SMPTE

SINCE 1916

STANDARDS QUARTERLY REPORT
March 2020

Result of SMPTE® Technology Committee Meetings
02-05 March 2020

Hosted by
Whistling Woods Film School
Mumbai, India

THE NEXT CENTURY

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SMPTE® Standards Quarterly Report:

SMPTE Standards Committee Meetings 2-5 March 2020

Hosted by *Whistling Woods Int. Institute of Film, Communication, Creative Arts, Mumbai, IN*

This Executive Summary lists the new projects this quarter and gives a high-level view of project developments. More information on the current status of the 150 active projects can be found in the detailed account, after this summary.

Nine SMPTE Technology Committees (TCs) and 6 subgroups scheduled meetings at this round.

Documents published in the last quarter from the work of each TC are listed on this page.

New Projects that Began in the Last Quarter

TC	Type	Project (links to online project overview)	Approval Date (links to this report)
Television / Broadband	*Revision*	*ST 2035 – Audio Channel Assignments for Digital Television Recorders; roll-up amd*	*Not started*
D-Cinema	*New RDD*	*RDD 53 – Transport of digital cinema content with multiple dynamic range*	*2020/03/13*
Packaging	*Amendment*	*ST 2067-102 - Output Profile List – Common Image Pixel Color Schemes*	*2020/01/21*
D-Cinema	*New RDD*	*RDD 52 - SMPTE DCP Bv2.1 Application Profile*	*2019/12/27*

ExecSum
^ Essence D-Cinema TV-Broadband CinemaSound Metadata FileSystems Network MediaSystems MediaPackaging

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Professional Media over IP Projects

Professional Media over Managed IP Networks

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

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

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

There are also parts in development on:

- Two new projects related to transport of metadata that has <u>not</u> been derived from ST 291 packets
- A document tying down some additional parameters for streaming standard definition video
- A project to develop a set of ST 2110 Protocol and Implementation Conformance Statements (PICS)

Network-Based Synchronization for the Professional Media Environment

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

- A SMPTE group is organizing ST 2059 "plugfests". Details.
- Revisions of the two standards have been balloted and are in comment resolution following one-year review of feedback from plugfests and implementations. Details
- A Study Group is producing reports on Security in ST 2059 Networks Details
- A recommended practice is being developed on PTP Device Monitoring Capabilities to provide interoperability in network monitoring and diagnostics. Details.
- A Drafting Group will create a report "Using ST 2059 in ST 2110 Networks with ST 2022-7 Redundancy" Details
- Engineering Guidelines are being drafted. Details

Industry IP requirements for non-transport layers

This new Ad-Hoc group within the Media Systems, Control and Services TC has recently been formed to identify media control requirements in IP networks and the network layers required. Details

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Interoperable Master Format (IMF)

IMF is a file-based framework designed to support multiple high-quality content versions of a finished work destined distribution channels worldwide. The suite (details) currently comprises 16 published SMPTE Engineering Documents. Additionally, some related SMPTE Technical Specifications (TSP) are publicly available here.

Some documents in the IMF suite are currently being revised. Details

An Amendment to ST 2067-21 IMF Application #2E is offered for public review here. Comments and implementation reports are requested.

IMF Plugfests are held regularly. Details

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SMPTE Video Compression Standards

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

- A project to standardize VC-6, a picture compression scheme based on "deep learning". Details
- A new Registered Disclosure Document (RDD) for a very specialized compression application of RAW Bayer sensor data. Details
- Development of an eight-part suite of documents defining the VC-5 compression system (developed from GoPro's Cineform codec). Seven parts of the suite are published and work is well-advanced on incorporating the final part on Metadata. Details.
- Projects to revise SMPTE VC-3 documents to add Alpha channel – Essence – MXF file
- Projects on the VC-2 document suite (developed from BBC's Dirac Pro). Details

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Cinema Projects

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

Cinema Sound Systems

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

It has a Working Group on Interoperability of Immersive Sound Systems in Digital Cinema and a working group on B-Chain Characteristics and Expectations.

Details

Digital Cinema (D-Cinema)

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

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

Current projects deal with:

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

Details

Reference Materials for DPX V2.0 HDR Implementations

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

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Material Exchange Format – MXF   This widely-used file-based media format does not stand still and there are always projects adding features and mappings to the MXF suite of standards or creating constraints for improved interoperability in a variety of application areas. There are currently 8 MXF-related projects in process. Details   They include:
- Mapping JPEG XS into the generic container
- MXF Multichannel Audio Labeling Framework (revision)
- Audio Controlled Vocabulary
- Mapping VC-3 Coding Units into the MXF Generic Container (amendment)

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Microservices for Media A project is underway to define a framework for media-related microservices as well as documents defining each microservice. Details
The group has worked on ways to get more engagement from industry and has formed an organization – the Open Services Alliance, OSA - in the last quarter.

Extensible Time Label A project is underway to create a Standard for a time label that overcomes the shortcomings of SMPTE ST 12 (support for today's higher frame rates, time values greater than 24 hours) as well as supporting additional requirements of current systems and workflows with extensibility for future requirements. A "Digital Birth Certificate" will be defined including a Source Ident. Details

Metadata and Registers This TC (and its predecessor) has been maintaining metadata ULs on behalf of the other SMPTE TCs for the last 20+ years. But its systems have recently 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

^ Essence D-Cinema TV-Broadband CinemaSound Metadata FileSystems Network MediaSystems MediaPackaging

SMPTE® Standards Quarterly Report:

Detailed Account

SMPTE Standards Committee Meetings 2-5 March 2020

Hosted by Whistling Woods Int. Institute of Film, Communication, Creative Arts, Mumbai, IN

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

We encourage interested parties to learn more about our Standards activities on this website page.

