tech-*i*

INSIGHT FROM EBU TECHNICAL

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emerging**3D**

EBU TECHNICAL
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MEDIA TECHNOLOGY & INNOVATION

http://tech.ebu.ch

viewpoint from Lieven Vermaele

Welcome to the first issue of **tech-*i***, a new publication from EBU Technical, which is designed to bring you information and news on media technology and innovation.

The EBU is the world's leading association of national broadcasters in the world. We promote cooperation between broadcasters and facilitate the exchange of audiovisual content.

In EBU Technical our objective is to assist EBU Members in this period of unprecedented technological change. This includes the provision of technical information to Members through conferences and workshops, publications, via the Internet, as well as the EBU Technical website. EBU Technical encourages active collaboration between its Members on the basis that they can freely share their knowledge and experience, thus achieving considerably more than individual Members could achieve by themselves.

Over the past year, we have been reviewing our goals and approach in EBU Technical and I would like to share with you our vision, and tell you something of our motive for creating **tech-*i***.

First of all I must stress that at EBU Technical we have an excellent team, albeit modest in size, of authoritative engineers and assistants with whom it is a privilege to work. In the current economic climate, it is critically important for us to maximise the team's expertise and value to our EBU Members and the media community.

We summarise our vision as follows:

EBU Technical is your reference in media technology and innovation. We are working to be the first port Members turn to when they need information on media technology. Our hope is to be able to give you information, or direct you to where to find it, whenever you need an answer or advice on any relevant technology question.

Also, when requested, we must be able to refer our Members to another Member or outside organisation that has the experience to provide answers to a particular matter. To do this effectively, it is imperative that we completely understand the landscape and what is happening in it today.

Our first priority is the needs of EBU Members because they are our 'shareholders'. We must also be a reference on their behalf for the outside world. This means representing them in the industry and the regulatory and standardisation bodies.

Every external organisation in search of an EBU position or viewpoint of the broadcasting communication community must know where to come and find this at EBU Technical.

I have stressed to our team that they must use the most advanced Internet tools available for our range of activities, from meetings to publications. This will be a critical part of our journey to maximum effectiveness and efficiency. I am very proud of our website (tech.ebu.ch) to which we now have many thousands of registrants, from both our Members and the wider broadcast community.

Part of our strategy is to complement our website news and information with a new newsletter, **tech-*i***. The newsletter is intended to not only serve EBU Members, but also the broader media community.

It will bring you a regular overview of important evolutions in media production and delivery technology as well as news of important projects in broadcasting and the Internet, and the clear positions of the EBU.

This magazine will stand next to our well-known EBU Technical Review that will continue to bring in-depth articles on technology. Our plan is not to wait for fixed publication dates with future issues of the Technical Review but, when there is a paper or article which is hot we will publish it on the web immediately.

I hope you find this approach convenient and valuable, and that we have the opportunity to help and guide you in your future developments.

Lieven Vermaele
Director, EBU Technical

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New radio, new media, & new structure

The EBU Technical Committee's Chairman, Alberto Morello, summarises the achievements to date and outlines the hot topics for 2010.

Midway through the two-year mandate of the EBU Technical Committee (TC), it's a good time to summarise where we are, and explain where we intend to go over the next year.

The mission of the Technical Committee is as follows:

- sharing technical knowledge between members
- recommending common technical solutions based on open standards for production and service delivery, to allow the development of a healthy consumer market in Europe
- following technical evolution in content production, broadcast and broadband network technologies and new services, to keep EBU Members relevant and innovative in a rapidly changing world
- identifying best technical practices

In the first year of our term we have made small steps in improving the working method of the Technical Committee, by introducing teleconferences between the physical meetings to improve efficiency, and increase our decision making capacity. We are clearly defining the strategic themes.

These are as follows:

- Digital switch-over and DVB-T2 scenarios
- Spectrum Management
- Digital Radio Harmonisation
- Interactive Multimedia for TV
- Hybrid Broadcast Broadband services
- Migration to HDTV in production and distribution
- IT-based and file-based production and archives

Let's analyse now the main achievements in the past year, with the active support of the four Management Committees (PMC, NMC, DMC, SMC):

- HDTV: Recommendation R 124 (Dec 2008): 'Choice of HDTV Compression Algorithms and Bit-rates for acquisition, production and distribution'.
  The recommendations are based on EBU tests of HDTV studio and broadcast compression codecs performed in 2007-2008 (results in BPN documents). Only an organisation like the EBU, because of the considerable purchase power of our members, could convince manufacturers to cooperate with us to make such tests. In Tec.3333, minimum HDTV receiver requirements have been defined, in consultation with consumer electronics manufacturers.
- Digital Radio: For good old 'analogue' radio, the public benefits from full access to any radio service everywhere in Europe. Alas, with Digital Radio different and incompatible receivers (DAB, DAB+, DAB-IP, DMB, DRM, DRM+, DVB-H) can be needed in different countries; and, crossing borders, a given car radio can even go silent!

The Technical Committee, WorldDMB and the radio receiver industry launched a strategic alliance in order to guarantee 'continuity' of digital radio services across Europe. The approach is based on three service/receiver profiles given in EBU Recommendation R 126 (Jan. 09). If the profiles are followed, the user will be able to buy, anywhere, a radio receiver (of a given profile), and use it anywhere irrespective of the adopted national radio system to reproduce services within the profile. The three receiver profiles are:
(i) the Standard Radio Receiver, expected to serve a market for audio only low cost radio devices; (ii) the Rich Media Radio Receiver for radios with small colour screens able to receive audio, advanced text and picture applications;
(iii) The Multimedia Receiver for combined devices such as mobile phones, personal media players, and able to receive advanced forms of multimedia including video.

