



SINCE 1916

STANDARDS QUARTERLY REPORT OCTOBER 2017

Result of SMPTE®
Technology Committee Meetings
20-23 September 2017

Hosted by
Sky Television
London, United Kingdom

THE NEXT CENTURY



Society of Motion Picture and Television Engineers®

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SMPTE® Standards Quarterly Report: **Executive Summary**

As a result of SMPTE Standards Committee Meetings

20-23 Sept. 2017

London, UK

Hosted by Sky Television

Nine SMPTE Technology Committees and 12 subgroups scheduled meetings at this round.

69 members attended in person over the four days, and there was additional participation by remote access. This Executive Summary captures some of the more notable project developments. More information on the current status of the 150 active projects can be found in the [detailed account](#), after this summary.

New Projects that began in the last quarter

Revision of 2071-3:2014 Media Device Control Discovery (MDCD)

[DG Project Details](#)

Open Binding of IDs; New RP 2112-11 on OBID Conformance Test Materials

[DG Project Details](#)

IMF Immersive Audio Bitstream Level 0 Plug-In

[DG Project Details](#)

Studio Video over IP Transport ST 2110 Part 22: VC-2 HQ Profile Video This is the first “lightly compressed” format to be introduced in the ST 2110 family

[DG Project](#) At proposal stage

Revision of RP 2080-2 Measurement and Calibration Procedure for HDTV Display Luminance Levels and Chromaticity

[DG Project Details](#)

One year review and revision for Precision Timing Protocol standards: [Details](#)

ST 2059-1 Generation and Alignment of Interface Signals to the SMPTE Epoch [DG Project](#)

ST 2059-2 SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications [DG Project](#)



RP 2091-2 Ruggedized Optical Connector System for ST 2036-4 10G SDI

[DG Project Details](#)

Revision of ST 292-1 1.5 Gb/s Signal/Data Serial Interface To add HDR/WCG signaling

[DG Project Details](#)

Revision of ST 2036-3 Ultra High Definition Television — Mapping into Single-link or Multi-link 10 Gb/s Serial Signal/Data Interface To add HDR/WCG signaling

[DG Project Details](#)

Registered Disclosure Document on IMF Application for ProRes format

[DG Project Details](#)

Screen Management System - Outboard Media Block Comm. Protocol For Digital Cinema

[DG Project Details](#)

Screen Management System - Outboard Media Block Comm. Reference RP For Digital Cinema

[DG Project Details](#)

Revision of RDD 44:2017 Apple ProRes in MXF

[DG Project Details](#)

Immersive Audio Track File For Digital Cinema

[DG Project Details](#)

Digital Cinema Packaging - Operational Constraints for Immersive Audio

[DG Project Details](#)

Revision to RDD 29:2014 Dolby Atmos® Bitstream Specification

[DG Project Details](#)

Revision of SMPTE ST 377-1:2017 MXF

[DG Project Details](#)

Professional Media over IP

Professional Media over Managed IP Networks

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

Three core parts - System Timing and Definitions, Uncompressed Active Video, PCM Digital Audio – are

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approved for publication, awaiting completion of a further part on Traffic Shaping and Delivery Timing for Video. There are also parts on Ancillary Data and Transparent AES3 transport.

[Details](#)

Study Group on Flow Control in Professional Media Networks

This group has completed a report on media flow control in IP networks. The report provides a lot of context information on IP media networks in addition to the core topic, the various techniques for switching media streams. [Details](#)

Network-Based Synchronization for the Professional Media Environment

Following the publication of two key documents (core parts of the ST 2059 suite) defining a system for using media synchronization packets on an information technology (IT) network, there are ongoing projects in support of the technology:

- A SMPTE group is organizing ST 2059 “plugfests”. [Details](#).
- A set of Engineering Guidelines for the use of this system is being drafted. The first, “Introduction to the New Synchronization System” has been published. [Details](#)
- One-year reviews of the two standards in the light of plugfest experience are underway. [Details](#)

Media Device Control over IP

This project has developed a suite of documents for the control of media-centric devices and services utilizing Internet Protocol (IP). [Details](#)

Interoperable Mastering Format (IMF)

This suite ([details](#)) comprises 12 published documents that have remained stable for some time. There are currently some projects to create additional IMF documents or revise existing ones. There is also SMPTE work outside the Standards Community to produce an [IMF Specification for Broadcast and Online](#) .

IMF Application #5 ACES

The Academy Color Encoding Specification (ACES, ST 2065-1), published in 2012, supports HDR / WCG. A new project extends its use as an application format in the Interoperable Mastering Format (IMF).

[Details](#)

IMF Output Profile Lists

Projects are underway to amend IMF Common Image Pixel Color Schemes, revise IMF Common Image Definitions and Macros and create new standard Dynamic Metadata for Color Volume Transform for IMF Applications.

[Details](#)



IMF Audio Essence Projects

Projects are underway on IMF Audio Content and Element Kind Definition and IMF Immersive Audio Bitstream Level 0 Plug-In. [Details](#)

There are also projects to introduce a new standard “IMF Sidecar Composition Map”, a new Registered Disclosure Document “IMF Application for ProRes format”, and to amend the IMF Cinema Mezzanine application. [Details](#)

SDI Interfaces

Work continues on the development of SDI interfaces:

- Suites of documents defining 6Gb/s, 12Gb/s and 24Gb/s electrical and optical interfaces target UHD applications and multi-stream HD applications. [Details](#)
- Projects defining a ruggedized optical SDI connector and its applications [Details](#)
- An SDI interfaces Working Group is managing a number of other SDI projects [Details](#)

HDR and WCG Signaling on Streaming Interfaces

This project will define a mechanism for signaling the carriage of high-dynamic-range (HDR) and/or WCG essence on streaming interfaces. The group has defined how the SDI Payload ID will be used for HDR / WCG signaling and identified the SDI standards that need revision, some of which have gone through ballot.

The group is also drafting a standard “Extended HDR/WCG Metadata Packing and Signaling for Serial Digital Interfaces”. [Details](#)

SMPTE Video Compression (VC) Standards

SMPTE has standardized five video compression (VC) standards – VC-1 to VC-5. Current work on video compression standards comprises:

- Development of an eight-part suite of documents defining the VC-5 compression system (developed from GoPro’s Cineform codec). Four parts of the suite are published and two more are ready for publication when revision of the Conformance Specification is complete. One part of the suite defines VC-5 mapping in the MXF Generic Container. [Details](#).
- Projects on the VC-2 document suite (developed from BBC’s Dirac Pro). This includes the addition of a new profile for ultra-high-definition (UHD) video sources carried on high-definition (HD) infrastructure as well as amendments and revisions to existing VC-2 documents. [Details](#)



Cinema Projects

Cinema Sound Systems

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

Current work on Cinema Sound Systems comprises:

- A Working Group on Interoperability of Immersive Sound Systems in Digital Cinema. Its goal is to standardize a single object-based distribution file format and related protocols for interoperable playback into a variety of theater speaker configurations. [Details](#)
- A Study Group on Immersive Audio Implementation has been set up to identify any additional work that is needed to ensure interoperable immersive sound distribution. [Details](#)

A standard “Calibration Reference Wideband Pink Noise Signal and Test File” was published in 2016 and a Digital Cinema Package (DCP) for it is in preparation.

