



SMPTE Standards Webcast Series
SMPTE Professional Development Academy – Enabling Global Education



Standards Update

Alan Lamshead, SVP Standards
Howard Lukk, Director of Engineering and Standards
August 3, 2017

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Your Host



Joel E. Welch
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SMPTE Standards Update Webcasts



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- Series of 90-minute, interactive webcasts covering select SMPTE standards and topics
- Free for everyone
- Sessions are recorded for on-demand viewing convenience SMPTE.ORG and YouTube

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Housekeeping



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- Please use the Chat/Questions to submit questions to the speaker
 - Verbal questions are strongly encouraged
- A PDF of slides used during today's webcast will be provided in exchange for your feedback
 - Once your feedback is submitted, you will be automatically directed to the PDF for downloading
- Please feel free to post or blog about today's webcast on your social media platform of choice

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Today's Guest Speakers



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Alan Lamshead

SMPTE Standards Vice President
SMPTE Fellow

SMPTE Board of Governors



Howard Lukk

Director of engineering and
standards

SMPTE Staff

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March Standards Committee Meetings



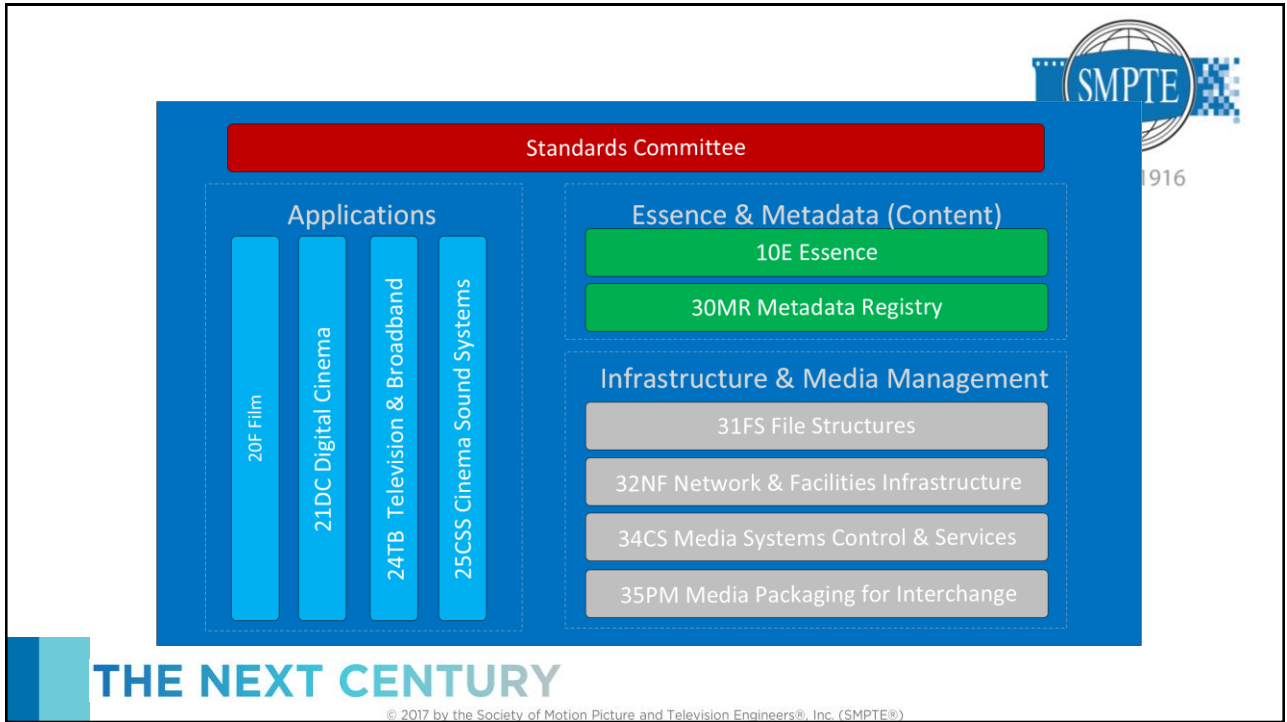
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- Nine SMPTE Technology Committees and 15 subgroups met
 - *13-16 June 2017, in Shanghai, China*
 - **Hosted by East China Television Technology League and Shanghai Media Group (ECTTL / SMG)**
- Over 30 members attended in person over the four days, and there was additional participation by remote access.
- There are currently almost two hundred active projects
- Meeting Outcome Report is posted on the SMPTE website

