Standards Quarterly Report
March 2016

1916-2016

Result of SMPTE® Standards Committee Meetings

29 February - 3 March 2016

Hosted by Arista Networks

Santa Clara, CA, USA

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Thanks to our Sponsor for Making the March Standards Committee Meetings Possible:

SMPTE® Standards Quarterly Report:
Executive Summary

As a result of SMPTE Standards Committee Meetings
29 Feb. - 3 March 2016
Santa Clara, CA, USA
Hosted by Arista Networks

Nine SMPTE Technology Committees and 11 subgroups scheduled meetings at this round, hosted by Arista Networks, 29 Feb. - 3 March 2016.

Around 60 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 more than one hundred twenty active projects can be found in the detailed account, below.

New Projects started in the last quarter

New document: Open Binding of IDs; RP on Measurement Details

Amalgamate Digital Cinema documents: Integrate Additional Frame Rate documents Details

New document: VC-5 Part 7 - Embedded Metadata Details

New Registered Disclosure Document: RDD 39 MXF OP-1a for AVC-ULTRA codec Details

New Document Suite: Studio Video over IP (SVIP) Details

New BXF suite version: BXF 5.0 Details

New Registered Disclosure Document: RDD Sony Lightweight Networked Device Control Protocol Details

New document: ST ACES Codestreams in MXF Details

VC-2 compression document suite work: Details

- Revision of SMPTE ST 2042-1

- Revision of SMPTE RP 2042-3 Conformance

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

- New document RP 2047-5: Level 66 UHDTV over HDTV Infrastructure

New document ST 2071-5: Media Device Control RESTful Protocol Details

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"Better Pixels" projects: There is growing recognition that the next step beyond high-definition television (HDTV) requires improvement in more than just pixel count. Improvements to parameters such as color gamut, displayed dynamic range, frame rates, and electro-optical transfer function all contribute to the improved viewing experience that is needed to justify the launch of new services.

High Dynamic Range (HDR) / Wide Color Gamut (WCG) / Electro-Optical Transfer Function (EOTF)
SMPTE has a project defining Dynamic Metadata for Color Volume Transformation of high luminance and wide color gamut (WCG) Images. A document suite is underway, currently comprising six parts on core components, syntax and carrier as well as four parts documenting individual application schemes. Five of these parts have been balloted and are in the process of comment resolution. Details
A project proposal for signaling the carriage of HDR and/or WCG essence was presented at this meeting round.

The SMPTE Study Group on the High-Dynamic-Range (HDR) Imaging Ecosystem released its report in Oct. 2015 and it is available here.

Higher Frame Rates (HFR)
A project to extend SMPTE ST 12 timecode to cover higher frame rates (HFR) is completed and ready for publication. Details
There are also two projects defining new time labels, see "Time Labels" below. As these are both new designs, there are no frame-rate constraints on them.

Studio Video over IP
A new project was launched at the beginning of 2016, "IP Media Inter-Networking with Separate Essence Flows ".
This project will develop a suite of standards defining separate elementary essence streams over IP for the purposes of live production. The resulting standards will be based on VSF Technical Recommendations TR-03 and TR-04. Details

Network-Based Synchronization for the Professional Media Environment
Two key documents defining a system for using media synchronization packets on an information technology (IT) network were published in 2015:
  "ST 2059-2: Precision Time Protocol SMPTE Profile for Time and Frequency Synchronization in a Professional Broadcast Environment" defines the behavior of the master.

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"ST 2059-1: The SMPTE Epoch and Generation and Alignment of Interface Signals" defines the behavior of the slaves, allowing them to create any synchronized video, audio or time code signal.

The first interoperability "plugfest" was held the week of 11 Sept. 2015 in order to test implementations of these two standards. A report has been completed and further plugfests for 2016 are being planned. Details

There is ongoing work between SMPTE and AES to investigate network synchronization when both SMPTE 2059 and AES67 are operating on the same network (partially motivated by these two standards being mandated by VSF TR-03 and TR-04 - see above).

A set of Engineering Guidelines for the use of this system is being drafted. The first, "Introduction to the New Synchronization System" had been balloted and comment resolution is almost complete. Details

Time Labels
There are two projects defining Time Labels that are more suited to the current media environment than the ubiquitous ST 12 Timecode.
- A project defining a 5-part "Generic Time Label" suite has completed Final Committee Draft ballot. However, some parts of the suite did not pass ballot and will need reballoting.
- A project defining a 9-part "Full-featured Time Label" suite has been submitted for Technology Committee (TC) review.

Associated with this work is the development of a Recommended Practice on Date-Time Terms and Definitions.

Details of these projects

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 a 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 awaiting publication. Details.
  - A related Standard to define VC-5 mapping in the MXF Generic Container is well advanced. Details
- Amendment of a suite of documents defining the VC-3 compression system in order to add image resolution independence and some other improvements (developed from Avid DNxHD). Details
  - The Material eXchange Format (MXF) container document for VC-3 is also being amended. Details

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- Amendment and revision to VC-2 documents (developed from BBC's Dirac Pro). This work took a new direction at the last meeting round, including the addition of a new profile for ultra-high-definition (UHD) video sources for use with a high definition (HD) infrastructure. 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 (CSS) comprises:
- A project group developing a Recommended Practice (RP) "Digital Cinema Sound System Setup and Calibration." Details
- A draft standard "Calibration Reference Wideband Pink Noise Signal and Test File." The document is published. The aim is to have a consistent pink noise signal for applications including theater testing. Details
- 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

Digital Cinema (D-Cinema)

This TC has published three multi-part document suites dealing with the topics D-Cinema Distribution Master, D-Cinema Packaging and D-Cinema Operations.

Current projects focus on incorporating provisions for stereoscopic subtitles into existing D-Cinema documents, updating encryption documents and updating facility list management documents. 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 this suite of standards or creating constraints for improved interoperability in a variety of application areas. There are currently 11 MXF projects in process. Details An additional MXF project is planned to begin early in 2016. Details

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SMPTE® Standards Quarterly Report:
Detailed Account

As a result of SMPTE Standards Committee Meetings
29 Feb. - 3 March 2016
Santa Clara, CA, USA
Hosted by Arista Networks

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

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If you need assistance 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 7-10 June 2016 in New York, NY, USA and will be hosted by CBS.

Further quarterly Standards meeting rounds are planned for:
  14-17 Sept. 2016 – Geneva, Switzerland. Hosted by European Broadcasting Union (EBU).
  5-8 Dec. 2016 – Burbank, California, USA. Hosted by The Walt Disney Studios.

In addition to the meetings of SMPTE Technology Committees (TCs), detailed below, there was a tutorial on using the powerful search tools in the new SMPTE Digital Library – access instructions are on this page.

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There was also a presentation that introduced new procedures for obtaining new Universal Labels (ULs) and working with the UL registers.

