

## DIGITAL BROADCASTING SYMPOSIUM 2019



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DIGITAL  
BROADCASTING  
SYMPOSIUM 2019  
DIGITAL TRANSITION  
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2005-2019

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**HbbTV: Can it Save  
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Cover Designed by ABU Publications:  
*From the opening session of the DBS 2019.*  
*From left to right, YB Gobind Singh Deo, Minister of Communications and Multimedia, Malaysia, Abdul Muis Shafii, DG, Radio Television Malaysia, and Dr Javad Mottaghi, SG, ABU.*



Asia-Pacific Broadcasting Union

## TECHNICAL REVIEW

### From the Editor's Desk



You will have noticed the redesign of the Technical Review. We have changed the cover design and the inside layout also to some extent. All part of the process to bring a more modern look to the magazine, and we hope you will all enjoy the new look. We are in the process of improving the magazine further and you may see some more changes in the coming issues. We would definitely like to hear from you and get your feedback so please feel free to drop us an email at [nadeem@abu.org.my](mailto:nadeem@abu.org.my).

As usual for the first issue of every year it carries the full report from the recently completed Digital Broadcasting Symposium, which was held on 4-7 March 2019. This year we celebrated our 15th year anniversary and we are happy to report another successful DBS. The report touches upon the 12 conference sessions, 8 workshops, 5 masterclasses and the industry exhibition, with some special highlights. We would like to thank everyone who joined us in KL in addition to all our sponsors, supporters and partners.

The mid-year meeting of the Technical Bureau this year was held at the back of the DBS event on 8 March. The highlights from the many discussions from the meeting are also featured in the issue. This was the first time the Technical Bureau meeting has been organised together with the DBS event and we would like to thank all the members for their feedback on DBS and how we can improve it further.

The two main articles for this issue are contributed by IRIB-Iran and Fraunhofer IIS. Both looking at very interesting and fast developing areas within the industry, one on TV and the other on Radio. The first article, very aptly titled "Hybrid Broadcast Broadband TV: Can it Save the Broadcasters?", discusses HbbTV implementation by IRIB, which is one of most popular and widely adopted IBB technologies by the industry. Like other IBB technologies HbbTV helps to create an enhanced experience for the viewers by integrating the broadcast and broadband service on one platform, making it easy to find, navigate and enjoy content in one place. The article focuses on the main benefits that HbbTV brings and how broadcasters can leverage on these to provide a better service to their viewers. The second article titled "How will Digital FM Transform FM Radio Broadcasting: Suggested Way Forward" contributed by Fraunhofer IIS looks at digital radio in the FM band, and how to migrate to the FM band without disrupting your existing FM services. It also presents some successful trials case studies conducted in selected countries.

In addition, this issue carries highlights from some key activities organised by our members including a report on the Annual Media Technology Conference organised by IRIB and a brief look at the BES Expo 2019 and the International Broadcast Conclave organised by Prasar Bharati in India. The issue concludes with our regular industry news, digital updates and the latest in equipment trends. We hope you will enjoy the new look of the TR and that the information and materials included are of benefit to all our readers.

The Asia-Pacific Broadcasting Union (ABU) is a professional union of broadcasting organisations in the Asia-Pacific area which aims to co-ordinate and promote the development of radio, television and allied services in the region. It is non-governmental, non-political and non-commercial.

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**The Asia-Pacific Broadcasting Union**  
2nd Floor, IPPTAR Building, Angkasapuri, 50614 Kuala Lumpur, Malaysia  
Telephone: (60-3) 2282 3108 Fax: (60-3) 2282 5292

For advertising inquiries, contact  
**Hamidah Rani**  
email: [hamidah@abu.org.my](mailto:hamidah@abu.org.my)

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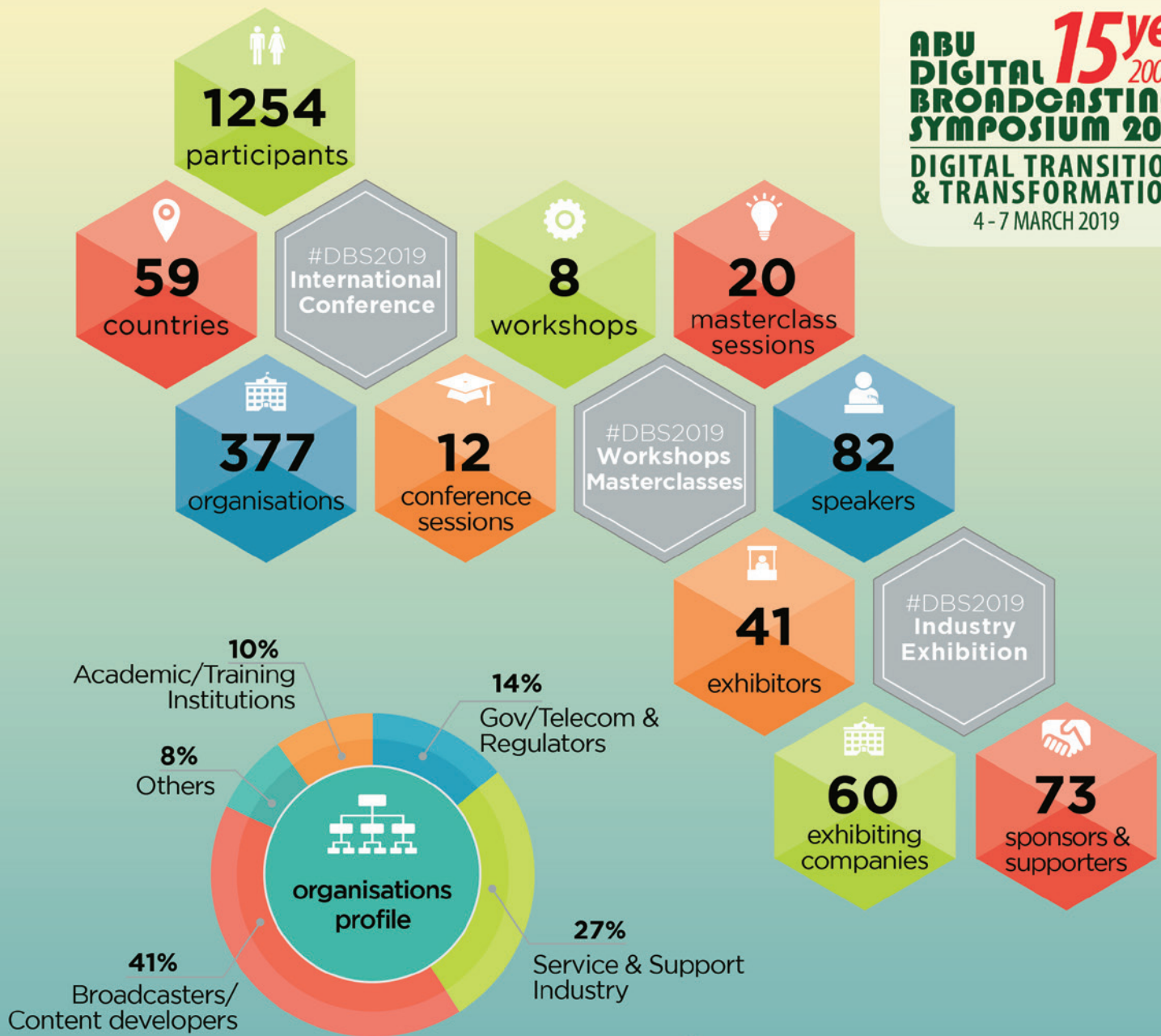


