MEDIA TECHNOLOGY & INNOVATION

ISSUE 16 • JUNE 2013

tech-i

The Sustainability Imperative

Plus

- EBU RADIO RECOMMENDATION
- FoBTV PROGRESS REPORT
- THE MEDIA APP LANDSCAPE
- NETWORKED MEDIA TASK FORCE

and more...

EBU

OPERATING EUROVISION AND EURORADIO

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Issue 16 • June 2013

Cover Story: The EBU's Sustainable Technology in Broadcasting group held a meeting in the UK earlier this year. They took the opportunity to visit Europe's most sustainable broadcasting facility, the new Sky Studios just outside London. There's an update from STiB on page 6 and a report from BSkyB on page 7.

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Visions of a bright future

Lieven Vermaele
EBU Director of
Technology & Innovation

At the end of last year the EBU launched Vision2020, a strategic study investigating how Public Service Media (PSM) and the EBU must adapt to serve audiences and stakeholders in the best way. The project, which involves many Members, will deliver reports in the months and years ahead, however I want to take this opportunity to give my own early impressions.

Firstly, there is great diversity in our EBU membership. Every EBU Member and every country has a unique national situation. In fact, each country in Europe is a PSM and media experiment in itself. This diversity can make Europe a very creative place, but makes it harder to benefit from economies of scale or harmonization (as in the USA).

On the other hand there is considerable alignment of views on future trends. EBU Members see the same trends - though at different speeds - and have similar priorities. This is where the EBU can help by forming a common vision of the future of media, the landscape and the role of PSM in society. Let me share my thoughts on the trends and the directions that should be taken.

The product and the brand. The medium of (linear) radio or television will not disappear, but it will become absorbed into a combined service. As a proportion of total viewing time, linear usage will decline. Linear viewing time will be shared with other media usages. Brands will become independent of specific delivery technology. The brand, if strong and relevant, will survive and prosper. A brand can become an application that assembles linear, on demand, multimedia and social elements. A brand will offer this service in a structured way via an interface, adapted to the user and his context; and launched on any available screen. A brand (and its app) will always be there for you, to inform, guide and entertain.

User behaviour and expectations. People will use more and more media, both live and on demand, local and global. Today we are trending towards more and more individualization of media usage; tomorrow media usage will be even more individual and personalized, but equally people will look for moments to consume media together. This demand will be the driver for linear and live TV in future. In the world of massively more information and content there will be a growing need for a guide, a media curator, a trusted brand and a (social) friend.

Competition. Here, in terms of barriers to entry, broadcast protects and broadband liberates. The growth of broadband leads to more international competition, making it easier for international brands to reach out to us locally. New, small competitors or non-native media brands will not start with linear TV services, but will build up their brand in alternative ways. New youth brands do not necessarily have to start from linear TV anymore.

Process and people. These products and interfaces will call for a complete reform of the media production environment. It will need to be much more item based ('atomized') and integrated. Until now, the only parameter a media planner had was time – the broadcast schedule. A new creative talent will arise that is able to package all these items into a service offering or interface.

Partnerships. European PSM organizations will remain relatively small and local, and have few opportunities for economies of scale. They will need to explore opportunities for cooperation in their market for production or service platforms. Their plan should be "compete in content and services, cooperate in technology and platforms".

PSM and society. PSM will need a new contract with society. We should see PSM as society's investment fund, investing in content and services and creating a return for society. PSM will be a benchmark and driver for the media market in many countries.

I will leave the EBU during the summer to spend more time with my technology start-up. But I'm pleased to have contributed to the initial phases of Vision2020. The future opportunities for PSM are visible today. Win-win solutions can and should be developed, both internally in the media organization, and between media players in the market. If we do so, I see a bright future for European media, PSM, and the EBU as an organization.

ASIA-PACIFIC BROADCASTING UNION

FAREWELL TO SHARAD

Sharad Sadhu, the Director of the ABU Technical Department, retired in March 2013 *writes David Wood*. He also steps down as vice-chair of the World Broadcasting Union's Technical Committee. Sharad has worked in broadcasting for 42 years, living through the great transitions to colour television, digital television and high definition. He joined the ABU in 1993 after a distinguished career in India. This included being Director of Engineering of the Indian national broadcaster, Doordarshan, and a Professor at the Indian Film and TV Institute. Sharad has been a firm supporter of the WBU and the ITU, and a friend of the EBU. He has helped considerably the journey of Asia-Pacific broadcasters to digital television. Two of his causes célèbres have been preserving spectrum for television broadcasting in the face of the land grab by wireless broadband, and encouraging the rollout of digital radio. In Sharad's farewell album, fellow ABU Director Takeshi Doki, wrote a poem that sums him up well:

"There is a man who stands firm even in a storm.
Dreaming of the sun coming back in the blue sky.
We are proud of this person like a sunflower."

EBU TECHNOLOGY & INNOVATION DEPARTMENT

WELCOME TO MICHAEL

We are pleased to welcome Michael Barroco to the EBU, where he joins the Media Delivery & Services team in the Technology & Innovation Department. He's not a complete stranger to the EBU having spent time working as an intern on various projects in recent years. He played a key role in the development of the EBU's open source tools for hybrid radio production, building on the work of the RadioDNS organization.

He holds an MSc in Computer Science from EPFL, the highly regarded technical university in Lausanne. He completed his thesis, on real-time analytics for large-scale video streaming platforms, while working at Livestream in New York during the past seven months. He's 25 years old and is originally from Geneva. He's looking forward to getting his teeth into EBU projects around broadband networks and user experiences.

DIGITAL RADIO SUMMIT 2013

MORE THAN 120 DELEGATES ATTENDED THE EBU'S DIGITAL RADIO SUMMIT 2013

FRESH OPTIMISM AROUND DIGITAL RADIO

The EBU's Radio Week provides an annual opportunity for the technical community of Europe's radio industry to step back and take stock. At the centre of these five days of meetings, assemblies and workshops was, as usual, the Digital Radio Summit, which this year attracted more than 120 participants from 20 countries. (Radio Week events attracted a total of 160 people.)

One of the clear signals emerging from the Summit this year was optimism for the future of digital radio in Europe. One of the factors contributing to this was the announcement of the EBU's new recommendation on digital radio distribution, R 138, which was warmly received by the delegates. (See page 12 for an introduction to R 138.) Sony's Andreas Schneider, speaking on behalf of manufacturers' group DIGITALEUROPE, stressed the need to harmonize across Europe with simple and focused requirements. He welcomed the new EBU recommendation in this regard.

The EBU's radio technology expert Mathias Coinchon reported on the RadioHack workshops that had taken place over the previous two days. Among the projects shared at this year's event were a universal receiver (FM, DAB, DRM, IP) based on the US$35 Raspberry Pi computer and a multiplatform radio app from RAI.Many members of the RadioDNS hybrid radio community were present, with particular interest this year in progress with visual radio using RadioVIS and the possibility of integrating work done at VRT on radio chaptering with the RadioEPG work.

Other highlights of a packed Radio Summit programme included a presentation on the strategy behind the successful RadioPlayer initiative from the UK and an insight into how NPO is implementing hybrid radio in the Netherlands based on the RadioDNS specification and using tools provided by the EBU. Predictably, there was plenty of interest in the presentation from the Norwegian regulator on plans for FM switch-off in that country.

Elsewhere in this issue of tech-*i* (p.13) you can find an article on the future of the AM bands, based on Niels Dreijer's presentation to Digital Radio Summit. All presentations from the event are available to EBU Members from: http://tech.ebu.ch/drs2013

BROADTHINKING 2013

A BROAD PERSPECTIVE ON BROADBAND DELIVERY

As usual, mid-March brought broadband media delivery to the top of the agenda at the EBU with the annual BROADTHINKING seminar. This year's event – on 27-28 March – was preceded by meetings of the DASH Industry Forum, which meant it really was broadband week at the EBU.

BROADTHINKING attracted more than 90 participants, for a programme featuring 22 presentations and plenty of opportunities to network and to discuss the many demos on show.

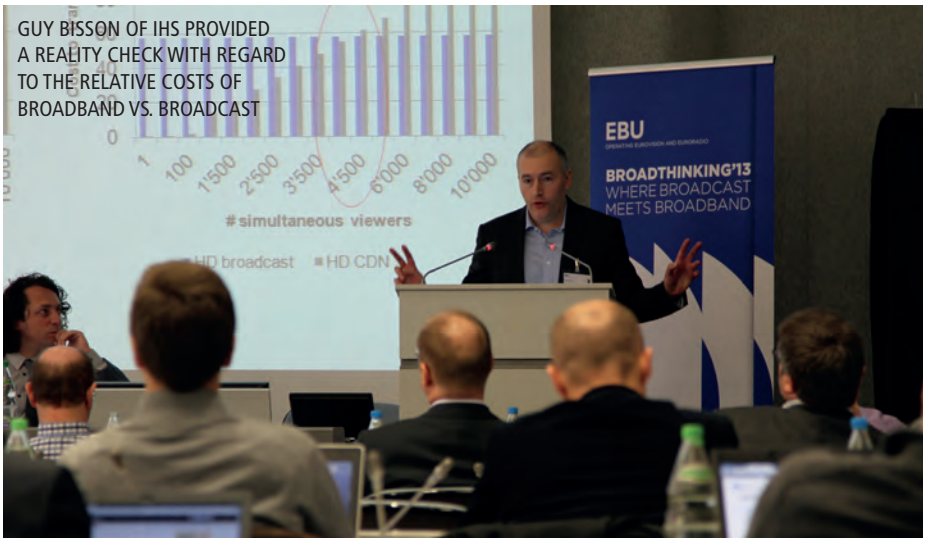
Presentations from IHS and NPO during the opening session illustrated clearly the growing importance of online media channels. But, in what was something of a reality check, they also also highlighted the fact that linear TV using broadcast continues to dominate and that online consumption still represents a very small percentage of overall viewing. Speakers emphasized the considerably higher costs – and, in the case of Janet West speaking on behalf of the BBC, environmental footprint - that come with broadband delivery.

For broadcasters, who made up more than a third of the participants, it was a useful chance to learn about technologies that will dominate in the years ahead. A combination of HEVC video coding plus MPEG DASH adaptive streaming is likely to be the standard for online distribution, over fixed and mobile broadband networks. While there's still work to be done on bringing DASH to the point where it's ready for widescale deployment, standardization work is making good progress. For broadcasters its inclusion in the HbbTV specifications is a notable point in its favour.

