tech-*i*

INSIGHT FROM EBU TECHNICAL

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Issue 09 September 2011

Will production be in the clouds?

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EBU TECHNICAL
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LEADING THE WAY FOR 3D NEWS AND SPORTS DELIVERY

News and sports gathering is one of the most competitive areas in the broadcast market, demanding the delivery of high-quality video in the most cost efficient method available.

Ericsson's Voyager II
Sports events are increasingly being broadcast in a mixture of HD and 3D, and there is the prospect of 3D TV growing in the future and encompassing news. Operators have to be ready to deliver the next-generation television experience that consumers demand.

As a result, the design of newsgathering systems needs to be re-thought in a way that gives operators much more flexibility, both in terms of presentation and delivery, and at the same time take into account the all-important issue of operational costs.

Voyager II is Ericsson's fifth generation DSNG and is the result of 15 years experience delivering solutions in this most demanding of markets.

To enable operators to migrate from one compression technology to another, Voyager II supports all the major compression formats, MPEG-2 and MPEG-4 AVC, in both standard or high definition resolutions as either 4:2:0 8-bit or 4:2:2 10-bit and for improved video quality.

Ericsson has been active in the 3D TV arena for some time and last year provided ESPN, the industry's first 3D sports television network, with a complete standards based video solution featuring Encoders and Professional Receivers tuned for ESPN 3D broadcasts as well as for high quality HD.

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Let's not forget to take quality into account!

The choices we face for the future of television programme production lead us to face up to the mounting challenges that are being made through the growing appetite for spectrum from wireless broadband.

Those who attended the EBU Technical Assembly this year in Norway will remember the presentations about the future directions of television programme production. Once the transition to HDTV (as we know it today) is done, there will be yet more mountains to climb in picture quality.

There are three schools of thought that were heard in the Technical Assembly discussions. You may have a view yourself on the right road to take.

One is that the practical way forward is for programme production to be done in 1080p/50, at least for prestige productions. Though compression can be used, basically it needs twice the bitrate of either the 1080i/25 or 720p/50 used today. But the pay-off in the short term is to allow high quality post production, and to 'future proof' your programme so that it will still look good in the years ahead. The pay-off in the longer term may also be 1080p/50 broadcasting. It seems that 1080p/50 capable set-top boxes are not far way now.

The second route may be programme production in the '4K' (2000 lines) format, which would be even better for post production. A 4K format is often used for digital cinema production, so it could have the double convenience of being used for movie production as well. In this case too, 1080p/50 broadcasting, down converted with superb quality, may be possible in the decades ahead. 4K cameras and file recorders are now on the market, so this is more than a dream.

The third route may be programme production in the '8K' (4000 lines) format, which will give absolutely stunning quality. Of course, this is surely a very long way away, but we may remember that for HDTV, it took 20 years from dream to reality.

There is surely a lot of analysis and discussion to be had before the future path is clear. But one thing is very clear. It is that television broadcast quality will continue to evolve – unless it is held back or constrained. Higher quality is its destiny.

When we look at the debate on the agenda for the World Radio Conferences in 2012 and 2016, we see growing pressure to request yet more of the current broadcast bands to be taken away from broadcasting, and given to other services such as wireless broadband.

Wireless broadband will be a vital service in the years ahead, for everyone including broadcasters, but it needs to be achieved without stifling the future of television broadcasting. Other bands should be investigated for wireless broadband. And we might take heed of those who claim that what is being asked would not really be needed if only more efficient broadband systems and spectrum management were used. Is it fair to ask broadcasting to 'take up the slack' from wireless broadband.

There will be no 'rush' to higher quality terrestrial broadcasting quality, but it will come for sure if only it is given the chance. Let's take a balanced view, and realise that although compression systems do become more efficient, savings made there will be more than accompanied by the increases in bitrate needed for higher quality services. Let's think 'long term' in spectrum management.

> "...television broadcast quality will continue to evolve – unless it is held back or constrained. Higher quality is its destiny."

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Refinements to EBU Technical Activities

One year on, David Wood reviews the refinements to the structure of the EBU's technical activities.

There is a saying that "time is a dressmaker specialising in alterations". In 2010, the EBU Technical Committee launched a new structure for the EBU's technical activities - its groups, committees, and meetings. One year later, in 2011, it's time for a few nips and tucks to make the new structure fit a little better.

In 2010, the Technical Department and Technical Committee sought a structure which would achieve these things;

1. Match better the challenges facing EBU Members today.
2. Take into account that problems and solutions today have both technical and economic dimensions.
3. Maximise the efficiency of the smaller number of technical staff of Members available to work collectively in the EBU.
4. Make maximum use of modern communications and internet systems.

The result was a new structure which called for two kinds of 'groups'.

The first was the 'Strategic Programme Groups' (SPGs). These were intended to bring together Members to develop common strategies for major issues collectively confronting Members. They would look at both technical dimensions and economic dimensions of issues such as, for example, the future of terrestrial broadcasting.

The second was the 'Expert Communities'. These were intended to bring together specialists who shared a common core of knowledge, such as, for instance, audio, and who could further their knowledge in a technological social network.

Both of these were able to establish 'Project Groups' to help achieve their objectives.

After its first year, in 2011, the Technical Committee reviewed how well the initial ideas had worked out. They listened to those with experience of the structure, and double checked that the technology directions proposed matched those we knew were needed. The result is some refinements while keeping the philosophy of the structure. They will come into force in September 2011.

The initial months of the new structure brought to light a principal problem, which was that Members were finding it difficult to know what was happening. They also wanted to help shape the issues that groups considered more important.

To improve this situation, the Technical Committee is inviting every EBU Member to nominate a 'Technical Liaison Officer'. The TLOs will be informed about every new activity, and asked whether his or her company wants to contribute to it. They will also be able to make suggestions for the work to be done.

The second principal problem was that both Expert Communities and Strategic Programme Groups were establishing Project Groups. Sometimes reporting procedures were not clear, and it was difficult to find a 'work plan' which describes what we expect to happen in the next (say) 12 months. For Members this was a source of vagueness.

Content Production	Content Delivery
Quality Control in Networked Production	Collaborative Terrestrial Networks
Future Infrastructures & Media Storage Systems	Spectrum Management
Media Information Management in Production	Broadband Networks
Future Television Formats & Production Technologies	TV Platforms & Services
Future Audio Formats, Radio & Production Systems	Radio Platforms & Services

Fig. 1 Strategic Programme Groups for 2011-12

To improve the situation, it was agreed that all Project Groups that have a 'deliverable' as an outcome - should be inside SPGs. The Expert Communities could suggest when a Project Group was needed, but the Project Group itself should be in the SPG structure. In this way, by looking at the plans of the SPGs we could prepare an 'annual work plan' each year that could be understood by everyone, and submitted to the EBU Technical Assembly for endorsement. We hope that in this way, everyone will be able to easily find out what we are doing and when it will be done.

The Expert Communities will continue and serve as technology social networks.

The Technical Committee agreed that we should begin by inviting Members to participate in ten Strategic Programme Groups (See Figure 1).

If sufficient Members signal their intention to participate in these groups, following a call being made to TLOs in June 2011, they will be officially set in motion in September 2011.