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# #DBS2019 - IN NUMBERS

**ABU** **DIGITAL BROADCASTING SYMPOSIUM 2019**  
**15 years** 2005-2019  
**DIGITAL TRANSITION & TRANSFORMATION**  
 4 - 7 MARCH 2019



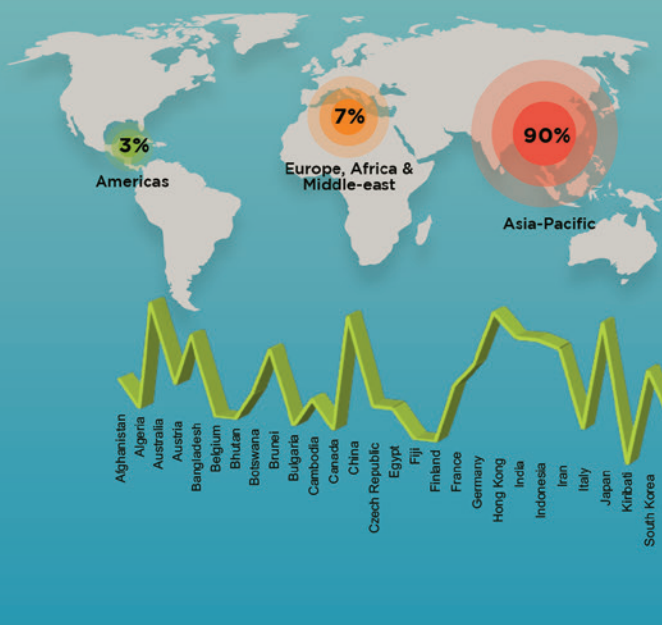
## Participants' Profile

**12%** C-Level / Decision Makers

**28%** Senior Managers

**44%** Specialists / Experts

**16%** Others





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# Go Digital to Stay Relevant, Minister tells Broadcasters



YB Gobind Singh Deo, Minister of Communications and Multimedia, Malaysia

Broadcasters have no choice but to use mobile and Internet-based delivery systems to compete and remain relevant, Malaysia's Minister of Communications and Multimedia told the Digital Broadcasting Symposium.

In his ministerial address, Mr Gobind Singh Deo said digital technologies and innovations were transforming the way organisations and businesses operated, and the way information was shared and exchanged.

"Like other industries, these innovations are forcing the broadcast and media industry to evolve by incorporating and adopting these technologies and solutions.

"The evolving behaviour of consumers, the growing strength of online and internet-based media delivery platforms, together with the exponential increase in mobile devices – this is the driving force that is changing the whole media landscape."

Mr Gobind said audiences today demanded that broadcasters make content available to them on their choice of device at their preferred times.

"This is a drastic change from the traditional way broadcasters used to operate. We as broadcasters serving the public need to accept this and make necessary changes in our operational model to serve the public.

"If we don't, then it is highly likely that the audience will switch to other providers who meet their requirements."

Mr Gobind said many broadcasters in the region are still struggling with their move from analogue to digital. This transition was not easy.

"We have been working very closely with countries in the region which have successfully completed the transition, as well as with ASEAN. I am happy to note that Malaysia is moving swiftly towards this goal.

"We have made huge investments to get the infrastructure ready for the digital transition and with the support of both government and private stakeholders involved, we hope to announce our analogue switch-off soon."

He was happy to note that Malaysia's public broadcaster, RTM, had actively been transforming itself in this digital wave in recent years, and was able to offer the public the benefit of these technologies now.

Mr Gobind encouraged fellow broadcasters from the region to make use of events and forums such as DBS to learn from the experts and work together to implement digital solutions quickly.

"The ABU has always been supportive of such endeavours from its members and the industry, and I believe they will continue to support them in the future."



Mr Shakib Ahmad Shakir, KKMM Deputy Secretary General (Policy), YB Gobind Singh Deo, Minister of Communications and Multimedia, Malaysia and Dr Javad Mottaghi, ABU Secretary-General

# Digital Transition & Transformation



Joan Warner, CEO, Commercial Radio Australia

The 2019 ABU Digital Broadcasting Symposium was held on 4-7 March at Hotel Royale Chulan, Kuala Lumpur. This symposium, themed 'Digital Transition & Transformation' is held once annually by the ABU, and was the 15th in the series. Prior to the conference proper, a half day workshop on DVB was held on the morning of 4 March, followed by an afternoon workshop on DAB+. The three-day conference, 20 Masterclass sessions covering five topics, and eight workshops together with exhibit booths, 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 many participants representing broadcasters, telcos, regulators, manufacturers and other industry players.