Digital Cinema (D-Cinema)

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

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

Current projects mainly focus on incorporating provisions for stereoscopic subtitles into existing D-Cinema documents, updating encryption documents and updating facility list management documents. A Working Group is also considering integration of D-Cinema additional frame rate documents. [Details](#)

Cinema Content Creation Cloud (C4) Identification (ID) System

This Metadata and Registers committee document was published in the last quarter. [Details](#)

Constrained Application of ST 268 - HDR DPX

Drafting of this standard to create a profile of the DPX file format standard (that will be ST 268-2) to carry HDR / WCG is well-advanced. [Details](#)

Material Exchange Format – MXF This widely-used file-based media format does not stand still and there are always projects adding features and mappings to the MXF suite of standards or creating constraints for improved interoperability in a variety of application areas. There are currently 10 MXF projects in process. [Details](#)



SMPTE® Standards Quarterly Report: Detailed Account

As a result of SMPTE Standards Committee Meetings

20-23 Sept. 2017

London, UK

Hosted by Sky Television

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 specific activities.

Go to www.smpte.org/standards for more information.

This report is a snapshot in time and should not be regarded as formal minutes, a positioning statement or an analysis piece. Please provide your comments or suggestions at standards@smpte.org

If you are interested in learning more about the SMPTE Standards program, please contact the [Director of Standards and Engineering](#)

Introduction

For some help getting started with the SMPTE Standards process and some of the conventions / acronyms used in this report, please jump to the [Annex](#).

Future Meetings

The next quarterly Standards meeting round will be held 4-6 Dec. 2017 in Santa Clara, CA, USA and will be hosted by Arista.



Further quarterly Standards meeting rounds are planned for:

March 2018	SMPTE Headquarters, White Plains, NY, US
June 2018	SMPTE Toronto Section, Ryerson University, Toronto, CA
Sept. 2018	EBU, Geneva, CH
Dec. 2018	TBA

In addition to the meetings of SMPTE Technology Committees (TCs) and their sub-groups, detailed below, there was a short report on the Joint Task Force on Networked Media and the IBC IP showcase as well as plans to adapt SMPTE standards to be more in line with ISO directives.

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 \(35PM\)](#)

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

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



Details from each Technology Committee (TC) meeting

Essence Technology Committee (TC-10E) chaired by Ed Reuss and Michael Zink

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

Video compression standards in SMPTE

The currently-active video compression projects are:

SMPTE 2073 Document Suite: VC-5 Video Essence

[DG Project](#)

This project standardizes the CineForm / GoPro video compression system. 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, in revision to cover additional Parts). Includes Reference Decoder, Sample Encoder, sample bitstreams
- 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)
- 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)
- ST 2073-7 – Metadata (this will provide a basic set of metadata for input image format and also facilitate round-tripping embedded metadata from other standards by use of identifiers – ACES, XMP, DPX, MXF, ALE and vendor-specific).
- ST 2073-10 - VC-5 Mapping into the MXF Generic Container – this TC-31FS work was published Q2-2017.

Status: Parts 1-4 are published, but Part 2 is being revised in this [Drafting project](#) to add test materials to support content defined in Parts 5 and 6 (which are ready for publication when Part 2 is ready); the revised Part 2 is at pre-DP ballot review, closing 26 Sept. Parts 5 and 6 are ready for publication, awaiting Part 2 revision.

All test materials are on a SMPTE “bitbucket” repository.



Work on Part 7 has resumed in this [Drafting project](#). The test materials will require addition of metadata, so that Part 2 will need additional revision.

The VC-5 group is holding meetings every 2 weeks.

Business Impact: Interoperability between systems

VC-2 video compression projects 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
- ST 2042-2: VC-2 Level Definitions
- RP 2042-3: VC-2 Conformance Specification
- ST 2042-4: Mapping a VC-2 Stream into the MXF Generic Container
- RP 2047-1: VC-2 Mezzanine Level Compression of 1080P High Definition Video Sources
- ST 2047-2: Carriage of VC-2 Compressed Video over HD-SDI
- RP 2047-3: VC-2 Level 65 Compression of High Definition Video Sources for Use with a Standard Definition Infrastructure
- ST 2047-4: Carriage of Level 65 VC-2 Compressed Video over the SDTV SDI
- RP 2047-5: VC-2 Level 66 Compression of UHD for use with HD Infrastructure

Revision: ST 2042-1 - VC-2 Video Compression Standard

[Drafting Project](#)

This revision adds a high quality profile to support Archiving and Production applications.

Status: Published in the last quarter.

Revision: ST 2042-2 - VC-2 Level Definitions

[Drafting Project](#)

Revision needed to cover ST 2042-1 Revision and new RP 2047-5

Status: Passed DP vote 1 Sept.

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

[Drafting Project](#)

This revision will specify test materials supporting ST 2042-1.

Status: This work is just getting underway.



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

[Drafting Project](#)

The project scope is: Specify a new level of VC-2 compression with coding constraints that enables UHDTV video to be compressed to the same bit rates as those of uncompressed HDTV signals.

Status: Published in the last quarter.

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

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

[DG Project](#)

This project group will draft the following suite of documents dealing with the use of fixed pixel matrix reference displays:

ST 2080-1: Reference White Luminance Level and Chromaticity (published)

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

ST 2080-3: Reference Viewing Environment Characteristics

RP 2080-4: Full Measurement / Calibration

ST 2080-x: Reference Display Characteristics

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

Status:

Part 1 is published (and ready for its one-year review).

Part 2 is published (and ready for its one-year review). A revision [Drafting Project](#) has been started. It will clarify line numbering conventions, define D93 white point more correctly and fix other minor issues.

Part 3 was published in Q2 2017.

Part 4 is nearly ready for pre-FCD-ballot review. Documentation on the last test pattern needs completion.

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



New Recommended Practice: RP 2093 - Television Lighting Consistency Index (TLCI)

[DG Project](#)

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 with regard to color reproduction for television.

Status: The DG is working on pre-FCD-ballot comment resolution and the draft will be updated to reflect the agreed resolution. The document will include spreadsheet elements for easy extraction of parameter values.

New Standard: ST 2100-1 - Definition and Representation of Haptic-Tactile Essence

[DG Project](#)

This project deals with technology to allow a remote viewer to receive and experience not only audio and video, but also the haptic or tactile “feeling” and “impact” of an event, regardless of the transmission means. There is an [associated transport project](#) in TC-32NF.

Status: ST 2100-1 was published in the last quarter and this project will be closed.

Revision: ST 2086 - Mastering Display Color Volume Metadata Supporting High Luminance and Wide Color Gamut Images

[DG Project](#)

This project will add recommendations on value ranges and minimum precisions for metadata items as well as a means to signal unknown values and update a normative reference.

Status: The revised document is in FCD ballot, closing October 1.

New Document: P3 Colorimetry

[DG Project](#)

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

Status: The group has held some initial discussions on the accuracy required for colorimetry coordinates. It expects that this document will be a Standard.