- Interactive Multimedia for TV: In 2001, DVB developed MHP for interactive multimedia that could be broadcast alongside digital television. This system has been taken up for broadcasting in Italy, Austria and Norway, in the United States for cable, in Japan, and in Blu-ray discs (BD-J), and was recommended to EBU members for 'green field' digital broadcasting. However, about three years ago some

01 BBC iPlayer
02 Cowon D2+ DAB Receiver
03 HD DVR HBB Set-top box from ADB
04 Philips Net TV

of the Intellectual Property Rights holders announced significant licence charges for broadcasters using the system. Consequently in 2008 the Technical Committee withdrew its MHP Recommendation. This caused the licence holders to rethink their policy, and they announced the waiving of all licence fees for free-to-air broadcasters. Thus, in November 2008, the TC reintroduced the MHP Recommendation R 106 rev2-2008

- Hybrid Broadcast Broadband services: EBU Members are starting to deliver TV and multimedia content in an 'IP' format. These are Web TV over Open Internet for PC user terminals (BBC iPlayer, Rai.tv, Mediathek, TDT Spain...), and IPTV over managed networks, where broadcasters are content providers only. In 2009, new hybrid consumer set-top boxes and TV sets promised to offer access to both broadcast TV services, and Broadband Open Internet. Various industry alliances introduced proprietary or pre-standard technologies (e.g., TV Widgets, Open IPTV Forum), and a variety of national initiatives were launched: the 'Canvas' project by the BBC; 4HTV in France; the German HBB platform.

The EBU TC hoped to avoid technology divergence through Europe and worldwide, by setting up a HBB Task force lead by Peter MacAvock, EBU and Arild Hellgren, NRK. EBU Recommendation R127 (Jan.2009) states: "EBU Members must foster, in cooperation with the industry and standardisation bodies, the development of hybrid broadcast broadband technical platforms". Minimum requirements have now been prepared, and the strawman specification so far identified is based on a proposal building upon the Open IPTV Forum and DVB specifications. It is to be harmonised, on a country-by-country basis, with any legacy middleware used for interactive TV (e.g. MHEG-5 for UK, MHP for Italy...).

- Spectrum Management: Many countries will release the 800 MHz band from broadcasting for mobile (IMT) services after ASO. The Technical Committee is working in the ITU and CEPT to minimise interference effects of 'spectrum sharing'. Reports have been prepared on FM Band II and the AM broadcasting bands. In the coming year, we will review the frequency bands for implementation of digital radio (DAB, DAB+, DRM, DRM+…)
- Other issues : EBU Recommendation R 125 (November 2008) recommends the use of DVB free-to-air signalling and the agreed DVB-CPCM specification in cases where content right-holders deem such technical protection measures necessary. The NMC studied Audio over IP interoperability standards (Doc Techs 3326 and 3329) and IP contrib. It also made audio codec evaluations for multichannel sound for HDTV and for digital radio.

In parallel to the normal activity, the Technical Department and the TC have started to consider a reorganisation of the current EBU technical structure (Technical Committee, Management Committees, Project Groups) to a new organisation, which will be finalised in autumn 2009, after consultation with the Technical Assembly. The new organisation will be built around a matrix structure, where the 'columns' will be Technical Expert Groups (TEG), online communities covering the main field of technical expertise (e.g. audio coding, video coding, broadcasting, online,...), and the 'rows' will be Strategic Program Groups (SPGs), dynamically setup according to hot topics, and characterised by interdisciplinary targets and market vision.

Before the Technical Assembly, TC members and the Technical Department started to define the hot topics for 2010. The main results are a mix of short term and long term topics:

- Start of HD broadcasting in various countries. Perspectives for higher standards (1080p/50; Scalable Video Coding; successor to MPEG-4 AVC)
- Digital Radio: Launch of a European Radio Forum. FM radio evolution. Role of webcasting for radio.
- Digital HD archives, tapeless workflows, interoperability in the IT production infrastructure
- Hybrid Broadband Broadcast. Definition of Harmonised Standards.
- Stereoscopic television. Will there be common standards?
- Next generation system for broadcasting to handhelds.

We plan to analyse these in the light of the outcome of questionnaires and discussions at the EBU Technical Assembly. The second year of the TC's term looks like being just as exciting as the first.

> "In parallel to the normal activity, the Technical Department and the Technical Committee has started to consider a reorganisation of the current EBU technical structure"

Alberto Morello (RAI)
Chairman,
EBU Technical Committee

3D TV beginners start here

The Deputy Technical Director of the EBU, David Wood examines the excitement surrounding 3D TV technology. He provides a look at the background of 3D production and puts forth that if ever 3D TV had a chance of succeeding, the time is now.

A Hollywood moviemaker, in the flush of box office success, claimed that 3D (cinema) stands for 'Dollars, Dollars, and more Dollars'. What could it stand for in television in Europe? Could it be 'Dilemma' (three times)? - or would it be more like 3x 'Do it now!'. That is the enigma for 2009 and 2010.

There is no doubt that 3D TV has a great 'wow' factor when you see it first time. Many people love it – particularly the young. But it is a risky venture. It is not HDTV, which is certain to be the future of television. 3D comes with a history.

3D cinema has emerged, flourished, and faded just as quickly, in cycles of ominous regularity. Could it be just a fashion for TV also, which will evaporate? Will the public tire of wearing glasses, and having axes thrown at them? On the small screen, will there be more to it than a fairground show?

3D production costs in Hollywood are said to be about double those for 2D, so this has got to be very popular. 3D production grammar can be quite restrictive. Looking to Hollywood, there the current rule of thumb is that for 2D versions of 3D movies, about one third of the material can used as it is, one third has to be adjusted, and one third can't be used. The best produced 3D production is going to be different to the best 2D production of the same event or story. Content compatibility is an issue.

The public too will be in for expense. The higher quality systems will need a new TV display, though possibly not a new set-top box. However good 3D is, will the recession put a brake on sales? These are the risks, but having said that, we should also recognise that if ever 3D TV had a chance of succeeding, it is now.

The great bugbear of 3D in the past was eyestrain. By using digital post processing in production, and in the receiver, we can reduce the potential for eyestrain, though probably not eliminate it. Furthermore, 3D works better the more definition there is in the picture, so, in this age of HD, it has a head start.

What is important now for those in broadcasting is to understand how 3D TV works, what it can do, and what making a test or starting a service could mean. For sure, if your senior management have not already asked you what the company should do about 3D TV, they soon will. This article is intended to give you at least a summary, which should help you in your decision making.