<https://www.smpte.org/standards/meeting-reports>

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SMPTE Technology Committees



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- Essence (10E)
- Film (20F)
- Digital Cinema (21 DC)
- Television and Broadband Media (24TB)
- Cinema Sound Systems (25CSS)
- Metadata and Registers (30MR)
- File Formats and Systems (31FS)
- Network and Facilities Architecture (32NF)
- Media Systems, Control and Services (34CS)
- Media Packaging and Interchange (35PM)

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



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- *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*

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10E “Better Pixels” Projects



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- 10E project on Content-Dependent Metadata for Color Volume Transformation (ST 2094) is now complete – 6 parts published
 - One part documents core components, four parts document individual application schemes, one Part documents KLV Encoding and MXF Mapping.
- Standard for a constrained version of DPX (ST 268-2) to carry HDR/WCG is well advanced

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Other 10E Projects



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- **Video compression standards in SMPTE**
 - SMPTE 2073 Document Suite: VC-5 Video Essence
 - Revision of SMPTE 2042 and 2047 Document Suite: VC-2 video compression
 - New Standard SMPTE RP 2047-5: VC-2 Level 66 Compression of UHD for use with HD Infrastructure – in publication queue
- SMPTE 2080 Document suite: Reference Display and Environment for Critical Viewing of Television Pictures
- New Document: RP 2093 - Television Lighting Consistency Index
- New Document: ST 2100-1 - Definition and Representation of Haptic-Tactile Essence is now published (Q3 2017)
- Revision of ST 2086 - Mastering Display Color Volume Metadata Supporting High Luminance and Wide Color Gamut Images – work just beginning
- New Document: P3 Colorimetry
 - will produce a normative reference document for the colorimetric attributes of P3 – work just beginning
- Revisions to Safe Action and Safe Areas for Television – to revise these documents for UHD images.

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Film Technology Committee (20F) chaired by John Miller



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- *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.*
- 20F did not meet during the June quarterly sessions. The next meeting of 20F will be during the SMPTE annual Technical Conference in Hollywood, October 2017.

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Digital Cinema Technology Committee (21DC) chaired by Dean Bullock and Chris Witham



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- *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.*

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21DC Projects



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- **Facility List Management projects**
 - Facility List Message standard
 - ST 430-7 will be replaced by a new standard ST 430-16 so existing implementations are not affected by the new features being added
 - New Document ST 430-15 - Facility List Message Exchange Protocol
- **Stereoscopic Subtitle / Timed Text projects**
 - Revision of ST 428-7: D-Cinema Distribution Master – Subtitle
 - Revision of ST 429-2: Digital Cinema Packaging - DCP Operational Constraints
 - Revision of ST 429-5: Digital Cinema Packaging - Timed Text Track File
 - New Standard ST 429-17: Digital Cinema XML Constraints

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21DC Projects (cont'd)



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- **D-Cinema Operations; Encryption projects**
 - D-Cinema Crypto Evaluation (FIPS Revisions)
 - Amendment to ST 429-6: Digital Cinema Packaging - MXF Encryption
- **Additional Frame Rates**
 - Working Group to integrate the separate documents for Additional Frame Rates into the main documents 428-1 and 428-2 (DCDM) and 429-2 (DCP), add HFR to DCP
- **Object Based Audio Essence (OBAE) in Digital Cinema Packaging**
 - Four new projects are being prepared

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



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

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24TB Projects



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- New document EG 2064-x: Tutorial on A-V Sync Measurement and Assessment
- New 2112 document suite on Open binding technology for persistent content identification in A/V essence
 - RP 2112-1 - Audience Measurement Using OBID and OBID-TLC
 - EG 2112-2 - Audience Measurement Ecosystem
 - ST 2112-10 - Open Binding of IDs (OBID)
 - RP 2112-11 - OBID Reference Implementation
 - ST 2112-20 - OBID Time Label and Content Distribution Identifiers (OBID-TLC)
 - RP 2112-21 - OBID-TLC Reference Implementation
- Revisions
 - Closed Captioning suite documents
 - ST 2010: VANC Data Mapping of ANSI/SCTE 104 Message
 - ST 2016-1: AFD and Bar Data

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Cinema Sound Systems (25CSS) chaired by Brian Vessa and Bill Redmann



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- *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.*

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25CSS Cinema Project Highlights



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- Project for Immersive Sound Model & Bitstream
 - 2098 Document suite being drafted
 - ST 2098-1 Metadata Definitions
 - ST 2098-2 Bitstream Specification
 - EG 2098-3 Immersive Audio Renderer Expectations
 - RP 2098-4 Immersive Audio Renderer Interoperability Testing
 - ST 2098-5 Audio Channels and Soundfield groups
- Project for B-chain Theatre Calibration
 - Two new RPs (RP 2096) are approved and in the publication queue
 - RP 2096-1 Cinema Sound System Baseline Setup and Calibration
 - RP 2096-2 Cinema Sound System Recurring/Maintenance Setup and Calibration