## Opening Session

The Industry Keynote address entitled 'Seizing the Digital Opportunity' was delivered by Joan Warner representing



Dr Javad Mottaghi, ABU Secretary-General, presenting a token of appreciation to Ms Joan Warner

the principal sponsor, WorldDAB. She reiterated that the broadcaster's role in shaping the future and saving lives during disasters is more important than ever before. This was demonstrated during the recent forest fires in California, where battery operated radio sets played a crucial function in keeping the affected population in touch with disaster relief centres as well providing timely weather updates. These sets overcame the blackspots, where broadcast content was still available, despite the mobile network transmitters being knocked out. In Australia, millions were raised for the Queensland flood crisis and stations doled out essential goods such as food, water and milk. All Townsville radio stations had 24/7 live and local broadcasts, providing emergency updates.

Digital improves the customer experience in various ways, including waking up to breakfast radio on DAB+. They can also listen via a station app on the bus or train, and check in on radio on Facebook. It is a breeze to find your station brands across different platforms, which is now made even easier with voice technology. WorldDAB has updated user experience guidelines for automakers, outlining how radio should be easily found and displayed in the multimedia system. The guidelines make allowance for station logos, programme information, internet integration and voice control of radio. This is radio's challenge in the car interior, as dashboard screens go supersized, in tandem with the trend in using voice to control the Internet of Things (IOT).

Digital can improve the experience for advertisers as DAB+ offers more targeted and integrated content, with innovative marketing opportunities. It makes the radio buying experience easier through automated holdings, and moves to more effective ways to trade broadcast, digital and podcast inventory.

## Technologies & Standards: New Developments and the Next Wave

The first session was moderated by Mr Hamid D Nayeri of IRIB-Iran and the panelists were Dr Peter Siebert, DVB Project Office, Lindsay Cornell, BBC, Mats Ek, Prokira and Akira Kiuchi, NHK. They elaborated on the developments of the various broadcast/telecommunication technologies over recent years and the improvements achieved. Broadcast to handhelds have been tried often with different technologies such as DVB-H and MediaFLo. However, all high-power high tower-based schemes (and satellite) have failed.

There are clear commercial reasons like extra costs for handsets, networks and content and no specific business model compensates for this. There are also technical challenges, especially restricted indoor reception as compared to mobile outdoor or rooftop. This point can be discerned by the findings that the signal level difference between Fixed DTT and Mobile TV is about 47dB for roof top vs indoor mobile reception (Source: Kent Walker, Qualcomm, DVB World 2017). Coverages predictions indicate that many more transmitter sites are needed to provide handheld reception, requiring the use of a dense cellular infrastructure. Thus,



handheld indoor reception is a demanding case, resulting in a trade-off between capacity, coverage and cost.

Entering this scenario is 5G, with its Fully Evolved Multimedia Broadcast Multicast Service/Enhanced TV standard. The 3GPP Release 14 specifies for dedicated carriers with up to 100% MBMS allocation and increased guard interval for bigger SFN networks. First trials with the new FeMBMS are taking place in Germany, and further improvements are expected to be announced with Release 16. DVB-T2 has higher spectrum efficiency, compared to FeMBMS which is not as cost efficient. Potential 3GPP-DVB cooperation is being explored, with two scenarios under consideration. The first is enabling DVB Services on 5G connected receivers and the second is installing DVB-I as a fully compatible service layer on top of 5G eTV/FeMBMS.

FeMBMS is LTE based, using OFDM like DVB-T2 and incorporates selectable lengths of Cyclic Prefix which allows the usage of SFN. Capacity is from 1 to 33 Mb/s, allocated in resource blocks and bandwidth options range from 1.4 to 20 MHz. A variety of modulation and coding schemes, comparable to DVB-T2 namely QPSK, 16QAM, 64QAM, 256QAM) are offered. FeMBMS may replace DVB-T2 networks even when using traditional broadcast infrastructure but it is about 20-30% less efficient compared to DVB-T2 in 8 MHz Channel. It could also provide mobile/indoor reception to handheld devices, but then Low Power Low Tower based networks need to be used.

On 1 Dec 2018, new 4K/8K Advanced Satellite Broadcasting was launched in Japan. 8K was offered as a single service whilst 4K was available with 16 services. Transmission was designed to combat rainy weather by implementing Hierarchical Modulation, in the form of 16 Amplitude PSK (APSK) with the more robust QPSK.



Hamid D Nayeri, IRIB-Iran, Dr Peter Siebert, DVB, Akira Kiuchi, NHK, Lindsay Cornell, BBC, and Mats Ek, Prokira

## Broadcasting Business and Strategies for the Future

The Moderator was Asaad Bagharib, Thinking Tub Media Ltd, with the panel comprising Panna Dey, Dolby, Grant Blackley, Southern Cross Austereo, Nick Piggott, RadioDNS, Fabio Gattari, Etere, Markus Fritz, Eutelsat, Dennis Breckenridge, Elevate Broadcast, and Ruxandra Obreja, DRM.

The four elements of the Next Gen Experience comprise of more pixels, better pixels, faster pixels and better sound. There are more pixels as the 8K mode has 7,680 x 4,320 pixels, better pixels, with wider colour gamut as 12 bits/pixel are used and faster pixels at 120 frames/sec. More pixels deliver a picture that is 16 times the resolution of present HDTV or 2K. Better pixels result in a High Dynamic Range (HDR), mimicking real viewing experiences to excite senses, physical and emotional responses. The high frame rate portrays better and smoother motion, while the wider colour gamut allows the reproduction of almost all surface colours.

Delivery of sound is better because it is multi-dimensional, fully immersing the viewer with sound objects that move around and above thus adding the perception of height dimension. The objects describe position, size, diffusion 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

OTT literally means Over-the-Top, a term used for delivery of video streams via the internet. It bypasses traditional distribution channels, with no cable or satellite service needed. The service can be streamed over the public internet, with lower costs than the traditional methods of delivery. OTT is developing at a rapid pace in transforming the TV industry and reshaping content distribution models, consumer viewing habits and advertising. There is growth in OTT advertising with ad targeting, personalisation, measurement and engagement.