No doubt there will still be things to learn, and improvements to be made. But the refinements made now should help to make a good thing better.

Aspects of DVB-T2

The EBU's Elena Puigrefagut and Roland Brugger from IRT outline the guidance on planning aspects of DVB-T2 published in a new EBU Technical Report.

The EBU has published a Technical Report (EBU – TECH 3348) providing guidance on planning aspects of DVB-T2, the second generation standard for digital terrestrial television which offers significant benefits compared to DVB-T.

Higher spectral efficiency

The DVB-T2 standard includes several new features and a range of new parameters which allows a capacity increase of up to 50%, or even more in particular cases. Notably, the new generation of FEC (error protection) and higher constellations (256-QAM), the new FFT modes (1k, 4k, 16k, and 32k), and the additional guard interval fractions which combined with a suitable symbol length (i.e., FFT mode) reduces the overhead required by DVB-T2 compared to DVB-T. This increase in capacity availability can be translated into a higher number of programmes to be accommodated in a multiplex or in a higher audio/video quality (e.g., HD quality with MPEG-4).

The DVB-T2 standard also offers a number of new features for improved versatility and ruggedness under critical conditions: rotated constellations, techniques to reduce the peak-to-average power ratio (PAPR), Multiple Input Single Output (MISO) transmission mode, and time interleaving. This increase in ruggedness can be translated in an enlarged coverage area. Those parameters are detailed in the Report.

New planning features

DVB-T2 allows for large area SFNs with a high data rate because of the possibility of choosing larger guard intervals. The Report discusses how a proper choice of symbol length, guard interval and pilot pattern configuration can be found (See Figure 1) and how the interval of correct equalisation is to be calculated. Further additional new planning features like the mode MISO, Physical Layer Pipes (PLP) and Time-Frequency Slicing (TFS) are described which allow for additionally increasing the robustness of the transmission, for individual adaption of transmission parameters for each service in a multiplex, or for aggregating more than one RF channel in a transmission (a feature for possible mid to long term planning), respectively.

Implementation scenarios

Among the very large choice of parameters and possible combinations, the Report discusses a limited number of DVB-T2 implementation scenarios each with an associated set of parameters. Scenarios are defined for rooftop reception, portable indoor and outdoor reception and for mobile reception. For rooftop and portable reception different scenarios are defined as a function of the strategy to follow: maximise data capacity per signal or maximise the coverage. For portable and mobile reception, a scenario using Multiple PLPs is also considered. A detailed list of the relevant parameters is given, including signal levels for planning, C/N values and effective bit rates.

In an annex, general network planning criteria like coverage definition, reception mode parameters, building penetration loss or man-made noise figures are collected. Additionally, a detailed listing of the net data capacity of a DVB-T2 multiplex for the various parameter combinations is given.

DVB-T2 in GE06 Plan

The GE06 Plan was established for the broadcast transmission systems T-DAB and DVB-T. The Report describes how DVB-T2 fits into this framework, gives an overview of which DVB-T2 variants are directly compatible with DVB-T or T-DAB plan entries, and indicates where particular provisions have to be made to be compatible with the GE06 Agreement.

Transition Scenarios

For the implementation of DVB-T2 networks a transition is required from either existing analogue distribution of TV or from DVB-T. Even the latter transition is not trivial since DVB-T2 equipment is not backwards compatible with DVB-T. The Report describes considerations and options of a transition to DVB-T2 with respect to existing infrastructure, to frequency planning issues, to particular aspects of a direct transition from analogue as well as particular aspects of a migration period from DVB-T to DVB-T2, e.g., in this period a need for additional spectrum seems likely.

Field trials with DVB-T2 are still in progress and in some countries regular DVB-T2 services have already commenced. It is expected that more experience regarding DVB-T2 performance will be gained during the next 12 months. The intention is to update the EBU TECH 3348 Report in due time when such additional information is available.

The Report has been contributed to the ITU-R Study Group 6 work on the DVB-T2 Standard. Recommendation ITU-R BT.1877 already includes the system characteristics and a future new Recommendation will cover the planning criteria, including protection ratios, for the second generation of digital terrestrial television broadcasting systems in the VHF/UHF bands.

Comparison of the coverage areas for 8k FFT DVB-T and 32k FFT DVB-T2

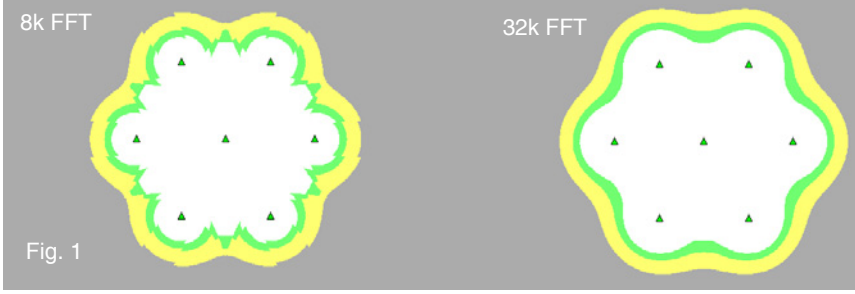


Fig. 1

Difference in coverage

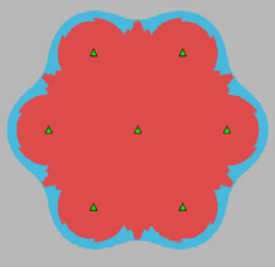


Fig. 2

no coverage > 95%
only DVB-T
only DVB-T2
both

Hybrid radio

Francis Goffin, Director General of Belgium's RTBF Radio, presents the challenges of bringing radio into the digital era.

I read in the June issue of Tech-i two very good articles from Beatrice Merlach (Switzerland) and Joan Warner (Australia) explaining eloquently that the future of radio belongs to digital radio broadcasting, especially DAB+. The articles argue that digital broadcasting rather than radio over IP, remains the best solution for radio to reach millions of daily listeners, at a fixed cost for the radio stations and practically free of charge for the listener.

I fully agree with this strategy. I'm really happy to read that both leading figures in broadcasting, coming from two different continents and from private and public groups, share the same view.

For me, many high stakeholders: technical, economic, cultural, democratic and social plead in favour of broadcasting. Broadcasting really is vital for the future of radio stations. But I will not repeat what has already been said very well on this matter.

In French speaking Belgium, RTBF has convinced the main private radio stations to migrate to digital radio and we are now negotiating with our government to obtain help to finance the investment needed during the early years when simulcasting in AM/FM and DAB+ will be required. At the end of 2012, we plan to start the roll out of two layers of common DAB+ multiplexes to replace AM/FM broadcasting. With this digital strategy, listeners will not only have a wider choice of radio stations (probably double what they have now!). They will also get their favourite programmes with metadata, such as texts, visuals and slide shows, transmitted simultaneously and directly to their new digital broadcast receiver.

> "terrestrial broadcasting networks are well placed to complement broadband networks in a hybrid delivery environment"

The move in radio to enrich its sound-only offering in a new digital world where screens, texts and visuals are omnipresent is already underway.

However, this is not the only strategy that we are recommending for the future of radio in Belgium. The target is also to make radio more appealing by meeting two other very important new needs of our "digital listeners": interactivity and videos, two requirements that broadcasting alone cannot offer.

