



STANDARDS QUARTERLY REPORT December 2024

Result of SMPTE[®] Technology Committee
Meetings (Online Only)

9th to 12th of December 2024



THE NEXT CENTURY

SMPTE® Standards Quarterly Report

This report comprises an Executive Summary followed by a [detailed description](#) of this round of Technical Committee meetings:

SMPTE Standards Committee Meetings 9 - 12 December 2024

Host: SMPTE Teams Call

Executive Summary

This Executive Summary lists new project proposals this quarter and provides a high-level view of project developments. More information on the status of the active projects can be found in the [detailed description](#) that follows this summary.

Seven SMPTE Technology Committees (TCs) scheduled meetings at this round (the subgroups mostly develop their projects by telecons).

There were 103 registrations for attendance over the four days.

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

Proposals for new SMPTE projects submitted in the last quarter			
Project Name	Type	Technology Committee	Approval Period Ends
ST 2094-xx DMCVT – Broadcast Application	New Standard	10E Essence	2024-10-08
RDD XX-Mapping Immersive Audio Bitstream into the MXF Generic Container	New RDD	31FS File Format	2024-10-16
ST-2110-41-FastMetadata	Amendment	32NF Network	2024-10-18
RP 2019-2 VC-3 Reference Materials	Revision	10E Essence	2024-11-14
ST-2019-1 VC-3	Revision	10E Essence	2024-11-14
ST xxxx Metadata Generated by LLMs: Contextual and Versioning Standards	New Standard	30MR Metadata	2024-11-20
ST xxxx Embeddings as Metadata: Contextual and Non-Human Readable Fields	New Standard	30MR Metadata	2024-11-20
ST xxxx AI Model Metadata and Creation of a Centralized Model Registry	New Standard	30MR Metadata	2024-11-20
ST 304 Broadcast Cameras — Hybrid Electrical and Fiber-Optic Connector	Revision	32NF Network	2024-11-29
PTP Best Practices for Professional Media Over Managed IP Networks	Change to be RP – was EG	32NF Network	2024-11-29
ST2067-201-IAB-Level0-Plugin	Revision	35PM Media Packaging	2024-12-16
ST 2067-21 (IMF App #2E)	Revision	35PM Media Packaging	2024-12-16

Professional Media over IP Projects

Professional Media over Managed IP Networks

This project group developed the ST 2110 suite that standardizes an interoperable system for professional media IP networks to transport separate video, audio, and associated data streams. [Details](#) Twelve parts of the suite are published, including recent revisions. An application document for fast metadata transport of audio metadata is also published.

A 2110 document is in development on Timing Planes for 2110 Streams, a document on the co-existence of VPID data and SDP data, and a revision to correct a small error in the fast metadata document. There are projects creating ST 2110 Protocol Implementation Conformance Statements (PICS) for most of the SMPTE 2110 suite documents. [Details](#)

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 this technology:

- The group that has organized ST 2059 “plugfests” has expanded its scope to write “best practices” documents; the first is underway. [Details](#).
- A revision of ST 2059-2 is being developed to reference — and harmonize with — the latest revision of the IEEE Precision Time Protocol standard. [Details](#)

A document on passing sync pulses over USB-C is well-advanced and should soon go to ballot.

Interoperable Master 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. The suite currently comprises 22 published SMPTE Documents - [Details](#).

There is work on IMF Output Profile List standards — a revision and 3 new standards. [Details](#)

There is new work on several IMF topics; new Application documents, Audio with Metadata, Auxiliary Image Sequence, Event-based Metadata, Virtual Track fingerprint. [Details](#)

SMPTE Video Compression Standards

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

The only work currently in progress is revision to VC-3 documents. [Details](#)

Cinema Projects

*IMF, above, is also highly relevant to the Cinema community.
The Cinema Group (27C) is handling the following work*

Cinema Sound Systems

This Working Group deals with improving the quality of sound in cinema presentations, through the standardization of technical practices from content creation dubbing stages to commercial outlets.

The TC has a working group on B-Chain Characteristics and Expectations, with drafting groups studying:

- Research on relevant Technical Documents
- In-situ Measurements and Testing (with sub-teams researching specific topics)

[Details](#)

Digital Cinema (D-Cinema)

This Group has published four large, multi-part document suites dealing with these topics:

- D-Cinema Distribution Master (428)
- D-Cinema Packaging (429)
- D-Cinema Operations (430)
- D-Cinema Quality (431)

Current projects include:

- Minimal Timed Text XML Requirements
- Japanese Subtitle Mastering
- Exhibition Display
- Digital Cinema Distribution Master - Packed Image

[Details](#)

DPX Projects

The HDR DPX standard was published in Q1 2019. There is ongoing work. [Details](#)

There is a new standard in development on Mapping DPX Picture Sequences into the MXF Generic Container. [Details](#)

Material Exchange Format – MXF

This file-based media format continues to develop with projects adding features and mappings to the MXF suite of standards or creating constraints for improved interoperability in a variety of application areas. There are currently 10 MXF-related projects in process. [Details](#)

They comprise:

- Text-based metadata carriage in MXF (revision)
- Mapping VC-6 into the MXF Generic Container
- Mapping VC-5 into the MXF Generic Container
- Mapping Audio Definition Model to MXF
- Mapping DPX files into the MXF Generic Container
- MXF Mappings for VI Lines and Ancillary Data Packets (revision)
- Extensible Time Label (TLX) in MXF via Descriptive Metadata Scheme for Compatible Time Labels (TLC) – 2 projects
- AVC into MXF Generic Container (revision)
- Mapping Immersive Audio Bitstream into the MXF Generic Container
- Descriptive Metadata Scheme for Identity and Integrity

Media Microservices

This group has a project in the public Committee Draft stage - IMF Registration Service API. Its Status Reporting and Logging document has just completed ballot. There is a Job Processing Architecture document in development and a new suite of documents for the Catena control interface. [Details](#)

Extensible Time Label (TLX)

This group has developed a Standard suite 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 such as a "Digital Birth Certificate" including a Source Ident. [Details](#)

Two documents to define KLV Encoding and MXF Mapping for TLX are underway. [Details](#)

Metadata and Registers

This TC (and its predecessor) has been maintaining metadata ULs on behalf of other SMPTE TCs and industry organizations for many years. Its systems were upgraded to use xml rather than spreadsheets, and an additional register was standardized for Essence elements keys. It 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 is studying this topic and its report, ER 1010, is now published [here](#). The task force continues to meet to consider standardization requirements, and it has instigated three AI metadata projects. [Details](#).

