

tech-i

INSIGHT FROM EBU TECHNICAL

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Issue 03 March 2010



SOLVING THE LOUDNESS PUZZLE

JUNE 2010

ARE YOU READY?



This year's World Cup will be kicking off on June 11th and with a global audience predicted to exceed 400 million viewers, it will be even more important than ever to have reliable systems that distribute high quality video material in standard or high definition video format.

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ERICSSON

We discuss hybrid, but we need fusion ...

Hybrid radio, hybrid TV sets, hybrid services ...the new buzzword is hybrid. Hybrid autos, for example, use two types of resources to power the car. This means that the user's experience is maintained and extended, and the cost of energy is minimised. Not every (intermediate) player in the ecosystem gains from the hybrid auto scenario, but the end user wins, and of course, they get something with added value from the carmaker.

So, what is the added value of 'hybrid' scenarios in the media? How does or could the world of internet/broadband connect with the world of radio and TV broadcasting?

There are in fact plenty of good reasons for success here, and many new opportunities. One thing we do not know is whether everybody in the value chain will gain from the scenario. And this makes the discussion so critical today – and quite difficult.

The broadcast media world is a well-understood and predictable environment. The demand for media channels is, however, continually rising, and this is a finite resource. Broadband provides the opportunity for many more channels and brands (especially nontraditional audiovisual media organizations) to reach the viewer. The broadband offer can be linear TV, on-demand video, multimedia information and applications, or combinations of all of them. By combining, the two worlds there will be an increase in content for the user. The service offer will be extended dramatically. The competition between media organisations will increase, and the way people actually source their media will become more important. Are all media organisations ready for such an evolution in the competition for the audiences, even if the current economic models can survive in a more fragmented world? The answer is probably not yet – but they will need to be. Some things are certain. On the one hand, broadcast is, and will be, the most efficient way to deliver a wide package of high quality linear (and even partially on-demand) content to an unlimited number of users, all living in a wide area, indoor or outdoor, mobile or fixed. On the other

hand, broadband is the most flexible way to deliver very different services in a time independent way to a wide group of separate users. Broadband can deliver many channels, specific on-demand items, plus more personal and other applications. It can merge and port internet applications to the TV set.

By the combined usage of the broadcast and broadband signal, we can deliver a more efficient and better end user experience. However, there is certainly those who do not recognise or understand the quality and efficiency arguments for broadcasting, and who would be reluctant to cooperate to deliver services, and we should not underestimate this element. On-demand services for programmes is a proven successful application. In fact, catch-up TV is more successful on 'real' TV than on the 'PC', in terms of time spent per user. In today's world, closed network operators demand sizeable fees to run this type of on-demand service. In a hybrid world using Open Internet, on-demand items can be provided either free or for a price, but now these applications can be offered without the gateway role of the network operator. Network operators would become only data transport service providers. This is a significant change.

Hybrid is not only a network issue; importantly it is also a platform issue. Many consumer devices are defining their own future application platforms. They have been triggered by the successful APPLE model. Their hope is to differentiate their service on the basis of providing the most attractive and distinctive applications. There may even be a need for media



organisations to use the proprietary applications and service environments developed by consumer manufacturers. If they don't, they may have to undertake a long development, testing, and approval process, themselves before they can provide applications. There is also no guarantee, even if they do so, that their applications will run on all devices in the market.

Finally, the issue is not only about content and applications displayed on a screen. Media organisations have to be aware that all of these applications on TV sets can run superimposed over their existing TV programmes. Some media organisations would prefer that 'unwanted' applications are blocked from overlay by the device manufacturer when the viewer is tuned to a specific broadcast channel.

In the end, the question will be 'who owns the screen' or in other words, who controls what the viewer sees when he tunes into a channel? Should it be the media provider, the service and/or network provider, the device manufacturer, or the viewers themselves? Of course, ultimately, the consumer is in control, but only in the framework that is delivered to them. We are facing crucial times. Media organisations have to define the framework in which they would like to work. This will not be done by technology and standardisation alone. The development and provision of HBB services by broadcasters at an early stage will be crucial. A content push can set the framework of the future.

The EBU is endeavouring to bring the parties together to build our future.

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Cover: Loudness Meter courtesy BBC R&D

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Published by EBU Technical
European Broadcasting Union
17a Ancienne Route,
CH-1218 Grand Saconnex, Switzerland.
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Production: WHD PR
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WHD PR
E-Mail: news@whdpr.com
Tel: +44 20 7799 3100
Printing: Lithmark Limited

A new chapter opens for EBU technical activities

In planning for over a year, the EBU's Technical Committee and Technical Department unveils the new structure that came into operation in March opening a new chapter in its history.

We have a proud heritage. The EBU was formed in 1950, though its predecessor the OIR began earlier in the 1930s, when broadcasting was young. Technology has been, and is, a major reason for the EBU's existence. For 80 years, engineers from Members have been sharing experiences, gathering information, carrying out collaborative programmes of work, and making recommendations for systems and policies. Much of the history of media technology was written by them. The structure of our activities has evolved over the years to respond to the times, and to Members' needs. Conscious of this, the Technical Committee and Technical Department are convinced that now is the right time for another major change. This has been in planning for over a year. The general principles were discussed by the EBU Technical Assembly in June 2009. We invited the comments of all EBU Members and Associate Members at each stage of the process. From 1 March 2010, the new structure will apply. The tools, and opportunities that they give the EBU, will allow us to act rapidly and effectively, and to better influence our future.

Why was change needed? What are the most important differences between our world today, and that of the early 1990s, when the current structure was established?

- The resources available to Members have changed. There are fewer research centres, though many Members do have technical advisors.
- Production equipment needs less 'hands-on' help from operational and maintenance engineers. The engineer has a more 'back office' role.
- Technology has changed too. Everything has passed to, or is passing to, digital. There are many more platforms available for media delivery. Internet is gaining a strategic importance. We must understand all the significant media platforms - and much more besides.
- The choices available today are more complex, and a technology analysis alone is no longer enough to make them. Decision-making and policy need an 'interdisciplinary' approach.

- There are very effective new tools for working and communicating using the web.
- Budgets (and time to travel) are scarce.

The EBU needs a structure today that combines:

- i) mechanisms for working together, in the new and 'old' new technologies, using the best available communications tools, with
- ii) mechanisms for creating policies and strategies that are interdisciplinary, flexible, and rapid.

All of this needs to be achieved on tight budgets. We believe we have a structure which matches these needs.

EBU technical activities rest on three



pillars. These are the EBU Technical Assembly, which is the ultimate governing body, and includes all EBU Members' senior technical staff. Second, there are their elected representatives who are empowered to take decisions on behalf of the Assembly - the Technical Committee. The Technical Committee decides structure and management, approves work programmes and deliverables. Thirdly, there is the permanent staff of EBU Technical. They have a fundamental role to support the Technical Committee's work and make decisions happen. These three are the guardians and motors of our technical activities. This will not change. But there will be a new house built on these foundations, with new and different rooms. Firstly, there are 'Expert Communities' (or ECs). They provide the virtual and physical 'meetings places' for specialists from Members who share a common knowledge base. Not every engineer knows

about every area of the media world, and 'specialists' often do specialise. Discussions in each Expert Community should be able to take place at a 'peer' level in a particular area.

