Asia-Pacific Broadcasting Union

Technical Review

No.257 January-March 2014

TECHNICAL REVIEW Scan code to download

ABU Digital Broadcasting Symposium 2014: Full Report Inside

PP 2412/11/2012 (031331) ▪ ISSN 0126-6209

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A New Approach for Broadcasting: Hybrid Broadcast Broadband TV (HbbTV)

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abstract

Hybrid Broadcast Broadband Television is a technology platform that combines television and Internet services. TV has shaped 20th-century culture more than any other technology. The Internet has also significantly expanded our communication options. This paper provides an overview of the Hybrid Broadcast Broadband TV (HbbTV) concept and its applications, as well as an update on standardisation and deployment status. It then describes the add-on to a digital TV headend (Satellite, DTTV, Cable, IPTV) to enable delivery of innovative HbbTV interactive non-linear and linear services.

Keywords: TV, IPTV, Digital TV, HbbTV.

Introduction

HbbTV is a technological standard that many major hardware and software manufacturers support and promote for use in TVs and set-top boxes. HbbTV was standardised by the European Telecommunications Standards Institute (ETSI) in June 2010. (ETSI TS 102.796 v1.1.1) [1] Version 1.2.1 of this specification has been approved by ETSI as ETSI TS 102 796 in November 2012. and Support for HbbTV version 1.5 (ETSI TS 102 796 V1.2.1) [2] is currently in development. HTTP Streaming is also becoming more and more popular for delivering audiovisual content over broadband links. HbbTV 1.5 introduces support for HTTP adaptive streaming (based on MPEG-DASH-Dynamic Adaptive Streaming over HTTP) [3], improving the perceived quality of video presentation on busy or slow Internet connections, and advanced DRM support added to this version. Figure 1 summarises HbbTV, which is a content distribution platform for signalling, transport and presentation of enhanced and interactive television services and related applications designed for both broadcast and internet networks and running on hybrid terminals that include both a broadcast and internet connection. Solutions for interactive TV services, developed previously, deliver similar functionality.

Some broadcasters have already worked on different hybrid solutions for different markets, for example MHP (Multimedia Home Platform) in Italy, MHEG-5 (Multimedia and Hypermedia Expert Group), Connected TV, and YouView in the United Kingdom.[4] It is expected that HbbTV will be inter-operational with these while ensuring significant enhancement to the viewing experience. Most other European

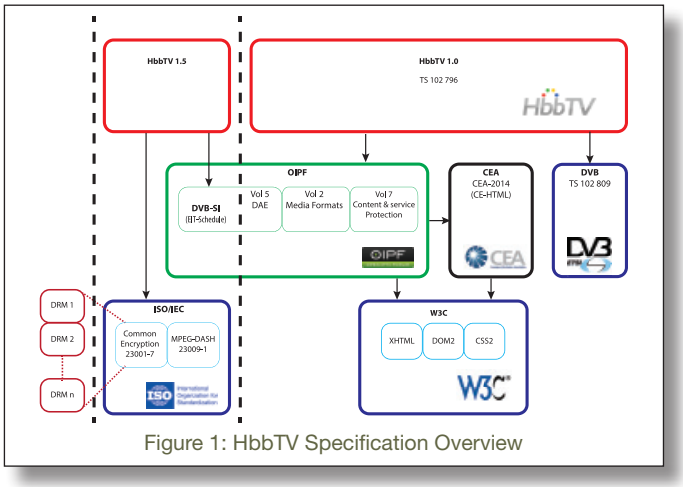

Figure 1: HbbTV Specification Overview

countries have officially endorsed the standard, including Germany (ARD, RTL, SAT1, Pro7 etc), France (France Telecom, NRJ, TF1, arte,

M6 vb), the Netherlands, Austria, Switzerland [5], the Czech Republic, Poland [6], Finland [7], and Hungary [8]. HbbTV services are deployed across satellite, terrestrial and cable platforms. [9] Figure 2 shows HbbTV trends in Europe [10].

HbbTV was originally developed in relation to the DVB system family for satellite, terrestrial and cable broadcasting (DVB-S/S2, DVB-T/T2 and DVB-C/C2) as well as for DVB-IPTV networks. HbbTV services can be embedded within the digital broadcast signal. [11]

The term Hybrid Broadcast Broadband TV represents a simple concept that facilitates a whole host of new functions. The

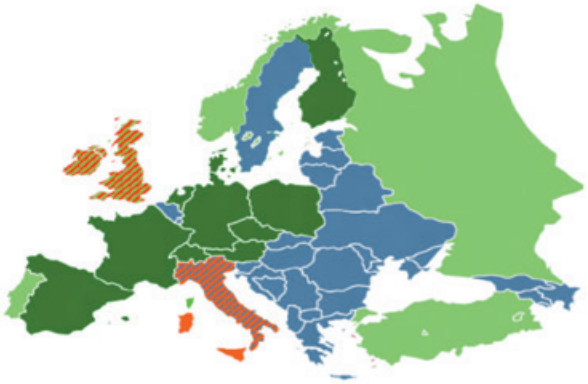

Figure 2: HbbTV Europe Coverage

principle is that, with the push of a button, viewers can carry out actions defined by the channel at specified access points during the programme. Like basic teletext, a push of the red button opens up or closes the HbbTV applications.

The form of processing information typical of TV is also used to call up Internet pages, which means the distracting URL will not be visible as it is in the Web browser. A blocking mechanism also prevents any terminals other than the TV from accessing the technology, which conceals a unique version of HTML developed specifically for entertainment devices. Web pages are called up using an application information table (AIT),which is sent as an additional signal attached to the radio signal. When the user activates the "red button" function, the AIT is read and the predefined URL appears on the screen without any irritating embellishments.

How Does it Work?

The signalling of applications is compatible with the DVB standard, this is done via the Application Information Table (AIT) in the relevant DVB service and is indicated in its Programme Map Table (PMT). The AIT signalling offers mechanisms for starting, stopping and switching to different applications.

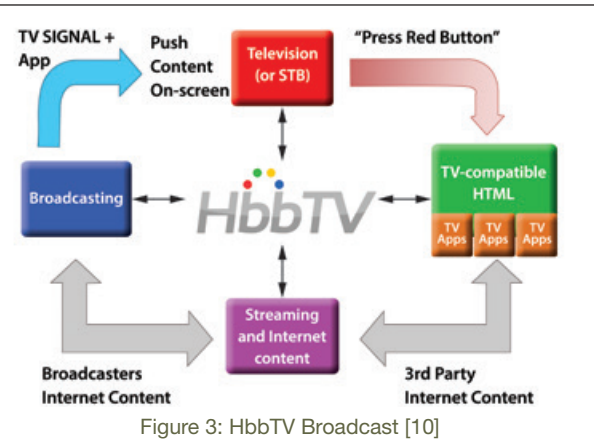

Figure 3: HbbTV Broadcast [10]

Applications can stream media content by using HTTP or RTSP unicast protocols. This is particularly useful for applications displaying broadband originated content, such as VOD or catch-up, but enables also extra content linked to an advertisement present on a TV channel for instance.

The standard specifies that the following media formats must be supported for broadband content:

System format: MP4 or TS
Audio: MPEG2 layer 3, E-AC3, HEAAC
Video: H264 AVC up to 1920x1080

HbbTV is based around technologies that will be more familiar to web developers than those of MHEG, including CE-HTML, a specification that includes XHTML, CSS, Ajax and Javascript. Crucially, that makes it accessible to considerably more coders than MHEG, with its more esoteric tech, does. In short, with HbbTV, its supporters claim, content providers can build and release apps that link to their material more quickly.