Other Projects

A very large number of SMPTE Standards projects are active — too many to cover in an executive summary even though they may be important to implementers. SMPTE has a searchable, publicly available [project summary page](#) that should help locate topics of interest that can then be followed up in the main body of this report.

SMPTE® Standards Quarterly Report

[Detailed Account](#)

SMPTE Standards Committee Meetings 9 - 12 December 2024

Host: SMPTE Teams Call

SMPTE® is a global leader in motion-imaging technology standards and education for the communications, media and entertainment industries — and the only organization to connect the areas of motion-imaging research, standardization, education, and business success.

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 see [this website page](#) or 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 Sally Hattori and Thomas Bause Mason respectively. At the start of 2025, the Standards VP position will pass from Sally to Raymond Yeung.

There are six Standards Directors, currently Pierre Lemieux, Thomas Kernan, Florian Schleich, Steve Llamb, Dean Bullock, Raymond Yeung.

Each round comprises meetings of Technology Committees (detail in the sections below) as well as any subgroups whose work requires face-to-face meetings. Subgroup work also proceeds continuously between the quarterly meetings using teleconferences.

If you need 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:

- Q1 2025 3-6 March Online
- Q2 2025 1-3 June; Imagica, Tokyo, JP
- Q3 2025 17-19 September Europe
- Q4 2025 December Online

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

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

[Cinema \(27C\)](#)

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

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

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

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

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

Links to each TC report section 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](#).

In addition to the TC meetings, there was a Standards Community meeting that covered:

- Future meetings schedule
- 2025 Media Technology Summit details
- HTML editing
- Study Group and Taskforce Updates (Sustainability, AI in Media)
- Library App
- Publication Update
- Change of Standards VP

The SMPTE website now has a [summary projects page](#) publicly available.

Details from each Technology Committee (TC) meeting

Essence Technology Committee (TC-10E) Chair: Fred Walls

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: Common LUT Format – ST 2136 suite

The Common LUT Format (CLF) can communicate an arbitrary chain of color operators (also called processing nodes) which are sequentially processed to achieve an end result.

The work will be based on an existing CLF specification developed by the Academy (AMPAS), available at <https://docs.acescentral.com/specifications/clf>

Current project:

ST 2136-1: Common LUT Format

Status: The DG has held 4 meetings in the last quarter; the next meeting will be 2024-12-17. A draft standard and xml schema were submitted for pre-FCD-ballot review that closed 2024-11-29 with 4 comments.

ST 2136-10: CLF Broadcast Profiles

A project proposal is planned for this new Part to the suite for profiles supporting live broadcast workflows.

DG: Measurement Methods for Resolution Characteristics of Camera Systems

Current project:

RP 2130 - 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).

Status: The DG Chair gave a presentation explaining techniques available and the DG's preference for a Wedge Edge Chart (with multiple wedge angles) and the process of deriving a figure for Modulation Transfer Function.

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.

Status: There was no report.

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.

Status: There was no report. The 2080-4 work will take priority.

DG: IPT-PQ

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 (scope now modified to only cover IPT-PQ-C2 and not IPT-PQ-C0), and that the characteristics are standardized.

Current project:

ST 2128 - IPT-PQ color representation.

Status: A package will be put together that resolves FCD ballot comments.

Revision: SMPTE 2046 Suite

Published Documents:

ST 2046-1:2009 - Specifications for Safe Action and Safe Title Areas for Television

RP 2046-2:2009 - Safe Areas for Protection of Alternate Aspect Ratios

EG 2046-3:2010 - Safe Areas for Television

Current projects:

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

Add Safe areas for UHD image formats. Update normative references.

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

Add Safe areas for UHD image formats. Update normative references.

*Status: There was no report.***DG: SMPTE 2073 Document Suite: VC-5 Video Essence**

This group standardizes the CineForm / GoPro video compression system.

Published documents:

OV 2073-0 - Document Suite Overview

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 2073-7 - VC-5 Metadata

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

*Status: There was a motion to close this group, as all existing 10E work is complete. It passed without objection.**Test materials are available on a GitHub [repo](#).**A VC-5 codec website (not part of SMPTE) is available at <https://vc5codec.org>**An IMF application is underway in [TC-35PM](#). And a [project](#) to revise ST 2073-10, the MXF wrapper, in TC-31FS.**A VC-5 "[landing page](#)" is available on the SMPTE website.*

Revision: ST 96:2004 Scanned Image Area

Update to current practices for diagrams, graphics, file formats, and conformance language. In particular, SVG graphics are needed instead of the current low-resolution images.

Status: There has been no progress in the last quarter – the MTF project above is taking priority. The document will be developed in HTML format.

Image Line Numbering

This will be a new document, probably an Engineering Guideline, explaining SMPTE practice for line numbering for video formats. In analog standards, the first line was numbered 1. In digital standards, the first line was numbered 0.

Status: There was no report.

Measurement of Video Display Reflectance

The text will be extracted from the present ST 2080-4 draft.

RP xxxx: Measurement of Video Display Reflectance

Status: There was no report.

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

Status: There was no report.

Revision of ST 2048 suite

These are routine revisions arising from 5-year reviews. Part 1 will have an amendment rolled-up. All parts will have their Normative References updated. The “road-map” figure will be replaced with bibliographic reference to the EG 2111 suite.

Status: Part 1 was published in the last quarter. Stop press: Parts 2 and 3 were published the day after the meeting.

Revision: ST 2048-1:2011 2048 × 1080 and 4096 × 2160 Digital Cinematography Production Image Formats FS/709

Revision: ST 2048-2:2011 2048 × 1080 Digital Cinematography Production Image FS/709 Formatting for Serial Digital Interface

Revision: ST 2048-3:2012 - SMPTE Standard – 4096 × 2160 Digital Cinematography Production Image Formats FS/709 — Mapping into Multi-link 10 Gb/s Serial Signal/Data Interface

DG: ST 2094-50 DMCVT – Broadcast Application

The broadcast industry has identified the use of diffuse white (or Reference White) metadata value as an anchor point for video transformations (tone mapping) HDR content to different target displays, HDR or SDR. With knowledge of diffuse white during content creation, a target display can more optimally compress highlights above diffuse white (highlights and speculars), preserving additional detail. Specifically, when diffuse white is used in conjunction with the mastering display color volume metadata:

- PQ contents can benefit from optimal static or dynamic highlight compression when using a knee above diffuse white.
- HLG content receives similar advantages from the identification of the gamma adapted state of the mastering displays EOTF, which is based on its peak brightness capabilities. By including mastering display color volume metadata (MDCV) and nominal diffuse white (ndwt) metadata, an optimized conversion from HLG to PQ, or SDR is possible.