In getting to grips with 3D TV, it is important to understand what it is not - despite the hype. It is not natural vision as we see it everyday. To provide that we would need the many gigabits needed to record and transmit a full optical 'wave-front' (technically the 'object wave').

Fig 1. The two Panasonic cameras are mounted side by side on a cross-bar rig in this shot taken at Broadcast Asia in June 2009. The two HD cameras provide HD-SDI outputs.

There would be many more technical problems to overcome too. Today's 3D will be a subset of natural vision, which provides some, but not all, of its elements. Everything – production, delivery, and display must be done carefully and purposefully in 3D TV, to reduce the propensity for eyestrain. Though it may seem simple, in fact there is no place here for 'lash ups'.

There are considered to be three generations of 3D TV which will progressively come into play in the decades ahead.

These are:

1st Generation 3D TV. This category of system is practical today, and could be broadcast. It is essentially the combination of left and right eye pictures. The viewer needs glasses, and the left and right picture are 'fused' by the brain into a picture with depth - provided there are no more than allowed differences between the left and right pictures.

2nd Generation 3D TV. These systems record a large number of pairs of signals, and usually present them on a display that does not need glasses (auto-stereoscopic). There are limitations on resolution and viewing position with today's technical systems, but they may eventually become practical consumer electronics.

3rd Generation 3D TV. Here we record the entire light field or object wave. No eyestrain. Pictures look great. We are probably 30-50 years away from such systems becoming practical.

The 3D TV we speak of today is usually 1st Generation - based on two camera images, which are shot, edited, encoded and delivered to the viewer, who will have some arrangement (usually special glasses) to ensure that the left and right eye signals get to the right home (eye).

3D Production

3D TV is shot with a rig which may be like that in Fig 1. There are many rules to be applied to production grammar in 3D, including the use of wide angle lenses, small apertures, carefully chosen 'lens to first object distance', and limited depth range in the shot. These are (of course) to make nice looking 3D which exploits the depth facility, but also to minimise eyestrain. There is an art in 3D production grammar. It is far from just putting two cameras next to each other – though that is where you start.

The camera rigs can be arranged to allow the inter-lens spacing to be varied, and the lens toe-in (the 'vergence') to be adjusted. There are different views about the use of 'toe-in', with electronic processing. It is possible to keep the cameras pointing directly forward and electronically 'point' the camera via frame processing.

When the material is shot, there is more to do. The left and right pictures need to be processed for correct geometry alignment, and to ensure that the depth position of the key objects in the shot is good. One reason to adjust this is to ensure that when there is a scene cut the main objects do not jump wildly in depth position – this will really start the eyestrain bells ringing. There are some systems available for 3D post production, such as the Quantel 'Pablo'. If you visit such companies, they will take you on a tour of what their equipment does.

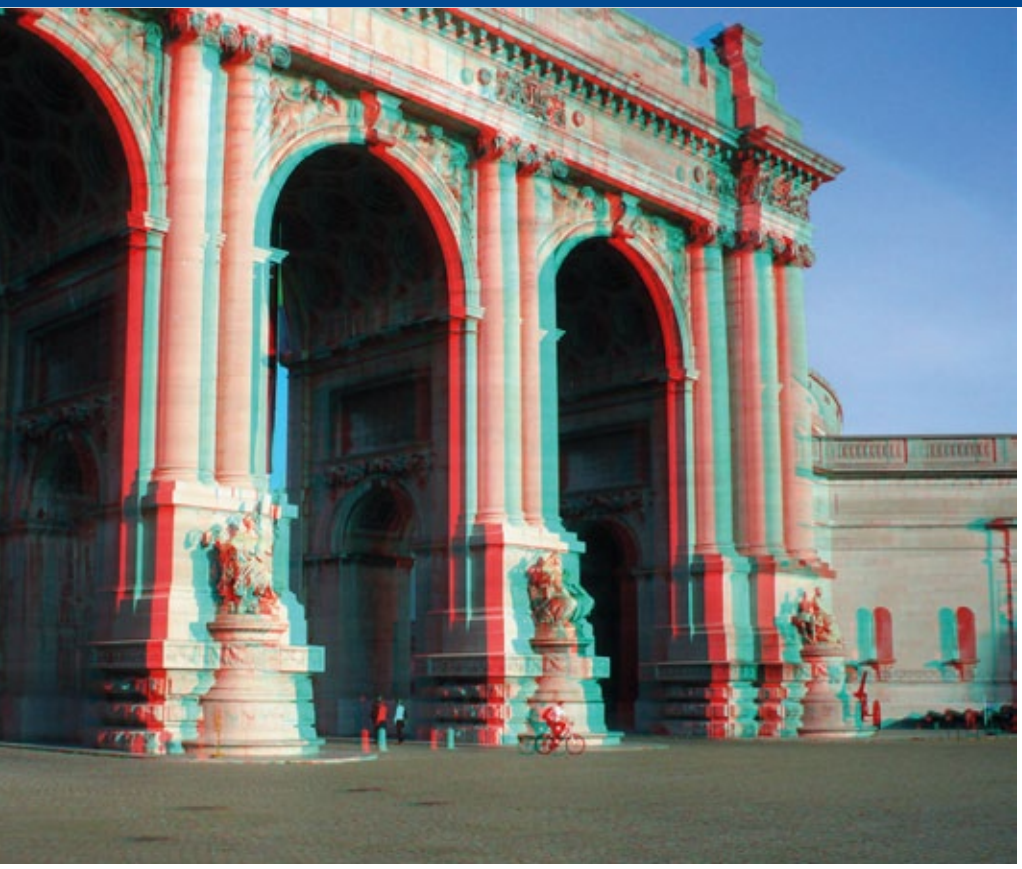
3D Delivery

Once the 3D programme is assembled, it needs to be delivered to the viewer. As you might expect, laboratories and manufacturers all over the world have come up with proposals for this, and many have made working systems. There are a lot of options, and all of them would work. The question is whether 3D TV can possibly be a success unless we all converge onto one system. This area is to some extent a 'standard's wild west'. The options for transmitting 3D TV come down to the following.