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

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

Introduction

The quarterly SMPTE Standards meeting rounds are led by the SMPTE Standards VP, a volunteer post, and the SMPTE Director of Standards Development, a staff post. These posts are currently filled by Bruce Devlin and Thomas Bause Mason respectively. There are three Standards Directors, currently Pierre Lemieux, Chris Lennon and Paul Treleaven.

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

There was also a Standards Community meeting that provided future meeting details and that showcased the work of the host, Whistling Woods International.

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:

June	2020	AWS, Portland, OR, US
Sept.	2020	EBU, Geneva, CH
Dec.	2020	Disney, Burbank, US
March	2021	TBA

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

Essence (10E)

Digital Cinema (21 DC)

Television and Broadband Media (24TB)

Cinema Sound Systems (25CSS)

Metadata and Registers (30MR)

File Formats and Systems (31FS)

Network and Facilities Architecture (32NF)

Media Systems, Control and Services (34CS)

Media Packaging and Interchange (35PM)

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

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

Documents published in the last quarter from the work of each TC are listed on this page.

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Details from each Technology Committee (TC) meeting

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

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

RP xxxx - Measurement Methods for Resolution Characteristics of Camera Systems

To facilitate the maintenance and operation of studio equipment, the purpose of this project is to document measurement methods for the spatial resolution characteristics of camera systems. Specifically, to measure the Modulation Transfer Function (MTF).

New document Drafting Project

Status: The project was approved 2019-09-24. The work will be based on ARIB 8-TR-B41v2_0-E1. The proponents have a Working Draft to bring to group. The group will schedule a meeting to review the draft in early May 2020.

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

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

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

RP 2080-2: Measurement and Calibration Procedure for HDTV Displays (deals with parameters that can be regularly adjusted - published)
Revision Drafting Project has been set up. It will clarify line numbering conventions, define D93 white point more correctly and fix other minor issues.

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

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

ST 2080-x: Reference Display Characteristics

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

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Status: The group has not made progress in the last quarter, but meetings will restart soon.
Part 4 passed FCD reballot 2019-01-11 with 73 comments to resolve, many of which are now resolved. Comment resolution is ongoing.
The Part 2 revision work will restart when Part 4 has completed pre-DP-vote review.
It has been identified that Part 1 will also need revision in the light of the Part 4 work.

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

ST 2122 - Academy Spectral Similarity Index (SSI)

This new project has been initiated to standardize SSI.

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

New Standard DG Project

Status: A DP vote was underway at the time of the meeting, closing the end of that day. The vote passed with no comments.

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

Revision addresses these issues discovered in current published document:

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

Revision Drafting Project

Status: A DP vote was underway at the time of the meeting, closing the end of that day. The vote passed with 2 comments.

ST 2065 - ACES suite

A revision of ST 2065-1, ST 2065-2 and ST 2065-3 is necessary to address issues reported since publication and to prepare the documents for ISO submission. This project describes the overall work effort and sets forth the basis on which a single DG will work on the documents. There will also project to revise Parts 4 and 5 in the File Systems TC. Bug and issue tracking for all 3 documents is in place on GitHub.

Revision DG Project

Status: Revised ST 2065-2 at FCD ballot, closing 2020-03-14.
Revised working drafts for ST 2065-1 and ST 2065-3 are being discussed in the DG. Pre-FCD-ballot review is predicted for March/April 2020.

ST 2065-1 – Academy Color Encoding Specification (ACES)
Revision [Drafting Project](#)

ST 2065-2 – Academy Printing Density (APD) — Spectral Responsivies, Reference Measurement Device and Spectral Calculation
Revision [Drafting Project](#)

ST 2065-3 – Academy Density Exchange Encoding (ADX) — Encoding Academy Printing Density (APD) Values
Revision [Drafting Project](#)

RP 2093 - Television Lighting Consistency Index (TLCI)

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

Status: A DP vote was underway at the time of the meeting, closing the end of that day. The vote passed with no comments.

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SMPTE Video Compression Standards

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The active video compression projects are:

RDD 51 - High Density Encoding – Data Encoding Specification

Losslessly reducing the footprint of large format, RAW, Bayer pattern files from ARRI ALEXA cameras.
New document [RDD Project](#)

Status: This document closed RDD ballot 2019-10-03. The 7 comments have been resolved and the package will be submitted for ST Audit.

SMPTE 2117 Document Suite: VC-6 Picture Compression

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

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

Status: ST 2117 Part 1 passed FCD ballot 2019-10-23. Comment resolution was completed 2020-02-17 and pre-DP-vote started the day of the meeting, closing 2020-03-18.

RP 2117-2 VC-6 Conformance
This Recommended Practice will define the VC-6 file-based conformance criteria.
New document Drafting Project

Status: This work has been deferred until the Part 1 work is completed.

