



Asia-Pacific
Broadcasting
Union

Technical *Review*

No.261 January-March 2015



ABU Digital Broadcasting Symposium 2015: Full Report Inside



DIGITAL BROADCAST SYMPOSIUM 2015: Enabling Change Smartly

Report by Jeewa Vengadasalam

Specialist II, Department of Electrical & Electronic Engineering

Lee Kok Chiang

Faculty of Engineering & Sciences,
University Tunku Abdul Rahman, Malaysia

The 2015 ABU Digital Broadcasting Symposium was held from 2-6 March at Hotel Istana, Kuala Lumpur. This symposium, an annual event organised by the ABU Technology, was the eleventh with the theme 'Enabling Change Smartly'. The symposium consisted of four days of workshops and exhibition and a three-day conference.

A full day DVB-T2 workshop focusing on Technologies and Implementation was conducted on 2nd March. On 3rd March, four workshops were conducted by Ericsson, MediaGuru, WASP3D and WorldDMB.

DBS Conference

The three-day conference, having a total of eleven sessions provided a unique opportunity for participants to have access to information on various aspects of broadcasting, ranging from terrestrial to satellite.

Opening Session

The Industry Keynote address entitled 'How Asia Pacific Adoption of DAB+ Helps Drive Innovation for Broadcast Radio Around the World' was delivered by Joan Warner representing the principal sponsor, WorldDMB. She related from her experience that radio is the most trusted of all media and broadcasters should push their services to the discerning public. In tandem with population growth, is the increase in energy consumption and digital broadcasting

can provide the solution as it needs lower power and less space. Radio reception in cars is also an important factor to take into account as time spent in traffic on the roads is substantial. WorldDMB is willing to give advice and help to broadcasters who have the intention of starting Digital Radio transmission and is also planning a think tank for the region.



Ministerial Session

"The ABU Digital Broadcasting Symposium 2015 was officially opened by the Deputy Minister of Communications and Multimedia of Malaysia. Dato' Jailani Johary. He congratulated ABU for organising the symposium and said that his ministry is happy to support and be part of it. The Government's vision, he added, is to provide free-to-air DTT transmission offering new and sophisticated content to 98% of Malaysians by 2017. In his opening remarks, ABU Secretary General, Dr Javad Mottaghi recalled the main task for broadcasters is to deliver content and to reach the public. To do so, spectrum is of vital importance, he said."



Session 1:

Evolving Technologies



Masakazu Iwaki,
NHK-Japan

Dr Hiroshi Shimamoto,
NHK-Japan

Craig Todd,
DOLBY

The first session was chaired by Masakazu Iwaki, NHK-Japan and the panelists were Dr Hiroshi Shimamoto, NHK-Japan; Dr Peter Siebert, DVB Project Office; Femi John, ATEME; Lindsay Cornell, BBC UK; Craig Todd, Dolby and Ruxandra Obreja, DRM Chairman. They looked at the various broadcast technologies evolving over the years and now reaching a mature stage. UHDTV conveys to the viewer the sense of being there, and a sense of reality, as if the viewer were watching a real scene. There are more pixels in the 8K mode with 7,680 x 4,320 pixels, better pixels with a wider colour gamut of 12 bits/pixel are used and faster pixels at 120 frames/sec. The strong sensation of reality is produced by the increase in the Field of View (FOV) to 100° and the higher pixel density of 8K, which results in a pixel structure that is imperceptible, even at close viewing. The high frame rate portrays better and smoother motion while the wider colour gamut allows almost all surface colours to be reproducible. The sound system has been improved with a 22.2 multichannel 3D surround sound system that complements the visual sensation of reality.

Over the past decade, DVB has improved transmission standards from DVB-S, DVB-C and DVB-T to DVB-S2, DVB-C2 and DVB-T2. These developments have kept in line with improvements in ITU and MPEG video coding standards that evolved from MPEG-2 for SDTV, H264/AVC for HDTV now H265/HEVC for UHDTV. The latest development, H265 is able to reduce the bitrate by 50% when compared to H264 whilst maintaining the same picture quality. The next generation of coding standards is expected to materialise around 2023. DVB-S2 was improved but since the change was not significant enough to be classified as revolutionary, the new standard was named DVB-S2X. Tomorrow's receivers will incorporate the H265/HEVC chip, capable of decoding HDTV formats up to 1080P, 60Hz and during Phase-1, the UHDTV formats up to 2160P, 60 Hz. Phase-2 will have more features, including a higher frame rate of 120 Hz, higher dynamic range and an advanced sound system. In the pipeline are the next generation subtitles, specifically for UHDTV. Additionally there will be a common Interface, CI Plus v2.0 and a new Emergency Warning System that wakes up the receiver.

Hybrid Radio is the combination of broadcast and IP where the precise mix depends on the broadcast technology and the broadcaster's requirements. ETSI has published some new standards on RadioDNS that transforms metadata into web addresses, Hybrid Slideshow that allows connected devices to access customised images via IP and Hybrid SPI or Service Programming Information which is the combination of the broadcast EPG and IP Radio EPG into a single XML document. Of significant interest is in the personalisation of radio reception that context and user preferences can bring.

Session 2:

Delivery of Beyond HD Resolution



The Chairman was Dr Peter Siebert, DVB Project Office with the panel comprising Dr Masayuki Sugawara, NHK STRL; Keong-Seop Kim, KBS Korea; Koji Kumano, Sony; Oliver Linow, Deutsche Welle and Tommy Ng, AsiaSat.