Once the diffuse white metadata (and possibly other items) is standardized, the values set at mastering or live capture can be carried in the media essence and subsequently encoded in video imagery for broadcast.

Status: The DG has been formed and is working on comments submitted during the project proposal.

DG: VC-3 Revision

Current Projects:

Revision of ST 2019-1 VC-3 Improvements and New Profiles

There are 3 major areas where the VC-3 family of standards requires attention:

1. Recent work with a VC-3 implementation triggered a careful revision of the standard and produced a significant number of relevant improvements and clarifications that should be included in the standard, that have no backward-compatibility issues but will improve interoperability.
2. Add 2 new profiles which will allow usage of RGB signals in other quality bitrates, such as HQ and SQ. This is a fully backward-compatible change.
3. Integrate Amd.1 in the document.



Revision of RP 2019-2 VC-3 Reference Materials Update

As a result of the changes to SMPTE 2019-1 to Improve and add New Profiles, RP 2019-2 also needs to be updated, providing a fresh reference decoder and test materials.

Status (both): A working draft for each document is available. The DG will hold its kick-off meeting 2024-12-19 or 20.

Other TC-10E business

There was a brief introduction to a project that is in preparation – Visible Difference Predictors.

Cinema Technology Committee (TC-27C) Chairs: Steve LLamb and C J Flynn

The application of the general scope as it applies to theatrical distribution, reproduction and operations, both analog and digital.

WG: Document Maintenance (WG27C-10)

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

Status: A large number of document revisions from this group have recently been published. The group will meet later in the meeting week.

Revision RP 200:2012 - 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 include Immersive Audio – to Include D-Cinema immersive audio objects and bed channels in an unambiguous manner. This practice specifies a measurement method and wideband sound pressure levels for motion-picture dubbing theatres, review rooms, and indoor theaters using steady state wideband pink noise methodology, aligned with ST 2095-1. Together with SMPTE ST 202, it is intended to assist in standardization of reproduction of motion-picture sound in such rooms.

Status: The group is working with HQ on editorial issues and getting the document formatted into the HTML template. The resulting document will be posted to the group and then moved to pre-FCD-ballot review.

SG: D-Cinema Origins Study Group Final Report Archival Effort

Researchers of media and technology history need widely accessible primary source documents to reference in order to accurately recreate milestones in technology and to utilize them in the consideration of future requirements.

There was no published Final Report of the Digital Cinema Study Group, or any collected components of the work of the subcommittees, which should be available for reference and historical significance.

Status: A number of seemingly “final” drafts have been received. The first version of the SG report has been submitted and a second version will be assembled. At the meeting, the idea of simply creating an archive rather than a report was considered.

WG: Sound (WG27C-20)

Current WG project:

RP xxxx – B Chain Characteristics and Expectations

The Working Group output will be a Recommended Practice derived from the results of DGs efforts (see below). There is consideration of producing an Engineering Guideline as well.

The Drafting Groups are:

DG: In-situ Measurements and Testing

Re-examine the system parameters that need to be measured and develop new and easily accessible measurement techniques (emphasis on repeatability).

Status: An Action Item to align the current project organization has been completed. Sub-Teams have been meeting on topics for development of Objective Metrics (all meet bi-weekly):

- *Linearity and coherence testing team – testing several concepts, reworking tests and creating new variations on what has been learned*
- *Coverage, level, consistency, timbre team – largely in Research stage on existing documents and reviewing standards and research papers*
- *Dialogue intelligibility team – continue developing tests (word lists, sentence lists, music and EFX beds)*
- *Clip Analysis team – Subjective listening testing of known difficult-to-handle movie clips*

DG: Technical Documents Research

DG is tasked with researching existing documents, standards and research papers pertaining to sound system performance and measurements – with the goal inherent within all DGs - of correlating Perception and Measurement with the potential of modern computers and algorithms.

Status: The group has been on hiatus, as lead drivers have been working on other B-Chain projects. Editing is in progress.

SG: Exhibition Display

The study group shall investigate the needs and wants of the various concerned parties – e.g., DCI, Exhibitors, Manufacturers, Distribution Partners, Installers, QC Testers.

It will investigate Projection and LED displays that now reach into the ITU-R Rec BT.2020 color space and use ITU-R Rec BT.2100 transfer functions, and the implications of their use in various combinations in current and future infrastructures.

Status: No status report, but editing is in progress.

Current Document:

Engineering Report

The report will identify existing SMPTE documents that will need revision to include the new capabilities. It will recommend any further work to plug gaps.

DG: Stereoscopic Subtitling

Note: this DG also looks after non-stereoscopic subtitle projects.

Current Projects:

EG 428-23 Mastering Guideline for Japanese Timed Text DCDM

Creation of a guideline document for XML DCDM mastering of Japanese Timed Text to achieve desired results in current ST 428-7 renderers.

Status: EG 428-23 has completed PCD [here](#). Update work is underway on comments received (html tooling had to be edited as conformance language was present).

RP 428-22 D-Cinema Distribution Master – Minimal Timed Text XML Requirements

A new recommended practice to create a “blank” ST 428-7 DCDM Subtitle file (Minimal Timed Text XML Requirements).

Status: A comment was received during pre-DP-ballot review; work is ongoing.

DG: DCDM Packed Image (pDCDM)

Digital Cinema Distribution Master (DCDM) image essence is regularly exchanged between post-production facilities, typically using the constrained TIFF files specified at SMPTE RP 428-5. Such exchange is time-consuming and costly because of the size of these files – on the order of 10 TB for a motion picture.

ST 428-24 D-Cinema Distribution Master — Packed Image (pDCDM)

This document specifies a mapping of DCDM images, as specified in SMPTE ST 428-1, into mathematically lossless JPEG 2000 codestreams, each called a packed image.

Status: Passed DP vote 2024-11-21 and ST Audit requested.

Metadata and Registers Committee (30MR) Chairs: Bill Redmann and Dean Bullock

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.

