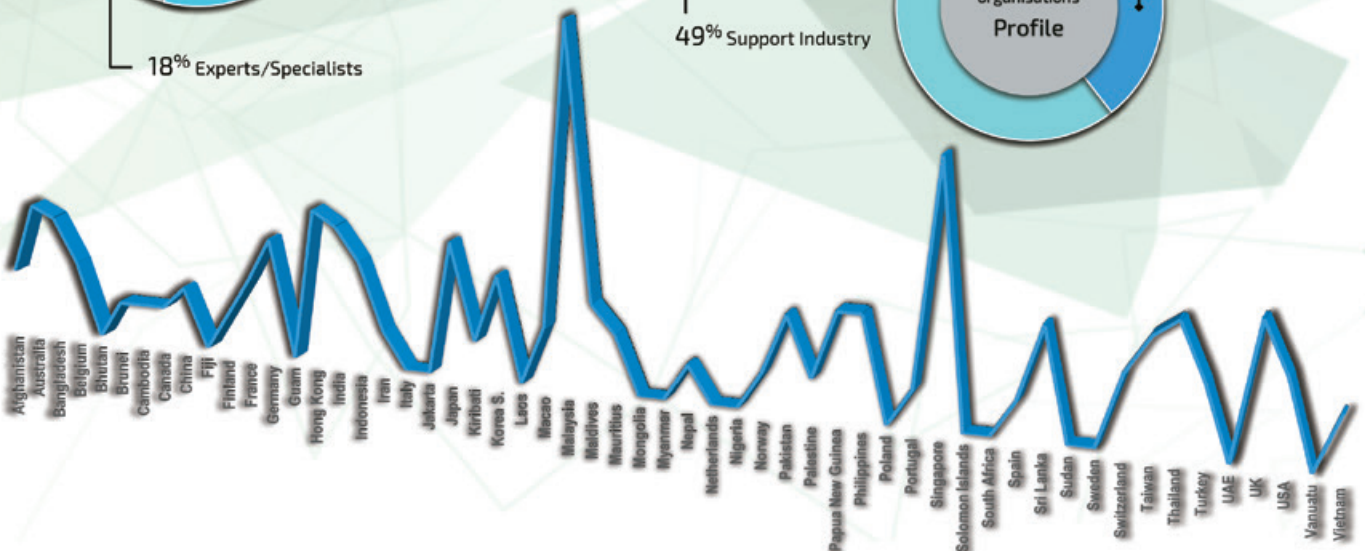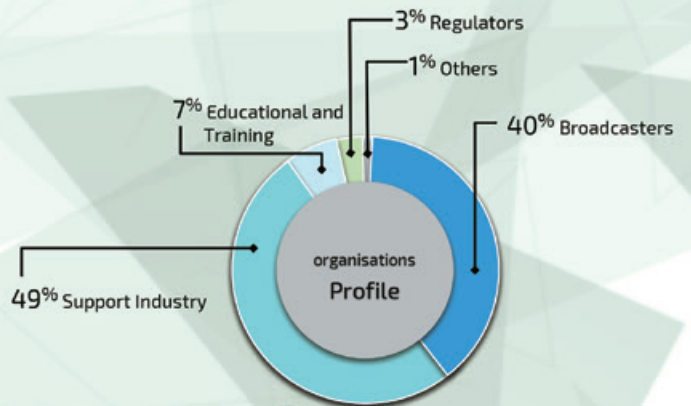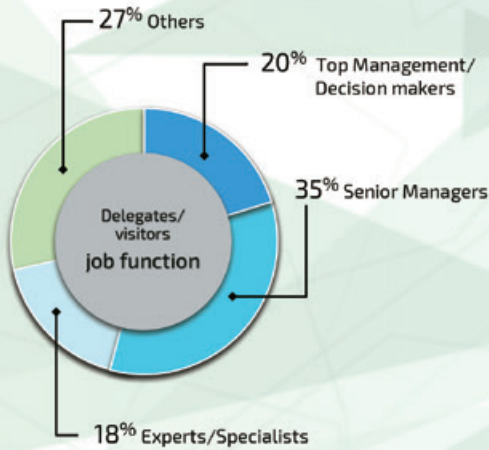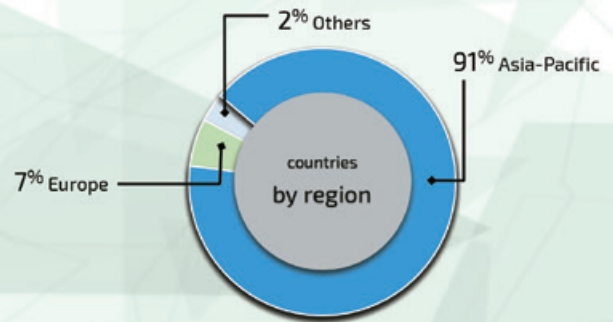# ABU Digital Broadcasting Symposium 2017:
Full Report Inside

EVENT SUMMARY

ABU DIGITAL BROADCASTING SYMPOSIUM 2017
"Digitise, Digitalise and Dominate"
6-9 March 2017, Kuala Lumpur

1148 delegates/visitors

55 countries

40% overseas delegates/visitors

47 exhibitors

379 organisations

75 experts/speakers

12 conference sessions

76% overseas exhibitors

14 workshops

countries by region
- 2% Others
- 91% Asia-Pacific
- 7% Europe

Delegates/visitors job function
- 27% Others
- 20% Top Management/Decision makers
- 35% Senior Managers
- 18% Experts/Specialists

organisations Profile
- 3% Regulators
- 1% Others
- 40% Broadcasters
- 7% Educational and Training
- 49% Support Industry

Afghanistan, Australia, Bangladesh, Belgium, Bhutan, Brunei, Cambodia, Canada, China, Fiji, Finland, France, Germany, Guam, Hong Kong, India, Indonesia, Iran, Italy, Jakarta, Japan, Kiribati, Korea S., Laos, Macao, Malaysia, Maldives, Mauritius, Mongolia, Myanmar, Nepal, Netherlands, Nigeria, Norway, Pakistan, Palestan, Papua New Guinea, Philippines, Poland, Portugal, Singapore, Solomon Islands, South Africa, Spain, Sri Lanka, Sudan, Sweden, Switzerland, Taiwan, Thailand, Turkey, UAE, UK, USA, Vanuatu, Vietnam

