



Asia-Pacific  
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Union

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**ABU Digital  
Broadcasting  
Symposium 2013:  
Full Report Inside**







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# DIGITAL BROADCAST SYMPOSIUM 2013

## “Next-Gen Media Space and the Connected World”

The 2013 ABU Digital Broadcast Symposium was held from 5-8 March 2013 at the Hotel Istana, Kuala Lumpur. The ninth instance of this annual event, organised by ABU Technology, carried the forward-looking theme, ‘Next-Gen Media Space and the Connected World’. The event comprised focused workshop sessions, an exhibition and a three day conference.

The symposium attracted over a thousand participants from 48 countries, representing all disciplines of the broadcasting industry, from regulators, manufacturers, policy makers, service operators and other industry players. With over 105 speakers from around the globe the conference and workshop sessions provided the latest information on broadcasting technology and its applications as well as updates on developments taking place within the industry.

### The Opening and Ministerial Session

In his address, the Deputy Minister of Information, Communications and Culture of Malaysia, Datuk Joseph Salang, said the Malaysian Government has already made the decision that the infrastructure for Digital Terrestrial Television roll out will be implemented by a private sector entity which will operate as a single common infrastructure provider to provide access to the broadcasters on the digital TV platform. Malaysia has also decided to adopt the second-generation technology for Digital Video Broadcasting, or DVB-T2, as the mandatory standard for Digital Terrestrial Television services for the country. He noted that the ABU’s Digital Broadcasting Symposium provides a platform for the broadcasters and other



industry players to discuss and exchange their views on new technologies and developments in the industry.

Addressing the opening session Dr Javad Mottaghi, Secretary-General, ABU remarked that the dynamic changes in technology have empowered new platforms that promote consumer participation and audience content creation, adding a new dimension to the media landscape. He commented that content delivery on all platforms has become the first imperative of the broadcasters who have to serve multiple screens.

The Industry Keynote was delivered by Ruxandra Obreja, representing the principal sponsor of the Symposium, the DRM Consortium. She cited that the radio sits at the heart of a connected new media space. Mobiles and radio go hand in hand, today with new and attractive features on digital radio devices and with the rapid growth in numbers of cars on the road, with an associated increase in radio listeners. What will now drive this industry is creative content to utilise the capabilities of the technology. Only good content will sell receivers and make digital radio a reality.

### Smart Applications and New Content Distribution Networks

The session looked alternate content delivery platforms starting with a look at the NOTTV mobile service in Japan, which is a subscription-based, nation-wide Mobile Multimedia Broadcasting service for smart phones and tablet devices. It is based on the ISDB-Tmm system and offers live, original content such as sports, music, entertainment, and drama; providing 3 channels, including a 24 hours news channel with on-demand content.

Looking at the broadcaster’s role in the new media landscape it was highlighted that traditional broadcast still has a long



way to go. However, broadcasters need to provide their content on all three media delivery systems, namely the linear, non-linear on-demand platforms and the multimedia and social platforms to satisfy the audience needs and to keep up with the competition. Value-added and hybrid services will continue to grow and play a very important role in delivery as well as the new business models of the future. Over-

## Developing System Standards – New and Enhancements

The session looked at the various system standards and highlighted recent enhancements and developments taking place in the industry. UHDTV already made an impact during the Olympics with its large cinematic screens and much higher resolution of 4K & 8K compared to the 1080 lines of HDTV. However, the bitrate required for transmission is high and MPEG 4/H.264 is not efficient enough for the purpose. It was suggested that the answer could possibly be found in the new High Efficiency Video Coding (HEVC) standard, which provides a compression efficiency 50% better than H.264. Technical work on better satellite transmission standards DVB-S2 evolution or DVB-S3 is already underway. As for terrestrial transmission, NHK has developed ISDB-Tn, comprising an FEC subsystem with BCH/LDPC codes, Ultra Multilevel OFDM up to 64K FFT, carrier modulation of 4096 QAM and MIMO with a single dual polarised antenna.

An effort to consolidate global TV standards has been made by the Future of Broadcast TV or FOBTv, which was established in 2011. The goals of FOBTv include having a single standard for UHDTV, an opportunity that should not be missed considering that present HDTV standards do not conform to a single uniform transmission standard.



An update from China advised that the Digital Terrestrial Multimedia Broadcast, or DTMB, has been enhanced with 256 APSK and 32k FFT to support higher transmission bitrates. This second generation DTMB is compatible with existing DTMB receivers.

The session was chaired by Lieven Vermaele of EBU and the panellists were John Femin of ATEME, Philip Laven of EBU, Masayuki Takada of NHK STRL, Matthias Stoll of DRM, Lindsay Cornell of BBC, Toni Fielder of Fraunhofer IIS and Dr Li LeiLie of SARFT-China.

the-top content (OTT) means on-line delivery of video and audio via the Internet without the ISP/Telco being involved in the control or distribution of the content itself. Contrary to popular myth, Internet piracy can be controlled by putting in place measures that combat copyright infringements and other violations of intellectual property laws. Among these anti-piracy measures are legislation, enforcement, Conditional Access (CA) and Digital Rights Management (DRM). The session was summed up with a presentation on the role of broadcast management systems in enabling efficient content delivery to multiple devices, highlighting the increased operational efficiency, improved revenue management and opportunities provided by such a system.

The session was chaired by Philip Laven of DVB and the panellists were Kanako Takeguchi of NHK, Lieven Vermaele of EBU, Shin Tonooka of MMBI-Japan, Nonie Llanes of Conax and Stephen Kyefulumya of Pilat Media.