We will begin with eight Expert Communities. They will cover eight coherent and manageable areas. The Expert Communities will need to be managed in the choice of issues they take up, but they will be 'communities' where everyone contributes. They are open to all specialists from EBU Members. Full details of membership conditions will be given on the website.

Their basic working tool will be working in a family of websites. They may decide to meet sometimes, if this is valuable. The Expert Communities will be the eyes and ears of the EBU in their given areas. They should signal when important developments are happening. They should assemble the evidence. They should share opinions, and develop operational guidelines where useful. They should also organise workshops and conferences for the membership at large.

The Experts Community can establish sub activities - these are 'Study Groups' (or SGs). These are groups, for example, for fact finding, developing, measuring, or testing. These SGs may need to meet physically. They have a Chair and members from within the Expert Community. The Technical Committee decided in February 2010 that the first two Study Groups would concern 3D TV and Cognitive Radio systems - but there will be more in time, based on the discussions in the ECs. Deciding what should be the initial areas for Expert Communities was not easy, but finally the Technical Committee agreed the following list.

There are three Communities on baseband systems, or 'media fundamentals', which form a cluster of ECs:

- Video
- Audio
- Metadata

There are two Communities on content production systems, which form a cluster:

- Integration and Media Management
- Networks and Infrastructures

There are two Communities on delivery systems, in a cluster:

- Broadcast and Broadband systems
- Spectrum Management

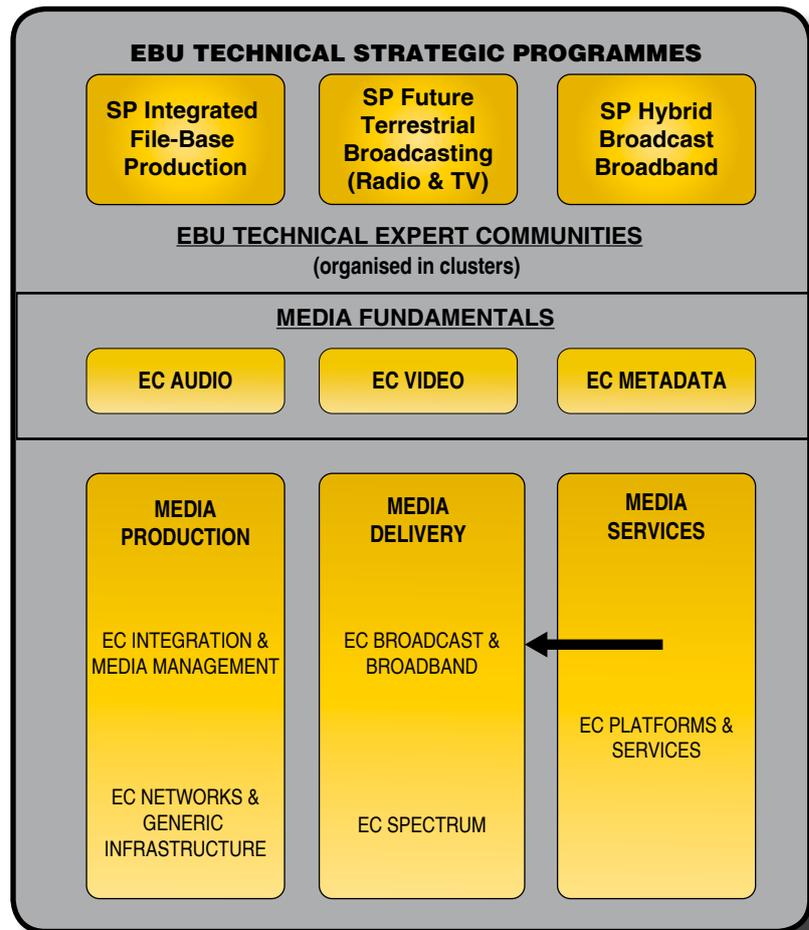
And a Community on:

- Platforms and Service - this Community will cover such areas as software applications for 'catch up' TV, smart phones, etc.

There will be available web areas for each of these ECs, where the details of the objectives and plans of the Community will be found, and information on correspondence threads and other tools will be given.

These Expert Communities will form the 'knowledge base' of the EBU for technology. They will be 'standing' structures that will continue as long as Members need them. The Chairs and Vice Chairs will be nominated by the Technical Committee. The second new room in the house is a new kind of activity. We have called these 'Strategic Programme Groups' or SPGs. They will be set up where it is clear to the Technical Committee that focussed and interdisciplinary action is needed in a given area. In summary, these groups will be there to propose what actions need to be done to make a given area succeed. The SPGs agree the requirements, policies, and standards needed to achieve given objectives, taking into account technical, economic, and content dimensions. The members will be those whose vision extends across these areas.

Their task will be to identify requirements and a programme of work needed for success, to set it in motion, and to ensure that it happens. Strategic Programme Groups can call upon the Expert Communities to establish sub-activities ('Project Groups' or PGs) for specific parts of their programme of work, such as preparing specifications. The Chair and members of the Project Groups will be drawn from the Expert Communities. SPGs will be given a specific timetable to do their work. The initial Strategic Programme



Groups will be as follows:

- Integrated File Based Content Production
- The Future of Terrestrial Radio and Television Broadcasting
- Hybrid Broadcast Broadband

These will also have specific working areas of a website, which will give their objectives, deliverables, timescale and participants. The Technical Committee will nominate the members of the SPGs.

It is planned that all currently active Project Groups in the 'old' structure will continue working with the same subject areas under the new structure. They will be associated with respective ECs and SPGs. Nothing will be lost with the change – neither the knowledge nor the enthusiasm of those who have worked so well and hard.

The staff of EBU Technical have of course, a critical role to play. They have to 'make it happen'.

Each Community will have a 'Coordinator', drawn from the engineers of EBU Technical, who understands the area well, and can contribute in an administrative and technical sense. Her or his job will be to work with the Chairs and Vice Chairs to manage the Community. Study Groups and Project Groups will also have a 'Coordinator' drawn from EBU Technical. Each group will be associated with an administrator, drawn

from the staff of EBU Technical.

The two 'Programme Managers' in EBU Technical will be the 'Coordinators' of the Strategic Programme Groups. They will also have overall coordination responsibilities for the clusters of Communities.

So, from 1 March 2010 we have set out on a new journey. An extensive migration programme is planned including webinars and a joint transition meeting with the 'old' structures. We will be learning about how to operate such a structure. A full report will be made to the Technical Assembly, which may lead to suggestions for fine-tuning. The Technical Committee recognises the achievements of those who have worked so diligently with the previous structure. They have the gratitude of the EBU, and we rely on them to help us make the new structure work well. In adapting the structure to these different times, we are doing justice to the work they did.