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ABU DIGITAL BROADCASTING SYMPOSIUM 2017:
DIGITISE, DIGITALISE & DOMINATE

The 2017 ABU DIGITAL BROADCAST SYMPOSIUM was held from 6-9 March at Hotel Royale Chulan, Kuala Lumpur. This symposium, aptly themed 'Digitise, Digitalise & Dominate', was the thirteenth in the series of digital broadcast symposia, organised annually by the ABU. Three pre-conference workshops were held on the first day. A full day 'New Media Masterclass' workshop, focusing on 'Transmedia Storytelling and Audience Engagement' and a parallel DVB workshop on Network Planning was held in the morning, followed by a DAB+ workshop in the afternoon. The 3-day conference, plus a total of fourteen workshops together with an exhibition, provided a unique opportunity for attendees to have access to information on all the various aspects of broadcasting ranging from terrestrial to satellite. The symposium attracted over 1100 participants representing broadcasters, telcos, regulators, manufacturers and other industry players.

Opening Session

The 13th edition of the ABU Digital Broadcasting Symposium (DBS) was officially opened by the Malaysian Deputy Minister of Communications and Multimedia, YB Dato' Jailani Johari.

The Deputy Minister said that "Over the years this symposium has grown to be a well-recognised event within the region and the media industry. It provides broadcasters and other media stakeholders with a valuable opportunity to know and experience the cutting-edge technologies and related service developments from around the world. It gives a platform for media professionals to network with eminent experts and like-minded colleagues."

He added that today the digital revolution has allowed alternate delivery mediums and easy integration with social media platforms. The Deputy Minister warned that these advantages should be exercised with caution and the highest degree of integrity to safeguard the public interest and the well-being of society. He stated that networks are prone to cyber-attacks.

YB Dato' Jailani Johari, accompanied by the ABU Secretary-General, Dr Javad Mottaghi and the Deputy Director General of RTM-Malaysia, Mr Magli Elias also inaugurated the exhibition held in conjunction with the DBS.

The Industry Keynote address, entitled `DAB+: Delivering Digital Radio's Digital',was delivered by Joan Warner representing the principal sponsor, WorldDAB. She asserted that Radio remains the most accessible media worldwide, as it can be received anywhere without any fee being imposed. It is robust and has proved its reliability in situations of emergency. Both Analogue AM and FM are compromised by their susceptibility to multipath interference and hence cannot promise sustainability as regards to the future of broadcasting.

Joan Warner, CEO, Commercial Radio Australia, representing the Principal Sponsor, WorldDAB, delivering the Industry Keynote.

Ms Warner said that, in comparison, DAB+ is efficient in terms of energy, transmitter infrastructure costs and RF spectrum usage. From a global perspective, the number of people able to receive DAB services had increased to 405 million, whilst the number of receivers sold had reached 55 million units. Hybrid Radio, an innovation that is a combination of DAB+ and IP, retains the cost effectiveness of a broadcast channel and at the same time offers interactivity. Streaming with mobile phones incurs data costs and drains more power from batteries. Smartphones incorporating DAB+ chips enable users to listen to radio with no streaming costs. They provide a richer radio experience with newer stations, broadcast images and live scrolling text. There is increased opportunity for listener interaction, with station websites and social media channels just one click away. These enhanced smartphones combine the best of Broadcast and IP, leading to the reliability of broadcast radio with interactivity of internet. They overcome blackspots where broadcast content is still available when the user is out of mobile network coverage area.

Advances in Technology: Improvements and New Technology

The first session was chaired by Masakazu Iwaki of NHK-Japan and the panelists were Dr Peter Siebert, DVB Project Office; Lindsay Cornell, BBC UK; Ruxendra Obreja, DRM Chairman and Tomoki Matsubara, NHK. They elaborated on the new developments of the various broadcast technologies over the years and the improvements achieved.

Masakazu Iwaki of NHK-Japan, chairing the first session of the DBS Conference

UHDTV Phase 1 receivers incorporating H265/HEVC chips are now capable of decoding UHDTV formats up to 2160 P, 60 Hz. Phase 2 will have more features; including a higher frame rate (HFR) of 120 Hz, wider colour gamut, higher dynamic range (HDR) and an advanced sound system. The Higher Frame Rate reduces motion blur as well as improving the sharpness of objects during motion. The wider colour gamut allows almost all surface colours to be reproducible.

Dr Peter Siebert of DVB, Lindsay Cornell of BBC, Masakazu Iwaki of NHK-Japan, Ruxandra Obreja of DRM and Tomoki Matsubara of NHK-Japan

HDR does not lose detail in dark areas and also reduces highlight compression. Two solutions for HDR have been proposed by either using the PQ Inverse EOTF or HLG OETF. PQ EOTF, or Perceptual Quality Inverse Electro Optical Transfer Function, is not backwards compatible to UHD Phase 1 Receivers. HLG OETF or Hybrid Log-Gamma Optical Electro Transfer Function (OETF) is backwards compatible with UHD Phase 1 Receivers, but only with standard dynamic range.

Digital Radio Mondiale (DRM) is available throughout the 30 kHz–300 MHz frequency range. Local and regional coverage can be implemented in the VHF bands (Band I, II – FM band, III). Medium and large area coverage can be undertaken in the HF band or AM bands using Long Wave (LW), Medium Wave (MW) and Short Wave (SW). DRM offers FM like sound quality without fading, crackling or distortions. It covers large areas using a single frequency which is a plus point for rural coverage, mobile reception and car receivers. A new generation of Chipset and Software Defined Radio (SDR) allows radio to be received on all frequencies by cars and mobile devices. Migration from FM to DRM can also bring significant cost savings in the form of lower transmitter power consumption, smaller floor space and reduced cooling requirements.

Enhancements in Workflow and Media Management

The Chairman was Dr Ahmad Zaki Mohd Salleh of Media Prima, with the panel comprising Michael Beke , MediaGeniX; Charles Sevior, Dell EMC ; James Thia, Sony Electronics; MC Patel, Emotion Systems and Shoaib Usman, Evertz.