HbbTV's Javascript API has extensions to provide for TV functionality, such as handling channel changes.

The HbbTV specification has been approved by ETSI (ETSI TS 102 796) and is based on existing standards and web technologies including OIPF (Open IPTV Forum), CEA, DVB and W3C. HbbTV provides the features and functionality required to deliver more advanced TV services and experiences for the future, typically areas are to replace the old EBU Teletext with a "superteletext", catch-up TV and on-demand services and other internet services with often a combination of classical broadcast and broadband delivery to the viewers. Utilising standard Internet technology it enables faster and easier application development for the broadcasters.

HbbTV applications are web-based applications using existing web Technologies; HyperText Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript. However HbbTV applications differ from regular web applications. HbbTV applications need to comply with different accessibility cases and HbbTV limitations.[12]

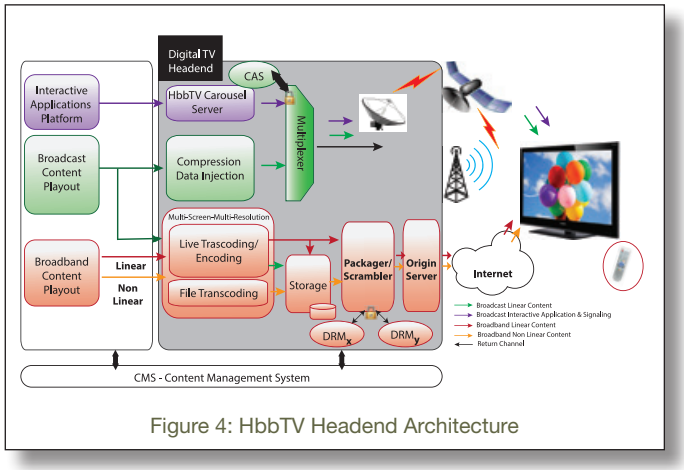

Figure 4: HbbTV Headend Architecture

Thus, existing online services can readily be adapted to the TV screen and service providers can more or less instantaneously provide services also for the TV screen. This allows the leveraging of synergy and effectiveness at the levels of conceptual design and application development as well as during integration and operation.

Deploying HbbTV application means dedicating bandwidth to these new services, 100 to 300 kbps to carousel an

application portal. The hybrid device (TV set or STB) is simultaneously connected to the broadcast network and the Internet. In systems where Internet connection is not available, applications like EPG, super teletext and news are still possible. If broadband coverage is not available and it may be preferable to broadcast more data through this HbbTV stream, e.g. full EPG or Teletext. In these cases the required bandwidth will be higher and can even reach 2-3Mbit/s per multiplex, for instance. [13]

HbbTV Services

HbbTV is a standard which allows TV and internet content to be linked via a television set. At the touch of a button on their remote control, the viewer can access information or complementary services, such as in-depth background on the current programme, video on demand, catch-up TV on demand, and sharing via social networks. It also makes it possible to interact with programmes themselves in the form of votes or the submission of questions. So, rather than being revolutionary, HbbTV is a pulling together of existing standards to create a platform designed to be straightforward to implement, and to enable easy development of applications.

Essential to HbbTV is a multimedia programme guide in which viewers will find content which doesn't reach the normal broadcast audience. For example in a live sports match spectators can view statistics, highligths, interviews etc. New TV will offer the most interesting moments of matches from your video archive. Also viewers will be able to vote and comment. when viewing the programme guide, being able to directly run trailers. An intelligent system can offer them related content, such as previous exerpts or other programmes with the same actors or director

Main Applications;

News, Sport, Stock Market etc. (figure 5)

Figure 5: HbbTV News Application

Video streaming applications delivering movies, tv shows and including trailer, rating, purchasing and visiting related contents features. Live, Catchup and VoD services, (Figure 6)

Games and competitions including quizs or puzzles. These applications can be related to the broadcasted event in order to enhance the user experience. Such as, chess or Sudoku [14]

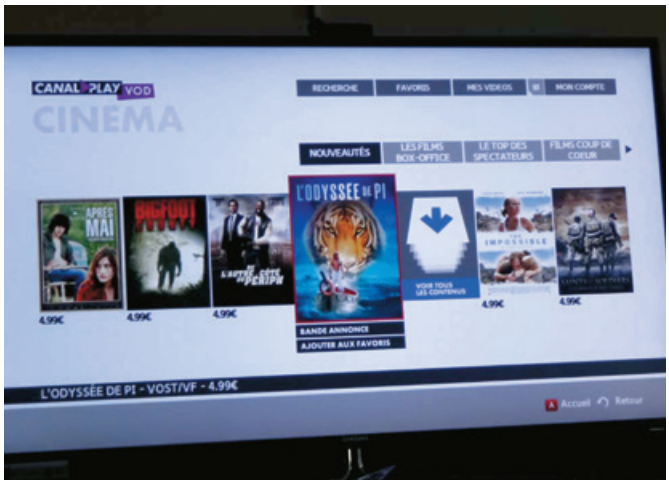

Figure 6: VOD application

Second Screen interaction applications; Video streaming applications delivering movies, TV shows, including second screen features to amplify information on a tablet, smartphone or PC.

Weather forecast, user can adjust their city,

Figure 7: Wheather Forecast Application

Design and development of live voting applications related with the broadcasted event,

Sponsor apps, instant advertisement and selling, (figure 8)

Figure 8: Commercial application

Enhanced Teletext,

Figure 9: Teletext application

Enhanced EPG; 7 days electronic programme guide features

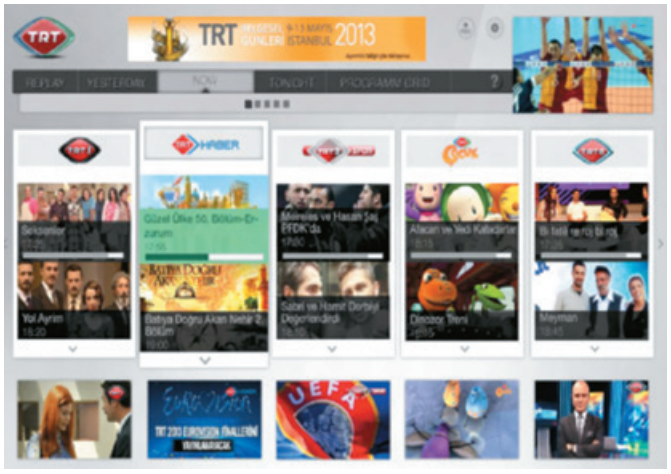

Figure 10: EPG

Live Sport statistics can be added

Figure 11: Sport Statisitcs

Social networks integration, instant messages, twitter, facebook etc.

Usability, Accessibility; These tools are different colour contrasts, font sizes, text to speech etc.

All these applications include integration with different backends like video, metadata and advertisement providers and servers.

Conclusions

TV applications are an efficient method of content delivery to end-users. In the fast moving world of Internet video services, HbbTV has gained wide ranging support from broadcasters, operators and technology providers throughout the world, and is the leading harmonising standard of broadcast, IPTV and broadcast entertainment delivery.

Through the adoption of HbbTV, consumers will be able to access new services. In addition to conventional TV, hybrid systems provide viewers with catch-up TV services, video on demand (VoD), interactive advertising, personalisation, voting, games and social networking as well as programme-related services such as digital text and EPGs.

A host of new attractive, interactive and personalised services as well as easy access to Internet services, comfortably all in one. Hybrid applications including different tools in order to improve the user experience and make the services available and accessible to everyone in any specific situation. HbbTV content can be either broadcast via DVB using DSM-CC object carousel or delivered via IP connection.