This Quarterly Report provides a detailed account of the meetings of the following 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) This TC did not hold its planned meeting.
Media Packaging and Interchange (35PM)

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

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Details from each Technology Committee (TC) meeting

Essence Technology Committee (TC-10E) chaired by Ed Reuss and Annie Chang

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

Topic: TC-10E documents published in the last quarter

SMPTE RDD 34:2015, LLVC – Low Latency Video Codec for Network Transfer
SMPTE RP 2073-2:2015 (Revision on SMPTE RP 2073-2:2014), VC-5 Video Essence – Part 2: Conformance Specification
SMPTE ST 2073-3:2015, VC-5 Video Essence – Part 3: Image Formats
SMPTE ST 2073-4:2015, VC-5 Video Essence – Part 4: Subsampled Color Difference Components
SMPTE ST 2085:2015, $Y'D'_zD'_x$ Color-Difference Computations for High Dynamic Range $X'Y'Z'$ Signals

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Topic: Video compression standards in SMPTE

Revision of SMPTE ST 2019 VC-3 Video Compression Documents to add Resolution Independence
DG Project

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VC-3 is a compression format based on Avid's DNxHD video codec, defined in a suite of documents:
ST 2019-1:2014 – VC-3 Picture Compression and Data Stream Format
RP 2019-2:2014 – VC-3 Decoder and Bitstream Conformance
ST 2019-3:2008 – VC-3 Type Data Stream Mapping over SDTI
ST 2019-4:2014 – Mapping VC-3 Coding Units into the MXF Generic Container
This project adds "image resolution independence" - 1x1 to 16384x16384 - to the list of VC-3 capabilities by revising ST 2019-1 and includes new bit patterns for conformance testing in RP 2019-2. It also adds support for 12 bits and Rec. ITU-R BT.2020 color space.
The additions are backwards compatible and no current features are deprecated.
Note: A separate project is underway in TC-31FS to update ST 2019-4 to support this feature in MXF.

Status: ST 2019-1 passed ST Audit 2015-10-26, but has been held back from publication until the revision of RP 2019-2 is ready. In the meantime, a sign error in two equations has been noticed, so a further DP approval process for ST 2019-1 will be held, using the corrected equations. RP 2019-2 passed FCD ballot on 21 Jan. 2016. The 13 comments are resolved and the document will go for elecrtronic DP elevation vote.

Business Impact: Interoperability between systems

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

- ST 2073-1 - VC-5 Elementary Bitstream (Published Q2-2014)
- RP 2073-2 - VC-5 Conformance Specification (Published Q2-2014, in revision to cover additional Parts; only Part 6 left to do) 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).

Status: Parts 1-4 are published, but Part 2 is being further revised to add test materials to support content defined in Parts 5 and 6. A repository for the software and test materials is being developed on "bitbucket" with SMPTE HQ.

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Part 5 and Part 6 are ready for publication, awaiting additional revision work on Part 2.
Part 7 is well advanced, Working Draft awaited. A new project formalizes this work.
A Part 0 overview document has also been submitted to the TC.
The work on an MXF wrapper for VC-5 is progressing in TC-31FS.
The VC-5 group is holding joint TC-10E and TC-31FS 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). Further development of VC-2 has recently been rationalized into one drafting group with the following projects:

Revision of ST 2042-1: VC-2 Video Compression Standard
DG Project
This revision adds a high quality profile to support Archiving and Production applications.

Status: Part 1 revision drafting is well-advanced.

Revision of ST 2042-2: VC-2 Level Definitions
Proposed DG Project
Needed in the light of ST 2042-1 Revision and RP 2047-5

Status: Project Proposal to be submitted

Revision of RP 2042-3: VC-2 Conformance Specification
DG Project
This revision will specify test materials supporting ST 2042-1.

Status: This work will follow the revision work in ST 2042-1.

Revision of SMPTE RP 2047-3: VC-2 Level 65 Compression of High Definition Video Sources for use with a Standard Definition Infrastructure
DG Project
The revision will correct errors that have been identified with "override" operation. It is necessary to specify overriding the pixel aspect ratio and the clean area as well as the base video format, together with consequent adjustments to informative Annex A.

Status: The revised draft document is ready for FCD ballot.

New Standard SMPTE RP 2047-5: VC-2 Level 66 Compression of UHD for use with HD Infrastructure
DG Project

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

Status: The revised draft document is ready for FCD ballot.

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

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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-x: Full Measurement / Calibration
ST 2080-x: Reference Display Characteristics
EG 2080-x: Engineering Guideline to provide context and background

Status: Part 1 and Part 2 have been published (and are approaching their one-year review).
Part 3 passed FCD ballot on 12 June 2015 with 13 comments to resolve. When the two remaining comments are resolved, a revised draft will be prepared and it will be submitted for pre-DP review. The next Parts to be worked on will be the Full Measurement / Calibration RP (started) and the EG.

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

New Document: ST 2087 - Depth Map Representation
DG Project
This project will define a standard for a data representation of depth maps in multi-view production and post-production.

Status: The document was submitted for pre-DP review and all comments were resolved. It will be submitted for DP elevation vote.

Business Impact: to support interoperability and exchange between relevant processes

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New Standard (suite): ST 2094: Content-Dependent Metadata for Color Volume Transformation of High Luminance and Wide Color Gamut (WCG) Images

DG Project

This project will develop a suite of standards for specifying the semantics and representation of content-dependent metadata needed for color volume transformation of HDR and WCG imagery to smaller color volumes (e.g. BT.709 or Digital Cinema) in mastering applications.

Initial document set (further Parts will be added if more proponents submit disclosures):

ST 2094-1 Core Components

ST 2094-2 Syntax and Carrier

ST 2094-10 Application #1

ST 2094-20 Application #2

ST 2094-30 Application #3

ST 2094-40 Application #4

This reflects the four detailed method disclosures received from Dolby, Philips, Technicolor, Samsung that are considered sufficiently different to make it impossible to rationalize into a single method. Drafts exist for all Parts except Part 2.

Status: This group held a meeting during this round and made progress with comment resolution.

ST 2094 Part 1 passed FCD ballot 26 Nov. 2015; the 64 comments are resolved and the document is in pre-DP review.

ST 2094 Part 30 passed FCD ballot 26 Nov. 2015 with 38 comments – one comment remains unresolved, and there are late comments being worked on.

ST 2094 Part 10 passed FCD ballot 19 Feb. 2016 with 22 comments – four comments remain unresolved.

ST 2094 Part 20 passed FCD ballot 19 Feb. 2016 with 61 comments; resolution is in progress.

ST 2094 Part 40 received pre-FCD comments that are being worked on before the document is submitted for FCD ballot.

There has been some progress on ST 2094 Part 2; KLV and XML representation requirements have been identified. Liaison with MPEG has also presented the possibility that transport via MPEG SEI messages may be possible.

Patent statements for Parts 1, 10, 30 have been received.

It has been decided that documents can proceed towards publication when Part 1 and the first of the application documents are ready for DP elevation vote.

New Document: RP 2093 - Television Lighting Consistency Index

DG Project

The project scope is to document "Television Lighting Consistency Index (TLCI)" and "Television Lighting Matching Factor (TLMF)". The introduction of light emitting diodes (LED) technologies is leading to unintended and possibly expensive consequences, including poor color matching between different light

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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: A draft RP 2093 document has been circulated for pre-FCD ballot review. Comments have been received and are being worked on.