### New Enhancements in Content Delivery – Towards Higher Capacity

The first presentation looked at the high-capacity, decentralised, purpose-built media transport network implemented by Kordia in New Zealand. A combination of Fibre, digital microwave and satellite links the network provides uncompressed HD and SD video, with multicast capability, transport of Ethernet services and other formats at very high quality. The network provides flexible distribution of signals throughout New Zealand with complete control, monitoring and management capability. Looking at higher

capacity UHDTV delivery over satellite it was stated that UHDTV requires 120Mbps delivery via satellite. While the 12GHz band requires a high efficiency modulation method or a wideband transponder, the 21 GHz band is wideband but suffers from rain attenuation, especially in this region. Also presented were results and parameters from a few recent trials.



Looking at new technologies in satellite broadcasting, the session highlighted current challenges, such as limited power and bandwidth of satellites, in-orbit satellites getting closer giving rise to more interference issues which are also a major hurdle in using smaller antennae as well as the need for higher capacity for applications like 3DTV and UHDTV. The results of trials were shared, with newer modulation schemes like 64APSK which can provide up to 209Mbps capacity. The presentation on Audio for HDTV looked at the importance of audio especially in high quality HD video, which in many instances is not given due attention. A few case studies were shared and lessons learnt from them.

On the DVB scene, DVB-T2 can be used for UHDTV transmissions and trials are planned or underway in Korea, USA and Spain. DVB-T2 Lite has been developed to allow simpler receiver implementations for lower capacity applications such as mobile broadcasting. This has a



maximum bitrate of 4Mb/s, lower time interleaver memory size and a reduction in permitted mode combinations.

The session was chaired by Richard Redmond of Harris and the panellists were Mark Johnston of Kordia, Dr Kazuyoshi Shogen of B-Sat, Abdul Rahman Khan of AsiaSat, Mathias Bendull of Dolby and Bernard Pichot of Enensys.

## Creative Radio Content for Multiple Platforms

Broadcasters are already reaching listeners and driving behaviour on mobile phones using apps. The Internet however cannot perform in exactly the same way as radio broadcasting. The more listeners there are to an Internet radio service, the more the bandwidth required. In contrast a whole city can listen to a radio broadcast without incurring extra bandwidth. In spite of this fact, Internet and streaming are part of the future of radio. Another area where radio is getting more attention is that of social media circles, this again is a growing industry and provides a new avenue for a revenue stream.

DRM and DAB+ are capable of providing multimedia services and surround sound. Among the most important services are Dynamic Label – programme accompanying snippets; Journaline – a text based information service that triggers interactivity and geo-awareness; MOT Slideshow – programme accompanying images; EPG – Electronic Program Guide and TPEG-Traffic Information. 5.1 Audio Enhancement for Digital

Radio is available using MPEG Surround-sound technology. It uses very low bandwidth in the audio channel and is compatible with mono/stereo receivers.



The session was chaired by Steve Ahren of Ahern Media & Training and the panellists were Joan Warner of CRA and Alex Zink of Fraunhofer IIS.

## Terrestrial Broadcasting for the Future – Digital Migration, Enhanced Platforms and Green Technology

Green technologies impact the environment, operating costs, and the bottom line. Total Cost of Ownership (TCO) is a good way to evaluate the impact of such technologies. In such evaluations one should consider the acquisition, maintenance, operating and training costs of all required systems in transmission facility including cooling and floor space. Transmitter Efficiency can be improved by using LDMOS power amplifier technology, advanced Real

## The HDTV Paradigm: Is Your Market Ready?

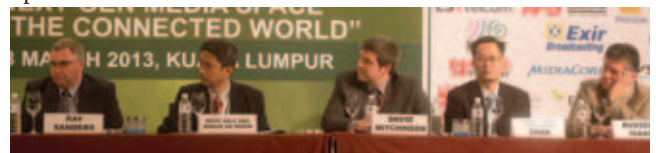
Consumer demand is growing for live content and viewers want to get more involved. There is a need to have proper integration and response to audience feedback. Thus production needs are more complex with distribution conducted across multiple platforms. This requires an integrated collaborative system, which not only brings huge efficiencies but also powers multiplatform distribution, providing new revenue streams. Non-Linear production is a new way to produce live content that can be used for linear broadcast programmes as well as for direct publishing to the Web.

HDTV Deployment has to take into account several key considerations, namely business, technical and operational. The business considerations are the content mix, target audience and budget. HD and SD content have to co-exist and this situation calls for problems dealing with different quality and aspect ratios. Budget is another constraint as sources of funding are needed. Availability of budget can influence the choice of a major upgrade or a series of small changes. Looking at technical considerations, there are the choice of transmission format, codec selection of MPEG 2 or MPEG 4 and non-linear workflow. Operational considerations include workflow using baseband or IP,

choice of new building or side by side HD/SD operation and comprehensive training.

The presentation on emerging broadcasters focused on how smaller broadcasters can leapfrog into HD and how to capture the market. The key is to study the market and the requirements of the viewers. Most established and bigger broadcasters don't go down to the niche audiences for specific programming needs. These are areas that can be tapped into and also consideration of the new delivery platforms and opportunities in online delivery. With careful research you can capture a huge audience with very little cost.

The session was chaired by Dato' Haji Abu Bakar Ab Rahim of RTM and the panellists were Peter Bruce of Grass Valley, Chan Tuck Kay of Rohde & Schwarz, David Mitchinson of Appear TV, Ray Sanders of Gencom and Russell Isaac of Sports Media Services.





Time Adaptive Correction (RTAC), advanced Crest Factor Reduction, variable speed cooling system and sharing liquid cooling across multiple transmitters. Liquid cooling system have higher initial purchase costs but requires less overall operating power and hence a less TCO.