The Technical Committee is grateful to EBU Technical, which has actively driven the complex process towards the new structure.

Alberto Morello, Head of the RAI Research Centre, Chair of the EBU Technical Committee
Lieven Vermaele, Director, EBU Technical
David Wood, Deputy Director, EBU Technical.



Nothing will be lost with the change – neither the knowledge nor the enthusiasm of those who have worked so well and hard.



Loudness

Meters get 'EBU Mode'

The EBU Loudness Group P/LOUD has taken yet another step towards solving the Loudness puzzle. Besides the main task to fix the Loudness Target Level and the respective recommendation, the meter manufacturers in the group have nearly finished a detailed specification to align their equipment. The shift from PPM to Loudness metering is near. Florian Camerer (ORF), chairman EBU P/LOUD and Frans de Jong (EBU), coordinator EBU P/LOUD report on the work to date.

It is probably the largest and most active EBU Group ever. More than 150 participants and followers are working to address those annoying loudness differences within and between broadcast channels. After only six meetings and just over a year's duration, the P/LOUD Group is close to finishing its specs. And speed is needed, as the pressure is mounting across the globe to better align television programme sound. Consumers and regulators are pushing for a more sophisticated measurement of audio levels, to minimise the annoyance for the viewer/listener.

So what's the problem?

For many years audio metering and alignment has relied on so-called Peak

Programme Meters (PPM). These were basically meant to prevent the audio levels going up too high, otherwise transmitters or recording devices would distort the signal. It was seen as a safeguard. At the same time the audio engineer would use his ears to judge how to 'ride the fader' to perceptually align the level between different programme elements. However, with the automation of broadcast processes (often replacing the audio engineer), the growing use of commercials and the availability of aggressive audio processing equipment, the trend has become to try to sound the loudest. Simply put, trying to hit the maximum allowed peak level as often as possible. This is a trend across the audio industry: in television broadcasting, radio and especially pop music production. The poor old PPM meter still does its job, but is unable to show the engineer what is actually going on regarding loudness. It was simply not designed to.

The Loudness Meter

The solution sounds simple: create a better meter - one that 'listens' like our ears. The problem is that our ears are complex, and connected to our brains, which means perception of loudness is dependent on many factors, including one's taste and mood. However, it is possible to build a meter that approximates our perceptions much better than a PPM does. Thanks to work in the ITU, there is an accepted base specification on how to measure loudness: ITU-R BS.1770. Actually, it works a bit similar to a VU (Volume Unit) meter, that is, it is integrating the energy of the audio more than it is following the peaks, as the PPM does. However, for practical implementation, more is needed than ITU-R BS.1770 alone. For example, the spec does

not define a gating function, which means that content with a lot of low level audio will register low on a loudness reading. Meter manufacturers need to decide on many more parameters, such as what scales are used, what integration times are available, etc.

This is why the EBU P/LOUD Group asked all participating manufacturers (which includes all the well-known meter manufacturers) to agree on a specification of what their meters will adhere to. The result is the so-called 'EBU mode', which all agreed to support. When an audio engineer sets a meter to 'EBU mode', it can be assured to read the same value as a colleague's using a loudness meter from another vendor set to 'EBU mode'. Obviously, there is enough freedom in the spec to allow manufacturers to compete on other functionality, design of the user interface and meter ergonomics.

Meter needs level

There is little use for a speedometer, if you don't have a speed limit. Similarly, the main task of the EBU P/LOUD Group is to recommend the Loudness Target Level to be used by broadcasters. That the value will be around -23 LKFS (the 'unit' of loudness referenced to digital full scale) was clear from the onset, but fixing the level without knowing the gating approach is not really possible. So, last November and December, P/LOUD participants performed subjective listening tests to help decide what gating approach and level to recommend. First results analysis indicated a relative gate of around -8 to -10 dB would be a good candidate, but a firm conclusion was not yet available at the time of writing.

People need guidelines

Besides deciding on the target level and

Top 3 Promises of Loudness Normalisation

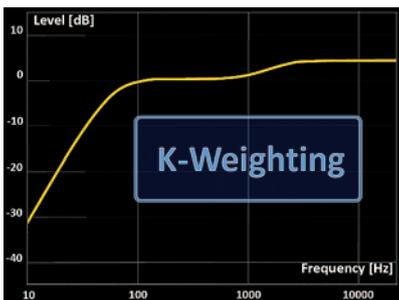
1. Better quality audio
2. Less audience annoyance
3. More dynamic range for creative use



- 01. An EBU P/LOUD Group meeting
- 02. Richard van Everdingen (Dutch Broadcast Loudness Committee) summarising the results of the Distribution Subgroup
- 03. Loudness metering is based on the so-called 'K-weighting' curve, which is roughly based on human perception of how loud various frequencies are perceived at an average listening level.



02



03

gate, the Group's other focus is now on creating Practical Guidelines to help broadcasters implement Loudness metering and normalisation in their facilities. The active participation of many hands-on audio engineers in the Group and the experience they have already gained in using the new meters and normalisation techniques provide an excellent basis to assist colleagues in other broadcast organisations.

There is another set of guidelines, which is already nearly finished. It is targeted at distribution organisations, such as cable rebroadcasters, to help make sure interchannel loudness differences can be addressed and level differences in home equipment can be minimised. Work in this area is covered by a P/LOUD subgroup on distribution. The results of this work will also be included in updates to 'EBU Tech 3333 - EBU HDTV Receiver Requirements'.

Managers need information

With the Loudness work maturing, the



01

need to keep management informed on what is happening increases as well. In several countries, meetings with broadcast executives are being organised to update them on future changes in audio level handling. Early feedback from the field shows that managers are eager to apply loudness measurement and normalisation to reduce viewer complaints. However, there also seems to be a bit of uncertainty on how commercial agencies can best be included. Within P/LOUD that is already happening anyway, as several ad agency representatives have recently joined the Group, and more are expected to follow. Loudness awareness is becoming more and more mainstream – hopefully to the benefit of audiences.

In summary, the EBU P/LOUD Group is well on track to finish its work. It is thanks to the combined participation of all key players, such as equipment manufacturers and broadcasters, hands-on expertise from seasoned audio engineers, and in-depth knowledge from research institutions, that the EBU Loudness Group flourishes and Loudness Nirvana comes closer.

“there is enough freedom in the spec to allow manufacturers to compete on other functionality, design of the user interface and meter ergonomics”

Peak Meters Types



Quasi Peak Programme Meters (QPPM) are often referred to as 'PPM'. These meters are actually not measuring the real peaks, as they have a built-in reaction time, typically 10ms. The EBU QPPM is defined in EBU Tech 3205.

Sample Peak Meters identify the highest sample value in a piece of audio. These are very popular as straightforward meters in NLEs and other non-core audio (software) products. Their accuracy is deceptive because audio is typically sampled not only at its peaks.

True Peak Meters measure the real peaks of a signal, as they take into account the fact that the reconstruction filter for sampled audio typically creates higher peaks than the samples. The difference can be up to about 3 dB compared to sample peak meters.

