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July Standards Committee Meetings Possible:

SMPTE Standards Quarterly Report:
Executive Summary

As a result of SMPTE Standards Committee Meetings
7-10 July 2015
Sydney (Randwick), Australia
Hosted by Randwick TAFE

Nine SMPTE Technology Committees and eleven subgroups scheduled meetings at this round, hosted by Randwick TAFE, 7-10 July. There was also a demonstration of HDR technology by Samsung.

Around 40 members attended in person over the 4 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 120+ active projects is in the **detailed account**, below.

New Projects started in the last quarter

- New Standard (ST 297-2): Multi-link SDI data streams over a single fiber using CWDM Details

- New Recommended Practice: On-screen Light Measurement (Film TC; not covered here)

- New Standard: HDTV Reference Display Primaries Details

- Amendment to ST 429-6 MXF Encryption (for IMF applications) Details

- New Standard: Coding and transport of haptic-tactile essence in Ancillary space Details

- New Standard: Coding and transport of haptic-tactile essence in AES3 Details

- Revision to VC-5 Conformance Details

- Revision to ST 2021 suite to add BXF 5.0 features Details

- New Registered Disclosure Document: Carriage of uncompressed video via MPEG Transport Stream over IP Details

- Amendment to: ST 2081-1 and ST 2082-1 Jitter Specification Details

- New Study Group: Flow Management in Professional Media Networks Details

- Amendment to: ST 338 to add new code points Details

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- New Standard (ST 2041-4): MPEG-H in AES3 Details

- Revision to ST 2071-1: Media Device Control to Add URI Fragment Details

- Revision to: Media Device Control - Edit XSD and WSDL for project adding URI Fragment Details

- Revision to ST 2067-20: IMF Application Details

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 "Better Pixels" projects: There is growing recognition that the next step beyond 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 launching new services.

High Dynamic Range (HDR) / Wide Color Gamut (WCG) / Electro-Optical Transfer Function (EOTF)
SMPTE has a Study Group that is compiling a report on the High Dynamic Range Ecosystem. In the Study Group meeting this time, a plan to complete the work in time for the SMPTE 2015 Annual Technical Conference & Exhibition (SMPTE 2015) was presented.

SMPTE has another project defining Dynamic Metadata for Color Volume Transformation of High Luminance and Wide Color Gamut Images. A document suite is planned, comprising parts on Core Components, Syntax and Carrier and 4 or more parts documenting individual application schemes.

Three SMPTE HDR/WCG projects have recently published:
- ST 2084 - High Dynamic Range Electro-Optical Transfer Function of Mastering Reference Displays
- ST 2086 - Mastering Display Color Volume Metadata Supporting High Luminance and Wide Color Gamut Images
- ST 2085 - Color Differencing for High Luminance and Wide Color Gamut Images"
Details of all HDR/WCG/EOTF projects.

Higher Frame Rates (HFR)
Provision for 100 and 120 fps (nominal) has already been added to SMPTE's ST 2036-1 UHDTV standard. Associated transport documents have also been introduced to cope with the extra bandwidth demands – **10Gb/s family** - **6, 12, 24 Gb/s family**.

A SMPTE Study Group looking at whether the high-frame-rate future might be based on integer rates or stay with fractional rates (f/1.001) has not received evidence either way, and will close. **Details**

A project to extend SMPTE ST 12 time code to cover higher frame rates is well advanced. **Details**

Interoperable Mastering Format (IMF) Over the last 4 years, this Working Group has been developing a large suite of documents defining a master set of file-based elements that can be used to create formats for downstream distribution using multiple composition playlists.

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There is a total of 11 published IMF documents.

Ongoing work in the group includes a further Standard on a Mezzanine Film Format as well as a Sample Material Interchange group that has organized IMF plugfests – the last one was at the end of March 2015. This work has helped to identify needed improvements to the IMF Standards and 1-year revision / amendment work is starting on 5 of the documents.
A new IMF project was proposed at this meeting round: IMF App#1 ACES (for long-term archiving)
 IMF details

Network – based Synchronization for the Professional Broadcast Environment

Two key documents defining a system for using synchronization packets on a data network to achieve media synchronization have published in the last quarter:
 "ST 2059-2: Precision Time Protocol SMPTE profile for time and frequency synchronization in a professional broadcast environment" defines the behavior of the mater.
 "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 system uses a SMPTE profile for the Precision Time Protocol (IEEE 1588 v2) that provides acceptable lock-up time, jitter and accuracy while providing metadata that allows time code generators to make adjustments for time discontinuities such as leap seconds and daylight saving during "daily jam".

Work on the system continues with a new Interoperability Testing group, and the drafting of 5 Engineering Guidelines for use of the system. **Details of both**

There is associated work on the development of Time Labels. **Details**

SMPTE Compression Standards   SMPTE has standardized five compression 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 a GoPro system). Two Parts of the suite are published, two more are ready for publication, and two more are at FCD ballot. **Details**.
  A Standard is being draft to define VC-5 mapping in the MXF Generic Container. **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 MXF container document for VC-3 is also being amended. **Details**
- Amendment and revision to two VC-2 documents (developed from BBC's Dirac pro system). One project adds a high quality profile for Archive and Production, the other is a clarification of a published VC-2 document. **Details**

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Cinema Sound Systems Projects: This Technology Committee has projects aimed at improving the quality of sound in conventional movie theaters, as well as standardization of new immersive, 3D, systems.

Current work on Cinema Sound Systems comprises:

- A project group developing a Recommended Practice "Digital Cinema Sound System Setup and Calibration". **Details**
- "Calibration Reference Wideband Pink Noise Signal and Test File" was elevated to draft publication status at this meeting round. 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**

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

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SMPTE Standards Quarterly Report:
Detailed Account

As a result of SMPTE Standards Committee Meetings
7-10 July 2015
Sydney (Randwick), Australia
Hosted by Randwick TAFE

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

We encourage interested parties to contact SMPTE Standards to learn more about specific activities. Go to **www.smpte.org/standards** for more information.

*If you are interested in learning more about the SMPTE Standards program, please contact Peter Symes, Director of Standards and Engineering, at **psymes@smpte.org**.*

If you need help getting started with the SMPTE Standards process and some of the conventions / acronyms used in this report, please jump to the **Annex**.