Consumers are using OTT because they can choose their TV series based on the programming. OTT platforms offer digital access to programs at a lower cost, with the added convenience of media consumption on the move, with smartphones and tablets. The market opportunities are considerable as the digital data can be measured, enabling advertisers to understand the cost of media, placement of ads and its success. Monetisation of content can be increased with dynamic ad insertion capabilities. OTT can reach out and engage relevant audiences while re-targeting capability based on audience data.

A challenge for OTT is fragmented media consumption, where young adults favour streaming services. There are a variety of industry standards, gaps in ad delivery infrastructure and the cost of IT infrastructure is high. It is best to use a Content Delivery Network (CDN) which is a system of distributed network servers. CDN optimises delivery of content via the internet, minimising latency and brings content to many



Asaad Bagharib, Thinking Tub Media Ltd, Grant Blackley, Southern Cross Austereo, Nick Piggott, RadioDNS, Dennis Breckenridge, Elevate Broadcast, Markus Fritz, Eutelsat, Fabio Gattari, Etere, and Ruxandra Obreja, DRM

places at once. It also allows the service provider to multiply OTT streams without purchasing unnecessary bandwidth.

## Cybersecurity and Media-Action Required

Moderated by Masakazu Iwaki, NHK, the panelists were Hamid Dehghan Nayeri, IRIB-Iran; Kathryn Brown, Commercial Radio Australia, Syed Mokhsein Syed Mansor, MCMC-Malaysia, and Mariette Peters-Goh, WongPartnership LLP, Singapore. A recent study conducted by Newscycle Solutions had revealed that 52% of news media companies experienced data breach or other forms of cyber-attack, in recent years. Most of these attacks happened on news media websites, where hackers tried to take over the site to further their agenda and interests.

We need to be concerned about Cyber Security as the broadcast industry is quickly adopting virtualised cloud services, for financial or agility reasons and multi-protocol delivery of content over IP to a wide range of consumer devices. The industry is also offering OTT services for direct consumer delivery of digital content and IP-based technology to support the bandwidths and speeds of next generation advanced television systems. These technologies create an environment that is more connected and hence more vulnerable to cyber threats.

Cyber threats may result in the theft of valuable content, piracy, including pre-release material. The result is damaging to the reputation of a news organisation together with leakage of data, such as financial information, personal data and e-mails. Other bad effects are software/file corruption or encryption and some of these could result in a media/broadcast operation's inability to continue operation.

The ABU is working with World Broadcasting Union to combat this, by setting up study project tasks, specifically on Cybersecurity and threats to broadcast and media. It encompasses collaboration between the different Broadcasting Unions and sharing threat information, actions taken and preventive methodologies. Other initiatives taken are continuous education and Information to member organisations in the form of seminars, workshops, conferences and recommendations. WBU documents include "WBU Cyber Security Recommendations for Media Vendors' Systems, Software and Services" published on January 2018 and "WBU Recommendations for Core Cyber Security Controls" issued on October 2018. Next will be "Cyber Security Requirements for Cloud Service Providers" and work on it is due to start in 2019.

Media is a high-profile target, attracting attention from all types of threats caused by occasional controversial statements made on air and objection to talent or programming from activist groups. Broadcasters have loyal listeners and lots of valuable information about them. Stations attract hackers, snoopers and those who gain satisfaction from attempting denial of service on media sites. Cyber resilience can be acquired by updating antivirus protection for files and emails, procuring the latest firmware and software updates and installing firewalls that restrict the ports from being accessed remotely. There should be regular password changes by the users, as well as daily back up of files in cloud or hard drives with offsite storage. The employees should be educated in increased awareness of threats and undergo training to counter them.



Masakazu Iwaki, NHK, Hamid D Nayeri, IRIB-Iran, Mariette Peters-Goh, WongPartnership LLP, Singapore, Syed Mokhsein Syed Mansor, MCMC-Malaysia, and Kathryn Brown, Commercial Radio Australia

## Big Data, Artificial Intelligence And Personalisation Of Media

The Moderator was Aale Raza, Whiteways Systems, with the panelists comprising of Deb Hishan, GfK, Masakazu Iwaki, NHK Japan, Asaad Bagharib, Thinking Tub Media Ltd, and Charles Sevier, Dell EMC. The portability and ubiquity of radio make it hard to undertake audience measurement but there many tools available such as diaries, meters and observations from streaming data. Hybrid RAM or Radio Audience Measurement (multimode) delivers a more holistic measurement of radio listening, by maximising completeness and granularity. A pilot study on audience measurement was conducted in Australia using wearable meter cum watches, E-diary pilot and smartphone app meter pilot. Analysis indicates that the meters are reporting incomplete listening and comparable patterns of listening when compared with diaries.

The pilot study also indicates that the participants had a sense of importance, were highly motivated and found the involvement, interesting and fun. The diary was comprehensive, non-invasive, and controllable, with most listeners jotting down the details required. Listeners liked the watch design, enjoyed wearing it and considered the step-counter as a bonus. However, they expressed privacy concerns and repeatedly forget to charge the battery. The app meter was easy to install, but again privacy concerns were expressed together with negative perceptions about battery drain.

Artificial Intelligence (AI) is assisting in the production of TV and Radio Programme, when viewed from the aspect of editing and forecasting. Speech synthesis is used for stock market reports and weather forecasting. Japanese sentence is synthesised from received data with fill in method, while the recorded words are connected and its time allocation adjusted by speech rate conversion technology. Speech is automatically generated from meteorological data sent from Japan Meteorological Agency based on announcer's experience. AI has learnt, how the announcer intonates and speaks with an interval.



Automatic audio broadcasting has reformed working-style by reducing the routine, repetitive task of the regional station announcer. It enriches regional broadcasting services by shifting working hours, to developing a regional programme. The development of quality speech synthesis technology has created an asset from NHK announcer's style of speaking. Automatic audio description is a form accessibility technology for visually challenged people and is enabled by XML sports data. In the past, TV reporters have been manually transcribing video footages such as interviews for accurate production. Utilisation of speech recognition systems is thus strongly recommended. The Rapid Transcription System produces transcripts from video footage both quickly and efficiently. The system has 80% Speech recognition accuracy, with user friendly application for correcting misrecognised words. A further development by NHK, is the real time recognition of information programmes, enabling closed captioning to be aired to viewers instantly.



