



STANDARDS QUARTERLY REPORT March 2024

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

4th to 7th of March 2024



THE NEXT CENTURY

SMPTE® Standards Quarterly Report

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

SMPTE Standards Committee Meetings 4-7 March 2024

Host: SMPTE Teams Online

Executive Summary

This Executive Summary lists new project proposals this quarter and gives 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 56 registrations for remote 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 projects submitted in the last quarter

Project Name	Type	SMPTE Technology Committee	Approval Period Ends
RP 268-3 – DPX Reference Materials	Revision	File System	2024-01-01
DG ST 2059 PTP Interoperability and Best Practices	Expanded scope for group	Network	2024-03-14
EG 2059-14-PTP Best Practices for Professional Media Over Managed IP Networks	New Engineering Guideline	Network	2024-03-14

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 media IP networks to transport separate video, audio, and associated data streams. [Details](#)

Eleven parts of the suite are published, including recent revisions.

- System Timing and Definitions
- Uncompressed Active Video
- Traffic Shaping and Delivery Timing for Video
- Constant Bit Rate Compressed Video
- Single Video Essence Transport over Multiple ST 2110-20 Streams (to support high bitrate streams)
- Measurement considerations for 2110 streams
- A document tying down additional parameters for streaming standard definition video
- PCM Digital Audio (undergoing minor revision)
- Transparent AES3 Data (e.g. Dolby E or non-audio in AES3)
- ST 291 Ancillary Data (undergoing minor revision)
- Timed Text streaming

There are also parts in development on:

- Transport of metadata that has not been derived from ST 291 packets (2 documents, both at ST Audit)
- Timing planes for 2110 streams

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” is expanding its scope to write “best practices” documents. [Details](#).
- A revision of ST 2059-2 is being developed to reference and harmonize with the latest revision of the IEEE PTP standard. [Details](#)
- A recommended practice on PTP Device Monitoring Capabilities was recently published. It provides interoperability in network monitoring and diagnostics.

Required Application Protocol Standards for IP-Based Media Production

A study group in the Media Systems, Control and Services TC has researched standards requirements for interoperability of production applications based on a capability view and a workflow analysis. Its report is being reviewed. [Details](#)

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 21 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 Applications, Audio with Metadata, Event based Metadata. [Details](#)

SMPTE Video Compression Standards

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

Work on video compression standards is nearing completion:

- A VC-6 mapping into MXF is underway. There is also an IMF application underway [MXF](#) [IMF](#)
- A suite of documents defining the VC-5 compression system is complete, though [minor revision](#) is taking place. An IMF Application is underway. [Details](#).
- Projects to revise SMPTE VC-3 documents to add Alpha channel. The essence document is complete. An MXF mapping and an IMF mapping are underway – [MXF](#) [IMF](#)

Cinema Projects

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

Document Maintenance

This Working Group looks after the maintenance of all TC published documents. [Details](#)

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

[Details](#)

Digital Cinema (D-Cinema)

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

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

Current projects include:

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

[Details](#)

DPX Projects (in the file systems TC)

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 widely-used 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:

- ST 380 - MXF Descriptive Metadata Scheme 1 (decision at this meeting to reaffirm and stabilize)
- RP 2057 - Text-based metadata carriage in MXF (revision)
- Mapping VC-3 Coding Units into the MXF Generic Container (amendment)
- 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) KLV Encoding and MXF Mapping
- Descriptive Metadata Scheme for Compatible Time Labels

Media Microservices This group has two projects in the public Committee Draft stage - IMF Registration Service API and Status Reporting and logging. They are planned to proceed through the publication process this year. There is a Job Processing Architecture document in development. Future work is being developed in RIS-OSA. [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. The 3 TLX documents were posted for a Public CD period and



have passed FCD ballot. 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 the last 20+ years. Its systems have been upgraded to use xml rather than spreadsheets and an additional register has been standardized for Essence elements keys. It now has tools available to check the integrity of requests for new ULs. [Details](#)

AI and ML in Media A joint task force with the Entertainment Technology Center is studying this topic and its report, ER 1010, is now published [here](#)). It continues to meet to consider standardization requirements.

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 4-7 March 2024

Host: SMPTE Teams Online

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.

There are six Standards Directors, currently Pierre Lemieux, Thomas Kernen, 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 some help getting started with the SMPTE Standards process and some of the conventions / acronyms used in this report, please take a look at the [Annex](#).

