



Standards Quarterly Report September 2014

Result of SMPTE® Standards Committee Meetings
17-21 September 2014 in Geneva, Switzerland
Hosted by EBU



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SMPTE Standards Quarterly Report: Executive Summary

As a result of SMPTE Standards Committee Meetings
17-21 September 2014
Geneva, Switzerland
Hosted by EBU

Nine SMPTE Technology Committees and twelve subgroups scheduled meetings at this round, hosted by EBU, 17-21 September. The meetings immediately followed IBC in Amsterdam.

Over 60 members attended in person over the 5 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 160+ active projects is in the [detailed account](#), below.

New Projects launched in the last quarter

- Open binding technology for persistent content identification in A/V essence [Details](#)
- Revision of ST 430-7: Digital Cinema Facility List Message (Extended) – no formal project proposal yet
- Amendment of EG 40: Conversion of Time Values Between SMPTE 12-1 Time Code, MPEG-2 PCR Time Base and Absolute Time (Errors were recently found in formulae) [Details](#)
- RDD on Sony Low Latency Video Codec Within an IP Network Environment [Details](#)
- Revision of RP 2047-3:2011 - VC-2 Level 65 Compression of High Definition Video Sources for use with a Standard Definition Infrastructure (need to fully specify over-riding the base video format) [Details](#)
- Three small projects related to the Media Device Control Suite: [Details](#)
 - Amend / Revise ST 2071-1 Media Device Control – to Add URI Fragment
 - Revise xml and wsdl elements as required to Add URI Fragment to ST 2071-1 and modify the MapEntry data
 - Revise ST 2029 to include the URNs in ST-2071-1
- Standard on VC-5 Mapping into the MXF Generic Container [Details](#)
- Study Group on High Dynamic Range Ecosystem [Details](#)
- Standard on UHDTV Color Bar Signal [Details](#)
- RDD Apple ProRes Bitstream and Decoder [Details](#)

The Interoperable Mastering Format (IMF) group has added a further document “ST 2067-21: Application #2 Extended “ to the existing suite of 6 published documents (Core Constraints; Composition Playlist; Essence Component; Common Audio Labels; Application # 2; Application # 3).

A set of 4 IMF Output Profile lists has also just passed DP ballot. A second IMF plugfest is being planned – provisionally for 2014-10-24. [Details](#)



Two Joint Task Forces in which SMPTE participates gave progress reports during the meeting round. They both deal with aspects of moving towards a data network environment for media:

- Joint Task Force on Networked Media
- Joint Task Force on File Formats and Media Interoperability

[Details](#)

A new Study Group working on the High Dynamic Range Ecosystem held its first meeting during this meeting round. It has been recognized 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, electro-optical transfer function will be studied. This meeting, the EBU and the BBC gave details of their experimental results. [Details](#)

A drafting group is developing a 6-part suite of documents on “Reference Display and Environment for Critical Viewing of Television Pictures”. The first Part, Reference White Luminance Level and Chromaticity, passed a DP vote at the meeting. The second Part, Measurement and Calibration Procedure for HDTV Displays, is in the process of ballot comment resolution. [Details](#)

There is a Working Group creating 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; primarily for Ultra HD SDI transport. The group is developing a large suite of documents and the first two, electrical parameters for 6Gb/s and 12Gb/s, have reached DP status. Another two, defining mappings for single link 6Gb/s and 12Gb/s interfaces are in ballot comment resolution. Further documents will define dual-link mapping, quad-link mapping and stereoscopic mapping for the three link speeds as well as mapping for multiple HDTV links. [Details](#)

There are currently 15 MXF projects in process, adding features and mappings to this file-based suite of standards or creating constraints for improved interoperability. [Details](#)

The final report from the SMPTE TC-25CSS B-Chain Study Group on Theater Testing Data (“B-Chain Frequency And Temporal Response Analysis Of Theaters And Dubbing Stages”) was approved. This work began in March, 2010 with the goal of studying the current standards and practices regarding B-Chain electroacoustic response and calibration, and make recommendations for work that SMPTE should undertake in these areas. During the 2.5 year study, the group tested many aspects of the subject however due to the volume of data collected, a subsequent group in TC 25CSS was tasked with analyzing the tests and making recommendations to the industry. [Details](#)



SMPTE Standards Quarterly Report: Detailed Account

As a result of SMPTE Standards Committee Meetings
17-21 September 2014
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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 Standards Committees 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](#).

A change was introduced quite recently to call the groups developing documents “Drafting Groups” (DGs) rather than “Ad-Hoc Groups”. If you follow Drafting Group links in this report, you may find that some still show up as AHGs because projects started before the change are not renamed.

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 8-12 December 2014 in Burbank, California and will be hosted by Walt Disney Studios.

Further quarterly Standards meeting rounds are planned for:

March 2015 – Currently no venue fixed – hosts invited! Provisionally week beginning 9th March.

July 7-10 2015 - Sydney, Australia – plan is for meetings to precede the SMPTE Conference in Sydney
September and December 2015



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 \(35PM\)](#)

In addition, there are [reports from the Joint Task Forces](#) in which SMPTE participates (Networked Media, File Format and Media Interoperability).

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 2084:2014, High Dynamic Range Electro-Optical Transfer Function of Mastering Reference Displays

SMPTE ST 2019-1:2014 (Revision of ST 2019-1-2008), VC-3 Picture Compression and Data Stream Format

SMPTE RP 2019-2:2014 (Revision of RP 2019-2:2008), VC-3 Decoder and Bitstream Conformance

SMPTE RP 219-1:2014 (Revision of RP 219:2002), High-Definition, Standard-Definition Compatible Color Bar Signal

....and change of status (withdrawn documents are still available):

Withdrawal of SMPTE ST 267M-1995, Television – Bit-Parallel Digital Interface – Component Video Signal 4:2:2 16x9 Aspect Ratio

Withdrawal of SMPTE RP 175-1997, Digital Interface for 4:4:4:4 Component Video Signals (Dual Link)

Topic: Video compression standards in SMPTE



DG Project: Revision of SMPTE ST 2019 VC-3 Video Compression Documents

This project extends the functionality of SMPTE VC-3 compression (based on AVID's DNxHD technology) by adding 5 new Compression IDs to support 4:4:4 sampling and RGB color space. This work affects two documents - ST 2019-1: VC-3 Picture Compression and Data Stream Format and RP 2019-2: VC-3 Decoder and Bitstream Conformance. In addition, ST 2019-4 is being revised in TC-31FS.

Status: The revisions of both ST 2019-1 and RP 2019-2 are published and the project will be closed.

Business Impact: Interoperability between systems

DG Project: Draft ST 2073: VC-5 Video Essence

This project standardizes the Cineform / GoPro video compression system. The document suite plan currently comprises:

- Part 1 - VC-5 Elementary Bitstream (Published)
- Part 2 - VC-5 Conformance Specification (Published) Includes Reference Decoder, Sample Encoder, sample bitstreams
- Part 3 - VC-5 Image Formats
- Part 4 - VC-5 Subsampled Color Difference Components
- Part 5 - Layers
- Part 6 - Sections (this refers to a mechanism for implementing special functions without disturbing standard decoders)
- Part 7- Metadata

Status: Parts 1 and 2 were published in 2014 – Q2.