James Thia of Sony, MC Patel of Emotion Sytems, Michel Beke of MediaGeniX, Dr Ahmad Zaki Mohd Salleh of Media Prima, Mr Charles Sevior of Dell EMC and Mr Shoaib Usman of Evertz

In the past, media evolved from (1) Black & White to Colour (2), Analogue to Digital and (3) Standard Definition TV to High Definition TV. Current transitions are from (1) SDI to IP; (2) specialised hardware to IT infrastructure; (3) on premise storage facilities to cloud and (4) the broadcast engineer to media technologist. The present transition is not just about replacing old boxes with new boxes but requires the simultaneous transformation of business model, operational processes, working culture and technology. Future-proofing broadcast workflows should take into account recent developments in 4k UHD, Higher Frame Rate, Higher Dynamic Range and surround audio. These factors, entail

the adoption by TV broadcasters of an all-IP architecture with multiplatform content delivery. Archives should be active with online storefront, resulting in content storage needs growing exponentially. Predictions from industry are that for every 5 years, the CPU complexity and memory storage will increase exponentially by 10 times. It is to be noted here that the laptops now use flash memory instead of hard drives. The media data centre must meet the business requirements of efficiency, agility and speed. These can be realised by utilising flash memory, cloud storage facilities and software defined networking.

Storage costs and complexity are becoming a massive challenge, spurred by HDTV and UHDTV with increased frame rates. Current tiered storage architectures are divided into primary storage, near line storage and archival storage (LTO). Data is constantly transferred and restored between these storage pools because primary and near line are more expensive than LTO. However, the ODA or Optical Disc Archive can serve as both near line and archive at a lower cost. Optical disc provides high-speed access, reliability, a lifetime of more than 50 years and is cost effective. It can be stored at room temperature and is not affected by humidity.

An IP revolution is happening with the Software Defined Video Network (SDVN) solution for the new media and broadcast industries. SDVN utilises a software defined network architecture to provide all the flexibility of a network based solution together with all the reliability of baseband video routing. SDVN offers broadcasters a flexible format agnostic and scalable infrastructure for SD, HD and Ultra HD (4K and 8K). Benefits of going IP include less cables, bi-directional workflow and single routing systems for video, audio and metadata.

Production Technologies from HD to UHD

Chaired by Prashant Butani, MEASAT Satellite Systems, the panelists were Jun Tsumochi, NHK; Ajeet Khare, Canara Lighting Industries; Dawoon Chung, Korea Broadcasting Service and Prashant Chotani, Travelxp.

A wireless link system is needed to collect HD video and audio streams transmit from OB site to broadcasting station. These streams are used for live-broadcasting, post production and archiving. With the advent of 8K UHDTV, a tremendous increase in bit rate is required compared to HD.

Ajeet Khare of Canara Lighting, Jun Tsumochi of NHK-Japan, Prashant Butani of MEASAT, Prashant Chotani of Travelxp and Dawoon Chung of KBS-Korea

The baseband signal bit rate of 8K is 16 times greater than the bit rate of HD whilst 8K satellite broadcasting capacity of 85 Mb/s is 3.5 times greater than HD bit rate. Thus, the 8K wireless link system requires more than 200 Mb/s compared with a HD wireless link that has a capacity of 60 Mb/s. In Japan, frequency allocation for wireless wave links have been made in the microwave and millimetre-wave band. The microwave link system uses B, C and D band with 18MHz channel spacing, as done now in the case of HD signal transmissions. The millimetre-wave link system in the 41-42 GHz band has been allocated a wider channel spacing of 125 MHz to cater for higher bitrates of 600 Mb/s. Both systems utilise dual polarized MIMO-OFDM technology together with a Forward Error Correction subsystem comprising of LDPC/BCH coding. Higher order constellation modes of 1024 QAM are needed in the case of microwave link whereas the millimetre wave link uses 32 QAM.

In the last few years, lighting equipment has been evolving with digital technology incorporating LED, which offers colour correction, Hue Saturation Intensity (HSI) correction and virtual filters. Among the functions available, are setting colour temperatures between 2800K and 10000K and choosing millions of colour shades with ease. This digital transformation is bringing about significant improvements in lighting control and supports green technology with an associated reduction in carbon emission.

Korea would be using the second-generation Advanced Television Systems Committee or ATSC 3.0 for UHDTV transmission. The first generation ATSC uses single carrier modulation with 8-Vestigial Sideband (8-VSB), a FEC subsystem of Trellis Coded Modulation concatenated with Reed Solomon code and MPEG-2 Video compression. It has a transmission capacity of 19.39 Mb/s but cannot deliver robust signals for mobile reception. In contrast, ATSC 3.0 uses multi carrier modulation or OFDM, a FEC subsystem of LDPC concatenated with BCH code and HEVC. Higher order constellation modes of non-uniform 4096, cater to the demand for increase of bitrate capacity. As it is, ATSC 3.0 has a transmission capacity of up to 52.2 Mb/s and can enable both fixed UHD and HD mobile reception.

Advance Solutions and Future Challenges

This session was chaired by Sharad Sadhu, Broadcast Media Consultant and the panelist were Nils Ahren, Rohde & Schwarz; Tsubasa Uchida, NHK; Akira Negeshi, NHK and Elizabeth S. Mendoza, Courseline Training Centre.

OTT entails the delivery of a multimedia service over an unmanaged network. Current technology uses the public internet and standard protocols to deliver multimedia content either Live or On Demand. There is no guaranteed QOS, so bits/pixel quality is more important. A huge variety of devices and capabilities must be supported simultaneously with different streaming standards, bit rates and resolutions. For video streaming, three ways exist to solve fluctuating network bandwidth: (1) Accept loss of data; (2) Try to outlast the low bandwidth periods through buffering and (3) Reduce the bitrate of the video. However, a better solution for OTT is Adaptive Bit Rate or ABR, which

Akira Negeshi of NHK-Japan, Nils Ahrens of Rohde & Schwarz, Sharad Sadhu, Media Specialist, Tsubasa Uchida of NHK-Japan and Dr Elizabeth S Mendoza of Courseline Training

first produces multiple files from the same source file to distribute to viewers who are watching on different powered devices via different connection speeds and at different resolutions. Secondly, ABR distributes the files adaptively, changing the stream that's delivered, to adapt to changes in effective throughput and available CPU cycles on the playback station. Thirdly, ABR operates transparently to the user, so that the viewer clicks just one button and all stream switching occurs behind the scenes.