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Ruhi TAS, an Electronics Engineer. received his B.Sc. degree in Electrical and Electronic Engineering Department of Hacettepe University, Ankara in 1995. He has M.Sc degree in mobile learning subject (TheApplication of Mobile Information Systems Technology to Electrical and Electronics Engineering Courses) from same university and same department, in 2011. He worked as a project leader and developer in R&D department (TRT), and he is currently working in the IT department as a software chief engineer in TRT. Skilled in Microprocessor programming and hardware design, web programming ASP.net, C #, Silverlight, database design and he attended many courses related to web and mobile programming. He is working on the HbbTV Project for TRT HD channel.

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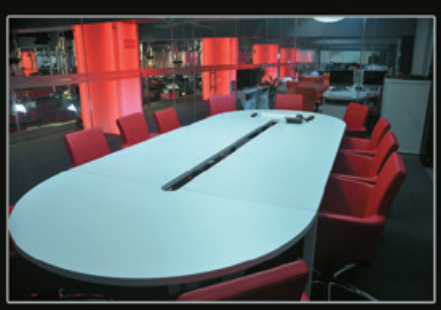


DBS 2014
– New Technologies Bring Profound Transformation, Deputy Minister says

By **Olya Booyar,**
ABU

The advent of new communication technology has brought a profound transformation in the way people communicate, the tenth ABU Digital Broadcasting Symposium was told.

In his opening address, Malaysia's Deputy Minister at the Ministry of Communications and Multimedia, Dato' Jailani Johari, said new technologies such as interactive TV and IPTV offered vast opportunities for public participation and engagement.

"Media use is expanded further and the time has come to examine the root and route of the communications and multimedia," he told delegates to DBS 2014 at the Hotel Istana in Kuala Lumpur. "The best place to start looking is the paradox of transformation."

He said Malaysia, like many other nations in the region, was very keen on the digital transformation of the broadcasting industry and had taken up the digital challenge.

"Our priority is to position the broadcasting industry in this country at the forefront of development and innovation in content, and we have made significant progress towards achieving this objective," he said. "To encourage and promote development of local content, the government is providing incentives to help nurture local entrepreneurs and producing products catering to the international markets."

Dato Jailani said that, to stay relevant, it was important for traditional media to persistently evolve and embrace the advent of new broadcasting technologies while remaining strong in upholding the ethics of public broadcasting, such as providing accurate news, respecting individual privacy, treating replies generously and listening to both sides.

Earlier, at the start of the symposium, Dato' Yasmin binte Tan Sri M Yusuff, one of Malaysia's best-known broadcasters, spoke in praise of radio.

"It's free, it's personal and it's always there," she said, though she warned that radio still needed to challenge itself to give people something they would not get from anyone else.

"Radio is still the biggest mood enhancer for people," she said, calling it a "Lifestyle support system".

Dato' Yusuff added that the rise of new technology had been predicted to spell the end of traditional media, but despite all the gadgets, the simple thing of listening to radio made people happy.

She said radio was still the most profitable mode of media; it was still free.

"It's not dying," she concluded. "It's evolving."

DIGITAL BROADCAST SYMPOSIUM 2014: Embracing Technological Innovations

Among the participants was Wayne Huggard, Transmission Services Manager at Television New Zealand. These are his impressions of the conference.

750 Delegates – 84 Speakers – 50 Countries

The 2014 ABU DIGITAL BROADCAST SYMPOSIUM was held from 4-7 March 2014 at Hotel Istana, Kuala Lumpur. This symposium, held once annually by the ABU, was the tenth symposium with the theme `Embracing Technological Innovations'. In this particular year, a total of 12 workshops were also conducted in conjunction with the conference including a pre-event, RTM-WorldDMB – ABU Regional Workshop and Demonstration, held on the 29 Feb-4 March 2014.

Session 1: System Standards – New Developments and Standards


Masakazu Iwaki


Femin John


Tuck Yee Poon


Kenichi Murayama

About every ten years there is a new compression format with about 50% improvement in efficiency each time. Femin John from ATEME, France, spoke of the development of HEVC which increases the options for encoding, giving reduced bandwidth and reduce content distribution costs.

Tuck Yeen Poon offered an overview of the BBC half-RF Radio Camera system. Mobile cameras that use a radio link are used for sports and special events broadcasts. However there is a limited number of channels available for these links. The half-RF system is a research project that goes back to the basics of RF and re-uses the enhancements of DVB-T2, in particular MIMO (multiple in, multiple out antennas) to provide a link in half the RF bandwidth.


Joan Warner


Colin Prior


Alexander Zink


Hermann Zensen

Phil Laven the Chairman of DVB asked if we need to take special measures to protect the future of terrestrial TV. He pointed out that free-to-air digital TV is the standard feature of modern TVs and is cheap for the consumer to receive. Broadcasters need to protect their spectrum by lobbing regulators and using spectrum efficiently. He revealed that 12% of the BBC's distribution costs are spent on online but deliver only 2% of the total viewing. 98% of viewing is still by broadcast.

NHK introduced their 8k Super HiVision system with 22.2 sound; to make you "feel that you are really there".

Kenichi Murayama asserted that Terrestrial Broadcasting is an integral part of society, therefore the next generation of Terrestrial Broadcasting should include 8K. NHK is making steady progress to realise SHV (8K) ISDB-T terrestrial transmission over long distances; using dual polarisation MIMO antennas with up to 4096 QAM to give 91.8Mbps over 27 km, a world first for 8K!

Emergency Warning System was a popular theme for several speakers:

Colin Prior described the Enensys Emergency Warning System for DVB-T2 and also an innovation that allows a DTH satellite distribution to provide a DVB-T2 input to DTT transmitters. The video based Emergency Warning System interrupts normal programmes in all services in the mux, but only at relevant sites. Thus all existing receivers are covered.

Joan Warner, representing both Commercial Radio Australia and World DMB, considered what is needed in a Broadcast Radio Emergency Warning System and demonstrated a proposed warning system. She further spoke of new developments in DAB+ standards, incorporating hybrid operation.

Alexander Zink gave an update for the DRM (Digital Radio Mondiale) perspective and stress the importance of an Emergency Warning System serving the needs of the hearing impaired and those speaking other languages.

An analogue topic concluded the session with Hermann Zensen describing DIGIDIA's synchronous FM headend to minimise interference between FM transmitters on the same frequency.

Session 2:
Going Beyond HD:
Opportunities and Challenges

Maintaining focus on moving objects is a particular problem in 4K production. Takeshi Shibagaki described Sony Corporation's newly developed products to support focus and other aspects of 4K in a case study of the FIFA Confederations Cup production. He also outlined '4K stitching' where two 4K images are stitched together to cover the whole field of play. An HD image can then be cut from the stitched image with flexible framing and zoom.

Jean-Paul Moerman (Salzbrenner Stagetec Mediagroup) listed the key elements to control loudness:

1. Uniformity in measurement
2. Using reference monitoring
3. Dynamic control
4. Listening to the content

His measurement of the sound level at which people listened to the News in their homes is 73dB SPL and 77dB pink noise will match this. He also drew our attention to reference standards EBU R128 and ITU-R BS 1770.

Won-Hyun Cho discussed KBS-Korea's experimental Terrestrial 4K UHD TV service and plans for some coverage of the Asian Games this year in the UHD format. He noted that, "Technical issues will always be solved by time and money". Korea has not yet decided on the use of the 698 ~ 806 MHz spectrum between LTE or UHD TV. In Korea this is called the "700MHz problem"! He suggested broadcasters should check their national situation regarding this.