1. Send a COLOUR ANAGLYPH which is a composite of the HDTV left and right matrixed luminance pictures, coloured Red and Blue/Green, in a single picture. This method has limitations in colour fidelity and resolution, but does not need any new infrastructure.
2. Sent TWO HDTV PICTURES left, right: i.e. a simulcast. This is the high quality/ bit rate hungry solution.
3. Send TWO 'HDTV' PICTURES BUT ARRANGED TO LOOK LIKE ONE HDTV FRAME. This can be done by a) assembling left and right as over and under anamorphic, b) by arranging them as side by side anamorphic, c) by using what is called offset subsampling (one sample left, then one sample right, and so on), or d) assemble left and right on alternate lines. There is a compromise with this system in quality and bandwidth. If one of these systems is used, there is a loss of resolution in either the vertical, horizontal, or diagonal planes. But the results will not be as bad as you may think, because the stereopsis process in the brain effectively lays the left signal on top of the right signal, so what you see is a sum of them. In theory at least, it would also be possible to complement the system with additional resolution later if it was valuable, using the MPEG SVC system or similar.
4. Send ONE HDTV PICTURE plus something which allows the two left and right pictures to be reconstructed in ►8

when did it start?

The first live 3D television broadcasting took place 27 years ago in February 1982 from Hamburg by EBU Member, ARD, to the German public. Between six and seven million anaglyph glasses were sold to the German public for the occasion. EBU Sub-group V1 was studying 3D TV at the time, for which David Wood was the Secretary. The ARD programme was produced by Hans Herbst, a pioneer of new technology in German broadcasting, and much of the technology was developed by the IRT in Munich. This programme was the first of a number of 3D TV broadcasts in Germany and France. The basic principles of a left and right eye picture were the same as those used today, though registration of images and picture quality has been improved by today's digital technology. The first 3D movie was made in 1922.



7► the receiver – a difference signal , or a 'depth map'.

Each of these methods has advantages and disadvantages – and proponents.

3D Displays

The options for 3D TV displays fall into five groups.

a. Normal colour TV displays. This can be used with colour anaglyph transmission, given the user has the red green/blue glasses needed.
b. New displays with active shutter glasses. left and right pictures are shown alternately with a 100/120Hz display rate. Shutter glasses open/close in sync. controlled by an IR transmitter in the display.
c. New displays with passive polarised glasses. left and right shown alternately with switched polarised screen cover and a 100Hz/120Hz display rate, or left and right on alternate lines.
d. Anamorphic displays. No glasses needed, but other limitations. One of the major developing companies, Philips, has withdrawn from this area. Most suited to 2nd generation 3D TV.

Each of these also has its own advantages and disadvantages. Current opinion in the broadcasting community is that options b and c are the best for broadcasting today. It would be possible to define a standard transmission format which will work with either b or c displays, to encourage competition for quality, features, and price.

3D TV Standards

Lots of standards groups are 'in the act'. ITU-R SG6, the home of Rec. 601. and Rec. 709. has been working over the past year assembling information. It's due to meet again in October 2009.

The DVB Project is just about to launch work in its Commercial Module on requirements for 3D TV.

The SMPTE has produced a report on scenarios and requirements, and plans to go further.

The ISO/IEC JTC1 MPEG group has developed the standards for '2D+something' compression.

The Blu-ray Consortium has proposals in discussion, as has the DVD Consortium. There are methods also used on the Open Internet.

Where do we go from here? Will there be a grand reconciliation? Is there a role for the EBU to play?

Closing Thoughts

Several things are clear.

The higher the quality of the pictures, the better is the 3D TV. This is not the place for loss of resolution or compression artefacts. This must be factored into plans.

All 3D TV systems have the potential to cause eyestrain. It can be minimised only if we pay attention to detail all the way along the production and delivery chain. But don't expect miracles. Do not expect the viewer to watch 3D TV for very long continuous periods, unless he is a seasoned 3D TV viewer with eyes accustomed to the optical gymnastics needed. Think in terms of an hour or two at most.

3D TV can have a lot of impact, but it is not true complete natural vision. There are limitations.

The most critical issue today is deciding on a unique transmission format for left and right signals, which operate in an HDTV environment.

Most of all, today you need to know how 3D TV works - so quiz the EBU, the manufacturers, or try it yourself. The 3D TV train is rolling, and you need to work out the cost of a ticket on it. If 3D cinema, packaged media, Internet, and broadcast services from private broadcasters, are successful then the '3D' in Europe might turn out to stand for 3x 'Demand (from the public)'.

> "As you might expect, laboratories and manufacturers all over the world have come up with proposals, and many have made working systems. There are a lot of options, and all of them would work. The question is whether 3D TV can possibly be a success unless we all converge onto one system."

Hybrid broadcast broadband HBB

As Hybrid Broadcast Broadband services become more popular, there are a variety of initiatives in European countries aimed at exploiting the functionalities available on a new generation of consumer electronics devices incorporating broadband connections. Here the EBU's Peter MacAvock gives his insight.

A hot topic, or hype? Well it certainly consumes much conference time and many column inches. Hybrid Broadcast Broadband is where CE and other devices which receive broadcast signals have an Internet connection to a broadband network to offer a richer user experience. That's the easy bit. But which platforms should be used and how will broadcasters and other content providers know which platform to target? Are there other problems to consider? And the markets in Europe and elsewhere are very different from each other, so can the same solution work across multiple territories.

EBU Technical has been considering this problem for some time. EBU members are innovators in their individual markets, and their collective knowledge and market presence accounts for a significant proportion of Internet traffic in Europe. Looking at the existing landscape some countries already have broadcast services which carry interactivity (UK - MHEG-5, Italy - MHP) and some do not (France, Germany). Most of the larger EBU members have catch-up TV and other Internet based services. Whilst these pure Internet portal services have always been popular, the advent of catch-up TV services like the BBC's iPlayer or Mediathek in Germany has seen their popularity soar. It's fair to say that in an Internet media landscape dominated by the Internet bluechips, the broadcasting industry has proved more resilient than most. So are the broadcasters experts in the area of delivering media over the Internet? The answer is a resounding yes. So broadcasters are comfortable with either broadcast or broadband media. What about both together? HBB offers a significant opportunity to match their expertise in both these areas to enhance the viewing experience. But enhancing the experience means careful positioning with respect to the existing markets and their players.