Transmitter efficiency can be categorised into energy, bandwidth, space and operational aspects. Reducing the energy requirement during operation is the best approach to reduce the carbon footprint. Energy costs can be controlled by using modern & more efficient transmitter technologies such as Doherty Amplification & Crest Factor Reduction. Bandwidth and spectrum efficiency can be increased by utilising advanced technologies like DVB-T2 and more efficient compression coding technologies such as HEVC.

The presentation on Megasolar highlighted the implementation and operation of a mega solar power system to power one of the radio transmitting stations of NHK and how much saving in terms of costs it generates. A similar implementation and operational experience was shared by Bangladesh Betar, which has developed a hybrid power system combining solar, wind, diesel generator and a battery bank to power their FM station. Details of cost savings achieved with the new system were also shared.

The session also was presented with a Hybrid TV implementation in Germany based on the HbbTV platform. The hybrid platform provides a solution combining the OTT linear and non-linear content. The system is widely deployed and is growing fast. Another important area that was addressed in the session was the new mobile LTE systems interference on DTT signals. Highlighting the technicalities of both systems it was stated that the interference caused by the unwanted signals from mobile base stations and handsets in close proximity, having a combined effect of blocking or overloading the DTT receiver. The presentation shared simulations of some of the studies carried out in Germany stating that coexistence of LTE and DTT will become a norm in the near future and that this kind of interference cannot be easily detected.

## Enhancements in Imaging and Content Creation

4K video is considered the next big thing which will hit the TV industry soon. 4K has twice the horizontal lines as those of current HDTV and is considered a version of UHD TV. Two types of 4K standards have been defined; one recommended for TV and the other for digital cinema applications. If considered in terms of picture elements this is a 20 times increase in resolution compared to SD, and 4 times compared to HD. XAVC is a new format developed by SONY for 4K production applications. The encoding system can downconvert the 4K video to HD and SD and some models can even perform simultaneous 4K and HD recording at acquisition. 4K imaging and production equipment is now available in the market.

Current RGB cameras have difficulty in obtaining the true colours sensed by the human eye. The RGB system currently in use was devised in the early 1930s. High-fidelity colour is achieved when colours of objects in the original scene are matched by those of the camera image. However, the spectral characteristics of RGB cameras cannot realise a wide colour gamut in practice, as part of the response has negative values. Hence a colour shift occurs and the colour gamut range is narrowed. The new XYZ colour matching function solves this problem by incorporating the negative response through a special transformation to represent the entire RGB colour

gamut. Applications of the XYZ system include UHD TV, digital archives, medical applications and colour inspection.

The presentation on UHD production discussed the world's first 4K terrestrial broadcast trial by KBS at the CES2013 Exhibition. The trial used 4K at 30p and the reaction from the viewers was very positive. The presentation described the setup used for capture and post production and highlighted some of the challenges faced in 4K transmission, such as the bandwidth limitations of systems available today. It looked at HEVC format as a more efficient compression solution, which was also employed in this trial. The session also witnessed a presentation on the workflow of the digital radio production facilities at KBS. The limitations of the current digital workflow for incorporating new media services and lack of support for multiple file formats was explained. The proposed new system will overcome current shortcomings while providing easy integration with other IT systems and easy expansion possibilities, which will support the multimedia services scheduled for launch in 2014.

The Chairperson was Chris Grey, Sony and the panellists included Norihiko Noguchi, Sony; Tomohiro Kamiyanagi, Ikegami; Yong-Seoh Nam, Korea and Kim Jin Sun, KBS.



## The Connected World

The session looked at OTT and the various implementation aspects of Hybrid TV including piracy and standardisation. OTT technologies and economies of scale are improving relative to broadcast, but incremental cost per household and per service hour overwhelmingly favour broadcast, as universal high bandwidth Internet delivery is beyond the capacity of many current infrastructures.

Hybrid TV is the convergence of broadcasting and communication and represents a change in media consumption style. The basic concept of Hybrid TV is where the Digital TV network delivers the content whilst the broadband network acts mainly as an interactive channel. Among the standards discussed were the OHTV (Open Hybrid TV) in Korea and HbbTV (Hybrid broadcast broadband TV) in Europe.



Hybrid broadcast broadband TV (HbbTV) is the Pan-European standard for Connected TV services such as Catch-up & VOD, Super Teletext, EPG, News, quizzes, T-shopping, T-government. It is a broadcasters & manufacturers initiative and a move to Pay TV. HbbTV uses a business neutral technology platform that is open and available with set-top boxes & connected TV sets from major manufacturers.

The session was chaired by Masakazu Iwaki of NHK STRL and the panellists were Laurence Peak of Verimatrix, Jean-Christophe Jubin of HTTV, Dong Jun Lee of KBS and Laurent Le Morvan of STMicroelectronics.

## Industry Looks to Next-Gen Services

The Industry Debate panel stressed unequivocally that the industry, particularly the broadcasters, need to go for the next generation media services and also become stakeholders in the connected media sector. The panel comprised eminent experts from all sections of the broadcasting industry.



Inviting views from the panel, the question on the table was to identify next-gen services and how the broadcasters should prioritise and prepare to take up these services.

Andrew Yeo, Publisher and Director, Asia-Pacific Broadcasting, said that audiences have new expectations and the broadcasters should meet those expectations using the next-gen services. The broadcasters should engage the audiences on as many platforms as possible.

Russell Isaac, Managing Director, Sports Media Services, laid emphasis on getting the eyeballs and targeting the audiences with the new services. He said that broadcasters need to use audience catalysts particularly on the social media platforms.