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



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- *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.*

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30MR Projects



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- **Application of the Unique Material Identifier (UMID) projects**
 - UMID Resolution Protocol
 - Proposed ST 330 Revision Project
- New Standard ST 2102: SMPTE Core Metadata Set
- New Standard ST 2088: SMPTE Essence Element Key Register Structure
- Revision ST 336: Data Encoding Protocol Using Key-Length-Value
- Amendment of RP 2092-1 Advertising Digital Identifier (Ad-ID®) Representations
- Create and Update Essence Element Register Contents
- New Standard ST 2114: Cinema Content Creation Cloud (C4) ID – recently published
- Revision of RP 2079: Digital Object Identifier (DOI) Name and Entertainment ID Registry (EIDR) Identifier Representations
- An Administrative Guideline (AG18) has been approved by the Standards Committee
 - Defines the process for adding new UL definitions to the metadata registers

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File Formats and Systems Committee (31FS) chaired by Bruce Devlin and Paul Gardiner



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- *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.*

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31FS MXF Project Highlights



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- Revision of ST 377-1:2011 - Material Exchange Format (MXF) - File Format Specification (and Amendments)
 - Provide a stable base documents by combining the two amendments to the primary MXF specification
 - Separate project to deal with more difficult issues will be done in a later revision
- New Document: ST 377-2 - KLV-encoded extension syntax (KXS)
- Revision ST 380: MXF Descriptive Metadata Scheme 1
- New Document: RP 2092-2 - Ad-ID Digital Ad Slate for MXF
- New Document: ST 381-4: AAC Family Compressed Digital Audio in MXF – ready for publication
- MXF Timecode Mapping and Labeling – SG report published on SMPTE web site June 2017
- New Standard ST 2073-10: VC-5 Mapping into the MXF Generic Container – Published April 2017
- New RDD 44: Mapping Apple ProRes into the MXF Generic Container – Published May 2017
- Revision RDD 32: XAVC MXF Mapping and Operating Points - Passed Ballot July 2017

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Other 31FS Projects



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Archive Exchange Format (AXF)

- Revision ST 2034-1: Archive eXchange Format (AXF) - Part 1: Structure & Semantics
 - Published last quarter
- New Document: ST 2034-2 - Archive eXchange Format (AXF) - Part 2: External Uses of XML Schema

Other TC-31FS Business

- New document ST 268-2: Constrained Application of ST 268:2014 – DPX for HDR and WCG

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



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- *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.*

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Professional Media over IP Networks



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Working Group on Video Over IP (32NF-60)

ST 2110 suite of standards specifying the carriage, synchronization and description of separate elementary essence streams over IP for the purpose of live production

- ST 2110-10 – System Timing and Definitions
 - describes the system timing and how RTP packets will be used, as well as how each of the streams will be carried in the network.
- ST 2110-20 – Uncompressed Active Video
 - carries only active video lines, without the burden of sync and VANC
 - resolution and frame rate independent
- ST 2110-30 – PCM Digital Audio
 - Leverages AES 67 for carriage of uncompressed Audio

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Professional Media over IP Networks *(cont'd)*



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- ST 2110-21 –Timing Model for Video
 - Two timing models (“narrow” and “wide”) offers flexibility to manage network traffic flows based on hardware or software design Senders and receivers
- ST 2110-31 – AES 3 Transparent Transport
 - Transport of legacy AES3 non-PCM audio.
 - Also permits transport of various data formatted into AES 3 according to SMPTE ST 337
- ST 2110-40 – Ancillary Data
 - Transport of ancillary data that was once inside the SDI VANC will be handled as a separate RTP essence that is not bound to video
 - Closed captioning, timecode, AFD, and other VANC data will be separated

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Professional Media over IP Networks *(cont'd)*



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- ST 2110-50 –Interoperability with ST 2022-6 Streams
 - Based on VSF TR-04
 - Compatibility with existing ST 2022-6 streams which are widely deployed today
- Parts 10, 20 and 30 have completed FCD ballot and all comments are resolved. Currently in Pre-DP review.
- Part 21 is currently in FCD Ballot
- Remaining parts in development

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32NF Projects



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Working Group on SDI Interfaces (32NF-40)