Part 3 is at ST Audit, closing 2014-10-12.

Part 4 was at FCD ballot (now closed, passed, with 3 comments to resolve).

Part 7 and then parts 5 & 6 will follow after the VC-5 team has completed work on an MXF wrapper for VC-5 in TC-31FS. This order of implementation was chosen to permit early use of VC-5 essence in MXF workflows that do not require advanced features.

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.

Status: The Part 1 revision was published 2012-08-30.

The bitstreams to complete Part 3 are awaited; the TC Chair has been in contact with the proponent, who plans to resume the bitstream work soon.



Business Impact: Interoperability between systems

DG Project: RDD: JPEG 2000 Mezzanine Profile for HD Applications

This project will create a JPEG2000 profile with consistent visual qualities so that in a multi-vendor environment, insert edits, assemble edits and concatenation can take place without significant visual artifacts. This profile is currently deployed by a number of users and the RDD is proposed to aid interoperability.

Status: The project Chair has informed the TC that the project will be closed.

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.

Business Impact: Interoperability between systems

DG Project: Draft SMPTE 2080 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
- RP 2080-2: Measurement and Calibration Procedure for HDTV Displays (deals with parameters that can be regularly adjusted)
- ST 2080-x: Reference Display Characteristics
- ST 2080-x: Reference Viewing Environment Characteristics
- RP 2080-x: Full Measurement / Calibration
- EG 2080-x: Engineering Guideline to provide context and background

Status: The Part 1 document passed FCD rebalot on 2014-08-12 with 29 comments. All comments had been resolved (4 were “non-responsive”) by the time of the meeting and a pre-DP review is to take place (now complete) followed by a Kavi vote to elevate to DP (closes 2014-10-23). The Part 2 document closed FCD ballot with 47 comments to resolve; by the time of the meeting 17 remained to be resolved. This document uses a novel method for developing colorimetry offsets to deal with different display technologies. The Reference Viewing Environment is the next document in the queue. Additional issues identified by the group are the need to revise RP 167-1995: NTSC Displays to deprecate 120 cd/m² white level and to establish a Reference Grey (18%) grey card.



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

DG Project: Revision of RP 219: High-Definition, Standard-Definition Compatible Color Bar Signal

The proposal is to add optional components to part of the signal to exercise levels in the white overshoot region above level 940 and in the sub-black region below level 64 (10bit samples).

Status: This document is published and the project will be closed. There is a related new project to define UHDTV Color Bars, below.

Business Impact: Improved interoperability between HD and SD color bar

DG Project: Draft 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 DG Chair reported that the document is now ready for FCD ballot – it will be sent to the TC Chairs shortly.

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: The project is under hiatus until October to allow the Chair to work on other commitments.

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 project group held its first meeting during this meeting round. Its purpose was to add input from the EBU and BBC, who presented their experiences during coverage of the Zurich Athletics and Commonwealth Games respectively.

DG Project: Draft ST 2084: High Dynamic Range Electro-Optical Transfer Function of Mastering Reference Displays



The scope of this project is to define an expanded luminance range for next-generation entertainment content and to define a new Electro-Optical Transfer Function (EOTF) based on a human perceptual model.

Status: This document is published and the project will be closed.

DG Project: Draft ST 2085: Color Differencing for High Luminance and Wide Color Gamut Images

The proposal is analogous to the transform from RGB to YUV, but in XYZ color space, allowing sub-sampling of the color difference channels.

Status: The DG held a meeting during this round and reached agreement that the document is now ready to be submitted to the TC for pre-FCD-ballot review.

DG Project: Draft ST 2086: Mastering Display Color Volume Metadata Supporting High Luminance and Wide Color Gamut Images

The metadata is designed to convey both the color gamut and the dynamic range of the display used for mastering.

Status: This document has passed DP ballot and will go to ST Audit shortly (now done, will close 2014-10-12).

Business Impact: A number of companies are proposing a “Next Generation” vision for delivering an enhanced viewing experience to the home. These three projects contribute to this vision.

DG Project: 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: A DG member reported on behalf of the Chair that the group is continuing to convert the original EBU document into a SMPTE draft document. It was noted that there is work in AMPAS on this topic.

DG Project: Coding of 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.



Status: A DG member reported on behalf of the Chair that the group has decided to split off the transport part of the work and take that up in TC-32NF. It is hoped that the reduced scope will allow a CD to be completed by December.

DG Project: Draft RDD 30: ARRIRAW Image File Structure and Interpretation Supporting Deferred De-mosaicing to a Logarithmic Encoding

This project documents the layout and the meaning of the image data and metadata in an ARRIRAW file.

Status: RDD 30 is in the publication queue. The project will be closed.

DG Project: Draft RDD 31: Deferred De-mosaicing of an ARRIRAW Image File to a Wide-Gamut Logarithmic Encoding

This project documents how the image data described in RDD 30 (above) are processed to produce a 'log' image that serves as an intermediate state between 'raw' and end-user-display-ready imagery.

Status: RDD 31 is in the publication queue. The project will be closed.

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: Project The SG held meeting during this round. It is developing a Request For Information to be sent to organizations that are aware of the performance available from conversion technology. The group will also work on an informational contribution for ITU-R.

DG Project: Revise ST 2036-1 for Additional Higher Frame Rates

This project will implement requests to add additional frame rates to SMPTE ST 2036-1, specifically 100fps and 120/1.001fps. Currently the only higher rate supported by ST 2036-1 is 120fps.

Status: The document was raised to DP status by vote in the TC meeting.

DG Project: Draft RP219-2: UHDTV Color Bar Signal

RP 219-2 will specify the parameters needed to apply color bars to UHDTV and D-Cinema production image formats. It will scale the spatial parameters from the HDTV spatial parameters of RP 219(-1).

Status: The DG held its Inaugural meeting 2014-08-18. At the TC meeting there was debate about whether D-Cinema should be included, but the proponents were not present and the question was tabled for the next TC meeting.

DG Project: Draft RDD: 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.

Status: The DG Chair reported that work is in progress and a sample implementation is looking good.

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

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

Status: The RDD is expected within the next 3 months and it is intended that it will go straight to RDD ballot.

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.

Digital Cinema Technology Committee (21 DC) chaired by John Hurst 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 RDD 28:2014, Dolby Atmos® Print Master File Specification
SMPTE RDD 29:2014, Dolby Atmos® Bitstream Specification
SMPTE ST 429-14:2014, D-Cinema Packaging – Aux Data Track File
SMPTE ST 430-12:2014, D-Cinema Operations – FSK Synchronization Signal

DG Project: Stereoscopic Subtitle and Timed Text Rendering

This DG will revise SMPTE standards in compliance with “Stereoscopic On-Screen Text – Study Group Report” version 1.2.

Documents affected:

- Revise ST 428-7: D-Cinema Distribution Master - Subtitle (Published)



- Revise ST 429-2: DCP Operational Constraints
- Revise ST 429-5: Timed Text Track File

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 draft revised ST 429-2 is ready for pre-FCD-ballot review, but will be held until draft ST 429-5 is ready.

Drafting Project: Revise ST 429-5: Timed Text Track File

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

Status: Some topics for the revision of ST 429-5 have been discussed and extensive update is underway.