UHDTV offers a wider field of view (FOV) from 300 to 1000 with more pixels and now there is to be further improvement with High Dynamic Range. HDR prevents loss of detail in the dark areas and also reduces highlight compression. Experts have expressed two views on the reasons for the current practice of highlight compression. The first view is that the current DR expression has been based on the limitation of the maximum luminance of CRT display, which is around 100 cd m⁻². The second view is that optimal highlight expression, as the current highlight-compressed DR expression, provides visual comfort. Two solutions have been proposed by either using the 'absolute' luminance approach or 'relative' luminance approach for HDR. The former approach specifies a larger absolute luminance range that requires the Electro Optical Transfer Function (EOTF) to be included as part of the specification but without the need to include the Optical Electro Transfer Function (OETF). The latter approach specifies the signal range for highlights that requires the OETF to be part of the specification as consistency of programme quality is necessary. ITU-R is studying the matter and ABU members are invited to participate in the discussion.

The price of UHDTV receivers has become lower than HDTV sets, and UHDTV can therefore no longer be regarded as a premium service only for privileged. 56% of Korean viewers prefer UHDTV via terrestrial delivery and content is readily available as costs of production have come down over the past few years. Between September and December 2012, Phase-I UHDTV was conducted with the world's first terrestrial 4K 30P on air trial using DVB-T2 256 QAM and HEVC source coding. From May-October 2013, Phase II took place, with 4K 60P again using DVB-T2 and HEVC coding. Phase III ran from May to December 2014, with live broadcasting of sports events including FIFA World Cup. The Korean 4K Roadmap has been drawn up for a period of 20 years. By 2019, 80% coverage is expected by targeting major cities and metropolitan areas. 40% of the programmes will be in UHD and indoor reception will be available. By 2024, nationwide coverage is projected where 90% of the content will be in UHD and mobile reception included. In the year 2025, HDTV will be terminated and preparation for 8K transmission started.

UHDTV brings about many challenges not only for terrestrial broadcaster but also the satellite industry. One of the key

factors is bandwidth limitation of the transponder which has to be overcome by a better transmission technology. The improved DVB-S2X uses 16 APSK and a 5% roll off factor resulting in efficiency improved by almost 40% when compared to DVB-S2 with 8PSK and 20% roll off factor. The combination of DVB-S2X and HEVC source coding allows even more UHD channels to be transmitted.

Session 3:

New Business Models



Chaired by Joan Warner, WorldDMB, the panelists were Dr Les Sabel, Commercial Radio Australia; Peter Bruce, IABM; John Kjellmo, Conax; Sanjay Salil, MediaGuru and Steve Ahern, Ahern Media & Training, Australia.

Interactive radio or Hybrid Radio would be the vision of the future. Content for Hybrid radio can be delivered by broadcast or IP more efficiently compared to streaming which costs both broadcasters and listeners. Not only that, streaming content one-to-one costs more than broadcasting it one-to-many. Another factor that needs to be taken into account is that streaming on mobile is not robust. Hybrid Radio utilises logos that adds visual branding and enabling easier selection of service. There is faster access to online content associated with broadcast delivered content. Advertisement value is enhanced because of the potential for a 'click through' sales model. Hybrid Radio brings in more revenue as it adds links to specific products and services offered by the sponsor. The key business drivers are improvements in branding, value added services, listener loyalty and interactive participation.

The traditional radio/music business model was compared to the streaming music business model. The traditional model identifies a target audience, promotes to them and plays whatever music they like, while mixing it with personalised information and advertising. Transmission is free to the listener and the broadcasters conduct surveys on listener consumption habits using sampling methodology. The broadcasters also pay the musicians a share of the revenue, defray other expenses and keep the profit. The streaming music model identifies a target audience and gives them a free app and some access in return for their personal information and consumption habits. It allows them choose music they like and helps them with music selection if they need it. It advertises to them or let them have ad-free listening if they pay a subscription. The operator also pays the musicians a share of the revenue and defrays other expenses.

When streaming started, there were no ads and music was delivered via a computer. The operators thought they would set up a 'rent the music' business model with subscriptions.

However faulty download system caused buffering and the audience was too small. Only few streaming companies could survive, radio broadcasters thought it was a threat and the record companies could not anticipate its effect on them. Now the scenario has changed with more ads that can be specifically targeted and the music can be delivered both by computer and mobile, resulting in music in your pocket. The subscription business model is only activated by about 10% of users and the main income comes from gathering and using audience data. Marketing data is the big game and is increasingly seen as a 'digital business'. The delivery system has been perfected as the buffering problem has been solved with new technology. There is a large audience and many streaming companies but the threat to radio is not as bad as many people think.

Session 4:

Content in High Definition



The session was chaired by Jack Nadarajah, Radio TV Malaysia and the panelists were Ajeet Khare, Canara Lighting Industries; Ryoong Sang Yoon, Korea Broadcasting Service and Yun Hwan Jeong, ABU.

At present studios worldwide are using hybrid lighting comprising Halogen and CFL (Compact Fluorescent Lamps) which generate excessive heat as well as high power consumption. The heat causes discomfort to the presenters and powerful air conditioning is required. Frequent & costly lamp replacement is needed resulting in high maintenance costs. Furthermore there is a health hazard in the form of Ultra Violet emissions from the lamps.

