

By Paul Nicholls, Sales and marketing manager PHABRIX

T&M isn't always the first area of broadcasting you think of as 'exciting'. However in measuring the latest technologies, T&M often has to be 'state of the art' itself.

I don't know if it's the subject of T&M I find exciting or the interaction with such a diverse group of engineers involved with today's complicated broadcast infrastructure. Every engineer seems eager either to hear about the latest innovation or to share their T&M experience.

One thing I have noticed however, and this is not intended as an insult, is that engineers are all getting a bit grey. Not the grey boring grey, just the years of experience showing in grey hair - or no hair even!

This is a bit of a long winded way of saying its a rarity to find a young engineer these days - they do exist and they know their stuff, but when it comes to the process of today's T&M as it affects them, their needs are very different

from the established, (and getting rarer) BBC crop of 'industry trained' engineers. Time is in short demand and without the apprenticeships of the past, today's 'youthful' engineers really have to hit the ground running with a good understanding from the gekko of the requirements of broadcast T&M.

The fact is that fully trained engineers are fewer and have to cover more ground within the broadcast environment than ever before. Look how fast it has all changed. NTSC and PAL were relatively simple to understand but now with HD, 3G, 3D, 2K, 4K, copper, fibre, IT, IP, ASI - there are a huge range of formats and technologies involved. Where there were once five engineers there is now one and although he/she may have inherited a whole plethora of T&M equipment invariably going back to the Ark - in a SDI environment, today's test equipment has to be focussed, reliable, accurate and in some ways simplistic. Not in a dumb way, it just has to filter the important information and bring it to the fore quickly in a predictable and reliable manner. I think all of the T&M manufactures in this edition would agree with this simple statement.

It's about ease of information gathering, fast response, direct presentation of pertinent signal data,

capture, logging - all in a comprehensive package that doesn't assume in a SDI world that vectorscopes and waveforms are the most important instrument displays.

Keeping in touch with technology and the needs for the next generation of T&M is really the theme of this article and in examining current trends, I'm going to use a recent visit made to the US with Philip Adams, MD of PHABRIX to pull these trends together using examples from those working at the coal face so to speak.

Phillip certainly has a grasp of the technology having worked in the industry as a design engineer for 25 years and this provides a huge advantage in 'leap frogging' beyond the 'now' and understanding the 'future' when talking with engineers. I call Phil the 'babel fish' of the future - translating the babble of new technologies into the products PHABRIX makes in order to supply the growing requirement for 'intelligent' T&M.

We began by visiting the CBS Networks laboratory in New York. Emmy award winning engineer Hank Mahler was engrossed in examining a 3D signal having been asked to provide a definitive 'route' to 3D for CBS. It was clearly a vexing problem with no immediate agreed

solution although he was having 'fun' experimenting with 'side by side' HD transmission in the lab. We used our new dual screen Rx2000 rack mount unit to show how each signal in the 3D stream could be easily displayed side by side and analysed.

3G was currently only being used for acquisition at CBS and according to Hank, 'not that popular' although he acknowledged that most broadcast manufacturers had added 3G to their product mix and there was a need to test it during the commissioning phase.

HD is king in the US, but there are still an appreciable number of 'mom and pop' stations who haven't adopted the mandate of HD across the US. Many local stations take feeds decoded off broadband with a different requirement altogether in testing a full down mixed signal.

The visit quickly turned to the practicalities of everyday T&M. The need for selectable IP control of instruments with different complexities of control surface. Central control room access to the T&M data at all times with the ability to zoom in or call up a specific instrument was a growing theme as SDI crossed boundaries with IP in major stations.

ASI testing was seen as increasingly important with a need to view ETR 290 sync errors and continuity error counts. PCR measurement, PSIP analysis with PMT and PID along with full decode of H264 is definitely becoming part of an



PHABRIX SxE eye and jitter analysis on the move

increasingly diverse set of signal measurement.

Audio was one area that certainly fired up a whole raft of discussion. Testing and visibility of 16 channels at anytime was considered a must. A requirement also to test Dolby E in transmission with an awareness of SMPTE 20/20 and 5.1 linear mix through with presets for the down mix parameters. Phase display of left, right with centre and low frequency enhancement displayed was also needed. Lip sync across all channels with sample offset between group 1 and group 2 was now considered a daily requirement.

VANC/ANC analysis was another hot topic with a simple 'is it there or not' function requested to sniff out any ancillary packets present.



All Mobiles fleet of OB trucks

At PHABRIX we provide DBN monitoring and CRC checking along with switching line tolerance as part of the analysis of ancillary packets. Both DID and SDID numbers are visible and can be individually selected for logging.

Another day brought a different set of signal test requirements, this time OB. All Mobile in New Jersey operates one of the largest fleets of mobile OB trucks in the US. The sheer scale of the



You name it, ESPN's Live studio in downtown LA has it.

operation is a sight to behold with a third all-3G, 3D truck in construction while we were there. Erik Thielking, director of All Mobile video is one of those powerhouses of information who has a very encompassing view of broadcast. Positioned as he is within the US network system, he had clearly adopted the new paradigm from the 'youtube' generation that you didn't have to be a powerful network to be a broadcaster.

Many of his top client projects were involved in specialised live events that had their first viewing via the web. The core content still had to be pristine and captured at the highest

possible quality for digital archive and multiple re-use of 'branded' formats from flash to HD to 3D. Streaming is a given with quality checks from ingest to satellite upload.

AC3 mode along with Dolby E were the dominant audio test scenarios. MADI was also an important technology that needed to be scanned. Ideally all 64 channels had to be checked for integrity with breakdown information on each track. The variety of signal types used within the OB environment

was staggering. Multiple formats were in use starting from SD rehearsal cameras to HD and 3D capture cameras all with a need for camera shading across positions.

The ability to analyze timecode in the embedded SDI stream was paramount for All Mobile.

The importance of eye and jitter measurement was a sweet spot for these OB engineers and it had to be portable to get within the confines space of these elaborate monoliths hence several PHABRIX SxE's with each truck.

Our last visit in New York was a tour round Post Works. Looking as minimalist as an IKEA lounge in the creative suites, several floors up housed the actual engineering bays.

Test and measurement here had a whole new set of parameters. The new Alexa cameras from ARRI with their onboard LUT's and metadata capture all needed a file check from preferably an automated T&M system. 'Look up tables' seemed to be the one necessary continuity check between dailies and final use. A modern day legalizer was also a request with an awareness of 2K and 4K formats. Logging of gamut was essential for Post Works with presets for daily set up. Working within a creative environment meant that many technical staff had access to few critical pieces of T&M equipment and although they

didn't have to know the complexities of what they were testing, there was an assumption that any T&M should have clear ergonomics and built-in 'intelligence' for filtering information - particularly when a highly strung colourist was in the engineering bay fiddling!

File based testing is a given in post environments these days and it's here that probably the biggest change in T&M still needs to take place.

On a more practical level, measurement of fibre along with copper was evident everywhere due to the lowering cost of install.

Continuing our customer visits to ESPN in Los Angeles, fibre had completely taken over the transmission of signals between floors. It was at ESPN that we noticed our first engineer under 30 - a bunch of them. Looking like characters from the 'Friends' sitcom, a mix of both male and female engineers reigned supreme over a very streamlined operation - and they were excited! It was also very gratifying to see that each had a portable PHABRIX Sx on their belt. A very intelligent solution!

In summary I hope I have briefly touched on many of the technologies today's T&M engineer has to address. One thing's for sure - there's still a lot of T&M required in these exciting technological times. One thought - perhaps even a little Grecian 2000 would help some of us continue to look state-of-the art.