Business Impact: Compatibility and Interoperability

DG Project: Draft ST 430-12: DCO - FSK Synchronization Signal

This project will define the modulation and protocol for a signal using a digital audio link that can be played back from a server and used to carry timing and identification information to accurately synchronize an external processor.

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

DG Project: Draft ST 429-14: Auxiliary Data Track File, incorporating ST 429-15: DCP - Auxiliary Data Composition Asset

This DG will specify a method to carry data that does not fall into the existing Sound, Picture, and Subtitle track files in a SMPTE Digital Cinema Package. Examples are object-oriented sound, motion control, and effects programming (wind, fog, etc.).

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

DG Project: Draft ST 429-16: Additional Composition Metadata and Guidelines

The DG will develop a new Standard "DCP CPL Metadata Asset item". Additional Composition Play List metadata items are needed. As a work-around, these items are currently encoded in the title of the composition, whose structure cannot accommodate the full range of desired metadata. As a result, metadata contained in the Composition Playlist is inconsistent and seldom utilized by exhibition equipment.

Status: The document passed ST Audit 2014-08-14 and is on the point of publication.

DG Project: Revision ST 429-9: D-Cinema Packaging - Asset Mapping and File Segmentation



This project will add support for multiple ASSETMAP.xml files in a single volume.

Status: The document is at DP ballot, closing 2014-09-25.

DG Project: 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: A Working Draft has been submitted to the TC for posting for pre-FCD-ballot review. The DG will hold a telecon on 2014-10-01 to review any comments and hopefully prepare for FCD ballot.

DG Project: Draft RDD 29: Dolby Atmos Bitstream Specification

For real-time playback through a cinema sound processor, a Dolby® Atmos™ bitstream needs to contain information to support both channel-based and object-based audio. This document defines the syntax of a frame-based Dolby Atmos bitstream. The bitstream carries audio essence and metadata necessary to reproduce a complete audio program.

Status: This document is published and the project will be closed.

DG Project: Draft RDD 28: Dolby Atmos Print Master File Specification

A Dolby® Atmos™ print master needs to contain information to support both channel-based and object-based audio, and therefore has several components. This document defines how to store the audio essence and metadata for a Dolby Atmos presentation. The files created with this specification are part of the DCDM and are passed on to other processes to package for distribution and playback.

Status: This document is published and the project will be closed.

Other TC-21DC Business

Two related topics have been brought up for new projects:

Revision of ST 430-7: Facility List Message

Facility List Message Exchange Protocol

However, no project proposals have been issued.



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 2016-2:2014 (Revision of SMPTE 2016-2-2007), Format for Pan-Scan Information

SMPTE ST 2016-4:2014 (Revision of SMPTE 2016-4-2007), Vertical Ancillary Data Mapping of Pan-Scan Information

SMPTE ST 2020-1:2014 (Revision of SMPTE 2020-1-2008), Format of Audio Metadata and Description of the Asynchronous Serial Bitstream Transport

SMPTE ST 2020-2:2014 (Revision of SMPTE 2020-2-2008), Vertical Ancillary Data Mapping of Audio Metadata – Method A

SMPTE ST 2020-3:2014 (Revision of SMPTE 2020-3-2008), Vertical Ancillary Data Mapping of Audio Metadata – Method B

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

Status: The project status reports that “all FCD comments have been addressed in Parts 1 and 2 and final documents have been prepared for submission to 24TB for 2-week pre-DP review”. However, at the TC meeting the TC Chair reported that these documents cannot go to 2-week review yet as an error has been found. Corrected documents are expected shortly.

The file binding document, Part 3, has been started. The scope and contents for an additional EG are being established.

Business Impact: Improved quality of experience and interoperability between systems

SG Project: Open binding technology for persistent content identification in A/V essence

This project aims to define an open binding technology standard (e.g., watermarks, fingerprints, metadata sidecars, etc.) for embedding persistent content identifiers into audio/video essence in a way that survives compression and distribution through the supply chain.



Status: The SG completed its report and it was accepted by TC-24TB at the last plenary in June. The SG then prepared a revised report for SMPTE publication. At this meeting, it was agreed that the SG should be disbanded having completed its work. Note below that a new DG has been approved to start the standardization work.

Business Impact: Formulate an understanding of potential technologies that can be applied to content identification and future standards requirements.

DG Project: Open binding technology for persistent content identification in A/V essence

This new project will develop an open binding technology standard (e.g., watermarks, fingerprints, metadata sidecars, etc.) for end-to-end embedding persistent content identifiers into audio/video essence in a way that survives processing, compression and distribution.

Status: This is a newly-approved project that follows from the Open ID SG (see above).

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 passed FCD ballot on 2014-05-26 with 7 and 5 comments respectively. All comments on ST 334-2 are resolved, some comments on ST 334-1 still need work. It is expected that these two will advance shortly after the meeting. ST 333 and RP2007 are held up due to shortage of editor's time.

DG Project: Revision ST 2010: VANC Data Mapping of ANSI/SCTE 104 Messages

This project is a straightforward updating of references.

Status: This document is also held up due to shortage of editor's time.

DG Project: Revision ST 2016-2: Format for Pan-Scan Information and ST 2016-4: Ancillary Data Mapping of Pan-Scan Information

The project adds support for UHD TV signals, as well as updating references.

Status: Both documents have been published. A "-0" roadmap document will be prepared. The DG will be disbanded, having completed its work. It was also mentioned that a new DG may be proposed in the future to work on revisions to ST 2016-1: Format for Active Format Description and Bar Data and ST 2016-3: Vertical Ancillary Data Mapping of Active Format Description and Bar Data.

DG Project: Revision ST 2020-x: Audio Metadata in VANC

The project is a straightforward updating of references for: ST 2020-1: Format of Audio Metadata and Description of the Asynchronous Serial Bitstream Transport; ST 2020-2: Vertical Ancillary Data Mapping



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of Audio Metadata - Method A; and ST 2020-3: Vertical Ancillary Data Mapping of Audio Metadata - Method B.

This suite of documents standardizes the carriage of Audio Metadata in VANC packets.

Part 1 defines the overall metadata format; Part 2 and Part 3 standardize methods for formatting the metadata into VANC packets.

Status: All Parts are published and the DG will be disbanded having completed its work.



DG Project: Revision ST 2031: Carriage of DVB/SCTE VBI Data in VANC

This project is a straightforward updating of references.

Status: The document passed FCD ballot on 2014-06-18, all comments are resolved. A package for pre-DP review will be prepared.

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

Status: Revision work is continuing. The diagrams in the standard are being clarified and expanded.

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.

SG Project: Immersive Audio Systems: B-Chain and Distribution Study Group

This group is developing a report on existing immersive cinema audio systems in order to determine what standards and recommended practices are needed. The B-chain and distribution requirements of the various systems will be studied. The National Association of Theater Owners (USA) and the International Union of Cinemas (Europe) have jointly submitted their Immersive Sound Requirements to the group.

Status: The SG's report was published and is available [here](#). The group is now looking at doing a 3500-4000 word article based on the report for the SMPTE Journal.

DG Project: Analysis of SMPTE B-Chain Study Group Theater Testing Data Report

This group is compiling and analyzing the theater testing data that was collected by the earlier B-Chain Study Group Theater Testing group is producing a report with analysis, comparisons and recommendations.