Future LED Technology has lower power consumption at only 20% as there is no loss due to heat radiation. Lamp lifetime is much longer at 50,000 hours with consistent colour temperature and no UV emissions. Less input power for the LED leads to lower cable ratings and smaller power distribution panels. The physical size of air conditioning plant is reduced by 50% and hence the power is similarly reduced. Separate dimmers and colour gels are not required as RGB versions of LEDs are available to generate the combination of colours needed. The studio is also cooler and more comfortable for the presenters. Although the initial cost of equipping a studio with LED Technology is higher, the yearly savings in reduced maintenance expenses results in higher Return on Investment (ROI). LED Technology represents Green Technology and is eco-friendly because fewer lamps are discarded due to their longer life spans. Furthermore, the Greenhouse effect is minimised and, being mercury free, it is non-toxic.

Session 5:

Spectrum



Kanit Sunchatavirul, NBTC-Thailand; Yahya Khaled, ATDI; Hj Aisharuddin Nuruddin, MCMC; Yushiro Kushiro, NHK-Japan

Chaired by Kanit Sunchatavirul, the panelists were Kath Brown, WorldDMB; Yahya Khaled, ATDI; Hj Aisharuddin Nuruddin, Malaysian Communication & Multimedia Commission; Yushiro Kushiro, NHK; Luc Haerberle, Colibrex LS telco and Lindsay Cornell BBC UK/DRM. Radio is the only mobile mass medium with robust networks and wide area coverage. There is no cost to the user and it engages the community with its programmes ranging from talk shows, quizzes and on air announcements. Radio has the right to its share of the allocation of spectrum and should not be taken for granted even if it is free. On the other hand, Telecom operators charge for carriage, content and devices. Therefore, they can afford to pay well for spectrum, which the Governments are keen to sell to the highest bidder. When comparing broadcast and smartphone coverage, it should be realised that when more people listen to the radio there is no impact on the network. In the case of smartphone, when more people listen on mobile, a denser network with more spectrum is needed. Briefly put, a smartphone is spectrum hungry and a denser mobile network requires more towers. Mobile Broadband can't do what radio can because one-to-many distribution is cost effective. 4G advanced LTE cannot replace broadcast.

The broadcasting service in Malaysia operates in the 174- 230 MHz VHF band and 470-742 MHz UHF band. After ASO and frequency re-stacking exercise, the DTT service is to operate within the frequency band 470MHz – 694MHz. The Malaysian Communications & Multimedia Commission (MCMC) mandated the DVB-T2 standard in Sep 2011 and HbbTV middleware in Jan 2013. Multi-screen & multi-choice are becoming the norm in TV viewing due to OTT video technology and broadband & smart devices penetration. Increasingly, media experiences are not only consumed across devices and time but also across services. There is now a wider choice of service providers, access anywhere and anytime, together with broader selections of content. As in many other countries, MCMC in Malaysia is facing many challenges to regulate OTT TV. Effort to block access to OTT TV services can be circumvented by technical means. Any attempt to regulate may be restricted by territorial jurisdiction as OTT TV providers and servers operating outside its country cannot be controlled. The complex OTT service architecture presents both a technical and political challenge to regulators worldwide.

WRC-15 would be reviewing international frequency allocations and this may affect the broadcaster's part of the spectrum. On the agenda are 'New spectrum allocations to Mobile Service on Primary Basis use for IMT and mobile broadband applications'. Preliminary views from APT members have indicated opposition to this move in sharing broadcast

service spectrum with IMT. The next item on the agenda is 'Examine the use of 694-790 MHz for Mobile Service in Region 1'. It should be noted that DTTB in Region 1 and Iran is governed by the GE06 agreement. APT Preliminary Views are that any possible regulatory actions be limited to Region 1 and the Islamic Republic of Iran which is party to GE06 Agreement. There should be no additional constraint on existing primary services in Region 3.

A Rapporteur group on "Future spectrum demands and use of the Broadcasting Service" has been established in ITU-R Study Group 6 (Broadcasting Service) and a questionnaire on spectrum use was circulated among ITU-R Member States (Administrations) and Sector Members (Circular 6/LCCE/90). This was based on current spectrum use of Broadcasting Service (TV/Radio, Digital/Analogue, LW-SHF) and future spectrum use (HDTV to UHDTV and/or 3DTV). The deadline is 22 May 2015 and broadcasters are strongly urged to discuss the matter with their regulators as their share of the spectrum is at stake.

Session 6:

Enabling Change Smartly



The session was chaired by Simon Fell, EBU and the presenters were Colin Prior, Enensys Technologies ; Nils Ahren, Rohde & Schwarz; Martyn Horspool, GatesAir and Milos Pavlovic, LS Telcom. Many different sets of commercial requirements including Indoor/mobile reception, Fixed rooftop, SFN operation and Pay TV have been successfully fulfilled by DVB-T2 Technology. The 'OneBeam' solution enables the use of DTH satellite to distribute signals to T2 transmitters operating in SFN, offering considerable savings in satellite transponder capacity. The single satellite distribution for T2-MI and DTH does away with the need for secondary distribution from main transmitters. EWS implementation on DVB-T2 enables disaster coordination agencies to deliver emergency information to viewers on a regional basis.

