suite (including the essential core parts) are published:

- System Timing and Definitions (now in revision following one-year-review)
- Uncompressed Active Video
- PCM Digital Audio
- Traffic Shaping and Delivery Timing for Video
- ST 291 Ancillary Data
- Constant Bit Rate Compressed Video
- Transparent AES 3 Data

There are also parts in development on:



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

Associated projects (both published Q2 2019) are:

- Revision to Seamless Protection Switching of RTP Datagrams document to be more generic, allowing it to cover ST 2110 streams
- A new Standard on Timing of ST 2022-6 streams in ST 2110-10 Systems

[Details](#)

Network-Based Synchronization for the Professional Media Environment

The ST 2059 suite defines a system for using media synchronization packets on an information technology (IT) network. There are ongoing projects in support of the technology:

- A SMPTE group is organizing ST 2059 “plugfests”. [Details](#).
- One-year review revisions of the two standards in the light of plugfest experience and implementations have been balloted. [Details](#)
- A Study Group has been started on Security in ST 2059 Networks [Details](#)
- A Drafting Group will create report “Using ST 2059 in ST 2110 Networks with ST 2022-7 Redundancy” [Details](#)
- Engineering Guidelines are being drafted. [Details](#)

Media Device Control over IP

This project has developed a suite of documents for the control of media-centric devices and services utilizing Internet Protocol (IP). Consideration of how to fit this technology into the IP ecosystem is underway. [Details](#)

Interoperable Master Format (IMF)

IMF is a file-based framework designed to support multiple high-quality content versions of a finished work destined distribution channels worldwide. The suite ([details](#)) comprises 16 published documents together with some current projects (noted below) to create additional IMF documents or revise existing ones.

IMF Technical Specification for DPP Application



Following SMPTE's first Technical Specification document from the DPP, published Q3 2018, new projects were started to add a JPEG 2000 Specification to the suite. [Details](#)

This work was completed in the last quarter

The suite of DPP documents are publicly available [here](#).

IMF Audio Essence Projects

A project is underway on IMF Audio Content and Element Kind Definition. A related document, IMF Immersive Audio Bitstream Level 0 Plug-In, was published in the last quarter. [Details](#)

IMF Document Maintenance

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

SDI Interfaces

Work continues on the development of SDI interfaces:

- Suites of documents defining 6Gb/s, 12Gb/s (completed) and 24Gb/s electrical and optical interfaces target UHD applications and multi-stream HD applications. [Details](#)
 - An SDI interfaces Working Group is managing other SDI projects. [Details](#) One of its projects on HDR/WCG signaling completed its work in the last quarter.
-

SMPTE Video Compression Standards

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

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

Cinema Projects



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

Cinema Sound Systems

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

It has a Working Group on Interoperability of Immersive Sound Systems in Digital Cinema.

[Details](#)

Digital Cinema (D-Cinema)

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

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

Current projects deal with:

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

[Details](#)

Reference Materials for DPX V2.0 HDR Implementations

The HDR DPX standard was published in Q1 2019. This project has started to produce a reference implementation and tools. [Details](#)

Material Exchange Format – MXF This widely-used file-based media format does not stand still and there are always projects adding features and mappings to the MXF suite of standards or creating constraints for improved interoperability in a variety of application areas. There are currently 7 MXF projects in process. [Details](#) They include two new projects:

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

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

This group is keen to get more participation from implementers of media microservices and has held two Media Microservices Summits in the last quarter to aid recruitment and identify the most important items to focus the work.



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Serial Audio Definition Model (ADM) over AES3

This standard specifies a method for transporting a serial representation of the Audio Definition Model (ADM, Rec. ITU-R BS.2076) alongside synchronized audio signals in professional applications using AES3 serial digital audio interfaces. [Details](#)

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



SMPTE® Standards Quarterly Report:

[Detailed Account](#)

SMPTE Standards Committee Meetings 18-21 September 2019

Hosted by Fraunhofer, Erlangen, DE

The Society of Motion Picture and Television Engineers® (SMPTE®) is a global leader in motion-imaging standards and education for the communications, media, entertainment, and technology industries – and the only organization to connect the areas of motion-imaging research, standardization, education, and business success.

We encourage interested parties to learn more about our Standards activities on [this website page](#).

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

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

Introduction

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

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

There was also a Standards Community meeting that introduced general updates on SMPTE HQ work and tools as well as presentations on Language Metadata Table (MESA) and 5G in broadcast (EBU).

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](#).

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Future Meetings

Quarterly Standards meeting rounds are planned for:

- Dec. 2019 Arista, San Jose, CA, US
- March 2020 SMPTE India Section, Mumbai, IN
- June 2020 AWS, Portland, OR, US
- Sept. 2020 EBU, Geneva, CH

This Quarterly Report provides a detailed account of the meetings of the following SMPTE Standards TCs and their sub-groups:

[Essence \(10E\)](#)

[Digital Cinema \(21 DC\)](#)

[Television and Broadband Media \(24TB\)](#)

[Cinema Sound Systems \(25CSS\)](#)

[Metadata and Registers \(30MR\)](#)

[File Formats and Systems \(31FS\)](#)

[Network and Facilities Architecture \(32NF\)](#)

[Media Systems, Control and Services \(34CS\)](#)

[Media Packaging and Interchange \(35PM\)](#)

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

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

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



Details from each Technology Committee (TC) meeting

Essence Technology Committee (TC-10E) Chaired by John Snow and Lars Borg

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

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

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

[DG Project](#)

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

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

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

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

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

ST 2080-x: Reference Display Characteristics

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

Status:

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

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

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

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.