Status: The report analyzing the venues (4 cinemas, 2 dubbing stages) was submitted to the TC for review and three final comments were considered at the TC meeting and the modified report was approved. The report was published and is available [here](#).

DG Project: Draft ST xxxx: 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 defined in ST 202:2010 and RP 200-2012 will be used and the algorithm used to generate the pink-noise file will be specified.



Status: The group anticipates submitting the draft Standard for 2 week pre-FCD-ballot-review around mid October. The development of the test files is proceeding well. A liaison will be sent to the AES, who have activities in this area and can review the draft and the algorithm.

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: The RP draft was submitted for DG review in mid July and resulting comments were worked on through August. In October, the updated draft will be reviewed in the TC and in a related AES group. It is anticipated that the draft for ballot will be available in November 2014.

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. A suite of documents is anticipated. The working group will liaise with TC-21DC and work closely with them in the creation of these standards.

Status: This WG has moved much of its work to its DG (25CSS-10, Immersive Sound Model and Bitstream), so its meetings are now only held quarterly. The DG’s first draft document is “Immersive Audio Metadata” and the goal is for pre-FCD-ballot-review by the December meeting round. The next DG document will be the Immersive Audio Bitstream Specification; work should have begun by the December meeting round.



Metadata and Registers Committee (30MR) chaired by Ingo Hoentsch

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

SMPTE ST 395:2014 (Revision of SMPTE 395M:2003), Metadata Groups Register

DG Project: EG 2061: Glossary of Stereoscopic 3D Terms

This project takes as its starting point the glossary developed last year by the 3D Home Master project in TC-35PM.

Status: The draft document closed FCD-ballot on 2013-10-24 with 6 comments to resolve, plus a further 10 non-voter comments. All comments are addressed and the commenters are requested to review whether they are resolved.

Business Impact: Understanding and common use of terms

Topic: UMID Projects

The Chair of the following three closely-related projects gave a status report.

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 updated, with a goal for completion by the December meeting round.

DG Project: UMID Resolution Protocol

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



Status: This project is newly-approved in TC-30MR and Kavi DG facilities have been set up. The DG Chair made a call for participation at the TC meeting. The first step will be to discuss a “conceptual model”.

DG Project: Revision of RP 205: Application of Unique Material Identifiers in Production and Broadcast Environments

This project incorporates improvements identified in the Study Group report Part 1.

Status: This document is on the point of publication; anticipate project closure at the next TC meeting.

DG Project: 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 DG is drafting the Standard “SMPTE Core Metadata”. There are just two metadata elements left – relations, rights - for the group to review.

Business Impact: potential foundation for Metadata

SG Project: HQ implementation of On-line Registers

TC-30MR’s metadata registers are currently spreadsheet-based and it has long been recognized that an online database is required. This SG has completed a report listing requirements for an online system and will remain available to assist SMPTE HQ with implementation issues.

Status: The SG Chair has assisted HQ’s selected supplier to become familiar with the requirements and the controlling documents. Efforts by the BBC to “clean up” the data in the spreadsheets may assist with the online register implementation.

Business Impact: Efficient and accurate maintenance of Universal Label assignments.

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: When there is SG consensus, the report will be submitted to the TC.



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 STxxxx: SMPTE Essence Element Key Register Structure

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

Status: A new project Chair was appointed at the last meeting. Some comments from DG review will be incorporated in the current draft and it will be posted for pre-FCD-ballot review before the December meeting round.

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 has submitted proposals for revision to the DG and has requested feedback. If no feedback is received, the document will be revised as proposed.

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: The document was at FCD ballot at the time of the meeting, closing 2014-09-25 (Result: the ballot passed with 9 comments to resolve).

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.

Status: The new WG Chair has arranged for resources in his organization (BBC) to put in place a transition plan from spreadsheet to database representation of the UL registers. A key part of the transition plan is the automated validation of data, and that is underway. The first results of this work were presented to the WG (and to the TC) in the form of “views” extracted from the database in a variety of formats (txt, html, xml, csv, json).



The status of the following individual register projects will not be updated while the transition work is in 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.

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 RDD 26:2014, MXF OP-1b Specification for AVC with Chunk Audio

SMPTE ST 422:2014 (Revision of SMPTE ST 422:2013), Material Exchange Format – Mapping JPEG 2000 Codestreams into the MXF Generic Container

Amendment 1:2014 to SMPTE ST 422:2013, Material Exchange Format – Mapping JPEG 2000 Codestreams into the MXF Generic Container – Amendment 1

SMPTE ST 2001-2:2014, XML Representation of SMPTE Registered Data (Reg-XML) – AAF and MXF Data

SMPTE ST 2019-4:2014 (Revision of SMPTE 2019-4-2009), Mapping VC-3 Coding Units into the MXF Generic Container

SMPTE ST 2034-1:2014, Archive eXchange Format (AXF) – Part 1: Structure & Semantics

SMPTE ST 2070-1:2014, Stereoscopic 3D in MXF for Operations – Common Provisions

SMPTE ST 2070-2:2014, Stereoscopic 3D in MXF for Operations – OP1a Mapping

SMPTE ST 2070-3:2014, Stereoscopic 3D in MXF for Operations – OP-Atom or Single Track OP-1a Mapping



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: Draft 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: A new Chair has been appointed for this project. The document passed a second FCD ballot on 2013-11-17 with 70 comments. All comments have been addressed and the DG Chair called for a formal 2-week review period to start.

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 FCD ballot on 2014-04-07 with 41 comments. All comments are resolved, so the document can progress to DP ballot.

DG Project: Revision ST 380: MXF – Descriptive Metadata Scheme-1

Status: This DG is disbanded, but at this TC meeting, there was a proposal for the document to be stabilized. A subject-matter expert agreed to review the document for stabilization.

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 passed FCD ballot on 2014-02-24 with 8 voter comments to resolve. It was agreed that the 2 commenters would work together in an attempt to come up with a revision that would resolve all their comments.

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

Status: A new Chair / Document Editor has been found to continue this work. This document failed FCD ballot (closed on 2013-05-23). All 43 ballot comments are now resolved, but one non-voter comment needs to be resolved. A second FCD ballot is now required.



DG Project: Draft ST 2070 (suite): Stereoscopic 3D in MXF for Operations

Document suite comprises: ST 2070-1 Common Provisions
ST 2070-2 OP1a mapping
ST 2070-3 OP-ATOM or Single Track OP-1a Mapping

Status: These documents are published and the group will be disbanded.

DG Project: Revision ST 422:2006: JPEG2000 in MXF

The main purpose of this revision is to add provisions for interlaced images.

Status: The revision, as well as a subsequent amendment, has been published. The DG will be disbanded.

DG Project: Revision ST 436: MXF Mappings for VBI Lines and Ancillary Data Packets

This project will create ST 436-1 (compatible with current ST 436) and will compile a list of topics for a separate project, ST 436-2, which will add new features or constraints that are possibly incompatible with ST 436-1.

Status: The Part 1 document has been published. The DG Chair feels that the enthusiasm for Part 2 has passed and is unlikely to proceed.

DG Project: Revision ST 2019-4: Mapping VC-3 Coding Units into the MXF Generic Container

Five new Compression IDs need to be added (triggered by changes to ST 2019-1 in TC-10E), plus a cleanup of normative references as necessary.