The only way to offer the back channel and rich (heavy) metadata such as videos, is to combine terrestrial broadcasting and internet distribution (broadband). The Anglo- Saxons call it HBB Radio, short for "Hybrid Broadcast and Broadband Radio" (which also exists for connected television).

This remarkable and recent (approximately 2 years old) technical invention is relatively simple. It was accomplished by those who understood that the future of radio lies in the complementary nature of the two distribution models:

- Broadcasting brings to the internet the power to distribute, simultaneously to millions of people the same sound content and the same light metadata.
- The internet brings to broadcasting the back channel from the listener, which is necessary for interactive functionalities (I like, I tag, I vote, I download, I click, I react, etc.) so familiar to the new generation. Also, greater enrichment of metadata and for images, up to and including videos, that DAB+ cannot offer.

In order to benefit from hybrid radio, a new, hybrid receiver will be necessary. It could not be better timed: all radio receivers need to be replaced to make way for migration to digital. Therefore, it makes good sense to directly propose receivers with hybrid technology!

The hybrid radio receiver (in whatever form – new digital traditional receiver, or integrated in a fixed or mobile terminal) will always prioritise radio listening via broadcast and, where connection is possible and/or desired, it will access internet heavier metadata from the radio service being listened to, all this by means of a simple code for each radio common to the terrestrial broadcast and to the internet – it's the RadioDNS[1] system.

In the event of a problem with broadcast reception, the hybrid receiver may obtain the sound content from the internet and will thus use radio over IP to resolve the temporary problem. This receiver is also equipped with a screen which can display text and visuals both from the digital terrestrial broadcast and from the internet. And with this hybrid combination, listeners will use around 20 times less data from their monthly broadband allowance. A big economic advantage for both sides – listeners and radio editors.

Hybrid radio will bring radio right to the heart of the digital era with text, visual-enriched sound and interactive functionality, which will also provide new commercial opportunities.

Francis Goffin

Francis Goffin is Director General of RTBF Radio (French speaking Belgian public service) since 2003. He has successfully overseen the redeployment of the organisation's public radio stations. In 2004, he revamped the programme offering of La Première and Musiq'3 while launching three new radio stations: VivaCité, Classic 21 and Pure FM. Six years later, these five public radio stations reach an audience share of around 34% (rising from around 25%). He is also a member of the EBU Radio Committee.

[1] Radio DNS is a project of collaboration designed to improve the use of a radio broadcast in conjunction with services over IP in order to provide listeners with a better radiophonic experience. www.radiodns.org

Horses for Courses

EBU Radio Department's Project Manager for New Media Matthew Trustram looks at RoIP as a Delivery Platform for Specialised Radio Audiences.

A key concern for the future of radio is that true, one-to-many broadcast transmission technologies, such as those belonging to the DMB family of standards, must be at the heart of any multiplatform landscape the future may hold. Streaming radio, otherwise called radio over IP or RoIP, alone, simply cannot sustain the number of listeners to a national public service network in a cost-effective way.

That said, it's impossible to ignore the new possibilities that RoIP affords, and, as ever when a new technology presents opportunities, broadcasters have rapidly innovated around ways to use it.

It is a mistake to see RoIP as simply a redistribution technology. While there are clear advantages to including live streams of broadcast networks in a delivery bouquet, to stop there is to miss the point, and such is the creativity and expertise of the European radio community that many truly new services have emerged on this platform.

The key to understanding the special way RoIP can serve audiences lies in its unique underlying economic model.

If we accept the principle that 'on-air', one-to-many broadcast represents, to the broadcaster, a fixed cost that is irrespective of the number of listeners, and that RoIP streams incur per-listener bandwidth costs in a more or less linear way, we see from Figure 1 that up to a certain size of audience, RoIP can be more cost-effective than broadcast.

It should be noted, of course, that Figure 1 is not prescriptive, and that it is highly simplified. (It neglects, inter alia, to take into account the cost of producing the content to be broadcast.)

It serves, though, to illustrate the key point that IP radio is well adapted to the transmission of specialised services to relatively small audiences. This should not exclude public service broadcasters with mandates to broadcast nationwide; indeed, on the contrary, there are many examples of innovation in this area among the EBU Membership.

Take Swedish Radio's weekend football coverage. The P4 network's flagship sports programme Sportextra broadcasts an eagle-eye view of the day's action in the Allsvenskan league to a weekend audience of up to 1,000,000 listeners via traditional on-air broadcast channels.

Meanwhile, fans of a particular club are able to follow every minute of every match their team plays. Thanks to RoIP technology and efficient cooperation with regional networks, Swedish Radio, remarkably, is able to deliver full, live commentary of every single match played by every team during the season. A feat that would not be possible using on-air broadcast delivery.

Another recent success comes from BBC radio, where, at the end of 2010, HD Sound moved from a test phase to become a live audio platform. By capitalising on recent codec developments the corporation is able to deliver higher-than-FM-quality 320kbps streams of cultural content (such as concerts on the arts and culture network, Radio 3) to its not inconsiderable specialised audiophile audience.

Elsewhere, Polish Radio was able to launch no fewer than 85 genre-based music stations to celebrate the broadcaster's 85th birthday, and among the many specialised services to have launched across Europe is Rai's WebRadio 7 - Napoli Canta, focusing on traditional Neapolitan song.

In addition to advantageous per listener costs for smaller audiences, web streams incur negligible startup expenses. Ephemeral stations like Goom Radio's Radio Caravane in France, which provided live commentary throughout the 2010 Tour de France, from July 3 until its planned evanescence as the riders reached the Champs Elysées on July 25, have capitalised on this. There are indications that similar 'pop-up' stations look set to be a key feature of tomorrow's radio landscape.

The internet will never become an efficient mainstream platform for radio broadcast; it's unlikely to reach core audiences, and is, simply put, the wrong tool for the job. Broadcasters must continue to play to the strengths of the platform which include low transmission costs for niche audiences, ease of startup and shutdown, and, of course, the two-way communication that the internet protocol was designed to support.

Cost-efficiency of RoIP and broadcast transmission by audience size

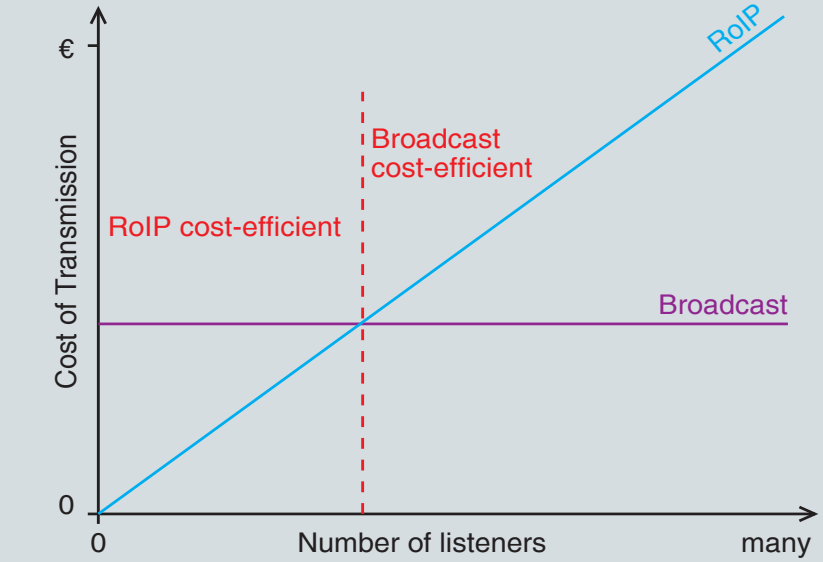


Fig. 1

A Cloud with a Silver Lining?