New Document: 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: The draft ST 2100-1 passed FCD-ballot on 5 June 2015 and all of the 88 comments were resolved. However, further comments were received at the pre-DP review. The DG expects to restart this work the week of 7 March 2016.

New Document: RP 219-2 - UHDTV Color Bar Signal
DG Project
RP 219-2 will specify the parameters needed to apply color bars to UHDTV and 2k, 4k production image formats (per ST 2048-1). It will scale the spatial parameters from the HDTV spatial parameters of RP 219-1.
The intent is to have a test signal for use on interfaces, not to design the best possible test signal for critical examination of the production chain.

Status: The draft RP 219-2 passed FCD ballot 18 Sept. 2015, with 22 comments to resolve. Four comments remain unresolved and are being worked on.

Amendment ST 2048-1: 2160-line and 1080-line Production Image Formats for Digital Cinematography
DG Project
This project adds additional frame rates (nominal 96, 100, 120 fps) to ST 2048-1 to satisfy user requirements and bring production image formats in line with existing distribution formats.

Status: A DP elevation vote was held at the meeting. The vote passed and the document will progress to ST Audit.

IntoPIX TICO lightweight Codec used in IP Networked or SDI infrastructures
RDD Project
This document defines a lightweight compression scheme to support multiple HD and UHD streams on 10G IP networks or 3G-SDI infrastructure. A 2-part document is proposed:
PART 1: TICO lightweight compression
PART 2: TICO mapping for SDI & IP infrastructures

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Status: The Document passed RDD ballot on 26 Nov. 2015. The 92 comments have been resolved and ST Audit has started.

Other TC-10E Business

There was a tutorial session on a repository for test files and codec software that has been set up. The repository uses the "git" interface and the VC-5 test materials have been uploaded. The repository is available for all groups in all TCs to use. Further tutorial materials will be made available.

Film Technology Committee (20F) chaired by David Schnuelle

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.

Topic: TC-20F documents published in the last quarter

None

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Digital Cinema Technology Committee (21 DC) chaired by Dean Bullock and Mike Radford

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.

Topic: TC-21DC documents published in the last quarter

SMPTE ST 430-14:2015, D-Cinema Operations – Digital Sync Signal and Aux Data Transfer Protocol

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Topic: Facility List Management projects
These two projects are being managed in one DG

Revision of ST 430-7 – Facility List Message
DG Project

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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 document was posted for pre-FCD-ballot review on 1 March 2016.

New Document ST 430-15 - Facility List Message Exchange Protocol
DG 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:** The document was posted for pre-FCD-ballot review on 20 Jan. 2016.

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Topic: Stereoscopic Subtitle / Timed Text projects

Revision of 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:** The project group has discussed the requirement and a first draft revised ST 428-7 has been drafted and reviewed in the DG.

Revision of ST 429-2: Digital Cinema Packaging - DCP Operational Constraints
DG Project

This revision project will address issues that arose during the ST 428-7 revision**.**

> **Status:** The Timed Text Essence Descriptor properties have been added together with new properties usage information. The document will be sent for pre-FCD ballot review when the ST 429-5 ballot comments are resolved.

Revision of 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:** The document passed FCD-ballot 16 Feb. 2016 with 16 comments to resolve.

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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:** This group has been working on an XML constraints document. The work is on hold whilst the Standards Committee is revising AG-05 on XML schemas.

Business Impact of Stereoscopic Subtitles projects: Compatibility and Interoperability

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Topic: D-Cinema Operations; Encryption

D-Cinema Crypto Evaluation (FIPS Revisions)

SG Project

This project examines the impact of changes to the FIPS encryption algorithm (deprecation of old random number generator). Output from this SG initiated the ST 430-1 revision, see below. The SG is considering an expected plan from NIST to declare key transport schemes (such as KDM) that are noncompliant to SP 800-56B as "deprecated" through 2017, and "disallowed" thereafter. Non-compliance will prevent Media Block FIPS certification.

> **Status:** At the meeting there was discussion on the best way forward; should the KDM be made compliant to SP 800-56B? What would the industry impact be? The TC identified that that more clarity is need on this issue and that the group needs to wait until NIST issues its decision (expected Q2 2016).

Revision of ST 430-1: D-Cinema Operations - Key Delivery Message

DG Project

This project will amend ST 430-1 to support delivery of MIC (Message Integrity Code) payloads in KDMs and cryptographic keys for AuxData essence.

> **Status:** The ST 430-1 revision has been prepared. A liaison from DCI on this topic has been received, recommending MDX1 generic Aux Data Key Type and MDX2 reserved for future use.

Revision of ST 430-2: D-Cinema Operations - Digital Certificate

DG Project

This project will amend ST 430-2 to allow devices to identify their ability to process MIC payloads in KDMs (as required by the ST 430-1 revision).

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Status: A draft ST 430-2 documenthas been prepared. Additions to the Role table are under discussion. Text change requests from TC-35PM have largely been approved; clarifications are under discussion.

Amendment to ST 429-6: Digital Cinema Packaging - MXF Encryption
DG Project
This project will amend ST 429-6 to incorporate requests from TC-35PM for use by IMF. Amendments to other TC-21DC documents are also required to support IMF.

Status: The DG had received an <u>additional</u> request from US Library of Congress to make changes to support AS-07 (archive format). However, it has been agreed that Library of Congress will normatively reference ST 429-6 in their own document and add the AS-07 information. So the work of this DG returns to drafting the IMF amendment.

New 21DC Business
At the last TC meeting, a request was made to the TC Chairs to change the scope of the ST 429-2 DCP Operational Constraints revision project (see above) to integrate ST429-13 Operational Constraints for Additional Frame Rates, and add the "HFR" frame rates from ST428-11 Additional Frame Rates (AFR Levels 7,8,9) to ST 428-1.
This time, the request was reinforced by a liaison document from ISO TC 36.
A revised project proposal for the work was reviewed. There was a motion to form a WG to deal with this topic and to manage any DG that might be formed to do the requested drafting. The motion passed.
The ISO TC 36 liaison also listed some other 21DC documents that could be issued as ISO standards. It was agreed that this should be a Standards Committee policy decision.

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.

Topic: TC-24TB documents published in the last quarter

SMPTE ST 2064-1:2015, Audio to Video Synchronization Measurement – Fingerprint Generation
SMPTE ST 2064-2:2015, Audio to Video Synchronization Measurement – Fingerprint Transport

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New 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.
Work on the Engineering Guideline is underway. It will be followed by Part 3.

Business Impact: Improved quality of experience and interoperability between systems

New Documents: RP and ST 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. This work had its foundations in a Technology Committee report, "Open Binding of IDs to Audiovisual Essence Report", available here. The group's focus is on carrying Ad-ID and EIDR identifiers, though it might be possible that others could be added later.

Status: The group has completed a Request for Proposals on "Open Binding of Distributor IDs and Time Labels to Content (OBID-TLC)". It has been identified that these items are required in addition to the content IDs that the group has been working on.