The Malaysian Communications and Multimedia Commission (MCMC) released a tender in April 2012 for rolling out and management of digital infrastructure for free-to-air broadcasters using the DVB-T2 standard. Detailed proposals from shortlisted bidders were thoroughly evaluated to carefully select a single party to function as a Common Integrated Infrastructure Provider (CIIP) for Free-to-Air (FTA) broadcasters in the country. Among the business plans is the provision of 98% fixed rooftop coverage nationwide by optimisation of existing transmitting infrastructure. It would also provide portable, indoor coverage nationwide by deploying low-power transmitters. Maximising the utilisation of the limited RF spectrum is to be fulfilled by deploying 8 MUXs in phases. The plans include subsidising a certain number of DVB-T2 STBs and indoor antennas.

Transmitter network design can vary from a few high-power transmitters on high towers to many low power transmitters or a mixed setup. High power transmitters rated above 2kW cannot guarantee 100% coverage. However low power transmitters are able to support high power transmission in order to ensure a better coverage for shadow areas such as buildings, indoor coverage for malls and small communities. Low power equipment ratings range from 1-200 W and can be classified into transmitters (small sized or mini), re-transmitter or gap-filler. A recent innovation is to introduce LTE mobile offload where LTE content is inserted into Future Extension Frames (FEF) of DVB-T2 signals. This unique solution combines DVB-T2 and LTE-A+ signals using a common hybrid exciter platform and over-the-air transmitters to deliver simultaneous digital TV and LTE content to all devices from a traditional DVB-T2 broadcast tower.

New Zealand completed in 2013 putting it among the four Asia Pacific countries which have done so. The other three countries are Japan, Korea and Australia. Lessons learnt from the New Zealand experience are that providing robust signal in rugged terrain is difficult to achieve. There is also as need to have a mix of terrestrial and satellite delivery for optimum reception.

Session 7:

Smart Technological Solutions



Dr Ahmad Zaki,
Media Prima



Guillaume Boutin,
WorldCast Systems



Nuno Ribeiro,
probe



Rick Asahina,
TVU Networks



Martin Roberts,
Adstream

The session, chaired by Dr Ahmad Zaki Mohd Salleh, Media Prima and with panelists comprising Guillaume Boutin, WorldCast Systems; Nuno Ribeiro, RPROBE; Rick Asahina, TVU Networks and Martin Roberts, Adstream Asia.

A professional monitoring strategy is needed when deploying a Digital TV network. The strategy encompasses the business model, architecture and technical specifications. The components of the business model are tower companies, broadcasters, regulation bodies and service companies. Tower companies have to provide the best broadcasting quality to their customers. With a professional monitoring network, tower companies can measure and provide evidence of the quality and the continuity of their services. They also need to reduce network maintenance costs which can be

done by undertaking troubleshooting and first maintenance actions with aid of remote controlled equipment.

Broadcasters want to monitor the Quality of Service of the tower companies. With a professional monitoring network, broadcasters can measure the QoS to compare with tower company reports. They also want to check the reception of a programme which can be obtained from recordings and other evidence. The regulators main concern is that broadcasters respect the standards as regards to frequency, power or MPEG errors. They need to reduce the number of field measurement exercises and again a professional monitoring network makes their work much easier and more efficient. The service companies sell the monitoring service which can be customised.

The architecture that is to be defined covers the monitoring network, the sites, user friendly software and communication capabilities with the central station. The specifications that are to be defined include the specific technical parameters that need to be measured, ease of installation and staff training.

Session 8:

Cloud Technologies in Broadcasting



The chairperson was Hj. Zulkifli Abdul Rahim, Radio TV Malaysia. The panelists were Charles Sevier, EMC Emerging Technology Division; Katrine Finstad, Appear TV; Paul Jones, Front Porch Digital; Hiroki Nonoshita, Ikegami and Jew Kok Lim, Aspera IBM. The OTT audience is growing and video usage is changing with more content is being available online. People are increasingly utilising their smartphones and tablets to watch what they want, when they want, where they want. OTT is rapidly evolving with fast IP connections, next generation compression, newer delivery standards make it easy to target any device, advanced targeted advertising solutions and Cloud access to shared Content Delivery Networks (CDN).

A broadcaster can reach anyone anywhere using unmanaged IP networks. OTT enables broadcast video delivery over unmanaged networks including 3G and 4G mobile. In countries with fast IP infrastructure, traditional terrestrial or satellite broadcast were found to be inadequate and could not satisfy viewers. Broadcasters must complement their services with OTT delivery as it offers several advantages and can be used to provide catch-up, on demand and linear TV for devices connected via IP.

Next-generation transport technologies are needed to move the world's digital assets at maximum speed, regardless of file size, transfer distance and network conditions. Existing TCP is unsuitable to the demands of today's big-data applications. Long distances degrade conditions

on all networks due to latency, packet losses and traffic bottleneck. TCP is designed for low bandwidth and adding more bandwidth does not improve throughput. A solution is provided by FASP 3, a universal high-speed data transport system which is file size independent with maximum transfer speed, optimal bandwidth utilization and maximum I/O throughput on any storage platform.

Session 9:

Industry Debate: Is Spectrum Essential for Broadcasting?



Dr Amal Punchihewa, Director ABU Technology, led the debate by posing the question of the availability of spectrum for the broadcasters to the panel members and participants. He elaborated further by stating that Radio & TV programmes which, packed and delivered to the users, do not take up spectrum space. On the opposing side the telcos are taking up the stand that mobile phones with their cellular concept of two way communication can also do this efficiently, effectively and if not even better. Mr Martyn Horspool from GatesAir USA put forth his perspective that terrestrial broadcasting will definitely continue as it is the most effective method of reaching the user. It can cater for the localisation of news as well as transmission across the entire country and around the world.