Video Compression Standards in SMPTE

The currently-active video compression projects are:



SMPTE 2117 Document Suite: VC-6 Picture Compression

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

[DG Project](#)

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

Status: The VC-6 group submitted a document package for Part 1 and an FCD ballot has started, closing 2019-10-23.

RP 2117-2 VC-6 Conformance

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

New document [Drafting Project](#)

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

SMPTE 2073 Document Suite: VC-5 Video Essence

This project standardizes the CineForm / GoPro video compression system.

[DG Project](#)

The document suite comprises:

ST 2073-0 - VC-5 Suite Overview (Published)

ST 2073-1 - VC-5 Elementary Bitstream (Published Q2-2014, revision published Q2-2017)

RP 2073-2 - VC-5 Conformance Specification (Published Q2-2014, revision to cover additional Parts published Q1-2018, revision).

Includes Reference Decoder, Sample Encoder, sample bitstreams

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

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

ST 2073-4 - VC-5 Subsampled Color Difference Components (Published)

ST 2073-5 – Layers (this allows embedding multiple images in a single bitstream; used for stereoscopic, HDR and interlaced frames) (Published Q1-2018)

ST 2073-6 - Sections (this mechanism allows implementation of special functions without disturbing standard decoders; it delineates contiguous portions of the bitstream and allows seeking and error detection) (Published Q1-2018)

ST 2073-7 – Metadata (On point of publication)



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

New document [Drafting Project](#)

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

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

Part 7 has been prepared for publication.

Part 2 Third revision in progress to add coverage for VC-5 Part 7. Work is underway on XML Schema and Python scripts for verifying conformance to ST 2073-7 Metadata.

Business Impact: Interoperability between systems

VC-2 video compression suite

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

ST 2042-1: VC-2 Video Compression Standard (latest revision published Q3 2017)

ST 2042-2: VC-2 Level Definitions (latest revision published Q1 2018)

RP 2042-3: VC-2 Conformance Specification

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

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

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

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

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

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

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

Status:

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

Work is underway on new conformance software:

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



Significant work remains to be done on associated tools, integration and testing.

FCD ballot estimate - around June 2020.

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

RDD 51 - High Density Encoding – Data Encoding Specification

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

[RDD Project](#)

Status: This document is at RDD ballot, closing 2019-10-03.

RP 2093 - Television Lighting Consistency Index (TLCI)

The project scope is to document “Television Lighting Consistency Index (TLCI)” and “Television Lighting Matching Factor (TLMF)”. The introduction of light emitting diode (LED) technologies is leading to unintended and possibly expensive consequences, including poor color matching between different light sources, and very hard-to-correct color reproduction. There is currently no standard method to quantify the quality of lighting in relation to color reproduction for television.

New document [DG Project](#)

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

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

Revision addresses these issues discovered in current published document:

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

Revision [Drafting Project](#)

Status: The FCD ballot did not achieve numerical consensus and was extended for 2 weeks until 2018-12-11. The extended ballot closed with 78 comments but did not achieve numerical consensus.

There are very few (2-3) comments left to address. The revised document will then go to 2nd pre-FCD review; the target is October 2019, with ballot November.

The TC decided that an Advisory Note that had been drafted on this revision would not be published.

ST 2113 - Colorimetry of P3 Color Spaces



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

New Standard [DG Project](#)

Status: The document was published 2019-01. The group is satisfied that other groups who may wish to update P3 documents to reference ST 2113 are aware, and this group will be closed.

ST 2122 - Academy Spectral Similarity Index (SSI)

This new project has been initiated to standardize SSI.

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

New Standard [DG Project](#)

Status: A Drafting Group has now been set up and has held three telecons. An initial draft document is available. More participation is invited.

ST 2065 - ACES suite

A revision of ST 2065-1, ST 2065-2 and ST 2065-3 is necessary to address issues reported since publication and to prepare the documents for ISO submission. This project describes the overall work effort and sets forth the basis on which a single DG will work on the documents. See also project to revise Parts 4 and 5 in [File Systems TC](#).

Revision [DG Project](#)

Status: A drafting group has been set up and the kick-off meeting will be 2019-10-15. Input documents for Parts 1 and 2 have been prepared.

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

Revision [Drafting Project](#)

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

Revision [Drafting Project](#)

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

Revision [Drafting Project](#)



RP xxxx - Measurement Methods for Resolution Characteristics of Camera Systems

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

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

New document [Drafting Project](#)

Status: The project will complete its approval process 2019-09-24. The work will be based on ARIB 8-TR-B41v2_0-E1.

[Digital Cinema Technology Committee \(21 DC\) Chaired by Steve Llamb and Chris Witham](#)

The application of the general scope as it applies to application of mastered essence to theatrical digital distribution, including compression, encryption, wrapping, marking, packaging, media, logging, playout, projection, reproduction, and related topics.