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

This project group will extend the VC-3 standard to include carriage of Alpha channel. There is associated work to revise the ST 2019-4 MXF mapping document in the file systems TC.
Amendment DG Project

Status: A Working Draft document was submitted to the drafting group for review 2019-12-20. The document will be sent to the TC Chairs to initiate pre-FCD-ballot review.

SMPTE 2073 Document Suite: VC-5 Video Essence
This project standardizes the CineForm / GoPro video compression system.
DG Project
The document suite comprises:

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

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

RP 2073-2 - VC-5 Conformance Specification (Published Q2-2014, revision to cover additional Parts published Q1-2018, revision).
Includes Reference Decoder, Sample Encoder, sample bitstreams
Revision Drafting Project to add Part 7 items underway

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

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

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

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

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

This will provide a basic set of metadata for input image format and facilitate round-tripping embedded metadata from other standards by use of identifiers – ACES, XMP, DPX, MXF, ALE and vendor-specific. New document [Drafting Project](#)

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

Status of suite: All parts except Part 7 are published.
Part 7 has been prepared and approved for publication; being held until Part 2 catches up.

Part 2 Third revision in progress to add coverage for VC-5 Part 7. The group met at this round. Work is underway on XML Schema, Python scripts and small C programs for verifying conformance to ST 2073-7 Metadata. The final step will be to integrate working code into the VC-5 reference codec to support the XML representation of metadata.

The ST 2073 overview document is also being revised.

Business Impact: Interoperability between systems

VC-2 video compression suite

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

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

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

RP 2042-3: VC-2 Conformance Specification (Published)
Revision [Drafting Project](#) This revision will specify test materials supporting ST 2042-1.

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

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

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

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

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

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

Status: Revision RP 2042-3 - VC-2 Conformance Specification
Work is underway on new conformance software:

- *A bitstream validator has been produced that performs in-depth verification of bitstreams and can also act as a reference decoder.*

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- *Automated generation of bitstreams to exercise various combinations of syntactic features.*
- *Bitstreams to exercise wavelet transform arithmetic are also mostly complete.*

It is hoped that Part 3 will be ready for FCD ballot around June 2020.

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

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Digital Cinema Technology Committee (21 DC) Chaired by Steve Llamb and Jack Watts

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

Stereoscopic Subtitle / Timed Text related projects

ST 429-2 - Digital Cinema Packaging - DCP Operational Constraints
This revision addresses issues that arose during an earlier ST 428-7 revision and the development of ST 429-16**.**
Revision [Drafting Project](#)

Status: This document revision is in the publication queue. Note that there is [other current work](#) on additional frame rates that further amends ST 429-2, and will need integration.

ST 428-7 - D-Cinema Distribution Master (DCDM) - Subtitle
Project Scope: To revise ST 428-7 to improve rendering of Japanese timed text subtitles. The standard normatively references ISO/IEC 10646-1, which defines font files. These files provide the information to properly render horizontal and vertical text. However, current cinema subtitle rendering implementations do not use the vertical metrics and other features of the font file resulting in improper vertical and horizontal positioning of Japanese characters within a vertical string.
Revision [Drafting Project](#)

Status: Some work-around rules have been developed to allow authors to improve rendering consistency when font file metrics are not used.

Business Impact of Subtitles projects: Compatibility and Interoperability

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Additional Digital Cinema Frame Rates

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

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

Status: This document is published.

ST 429-2 - D-Cinema Packaging - DCP Operational Constraints
Amendment Drafting Project

Status: ST 429-2 amendment was published 2019-01. However, a problem with its normative reference to ST 429-4 was identified at the 2019-06 meeting and the publication was removed from the store. The way forward was complicated by the fact that other revision work on ST 429-2 for stereoscopic subtitles was underway. It was decided to take that work through to publication and to base this amendment on that version. This amendment has reverted to FCD status to correct the reference and DP ballot will follow shortly.

ST 429-4 - D-Cinema Packaging - MXF JPEG 2000
Revision Drafting Project

Status: This document passed ST Audit 2020-02-27.

Immersive Audio Projects in TC-21DC

ST 430-17 – SMS-OMB Communication Protocol
This project will define the protocol between a Screen Management System and an Outboard Media Block that supports the decryption and playback of an Immersive Audio Track File containing a ST 2098-2 bitstream from a compliant DCP.
New document Drafting Project

Status: The draft document passed FCD ballot 2019-11-29 with 4 comments to resolve. Comment resolution was completed 2020/02/28 and pre-FCD-ballot review should follow shortly.

RP 430-18 - SMS OMB Comm. Reference Method

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

New document Drafting Project

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- *Status: The draft document completed pre-FCD-ballot review but has not progressed to FCD ballot. There was no report this time, though it was reported at an earlier meeting that this document may not be needed as the Protocol document itself is being made clearer.*

ST 430-14 Digital Sync Signal and Aux Data Transfer Protocol
Revise ST 430-14 to:
- allow the client to indicate that it accepts both plaintext or encrypted data items;
- correct selected outstanding issues identified through implementation experience, as captured at https://github.com/SMPTE/st430-14/issues

Revision Drafting Project

Status: All GitHub comments have been addressed and pre-FCD-ballot review can commence when DG review is completed.

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21DC Document Maintenance
General document maintenance, document issue tracking, 1-year & 5-year reviews of documents, project proposals for revisions/amendments as required.