NHK Japan is accelerating its R&D plans. The various targets for SuperHiVision (SHV) have been advanced and they anticipate a more usable 'Integral 3D' system in 2030. SHV is an 8k system with 33 million pixel resolution (7680 x 4320) for a 100deg field of view, with 22.2 sound.

Masakazu Iwaki spoke of NHKs Science & Technology Research Laboratories activities across all aspects of SHV, including production and compression with satellite, terrestrial, cable and IP transmission. An example of the IP work was the 2012 London Olympics, with Super Hi-Vision demonstration to screens in the UK, US, and Japan.

'Audio Objects' were discussed by both Toni Fiedler of the Fraunhofer Institute and Ignacio Sanz from Dolby Laboratories.

Fraunhofer is working towards an Immersive Audio for Next Generation Broadcast standards with H265 xHE-AAC. The goal is an audio system that is:

- Personalised
- Immersive, with the addition of height
- Adjustable to the environment; eg headphones v. room listening.

MPEG-H 3DA supports 'audio objects' which are sound elements that can be separated from the mix. For example, to allow viewers to select their own preference for dialogue level.

Dolby 'Atmos' employing Audio Objects has already been extensively used in movies and Dolby are now working to bring Audio Objects to the Broadcast world. They are also developing 'Dolby Vision' to improve picture quality with increased dynamic range.

Session 3:
Effective Business Solutions for the Evolving Media Market

Digital archiving is now a must for Broadcasters with data consumption doubling every two years; but we also hold extensive pre-digital content. Sanjay Salil described a complete archive digitisation process and solution from MediaGuru.

Stephen Lee of Conax asked what you should expect from your content security partner.

Charles Sevior pointed out that we now have to support the third platform of IT; the first was Terminals, the second PCs and now the third is mobile devices. EMC Isilon provides platform solutions for the file storage that is at the heart of 'tapeless' operation.

A solution of some of the issues Broadcasters in emerging markets faced when sourcing new systems was offered by Fintan McKieman. Ideal Systems can provide Automation, MAM, Playout, Newsroom, etc systems, all as software that can be run on locally purchased PCs; avoiding equipment shipping and importation problems and costs.

Aale Raza asked if 24 hour News Channels had had their day, now that on-line has become the main source of news for many people. He believes that hard news is what viewers want from us and news channels had to consider their ratio of Hard verse to Soft News. He offered a series of suggestions to revamp the newsroom to retain viewers.

Ruhi Tas gave an overview of Hbb and TRT's (Turkish Radio Television) Hbb project including a preview of their new EPG.

The conditions for 4K to be a success were considered by Andrew Yeo of APB magazine and challenged Broadcasters to, "Make haste slowly while keeping a close watch on your audiences." There is an opportunity at the intersection of Cloud Technology and Big Data Analytics. He ended the session with a call to, "Embrace Technology and secure a piece of the silver lining in the cloud!"

Session 4:
Future of TV Content

Session 4 was a time for Engineers to hear the voice of Producers.

Shigeru Iino is the Principal Programme Director of Science Programs at NHK-Japan. As a Producer he advocated the 'power of code'. Engineering has made new programme formats possible such as 'BitWorld' a children's program that uses multiple low-bit-rate sub-channels to achieve a 'game like' broadcast. However to facilitate these advances, there was a need for a conversation; a 'common language' between producers and 'geeks'.

Telecom Malaysia's strategy is to be a 'broadband champion'. It is moving into content with its 'Hyppy TV everywhere' offering. Jeremy Kung Eng Chuang referred to their exclusively produced local content, and premium live sport. Streaming TV that is "Prime time /any time /anywhere".

James Jinhak Jeon, a TV Producer at Korean Broadcasting System, has observed the disappearance of CD shops from Korea; to be replaced by streaming services. He also described how the Korean 'Idol' shows have changed the music industry. The music companies have changed the process of finding talent (singers) from 'hunting or fishing, to farming'. The development of talent has been de-risked into a factory system of audition, training, debut and independent unit. However he also noted that PSY and 'Gangnam style' was a success outside the factory system; thus, "Unique content can always succeed".

Channel 7 (Seven West Media) Australian is a new member on ABU. David Porter their General Manager of News & Public Affairs used DBS2014 to launch 'Media Beach'. This is a new international content exchange for the industry including the ability for live streams. Media Beach even includes a smart phone app so staff can directly send in field content. The platform is intended to allow uses to cost effectively buy and sell international news content.

Steve Ahern (Ahern Media & Training) spoke of audience divergence with large screens heading to high quality 4k image for group consumption while small screens and headphones were going to a personalises albeit low quality experience. The news cycle has become more complex with social media re-triggering stories and reactions through the cycle. With three or multi-screen environments there is now more than 24 hours of content consumption in a day. This is good news for broadcasters who are in the content business; however skills transfer is needed so that everyone in the organisation can contribute content. For example, camera operators can train everyone to frame a picture on their mobile phones. Staff also need the right apps and tools, such as external microphones for smart phones.

Session 5:
Spectrum for Broadcasting – Nexus in Regulation and Broadcasting

Session five focused on spectrum issues.

Col. Dr. Sukonrat Chairman of the NBTC Thailand Broadcasting Commission outlined his country's transition from 15 years of no regulation to a new regulatory framework. Commercial television licences have been allocated by auction and public broadcasting licences by a 'beauty contest'. Short 60 minute auctions were used to discourage over-payment and the proceeds from the auctions will be used for the broadcasting development fund.

A key insight from Matthias Stoll (Ampegon, Switzerland) was that 'free to air' broadcasting means there is no gatekeeper. He also noted that comparing AM with DRM; the new technology transmitters give significant efficiency improvements.

Simon Fell from the European Broadcasting Union warned of the need to maintain spectrum for broadcasting and reminded that mobile has not yet made a case for its spectrum demands. The 700MHz band is the current issue [for allocation between Broadcast DTT and mobile LTE] and no decision has yet been made at an EU level. DTT is still the most popular viewing platform in Europe. Most TV viewing is still linear and TV is the one truly converged device. Data costs and limits mean that consumers are not watching full TV programmes on mobile devices; but "there is no fair use limit on your TV set"

The other area of spectrum concern for broadcasters was covered by Lindsay Cornell, the BBC's Principal Systems Architect. This is frequencies for programme making and special events (PMSE) also known as radio cameras and radio microphones, OB or ENG for News and Sports. Radio links are needed to get close to the action and to allow people to move around. The links need to be high quality (for subsequent editing), and low delay/latency (especially for audio performers). The allocation to broadcasters is under pressure and has shrunk dramatically which has created uncertainty for users and manufacturers. Spectrum for broadcasting is important, PMSE is a vital part of broadcasting and we must make sure our governments understands the value and importance of broadcast spectrum at WRC-15.

Yahya Khaled provided an ATDI case study of the interaction between IMT and DTT in 800 MHz considering the beneficial effects of changing polarity and filters on the LTE transmitters.

Session 6:
Embracing Technological Innovations

The HiMotion II camera system is a collaboration between nac and Ikegami. The HiMotion was originally introduced in 2011 and has been used in major sports events since then. Hidetake Kimotsuki explained that the HiMotion II has a maximum frame rate of 1,000fps (1080i) and includes flicker correction but still has three sensors which give advantages such as matching with other camera types used in a production. The camera can operate either in stand-alone mode or as part of a multi-camera system.

Deutsche Welle delivers multimedia products in 30 languages from Germany. This includes 6 linear TV services in four languages across developed and emerging markets. Internet play-out has now been brought back in-house because of its importance; and Akamai provides the CDN. DW has implemented and extensive monitoring system to assure its international delivery. Oliver Linow concluded that, "If you want to reach the same level of Quality of Service for online distribution as for traditional broadcasting you have to be aware about the importance of monitoring and quality control from beginning to end."