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

Future Meetings

The next quarterly Standards meeting round will be held 16-19 September 2015 in Paris, France and will be hosted by CST.

Further quarterly Standards meeting rounds are planned for:
  December 2015 – Atlanta, GA, USA. Hosted by Turner.
  March 2016 – Host and venue TBA.
  June 2016 – Singapore. Hosted by Xilinx.
  September 2016 – Geneva, Switzerland. Hosted by European Broadcasting Union

This Quarterly Report provides a detailed account of the meetings of the following Technology Committees and their sub-groups:

Essence Technology Committee (10E)
Digital Cinema Technology Committee (21 DC)
Television and Broadband Media Committee (24TB)
Cinema Sound Systems Committee (25CSS)
Metadata and Registers Committee (30MR)
File Formats and Systems Committee (31FS)
Network and Facilities Architecture Committee (32NF)
Media Systems, Control and Services Committee (34CS)
Media Packaging and Interchange Committee (35PM)

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Details from each Technology Committee meeting

Essence Technology Committee (TC-10E) chaired by Ed Reuss and Paul Gardiner

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 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

DG Project: **Revision of SMPTE ST 2019 VC-3 Video Compression Documents to add Resolution Independence**
VC-3 is a compression format 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

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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: This document passed FCD ballot on 2015-05-22 with 27 comments; all are resolved. It is ready for pre-DP review, and is being kept in step with the TC-31FS mapping document.

Business Impact: Interoperability between systems

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

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) Includes Reference Decoder, Sample Encoder, sample bitstreams
- − ST 2073-3 - VC-5 Image Formats
- − ST 2073-4 - VC-5 Subsampled Color Difference Components
- − Part 5 – Layers (this allows embedding multiple images in a single bitstream; used for stereoscopic, HDR and interlaced frames)
- − Part 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)
- − Part 7 – Metadata (this will provide a basic set of metadata for input image format and also facilitate embedding metadata from other standards)

Status: Parts 1 and 2 are published, but Part 2 has been revised to add test materials to support Parts 3 and 4 – it is at FCD ballot closing 2015-08-10. A repository for the software and test materials is being developed with SMPTE HQ.

Parts 3 and 4 are ready for publication, awaiting completion of the Part 2 revision.

Parts 5 and 6 are at FCD ballot, closing 2015-07-24.

Part 7 work has resumed and a Working Draft was presented to the DG that met during the meeting round.

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

DG Project**: Amendment of ST 2042-1: VC-2 Video Compression Standard and RP 2042-3: VC-2 Conformance Specification**

This amendment of the SMPTE mezzanine video compression standard (based on BBC's DIRAC pro) adds a high quality profile to support Archiving and Production applications.

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Status: The Part 1 revision was published 2012-08-30.
The proponent reported that the sample encoder software is almost complete, bitstreams are expected to be ready by the next meeting.

Business Impact: Interoperability between systems

DG Project: **Revision of SMPTE RP 2047-3: VC-2 Level 65 Compression of High Definition Video Sources for use with a Standard Definition Infrastructure**
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: There has been reassignment of the proponent's staff on this work and progress is expected in the next quarter.

Business Impact: Interoperability between systems

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DG Project: **SMPTE 2080 Document suite: Reference Display and Environment for Critical Viewing of Television Pictures**
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.
Part 3 passed FCD ballot on 2015-06-12 with 13 comments to resolve. At the time of the meeting 10 comments were resolved, 3 comments were addressed.
The DG has decided to split off specification of reference display primaries as a separate document from the Part on Reference Display Characteristics – see **proposed project**. At the meeting, there were disparate views about whether specifying spectral characteristics of primaries is practical with the diversity of technologies available. Although an interesting topic for scientific study, it was decided not to produce such a SMPTE engineering document at this time.

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

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DG Project: **New Document: ST 2087 - Depth Map Representation**
This project will define a standard for a data representation of depth maps in multi-view production and post-production to support interoperability and exchange between relevant processes.

    Status: The document passed FCD ballot on 2014-10-28 with 11 comments to resolve. There is now just one comment left to resolve.

DG Project: **Revision of RP 173: Loudspeaker Placements**
This project will update the Recommended Practice in line with techniques adopted by the broader recording industry, as embodied by AES and ITU standards.

    Status: At the TC meeting, it was decided that this revision project will be closed.

Topic: Projects on Systems for High Dynamic Range and Wide Color Gamut

SG Project: **Study Group on HDR Ecosystem**
Scope: To identify the specific parameters and respective ranges that constitute "High Dynamic Range" (HDR). Based on the agreed definitions, review the impact to form a complete ecosystem for the creation, delivery and playback of HDR content across both linear and home entertainment distribution platforms. Deliverable is a report on existing standards that are impacted; identifying standards gaps which should be addressed, and recommendation on methodology and priority.

    Status: The SG has received multiple submissions for inclusion into its report (which is now up to revision 32). The SG decided to restructure the report to accommodate the submissions. As a consequence, the planned completion is moved back from IBC to the SMPTE Technical Conference in October.

DG Project: **New Standard (suite): ST 2094: Content-Dependent Metadata for Color Volume Transformation of High Luminance and Wide Color Gamut Images**
This project will develop multi-part standards for specifying the semantics and representation of content-dependent metadata needed for color volume transformation of high dynamic range and wide color gamut imagery to smaller color volumes (e.g. BT.709 or Digital Cinema) in mastering applications.

    Status: This group meets weekly and also met during this meeting round. The structure of the document suite has been revised to comprise:
    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

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This reflects the four detailed method disclosures received from Dolby, Philips, Technicolor, Samsung that are sufficiently different to make it impossible to rationalize into a single method. Further Parts will be added if more proponents submit disclosures. Drafts exist for all Parts except Part 2.

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SG Project: Integer and Fractional Frame Rate Conversion
The aim of this project is to determine whether practical high-quality conversion can be achieved, in real-time as well as in non-real-time, that could enable discontinuing the use of higher fractional frame rates - in particular, between UHDTV video at an integer frame rate of 120 fps and UHDTV and HDTV at conventionally used lower fractional frame rates.