On the second day of BROADTHINKING the focus turned to content delivery networks – CDNs – generating plenty of discussion and questions from the floor. Speakers representing some of the key players in the domain gave participants an overview of the options, from building your own CDN to using CDN federation to reduce costs and increase reach. Martin Boronski of French commercial broadcaster M6 made a strong case for the build-your-own approach, citing a saving of around 30% when compared to a global CDN. Nevertheless, for M6 some challenges remain relating to, for example, Quality of Service and a need to increase capacity.

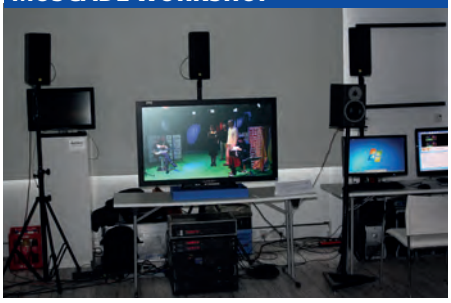
The event came to a close with a session on hybrid TV platforms, including updates on the spread of HbbTV services across Europe as well as reports on progress with MHP-based services in Italy and the UK's YouView platform.

BROADTHINKING 2014 will take place 26-27 March; and EBU Members can access the presentations from this year's event at: http://tech.ebu.ch/broadthinking2013



GUY BISSON OF IHS PROVIDED A REALITY CHECK WITH REGARD TO THE RELATIVE COSTS OF BROADBAND VS. BROADCAST

MUSCADE WORKSHOP



PETER KOVACS

DANCING WITH DEPTH AND DIMENSIONS

As the MUSCADE project comes to a close in June, a workshop was held at the 3D Innovation Center in Berlin on 21 March to show the final outcomes of the project and demonstrate new technologies to the public and the European Commission. **MU**ltimedia **SCA**lable 3**D** for **E**urope is an FP7 Project set up to create major innovations in the fields of production equipment and tools, production, transmission and coding formats for 3D content.

A number of impressive demonstrations were presented as part of the event. Using the 3D Innovation Center studios, a dance performance was captured with a special 3D rig developed within MUSCADE. The rig uses four cameras to generate multiview content, with two central cameras generating a "traditional" stereo 3D picture and two cameras placed outside them to acquire additional views and improve the depth information. The real-time decoding and reproduction of the transmitted multi-view video plus depth (MVD) content was presented on an auto-stereoscopic (i.e. glasses-free) screen. The basic stereoscopic content captured by the central pair was also displayed in the 3D cinema, proving that the MUSCADE rig is suitable for display-agnostic 3D content production.

Other demonstrations included multiview 3D content transmitted over satellite, automated correction of audio based on measurements of the room's acoustics, and real-time encoding for multi-view 3D content to be rendered on lightfield displays.

The workshop was jointly organized by the EBU and Fraunhofer HHI. There were around 65 participants. For more information on MUSCADE visit: www.muscade.eu

THE MEDIA & IT RENDEZVOUS **Broadcast production increasingly makes use of IT-based infrastructure and storage. This means that broadcast engineers find themselves dealing more and more with IT tools and services, but also that IT specialists are playing a greater role in the world of broadcasting. The programme of the EBU NETWORK TECHNOLOGY SEMINAR reflects this evolution. We're keen to increase the participation from IT specialists working at EBU Members, a group that may not be familiar with the event. Please make sure your colleagues know about NTS 2013 – The Media & IT Rendezvous. http://tech.ebu.ch/nts2013**

DIGITAG

BROADCASTING REACHES... THE EUROPEAN COMMISSION

DigiTAG, the association tasked with protecting broadcast spectrum for broadcasters, will be launching a series of events in the next year to promote the initiative '*Broadcasting reaches*...'. The association has developed the *Broadcasting reaches*… message to promote the benefits of terrestrial broadcasting. The message needs to be clear to administrations, governments and the European Commission: broadcasting will remain a key part of the media landscape. Broadcast spectrum is coming under greater pressure, and broadcasters and the broadcasting industry need to come together to protect spectrum now and in the future.

Broadcasting is at a key juncture. As the majority of countries in Europe switch off analogue it is important that those outside the DTT world are reminded of the importance of terrestrial broadcasting. The full broadcast value chain needs to support the right of broadcasters to spectrum, which has traditionally been allocated to allow for future growth of the industry. Broadcasting brings a return for society both socially and economically, something which shouldn't be lost in the race for spectrum.

Broadcasting reaches…is an initiative launched by DigiTAG as a reminder that broadcasting is part of everyday life. It reaches all people, socio-economic groups, platforms, screens, individuals, groups and ages. Lieven Vermaele, DigiTAG's president said *"An informed society needs broadcasting. It remains important for social cohesion and it's time the broadcasting community speaks together with one voice to protect the future of broadcasting. We are seeing other lobbies bringing together their industries; the broadcasting industry needs to be clear in its message so that it protects the future of the industry. DigiTAG is the platform on which we can bring together all of the players from the world of broadcasting to ensure our voice is heard."*

The first *Broadcasting reaches*... event will be held in Brussels on Thursday 6 June, jointly hosted by DigiTAG and the EBU. For further information on this and other *Broadcasting reaches*... events, please contact the DigiTAG Project Office: www.digitag.org

Broadcasting reaches… one message, one industry, one voice.

METADATA DEVELOPER NETWORK WORKSHOP

5-6 JUNE, GENEVA

This workshop is a unique chance to be updated on the use of metadata in the broadcast industry and to learn by joining the discussions.

http://tech.ebu.ch/mdn2013

EBU TECHNICAL ASSEMBLY

13-14 JUNE, MUNICH

This year's TA takes place in Munich, hosted by the public broadcaster of the German state of Bavaria, Bayerischer Rundfunk (BR). All Technical Directors and Chief Technology Officers of EBU Members are encouraged to attend.

http://tech.ebu.ch/ta2013

NETWORK TECHNOLOGY SEMINAR 2013

25-26 JUNE, GENEVA

The Media and IT Rendezvous. Bringing together specialists in broadcast engineering and IT networks and infrastructure, whether for production, contribution, B2B, or primary distribution.

http://tech.ebu.ch/nts2013

LIBRE SOFTWARE MEETING 2013

6-11 JULY, BRUSSELS

An open platform for users, developers and stakeholders in free and open source software. The EBU will once again organize sessions on media, radio and television.

http://tech.ebu.ch/opensource2013

IBC 2013

13-17 SEPTEMBER, AMSTERDAM

As usual the EBU will be present at Europe's premier broadcast media convention. Along with demos and presentations on the EBU booth (10.F20), a conference session on Saturday afternoon will show how innovation is alive and well in public service media.

http://tech.ebu.ch/ibc2013

Looking further ahead...

FORECAST 2013
13-14 November

PRODUCTION TECHNOLOGY SEMINAR 2014
28-30 January

DIGITAL RADIO SUMMIT 2014
12 February

BROADTHINKING 2014
26-27 March

The presentations given at all EBU Technology & Innovation events are available from our website, often with accompanying videos. Just visit our Event Calendar and click on Past Events.

http://tech.ebu.ch/events

The Sustainability Imperative

OVER THE LAST EIGHTEEN MONTHS AN EBU STRATEGIC PROGRAMME FOCUSING ON GREEN ISSUES HAS BEEN TAKING SHAPE. ITS INTERIM CHAIR, **SIMON TUFF** (BBC), HERE SETS OUT THE OBJECTIVES OF THE GROUP, NOW RENAMED "SUSTAINABLE TECHNOLOGY IN BROADCASTING".

It is now almost beyond doubt that we are entering a period of climate change, almost certainly man made. There are those who disagree but given the increasing strength of the scientific evidence it would seem prudent, whatever your view, for all businesses, organizations and individuals to have an awareness of the issues and to plan how they should respond. When doing this you need to consider not only environmental factors but also factors such as dwindling supplies of finite resources (like rare earth metals, essential for most modern electronics, and fossil fuels) and the waste we generate, including its quantity and methods of disposal. To help Members tackle these challenges the EBU has formed a strategic programme to examine the impact of broadcasting technology on the environment and investigate how best this can be managed.

IMPACT OF BROADCASTING

How significant is broadcasting in the overall climate change picture? The IPCC report from 2007 (the most recent set of global figures published to date) considered aviation, usually seen as the bad boy of environmental impact, to be responsible for about 2% of the global carbon footprint. Aviation's proportion of global carbon emissions has, perhaps surprisingly, remained remarkably flat in recent years, mostly as a result of investment in improved aircraft technology and processes and, to some extent, the the suppression of demand caused by economic conditions.

The Information Technology and Communication sector is also calculated to be responsible for around 2% of the global carbon footprint. However a rise to 3% or even 4% is predicted in new figures to be released later this year. This increase is led by an elastic growth in demand, in spite of industry efforts to develop low power technology and more efficient data centres. (This phenomenon of improved technology leading to increased consumption is explained by the "Jevons paradox" which is well explained on Wikipedia.)

How does broadcasting measure up within this? In 2007 the UK's Ofcom calculated that worldwide broadcasting is responsible for approximately 1.8% of the global carbon footprint (see BBC WHP 189). Very little has been done to mitigate this impact in the years since, and we have generally made things worse by delivering content demanding larger screens, with more loudspeakers and on diverse platforms.

This trend will continue as we fully migrate to HD with 5.1, then to 4k and 8k UHDTV with 22.2 audio, encourage the use of multiple devices simultaneously, such as social interactivity via the second screen, and adopt IP delivery. It's been estimated that IP delivery uses at least three times the energy per viewer hour compared with digital terrestrial transmission.

OUR OBJECTIVES

The EBU Strategic Programme on Sustainable Technology in Broadcasting (StiB) has set the following as its high level objectives:

1 To communicate the why and the how of sustainable broadcast technology and how broadcasting organizations can develop internal strategies for sustainability.
2 To facilitate a workable definition of sustainability for the broadcasting industry and to help identify and form standards for use by the industry.
3 With the support of the Technical Committee to establish strong working relationships with or a sustainability facet within all EBU technology projects and working groups.
4 To establish the requirement to use carbon calculators as part of programme production and through this to develop and deliver best practice.
5 To help produce and/or publish guidelines on sustainable best practice in broadcast production in coordination with the BeyondHD and FNS groups. It is expected that these will help deliver benefits from the use of carbon calculator tools.
6 To help members understand how to use sustainable measurement and metrics to deliver business transformation, thus aiding informed decision making. This could be supported by the use of case studies and should take advantage of work done in other related industries like the ITC sector. This is expected to focus on programme production, apparatus rooms, data centres, contribution and distribution.