IBM's Bart Bogaert trumpets the benefits of cloud computing for broadcasters.

Bart Bogaert
IBM

Media companies are at a crossroads: join the digital revolution of the so-called cloud computing or – almost certainly – disappear! Is cloud computing hype, a buzzword like so many in the world of technology and new media? Although cloud computing is service oriented, the reality is that it comprises a fundamental change, a revolution that compares with the rise of the PC. Companies will have to move in time if they want to survive.

Over recent years the media industry has gone through the wave of digitisation. Many leading enterprises moved in this direction and succeeded, taking the next step to operational efficiency. However, the adoption of service oriented architecture has only just started. Despite the massive investments in new technologies, the competitive position of media companies has not greatly improved.

One might argue that the recent economic recession is the underlying reason for the struggling position of the industry. However, recent reports show that the media industry is missing the trend of recovery. New analysis by research firm IBISWorld looks at ten industries that appear to be dying. Forecasted to decline over the period 2010-2016 are five media-related industries among the ten industries listed. As the first signs that the economy is starting to recover from the latest recession appear, it seems unlikely that the media industry is going to match the recovery pace. The dominance of the internet and digital media has left the traditional media companies at a clear distance. Moreover, the pervasive character of information technology appears to be disruptive for the business models used so far.

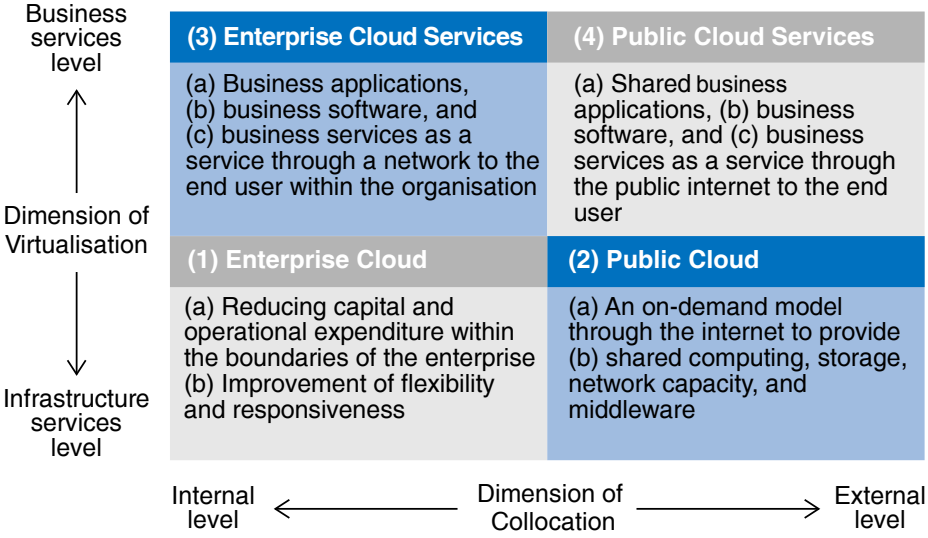
The underlying reason for this struggling position is not caused by the recent economic recession. The critical point is that the introduction of new technologies, by traditional media companies, is occurring while the underlying principles of the IT technologies are changing towards cloud computing. Conversely, new media companies use cloud computing to explore the creation of alternative business models. The concurrence of these circumstances creates a twofold stress within the media industry. The first circumstance that creates stress is that the industry is facing competition from the alternative business models relying on cloud computing. The second circumstance that creates stress lies within the organisation. The reluctance to change towards new technologies is motivated by the negative experience of digitisation. Now, the challenge of the media industry is to overcome the current situation. Therefore, the adoption of cloud computing can be a response to these challenges.

The recent history of information technology shows it endured a disruptive change that started slowly in the early 1980s. Then, the upcoming personal computer and client/server technologies were disruptive for proprietary technologies. At that time, several technology companies ran into problems, some prominent brands went bankrupt or were broken up after being placed in Chapter 11. Nowadays, the use of information technology again will spread deeply into the core of business processes in many industries, including the media industry.

Cloud computing is mainly known from a consumers point of view. However, cloud computing goes farther than consumer services provided over the internet. Cloud computing can be described using two dimensions. One dimension concerns the collocation of the cloud. At one extreme is the internal cloud, here a business uses its own internal cloud. At the other extreme is the external cloud, here a business integrates public services through the internet. Various mixed models are possible, one example is the 'hybrid cloud'. The other dimension concerns the level of virtualisation at which cloud computing takes place. A business can apply cloud computing from an infrastructure level (compute and storage capacity) up to a business level (business applications). We expect that large businesses will build their own cloud, which will enable a responsive business support for its employees and partners. Small businesses and self-employed people will likely use a public cloud.

For businesses, the system and application virtualisation using cloud computing is the next step in the paradigm on how information technology is exploited. Moving the industry forward towards a complete virtualised and integrated service model is the next step. New business models will then support new creative business ideas in a flexible manner.

One needs courage to dive into cloud computing. Unfortunately, most businesses have cold water fear. However, ultimately you will have to learn to swim.



More than just a sticky label

Jens Fischer examines the wider use of the 3G serial digital interface for 1080p/50 production.

Since the launch of the first HDTV channels worldwide, broadcasters, the broadcast equipment industry, and the consumer electronics industry have all discussed what are the next generation HDTV formats. Each 'side' presents comprehensible arguments for their favourite format. And of course, everyone is right in their own context.

But, over the past two years, industry has moved into a higher gear on this issue. New "Stickers" have appeared on production equipment, and manufacturers are implementing new functions and standards. At present, though maybe less visible than the 3D hype, '3G-SDI' is changing from being a high-end to a more widely available feature.

"3G-SDI" refers to the 3Gbit/s serial digital interface which is used in production to transfer, for example, 1080p/50[1] signals.

Today 3G-SDI is implemented in many production devices - whether you are looking for a standards converter, a router, display, camera, graphic system, etc. Not yet readily available are products like camcorders. But, with the next generation of production codecs, they will be ready too.

Today, many of the worldwide TV and sports events are shot in 1080i/25, as was the Eurovision Song Contest in Düsseldorf 2011. But many TV stations throughout the world deliver a 720p/50 format to the consumer to utilise the better encoding performance (and less bitrate demands) of progressive signals in distribution, and to avoid de-interlacing at the receiver. The introduction of 1080p/50 on the production side would mean that we can easily derive all broadcast HDTV formats, 1080i, 1080psf and 720p, with their full quality potential. This will have an important impact on the picture quality for the consumer at home.