The group has developed a Self-Assessment Test Plan. It is hoped that the assessments and review of the results will be complete by the June meeting round.

A new document project has been started to develop an RP that supplements the OBID ST by providing implementation recommendations specifically with respect to the audience measurement context.

Revision of Closed Captioning suite documents
DG Project
This project is a straightforward updating of references for documents ST 333:2008, ST 334-1:2007, ST 334-2:2007, and RP 2007:2007 that cover carriage of CEA-708 (and CEA-608) closed caption data over various interfaces.

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Status: ST 334-1 and ST 334-2 are published.
The document editor expects to have revised drafts of ST 333 and RP 2007 by the next meeting round.

Revision ST 2010: VANC Data Mapping of ANSI/SCTE 104 Messages
DG Project
This project is a straightforward updating of references.

Status: A working draft revision was posted for pre-ballot review some while ago and comments were received, primarily editorial. The document editor expects to have a revised draft by the next meeting round.

New Project Proposal
Revision of ST 2016-1: AFD and Bar Data
There have been requests from ATSC and DVB to add bar data for UHDTV (1 and 2). There was a presentation on a proposed project for this work. A new DG project will be set up and the approval process initiated.

Cinema Sound Systems (25CSS) chaired by Brian Vessa and Kurt Graffy
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.

Topic: TC-25CSS documents published in the last quarter

SMPTE ST 2095-1:2015, Calibration Reference Wideband Digital Pink Noise Signal

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New Standard ST 2095-1: Calibration Reference Wideband Pink Noise Signal and Test File
DG Project
Examination of various "reference" noise files has revealed inconsistency in both RMS and Peak amplitude values. This group will create a pink-noise calibration Standard, and produce a reference pink-noise .wav file and a DCP containing the file. The pink noise characteristics defined in ST 202:2010 and RP 200:2012 will be used as a basis, and the algorithm used to generate the pink-noise file will be specified.

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Status: ST 2095-1 has been published. The task remaining is for the creation of a DCP containing the reference calibration noise signal. It has been decided that two separate CPL's will be needed, one for 5.1 playback systems and a separate one for 7.1 configurations.

New Recommended Practice: Digital Cinema Sound System Setup and Calibration ("B-chain Modern Calibration Procedure")
DG Project
This group will create a Recommended Practice that codifies and expands 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.

Status: The draft of the document was released for "real world" testing by commercial technicians in Nov. 2015. Feedback is being analysed and revisions made. The final editorial pass and FCD ballot process will begin in April 2016.

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 as well as any other standards the group determines to be necessary to achieve D-Cinema interoperability. A suite of documents is anticipated.

Status: This WG (25CSS-10) plans to re-convene to determine the next steps. It is currently concentrating on the work of the following drafting groups:

Digital Cinema Immersive Audio Renderer Baseline Expected Behavior
DG Project
This new project has been set up to develop an EG on the baseline expected renderer behavior, followed by an RP defining a testing procedure.

Status: The group has held nine meetings since 1 Oct. 2015. The draft EG is under review by the DG. There has been progress on definitions and metadata affecting rendering as well as work on characterization of the target environment.

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DG on Immersive Sound Model & Bitstream

This group's initial focus is on Metadata Definitions. Work is underway on a Bitstream Specification. Three input documents were originally submitted – Dolby Immersive sound bitstream, DTS MDA bitstream and a Dolby Lossless Audio codec. More recently, a document from Blue Ripple Sound has been submitted.

> **Status:** The group has completed its Metadata Specification Working Draft; it may be held from progressing to Committee Draft pending harmonization with the Bitstream Specification and Renderer Baseline Expectation EG and RP work.
> The Bitstream Specification group based its first draft on a contribution from Blue Ripple Sound. A gap analysis has been performed between the first draft and the original Bitstream Requirements document. A second editing pass has started.

Other 25CSS Business

The TC Chair gave a presentation on expected new work on Loudness in the cinema environment. It also touched upon an Immersive Audio <u>mix</u> file format (rather than <u>delivery</u> file format); work that is expected to be done in TC-35PM.

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

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.

Topic: TC-30MR documents published in the last quarter

Publication of XML-based register set (Elements.xml, Labels.xml, Types.xml, Groups.xml) at http://smpte-ra.org/smpte-metadata-registry

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EG 2061: Glossary of Stereoscopic 3D Terms
DG Project
This project takes as its starting point the glossary developed by the 3D Home Master project in TC-35PM.

> **Status**: DP elevation ballot is underway, closing 2016-03-17.

> **Business Impact**: Understanding and common use of terms

Topic: UMID Projects

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The Chair of the following projects gave a status report. Note that another project in this set, revision of RP 205, has published and that DG is disbanded.

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 is studying ways to make the UMID more useful, particularly in Material location across various systems. The SG is preparing two reports:

- Study Report on UMID Applications Part 1 (UMID Application Principles, Best Practices) - complete and submitted to HQ.
- Study Report on UMID Applications Part 2 (Additional Technology that needs Standardization)
    - Part 2.1: UMID Resolution Protocol, UMID-based Program Package Exchange – approved June 2014
    - Part 2.2: UMID Applications in MXF

Status: Part 2.2 of the report was published in December 2015 – it is available here. The SG remains open to provide assistance to the other UMID project groups (see below).

UMID Resolution Protocol
DG 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 DG on 5 Dec. 2014. There has been no further progress in the last quarter.

Proposed ST 330 Revision Project
The TC Chair undertook to set up this new project and initiate the approval process imminently.

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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: The ST 2012 draft has been posted for pre-FCD ballot review.

Business Impact: Potential foundation for Metadata

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Metadata Strategy

[SG Project](#)

This review of the role of the TC started in the March 2012 meeting round, examining how the focus of the TC should expand beyond the registration of metadata and towards standardizing metadata schemes and XML projects.

> **Status:** The SG Chair plans to hold a final meeting of the group to decide what further action is appropriate..

Topic: Register Structure Document Projects

There are several SMPTE standards defining the structure of various metadata registers defined by ST 336: Data Encoding Protocol Using Key-Length-Value. They are all being updated to include new requirements such as including xml symbols. Four of these updates are now published:

− ST 335:2012 Metadata Element Dictionary Structure
− ST 400:2012 SMPTE Labels Structure
− ST 2003:2012 Types Dictionary Structure
− ST 395:2014 Groups Register Structure

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 draft has been revised to address DG comments and will be submitted to the TC drop-box for the TC Chair to initiate 2 week pre-FCD-ballot review.

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 draft is ready for 2 week pre-FCD review and it will be submitted to the TC drop-box for the TC Chair to initiate the review.

Metadata Definition

WG Project

This Working Group (30MR10) co-ordinates a number of DG projects for adding or maintaining metadata items in registers. Because the registers are updated frequently, a version number identifies each revision.

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Experts within the WG have been working on a cleanup of the register data, in particular the removal of redundancy. There has been a move to the use of xml to represent the registers.