DG Project

Status: The TC reviewed the report submitted by this group. The main topics are:

- *one-year and five-year document list*

- *TC-21DC documents that reference older versions of ST 377, ST 379. ST 422*

- *ISO TC36 Request for doc updates*

New Registered Disclosure Document - RDD 52 - SMPTE DCP Bv2.1 Application Profile
This RDD constrains the implementation of Digital Cinema Composition mastering, as determined by proponent consensus based upon real world industry requirements and practices

RDD Project

Status: This project passed RDD ballot 2020-02-13 with 12 comments to resolve.

New Registered Disclosure Document - RDD 53 - Transport of digital cinema content with multiple dynamic range
This RDD is intended to support the development of applications that create, read and process Hybrid Tone Mapping content for cinema distribution.

RDD Project

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Status: This project is in the approval phase; approval process closes 2020-03-13.

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

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

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

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

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

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

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

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

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

- *Status: The group has been processing 1 year reviews as they come due. A DG project was set up for this purpose. Parts 10, 11, 20, 21 were submitted for ST Audit 2020-03-02. ST 2112-10 and ST 2112-20 both received one comment; these have been addressed.*
  ST Audits on RP 2112-11 and RP 2112-21 were withdrawn after it was found that an associated file had been omitted from the ballot. Their status returned to pre-DP-vote-review.
  Revision to the remaining documents RP 2112-1 and EG 2112-2 has reached FCD ballot, closing 2020-03-05.

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Revision: ST 2016-1 - AFD and Bar Data

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

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

Other TC-24TB business

The following document review actions are under way:

- ST 2035 Amendment 1 has been rolled up into ST 2035 by the Chair. A project statement has been drawn up to cover this work.
- SMPTE 2052 – it was agreed that Parts 1, 10, 11 of this document suite on SMPTE Timed Text will be revised in a constrained revision project. A GitHub repository has been opened for issue tracking on these documents.

Cinema Sound Systems (25CSS) Chaired by Brian Long and Bill Redmann

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

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

Interoperability of Immersive Sound Systems in Digital Cinema

WG Project

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

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

Working Group Documents

ST 2098-1 Immersive Audio Metadata (Published, in one-year review)

ST 2098-2 Immersive Audio Bitstream Specification (Published, revision published Q2 2019, one year review starting)

EG 2098-3 Immersive Audio Renderer Expectations

RP 2098-4 Immersive Audio Renderer Interoperability Testing Procedure (being merged into Part 3 and then discontinued)

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

Status: Document work in this WG (25CSS-10) is carried out by the following drafting groups:

SMPTE 2098 Projects on Immersive Sound Model and Bitstream

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

DG Project

Status: There is currently no project work for the group. An AHG is carrying out one-year review on ST 2098-2.

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SMPTE 2098 Projects on Digital Cinema Immersive Audio Renderer

This DG is responsible for Parts 3, 4 – Part 4 was later merged into Part 3.

DG Project

Status: At the 2019-09 meeting, the DG decided to merge Part 4 into Part 3. The proposal for scope change of Part 3 was approved.

EG 2098-3 - Immersive Audio Renderer Expectations
Specifies the baseline expected behavior of a generic renderer in response to particular bitstream expressions and playback environment parameters and describes a test procedure that can be used to test the interoperability of such renderers.
New document Drafting Project

Status: Final edits to EG 2098-3, including merging RP 2098-4 that covered the test procedure, were completed and the draft document has completed pre-DP-vote review. A voice vote at the meeting to raise the document to DP status passed.

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Working Group on B-Chain Characteristics and Expectations
Create recommended practices and engineering guidelines for cinema sound systems to ensure they faithfully play back modern, digital, full dynamic-range movie soundtracks.
Working Group Project

Status: The WG Chair gave a presentation, identifying its scope in the 25CSS workflow diagram. Three AHG work areas have been identified: Clip Analysis, In-situ Measurements, Technical Reference Documents. Chairs have been appointed for each of these. The WG is suspending meetings until the AHGs have completed their work

RP xxxx - B-chain characteristics and expectations required to play back modern, digital, full dynamic-range movie soundtracks

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Describes a test procedure that can be used to test the interoperability of an immersive audio renderer. New document [Drafting Project](#)

Status: This project completed approval 2019-10-15.

New Project Proposal
A presentation was given at the 2019-12 plenary on issues that may result in a revision of ST 2095-1 Calibration Reference Wideband Digital Pink Noise Signal. Nothing further has been heard.

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

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

UMID Projects

The Chair of the following projects gave a status report.

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

Status: Nothing to report.

UMID-related Standards:

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

ST 330 - UMID

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

Status: The ST 330 Committee Draft passed FCD Ballot 2020-02-14 with 22 comments to resolve. There was a ballot comment about using RP 210 as a Normative Reference (RP210 has been superseded). The document was reviewed and it was agreed that the reference could be deleted. The DG Chair will repost the document with that change. Resolution for all other comments had been

agreed, so the draft revision will be ready for pre-FCD-ballot review when the comments are formally accepted.

RP 205 – UMID Applications

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

Revision [Drafting Project](#)

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

New Document: UMID Resolution Protocol

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

New document [Drafting Project](#)

Status: There was a suggestion at the meeting to move this project to TC-34CS, as that is where the subject-matter experts are. The SVP approved this move.