Marc Wharmby, Vice President of Front Porch Digital discussed Cloud-based Technologies for Broadcasters. He described the different models of Cloud Services

- Public Cloud (e.g. Drop Box)
- Private Cloud – dedicated to one customer
- Hybrid Cloud e.g. load balancing
- Community cloud – a shared private cloud.

He also listed the advantages of Cloud Services as; faster to develop services, agility, global access and data protection. Particularly for broadcasters there are advantages in disaster recovery and for deep archiving. However there are challenges with security and access bandwidth.

Andy Stanton described how Wohler have engineered a mid-range solution for confidence monitoring for streaming and file based formats in familiar formats.

Gunnar Nessa gave a radical re-think of head-end design by Appear TV. By moving the router to the backplane with encoders and multiplex as modules, a dramatic simplification is possible with attendant improvements in performance and availability.

Jérome David from Thomson Broadcast reviewed the 'state of the art' in transmission standards with new HD services and telecom delivered IP services. He suggested that HEVC gave an opportunity for UHF spectrum sharing with 4G services. He proposed that DVB-T2 can provide a Hybrid broadcast and telecom service using the PLP (physical layer pipes).

Session 7:
Implementing Green Technologies: Effective Solutions and Case Studies

All the Transmitter makers stress the power and operating saving that are available from modern transmitters. Transmitter efficiency as both a cost saving to broadcasters and as a green technology was covered by both Martyn Horspool of Harris Broadcast and Nils Ahrens from Rohde & Schwarz. Martyn described several techniques for transmitter efficiency, but some are too complex to be practical yet.

However Harris has a new 'push-pull' design that gives a 33% power consumption reduction. Nils demonstrated the importance of transmitter efficiency to the cost of operation over the life of a transmitter and the break-even point for a modern transmitter to recover its cost. John Abdnour from Nautel went beyond the transmitter, to consider where Green technologies could be applied to the whole transmission site. He showed several examples of solar and wind power at sites. Modern tower lights can now be run at a fraction of former power costs. Better telemetry can reduce the need to visit transmission sites, thus using less fuel, especially for difficult to reach sites.

SFN networks require fine network planning and in some markets there is more competition 'on the air'. These are among the reasons why an accurate understanding of transmitter radiation pattern characteristics are important. Ground based measurements have limitations due to reflections and a limited number of possible measurement points. Helicopter measurement has been used, but this is expensive. Luc Haeberlé described Colibrex's use of an electrically powered 'drone' or remotely piloted aircraft to make airborne measurements and radiation pattern plots.

Optimisation of DVB-T2 network design was covered by Espen Myhre from Nevion. Reliable operation is dependent on good architecture. He also stressed the importance of the EPG for viewer satisfaction.

Shane Angelo (General Dynamics Mediaware) talked about working in compressed MPEG without returning to 'baseband' video. It is now possible to carry out all the normal channel operations (Logo insertion, switching, etc) in the compressed domain. This could provide several advantages including speed of turnaround and retaining highest available quality.

Session 8:
Multiplatform Delivery of Radio and TV Content

Hbb (Hybrid broadcast broadband) allows broadcasters to leverage their existing infrastructure to thrive in the broadband world. Reuben Verghese offered Accedo's 'fast start' templates to get running with Hbb. However, as well as the technology the correct services and partnerships are necessary and these can provide new revenue. TV commerce with one-click-purchase is one possibility. Hbb can put broadcasters back in control of next generation TV devices and services.

Broadcast is still the backbone of the Radio industry, but Joan Warner asserted that Commercial Radio in Australia capitalises on everything it can, including the use of Apps. Radio uses Apps for access; streaming to Tables and Phones until we get broadcast chips into these devices. Apps can also be used to add interactivity to extend the conversation with listeners.

The key to OTT video is using adaptive bit rate to eliminate buffering issues. However this is a complex process that fragments the content with multiple copies at different bit rates. Tektronix' Klaven Siow explained that both quality of experience and quality of service must be monitored considering the different bit rates, the media and the network.

NHK launched Hybridcast in September 2013 which provides viewers with the best mix of broadcast and broadband services. Shigeaki Mitsuya showed screen shots of the EPG with the past 30 days as well as seven days forward and including video on demand and catch up services. It also allows a second screen device to interact by WiFi to give program information and even TV remote control (volume and channel up/down).

Jin-Woo Kim told how KBS Korea also has its 'red button' service called 'iCon' The service is still at an early stage but version 2.0 is under development to also include second screen applications.

The final speaker returned to Hbb: Khush Kundi (Ericsson) gave a non-technical outline of how broadcasters can apply Hbb. for Interactive, catch-up and monetisation. Our viewers have more choice than ever before, "But it's not just about replication TV on the internet – its about creating a new experience!"

Session 9:
Industry Debate:
Embracing Technological Innovations:
What Can We Achieve in the Next Three Years?

Moderator ABU Technology Director Dr Amal Punchihewa asked, "What can we achieve in the next three years. The ABU would like to see each member have a plan for its future."

Following are some comments made by panellists.

Chris Grey, Sony: 4k will force the move from SDI to IP. SDI Engineers will have a steep learning curve if they are not already ready. Don't wait for 4k transmission before you start 4K production, so you will have your content ready.

Charles Sevior, EMC Isilon: had three observations: 1-People: Both Broadcast and IT knowledge are needed. 2-Process:

we must make more efficient processes. 3-Platform: There are now more outlets. Introduce file based workflows and get your metadata right. Get your big data right.

Joan Warner, Commercial Radio Australia and World DMB: The immediate issue is retaining a place for radio as an industry. We need to go to the Government to ensure we are not forgotten. Plan to go to the regulator with a digital plan.

Lindsay Cornell, BBC-UK: We need to do research into making life easier and satisfying for viewers and listeners. Broadcasters and the Broadcast industry as a whole need to represent themselves to government to prevent loss of spectrum. New processes and new workflow have saved the BBC money. Be aware of 700MHz issue.

Simon Fell, European Broadcasting Union: the 'trick' is to provide more and different content on DAB compared to FM. You need to be findable on relevant on all these platforms; your metadata must be right. Big Data is an important development and you need to keep across this. No one has really thought through production in 4K yet; for example are audiences ready for multiple images on one screen? Embrace the IP change and deliver great catch-up content to your audience.

From the audience,
Ian Bull, Radio New Zealand: We need to be prepared for disaster. RNZ is moving from having a dominant site to a multi-site operation.

Phil Laven, DVB: The challenge is switching off analogue. "Set a date and just do it."

Session 10:
File Based Workflow and Media Management Solutions

Jacky Chung introduced the Sony Optical Disc Archive system. He listed the requirements to consider for an archiving system: Reliability, Scalability, Compatibility, Efficiency, and your Liability (cost of ownership).

Stage two of NKK's transition to server based operational and archive was describe by Go Koshii. 'NDACS' is a very large system and it changed the workflow in News broadcasting dramatically with much faster editing, clip status information and metadata management.

Panasonic have a new concept: a 'media-less' field camera (PX270). Their aim was to reduce the data rate sufficiently to take advantage of cloud based operation via WiFi/3G/4G/LTE. Neil Ugo described a work flow where assignment metadata is sent form the station to the camera, all video shot is streamed back to the station as proxy and the TV station editor can immediately edit the proxy. The EDL is sent to the camera where it is auto-conformed and the finished clip is transmitted to the station in the camera's downtime.

Production workflow over the last 20 years was reviewed by Peter Bruce of Grass Valley and proposed a simplified workflow top give improved efficiency.