By working towards the above objectives we can help protect the viability of our industry, safeguard its reputation, reduce the impact of climate events and resource constraints, and save money (in a world of rapidly increasing energy and material prices).Finally, to an increasing number of people, it just seems like the right thing to do.

If you want to help your organization deliver a more sustainable future or just want to find out more then go to the EBU's website at: http://tech.ebu.ch/green

Greening Sky

BSKYB IS ONE OF EUROPE'S LEADING COMMERCIAL BROADCAST ORGANIZATIONS, DELIVERING TELEVISION, BROADBAND AND OTHER SERVICES TO MORE THAN 10.7 MILLION HOMES IN THE UK AND IRELAND. THE COMPANY IS ALSO TAKING A LEAD ON SUSTAINABILITY MEASURES. **LAURA STEELE**, SKY'S ENVIRONMENT MANAGER, PROVIDES AN OVERVIEW.

Sky was pleased to host a recent meeting of the EBU's STiB (Sustainable Technology in Broadcasting) group at 'Sky Studios', Europe's most sustainable broadcasting facility. We provided the group with what we hope was an interesting and informative visit, including a tour of our 4.4MW Combined Cooling and Heating Power biomass plant (CCHP) and 100kW wind turbine – two renewable energy projects that provide over 40% of the energy that is required by Sky Studios.

Although planning requirements mandated only a 20% contribution from renewable energy sources for Sky Studios, we made the decision to go beyond this during construction to maximize the use of on-site renewables at the facility. This was done with a long term view of continuing to redevelop our London-based campus. Thus the CCHP plant will be able to provide heat requirements for the proposed new campus as well as providing additional cooling through a district distribution system. This has been viewed very positively by the local planning authorities as they develop their applications for future buildings, and ultimately will make a great contribution to their sustainability targets.

AMBITIOUS TARGET

Sky Studios' two renewable energy projects are part of a wider target across all Sky's owned sites to obtain 20% of our energy from owned or controlled renewables by 2020. To achieve this we have deployed an range of state-of-the-art renewable technologies. These are funded from a specific green capex pot for low-carbon and carbon-efficient projects over the next five years. Together these contribute about 10% of the overall energy demand, which equates to 7,600 MWh/yr of energy and saves the equivalent of £800k per year in avoided energy costs.

Being led by our CEO, Jeremy Darroch, and with continued commitment from the most senior levels in the business, these projects have been a success. The business recognizes the need for a secure energy supply if it wants to be sustainable in the long term. This support and commitment from management is ever-present.

Renewable energy is not without its challenges though, and any owner operator should be well informed before embarking on a large scale investment. Technologies remain in development, and many options available on the market are still quite immature. At Sky we have tackled these challenges by working closely with our maintenance provider. All stakeholders involved in the design and operation of such groundbreaking technologies must be empowered and incentivized to optimize the plant operation so that efficiency and benefits are maximized.

RAISING AWARENESS

Sky's ambition is to lead the way across our industry in promoting sustainable production. But making our studios as sustainable as possible isn't our only focus; our commitment to sustainable production is also reflected by what we do right across the business. This includes increasing awareness of sustainability issues within the production industry; working with key production companies and other media organizations to reduce their impacts and associated emissions; and more broadly increasing customers' awareness of environmental issues through programming.

Sky has commissioned ten programmes so far to help raise awareness of deforestation and has run over 130 hours of environmental programming across our channels, via six specially created 'Rainforest Weeks'. This is all as part of Sky Rainforest Rescue, a partnership with WWF that aims to help save one billion trees in the state of Acre, in northwest Brazil. Tackling deforestation plays an important part in combating global warming, which is why, through such programming, we hope to inspire people to take action on climate change and help to protect the rainforest.

Grand Aspirations

IT'S A GRAND TITLE: THE FUTURE OF BROADCAST TELEVISION. THE ASPIRATIONS OF THE GROUP ARE EQUALLY GRAND. SO WHY IS FoBTV IMPORTANT, WHAT IS IT TRYING TO DO AND HOW DOES IT HOPE TO GET THERE? ON THE NEXT PAGE DAVID WOOD OFFERS A VIEW ON SOME OF THE TECHNIQUES BEING CONSIDERED; HERE THE EBU'S **PETER MACAVOCK** CONCENTRATES ON THE NUTS AND BOLTS.

Mark Richer, the president of ATSC, should be credited with being the father of FoBTV. But it was not difficult for him to find like-minded individuals seeking to seize the opportunity to develop a single worldwide terrestrial broadcasting system meeting the requirements of American, Asian and European broadcasters. In the past, one could accept specific television standards for each distinct geographical region, but those who make the TV sets are global players and, more and more, those TV sets cross international boundaries. Indeed, the broadcast business can no longer afford to be formed of distinct islands. Broadcasting must go the way of other global technology industries like information technology, telecommunications, internet, etc.

The far-sighted founders of FoBTV are listed in the blue box to the right. Since their signatures on the original Memorandum of Understanding brought FoBTV into being in November 2011, 48 additional organizations have joined the initiative. In April 2013, the chair passed from ATSC's Richer to DVB chairman Phil Laven. With this transition, FoBTV enters a second and arguably its most challenging phase: deciding on technology.

A UNIQUE VISION

What makes FoBTV unique is that for the first time, a group of organizations previously working to address requirements for their home markets have recognized the importance of a global approach to terrestrial broadcasting in future. The vision of FoBTV is that a TV set bought in the US will work in Europe, China or Japan. FoBTV is the first serious attempt from the industry to address this so that future generations of TV receivers can work across the world. An ambitious task, is it not?

And they are all there: DVB's traditional 'competitors' ATSC and ARIB are both FoBTV partners, as are Chinese proponents of systems.

With the EBU and NAB to the fore in the effort, FoBTV has already gathered a set of 61 use cases from the stakeholders around the world. These cases represent how their proponents expect broadcast television to be used: mobile phones, tablets, UHDTV, HDTV, interactive TV, to name but a few.

Laven's task as new FoBTV chairman will be to steer the group as they embark on turning these use cases into a set of Calls for Technology based on an agreed system architecture. The unenviable task of coordinating these CfTs falls upon the able shoulders of technical group chair, Jiang Wenjun (NERC-DTV, China).

A key aspect of FoBTV's work is that it doesn't expect to develop technologies itself, but will rather rely on the constituent bodies to do the standardization work using requirements from FoBTV – these are the Calls for Technology referred to above. How this will work in practice remains to be seen, but it's certainly ambitious.

FoBTV FOUNDERS

- Advanced Television Systems Committee (ATSC)
- Canadian Broadcasting Corporation (CBC)
- Communications Research Centre Canada (CRC)
- Digital Video Broadcasting Project (DVB)
- European Broadcasting Union (EBU)
- Electronics and Telecommunications Research Institute, Korea (ETRI)
- TV GLOBO, Brazil
- IEEE Broadcast Technology Society (IEEE-BTS)
- National Association of Broadcasters, US (NAB)
- National Engineering Research Center of Digital Tv of China (NERC-DTV)
- NHK Science and Technology Research Laboratories, Japan (NHK STRL)
- Public Broadcasting Service, US (PBS)
- Brazilian Society of Television Engineers (SET)

GLOBAL DIVERSITY

But it's not all plain sailing. FoBTV boasts a diverse membership from all corners of the world, each bringing its own culture to the organization. This richness has its disadvantages when planning work, but the enthusiasm of the participants is infectious and I am sure they will find a way.

At present, the meeting cycle centres on key international trade shows. If work is to accelerate – as it must to address the requirements set – then FoBTV must hold meetings outside trade shows. This will challenge the working methods further, as such an international effort will have to deal with online participation on a grand scale and across the world's many time zones.

PARADIGM SHIFT

So is FoBTV going to succeed? In a way, it already has. The use cases are valuable in themselves, as they represent a truly worldwide set of such cases. Even if no technology comes from the group, it represents a paradigm shift in TV standards development: for the first time, the world agrees that it needs a worldwide TV standard.

The task of the new chairman will be to bring together all these diverse cultures and working methods, develop an FoBTV way of doing work, and then keep to aggressive timelines. If, over the course of the next year, the work can adapt to the challenges of agreeing core architectures and technology requirements, then FoBTV will have achieved something very useful indeed.

FoBTV
FUTURE OF BROADCAST TELEVISION

DAVID WOOD EXPLORES TWO OF THE OPTIONS ON THE TECHNOLOGY MENU FOR THE FOBTV GROUP AS THEY DISCUSS A GLOBAL TERRESTRIAL TV SYSTEM.

From Paris with love

In April 2011, a small group met at a restaurant in the Paris casino in Las Vegas for dinner. Between the *entrée* and the *plat principal*, Mark Richer, president of the ATSC, suggested that the world was ready for a common next generation terrestrial television system.

We took the idea further and formed what was, at first, the 'Paris Group' to try to do so. The food at the casino was good, but the initial name was indigestible to many, and the group became FoBTV – the Future of Broadcast Television group – more explicit but less romantic.

Two years later there are many members, groups, and not a few meetings to try to distil a long list of 'wants' for a future digital terrestrial television system into one that the world can accept as its own. Apart from the questions of what services it should provide, one of the most interesting issues on the table will be the way a future digital terrestrial television system itself should be designed.

If you were starting from a clean sheet you might look for the system which is not 'the unique best', because there isn't one. You look for an optimized system, taking into account all the variables. Thus, for our future digital terrestrial television system, we might try to find the system which offers the best overall combination of a) largest coverage, b) largest capacity (bit rate), c) lowest cost to broadcaster and viewer, d) most efficient use of precious frequency channels, and maybe e) the possibility of working with our current systems.

"One of the most interesting issues on the table will be the way a future DTT system itself should be designed"

FROM MAX DATA THROUGHPUT...

Up to now, digital television systems have been designed in a particular way, technically called a 'maximum data throughput' approach. What this is should become clear in a minute. This is the basis of terrestrial systems such as ISDB-T, DVB-T, DVB-T2, and DVB-NGH.

But there is a school of thought that another approach would be better, one technically called a 'maximum frequency re-use' approach. This second idea is proposed by a group that includes the CRC in Canada and others.

There are complexities, but to understand *grosso modo* these two approaches, imagine a row of TV transmitters. They each serve viewers in an area around them.

In the first approach, the coverage areas do not overlap, but they do touch up against the next one along. Normally, today, adjacent transmitters are not allowed to use the same broadcast channel. In other words, there is gap of transmitters, before a frequency channel is reused. Now, in our system design, we arrange to provide the highest bit rate we can from each transmitter – maximum data throughput. The limitation on the bit rate is essentially set by the capacity of the receiver to distinguish small differences in signal level and interference.