Status: The SG continues to explore how UMID can contribute to “material” identity and integrity (relates to DMS-II project in 31FS).

DG: UMID-related Standards

Current project:

Revision RP 205 – UMID Applications

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

Status: During preparation for publication some issues were discovered and at the last meeting it was agreed that RP 205 would have a second FCD ballot. The draft is being developed and reviewed.

SG: 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.

Status: The SG continues to hold bi-weekly telecons. Work on the draft report is continuing.

DG: AI Model Metadata

The drafting group will develop the following three standards:

ST xxxx Metadata Generated by LLMs: Contextual and Versioning Standards

ST xxxx Embeddings as Metadata: Contextual and Non-Human Readable Fields

ST xxxx AI Model Metadata and Creation of a Centralized Model Registry [Walls]

Status (all): The three projects have just completed their approval stage. The DG will hold its kick-off meeting 2025-01-06.

WG 30MR10: Metadata Definition

This Working Group coordinates 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 ST 2123 register release is available online [here](#).

Published Documents:

ST 335:2012 - SMPTE Standard - Metadata Element Dictionary Structure and Amendment 1 2019

ST 395:2014 - SMPTE Standard - Metadata Groups Register

ST 400:2012 - SMPTE Standard - SMPTE Labels Structure

ST 2003:2012 - SMPTE Standard - Types Dictionary Structure

ST 2088:2019 - SMPTE Standard - Essence Element Key Register Structure

ST 2123:2023-04 - SMPTE Standard - SMPTE Metadata Registers (“Jalapeno” release)

The Metadata Registers are publicly available here: <https://registry.smpte-ra.org/pages/>

Current projects:

Revision ST 2123 SMPTE Metadata Registers

Adding requested Universal Labels to the registers that comprise ST 2123 - SMPTE Metadata Registers.

Status: The ST 2123 “Jalapeno” release was published, and the xml registers released [here](#) on SMPTE-RA 2024-05-27.

The next planned release, “Balsamico”, is at pre-FCD-ballot review, closing 2024-12-19. Codenames for the next two releases are “Vegemite” and “Hoisin”.

Requested UL additions are being processed for the Vegemite release.

There are WG 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.

Revision ST 335 Metadata Element Dictionary Structure

Normalize to AG18

Revision ST 395 Metadata Groups Register Structure

Normalize to AG18

Revision ST 400 SMPTE Labels Structure

Normalize to AG18

Revision ST 2003 Types Dictionary Structure

Normalize to AG18

Status: ST 335 FCD ballot passed 2022-07-18 with no comments and the document was automatically elevated to DP status. FCD ballot of the other three documents closed 2024-08-20. ST 395 had 53 comments, ST 400 had 2 comments, ST 2003 had 5 comments. Comment resolution is the next step. Many comments were editorial, and it was recognized that some apply to ST 335. Consequently, reballot of ST 335 is most likely.

File Formats and Systems Committee (31FS) Chair: Wolfgang Ruppel

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.

Revision: RP 2057 - Text-based metadata carriage in MXF

This is a constrained revision to roll up an amendment and check Normative References. However, the document is also being revised in line with AG24 – MXF Style Guide.

Status: The draft revision of RP 2057 passed FCD ballot on 2018-02-09 with 5 comments to resolve. The document author has migrated the document to HTML and is generating code directly from the SMPTE-RA data (to ensure consistency) and an MXF vocabulary. The work is progressing.

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

Current project:

ST2117-10- Mapping ST 2117-1 (VC-6) into the MXF Generic Container

Status: The document is published and the group will be closed. The PCD version will be removed.

DG: ST 2073-10 mapping ST 2073 into MXF

Current project:

Revision ST 2073-10 - Mapping VC-5 Video Essence into the MXF Generic Container

Current version omits capabilities from VC-5 document revisions that have been published after ST 2073-10 was published.

Status: Work on ST 2073-10 revision has begun in bi-weekly meetings. The new features that are being reviewed for inclusion are Layers, Sections, and Metadata (though it may not be necessary to expose all these in the Mapping).

DG: TLX and TLC MXF mapping

Status: The DG has held 2 meetings in the last quarter. It is not planning a Public CD for these documents.

Current Projects:

ST 2120-4 – Carriage of TLX in DMS-TLC (was Mapping TLX into MXF and KLV)

TLX is Extensible Time Label, ST 2120 parts 1-3 that have just completed FCD ballot in this [TC-32NF DG](#). This document defines TLX-KLV elements in accordance with 377-1 to assure useability within MXF. The DG does not want a PCD phase for this document.

Status: There is no working draft yet as it has been dependent on mapping TLX components into “TLC”, a more generic structure; see the next project (ST 2134) below. It is also waiting for ST 2120-2 in TC-32NF to stabilize.

ST 2134: Descriptive Metadata Scheme for Compatible Time Labels (TLC)

Specify an architecture to support multiple schemes for time labels and for collections of time labels that is compatible with MXF and KLV and permits the representation and serialization of these labels in MXF, KLV, XML and JSON. Specify at least one such scheme (besides TLX).

Status: Pre-DP-vote review concluded 2024-12-06 with no comments. At the meeting, a DP elevation vote was held. The vote passed without opposition.

DG: ST 2131 - Mapping ADM to MXF

ADM = Audio Definition Model. Defines a means of mapping audio metadata RIFF chunks to MXF with specific consideration of the requirements related to ADM metadata – mapping ST 2067-204 to MXF in the same way that ST 2127 maps ST 2067-203 into MXF. There has been close collaboration and overlap with “35PM DG IMF Audio with Metadata”.

Status: Progress has been slightly delayed; the DG expects to make progress in the coming quarter. Public CD comment period closed (on GitHub [here](#), ST 2131 + MXF and WAV sample files). The DG received useful additions for the document to prepare it for the FCD ballot package.

WG: MXF-related Documents Maintenance

Formed at the 2021-08 meeting to manage maintenance of MXF documents.

Status: The group is preparing one-year and five-year review disposition recommendations on documents and assistance was given during the TC meeting.

Revision-ST-381-3-AVC into MXF Generic Container

Status: The revision passed DP vote 2024-12-06 and an ST Audit package is being prepared.

DG: Revision of ST 436-1 MXF Mappings for VI Lines and Ancillary Data Packets

Update the normative references and make any additional editorial adjustments required.