Future Meetings

Quarterly Standards meeting rounds are planned for:

- Q2 2024 4-6 June, Ottawa, CA
- Q3 2024 18-20 September, Geneva, CH
- Q4 2024 9-12 December Online
- Q1 2025 3-6 March 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](#).

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

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 xxxx: Common LUT Format

Status: The DG has held 3 meetings in the last quarter; the next meeting will be 2024-03-12. A draft standard and xml schema are being developed in the DG.

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. The group has held three meetings in the last quarter. The technique has been generalized beyond media image formats. There has been a liaison from the EBU, enquiring about the possibility of harmonizing this work and some EBU work on this topic.

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 at this meeting. A plan was previously announced to initiate a second FCD ballot, incorporating resolved comments from the first FCD ballot.

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 at this meeting; the 2080-4 work will take priority.

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

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: The DG Chair will send a draft document to the TC Chair to initiate pre-DP review.

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 at this meeting. It was previously reported that UHD formats have been added to both documents.

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

This group standardizes the CineForm / GoPro video compression system.

Published documents:

ST 2073-1 - VC-5 Elementary Bitstream

RP 2073-2 - VC-5 Conformance Specification

ST 2073-3 - VC-5 Image Formats

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

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

ST 2073-6 - VC-5 Sections

ST 2073-7 - VC-5 Metadata

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

Status: An issue that the test materials were not available has been resolved with a new GitHub [repo](#). It is also necessary to include this link in the published RP 2073-2 document; this will be handled by the Director of Standards.

Possible future projects dealing with alternative codebooks, lossless encoding and block-based encoding were described. A VC-5 codec website (not part of SMPTE) is available at <https://vc5codec.org>

An IMF application is underway in [TC-35PM](#). There is a [project](#) to revise ST 2073-10, the MXF wrapper, in TC-31FS.

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 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 at this meeting.

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 at this meeting.

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 at this meeting.

Revision of ST 2048 suite

These are routine revisions arising from 5-year review. 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: FCD ballot for all three parts closed 2024-01-12. Part 1 has 11 editorial comments including several related to older style and template. Parts 2 and 3 had no comments and are automatically elevated to DP status.

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

Other TC-10E business

A presentation was given on Supplemental Data for Diffuse/Reference White; this work is expected to be a new TC-10E project, possibly as a revision of ST 2086.

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 & 5-year reviews of documents, project proposals for revisions/amendments as required.

Status: The following ST Audits for digital cinema documents generated from HTML closed in 2023-12:

ST 429-2, ST 429-3, ST 429-5, ST 429-10, ST 429-14, ST 429-16, ST 429-18, ST 429-19, ST 430-1, ST 430-5, ST 430-12. The first document using the HTML pipeline has published – ST 429-2.

ST 2095-1 revision (not html) has also published. Another 23 documents are in the queue for attention.

Revision RP200:2012 - 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. 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. Together with SMPTE ST 202, it is intended to assist in standardization of reproduction of motion-picture sound in such rooms.

Status: No meetings in the last quarter.

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: The DG meets every 2 weeks. Sub-Teams have been meeting on topics for development of Objective Metrics. There has been no review room availability for In-Situ testing. The group has been concentrating on:

- *Continued refinement of the “Single Ended Coherence Test”*

- *Developing Test Signals – details of the multiband test signal with octave bands from 31.5Hz to 8kHz were given at the meeting.*
- *Developing Recommended Testing Procedures*

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 meeting regularly again after a hiatus. The Report document has had some sub-topics elevated into topics, due to feedback from the In-Situ Group. These topics will now get their own areas for document research and storage.

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: There was no report at this meeting.

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 is now at PCD [here](#), ending no earlier than 2024-04-10 and no later than 2024-10-10. It was reported that one manufacturer has incorporated these guidelines into a projector.

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: There was no report. The document passed FCD ballot 2023-01-13 with 5 comments to resolve. Comment resolution is being worked on. The document has been converted to HTML and HTML publishing pipeline issues have been resolved.

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: In public CD [here](#) ending no earlier than 2023-12-29, and no later than 2024-06-28. Reviewers are requested to provide feedback. There are known to be a couple of implementations. A June FCD is targeted.

Other TC-27C business

The meeting was made aware that a new project proposal “D-Cinema Study Group Final Report Archival Effort” could be expected imminently.

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 does not have any active work.

DG: UMID-related Standards

This DG is managing the following 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: FCD ballot will be initiated in the TC imminently.

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 – next meeting 2024-03-11. The draft report is approaching completion.