Other TC-10E Business

Project proposals to revise the following documents to add UHD image definitions have been drafted:

- A [Drafting Project](#) proposal to revise ST 2046-1:2009 Specifications for Safe Action and Safe Title Areas for Television has been issued.
- A [Drafting Project](#) proposal to revise RP 2046-2:2009 Safe Areas for Protection of Alternate Aspect Ratios has been issued.

There is a new project proposal in preparation for FS-Gamut and FS Log Characteristics of Camera Systems.

[Film Technology Committee \(20F\) chaired by John Miller](#)

The application of the general scope as it applies to application of mastered essence to theatrical film distribution, including, media and component creation, marking, laboratory methods, reproduction, packaging, projection, and related topics. Additionally film capture, editing and recording.

This group does not meet during the quarterly sessions that this report covers. The next meeting of this group will be during the Annual Technical Conference in Hollywood, CA, October 2017.

[Digital Cinema Technology Committee \(21 DC\) chaired by Dean Bullock and Chris Witham](#)

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

Facility List Management projects

These two projects are being managed in one DG

Revision: ST 430-7 - Facility List Message

[Drafting Project](#)

The revision will add the Extended Facility List Message with the objective of minimizing changes over current practice, while simplifying extensibility and introducing additional features as required.

Status: The revised document was published in the last quarter as ST 430-16, so that existing implementations of ST 430-7 are not affected by the extensions. ST 430-7 will be withdrawn.



New Standard: ST 430-15 - Facility List Message Exchange Protocol

[Drafting Project](#)

Project scope: Specify a protocol to efficiently publish, retrieve, synchronize and submit aggregate FLM instances over the web, based on current industry practices.

Status: ST 430-15 was published in the last quarter.

Stereoscopic Subtitle / Timed Text projects

Work on this topic affects the documents below and is being handled by a DG.

Revision: ST 428-7 - D-Cinema Distribution Master - Subtitle

[DG Project](#)

This revision results from a request from Japan Digital Cinema Forum (JDCF). The work involves clarification of ST428-7 provisions and revision to better match Japanese content creator requirements.

Status: Some drafting of the ST 428-7 revision was completed, but the JDCF request has since been withdrawn.

New Standard: ST 429-17 - Digital Cinema XML Constraints

[DG Project](#)

This project will draft a Standard containing the XML constraints already reviewed by the Stereoscopic Subtitle and Timed Text Rendering drafting group.

Status: ST 429-17 draft has been sent to 21DC Chairs for DP vote.

Revision: ST 429-5 - Digital Cinema Packaging - Timed Text Track File

[DG Project](#)

This revision project will address issues that arose during an earlier ST 428-7 revision.

The scope has been expanded to include IMF application, references to MXF now allow different Generic Containers, optional Timed Text Descriptor items have been added (including Stereoscopic Subtitles).

Status: ST 428-5 revision has been sent to 21DC Chairs for DP vote.

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

[DG Project](#)

This amendment will address issues that arose during an earlier ST 428-7 revision.

Status: This document has been held awaiting UL value completion. At the meeting, assistance was offered to get the UL work completed quickly.



Business Impact of Stereoscopic Subtitles projects: Compatibility and Interoperability

Compliance to NIST SP800-56B

[SG Project](#)

Scope: Investigate requirements for compliance to NIST SP800-56B, and identify any impact to SMPTE standards.

Status: The group has completed a report. No SMPTE standards are impacted and the group will be disbanded.

Amendment: ST 429-6 - Digital Cinema Packaging - MXF Encryption

[DG Project](#)

This project amends ST 429-6. TC-35PM has requested an amendment to ST 429-6 (MXF Track File Essence Encryption) for use by IMF by relaxing mandatory use of ST 429-3 (Sound and Picture Track File). Amendments to other TC-21DC documents are also requested to support IMF.

Status: The document has just started DP ballot, closing 5 Oct..

Additional Frame Rates documents

[WG project](#)

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

Status: The group has submitted a report of its findings to the TC, with recommendations for work on affected standards. Projects for the revision of those standards will be set up.

Immersive Audio Projects in TC-21DC

New Standard - SMS OMB Comm. Protocol

[Drafting Project](#)

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.

Status: This project was approved in late Aug. 2017. There have been no meetings yet.

New Recommended Practice – SMS OMB Comm. Reference Method



[Drafting Project](#)

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.

Status: This project was approved in late Aug. 2017. There have been no meetings yet.

New Standard - DCP Operational Constraints for Immersive Audio

[Drafting Project](#)

This project will define all necessary constraints for a DCP that carries ST 2098-2 essence.

Status: This project was approved in early Aug. 2017. A drafting group has been set up and a draft document has been submitted and reviewed.

New Standard - Immersive Audio Track File

[Drafting Project](#)

This project will create a track file specification for use with ST 2098-2 Immersive Audio Bitstream and specify how to use the track file in an ST 429-7 CPL and how to deliver the Immersive Audio Key in a KDM.

Status: This project was approved in early Aug. 2017. A drafting group has been set up and a draft document has been submitted and reviewed.

Revision : RDD 29 - Dolby Atmos® Bitstream Specification

[Drafting Project](#)

Since RDD29 was published in 2014, differences between this RDD and actual implementations have been discovered. This document will be updated to reflect those differences.

Status: This project was approved 1 Aug. 2017.



Television and Broadband Media Committee (24TB) chaired by Michael Dolan

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.

ST 2064 suite of documents on A-V Sync Measurement and Assessment

DG Project

The scope of this group is “Define recommended techniques for audio-video synchronization error measurement, and techniques and environment for synchronization assessment”. It is developing a document suite based on audio and video fingerprints:

- Part 1: Fingerprint Generation
- Part 2: Fingerprint Stream Transport (includes VANC in SDI/HD-SDI, IP, MPEG)
- Part 3: Fingerprint File Binding
- Part x: Engineering Guideline

Status: Parts 1 and 2 are published. The draft of the Engineering Guideline is almost complete. The need for Part 3 is being reconsidered.

Business Impact: Improved quality of experience and interoperability between systems

New SMPTE 2112 document suite on Open binding technology for persistent content identification in A/V essence

DG Project

This project will develop an open binding technology standard (e.g., watermarks, fingerprints, metadata sidecars, etc.) for embedding end-to-end persistent content identifiers into audio/video essence in a way that survives processing, compression and distribution. The group’s focus was on carrying Ad-ID and EIDR identifiers. More recently, the group identified the need for “Open Binding of Distributor IDs and Time Labels to Content (OBID-TLC)” . Both types of watermark may be carried simultaneously and independently decoded (including up to four separate TLC’s).

RP 2112-1 - Audience Measurement Using OBID and OBID-TLC

Status: The document is well advanced in the drafting process.

EG 2112-2 - Audience Measurement Ecosystem

Drafting Project

Status: The document is well advanced in the drafting process.