Session 11:
Digital Switch Over: Learning from Experiences

The first two speakers considered frequency and interference planning:

Milos Pavlovic described LS telcom AG work in frequency planning and to predict interference between LTE and DVB-T2 services; for example in the border region between Poland (DTT) and Germany (LTE). Degradation to the Television signal from LTE can be due to any of: overloading of the DTT receiver, co-channel or adjacent channel interference. It was encouraging to learn that under "provision 36 of the [German] national frequency band allocation mobile service must not cause any interference into the broadcasting service." Mats Ek Technical Director at Progira separated the interference issue into LTE uplink and downlink interference into DTT, to show the holes in the DTT coverage area that can be caused by mobile devices.

IP Infrastructure for the Future Broadcast Facility was the subject of the next two speakers:

The building blocks in a broadcast facility were set out by Glyn Bartlett, from Vector 3, to show an approach to redundancy management in a multi-channel where IP Infrastructure offer significant advantages. Evertz' Mark Moore, demonstrated a virtualised station environment using IP with 10GbE. This has the advantages of less cable with bidirectional and direct optical interfaces available. However to achieve this reliable, deterministic video paths are required that are seamlessly integrated into present control interfaces.

Then two speakers covered the testing and certification of DTT receivers.

Tatjana Medic described the 'reception solutions' Funke provided and stressed the importance of a good antenna and tested, certified reception equipment.

Pasi Toiva,from Finland's Labwise Ltd observed that without a fixed standard and testing regime the consumer market can have problems, especially with dynamic PSI/SI.

DBS Workshops

Report by **Jeewa Vengadasalam**
Deputy Director, Institute of Broadcasting and Information, Malaysia (IPPTAR)

RTM-WorldDMB-ABU DAB+ Technology Workshop:

Results and Next Step


Patrick Hannon


Dr Les Sabel


Kath Brown

This workshop was presented by Partrick Hannon, President WorldDMB; Zulkifli Abdul Rahim, RTM; Les Sabel, S Comm Technologies, Azlina Mohd Yusof, Malaysian Communications and Multimedia Commission and Kathryn Brown, Commercial Radio Australia. The discussion was on the field test results in Malaysia, DAB+ business case reviews, next steps to move forward, regulation,collaboration and commercialisation, rollout timing, geography and cost.

A DAB+ trial in the VHF band III Channel 11 A was conducted over the previous weekend using a 1KW main transmitter at KL Tower and five 50W repeaters located at several sites in the Klang Valley. The main transmitter antenna was a horizontally polarised 8 high stack of Dipole Panels and the repeater antenna was single log periodic. The demonstration was to investigate the Quality of different audio bit-rates and coding methods, impact of field strength on performance at different FEC code rates, complex multipath situations and dynamic environments. Simulation was also done and actual field trial results confirmed the coverage predictions. The results obtained were quite impressive despite the fact that there was Adjacent Channel Interference (ACI) from an analogue TV transmission on Channel 12.

Recommendations made are that: (1) Coverage prediction is essential for successful rollout. (2) Use map data that is appropriate to the area being planned. (3) Field strength planning levels vary depending on the type of buildings in the area. (4) Use field testing at the beginning to verify coverage planning data and parameters are appropriate. (5) Use field testing after broadcast system rollout to check coverage and tune the models.

The competitive landscape for broadcasters is changing with the advent of digital music services, smart devices and the competition for FM radio.The FM spectrum is crowded and there is no room for innovation. DAB+ can reap benefits by bringing in new audiences, revenue and extending coverage.

Graphically Rich Monitoring and AVB


Geoff Love

Geoff Love, Axon presented a topic on broadcast monitoring and control in which a complex workflow can be configured in a short amount of time. Events can be managed and reported using hierarchical system status. The control devices via intuitive and user friendly interfaces can maintain a workflow over its lifetime.

The increasing interest in 4K has required the need for larger bandwidth and SDI may no longer be practical. This uitilises a single wire for a single stream of video going in only one direction. For routing, a central cross-point based video router is used with all signals going to and leaving that central box. With an Ethernet based solution we will get a distributed, networkable, routing system where routing and transport are merged into a single layer infrastructure. However conventional Ethernet less ideal for a production environment as it is a best effort delivery strategy, non-deterministic with no concept of Isochronous Delivery and not content aware. Audio Video Bridging (AVB) is now available that can make reliable audio/video connections possible through a few additional protocols/technologies. It has specifications that will allow time-synchronized low latency streaming services through IEEE 802 networks.

Next Generation Format XAVC Workflow for 4K and HD


Takeshi Shibagaki

Presented by Sony, this workshop focused on production and editing equipment for 4K. The differences between 4K and HD workflow was discussed and this session was mainly a practical demonstration. There was considerable interest generated as broadcasters want to be futureproof by being 4K ready when they purchase HD equipment.

Digital Broadcast – The Role of Efficient Multiplatform Ecosystem and Technologies

The presenters were Tony Moran and Khush Kundi from APAC, Ericsson, who discussed consumer & technology

trends and architecting for change. The key trends are the growing importance of mobile devices, linear TV is coming under pressure and the emergence of aggregated, pick-and-mix solutions. Mobile TV makes TV viewing a continuous activity and are second screens during multitasking. The traditional way of viewing is losing momentum except for live TV junkies and sports fans. Consumers are looking for one simple and personalised experience that combine their TV, content and services.

Tony Moran

Khush Kundi

High Efficiency Video Coding (HEVC) is ten times more complex than AVC but it can reduce SD bit rates by 40%, HD bit rates by 50% and UHDTV by 53%. Among HEVC features are that it uses 64x64 block sizes and 35 Intra modes compared to 16x16 block size and 9 Intra modes for AVC.

MPEG DASH has been standardised for adaptive streaming and offers several advantages over legacy streaming. It is has common encryption, separate metadata and easy time shifting. Many international organisations including Microsoft and Google are supporting the MPEG DASH initiative.

Experience How WASPD 3D is Changing the Real Time Content Creation Strategies

Tushar Kothari

Tushar Kothari demonstrated the capabilities of the graphics system which reduces the complexities of end to end content creation and on air delivery. The aim is faster content creation and easier data integration in quickly delivering in depth, visually stunning and sophisticated news presentation in real time. Its applications include custom made presentations of News, Sports, Elections and Weather.

Spotlight on Fast and Portable Baseband Health Check Solution

Mohd Fauzi Kamaruzaman

There are many aspects of a health check of a studio broadcast chain as stated in this workshop by Mohd Fauzi Kamaruzaman, Tektronix. During the ingest and production, the technical parameters examined include Video Levels, Gamut, Black/Frozen frames and Audio Levels. Monitoring is very important as the broadcaster has to comply with regulations laid down by the individual country such as subtitling and closed caption. Furthermore, there would be loss of revenue from picture loss or advertisement not played out correctly.

Dolby Audio in DVB-T2, HbbTv and Case Studies

Greg Price

Jerry Gui

Dolby has created a complete technology system for the conveyance of mono, 5.1 and 7.1 channel Surround Sound through content creation, distribution, transmission, and presentation in the consumers home. The Dolby system comprises of 1) Bitrate reduction codecs and matrix encoding 2) Metadata to provide a controllable, predictable, and enjoyable listening experience in a variety of listening and monitoring environments and 3) Loudness measurement for proper usage of key metadata parameters.