Status: The SG organized a technology demonstration for Wednesday, March 18, 2015 at FOX Studios in Los Angeles. The SG concluded that the RFI responses provided informative background and opinions on the known frame rate conversion techniques and their challenges. But respondents provided no demonstrations, objective numeric evaluation criteria, or data from controlled subjective assessments of quality for conversions to or from 120 fps or 120/1.001 fps, or for any other kind of frame rate conversions. The SG consensus is that there is little productive additional work it can do, and it was agreed that the project will be closed.

DG Project: New Document: RP 2093 - Television Lighting Consistency Index
The project scope is to document the "Television Lighting Consistency Index (TLCI)" and the "Television Lighting Matching Factor (TLMF)". The introduction of LED lighting 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 regards to color reproduction for Television.

Status: The draft RP 2093 document is well advanced, but the document editor has been experiencing problems with equation editing in Microsoft Word. One of the TC-10E Chairs agreed to try to fix the problem, but did not expect to get the work done until the next meeting round.

DG Project: New Document: ST 2100-1 - Definition and Representation of Haptic-Tactile Essence
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 2015-06-05 with 88 comments to resolve. At the time of the meeting, 56 comments were resolved.

DG Project: New Document: RP 219-2 - UHDTV Color Bar Signal

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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, rather than designing the best possible test signal for critical examination of the production chain.

> **Status:** The draft RP 219-2 was posted to pre-FCD-ballot review. The DG has been working on the comments received and there is one that remains to be dealt with.

DG Project: **2160-line and 1080-line Production Image Formats for Digital Cinematography - Additional Frame Rates**

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:** This is a newly approved project. A draft document has been posted for pre-FCD-review.

RDD Project: New RDD 36: Apple ProRes Decoder

This project will produce an RDD that documents the Apple ProRes decoding functionality and the Apple ProRes video bitstream. It will contribute sample ProRes bitstreams and the resulting images, as well as a reference decoder.

The reference decoder is C code and it will be part of the balloted RDD as a zipped SMPTE Element. This software decodes ProRes elementary streams.

> **Status:** The RDD passed ballot on 2015-06-26 with 14 comments to resolve. The proponents have also decided to made improvements to their reference implementation.

RDD Project: Draft RDD 34: Sony Low Latency Video Codec within an IP Network Environment

This RDD describes a codec scheme implemented in Sony equipment that supports a degree of compression whilst providing low latency and high picture quality.

> **Status:** The RDD passed ballot on 2015-06-24 with 46 comments to resolve. At the meting, all comments had been resolved and the document will proceed to ST Audit.

RDD Project: IntoPIX TICO lightweight Codec used in IP Networked or SDI infrastructures

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

> **Status:** At the meeting, it was reported that drafting is nearly complete and a ballot draft is expected in 2015-08.

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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

SMPTE RP 21:2015 (Revision of RP 21-2004), Dimensions of 35-mm and 70-mm Motion-Picture Rewind Spindles

SMPTE ST 241:2015 (Revision of ANSI/SMPTE 241-1995), Motion-Picture Equipment – 35-mm ad 70-mm Projection Reels

SMPTE ST 217:2015 (Revision of SMPTE 217-1998), Motion-Picture Film (70-mm) – Striped Release Prints – Recorded Characteristics of Magnetic Audio Records

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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

None

DG Project**: Stereoscopic Subtitle and Timed Text Rendering**
This DG will revise SMPTE standards as recommended in "Stereoscopic On-Screen Text – Study Group Report" version 1.2.
Documents affected:
- Revise ST 428-7: D-Cinema Distribution Master - Subtitle (Published). A request has been received from Japan Digital Cinema Forum to further revise ST 428-7; the DG has decided that more information is required.
- Revise ST 429-2: DCP Operational Constraints
- Revise ST 429-5: Timed Text Track File

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[Drafting Project]**: Revise ST 429-2: DCP Operational Constraints**
This revision project will address issues that arose during the ST 428-7 revision**.**

Status: The revised draft is ready for pre-FCD-ballot review, but will be held until the ST 429-5 revision is also ready. An action at the last TC meeting was for the DG to develop questionnaires for Mastering Houses, Server Manufacturers, Projector Manufacturers and Studios asking whether the currently specified sRGB colorspace should specify XYZ colorspace instead. It was decided that no change is needed.

[Drafting Project]**: Revise ST 429-5: Timed Text Track File**
This revision project will address issues that arose during the 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 revision has progressed over the last quarter, but there is more to do before it will be ready for pre-FCD-ballot review.

Business Impact: Compatibility and Interoperability

[DG Project:] **New ST 430-14: Aux Data Sync Signal and Transfer Protocol**
Project Scope is to develop standard(s) for the transmission and synchronization of Aux Data from a Media Block to one or more Processors in a D-Cinema system.
Applications include Immersive Sound and control for Motion Systems, e.g. motion chairs.

Status: The document passed DP ballot on 2015-06-17 and will close ST Audit on 2015-07-28.

[SG Project]**: D-Cinema Crypto Evaluation (FIPS Revisions)**
This project examines the impact of changes to the FIPS encryption algorithm (random number generator).
Status: A method devised for dealing with the change to a new random number generator has been shown to be impractical, and a new method has been proposed – document "DCI Proposal: KDM-Borne Message Integrity Code (MIC) Keying". It was submitted to the group 2015-6-4. Only Mediablocks that signal their ability to process new KDM (in their certificate) will be sent the new form. New media blocks would have to support both KDMs. The TC Chair will initiate a new project to implement the system.

Topic: Facility List Management projects
These two projects are being managed in one DG that has held 3 telecons since the last meeting round

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

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 group has held 7 telecons in the last quarter. Attributes have been updated in the draft revision to reflect current practice and requirements. There are ongoing discussions on provenance and cryptographic requirements.

DG Project: **New Document - Facility List Message Exchange Protocol**

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

Status: Work is progressing on draft document.

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New 21DC Business

Proposed DG Project: Amendment to ST 429-6 MXF Encryption for TC-35PM

This project will amend ST 429-6 to incorporate requests from TC-35PM for use by IMF. Note that amendments to other TC-21DC documents will also be required to support IMF.

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

None

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DG Project: **Draft ST 2064 suite of documents on A-V Sync Measurement and Assessment**

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

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Status: Parts 1 and 2 are ready for DP elevation and votes were planned for the meeting. However, it was decided to conduct the DP elevation by KAVI ballot. The DG has decided that the next work will be an EG on this technology, to be followed by Part 3.