Asaad Bagharib, Senior Vice President, MediaCorp Technologies, wants to make the next-gen services affordable, widely accessible and available by using all the platforms by using OTT and Mobile. He said the industry needs to be future proof, deliver services everywhere and reorganise their businesses to meet these challenges.

Dr Kazuyoshi Shogen, Senior Associate Director, B-SAT, identified Ultra HDTV and Hybrid-cast as the new services that need to be popularised. He said that services for people needing assistance and the Emergency Warning Broadcasting Service were important from the public point of view.

Chris Grey, General Manager, Sony, Hong Kong, pointed out that a wide variety of equipment is available to take up the

next-gen services by broadcasters. This could be done either at the end of life cycle of the facilities or with a jumpstart. The real answer is in the return on the investment and that needs to be studied.

Nils Ahrens, Regional Sales Manager, Broadcast, Rohde & Schwarz, said a priority is to create a brand and a target group. To put out the next-gen services a new infrastructure would have to be added to the current broadcasting facilities.

Jorn Jensen, President, WorldDMB said that digital radio offers many next-gen services and audience attention is to be focused around those. Radio broadcasters need to access audiences on all platforms including radio on mobile phones.

Ghulam Mujaddid – PBC, said that broadcasters have to be stakeholders in the new media and for that purpose necessary regulations need to be set up. He pointed out that new services could also be put out on the Internet and using smart apps and social media platforms. He said that his organisation has amply demonstrated this.

The panel then debated a second question regarding the connected world and several related issues, including impact on traditional broadcast content consumption.

Among the messages that emerged, were that the connected world was both a threat and an opportunity; though the content fascinated viewers, the TV device need to be protected against malware; and that the connected TV will facilitate audiences in choosing good content. It also emerged that currently digital radio is quite well connected and caters to the need of the mobile society both via radio sets and mobile phones.

There were several interventions from the floor with some of the ABU members indicating their interest in 3DTV broadcasting, IPTV and 4K-HDTV. There was a comment that the transition from SD to HD in the Asia-Pacific was pretty slow and that the broadcasters should be user-centric in putting out new services.

Wrapping up the debate, Sharad Sadhu, who moderated the session, said that industry leaders were decidedly in favour of the industry putting out next-gen services and going ahead to play their role in the connected media environment.



The final presentation of the session looked at the use of DVB-T2 gateways to improve protection and reliability of the DVB-T2 signal in a distribution network. Loss of signal to the modulators and transmitters will cause loss of signal to consumers and increased downtime means loss of customers. The DVB-T2 Gateway plays a very important and crucial role, especially with SFN distribution where a single transmitter failing could impact the network. The T2 gateway provides functionality to maintain up-time with reliable security and monitoring of the DVB-T2 networks.

The session was chaired by Alan Turner of Kordia and the panellists were Richard Redmond of Harris, Masaki Ishihara of NHK, Nils Ahren of Rohde & Schwarz, Md Muzibur Rahman of Bangladesh Betar, Daniel Kleinbauer of Media Broadcast, Milos Pavlovic of LS Telcom and Espen Myhre of Nevion.

## Media Management – Workflow Technologies for Improving Efficiency



A new future-proof media solution for archiving can be accomplished with optical disc cartridges. Current offline shelf archive systems with professional discs do not have enough capacity. An online robotic archive library with data tape (LTO) needs frequent copy migration. Optical disc cartridge on the other hand provides both offline and online solutions and has several benefits including generational compatibility, more tolerance to temperature changes and random access, leading to it being more video friendly with the ability to preview the content. The technology is also more energy efficient compared to current tape and disk technologies, providing a lower Total Cost of Ownership.

On media cloud building practicalities it was said that Content Storage Management (CSM) solutions have been available for more than a decade. Current cloud solutions introduce new challenges as they are not primarily geared at managing audiovisual content. There is increasing demand in particular for Disaster Recovery and requirements such as universal file formats, media content awareness, security, controlled access and distribution mechanisms. A media cloud should address these issues and should support unique features related audiovisual content.

The presentation on MAM systems and improving efficiency noted that the main advantage of such a centralised media management systems is to provide connectivity and sharing possibility to everyone involved. The system should also support multiple functionality from ingest all the way to broadcast and archive. It should be flexible enough to support multiple media types and formats.

The traditional approach to Quality Control of file-based video was visual inspection, which was effective when reviewing relatively small volumes of video content and subject to human error. Automatic Quality Control not only saves time, resources and provides consistent results but also detects “inside” the file, such as syntax errors, encoding parameters, and structural metadata.

The session was chaired by Asaad Sameer Bagharib of MediaCorp and the panellists were Noboru Yanagita of Sony, Marc Wharmby of Front Porch Digital, Yoann Poizeau of Dalet, Roger Heath of Evertz and Andrew Scott of Tektronix.

## Multimedia Business Solutions in Emerging Markets

The final session looked at business models and solutions. The first one, sharing lessons learnt from various DRM+ trials in the region, mentioned that several trials have been completed in countries including Korea, India, Brazil, Sri Lanka and others, all proving the quality and versatility of the system. The largest DRM initiative is currently in India where 72 MF transmitters have been replaced with DRM30 Transmitters. When completed, 70% of the country will be covered by DRM30. The world’s first 1MW HF Transmitter is currently in operation in India, catering for international broadcasting.

Convergence of technologies is leading to a dramatic change in climate within the broadcast landscape. Broadcasters can navigate the changes impacting the industry by charting consumers’ new viewing habits & develop ways to engage them. The consumer wants the content to follow him everywhere on any of his mobile devices. Broadcasters must engage the viewers by citizen journalism, blogs and User Generated Content (UGC). It is a meaningful way of winning hearts and loyalty to the channel.