In the context of helping the handicapped citizens of Japan, NHK has conducted research into tactile and haptic presentation methods, Japanese sign language computer graphics (CG) system and Speech recognition for closed captioning. It is vital to convey information in sign language to those who are born with hearing difficulties, as it is the equivalent of their mother tongue. A closed caption service is not sufficient for them and few TV programmes are produced with sign language. However, there are not enough sign language interpreters and it is not easy to have sign language interpreters on site any time. Weather information for the disadvantaged public is expanded by sign language computer graphic animation system. The fixed pattern CG animation system generates sign language animations directly from weather data.

Another commendable effort by broadcasters, notably the ABU, is the aid in the form of Radio in a Box, delivered to the teachers of a province in the Philippines which is regularly struck by typhoons. The Philippines has drafted a comprehensive National Disaster Risk Reduction Management Plan to mitigate the effects of natural disasters such as typhoons. Radio in a Box fits perfectly well with this plan, by educating young children and training adults as well as acting as an Emergency Warning System.

Innovating the Audio Experience

The session was chaired by Steve Ahern, AMT Australia and the presenters were Kartini Kamarul Ariffin, IM4U Radio Malaysia; Firdaus Shamshuddin, IM4U Radio Malaysia; Andi Permadi, Radio Republik Indonesia; Jørn Jensen, NRK Norway; Shanthi Bhagirathan, MBC Sri Lanka and Alexander Zink, Fraunhofer.

DRM offers more choice for listeners with four 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 area is very wide and the signal robust, even with a single transmitter. Single Frequency Networks can be implemented since OFDM signals are used. When all these capabilities are combined, the result is that DRM is 'green' and energy efficient. 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. Emergency warning & alert systems have been incorporated in all sets as a mandatory requirement.

DRM Multimedia applications that provide great listener benefits & revenue sources are TextMessages, Journaline, MOT Slideshow and TPEG / TMC Traffic Information. Journaline is a text based information service (Unicode), supporting all classes of receivers triggering interactivity and geo-awareness. Services based on Journaline can be set up to accompany the radio programme provided by the broadcaster and to reuse existing information or Internet content. Journaline can also be set up as a standalone service, enabling commercial / group or closed user groups. Journaline enables efficient, on-demand text information services on digital radio and is free-to-air with no Internet required. It is specifically designed for digital broadcast services as it has a low bitrate requirement of 200 b/s and reuses existing data sources for broadcasters such as RSS or XML. XML files are used for static content and menu structure, whereas RSS feeds are used for half-dynamic content with periodic update from the Internet. Another source is real-time feed for highly dynamic content such as sports results tables that update the individual page with every re-transmission.

Steve Ahern of AMT, Jorn Jensen of NRK, Firdaus Shamshuddin and Kartini Kamarul Ariffin of IM4U Radio Malaysia, Andi Permadi of RRI-Indonesia, Shanthi Bhagirathan of MBC-Sri Lanka and Alexander Zink of Fraunhofer

Naoya Kimoto of NHK-Japan, Toni Fiedler of Fraunhofer, Jayant Shah of Dolby, Dr Peter Siebert of DVB,
Dennis Breckenridge of Elevate Broadcast, Joe Lamdani of AVID and Deokjoon Woo of KBS-Korea

Immersive Media: Future of TV Experience

Chaired by Dr Peter Siebert, DVB Project Office, with a panel comprising Jayant Shah, Dolby Laboratory; Deokjoon Woo, KBS; Toni Fiedler, Fraunhofer; Dennis Breckenbridge, Elevate Broadcast; Naoya Kimoto, NHK and Joel Lamadani, AVID.

The shift from 5.1 channel surround sound to a more realistic immersive sound suitable for UHD was discussed. This is multi-dimensional audio that fully immerses the viewer with sound objects that move around and above thus adding the perception of height dimension. The objects describe position, size and require dynamic metadata. Immersive sound engages human sensory system more naturally, by allowing the sensors to process information more similarly to the natural world. It allows fluid movement of audio in a 3D space, removing the constraints of channel-based audio. The benefits are greater control of perceptual space or higher resolution and robustness across listening environments. Immersive audio can be experienced at home by installing upward firing speakers that do a remarkable job of introducing the dimension of height. Standards for Immersive Audio have already been specified with Dolby AC-4 and MPEG H. South Korea has adopted the second generation ATSC 3.0 standard using MPEG-H 3D audio and it is to be noted that DVB standard has incorporated MPEG-H 3D as part its toolbox.

Next generation video would be progressing to higher resolutions of 4K or 8K, higher frame rate (HFR) of 120 fps, higher dynamic range (HDR) and greater colour gamut. The combination of a larger quantity of pixels and better pixels mimic real visual experiences to excite the senses and stimulate physical and emotional responses.

Towards the IP Ready Broadcast Chain

The session was chaired by Dr Fintan Mc Kiernan, IDEAL Systems Singapore and the panelists were Markus Frirtz, Eutelsat; Anthony Gofton, Solid State Logic; Oliver Linow, Deutsche Welle; Eric Hamilton, Caton Technology and Nick Piggot, Radio DNS.

In a fast-changing broadcast environment, satellites are uniquely placed to provide a first-class platform for delivery on a multichannel basis, distribute to multiscreen and access to multi-region. Hybrid Broadcast Broadband TV (HbbTV) offers VOD services to all DTH users. The addition of a hard drive to the decoder enables it to store popular content sent via satellite. The user can access it on demand and view it in the best quality without buffering. Briefly put, VoD / Catch-up TV is available to all homes with best image quality irrespective of internet connection or data quota. The benefits are flat-fee distribution cost, irrespective of the number of viewers and guaranteed quality of service.

Nick Piggott of Radio DNS, Oliver Linow of Deutsche Welle, Markus Fritz of Eutelsat, Dr Fintan Mc Kiernan of IDEAL Systems,
Anthony Gofton of Solid State Logic and Eric Hamilton of Caton Technology

Furthermore, the coverage of VoD service is broader, enabling HD or UHD services to all viewers and even those beyond the broadband footprint. Satellite multiscreen video delivery, based on IP technologies can be dedicated to mobile devices. It distributes linear TV, on-demand content and Free-to-Air by seamlessly integrating with existing OTT services and mobile applications. Ubiquitous coverage is available with guaranteed quality of service irrespective of local internet connections. It is suitable for people at home who can watch the video on a smartphone or tablet. They are able to watch TV easily, everywhere at home, independent of the availability and quality of terrestrial networks. There are no restrictions on volume or additional mobile data traffic costs. IP-Native Multiscreen Distribution via Satellite is also suitable for public venues where a large number of users can simultaneously watch different channels.