Business Impact: Improved quality of experience and interoperability between systems

DG Project**: New Document: Open binding technology for persistent content identification in A/V essence**
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 SG 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 issued a Request for Proposals (RFP). It has also developed a Test Plan. The RFP responses have raised a couple of issues and the RFP / Test Plan may be revised as a result – to be discussed in the week following the meetings. The ATSC also have a similar activity covering the emission domain in the US, and they have asked this group to comment on aspects of their proposal – for instance, where in the professional domain their identifiers might be inserted.

DG Project: **Revision of Closed Captioning suite documents**
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.

Status: ST 334-1 and ST 334-2 are published.
ST 333 and RP2007 await available effort.

DG Project**: Revision ST 2010: VANC Data Mapping of ANSI/SCTE 104 Messages**
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. Additional detailed comments have recently been received and they will be addressed in an update to the working draft.

DG Project**: Revision of ST 96: 35- and 16-mm Motion-Picture Film — Scanned Image Area**

Status: There was no report at this meeting.

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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.

DG Project: **New Standard ST 2095-1: Calibration Reference Wideband Pink Noise Signal and Test File**
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.

> **Status:** The draft ST 2095-1, zipped together with a Python script to generate the pink noise, passed FCD ballot 2015-04-03 with 12 comments; all are now resolved. A DP elevation vote was held at the meeting. The vote passed. The group still needs to determine the packaging of the test DCP file for distribution.

DG Project: **Draft RP xxxx: Digital Cinema Sound System Setup and Calibration ("B-chain Modern Calibration Procedure")**
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.

> **Status:** A major rewrite was completed and submitted to the DG in early 2015-02. Work is almost complete on the graphics for the document. There is a dependency on ST 2095-1, which will soon go to DP ballot. It is planned that the completed document will go for evaluation by "real world" testing by commercial technicians, prior to final revision and submission for ballot (predicted to be September or October 2015).

WG Project**: Interoperability of Immersive Sound Systems in Digital Cinema**
This working group will identify 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 will also address 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.

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A suite of documents is anticipated.

Status: This WG (25CSS-10) is currently concentrating on the work of the Immersive Sound Model and Bitstream DG. The DG's initial focus on Metadata Definitions is nearing completion and attention is shifting to the Bitstream Specification. Three input documents have been submitted – Dolby Atmos, DTS MDA and a Lossless Audio codec from Dolby. The aim of standardizing a single specification seems unlikely to be met, and the group is considering standardizing multiple bitstreams. The DG has undertaken a gap analysis and an AHG has been formed to define requirements.

Other 25CSS Business

A presentation was given on enhancements to the Broadcast Wave Format to include the Audio Definition Model.

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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-24TB documents published in the last quarter

SMPTE RP 2092-1:2015, Advertising Digital Identifier (Ad-ID®) Representations

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

   Status: Comment resolution is now complete. The DP ballot package will be prepared for the TC Chair to initiate pre-DP-ballot review.

   Business Impact: Understanding and common use of terms

Topic: UMID Projects

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

SG Project: **Application of the Unique Material Identifier (UMID)**
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 2014-06
    - Part 2.2: UMID Applications in MXF

   Status: Part 2.2 of the report has been completed by the SG and will be posted by the TC Chair for 2-week review prior to making a recommendation to the SMPTE Standards VP to publish. As a result of the report, projects will be initiated for an RP on "The Domains of Media Identity" and on ST 330 extensions.

DG Project: **UMID Resolution Protocol**

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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 2014-12-05. There has been no progress since, as effort has been devoted to the UMID applications SG report.

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DG Project**: New Standard ST 2102: SMPTE Core Metadata Set**
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 draft Standard (together with associated schema) has been submitted and will be posted for pre-ballot review.

Business Impact: Potential foundation for Metadata

SG Project**: Metadata Strategy**
This review of the role of the TC started in the 2012-03 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: No progress; effort devoted to intensive 30MR10 register cleanup work. The SG Chair hopes to present the report by the September meeting.

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

DG Project**: Draft ST 2088: SMPTE Essence Element Key Register Structure**
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 has been posted for further DG review for 3 weeks. The DG will submit the draft standard to the TC Chair to initiate 2-week pre-FCD-ballot review. The document number ST 2088 was assigned.

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DG Project: **Revision ST 336: Data Encoding Protocol Using Key-Length-Value**
Revise ST 336 to update references and review whether its provisions reflect current register operation.

> **Status:** The DG Chair reported that a DG telecon had been held to review the document editor's proposals. Much of the revision involves the removal of repetition in the Normative requirements.

Drafting Project: **RP 2092-1: Ad-ID® Identifier Representations**
This document is closely associated with the **TC-31FS project** developing an Ad-ID "digital slate". The two projects share a 31FS drafting group "Ad-ID Digital Ad Slate for MXF".

> **Status:** This document published since the last meeting and the project will be closed.

WG Project: Metadata Definition
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.
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) passed FCD ballot on 2015-05-18 with 13 comments to resolve. At the time of the meeting, one comment remained unresolved and there were a further 10 days left before the formal comment resolution period closed.
>
> The individual register projects below will not be updated while the transition work is in process, and it is likely that they will be replaced or amended by the new process.

DG Project: **Update Metadata Element Dictionary Contents (RP 210)**

DG Project: **Update Metadata Labels Register Contents (RP224)**

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

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

DG Project: **Create and Update Essence Element Register Contents**
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

The TC approved an application from the US Library of Congress for a Class 13 node in each of the Elements, Labels, Groups and Types registers.

The TC Chair outlined proposed changes to the mechanism for approval of new UL requests.

File Formats and Systems Committee (31FS) chaired by Thomas Bause Mason and Pierre Lemieux

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 ST 434:2014 (SMPTE 434-2006), Material Exchange Format — XML Encoding for Metadata and File Structure Information

SMPTE RDD 26:2015 (Revision of SMPTE RDD 26:2014), MXF OP-1b Specification for AVC with Chunk Audio

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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

DG Project**: New Document: ST 377-2 - KLV-encoded extension syntax (KXS)**
This work specifies an alternative approach to the 'Application Metadata Plug-ins' specified in SMPTE 377-1.