The session also shared experiences in implementation of NOTTV, a subscription based mobile multimedia broadcasting system in Japan based on the ISDB-Tmm system. The presentation also described the launch and implementation of a successful DTT system. It looked at the elements that need to be considered in planning, implementation and roll-out of such a DTT network. Now with the launch of LTE services one needs to be very careful with the interference these may cause to broadcast signals, another aspect that needs to be considered when planning for services.

The session was chaired by Vanessa Ching of Snell and the panellists were John Abdnour of Nautel, Andrew Yeo of Asia Pacific Broadcasting, Shin Tonooka of mmbi-Japan and Tatjana Medic of Funke Antennen.





## Seminar on Copyright Issues

There is a whole new paradigm on the horizon that reflects the changing dynamics of the media landscape in this digital age. The Legal Department of the ABU organised a half day seminar entitled, "Content and Copyright Related Issues", to address the many concerns and to prepare broadcasters to be able to take progressive action in curbing the challenges arising out of piracy and rights infringement issues when moving on to the new digital media delivery and distribution platforms. The sessions were focused on giving an overview of the challenges faced in the digital age, to understand how we can curb infringement and to discuss the necessary steps that broadcasters have to take towards a piracy free industry.



Ms Zuraidah Mohd Yatim, of Media Prima elaborated on the challenges that copyright practitioners are facing in the digital era and highlighted the need for awareness and education on piracy problems, self-regulated approaches by broadcasters, implementation of IP policy within organisations, extending licensing schemes, and regulating orphan works as a way forward. She stated that, with the multiple platforms available for content, the rights owners, rights holders and broadcasters could maximize their business and income and therefore it was important that broadcasters adapt to the changes and work towards protecting their content.

Datuk Sudra Rajoo, Director of Kuala Lumpur Regional Centre for

Arbitration (KLIRCA), addressed the advantages of alternate dispute resolution, especially in today's growing broadcasting industry where, "More cross border relations are forged, for example through multi-national distributorship contracts, copyright and intellectual property agreements". Datuk elaborated the different mechanisms available to resolve disputes without resorting to the courts, including mediation, conciliation, expert determination, adjudication and arbitration.

Mr Sharad Sadhu, Director ABU technology, spoke about the multiple services offered by broadcasters today. He elaborated on the hybrid broadcast platforms and identified the piracy problems, challenges such as content domination, content piracy, depiction of ads, undesirable material and responsibility. He also explained the guidelines for hybrid TV and questioned what the policy makers and legal professionals sought from technical departments to support the common fight against piracy.

Mr Stephen Lee, Sales Executive, Conax, informed the members of the latest technology that is available and provided by the company to curb piracy. He stated that they have successfully secured 350+ DTV operations in 80 countries elaborating in detail the advantages and techniques of subscription, pairing, pay-per-view, on demand, messaging, fingerprinting, DRM Control, Centralised CAS and redundancy.

In conclusion the Legal department of ABU briefly explained the history leading up to the Broadcasters Treaty, the importance of broadcasting laws being updated and the need for members to negotiate with their respective national delegations to voice their support for the Treaty at the WIPO SCCR Meetings.

## IPPTAR-ABU Workshop on HDTV Studio Operations

The workshop, jointly organised by the Tun Abdul Razak Broadcast & Information Institute (IPPTAR) and the ABU Technology covered both the technical and production aspects of HDTV Studio Operations. The differences and the similarities between HD Camera signal processing system and SD system were also explained.

In the morning session Aaron Hee and Norihiko Noguchi from Sony made presentations on the history of development HD Camera systems and explained the important aspects of moving from SD to HD. John Anthony, Broadcasting Trainer highlighted fundamentals, such as HDTV format, compression, MPEG and aspect ratio. Andrew Scott from Tektronix explained measurements for HDTV production. V. Jeewa, Deputy Director of IPPTAR made a presentation on HDTV camera signal processing, shading and gamma corrections.

In the afternoon session, Ms Beatriz Alonso Martinez from Grass Valley talked about SD to HD File-based Workflows and introduced new file-based systems. Toni Fiedler of Fraunhofer explained multichannel audio for HDTV and clarified some of

the misunderstandings about multichannel audio. He also stressed the usage of the HE-AAC format in HDTV. Zhigang Shi from RTPRC-China shared his experiences of HD shooting during the Olympic Games in China and outlined the unique techniques of HD live production. Russell Isaac of Sports Media Services talked about the realities of HD OB and shared some videos on the tricks and important points when shooting live HD.

The workshop, attended by 40 local and overseas participants, was a good opportunity to share the experiences of both the technical and production side of High Definition.



## ITU-ABU-AIBD Workshop on Digital Broadcasting Implementation

The two-day workshop on “Digital Broadcasting Implementation” jointly organised by the ITU, ABU and AIBD, provided expert knowledge and information on the road to digitalisation, focusing on the main issues like frequency planning, spectrum management, digital broadcast technologies and alternative delivery methods as well as sharing some of the case studies and experiences of digital migration and efforts from within the region.

### The Workshop

The workshop began with a brief introduction to the digital migration process, highlighting the important role played by the ITU through its digital migration guidelines and projects already completed in many countries in the region. The brief presentation explained the digital migration process and how important each step is towards achieving the required goal, stressing on the importance of having all stakeholders on-board and working closely together to achieve the benefits of moving to digital.



The keynote address at the workshop was delivered by Dato’ Mohd Ali Hanafiah Mohd Yunus, the Chief Officer of Industry Development and Resource Planning at MCMC, the Malaysian regulatory body. He highlighted that Malaysia has taken the necessary steps and is currently on the verge of selecting the network operator for digital implementation.