There is a need for a game-changing infrastructure that redefines real-time video and data flow on the Internet. The challenge is that demand for moving large data is increasing faster than allowable capacity. Remote-to-remote transfer protocol (R2TP) is very efficient with anti-congestion, error-recovery mechanisms and low latency. R2TP can power open or public internet broadcasting which is less expensive compared to broadcasting over private Internet connections. Other advantages are highly secure broadcasting with maximisation of Quality of Service (QoS) and Quality of Experience (QoE).

Cloud Technologies, Media & Cyber Security

This session was chaired by Dr Amal Punchihewa, ABU and the presenters were Jew Kok Lin, ASPERA-IBM; Dr Siebert Fell, EBU; Aale Raza, Whiteways Systems and Azleyna Arifin, MCMC Malaysia. Dr Siebert represented Simon Fell, who could not make it to the symposium this year. He presented the EBU recommendations on Cyber Security which laid out the guidelines for broadcasters in confronting virus attacks and hackers. The recommendations were rather timely as there had been recently a spate of botnet attacks on broadcast installations.

The term botnet is coined from both words robot and network. A botnet is a number of Internet-connected devices used by a malicious programmer to perform various tasks. Botnets can be used to perform Distributed Denial Of Service (DDOS) attacks, steal data, send spam and allow attackers access to a broadcast station's systems.

The goals of the EBU Media Cyber Security Group are: (1) Raise awareness of Media Security as a business risk; (2) Define best practices and best processes adapted to the media industry; (3) Provide a trusted platform for information sharing Hands-On learning and tutorials. The major concern for broadcasters are cloud service security, ransomware and production security of IP based workflows.

The growth in the number of botnet attacks is due to the increased utilisation of IP Networks, which provide direct connectivity. A typical connected broadcast network offers huge benefits as it permits immediate access to data and audio/video files. It allows instant playback by providing "live" pictures and breaking news. It also results in saving a lot of manpower hours and money. It is this very accessible nature of IP networks which has the negative side-effect of making them vulnerable to botnet attacks.

Broadcasters can inhibit malicious software from attacking them by securing their facilities with firewalls, anti-viruses and other security measures. Control rooms should not be accessible to outsiders and network architecture should be isolated from the main office systems. Storage should be checked for viruses, malwares, phishing and botnet periodically. Ingest machines must always have up to date anti-virus protection and staff should be sent for periodical training.

The Changing Media Business: Opportunities for Broadcasters The session was chaired by Jamel Seman, Radio Television Malaysia with panelists Jon Flay, Megahertz; Hitesh Upadhyay, The Weather Company; Steve Ahern, AMT Australia and Peter Bruce, IABM.

The media industry is facing challenges from evolving technology, shifts in audience, changing financial models and competition from non-traditional broadcasters. Technology is evolving to ultrahigh resolution pictures spurred by advances in IP, UHD, HDR, and HFR. This technological evolution requires new systems, operations and workflow. The audience

Azleyna Ariffin of MCMC, J K Lim of Aspera-IBM, Dr Amal Punchihewa of the ABU, Dr Peter Siebert of DVB representing Simon Fell of the EBU (who joined via Skype) and Aale Raza of Whiteways Systems

Peter Bruce of IABM, Hitesh Upadhyay of The Weather Company, Jamel Seman of Radio Television Malaysia, Jon Flay of Megahertz and Steve Ahern of AMT Australia

is shifting to OTT, Mobile or VOD, causing new customer behaviours and driving new content. Financial models are changing to revenue models based on Subscription VOD and transactional VOD. These make CAPEX risky as result of changes in budgets, operating expenditure and profits. Competition from Internet media, social media, broadcasters require an agile approach to changing market.

The changing trends of the broadcast media industry include the decline of linear TV, as was evident from the Rio Olympic 2016 games. On the other hand, subscriptions for SVOD services such as Netflix have been growing in number in the past three years. Linear TV is far from dead, although broadcasters are increasingly investing in new media offerings to accommodate changing viewing habits. Transition to OTT and multi-platform delivery continues to disrupt the traditional broadcast landscape. Changing viewing habits have forced broadcasters to launch new media offerings, by transformation infrastructures capable of delivering both linear & non-linear channels.

Many traditional broadcast and media technology suppliers still rely on hardware as their primary source of revenues. However, end-users are moving to software-defined infrastructures built on COTS equipment, putting pressure on hardware revenues. Traditional suppliers are therefore embarking on a difficult transition from purpose-built hardware to delivering software running on general-purpose equipment

Evolving Platforms-OTT, IBB and the Interactive Audience The chairperson was Che Rohana Che Omar, Radio TV Malaysia. The panelists were Mika Kanerva, Sofia Digital; Roy Reinbach, NeuLion; Mariano L Monteverde, VSN APAC and Dr Megat Al Imran, University Putra Malaysia.

The panel examined the market trend towards HbbTV and the key factors triggering it. Although viewing time and device reach are prominent factors, the most important factor

for the consumer is the content. The red button on the TV remote grants the user, direct access to an on-demand video catalogue and the visually rich Electronic Programme Guide. The user is able to play all the past episodes of shows directly from current TV show. There is also a greater number of TV Channels as result of the extended channel line-up over IP video streaming and curated thematic streaming channels for audiences' specific interests.

HbbTV technology is set to be part of Malaysian DTTV standard which is the second-generation DVB-T2. When officially launched, the Malaysian DTTV DVB-T2 network will have HbbTV services available from day-one. There is a system update for existing Smart-TV to support DTTV and HbbTV. Thus, HbbTV features would be activated for more than the 1 Million receivers already out in the market. HbbTV test suite and certification processes are

Dr Megat Al Imran of University Putra Malaysia, Mika Kanerva of Sofia Digital, Che Rohana Che Omar of Radio Television Malaysia, Roy Reichbach of Neulion and Mariano L Monteverde of VSN APAC

Les Sabel of Commercial Radio Australia, Aale Raza of Whiteways Systems, Pham Nhu Hai of the ITU, Simon Tsang of Enensys Technologies/ Test Tree, Andy Joseph of Factum Radioscape and Arne Borsum of IZT

currently underway, together with the distribution of HbbTV-enabled Set-Top Box. MYTV has envisaged both premium subscription-based services and MyFreeview, which is a common platform for DTTV broadcasters.