Status: The document passed a second FCD ballot on 2013-11-17 with 70 comments. All comments had been resolved by the last meeting and the DG Chair had uploaded the revised draft for pre-DP review. However, it has since been found that some metadata issues need rationalizing with 30MR. It is believed that a fix has been found, but it is possible that another FCD ballot will be held to be certain that the changes are not structural.

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[DG Project](#): **Revision ST 434: XML representation of MXF metadata**
 Update ST 434 to take account of changes to ST 377-1 and other MXF documents

> **Status:** This document passed ST Audit on 2015-02-03. However, publication is delayed while the TC Chairs check a document issue with the Document Editor.

[DG Project](#): **Revision EG 42: MXF Descriptive Metadata**
Changes that arose during the ST 380 revision have been incorporated in the EG 42 draft.

> **Status:** This revision is at ST Audit, closing on 2015-07-26.

[DG Project](#): **New Document: ST 2042-4 - Wrapping VC-2 Video Essence in the MXF Generic Container**

> **Status:** This document failed FCD ballot (closed on 2013-05-23). The proponents have restructured the document to remove extraneous material and it has completed pre-FCD-ballot review without comment. It will be posted for a second FCD ballot imminently.

[DG Project](#): **New Document: AAC Family Compressed Digital Audio in MXF**
A new MXF mapping document is proposed that will cover all the variants of AAC that are used in broadcast applications.

> **Status:** The DG Chair reported that the document is almost ready for pre-FCD-ballot review, but asked that the TC approve the assignment of document number ST 381-4. This was approved. When 30MR confirms the UL requests, the document can go to FCD ballot.

[SG Project](#): **MXF Timecode Mapping and Labeling**
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:** The SG document editor informed the TC that the first draft will be available in the SG in about a week and that it is expected that it will then undergo revision up to the next meeting round.

[DG Project](#): **New Document: RP 2092-2 - Ad-ID Digital Ad Slate for MXF**
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 ballot on 2014-11-20 with 33 voter comments; all have been resolved, but the document editor reported that the DG would like to send the document for a second (3 week) FCD ballot.

[DG Project](#): **New Standard ST 2073-10: VC-5 Mapping into the MXF Generic Container**

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

Status: The draft Standard passed FCD ballot 2015-06-08 with 8 comments to resolve. All comments have been addressed. When resolution is complete and the requested ULs are confirmed, the document will be ready for pre-DP review.

DG Project: **Revision RDD 26: MXF OP-1b for AVC with chunk audio**
This project adds wrappings of the AVC Intra encoded video essence for additional source images: - 1080p/4:4:4 - 2K/4:2:2/4:4:4 - 4K, UHDTV1/4:2:2/4:4:4.

  Status: This document has been published and the project will be disbanded.

DG Project: **Revision of ST 2019-4:2014 (Mapping VC-3 into the MXF Generic Container)**
   This project will add support for image resolution independence.

  Status: The document was elevated to DP status at the TC meeting. It will go to ST Audit.

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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".
A new AXF project will:
- Prepare Reference AXF Objects
- Prepare Reference AXF Media or at least Media Structures
- Verify AXF Objects and Structures
- Develop Tools for AXF Object & Media Verification
- Develop Utilities for AXF Object Recovery on Various OS's

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

WG Project: **ST 2034-1: Archive eXchange Format (AXF) - Part 1: Structure & Semantics**
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: There was no report at this meeting. Status at the last meeting was:
  Revision to the text and to the XSD file is complete. A UML diagram has been updated but there are

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problems integrating the diagram into the Word document. When this has been done, the revised Standard can go for TC review and balloting can begin.

WG Project**: New Document: ST 2034-2 - Archive eXchange Format (AXF) - Part 2: External Uses of XML Schema**
Part 2 covers the use of AXF Structures in "Unwrapped" form, enabling aggregation of files into a "Bundle". The schema can serve as a manifest and it can apply hierarchical structure to files. It is intended for use from file capture on set through to archive input. There was a strong end-user demand for this work.

> **Status:** There was no report at this meeting. Status at the last meeting was:
> A new document editor is needed and work is suspended until a new editor is appointed.

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DG Project**: ST 2001: XML Representation of SMPTE-registered Data (Reg-XML)**
ST 2001 is about representing <u>instances</u> 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 2014-Q2. An issue about missing xml elements was discovered soon after publication. A corrected draft of Part 1 is at ST Audit, closing 2015-07-26.
> Part 2 was published 2014-Q3.

DG Project**: New Document: XML Schema for Audio and Related Metadata**
This DG will develop an XML Schema for audio and related metadata focusing on the technical aspects and harmonizing the work with existing SMPTE audio metadata efforts.

> **Status:** The project having expanded well beyond its original scope in general, and XML in particular, the TC elected to close it, with the expectation that a replacement project will be proposed and that the SVP will decide the most appropriate TC to handle it.

Other TC-31FS Business
Revision of ST 380
It was identified in an earlier meeting that ST 380 should be revised. It was agreed that the proponent should use an **existing dormant ST 380 revision project** for this purpose, modifying the details as appropriate.
Stabilization of ST 379-1
A stabilization vote was held and the vote passed.

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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 ST 318:2015 (Revision of SMPTE 318M-1999), Synchronization of 59.94- or 50-Hz Related Video and Audio Systems in Analog and Digital Areas — Reference Signals

SMPTE ST 425-3:2015 (Revision of SMPTE ST 425-3:2014), Image Format and Ancillary Data Mapping for the Dual Link 3 Gb/s Serial Interface
And:
Amendment 1:2015 to SMPTE ST 425-3:2014, Image Format and Ancillary Data Mapping for the Dual Link 3 Gb/s Serial Interface — Amendment 1

SMPTE ST 425-5:2015 (Revision of SMPTE ST 425-5:2014), Image Format and Ancillary Data Mapping for the Quad Link 3 Gb/s Serial Interface
And:
Amendment 1:2015 to SMPTE ST 425-5:2014, Image Format and Ancillary Data Mapping for the Quad Link 3 Gb/s Serial Interface — Amendment 1

SMPTE OV 2036-0:2015 (Revision of SMPTE 2036-0:2013), Ultra High Definition Television — Overview for the SMPTE ST 2036 Document Suite