Bit rates in these kinds of systems have been rising as receivers are able to distinguish ever smaller differences in broadcast signal levels. We have come a long way. The first digital DVB-T terrestrial system had a capacity of about 24 Mbit/s in one channel. Last year, NHK tested a system (technically 4kQAM plus MIMO) which offered about 90 Mbit/s capacity in one RF channel.

...TO MAX FREQUENCY RE-USE

But there may be another way to design a system. Imagine now that all transmitters use the same frequency channel. The channels are re-used immediately. This is a maximum frequency channel reuse approach. In this case, we transmit much nominally smaller useful bit rates in each of them, but we have put a wrapper of protection around them, which makes them still work in spite of the interference coming in from the transmitter next door.

The price of this wrapping is that it takes up capacity in the channel. But, the advantage is that all transmitters are now using the same frequency channel.

We can now further increase the capacity somewhat for a service by using a number of transmitters emitting from the same aerial on the same channel (technically a hierarchy), and we could arrange to combine the data from them in the receiver. So, we have become more efficient in our use of frequency channels, but less efficient in our use of each specific channel – alleviated by multiple transmitters from the same mast.

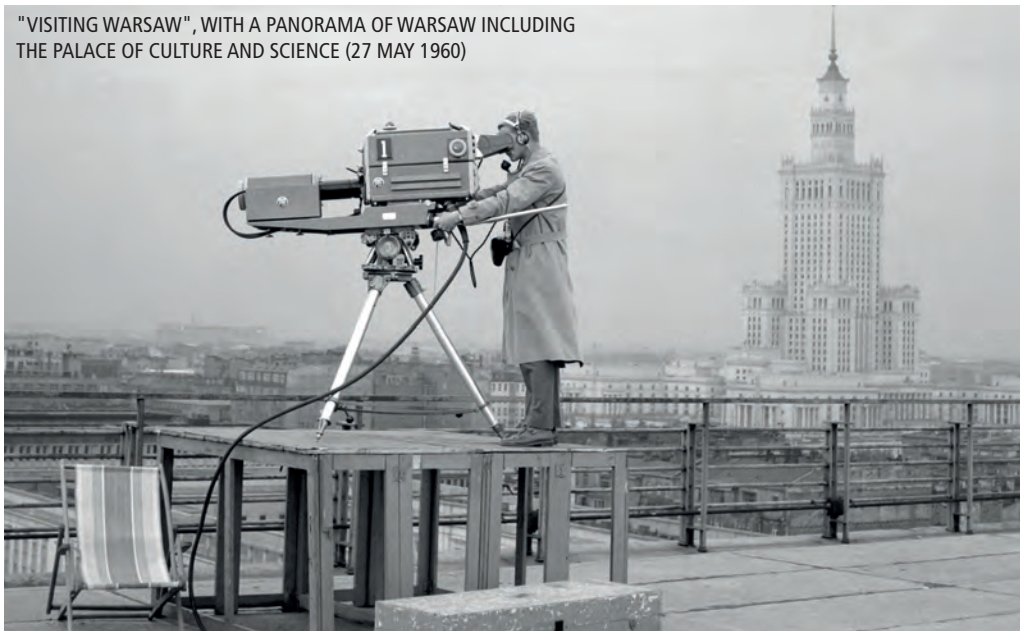
Will both of the approaches be more or less equivalent in efficiency overall in the end, or will one or other have a serious advantage? There is probably quite a lot of maths to be done in sorting this out – and I am not the man to do it. Maybe you are?

TVP – Telewizja Polska

THE PRIORITY OF TVP IS TO REAP THE FULL BENEFITS OF THE ANALOGUE-TO-DIGITAL SWITCHOVER PROCESS BY IMPLEMENTING A FULL RANGE OF ADDITIONAL INNOVATIVE SERVICES, **WIESŁAW ŁODZIKOWSKI**, DIRECTOR OF THE TECHNOLOGICAL DEPARTMENT, EXPLAINS.

The first experimental television broadcasts in Poland took place in Warsaw in 1931. However, World War II hampered the development of TV , and it took another two decades before, on 25 October 1952, the first programme was broadcast. It was only 30 minutes long and could be watched on the 24 TV receivers that were in the country at the time. This was the starting date for the TVP1 service.

Since that time TVP's offer has grown and it now consists of 26 services, three of which are HD. An internet broadcast from both chambers of the Parliament is also available (TVP Parlament). A unique strength of TVP is the availability of 16 separate regional services.



"VISITING WARSAW", WITH A PANORAMA OF WARSAW INCLUDING THE PALACE OF CULTURE AND SCIENCE (27 MAY 1960)

PAT ZYGMUNT JANUSZEWSKI

DIGITAL TERRESTRIAL

Terrestrial reception still dominates the Polish broadcasting market. Therefore TVP has always prioritized the provision of good terrestrial coverage. Now the switchover process is in its final stage, with switch-off date set for 23 June 2013. A number of gap-fillers are being deployed to bring coverage to above 99%.

There are three free-to-air terrestrial multiplexes in Poland. TVP broadcasts its services in part of multiplex no. 1 and exclusively in multiplex no. 3.

There are eight TVP services available free-to-air via the digital terrestrial network: two HD services and two different regional services for each region, specially chosen to fit best the needs of local viewers. These factors clearly distinguish TVP's terrestrial programme portfolio from those of other broadcasters.

HD, 3D AND MORE

Our first HD channel, TVP HD, was introduced in 2008. However it was a premium service which was not available on the terrestrial network. In June 2012, just before the UEFA European Football Championship which was co-hosted by Poland and Ukraine, the two main TVP services (TVP1 and TVP2) became available in HD free-to-air via the DVB-T network.

The TVP HD channel is seen as a vehicle for testing and introducing innovative technological solutions. Starting with the finals of UEFA EURO 2012, it has broadcast content in 3D on a regular basis.

A number of additional services have been made available over the DVB-T network. Access services are of special concern and that is why TVP leads among other broadcasters in DVB subtitling, original audio and audio description.

TVP was also the very first broadcaster in Poland to launch DVB-T2 tests including SFN (single frequency network) configuration. The DVB-T2 standard gives TVP the potential to boost its position within the terrestrial market segment.

HYBRID TV

TVP retains its pioneering role in introducing hybrid TV into the Polish market. The first HbbTV services were launched to complement transmissions from 2012 UEFA European Football Championship and the 2012 London Olympics.

A special platform has been developed by TVP to accommodate the whole range of HbbTV services: news, sport, weather forecasts and culture. A dedicated hybrid service for the purposes of emergency management and alerts is under development.

TVP adapts to evolving market and media consumption trends. Therefore most of our audiovisual materials are available via the TVP website. It comprises 46 portals, 3,668 web pages and almost 236,000 videos. In 2012, 15.5 million users generated 74 million hits.

Teatr Telewizji (TV Drama Scene) is an excellent example of a marriage of tradition and technology. The very first performance was given live on 6 November 1953. Today shows can also be watched on computers and mobile devices. Internet users can choose from several different viewing angles (multiview) or use the second screen.

ARCHIVES & INTEGRATION

TVP is in possession of unique audiovisual archives – a very important part of our national cultural heritage. Over time different production methods and storage media were used. In order to prevent their degradation and possible loss, a state-of-the-art HD/4k complete reconstruction system has been built to allow restoration, correction and conversion to digital formats for both the video and audio.

Media production and distribution is evolving into the file-based domain. A strategic decision has been made to implement an integrated centralized Media Asset Management (MAM) system. It consists of two core components: Central Ingest and Digital Archive, the first of which has already been implemented. The whole investment will be completed in 2014.

The infrastructure of the 16 regional branches of TVP is also undergoing modernization to allow file-based workflow and reduce the number of physical data storage media in use.

We are very proud of our company's history of over half a century, but this gives us no special advantage in a rapidly changing market. We must do our best to keep pace.

Use the Task Force

THE TRANSITION TO FILE-BASE WORKFLOWS, REPLACING SPECIALIZED TAPE-BASED EQUIPMENT WITH IT INFRASTRUCTURE, HAS BEEN EMBRACED BY MOST BROADCASTERS IN RECENT YEARS. THE LAST MEDIA DOMAIN STILL RELYING MAINLY ON SPECIALIZED HARDWARE AND INTERFACES IS LIVE PRODUCTION. **FÉLIX POULIN** EXPLAINS HOW THE EBU IS HELPING TO LEAD AN EFFORT TO CHANGE THIS.

Live production is very demanding, whether it is for live news casts, remote coverage of sport events or multi-camera recording to be edited afterwards. These use cases require tight synchronization of the sources, sustained real-time processing, and the transport of large amounts of data with high availability. Up to recently this was only possible to achieve using high-end specialized infrastructure.

With the continuous growth of IT performance and capacity making 10 Gigabit Ethernet networking affordable (and up to 40GbE and even 100GbE in a few years), the idea of replacing these professional interfaces (e.g. HD-SDI, AES, etc.) with standard packet-based networks like Ethernet and IP is under serious discussion across the industry.

GOOD REASONS

There are many reasons why our industry is interested in this evolution. Perhaps predictably, in a survey of EBU Members we conducted in January 2013, the most anticipated benefits were related to potential cost reductions thanks to the replacement of speciality infrastructure with ubiquitous commodity equipment.

Other benefits identified in the survey were increased flexibility and efficiency. Reasons given included the possibility to aggregate multiple links (SDI) into a network link and the unified connectivity that is independent of the format being carried. There is no SD or HD Ethernet; there's just a pipe that you can fill with whatever content until it is full! Therefore, such infrastructure is scalable to support higher resolutions, frame rates and dynamic range in the future. Also, the storage, memory and processing resources can be allocated on demand more easily.

And this added flexibility is a key enabler for new workflows that are more distributed, remote, automated and collaborative. The widespread business reorganization taking place in our industry – see the EBU's IMPS strategic programme, for example – calls for innovative adaptation; will this technology evolution provide that opportunity?

BROADCASTER CONCERNS

As with all technology changes, there are challenges to be addressed and trade-offs to be identified. These trade-offs need to be well compensated by the benefits in order to make the change acceptable for the users.

According to our survey, the top concern preventing broadcasters from moving forward is the absence of proof that the required reliability and quality of service can be achieved.

Among the other issues mentioned by many respondents were the lack of expertize on "media over IT" and the lack of open standards to ensure interoperability. Users are also very concerned by operational aspects like the loss of the signal visibility provided by today's systems that makes it quick and relatively easy to troubleshoot and fix in the case of failure.