Status: Contributions to the WD have been received and the template has been updated. The DG Chair hopes to get to FCD ballot soon.

DG: Mapping DPX files into the MXF Generic Container

Project Scope: Specify mapping of a sequence of DPX pictures as defined by SMPTE ST 268-1 and SMPTE ST 268-2 into the MXF Generic Container. DPX sequence handling could be simpler if wrapped into a container and MXF is the container of choice. MXF+DPX solves many issues for both standards.

Includes:

- Define frame/clip wrapping for SMPTE ST 268-1 & ST 268-2
- Define necessary SMPTE Registry ULs for DPX into MXF identification
- Define basic constraints on DPX sequences that can be mapped into MXF
- Allow future extensions and constraints for specific applications
- Support advanced colorimetry and bit depth as defined in ST 268-2

Status: No DG activity in the last quarter, some work on draft. Core constraints defined; ULs defined; Frame/Clip wrapping modes defined; Mapping/Helper tables provided for implementers.

RDD 60-Mapping IAB into the MXF Generic Container

Standards and guidance already exist for mapping Immersive Audio Bitstream essence into MXF for D-Cinema and IMF applications. *This document* defines a baseline method of mapping IAB essence to the MXF generic container in a manner compatible with requirements for broadcast in-house archival and repository file formats.

This new project completed approval 2024-10-16. ULs have been requested, and the project awaits 30MR review / approval.

DG: Descriptive Metadata Scheme for Identity and Integrity

There is a current requirement for Identity and Integrity Metadata to be carried in professional media files throughout the production process. Professional media file formats include at least ST 377 MXF.

This metadata must be inserted as soon as it is available (as early as camera crew assignment) and must persist throughout the production chain - through Ingest, Editing, Packaging and Payout. At each stage of the production chain, media and metadata must be able to be augmented and modified.

Current Project:

ST 2140-1 Descriptive Metadata Scheme for Identity and Integrity

The DMS-II project will develop and document an architecture, a data model and a detailed specification to carry Identity and Integrity metadata in ST 377 MXF files using the ST 336 KLV Protocol.

The data model and specification will include the categories listed above.

The specification for bindings will address MXF media structures including I frame and long GOP media and Frame wrapped, Clip wrapped and Partitioned files.

Status: The group has held 3 well-attended meetings in the last quarter. ST 2140-1 will address Architecture, Data Model, Representations, and Bindings. Suitable UML tooling is being selected.

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 (Rev. 1 published 2017)

Part 1 has also been published by ISO as a Publicly Available Specification; ISO/IEC DIS 12034-1.

Status: The Working Group meets weekly.

Current projects:

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

This part creates “Wrapped” AXF Objects. 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.

Status: No major progress in last quarter (focus has been on Open-Source project). The document is awaiting update of XSD file to match text and update of UML diagrams.

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

Part 2 covers the use of AXF Structures in “Unwrapped” form, enabling aggregation of files into a “Bundle”. It is useful in workflows. 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.

Status: Part 2 is in abeyance until the open-source work is completed. The WG has studied workflows to include in the consideration of requirements. A conceptual model has been completed. 49 Use Cases have been identified and have led to revisions to ST 2034-1.

AXFlib – Open-Source Toolkit for AXF

The availability of Open-Source Code should increase AXF Traction - Small Archives and Libraries cannot afford large-scale systems, but they are interested in applying AXF.

Wider availability of AXF systems helps large vendors, too; it increases confidence of long-term AXF support. It helps assure recoverability of large investments in libraries.

Issues such as ownership and licensing need to be decided (and could form a model for SMPTE)

Status: The group is continuing to work through details on establishing this toolkit.

DG: JSON Representation of SMPTE Registered Data (RegJSON)

Specify an isomorphic (reversible) mapping of SMPTE metadata to JSON, following the approach of defining mapping rules and normative schemas as employed for ST 2001 XML Representation of SMPTE Registered Data (Reg-XML). The public CD process will be used.

ST 2135 JSON Representation of SMPTE Registered Data

Status: Progress on the WD has been impacted by other work. Work will resume 2025-01, with monthly meetings.

DG: Constrained DPX for HDR

Published documents:

ST 268-2 - Constrained Application of Digital Moving-Picture Exchange (DPX) Format for High Dynamic Range (including Amendment 1, also published)

ST 268-3 Reference Materials for DPX V2.0 HDR Implementations

Current projects:

Revision RP 268-3 - Reference Materials for DPX V2.0 HDR Implementations

Project scope: A revision project has been initiated to support the newly-defined FP16 format from the ST 268-2 revision.

Status: The DG has been in the process of modifying the reference software accordingly (including changes to the interface functions for better memory efficiency). Modifications believed complete. New FP16 example images will be added. Some issues in the current reference materials will also be fixed.

Other TC-31FS business

The TC received a new request for a new RDD project:

Material Exchange Format (MXF) - Mapping Immersive Audio Bitstream into the MXF Generic Container for Repository File Formats.

Network and Facilities Architecture Committee (32NF) Chairs: [Ievgen Kostiukevych](#) and [Bruce Devlin](#)

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:

Develop and maintain SMPTE documents related to electrical and optical SDI interfaces, including SDI, HD-SDI, and Ultra HD-SDI interfaces. Provide input on one- and five-year reviews, revise existing documents as directed, and develop new documents when needed.

Status: The WG does not have any current projects.

WG: Video Over IP

This Working Group (32NF60) handles projects related to IP transport of media.

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:

- OV 2110-0 – Roadmap for the 2110 Document Suite
- ST 2110-10 – System Timing and Definitions
- ST 2110-20 – Uncompressed Active Video
- ST 2110-21 – Traffic Shaping and Delivery Timing for Video
- ST 2110-22 – Constant Bit Rate Compressed Video
- RP 2110-23 – Single Video Essence Transport over Multiple ST 2110-20 Streams
- RP 2110-24 – Standard Definition Video in ST 2110
- RP 2110-25 – Measurement Practices (related to ST 2110 video, audio, ancillary data streams)
- ST 2110-30 – PCM Digital Audio
- ST 2110-31 – AES3 Transparent Transport
- ST 2110-40 – SMPTE ST 291-1 Ancillary Data
- ST 2110-41 – Fast Metadata eXpress (FMX)
- ST 2110-43 – Timed Text Markup Language for Captions and Subtitles
- ST 2127-2 – Mapping MGA Audio Metadata to ST 2110-41

Status of DG: Revisions to parts 10, 20, 21, 22, 24, 31, 40 have been published as well as publication of new documents RP 2110-25, ST 2110-41, and ST 2127-2.