ST 2112-10 - Open Binding of IDs (OBID)

Drafting Project



Status: The document is almost ready for pre-FCD review (including the symbol table, which is a non-prose element)

RP 2112-11 - OBID Conformance Test Materials

[Drafting Project](#)

Status: The document is ready for pre-FCD review (including sample Ad-ID and EIDR files)

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

[Drafting Project](#)

Status: The document is progressing in early form

RP 2112-21 - OBID-TLC Conformance Test Materials

The group has not not made a decision yet whether to proceed with this work

Revision: ST 2016-1 - AFD and Bar Data

[DG Project](#)

ST 2016-1 does not currently include UHD formats. SMPTE has been requested by ATSC, CTA and DVB to update it.

Status: The UHD information has been added in a working draft. Additional work is underway to signal the original HDTV format.



Cinema Sound Systems (25CSS) chaired by Brian Vessa 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, ASA.

New SMPTE 2096 document suite: Digital Cinema Sound System Setup and Calibration (“B-chain Modern Calibration Procedure”)

[DG Project](#)

This group is creating documents that codify and expand currently-practiced measurement methodology using today’s technology and analyzers into step-by-step procedure(s) for measuring and calibrating the frequency response and sound pressure levels of the B-chain sound system in indoor theater spaces. A major rewrite was completed and submitted to the DG in early 2015-02. The DG recently decided to split the work into:

RP 2096-1 Cinema Sound System Baseline Setup and Calibration

RP 2096-2 Cinema Sound System Recurring/Maintenance Setup and Calibration

Status: The two RP’s were published in the last quarter and the project has been deactivated.

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, requirements for backwards compatibility and other standards the group determines to be necessary to achieve D-Cinema interoperability.

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



Immersive Sound Model and Bitstream

[DG Project](#)

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

New Standard: ST 2098-1 - Immersive Audio Metadata

[Drafting Project](#)

The group's initial focus was on this metadata definitions document.

Status: The document was completed, and was recently updated to harmonize with other Standards / EG's.

New Standard: ST 2098-2 - Immersive Audio Bitstream Specification

[Drafting Project](#)

At a TC meeting in July 2016, a decision was taken to use a Dolby input document as the starting point for ST 2098-2.

Status: Drafting work is well-advanced. Good progress was made at a recent face-to-face meeting; there are just a few minor issues to resolve.

New Standard: ST 2098-5 - D-Cinema Immersive Audio Channels and Soundfield Groups

[Drafting Project](#)

Status: The document is at ST Audit, closing 12 October.

Digital Cinema Immersive Audio Renderer

[DG Project](#)

This DG is managing the following two document drafting projects:

New Engineering Guideline: EG 2098-3 - Immersive Audio Renderer Expectations

[Drafting Project](#)

Specifies the baseline expected behavior of a generic renderer in response to particular bitstream expressions and playback environment parameters.

Status: Near complete; awaiting industry testing roadmap.

New Recommended Practice: RP 2098-4 - Immersive Audio Renderer Interoperability Testing Procedure

[Drafting Project](#)



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

Status: Near complete; awaiting industry testing roadmap.

Study Group: Immersive Audio Implementation

[SG Project](#)

It has been recognized that a standardized Immersive Sound Model and Bitstream is only one part in ensuring interoperable immersive sound distribution. This SG has been formed to identify any additional work that is needed. The SG was approved 21 Nov. 2016.

Status: The final Study Group draft was posted 18 September 2017. Additional work has been identified and four project proposals for TC-21DC were prepared; details [here](#). The SG work is expected to conclude at the end of October 2017.

Other TC-25CSS Business

There has been some delay in preparing a DCP for the ST 2095-1 Calibration Reference Wideband Digital Pink Noise Signal. There has been no further progress in the last quarter.

Metadata and Registers Committee (30MR) chaired by John Hurst and Mike DeValue

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)

[SG Project](#)

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

Status: The SG Drafting Project proposal for RP 205 revision was approved in the last quarter (see below). There have been no other SG issues.

UMID-related Standards:



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

New Document: UMID Resolution Protocol

[Drafting Project](#)

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.

Status: An initial strawman draft was submitted to the UMID Related Standards DG. There has been no further progress in the last quarter.

Revision: ST 330 - UMID

[Drafting Project](#)

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.

Status: A final draft revision is almost complete. Some time-related aspects are being reviewed by SMPTE time experts.

Revision: RP 205 – UMID Applications

[Drafting Project](#)

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

Status: The work has not yet started.

New Standard: ST 2102 - SMPTE Core Metadata Set

[DG Project](#)

This group's scope is to define an interoperable minimum core set of descriptive metadata for professional motion imaging applications and users.

Existing SMPTE metadata is application-specific and is not supported right through media workflows.

Status: DP ballot is underway, closing 25 Sept. 2017. (At close, results are: 17 Affirmative, 0 Negative, 2 Abstain)

Business Impact: Potential foundation for Metadata



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

[DG Project](#)

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

Status: The document passed FCD ballot 20 October 2016 with 15 comments to resolve. A Comment Resolution draft has been completed. The DG Chair will consult with commenters to see whether the latest draft resolves their comments.

Revision: ST 336 - Data Encoding Protocol Using Key-Length-Value

[DG Project](#)

Revise ST 336 to update references and review whether its provisions reflect current register operation.

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

Amendment: ST 335 - Metadata Element Dictionary Structure

[Drafting Project](#)

This project corrects an error that was introduced in ST335:2012 table 1.

Status: The ST 335 amendment is ready for FCD ballot. The TC Chairs will initiate the ballot.

New Standard: ST 2114 - Cinema Content Creation Cloud (C4) ID

[DG project](#)

When using cloud services for storing, processing and exchanging content data, it is essential to identify it in a robust and immutable fashion. Current data identification systems have problems with uniqueness, consistency, usability and security.

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

Revision: RP 2079 - Digital Object Identifier (DOI) Name and Entertainment ID Registry (EIDR) Identifier Representations

[Drafting project](#)

Revision of SMPTE RP 2079:2013 to reflect the recently published IETF RFC 7972, which specifies a URN representation of EIDR Identifiers, and recent improvements to the EIDR online resolution service.

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

Metadata Definition

WG Project

This Working Group (30MR10) co-ordinates the process for adding or maintaining metadata items in registers. Experts within the WG recently cleaned up the register data, in particular the removal of redundancy. Registers are now maintained and balloted in xml format (spreadsheets were previously



used). An online tool has been introduced to assist with the development of metadata entries and their acceptance for batched ballots.

Status: The next revision of the four registers in xml form (code-named “Brown Sauce”) has been published. A new project to develop the next publication will be initiated.

The Metadata Registers Development Area is available here: <https://registry.smpte-ra.org/pages/>

An Administrative Guideline (AG18) that defines the process for adding new UL definitions to the metadata registers has been published.

The existing Standards defining ULs for Elements, Groups, Types and Labels will be revised in line with AG18.

Create and Update Essence Element Register Contents

[DG Project](#)

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

Status: A draft register has been compiled for existing essence elements and is available in spreadsheet form at the above URL (login required).

[File Formats and Systems Committee \(31FS\) chaired by Bruce Devlin and Paul Gardiner](#)

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

Material Exchange Format (MXF)

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

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

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

New Document: ST 377-2 - KLV-encoded extension syntax (KXS)

[DG Project](#)



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

Status: This document was held awaiting publication of the registers containing ULs used by this document. Publication has now occurred and the document will have a final DG review on 6 Oct. and then proceed to pre-DP ballot review.

