

NEWS

A roundup of the latest Everyday News from the world of electronics



Nits and smart pixels – report from the DTG by Barry Fox

The Digital TV Group (DTG) is a self-funding UK collaboration centre for innovation in digital media technology, which was set up in 1995 with the purpose of looking after the digital TV marketplace. It underpins the free-to-air platforms Freeview, Freesat and YouView, and supports the development of pay-TV and other platforms.

I attended the 11th DTG Summit, held in May. For much of the meeting, a stream of speakers stated the obvious: nobody knows the extent to which OTT (over the top) online streaming will replace over the air broadcasting, or on what timescale.

Anne Bulford OBE, the BBC's deputy director general, opined (pointlessly): 'We have to be more responsive in how we respond'.

Thomas Wrede, VP reception systems at satellite operator SES Astra, reminded the audience that the mobile industry enjoys a huge advantage over broadcasters; people expect to change their handsets every two years but TV viewers expect to keep their sets for at least five years, and usually longer. 'If people changed their TVs every two years, WOW what we could do?', Wrede mused.

Arguably the most colourful opinion came from Jonathan Thompson, CE Digital UK: 'If anyone else tells me TV is dead, I will kill myself!'.

The nit view from Dolby

Among so much soft waffle it was a refreshing to hear Pat Griffis, VP technology, office of the CTO, Dolby Laboratories, talk hard tech fact about HDR (high dynamic range) video.

'The nits race is on, have no doubt about it,' he said, before delivering a masterly 'thesis' on how HDR makes pixels 'better' and dynamic metadata makes them 'smarter' – to deliver better HDR to homes with HDR



Modern displays continue to improve their brightness, measured in 'nits' (candela per metre squared) and dynamic range, but broadcasters must still cater for less bright legacy systems with standard dynamic range.

TVs, map HDR to SDR (standard DR) for homes still using legacy sets and make artistic content look consistent over a range of devices from TVs to mobiles. Griffis then rebuffed 'what a lot of people say' about the practical difficulties of using dynamic metadata with live broadcasts.

'The challenge we have is that production technologies are continuing to improve, towards an aspirational goal set by SMPTE (Society of Motion Picture and Television Engineers) of 10,000 nits (the colloquial term for candelas per metre squared), but today's SDR delivers around 100 nits'.

'However, display technology is continuing to advance. We are getting closer to what the human eye can see. Remember that every time you open your eyes you see HDR. We are already seeing consumer displays of 1800 nits from Sony, which is 18-times brighter than legacy displays, and we can expect to see even brighter consumer displays in the future'.

This was particularly interesting because Sony has so far refused to put a brightness figure on its new TVs.

Holding up a mobile, Griffis said, 'This LG phone supports HDR and is in the market today. The future is here and it will continue to advance'.

He continued by explaining that the 'classic way' to down-convert HDR to SDR was with a 'static curve', which is 'blind to the picture content' and works unsatisfactorily because 'it knows nothing about the content (and) is like deflating a balloon'. A better way, he said, is to 'look at the content' by measuring 'the brightest, darkest and average picture content'.

'When mapping HDR to SDR you get a better result from knowing the content; capturing the maximum, minimum and mid.'

It's the content, stupid

Griffis continued, 'It not only improves reproduction quality but make re-rendering more consistent across devices, so that the artistic look is very similar regardless of whether it's a TV set or mobile device.'

'There are already a hundred movies that have been graded this way using 'smarter pixels content', for Vudu, Amazon and UHD Blu-ray titles.'

'But what about live?' he asked rhetorically, 'Live is the tough one because you are switching sources quickly. We have heard a lot of people say, 'you can't use this kind of content mapping approaches with dynamic metadata because metadata doesn't work in a broadcast facility'. We are well aware of that, and the proposal we have put on the table and talked to many broadcasters about is that just before the (broadcast) encoder you generate the metadata, in near real time, with one frame delay, and then combine it with the content. The device does the analysis just before the

Nits and smart pixels – report from the DTG – continued

encoder. It's compatible – Dolby is codec agnostic. This is what we use already with all the major editing tools. It's well proven technology. The key was to make it work in near real time for broadcast.'

'No metadata needs to be harmed, contrary to what some people may be saying. It's derived just before (broadcast) encoding.'

Smarter and better

'So the bottom line is that I like to think of this dynamic metadata as making the pixels 'smarter'. HDR makes them better, dynamic metadata makes them smarter.

'Google's Chromecast supports these kinds of concepts. There are hundreds of smart-pixel titles from Hollywood in the market. Netflix Originals will be moving to this approach, with Amazon, Vudu and Blu-ray.'

There was one hard fact notably missing from Pat Griffiths' talk. When Dolby first talked about HDR, there was talk of dynamic metadata adding around 20% more bits to the bitstream, which is not what bandwidth-strapped broadcasters want.