Status: This document has been published. The TC Chair will investigate disbanding the group.

DG Project: 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 met during this meeting round and made good progress. 2 week pre-FCD-ballot review is expected soon.

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 new SG Chair has reviewed the work and intends to reduce the scope of the project in order to get existing problems solved.

DG Project: RP 2089: Carriage of EIDR Identifiers in MXF files



This project will specify the carriage of EIDR Identifiers (as specified in RP 2079) in MXF files using the Descriptive Metadata Scheme mechanism specified in SMPTE ST 377-1:2011 and ST 377:2004.

Status: This document was on the point of publication when it was noticed that the requested Universal Labels had not been assigned; this has now been done and the document should publish shortly.

DG Project: 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 underway in TC-30MR.

Status: The document is ready for 2 week pre-FCD-ballot review in the TC.

RDD Project: RDD 32: MXF Interoperability Specification of Sony AVC Products

Additional constraints need to be specified to facilitate interoperability between Sony AVC products and others.

Status: The RDD ballot is in progress, closing 2014-09-29.

DG Project: VC-5 Mapping into the MXF Generic Container

This project will draft a standard for mapping a VC-5 bitstream into an MXF Generic Container.

Status: An early draft has been put together, using earlier work “Mapping TIFF/EP Profile 2 Essence into MXF Generic Container” as a model. RGB and YCbCr will be handled by MXF picture descriptors, but Bayer RGGGB may be deferred to a future revision. It is currently planned to only define Frame wrapping, unless there are requests for Clip wrap or Custom wrap.

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

This document includes a schema file.

Status: The Part 1 document is published.

WG Project: Draft 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: The WG Chair walked through an overview of the document at the TC meeting. Drafting work is well underway.

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

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 2014-Q2. An issue about missing xml elements was discovered soon after publication and the DG Chair will add the missing elements and the draft document will be submitted for DP rebalot.

Part 2 was published in the last quarter.

DG Project: 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 work of this group is suspended; an EBU model has been submitted and the group may defer to that data model. There has been an informal meeting to reinvigorate work with the EBU.

A gap analysis is underway in a [TC-32NF project](#).

Other TC-31FS Business

5-Year Review of ST 268: File Format for Digital Moving-Picture Exchange (DPX)

The TC has received a roll-up version including the 2012 amendment (for ACES application) with redline with respect to the published version. It will be reviewed in the TC for 2 weeks and then published. It is anticipated that there will be a vote at the next meeting for the rolled-up document be made stable.



**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 425-1:2014 (Revision of SMPTE ST 425-1:2011), Source Image Format and Ancillary Data Mapping for the 3 Gb/s Serial Interface and:

Amendment 1:2014 to SMPTE 425-1:2011, Source Image Format and Ancillary Data Mapping for the 3 Gb/s Serial Interface – Amendment 1

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 10Gb/s and 25Gb/s optical interfaces including the mapping of essence, data, and metadata and the details of the physical interfaces.

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

DG Project: UHDTV Colorimetry Signaling

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

Status: The DG has completed its work on the colorimetry signaling amendments for ST 425-3 and ST 425-5 and the documents have completed 2 week pre-ballot review with no comments. CD versions of both ST 425-3 AMD1 and ST 425-5 AMD1 have been sent to the TC chairs with a request to start FCD ballots.

DG Project: Amendment ST 425-1: Source Image Format and Ancillary Data Mapping for the 3 Gb/s Serial Interface

Some issues with ST 425-1 were discovered during its 5 year review and the 3G Multi-Link work.

Status: The amendment passed ST Audit on 2014-05-12. It has been “rolled up” into a revision of ST 425-1 and has been published. The group will be disbanded.

DG Project: Document suite 2076: Stereoscopic 3D (S3D) Production Timing and Synchronization



This group is developing a document suite on 3D timing and sync for:

Part 1: (ST) Camera Systems

Part 2: (ST) Live Production Systems

Part 3: (ST) Physical Layer for Video Transport

Part 4: (EG) Physical Layer and System Guidance

Status: The four documents closed FCD ballot 2013-09-10. As part of the comment resolution process it was agreed to combine Parts 1-3 into a single RP that will be FCD balloted; the EG will remain separate.

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. The DG is coordinating its work with 31FS and EBU Core.

Status: The DG identified that, with other groups working in similar areas, a gap analysis would be beneficial to identify where additional effort is required. Unfortunately, due to other commitments, there has been no progress and the DG and TC will discuss whether external organizations could help with this effort.

DG Project: EG on SDI Interfaces

This group will draft EGs to provide an overview of the many SMPTE SDI interface standards and technologies, including how they relate to each other, what image formats are carried, performance.

Status: The DG did not give an update this round.

DG Project: Draft ST 2062: 25 Gb/s Serial Signal/Data Interface

Documents: Part 1: Image Format Mapping Part 2: Optical Fiber Interface

Status: These documents both passed FCD rebalot on 2012-08-22. There have been problems with comment resolution and the DG Chair proposed terminating the work and closing the group. The proposal was accepted by the WG.

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

Status: The documents both passed FCD ballot on 2014-07-20 and both had 21 comments to resolve. Comment resolution is underway.

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



Status: Most of the required changes on EG34 have been completed with a few minor points left to fix. There has been no recent progress on but it was agreed that RP 198 – HD Check-field – is higher priority than EG34 and should be completed first.

DG Project: Revision ST 297: Serial Digital Fiber Transmission System for ST 259, ST 344, ST 292 and ST 424 Signals

Scope is to revise ST 297:2006 to update only the normative references and responsible TC.

Status: It was agreed at the last meeting that the scope of this revision would be expanded to include 6G-SDI and 12G-SDI parameters. This was done and ST 297 passed FCD ballot 2014-07-26 with 8 comments to resolve. All comments have now been resolved and the WG requested that a 2 week TC pre-DP-vote review should start.

DG Project: 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

ST 2036-4 covering UHDTV1 @ 100Hz / 120Hz and UHDTV2 24Hz to 120Hz carried in a 12-bit container

Status: ST 2036-4 passed FCD ballot 2014-09-04 with 39 voter and non voter comments. Comment resolution is underway – all comments have been addressed. The ST 2036-3 revision has not yet gone to ballot.

DG Project: Ruggedized Optical Connector System for SDI

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; Small size.

Status: The DG held its first meeting during this meeting round.
A new working draft document was posted prior to the meeting.
The group continues to review and develop this document and is currently focused on methods for identifying / signalling the carriage of multiple interface variants, connector and fiber types

WG Project: Video Over IP

This Working Group (32NF60) was established to handle projects related to IP transport of media. The WG's documents are the 7-Part ST2022 family.

Status: There was no report.



DG Project: Amendment ST 2022-6: Mapping of High Bit Rate Media Signals on IP Networks

Interoperability tests have revealed minor implementation variations; this amendment to ST 2022-6:2012 will add clarification regarding RTP Timestamps

Status: There was no report.

WG Project: 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's main focus this quarter has been on DG comment resolution of the four already balloted documents (the additional 2 optical interface documents were withdrawn last time after a TC decision that their parameters would be specified in the ST 297 revision).