Stereoscopic Subtitle / Timed Text related projects

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

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

Revision [Drafting Project](#)

Status: This document passed DP vote 2019-09-19 and will be sent for ST Audit. Note that there is [other work](#) on additional frame rates that further amends ST 429-2, and will need integration.

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

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

Revision [Drafting Project](#)

Status: The group continues to meet bi-weekly. Substantial progress has been made in clarifying the document through improved text and illustrations. Examples of variations in rendering of Japanese subtitles have been supplied by members in Japan. Most issues involving the positioning of the subtitles have been resolved.

Remaining issues have to do with applying the italic attribute and rotate element.

Business Impact of Stereoscopic Subtitles projects: Compatibility and Interoperability



Additional TC-21DC Frame Rates documents

Project Scope: Integrate the separate documents for Additional Frame Rates into the main documents 428-1 and 428-2 (DCDM) and 429-2 (DCP), add HFR to DCP.

Revisions [WG project](#)

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

Revision [Drafting Project](#)

Status: This document is published.

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

Amendment [Drafting Project](#)

Status: ST 429-2 amendment was published 2019-01. However, a problem with its normative reference to ST 429-4 was identified at this meeting and the publication was removed from the store. Be aware of [other revision work](#) on ST 429-2 for stereoscopic subtitles.

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

Revision [Drafting Project](#)

Status: This document closed FCD rebalot 2019-02-05 with 3 comments to be resolved.

The one remaining comment was discussed at the meeting. It concerned document references to the 2004 version of ST 377 and ST 379 rather than current versions. It was determined that the problem could not be fixed in the document and a disposition vote was held to set aside the comment. The vote passed. The document will proceed to pre-DP review.

Immersive Audio Projects in TC-21DC

ST 430-17 - SMS OMB Comm. 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 completed pre-FCD-ballot review but has not progressed to FCD ballot. The work has been largely done and a UL registration has been resolved.

RP 430-18 - SMS OMB Comm. Reference Method

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

New document [Drafting Project](#)



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

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

Revise ST 430-14 to:

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

Revision [Drafting Project](#)

Status: This group reported good progress.

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: This new project completed approval 2019-08-23 and is getting set-up.

[Television and Broadband Media Committee \(24TB\) Chaired by Bill Miller](#)

The General Scope as applied to mastered essence for television and broadband distribution (both separately and for hybrid television/broadband environments), including compression, encryption, wrapping, marking, packaging, media, tracking/control, presentation, reproduction, and related topics.

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

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

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

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

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

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

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



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

Status: The group has been processing 1 year reviews as they come due. A [DG project](#) has been set up for this purpose. Parts 10, 11, 20, 21 were at FCD ballot at the time of the meeting, closing the following day (2018-09-19). Project proposals have been drafted for revision to the remaining documents [RP 2112-1](#) and [EG 2112-2](#).

Revision: ST 2016-1 - AFD and Bar Data

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

Revision [DG Project](#)

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

Other TC-24TB business

EG 26 - Audio Channel Assignments for Digital Television Tape Recorders with AES/EBU Digital Audio Inputs passed Withdrawal ballot. It is superseded by ST 2035 and HQ will be asked to roll-up Amendment 1 into ST 2035.

ST 357 – Declarative Data Essence — Internet Protocol Multicast Encapsulation. A vote was held to stabilize this document. The vote passed.

SMPTE 2052 – it was agreed that Parts 1, 10, 11 of this document suite on SMPTE Timed Text will be revised in a constrained revision project.

[Cinema Sound Systems \(25CSS\) Chaired by Brian Long and Bill Redmann](#)

The application of the general scope as it applies to standards for theater sound and cinema B-Chain systems, including performance, measurements, setup, calibration, acoustics and related topics.

The TC is maintaining a workflow chart, identifying how its projects link up and where other work is needed. A regular feature of the meetings is a set of rapporteur reports from related organizations – MPEG, AES, EBU, InfoComm, ITU.

Interoperability of Immersive Sound Systems in Digital Cinema

[WG Project](#)



This working group is charged with identifying areas of the D-Cinema architecture that require standardization to achieve interoperability of audio for systems with capability greater than 7.1. It will create engineering documents as needed, including standardizing a single object-based distribution file format and related protocols for interoperable playback into a variety of theatrical speaker configurations.

The group is also considering recommended calibration methods for these audio playback systems.

Working Group Documents

ST 2098-1 Immersive Audio Metadata (Published)

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

EG 2098-3 Immersive Audio Renderer Expectations

RP 2098-4 Immersive Audio Renderer Interoperability Testing Procedure

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

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

SMPTE 2098 Projects on Immersive Sound Model and Bitstream

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

DG Project

Status: There is currently no project work for the group.

ST 2098-2 - Immersive Audio Bitstream Specification

The document was published in August 2018. A revision to add functionality for IMF and improvements to pseudocode was published in June 2019.

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

SMPTE 2098 Projects on Digital Cinema Immersive Audio Renderer

This DG is responsible for Parts 3, 4

DG Project

Status: The DG has decided to merge Part 4 into Part 3. The proposal for scope change of Part 3 needs to go through TC and ST approval. Once done, the project for Part 4 will be closed.