Aale Raza, Whiteways Systems, Deb Hishon, GfK, Masakazu Iwaki, NHK, Asaad Bagharib, Thinking Tub Media Ltd, and Charles Sevier, Dell EMC

## Migrating to IP – Standards, Strategies and Challenges

The session was moderated by Dr Fintan Mc Kiernan, Ideal Systems SEA, and the panelists were Yew-Jin Cheong, Rohde & Schwarz, Toshiro Mitsuyoshi, NHK, Torkel Aamodt Thoresen, Nevion, Peter Bruce, IABM, and Jonathan Triboulet, Skyline Communications.

Broadcasters are losing audiences and revenue to OTT operators and current SDI infrastructure won't be able to support the high bandwidth demand of 4K/UHD/HDR/HFR/WCG content. Satellite transmission is still too expensive compared to the IP contribution/distribution method. More and more solutions are based on Virtualisation and Cloud, which can leverage the commercial off the shelf (COTS) platform. The merging of IT and broadcast is happening at a faster pace. Video has become mainstream content consumed on the Internet and the line between Internet Professional Video and Broadcast Video has blurred.

The challenges of IP adoption include interoperability, as the IP Standards Set is not fully complete. More details are still under discussion and evaluation, such as single stream 5G Latency issue as the current latency can be as low as 2ms, but still not good enough for some programmes, like high-frequency-trading or soccer matches. Other challenges are Cyber security issues and the skillset upgrade of current broadcast operators and technical staff.

IP adoption has been slower than predicted due to interoperability concerns. Thus, SMPTE ST 2110 was ratified at the end of 2017, and looks set to drive growth in the adoption of IP technologies. End-users could increase their investment in IP enabling remote production workflows at events. The earlier SMPTE ST 2022 ratified in 2012, provided a single Serial Digital Interface (SDI), over IT networks using IP and Real-time Transport Protocol whereas the latest SMPTE ST 2110 conveys audio, video and data as separate flows across the network. Packetised data is contained or “encapsulated” inside other packets for transport. Information in headers is vital to make it all work but does represent an overhead. However, SMPTE 2110 needs a managed IP Network without any packet dropping.

NHK Japan has undertaken the implementation of IP for DTT network in SFN taking into account that there are 40 channels (470-710MHz) and about 2200 relay stations. An SFN is a network of transmitting stations that use the same frequency channel and carry the same data. Broadcast waves from each relay station have to reach overlapping area between adjacent stations within guard interval duration. IP networks are used as a backup, and the wired IP network area has been spreading rapidly. NHK has connected IP networks to the tops of mountains at an affordable cost. The problems of IP transmission for SFN are network delay, delay jitter and packet loss. The results are that delay time cannot be adjusted, slave synchronisation clock plus Broadcast TS cannot be regenerated and a program cannot be transmitted within the determined time of microwaves by Forward Error Correction (FEC) subsystem. Hence IP transmission equipment has been designed to contain a receiver buffer that absorbs the delay jitter, and a common clock which makes it possible to adjust delay time. The equipment can also regenerate BTS (Broadcasting TS) by synchronizing with common clock and lost packets are recovered by using the FEC.



Dr Fintan Mc Kiernan, Ideal Systems SEA, Torkel Aamodt Thoresen, Nevion, Jonathan Triboulet, Skyline Communications, Peter Bruce, IABM, Toshiro Mitsuyoshi, NHK, and Yew-Jin Cheong, Rohde & Schwarz

## Digital Transformation – Workflow Enhancement, Media Management and Cloud Integration

The Moderator was Charles Sevier, Dell EMC, and the panelists were Paul Shutt, VIRZT, Aaron Alphonso, Macquarie Media Ltd, Johan Vanmarcke, Mediagenix, Tomas Chen, Sony, Bruno Burte, NOA GmbH, and James Taylor, Ideal Systems.

The new Media Asset Management (MAM) system comes with higher resource efficiency across multiple cloud infrastructure zones and increased automation, while leveraging Cloud Technologies to improve video production workflows and IT

return on investment. The MAM introduces a new smart transfer system, optimised search for millions of assets and extended media support.

MAM is now available across multiple cloud infrastructure zones where Media companies have the flexibility to access their content anywhere on Amazon Web Service. The new cloud infrastructure zones allow MAM to manage compute, storage and transcode resources across multiple cloud and on-premise zones. This technology is also extremely useful for connecting multiple physical data centres or production facilities under a single MAM. Support for this technology enables both cloud and hybrid architectures. This allows pre-existing infrastructures to be connected and augmented with the most attractive cloud services. Users can securely access content on MAM from any location, using the improved two-factor authentication in-cloud or on premise.

The complexity of multi-platform production and delivery is reduced by streamlined workflows where the station is managed with a single tool. The MAM automatically moves media where it's needed and when it's needed. It consolidates news, sports, promos, and programming. At the same time, it can produce for and deliver to any platform: broadcast, mobile, and online. Thus, using MAM as a platform can make content delivery workflows more efficient, whilst delivering superior ROI and maximise the value of the content. MAM scales as the organisation's needs grows/changes whilst using robust open APIs for simplified integration with other applications.

The core concept of Media Services Orchestration Platform is to ease the creation of viable broadcast platforms in the cloud. By working with the world's leading technology vendors it is possible to create modular broadcast solutions, automated and orchestrated with common DevOps and SDI tooling. Investing in fixed infrastructure for transient workflow spikes caused by moving archives between platforms is highly inefficient. Instead of purchasing or renting infrastructure, a cheaper alternative is a hybrid cloud solution. This solution removes the need to provide additional in-house capacity in terms of software and hardware. It can perform simultaneous pathways with no incremental pathway licence cost, associated with some workflow orchestration solutions. There are no fixed costs as pure 'on-demand' costing enables the workflows to exist in a 'cold-standby' state with no cost overhead. However, Cloud DevOps skills are required to initially setup and configure the workflows. It is also Inefficient for small numbers of assets.