Furthermore, if we shoot the best picture quality with 1080p/50, we may be able to eventually deliver it to the home when, and if, new STBs become available. The magic words here are "new business cases". It is possible to 'broadcast' a 1080p/50 signal simultaneously to a chain of cinemas around the globe, and when available, to consumers with a new receiver. Also, thanks to new coding and distribution technologies such as scalable video coding, it might be possible, e.g., to broadcast the 720p/50 signal (base layer) via satellite and an enhancement layer with the rest of the 1080p/50 bits via internet.

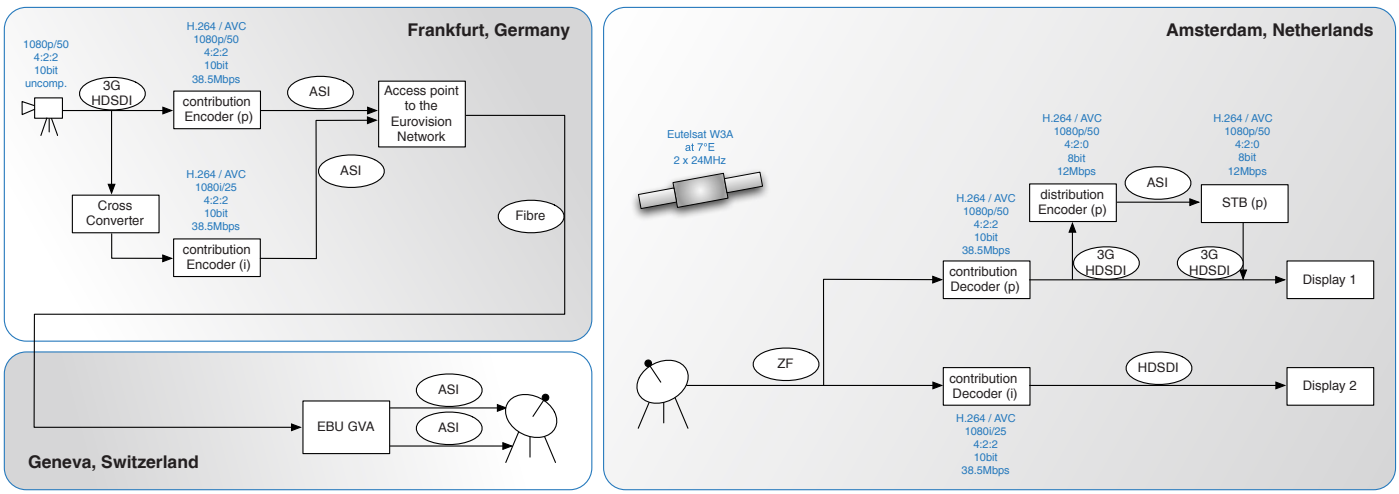
At IBC, a 1080p/50 signal chain from the camera, via contribution and distribution to the consumer display will be built, and we hope to transmit a live signal from a venue, such as the roof of the ARD Sternpunkt building in Frankfurt, Germany in September 2011. The signal will be captured with a Grass Valley LDK 8000 (WorldCam). Furthermore, this output signal will be cross converted by a Snell Alchemist Ph.C - HD to the 1080i/25 format. Both signals will be encoded by the Fujitsu IP9100 AVC / H.264 encoders and use a bit-depth of 10bit/sample and a colour sub-sampling ratio of 4:2:2. The contribution network video bitrate will be that used by the current Eurovision network contribution profile. If current plans are realised, both ASI-Streams will be transmitted in parallel via the Eurovision Fine Fibre Network from the ARD Sternpunkt building in Frankfurt to the EBU / Eurovision headquarters in Geneva. There, the Eurovision engineers will link the signal up to the Eutelsat W3A satellite at 7°E, which will be received at the IBC in Amsterdam. Therefore, each feed will be transmitted with 24MHz bandwidth.

Additionally, at the EBU Village (10.F20) at IBC 2011, the 1080p/50 signal will be re-encoded to a 4:2:0, 8bit distribution link. The distribution bitrate will be at comparable or less bitrate than 1080i/25 and transmitted to a "1080p/50 ready" prototype STB from Broadcom. Inside, a new generation of chipset decodes the AVC / H.264 Level 4.2 signal. It is interesting to know that this kind of chipset can handle multiview coded signals (MVC) and scaled signals (SVC) as well. Both are enhancements of the current video codec AVC / H.264 and published as the ISO/IEC 14496-10, "MPEG-4 Part 10: Advanced Video Coding".

All the different contribution and distribution signals will be presented natively on high quality, 42 inch Dolby reference displays.

This showcase will demonstrate that 1080p/50 is not just a new "Sticker". It is a feasibility demonstration to test interoperability that could raise the HDTV picture quality for the consumer to the next level.

The author is currently working in the EBU Technology and Development Department on a 1080p/50 project for a Masters Thesis with the RheinMain University of Applied Sciences.



[1] Specified in EBU Tech 3299 as System 4 with 1920x1080 pixel resolution and 50 frames per second progressive scanning.

Managing workflow changes and its impact on staff

Christian Winther Rohde, Chief Director of DR News reflects on the early introduction of online editing and the proliferation of computers in the work environment.

Christian Winther Rohde
Chief Director, DR News

When I started working for the Danish Broadcasting Corporation's DR News in 2002, I was working in the old building where the editorial rooms were located. I noticed that there were two rooms that were hardly ever used. These rooms housed the two test systems that were used to decide which nonlinear edit system DR News would choose for the future. The other rooms in the building were conventional linear tape-to-tape editing suites.

At that time, I had been using an Avid Final Cut Pro 2 and After Effects, so for me nonlinear editing was the only thing I knew.

I was quite surprised that many of my colleagues were apprehensive about editing on a computer. Many were skeptical about the idea that we should all be working as a TV cameraman and at the same time have to edit our own material, becoming so called multi-technicians.

Some of the comments I heard were:

- Is computer editing any better than how we do it now?,
- The quality of the end product will certainly drop if we have to work faster.
- The quality of the material will certainly drop if we film and edit our own material.
- Is this a downsizing strategy by management to cut down staff?

Some employees, especially the younger ones had "grown up" with the development of the digital video camera and were therefore used to the idea of filming and editing their own material.

In the transition to a digital workflow environment people were divided into roughly two groups. There were those that for whom computers were new and too complicated to understand, whereas for others they were a natural part of their lives.

Since then, we have gradually evolved by educating more people with the technology. This transition period proved to be a stressful time for some. Many of the workflows that we used every day have now changed.

I remember there were times when I had to adapt the workflow, sometimes even by the hour. This could have been because there was a breakdown of a server or maybe a time related issue would arise and a change of deadline would occur in order to get a programme to air on time.

As we use computers more and more for a greater variety of tasks, the demands on the IT support department increases. Because of the mix of broadcast software and basic PC software on our computers we need a dual purpose support department. We have a group that handles standard PC issues and one that handles news production related issues. This way we have a specialised team that knows and understands the technologies of news broadcasting.

Therefore, with more computers in the gallery, IT support has become just as important to the production as any other member of the crew.

Today, with a complete digital workflow, our dependence on computers is almost as high as it can get. Just 10 years ago the computers were primarily used for word processing. Now computers control or are involved in almost every aspect of creating a news programme.