To succeed with this technology change and maximize the potential benefits, these concerns need to be addressed. Likewise, as we've learned during the transition to file-based production, questions around work practices and workflow adaptation need to be addressed along with the technology change. This is why we require an industry-wide effort to align the efforts of the players involved.

A TASK FORCE IS BORN

The EBU, the Society of Motion Picture and Television Engineers (SMPTE) and the Video Services Forum (VSF) have formed a Joint Task Force on Networked Media (JT-NM). The mission of JT-NM is to define a strategy to develop a packet-based network infrastructure for the professional media industry. To achieve this it will bring together manufacturers, broadcasters, standards bodies and trade associations in an open, participatory environment.

The EBU sees a window of opportunity to ensure the user requirements of our Members are taken into account in the development of new technology solutions and standards. The EBU Technical Committee endorsed the creation of the Task Force and intends to take an active role in its work.

JOIN JT-NM

The new Task Force is seeking active participation from the professional media industry, including broadcasters and manufacturers. If you would like to participate please contact Bob Ruhl (bob.ruhl1@verizon.net) providing your name, e-mail address, work affiliation and explaining briefly your interest in JT-NM.
A face-to-face briefing will be held in Geneva on Thursday 27 June, just after the EBU Network Technology Seminar http://tech.ebu.ch/nts2013

Recommending Radio

THE EBU PUBLISHED A LANDMARK RECOMMENDATION ON DIGITAL RADIO EARLIER THIS YEAR. RADIO NACIONAL DE ESPAÑA'S **JAVIER SÁNCHEZ PÉREZ**, CHAIR OF THE EBU DIGITAL RADIO PLATFORMS GROUP, INTRODUCES R 138 AND EXPLAINS ITS IMPORTANCE.

JAVIER SÁNCHEZ PÉREZ IS THE CHAIRMAN OF THE EBU'S STRATEGIC PROGRAMME ON DIGITAL RADIO PLATFORMS.

JOIN US

You can participate the discussions on the future of radio and help to build on R 138 by joining the EBU Strategic Programme on Digital Radio Platforms. Visit: http://tech.ebu.ch/drp

In our world today, where the internet is everywhere and everything has become digital, interactive and visual, it is almost a miracle that analogue radio goes on having the vast importance that it still has. Nevertheless, although we have had digital radio broadcasting since the mid-1990s, the fact is that its adoption by European audiences has been limited.

The lack of a common European analogue switch-off date for radio with an associated digital dividend is likely to have been a factor holding back deployment, but it's important to remark that there is no political plan at a European level for the transition to digital radio. In fact, it seems it is not a priority for the European Commission and, therefore, there is no common European strategy for a single market for digital radio or even a mention in the European Digital Agenda. The main reason given is that the subsidiarity principle (defined in Article 5 of the Treaty on European Union) applies to digital radio and, consequently, the EU does not take action. Evidently, this fact does not encourage its deployment nor its adoption by the audience, because each country decides for itself how to introduce digital radio, taking decisions at different times. The result is a non-harmonized European digital radio market with a high level of fragmentation.

LACK OF DEVICES

One of the visible consequences of this lack of harmonization is that the big electronic device manufacturers, necessary actors for an effective adoption of digital radio by the audience, have not focused their efforts on developing attractive products designed to take advantage of the full potential of digital radio. In the context of the global economy, this industry's minimum size market is Europe and products are launched only where economies of scale will lead to reasonable prices for consumers. It's logical that, in the absence of a minimum harmonization among European countries (taking a mid-to-long term view and with a realistic regulatory framework), the industry won't commercialize the devices that would create a critical mass leading to effective market take-up.

Against this background, the EBU's Digital Radio Platforms group (SP-DRP) was initiated in November 2011 and quickly realized that missing from the many tons of papers about digital radio was a document concerning deployment on a Europe-wide basis. So the group decided to try to develop a Recommendation based on a simple idea: achieving consensus among EBU Members, for the first time since the advent of digital radio, outlining in a short position paper the main aspects for digital radio deployment.

MISSION: CONSENSUS

The document would take into account that radio, understood as a mass medium of the 21st century, must evolve while keeping its identity. Also, it had to be a strategic document for immediate application, valid for any radio broadcaster and any radio service, and applicable to all radio broadcasting bands.

In the end consensus was achieved and R 138 was approved. It is a one page document (http://tech.ebu.ch/docs/r/r138.pdf) and it's worth reading! Its six key points are:

- there should be adequate national planning, in order to provide digital solutions for all radio services;
- there should be immediate deployment using DAB+;
- where DAB coverage isn't possible the Digital Radio Mondiale (DRM) system should be used;
- enhanced features such as text, images and programme guides should accompany digitization;
- hybrid services should be deployed with digital broadcasting systems, for example using the RadioDNS system;
- added momentum could be given to deployment if it were possible to agree on harmonization around a future analogue switch-off date for radio in Europe.

Certainly, there is a lot of work ahead of us and we need the help of everybody: if all the players involved (regulators, broadcast equipment industry, consumer electronics industry, mobile device industry, retailers, automotive industry, broadcasters, network operators, etc.) do not work together with clear common objectives, establishing an agenda, making commitments and complying with a proposed schedule, the transition to digital radio in Europe will be a long and uncertain process. In this sense, R 138 can be understood as a proposal from EBU Members in order to prevent this.
Download R 138:
http://tech.ebu.ch/docs/r/r138.pdf

The future of the AM bands

MOST OF US CONSIDER AM BROADCASTING A THING OF THE PAST. AT THIS YEAR'S DIGITAL RADIO SUMMIT, **NIELS DREIJER** AND **JENS CHRISTIAN SEEBERG** (TERACOM) WONDERED IF WE MAY HAVE OVERLOOKED SOMETHING.

A modern 100 kW AM band transmitter can fit in the same 1 m² space as a 10 kW DAB unit, and its technology is every bit as advanced. The real question is if the AM band transmitter will be relevant in an all-digital world.

COST/COVERAGE

Contrary to the FM, DAB and TV bands, signals in the AM bands are not limited by the 60-75 km to the horizon from a transmission tower. AM band signals will follow the earth's curvature or jump to the sky and back, or both.

By covering a contiguous distance of 300-600 km rather than 75 km, a single AM band transmitter has 4-8 times the range but distributes to an area 16-64 times larger. The relative merits of the different bands in terms of transmitter sites are shown on the diagram, assuming that only one audio channel needs to be transmitted and that useful ranges are AM 300 km, FM 75 km and DAB 38 km.

Obviously DAB can carry 10-16 audio channels (or more) as compared to one, but all else being equal we may conclude that the relative cost per km² of the first audio channel with AM band transmission is 2-6 percent at maximum range.

DIGITAL BACKUP

If emergency power for a major radio and TV transmitter site fails during a blackout, all terrestrial coverage may be lost over a large area unless an AM band transmitter within range can fill the gap. Cable fires are not that uncommon, and neither is flooding of infrastructure. Such events can result in a prolonged loss of all locally transmitted services.

Transmitter synchronism is vital for digital single frequency networks such as DAB and when lost, large interference zones with no reception are created.

When and if the robust FM transmitter networks are closed, the lowest-cost replacement for emergency and backup transmissions would be an AM band solution that can be received by a large proportion of car and portable radios.

POWER EFFICIENCY

If the AM bands are only used for occasional network backup with no regular programming, they are unlikely to be found on future receivers. So to make AM transmitters a credible backup, they must remain on air.

Reduced or time-slot transmission can yield immediate cost savings, but so can modern technology. The operating efficiency of a modern AM band transmitter often exceeds 90 percent. For analogue operation, modern signal processing allows AM band transmitters to output high power levels in the "sidebands" and give the same useful range with less carrier power.

Considering the 60-70 percent efficiency of legacy transmitters and a 4-5 dB sideband power increase, this translates into a 3-5 times saving in electricity costs and transmitter size. Electricity savings, unmanned operation and the lower price of a small AM band transmitter operating in analogue mode can combine into a payback time of less than two years.

With this transmitter migrating to a robust DRM digital mode in the future, further power savings are possible. Alternatively, useful range can be increased by utilizing the full digital power of the frequency permit.

MERGING SITES

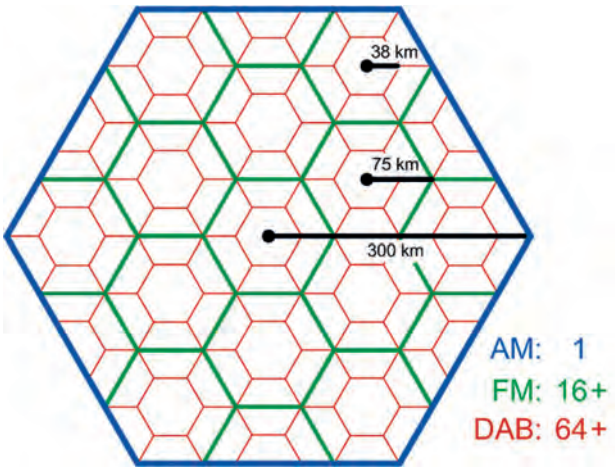
Although modern AM band transmitters may be power efficient, can cover large areas at low cost and have become very compact, their long wavelengths still mean large antenna systems. However, they do not require special transmitter sites if you are creative and can accept some compromise.

Early in the Cold War, the RIAS covered the entire GDR from West Berlin with a simple wire antenna from only 31 m high antenna masts. Or why not move that wire to an existing FM, DAB or digital TV tower? It will have to slope upwards from the ground, but it works and costs next to nothing. Taken one step further, one may "shunt feed" the existing tower with the sloping wire and use the grounded tower as the antenna.

Economic pressures dictate lower distribution costs. But by automatically concluding that this means giving up AM band transmitters and their digital potential, we may indeed overlook something.

Presentations from the EBU Digital Radio Summit 2013 can be viewed at http://tech.ebu.ch/drs2013.

NUMBER OF TRANSMITTERS REQUIRED FOR AM, FM AND DAB BANDS TO COVER A 300 KM RANGE WITH AT LEAST ONE AUDIO CHANNEL



JENS CHRISTIAN SEEBERG WITH A MODERN 50/100 kW SERIES AM BAND TRANSMTTER CO-SITED WITH DAB AND DIGITAL TV.

A New Paradigm for Content Preparation

AS THE MULTI-PLATFORM MEDIA UNIVERSE BECOMES A REALITY, CBC/RADIO-CANADA HAS BEEN DEVELOPING NEW WORKFLOWS TO DELIVER CONTENT QUICKLY AND EFFICIENTLY. **MAXIME CARON** AND **JONATHAN DUPRAS** DESCRIBE THEIR PROPOSED APPROACH.