If you're a new arrival to this space, the first tendency is to look at what the standardisation bodies are doing. Well for a start, they're all working hard in this space. But IPTV, open Internet and HBB are complex markets – more complex than the broadcasting distribution model. Mention Internet and media and you'd be surprised who claims to be an expert with a stake. And standardisation bodies such as DVB, ETSI and OIPF (Open IPTV Forum) sometimes get bogged down trying to address each stakeholder's requirements and end up addressing nobody's.

So the industry is moving to individual initiatives: Project CANVAS (UK), HBB TV (France/Germany), MHEG-5 IPTV Profile (UK), MHP 1.1.3 (Italy) and the commercial offerings from the CE vendors like Samsung, Philips, Sony and Panasonic. EBU Technical's job is to see whether there is an opportunity to agree some common elements and drive consensus in this direction in the interests of those developing content for these markets.

One of the EBU Technical groups – D-WMT (Web Media Technologies) has been working on providing feedback on one of the promising initiatives called HBB TV (a combination of an OIPF-based platform and DVB application signalling). The group has also been developing a set of high-level requirements to help the development of a common position at a more general level. In addition, the group has been applying these requirements to the current draft HBB TV specification.

One hurdle any HBB system will need to overcome will be the area of digital rights management (DRM). In some cases, and HBB TV was one, developers seek to avoid the question altogether by suggesting that their specifications should be used in streamed mode only. Once a download option is added, rights holders insist on a DRM system that will facilitate the lawful use of the downloaded content. If you're specifying a solution for a closed market, it's a question of picking one of the systems available – it's much harder in a standardisation environment.

One thing EBU Technical has learnt is that it is important not to get tied down in a discussion exclusively on consumer platforms. Such platforms are important but are also very complex and very tied to their target markets. The entire HBB chain has a wider scope. For example, I'm pretty sure that we'll all easily agree on audio and video formats and a set of wrappers for the media content. But there's still a real problem and room for much consensus-building on network infrastructures that would support the delivery of large-scale media content across the Internet in a reliable manner.

So the debate rumbles on. With the expertise of its members and staff, EBU Technical is the natural focal point for HBB discussions. But we must all move quickly: markets are developing at different speeds, but the window of opportunity for a harmonised approach is small at best. Equally, it's important not to confuse the market any more than it is at present. Otherwise, we're just adding to the hype, rather than making a hot topic an exciting innovation.

Can the EBU speak up?

The ITU-R has been working for more years than anyone can remember to help broadcasters provide consistent loudness across their TV programmes and TV channels. The apparent change of 'loudness' which occurs when you change channels, or cut to an advertisement break, is a source of irritation to viewers and an embarrassment to broadcasters. This difference is partly due to the different levels of audio compression used, and partly because we all want to 'get noticed' with our audio – what we might loosely call 'creative reasons'.

A group was set up by the ITU (in Working party 6C) in the last decade to rationalise the situation. They were partially successful because a new audio weighting curve was agreed (Rec. 1770) that will turn audio volts (at least for speech) into something that approximates loudness. When you have this, all you need to do is to decide what common level to set the loudness dial – then the annoying loudness swings should not occur. The difficulty has been to get people to agree on this common setting of the dial – the 'reference level'.

Sometimes you may not need a reference level because 'metadata' is available with the programme that can equalise the loudness automatically, but regularly it's not available, and a setting has to be made. ITU meetings have come and gone regarding this reference level over the years without agreement.

The disagreement in the ITU comes down to how the measurement of loudness would be done. At first it seemed the measurement should be done on the 'dialogue' component of the programme. Then came the argument that the measurement should be made on the entire programme giving the global average loudness. Yet others wanted to allow both methods to be used. A pragmatist might have said that any of these three solutions was better than no solution – but this was not to be.

The ITU-R is looking to the EBU group P/LOUD to help solve this by the autumn 2009 meeting. If it goes beyond that unresolved, there are voices in the ITU-R in favour of shelving the issue permanently as 'unsolvable'. Let's hope for the public's sake, there will be a white knight coming to the rescue.

David Wood

Better compression than H.264/AVC? Where?

The consumption of video content is constantly increasing both in terms of quality and quantity due to the availability of affordable higher resolution terminals and cameras. In the same spirit of evolution, higher capacity networks are being deployed to cope with the bandwidth needs, albeit at a slower pace. In order to provide forthcoming services such as mobile HD at an affordable video rate, an efficient video coding technology is needed.

The latest video technology standardised was Scalable Video Coding (SVC) in 2007, the successful standardisation effort of ITU-T VCEG and MPEG providing scalability on top of H.264/AVC coding efficiency. However, SVC is more of an additional feature than a more efficient coding technology.

In order to provide a standardised solution in the coming years, the MPEG committee created the High-Performance Video Coding Ad-hoc group (HVC - AHG) to investigate the next generation coding technology. Its main requirements are the following:

- Performance improvements in terms of coding efficiency at higher resolution.
- 50% better coding efficiency than the actual state of the art codec (H.264/AVC).
- A compromise between better coding performance and complexity.
- Applicability to entertainment quality services such as mobile HD, home cinema and Ultra High Definition TV.

Evidence of such technology has already been proven in the HVC - AHG by various proponents according to the call for evidence issued in April 2009[1]. Based on these results, a call for proposals will be published in the coming months. The targeted image formats are only progressive scanned and they span different image resolutions classified in the following categories: Class A - 4K, 2K; Class B - 1080p/50-60-24; Class C - WVGA; Class D - WQVGA; Class E - 720p/50-60.

A similar investigation is also ongoing in the ITU-T VCEG group. The possibility of another joint MPEG ITU-T effort is not excluded but is not yet clearly defined.

Both entities are seeking test material especially for high resolution (4K,2K) and HDTV (720p). Broadcasters are strongly encouraged to contribute with high criticality and quality content. More information can be obtained by contacting Adi Kuoadio at kuoadio@ebu.ch.

Talking about codecs, JPEG2000 carriage over MPEG-2 TS standardisation work has been initiated to define all necessary identifiers and field descriptors in a future amendment of the MPEG-2 TS standard. The later work follows the JPEG2000 broadcast profiles defined in the JPEG2000 standards.