Status: The four registers in xml form (for the first time) have been published on smpte-ra. It was agreed that some issues raised during the ballot for these documents would be deferred until the next release. Work has started on that release.

Before the xml-based work began, the individual registers were developed in the drafting groups and projects below. It was decided that four drafting groups (elements, labels, groups, types) would be disbanded in favor of the work being done directly in this WG and that the four corresponding projects would be amalgamated into one. The Essence Element register will remain separate until the controlling standard has been approved.

Update Metadata Element Dictionary Contents (RP 210)
DG Project

Update Metadata Labels Register Contents (RP224)
DG Project

Create and Update Groups Register Contents
DG Project
For some while, an informal Groups Register has being maintained.

 Create and Update Types Register Contents
 DG Project
For some while, an informal Types Register has being maintained.

Create and Update Essence Element Register Contents
DG Project
The group will create a register of SMPTE ULs for use as essence keys and process requests for register additions, modifications and deprecations.

Other 30MR Business

ST 335 Amendment project
It was agreed that this amendment project will go for approval. There was discussion about the scope being widened to include some additional expected amendments to ST 335, but it was agreed that this project should go ahead with the limited scope of adding text that explicitly permits UMID labels to have UL Size "0A".

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ST 2003 Amendment project
This amendment was deferred at this meeting.

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.

Topic: 31FS Publications in last quarter

SMPTE EG 42:2015 (Revision of EG 42-2004), Material Exchange Format (MXF) – MXF Descriptive Metadata

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Topic: 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: All comments are resolved and the DG Chair uploaded the revised draft for pre-DP review. The DG now needs to confirm the ST 377-2 ULs before initiating DP elevation vote.

Revision ST 380: MXF Descriptive Metadata Scheme 1
DG Project
The current document has been reviewed and it was identified that some changes are required.

Status: The draft revision document has been updated to address a number of comments. When any responses have been resolved, re-ballot of ST 380 will be initiated.

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Revision EG 42: MXF Descriptive Metadata
DG Project
Changes that arose during ST 380 revision have been incorporated in the EG 42 draft.

Status: EG 42 is published; the project will be closed.

New Document: ST 2042-4 - Wrapping VC-2 Video Essence in the MXF Generic Container
DG Project

Status: This document passed FCD reballot on 13 Aug. 2015 with 10 comments to resolve. All have been addressed, awaiting commenter response.

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: The draft document failed FCD ballot through lack of numeric consensus on 23 Oct. 2015. It has 11 comments to resolve. There has been no progress in the last quarter, but work is expected to resume Q2/Q3 2016.

MXF Timecode Mapping and Labeling
SG Project
It has been identified that a number of topics on the use of timecodes in MXF require additional guidance or definition. This project will review requirements, existing techniques and documents, and if necessary propose revision or new documents.

Status: A draft of the SG report has been submitted to the TC for review. It was previously reviewed in the DG and new use cases related to discontinuous metadata representation were proposed; the DG is considering how fully to document them.

New Document: 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 document passed FCD reballot on 5 Aug. 2015 with 37 voter comments; all have been resolved. Some pre-DP-ballot review comments were received. There was no further report this quarter.

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New Standard ST 2073-10: VC-5 Mapping into the MXF Generic Container

DG Project

This project creates a standard for mapping a VC-5 bitstream into the MXF Generic Container, supporting the VC-5 Image work in TC-10E.

Status: The draft Standard passed FCD ballot 8 June 2015 with 8 comments to resolve. All comments are resolved. The group will submit ST 2073-10 for pre-DP review as soon as the registry submission is complete (a request for Groups, Types and Elements is needed in addition to the Labels already submitted).

Revision of ST 2019-4:2014 (Mapping VC-3 into the MXF Generic Container)

DG Project

This project will add support for image resolution independence.

Status: The document is ready for publication, but is being held back until revisions to other ST 2019 documents in TC-10E are further advanced.

New document: ACES Codestreams in MXF

DG Project

An ACES file container exists (SMPTE ST 2065-4), but no code stream wrapper, or other supporting data structure exists. This project will specify descriptive metadata items for correctly processing and transforming ACES codestreams.

Status: The project was approved 23 Dec. 2015. An initial draft is expected soon and a Drafting Group needs to be set up.

New RDD 39: MXF OP-1a Interoperability Specification for Panasonic AVC-ULTRA Codec

RDD Project

This RDD provides the specification for implementing an MXF OP-1a file that encapsulates AVC-ULTRA video essence, uncompressed PCM audio essence, and data essence originally carried in ancillary packets.

Status: The project was approved 23 Dec. 2015. The document is at RDD ballot, closing 4 April 2016.

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Topic: Archive Exchange Format (AXF)

This Working Group (31FS-30) will define 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.
Part 2 will cover "External Uses of XML Schema".

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

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

The Part 1 document is published. However, initial implementation work has shown up some inconsistencies between the prose and the XSD file and a revision project has been started.

Revision Project **Status:** The planned revision was complete, but new input requesting symbolic links in the file tree has been received. It is hoped that document revision will be complete by the next meeting round. The WG Chair stated that he is aware of four companies working on implementations; one has over 100 sites.

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 work.

Status: Work will resume after the Part 1 revision is complete. The WG Chair mentioned that there has been new interest in the work, particularly from the Hollywood community.

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ST 2001: XML Representation of SMPTE-registered Data (Reg-XML)
DG Project

ST 2001 is about representing instances of SMPTE-registered data in XML.

There are two Parts: ST 2001-1: Mapping Rules (includes 2 schemas)

ST 2001-2: AAF and MXF data (includes an XML meta-dictionary and schema)

Status: Part 1 was published Q2 2014. An issue about missing xml elements was discovered soon after publication. The corrected draft of Part 1 passed ST Audit on 26 July 2015 and is ready for publication.

Part 2 was published Q3 2014.

Other TC-31FS Business
Proposed New Standard: Mapping of Apple ProRes into the MXF Generic Container
There was a presentation on this new project proposal. Ways to create a Standard based on material that is in an RDD (RDD 36: Apple ProRes Bitstream Syntax and Decoding Process).

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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.

Topic: 32NF Publications in last quarter

SMPTE RP 184:2015, (Revision of RP 184-2004), Specification of Jitter in Bit-Serial Digital Systems
SMPTE RP 192:2015, (Revision of RP 192-2003), Jitter Measurement Procedures in Bit-Serial Digital Interfaces
SMPTE ST 2036-3:2015 (Revision of SMPTE ST 2036-3:2012), Ultra High Definition Television – Mapping into Single-link or Multi-link 10 Gb/s Serial Signal/Data Interface
Amendment 1:2015 to SMPTE ST 2036-3:2012, Ultra High Definition Television – Mapping into Single-link or Multi-link 10 Gb/s Serial Signal/Data Interface – Amendment 1
SMPTE ST 2101:2015, Format for Non-PCM Audio and Data in AES3 – AC-4 Data Type

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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.

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

The **business impact** of all WG 32NF40 work items concerns interoperability between systems.