In the last few years, the digital entertainment industry has been evolving more rapidly than ever, changing the way people consume audio and video content. Digital display devices are now present everywhere in our lives: computers, television sets, mobile devices, tablets and digital signage, all part of our digital culture. Content consumption is shifting from a schedule based model to an on-demand model. In order to remain relevant in this changing landscape, television broadcasters have to evolve from a television producer to a media company. Thus, a new generation of broadcasters is no longer limited by linear television schedules, which in turn opens the possibility of maximizing the usability and reach of our content.

The challenge we now face is how we adapt our production methods to deliver content to those new emerging platforms quickly and efficiently. While the success of a television programme used to be measured in millions of viewers, the present fragmented market reality requires that smaller product distribution models now make up a part of new revenue streams. As broadcasters, we must have the means to prepare and distribute content targeting these platforms and integrate them with our conventional distribution models in order to leverage the existing infrastructure investment.

AN INTERMEDIATE ASSET

The main goal behind this new production workflow concept is that we are no longer producing television content but producing media content. Television thus becomes one of the many distribution platforms where content can be leveraged. Therefore, the final output produced by the production crew is stored as an intermediate asset in a content library, from which automated versioning and publishing services use the content based on business demands and requirements. By resorting to automated versioning and publishing services driven by a business layer (traffic and programming systems), manual processing and data entry to deliver to alternative platforms become much more efficient and part of the core business processes.

The added value process is where raw material can be prepared and transformed into an engaging show: specifically, video and audio editing, creation of descriptive video and closed captions. Obviously, modifying content manually requires artistic talent and time, which in turn would increase the cost to produce content.

The idea behind our new workflow is to split the content distribution process into two independent steps:

- The versioning process is where programmes are modified to meet the business requirements of the targeted platform. These processes include: graphics, branding, segmenting and concatenation steps that can be easily automated and do not necessarily need a human touch. Business planning now has the flexibility to decide how to prepare the content in relation to the expected revenue from each platform.
- The transform service is where content is adapted to be technically compatible with the targeted platform. This step (commonly known as transcoding) ensures all parameters are compatible with the targeted platform.

Using a media service oriented architecture (SOA), the various digital distribution services have been divided into core components:

VERSIONING SERVICE

The versioning service is where content is prepared in relation to the targeted platforms' business requirements. The following functionality must be provided by the service to meet the current requirements of the company: concatenating video files (mainly for ad insertion), segmenting, adding platform specific branding and graphics.

Traditionally, in the broadcast world, all versioning has been done at the baseband level, using linear systems, and limiting its output to real-time. A non-real-time file-based system would solve multiple scalability problems while also substantially simplifying regular linear television presentation.

To keep an edge against new technologies that will emerge in the future, it would be important to allow flexibility on the format choice of this intermediate asset, thus allowing standards to grow as technology evolves and to be codec agnostic. It would be a mistake to create this library with a single format in mind, as the life of the system would be limited once a better quality would be required.

TRANSFORM SERVICE

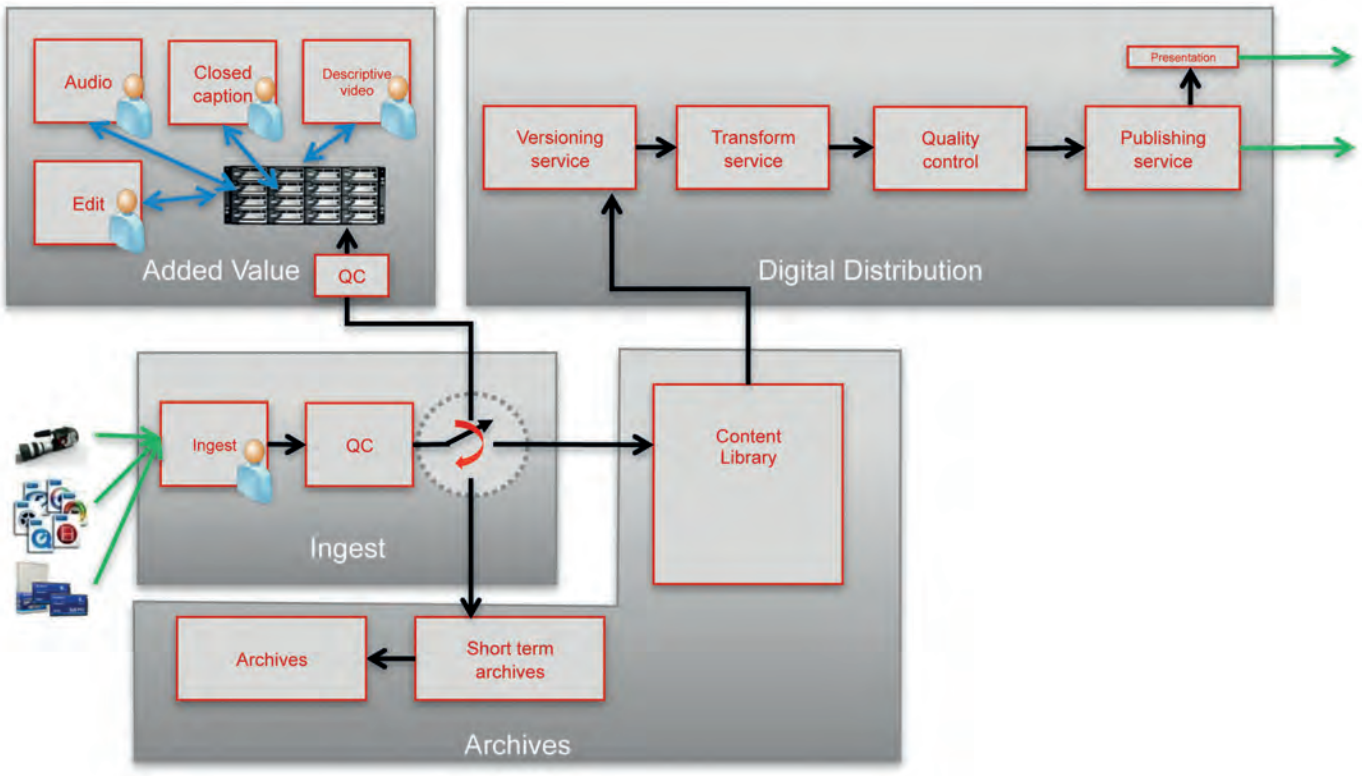
The transform (or transcoding) service is where content is adapted to ensure all parameters are technically compatible with the targeted platform. Transforming content to a format optimized for each of the targeted platforms is the key to maximizing the overall quality of experience offered to our viewers.

With H.264 encoding for adaptive streaming, up to two hundred parameters can be customized. To reach this level of flexibility, relying on a complex "network" of watch folders and filters can be quite time-consuming. In addition, during our previous experience with OTT services, we discovered using a single transcoding platform to meet all our distribution partners' requirements is extremely difficult to achieve because of the slight variations of the parameters of the different encoders.

By using transform services driven by an orchestration system, it will be possible to route requests to the right transcoder taking account of technical requirements and overall system load, and thus maximizing the system load. This approach will also simplify platform optimization for specific codecs and the aggregation of newly targeted platforms.

PUBLICATION SERVICE

CBC/Radio-Canada is both a content producer and distributor, offering its own distribution channels (e.g. Tou.tv) but also offering its content to external partners like cable catch up services or OTT content providers. We have more than 26 different distribution points



IN CBC/RADIO-CANADA'S PROPOSED NEW MODEL THE CONTENT DISTRIBUTION PROCESS IS SPLIT INTO TWO INDEPENDENT STEPS, A VERSIONING PROCESS AND A TRANSFORM SERVICE.

when counting both internal and external partners. Therefore, we need to ensure that both content and its descriptive metadata are published at the right time as per the negotiated agreements, and also removed at the end of the same contractual agreement.

There are no industry standards to exchange files and metadata today. Some of our partners require XML files while others prefer an RSS data feed. Moreover, the metadata required changes from partner to partner, thus demanding intensive manual labour to initially set up interfaces between our production facility and the different distribution points.

One of the challenges the corporation currently faces with regard to multiplatform distribution is content awareness. While it's relatively easy to know when a show is available (or not) on a platform owned by CBC/Radio-Canada, it can be an act of faith with a third party. The ideal publication service would offer a retroaction loop allowing us to create a content dashboard, where users can see what piece of content is available where, at all times.

A QUANTUM LEAP

As broadcasters' infrastructure evolves, we are seeing a transition from dedicated hardware to software-based systems using generic IT tools. The current initiative undertaken by CBC/Radio-Canada is looking to leverage this trend along with media SOA based systems to reduce the footprint used by the technical infrastructure and reduce power cost.

Another added benefit from a media SOA implemented in a non-linear environment is the possibility of changing the method used to size hardware needs. Instead of having to ensure that there are enough resources to meet peak demand, it would be possible to operate with the aim of meeting average demand by using time segments where demand is lower to prepare content.

Processes required to create content for multiplatform distribution are pretty similar to those of traditional television presentation. While the latter is nearly always done in a linear environment, once broadcasters begin to have true and tested multiplatform non-linear content preparation systems, what is to stop them transitioning their broadcast operation in the same way and leaving only a single final video baseband playout server?

CBC Radio-Canada

Towards a new integration architecture

BELGIUM'S VRT HAS BUILT A NEW MEDIA INTEGRATION PLATFORM BASED ON WORK DONE IN THE EBU'S METADATA MODELS GROUP. AN OVERVIEW IS PROVIDED BY PROJECT LEADER **WOUTER VANDERHAEGHE**, SENIOR RESEARCHER **MIKE MATTON** AND COMMUNICATIONS OFFICER **EVELIEN VAN MALDEREN**.

At the end of 2011 it became clear that the media integration platform at VRT had evolved into a poorly adaptable system. Systems were coupled too tightly and changes to existing integrations were difficult. Over the years the system had developed into one that, although it performed well in transferring media from A to B, was poor in supporting business processes.

This assessment led to the start of a new media integration programme at VRT in May 2012. The Media Integration Group (MIG) was set up to link media systems together, in line with service oriented principles and patterns. Its goal is to support VRT's media business processes.

The EBU Class Conceptual Data Model was chosen as the basis of our media integration data model. However a data model is not the final objective of a media integration process; rather it is one of the key factors that affect the success of an implementation.

GENERAL ARCHITECTURE

VRT's media integration architecture is based on identified media business processes. Integrations implement these processes, enabled by a common infrastructure, generic services (e.g. transfer layer) and adapters to systems in a particular media domain. The general architecture is shown in Figure 1.