Following presentations of case studies from different countries discussions took place on the experience and outcomes of digital implementation in the countries like Sri Lanka, Hong

Kong, Philippines, Laos, Vietnam, Myanmar, Malaysia and Indonesia. Also major challenges in digital broadcasting like licensing models, frequency planning, sharing of common infrastructure, selection of standards, transmission network design and availability of receiver sets were debated.

Relevant terrestrial broadcast networks and frequency ranges in Europe with the current status and considerations on terrestrial platforms with case studies and future plans were discussed. A specific session was presented on digital radio and TV standards and the developments taking place in that arena, looking at the different digital TV and radio broadcast technologies, such as DVB-T2, ISDB-T, DTMB, DAB+ and DRM+, and the countries adopting those technologies.

A look at life after ASO was presented by Japan, discussing how the Japanese planned for the use of spectrum after the ASO and what frequencies were allocated to what services. Japan, using ISDB technology, has been broadcasting to both TV and mobile handsets. One of the vacated frequency bands has been allocated to mobile multimedia broadcasting, which was launched last year and is very popular among users.

Coverage planning remains an important issue for broadcasters. The modern tools used for the planning of SFN and MFN implementation were also presented. The analysis of population and coverage was also included in the discussions, which looked at few case studies from different countries. The final session looked at the setting up of digital broadcasting trials and how to go about them. It highlighted why digital trials are useful to confirm the theoretical studies to some extent, although sometimes not necessary, as current technology and tools are able to simulate practical scenarios very accurately, it helps in many cases to work specific details. The session also shared experiences of digital trials carried out recently in the region and what the findings from these trials represented.

Over 20 experts addressed the sessions and the workshop was attended by over 180 participants from over 30 countries, representing regulators, broadcasters, telecom operators, service providers and others involved within the industry including.

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## Saving Lives

### ABU-UNESCAP Disaster Risk Reduction Project

The ABU/UNESCAP Disaster Risk Reduction Broadcast Media Initiative kicked-off with a two-day workshop during the ABU Digital Broadcasting Symposium. Broadcast media and government officials from seven of the regional initiative's ten target countries participated in the workshop and project induction meeting on 8 and 9 March at the DBS2013.

The primary objectives of the initiative are to strengthen the ties and improve the technical linkages between the broadcast



media and early warning authorities in order to be able to transmit warning alerts through the broadcast media in a more timely, efficient, and accurate manner. The first day saw presentations by the Japan Meteorological Agency, the Maldives National Disaster Management Centre, the Malaysian Meteorological Office and the Disaster Risk Reduction Network of the Philippines. Topical presentations included Emergency Warning and DRR for the disabled and elderly, messaging to the public prior and during an emergency and during response, relief, and recovery, and the Radio-in-a-Box technology. The second day's discussion focused on the Standard Operating Procedures (SOP) between broadcast media and government authorities authorised to issue emergency alerts, and the development of country specific action plans for the Initiative.

The current project is continuation of the work that the ABU started after the 2004 Indian Ocean tsunami. Since then the ABU has emerged as a regional leader in early warnings and disaster preparedness through the media. Working with more than 50 of its members, the Union is spearheading a wide ranging campaign not only to use media for population disaster preparedness but also to make national broadcasters in its 61 member countries an integral part of their national disaster management systems and ultimately save lives.

## Exhibition

The ABU DBS 2013 recorded its highest number of exhibitors with Grass Valley, WorldDMB, Harris, Playbox Technology, Rohde & Schwarz, Conax, Nevion, Ideal, Measat, Miranda, Tektronix, Asia-Pacific Broadcasting, Net Insight, Nautel, Front Porch Digital, Kathrein, LS telcom, Stagetec, Enensys, Radio Television Malaysia, Radio Frequency Systems, Exir Broadcasting, Lemo, Gencom, MediaCorp, SONY, Mahajak, STMICROELECTRONICS, Asia Media and NERA.

Coming on board for the first time were DB Broadcast, Light Way Electronics, SM CNS, Appear TV, Mobile Viewpoint, ELTI, EMS Test Measurement, LYNX Technik AG, VSN and Orban.

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

The key products on display were broadcast transmitters, cable and antenna systems, multimedia software solutions,



measuring and monitoring devices, file processing equipment, digital radio devices, network and frequency planning solutions, advanced cameras, latest audio systems, workflow solutions, multimedia content production, advanced DVB-T2 systems and OTT distribution over internet. Also, well-known media providers were present in the exhibition and provided a different perspective to the event.

# DBS Workshops

## Building a Reliable DVB-T2 Network – Theory and Experience

This workshop, presented by Nevion, discussed issues related to implementation of DVB-T2 networks. It explained the process of spectrum and coverage planning for DVB-T2 implementations and shared experiences from planning to practical implementation. It outlined that it is essential to identify the state of current infrastructure; costs involved in the setup of the new systems and the importance of using qualified suppliers and system providers. Deploying digital is a complicated process and needs the cooperation of all stakeholders involved, from regulators, infrastructure providers, operators, broadcasters to receiver manufacturers. The session also looked at the advanced features of DVB-T2, which provide whole lot flexibility when it comes to implementing services. Features like SFN, use of multiple PLP and rotated constellation provide added robustness to the signal. The workshop looked at the importance of using a T2 Gateway in an SFN deployment which provides easy insertion of regional content, generates the necessary timing information and other useful features. The session was presented by Alan Turner of Kordia, Ray Sanders of Gencom and Espen Myhre of Nevion.