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 had completed DG review 2019-03-25 before the merge proposal. Now, aspects from the now-dropped Part 4 have been incorporated and editing work continues at approximately bi-weekly meetings.

RP 2098-4 - Immersive Audio Renderer Interoperability Testing Procedure

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

New document [Drafting Project](#)

Status: (prior to merge proposal) Editing work continues at approximately 2-weekly meetings.

Study Group on B-Chain Characteristics and Expectations

Determine the documents needed to specify the B-Chain characteristics required to play back modern movie soundtracks in dubbing theaters and cinemas with the sustained high levels and transients that are now common. Create project statements for a drafting group to write these documents and a project statement for each document.

Study Group [Drafting Project](#)

Status: The SG completed its prescribed tasks and submitted its report to the TC. The SG has been closed and a project proposal was made to form a WG to perform work identified and to manage document drafting.

Work Group on B-Chain Characteristics and Expectations

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

Working Group [Drafting Project](#)

Status: The WG project was proposed and is under ST & TC review.

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

The application of the general scope as it applies to definition and implementation of the SMPTE Registration Authority, used to identify digital assets and associated metadata. Additionally, the common definition of metadata semantic meaning across multiple committees.

UMID Projects

The Chair of the following projects gave a status report.

Application of the Unique Material Identifier (UMID)

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



The UMID is standardized in ST 330 and RP 205 covers application of UMIDs in Production and Broadcast Environments. This SG studied ways to make the UMID more useful, resulting in a report available [here](#). The SG remains open for assistance to the other UMID project groups and to review any new work items. [SG Project](#)

UMID-related Standards:

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

ST 330 - UMID

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

Revision [Drafting Project](#)

Status: The ST 330 Committee Draft has been submitted to the TC Chairs for FCD Ballot. The ballot will follow when formal approval for use of an ICAO reference has been confirmed.

RP 205 – UMID Applications

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

Revision [Drafting Project](#)

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

New Document: UMID Resolution Protocol

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

New document [Drafting Project](#)

Status: Nothing to report.

ST 2088 - SMPTE Essence Element Key Register Structure

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

New document [DG Project](#)

Status: The document passed ST Audit on 2019-07-09 with no comments. It is in the publication queue and the project will be closed.



UUID File Naming

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

New [SG Project](#)

Status: This is a newly-approved project and the SG will be set up shortly. It will search through all SMPTE documents for UUID use.

Metadata Definition

This Working Group (30MR10) co-ordinates the process for adding or maintaining metadata items in registers. Registers are now maintained and balloted in xml format (spreadsheets were previously used). An online tool has been introduced to assist with the development of metadata entries and their acceptance for batched ballots.

Status: The current revision of the four registers in xml form (code-named “Ponzu”) was published in 2018 Q3. The next release will be “Tabasco” and the project group is progressing through the ballot process. It has been realized that a simple prose document is needed as well as the set of xml documents that will be treated as elements of the ballot document.

The entries currently being collected will then be prepared for ballot, to form the “Sriracha” release. The Metadata Registers Development Area is available here: <https://registry.smpte-ra.org/pages/>

The existing Standards defining ULs for Elements, Groups, Types and Labels will be revised in line with administrative guideline AG18 that defines the process for adding new UL definitions to the metadata registers. These projects will implement this work:

ST 335 Metadata Element Dictionary Structure - AG18

Revision [Drafting Project](#)

ST 395 Metadata Groups Register Structure - AG18

Revision [Drafting Project](#)

ST 400 SMPTE Labels Structure - AG18

Revision [Drafting Project](#)

ST 2003 Types Dictionary Structure - AG18

Revision [Drafting Project](#)

Create and Update Essence Element Register Contents

This is a temporary activity to record SMPTE ULs for use as essence keys and process requests for register additions, modifications and deprecations. When ST 2088 publishes, this group will be closed



and the work will pass to the WG to create an xml register like the existing four. A draft register in spreadsheet form has been compiled for existing essence elements (and any new assignments) and is available at the above Development Area URL.

[DG Project](#)

Status: As ST 2088 is nearing publication, there have been discussions with the creator of the online registers and the Essence Element contents will be incorporated into the xml register set.

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

The application of the General Scope as it applies to definition of common wrappers, file formats and file systems for storage, transmission, and use in the carriage of all forms of digital content components.

Material Exchange Format (MXF)

MXF defines a file format for Video, Audio and Data essence along with associated Metadata, for use in production systems (rather than final delivery).

There are several MXF projects under way. Some define new MXF features / applications, others revise existing documents for better interoperability.

Business Impact of all MXF-related work items: Interoperability between systems in file-based production

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

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

New document [DG Project](#)

Status: The DG met at this meeting round. Document drafting is well advanced and the WD is being refined in preparation for pre-FCD ballot review.

ST 377-2 - KLV-encoded extension syntax (KXS)

This work specifies an alternative approach to the 'Application Metadata Plug-ins' specified in SMPTE 377-1. The document passed a second FCD ballot on 2013-11-17 with 70 comments, but then went into hiatus. The work has now resumed.

New document [DG Project](#)

Status: The document was published in the last quarter. The DG will be kept open for possible related developments.