FINAS and Filem Negara Malaysia, the leading government agencies under the Ministry of Communication Multimedia are to implement six key initiatives of which one is to digitise content. The outcomes are increased digital reference of local heritage and locally host local digital content for easy access by public. Digitisation activities include the provision of digitisation infrastructures for the agencies, building facilities for upgrading the contents and developing Digital Assets Management for the digital contents produced.

Digital Transition – Experiences in Digitising and Digitalising Infrastructure

The final session was chaired by Les Sabel, Commercial Radio Australia and the panelists were Aale Raza, Whiteways Systems; Pham Nhu Hai, ITU and Simon Tsang, Enensys Technologies. Video and audio archives are of great historical importance, deserving long-term preservation for future generations. Challenges faced by content owners are storage media conditions, where the media is worn out and players not available. The video quality is unsatisfactory and metadata not properly marked. The main concern is that even though one retrieves the footages from old tapes, they are still not usable. The reasons are picture impairments arising from colour degradations, stains, film grain, noise and vertical line scratches. However, the good news is the availability of software which can perform cleaning and restoration for old and defective videos.

The ITU Radiocommunication Bureau has come out with a new Handbook on DTTB Networks and Systems Implementation, 2016 Edition. The last ITU-R Handbook on Digital Terrestrial television broadcasting in the VHF/UHF bands was published in 2002. Since then the broadcast world has undergone many changes in technology including HDTV, UHDTV, Immersive sound and Integrated Broadcast Broadband (IBB). These new developments encouraged the ITU to publish a handbook that reflects the new environment.

The ITU has provided assistance for the preparation of national digital roadmap for more than 30 countries since 2009. It has a Digital Switchover database and laid out the guidelines for the transition to digital broadcasting. DSO is still ongoing around the world, leading the ITU to revise its publication, 'The Guidelines for Transition to Digital Broadcasting', first prepared in 2010 for Africa. The guideline was revised in 2014 for global usage and has been updated for Satellite TV, Cable TV and IPTV.

The ITU's view is that Radio and Television are evolving, beyond their formal definition of broadcast via electromagnetic spectrum, as the ways in which people consume audio and visual content are shifting. In the internet age, broadcast must be both digital and hybrid with more stations providing interactivity. Linking content across platforms seamlessly combines Broadcast and the Internet.

Report on DBS by
Jeewa Vengadasalam
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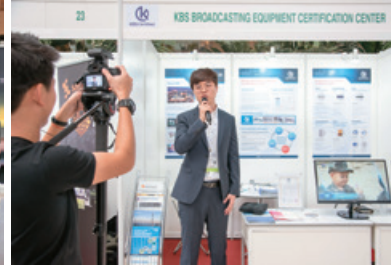
DBS Exhibition

The DBS Exhibition was held from 7-9 March with the new location providing us with a welcome change.

The DBS exhibition played host to 47 companies and organizations, made up of equipment manufacturers, system integrators, transmission network integrators, frequency planners, internet and broadcast service providers, digital system proponents, regulatory agencies and other media players.

For the second year in a row, Sony was the winner of the Best Booth Award. Mr Jon Flay of Megahertz presented the award to to Mr Alen Nor Mahat of Sony.
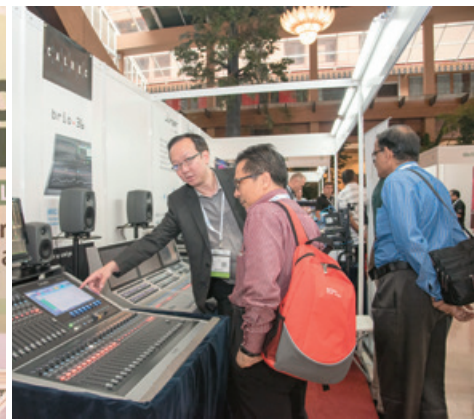
DBS Workshops

DVB Workshop: From Network Planning to the Living Room – How to set up a DTT Network

Broadcasters must identify the kind of network needed, that is either an SFN (Single Frequency Network) or MFN (Multiple Frequency Network). Next would be to specify the type of service needed, which can be fixed, mobile or portable. The network has to be designed for either local or nationwide coverage. Hence the transmitter distances must

be ascertained and the guard interval specified, after taking into account the different configuration modes for the OFDM carriers ranging from 1k, 2k, 4k, 8k, 16k and 32k mode. The resolution of the programme should be determined as to whether it is to be SD or HD. This in turn affects the choice of technical parameters including the code rate, modulation, and pilot pattern. Thus, it can be deduced that starting with the right basics is an essential part of the initial plan. Selection and availability of broadcasting sites have to be carried out. Network optimisation can be obtained by conducting project-specific antenna design. Taking into consideration is the use of existing infrastructure from analogue TV network and its suitability for DTT.

Professional network planning saves time, money and prevents problems from cropping up at a later stage when it is too late. It ensures optimized CAPEX and OPEX, making possible the analysis of various options to find the best solution. Planning also ensures an interference optimised network that takes into account the various constraints such as self interference in case of SFN, protection of analogue TV, interferences between DVB-T2 and other services and bi-multilateral agreements between neighbouring countries.

The DVBT2 Gateway is located at the head-end, taking in the output from the multiplexer and providing adaption of the transport streams for DVB-T2 transmission in MFN and SFN. The several DVB/MPEG-2 transport streams are encapsulated into a single T2-MI stream (DVB-T2 distribution protocol), enabling the synchronisation of the various DVB-T2 modulators for SFN and MISO broadcasting. All DVB-T2 transmitters in a SFN cell must transmit exactly the same content at exactly the same time and on exactly the same frequency. Therefore, all the transmitters must be synchronized with common timing reference from GPS and T2-MI packets carrying T2-MI timestamp and T2 framing.