DG: ST 331:2011 - SMPTE Standard - Element and Metadata Definitions for the SDTI-CP amendment

This project will increase resolution and/or rate of creation date/time stamps

Status: The revision completed ST Audit 2023-10-03 and should be published imminently.

WG 30MR10: Metadata Definition

This Working Group co-ordinates the process for adding or maintaining metadata items in registers. Registers are maintained and balloted in xml format. An online tool has been introduced to assist with the development of metadata entries and their validation and acceptance for batched ballots. The document is ST 2123 - SMPTE Metadata Registers. It contains a prose document and elements containing the individual registers in xml form. Requests for changes to the registers are processed and collected into batches for balloting. The current 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 (“Vindaloo” 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 candidate will be posted for ST Audit imminently.

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. ST Audit is held, pending revision of the other three documents. Those three completed pre-FCD-ballot review 2023-10-06 with one overall comment that will be addressed in the FCD ballot drafts. FCD ballot is expected shortly.

[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.

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

Revision: 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. References to RP 210 and RP 224 will be replaced with references to online xml registers and the ST 377-1 reference will be

updated. Some minor typos will be fixed and boilerplate updated. Note: similar updates to EG 42 are proposed.

Status: A cover page for stabilization was agreed at the meeting and there was a vote to reaffirm and stabilize ST 380. The vote passed.

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: There has been no progress in the last quarter. 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 will use the HTML authoring tools to complete the revision.

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 passed FCD ballot 2024-01-23 with 23 comments that have all been resolved. The TC Chair will initiate pre-DP-vote review.

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

Current project:

Amendment: ST 2019-4:2016 - Mapping VC-3 Coding Units into the MXF Generic Container

This project will add support to ST 2019-4: 2016 for mapping a VC-3 bitstream carrying an Alpha channel into MXF, using the pre-defined HD raster profiles. There is a [related project](#) in the Essence TC.

Status: The document is at ST Audit, closing 2024-03-08.

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 documents published after ST 2073-10 was published

Status: Work on ST 2073-10 revision is on hold pending related work on IMF Application VC-5 underway in 35PM.

DG: TLX and TLC MXF mapping

Current Projects:

ST 2120-4 - TLX KLV Encoding and MXF Mapping

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 a new approach has been adopted, based on mapping TLX components into “TLC”, a more generic structure; see the next project below. This will be the bulk of the work for the DG in the coming months; no WD yet.

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-FCD-ballot review of ST 2134 closed 2023-06-20. The document editor has revised the document to resolve some Universal Label issues. When the 30MR Registry Maintenance team confirms their issues are resolved, the document will go to FCD ballot.

DG: ST 2131 - Mapping ADM to MXF

ADM = Audio Definition Model. Define 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 & overlap with “35PM DG IMF Audio with Metadata”.

Status: Public CD is on Github [here](#) (ST 2131 + MXF & WAV sample files). The public CD period will finish in March 2024 and FCD ballot will be initiated.

WG: MXF-related Documents Maintenance

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

Status: Revision of ST 381-3:2017 AVC Mapping into MXF GC is planned.

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: There was no progress in the last quarter.

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.

Status: The group is making progress, with monthly meetings. It was mentioned at the meeting that ST 384 should be referenced.

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.

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

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 & 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: The WG is studying workflows to include in the consideration of requirements. A conceptual model has been completed. 49 Use Cases have been considered; Use Cases are being modeled.

AXFlib – Open-Source Toolkit for AXF

Availability of Open-Source Code should increase AXF Traction - Small Archives & Libraries can't 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 & licensing need to be decided (and could form a model for SMPTE)

Status: Open-Source Code for some key services in Part 1 is being developed. Planned initial functions are Presentations, Unwrapper, Validation Tools, Wrapper, Selectively pull files out, Metadata reader for AXF Objects. AXF tools will be developed. Copyright and licensing issues are being considered.

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: The group meets monthly. It has defined a working methodology and is building up assets as part of the work (sample files, drafts, rule candidates).

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 is in the process of modifying the reference software accordingly. Once the software is known to be working, new FP16 example images will be added.

Network and Facilities Architecture Committee (32NF) Chairs: levgen 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.

NOTE: The work of WG-32NF70 on UHD SDI interfaces has been merged into this group and the scope has been updated.

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

Current Projects:

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

Minor revision including updated references.

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

Minor revision including updated references.