ECO Displays



Leendert Jan de Olde & Nils de Caluwe of Philips Consumer Lifestyle at the High Tech Campus in Eindhoven examine the challenging environment for television manufacturers striving for energy efficient output.

The global trends of increasing the environmental awareness of consumers, as well as emerging legislation in all regions of the world, continuously impose new challenges on all consumer electronics companies including TV manufacturers. In the highly competitive TV market, a level playing field is of great importance. Verification by authorities is essential to ensure that the rules and regulations are respected by everyone. TV manufacturers have been able to significantly improve the energy efficiency of their televisions in the last decades. LCD technology, dominant in both TV and monitor applications, is moving towards better efficiency through the use of new materials and software. The mainstream introduction of televisions with LED backlights in 2009 also allowed the elimination of mercury which is present in the CCFL previously used in the panel backlights. The introduction of newer generations of LEDs is also expected to reduce energy consumption compared to predecessors with CCFL backlights. To illustrate, a typical 32 inch CRT television in 1999 weighed 20 kg and consumed 150 watts, whereas nowadays a 32 inch LCD television weighs 11 kg and consumes less than 60 watts.

Despite these improvements in energy efficiency, the total residential energy consumption due to the use of televisions has increased from three percent in the early 1990s to eight percent in 2008. This is mainly due to the consumer demand for larger screen sizes, the introduction of digital TV, the increase in daily television viewing hours and the total number of televisions per household. The 'business as usual' scenario estimates a further growth of total annual energy consumption related to television of 100 percent by 2020.

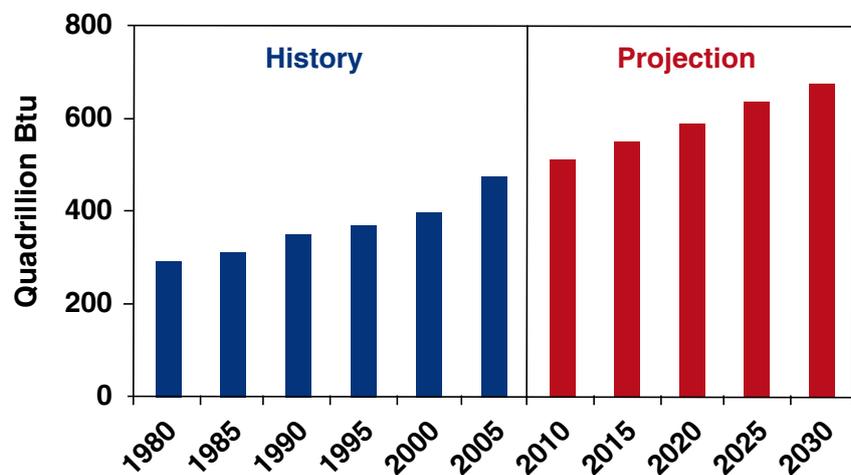
This increase in total energy consumption is the major reason why televisions are one of the first product groups to be addressed by environmental legislation. In July 2009 the European Commission published regulation (EC) No 642/2009 for televisions. Amongst other things, it sets minimum requirements for the standby and on-mode power consumption of televisions starting August 2010 and more stringent requirements entering into force in April 2012. In parallel the EU worked on an energy label for televisions that is expected to be published by summer 2010 and will establish a mandatory A-G label with three additional rankings (A+, A++ and A+++)

allowing for rapid innovations to be recognised. TV producers are accustomed to operating in a highly competitive market with low margins. It is, therefore, of great importance that legal requirements do not lead to a disturbance of the level playing field. Fundamental aspects supporting a level playing field are, for example, the application of energy requirements across the board in terms of technology. TV products that target the same consumers should meet the same energy efficiency requirements regardless of the technology (CRT, Plasma, CCFL LCD or LED LCD) that is being used. Additionally governments must actively maintain the level playing field through verification.

To illustrate what happens when verification is lacking, the UK's government Department for Environment, Food and Rural Affairs published a study in November 2009 that showed 16 out of 24 washer driers tested did not perform in accordance with all the declarations on their labels. According to the study, the products were in fact less efficient than what the producers had claimed. Verification by authorities contributes to the credibility of the energy label, and also assures that brands, willing to invest in sustainability, are rewarded for their energy efficiency related innovations and investments.

The TV market is a hostile environment, one where most established brands rarely manage to make a sustainable profit. The visibility that TVs have, due to their prominent position in most households, has also made them one

of the key focus points for any new regulation or campaign from NGOs. Despite this, many parties still attempt to break into the TV market, resulting in many non-branded products of which the level of compliance should be guaranteed. From the outset, during the legislative development process, governments should consider how to enforce verification by market surveillance authorities in a pragmatic way. Established manufacturers of TVs have proactively contributed to establishing legislation as well as in making investments to go beyond these legal requirements. However, proper enforcement and verification by market surveillance authorities is essential to maintain the level playing field that supports proactive and responsible TV manufacturers in their energy efficiency ambition and societal responsibility.



World Marketed Energy Consumption 1980-2030

Tapeless Environments

VRT Media Lab's top expert, Luc Andries tells tech-i how the broadcaster is overcoming the obstacles of working in a file-based production environment.

VRT in Belgium installed a file-based news production system, named the Digital Media Factory, at its headquarters in Brussels two and a half years ago. However, since the collaborative tapeless approach has replaced the former, largely sequential tape-based system, the company has suffered lost and dropped media file transfers, a problem it is still striving to overcome.

Five years ago, VRT Media Lab, the research and development arm of VRT Belgium, received a request from VRT management asking if it would be possible to build a file-based news production system environment, replacing its tape-based system, as used by most broadcast companies at that time. VRT was then using around 30,000 high cost video tapes per year.

Luc Andries, a top expert at VRT Media Lab, comments: "The name of the game was then and is now to ingest a file over an IP file-based network to a central storage system, where the file can be worked on by different people, simultaneously."

VRT went to a file-based system in one leap, an unusual move using cutting edge technology for the time. However, when the system, that on paper looked fine, was brought to life, some problems appeared. Andries explains that the central problem was the unforeseen different behaviour of an IP network when handling large video files instead of classical IT data: "The main problem was the switches weren't handling the transfer of video data very well. IT traffic can be compared to car traffic on a road; when there is a bottleneck the traffic merges from two lanes into one, but there are no crashes."