ST 380 - MXF Descriptive Metadata Scheme 1

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

Revision [DG Project](#)

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

RP 2057 - Text-based metadata carriage in MXF

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

Revision [Drafting Project](#)

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

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

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

Revision [DG Project](#)

Status: A pre-DP-vote package has been submitted with a request to start the review.

ST 377-4 – MXF Multichannel Audio Labeling Framework

This is a revision primarily intended to create additional MCALabelSubdescriptor properties and a controlled vocabulary.

Revision [DG Project](#)

Status: The working draft was submitted to the TC for pre-FCD-ballot review. Comments were received, suggesting that the Controlled Vocabulary should be separated into a new document allowing it to be used in a wider field of applications. The proponents agree and the proposal has been sent to the DG for comment. It is then intended that the draft project proposal will be posted for approval. Ideally, the two documents will be balloted together to help reviewers understand the context.

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

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

Revision [DG Project](#)

Status: The FCD ballot passed 2019-09-09 with 5 comments that have already been resolved. The document is ready for pre-DP-vote review.



Working Group on Archive Exchange Format (AXF)

This Working Group (31FS-30) has defined an archive format that will promote interoperability between all forms of archive media. Part 1 has been published for some while and deals with ‘AXF Structure and Semantics’ and includes an XML schema. A revision to the Part 1 document was published in Q2 2017. It has been published by ISO as a Publicly Available Specification, ISO/IEC DIS 12034-1.

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

There are 2 current projects:

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

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

Revision [Drafting Project](#)

Status: The text update has been complete for some while, but a possible requirement has arisen to add a “conditional any” function for extensibility that was identified in the development of Part 2.

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

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

New document [Drafting Project](#)

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

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

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

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

New document [DG Project](#)

- **Status:** The DG has requested that the API be rewritten in C++ (currently C). The project also includes DPX files that can be used to test reader implementations. A spreadsheet has been reviewed to track the different dimensions to vary parameters to ensure maximal coverage.



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Other TC-31FS business

Revision of ST 2065-4:2013 ACES Image Container File Layout

A new project is to be proposed. Another project will be required for revision of Part 5 - Mapping ACES Image Sequences into the MXF Generic Container. See also project to revise Parts 1, 2 and 3 in Essence TC.

MXF encapsulation of JPEG XS

Proponents plan to introduce a new project to define this MXF encapsulation in the week after the meetings.



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

The application of the general scope as it applies to definition and control of elements supporting the infrastructures of content production and distribution facilities, including file management, transfer protocols, switching mechanisms, and physical networks that are both internal and external to the facility excluding unique final distribution methods.

Working Group on SDI Interfaces

WG Project

The Working Group (32NF40) scope is:

Manage Engineering Documents dealing with electrical and optical SDI interfaces with nominal link rates up to 3Gb/s as well as a 10Gb/s optical interface including the mapping of essence, data, and metadata and the details of the physical interfaces.

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

The WG is responsible for the following projects:

New Document Suite: EG 2111 on SDI Interfaces

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

New document suite [DG Project](#)

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

EG 2111-1 - SD and HD-SDI Roadmap

New document [Drafting Project](#)

Status: At FCD ballot, closing 2019-09-23.

EG 2111-2 UHD-SDI Roadmap

Status: Published in last quarter

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

[Drafting Project](#)

Status: At FCD ballot, closing 2019-09-23. There are several comments to resolve.

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

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

Revision [Drafting Project](#)

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

Working Group on Video Over IP

[WG Project](#)

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

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

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

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

Document suite [DG Project](#)

The suite currently consists of:

ST 2110-10 - System Timing and Definitions

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

ST 2110-20 - Uncompressed Active Video

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

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

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

ST 2110-22 - Constant Bit Rate Compressed Video

Published

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

New Document [Drafting Project](#)

RP 2110-24 – Standard Definition Video in ST 2110

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

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New Document [Drafting Project](#)

ST 2110-30 - PCM Digital Audio
Published.

ST 2110-31 - AES3 Transparent Transport
Published

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

ST 2110-41 – Fast Metadata
New Document [Drafting Project](#)

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

New Document [Drafting Project](#)

Status of 2110 Projects:

- ST 2110-22 was published in the last quarter.
- ST 2110-23 had a DP elevation vote at the TC meeting. The vote passed.
- ST 2110-24 - a [project](#) has been created, closing approval on 2019-09-26.
- ST 2110-10 one-year-review identified topics that require revision, including definitions of syntax for asynchronous operation, definition of Reconstruction delay and improvement to RTP timestamp definitions. The draft revision is intended to be submitted to FCD ballot shortly after the meeting round.
- ST 2110-20 one-year-review. Items for revision have been listed in the [project](#).
- ST 2110-21 one-year review and revision. A [project](#) has been created, closing approval on 2019-09-26.
- ST 2110-30 one-year review and revision. It was agreed at the DG meeting that no action is required.
- A [Project](#) has been approved “Protocol Implementation and Conformance Statement” (like a conformance checklist) for each of the documents in the ST 2110 suite.
- ST 2110-40 – work on a revision project statement has begun.
- ST 2110-41 work is progressing. The group is deciding between using a KLV structure or a Words-Identifier-Blob structure. Part 42 awaits the definition of Part 41.

Planned Project

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

Project proposal awaited.