The consumer is also affected by advancements in STB design and LCD/LED display technology. HEVC is the next generation codec and it is mass market ready now. In 2015, all mobile handsets and TVs were shipped with HEVC support. Furthermore, all TVs support up to 10 bits for both 2K and 4k HDR needs.

DAB+ Workshop: Expansion in the Asia Pacific

2017 has been a landmark year for DAB+ as the number of countries on air have reached 36, with 405 million people receiving and 55 million sets sold. In advanced countries, DAB+ is widely available in cars with market penetration of 87% in the UK, 83% in Norway and 65% in the Switzerland. Taking into context the Australian environment, there has been a significant increase in audio quality for AM stations. The share of listening for AM networks has been trending downwards, and AM listening makes up less than one quarter of total radio audiences.

DAB+ represents a substantial audio improvement and a level playing field for AM in capital cities. Operational cost of DAB+ is roughly 30 times lower than AM, while it is 8 times cheaper in the case of FM.

ABC radio has experimented with bit rates and is satisfied with the existing quality, deciding that it is unnecessary to increase it from current levels. In addition a properly designed antenna can provide excellent reception without multipath interference, even on while on the move. The use of Single Frequency Networks allow broadcasters to be economical with the use of RF spectrum. Single transmitters carrying a number of different services also lead to a level playing field in terms of reception quality.

Joan Warner, Commercial Radio Australia

Bernie O'Neill, WorldDAB

Jørn Jensen, NRK

Dr Les Sabel, Commercial Radio, Australia

Lindsay Cornell, BBC

Nick Piggott, RadioDNS

Keiko Bang,
Bang Productions

Marini Ramlan,
Primeworks Studios

Hamdhoon Rashad,
ABU

There are also opportunities to cater for niche markets and broaden the range of content. Audiences can be served better by making content available on multiple platforms and simulcasting on IP audio for playback. Hybrid Radio delivers audio using broadcast which is reliable and free, while enhancing radio using IP adds interactivity. Last year, the world's first DAB+ enabled smartphone went on sale in over 20 countries.

New Media Masterclass: Transmedia Storytelling and Audience Engagement

In the fast-changing digital landscape, broadcasters are faced with the challenge of adapting to innovative ways of doing things to cater to the demands of extremely fragmented audiences.

This was the basis for the New Media Masterclass under the theme of 'Transmedia Storytelling and Audience Engagement', which took place on 6 March 2017 and was organised by ABU

Madiana Asseraf,
EBU

Programme Department. It attracted a crowd of more than 130 of the delegates who attended the ABU DBS 2017.

The aim of the Masterclass was to inspire broadcasters to create innovative and engaging content to attract new age audiences and to share knowledge and experiences with broadcasters on new ways to enhance their content to reach to wider audiences. The Masterclass focused on how innovative and engaging content are created and distributed for new age audiences.. Major topics covered in the Masterclass ranged from new media content, innovative storytelling and audience engagement.

Divided into three modules, the Masterclass explored ways to expand existing media content for multi-platform presentation and how to use transmedia tools and concepts to enhance content. The Masterclass also looked in detail into the realm of transmedia storytelling and the importance of investing in a transmedia strategy to place the users at the centre of the story.

In addition, participants were engaged in a discussion on what is meant by 'innovative storytelling' and why innovating is important in our era. It also discussed how to implement story-driven innovation within organisations with emerging examples on new formats of storytelling, Gaming, Augmented Reality (AR) and Virtual Reality (VR).

There was an also a stimulating discussion on the importance of understanding audiences and their role and expectations, to produce more relevant content. It also shared experiences on matching content to audience on different platforms, and the importance of allowing and encouraging audience participation. Recent examples and case studies on data-driven content production and audience participation were also presented and discussed.

The Masterclass concluded with a group discussion exercise on key learning and major take-aways to help participants identify concrete applications of the learning to their daily work.

The Masterclass was facilitated by Ms Madiana Asseraf, Senior Media Development Manager at EBU. Ms Asseraf was supported by 4 guest speakers; Mr Steve Ahern, Managing Director of Ahern Media and Training, Ms Ayako Takada, Program Director at NHK Japan, Ms Keiko Bang CEO and Founder of Bang Productions Singapore and Ms Marini Ramlan, GM Innovation & Distribution at Primeworks Studios & Primeworks Distribution in Malaysia.

On 7 and 8 March 2017, Dolby hosted a series of presentations and demos at ABU DBS 2017. Next-generation Dolby Technologies presented and demonstrated were; High Dynamic Range Video Technology; Object-based immersive audio for broadcast; Enhanced audio for mobile OTT, Dolby 5.1; Content Production Workflow and HbbTV- Interactive Digital TV.

High Dynamic Range Video Technology

Dolby Vision™ delivers a dramatically different visual experience - astonishing brightness, incomparable contrast, and captivating colour, bringing entertainment to life before your eyes. It achieves this stunning image quality by leveraging breakthrough HDR and wide colour gamut imaging technologies, both on-screen and through specially mastered content. As a result Dolby Vision enabled devices to deliver images with much greater brightness, and to provide much deeper, more nuanced and detailed darks, while rendering a fuller palette of rich colours, never before seen on screen.

To deliver this experience, Dolby Vision augments the video fidelity of 2k and 4k content for cinema, and Ultra HD and HD video for over-the-top online streaming, broadcast, and gaming applications, by maintaining and reproducing the high dynamic range and wide colour gamut of the original signal created during the artistic post production process.

Key technology elements behind Dolby Vision span content creation (production and postproduction), distribution (codec), and playback (decode and display, plus interfaces).

## Object-based Immersive Audio for Broadcast

Dolby Atmos delivers moving audio – sound that can be precisely placed and moved anywhere in three-dimensional space, including overhead. It brings entertainment alive, all around the audience, in a powerfully immersive and emotive experience.