Current projects:

RP 2110-11 – SMPTE 2110 System Timing Planes

This practice will specify additional behaviors of media devices using controls available in ST 2110-10. While 2110 suite documents describe device interfaces, some additional practices are required to address inter-essence timing alignment at a system level.

Status: Regular bi-weekly meetings will resume following a hiatus.

Revision: ST 2110-30 – PCM Digital Audio

Scope-limited revision to update the reference to AES67-2018 to allow reference to the PICS contained in that revision of AES67. If other improvements are identified by the PICS team, they will be included.

Status: The document is at FCD ballot, closing 2024-12-20.

ST 2110-41 – Fast Metadata eXpress (FMX)

An RTP Payload Format for general metadata objects. Intended for transporting any metadata that did not originate as ST 291 ancillary data. Each type of metadata needs a defining document (SMPTE or other).

Supports “tightly-bound” metadata (associated to an essence stream) as well as other metadata with no specific relationship to an essence stream.

Status: The document is published. However, an error in an Annex has been identified and a revision is underway. It will implement the recommendations contained in [this advisory note](#). It is expected that the revised document will be available for FCD shortly.

A register for ST 2110-41 Data Item Types has been set up [here](#).

ST 2127-2 - Mapping MGA Audio Metadata to ST 2110-41

Provide a standard for mapping Metadata-Guided Audio (MGA) Audio Metadata, as defined in SMPTE ST 2127-1, to the SMPTE ST 2110-41 Fast Metadata framework.

Status: The document is published (kept here for its relationship to ST 2110-41). It also has a Data Item Type registration [here](#).

RP 2110-xx - VPID-SDP Interplay

Most SDI signals, by rule, include a VPID (Video Payload Identifier) within the ancillary data space. Within the ST 2110 system, information about the video signals is conveyed through management systems using SDP objects, and this information includes some of the data that also exists in the VPID. This document establishes recommended practices for the interplay of SDP and VPID information in ST 2110 systems.

Status: The project completed the approval period 2024-06-24. An outline approach has been proposed to the WG, and comments have been received.

DG: RP 2110-1xx's - Protocol Implementation Conformance Statements (PICs) for ST 2110 Suite

A PICS functions like a conformance checklist that implementers can complete. Each PICS document is numbered 100 greater than the document it applies to – e.g., RP 2110-110 applies to ST 2110-10. The group provided feedback to the 2110 DG, which was processed as late comments in the one-year-review versions of these documents.

Status: There was no report at this meeting round. The situation at the last meeting was as follows: Parts 110, 120, 121, 122 closed FCD ballot 2023-06 with no comments and were automatically elevated to DP status. FCD ballot of parts 124, 131, 140, 143 closed 2023-11-29 with 4,3,3,0 comments, respectively. However, a comment about using dated references vs undated references has held up progress on these documents. Part 130 awaits completion of ST 2110-30 revision.

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 (revision published in 2023)

RP 2059-15 - YANG Data Model for ST 2059-2 PTP Device Monitoring in Professional Broadcast Applications

Current DGs and projects:

DG: ST 2059 Suite Revisions

The DG meets bi-weekly and currently has the following project:

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

Investigate how ST 2059-2 could be made compatible with the 2019 version of IEEE 1588 without breaking existing implementations. Two issues have already been uncovered that impact ST 2059-2: Mixed unicast/multicast mode delay request message rate signaling and TLV messages.

Status: The objectives of the revision are:

- *Achieve compliance with IEEE Std 1588-2019 (PTP V2.1)*
- *Allow for backward compatibility with current version of ST 2059-2*
- *Allow installations to migrate gradually from current version of ST 2059-2 to new version*
- *Allow use of new features of PTP V2.1*

Revised ST 2059-2 document completed pre-FCD review in August and DG is currently working on changes to the document based on review feedback.

This document is ready to go to public CD; this should occur 2025-01.

DG: ST 2059 PTP Interoperability and Best Practices

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.

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](#).

The DG recently extended its scope to include documenting best practices.

Status: The DG will continue looking for opportunities for small focused interops for specific standards

- *YANG Model – RP 2059-15*
- *ST 2059 new TLV and backwards compatibility*
- *ST 2059 security*
- *Possible remote virtual events*

Current Projects:

RP 2059-14: PTP Best Practices for Professional Media Over Managed IP Networks

Status: The DG submitted a project change to make this a Recommended Practice rather than an Engineering Guideline; the change completed approval without comment 2024-11-29. The document is taking shape.

DG: ST 2120: Extensible Time Label (TLX)

Create a basic Time Label with a defined mechanism for registration of additional fields. There is associated MXF work in this [File Systems technology committee DG](#).

Current Projects:

ST 2120-1 – Extensible Time Label – TLX Structure**ST 2120-2 – Extensible Time Label – TLX Items** (includes a JSON schema element ST 2120-2a)**RP 2120-3 – Extensible Time Label – TLX Profiles** (includes a JSON schema element ST 2120-3a)

Status: The three documents above passed FCD ballot 2022-12-26.

Part 1 was reballoted at FCD. It passed 2024-09-26 with 43 comments. 22 are editorial and have been addressed. The remaining 21 are substantive and comment resolution is underway.

Part 2 has 36 comments (11 addressed), and Part 3 has 25 comments (22 addressed). Comment resolution is paused to consider whether comments on the reballot of Part 1 affect these two documents.

DG: UTC-aligned Timecode

Current Project:

ST 12-4 – UTC Aligned Timecode

Develop algorithms and methods to accurately relate the timecode date, time, and metadata to PTP referenced time for both integer and fraction frame rates.

Define the binary group coding of the date, UTC offset and optionally the rate and higher rate metadata utilizing ST 262 or ST 309.

Develop a new standard to document for the new timecode generation process

Status: The document passed FCD ballot 2024-10-16 with 43 comments to resolve. Comment resolution is well-advanced.

DG: Signal Sync Alternate Mode

Current Project:

ST 2139 - Signal Sync Alternate Mode

Enable transport of timing signals using a USB-C Alt mode. This would enable devices that have only USB-C connections to join systems that use, e.g., the sync signal defined in SMPTE 274:2008, Clause 10.