Working Group on Ultra HD SDI Interfaces

[WG Project](#)

This Working Group (32NF70) was established to create a hierarchy of single-link, dual-link and quad-link electrical and optical SDI interfaces with nominal link rates of 6Gb/s (ST 2081 suite), 12Gb/s (ST 2082 suite) and 24Gb/s (ST 2083 suite). See below for the individual documents in each suite. The optical interface parameters supporting these standards have been added to ST 297-1: Serial Digital Fiber Transmission System for ST 259, ST 344, ST 292-1/2, ST 424, ST 2081-1 and ST 2082-1 Signals.

WG Status: Although there are separate drafting groups for 6Gb/s and 12Gb/s (see below), the WG generally develops its documents so that the two are kept “in step”. Additional work has been passed to this WG from the [SDI WG HDR signaling project](#) to include HDR signaling over these UHD-SDI standards, with revision work as noted below.

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

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

[DG Project](#)

This group is responsible for the following documents:

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

ST 2081-10: 2160-line and 1080-line Source Image and Ancillary Data Mapping for Single-link 6G-SDI (published and HDR revision published Q2 2018)

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

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

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

Status:

The one year review revisions of ST 2081-11 and -12 published in the last quarter.

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

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

[DG Project](#)



This project is responsible for the following documents:

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

ST 2082-10: 2160-line and 1080-line Source Image and Ancillary Data Mapping for Single-link 12G-SDI (published and HDR revision published Q2 2018)

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

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

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

Status:

The one year review revisions of ST 2082-11 and -12 published in the last quarter.

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

UHD-SDI Stress Pattern and Check Signal

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

[DG Project](#)

Status: There has been no progress for some while.

Working Group on Time Labeling and Synchronization

[WG Project](#)

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

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

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

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

This DG will revise these two PTP standards in the light of interop testing and other scrutiny since the original publication. It has been decided that mention of a 5 second lock time will be removed from the



Introduction of ST 2059-1 as lock time is a complex parameter to define (a new project for a 2059 family document on this subject is planned).

Revision [DG Project](#)

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

Revision [Drafting Project](#)

Status: The document passed FCD ballot 2019-09-03 with 56 comments to resolve. Work on comment resolution is underway in the DG.

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

Revision [Drafting Project](#)

Status: The document passed FCD ballot 2019-07-29 with 29 comments to resolve. Comment addressing is close to completion in the 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: The group presented its report on the 2019-02 plugfest at this meeting round. It will be considered for publication as an Engineering Report.

RP xxxx - ST 2059-2 PTP Device Monitoring Capabilities

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

New document [DG Project](#)

Status: The group holds weekly telecons and has developed a table of parameters for monitoring. The goal is to have a WD available by the end of the year.

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



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

New report [DG Project](#)

Status: No progress

ST 2120: Extensible Time Label (TLX)

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

New document suite [DG Project](#)

Status: The DG agreed a simplified project definition to be less specific about the form of time label that will be used. It will be submitted to the WG and then to the TC for change to project. The DG has been developing an object model as a framework (primarily for Part 1).

Three documents are currently in development:

ST 2120-1 – Extensible Time Label – System

New Standard [Drafting Project](#)

ST 2120-2 – Extensible Time Label – Items

New Standard [Drafting Project](#)

Status: The DG has reviewed a draft document.

ST 2120-3 – Extensible Time Label – Profiles

New Standard [Drafting Project](#)

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 further progress.

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 new progress to report.



Working Group on Data over AES3

[WG Project](#)

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

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

ST 337 family of documents

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

[DG Project](#)

This group is responsible for the following documents:

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

This project defines the open transport over AES3 of real-time, dynamic (time synchronous) audio metadata.

Status: The document was published in the last quarter.

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

MPEG-H provides for carriage of immersive and interactive audio in the form of channels and objects and also in the form of Higher Order Ambisonics (HOA). The project will develop a standard to specify the format for carriage of MPEG-H data for professional applications as Non-PCM audio using the AES3 serial digital audio interface defined by ST 337.

New document [Drafting Project](#)

Status: The WD document is in progress.

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

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

New document [DG Project](#)

Status: The document completed pre-DP ballot review 2019-08-27. A DP elevation vote was held at the plenary. The vote passed.

A related project:

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

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

Amendment [Drafting Project:](#)

Status: Closed FCD ballot 2019-07-30 with no comments. Automatically elevated to DP status.



Study Group: Security in SMPTE ST 2059

This SG will investigate vulnerabilities in ST 2059 systems, both malicious and accidental

[SG Project](#)

Status: The SG has completed a short initial report to inform industry and draw cybersecurity expertise. For the main report, it has been decided that small incremental reports will be issued approximately quarterly.

The SG is developing a PTP threat list and table and Threat Model. It has developed a PTP architecture diagram to visualize threats and trust boundaries.

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

The General Scope as applied to the implementation of media services, methods of managing and controlling hardware devices and software systems, and the management of media workflow processes, including associated signaling and control mechanisms.