SMPTE ST 2036-4:2015, Ultra High Definition Television — Multi-link 10 Gb/s Signal/Data Interface Using 12-Bit Width Container

SMPTE RDD 33:2015, Format for Non-PCM Audio and Data in an AES3 — Dolby-E® Data Type

SMPTE ST 337:2015 (Revision of SMPTE 337-2008), Format for Non-PCM Audio and Data in AES3 Serial Digital Audio Interface

SMPTE ST 338:2015 (Revision of SMPTE 338-2010), Format for Non-PCM Audio and Data in AES3 — Data Types

SMPTE ST 339:2015 (Revision of SMPTE 339-2008), Format for Non-PCM Audio and Data in AES3 — Generic Data Types

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SMPTE ST 340:2015 (Revision of SMPTE 340-2008), Format for Non-PCM Audio and Data in AES3 — ATSC A/52 Digital Audio Compression Standard for AC-3 and Enhanced AC-3 Data Types

SMPTE ST 2059-1:2015, Generation and Alignment of Interface Signals to the SMPTE Epoch

SMPTE ST 2059-2:2015, SMPTE Profile for Use of IEEE-1588 Precision Time Protocol in Professional Broadcast Applications

SMPTE ST 297:2015 (Revision of SMPTE 297-2006), Serial Digital Fiber Transmission System for SMPTE ST 259, SMPTE ST 344, SMPTE ST 292-1/2, SMPTE ST 424, SMPTE ST 2081-1 and SMPTE ST 2082-1 Signals

SMPTE 2081-0:2015, SMPTE Bit-Serial Interfaces at 6 Gb/s – Overview for the SMPTE ST 2081 Document Suite

SMPTE ST 2081-1:2015, 6 Gb/s Signal/Data Serial Interface – Electrical

SMPTE ST 2081-10:2015, 2160-Line and 1080-Line Source Image and Ancillary Data Mapping for Single-Link 6G-SDI

SMPTE 2082-0:2015, 12G-SDI Bit-Serial Interfaces – Overview for the SMPTE ST 2082 Document Suite

SMPTE ST 2082-1:2015, 12 Gb/s Signal/Data Serial Interface – Electrical

SMPTE ST 2082-10:2015, 2160-Line Source Image and Ancillary Data Mapping for 12G-SDI

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WG Project: SDI Interfaces
This 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.

DG Project: Amendments for UHDTV Colorimetry Signaling
This DG is drafting amendments to ST 425-3 and ST 425-5 to add Payload ID signaling for UHDTV colorimetry.

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Status: ST 425-3 AMD1 and ST 425-5 AMD1 have published. The project will be closed and the multi-link DG that had been kept open for this work will be closed.

DG Project**: New document suite 2076: Stereoscopic 3D (S3D) Production Timing and Synchronization**
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".

Status: RP 2076-1 passed FCD ballot 2015-04-09 with 33 comments to resolve.
EG 2076-2 is almost complete but requires some assistance to complete the SDI section(s) – this is expected to happen 2015-08 – and then the document can go to FCD ballot.

DG Project**: SDI Audio Track Allocation Signaling**
This project will define a signaling mechanism, likely to be carried in Vertical Ancillary Data Space, that provides serial digital interfaces with a means to clearly identify the configuration parameters of any given SMPTE ST 299-1 or -2 embedded audio track.

Status: The work of this DG has been on hold, awaiting the audio metadata gap analysis work in **TC-31FS**. However, that project was closed during this meeting round and another is expected to take its place

DG Project**: New Document: EG on SDI Interfaces**
This group will draft EGs to provide a tutorial on the many SMPTE SDI interface standards and technologies, including how they relate to each other, what image formats are carried, performance.

Status: The group has been working on developing the list of applicable SDI Standards that should be included and described in the EG. A table of parameter values that each SDI standard supports is also in development, but there is concern that the scope of work is too great for the group to complete in a reasonable time frame. In the DG's meeting it was agreed to prioritize the work by limiting the initial scope to HDTV and UHDTV SDI-Standards.

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

Status: Both documents were elevated to DP status by votes at the TC meeting. They will now go for ST Audit.

DG Project**: Revision of EG 34: Pathological Conditions in Serial Digital Video Systems
and Revision RP 198: Bit-Serial Digital Checkfield for Use in High-Definition Interfaces**

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It was agreed that RP 198 – HD Check-field – is higher priority than EG34, in order to get 3Gb/s interfaces specified, and should be completed first.

Status: The focus is on RP 198 and the inclusion of the 3Gb/s interface. There was discussion on extending the scope to include the newly standardized 6Gb/s and 12Gb/s interfaces, but it was decided that they would be defined in a second document, RP 198-2 (this document will become RP198-1).

DG Project**: Revision of ST 297: Serial Digital Fiber Transmission System for ST 259, ST 344, ST 292 and ST 424 Signals**
Scope was to revise ST 297:2006 to update only the normative references and responsible TC; now extended to include details for ST 2081 and ST 2082 projects.

Status: ST 297 is published; this project will be closed.

DG Project**: ST 2036: UHDTV Multi-link 10Gb/s interfaces**
The DG is working on 2 documents:
ST 2036-3 revision to constrain original document to UHDTV1 formats up to 60Hz carried in a 10-bit container and include colorimetry signaling.
ST 2036-4 covering UHDTV1 @ 100Hz / 120Hz and UHDTV2 24Hz to 120Hz carried in a 12-bit container.

Status: ST 2036-4 is published.
The ST 2036-3 amendment is in FCD ballot, closing 2015-07-25.

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

Status: Since the last meeting round, a revised working draft was posted for DG review prior to posting for pre-FCD-ballot review. Some DG comments were received and the document editor is working to address them.

DG Project**: New 2100 Document Suite: Transport of Haptic-Tactile Essence**
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: Two Drafting Projects have been set up:

Drafting Project ST 2100-2**: Coding and Transport Of Haptic-Tactile Essence in AES3**

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Drafting Project ST 2100-3: **Coding and Transport Of Haptic-Tactile Essence in Ancillary Space**

Both projects are the proposal stage.

WG Project: **Video Over IP**

This Working Group (32NF60) was established to handle projects related to IP transport of media. The WG has produced the 7-Part ST 2022 suite of standards.

Status: The group currently has no projects.