Status for both: ST 2081-1 and ST 2082-1 completed ST Audit. Documents reviewed for publication with suggested editorial changes. Response from 32NF-40 to suggested changes still pending.

WG: Video Over IP

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

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

DG: SMPTE 2110 suite - Professional Media over Managed IP Networks

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

Published documents:

ST 2110-10 - System Timing and Definitions

ST 2110-20 - Uncompressed Active Video

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

ST 2110-22 - Constant Bit Rate Compressed Video

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

RP 2110-24 – Standard Definition Video in ST 2110

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

Status of DG: Revisions to parts 10, 20, 21, 22, 24, 31, 40 were published over the last year as well as publication of new document RP 2110-25.

Current projects:

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

Errors were discovered in SDP entries in the currently published version, caused by it being published in 2023 rather than the anticipated 2022.

Status: The document is at ST Audit, closing 2024-03-08.

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: Meeting participants are considering the best method for carrying the data to enable the alignment of the essence streams at a chosen processing point. A document has been started.

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 revised document closed FCD ballot 2023-10-11 with one comment that has been resolved. Pre-DP-vote review is underway, closing 2024-03-11.

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 at ST Audit, closing 2024-03-08.

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 at ST Audit, closing 2024-03-08.

DG: RP 2110-1xx’s - Protocol Implementation Conformance Statements (PICS’s) 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: 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 was discussed and it was agreed that some explanatory text would be drafted for all PICS explaining that a PICS document only applies to a particular version of the document it is used with.

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 remaining major issue is the SMPTE TLV. The method used to transport this TLV in the current version of ST 2059-2 is not allowed in PTP V2.1. The group is working to revise ST 2059-2 so that it defines two transport methods for the TLV:

- *SM TLV Method 1: conveyed using legacy Management messages*
- *SM TLV Method 2: attached to Announce messages*

A public CD period is planned to permit implementations to test compatibility – target is July 2024.

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.

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 DG has submitted a project proposal (approval closing 2024-03-14) to change the scope of 32NF-80 DG ST 2059 PTP Interoperability Testing to include drafting documents to promote PTP Best Practices. Proposed new DG name: PTP Interoperability and Best Practices.

It has also submitted a project proposal (approval closing 2024-03-14) to restart work on EG 2059-14 Best Practices for Large Scale SMPTE 2059-2 PTP Deployments, with a new title PTP Best Practices for Professional Media Over Managed IP Networks based on ST 2059.

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*

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 group has held 4 meetings this quarter; the next meeting is 2024-03-14. The three documents above passed FCD ballot 2022-12-26.

Part 1 passed with 15 comments (including late comments) – all are addressed, 7 accepted, 7 non-responsive, 1 on which progress has been slow; efforts to resolve that last comment have been protracted and are continuing. When resolved, the DG will decide whether to reballot at FCD or proceed to pre-DP-vote review.

Part 2 has 36 comments and Part 3 has 25 comments to resolve; some comments have been addressed but the work is awaiting completion of Part 1 comments.

DG: 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

Current Project:

ST12-4 – UTC-Aligned Timecode

Develop a new standard to document the new timecode generation process

Status: Pre-FCD-ballot review closed 2023-12-22. The document is now at public CD on GitHub [here](#).

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.

SG: Security in SMPTE ST 2059

This Study Group investigates vulnerabilities in ST 2059 systems, both malicious and accidental. The group has decided to issue limited-scope incremental reports, whilst collecting topics (in a “backlog”) for future reports.

Published Reports:

Version 1 of the report is published, [ER 1004](#). It focused on the Threat Landscape.

Version 2 that focuses on threat detection and mitigation strategies is published, [ER 1009](#).

Status: This SG has been put on hiatus following the publication of its version 2 report.

The group has not been closed, as it is possible that there may be a 3rd report on new security features introduced in IEEE 1588:2019 once the best practice on secure key exchange methods settles down and implementations of the 2019 version appear.

32NF Document Maintenance Group

This group holds monthly 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:

Status: There are 111 documents in the master

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

list. Of those, 45 documents are left for review; volunteers please! The group has requested an “umbrella repo” for all IP Networking and SDI issues and the best way to implement this is still being considered.

[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:

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 8.0.

Status: The DG Chair reported that the BXF 8.1 revision to incorporate NABA requested changes has been published. The only document affected is ST 2021-4.

The group has been working on assembling all BXF document elements from v 1.0 to 8.1 into a GitHub repo for easy access by implementers.

It anticipates working on a few minor updates for BXF 9.0.