Dr Ahmad Zaki Mohd Salleh, Media Prima Malaysia, responded by stating that terrestrial broadcasting is the mainstream for delivering content to viewers. IP is not designed for broadcasting with its one to one connectivity. It cannot handle huge numbers of users as the streaming required tends to impose a tremendous strain on the infrastructure leading to traffic congestion and ultimately a drop in picture quality at the receiving end. However, it is essential for broadcasters to follow technology and OTT can complement Free to Air.

Dr Amal Punchihewa then touched on the aspect of Early Warning System and Ruxandra, DRM informed the panel that when disaster strikes, the TV tower as well as the Mobile tower can be struck, but Radio is always on air. Radio has always proven to be the last line of resistance. Digital Radio Mondiale is capable of providing sound and instructions in several languages. DRM can get messages across vast continents and long distance. Compared to a dedicated EWS that is expensive to maintain, an inbuilt system within a DRM set is more accessible and cheaper. Kathryn Brown, Commercial Radio Australia, replied that when cyclones struck parts of Australia recently, the mobile towers were knocked down whereas the high powered Radio Transmitters stayed intact and alerted the public to stay in the basements. Simon Fell of EBU commented that 250 million people in Europe relied on terrestrial TV as it had proven over the years to be resilient in a disaster recovery situation.

As for the agenda on WRC-15, Dr Amal Punchihewa stated that the ABU stand was to resist any changes to the broadcast spectrum as he foresees the need, even after the Digital Dividend, to reserve it for future developments such as 4K UHD TV. The cost of distribution via the mobile network is very high and since the public enjoy free terrestrial TV then they deserve to keep it.

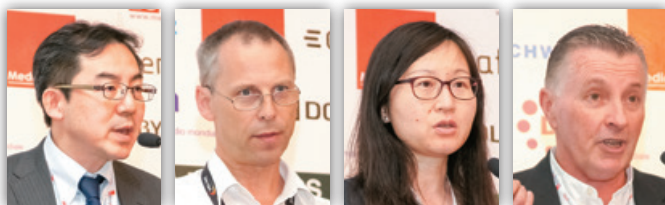
The question of Quality was also debated by the panel which led to the comment that the mobile network tends to lose connectivity resulting in loss of service. Quality is the key factor that keeps listeners attached to the service. Better quality of reception can be obtained by Free to Air as long as the signal strength is adequate. In Russia, quality monitoring is conducted over a vast area, stretching thousands of kilometers with measuring devices both at the transmitter and consumer end.

The panel also raised the issue of the demand by the IMT group for more spectrum. Their claim is based on data showing population growth growing exponentially in the same geographical area. The panel however contested this report by saying that the base is greater as population survey indicates that people are migrating to cities. The broadcasters must defend their portion of the spectrum by showing they are vibrant and have plans to harness the spectrum. The real motive of the telcos is to grab the business model of broadcasters. They are well aware that in order for advertisements to work, a large population that provides a ready market is needed. Not everybody wants to watch TV on mobile as the small screen does not fully give a comfortable viewing experience. A new way of experience is watching TV on the tablet which inherently has a slightly larger screen. Therefore coverage planning should also cater for indoor and mobile reception even if the costs are higher.

The industry debate ended on the note that broadcasters must transmit programmes that are attractive and HDTV is one of the methods to gain and also retain audience.

Session 10:

4K Production, Workflow, MAM and Archiving



Genya Kamada, SONY
Mike Grayson, Spectra Logic
Dr Yuan-Xing Zheng, BBC-UK
Brad Redwood, PlayBox Technology

The session was chaired by Dr. Amal Punchihewa, Director of Technology at ABU and the panelists were Genya Kamada, Sony Japan; Mike Grayson, Spectra Logic; Dr Yuan-Xing Zheng, BBC UK and Brad Redwood, Playbox Technology.

Technology trends from 2K HD to 4K/8K UHD and increased frame rates from 25fps to 120fps have led to a phenomenal growth of files causing a massive challenge to storage costs and its associated complexity. Archiving storage media format vary; ranging from tape, hard drive to optical disk. Memory is used for temporary storage of data whereas permanent storage is on other media. Optical Disk provides high speed access, reliability, lifetime of more than 50 years and is cost effective. It can be stored at room temperature and is not affected by humidity.

Broadcasters should also set up a Disaster Recovery Centre and look at the various features that it must have to ensure reliability. It must be simple to set-up and use, without the need to revise normal operational workflows, nor add extra staff. The centre must maintain continuous programme transmission even when there is total failure of the Station MCR or links. Therefore work needs to be immediately continued from the replicated site. It must be fully automatic, so that the system transports files to a silo for protection and can play-out in sync with the main facility. There must also be facilities that enable extended periods of operation and the use of assets from the Deep Archive library.

Session 11:

Integrated Broadband - Broadcast Systems



Magli Alias,
RTM-Malaysia



Dr Yusei Nishimoto,
NHK-Japan



Haji Ibrahim
Haji Mohamad,
RTB-Brunei



Dr Fintan Mc
Kiernan,
IDEAL Systems



Régis Saint Girons,
HbbTV Association

The final session was chaired by Magli Alias, Radio TV Malaysia and the panelists were Dr Yusei Nishimoto, NHK; Hj. Ibrahim Hj Mohamad, Radio TV Brunei; Dr Fintan McKiernan, Ideal Systems; Regis Saint Girons, HbbTV Association and Simon Fell, EBU.