Another effort of MPEG to be carefully scrutinised by the industry is the initiative to define a new MPEG transport stream called the Modern Media Transport - MMT. The MMT mechanism should provide a unified solution for efficient carriage of MPEG coded content in heterogeneous networks. A workshop was held at the MPEG London meeting[2] to identify the needs and potential technologies. A preliminary set of uses cases (transport over Fixed and Mobile networks, Adaptive progressive download, context aware streaming, open IPTV, etc…) and requirements was drafted[3] and is subject to input from relevant standardisation bodies (DVB, etc...).

Adi Kuoadio

[1] Call for HVC evidence - ISO/IEC JTC1/SC29/WG11/N10553
[2] http://www.chiariglione.org/mpeg/tutorials/seminars/mmt-2009/index.htm
[3] Draft use cases and requirements for MMT - ISO/IEC JTC1/SC29/WG11/N10854

Timing & Synchronisation

The joint EBU SMPTE Task Force on Timing and Synchronisation was formed in 2007 to examine future requirements for synchronising systems and for time labelling in various broadcast and media creation applications. The final report leverages nearly two years of focused industry research and user input to provide a comprehensive set of recommendations for simplifying and codifying synchronisation systems and timing labelling in the digital era. It features input from broadcast, post production, movie studio, and cable professionals, as well as broadcast and network equipment manufacturers.

Today's solutions, principally colour black distribution and SMPTE 12M Timecode date from analogue-only and tape environments, and are still viable today. There have been major changes in technology and requirements since their development. These changes particularly relate to networked and IT based media creation and broadcast technologies. The joint Task Force, co-chaired by SMPTE's Engineering Director Peter Symes and Dr. Hans Hoffmann Programme Manager at the EBU, has now concluded its work with a comprehensive report that is being published in time for IBC 2009. The report describes the detailed standardisation needs for Timing and Synchronisation for the next decades in media creation and broadcast technologies.

The Task Force spent time collecting and organising user requirements, and then published a Request for Technology in early 2008 seeking proposals to address the requirements. A number of proposals were received and analysed

which led to the conclusions now published in the report (Request for Standardisation) requesting concrete and detailed standards work from the SMPTE engineering groups.

The report recommends innovative, user-defined approaches – such as evolving a single synchronisation standard that can address all formats and leveraging today's widely installed Ethernet devices and infrastructures to minimise proliferation of unnecessary, dedicated interfaces and networks; prevent expensive, wholesale equipment replacements; avoid multi-format workflow inefficiencies; and, overcome audio/video metadata mismatches in fast-paced production environments.

For example, many of today's island systems – news editing stations, sports operational devices, craft editors, and post production suites – are built largely upon standard IT platforms. These platforms use many basic components provided by IT vendors with additions and enhancements provided by television equipment manufacturers. It only makes sense that a standard leverages this existing infrastructure investment.

SMPTE will now commence the standardisation work in the related engineering committees and EBU will proactively contribute to the concrete standardisation efforts.

The report is available for EBU Members from tech.ebu.ch and for SMPTE Members from www.smpte.org.

Dr Hans Hoffmann

DVB Project news

Earlier this year, DVB's Technical Module held its 81st meeting (11-12/06/09) and its Steering Board held its 62nd meeting (02/07/09). With its offices hosted in the EBU headquarters, DVB continues to be a powerhouse specification-producing body in the broadcasting domain.

With the approval of the landmark DVB-T2 specification in June 2008, DVB's recent work has concentrated on Internet delivery related elements. A significant work item is underway, supported by EBU Technical, on innovative network infrastructures geared towards the delivery of large format media content over the Open Internet.

Thus far, standardisation bodies have concentrated on a migration path which sees them concentrate firstly on closed-loop managed IPTV systems (essentially a form of cable on a broadband network), then moving to the delivery of media content on an open network. DVB is no different. Whilst the roadmap is common, there are significant differences in the commercial models and technical platforms being used in the two cases.

MHP is back on the agenda in DVB. Globally Executable MHP is a specification which was designed to internationalise MHP back in 2003 when it was first published. It allowed environments where core DVB specifications such as DVB-Service Information were not available to draw on the equivalent sub-systems in these markets. The first GEM versions referenced sections in MHP and were destined for the US cable and terrestrial markets. With the popularity of these derived specifications, DVB has taken the decision to make GEM the main document with new versions of MHP referencing the new GEM specification. TM81 approved the refactored MHP and GEM specifications.

The 82nd meeting of the Technical Module – the engine room of DVB – will take place on 23-24 September 2009.

Peter MacAvock

01 | Auction of 2.5GHz Frequencies in Denmark - Consultation

Denmark's Minister for Science, Technology and Innovation has decided that an Auction of Licences in the frequency bands 2010-2025 MHz (the 2010 MHz Band) and 2500-2690 MHz (the 2.5 GHz Band) will take place in the first quarter of 2010, and that this spectrum will be awarded nationwide on a service- and technology -neutral basis.
The decision was made following a recommendation from the National IT and Telecom Agency.
A consultation document containing a summary of the overall framework of the auction has been prepared, and stakeholders are invited to submit their views on this.
This consultation document is being published simultaneously with a draft Executive Order on the Auction of Licences to Use Radio Frequencies in the Frequency Bands 2010-2025 MHz and 2500-2690 MHz and a draft information Memorandum on the auction of frequencies in the bands 2010-2025 MHz and 2500-2690 MHz. Stakeholders can find further information on the auction in these documents.

02 | ZDF and ARD start HD Transmissions

German public broadcasters ARD and ZDF are preparing for their first regular HD broadcasts in 720p/50 on the Astra satellite at 19.2 degrees East.
Regular broadcasts will launch with the Winter Olympics in Vancouver, Canada. Initially, the HD broadcasts will only be available on satellite, but cable operators Unitymedia and Kabel BW are expected to announce they will carry the HD signals. Kabel Deutschland and the IPTV provider Deutsche Telekom T-Entertain are reported to be also in discussions.