UUID File Naming

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

New [SG Project](#)

Status: A group has been set up for this SG. There was no project report at this meeting.

Metadata Definition

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

Status: The next release will be "Tabasco" – ST 2123. It passed FCD ballot 2020-02-14 with one comment that was discussed at this meeting and likely to be resolved. The ballot comprised a simple prose document and the set of xml document elements.

The entries currently being processed will be frozen in the next few weeks. Approved items will be included in the "Sriracha" release for subsequent FCD ballot. It is intended that the Essence Elements register will be added to this ballot.
The Metadata Registers Development Area is available here: https://registry.smpte-ra.org/pages/

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

ST 335 Metadata Element Dictionary Structure
Normalize to AG18

Revision [Drafting Project](#)

ST 395 Metadata Groups Register Structure
Normalize to AG18

Revision [Drafting Project](#)

ST 400 SMPTE Labels Structure
Normalize to AG18

Revision [Drafting Project](#)

ST 2003 Types Dictionary Structure
Normalize to AG18

Revision [Drafting Project](#)

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File Formats and Systems Committee (31FS) Chaired by Fred Walls and Tatsuji Yamazaki

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

Material Exchange Format (MXF)

MXF defines a file format for Video, Audio and Data essence along with associated Metadata, for use in production systems (rather than final delivery).
There are several MXF projects under way. Some define new MXF features / applications, others revise existing documents for better interoperability.

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

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

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

New document [DG Project](#)

Status: The document passed FCD ballot on 2020-02-06 with 9 comments to resolve. All comments have been addressed and were further discussed in the DG meeting that was held the day after the TC meeting.

ST 380 - MXF Descriptive Metadata Scheme 1

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

Revision [DG Project](#)

Status: *FCD ballot comment resolution is complete. There has been no further action this quarter.*

RP 2057 - Text–based metadata carriage in MXF

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

Revision [Drafting Project](#)

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

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

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

Revision [DG Project](#)

Status: This revision has been published and this project will be closed. It has been noted that two small editorial corrections need to be made to the published version.
The follow-on revision project, mentioned above, can now start. The revision will reflect how MXF is used in the field as well as adopt a consistent formatting for registers. The proponent outlined a proposal to split this large document into component parts.

ST 377-4 – MXF Multichannel Audio Labeling Framework

This is a revision primarily intended to create additional MCALabelSubdescriptor properties and a controlled vocabulary. During the development project, it was decided that the Controlled Vocabulary would be removed and that it would be a separate document, encouraging use outside of MXF.

Revision [DG Project](#)

Status: This document passed FCD ballot on 2020-01-17 with 15 comments and one late comment to resolve. The DG has developed a plan to make this document (after comment resolution) and the

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Audio Controlled Vocabulary (project below) available for a period of public review to encourage implementers to validate the documents before publication as fully-approved standards. The TC approved this action.

ST 377-41 - Audio Controlled Vocabulary

This document is "broken out" from the revision of ST 377-4 MXF Audio Labeling Framework.

New document DG Project

Status: This draft document will be submitted for pre-FCD-ballot review. When complete, the process of public review outlined in the ST 377-4 project report above will be followed.

New Standard: Mapping JPEG XS Codestreams into the MXF Generic Container

This project specifies the mapping of JPEG XS codestreams conforming to ISO/IEC 21122-1 (JPEG XS Core Coding System) into the MXF generic container.

New document DG Project

Status: The draft document is ready to be submitted for pre-FCD-ballot review, subject to a final check with the DG.

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

This project will add support for mapping a VC-3 bitstream carrying an Alpha channel into MXF, using the pre-defined HD raster profiles. There is a related project in the Essence TC.

Amendment DG Project

Status: A working draft has been presented to the DG for review. When all comments have been addressed, the document will proceed to pre-FCD-ballot review in the TC.

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Working Group on Archive Exchange Format (AXF)

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

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

There are 2 current projects:

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

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

Revision [Drafting Project](#)

Status: The text update had been complete for some while, but a requirement arose to add a "conditional any" function for extensibility that was identified in the development of Part 2. This function requires a namespace, create date/time, and update date/time version, and has the capability to define any attribute within the namesapce.

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

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

New document [Drafting Project](#)

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

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

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

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

New document [DG Project](#)

Status: The API has been rewritten in C++, the code is available on GitHub. A basic reader and writer have been implemented. The project also includes DPX files that can be used to test reader implementations.

Other TC-31FS business

A presentation was given by ARRI on upcoming proposed RDD projects.

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

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protocols, switching mechanisms, and physical networks that are both internal and external to the facility excluding unique final distribution methods.