New document suite SMPTE 2076: Stereoscopic 3D (S3D) Production Timing and Synchronization
DG Project
The suite of four documents that were FCD balloted (ST 2071-1 Camera Systems, ST 2071-2 Live Production Systems, ST 2071-3 Physical Layer for Video Transport, EG 2071-4 Physical Layer and System Guidance) have been reorganized in line with ballot comments as:
   RP 2076-1, "Production Timing and Synchronization – for S3D or Multi-View Camera Systems"
   EG 2076-2, "Synchronization for Stereoscopic 3D (S3D) or Multi-view Images- Alignment, Transport and System Guidance". They will be reballoted.

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Status: RP 2076-1 passed FCD ballot 9 April 2015 with 33 comments; all have been resolved. The document will proceed to pre-DP review.

EG 2076-2 passed FCD ballot 8 Jan. 2015 with 19 comments; resolution of the comments is in progress.

New Document: EG 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: This group has met 4 times since the December face-to-face meeting in Atlanta. A straw man WD document is being put together. At the DG meeting during this round, updates were made to a table of interface standards and related picture formats that will form part of the EG.

Revision of RP 184: Specification of Jitter in Bit-Serial Digital Systems and
Revision of RP 192: Jitter Measurement Procedures in Bit-Serial Digital Interfaces
DG Project

Status: Both documents are published and the project will be deactivated.

Revision of EG 34: Pathological Conditions in Serial Digital Video Systems and
Revision of 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: A new draft of RP 198 has been posted to the DG. More meetings are required to review document and discuss next steps, but RP 198 may be close to informal review by a wider audience.

New Document: ST 2091 - Broadcast and Video Serial Digital Fiber Transmission Systems – Ruggedized Connector Interfaces
DG Project

This project will create 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.

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Status: A new draft document (v1.2) was posted to the DG containing language aimed at overcoming a problem on the carriage of signals defined in ST 2036-4 – ST 2036-4 normatively defines its own connector and does not allow alternative connectors.

New ST 2100 Suite: Transport of Haptic-Tactile Essence
DG Project
This project has been split away from the TC-10E project on *Coding* of Tactile Essence in order to focus on defining the *transport* of this essence.

Status: This group has been on hiatus for the last quarter to focus effort on the 10E project. Two Drafting Projects have been set up (both projects are at the proposal stage):

Drafting Project ST 2100-2: **Coding and Transport Of Haptic-Tactile Essence in AES3**
At the Sept. 2015 meeting, it was decided that this group may also define the use of HANC space for carriage.

Drafting Project ST 2100-3: **Coding and Transport Of Haptic-Tactile Essence in Ancillary Space**
At the Sept. 2015 meeting, it was decided that this group may confine its attention to the use of VANC space for carriage.

CWDM optical interface for multi-link SDI
DG Project
This project will standardize a Coarse Wavelength Division Multiplex optical interface for multi-link SDI. It is proposed that this document should be ST 297-2, with ST 297 renamed to ST 297-1.

Status: The group held a meeting during this round. It was agreed to move the CWDM interface definitions for 10.692Gb/s standards into one or more additional parts. The DG is also considering adding support for single-link and multi-stream CWDM.

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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.

Status: The WG is waiting for assignment of ST 2022-x family 5-year reviews. It is also managing the DG project below that was approved 21 Jan. 2016.

New document suite: IP Media Inter-Networking with Separate Essence Flows
DG Project

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This project will develop a set of standards specifying the carriage, synchronization, and description of separate elementary essence streams over IP for the purposes of live production. The resulting standards will be based on VSF Technical Recommendations TR-03 and TR-04.

A five-part suite of documents with the title "IP Media Inter-Networking with Separate Essence Flows" is proposed:

Part 1: System
Part 2: Uncompressed Active Video
Part 3: PCM Audio
Part 4: Ancillary Data
Part 5: SDI as an Essence

> **Status:** Drafts for Parts 1-5 have been submitted, based on the appropriate sections of TR-03 and TR-04, for comment within the DG.

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, 12Gb/s and 24Gb/s.

> **Status:** Comment resolution on the FCD ballots for Part 11 and Part 12 of both ST 2081 and ST 2082 is complete (see below). To resolve some comments, a project "10E 2160-line and 1080-line Production Image Formats for Digital Cinematography - Additional Frame Rates" was started.
>
> An amendment project to correct the jitter specification in ST 2081-1 and ST 2082-1 is underway in the ST 2081 suite DG; the DG has produced a second draft of each amendment addressing DG comments; when consensus is achieved the documents will progress to TC pre-FCD ballot review.
>
> The WG now plans to start work on new parts (ST 2081-30, ST 2082-30) that will standardize Multi-stream mapping. Following on from that will be stereoscopic image mappings and 24Gb/s interfaces.
>
> Other progress is covered in each of the projects below.

New ST 2081 suite: 6Gb/s Signal/Data Serial Interfaces
DG Project

This project is developing 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)
ST 2081-11: 2160-line and 1080-line Source Image and Ancillary Data Mapping for **Dual**-link 6G-SDI
ST 2081-12: 4320-line and 2160-line Source Image and Ancillary Data Mapping for **Quad**-link 6G-SDI

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There are also 3 documents (like -10, -11, -12) planned for stereoscopic content and a multi-stream mapping document (multiple 1.5G and 3G over 6G).

> **Status:** ST 2081-11 passed FCD ballot 9 March 2015 with 13 comments; all are resolved.
> ST 2081-12 passed FCD ballot 9 March 2015 with 26 comments; all are resolved.

ST 2082 suite: 12Gb/s Signal/Data Serial Interfaces
DG Project
This project is developing 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)
ST 2082-11: 2160-line and 1080-line Source Image and Ancillary Data Mapping for **Dual**-link 12G-SDI
ST 2082-12: 4320-line and 2160-line Source Image and Ancillary Data Mapping for **Quad**-link 12G-SDI
There are also 3 documents (like -10, -11, -12) planned for stereoscopic content and a multi-stream mapping document (multiple 1.5G, 3G, 6G over 12G).

> **Status:** ST 2082-11 passed FCD ballot 9 March 2015 with 19 comments; all are resolved.
> ST2082-12 passed FCD ballot 9 March 2015 with 29 comments; all are resolved.

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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.

> **Status:** The WG met during this meeting round. The main projects discussed were the 2059 Engineering Guidelines, the Time Labels projects, the PTP interoperability group and the HFR time code project. A joint telecon with the AES group responsible for AES67 was held to consider mixed networks that have both the SMPTE PTP Profile and the AES PTP Profile present (and the PTP Default Profile that is mandated by AES67).

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

New Standard ST 12-3: Time Address for High Frame Rate signals and its data structure in the ancillary data space
DG Project

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Project Scope: To create a standard specifying time address for HFR and its data structure in the ancillary data space. The document will specify rates of 72, 96, 100, 120 and 120/1.001 fps and it will be extensible to cover rates of up to 960 fps.

Status: As of the 32NF meeting ST 12-3 is being prepared for publication.
Note: This document was published in the SMPTE Library on March 28, 2016.

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 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.