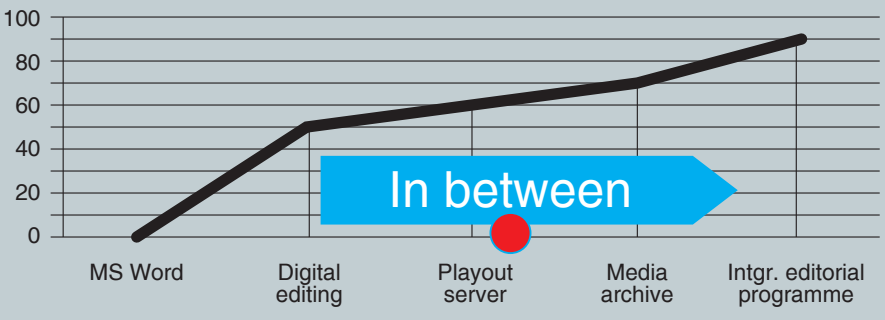
One of the main things that we have learned, in order to ensure that people remain calm even in the most intense server breakdown situations, is the need for backup scenarios. It's important to feel in control even when things begin to collapse around you. Every day we train to maintain our backup skills. It´s really rare that we experience problems that last longer than 20 minutes, however this does not diminish our necessity to be prepared.

Each day a different technician is selected to use the backup workflow so that everybody is familiar with it.

As I see it, we will keep on implementing more and more computers in our workflow in the future. We will develop new software and automate as much as we can to remove human errors. More broadcasters will chose virtual studios until every loop, graphical element and video is played out from a computer. We will of course be ever more dependent on computers and more vulnerable to their failure.

But regarding the news, we will never, no matter what, be more than 90% dependent on computers. We will always be able to place a camera in front of a person to read the news from a piece of paper.

Workflow changes - Computer dependance



Green broadcasting: A @#$%&! nuisance?

David Wood looks at some very important reasons for broadcasters to take up green initiatives.

Green broadcasting is the subject of humour ("green broadcasting is separating television programmes into different types of rubbish") and cynicism ("sure, we're carbon neutral – every time the boss goes to town in his limo, we pay for a tree to be planted"). Yet, as the consequences of climate change and rising energy costs begin to arrive, there is growing political pressure to walk the green road. Green means essentially reducing the amount of carbon-generated energy that is used by society.

Broadcasters have businesses to run, and stakeholders (often the public) to satisfy that they are acting wisely and efficiently. Why should we pay to 'green' ourselves when any energy savings we make are overshadowed by the growing energy excesses of others? Should we act in our individual self-interest, or act individually for the collective good of the community as a whole?

While the world ponders these questions, continuously rising energy costs at least give us clear reason to seek ways of reducing our own energy bill. Reducing the company's burden for energy is part of green broadcasting. But so, politicians argue, is reducing society's energy burden. This means not just examining the equipment inside a broadcast company, it means examining the overall way we do things. For example, given that we need a screen at home, are some types greener than others? Given that society has a need to get news programmes to everyone, are some methods of delivery greener than others?

As far as broadcasters themselves are concerned, the measures they take might include using wind turbines, natural ventilation, rainwater, refurbished construction material, and choosing production equipment with the lowest carbon footprints. Of course, someone has to pay for all that. In addition, it may be that 'cloud computing' for post production helps to save energy, because servers can be located in distant cold locations where no cooling energy is needed.

For the home installation, energy use will be dominated by a small number of elements.

These are, firstly, the display itself. Today we replace our home TV set about every 7-8 years, and usually with a larger screen. Offsetting this to a degree, display makers do improve power consumption.

The second is the 'standby' power consumption of things like set-top boxes. Globally, the home display and the home standby power are the two largest numbers in the overall power consumption equation for broadcasting. Reducing these could switch off a power station or two.

A third element which consumes power can be an 'aerial amplifier', which is usually left switched on - even when no one is watching the TV.

One thing in the environment's favour is that handheld systems are more often designed today with power saving in mind. It directly affects the manufacturer's bottom line and success if battery life is longer.

Arguably, the biggest and most controversial challenge will come with the discussion on the 'environmental load' of systems 'end to end'. If we take a given human activity, which way of achieving the objectives has the lightest environmental load? For example, and to exaggerate to make a point, if we need to hold an international meeting, is it better environmentally to use cheap air flights for delegates, or an expensive sophisticated enhanced reality video system?

For broadcasters there will be a '64 thousand dollar question' – is it environmentally better to use broadcasting or broadband to deliver our content? This will have a bearing on the use of the 'digital dividend', and the future use of today's broadcast bands.

An important study by the BBC casts some light on this[1]. The report finds that, all other things being equal, broadcasting has a lighter carbon footprint than broadband where the audience size for the same programme is large. Where only a very small number of viewers want to watch a programme, then broadband can have a smaller footprint. This might be intuitively obvious to engineers, but the scientific research will be helpful to explain this to others. It is one of the reasons why broadcasting bands must be maintained.

The most saleable argument for green measures for broadcast management today is to protect themselves from steeply rising energy costs, but if they accompany that with support for societal goals, future generations at least will thank them.

[1]http://downloads.bbc.co.uk/rd/pubs/whp/whp-pdf-files/WHP189.pdf.

Networking for the network community

This year's annual Network Technology Seminar took place on June 28 and 29 at EBU headquarters in Geneva. More than 90 people from broadcasters and the industry met to hear the latest developments in broadcast contribution. This year's seminar was also the first one organised in partnership with SMPTE.

The transition to IP has now reached a new level of maturity with real case scenarios from broadcasters in Europe using IP/MPLS for the converged transport of media and IT traffic. However, at the same time, it has been shown that satellite contribution or direct video transport over fibre remain efficient and safe systems for media contribution.

With the advent of high bitrate on 3G/UMTS, new video contribution techniques using mobile networks are possible. This provides an opportunity to cover breaking news very quickly using equipment that fits in a backpack while on the move. Presently, the lack of a guaranteed quality of service and long transmission latency however, limits the field of application for this new technique.

3D contribution is now a reality as the first sporting events are being shot and retransmitted in 3D. Contribution is critical to preserve the 3D effect and quality in the transmission chain.

Storage and file transfer covered a good part of the seminar, as nowadays almost all organisations use file formats for production and exchange. Challenges remain regarding high capacity storage, delivery and interoperability on file formats and metadata.

On the standard front, audio over IP on WAN has reached maturity but work is in progress for intercom interoperability over IP and video contribution over IP. There is still a standardisation gap for studio and local audio over Ethernet/IP, as no common format exists among the proprietary formats.

The seminar concluded with a reminder on IPv4 address space depletion, which will force the adoption of IPv6 in the coming years.

It must also be noted that the day before the seminar started, the expert community on networks met to discuss the progress of EBU groups on networks. New project groups addressing storage, Service Level Agreement (SLA) management with operators and green broadcasting may be started in the coming months. Please join in if you are interested, as your active contribution is needed.

All presentations and a recording of the seminar can be found on EBU website for participants or EBU members: http://tech.ebu.ch/events/networks11.

Félix Poulin, Mathias Coinchon

In the Spotlight

Yves LeBras
France Télévisions

Yves Le Bras graduated as an electronics engineer and went on to do his post graduate degree with a thesis in biomedical engineering. After teaching computer sciences and image processing at the Compiègne University of Technology he has held positions at Thomson Broadcast's, Agence France Presse, as well as France 2 and France 3. Since 2010, he has been head of Innovations and Development at France Télévisions.