Revision: ST 380 - MXF Descriptive Metadata Scheme 1

[DG Project](#)

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.

Status: The draft revision of ST 380 has been updated to address comments from the Feb. 2014 FCD ballot that failed numeric consensus. The draft will be prepared for a second FCD ballot.

New Document: ST 381-4 - AAC Family Compressed Digital Audio in MXF

[DG Project](#)

This new MXF mapping document will cover all the variants of AAC that are used in broadcast applications.

Status: ST 381-4 was published in the last quarter and the project will be closed.

New Recommended Practice: RP 2092-2 - Ad-ID Digital Ad Slate for MXF

[DG Project](#)

The group will develop a Recommended Practice, with principal input document being AMWA AS-12 (which this document will ultimately replace). An associated Ad-ID representation project is complete in TC-30MR.

Status: The proponents have decided to terminate this project.

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

[Drafting Project](#)

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

Status: This work has been deferred in favor of the ST 377-1 project below, but can now resume.

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

[DG Project](#)

This is a constrained revision to roll-up two amendments and check Normative References and deal with any consequences arising.



Status: This project will be handled in two phases to separate the amendment roll-up from the other issues. It was agreed that this will be a project to create a stable ST 377-1 and an [additional project](#) introduced to deal with substantive issues that may be more complicated to implement. There have been no comments on the first-phase revision, and it will be sent for FCD ballot.

Revision: ST 381-2 - Material Exchange Format (MXF) - Mapping MPEG Streams into the MXF Constrained Generic Container

[Drafting Project](#)

This is a constrained revision to update references and bibliography.

Status: The draft revision passed FCD ballot on 10 May 2017 with one comment on adding a Multi-channel audio ID. The group has decided to add this descriptor and the project scope will be adjusted accordingly.

Revision: ST 381-3 - Material Exchange Format - Mapping AVC Streams into the MXF Generic Container

[Drafting Project](#)

This is a constrained revision to update references and bibliography.

Status: The revised Standard is now in the publication queue.

Revision: RDD 32 - XAVC MXF Mapping and Operating Points

[Drafting Project](#)

A description of the operating points newly added since 2014 is required.

Status: The revised Registered Disclosure Document is now in the publication queue.

Revision: RDD 44:2017 - Apple ProRes in MXF

[Drafting Project](#)

Add provisions needed for IMF and clarify the usage of these provisions for other applications.

Status: The revised Registered Disclosure Document is now at RDD ballot, closing 5 Oct. 2017.

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. A multipart suite of documents is planned:

Part 1 deals with 'AXF Structure and Semantics' and includes an XML schema. This document is published.

Part 2 will cover "External Uses of XML Schema".



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

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

[WG Project](#)

A revision to the Part 1 document was published in Q2 2017. The document has been published by ISO as a Publicly Available Specification, ISO/IEC DIS 12034-1.

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

[WG Project](#)

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.

Status: Work is progressing; still a lot to do.

New Standard: ST 268-2 - Constrained Application of Digital Moving-Picture Exchange (DPX) Format for High Dynamic Range

[DG Project](#)

This project will develop a new constrained standard for ST 268:2014 (DPX) for the application of high dynamic range (HDR) and wide color gamut (WCG) pictures. This will be a new engineering document and not a revision of ST 268. It is intended to be as constrained as possible to achieve the best interoperability.

Status: The draft ST 268-2 passed FCD ballot on 30 Aug. 2017 with 43 comments to resolve. Comment resolution is underway.



Network and Facilities Architecture Committee (32NF) chaired by Friedrich Gierlinger and John Snow

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

Working Group on SDI Interfaces

WG Project

The Working Group (32NF40) scope is:

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

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

The WG Chair gave a report on its projects, detailed below.

New Document Suite: EG 2111 on SDI Interfaces

DG Project

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. As this task is potentially large, it was decided at the July 2015 meeting that initial focus would be on HD and UHD SDI interfaces.

Status: Three EGs, in the form of posters, are well-advanced covering:

EG 2111-1 SD and HD-SDI Roadmap

EG 2111-2 UHD-SDI Roadmap

EG 2111-3 10G-SDI Roadmap

The first of the SMPTE wall charts (proposed EG 2111-2 UHD-SDI Roadmap), was published in the July edition of the SMPTE journal.

The second wall chart (proposed EG 2111-3 10G-SDI Roadmap), is currently in development for publication in the next SMPTE journal.



**Revision: EG 34 - Pathological Conditions in Serial Digital Video Systems
and**

Revision: RP 198 - Bit-Serial Digital Checkfield for Use in High-Definition Interfaces

[DG Project](#)

It has been agreed that RP 198 – HD Check-field – is higher priority than EG 34, in order to get 3Gb/s interfaces specified, and should be completed first.

Status: The RP 198 draft revision closed FCD ballot 15 May 2017 with 72 comments to resolve. DG meetings have been setup to address the comments.

**New Document Suite: SMPTE 2091 - Broadcast and Video Serial Digital Fiber Transmission Systems –
Ruggedized Connector Interfaces**

[DG Project](#)

This project is creating a standard for a ruggedized optical connector suitable for SDI as used in HDTV and UHDTV systems. The system also has the following features: automatic dust protection, automatic laser source eye protection, high durability, low maintenance and small size. The document will include a section on labeling requirements for improved interoperability.

It was decided that connectivity requirements for the ST 2036-4 interface would be removed from this draft standard and moved to a new RP. So it is expected that the standard will become ST 2091-1 and the recommended practice RP 2091-2.

Status: ST 2091-1:2017 published on February 13th 2017.

RP 2091-2 completed pre ballot review 19th September. Comments were received and have been addressed and the WG requested that RP 2091-2 be sent for FCD ballot.

New ST 2100 Suite: Transport of Haptic-Tactile Essence

[DG Project](#)

This project was split away from the [TC-10E project](#) on *Coding* of Tactile Essence some while ago in order to focus on defining the *transport* of this essence.

Status: This group has restarted meetings, having been on hiatus to focus effort on the 10E document ST 2100-1 that has now been published. Two Drafting Projects are set up (both projects are still at the proposal stage):

[Drafting Project ST 2100-2: Coding and Transport Of Haptic-Tactile Essence in AES3](#)

[Drafting Project ST 2100-3: Coding and Transport Of Haptic-Tactile Essence in Ancillary Space](#)



New Standard: ST 2108 - Extended HDR/WCG Metadata Packing and Signaling for Serial Digital Interfaces (and associated document revisions)

[DG Project](#)

This project will define an HDR and WCG carriage mechanism to provide information to ensure that content is correctly processed in a production facility as well as correctly displayed on professional reference displays using SMPTE interface standards.

Several SMPTE interface standards will require amendment as part of this work. The plan is to put static HDR/WCG signaling parameters in the Payload ID (ST 352), and all other HDR-related metadata in a **new** “HDR/WCG Ancillary Data Packet”, documented in ST 2108.