Enhanced Audio for Mobile OTT

Dolby Audio for Mobile Applications meets the needs of audiences around the world, by bringing:

- Loud and clear sound
  - Enhanced dialogue control and loudness management provides greater detail across a wide range of sounds, letting audiences hear pivotal dialogue in crystal clarity.
- Personalisation Capabilities
  - A robust set of features allows viewers to personalise their listening experience.
    1. A selection of languages in Dolby Audio quality
    2. A choice between home/away commentators while watching live sports
    3. Improved accessibility through descriptive video services
- Immersive audio experience
  - To allow audiences to feel like they are in the centre of the scene or live event, viewers can now enjoy virtual Dolby Digital 5.1 surround sound and Dolby Atmos of
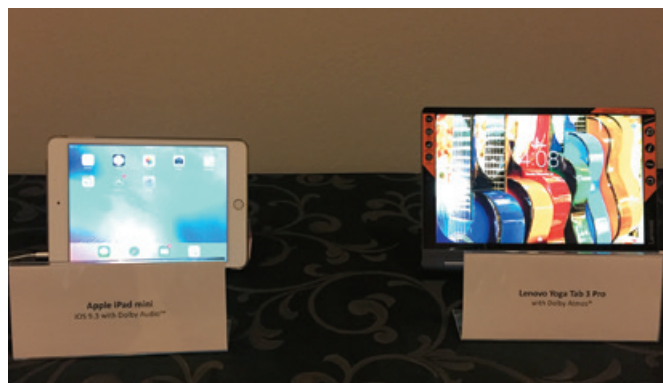
the highest quality, when listening through headphones or built-in speakers.

- Consistent Dolby Audio quality across platforms
  – Dolby Audio for Mobile Applications is compatible across device platforms, empowering all audiences, regardless of device OS, to fully immerse themselves in their stories.

Dolby 5.1 Content Production Workflow

Dolby Digital Plus is the established standard for 5.1-channel surround sound in HD broadcasts and gives content creators the freedom to explore their creative visions and the power to realize them. Surround sound can be easily implemented with small changes in workflow and use of some additional equipment. Surround sound adds realism, enhances the experience and complements HD pictures with high quality audio.

HbbTV- Interactive Digital TV Feature

With transition from analogue to digital terrestrial television comes the opportunity for the broadcast industry to offer better picture and audio quality, and HbbTV can bring the TV experience for the user to a new level. HbbTV is a standard by which broadcasters can complement their services delivering additional content and features via broadband. Some newer DTT (Digital Terrestrial Television) platforms are now offering HbbTV. South East Asia has started adopting this technology and among the early adopters are the DTT platforms in Malaysia and Vietnam. At Dolby, we are working with broadcasters in SEA ensuring that the audio quality for HbbTV continues to be "broadcast quality" thus helping a seamless transition between broadcast and online. Offering Dolby audio via HbbTV also helps to meet the consumer's expectations for online content where well stablished and very successful online video delivery services like Netflix, Amazon Video and iTunes offer Dolby audio.

New Members

Affiliate Members

RATEM and Videoship join the ABU as Affiliate Members

RATEM, based in Istanbul, Turkey is a professional union of broadcasting organisations.

Founded in 2001, it is the largest professional semi-public, non-profit organisation in the broadcasting industry, which represents 796 radio and television companies including the public broadcaster TRT (Turkish Radio and Television Corporation). It aims to protect the intellectual property rights of its members, arising under the Law of Intellectual Property Right; as well as finding solutions to the problems of the industry and developing activities in order to ensure continuous development.

It also operates the MEYESER – Vocational Assessment Center (www.meyeser.org) which is accredited both nationally and internationally. and provides certification for a number of broadcasting occupations. Another service for the broadcasting industry is the RATEM Academy, which was founded in 2014, in cooperation with the BBC Academy. It aims to meet qualified employee needs and to fill the scientific resource gap for the radio and television broadcasting industry in Turkey and offers a research center for broadcasting, e-library, face to face and remote education systems.

Another RATEM activity includes the organisation of IFTV (Istanbul International Film-TV Forum & Fair). The objective of this event is to discover the ever growing Turkish Media Market, exploit new opportunities in the EMEA region and to build global partnerships.

VideoShip Enterprises Ltd is a Canadian company with affiliated offices in Ottawa (Canada), Atlanta (USA), Pensacola (USA), and Dublin (Republic of Ireland). The company was established in 2000 and has drawn on the rich experience of its core engineering and design team to deploy innovative, mission critical solutions for high profile clients in the cable and broadcast industries.

VideoShip has a commitment to excellence in providing robust turnkey solutions that include:

- Video aggregation, workflow and distribution
- System integration – video encoding and transcoding technologies
- Optimal use of existing network infrastructure – terrestrial/satellite hybrids
- Customized and branded user interfaces

Since 2005, VideoShip has been working with Cox Media to develop software tools for the cable advertising industry. This suite of integrated modules gradually expanded to become what is now known as the Media Management System (MMS). VideoShip also developed Cox Media's highly successful SpotXpress system – the first public website of its kind that allows advertisers to submit spots over the Internet. It also provides similar services to Comcast Corporation.

Tom McGann Memorial Summit 2017
– Engineering the Future

Tackling Skill Shortages in Broadcast & Media Technology

The Tom McGann Memorial Summit is a new initiative from the IABM Educational Foundation, the charitable body supported by the IABM, the trade organisation for technology suppliers in the broadcast industry.

Tom McGann spent his career in the broadcasting industry. He was one of the founders of the IABM, driving forward the interests of technologists in the industry as well as its commercial status. During his time at the IABM he played a pivotal role in the movement to transform IBC into the truly international, annual convention we know today.

The aim of the Tom McGann Memorial Summit is to bring together all sides of the industry to analyse the requirements for engineering and technical talent in the future, and to determine how that talent can best be attracted, developed and retained. The intention is that the event will take place in different parts of the world, stimulating the debate and promoting the industry as a challenging and satisfying place to work.

The first Tom McGann Memorial Summit took place in Geneva in late November 2014 in association with the European Broadcasting Union (EBU). Its aim was to convene all sides of the broadcasting industry to tackle technical skills shortages and to determine the future needs for engineering staff resources and how they might be met.

The second summit, addressing skill shortages in broadcast & media technology, was held in Kuala Lumpur on 4th and 5th of March. Summit delegates came from across the technology supply chain and from Asia-Pacific countries. They included broadcasters, their product and service suppliers, and representatives from training academies, relevant academic institutions and students interested in a career in broadcast and media technology. This delegate mix enabled the summit to consider issues from secondary education through recruitment, retention and continuing professional development. Inevitably, these issues were also shaped to take account of changing technology, new business models and economic realities.

The outcome is an industry-wide call to action supported by an initial framework of related commitments to up-skill technical staff.