## Digital TV Fundamentals: MPEG, QAM & C-OFDM



The workshop by Rohde&Schwarz explained the fundamentals of Digital TV starting with the different stages in the transmission chain and discussing details of MPEG2 transport streams multiplex, compression standards and its effect on picture quality, video data rates, channel coding, modulation methods and FEC subsystems.

This was followed by discussion of the need for Digital TV trials to compare and demonstrate various standards, check coverage area, compare different modes and fine tune parameters to meet the requirements. Sharing some of the experiences on trials in different countries it also highlighted the advantages of SFN, single and multi PLP networks and advantage of digital networks over analogue in terms of interference. The session was presented by Hock Leong Tan of Rohde&Schwarz.

## Maximizing FM Coverage – Advances in Technology and SFN Network Design

Richard Redmond of Harris looked at the limitations of FM coverage and advanced SFN networks as a solution. He introduced the MaxxCasting system that combines radio and cellular technology to enable FM broadcasters using boosters to enhance their signals by reducing multipath interference between the main and booster



transmissions through the use of a cluster of boosters. With the use of Sychrocast frequency and modulation are synchronised with the primary transmitter providing clean coverage in prime areas and moving remaining interference to the unpopulated areas and equalizing the delay on STL paths using GPS satellites. Sharing his experience Mr Redmond stated that new advancements in network design and research have provided such benefits and Harris is able to provide a complete and integrated solution with its advanced transmitter designs and planning tools.

## Effective Workflow Innovations – From Acquisition to Archive



Nori Noguchi and Noboru Yanagita of Sony made presentations on effective workflows, XDCAM technologies and archive solutions. They explained the XDCAM technology fundamentals, codecs used, cost-effectiveness and other advantages. They also highlighted the long recording time with the help of MPEG2 Long GOP and the ultra-high reading speed for ingesting. With media available as disc and memory card flexibility is provided for different applications. Looking at the XDCAM workflow and archiving applications, it was stated that XDCAM provides a complete workflow from acquisition to archive. Also presented were some unique ENG features of XDCAM camcorders, use of Wi-Fi remote control, field viewers, professional disc decks and the use of XDCAM station for archiving of tape onto professional XDCAM disc media.

## The World of DTT: Developments, Technology and the Future of Terrestrial Broadcasting

The workshop looked at need for digital terrestrial broadcasting highlighting that broadband delivery is really not a substitute for that. It covered, the continuous need for broadcasting and spectrum in the future and the challenges between broadband and broadcast. Aiming to advance and safeguard the development of digital terrestrial television in Europe and around the world and bringing all stakeholders together involved in the implementation of DTT platforms. DigiTAG, it was said, raises awareness about the importance of terrestrial broadcasting for the future. The session also looked at DTT roll-out and migration to T2, comparing the features and benefits of DVB, ATSC, ISDB and DTMB technologies, pointing to the strong growth of terrestrial delivery compare to satellite and cable broadcasting in Europe and worldwide. It is now sensible to “leapfrog” from analogue to DVB-T2 as has been the case with many countries in Asia and Africa. Also highlighted were some case studies and best practices for roll-out of end-to-end services. The workshop also looked at the importance of receiver conformance testing to safeguard consumers and to providing them with receivers that provide all the benefits of the service being offered.





## Bringing Stereo Broadcast Productions into the Multichannel Realm

This workshop, presented by Dolby, explained the importance of providing a high definition digital surround sound experience to the viewers and the opportunities to utilise the multichannel capabilities of latest audio technologies. It focused on the fundamentals of Dolby technologies conveyance of mono through 5.1 channel Surround Sound through content creation, distribution, transmission and presentation in the consumer's home. The system comprises bitrate reduction codecs and matrix encoding, metadata to provide a controllable, predictable and enjoyable listening experience in a variety of listening and monitoring environments, loudness measurement and tools for proper use of key metadata parameters. The session also included a demonstration of tools and techniques and their application in providing a unique experience in different environments.



## DAB+ Killer Apps with Energy Saving



DAB+ can broadcast across platforms, including to mobile devices. It is a powerful spectrum efficient technology where broadcasters can keep analogue spectrum. DAB+ transmitters support green operation and the energy savings that can be achieved are comparable to operating 28 traditional analogue FM transmitters. The DAB core standard is now free from royalties as patents have now expired. The DAB family of technologies greatly enhance experience through many unique features. Like DAB+ services you can run slide shows, EPGs, categorisation and some support short videos. The session also looked at the take up of DAB+ around the world. It has now been adopted by over 40 countries, with receivers available in a wide variety at different price ranges to suite the desired usage. There are a lot of apps available for mobile devices with very exciting and unique feature for receiving and enhancing the experience of DAB+, some of these were also displayed at the session. The workshop was presented by Jørn Jensen of WorldDMB, Joan Warner of CRA, Lindsay Cornell of BBC, Richard Redmond of Harris, Kathryn Brown and Les Sabel of CRA.

## DVB-T2 Implementation – Optimising Satellite Capacity for Regional and DTH Distribution

Bernard Pichot and Colin Prior of Enensys explained their solutions for distribution of regional content over DVB-T2 and satellite DTH, through DVB-S/S2, combined networks. In the case of DTH architecture, the A/V content from the DVB-T2 service are multiplexed into a Multiple Program Transport Stream (MPTS) which is broadcast over satellite networks. The end user DTH receivers are able to render an A/V service from the received MPTS. For DVB-T2 distribution architecture in a SFN, the A/V content are multiplexed into a MPTS which is encapsulated into T2-MI protocol (DVB-T2 distribution protocol) which is then broadcast over satellite networks. The transmitter sites receive the T2-MI stream and broadcast it on the DVB-T2 network. The end user DTH

receivers are not able to read the T2-MI stream, however, this problem can be solved with a DVB-T2 local adapter, 'T2Edge' at transmitter sites. This method optimises the satellite, there being no duplication of content. It is DTH compliant, preserve SFN parameters and is single and multiple PLP compliant.