Status:

ST 372 revision was elevated to DP by vote at the TC meeting. [Drafting Project](#)

ST 425-1 revision was elevated to DP by vote at the TC meeting. [Drafting Project](#)

ST 2081-10 and ST 2082-10 are being revised in WG 32NF-70 and ST 2081-11, ST 2081-12, ST 2082-11, ST 2082-12 will follow; see [below](#).

ST 2036-3 revision will be posted for FCD ballot. [Drafting Project](#)

ST 292-1 revision is complete and it will be posted for pre-FCD ballot review. [Drafting Project](#)

Next up for revision in this DG: ST 425-3, ST 425-5.

Work on the new document, ST 2108, will resume now that the revisions are well under way.

Working Group on Video Over IP

[WG Project](#)

This Working Group (32NF60) was established to handle projects related to IP transport of media. The WG has produced the seven-part ST 2022 suite of standards.

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

New document suite: ST 2110 - Professional Media over Managed IP Networks

[DG Project](#)

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 use VSF Technical Recommendations TR-03 and TR-04 as their starting point.

The suite of ST 2110 documents currently comprises:

New Standard: Part 10 - System Timing and Definitions

[Drafting Project](#)



New Standard: Part 20 - Uncompressed Active Video

[Drafting Project](#)

New Standard: Part 21 - Traffic Shaping and Delivery Timing for Video

[Drafting Project](#)

New Standard: Part 30 - PCM Digital Audio

[Drafting Project](#)

New Standard: Part 31 - AES3 Transparent Transport

New Standard: Part 40 - Ancillary Data

[Drafting Project](#)

The group is also developing this document that defines constraints on ST 2022-6 streams for interoperation with ST 2110 streams:

New Standard: ST 2022-8 - Interoperation of ST 2022-6 streams (had been planned to be ST 2110-50)

[Drafting Project](#)

Status: ST 2110 Parts 10, 20, 30 are approved for publication. They are being held until Part 21 is finished because Part 21 is normatively referenced in Part 20.

Part 21 is in pre-DP ballot review, closing 30 Sept. 2017.

Part 40 is in FCD ballot, closing 25 Sept. 2017.

Drafts exist for Parts 31 and ST 2022-8, but the above Parts have taken precedence.

Revision: ST 2022-7 - Seamless Protection Switching of RTP Datagrams

[DG Project](#)

A revision to SMPTE ST 2022-7 to add a Ultra-Low-Skew receiver class, and to make it applicable to any RTP flow (rather than just ST 2022 flows). This is based on a one-year review. The project scope was amended at the March 2017 meeting to extend ST 2022-7 to provide seamless protection switching of a range of professional media RTP streams, including AES67 and ST 2110, hence the new title above.

Status: An updated WD was submitted to the WG on 19 Sept. 2017. The WG will consider consensus for pre-FCD-ballot review.

The WG has also been examining an issue with ST 2038 – Carriage of Ancillary Data Packets in an MPEG-2 TS. The horizontal offset field is not large enough to deal with one corner case.



Working Group on Ultra HD SDI Interfaces

[WG Project](#)

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

WG Status: Although there are separate drafting groups for 6Gb/s and 12Gb/s (see below), the WG generally develops its documents so that the two are kept “in step”. Additional work has been passed to this WG from the [SDI WG HDR signaling project](#) to include HDR signaling over these UHD-SDI standards. It was decided at this meeting round that the next documents to be developed will be the ST 2083 suite, followed by the stereoscopic documents.

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

[DG Project](#)

This project 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) A [one-year review project](#) has been initiated.

ST 2081-11: 2160-line and 1080-line Source Image and Ancillary Data Mapping for **Dual-link** 6G-SDI (published)

ST 2081-12: 4320-line and 2160-line Source Image and Ancillary Data Mapping for **Quad-link** 6G-SDI (published)

ST 2081-30: [Drafting Project](#) Transport of Multiple 3Gb/s or 1.5Gb/s signals on a 6G-SDI link

Status: ST 2081-30 is in the publication queue.

The one year review revision of ST 2081-10 includes additions to signal HDR/WCG. It is ready for pre-DP-ballot review.

The one year review of ST 2081-11 and -12 is due, and the additions to signal HDR/WCG are being included.

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

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

[DG Project](#)

This project is responsible for the following documents:

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



ST 2082-10: 2160-line and 1080-line Source Image and Ancillary Data Mapping for **Single-link** 12G-SDI (published) A [one-year review project](#) has been initiated.

ST 2082-11: 2160-line and 1080-line Source Image and Ancillary Data Mapping for **Dual-link** 12G-SDI (published)

ST 2082-12: 4320-line and 2160-line Source Image and Ancillary Data Mapping for **Quad-link** 12G-SDI (published)

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

Status: ST 2082-30 is in the publication queue.

The one year review revision of ST 2082-10 includes additions to signal HDR/WCG. It is ready for pre-DP-ballot review.

The one year review of ST 2082-11 and -12 is due, and the additions to signal HDR/WCG are being included.

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

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 in both digital and analog forms.

WG Status: The WG met during this meeting round to discuss its projects, noted below. The topic of timing after rasters become a thing of the past (e.g. elementary streams) also arose. This topic will be developed in future meetings.

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

ST 2059 Interoperability Testing

[DG Project](#)

The aim is to confirm that the provisions of the standards are unambiguous and that the technology does, indeed, yield 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 three rounds of testing, all hosted by FOX NE&O in Houston, TX, USA:

- Nov. 2015
- June 2016



- March 2017

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

[DG Project](#)

This DG will revise these two PTP standards in the light of interop testing since original publication.

Status: This DG waited for the March 2017 interop tests to complete before starting revision work. A number of comments, mostly on ST 2059-2, have been posted so far, including issues uncovered during interops. The interops have not yet tested the generation of “Time of Day” ST 12-1 codewords from PTP, due to a lack of implementations. However, it emerged during the TC meeting that at least two implementations now exist.

Development of a suite of PTP synchronization Engineering Guidelines

[DG Project](#)

This group manages the development of a suite of Engineering Guidelines related to the ST 2059-1 and ST 2059-2 Synchronization documents in the drafting projects below.

These documents are an important way to ensure that new implementers, who may not have been part of the development, will correctly implement the system.

New Engineering Guideline: EG 2059-10 - Introduction to the New Synchronization System

This document will provide users of the system, both implementers and operators, to understand the context and technology of what some may see as a major technology shift.

Status: This document is published, but kept in this report to give a clear picture of the suite.

New Engineering Guideline: EG 2059-11 – Management of Time Discontinuities

[Drafting Project](#)

Status: A WD was submitted 20 April 2015; no progress since.

New Engineering Guideline: EG 2059-12 - Systemization Considerations for using SMPTE ST 2059

[Drafting Project](#)

Status: This document had previously been called “Facility Migration Guide”. A WD was submitted 23 April 2015; no progress since.

New Engineering Guideline: EG 2059-14 - Best Practices for Large Scale SMPTE ST 2059-2 PTP deployments

[Drafting Project](#)

Status: The most recent WD was submitted 26 Nov. 2014, no progress since.