Charles Sevier, Dell EMC, Paul Shutt, VIRZT, Aaron Alphonso, Macquarie Media Ltd, Johan Vanmarcke, Mediagenix, Tomas Chen, Sony, Bruno Burte, NOA GmbH, and James Taylor, Ideal Systems

## Delivery Technologies for the Future – UHD, 5G and More

The session was moderated by Dr Peter Siebert, DVB Project Office, and the panelists were Andreas Streit, LS Telcom, Fumiki Uzawa, NHK, Jae Kwon LEE, KBS-Korea, Dr Les Sabel, WorldDAB, and Colin Prior and Simon Tsang of ENENSYS.

8K UHDTV Video Transmission System with Adaptive Rate Control for Mobile Live Production has been initiated by NHK in Japan. On December 1st, 2018, Japan started 4K and 8K ultrahigh-definition television (UHDTV) broadcasting. Japanese broadcasters have developed various kinds of equipment for UHDTV but mobile wireless links for live productions were not ready.

Marathon races are very popular and coverage is produced by NHK and many commercial broadcasting companies. It's necessary to enable real-time video transmission from moving vehicles using mobile wireless links. However, current marathon broadcasting is implemented with only 2K HDTV.

Changing from 2K to 8K is demanding as a very high bit rate is required for transmission of 8K UHDTV. 8K satellite broadcasting at 85 Mbit/s uses 3.5 times the bit rate of 2K and for ENG (Electronic News Gathering) applications an even higher bit rate is required. In Japan the frequency allocation is limited for broadcaster mobile wireless links, with only 1.2 and 2.3 GHz bands available. This factor has to be taken into account seriously, as the frequency bandwidth available for 1 video channel is 18 MHz. Requirements for 8K mobile wireless link systems keep 18 MHz channel spacing, the same as for 2K signal transmissions.

Technology for Implementing 8K Mobile Wireless Link uses adaptive transmission-controlled MIMO technique for large-capacity transmission. The technique consists of 4x4 Singular Value Decomposition MIMO which optimises the propagation path generated by multiple antennas. Added to this technique are adaptive bit and power allocation, together with Time Division Duplex which provides feedback without additional bandwidth. Additional techniques are rate matching technology for uninterrupted video transmission, which adapts error correction coding rate control in accordance with channel conditions and adaptive video bit rate control, that adjusts the video bit rate to the rate-matched coding rate. The combined techniques achieve more than 145 Mbit/s transmission capacity for uninterrupted video transmission.

An alternative method of broadcast content distribution is FeMBMS (Further evolved Multimedia Broadcast Multicast Service) using Point to Multi Point (P2M) in 5G networks. FeMBMS can offload linear TV and scheduled broadcast content, saving on air interface spectrum and transmission network resources. When configured in broadcast mode, up to 60% of carrier resources can be allocated in eMBMS and up to 100% in FeMBMS. Increase of the guard interval up to 200µs is needed and broadcast services may be shared amongst multiple mobile network operators using High tower High power (HTHP) Transmitters. Combining broadcast (DVB-T2 HPHT) and broadband LTE (LPLT) networks allows HPHT TV to a mass audience (P2MP) whereas LPLT (Low Power low tower) satisfies individual request for content (P2P).





Dr Peter Siebert, DVB, Simon Tsang & Colin Prior ENENSYS, Andreas Streit, LS Telcom, Fumiki Uzawa, NHK, Jae Kwon LEE, KBS-Korea, and Dr Les Sabel, WorldDAB

## Advances in Digital Radio and TV Technologies

Moderated by Bernie O'Neil, WorldDAB, the panelists were Taeko Hattari, NHK-Japan, Dr Kong Bin, NRTA-China, Jun Ho CHO, KBS-Korea, Sota Kobayashi, Ikegami, Rezvaneh Sahba, IRIB-Iran, and Alexander Zink, Fraunhofer IIS. On 1 Dec. 2018, Japan officially launched UHDTV (8K/4K) channel with two satellite broadcasting services capable of send 22.2 multi-channel audio. The services at UHDTV resolution provide sports, orchestra and documentary programmes, which are able to be received by LCD/LED Display units purchased at reasonable cost from home electronics stores.

NHK has the world's first 8K live production studio which is usually used for sports programmes to receive signal from OB vans. IP technology is utilised in studio core system with Video-over-IP and audio-over-IP. All signal paths are duplicated to make provision for redundancy or back up and can produce 22.2 multi-channel audio and 5.1 channel audio. The design of the audio system enables quick switching and with a backup MAD1 line for live broadcasting. The design caters for both 22.2ch and 5.1ch audio system, and 30 loudspeakers have been placed in the studio for this dual purpose. The 22.2ch programme signals are fed from 22.2ch audio mastering studio or 22.2ch OB van. The function of this studio is to add some comments, music, and sound effects in order to make the final programme mix.

The performance requirements for the new generation of 4K Master Monitor are more stringent compared to HDTV. The 3 major changes in performance are that 4K UHDTV need to have better resolution, higher dynamic range and better colour conforming to BT2020 international standard. HDR is more realistic and closer to what we see in real life, providing video with a wider range of luminance. Thus, a HDR Master Monitor should output more than 1,000cd/m<sup>2</sup> for peak luminance, by utilising brighter backlight and powering circuitry. It must contain an LCD specifically designed to reduce backlight leakage and have good contrast ratio. Uniformity in terms of luminance and chromaticity are also necessary. HDR monitor for 2K systems are also available to show HDR videos.

The Digital Radio Mondiale Emergency Warning Functionality (EWF) can save lives by its integration with the national warning infrastructure. In the case of pending or current

disasters, EWF must inform the public with maximum reach and as quickly as possible whilst carrying all relevant information. All DRM sets have EWF as default feature and can receive alarm signals, automatically retune to stations and have automatic receiver switch-on. EWF Implementation requires a government decision to include DRM radio into the national emergency warning network. Identification of the coordinating agency is needed as well as choice of languages used for alerts. EWF implementation also requires firm communication to receiver industry for mandatory incorporation of DRM EWF features.