A consensus has been reached to adopt a 250nsec transmitter inter-link delay timing requirement for all 6G, 12G and eventually 24G multi-links. It has also been agreed to remove the 1080-line Additional Frame Rate (AFR) definitions from ST 2081-10 and ST 2082-10. Mappings for 2160-line AFR standards (ST 2082-11 dual-link 12G mapping etc.) and quad link mappings (ST 2081-12 and ST 2082-12) will be changed to explicitly describe 1080-line AFR sub-images.

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

This project is developing documents:

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

ST 2081-10: 2160-line and 1080-line Source Image and Ancillary Data Mapping for **Single**-link 6G-SDI

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 2081-1, ST 2081-2 (optical, now abandoned), ST 2081-10 passed FCD ballot 2014-02-11. Voter comments were received.

ST 2081-1 has reached DP status. Comment resolution on ST 2081-10 will start when comment resolution on ST 2082-10 (see below) is complete; that is because the comments received on both documents were very similar and resolution needs to be consistent. A WD of ST2081-11 is expected before the December meeting round.

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

This project is developing documents:

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



ST 2082-10: 2160-line and 1080-line Source Image and Ancillary Data Mapping for **Single-link** 12G-SDI

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 multistream mapping document (multiple 1.5G, 3G, 6G over 12G).

Status: ST 2082-1, ST 2082-2 (optical, now abandoned), ST 2082-10 passed FCD ballot 2014-02-11. Voter comments were received.

ST 2082-1 has reached DP status. Comment resolution on ST 2082-10 continues; 29 of the 37 comments are resolved. A WD of ST2082-11 is expected before the December meeting round.

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. It had formerly been a Technology Committee, TC-33TS.

Status: The WG met during the Geneva meeting round. Most of the time was spent on Synchronization issues, primarily WG consensus on ST 2059-1 comment resolution. There was also some review of ST 2059-2's readiness for DP ballot. There was a request for volunteers to Chair the "New Time Labeling System" DG and the "2059-1x Engineering Guidelines" DG.

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

DG Project: New Synchronization System

This is an "umbrella" project. The group facilitates development of a suite of Synchronization documents that are tracked in DG projects below.

Drafting Project: Draft 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

Status: The document passed FCD-ballot on 2013-09-26 with 142 voter comments to resolve. In the last quarter there have been many telecons aimed at bringing closure to the comment resolution



process. Three issues were elevated to the TC meeting:

1. Should the SMPTE Epoch stay as per the current draft? Decision: Yes
 2. Should Section 9 (on timecode calculations) stay in the document? Decision: Yes
 3. Should a comment on IPR be overridden? Decision: No, further HQ enquiries should be made
- There will be 1-2 more DG meetings to work on last few comments and it is hoped the document can then go to pre-DP-ballot review.

Status of the Simulation work: It was decided that the simulation work should continue for about 2 more weeks.

Drafting Project: Draft 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.

Status: After some discussion of final points arising during pre-DP-ballot review in the WG meeting, a DP ballot package will be prepared.

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.

Status: A Chair for this DG is sought. 4 EG drafting projects have been set up:

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

Status: An updated draft document has been submitted to the DG. No progress in the last quarter.

Drafting Project: Draft EG 2059-11: Time Discontinuities

Status: Project initiated. No progress in the last quarter.

Drafting Project: Draft EG 2059-12: Facilities Migration Guide

Status: Project initiated. No progress in the last quarter.

Drafting Project: Draft EG 2059-13: Best Practices for Large Scale SMPTE ST 2059-2 PTP implementations

Status: Initial draft has been submitted. No progress in the last quarter.

DG Project: New Time Labeling System

This is an “umbrella” project. The group facilitates development of a suite of Time Labeling documents that will have drafting projects set up.



Status: The DG held a meeting during the round. There are four label documents being developed:

- Full-featured Time Labels

Status: A version was uploaded 2014-09-17, but there was no report.

- Generic Time Label

Status: A version was uploaded 2014-09-17, and there was a short report in the DG meeting.

- Date-Time Terms and Definitions

Status: The DG spent some time at the meeting walking through this document and feeding back comments to the editor (such as the need for this document to have conformance language as it is intended to be a Normative Reference for other documents).

- Simple Time Label (this one is less certain)

Status: Currently no draft.

DG Project: Revise 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 draft revised document went to FCD ballot during the meeting round.

Proposed DG Project: Amend 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: Project starting its approvals.

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

This is an “umbrella project” to manage individual DG projects for each document.

There is a shortage of free code points for identifying non-linear PCM formats carried by AES-3. The extension mechanism will be documented in ST 337 and the extended data types will be documented in ST 338. The DG will revise or add any other documents in the family that are required for the change.

Status: Drafting Projects are set up for:

Drafting Project: Revise ST 337: Format for Non-PCM Audio and Data in an AES3 Serial Digital Audio Interface

Status: This document passed FCD rebalot on 2014-07-21 with 2 comments to resolve (now resolved).

Drafting Project: Revise ST 338: Format for Non-PCM Audio and Data in AES3 - Data Types



Status: This document passed FCD rebalot on 2014-07-21 with 2 comments to resolve (now resolved).

Drafting Project: Revise ST 340: Format for Non-PCM Audio and Data in AES3 - Data Types

Status: This document is pending ST Audit (now posted and closing 2014-10-12).

Drafting Project: Revise ST 339: Format for Non-PCM Audio and Data in AES3 - Generic Data Types

Status: This document is pending ST Audit (now posted and closing 2014-10-12).

Drafting Project: Draft ST xxxx: Mapping of ETSI TS 103 190 (AC-4) over AES3

A new document will be drafted and ST 338 data-type 24 will be requested.

Status: This document is about to start DG review.

Drafting Project: Draft RDD 27: Mapping of Dolby-E over AES3

A new document will be drafted. It was discovered in the Code-Point Extension project that there is no publicly-available reference document for implementation of data-type 28.

Status: Drafting is under way and the RDD is expected soon.

SG Project: Study Group on Embedded Audio

The group will study the support that SDI infrastructure provides for single link 3Gb/s, multi-link 3Gb/s and how much of that supports the full 32-channels of audio per link. It will recommend any standardization work that it finds necessary.

Status: The SG sent out a survey that received very little response. At the last meeting, it was decided to send the survey again. There was still little response. Therefore, the SG Chair proposed that the group should be disbanded.

Other 32NF Business

Presentation on new project proposal for transport of haptic-tactile essence

This presentation introduced a new project proposal that has been split away from the TC-10E project on Haptic – Tactile Essence to define transport (and coding/decoding if required):

Proposed DG Project: Transport of Haptic-Tactile Essence



Media Systems, Control and Services Committee (34CS) chaired by Chris Simons 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: 34CS Publications in last quarter

SMPTE ST 2071-1:2014 (Revision of SMPTE ST 2071-1:2012), Media Device Control Framework (MDCF)
SMPTE ST 2071-2:2014 (Revision of SMPTE ST 2071-2:2013), Media Device Control Protocol (MDCP)
SMPTE ST 2071-3:2014, Media Device Control Discovery (MDCD)

Topic: BFX 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 BFX
- RP 2021-9: Implementing BFX

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 BFX and these are batched into versions. The current published version is BFX 3.0.