Status: The WD has been developed over the last quarter and has been submitted to the TC for pre-FCD ballot review, closing 2024-12-20. A public CD is planned. The DG Chair will contact USB-IF to obtain an Alt Mode Standards ID for signal sync.

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!

Status: A project proposal is awaited to restart development of ST 2041-4 – MPEG H Data in AES3. The 32NF document maintenance group has proposed an amendment roll-up for ST 338; a project proposal is awaited.

WG: 32NF Document Maintenance Group

This group holds bi-weekly meetings to address issues reported on GitHub and to make the process easier to use. It also works on one-year and five-year document reviews. There are 6 GitHub repos, and more are needed:

ST 299-1 GitHub	ST 2022-1 GitHub	ST 2059-2 GitHub	ST 2110-10 GitHub
RP 2110-23 GitHub	ST 2110-30 GitHub		

Status: The TC debated ways to deal with document maintenance for the very large number of documents for which TC-32NF is responsible. The WG is still looking for a Chair.

Media Systems, Control and Services Committee (34CS) Chair: Karyn Reid

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 signaling and control mechanisms.

DG: 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.

Status: There has been no progress in the last quarter as the DG Chair has focused on associated TC-30MR UMID work.

DG: BXF Suite of Documents

Published documents:

- OV 2021-0: Roadmap for the 2021 Document Suite
- 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 8.1.

Status: The group anticipates working on BXF 9.0 when there is a critical mass of new items; currently the group's work is paused.

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

This group will explore prospective Media Industry layering models and standards requirements for interoperability of production applications running on IP-based media networks.

Status: The TC is reviewing how to deal with areas of the report that are outdated.

DG: Media Microservices

This group has been managing Microservices projects submitted to SMPTE from the Open Services Alliance (OSA). The OSA has been merged into the SMPTE RIS activity – Rapid Industry Solutions.

Status: Topics for future work are being developed in RIS-OSA. Currently they are: Best Practices for Live Stream Distribution, (followed by) Global Service Repository.

Projects currently underway:

ST 2125 – IMF Registration Service API

This project facilitates the use of IMF packages.

Status: Issued as public CD document [on this page](#). The DG has decided to revise the Public CD and submit the revision for a second public CD period. The DG believes it can change JSON Schema to an informative reference, collect updates from the document editor, and then proceed to FCD.

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 protocols.

Status: Issued as public CD document [on this page](#) (comment period now closed). It now includes terms harmonized with the terminology project. ST 2126 closed pre-DP-vote review 2024-11-21 with one editorial comment.

Media Microservices Terminology

Provides definitions for terminology used in the other Microservices documents.

Status: This project is proceeding as an online vocabulary resource on the SMPTE website; implementation is underway.

ST 2133 - Job Processing Architecture

Aims to overcome variations in existing Job Processing Architectures that cause interoperability problems.

Status: Pre-FCD-ballot review closed 2024-06-06 with no comments. It should be posted as a public CD shortly.

Catena Projects

Catena is a media resource control system. It will be a multi-part suite, with the following projects approved:

ST 2138-10 – Catena Model

ST 2138-11 – Catena gRPC Connection

ST 2138-12 – Catena REST Connection

ST 2138-13 – Catena WSS Connection

Status: The above projects await finalization within RIS-OSA. There is also ST 2138-50 - Security underway in RIS-OSA. The proponent has a Catena GitHub repo at <https://github.com/rossvideo>

Media Packaging and Interchange Committee (35PM) Chair: JoAnne Kim

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.

Status: The DG does not currently have any documents in maintenance.

Published Interoperable Mastering Format documents:

- OV 2067-0 - Interoperable Master Format
- ST 2067-2 - Core Constraints
- ST 2067-3 - Composition Playlist
- ST 2067-5 - Essence Component
- ST 2067-8 - Common Audio Labels
- ST 2067-9 - Sidecar Composition Map
- ST 2067-20 - Application #2 (Withdrawn)
- ST 2067-21 - Application #2E
- ST 2067-30 - Application #3
- ST 2067-40 - Application #4 Cinema Mezzanine
- ST 2067-50 - Application #5 ACES
- ST 2067-60 - Application #6 UHD TV Program Workflow (AVC)
- ST 2067-70 - Application SMPTE ST 2019-1 (VC-3)
- ST 2067-71 - Application SMPTE ST 2117-1 (VC-6)
- RDD 45 - Application ProRes
- RDD 59-1 - Application Constraint DPP (ProRes)

ST 2067-100 - Output Profile List

ST 2067-101 - Output Profile List - Common Image Definitions and Macros

ST 2067-102 - Output Profile List - Common Image Pixel Color Schemes

ST 2067-103 - Output Profile List - Common Audio Definition and Macros

ST 2067-200 - Dynamic Metadata for Color Volume Transform (DMCVT) Plug-in

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

ST 2067-202 - Isochronous Stream of XML Documents (ISXD) Plug-in

ST 2067-203 - IMF Audio with Frame-based S-ADM Metadata Plug-in

DG: IMF Output Profile List

This group created Parts 100, 101, 102, 103 of the IMF suite. A decision has been made to convert to the HTML document development workflow for the four projects below.

Status: There has not been much progress due to other work. The Working Draft documents are being developed in HTML; some new tooling was described and offered at this meeting round, and that will speed up this work.

Current projects:

Revision: ST 2067-101-OPL-Image Macros

Revision to clarify the handling of images that are: i) chroma-subsampled; ii) Interlaced; and iii) stereoscopic.

This project also adds new common image processing macros to ST 2067-101:2018 including 3x3 matrix, 1D LUT (Lookup Table), named transfer function decode/encode, and named color space conversion.

Status: This work is active.

ST 2067-104 – OPL Composite and Blend Macros

This new document develops the processing macros for image composite and blending between a foreground and a background plate with an alpha (channel) image to control the operation. The macros are part of the IMF OPL framework defined by ST 2067-100.

Status: Completion will follow Part 101.

ST 2067-105 – OPL Output Macros

This new document develops the image and audio output macros for the IMF OPL framework defined by ST 2067-100. This project will add a set of output macros based on the AMWA AS-11 in OPL report (SMPTE ER 1006) and IAB in OPL report (SMPTE ER 1005), including the generation of ISO BMFF (QuickTime), TTML, AMWA AS-11, PCM essence in ISO BMFF (QuickTime), and immersive audio in BWF+ADM files.

Status: Completion will follow Parts 101 and 104.