03 | HD Services for Czech TV

Czech public broadcaster CT has begun trial satellite HD transmissions with a view to launching a full service in time for the 2010 Winter Olympic Games in Vancouver, Canada. The service will be known as CT HD with programmes in native HD and some upgraded from SD.
It will employ MPEG-4 and 1080i/25 and be distributed initially by Astra 1E at 23.5 degrees East in DVB-S and later switching to Astra 3B and DVB-S2.
Although CT HD will use conditional access, it will not be a paid-for channel, with viewers only requiring access cards from the DTH platforms Skylink or CS Link.

04 | Expansion of DTT in France

The French broadcasting regulator Conseil supérieur de l'audiovisuel (CSA) has authorised the commissioning of 55 new zones for coverage of digital terrestrial television (DTT).The coverage rate of the metropolitan population now exceeds 88%. The 55 sites were selected from the departments currently underserved by DTT. This is an opportunity for coverage in these areas to rise from 1.5% to 14.5% of the population, bringing them closer to the departmental goal of 91% set by the CSA for the cessation of analogue broadcasting for television.

05 | DVB-T Launched in Israel

On August 2nd, 2009 the new IDAN Plus DVB-T service was launched in Israel. This nationwide free-to-air service in one multiplex offers 5 channels including: IBA 1, IBA 33, Channel 2, Channel 10 and the Knesset Channel. The system offers MPEG-4 video, a 7 day EPG and HD support. Even though HD channels are not yet aired, IDAN Plus requires users to have an HD compatible set-top box to be fully future-proof. Analogue switch-off is slated for 2011.

06 | Serbia Opts for DVB-T2

Serbia has decided to opt for the DVB-T2 and MPEG-4 standards in its forthcoming transition to digital broadcasting. Speaking about the transition, Jasna Matic, Minister for Telecommunications and Information Society, said that the country would complete the switchover by 4 April, 2012 rather than the 2015 suggested by the ITU in order to be synchronised with the EU and neighbouring countries.
It was also announced that the state will allocate between $15-40 million (€10.7-28.6 million) for set-top boxes, with the higher figure required if they are supplied to all citizens and the lower one for just the socially disadvantaged. All those eventually eligible will nevertheless be required to be already paying the (obligatory) receiver licence fee. Although boxes currently cost between $60-70, they are expected to retail for €50 by 2011.

07 | Azerbaijan Speeds Up Works On Digital Television Broadcasting

In a recent statement, Azerbaijan's minister for Information and Communication Technologies has confirmed that the country is stepping up its efforts in its move to digital television. This will keep Azerbaijan in line with the ITU's recommendation that countries should switch fully to digital television broadcasting by 2015. The country has formulated a three stage plan for the introduction of digital TV which is designed to expand the capacity of its TV systems, develop a multichannel environment and overall improve the image and sound quality of its broadcasts.

08 | RTL launches HD channels on UPC

Two of the four Dutch RTL channels will be available on the UPC network in an HD simulcast from October onwards. Also included will be the catch-up TV service RTL Gemist on its VOD platform. The HD simulcasts will begin with RTL7 and RTL8. The two channels broadcast mainly TV series and movies, of which HD versions are available.

The flagship channels RTL4 and RTL5 will follow from early 2010. In addition, RTL and UPC say they will use the digital platform for the promotion of new programmes and series with a special preview functionality. Viewers will be able to see new episodes of TV series and programmes before they are aired on one of the RTL channels.

09 | TF1 signs VOD Agreement with Orange

Orange France has signed an agreement with TF1 Video to make content from TF1 Vision, the TF1 Group's video-on-demand service, available via the on-demand library of Orange's IPTV service Orange TV, and online via the Orange France website.
A selection of premium TF1 Vision content will be made available between now and the end of the year, including the latest seasons of US series such as Lost, Grey's Anatomy and Ugly Betty, and dramas and series from TF1.

Certain flagship programmes are also expected to be made available on-demand before being shown on the linear TF1 channel.
The company reported that it had reached 2.339 million digital customers (served by IPTV and satellite TV services) in France by the end of June 2009, an increase of 68% from June last year. The figures noted that 416,000 were for its satellite TV services.

10 | SES Astra Contracts More Capacity to ARD and ZDF

SES Astra has signed two long term agreements with ARD and ZDF to provide additional transponder capacity to the German public broadcasters. On the basis of the agreements which extend over a period of 15 years, SES Astra is to provide ARD and ZDF with one additional transponder each. ARD and ZDF plan to utilise the new capacity to further develop the possibilities of digital broadcasting, including HDTV. The transponders will be made available early next year.

11 | RAI & Mediaset Launch New Free Satellite TV Platform

Italy's state-owned broadcaster RAI, and commercial broadcaster Mediaset have announced the launch of a new satellite platform.
The new satellite platform, TivuSat, will be free and will host around 22 channels, including traditional free-to-air and new digital channels. The move aims to drive the switch from analogue to digital terrestrial TV in Italy, due to be completed by 2012. One target is to reach the 5% of Italian families that are not currently reached by digital terrestrial.

TivuSat users won't have to pay for content but access to the new offering requires a decoder and smart card for a total cost of less than €100 and a satellite dish pointed at Eutelsat 13° East. The service can be activated in just a few minutes. RAI and Mediaset each own 48.25% of the new venture, with Telecom Italia Media holding the remaining 3.5%.

12 | Viasat Adds TV4 & SVT services

TV4 Play joins Viasat OnDemand after SVT Play was added recently to the digital offering. Viasat OnDemand was first launched as an online video streaming service in 2007, providing feature films, live sports events and TV series to subscribers in Sweden, Norway and Denmark. Viasat Broadcasting, which operates a number of direct-to-home platforms throughout the Nordic region, launched Viasat OnDemand as an online video streaming service in 2007, providing a selection of films, sports and TV series for Sweden, Norway and Denmark. In October 2008, it also became the brand name for the on-demand TV service through the recordable digital box ViasatPlusHD for Viasat subscribers in Scandinavia.