Alexander Zink, Fraunhofer IIS, Dr Kong Bin, NRTA-China, Bernie O'Neil, WorldDAB, Jun Ho CHO, KBS-Korea, Sota Kobayashi, Ikegami, and Rezvaneh Sahba, IRIB-Iran

## Immersive Technologies And Industry Trends in VR, AR, MR & 360 Video

The Moderator was Peter Bruce, IABM, and the panelists were Atsunori Toyoda, NHK, Toni Fiedler, Fraunhofer IIS, Jong Min Kim, VR, and Dr Mohieddin Moradi, IRIB-Iran.

A lot of programmes in recent years have been using computer graphics and virtual reality. However, the equipment is very expensive and the station has to find space for the green and blue backdrops. A recent advancement was made by NHK with the development of a real-time virtual studio with no chroma keying. The system does not require chroma key green or blue backdrops and can cope with people making gestures.

The key features of this system are that the boundaries can be touched up, to generate good masking. The subject can be separated from any distance with the depth sensor, whilst its viewpoints are converted into a TV camera viewpoint. The skeletal tracker allows for computer graphics following a person's movements. Lastly, the system is easy to operate with its simple graphical user interface. The results are that background separation and compositing, without the need for chroma keying, is available for the first time.

This new technology uses Left and Right Infrared (IR) Cameras to measure depth from the backscreen. The depth can be adjusted to lift out the things in the foreground, causing an image to be separated from the background. The TV camera itself obtains a colour image, while the IR depth sensor obtains a depth image. Both images are combined and the boundaries touched up to make them smoother. This in turn generates a key signal, separating just the person. The novelty of the system is that it can be used indoors or outdoors without chroma keying and

can produce virtual reality in existing studios. There is no limit on what colours a person can wear and it will cope with a person making gestures.

Versatile Video Coding is slated to be the next generation of video compression technique for UHD TV, HDR and 360 video. Versatile Video Coding (VVC) is being developed for finalisation around 2020 by the Joint Video Exploration Team (JVET), a united video expert team of the MPEG consortium and the ITU. It will be the successor to High Efficiency Video Coding (HEVC also known as ITU H.265). The standardisation process for the HEVC successor officially began in October 2017.

The new algorithms have 30-50% better compression rate for the same perceptual quality, with support for lossless compression. VVC can also support YCbCr configurations of 4:4:4, 4:2:2 and 4:2:0 with 10 to 16 bits per component, BT 2100 wide colour gamut and HDR of more than 16 stops (with peak brightness of 1000, 4000 and 10000 nits), variable frame rates up to 120 Hz, scalable video coding for temporal (frame rate) and spatial (resolution). This new standard is expected to have encoding complexity that is 10 times that of HEVC.



Atsunori Toyoda, NHK, Peter Bruce, IABM, Toni Fiedler, Fraunhofer IIS, Jong Min Kim, VR, and Dr Mohieddin Moradi, IRIB-Iran.

## OTT, IBB and Content Networks

The session was moderated by Dr Ahmad Zaki Mohd Salleh, Media Prima, and the panelists were Oliver Linow, Deutsche Welle, Mika Kanerva, Sofia Digital, James Taylor, Ideal Systems, Tom Sutherland, MetraWeather, and Yoshimitsu Tsurimaki, NTT Data Institute of Management Consulting.

The limitations of 2nd Gen playout in the cloud are that real-time or 'just in time' systems place a number of constraints on a system. Servers must be able to handle peak real-time load, often requiring expensive dedicated GPU instances to guarantee deterministic performance. Errors due to mistakes in playlists or assets can often only be detected during the event itself, limiting the ability for OPs to correct an error. Playout Operations had always been restricted to be reactive in their problem solving, this makes 24/7 real-time ops expensive

The advantages of render ahead workflow in the Cloud are that it renders "chunks" based on the events in the playlist into the desired delivery format by 'render-nodes'. These chunks are then played out by a 'playout-node'. Separating rendering and real-time playback of these chunks massively optimises resource utilisation by allowing all the heavy rendering to be compressed in the time domain, releasing the render resources when no longer required. Render-ahead fits into playout operations, as it allows for greater decoupling of upstream operations from the playout. Render-ahead workflow builds on cloud security as rendered segments are held in an encrypted form at rest and can only be decrypted by playout nodes for transmission. It is impossible to directly access assets through any, user as authentication is needed.

Hybrid broadcast broadband TV (HbbTV) is a global initiative aimed at harmonising the broadcast and the broadband delivery of entertainment services to consumers through connected TVs, set-top boxes and multiscreen devices. Among the technological advantages of HbbTV are that it enriches Broadcast Services with Datacast and OTT Internet. It enables personalised and targeted ads on TVs, as well as create branded TV viewing experiences with Operator Applications (OpApps) in Smart TV and STB.

Another type of content can be exploited is by leveraging weather for broadcast and online viewership. There is a case for more weather events as the destructive power of typhoons in the NW Pacific has increased by 50% in the last 40 years. The average precipitation from storm events has increased by 20 to 40% in the last 40 years. There has been improving accuracy and lead-time of warnings and forecasts. The public need to be informed and warned and the primary concern for severe weather forecasting is not forecast accuracy, it is the timely communication of warnings. Broadcast media have a pivotal role in communicating this critical information. Cost effective weather programming has wide appeal with highly sponsorship value and has low cost of production. Broadcasters have an essential role in communication of weather warnings. Due to its real-time nature and their high engagement, broadcasters can leverage weather using quality data and compelling graphics.



Dr Ahmad Zaki Mohd Salleh, Media Prima, Oliver Linow, Deutsche Welle, Tom Sutherland, MetraWeather, James Taylor, Ideal Systems, Yoshimitsu Tsurimaki, NTT Data and Mika Kanerva, Sofia Digital



## Digital Transitions and Analogue Switch Off – Challenges, Case Studies and Experiences

The Moderator was Alex Reza Shariman Othman, RTM-Malaysia, and the panelists were Helge Stephansen, Nevion, Ilham Ghazi, ITU, Bernie O'Neil, WorldDAB, and Yogendra Pal, DRM Chapter India. India has a population of 1.3 billion and coverage by public broadcasting is from 138 MW Transmitters, 48 SW Transmitters & 489 FM Transmitters, making up a total of 675 Transmitters. Private FM Broadcasters are also operating with 330 Stations having a coverage of about 40%.