WG Project: **New Document suite: Ultra HD SDI Interfaces**

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: The WG met during this meeting round. Progress is covered in each of the projects below.

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

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

Status: ST 2081-11 passed FCD ballot 2015-03-09 with 13 comments to resolve.
ST2081-12 passed FCD ballot 2015-03-09 with 26 comments to resolve.
Comment resolution is in progress and has given rise to a new project "**10E 2160-line and 1080-line Production Image Formats for Digital Cinematography - Additional Frame Rates**"

An **amendment project** to correct the jitter specification in ST 2081-1 and ST 2082-1 is underway in this DG.

DG Project: **ST 2082 suite: 12Gb/s Signal/Data Serial Interfaces**

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

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

Status: ST 2082-11 passed FCD ballot 2015-03-09 with 19 comments to resolve.
ST2082-12 passed FCD ballot 2015-03-09 with 29 comments to resolve.
Comment resolution is in progress and has given rise to a new project "**10E 2160-line and 1080-line Production Image Formats for Digital Cinematography - Additional Frame Rates**"

An **amendment project** to correct the jitter specification in ST 2081-1 and ST 2082-1 is underway in the 6Gb/s DG.

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WG Project: Time Labeling and Synchronization
This Working Group (32NF80) was established to handle projects for next-generation synchronization of systems using packetized networks and time labeling of essence in both digital and analog forms.

Status: The WG met during this meeting round, the first face-to-face meeting since the publication of ST 2059-1 and ST 2059-2. The main projects discussed were the HFR time code project, the Time Labels projects, the 2059 Engineering Guidelines and the PTP interoperability group (see below). In addition, the WG started to consider how interoperability testing could be undertaken. The aim is to confirm that the provisions of the standards are unambiguous and that the technology does, indeed, yield the intended results.

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

DG Project: New Synchronization System
The main work of this group is complete, following the publication of the two standards it has been drafting:

ST 2059-1: The SMPTE Epoch and generation and alignment of interface signals
This document contains:
Definition of epoch used for synchronization system
Alignment of video and audio signals at the epoch
Formulas for generating video, audio, ST 12 time code and ST 309 date from TAI time via PTP and additional metadata

ST 2059-2: Precision Time Protocol SMPTE profile for time and frequency synchronization in a professional broadcast environment
This document defines the IEEE 1588 PTP profile for the SMPTE synchronization system.

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AHG 2059-1 "Golden" test vector creation

Status: Nothing new to report

DG Project: **New Document ST 12-3: Time Address for High Frame Rate signals and its data structure in the ancillary data space**
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: Draft ST 12-3 passed FCD ballot 2015-06-19 with 26 comments to resolve. Comment resolution is in progress.

DG: PTP Interoperability Testing
At the 2015-07 TC meeting, this group was converted into a DG from an AHG, as it is expected to last multiple meeting cycles and requires KAVI resources. Interested parties may join the group, subject to signing an agreement.

Status: The group has met several times since its formation at the last meeting round. It has agreed an overall approach and started a draft Memorandum of Understanding under which the testing will be done. It has also drafted a Liaison letter to the IEEE PTP Interop group.

DG Project: **Development of a set of synchronization Engineering Guidelines "EG 2059-1x"**
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 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**. At the TC meeting, the possibility of another EG on interoperation with AES67 was mentioned.

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

Status: The WD submitted 2015-05-22 is close to being ready for pre-FCD-ballot review.

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

Status: A WD was submitted 2015-04-20.

Drafting Project: **New Document: EG 2059-12 - Systemization Considerations for using SMPTE ST 2059**

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Status: A WD was submitted 2015-04-23.

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

Status: The most recent WD was submitted 2014-11-26, but it is understood that an updated version will be posted very soon.

DG Project: **New Time Labeling System**
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:

Drafting Project**: 2015 Suite: Full-featured Time Labels (aka "TRL")**
Status: The following draft documents have been recently created / updated and the proponent expects to add other Parts to the suite:
EG 2015-1: Time Related Label (TRL) – Ecosystem
RP 2015-2: Time Related Label (TRL) – Terms, Definitions and Timescales
ST 2015-3: Time Related Label (TRL) – Media Index Counts
ST 2015-4: Time Related Label (TRL) – Data Objects and Container Structure
ST 2015-11: Time Related Label (TRL) – Ancillary Data Mapping
RP 2015-31: Time Related Label (TRL) – Profiles

Drafting Project**: 2013 Suite: Generic Time Label**

Status: An updated suite of documents was uploaded 2015-07-08:
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
The suite of documents will be posted for TC pre-FCD-ballot review.

Drafting Project**: RP 2014 Suite: Date-Time Terms and Definitions**

Status: It has been recently agreed that this document will comprise 2 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.

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DG Project: **Revision of ST 318: Synchronization of 59.94-Hz or 50-Hz Related Video and Audio Systems in Analog and Digital Areas – Reference Signals**
This project has been set up to add alignment information for ST 2059-1, update references and general editorial cleanup.

> **Status:** The document is published and this project will be closed.

DG Project: **Amendment EG 40: Conversion of Time Values Between SMPTE 12-1 Time Code, MPEG-2 PCR Time Base and Absolute Time**
This project will make small corrections to formulas where errors had been pointed out during the 2014-06 meeting round.

> **Status:** No progress in last quarter.

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DG Project: **Code-point Extension Mechanism for the ST 337 family**

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:

Drafting Project: **32NF 338 Amendment**
Amendment has been started to add AC-4 (code point 24) and MPEG-H (code point 25) see these projects below. Also, to add a code point for DTS.

> **Status:** The initial WD is in DG review.

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

> **Status:** This document passed FCD ballot 2015-05-13 with 6 comments; these have been resolved and the DG is addressing post-ballot source format references.

Drafting Project: **New document ST 2041-4 (proposed): MPEG-H in AES3**

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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. The proponent anticipates a first draft in about a month.

Drafting Project: **New document DTS Audio over AES3**

   Status: A Project Draft has been reviewed in the DG and there are no comments. The DG plans to send to 32NF for pre-FCD-ballot review soon.

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SG Project: **Flow Control in Professional Media Networks**
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 had its kick-off meeting just before the Sydney meeting round. It has identified a set of initial tasks including the creation of a glossary and identifying necessary liaisons.