Sources: Azerbaijan State Telegraph Agency, Broadband TV News, CSA, Danish National IT and Telecom Agency, SES Astra, TF1/Orange

Digital Radio Receiver Profile Summit – Geneva

The future of digital radio as a standalone service has been given a real boost lately with the finalisation of a set of digital radio receiver profiles for the DAB family of standards. The same process is being repeated for the DRM family of standards and the Internet Radio grouping IMDA. So if the announcement of the DAB family of receiver profiles was made at IBC '08, why hold a workshop in March? Well the influence profiling would have on the industry was probably under-estimated, and it was important to gather

the stakeholders together with a view to discuss the implementation of digital radio standalone services in various markets across the world.

Joan Warner from Australia provided an insight into the DAB+ developments there and closer to the EBU's home, Thomas Saner told us about the DAB and DAB+ deployments in Switzerland. It was also useful to hear that Digital Europe – formerly EICTA – the grouping of European CE vendors has indicated that its members will produce DAB/DAB+ Profile 1 receivers (the most basic one) in time for the Christmas '09 market. Furthermore, Digital Europe itself is investigating introducing a compliance logo to help the consumer understand the functionalities associated with digital radio – and the DAB family.
The work continues, but the summit provided an insight into developments in Germany (where the debate has moved on since then) and in France where the wish is to launch digital radio with the most complex profile thus far designed.

Peter MacAvock

Broad Thinking '09 – Geneva

Designed to study the state of the art in broadband and Hybrid Broadcast Broadband (HBB) developments, the conference included representatives from all sectors of the IPTV and Internet TV value chain.
The question on everyone's lips was – "What's the BBC really doing with CANVAS?". Well Jeff Hunter (BBC R&I) provided some insight – even if some of the most telling responses to questions were "I'm afraid I can't reveal that at this time". There was a detailed presentation of 'HBB TV' – a draft HBB specification that includes a derivative of an Open IPTV Forum platform and DVB application signalling. Also important is a status of the activities in the broadband media domain from different countries. A key feature of the different European markets is that they are at different stages of development – leading to different technical solutions targeting different platforms. A nightmare perhaps for those, like EBU Technical, wishing to harmonise aspects of broadband television across Europe.

Peter MacAvock

The future is IP-based:
Networked Media Exchange Seminar at EBU co-organised with VSF

The yearly EBU Networks seminar, held in June 2009, shared experience on technical solutions for audio-visual contribution networks. This event attracted over 100 specialists and gave the audience a technology and strategic update on future-oriented views on network technologies currently in development.
Major consideration was given towards reliable IP networks for broadcast applications.
For the first time ever, the event was co-organised between the EBU Technical Network Management Committee, the EBU Training Department and the Video Service Forum (VSF). The VSF is an international association composed of service providers, users and manufacturers dedicated to interoperability, quality metrics and education for video networking technologies.
Details of the seminar included: Use Case presentations on the use of MPLS, an outlook on IP

networked based coverage of the Olympics 2008-2012, file-based news exchange project of the Eurovision and how to deliver HD over IP networks. Further sessions dealt with measurements in IP networks and quality of experience issues, MXF in contribution links, uncompressed HDTV and audio over IP, studio networks, fast file transfer protocols and an update on the EBU work on standards converters and new contribution codecs.

Dr. Hans Hoffmann

EBU Camera Workshop:

The art of creating HDTV at ARRI Media Studios in London

EBU Members' heads of camera departments, chiefs of studios, directors of photography and so forth from TVP, RSI, TRT, BBC, VRT, Czech TV, Dr, NRK, SWR, ZDF, WDR and RAI gathered at the premises of ARRI Media Studios in London in May this year for a training course on the practical use of various HDTV cameras.
When broadcasters invest in HD cameras, they wish to optimise their technical and creative skills in setting up and manipulating the devices. Broadcasters want the cameras to be able to produce according to their expectations, to make HDTV productions look world class and clearly competitive. This was the objective of this first EBU workshop of its kind. The course was led by ex-BBC and world class expert Alan Roberts and dealt with theory and best practice, focusing on the practical use of different types of cameras in live shooting, multi and single camera use, and offered each participating Members' team the opportunity to work with the camera types they use at their broadcasting organisation.

Manufactures such as Sony, Panasonic, Ikegami, Hitachi, Thomson-GVG and of course ARRI provided the equipment. Needless to say the famous ARRI Media Studios, with a great support team, and BBC experts provided the perfect surroundings for this course.

Dr. Hans Hoffmann

Circles of Confusion

out now

The EBU Technical has published *Circles of Confusion*, a book by Alan Roberts about television: how it works; why it works this way, how to get the best from it. The book targets broadcast professionals in the technical and creative domain. Those who need to have a basic theoretical knowledge on television and how to translate this into practical use will find this book to be a high reference daily working tool. The book is available from tech.ebu.ch.

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TTI Workshop

28-29 Sept 2009 / EBU, Geneva / EBU Members only. This Traffic and Travel Information (TTI) Workshop will focus on the Message Exchange Server (TTI MES), a language-independent platform collecting international road traffic information from EBU Members in TPEG format.

Time & Sync Webinar

16 Oct 2009 / Online - 14:00 (CEST) / EBU Members only / No fee. In this Webinar Dr Hans Hoffmann (EBU) will introduce you to the background and key aspects of the new Time & Sync specification, created by the EBU-SMPTE Time & Sync Task Force.

Forcast 2009

23-24 Nov 2009 / EBU, Geneva / EBU Members only. Forecast 2009 is an annual specialised meeting on Spectrum and Delivery technology topics, organised by the Delivery Management Committee (DMC) and the Spectrum Management Committee (SMC).

EBU-DRM Workshop

26 Nov 2009 / EBU, Geneva. What business and technical opportunities does Digital Radio Mondiale offer?
This workshop will also showcase the current state of DRM transmissions and recent developments in coverage and the receiver market.

EBU Technical on course to visit Eurosport

TBA / Eurosport, Paris / EBU Members only. EBU Technical together with EBU Training are organising a theme day at Eurosport in Paris for a limited group of EBU Members' HDTV experts. Similar to the previous theme days at the SRG (Swiss public broadcaster) in Zurich and the BBC in London last year, the overall purpose of the event is to share the experiences learnt on the road to HDTV migration. With Eurosport having recently moved to HD production, the event promises to provide plenty of insight and knowledge sharing.

Further information can be found under tech.ebu.ch.

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