



Alan Lamshead

## Update on Standards for HDR, WCG, and HFR

**T**he topics of high dynamic range (HDR), wide color gamut (WCG), and high frame rate (HFR) have dominated the motion imaging landscape over the past three years. There continues to be an ongoing debate over the relative benefit of “more pixels, better pixels, or faster pixels” in improving the visual quality of media presentations in both the home and the cinema. In reality, it is not one or the other that will win out but a combination of these tools that will bring more compelling images to modern motion imaging.

SMPTE has been developing standards in these areas for several years, and although we have not completed the task, we are a long way down the road.

In the area of HDR and WCG, SMPTE published three foundational standards in 2014 and 2015. SMPTE ST 2084 standardized a new electro-optical transfer function for displays, based on the human vision system perceptual model. SMPTE ST 2085 standardized Y'D'ZD'X color-difference computations for high dynamic range X'Y'Z' signals. SMPTE ST 2086 standardized static color volume metadata for mastering high luminance and WCG images.

The SMPTE ST 2094 suite of standards specify content-dependent metadata needed for color volume transformation of HDR and WCG imagery to smaller color volumes (e.g., BT.709 or Digital Cinema) in mastering applications. These seven


documents have been published since July 2016.

On the topic of high frame rate, SMPTE ST 2048-1, the standard for 2 and 4K digital cinematography production formats, was amended in 2016 to support 96, 96/1.001, 100, 120, and 120/1.001 frames/sec. Additionally, SMPTE ST 428-11, the D-Cinema alternate frame rates standard now supports 96, 100, and 120 frames/sec.

The SMPTE ST 2081 and ST 2082 suite of standards document 6 and 12 Gbit/sec serial digital interfaces (SDIs) for frame rates up to 120 frames/sec. SMPTE ST 12-3 was published in March 2016 to document the carriage of SMPTE time code for HFR signals.

One of the newer projects is to define a mechanism for signaling the carriage of HDR and WCG essence on streaming interfaces. The group has defined how the SDI Payload ID will be used for HDR/WCG signaling and has identified the SDI

standards that need revision. It will also define a separate Ancillary Data Packet for additional signaling information. The work has already begun, revising the SDI standards with the new payload ID signaling. An Ad Hoc group has been formed in Technology Committee (TC) 10E to investigate the need for test patterns for HDR systems.

So you can see, a lot has been accomplished, but there is still work to do. The SMPTE Standards community continues to work on these three fascinating areas as well as a host of others. You can become involved by joining one of our 10TCs that meet face-to-face four times per year, and signing up for one of the host of subgroups meeting, actually drafting the documents. Virtually, all of the subgroup and TC meetings have remote access to permit maximum participation. To learn more about the Standards activities see <https://www.smpete.org/standards/engineering-committees>. 

### UPCOMING FACT-TO-FACE STANDARDS MEETINGS

13-16 June 2017

Shanghai, China

Hosted by Shanghai Media Group

20-23 September 2017 (following IBC)

England

Host and location to be finalized

4-8 December 2017

Santa Clara, CA, USA

Hosted by Arista

The meeting outcome report from each of these meetings will be posted on the SMPTE website to provide access to the public on SMPTE standards activities. The most recent meeting outcome report can be downloaded at <https://www.smpete.org/standards/meeting-reports>.