BXF Suite of Documents

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

RP 2021-1: General Information and Informative Notes

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

ST 2021-2: Protocol

EG 2021-3: Use Cases

ST 2021-4: Schema Documentation

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

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

RP 2021-6: BXF SDK Documentation

RP 2021-9: Implementing BXF

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

[BXF incremental development.](#)



New features are added to the suite at regular intervals and these are batched into versions using a numeric version number – current published version is BXF 6.0 and current development is BXF 7.0. BXF 6.0 added various items received from NABA, Extreme Reach, NBCU, Channel 4, Viacom.

Status:

The BXF 7.0 revision drafts for Parts 1 and 4 passed FCD ballot 2019-09-10. Part 1 has 8 comments to resolve – resolution is in progress. It was agreed that Part 4 will be directly elevated to DP status. It was found that revision to Parts 2 and 3 were not needed for BXF 7.0 and agreed that those projects can close.

Work includes:

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

Media Device Control over IP

This project has developed a suite of documents for the control of media-centric devices and services utilizing Internet Protocol and well-established Internet / IT standards and best practices wherever possible.

Document suite [DG Project](#)

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

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

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

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

Revision [Drafting Project](#)

ST 2071-4: Media Device Control - Capability Interface Repository
New document [Drafting Project](#)

Provides a common infrastructure and API with which vendors and SDOs can register Capability Interface Definitions, their documentation, unit tests, and test cases and where Developers, Customers, and Interface Consumers can query the definitions, documentation, and tests for the Capability Interfaces implemented by Devices and Services used within their systems. WSDL & XML Schemas are included.



2071 suite status:

A special item was discussed at this meeting, that had an impact on this document suite. The discussion reviewed control requirements in the IP ecosystem. The SVP gave a presentation that showed a possible evolution, including a “Production Network Layer”.

Part 3: Issues arising in the discussion led to a decision to hold the FCD ballot of draft revision ST 2071-3 until the next plenary round, when there should be a better appreciation of how this suite can contribute to the IP ecosystem.

Part 4: There has been no work on Part 4 in the last quarter.

Business Impact: Interoperable Media Device Control

SMPTE xxxx - Media Microservices Overall Architecture

Project scope: Create a base document for a suite of documents, specifying an overall architecture enabling interoperable microservices, and manage the development of later documents in the suite. This project was approved 2018-03-28. The long-term goals are to publish the suite of architectural documents and provide the ability for contributors to register microservices with SMPTE, making a functional set of interoperable media microservices available for implementers.

Two “Media Microservices Summits” were held in Los Angeles and New York in May 2019. They helped the group to define some target items: Defining a common taxonomy, terms & definitions, resource management, decomposition of services.

New document suite [DG Project](#)

The group has early drafts of four documents thus far:

Media Microservices Terms and Definitions

Media Microservices Overall Architecture

Media Microservices Architectural Requirements

Media Microservices Decomposition

Status: A face-to-face DG “kickoff” meeting has been fixed for 2019-10-09 in New York; to coincide with the NAB NY event. The aim is to create a roadmap for the work.



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

The General Scope as applied to the packaging of media elements, to facilitate interchange and interoperability of formats within specific integrated application ecosystems in the professional fields of media creation, production, post-production archiving and related topics.

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

IMF Document Maintenance DG

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

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

Contact TC Chairs for access to the GitHub repository:

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

The work of this group initiated multiple projects. Their current status:

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

Revision [Project](#)

Status: Comments from pre-FCD-ballot review are addressed and FCD ballot is about to start.

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

Revision [Project](#)

Status: Comments from pre-FCD-ballot review are addressed and FCD ballot is about to start.

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

Revision [Project](#)

Status: Comments from pre-FCD-ballot review are addressed and FCD ballot is about to start.

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

Revision [Project](#)

Status: Comments from pre-FCD-ballot review are addressed and FCD ballot is about to start.



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

Amendment [Project](#)

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

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

Status: Pre-FCD-ballot review completed 2019-07-12; no comments. The CD document is published on github for a public review period. This has enabled TSP 2121-4 to proceed – see below.

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

Revision [Project](#)

Status: WD under development. Introducing support for Digital Cinema DCDM was prioritized over HDR and a proposal to change the project scope will be brought forward by the proponents.

The TC held votes to reaffirm ST 2067-9 and ST 2067-200 and to reaffirm and stabilize ST 2067-30. The votes passed.

IMF Plugfest DG

The Plugfest DG has held several plugfests, the most recent was in London, 2019-05, at Amazon HQ. The group aims to have 2 plugfests per year, one in Europe and one in USA.

[Drafting Project](#)

Status: The SVP announced that another virtual plugfest is being planned and test vectors are in development.

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

IMF Audio Essence DG

This DG is working on the following projects:

ST 2067-xxx: IMF - Vocabulary and syntax for MCA Audio Content Kind and Element Kind

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

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

New document [Drafting Project](#)



Status: The group has decided to put this work on hold in favor of doing work on ST 377-4 [revision](#) and a new Controlled Vocabulary document in TC-31FS. This work will resume when that work is complete.

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

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

- Mapping of ST 2098-2 bitstream into IMF Track Files
- Mapping of ST 2098-2 bitstream into the IMF Composition as Virtual Tracks
- Extension mechanisms for adding metadata to the Track File containing the ST 2098-2 bitstream

Status: The document was published in the last quarter. This project will be closed.

IMF Application DPP WG

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

Status: The three documents in the projects below were submitted for TC review after a separate [amendment project](#) to add HLG to ST 2067-21 reached CD status and was made available for public review.