Working Group on SDI Interfaces

[*WG Project*](#)

The Working Group (32NF40) scope is:

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

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

The WG is responsible for the following projects:

New Document Suite: EG 2111 on SDI Interfaces
This group will draft EGs to provide a tutorial on the many SMPTE SDI interface standards and technologies, including how they relate to each other, what image formats are carried, performance. It was established at the 2018-12 meeting that pdf can be considered an "editable format" for these documents.
New document suite [DG Project](#)
Three EGs, in the form of posters, are being produced:

EG 2111-1 - SD and HD-SDI Roadmap
New document [Drafting Project](#)

> *Status: Passed FCD ballot 2019-09-23 with 21 comments to resolve. The TC considered one comment that remained unresolved about adding identification of "legacy" formats, but the consensus was to leave as-is. Comments are now close to being fully resolved with assistance from the TC Chairs.*

EG 2111-2 UHD-SDI Roadmap

> *Status: Published in last quarter*

EG 2111-3 10G-SDI Roadmap - ready for ballot, though project needs to be set up
New document [Drafting Project](#)

> *Status: Passed FCD ballot 2019-09-23 with 17 comments to resolve. The remaining comments are considered straightforward to resolve.*

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

This revision adds a note describing limitations of usage with low-frame-rate 720p transports.
Revision [Drafting Project](#)

Status: FCD ballot closed 2019-08-26 with 9 comments that are now resolved. The TC Chairs will initiate pre-DP-ballot review.

Working Group on Video Over IP

[*WG Project*](#)

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

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

Document Suite: SMPTE 2110 - Professional Media over Managed IP Networks
This group is developing a suite of standards specifying the carriage, synchronization and description of separate elementary essence streams over IP for the purpose of live production. The resulting standards used VSF Technical Recommendations TR-03 and TR-04 as their starting point.
Document suite [DG Project](#)

The suite currently consists of:

ST 2110-10 - System Timing and Definitions
Published and a Revision [Drafting Project](#) from one-year review is underway.

ST 2110-20 - Uncompressed Active Video
Published and a Revision [Drafting Project](#) from one-year review is underway.

ST 2110-21 - Traffic Shaping and Delivery Timing for Video
Published and a Revision [Drafting Project](#) from one-year review is underway.

ST 2110-22 - Constant Bit Rate Compressed Video
Published

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

RP 2110-24 – Standard Definition Video in ST 2110
Recommended Practice for transporting the standard-definition television signals described in SMPTE ST 125 within the SMPTE ST 2110-20 payloads; to overcome some items that need further definition.
New Document [Drafting Project](#)

ST 2110-30 - PCM Digital Audio

Published. No one-year revision required.

ST 2110-31 - AES3 Transparent Transport
Published

ST 2110-40 - SMPTE ST 291-1 Ancillary Data
Published and a Revision [Drafting Project](#) from one-year review is underway.

ST 2110-41 – Fast Metadata
Intended for the transport of any metadata that did not originate as ST 291 ancillary data.
New Document [Drafting Project](#)
ST 2110-42 – Formatting an ST 2110 Sender SDP Object for Transport using ST 2110-41 Fast Metadata (FMX)
New Document [Drafting Project](#) (will not start until -41 is going through the ballot process)

Status of SMPTE 2110 projects: The DG has held weekly meetings through the last quarter.

- *RP 2110-24 - this project was approved 2019-09-26. A draft document is in development.*
- *ST 2110-10 draft revision is at FCD ballot, closing 2020-03-26.*
- *ST 2110-20 draft revision is under pre-FCD-ballot review, closing just after the TC meeting on 2020-03-05.*
- *ST 2110-21 Some items were identified from one-year review. The group is using data gathered at interops to create an Annex to be added to the revised document.*
- *ST 2110-30 one-year review and revision. It has been agreed that no action is required.*
- *A [Project](#) has been approved "Protocol Implementation and Conformance Statement" (like a conformance checklist) for each of the documents in the ST 2110 suite.*
- *ST 2110-40 – Items were identified from one-year review and a revised draft was posted 2020-02-13.*
- *ST 2110-41 – a draft document was submitted to the DG 2020-02-13 and reviewed. The draft is being revised in the light of comments received.*

Planned Project

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

Project proposal awaited.

Working Group on Ultra HD SDI Interfaces
[WG Project](#)

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

WG Status: There has been nothing to report in the last two quarters. The TC Chair will discuss with the WG Chair whether further work is expected. There are a couple of one-year reviews due. There had been an intention to develop the ST 2083 suite.

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

This group is responsible for the following documents:

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

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

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

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

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

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

This project is responsible for the following documents:

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

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

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

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

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

UHD-SDI Stress Pattern and Check Signal

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

Status: There has been no progress for some while and the future of this project will also be checked.

Working Group on Time Labeling and Synchronization
WG Project

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

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

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

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

This DG will revise these two PTP standards in the light of interop testing and other scrutiny since the original publication. It has been decided that mention of a 5 second lock time will be removed from the Introduction of ST 2059-1 as lock time is a complex parameter to define (a new project for a 2059 family document on this subject is planned).
Revision DG Project

DG Status: The DG has been looking for proponents to write a "PTP Lock Time" EG.

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

Status: The draft revision passed FCD ballot 2019-09-03 with 56 comments to resolve. The DG has reached consensus on comment resolution.The draft is being updated and commenters will be asked to review the resolution, allowing pre-DP-ballot review to get underway.

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

Status: The document passed FCD ballot 2019-07-29 with 29 comments to resolve. Much time was spent in the last quarter on one comment regarding traceability. The document editor is now preparing a draft with all DG-approved changes for commenters to review this month.

^ Essence D-Cinema TV-Broadband CinemaSound Metadata FileSystems Network MediaSystems MediaPackaging

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ST 2059 Interoperability Testing

The purpose is to confirm that the provisions of the standards are unambiguous and that the technology yields the intended results. The Interop DG itself is open to all SMPTE Standards Community members, but its Testing AHG and attendance at the interop meetings is subject to signing a non-disclosure agreement and memorandum of understanding.