HbbTV or Hybrid broadcast broadband TV is the seamless merger of Television and the Internet. It is designed to work in a mixture of broadcast and broadband (OTT) as well as in pure Broadcast mode. HbbTV gives broadcasters the freedom to enhance their TV programmes and users easy access to services through TV channels. It is the most popular open interactive TV standard being deployed in over 20 countries and on more than 20 million devices.



DBS 2015 Photo Gallery

**WE EXTEND OUR APPRECIATION AND THANKS TO THE
FOLLOWING SPONSORS, EXHIBITORS, SUPPORTERS AND
MEDIA PARTNERS FOR THEIR INVALUABLE SUPPORT**





DBS Workshops

The thirteen workshops that were conducted at the Digital Broadcast Symposium 2015 provided an in-depth knowledge of the latest developments and opportunities in the broadcast industry.

DVB-T2: Technologies and Implementation



Dr Peter Siebert,
DVB

A detailed explanation on the latest development of DVB-T2 worldwide was delivered by Dr Amal Punchihewa, ABU; Dr Peter Siebert, DVB; Simon Fell, EBU; Colin Prior, Enensys Technologies; Eric Li Bin, Rohde & Schwarz; Lachlan Michael, Sony; Elmar Möller, Media Broadcast; Laurent Le Morvan, STMicroelectronics; Martyn Horspool, GatesAir; Andy Hickman, Digital TV Labs and Christophe Clement, Nagravision.



Lachlan Michael,
SONY

Research into improving DVB-T2 is being conducted by studying (1) Nonlinear denser constellation which would increase spectrum by 10% (2) MIMO that would increase capacity by 85% and (3) Time Frequency Slicing which when combined with network planning increases capacity by 75%.



Elmar Möller,
Media Broadcast

DVB-T2 is also utilising HEVC source coding so that it can transmit 4K UHDTV efficiently. The next phase of DVB-T2 introduces mobile services by transmitting T2 Lite signal that is inserted into Future Extension Frames. Mobile TV can find a ready market in APAC and it can provide new entertainment on the smartphone.

The ITU's target date for Analogue Switch Off is 17 June 2015 for UHF and 17 June 2020 for VHF which involves 33 countries. The deadline may not be achieved but most countries have some form of digital terrestrial services either a full scale service or trial. The



Simon Fell,
European
Broadcasting Union

majority of DTT services are still DVB-T SD with MPEG-2 compression. There is difficulty in transitioning from a legacy of millions of MPEG-2 DVB-T to the next generation of MPEG-4 DVB-T2 and



Colin Prior,
ENENSYS

new hardware at higher cost.

would take many years. However, the latecomers to the digital terrestrial world would be able to benefit from MPEG-4 over DVB-T2 and achieve some HD services. More advanced services are due to try HEVC codecs delivered by DVB-T2 which will give many more HD services in the same capacity but again this requires



Laurent Le Morvan,
STMicroelectronics

From DVB-T2 to Virtualised Headends – What will Delivering TV Services in the Future look like?



Khush Kundi,
Ericsson

Khush Kundi from Ericsson presented this workshop on TV delivery platforms. Video now accounts for 40% traffic on the telco networks and is expected to rise to 55% by 2020. The rise is linked to demand for more content and the speed of the network. When compared to traditional broadcasting, which is multicast, LTE Broadcast brings advanced personalised services by unicast. One data channel is available per user and there are unlimited channels with a restricted number of users. Any content is available at anytime, anywhere. LTE Broadcast allocates blocks of spectrum, switching dynamically to cater for the shifting traffic demand which occurs for a dense population. Frequency reuse is also optimised.

Digital Archiving of Audio-Visual Content and Digitization Value Chain for Broadcasters



Poonam Sharma,
MediaGuru

The MediaGuru workshop was presented by Poonam Sharma and Sushil Khanna, this workshop looked into Digital Archiving using the wide lineup of tape, disk and memory. Digitalisation converts content into an output which is future-ready and readily accessible. It provides a solution that easily retrieves and repurposes content in digital output files.

Digital Preservation is necessary for broadcasters to preserve, retrieve and monetize their archives. Audio and video formats have evolved over the years leading to the problem of legacy content recorded in obsolete formats and thus inaccessible. Digitisation also leads to major cost savings and better monetisation possibilities.



Sushil Khanna,
MediaGuru



Kathryn Brown,
Commercial Radio
Australia



Dr Les Sabel,
Commercial Radio
Australia



Haji Zulkifli Abd
Rahim, Radio
Television Malaysia

Other countries such as Switzerland and Denmark would be following suit at a later date.

DAB+ chips must be incorporated into smartphones and portable devices in order to reach the tech savvy younger generation of listeners. Therefore, the future of radio lies in using Hybrid Radio which is a combination of broadband and broadcast. Another innovation is the portrayal of new characters in LCD/LED displays and thus solving the technical issue of letters having accents occurring with the different spoken languages around the world.

WASP 3D



Tushar Kothari,
WASP3D

Tushar Kothari presented the WASP3D workshop on Real Time Graphics/On Air Graphics which has become an integral part of television channels. It is important as it occupies a high percentage of on air time and is also a source of revenue. The current video wall has limited graphic capabilities, suffers from the delay in loading images and has no interactivity with content.

The new approach is to connect a graphic engine and create single to multiple outputs from 1k to 4k resolution. The virtual set has also been improved by doing away the need for an external chroma layer and reducing the cost of camera tracking.