ER 2121-2: Application DPP Requirements Document

The DPP/NABA members have identified additional requirements for the use of J2K within the TSP 2121 family, which should be reflected in ER 2121-2. ER 2121-2 will be revised to reflect the new requirements.

Revision [Project](#)

Status: The revised document is published, the project will be disbanded.

ER 2121-3: DPP Audit of Business Requirements

Revise ER 2121-3 to note how requirements of revised ER 2121-2 are met by the TSP 2121 family of documents.

Revision [Project](#)

Status: The revised document is published, the project will be disbanded.

TSP 2121-4: Application Constraint DPP (JPEG 2000)

This Specification will constrain IMF Application #2E to define specific technical requirements which will be implemented in a common way for many broadcast and online users of IMF, whilst keeping aligned with the broader App #2E.

New Specification [Project](#)

Status: The document is published, the project will be disbanded.



SMPTE Standards Publications in the Last Quarter

10E Essence:

20F Film:

21DC Digital Cinema:

ST 430-1:2017 Am 1:2019 D-Cinema Operations – Key Delivery Message

ST 429-18:2019 D-Cinema Packaging - Immersive Audio Track File

ST 429-19:2019 D-Cinema Packaging — DCP Operational Constraints for Immersive Audio

ST 430-12:2014 Am1:2019 D-Cinema Operations – FSK Synchronization Signal

24TB Television & Broadband Media:

25CSS Cinema Sound Systems:

ST 2098-2:2019 Immersive Audio Bitstream Specification

30MR Metadata & Registers:

31FS File Formats & Systems:

ST 377-2:2019 MXF KLV-Encoded Extension Syntax (KXS)

RDD 50:2019 Avid DNxUncompressed – Packing definition and mapping to the MXF Generic Container

32NF Network & Facilities Architecture:

ST 2022-3:2019 Unidirectional Transport of Variable Bit Rate MPEG-2 Transport Streams on IP Networks

ST 2082-12:2019 4320-line and 2160-line Source Image and Ancillary Data Mapping for Quad-link 12G-SDI

ST 2082-11:2019 4320-line and 2160-line Source Image and Ancillary Data Mapping for Dual-link 12G-SDI

ST 2081-12:2019 4320-line and 2160-line Source Image and Ancillary Data Mapping for Dual-link 12G-SDI

ST 2110-22:2019 Professional Media Over Managed IP Networks: Constant Bit-Rate Compressed Video

ST 2109:2019 Format for Non-PCM Audio and Data in AES3 — Audio Metadata

EG 2111-2:2019 3/6/12 & 24 Gbit/s SDI Standards Roadmap

ST 2036-4:2019 Ultra High Definition Television – Multi-link 10 Gb/s Signal/Data Interface Using 12-Bit Width Container

ST 2108-2:2019 Vertical Ancillary Data Mapping of KLV Formatted HDR/WCG Metadata

34CS Media Systems, Control & Services:

OV 2021-0:2019 Broadcast Exchange Format — Roadmap for the 2021 Document Suite

35PM Media Packaging & Interchange:

ST 2067-201:2019 Immersive Audio Bitstream Level 0 Plug-in



Notes on this Report and the SMPTE Standards Process

All trademarks appearing herein are the property of their respective owners.

SMPTE Technology Committees (TCs) are tasked with the development and ongoing maintenance of engineering documents concerning Television, Broadband, Film and Digital Cinema. TCs are set up by the Standards Vice President (SVP) and are overseen by the Standards Committee (ST).

The standards process operates under the [SMPTE Standards Operations Manual \(OM\)](#) All participants must abide by these provisions.

Within Technology Committees, there may also be Working Groups (WGs), Study Groups (SGs) Drafting Groups (DGs) and Ad-Hoc Groups (AHGs).

The ‘Standards Community’ (SC) is a “parent group” that provides access to all Technology Committees. An SC meeting is held during each meeting round to convey information that is relevant to all TC’s, such as meeting logistics and registration information.

SMPTE Document Development Process

The document stages are:

WD = Working Draft

CD = Committee Draft **FCD** = Final Committee Draft

DP = Draft Publication, which initiates.....

ST Audit - a due-process check by the Standards Committee

SMPTE Document-Type Abbreviations

ST = Standard

RP = Recommended Practice

EG = Engineering Guideline

TSP = Technical Specification **RDD** = Registered Disclosure Document

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

SMPTE Document Review

The SMPTE Operations Manual calls for review of published documents:

- One Year after original publication - to check whether comments have been received during initial implementations and to revise if required

- At Five Year intervals after original publication - to check whether the provisions need to be revised

Options are: Revise; Reaffirm; Stabilize; Withdraw.

Other Notes

*This report describes each active **Project** in each TC. Occasionally, there is more than one project group working on a technology topic. In this case, those projects are grouped under a **Topic** headline.*

*SMPTE manages its standards documentation, meetings and ballots in an online system called **OLC**. It has a **Project View** that includes a publicly-accessible project summary page. It is used to state the project scope and details at the proposal stage and to track progress through to completion. In this report access to the project view is via a link [DG Project](#) or [Drafting Project](#) if there is more than one document in a DG.*