Interoperability DG Project

There have been five rounds of testing, all hosted by FOX NE&O in Houston, TX, USA:

2015-11, 2016-06, 2017-03, 2018-02, 2019-02.

Reports (where available) are on this SMPTE website page.

> *Status: The group has completed its analysis of the results from the 2019-02 interop with some supplementary details covering Grand Master Failover and Large-scale system power cycle tests. Planning is under way for the next interop that will be held in November at Disney, Houston, Texas.*

ST 2120: Extensible Time Label (TLX)
Create a basic Time Label with a defined mechanism for registration of additional fields
New document suite DG Project
Three documents are currently in development:
ST 2120-1 – Extensible Time Label – System
New Standard Drafting Project
ST 2120-2 – Extensible Time Label – Items
New Standard Drafting Project
ST 2120-3 – Extensible Time Label – Profiles
New Standard Drafting Project

> *Status: The DG has held 7 meetings in the last quarter. The work during this period has focused on defining a "Minimum Viable Product", MVP, rather than permitting the extensibility to lead to a lot of non-interoperable systems. Next steps:*
> - *Finalize consensus on terms and definitions*
> - *Propagate definitions into ST 2120-1 draft, formalize structure*
> - *Propagate MVP items in ST 2120-2 draft (mostly redaction)*
> - *Propagate MVP capabilities into ST 2120-3 draft*
> - *Determine if/how/where use case solutions are documented.*
> - *Determine if/how/where carriage is documented*

RP xxxx - ST 2059-2 PTP Device Monitoring Capabilities

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

New document DG Project

Status: The group holds weekly telecons, 9 in the last quarter. It has:

- *Finalized an initial list of parameters to be monitored*
- *Decided to build on IETF RFC 8575 YANG Data Model for PTP with augmentation to cover specific parameters for our use case (for GNSS, Grand Master, ST 2059-2, RFC 8173 PTP MIB)*
- *Followed the work of IEEE on PTP v2.1 and YANG implementations to align our work with upcoming developments and initiated a liaison request with ITU-T*

The data model now needs to be finalized into XML.

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

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

New report DG Project

Status: No progress this quarter

Development of a Suite of PTP synchronization Engineering Guidelines

This group was set up to develop a suite of Engineering Guidelines related to the ST 2059-1 and ST 2059-2 Synchronization documents. EG 2059-10 - Introduction to the New Synchronization System – was published some time ago. After some pruning, the documents below remain.

Engineering Guideline DG Project

EG 2059-14 - Best Practices for Large Scale SMPTE ST 2059-2 PTP deployments
New document Drafting Project

Status: A new draft was posted during the 2019-03 meeting week. The document editors plan to start working on a new draft early in 2020

RP 2104-1 - Date-Time Terms and Definitions

A Part 2 document is also planned, dealing with Other Media Terms and Definitions.

New document Drafting Project

Status: No progress this quarter.

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Working Group on Data over AES3
WG Project

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

WG Status: The WG documents ST 2116: Format for Non-PCM Audio and Data in AES3 — Carriage of Metadata of Serial ADM (Audio Definition Model) and ST 338 Data Types were published in the last quarter.

ST 337 family of documents

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

DG Status: This group is just responsible for the following document, having recently completed ST 2109 - Format for Non-PCM Audio and Data in AES3 - Audio Metadata:

ST 2041-4 - Carriage of MPEG-H 3D Audio Streams (MHAS) in AES3 Transport
MPEG-H provides for carriage of immersive and interactive audio in the form of channels and objects and also in the form of Higher Order Ambisonics (HOA). The project will develop a standard to specify the format for carriage of MPEG-H data for professional applications as Non-PCM audio using the AES3 serial digital audio interface defined by ST 337.
New document Drafting Project

Status: There has been no progress on the WD document for several quarters.

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Study Group: Security in SMPTE ST 2059

This SG will investigate vulnerabilities in ST 2059 systems, both malicious and accidental. The group has decided to issue limited-scope incremental reports each quarter, whilst collecting topics (in a "backlog") for future reports.
SG Project

Status: The SG has held 2 meetings in the last quarter. A new Chair has been appointed and the group plans to return to bi-weekly telecons.
The current version of the report is close to completion. Topics for the next quarter's incremental report will then be selected from the backlog.

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Media Systems, Control and Services Committee (34CS) Chaired by John Footen and Paul Gardiner

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

BXF Suite of Documents

The Broadcast Exchange Format document suite (all published) comprises:

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 6.0 and current development is BXF 7.0.

Status:
The BXF 7.0 revision drafts for Parts 1 and 4 were published in the last quarter. That completes BXF 7.0. The group is on hiatus before it starts to collect work items for BXF 8.0 (potential for new work around commercial content delivery has been identified).

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AHG: Industry IP requirements for non-transport layers

This group was set up shortly after the meeting. As an AHG, it is expected to complete its work by the next meeting round in June. It is intended that the group will identify requirements, including any SGs or DGs that would be required to take this work forward.