WorldDMB



Bernie O'Neill,
WorldDMB

The WorldDMB workshop was presented by Bernie O'Neill, WorldDMB; Joan Warner, Commercial Radio Australia; Lindsay Cornell, BBC; Simon Fell, EBU; Dr Les Sabel, WorldDMB; Ariza Dinga, Radio Republik Indonesia; Zulkifli Abd Rahim, Radio TV Malaysia and Kath Brown, Commercial Radio Australia.

Launched in 2009, DAB+ is transmitted in five major cities in Australia, covering 65% of the population. 100,000 cars with DAB+ radio as standard accessory have been sold. Regular DAB+ services have also been launched in Hong Kong, Tunisia, Qatar and Kuwait while trials are taking place in Malaysia, Indonesia, South Africa. Norway has achieved 99% coverage is the first country set to have Digital Switch Over in 2017.



Lindsay Cornell,
BBC

Review of Transmitter Total Cost of Ownership

Presented by Martyn Horspool, the GatesAir workshop explained the definition of Total Cost of Ownership of a transmitter, data needed and the calculations involved. Total Cost of Ownership is the total cost of acquisition and operating costs over the asset life cycle. Key factors that need to be taken into account include equipment acquisition cost, taxes, loan terms, floor space, installation and commissioning costs and operational costs. A TCO analysis can be used to gauge the viability of any capital investment. It can be used when the time is reached to upgrade or purchasing a new transmitter.



Martyn Horspool,
GatesAir

Future of TV: UHD TV and Livesphere



Abdul Haleem
Rahiman, ATEME

The ATEME workshop presented by Femin John and Abdul Haleem Rahiman provided a technical overview of HEVC/H265 and UHD TV and compared them with H264 and HDTV. The HEVC Main profile would enable broadcast quality UHD TV at video bitrates below 13 Mbps. HEVC is source coding and is compatible with MPEG 2 Transport Stream (MPEG-TS), enabling the use

of existing transmission technology including DVB-T2 or DVB-S2. As for UHD TV, 10 bit encoding and an extended color space (BT 2020) are part of the standard. The human eye is very sensitive to certain colours, for instance dark blue. Compression artifacts in these colour ranges are very visible and are very annoying. These artifacts are not present using the standard HDTV colour space (BT 709) but visible with the new extended



Femin John,
ATEME

UHDTV colour space. Using extra precision, from 8 bits to 10 bits reduces these defects.

In 360 Video Broadcasting or LiveSphere, the scene is captured from all possible viewing angles with multiple overlapping wide angle cameras. The multiple views are stitched together into a single ultra-high resolution video. On the rendering screen, viewers may choose and dynamically modify the field of view by moving around and touching the screen.

Even More Channels, Ever More Platforms... Can Your System Manage?

The MediaGeniX workshop was presented by Michel Beke and this workshop dealt with software for channel management, cross-media scheduling, workflow and content lifecycle. Broadcast organisations operate many channels with some run from a central site and others in an external playout site in the region. It is a complex and costly operation and impossible to grow in a changing media landscape. These issues can be solved with installing appropriate software to manage the daily operations, media assets and playout. The net result is smoother, fault free operation with less cost.



Michel Beke,
MediaGeniX

DVB-T2 Receiver Compliance Automation & "Connecting Islands, Not Building New Ones"



Chan Tuck Kay,
Rohde & Schwarz

The Rohde & Schwarz workshop on DVB-T2 Set Top Box/Integrated Digital TV compliance testing was presented by Eric Li Bin and Chan Tuck Kay. Compliance testing results in certification of the device under test should it pass all the requirements. To the operator, a certified receiver can guarantee the subscribers' viewing experience. To the manufacturers, a logo test is the best way to reduce field complaints and is a MUST if their competitors have already obtained it. To the shop, it can bring better sales as the buyers are guaranteed quality.



Eric Li Bin,
Rohde & Schwarz

Clever Radio for Smart Countries



Ruxandra Obreja,
Digital Radio
Mondiale

The presenters of the DRM Workshop were Ruxandra Obreja, Alexander Zink and Lindsay Cornell. This workshop explained the benefits of DRM, its technology and the steps necessary for its implementation. DRM offers more choice for listeners with 4 programmes on one frequency. Audio quality is excellent with no distortion and comes with Stereo and 5.1 surround sound. Multimedia applications brings about

more listener benefits while at the same time provide extra revenue opportunities for broadcasters. Coverage areas can be very wide and the signal robust, even with a single transmitter. Single Frequency Networks can be implemented since OFDM signals are used. Automatic tuning is now controlled by station name and no longer by frequency. The radio set is also capable of re-tuning when leaving a coverage area. The emergency warning & alert system has been incorporated in all sets as a mandatory requirement.



Alexander Zink,
Fraunhofer

Lessons Learnt from DTT Network Implementation in Terms of Planning, Coordination, Installation and Verification



Milos Pavlovic,
LS telcom

The LS telcom workshop on DTT implementation was presented by Luc Haeberle and Milos Pavlovic. It included the multimillion dollar project announced last year by the Malaysian government. Starting with the right basics must be part of the initial plan by identifying the main targets with their Quality levels of Service: SD/HD/UHD, type of reception, coverage, cost of receiver and cost of the investment in the distribution network. The roll-out should be scaled out in different phases. Selection and availability of broadcasting sites have to be carried out.