WG Project: BFX 4.0

Some topics initially slated for BFX 4.0 are: trading partner registry; MVPD route data; live schedule files (a la OATC); BFX/MXF mapping; PMCP support; time code in and out support; alternate captioning support

Status: The bulk of BFX 4.0 is schema work; an XML AHG meets weekly. The document suite has been revised to add these BFX 4.0 new features:

- 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; Rest of PMCP (about 75% already in BFX)

DG Project: Media Device Control over IP



This project is developing a suite of documents:

ST 2071 Part 1: Media Device Control Framework - Now Published

ST 2071 Part 2: Wire Level Protocol - Now Published

ST 2071 Part 3: Discovery (describes how various existing Service Discovery Protocols work with the Media Device Control Framework, including a “zero configuration” mode)

ST 2071 Part 4: Core Capability Interfaces (includes an API for a “Capability Interface Registry”)

Status: Part 1 revision, Part 2 revision and Part 3 are all published. Part 4 is at FCD ballot, closing 2014-10-20. There are new project proposals set up to [update ST 2029](#) to include the URNs in ST 2071-1, as well as improvements to ST 2071-1 to [add URI Fragment notation](#) and [extend MapEntry representation](#) to support XML data types.

Business Impact: Interoperable Media Device Control

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

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

SMPTE ST 2067-21:2014, Interoperable Master Format – Application #2 Extended

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

Status: The bulk of the IMF standardization is complete.

The WG is waiting for new J2K profiles from JPEG Group in order to continue the work on the “Extended Plus Application”.

The group is investigating the possibility of shorter constraints for subtitles and captions. It is also preparing a best-practices list in order to make implementations easier.

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

Status: Published.

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

Status: Published.

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

Status: Published.

DG Project: IMF CPL and OPL

This group’s Composition Playlist has been published for a while and it has now been working on Output Profile List (OPL) documents.

The OPL Group began drafting new documents in July focusing on core OPL information.

Status: The following Output Profile List documents all passed DP ballot 2014-09-05:

ST 2067-100 IMF Output Profile List - Core

ST 2067-101 IMF Output Profile List - Image

ST 2067-102 IMF Output Profile List – Common Pixels

ST 2067-103 IMF Output Profile List - Audio

DG Project: IMF Wrapping, Security & Packaging

This group has developed ST 2067-5: Interoperable Master Format – Essence Component

Status: ST 2067-5 is published.

DG Project: IMF Data (Text) Essence

Status: Mapping from ST428-7: D-Cinema Subtitle to SMPTE-TT is currently under way in [TC-24TB](#).

DG Project: IMF Audio



Project: ST 2067-8: IMF Common Audio Labels.

Status: Published.

AHG Project: IMF Sample Material Interchange

This group has been set up to facilitate interoperability testing by making sample material available online.

Status: The Sample Material Interchange Group (SMI) will meet 2014-10-02. This will include the group's second plug fest to continue testing interchange content.

DG Project: Draft 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.

DG Project : IMF Application #2 Mezzanine Film Format

This standard will extend the capabilities of IMF Application #2 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: This project is waiting for an initial draft from Film Archive Proponents.

Task Force Updates

SMPTE forms a "Joint Task Force" with other industry bodies from time-to-time to investigate a particular technology issue that faces the industry.

Status: SMPTE currently participates in the following two Task Forces and presentations on progress were given at the meeting round.

Joint Task Force on Networked Media – JT-NM

This Task Force was formed by EBU, SMPTE and VSF.

Context: Transition from purpose-built infrastructure to IT-based packet networks

Goal: Drive the development of an interoperable network-based infrastructure for live media production, encompassing file-based workflows.

Key Events: Collected "User Stories" 2013-06. Issued a Request for Technology 2013-09. Issued "Gap Analysis" Report 2013-12. Started Phase 2, definition of Reference Architecture, 2014-04-30.



Status: The Phase 2 work has proceeded with meetings in Manhattan, London, Atlanta and IBC. The goal is to publish its final report 2014-12-16. Its work is divided into three groups:

- System: A High level view of a Networked Media system (layered model)
- Modeling: Creating a UML model based on the submitted user stories
- Minimum Viable: defining a minimum viable system that supports a known operational scenario (live studio multi-camera sports commentary chosen)

More resources here: <https://tech.ebu.ch/JTNM>

Joint Task Force on File Formats and Media Interoperability – JTFFMI

This Task Force was formed by NABA, EBU, SMPTE, AMWA, 4A's (American Association of Advertising Agencies), ANA (Association of National Advertisers). The activity was kicked off by a report from NABA that identified the need for this work.

Status: The JTF has developed a high-level conceptual workflow/roadmap, starting in 2014-07 and ending with a report to the JTF in 2014-12. Activities include a number of presentations on Existing Practice, a Gap Analysis and the development of a “periodic table” showing the scope, specs, parameters of each existing document submitted.

Many connections with existing SMPTE activities (Ad-ID, EIDR, BXF, FIMS, IMF, MXF) have been identified.



Notes on this report and the SMPTE Standards Process

SMPTE Technology Committees (TC's) are tasked with the development and ongoing maintenance of engineering documents relevant to Television, Broadband, Film and Digital Cinema. TC's 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](#).

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

'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:

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

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.

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Documents Recently Published in the Digital Library (most recent at end)

	Document No.	Title	Date Added to DL
1	SMPTE RP 291-2:2013	Ancillary Data Space Use – 4:2:2 SDTV and HDTV Component Systems and 4:2:2 2048x1080 Production Image Formats	6/20/2013
2	SMPTE 352:2013 (Rev. of SMPTE ST 352:2011)	Payload Identification Codes for Serial Digital Interfaces	6/20/2013
3	SMPTE EG 377-3:2013	Material Exchange Format (MXF) – Engineering Guideline	6/20/2013
4	Amendment 2:2013 to SMPTE ST 382:2007	Material Exchange Format – Mapping AES3 and Broadcast Wave Audio into the MXF Generic Container – Amendment 2	6/20/2013
5	SMPTE ST 392:2013 (Rev. of SMPTE 392M-2004)	Material Exchange Format (MXF) – Operational Pattern 2A (Play-List Items, Single Package)	6/20/2013
6	SMPTE ST 428-12:2013	D-Cinema Distribution Master Common Audio Channels and Soundfield Groups	6/20/2013
7	Amendment 1:2013 to SMPTE ST 429-2:2011	D-Cinema Packaging – DCP Operational Constraints – Amendment 1	6/20/2013
8	SMPTE ST 2022-5:2013 (Rev. of SMPTE ST 2022-5:2012)	Forward Error Correction for Transport of High Bit Rate Media Signals over IP Networks (HBRMT)	6/20/2013
9	Amendment 1:2013 to SMPTE RP 2057:2011	Text Based Metadata Carriage in MXF – Amendment 1	6/20/2013
10	SMPTE RDD 9:2013 (Rev. of RDD 9-2009)	MXF Interoperability Specification of Sony MPEG Long GOP Products	7/25/2013
11	SMPTE ST 2065-4:2013	ACES Image Container File Layout	7/25/2013
12	SMPTE ST 2067-3:2013	Interoperable Master Format – Composition Playlist	7/25/2013
13	SMPTE ST 2067-5:2013	Interoperable Master Format – Essence Component	7/25/2013
14	SMPTE ST 2071-2:2013	Media Device Control – Part 2: Protocol (MDCP)	7/25/2013
15	SMPTE ST 2075:2013	Mapping EBU TECH 3264 (STL) into the MXF Generic Stream Container	7/25/2013
16	SMPTE ST 381-3:2013 (Rev. of RP 2008-2008)	Material Exchange Format – Mapping AVC Streams into the MXF Generic Container	10/7/2013
17	SMPTE ST 428-11:2013 (Rev. of SMPTE 428-11-2009)	Additional Frame Rates for D-Cinema	10/7/2013
18	SMPTE ST 2036-0:2013 (Rev. of SMPTE 2036-0:2012)	Ultra High Definition Television - Roadmap	10/7/2013
19	SMPTE ST 2036-1:2013 (Rev. of SMPTE 2036-1-2009)	Ultra High Definition Television – Image Parameter Values for Program Production	10/7/2013
20	SMPTE 2052-0:2013 (Rev. of SMPTE 2052-0:2010)	SMPTE-TT and Format Translation – Roadmap for the 2052 Document Suite	10/7/2013
21	SMPTE ST 2052-1:2013 (Rev. SMPTE ST 2052:1-2010)	Time Text Format (SMPTE-TT)	10/7/2013
22	SMPTE RP 2052-10:2013 (Rev. of RP 2052-10:2012)	Conversion from CEA-608 Data to SMPTE-TT	10/7/2013