SMPTE xxxx - Media Microservices Overall Architecture

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

New document suite DG Project

- *Status: The DG Chair gave a presentation that covered work in the Open Services Alliance (OSA) whose latest meeting was in New York City 2020-02-11. The OSA is working on pilot projects and it anticipates feeding documents to SMPTE as soon as they are deemed "ready".*

Media Packaging and Interchange Committee (35PM) Chaired by Chris Witham and Florian Schleich

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

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

IMF Document Maintenance DG

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

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

Contact TC Chairs for access to the GitHub repository:
https://github.com/orgs/SMPTE/teams/35pm/repositories

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The work of this group initiated the following projects:

Revision: ST 2067-2: Interoperable Master Format — Core Constraints
Revision [Project](#)

Status: Closed DP ballot at the end of the meeting day, 2020-03-05. Result: passed with no comments.

Revision: ST 2067-3: Interoperable Master Format – Composition Playlist
Revision [Project](#)

Status: Closed DP ballot at the end of the meeting day, 2020-03-05. Result: passed with no comments.

Revision ST 2067-5: Interoperable Master Format – Essence Component
Revision [Project](#)

Status: Closed DP ballot at the end of the meeting day, 2020-03-05. Result: passed with no comments.

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

Status: Closed DP ballot at the end of the meeting day, 2020-03-05. Result: passed with no comments.

Amendment: ST 2067-21 - Interoperable Master Format – Application #2E
Amendment [Project](#)
The amendment will add support for Hybrid-Log-Gamma color system as specified in ITU BT 2100. This project is the first test for a new process that allows publication of the CD document prior to FCD ballot in order to verify independent implementations at a SMPTE IMF plugfest. When interoperability is verified, the document will proceed to FCD ballot.

Status: The CD document is published on GitHub for public review until 2020-07-24. The document provisions were successfully tested during the recent SMPTE IMF Plugfest. The document will be updated to reference revised version of ST 2067-21.

Revision: ST 2067-40: Interoperable Master Format – Application #4 Cinema Mezzanine
Scope: Incorporate Amendment 1:2017, update normative references and add support for the preservation and interchange of SDR DCDM essence and timeline.
Revision [Project](#)

Status: Finished Pre-FCD Review on March 2. A CD has been posted, as the proponents are requesting temporary publication for public review.

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

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Updates related to Revision of 2067-21
Amendment [Project](#)

Status: New project, completed approval 2020-01-21. The document will first be reviewed in the OPL DG.

IMF Plugfest DG

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

[Drafting Project](#)

Status: The Disney/ABC plugfest was preceded by a long virtual plugfest period - 2019-11-01 through 2020-01-31. Topics tested:

- *Internet Media Subtitles and Captions 1.1 (IMSC1) - includes HLG and SRGB rendering.*

- *Side Car - this test was designed to include referenced PDF as sidecar in an IMP.*

- *IAB - play an Immersive Audio Bitstream track file from an IMF with a corresponding CPL per ST 2067-201.*

- *SMPTE TSP-2121 Application DPP - testing HLG functions within IMF; checking that the extra metadata does not interfere with downstream HLG usage.*

- *Interop - new design format for test vectors.*

The group has decided that future plugfest testing is now to occur in a virtualized environment and the F2F events are to be used for discussion of the results.
The next virtual plugfest is planned to start 2020-04-01 with F2F 2020-06-05 in Los Angeles, CA, US.

IMF Audio Essence DG

Status: This group does not have current work and will be closed down.

IMF Application DPP WG

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

Status: All the WG's documents are published.There was no report at this meeting.

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SMPTE Standards Publications in the Last Quarter

10E Essence:

20F Film:

21DC Digital Cinema:

24TB Television & Broadband Media:

25CSS Cinema Sound Systems:

30MR Metadata & Registers:

31FS File Formats & Systems:

ST 377-1:2019 - SMPTE Standard - Material Exchange Format (MXF) — File Format Specification

ST 422:2019 - SMPTE Standard - Material Exchange Format — Mapping JPEG 2000 Codestreams into the MXF Generic Container

32NF Network & Facilities Architecture:

RP 2110-23:2019 - SMPTE Recommended Practice - Single Video Essence Transport over Multiple ST 2110-20 Streams

ST 2116:2019 - SMPTE Standard - Format for Non-PCM Audio and Data in AES3 — Carriage of Metadata of Serial ADM (Audio Definition Model)

ST 338:2016 Am1:2019 - SMPTE Amendment - Format for Non-PCM Audio and Data in AES3 — Data Types

34CS Media Systems, Control & Services:

RP 2021-1:2020 - SMPTE Standard - Broadcast Exchange Format (BXF) — Requirements and Informative Notes

ST 2021-4:2020 - SMPTE Standard - Broadcast Exchange Format (BXF) — Schema Documentation

35PM Media Packaging & Interchange:

^ Essence D-Cinema TV-Broadband CinemaSound Metadata FileSystems Network MediaSystems MediaPackaging

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Notes on this Report and the SMPTE Standards Process

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

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

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

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

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

SMPTE Document Development Process

The document stages are:

WD = Working Draft **CD** = Committee Draft **FCD** = Final Committee Draft

DP = Draft Publication, which initiates...... **ST Audit** - a due-process check by the Standards Committee

SMPTE Document-Type Abbreviations

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

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

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

SMPTE Document Review

The SMPTE Operations Manual calls for review of published documents:

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

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

Options are: Revise; Reaffirm; Stabilize; Withdraw.

Other Notes

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

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