Status: The first round of testing was the week of 9 Nov. 2015, hosted by FOX NE&O in Houston, TX. The main conclusion was that ST 2059-1 and -2 fundamentally work as intended; the standards need only minor clarifications. It was confirmed that goals for Lock Time and Accuracy are achievable. The report has been prepared. Testing also provided some feedback for the ST 2059-1 and -2 one-year reviews. Four more interop meetings for 2016 are being planned.

Development of a set of synchronization Engineering Guidelines "EG 2059-1x"
DG Project

This is an "umbrella" project. The group facilitates 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.

Status: A Chair for this DG is sought. The four EG drafting projects below have been set up, and a draft exists for a possible fifth one on "Local Time" – now likely to be a recommended practice, RP 2059-20 – see project proposal.

New Document: EG 2059-10 - Introduction to the New Synchronization System
Drafting Project

Status: This document passed FCD ballot 16 Oct. 2015 with nine comments to resolve; resolution is almost complete.

New Document: EG 2059-11 – Management of Time Discontinuities
Drafting Project

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

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New Document: 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; an updated version is expected soon.

New Document: 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, but it is understood that the co-authors are developing an updated version that will be posted very soon.

New Time Labeling System
DG Project

This is an "umbrella" project. The group facilitates development of a suite of Time Labeling documents.

Status: A Chair for this DG is sought (the pro-tem Chair is unable to devote enough time to get the work moving). There are currently three label document suites being developed:

SMPTE 2103 Suite: Generic Time Label
Drafting Project

Status: The following suite of documents closed FCD ballot 21 Sept. 2015:
ST 2103-1: Generic Time Label - Data Definition
ST 2103-2: Generic Time Label - Transmission in Ancillary Data Space
ST 2103-3: Generic Time Label - Character Representation
RP 2103-4: Generic Time Label - Interoperation with Time and Control Code
RP 2103-5: Generic Time Label - Time and Date Calculations

Part 1 passed with 55 voter comments to resolve. Part 2 passed with 47 voter comments to resolve. Parts 3, 4 and 5 failed to achieve numeric consensus and received 56, 44, 73 comments respectively. They will need to be re-balloted.
All comments have been addressed. The DG is considering whether Parts 1 and 2 should be reballoted as well as 3,4,5.

SMPTE 2105 Suite: Full-featured Time Labels (aka "TRL")
Drafting Project

Status: The current suite comprises:
EG 2105-1: Time Related Label (TRL) – Ecosystem
RP 2105-2: Time Related Label (TRL) – Terms, Definitions and Timescales

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ST 2105-3: Time Related Label (TRL) – Media Index Counts

ST 2105-4: Time Related Label (TRL) – Data Objects and Container Structure

ST 2105-5: Time Related Label (TRL) – Conversions

ST 2105-6: Time Related Label (TRL) – Character Format Encoding (TCF)

ST 2105-11: Time Related Label (TRL) – Ancillary Data Mapping

ST 2105-21: Time Related Label (TRL) – Legacy Timecodes

RP 2105-31: Time Related Label (TRL) – Profiles

The WG requested that the TC conducts a two-week pre-FCD ballot review for this suite of documents.

RP 2104 Suite: 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 has been posted for review and comment.

Amendment of EG 40: Conversion of Time Values Between SMPTE 12-1 Time Code, MPEG-2 PCR Time Base and Absolute Time

DG Project

This project will make small corrections to formulas where errors had been pointed out during the 2014-06 meeting round.

Status: The amendment is at FCD ballot closing 17 March 2016.

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Code-point Extension Mechanism for the ST 337 family

DG Project

Originally, this "umbrella project" was set up to manage individual drafting projects needed to introduce a code-point extension mechanism for documents in the ST 337 family; the extension mechanism in ST 337 and the extended data types in ST 338 as well as revising or adding any other documents as required. Now that the extension mechanism is done, the DG is being used to document other formats for encapsulation in AES3.

Status: The revised ST 337, ST 338, ST 339 and ST 340 documents are published. New document "RDD 33 - Mapping of Dolby-E over AES3" has also published. The following Drafting Projects remain:

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Amendment of ST 338: Format for Non-PCM Audio and Data in AES3 — Data Types
Drafting Project
Amendment to add AC-4 (code point 24), DTS type IV (code point 17) - see these projects below.

Status: The amendment passed FCD ballot 12 Feb. 2016 with two comments to resolve. It completed pre-DP review at the start of the TC meeting and a DP elevation vote was held. The vote passed.

New Document ST 2101 - AC-4 Data Type
Drafting Project
A new document will be drafted and ST 338 data-type 24 is requested.

Status: Published.

New document ST 2041-4 (proposed): MPEG-H in AES3
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: The project is approved. No further progress this quarter.

New Standard ST 2106: DTS Audio over AES3
Drafting Project

Status: The document failed FCD ballot 16 Oct. 2015 because it did not achieve numeric consensus. It passed FCD re-ballot on 19 Feb. 2016 with 14 comments to resolve.

New document Audio Metadata over AES3
Drafting Project
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: The project was approved 3 Sept. 2015. Parts of the planned metadata payload were developed by ITU and EBU and liaisons notifying these organizations have been sent. A WD has been submitted to the DG together with a requirements document.

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Flow Control in Professional Media Networks
[SG Project](#)
This SG will investigate current and future professional media network management technologies, determine user requirements, transmission methods for management commands and provide background information. It will review existing standards and specifications and identify gaps / recommendation standards development.

> **Status:** This SG has held four telecons in the last quarter as well as a meeting during this round and continues with a bi-weekly schedule of telecons. The two main tasks are integrating contributions into the draft report and developing questionnaires for users and technology providers. Current topics under discussion for the report are QoS and Congestion Control.

RDD Carriage of uncompressed video via MPEG Transport Stream over IP (Evertz)
[DG Project](#)
The (abridged) project scope is: Outline the architecture and structure of small, simple changes to the existing broadly-used mpeg2 transport stream specification to accommodate transmission of uncompressed video over IP. Provide details on how the separate elements are launched into the network and how they are re-aligned at destination locations.

> **Status:** The RDD is approved for publication.
> **Note:** This document was published to the SMPTE library on March 28, 2016

Other 32NF Business

Proposed new Project: HDR and WCG Signaling on Streaming Interfaces
A presentation was given. The problem to be solved was defined:
With increased interest in high dynamic range (HDR) and wide color gamuts (WCG), and new transfer functions (EOTF) developed in SMPTE and elsewhere, there is a need to create a signaling representation to identify the content so that it is properly processed in a production facility as well as correctly displayed in professional reference displays using SMPTE interface standards.

A project proposal will be prepared.

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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.