ST 2067-106 – OPL EssenceType Transform Macros

This new document develops the essence type transform macros for timed-text rasterization and immersive audio bitstream (IAB) conversion. The macros are part of the IMF OPL framework defined by ST 2067-100.

Status: Completion will follow Parts 101 and 104.

DG: IMF Application VC-5

IMF Application for VC-5 based on ST 2073-10 MXF Wrapper. This group documents an IMF Application for VC-5 based on SMPTE ST 2073-10 MXF Wrapper. The DG holds bi-weekly meetings.

Current Project:

ST 2067-72 - IMF Application VC-5

Completion of an IMF Application for VC-5 image essence limited to the capabilities of the VC-5 MXF wrapper specified in SMPTE ST 2073-10.

Status: Public CD has been initiated [here](#). This version handles most IMF workflows, but omits capabilities specified in VC-5 documents published after VC-5 MXF Wrapper, ST 2073-10:2017. When that document has been updated to include the new capabilities, Part 72 will be updated to include them. Some IMF User Group outreach and some SMPTE marketing is planned for the coming quarter.

DG: IMF Application VC-6

This group documents an IMF application for the video codec VC-6 specified by the SMPTE ST 2117 document suite.

Current Project:

ST 2067-71 - IMF Application VC-6

Define a simple mapping for VC-6 to enable it to be used in IMF workflows.

Status: The document is published, and the group will be closed.

ST 2067-204 IMF Audio with ADM Metadata Plug-in

Develop a standard for an Interoperable Master Format (IMF) plug-in to allow ADM (Audio Definition Model, ITU-R BS.2076) metadata to be carried alongside PCM essence in IMF compositions, where the Track Files used are Audio Track Files (SMPTE ST 2067-2) augmented by ADM metadata.

Status: ST 2067-204 is posted for Public CD review [here](#). This document is moving forward in sync with ST 2131 in TC-31FS, as this project is closely bound with that one.

DG: IMF Aux Image Sequence Plug-in

This group documents the use of plug-in track for the IMF packaging framework to support additional image sequences beyond the main image virtual track.

Current Project:

ST 2067-205 IMF Auxiliary Image Sequence Plug-in

Specify Auxiliary Image Sequence Track File, Virtual Track for CPL, and any additional constraints. Sign language is an example use case.

Status: No progress this quarter. The source documents from the DPP (based on DPP006) are available and the DG has been awaiting rights assurances from the DPP.

DG: Event-based Text Data Plug-in

This group is documenting the use of plug-in virtual tracks for the IMF packaging framework to support timed-based textual metadata. Such metadata presents event-based metadata in XML format.

Status (both): The DG Chair gave a status update. The initial WDs will be developed using the new html-publishing tool. ST 2067-207 will be an application of ST 2067-206.

Current Projects:

ST 2067-206 IMF Event-based, Text-based Metadata Plug-in

Develop a standard for an Interoperable Master Format (IMF) plug-in to add event-based, text-based metadata to IMF Compositions, including an optional XML/JSON scheme for generic, event-based metadata.

ST 2067-207 IMF – Event-based, Text-based Metadata: Video Viewports

Develop a standard that extends the “Interoperable Master Format — Event-based, Text-based Metadata Plug-in” for use in adding video viewports metadata (such as “pan and scan” metadata) to IMF Compositions.

ST 2067- 4 IMF - Virtual Track Fingerprint

This project is managed under the TC by individuals without a group. The scope is to define a method for computing a unique identifier for the contents of a virtual track in an IMF Composition Playlist.

Status: A document for TC review is expected before Christmas. A GitHub repo has been created for this work and the document has been added.

Other TC-35PM Business

There is a proposal that TC plenary meetings should have an agenda item focusing on the future developments that may result in standards for their area of interest. TC-35PM took a lead on this with a discussion of media packaging use cases, including the need to access small amounts of media files, rather than downloading 8 TB!

There was also further information on HTML tooling for standards development.

SMPTE Standards Publications in the Last Quarter*Includes Revisions and Amendments*

SMPTE introduced a new policy at the beginning of 2024 of making its standards available free of charge to SMPTE members. To support this, the standards (along with conference papers and the Motion Imaging Journal) are available on smpte.org – go to <https://my.smpte.org/s/>

10E Essence

[SMPTE ST 2048-1:2024](#), 2048 × 1080 and 4096 × 2160 Digital Cinematography Production Image Formats FS/709

[SMPTE ST 2048-2:2024](#), 2048 × 1080 Digital Cinematography Production Image FS/709 Formatting for Serial Digital Interface

[SMPTE ST 2048-3:2024](#), 4096 × 2160 Digital Cinematography Production Image Formats FS/709

27C Cinema**30MR Metadata & Registers****31FS File Formats & Systems**

[SMPTE ST 2117-10:2024](#), Video Compression — Mapping VC-6 into the MXF Generic Container

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

[SMPTE ST 2067-71:2024](#), Interoperable Master Format — Application SMPTE ST 2117-1 (VC-6)

SMPTE Public Committee Drafts*Link to current PCD page [here](#)*

[Annex: Notes on this Report and the SMPTE Standards Process](#)

SMPTE Technology Committees (TCs) are tasked with the development and ongoing maintenance of engineering documents concerning Television, Broadband, 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. A suite of [Administrative Guidelines](#) support the Standards OM.

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 encompasses all Technology Committees. Joining the SC requires a Standards Participation subscription that allows members to join all TCs and sub-groups that are of interest. An SC meeting is held during each meeting round to convey information that is relevant to all TCs, such as meeting logistics and registration information.

SMPTE Document Development Process

The document stages are as follows:

WD: Working Draft

CD: Committee Draft, including → **PCD:** Public Committee Draft option for early public exposure via GitHub

FCD: Final Committee Draft (has passed FCD ballot)

DP: Draft Publication, which initiates → **ST Audit:** A due-process check by the Standards Committee

SMPTE Document-Type Prefixes

ST: Standard

RP: Recommended Practice

EG: Engineering Guideline

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

RDD: Registered Disclosure Document

ER: Engineering Report (from Study Group or Task Force)

AN: Advisory Note

AG: Administrative Guideline

SMPTE Document-Type Suffix

Amendment = Amendment

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 as follows: Revise; Amend; Reaffirm; Stabilize; Withdraw.

A review may be conducted at any time to update specifications and/or to correct errors.

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.