Subtitling is a good example to illustrate what occurs in a business process integration at VRT. The following happens when a subtitle file is integrated into the subtitling workflow system:

- When a subtitle file is available, an event is generated on the messaging middleware.
- The integration system that supports subtitle playout on TV subscribes to this event. The file is then sent to the correct destinations. Playout is a highly critical process, and this integration must be extremely reliable.
- The event is also collected by the integration that supports the archiving process. The subtitle file is, when possible, coupled via a REST service to its media item in the archive MAM (media asset management) system. This integration, supporting an archiving process, is less critical than the previous one.

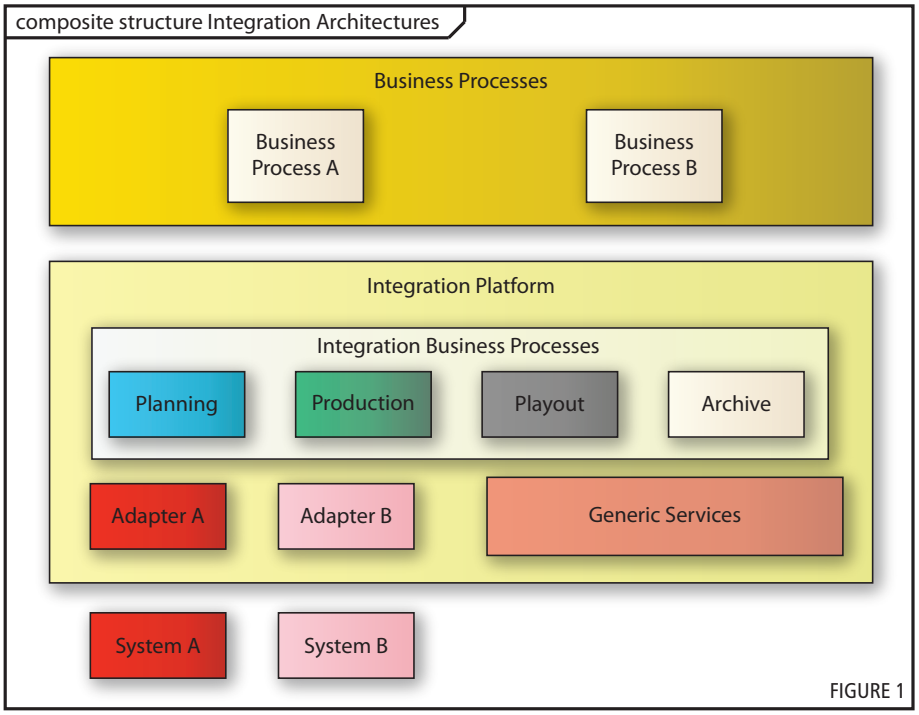


FIGURE 1

Due to the complex and the cumbersome nature of the VRT P-META implementation in the old integration system, VRT searched for a new metadata and class model. This new model had to meet various requirements. It had to be as complete as possible in order to model media workflows; it should not be overly complex; and it had to be adaptable and expandable to the needs of VRT. Further, the model should follow as many industry standards as possible and make use of existing knowledge on media workflows gathered by VRT and the EBU in general. Finally, once implemented, the model should be easily understandable by all relevant stakeholders. This latter requirement simplifies discussion and communication about integrations at VRT and with external partners.

CHOOSING CCDM

Many tasks in a broadcast workflow need a data model. For smooth operation of the tasks, the design of this data model is vital. For this reason, the EBU's Metadata Models project (http://tech.ebu.ch/pmag) devised the Class Conceptual Data Model (CCDM). It consists of a minimal and flexible set of classes usable for archives, media integrations, broadcast production, etc. The available classes are divided into four domains: asset management; commissioning, planning and logistics; production; and distribution, as illustrated in Figure 2.

The CCDM offers implementers a lot of freedom. It is, for instance, possible to adapt names of classes and to alter their relationships. CCDM serves only as a guideline for designing a semantic data model. For more information and an in-depth description of CCDM, refer to EBU Tech 3351 (http://tech.ebu.ch/publications).

VRT'S IMPLEMENTATION

The current integrations at VRT implement three of the four domains. The commissioning, planning and logistics, production, and distribution domains of CCDM currently have a partial implementation in the VRT CCDM. A diagram of the current implementation is

shown in Figure 3.

The decision was made to implement only what is needed at the given implementation time. The idea is that our CCDM implementation evolves and grows over time, according to the needs, and is not more complex than necessary at the given time.

In the commissioning, planning and logistics domain the big question was how editorial objects relate to other editorial objects. In CCDM, an editorial object can be 'part of' or 'source of' other editorial objects. We had to decide on the semantic meaning of these relationships between editorial objects in our situation and what the properties of these relationships are. Furthermore, we decided to implement a number of group concepts of editorial objects (e.g. a series).

In the production domain the media resource is defined as a container. All the details of the production are defined at the essence, format and locator concepts.

In the distribution domain we defined publication events, channels and services. This was done in order to map the distribution needs onto different delivery methods (TV, radio, internet).

In general, the biggest issue to tackle was the way to relate editorial objects, media resources and publication events to one another. At VRT an object may originate from a lot of different places. For example, it is possible that a publication event is defined before an essence is defined (e.g. subtitles). The model and the relationship between the main objects in the model have to be able to support this.

REST SERVICES

We technically implemented the model in a relational database and decided to make the data available via REST services. Changes to the system or external events are implemented as events and messages, with RabbitMQ as the messaging system, in order to decouple the different systems in the integrations, and to provide routing of messages to different destinations. It also allows prioritization of events that are more critical than others. In our example of subtitle integration, the integration with subtitle playout is more critical than the integration with the archive MAM and can thus be treated accordingly.

Some examples of processes that are supported with the new media integration system include:

- Subtitling workflow, from the planning system and MAM system to the playout;
- Support of the production and archiving processes from the VRT archive system to the radio production systems, for audio and video;
- Implementation of the processes to archive media from a video tape ingest system;
- Support for compliancy recording;
- Publication of media, subtitle and metadata to the VRT media web platform.

It is never easy to define and implement a data model for media integration. Historically, the meaning of metadata differs in the several systems that have been brought to use over time and, moreover, the meaning of metadata in one system can evolve as well.

VRT chose CCDM as the metadata model for its new media integration system, to be used as a standard and to be the common language for system to system communication now and in future. A future goal is to use it as a model in the archive MAM. In terms of internal communication at VRT, the CCDM model also defines a fixed meaning and a framework for VRT engineers as well as users at VRT.