## DVB-T2 Implementation



Philip Laven of DVB, Shimizu Kazuhiro of Sony, Alex Ng from Harris and Colin Prior of Enensys made presentations on DVB-T2 Implementation issues. The new profiles of DVB-T and DVB-T2 Lite were introduced targeting mobile broadcasting with increased flexibility and the simultaneous use of robust FFT size as T2-base utilising new robust low code rates and low power consumption. The new DVB-NGH (Next Generation Handheld) was described as having key techniques such as Time Frequency Slicing (TFS), MIMO, non-uniform constellations, rotated constellations (2-D and 4-D) and improved LDPC codes. The maximum data rate for DVB-NGH is 12Mbit/s. The session also discussed DVB-T2 transmitter requirements, available transmitter technologies and implementation issues. The workshop also included a demonstration of DVB-T2.

## Quality Assurance and Monitoring in Broadcast Chain



Tektronix explained the aspects of quality assurance in a broadcast chain. The move to file-based systems has its benefits and now it is possible to monitor the data streams to maintain and ensure the required quality is maintained. During ingest and production, the technical parameters are examined include video levels, gamut, black/frozen frames and audio levels, QA is very important as the broadcaster should comply with regulations laid down by the individual regulators regarding subtitling and closed captioning etc. Also not maintaining required quality could result in loss of revenue and credibility from advertisers and general audience. The session also ran hands-on demo of the monitoring and measurement equipment, showcasing how each parameter is controlled and what results are reported from the device. The session was presented by C B Law and Andrew Scott of Tektronix.

## Some Alternatives for TV Production in the Challenging Environment

Hyung Jun Kim of KBS presented some alternatives for TV production. The broadcast production environment has many challenges including weakening



distribution power, shrinking revenue and technology and trends changing too fast. The broadcast can take countermeasures by tapping new and niche audiences through new channels like YouTube, on-demand content and other alternate delivery platforms. Through the use of these channels a new competitive financial strategy can be designed such as expanding content to multiple platforms, including mobile and even collaboration with cinemas and 3D production.

### Best practices to select and Implement a MAM System

Yoann Poizeau from Dalet shared his experience in implementing a Media Asset Management System and selecting one that is appropriate for your requirements. Providing a step-by-step guideline he stated that the most important reason for implementing a MAM system is to increase productivity and efficiency within the workflow. This is achieved by sharing content and gathering valuable metadata about each clip you have and then integrating all into one system. The best way forward is to use open platform and IT standards, also one that provides scalability and high availability, facilitate change management and one that can evolve with the client. Another important feature that is now required is generating content for multiple platforms.



### Media Production Hub: Setting-up an Open Infrastructure, and DVB-T2 – from Studio to Transmitters



Walter Tan of Rohde&Schwarz compared the open architecture of the media production hub with proprietary architecture. He described how a proprietary or dedicated solution is usually deployed first with innovation focused on one specific challenge such as video servers or replacing a tradition VTR operation. Once deployed the broadcaster is locked to the supplier and the required flexibility and scalability is not achieved. Open solutions are deployed once the technology becomes more mature and offers higher latest technology and efficient workflow. These are more resource or service centric than product centric and are based on wide adopted industry standards. The session was also presented with the R&S's fully integrated and highly compact DVB head-end highlighting its features, functionality and implementation examples.

### What Does ITU Do?

Istvan Bozsoki of the International Telecommunication Union explained that the ITU plays a very important role in the broadcasting world especially during this period of analogue to digital transition. The ABU works closely with the ITU on spectrum issues and other matters pertaining to digital migration. Spectrum issues are debated



within the ABU before being presented at the World Radio Conference and this allows the views of all members to be taken into account and considered. The workshop examined the organisation and workflow of the different sectors of the ITU and its various study groups. It also highlighted the areas where ABU work very closely with the ITU as one of its sector members.

### Elements of Technology to Maximise Throughput

This workshop, presented by Newtec, focused mainly on DVB-S2 extensions and related efficiency gains. Among the parameters that were modified include lower roll off factors, higher modulation and FEC granularity, and advanced pre-distortion to name a few. It was stated that, through the use of DVB-S2 extension and the new HEVC compression, UHDTV transmission using a single transponder has now become a practical proposition. Also shared were the results of an industry survey that was carried out related to the new standard. Some suggestions were also provided on ways to migrate to the new system.



### DVB-T2 Network Deployment & New Business Models



Thomson Broadcast presented this workshop on DVB-T2 Network deployment. DVB-T2 provides improved performance compared to DVB-T by various techniques including higher modulation order up to 256QAM and a more robust FEC subsystem of BCH/ LDPC coding LDPC that enables it to perform close to theoretical Shannon limit operation. Rotated constellation improves robustness for portable and indoor reception. The higher guard interval allows a larger SFN cell size. Multiple PLP operation is a technique that broadcasters should utilise and future equipment purchases must take into account. Insights were also provided into some case studies conducted in France.

### Webinar Session: Elements of Modern Frequency and Network Planning

This special Webinar session was presented by Markus Morgen of LS Telcom from Germany. He shared his experiences on frequency and network planning and exemplary planning procedure for DVB-T2. He introduced the Geographic Information System (GIS) for the Single Frequency Network planning and coordination of terrestrial broadcasting services. He also highlighted systems to preserve the already existing services. It was stated that one of the most important this is to finalise your requirements so that the tools can be setup to provide you with the results that address your requirements.

