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SMPTE Standards Update on 3D

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SMPTE 3D related work

SMPTE 3D Home Master Working Group:

Task: *Generate specifications for the 3D Home Master for the carriage of 3D content amongst mastering facilities and between a mastering facility and the ingest facility of a distribution system.*

New name for the work: **Stereoscopic Distribution Master** : Set of Standards ST 2061-xx

- The Stereoscopic Distribution Master (formerly known as the '3D Home Master') is intended to provide a standardized means for interchange of 3D content amongst mastering facilities, and between a mastering facility and the ingest facility of a distribution system. The Stereoscopic Distribution Master may feed various distribution outlets for 3D content to the home, including (but not limited to): mobile, Blu-ray/DVD, streaming, terrestrial, and cable/satellite broadcast.
- The document includes Glossary, and covers Image Structure, Subtitles, Captions and Graphical Overlays, and Metadata

SMPTE Cataloging of 3D Frame Compatible Modes

- From Work Statement: “Document the various ways an image pair is sampled and packed into a single image frame. Define and assign unique identifiers to the various packing arrangements and signaling how a stereo pair is packed into a single frame. Identify pathological cases and note them...”
- Frame Compatible modes include
 - Side by Side
 - Top and Bottom
 - Checkerboard (Quincunx)
 - Anaglyphic
 - Frame sequential
- ST 2068
- This work will tie into MPEG SEI messaging to pass this information through distribution chains
- Can be used to harmonize with HDMI 1.4a signaling between consumer electronic equipment

3D: Dense Disparity Map Representation

- From Work Statement: “Identify requirements for a data representation of disparity maps relevant for production, post-production, and distribution of 3D content.
- ST 2066 WORKING DRAFT: “This document provides a standard for data representation of disparity maps for use in exchanges between stereoscopic 3D production and mastering systems”

Stereoscopic 3D Full Resolution Contribution Link Constraints

- From the Work Statement: “Document constraints on MPEG-2 Transport along with any necessary coding constraints (for MPEG-2, MPEG-4 AVC, and JPEG 2000 at least) to permit carriage of full resolution stereoscopic image pairs via MPEG-2 TS over contribution links.”
- SMPTE ST 2063. Stereoscopic 3D Full Resolution Contribution Link – MPEG-2 TS
- Status: Final Committee Draft

Studio Interfaces for 3D

ST 292-2

- This standard defines a means of transporting stereoscopic images (Left eye and Right eye images) using an interface consisting of two links based on the SMPTE ST 292-1 data structure. The Left eye images are carried on one link of the interface and the Right eye images are carried on the other link. The stereoscopic image formats to be transported using this standard are the 4:2:2 10 bit image formats defined by SMPTE ST274, ST2048-2 and ST296, which can be transported by a single SMPTE ST292-1 serial interface. Audio and other associated ancillary data may also be transported. This standard also defines a payload identifier.
- Done and published

Studio Interfaces for 3D – 3 Gbit/s HD SDI

- ST 425-2
 - Source Image Format and Ancillary Data Mapping for Stereoscopic Image Formats on a single-link 3Gb/s Serial Interface The real time transport of image formats for **3DTV**, 2k and 4k production and UHDTV applications drive SDI interface bandwidths beyond those currently supported by SMPTE 292 (1.5 Gb/s) and SMPTE 424 (3 Gb/s) SDI interfaces.
 - Status: Final Committee Draft
- ST 425-4
 - Dual 3 Gb/s Serial Digital Interface for Stereoscopic Image Transport
 - This standard defines a means of transporting stereoscopic images (Left eye and Right eye images) using an interface consisting of two streams based on the SMPTE ST 425-1 data structures. The Left eye images are carried on one stream of the interface and the Right eye images are carried on the other stream.
 - Work in progress

File Formats for 3D

- Interoperable Master Format (IMF)
 - Work on S3D
- 3D interleaved in MXF OP 1a
 - File format to standardize the transport of left and right eye images in frame interleaved MXF files for use in TV acquisition, contribution, distribution, station operations, and archives.