DVB-T2 and Two 4K Services over DVB-T2 and DVB S2

Michael Van Dorpe

Colin Prior

Phil Laven

The presenters were Phil Laven, DVB, Colin Prior, Enensys Technologies and Michael Van Dorpe , Vilage Island. The technical parameters of DVB-T and DVB-T2 were compared and the utilisation of Low Density Parity Check Code (LDPC) for the Forward Error Correction Subsystem, 256 QAM Constellation mode and FFT size up to 32K was highlighted. DVB-T2 is also future proof as it has the capacity to deliver two UHDTV 4K services, as evidenced by the demonstration held in the workshop hall. DVB S2 with 8PSK modulation and capacity of 40-58 Mb/s was used to downlink two 4K services, each at 19Mb/s HEVC bitrate, to a DVB T2 transmitter at the DBS Symposium hotel site. The DVB T2 transmission parameters were 32K FFT, 256 QAM and payload of 40 Mb/s

4k Ingest & Distribution

Tuck Kay Chan

Li Bin Eric

Chao Yin Loong

Tuck Kay Chan, Li Bin Eric and Chao Yin Loong of Rohde & Schwarz presented this workshop. UHDTV or 4k provides more immerse and captivating experience for the viewer. There is already a trend to increase the display dimensions

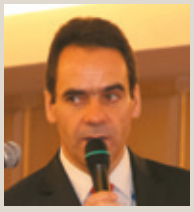
and resolution. Several TV manufacturers have presented displays of 60 to 180 inches that offer a wider viewing angle of 550 for UHDTV compared to 300 for HD. The viewing distance for UHDTV is 1.5 x picture height compared to 3x picture height for HD. Colour space parameters also increase with the adoption of BT 2020 with 10 & 12 bit sample whereas the existing HD uses BT 709 with 8bit sample.

'DRM – The Unique Benefits for Your Needs'


Lindsay Cornell


Alexander Zink


John Abdnour


Matthias Stoll

This workshop was presented by Alexander Zink, Fraunhofer; John Abdnour, Nautel; Matthias Stoll, Ampegon AG; Hermann Zensen, DIGIDIA and Lindsay Cornell, BBC.

When DRM was created in 2001, AAC with SBR was the best codec available, but needed more than 14 kbps to work. The most robust DRM modes only provide around 10 kbps payload in a 10 kHz channel. The speech codecs allow DRM to carry audio in these robust modes and multiple services in less robust modes. The DRM core standard provides choice of three MPEG audio codecs: HE-AACv2 (general-purpose, i.e. all kinds of audio signals), CELP (speech content only), HVXC (speech content only). With advances in audio compression, improved codec are available: xHE-AAC, AMR-WB+ (speech) and HE-AACv2 (general audio). Anticipated applications include media download to mobile devices and digital radio.

With Extended HE-AAC (xHE-AAC), there is no need to restrict content to speech only in very robust modes. Broadcasters can deliver their normal programming even when they are using NVIS or multi-hop around the world. Opportunities are available to provide multiple audio services in good audio quality even in standard 9kHz MW channels. Broadcasters can provide alternate programming like news in different languages simultaneously but with all their usual jingles and sound beds.

Media Beach: The Industry Marketplace for High-Speed Delivery of Broadcast Quality Content Across the Globe

The presenters were David Porter, Seven Network, Australia and Colin Grimes, VideoShip, Canada. The current trends are


David Porter


Colin Grimes

that there is maturity of file based workflow & IP transfer which enables opportunity for direct relationships globally. There is a need for integrated networks as there are ever-increasing demands in newsrooms for bulletins, specials and live breaking news. A media industry gap exists during content exchange for broadcasters & contributors and the need for broadcast quality files and live streams together with high speed transmission.

Accelerated File Transfer using proprietary acceleration technology enables all file transfers to be as fast as possible – regardless of account type or workstation/desktop being used. The infrastructure incorporates cloud transcoding of the highest broadcast quality that can handle standards conversions such as NTSC to PAL and vice versa.

DigiTAG Workshop


Simon Fell


Tatjana Medic


Paul Higuera

This DigiTAG workshop was presented by Simon Fell, EBU; Tatjana Medic, Digitag and Paul Higuera – Digital TV Labs. The key priority of DigiTAG are to create momentum around, and to raise awareness of the importance and need for, terrestrial broadcasting (and spectrum) as a service worldwide. Concern was raised about the release of spectrum in 700MHz band which represents typically 24.5% of the total allocated to terrestrial transmission. No decision at EU level has yet been made and significant issues would result from the release of this band from current use. Serious consideration needs to be given to compensation for any move . Considerable costs would be incurred by citizens and industry from such a change of use. Terrestrial Broadcasters also need certainty regarding the rest of the UHF band in order to continue to innovate and develop their services. The future use of the UHF band must be considered in the wider context, taking into account all technologies and frequency bands available to deliver services to consumers.

The twelve workshops that were conducted at the Digital Broadcast Symposium 2014 provided an in-depth knowledge of the latest developments, management techniques and opportunities in the broadcast industry.

INDUSTRY DEBATE:

Focus on What can be Achieved in the Next Three Years

Moderator:
Dr Amal Punchihewa

Panel Members:
Chris Grey, Sony; **Charles Sevior,** EMC2; **Joan Warner,** CRA; **Simon Fell,** EBU; **Lindsay Cornell,** BBC;

The ABU represented by the Dr Amal Punchihewa, Director of the Technical Department lead the debate by posing the question, 'What can be achieved within the next three years?' Chris Grey responded by stating that the next step would be larger screens and higher resolution formats 4K and 8K. This requires installation of facilities that would accommodate the higher bitrates and IP technology would provide the solution. Integration between IT and broadcasting should take place with the use of 6G SDI as a single cable solution.

Charles Sevior touched on the issue of people, process and places. The skills of IT staff and broadcast staff have to be merged as there is a rapid move to IP. The staff have to learn new technology but not lose skills. Process is the change in operation from linear tape to file based systems. The IT platform brings with it the need for new storage, which can be cloud based.

Joan Warner stated that radio broadcasters must retain their place in the communication and multinational sector. Radio tends to be forgotten and broadcasters must remind the government to focus on the future of radio as social media cannot deliver everything. Regulation is needed to ensure that digital radio chips are incorporated into phones.

Simon Fell commented that Norway has switched off FM Radio and is using DAB+. Norway being a mountainous region cannot use satellite effectively as there is considerable amount of blockage in terms of Line of Sight. He also said that car manufacturers must make new cars with DAB+ radio tuners so that emergency features and traffic and travel information are available during a drive through tunnels in the mountains.

Lindsay Cornell debated on the issue that broadcasters have no strong voice at the ITU administration. The broadcasters had taken for granted that the spectrum initially allocated was their right for life and had become complacent. There is pressure on the VHF spectrum that rightly belong to DAB+.

The comment from Phil Laven was that the real test is whether analogue can be switched off. Nations must have a plan on ASO and show the plan to the government . He also emphasised that it is now important to have 4K content and pointed out that many 4K cameras are being sold.

Exhibition

The ABU Digital Broadcasting Symposium 2014 recorded its highest number of exhibitors this year with WorldDMB, Sony, Grass Valley, Harris, EMC Isilon, ATDI, Rohde & Schwarz, Playbox Technology, Measat, Nautel, LS Telcom, High Definition Technology, Content+ Technology Asia, Front Porch Digital, Kathrein, Orban, Light Way Electronics, Wohler Technologies, Asia-Pacific Broadcasting, Gencom Technology, Tektronix, Calrec Audio, Bessar, Thomson Broadcast, Radio Frequency Systems, Canara Lighting, ELTI, Nera, Spinner, Ideal Systems, Enensys, Mahajak & Studer, Appear TV, Dimetis, RTM, Axon, Stagetec, Canon, WASP3D, Lynx Technik Pte Ltd, APT, Whiteways, Skyline Communications, Aviindo, Village Island, Nevion, MSA Focus and Conax.