Can you tell us something of your current responsibilities at France Télévisions?
Here at France Télévisions we have a culture of innovation. As the head of the Innovations and Development team, I am responsible for keeping an eye on emerging technologies and implementing them. I am also in charge of an innovative project for the merging of France Télévisions master control rooms and VOD facilities.

It's always interesting to hear about 'outside interests' – what are yours?
I love playing the guitar, walking, reading and travelling with my family.

What do you consider as your finest achievement so far in your career?
I love technology and its relevance to humans. I derive pleasure in the success of managing projects that involve technological and social challenges with large multidisciplinary teams. My career has given me many of these opportunities, not all of which involved broadcast technologies. One such project was the development of software for image correction in a satellite image receiving station.
In the broadcast field, I was pleased to manage the move of France 2 to the new France Télévisions building, in 1998, with the introduction of new technologies (e.g., networked nonlinear editing for news) without a strike! More recently, in 2007, the move of the France 3 exchange network from dedicated lines to standard IP was a great challenge, as was the switch to 16/9 (France 3 has more than 100 technical establishments in France).

Why did you step forward as a candidate for the EBU Technical Committee?
The Committee offers the means to share experiences between members.

What are for you the most important challenges facing EBU Members, particularly those with circumstances similar to France Télévisions, today?
It is obvious that linear broadcasting will be complemented by video on demand consumption. This will change not only our master control rooms but also our news processes. News bulletins will still exist but continuous news production is mandatory for the on demand customers. This is a great challenge and an essential evolution, not only for France Télévisions but for the majority of EBU Members.

UHDTV standards move closer

ITU-R Working Party 6C has been working for about five years on the next generation(s) of television. The systems with a quality 'beyond HDTV' are called Ultra High Definition Television (UHDTV). Two 'levels' of UHDTV are foreseen. UHDTV1 (or the 4K system) which is constructed to have four times the potential definition of today's 1080p systems, and UHDTV2 (or the 8K system) which has sixteen times the resolution. The current plan is to agree a draft new Recommendation for the main elements of these systems at the forthcoming meeting of ITU-R WP6C, at the beginning of October 2011.

The basic principle of these systems is to use the 1080p format from ITU-R Rec. 709 as a building block. Thus the format itself is not subject to controversy. The main discussions and debates have concerned the colour primaries, colour equations (the way luminance and chrominance components are derived), and picture rates needed for our next generation television.

One measure which will remove a long standing 'fault' of current television systems is to use what is termed 'constant luminance coding'. This will prevent errors in the luminance signal when sub-sampling of the colour difference signals is used (to 4:2:2 or 4:2:0).

A thorny question has been the options for picture rates for these future systems. At the last meeting of WP6C a proposal was made to add 120Hz to the currently used picture rates. At the time of writing this has had no opposition. But at the time of writing this note, there were still some open questions about the optimum colour equations for UHDTV, though agreement is close.

It is currently planned to provide demonstrations of the UHDTV2 system (also called 'Super High Vision' during the meeting of WP6C. The UHDTV systems will be a 'game changer' for television, and may also find use in the digital cinema environment.

For more details of the ITU-R work, visit www.itu.int.

David Wood

EBU Loudness work peaks

R 128 is becoming the norm

A small army of audio engineers is travelling around the world to spread the loudness gospel. "Make LUFS not war" is their key message and the magic number is -23 LUFS. The resonance is enormous. Broadcasters and legislators in many countries are looking how to implement EBU R 128. The date that appears most frequently is January 1st, 2012. By that date TV commercials in the Netherlands and France must be EBU R 128 normalised, or they will be refused. Other examples include broadcasters in Germany, Austria and Switzerland, which are expected to implement EBU R 128 in 2012, as well.

On the equipment side, virtually all professional audio equipment vendors are supporting the EBU specifications. The uptake of the EBU work in standardisation is strong too. The EBU "foreground loudness" gating technique is now part of the ITU-R BS.1770-2 international measurement algorithm, which ensures the same gating principle is applied throughout the world, regardless of the local loudness spec used. The only price to pay for this success was a small change in the gating level (from -8 LU to -10 LU). EBU PLOUD chairman Florian Camerer is happy with this result saying,

01. Askan Siegfried (NDR) mixed the ESC 2011 multichannel audio.
02. The ESC 2011 audio team.

"The small change in gating level will hardly be noticeable in practice and typically is invisible to the mixing engineer. With a relative gate of -10 LU, dynamic material will get a slightly lower measurement value and thus appear slightly louder than with the gate at -8 LU. The main thing that counts is that we now have a harmonized base spec, using a very elegant algorithm and opening the door to improved audio quality around the globe".

The use of EBU R 128 has not gone unnoticed with large events too. Behind the scenes of the Eurovision Song Contest for example, Tonmeister Askan Siegfried monitored his surround mix with EBU R 128 compliant meters. He commented, "We did not change our mixing style for the event, but instead tried the inverse: to see if we were mixing consistently. The EBU Mode loudness meters confirmed this was the case".

An event that was already explicitly mixed to EBU R 128 was the Wiener Philharmoniker concert in Madrid, in June. The audio engineer responsible, Gabriel Solsona (RTVE), proudly inserted the EBU R 128 logo in the credits to emphasise this fact. EBU R 128 is clearly becoming the norm.

More loudness at IBC.

Frans de Jong

EBU at IBC '11

You have a problem, we have a solution – or at least we're working on it!

IBC is EBU's main shop window for the broadcast technology industry. EBU's opinions and recommendations remain among the most highly respected. So when EBU prepares its IBC presence, it must carefully decide which topics to showcase.

Divided into production and delivery domain topics, EBU will showcase areas where it is currently working and where the EBU believes the industry needs broadcasters' advice. Work on 1080p/50 production and delivery, codec evaluations and loudness are covered elsewhere in this issue. The three major topics affecting the distribution and consumer platforms domain are hybrid radio, hybrid TV and second screen devices. All three will be showcased in this year's EBU Village (10.F20).

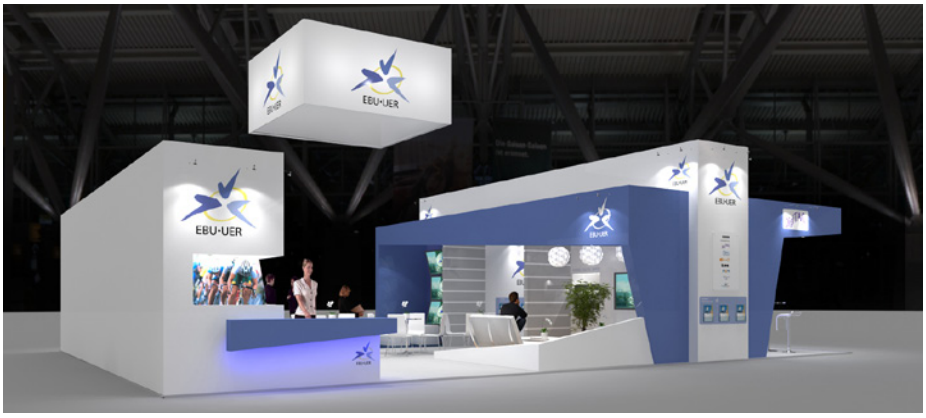
EBU's Technical Department has been very active in developing and promoting hybrid radio. Indeed, the EBU has developed an open-source implementation of a hybrid radio production platform, in order to showcase this technique. EBU Members are launching services that aim to provide a bridge between an analogue/digital distribution environment and online services available on radio.