New Time Labeling System

Status: At a WG meeting in early June, a decision was taken to request the parent TC to:

- close both existing time label projects (SMPTE 2103 suite and SMPTE 2105 suite)
- keep the documents available
- entertain a single proposal to start a new project to create a single new time label (with new documents not copied from the existing ones)

This action followed strong user feedback at the Timecode Summits (report [here](#)) that SMPTE should standardize just one time label format.

There have been no proposals submitted.

New Recommended Practice: RP 2104-1 - Date-Time Terms and Definitions

[Drafting Project](#)

It has been agreed that this document will comprise two Parts.

Part 1 will be Date-Time Terms and Definitions; this is required urgently so that it can be a Normative Reference for the other time / sync documents.

Part 2 will be other Media Terms and Definitions.

Status: A draft of RP 2104-1 was posted for review and comment July 2015. There has been no progress since.

ST 337 family of documents

[DG Project](#)

Originally, this project was set up to manage individual drafting projects needed to introduce a code-point extension mechanism for documents in the ST 337 family; adding the extension mechanism in ST 337 and adding the extended data types in ST 338 as well as revising or adding any other documents as required.

When the extension mechanism was done, the DG was kept open to document other formats for encapsulation in AES3.

Status: The DG meets approximately bi-weekly. Drafting Projects currently being managed are:

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

[Drafting Project](#)

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.

Status: An initial draft document was submitted to the DG in Dec. 2016. A revised document is being drafted.

New Standard: Multi Dimensional Audio (MDA) in AES3 using ST 337

[Drafting Project](#)

Based on the MDA specification (ETSI TS 103 223), the project will develop a standard that describes the carriage of MDA over AES3.

Status: This project was approved in Nov. 2016. A draft document is awaited.

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

[Drafting Project](#)

This project will develop new documents for the open transport over AES3 of real-time, dynamic (time synchronous) audio metadata. The use of the KLV data type, defined in ST 355, is being considered.

Status: An updated draft was posted in August and reviewed in DG meetings. There is ongoing discussion. The DG was asked to consider whether a separate proposal for carrying ADM over AES3 could be integrated into ST 2109. After review, the consensus view was that this proposal should become a separate TC-32NF project.

Flow Control in Professional Media Networks

[SG Project](#)

This SG is investigating current and future professional media network management technologies, determining user requirements, transmission methods for management commands and providing background information. Key Elements in report:

- What Is Flow Management?
- Network Switch Architecture Overview
- Methods of Flow Switching
- Methods of Clean Switching Packetized Video
- Methods of Flow Control
- Control Protocols
- Congestion Control
- Recommendations for SMPTE Work

Status: The SG has completed the report and it is submitted to the TC for 2 week review, starting 23 Sept. 2017.



Media Systems, Control and Services Committee (34CS) chaired by Chris Lennon and Karl Paulsen

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

BXF Suite of Documents

This TC is responsible for a suite of documents defining the Broadcast Exchange Format, comprising:

ST 2021-1: General Information and Informative Notes

ST 2021-2: Protocol

EG 2021-3: Use Cases

EG 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 primarily an XML-based system that standardizes exchange of Schedule, As-run, Content Transfer instructions, Content-related metadata, Agency instructions, Content Delivery Specification metadata, and Quality Control requests and results. The group has an XML AHG which manages schema enhancements.

Features are steadily being added to BXF and these are batched into versions. The current published suite includes features introduced in versions up to BXF 5.0.

As work on BXF 5.0 was completed in the last quarter, the group is **inviting inputs for the next BXF version**, 6.0. Nine inputs have been received at the time of the meeting, including additional NABA and DPP work in BXF schema (Library Masters, CPL/OPL, UHD Air Ready Master, IMF Broadcast Delivery Spec, Delivery of TV Programs as AS-11 files).

BXF 5.0

[DG Project](#)

BXF 5.0 introduces new components and improvements to extend BXF functionality. There is work on Program Synopsis Support, QC Node, Point of Interest, Graphic Slate Template Support, NABA DPP Content Delivery Specification Schema, BXF SDK. There are also various small improvements to the suite of documents.

Status: BXF 5.0 documents, comprising revisions to Parts 1,2,3,4,9 and a new Part 6, were all published in the last quarter. It is expected that this project, and the associated drafting projects



below, will be closed and the DG will come off of a well-earned hiatus early in 2018 to start on BXF 6.0 work.

Revision: ST2021-1 Broadcast Exchange Format Requirements and Informative Notes

[Drafting Project](#)

Revision: EG 2021-2 - Broadcast Exchange Format (BXF) Protocol

[Drafting Project](#)

Revision: EG 2021-3 - Broadcast Exchange Format (BXF) Use Cases

[Drafting Project](#)

Revision: EG 2021-4 - BXF Schema Documentation

[Drafting Project](#)

New Recommended Practice RP 2021-6: BXF SDK

[Drafting Project](#)

Revision: RP2021-9 - Broadcast Exchange Format (BXF) Implementation

[Drafting Project](#)

Media Device Control over IP

[DG Project](#)

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

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

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

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

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

ST 2071-4: Media Device Control - Capability Interface Repository

WSDL & XML Schemas are included.

Defines the Capability Interface definitions/API and systemic requirements for a repository/registry that can contain Capability Interface definitions, their corresponding documentation, programmatic artifacts, unit tests, and test cases. Provides a common infrastructure and API with which vendors and SDOs can register Capability Interface Definitions, their documentation, unit tests, and test



cases and where Developers, Customers, and Interface Consumers can query the definitions, documentation, and tests for the Capability Interfaces implemented by Devices and Services used within their systems.

(Proposed) ST 2071-5: Media Device Control - RESTful Protocol+HATEOAS – New intended project, proposal will be issued. HATEOAS = Hypermedia as the Engine of Application State.

Status:

Part 1 and Part 2 revisions were published Q4 2016.

Part 3 revision and Part 4: A DP ballot was held, but comments were permitted in error and there are doubts about the document version that was submitted. At this meeting, the TC Chair agreed to address the DP comments, and likely take both documents through the SMPTE process again, beginning at FCD ballot.

Part 5 [project proposal](#) exists. It is likely that this activity will follow completion of Parts 3 and 4.

Business Impact: Interoperable Media Device Control

Media Packaging and Interchange Committee (35PM) chaired by Pierre Lemieux

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) and high-dynamic range (HDR) imaging.

Overview of TC-35PM structure and IMF

This TC's work is currently about developing and maintaining the suite of Interoperable Master Format (IMF) documents.

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.



Current IMF Publications

ST 2067-2; Interoperable Master Format — Core Constraints

ST 2067-3: Interoperable Master Format – Composition Playlist

ST 2067-5: Interoperable Master Format – Essence Component

ST 2067-8, Interoperable Master Format — Common Audio Labels

ST 2067-20, Interoperable Master Format — Application #2

ST 2067-21, Interoperable Master Format – Application #2E (previous title Application #2 extended)

ST 2067-30, Interoperable Master Format — Application #3

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

ST 2067-100, Interoperable Master Format – Output Profile List

ST 2067-101, Interoperable Master Format – Output Profile List – Common Image Definitions and Macros

ST 2067-102, Interoperable Master Format – Output Profile List - Common Image Pixel Color Schemes

ST 2067-103, Interoperable Master Format – Output Profile List – Common Audio Definition and Macros

WG 35PM50: IMF Document Maintenance and Sample Material Interchange (SMI)

[IMF Plugfest Project](#)

The SMI group has held several plugfests, the most recent was at IRT, Munich, in May 2017.