The exhibition, which spread over two halls, displayed advances in technology and solutions from leading manufacturers, system integrators and service providers. The exhibition was attended by over 1000 professionals representing broadcasters, regulators, Telcos, media faculty students and other industry players. This was a great opportunity for the visitors and manufacturers to meet, share their experiences and interact with each other.

The key products on display were broadcast transmitters, cable and antenna systems, multimedia software solutions, measuring and monitoring devices, file processing equipment, digital radio devices, network and frequency planning solutions, advanced cameras, latest audio systems, workflow solutions, multimedia content production, advanced DVB-T2 systems with 4K video transmission systems and OTT distribution over internet. Also, well-known media providers were present in the exhibition and provided a different perspective to the event.

10th Global Shortwave Coordination Conference

The 10th Global Shortwave Coordination Conference was held from the 20th to 24th January 2014 in Kuala Lumpur. The event was attended by over 100 frequency managers representing over 50 shortwave broadcasters and operators. The Global Coordination meeting is the joint meeting of the three coordination groups, HFCC from Europe, ASBU from the Arab States and ABU-HFC from the Asia-Pacific region. Together these groups comprise around 90% of the world's shortwave radio broadcasters. The joint meetings are held once every year and are hosted in the Asia-Pacific region every other year. The three Groups, as a whole, deal with reduction of interference on frequency channels used for around 5000 shortwave radio transmissions that are put out by the broadcasters' every day.

Speaking at the opening session of the conference, Oldrich Cip who chairs the High Frequency Coordination Committee (HFCC) said that shortwave radio was important for travellers and isolated people, and it reached across the digital divide to the most disadvantaged and marginalised societies. The International Federation of Red Cross and Red Crescent Societies had underlined this role of wireless radio in the 2013 World Disaster Report, saying that, "Marginalised populations might not have the money or the knowledge to take advantage of the digital revolution". The report noted that with only six per cent of people in low-income countries using the Internet in 2011, the digital divide was still stark and therefore access to low cost media technology was really the key. Mr Cip also urged the conference that effort was needed to ensure that terrestrial broadcasting was part of the framework of the Global Strategy for Disaster Risk Reduction. The session was also addressed by Mr Bassil Zoubi, Head of Transmission at ASBU and Chairman of the ASBU coordination group. He said "Shortwave programs will continue to be vital in addressing and communicating with some important parts of the world, especially with Internet penetration in the Arab countries around 34% while in some other parts of the worlds it is less than 10%". From the host, ABU Director of Technology, Dr Amal Punchihewa, reiterated that the ABU will continue to work with its partners to ensure this technology will survive and thrive for the benefit of the populations, in times of crisis, in areas of isolation and at the most vulnerable times.

The Steering Committee of the ABU-HFC Group also had its regular meeting to discuss issues surrounding shortwave in this region. Several important issues were discussed including the move to digital, specially on shortwave platforms, the need to support HFCC and the coordination process and how to improve member coordination and contact within the group as some of the bigger broadcasters do not actively update and coordinate their schedules. The group also nominated the Members of the Steering Committee for the next two years.

The meeting also discussed more on the DRM platform, as it is the most viable solution for shortwave broadcasters to go digital. The meeting requested the possibility of getting more information on its implementation as well as sharing the experience of broadcasters who have already implemented DRM, such as India and Malaysia. It also raised concerns regarding the availability of DRM receivers, which will play a key role in its roll out. The other topic widely discussed was the role of shortwave radio in disaster early warning and mitigation efforts.

The 5-day conference also had meetings of the associated groups on the sidelines. These include the Group of Experts (GOE), Meeting of the ASBU coordination group and the meeting of the ITU representative and the regional coordination groups. These sessions discussed a number of tasks and activities to help improve shortwave broadcasting and make it more relevant as well as ways to increase listenership.

As usual the meeting had parallel training and workshop sessions conducted by experts. These workshops sessions help participants, especially those who are new to the shortwave coordination process and the use of the software tools, to understand the basics of shortwave operations and how the software tools help in generating the required schedules. It also helps and guides the less experienced participants on how to approach and read the collision lists to improve their schedule and to reduce interference.

The global meeting was hosted by the ABU on behalf of the ABU-HFC group. Shortwave Coordination is a bilateral process in which the frequency managers adjust their frequencies to accommodate each other's transmissions. This process is supported by a complex technical evaluation and validation process, the latter requiring advanced software tools and fast computing facilities.

RTM-WorldDMB-ABU DAB+ Technology Workshop and Transmission Demonstration Report

Radio Television Malaysia (RTM), the WorldDMB, the Tun Abdul Razak Institute of Broadcasting and Information (IPPTAR), Commercial Radio Australia (CRA) and the ABU organised a successful four day DAB+ Technology Workshop and Transmission Demonstration in Kuala Lumpur from February 28 to March 4, 2014. This event showcased the DAB+ technology standard and its transmission techniques, demonstrating its features and efficiency improvements compared with analogue FM broadcast.

The workshop, organised in the lead-up to the Digital Broadcasting Symposium 2014, held from 4th to 7th March, was attended by more than 130 delegates from 18 countries and reflected growing interest in the digital radio and DAB+ standard in the Asia-Pacific. DAB+ equipment was displayed and experts from Australia, France, Germany and Singapore demonstrated tools and equipment. Delegates gained first-hand knowledge of the transmission equipment and experienced digital-quality audio and the new features of a wide range of receivers.

a 1-day transmission trial and field measurement exercise in and around the city of Kuala Lumpur plus a half day session to discuss the results of the test. The first day of the workshop provided an overview with up-to-date information on planning and digital radio implementation, benefits of DAB+ digital radio services, receiver availability and functionality, automotive receivers, smartphones, radio apps and information on the cost savings offered by transmitting via DAB+. Participants experineced a live demonstration of DAB+ receiver capabilities such as automatic switching from current on-air programming to an emergency warning and a new categorised slideshow feature. The second day involved discussion of aspects of infrastructure system planning, structure of DAB+ broadcasting, transmission, RF planning, network planning, system construction and operations and maintenance.

A one-day live drive test trial enabled delegates to listen to DAB+ transmissions on air in Kuala Lumpur and some adjacent areas. Two coaches transported over 60 delegates on the drive tests and they were able to tuned in to a live DAB+ transmission from the KL Tower and a number of repeater sites around the city, providing invaluable insight on the many factors to bear in mind when conducting field tests.

The workshop achieved the aim of equipping the participants with expertise in the area of digital radio broadcasting, helping them towards carrying out similar implementations. This included the provision of a set of recommendations for broadcasters and regulators to consider when planning the digitalisation of radio in their own countries.

Director of Technology at the Asia-Pacific Broadcasting Union Dr. Amal Punchihewa highlighted the need for having a clear plan and strategy in digitalisation of radio broadcasting. “It is important that we use the limited resources we have efficiently to serve communities,” he said.

He added that commitment from all parties, including regulators, public and commercial broadcasters and receiver manufacturers, is paramount for a successful roll out of a digital radio broadcasting, as it was with television.

The field-test results and discussion session presented the results of successful broadcast trials of DAB+ in Kuala Lumpur, included an investigation into the next steps to move forward with DAB+ implementation, looking at regulation, collaboration and commercialisation as well as business cases for digital radio, network roll out planning, geography and costs.

WorldDMB President, Patrick Hannon said: “Commitment from all parties including regulators, public and commercial broadcasters, receiver manufactures and retailers is paramount for a successful roll-out of DAB+ digital radio. Now is the time to tell your regulator about your spectrum and network planning requirements for digital radio so that the regulator can develop a policy framework that paves the way for a digital radio future.”