"However, media video files are different as they can be 20 to 50 GB long for just one hour of video. The problem is these are not single packets or short bursts of packets, like in IT data. They are streams of hundreds of packets sent back to back. Hence, they behave more like trains: if there are two trains on the tracks that need to combine into one track, without stop signs the trains will crash. Translated back to the world of video files, transfers are getting lost in the network or heavily delayed. This creates the problem for the journalists that sometimes their item is missing the deadline for going on air. "This problem is still not completely solved today," comments Andries. VRT transfers around 10,000 to 20,000 video files per day with some 1,300 users active on the system. When the system went live, about two percent of those transfers were being lost

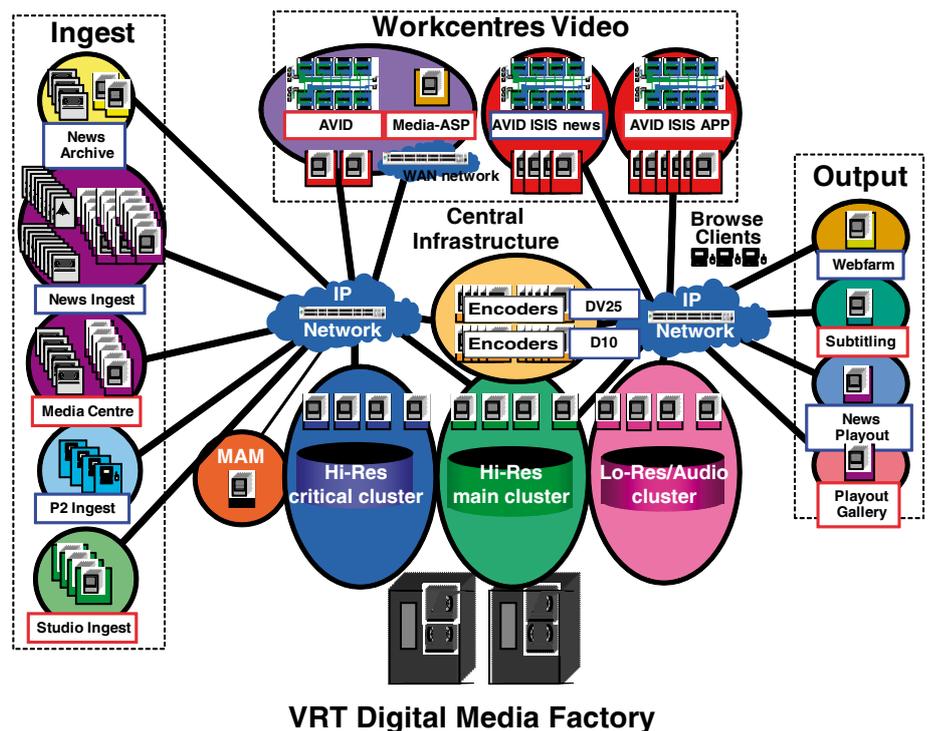
Andries says: "Our original design was fine, but the new file-based workflows imitated too closely the old tape-based workflows; there wasn't enough focus on what media traffic really is and how that should be taken into account. At the time we built the network, and even today more than two years later, this was and still is, an entirely new way of thinking. "Most other broadcasters are having the same problems as VRT, but none could explain what the problem was, except that IP is not plug and play for media, until I articulated the cause behind it recently," he notes.

The solution, says Andries, is to look at media traffic on a much smaller timescale, a 'quantum time-scale' down to the packet level using completely different parameters to characterise it, compared to the usual way IT traffic is described. Burstiness and instantaneous throughput at that 'quantum time-scale' have to replace or complement traditional average bandwidth specifications. "You need to look at the individual transfers, viewing them on the quantum timescale," he states.

"IP is not a commodity in media yet. Everybody thinks IP is plug and play, but it isn't in media.

Commodity IT switches are not up to the task of handling large media transfers. However, file transfer is the way to go," notes Andries. The market players that will be able to win this marketplace and solve the network issues are those with a network-centric view, he states. He claims the big IT companies traditionally tied to the IP networking space do not understand media, while the broadcast technology providers understand media, but not the IT, as they try to approach it from the application layer instead of going deeper into the platform. "What we need to see are the IT companies that start from the network. They will find it easier to work this problem out," Andries says.

"Understanding the physical data flows is key," claims Andries. "For broadcast companies, the first step is to look at the characteristics of your media flows; what the network needs to handle. Then you must build that into the design of the network. In storage, we have solved the problem, have it working in R&D and are ready to build products from it now. But in the 'client-networks', it will still take some time to get this problem completely solved," Andries sums up thoughtfully.



CES

Report



Myra Moore of Digital Tech Consulting (DTC) visits the 2010 International Consumer Electronics Show (CES) to see that evolutionary changes in television technology were the primary 'attention getters' at the event with 3D TV taking the top 'attention-getting' prize.

With most major television suppliers demonstrating 3D products (TVs and Blu-ray disc players) and a couple of high-profile broadcast announcements, attendees and the public at large – through copious media coverage – got a large dose of a home entertainment world seen through special 3D glasses.

Although it was difficult for them to shine through the spotlight glare of 3D TV, there were other evolutionary technological advances worthy of some note. These included more applications for connected TVs, new products for the US standard for broadcast mobile TV delivery, and a small army of e-book readers.

3D TV

On the heels of the Blu-ray Disc Association finalising a 3D standard in December, LG, Panasonic, Samsung, Sony, Toshiba, and Vizio showcased 3D LCD and Plasma TVs and/or 3D Blu-ray disc players that will be available to consumers at variable dates throughout the 2010 calendar.

Despite some 'off the show floor' demonstrations of 3D TV that doesn't require the donning of glasses (one must find a sweet spot in which to see the images in 3D and maintain that spot to continue seeing them), 3D – for the foreseeable future – requires glasses. Whether or not the average consumer will buy into wearing special glasses while watching TV is a matter for continued debate, but regardless of the debate's outcome, there will be plenty of 3D-ready sets on the market.

DTC believes that most TV providers are employing one of two basic strategies to promote stereoscopic 3D TV – either use new, more powerful processing chips

to deliver a full HD picture for each eye, or retrofit current technology that simply divides the image (one for each eye) and satisfies the technical definition of 3D (but at a lower quality than the sets with new, powerful chips). The second approach will allow a supplier to simply checkmark the 3D ready box on the list of TV features.

The latter will allow for the purchase of a 3D-ready set without a lot of added cost to the consumer. Because of this, 3D set sales could be rather robust if an already planned purchase of a new set results in a 'check-boxed' 3D TV. Of course, content availability and consumption will be the true test of 3D TV popularity. Prior to CES, it appeared as if packaged media (prerecorded BDs) would be the primary source of content but announcements by ESPN and Discovery (as well as BSKyB's roll out of a 3D channel) suggest that the broadcast/pay TV community is gearing up for the latest innovation.

Sceptics abound when considering the need to purchase new displays and source devices, and the need for glasses (in many cases, battery powered glasses). A BD 3D standard and availability of network-delivered 3D programming (especially sports) is the potential bright spot. Stay tuned.

Applications for Connected TVs

TVs with Internet connections have already been on the market but applications and software that help make entertainment/communication better suited for the TV continue to roll out. At CES, Skype teamed up with LG and Panasonic to demonstrate video phoning through the TV, and Toshiba says it will include a web cam within its new CELL TV. Other unveilings included DivX's

DivX TV, which provides direct access to select online content through imbedded software. The demonstration was done in conjunction with LG.