DG Project: **RDD Carriage of uncompressed video via MPEG Transport Stream over IP (Evertz)**
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 project has just been launched. A first draft of the RDD is expected shortly.

Other 32NF Business
   Proposed DG Project: **CWDM optical interface for multi-link SDI**
   This proposed new project to standardize a Coarse Wavelength Division Multiplex optical interface for multi-link SDI was presented in the WG meeting.
   It is proposed that this document should be ST 297-2, with ST 297 renamed to ST 297-1.

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Media Systems, Control and Services Committee (34CS) chaired by Chris Lennon and John Footen

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: 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

It is primarily an XML-based system that standardizes exchange of Schedule, As-run and Content-related metadata. The group has an XML AHG.

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 3.0.

WG Project: BXF 4.0

The bulk of BXF 4.0 is schema work. The document suite (Parts 1, 2, 3, 4, 9) has been revised to add BXF 4.0 features such as:

Live Schedule Files – OATC support; Addition of Backup Events; Ability to Exclude From EPG;
Time Code In/Out Option; Low Res Proxy URL; Format sub element definitions;
Multiple episode support; Schedule Episode number; etc.

Status: The balloted Parts passed FCD ballot on 2015-06-10. Parts 1, 3, 4, and 9 each had one comment and Part 2 had 2 comments. All comments have been resolved. Pre-DP-ballot review will be started.

Proposed DG Project: BXF 5.0

BXF 5.0 is expected to include such things as: measurement data, QC data, file delivery parameters, trading partner registry, FIMS transfer connector, traffic instruction use cases.

Status: The BXF 5.0 project proposal was reviewed in the TC meeting and will go for project approval.

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DG Project**: Media Device Control over IP**
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 under development 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.

ST 2071-5: Media Device Control - RESTful Protocol – New intended project, proposal will be issued.

Status:
> All four Parts are at FCD ballot (Parts 1-3 are revisions of the published documents). Parts 1, 2, and 4 close 2015-07-15. Part 3 closes 2015-07-16.
> There are new project proposals associated with this work. Improvements to ST 2071-1 to **add URI Fragment notation** has been issued together with **Edit XSD and WSDL for project adding URI fragment** and an update to ST 2029 will take place in TC-30MR.

> There is some DG discussion about the new project to create RESTful protocol extensions.

Business Impact: Interoperable Media Device Control

Media Packaging and Interchange Committee (35PM) chaired by Annie Chang

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.

Topic: 35PM Publications in last quarter

None

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WG Project: 2067 Document Suite: Interoperable Master Format (IMF)

This Working Group (35PM-50) co-ordinates the activities of a number of DGs defining various aspects of IMF. 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 (nearing its 1 year review)

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 #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 bulk of the IMF standardization is complete.

Activity continues in the Mezzanine Film Format DG; see below. The Sample Material Interchange AHG held another plugfest on 2015-03-27 at Netflix, LA.

There has been discussion on support for HDR in IMF.

A new project has been proposed for ACES in IMF – see below.

One year review is due on the following IMF documents (any plugfest bug-fixes identified will be incorporated):

ST 2067-2 IMF Core Constraints

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ST 2067-3 IMF Composition Play List
ST 2067-5 IMF Essence Component
ST 2067-20 IMF Application #2
ST 2067-21 IMF Application #2 Extended

DG Project: **Draft ST 2067-20: IMF Application #2, JPEG 2000**

Status: Published and now opened for a **1 year review amendment / revision** project.

DG Project: **Draft ST 2067-30: IMF Application #3, MPEG-4 Visual Simple Studio Profile (SStP)**

Status: Published.

DG Project: **Draft ST 2067-2: IMF Core Constraints**

Status: Published and now opened for a **1 year review amendment / revision** project.

DG Project: **IMF CPL and OPL**
This group's Composition Playlist, ST 2067-3, is opened for **1 year review amendment / revision** project. The group has also been working on Output Profile List (OPL) documents.

Status: The set of Output Profile List documents has just been published:
ST 2067-100 IMF Output Profile List - Core
ST 2067-101 IMF Output Profile List - Common Image Definitions and Macros
ST 2067-102 IMF Output Profile List - Common Image Pixel Color Schemes
ST 2067-103 IMF Output Profile List - Common Audio Definition and Macros

DG Project: **IMF Wrapping, Security & Packaging**
This group has developed ST 2067-5: Interoperable Master Format – Essence Component

Status: ST 2067-5 is published. **1 Year review amendment / revision** project initiated.

DG Project: IMF Data (Text) Essence

Status: Adopting W3C IMSC-1 Profile as a constraint for subtitling and captioning.

DG Project: IMF Audio
Project: ST 2067-8: IMF Common Audio Labels; published.

 Status: The IMF Audio group has resumed meetings (4 in the last quarter) to discuss an audio requirements document for immersive/object-based audio. The document has been created.

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AHG Project: **IMF Sample Material Interchange (SMI)**
This group has been set up to facilitate interoperability testing by making sample material available online. It is also organizing IMF plugfests (last one on 2014-10-24 at which interoperability between 7 working systems was tested; including both HD and UHD files).

Status: The SMI held 5 meetings in the last quarter. Another plugfest is planned for2015-03-27 at Netflix in Los Angeles.
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

DG Project: **ST 2067-21: Extensions to IMF Application #2, JPEG 2000**
This extension supports higher specifications including resolution, frame rates and multiple color space encodings.

Status: Published and now opened for a **1 year review amendment / revision** project.

DG Project: **New Document ST 2067-40: IMF Application #4 Mezzanine Film Format**
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: An initial draft was posted to the WG 2014-12-19. 16-bit half-float encoding has been added to the standard.
The group is organizing an App #4 Plugfest – September 21/22 in Paris, after the next quarterly Standards meeting round.

Proposed DG Project: **New Document IMF App#1 ACES (for long-term archiving)**
A presentation was given at the TC meeting for a new application document specify ACES in IMF.
The ACES archiving use case requires data structures for aligning sound fields and timed text with ACES-encoded images. An ACES file container exists (SMPTE ST 2065-4), but no code stream wrapper, or other supporting data structure exists. A formal project proposal will be drafted and the first meeting is planned during the Paris meetings round.

Notes on this report and the SMPTE Standards Process

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