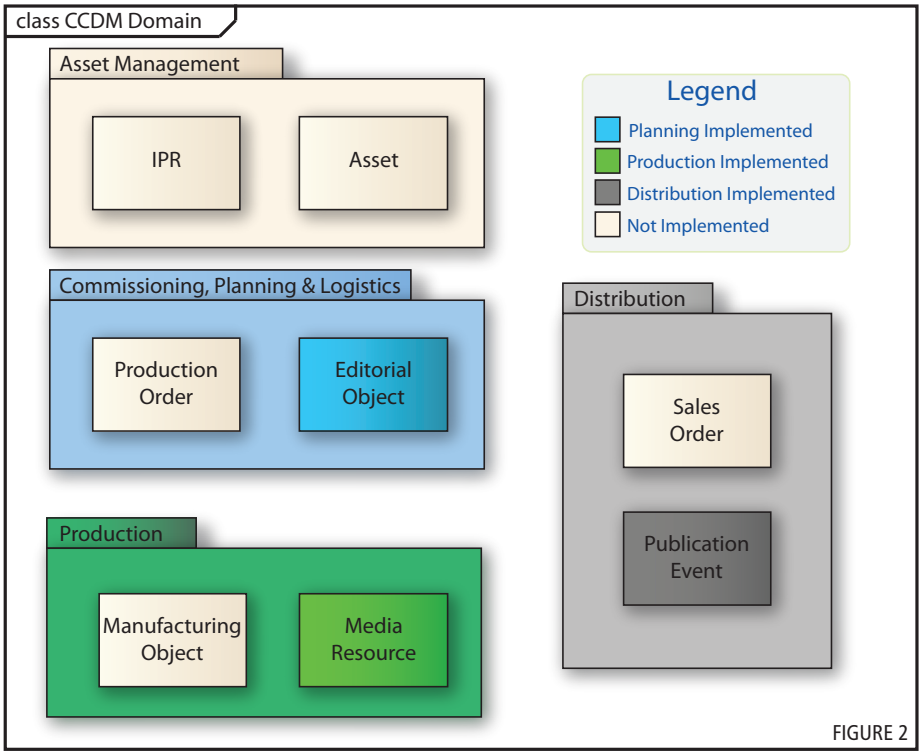


FIGURE 2

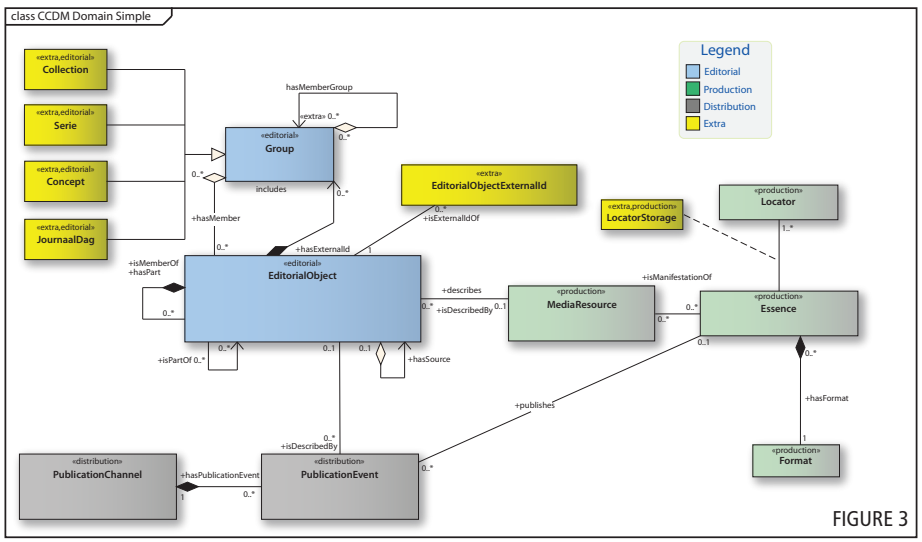


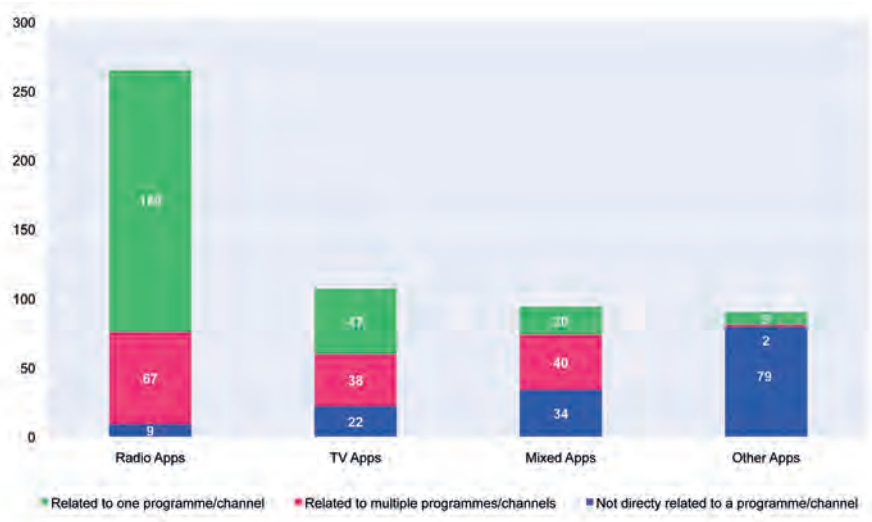
FIGURE 3

Planet of the Apps

A SURVEY OF 556 MEDIA APPS FROM 71 EBU MEMBER ORGANIZATIONS IN 43 COUNTRIES WAS THE BASIS OF A BROAD STUDY CONDUCTED BY EURORADIO IN RECENT MONTHS. THE EBU'S HEAD OF RADIO **CHRISTIAN VOGG** PROVIDES AN OVERVIEW OF THE MAIN RESULTS OF THE STUDY, WHICH WAS SUPPLEMENTED BY ADDITIONAL QUESTIONNAIRES.

It's commonly known that our media world is becoming more and more fragmented; at the same time the means and ways of media distribution and consumption converge. Television becomes hybrid, radio goes visual, and both meet on the internet. Newspapers and print magazines produce videos and audio, ordinary citizens become amateur journalists. The struggle for visibility and recognition gets tougher every year, and branding is an important issue.
These developments are the background music to the rapid rise of mobile phones that offer far more than the simple telephone function. Since Apple launched its iPhone in 2007 it has been all about apps. With the arrival of the iPad in 2010, tablet computers have become an important part of the mix. The first media apps from Public Service Media (PSM) appeared in 2008.
An app is a self-contained world, be it an office application, a game, a travel guide or a radio station. Apps are able to promote a certain brand. And as our study shows, there are dozens of different ways to construct a media app. Therefore we analyzed not only the technical platforms but also the content and the strategies behind the apps. In short, we wanted to know the success factors for an app – and, of course, the factors that can lead to failure.

FIGURE 2: RADIO DOMINATES THE PSM APP LANDSCAPE AND MOST ARE RELATED TO A SINGLE CHANNEL OR PROGRAMME



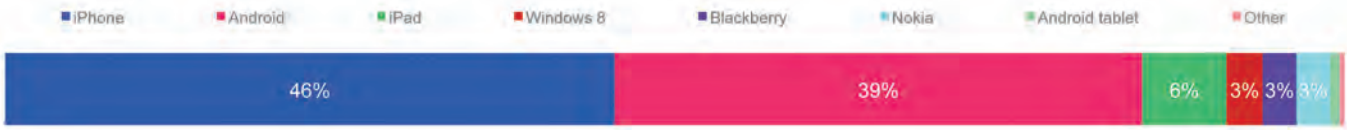
AUDIO DOMINATES

The most popular feature in apps from PSM are audio live streams, mostly provided as MP3 (128 kbps), offered by 90% of the organizations surveyed. Video live streams are only provided by 38%. The standard codec used for live video is H.264/MPEG-4. So live audio streaming seems much easier to realize, more cost-efficient and easier to manage than video live streaming. Also from a rights perspective videos are more complicated than radio.
Some questions in the survey concentrated on workflow issues and on the connection between desktop, mobile and app content. As of today slightly more than half of our respondents don't have a dedicated mobile version of their website. Having an app appears to have been the priority for most; and of those that do not have a dedicated mobile website, only 39% plan to create one soon. Others are still deciding whether to launch a mobile or responsive website; citing cost as an issue for responsive design.

MEASUREMENT CHALLENGES

One of the biggest challenges is getting high quality user data. 94% of organizations answering the survey have a tool to monitor website traffic and 81% have one to monitor their app traffic. Half of them use Google Analytics to monitor website and app traffic. Others use Comscore. The problem is to compare off-air listening figures to live stream via the app and to podcast downloads. There is still the need for a comparable "currency" on audience. This will be a task for the future to develop coherent measuring tools across all platforms.
Of course interactivity is an important feature of apps. 46% of the organizations answering the survey said they use their app as an interactive tool. The most popular is posting to social networks (67%) such as Facebook and Twitter, followed by commenting on the organization's or programme's website (50%). And 42% even allow their users to post text messages directly to the studio or directly to the presenter of the show. Compared to this, push notifications are not used widely; only a third use them for breaking news, and some others for sport results, crime alerts and song titles.

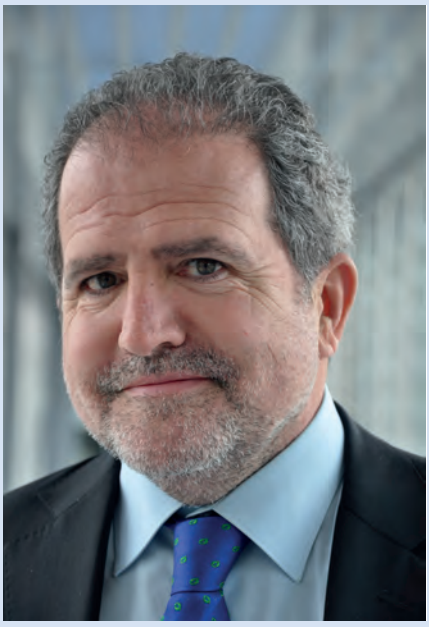
FIGURE 1: PUBLIC SERVICE MEDIA APPS BY TECHNOLOGY PLATFORM



When asked whether their app had met their expectations the answers were not overwhelmingly positive: rated on a scale of 1 to 10 the average score was 6.0. It's clear that many responders are not fully satisfied with their apps – or perhaps had higher expectations. Almost four fifths of organizations plan to add new functionalities to their app(s).
The key functionalities to be included reflect the most favoured features: EPG and podcasts, followed by weather info and links to internal websites. Some want to increase the number of their apps. Others, for example in France and Switzerland, intend to launch a national radio-player app together with commercial competitors. In general the app landscape across European PSM is very diverse and illustrates the tough struggle for visibility in the ocean of media and services. If the new trend - national radio-players - will prevail, we will know only in a few years.

KEY FINDINGS

- iOS is most popular, followed by Android. Windows, Blackberry and Nokia are far behind (Figure 1).
- 8 apps per Member on average, reflecting branding per channel or even per programme (Figure 2).
- 265 pure radio apps; 107 pure TV apps; 184 mixed and other (e.g. games, etc.)
- most popular features are live radio streams, playlists, news and podcasts.
- most Members prioritized app development over mobile or responsive websites.
- audience measurement is difficult, with no comparable "currency"
- success is based on brand, user-friendly stable functions and use of a popular technical platform
- national radio-player apps combining PSM and commercial radio may become a new trend
- 65% developed their apps per platform; 21% relied on HTML5.



Pere Vila Fumas

rtve

IN EACH ISSUE OF TECH-*i* WE ASK A MEMBER OF THE EBU TECHNICAL COMMITTEE TO STEP INTO THE SPOTLIGHT. THIS TIME IT'S THE TURN OF **PERE VILA FUMAS**, DIRECTOR OF PLANNING AND TECHNOLOGICAL INNOVATION AT SPAIN'S RTVE.

WHAT ARE YOUR CURRENT RESPONSIBILITIES AT RTVE?
The scope of my responsibilities for the RTVE group includes coordinating, planning and directing technology-related activities. This work is particularly relevant today as we face challenges relating to radio spectrum and digital dividends, cross-platform content distribution, digital production, and integration of radio, TV and online.

A key element is reconciling integration at group level with required levels of autonomy in radio, TV and online content. It's about maintaining good levels of coordination, commitment and motivation, while implementing pragmatic policies around the sharing of infrastructure and services.

Along with this I am directly responsible for the management of our Television Engineering group, where the priorities include the digitization of production, tapeless workflows, evolution to HD, aspects of HbbTV rollout, and implementation of the digital dividend.

WHAT DO YOU CONSIDER AS YOUR FINEST ACHIEVEMENT SO FAR IN YOUR CAREER?
I'm proud of the many interesting professional experiences I've had so far. I would emphasize my work in the digitization of production and tapeless workflows, the design and implementation of transport systems and signal contribution for RTVE group, the launch of HbbTV, and – most recently – the first experiences in 4k. And I hope to have more such experiences in future!

WHY DID YOU STEP FORWARD AS A CANDIDATE FOR THE EBU TECHNICAL COMMITTEE?
Being a member of the TC helps me to keep a wide perspective and look towards the technical issues that will affect our industry in future. It's an extremely interesting forum in which to discuss issues related to our technology needs and our plans in the medium to long term. In fact, in my opinion it's the most interesting such forum in our industry in Europe. Also, importantly, this TC combines theory with everyday practice: its members are all professionals with high levels of experience and interesting views and ideas. I'm happy to contribute and participate.

WHAT, FOR YOU, ARE THE MOST IMPORTANT CHALLENGES FACING EBU MEMBERS TODAY?
We have several, but if I had to highlight some in order of importance, my list would be: connected TV distribution and access to content on new platforms; new uses of radio spectrum and the possibilities of sharing with other services; continuous improvement in production, particularly with regard to tri-media integration; and how we can apply new technologies relating to HD, UHD, HEVC, etc.

In some of these fields, especially spectrum, the EBU is challenged by the fact that the uses and needs differ from country to country and by organization. The positions and actions need to be defined accordingly.

TELL US ABOUT SOME OF YOUR INTERESTS AWAY FROM THE WORKPLACE.
With my family I like to share in the social and cultural life of Madrid, but also, in contrast, to relax in an ancient fisherman's house on the Mediterranean coast.

EBU NETWORK TECHNOLOGY SEMINAR 2013

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In collaboration with SMPTE

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