Terrestrial Mobile DTV

And now that the US has shut off high-power analog transmissions, broadcasters, device makers and broadcast equipment suppliers turn their attention to creating a mobile DTV ecosystem. A small version of that ecosystem was on display at CES with a mix of prototypes and first-release receivers demonstrated from companies such as LG, Dell, Samsung and others. Local Las Vegas television stations broadcast ATSC mobile DTV signals to the devices, while encoder and chip suppliers promoted their products. Washington, D.C. is the site for the first big push to kick off the new standard as the Open Mobile Video Coalition (OMVC) coordinates a 'showcase' to measure consumer interest in over-the-air mobile TV in the first quarter of 2010. Some of the devices displayed at CES will be used to receive ATSC mobile DTV signals from eight local television stations broadcasting both free and pay content.

Digital Tech Consulting is a boutique market-research company that follows the worldwide digital television market. DTC's work in the digital TV industry has included forecasting the worldwide DTV receiver market, helping individual governments plan their DTT transitions, tracking the activity of individual terrestrial broadcasters, and providing the only digital converter-box tracking service for the world's largest analog shut-off programme. For more information on DTC, please go to <http://dtrereports.com>.

Myra Moore is DTC's president and chief analyst with more than 15 years experience as a market research director, industry analyst and business journalist.

Material eXchange Format Interoperability

Pedro Ferreira of MOG Solutions reprises his recent MXF Masterclass at the EBU.

Anyone initiated in the world of broadcasting will certainly be familiar with the Material eXchange Format. Since its ratification as a SMPTE standard in 2004, MXF quickly became pervasive taking in cameras, video servers, editors, MAMs, etc. No serious contender in the broadcasting scene lacks support for this wrapper format.

MXF was designed with a long list of requirements in mind, such as to carry an open set of different encoding formats and metadata schemes, to be streamed and archived, and to cater for simple EDLs while providing efficient random access, amongst others.

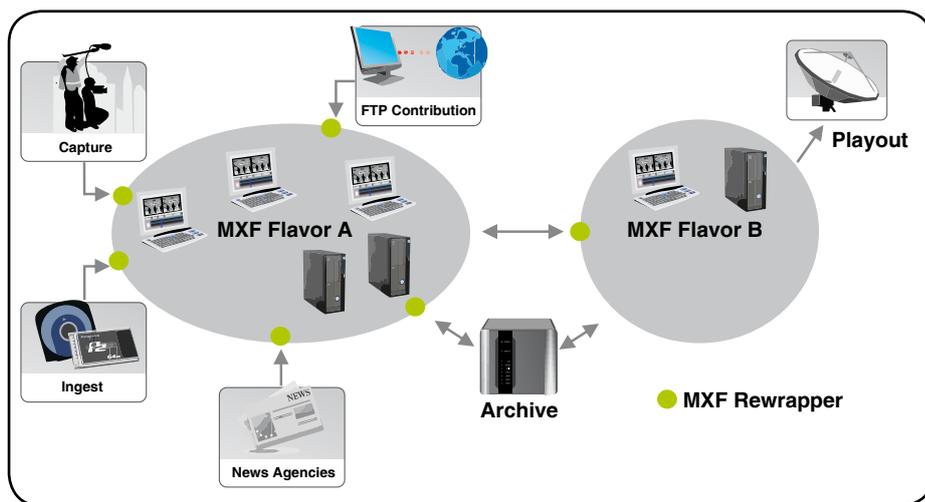
These requirements were addressed by adding flexibility to the standard, making MXF open to extension and leaving room for manufacturers to optimise files for the task at hand.

However, implementing a decoder capable of understanding all the possible variations in MXF would be extremely expensive and inefficient. This was anticipated by the designers of MXF and an elegant solution was devised: Operational Patterns (OPs) constrain the complexity of an MXF file, making it possible to devise simpler MXF decoders.

No Silver Bullet

Unfortunately, there is no silver bullet, and for a while many systems, although claiming MXF support, were unable to interoperate. The reasons for this were mainly twofold: on one hand, some details on the normative text were not clear enough, leading to different interpretations. Whilst on the other hand, there was a motive intrinsic to MXF and its sheer complexity required some time for the implementations to mature.

Today, interoperability is quite satisfactory in most applications, largely due to extensive collaboration among manufacturers. The recognition of these problems, especially the above mentioned ambiguities in the standard, is at the core of some important efforts in bringing overall MXF interoperability to another level. The most important is arguably the 2009 revision of the standard, which together with a new set of documents that are being worked on at SMPTE, strive to clarify and simplify MXF; plus, a number of efforts have been set underway, both by users and manufacturers, creating simplified OPs and best practices.



MXF Rewrapping In A Facility With Two Local MXF Flavors

Planning For Interoperability

If you are designing a file-based facility, you don't care what the root cause for less than optimal interoperability might be – you just want it to work. The fact is that there are different MXF flavors. Some manufacturers choose OP1a because of its cohesion; some choose OPAtom as it leans best to post-production; some even choose OP1b reference files for the simpler addition of audio tracks. That is not going to change.

However, there are simple steps you can take to enhance current and future interoperability.

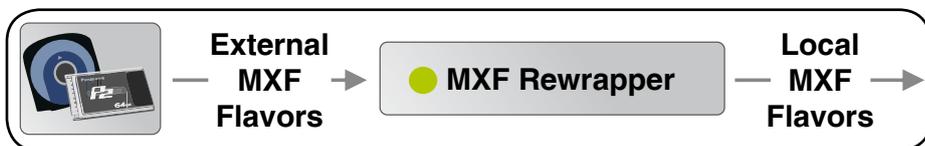
First of all, analyse your system and define a set of rules for your MXF files. Let us call it a profile. It can be the MXF flavor your editing systems work best with or the format you want to have in your archive, whatever. If clearly separate islands in the facility have disparate requirements, consider defining a couple of profiles. Then, define interface points where you convert all other flavors to the one of your choice. When you receive files from the outside, convert them to your profile. When you

need to send files to devices that don't understand them, convert them back.

A solution like this protects you from having to deal with a large number of different formats everywhere in the facility, simplifying the layout and expansion of the system. And don't think this is too inefficient: unlike transcoding, converting across different MXF flavors (known as rewrapping) is extremely fast and does not affect the picture or sound quality. Several appliances efficiently convert among several MXF flavors and can be used at the interface points. For example, when ingesting rushes, files can be automatically converted from the camera wrapper to your own MXF profile, without any noticeable loss in transfer speed.

Conclusion

MXF quickly became the wrapper format of choice in broadcast applications. Formal and ad-hoc work are mitigating some interoperability problems but it is still the system designer's responsibility to plan for interoperability. To this end, a careful choice of formats and interface points paves the way to the design of robust and expandable systems.



Rewrapping Generic MXF To Local MXF Flavors

HIPS

Christoph Nufer, IRT, Chairman of P/HIPS reports on the EBU's strategic programme working on Harmonisation and Interoperability of HDTV Production Standards (HIPS)

The EBU Strategic Programme Group is working together with manufacturers to foster interoperability amongst equipment for HDTV production, for file and 3G-SDI -based exchange of content.