- New Document suite: EG on SDI Interfaces – 3 wallcharts
- Revision of EG 34: Pathological Conditions in Serial Digital Video Systems
- Revision of RP 198: Bit-Serial Digital Checkfield for Use in High-Definition Interfaces
- New Document: ST 2091 - Broadcast and Video Serial Digital Fiber Transmission Systems – Ruggedized Connector Interfaces
- New document ST 2100-2: Transport of Haptic-Tactile Essence in AES3
- New document ST 2100-3: Transport of Haptic-Tactile Essence in VANC

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32NF “Better Pixels” Projects



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- Will define an HDR and WCG carriage mechanism representation which can be used to provide information essential to insure that content is correctly processed in a production facility as well as correctly displayed on professional reference displays using SMPTE interface standards
- Payload ID will be modified to include the signaling – work underway to revise SMPTE standards and make sure they are harmonized with ITU standards
- Drafting a new standard ST 2108 - Extended HDR/WCG Metadata Packing and Signaling for Serial Digital Interfaces

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32NF Projects (cont'd)



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Working Group on Ultra HD SDI Interfaces (32NF-70)

- New document ST 2081-30: Transport of Multiple 3Gb/s or 1.5Gb/s signals on a 6G-SDI link
- New document ST 2082-30: Transport of Multiple 6Gb/s, 3Gb/s or 1.5Gb/s signals on a 12G-SDI link
- 1 year and reviews of previously published ST 2081 and ST 2082 documents

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32NF Projects (cont.)



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Working Group on Time Labeling and Synchronization (32NF-80)

- **SMPTE 2059 New Synchronization System**
 - New Document: EG 2059-10 - Introduction to the New Synchronization System – published Q2
 - New Document: EG 2059-11 – Management of Time Discontinuities
 - New Document: EG 2059-12 - Systemization Considerations for using SMPTE ST 2059
 - New Document: EG 2059-14 - Best Practices for Large Scale SMPTE ST 2059-2 PTP deployments
 - SMPTE 2059 interoperability testing
 - One year review (revision) of ST 2059-1 and ST 2059-2
- **Time Code Summit report**
 - New Report ER-2 - Time Code Summit Report published in May

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32NF Projects (cont.)



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- **ST 337 family of documents**
 - New document ST 2041-4: MPEG-H 3D Audio Streams (MHAS) in AES3
 - New Standard ST 2106: DTS Audio over AES3
 - New document: Multi Dimensional Audio (MDA) over AES3
 - New document: ST 2109 - Audio Metadata over AES3
- **SG on Flow Control in Professional Media Networks**

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



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- *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.*

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34CS Project Highlights



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- **BXF Suite of Documents**
 - 5 documents being revised to add BXF 5.0 changes
 - New Recommended Practice RP 2021-6: BXF SDK
 - All are approved and in publication queue
- **Media Device Control over IP**
 - SMPTE 2071-3 and 04 revisions completing Draft Publication vote

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



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- *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.*

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35PM IMF Project Highlights



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- Completed the one-year review revisions (designated "IMF 1.1") of the following core IMF standards:
 - ST 2067-2: IMF Core Constraints
 - ST 2067-3: IMF Composition Playlist
 - ST 2067-5: IMF Essence Component
 - ST 2067-20: IMF Application #2
 - ST 2067-21: Application #2E.
- Amendment to ST 2067-102 (IMF Common Image Pixel Color Schemes)
 - Add support for 4K, Wide Color Gamut (WCG) and High-Dynamic Range (HDR) and transfer function as specified in ST 2084:2014

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IMF Projects



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- **IMF Audio Essence**
 - New Document: IMF Audio Content and Element Kind Definition
- New Document ST 2067-50: IMF Application #5 ACES

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IMF Project Highlights (cont'd)



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- 35PM Plugfests
 - Los Angeles, 16-17 Feb. Tests Vectors were used to conduct the tests and the results were very good, especially on subtitles.
 - Considering a plugfest focusing on OPL in October 2017 for Transcoder.
 - Plugfest specifically for ST 2067-40 was held in Erlangen, Germany 1-2 Mar. 2017.
 - A UL error has been found in this document and a project to correct the document (and possibly include some additions) will be set up

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Upcoming Standards Meetings



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- **September 20-23, 2017, (following IBC)**
London, England - Hosted by Sky, UK
- **December 4-8, 2017**
Santa Clara, CA, USA - Hosted by Arista.

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Meeting Outcome Reports



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- To learn more about the Standards activities see:
<https://www.smpete.org/standards/engineering-committees>.
- To download the most recent meeting outcome report:
<https://www.smpete.org/standards/meeting-reports>

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Questions



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