Speaking a couple days later at a MESA (Media and Entertainment Service Alliance) event, Simon Gauntlett, Dolby's director of imaging standards and technology (ex-DTG) acknowledged that 'metadata is a bit of a dirty word when you are working live,' and explained, 'we are learning a lot as we do experiments. When delivering metadata to the home you could do it frame by frame, but in general people tend to do it scene by scene to avoid transition jumps. It varies with the content. It could be as low as 5% or it could be as high as 10% to 15%. We don't know yet'.

Making IT work – first computer restoration conference

The first-ever international conference of computer conservationists was held in May across two UK venues that have led the world in the developing discipline.

The two-day conference was organised by The National Museum of Computing (TNMOC) and the Computer Conservation Society (CCS). With more than 50 participants from New York, California, Seattle, Paderborn in Germany and across Britain, the growing art and science of computing conservation was discussed and demonstrated, showing the growing maturity of the discipline.

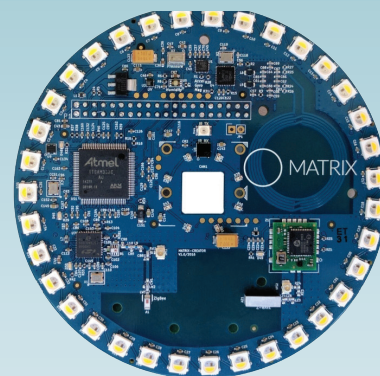
The first day, at the London headquarters of the BCS, focused mainly

on the principles of computer conservation. Robert Garner of the Computer History Museum in the US described the restoration and exhibition of a 1960s IBM mainframe computer.

Day two at TNMOC consisted of workshops on world-renowned practical conservation projects on display, including the Colossus rebuild, the Harwell Dekatron restoration and the EDSAC reconstruction.

For those who could not attend the event, but are fascinated by this relatively young discipline, a full set of papers from the conference will be made available online via the CCS and TNMOC websites during the summer.

More Pi from Farnell



Farnell has announced it is the distributor for MATRIX Creator, a Raspberry Pi add-on that provides multiple functionality and cost-effective development of IoT devices.

MATRIX Creator is particularly suited to home automation systems involving optical and sound elements. Its microphone array allows a user to develop DIY Amazon Echo and Alexa-based projects, as well as voice recognition systems. The optical and physical sensors enable development of facial recognition and motion detection for security applications.

The board incorporates an ARM Cortex M3 microcontroller, sensors for motion, temperature, humidity, light, ultraviolet and infrared, an 8-microphone array and a 35-LED array. It can be programmed in 40 different languages, and incorporates integrated Z-Wave and zigbee communications plus connectivity via a wide range of analogue and digital input/output interfaces. Further details at: <http://bit.ly/2rJziyq>

Eptsoft addresses STEM skills shortages

Digital publisher eptsoft.com has launched material to address the problem of key employment skills shortages, especially among young workers in STEM subjects: science, technology, engineering and maths. The company's online course in electronics provides a certificate of completion at the end to bolster CVs.

All eptsoft courses are comprehensive and aimed at both the beginner (some basic level understanding of electronics is assumed) and more advanced students looking for a refresher. Menu driven, the material is interactive and encourages exploration and experimentation.

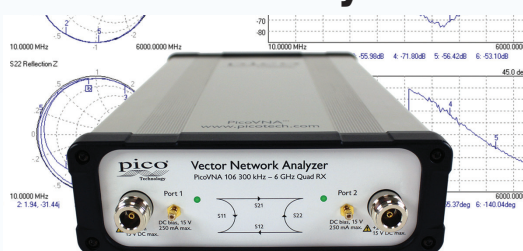
In addition to the online course content, eptsoft is giving a free PC-based app 'Electronics, Mechanics, Maths & Computing' (worth around £120 and available on Amazon). For further details, see: www.eptsoft.com

Pico launches low-cost network analyser

Pico Technology has applied its expertise in compact USB instrumentation, combined with its experience with high-performance sampling oscilloscopes and time domain reflectometry, to launch a high-quality, low-cost vector network analyser.

If you work with high-speed data, communications or computing, you often need to characterise high-frequency interfaces, devices, multipath interconnect and antennas. This product fills a need for a straightforward, accurate, fast, portable and low-cost measurement instrument, one that can support developing applications such as 5G, IoT, radar, and tissue and materials imaging.

The PicoVNA 106 is an all-new, UK-



designed, USB-controlled, professional and laboratory-grade 300kHz to 6GHz vector network analyser. It has exceptional dynamic range of up to 118dB at 10Hz and only 0.005 dB RMS trace noise at its maximum bandwidth of 140kHz.

The PicoVNA 106's small size, weight and cost suit it to field service, installation test, embedded and training applications. For more information visit: www.picotech.com