EBU Members and representatives from Avid, Grass Valley, Panasonic, Snell and Sony launched the HIPS project in late December 2009. The programme is chaired by Christoph Nufer (IRT) with Dr Hans Hoffmann (EBU) as coordinator. Whilst the founding members work at a fast pace on the first deliverables, the group would welcome new active participants particularly from EBU Members, but also from industry too.

In order to provide solutions to the market in a timely manner, the programme consists of four sub-projects each addressing one particular interoperability task:

1. The MXF sub-group is identifying current interoperability issues in the MXF domain, such as carrying subtitles, handling of timecode and active format description information inside MXF. A questionnaire has been published which will give the group an overview of current practices. In addition the sub-group will investigate the option of publishing a description of an EBU MXF 'profile' which will be a constrained version of the Operational Patterns 1A and Atom.

Assisting the chair of this sub-project is Adi Kouadio (EBU) acting as project manager.

2. Emerging studio compression particularly suitable to premium productions is the focus of the codec sub-group. Attention will be paid to formats that are supporting the HDTV production format 1080p/50. The sub-group will produce new HDTV test sequences before the summer of 2010 for evaluation and comparison purposes. The sub-group is chaired by Massimo Visca (RAI) with Roger Miles, EBU, as project manager.

3. The metadata sub-project is concentrating on camera metadata which is generated in the field or studio and is ingested in the digital workflow. EBU's Jean Pierre Evain is driving the work at a high rate, and taking on board previous work of the EBU and recent activities on camera metadata in the SMPTE.

4. The aim of the 3G-SDI sub-project is twofold: first, to inform EBU Members about the options for 3G-SDI infrastructure and secondly, to identify the broadcasting organisations' requirements in order to limit the options which the 3G-SDI standards provide. The final aim of the subgroup is a recommendation for the users and the industry. A questionnaire has been published which will give the group an overview of the current use of 3G-SDI. The sub-project is

chaired by Andy Qusteded (BBC) with Marc Lambregths (EBU) as project manager. EBU Strategic Programme Groups work interdisciplinary across different technology domains, and address issues of imminent importance to EBU Members. The programme is working to a fast pace and interested EBU Members, as well as industry representatives are encouraged to drive the work by active participation. For further information contact: hoffmann@ebu.ch

EBU Strategic Programme Groups work interdisciplinary across different technology domains, and address issues of imminent importance.



01



02



03



04

01. Grass Valley K2 Summit HD Production Client
02. Avid Media Composer Nitris DX

03. Panasonic HPX2700 HD VariCam Camcorder
04. Snell Quasar Ph.C Motion Compensated HD Up Converter



DVB begins 3D TV

In 2009, the DVB Technical Module undertook a 'study mission' in 3D TV technology. The group, in which the EBU took an active part, concluded that the display technology for 3D TV was 'ready', in the sense that a number of implementations were practical, and displays looked set to be launched on the public. Coupled with that, a pay TV operator (BSkyB) was interested in starting a 3D TV service soon. It was time to move.

With this news, the DVB Commercial Module began to prepare Commercial Requirements for 3D TV, and the DVB CM-3DTV group held its first meeting in January 2010. The group is chaired by David Wood (EBU). Equally, the DVB Project Technical Module launched a group to develop the systems technically to meet the requirements. This is chaired by David Daniels (BSkyB).

The EBU Technical Committee launched an EBU 3D TV Study Group at the beginning of February 2010.

The DVB Commercial Module group first launched a questionnaire to examine what the different segments of the broadcast chain (production, distribution, receivers, and viewers) saw as the most important

requirements for 3D TV. Not surprisingly, there were different priorities from different parts of the chain. The group also arranged a workshop to bring everyone up to the same level of understanding about 3D TV. Although there are many companies and many options for 3D TV, an overall pattern emerged of commercial environments. There are two sets of commercial requirements to fulfil. This means there will probably need to be two 3D TV systems, one for each of them.

The first commercial situation is where the broadcaster needs to provide a 3D TV service without the viewer needing to change an existing set-top box. This can be the case for a pay TV operator whose viewers are using a set-top box supplied by, or available under a licence from, the pay TV operator. The second commercial situation is where the broadcaster does not use such set-top boxes, but rather needs to provide a 3D TV service which includes a 2D version which can be seen by normal 2D receivers. These two environments are called, respectively, 2D HDTV Frame Compatible, and 2D HDTV Service Compatible. The second option may be necessary for free to air broadcasting and the first for pay TV. Blu-ray will use the second approach, while the first 3D TV

broadcast services will use the first. For each of these two commercial circumstances there are a number of technical solutions. Should 3D TV cope with all of them, or just with one of them? This will be the discussion for the coming months. There is also likely to be much discussion about which of these two circumstances will arise first, and how fast they are both needed.



Although there are many companies and many options for 3D TV, an overall pattern emerged of commercial environments.



In the short term, it is clear that the immediate needs are for a specification for a signalling system for 3D TV for digital broadcasting, and for signalling to help position sub-titles for 3D TV in a way they do not cause irritation and do not obscure. Furthermore, we need to decide what to ask of the connector between the set-top box and the display – the HDMI 1.4 connector – so that those who buy displays now will still be able to use them in the future. The Commercial group will now be asking the Technical Module to solve these requirements technically. In summary, the 3D TV environment is quite complex, and achieving a unique standard may not be possible. However we can try to create a world with a minimum number of standards, and we should be able to make equipment interoperable. A good start to the work.

David Wood



EBU PRODUCTION TECHNOLOGY SEMINAR 2010 - Geneva

A reality check on digital workflows

The EBU Production Technology Seminar 2010 had an impressive turnout with 132 participants. The popularity of the event was largely due to the need for balanced and neutral information on the current state of digital and HDTV production workflows. The seminar also provided an insight into future issues such as 4K production and 3D TV, presented and demonstrated by the RAI Research Centre. The conference began with a set of presentations by EBU Members, sharing their experiences. Marco Derighetti (SRG-SSR) gave a presentation on how the Swiss national broadcaster succeeded in broadcasting the opera 'La Bohème' live from an apartment complex. The audio planning and execution was particularly astounding. This was followed by presentations from the BBC on low cost HD productions, TVP on file-based workflows and ZDF introduced their new virtual newsroom studio.

Another highlight of the conference was provided by Tom Poederbach, who introduced the audience to the video capabilities of DSLR photo cameras. It was not only the violent action scenes of a film excerpt that shocked the professionals in the room, but also

newest HD OB truck was parked at the EBU for visits during the second day of the event. Roland Fisher's (RTS) presentation emphasised the benefits of using fibre-based interconnects, flexible workspaces and file-based technology in the building of the OB unit. He also shared his insights on file-based post production obstacles currently encountered when integrating products from different vendors.