HbbTV, MHP, YouView, MHEG-5 are the subject of many conferences around Europe. Who's doing what? What are the functionalities of each? How will these important technologies live alongside IPTV services, manufacturers' portals and other internet bluechip driven initiatives? EBU's stand at IBC will demonstrate EBU Member initiatives in this area to show what's happening and what's possible.

Finally, there's the prospect of second screen or companion screen devices and applications. Promising to be an integral part of a broadcaster's offering, it's important to understand what are the opportunities and challenges. With some targeted demonstrations, the EBU will aim to examine these.

Our aim is to highlight issues of importance to broadcasters and their viewers. Many IBC visitors consider the EBU as a reference point for the problems facing the industry and recommendations on how to address them.

Peter MacAvock



Workflow interoperability, immersive laying-back to interactive laying forward

The EBU Technology and Development Department is also focusing on four major technology demonstrations that take into account the progress in tools for interoperability in digital workflows with Service Oriented Architecture (SOA), the demand for more immersive next generation HDTV, the maturity of 3DTV, and the transmission of content via IP to connected devices and its adaptation to the quality demands of the consumer.

For many years, the EBU predicted that future HDTV production would move to a 'full' HDTV progressive format, and as a result has been in the crossfire of industry voices many times. But in time, products have been developed and 1080p/50, as the next generation master HDTV format, has reached a status where a full chain, from cameras, via production and contribution and finally distribution up to the set-top box and consumer displays can be realised with "off the shelf" equipment. The results will be shown in the IBC 2011 demonstration. The 1080p/50 full real-time production chain (see also page 9) may allow consumers to reach the next quality level of HDTV, and content producers to add more value to their assets.

At the same time 3DTV has reached, from the hype of the past years, a maturity and reality level that attracts the attention of all broadcasters, either for production for the international market, or in some cases for distribution to the home. The EBU will show some of the innovative production highlights of EBU Members in 3DTV.

2011 has been a milestone year for the Framework for Interoperable Media Services (FIMS) Task Force setup by the Advanced Media Workflow Association (AMWA) and the EBU, which will greatly facilitate the transition to IT and file based programme production. It will provide a universal interface language for broadcasters and equipment makers to interconnect IT production elements. The EBU Village will show a further demonstration of the system specification.

Lastly, broadcasters are also distributing via the internet to the home. Here again, decisions are required about the image format and last but not least which internet suitable video codec to use. Naturally, broadcasters want to limit the need for cross-conversions. Using the same image format like in production or linear distribution could be an advantage. EBU Technical will demonstrate how progressive image formats are used with two prominent internet-compression codecs at different typical internet bitrates. IBC participants will be able to suggest the resulting image quality for viewers in the home - on their second screen.

Dr Hans Hoffmann

Time to weigh anchor

At the end of May 2011, Ed Wilson formally retired from the EBU, after 43 years in digital TV, just over half of which was spent with the EBU Technical Department.

Although taking early retirement from the EBU, Ed Wilson will remain Executive Director of DigiTAG, the organisation established to help the successful launch of digital terrestrial television internationally. DigiTAG has its offices at the EBU headquarters in Geneva. Ed will also continue to work within the DVB Commercial Module.

Readers may wonder – is it really possible to have worked in digital TV for 43 years – after all the DVB project has been going 'only' 18 years?

Ed responds, "My first work experience was with the BBC Electronic Designs Department in the centre of London in 1968. I worked there for a 'Pre-University Training' year as a laboratory technician and constructed the first prototype ANCHOR (Alpha-Numeric CHaracter GeneratOR).

Ed continues, "At that time, the BBC broadcast the football results by pointing a black and white camera at a 'teletypewriter'. For the horse race results, an artist/signwriter painted the horse names and the betting odds in white on a blackboard. ANCHOR, in contrast, created words and numbers entirely electronically by cutting pieces of horizontal, vertical and diagonal white bars and circles on the TV picture and 'gluing' the appropriate pieces together to spell useful phrases, sentences and ultimately paragraphs. The digital technology used was DTL (diode-transistor logic), and ANCHOR was first used live on air for the UK General Election results in 1970. After my ANCHOR baptism in digital TV, I continued to work on broadcasting technology, and I've been lucky enough to be involved in a whole string of cutting edge, exciting and sometimes even prizewinning projects".

Ed Wilson was also involved with the computer adaptive antenna system SABRE, the development of the 4:2:2 digital studio TV standard, Teletext, Ambisonic surround sound, the MAC system and PDC among other achievements. His main interest outside broadcasting has always been sailing which gave rise to the nautical title.

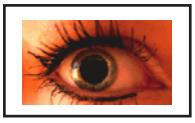
diary **2011**

Beyond HD
6 Sep / 14:00 (CEST) - Online / Open to all. EBU Programme Manager Dr Hans Hoffmann will provide an update on the 'Beyond HD' technology relevant for broadcasters.

IBC Conference & Exhibition
8 - 13 Sep / RAI, Amsterdam (NL). Hybrid TV and radio, 1080p/50 technology, comparative codec evaluations, loudness meters, and much more will be on show at the EBU Village (10.F20). 3DTV Broadcast Standards: a 'don't miss' conference session will take place on Sunday, 11 September, at 14:00, in Room E102.

MXF Masterclass
22 - 23 Sep / Geneva (CH) / Fee. Acquire expert knowledge in MXF technology to better understand how to migrate to a file-based workflow system.

Guidelines for Digital Media Asset Management
29 - 30 Sep / Geneva (CH) / Fee. A Master Class with guidelines for successful Digital Media Asset Management.
Hosts: Brendan Mallon (BBC Scotland) and Jean-Noël Gouyot (Ina SUP & EBU Training).



S3D Technology & Human Factors Workshop
6 - 7 Oct / Geneva (CH) / No fee & open to all. This 3D workshop invites the showing of human reactions to S3D. S3D will be considered from a medical aspect and will draw attention to the human factors in 3DTV, and live production.

F.R.A.M.E Master Course
17 - 21 Oct / Bry-sur-Marne (14 km East of Paris) (FR) / Fee. The Second Session of Future for Restoration of Audiovisual Memory in Europe (F.R.A.M.E) to be held at l'Institut national de l'audiovisuel (INA) headquarters.

Forecast 2011
9 - 10 Nov 2011 / Geneva (CH) / Fee. The premier event addressing the challenges and opportunities of media delivery.

AIEMPro 2011 in Arizona
28 Nov - 1 Dec / Scottsdale, Arizona (USA) / Fee. This ECM-SCAIE AIEMPro workshop explores the application and evaluation of automated information extraction techniques and audiovisual content analysis tools to support future media production for novel TV services.

Further details and up to date information can be found at http://tech.ebu.ch/events

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