23	SMPTE RP 2052-11:2013	Conversion from CEA-708 Caption Data to SMPTE-TT	10/7/2013
24	SMPTE ST 2068:2013	Stereoscopic 3D Frame Compatible Packing and Signaling for HDTV	10/7/2013
25	SMPTE EG 2074:2013	SMPTE Metadata Naming Guidelines	10/7/2013
26	Amendment 1:2013 to SMPTE ST 12-1:2008	Time and Control Code – Amendment 1	10/7/2013
27	Amendment 1:2013 to SMPTE ST 12-2:2008	Transmission of Time Code in the Ancillary Data Space – Amendment 1	10/7/2013

28	SMPTE ST 125:2013	SDTV Component Video Signal Coding for 4:4:4 and 4:2:2 for 13.5 MHz and 18 MHz Systems	1/10/2014
29	SMPTE ST 422:2013	Material Exchange Format – Mapping JPEG 2000 Codestreams into the MXF Generic Container	1/10/2014
30	SMPTE RP 2021-5:2013	Using Ad-ID and EIDR as Alternate Identifiers in SMPTE BXF and ATSC PMCP	1/10/2014
31	SMPTE ST 2022-7:2013	Seamless Protection Switching of SMPTE ST 2022 IP Datagrams	1/10/2014
32	SMPTE RP 2079:2013	Digital Object Identifier (DOI) Name and Entertainment ID Registry (EIDR) Identifier Representations	1/10/2014
33	SMPTE RDD 24:2013	Specifications of the FIMS Media SOA Framework	3/26/2014
34	SMPTE ST 436-1:2013	MXF Mappings for VI Lines and Ancillary Data Packets	3/26/2014
35	SMPTE ST 2001-1:2013	XML Representation of SMPTE Registered Data (Reg-XML) – Mapping Rules	3/26/2014
36	SMPTE ST 2067-2:2013	Interoperable Master Format – Core Constraints	3/26/2014
37	SMPTE ST 2067-8:2013	Interoperable Master Format – Common Audio Labels	3/26/2014
38	SMPTE ST 2067-20:2013	Interoperable Master Format – Application #2	3/26/2014
39	SMPTE ST 2067-30:2013	Interoperable Master Format – Application #3	3/26/2014
40	SMPTE RP 2077:2013	Full-Range Image Mapping	3/26/2014
41	SMPTE ST 12-1:2014	Time and Control Code	3/26/2014
42	SMPTE ST 12-2:2014	Transmission of Time Code in the Ancillary Data Space	3/26/2014
43	SMPTE EG 16:2014	Measurement Methods for Film and Digital Motion-Picture Camera Acoustical Noise – Field Method	3/26/2014
44	SMPTE ST 2051:2014	Two-Frame Marker for 48/(1.001)-Hz, 50-Hz and 60/(1.001)-Hz Progressive Digital Video Signals on 1.5 Gb/s and 3 Gb/s Interfaces	3/26/2014
45	SMPTE RP 2072:2014	Emphasis and Preferred Sampling Rate for AES/EBU	3/26/2014



		Digital Audio in Television	
46	SMPTE 425-0:2014	SMPTE Bit-Serial Interfaces at 3 Gb/s – Roadmap for the 425 Document Suite (12 pages)	4/10/2014
47	SMPTE ST 425-3:2014	Image Format and Ancillary Data Mapping for the Dual Link 3 Gb/s Serial Interface (44 pages)	4/10/2014
48	SMPTE ST 425-5:2014	Image Format and Ancillary Data Mapping for the Quad Link 3 Gb/s Serial Interface	4/10/2014
49	SMPTE ST 425-6:2014	Quad 3 Gb/s Serial Digital Interface for Stereoscopic Image Transport	4/10/2014
50	SMPTE RDD 25:2014	AVC MXF Proxies	4/23/2014
51	SMPTE ST 428-7:2014	Digital Cinema Distribution Master – Subtitle	4/23/2014
52	SMPTE ST 2073-1:2014	VC-5 Video Essence – Part 1: Elementary Bitstream	4/23/2014
53	SMPTE RP 2073-2:2014	VC-5 Video Essence – Part 2: Conformance Specification	4/23/2014
54	SMPTE RDD 26:2014	MXF OP-1b Specification for AVC with Chunk Audio	6/30/2014
55	SMPTE ST 422:2014	Material Exchange Format – Mapping JPEG 2000 Codestreams into the MXF Generic Container	6/30/2014
56	Amendment 1:2014 to SMPTE ST 422:2013	Material Exchange Format – Mapping JPEG 2000 Codestreams into the MXF Generic Container – Amendment 1	6/30/2014
57	SMPTE ST 425-1:2014	Source Image Format and Ancillary Data Mapping for the 3 Gb/s Serial Interface	6/30/2014
58	Amendment 1:2014 to SMPTE ST 425-1:2011	Source Image Format and Ancillary Data Mapping for the 3 Gb/s Serial Interface – Amendment 1	6/30/2014
59	SMPTE ST 429-14:2014	D-Cinema Packaging – Aux Data Track File	6/30/2014
60	SMPTE ST 430-12:2014	D-Cinema Operations – FSK Synchronization Signal	6/30/2014
61	SMPTE ST 2070-1:2014	Stereoscopic 3D in MXF for Operations – Common Provisions	6/30/2014
62	SMPTE ST 2070-2:2014	Stereoscopic 3D in MXF for Operations – OP1a Mapping	6/30/2014
63	SMPTE ST 2070-3:2014	Stereoscopic 3D in MXF for Operations – OP-Atom or Single Track OP-1a Mapping	6/30/2014
64	SMPTE ST 2071-1:2014	Media Device Control Framework (MDCF)	6/30/2014
65	SMPTE ST 2071-2:2014	Media Device Control Protocol (MDCP)	6/30/2014
66	SMPTE ST 2071-3:2014	Media Device Control Discovery (MDCD)	6/30/2014