The seminar was also a good opportunity to introduce the work of the EBU project P/DATA on archives and now many anticipate reading the full report of the group, which is due shortly. Gerhard Stanz, project manager of Austria's large archive project at ORF, shared tips on managing archives and deleting material. He argued that to efficiently delete material, people with a 'bird's eye view' are required. Journalists who shot the material are not the right people to decide what is to be deleted. According to Stanz, lots of material is deleted everyday to make sure the archive stays manageable. There was also a demonstration of the BBC's latest version of the cost-efficient ingest software called Ingest. The day ended with

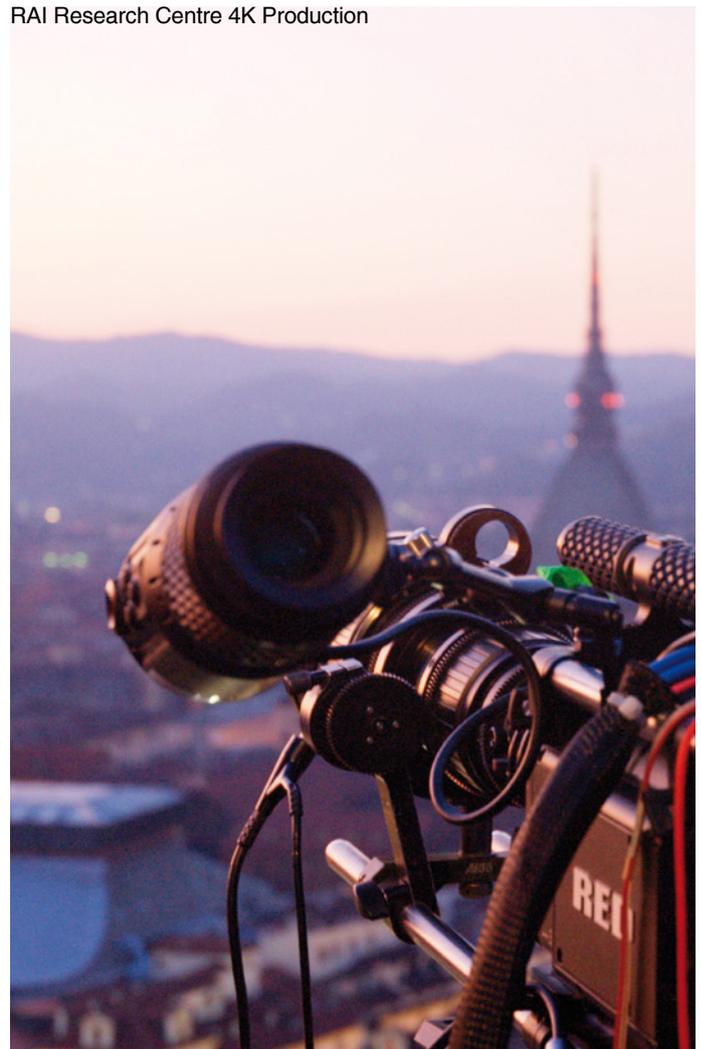


SRG-SSR 'La Bohème' Broadcast

the unexpectedly high quality that these large-sensor devices are capable of producing. Although, the shortcomings for professional video applications are multiple (no timecode, limited recording time, no zoom correction), there are benefits as well (lightweight, inexpensive, abundant choice of top quality lenses). A truly revolutionary development in our quickly changing media industry. This presentation triggered the idea of providing a special workshop to EBU Members on the use of DSLR cameras. Details will be announced on the EBU Technical website

The organising committee's chairman, Per Boehler (NRK), gave a quick tutorial on lens quality. Worryingly, knowledge about lens quality, and how to measure it, is becoming very rare amongst broadcasters. Not only are the experts themselves disappearing as Per jokingly remarked; he is one of his organisation's last walking 'dinosaurs'. He is seriously concerned that he is using what is maybe the last operational lens-testing facility at a European broadcaster. Other presenters included Alan Roberts, HD 1, the Swiss broadcaster RTS' (Radio Television Suisse)

RAI Research Centre 4K Production



promises for the future: better interoperability, a growing importance of games for broadcasters, and optional 4K and 3D productions. Many of the presentations dealt with the issue of interoperability in the digital workflow. With the increasing use of software components, issues of interoperability are not going away. In contrast, they are getting more complex as echoed in the presentations by Bruce Devlin on software based codecs and Ingo Hontsch's (BFE) view on system integration.

There was a big discussion on the importance of quality to broadcasters. This was addressed in two presentations: one from Andy Qusted (BBC) and the other by Christoph Nufer (IRT) and Martin Riedmayer (IRT). These were followed by a lively panel discussion. Public broadcasters must get it right was the clear conclusion. HDTV means high quality to the consumer, but is not always easy to achieve and requires the careful design of the full chain, and of course good source material. Friedrich Gierlinger (IRT) pointed out that video can only be finally checked on a good reference monitor.

Other valuable presentations on the video side were given by key figures of the media industry, but a real highlight was on the last day when a full morning was spent on audio issues. World renowned experts like Gerhard Stoll (IRT) and P/LOUD chairman Florian



RTS HD1 OB truck

Camerer (ORF) addressed the audience on up/downmixing and loudness issues. John Emmet looked at the issues surrounding lip sync, and Lars Jonson (SR) examined audio file formats. The seminar ended with an impressive case study presented by Julian Gough (BBC) on the audio recording of the BBC Proms. The next Production Technology Seminar will take place in February 2011.

DIARY 2009 - 2010



3D TV Webinar

18 Mar / Online - 14:00 (CET) / EBU Members only / No fee. Has the 3D TV dream become a reality already? In this EBU Webinar, long-term 3D enthusiast David Wood provides an update on the status of 3D TV and its standardisation.



HDTV Production & Emission Standards

26 Mar 2010 / Online - 14:00 (CET) / Members only / No fee. Why is the HD future progressive? That is the central question Dr Hans Hoffmann addresses in this Webinar.



Digital Radio Webinar

19 Apr 2010 / Online - 14:00 (CEST) / Members only / No fee. EBU's Mathias Coinchon will brief participants on the latest Digital Radio developments in Europe and beyond.



Cognitive Radio Webinar

12 May 2010 / Online - 14:00 (CEST) / Members only / No fee. What is Cognitive Radio? And how intelligent is it? Darko Ratkaj provides an update on Cognitive Radio, its promises, challenges and controversies.



Technical Assembly 2010

9-11 June / Italy / Members only. The Technical Assembly analyses current technology, future prospects for production, broadcast and broadband delivery, and spectrum management - all of key strategic importance for Members.



Metadata Webinar

17 Jun 2010 / Online - 14:00 (CEST) / Members only / No fee. Learn about metadata for the media industry. Join this Webinar for an update on recent metadata developments presented by EBU's metadata expert, Jean-Pierre Evain.



Digital Switchover Webinar

14 Jul 2010 / Online - 14:00 (CEST) / Members only / No fee. Join Elena Puigrefagut for an update on the digital switchover taking place in the EBU Members' broadcasting areas.

Further information can be found at <http://tech.ebu.ch/events>

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