The group is considering a plugfest focusing on OPL, probably after the development work (see below) is complete.

Content for IMF testing is hosted on a SMPTE resource using Signiant Media Shuttle.

The WG announced that a related activity has been launched – The IMF Users Group. More information:

<https://imfug.com>

IMF Document Maintenance

An IMF bug tracker (used for both bugs and improvement requests) is in operation at:

<https://standards.atlassian.net/projects/IMF/issues/IMF-1?filter=allopenissues>

These bug reports contribute to document revision work. At the time of the meeting, 36 issues were recorded; no issues are considered urgent to fix.



IMF Output Profile Lists (OPL) DG

An OPL defines the transformation of a single IMF Composition into deliverables appropriate for downstream distribution channels. This transformation consists of a sequence of parameterized steps, called Macros.

The group hopes to start on a new standard defining “Composite Operator” soon. It has identified a small correction needed in Part 101 and the need to support Dynamic Metadata in IMF.

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

[DG Project](#)

Add support for all the color schemes specified in ST 2067-21:2016 ("Application #2E") and transfer function as specified in ST 2084:2014

Status: The draft amendment completed ST Audit on 30 August 2017 and is in the publication queue.

Revision: ST 2067-101 - IMF Common Image Definitions and Macros

[DG Project](#)

This revision addresses four bug-tracker issues: IMF-15, 16, 17, 18 as well as editorial issues.

Status: The WD has completed pre-FCD-ballot review and comments are being resolved. FCD ballot is expected shortly.

New Standard: ST 2067-200 - Dynamic Metadata for Color Volume Transform for IMF Applications

[DG Project](#)

This document allows Dynamic Metadata for Color Volume Transform (as specified in ST 2094-2) to be added to compatible IMF Applications.

Status: A WD is expected in about a month following the meeting.

IMF Audio Essence Projects

IMF Audio Content and Element Kind Definition

[DG Project](#)

Define controlled vocabulary for Multi channel Audio (MCA) Audio Content Kind and MCA Audio Element Kind as they pertain to IMF. Note: It is expected that the scope of this project will be widened in the coming quarter.



Status: The group has developed a draft Engineering Report “IMF – Specifying Audio Element and Content Kind in Application #2E Compositions” that has been updated in response to comments received during its review period. A new standard is proposed in the report and a project has been set up to create it:

IMF Immersive Audio Bitstream Level 0 Plug-In

[Drafting Project](#)

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

- Mapping of ST 2098-2 bitstream into IMF Track Files

- Mapping of ST 2098-2 bitstream into the IMF Composition as Virtual Tracks

- Extension mechanisms for adding metadata to the Track File containing the ST 2098-2 bitstream

New Standard: ST 2067-50 - IMF Application #5 ACES

[DG Project](#)

This project will specify an application of the IMF framework that uses image essence conforming to SMPTE ST 2065-4 (ACES), and audio and subtitle essence as specified in SMPTE ST 2067-2.

Status: The Draft ST 2067-50 completed pre-FCD-ballot review with no comments. FCD ballot will start once its UL registers request has reached “mature” status (ballot now started, closing 1 Nov. 2017).

New Standard: ST 2067-9 - Sidecar Composition Map

[DG Project](#)

This project will define an XML document that (a) can be carried as an IMP asset and (b) associates other selected IMP assets (called Sidecar Assets) with one or more IMF Compositions

Status: The document was submitted for pre-FCD-ballot review and comments are being resolved. The DG Chair expects the document to be ready for FCD ballot one-to-two weeks after the meeting.

Amendment: ST 2067-40 - IMF Application #4 Cinema Mezzanine

[DG Project](#)

A plugfest specifically for ST 2067-40 was held in Erlangen, Germany 1-2 Mar. 2017 and some errors, including a UL error were discovered. This amendment will correct the errors. The plugfest report should be available soon.

Status: ST 2067-40 amendment is at FCD ballot, closing 10 Oct. 2017.



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New Registered Disclosure Document: RDD 45 - IMF Application for ProRes format

[DG Project](#)

This RDD specifies an IMF application based on Application #2E (SMPTE ST 2067-21) that uses Apple ProRes image essence (as specified in SMPTE RDD 44) instead of JPEG 2000 image essence.

Status: Project approved 23 Aug. 2017. The RDD ballot is underway, closing 5 Oct. 2017.



SMPTE Standards Publications in the Last Quarter

10E Essence:

[ST 2042-1:2017 VC-2 Video Compression](#)

[RP 2047-5:2017 VC-2 Level 66 Compression of Ultra-high Definition Video Sources for use with a High Definition Infrastructure](#)

[ST 2100-1:2017 Definition And Representation of Haptic-Tactile Essence](#)

20F Film:

21DC Digital Cinema:

[ST 430-15:2017 D-Cinema Operations — Facility List Message Exchange Protocol](#)

[ST 430-16:2017 D-Cinema Operations — Extended Facility List Message](#)

24TB Television & Broadband Media:

25CSS Cinema Sound Systems:

[RP 2096-1:2017 Cinema Sound System Baseline Setup and Calibration](#)

[RP 2096-2:2017 Cinema Sound System Maintenance Calibration](#)

30MR Metadata & Registers:

[ST 336:2017 Key-Length-Value](#)

[ST 2114:2017 Unique Digital Media Identifier \(C4 ID\)](#)

[RP 2079:2017 Digital Object Identifier \(DOI\) Name and Entertainment ID Registry \(EIDR\) Identifier](#)

31FS File Formats & Systems:

[ST 381-4:2017 Mapping AAC Compressed Audio into the MXF Generic Container](#)

32NF Network & Facilities Architecture:

34CS Media Systems, Control & Services:

[ST 2021-1:2017 Broadcast Exchange Format \(BXF\) — Requirements and Informative Notes](#)

[ST 2021-2:2017 Broadcast Exchange Format \(BXF\) — Protocol](#)

[EG 2021-3:2017 Broadcast Exchange Format \(BXF\) — Use Cases](#)

[EG 2021-4:2016 Broadcast Exchange Format \(BXF\) — Schema Documentation](#)

[RP 2021-6:2017 BXF SDK Documentation](#)

35PM Media Packaging & Interchange:



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 relevant to 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](#). 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 includes all Technology Committees. It is used to convey information that is relevant to all TC’s, such as meeting logistics and registration information. An SC meeting is held during each meeting round.

SMPTE document development process

The document stages are:

PD = Project Draft **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 **RDD** = Registered Disclosure Document

OV = Overview used with multipart document suites

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 revise as 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 particular technology field. In this case, those projects are grouped under a **Topic** headline.*

*SMPTE manages its standards documentation, meetings and ballots in an online system called **SMPTE Workspace**. 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 hyperlink such as [DG Project](#).