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 SG report was reviewed in the TC and comments were submitted. The SG's response to the comments is awaited.

DG: Media Microservices

This group has been managing Microservices projects submitted to SMPTE from the Open Services Alliance, OSA. In the last quarter, the OSA has been merged into the SMPTE RIS activity – Rapid Industry Solutions.

Status: Topics for future work are being developed in RIS-OSA. They include Catena (Data Model, Security, Architecture, Orchestration, GitHub); Best Practices for Live Stream Distribution; Global Service Repository.

A project to standardize Catena will be proposed imminently.

RIS-OSA will hold meetings 26 and 27 March in NYC and online – [details](#).

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 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 ways.

Status: Issued as public CD document [on this page](#). It now includes terms harmonized with the terminology project and it is being reviewed by the SMPTE editor before moving to FCD ballot.

Media Microservices Terminology

Provides definitions for terminology used in the other Microservices documents.

Status: This project will proceed as an online vocabulary on the SMPTE website.

ST 2133 - Job Processing Architecture

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

Status: A new draft has been posted, adding terminology and making requirements normative. The DG will review it for CD readiness at the next meeting.

Media Packaging and Interchange Committee (35PM) Chairs: Raymond Yeung and 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 has taken on work to review the impact of the deprecation and eventual removal of support for SHA-1 hashing on IMF standards. The DG Chair delivered a report that noted that SHA-1 is used as an error check in IMF but not for content security. An advisory note is proposed to explain this situation. The DG does not currently have any documents in maintenance,

Published Interoperable Mastering Format documents:

- 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
- 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 UHDTV Program Workflow (AVC)
- 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) Plugin
- 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 been no work on the remaining OPL documents in the last quarter. The DG hopes to restart work in the next quarter.

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 (Look Up Table), named transfer function decode/encode and named color space conversion.

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.

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-3

Current project:

ST 2067-70 - IMF Application of ST 2019-1 (VC-3)

To define a mastering workflow using VC-3 family of codecs in IMF, focused on broadcast post-production. A public CD release is intended.

Status: The document was posted as a PCD on [GitHub](https://github.com) and has been well publicized. It passed FCD ballot 2023-04-01 with 11 comments to resolve. Proposed comment resolution is complete and a pre-DP-vote review will be posted.

DG: IMF Application VC-5

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

Current Project:

ST 2067-72 - IMF Application VC-5

Status: The latest draft has been approved by DG for pre-FCD-ballot review. Public CD release is planned.

DG: IMF Application VC-6

Current Project:

ST 2067-71 - IMF Application VC-6

Status: The document completed its PCD period on [GitHub](#) with four comments. An FCD ballot was then held, passing 2024-02-23 with 21 comments that are mostly resolved.

DG: IMF Audio with Metadata

Status: First implementations of both standards are available. Both standards are on the agenda of the IMF User Group plugfests 13 and 14 December.

Current projects:

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

Draft a standard for an IMF Plug-in for adding MGA signals with S-ADM metadata as Virtual Tracks to IMF compositions.

Status: Published.

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](#). A plugfest was held in the last quarter and test vectors are available. FCD ballot is expected soon.

DG: ST 2067-205 IMF Auxiliary Image Sequence

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

Status: This project was impacted by personnel change. A new project Chair has been appointed and the project statement has been updated.

DG: Event-based Text-based Data Plug-in



Status: There has been no major update in the last quarter. It was reported at the previous plenary that there is already an implementation available.

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 Video Viewports Metadata Plug-in

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

Other TC-35PM business

The results of the IMF plugfest in December 2023 are available in a report [here](#).

SMPTE Standards Publications in the Last Quarter*Includes Revisions and Amendments***10E Essence****27C Cinema****30MR Metadata & Registers****31FS File Formats & Systems****32NF Network & Facilities Architecture****34CS Media Systems, Control & Services****35PM Media Packaging & Interchange**

Note: while the new site for standards, explained below, is brought up to speed, we have omitted listing the new publications. This will resume next time, when the IEEE subscriptions will have ended and the SMPTE store will be the sole source for standards.

SMPTE has introduced a new policy 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/>

If you have a current SMPTE subscription on IEEE Xplore you will have access to content on both platforms until that subscription expires.

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

Notes on this Report and the SMPTE Standards Process

Any 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, 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 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:

WD = Working Draft **CD** = Committee Draft inc. **pCD** 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

RDD = Registered Disclosure Document **ER** = Engineering Report (from Study Group or Task Force)

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.