Luc Haeberlé,
Colibrex GmbH

The workshop also discussed the typical errors in network planning and how to avoid them. Network optimisation can be obtained by conducting project-specific antenna design. Taken into consideration has to be the use of existing infrastructure from the analogue TV network and its suitability for DTT.

Simple and Effective Surround Audio Production Techniques with Local Production Case Studies

The workshop from Dolby was presented by Geoffrey Low who introduced simple and effective surround production techniques and shared some regional production case studies. Surround audio production is very much similar to Stereo audio production. Mixing In surround will simultaneously give stereo & mono mixes without the need to remix for individual format. Only one audio mixing effort is necessary to produce results in 5.1, stereo and mono mixes. Mixing in surround is easier than stereo because of more space & headroom and easier separation. Once the sound technician is familiar with the system, he can work equally as fast in 5.1 as he can in stereo.



Geoffrey Low,
DOLBY

Content Archive & OTT Content Delivery



Samuel Kajindran,
EMC²

Charles Sevior and Samuel Kajindran presented the EMC2 workshop on archiving and content delivery, including the aspect of marketing. Audiences in the digital age are changing and new strategies in marketing have to be formulated. Marketing can no longer be based on demographic patterns but

on behavioural segmentation. Mass advertising is no longer workable and now requires one to one communication. There is also a need for shift from on air blasts of adverts on a time interval basis to a continuous relationship.



Charles Sevior,
EMC²



Exhibition

Fifty-five exhibitors took part in the DBS exhibition which showcased the latest trends in technologies, applications and services provided by major manufacturers and other industry players. Products ranging from antennas, digital cameras, mixers and Frequency & Coverage planning software. Needless to say, UHDTV sets were also on display.

Industry Debate:

Is Spectrum Essential for Broadcasting

Moderator:

Dr. Amal Punchihewa

Panellists:

Simon Fell, Dr Ahmad Zaki, Kathryn Brown, Martyn Horspool, Ruxandra Obreja

Shortened version of a report by Lindsay Cornell, Principal Systems Architect, BBC Future Media

Amal introduced the session, pointing out the difficulty of having a debate when all the delegates and panellists already agreed that broadcasting needed spectrum; but who would argue against them? So, Amal had collected together some questions to create the debate. The important thing was to demonstrate that everyone understood and actively supported, by their actions, the importance of spectrum to the business of broadcasting and to communicate this to colleagues, national regulators and so on, so that the broadcasters' future was protected.

Broadcasters, whether radio or television, create content and then package it, by analogue or digital techniques, and deliver it to consumers. The telecoms people claim that they can do it better! But is this true? What do we say to counter these arguments? How do we convince regulators and governments that broadcasters do an essential job to inform, educate and entertain the people?

Martin said that, through its international contacts and contracts, he believed that broadcasting would continue for a long time to come. Issues of economy, reliability, emergency warning information, local, regional, national coverage all pointed to the essential role of broadcasting. Dr Zaki said that regarding OTT, it was essential for broadcasters to move with technology. Media Prima felt that its OTT offering was complimentary to the traditional broadcasting platforms. Young people especially do not like to do as their parents do, so to reach them with our services, OTT helped enormously. But it was only complimentary – it could not replace broadcast.

Ruxandra highlighted the role of radio in the event of national disasters. In her experience, following news stories, the only communication remaining was radio – TV and mobile become useless, whilst battery powered radios kept going. Analogue radio did this and digital even better because, with digital, additional information could be supplied, like messages in multiple languages. In the lower frequency bands radio could be delivered from long distances away – UK to India, New Zealand to Brazil etc.

Kath added that CRA had requested information from operators, after the flooding in Eastern Australia, regarding what had happened to their services. The high power broadcast transmitters were still in operation, but most of the mobile telecoms base stations were not working because of a failure of mains power, which was lost for three days. This supported Ruxandra's comments about radio being the only service still available.



Simon reiterated that DTT was the major platform in Europe – it provided services to 250m people. Most DTT users were consuming free-to-air content and that was really only possible with dedicated terrestrial spectrum. Simon mentioned OTT platforms where a large proportion of viewing was catch-up for linear free-to-air TV – content that had established itself due to its mass-audience broadcast tradition. One of the great things about free-to-air linear TV was serendipity: if you always had to search for content then you might end up with just watching one show, whereas with broadcast TV you saw something you didn't expect to enjoy and so you could enrich your life. This was surely an important point in terms of social cohesion – if people only consumed what they already knew, their prejudices would be enforced rather than dissipated.

What about access with satellite or IP? What was the experience with OTT? Was it reliable? What about quality? Dr Zaki said that whilst rain-fade affected satellite, no such problem existed with UHF! Throughout the years broadcast spectrum has been eroded: from 470-860 down and down. How far would it go? These things happened at the WRCs and there was another one in the coming year. The report M.2990 said that requirements for IMT would triple but others had studied the report [EBU] and showed that it made no sense! It was based on estimates of population growth, etc., but the assumptions were not reasonable. Simon said there was also a paper from LS Telecom questioning the measurement methods proposed. He also shared that the figures were incredibly speculative – Cisco had revised their estimates downwards by 50%. Simon also mentioned C-band distribution of TV in tropical regions and the threat from IMT. The spectrum that IMT already had was not fully used, but no-one had been properly checking this. Most use of IP video was not by mobile broadband, but via Wi-Fi (87%) and the projections in M.2290 did not take account of that. These discussions, though, needed to be turned into action so that these arbitrarily large demands for spectrum were countered.