Topic: 34CS Publications in last quarter

SMPTE ST 2021-1:2015 (Revision of SMPTE ST 2021-1:2012), Broadcast Exchange Format (BXF) – Requirements and Informative Notes

SMPTE ST 2021-2:2015 (Revision of SMPTE ST 2021-2:2012), Broadcast Exchange Format (BXF) – Protocol

SMPTE EG 2021-3:2015 (Revision of SMPTE EG 2021-3:2013), Broadcast Exchange Format (BXF) – Use Cases

SMPTE EG 2021-4:2015 (Revision of SMPTE EG 2021-4:2013), Broadcast Exchange Format (BXF) – Schema Documentation

SMPTE RP 2021-9:2015 (Revision of SMPTE RP 2021-9:2012), Implementing Broadcast Exchange Format (BXF)

TC-34CS did not hold a meeting at this round. The project information below is retained from the December 2015 plenary, though clearly, ST 2021 suite has moved on with the publication of the documents above.

Also, a new TC-34CS RDD project has been approved "Sony Lightweight Networked Device Control Protocol". The document may go to ballot in the coming quarter.

Topic: BXF Suite of Documents

This TC is responsible for the 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 2021-9: Implementing BXF

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It is primarily an XML-based system that standardizes exchange of Schedule, As-run, Content Transfer instructions, Content-related metadata, and Agency instructions. 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 4.0 (recently published, as noted above).

BXF 5.0
Active DG Project
BXF 5.0 includes proposed improvements in the following areas: measurement data, QC data, file delivery parameters, trading partner registry, FIMS transfer connector, traffic instruction use cases.

> **Status:** The BXF 5.0 project is now active, and the DG is meeting regularly to advance this work. The target for completion of this project is 12/31/2016.

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Media Device Control over IP
DG Project
This project is developing 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.
    2015 Revision in process to add support for FIMS v1.2
ST 2071-2: Media Device Control - Protocol – Published in 2012, updated in 2014.
    2015 Revision under development to add support for FIMS v1.2.
ST 2071-3: Media Device Control - Discovery – Published in 2014.
    Describes Zero Configuration (ZeroConf) and Device, Service, and Capability discovery operations for Media Device Control using well established and widely used Internet Protocol standards.
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.

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Status:

All four Parts closed FCD ballot (Parts 1-3 are revisions of the published documents). Part 1 closed 15 July 2015 with no comments; automatically DP status. Part 2 closed 15 July 2015 with no comments; automatically DP status. These two documents will proceed to ST Audit.

Part 3 closed 16 July 2015 with nine comments. The unresolved comments are all from one commenter who has been unresponsive to the proposed resolution. Part 4 closed 15 July 2015 with three comments; all comments are resolved, so the document can proceed to DP vote.

The project proposal for Part 5 is awaited. Update March 2016: project proposal online but awaiting approval.

There was an enquiry about whether ST 2071 could be used to implement an ATSC transmission system scheduler to control bitrates. The DG Chair responded that this application can be implemented now, and the details can be added to the Capability Interface Repository.

Business Impact: Interoperable Media Device Control

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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: Interoperability between systems, cost effective exchange of master formats in file form and new functionalities.

At this plenary meeting, the group described some structural changes that will be implemented, now that most of the ST 2067 IMF suite is mature. The Working Group will now focus on Sample Material Interchange (SMI,which includes plugfest activities) as well as IMF document maintenance. Other projects developing new IMF features will report directly to the TC. This plenary agenda was organized around the new structure.

Topic: 35PM Publications in last quarter

None

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WG 35PM50: IMF Document Maintenance and Sample Material Interchange

IMF comprises a master set of file-based elements for any downstream distribution using multiple composition playlists. The master set of files is used as the input to subsequent processing that creates deliverables.

Published IMF documents:

ST 2067-2:2013, Interoperable Master Format — Core Constraints

ST 2067-3: Interoperable Master Format – Composition Playlist

ST 2067-5: Interoperable Master Format – Essence Component

ST 2067-8:2013, Interoperable Master Format — Common Audio Labels

ST 2067-20:2013, Interoperable Master Format — Application #2

ST 2067-21:2014, Interoperable Master Format – Application #2E (previously titled Application #2 extended)

ST 2067-30:2013, Interoperable Master Format — Application #3

ST 2067-100:2014, Interoperable Master Format – Output Profile List

ST 2067-101:2014, Interoperable Master Format – Output Profile List – Common Image Definitions and Macros

ST 2067-102:2014, Interoperable Master Format – Common Image Pixel Color Schemes

ST 2067-103:2014, Interoperable Master Format – Output Profile List – Common Audio Definition and Macros

Status: The WG has designated documents that are being amended / revised at one-year review as "IMF 1.1". The objective is to advance the set of documents to DP ballot simultaneously. The documents are:

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Amend/Revise ST 2067-2: IMF Core Constraints
DG Project

   Status: Awaiting two unpublished normative references.

Amend/Revise ST 2067-3: IMF Composition Playlist
DG Project

   Status: Ready for DP ballot.

Amend/Revise ST 2067-5: IMF Essence Component
DG Project

   Status: Ready for DP ballot.

Amend/Revise ST 2067-20: IMF Application #2, JPEG 2000
DG Project

   Status: Ready for DP ballot.

Amend/Revise ST 2067-21: Application #2E
DG Project
This extension supports higher JPEG 2000 specifications including resolution, frame rates and multiple color space encodings.

   Status: Revised FCD under review.

IMF Sample Material Interchange (SMI)
 AHG Project
   This group has been set up to facilitate interoperability testing by making sample material available online. It is also organizing IMF plugfests. Bug Tracking has been implemented and bug resolution will result in edits to the IMF standards in 1 year reviews – see: dev.imfforum.com/bugs

   Status: An IMF Plugfest was held 22 Jan. 2016 in Amsterdam, NL, hosted by Netflix. A report containing the anonymized results of the testing has been posted to the TC.

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IMF Output Profile Lists
DG Project

Project to develop IMF Output Profile Lists (OPL). 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.

> **Status**: The project is temporarily suspended whilst the SMI group carries out validation. It will work on a "compositie operator" and address dynamic metadata.

IMF Audio Essence
DG Project

This drafting group is currently inactive, but may be reactivated to look after a new project on an immersive audio mix file (see 25css details here).

New Document ST 2067-40: IMF Application #4 Mezzanine Film Format
DG Project:

This standard will extend the capabilities of IMF Application #2, JPEG2000, to include amendments to satisfy cinematographic needs including (but not limited to) resolutions up to 8k, lossless J2K, XYZ and 16 bits. Intended for film archive applications.

> **Status:** ST 2067-40 is ready for FCD-ballot. The proponents are considering a plugfest in September and anticipate an "app#4e" with half-float encoding to support HDR.

Proposed DG Project: New Document IMF App#1 ACES (for long-term archiving)

A presentation was given at the July 2015 TC meeting for a new application document to specify ACES in IMF. The planned project is on hold, to allow the container to be established first in TC-31FS (EXR mapped into MXF).

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Notes on this report and the SMPTE Standards Process

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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 (this revision effective from 2015-01-31). 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
There may be proposals to Revise or Amend documents, or they may be reaffirmed, made stable or withdrawn.

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 **Kavi**.*
*Kavi has a **Project View** that includes a publicly accessible project summary page. It is used to state the project justification at the proposal stage and to track progress through to completion.*
*In this report access to the project view is via a hyperlink in the **Project** word in the title.*

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