All India Radio (AIR) FM Services provide 52% of population coverage whilst the private FM cover 40% (mostly overlapping). 98.4% of population is covered by AIR MW Coverage and it must be emphasised that about 50% population of country depends only on MW coverage. India also broadcasts internationally by transmitting on AM/ SW Radio to practically every part of the world.

However, there are concerns for analogue MW & SW because of poor quality signals, only one service per transmitter and no Value-Added Services. FM provides better quality than AM but has limited RF spectrum, single service per frequency, no value-added services and huge capital investment is required. Both AM and FM are obsolete technology, inefficient in terms of spectrum and energy hungry.

Digital systems must allow easy migration by re-using existing frequency spectrum and utilising existing technical infrastructure consisting of transmitters, feeder lines and towers. The new system should be capable of simulcast operation (analogue as well as digital) until listeners procure digital receivers. Digital must be non-proprietary and work in all broadcast bands i.e. SW, MW and FM.

India has one of the largest digital radio deployments comprising of 39 DRM Transmitters with 35 transmitters operating in the MW band and 4 Tx operating in the SW band. Over 3 billion rupees have been invested and 0.6 billion people have been covered, with a power consumption of 8 MW. In addition, AIR has carried out trials on Emergency Warning Functionality as certain areas of India are prone to natural disasters.

The lessons learnt by AIR on the Digital Rollout are manifold and are felt by the stakeholders. Broadcasters (public & private), Government (ministries, regulator, etc.), manufacturers (chipsets, desktop, automotive, mobile) and retailers must have close cooperation and coordination. The launch date for public market must be announced after all technical preparation has been completed. The radio content must be ready and inexpensive receivers available. The relevant authorities must convey clear and consistent information to public about Digital Switch Over (DSO).



Alex Reza Shariman Othman, RTM-Malaysia, Dr Helge Stephansen, Nevion, Ilham Ghazi, ITU, Yogendra Pal, DRM Chapter India, and Bernie O'Neil, WorldDAB

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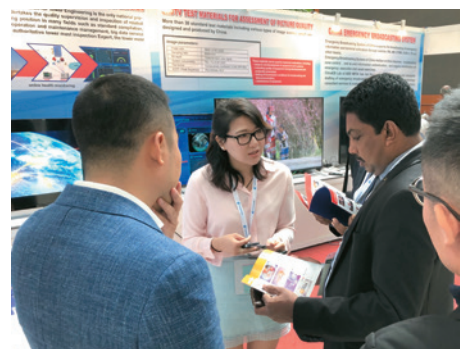
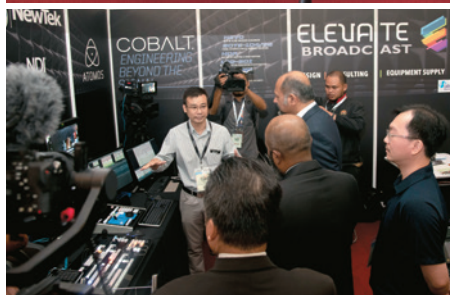


# DBS Exhibition

The DBS Exhibition was held on 5-7 March and played host to 41 exhibitors, some of whom invited partner companies to exhibit alongside them at their booths, bringing to 60 the total number of companies represented.

The DBS exhibition this year showcased VR headgear, antennas, digital cameras, mixer and frequency & coverage planning software among others.

Integriti Padu Sdn Bhd won the 2019 DBS Best Booth Award. Mr Hamid D Nayeri, the ABU Technical Committee Chairman from IRIB-Iran, presented the award to Ms Mardhiah Nasir, Vice President of Sales, Integriti Padu Sdn Bhd.





## Industry Debate:

# Broadcasters and the Connected Generation

– Content Ideas, Business Cases and Serving a Global Audience

**Panelists:** Hong, Young Kyung, KBS-Korea, Oliver Linow, Deutsche Welle, Abdul Muis Shefii, Radio Television Malaysia, Peh Beng Yeow, Mediacorp-Singapore, Lindsay Cornell, BBC-UK, Ruxandra Obreja, DRM.



Abdul Muis Shefii,  
Radio Television  
Malaysia



Mr Akira Negishi,  
NHK-Japan

The Moderator, Mr Akira Negishi of NHK-Japan, started the debate by stating that the audience wants to get engaged by being connected with the station. The younger generation prefers interactivity, challenging the broadcast stations to stay relevant in a rapidly changing world. The population between the age group of 10 to 30 tends to access the internet more than staying tuned to linear TV. Besides that, studies have shown that 70 % of them get news via the internet.



Hong, Young Kyung,  
KBS-Korea



Ruxandra Obreja,  
DRM

Everyone has a smartphone, demands instant access to information and wants to know the gist of everything going on. In Singapore, Toggle, which is the local OTT entertainment provider, allows users of the new Apple TV to access locally-produced content from Toggle. This latest foray marks the aggressive expansion of Toggle over the years, to be available on different platforms and screen sizes – starting with an online entertainment portal to an app on smartphones and tablets that allows for livestreaming and catch-up TV services. Multiplatform usage has spread to the younger generation with each owning a phone. There is

now more competition for the eyeballs and ears.

Being tech savvy, consumers want more control and want to share information. Viewing patterns have changed, with users preferring small clips of video instead of long programmes. The viewing locations have changed from the house to the office and while taking public transport or walking. Even when the TV in the house is switched on, the phone that is by the user's side is also switched on

New platforms have emerged, as old ones are not working efficiently. There are lots of content but not all can be seen as there is limited time. Hence, it is a wise move to put the additional content on social media such as Facebook, YouTube and Twitter. It is also best to customise content for advertisements and create content that enables consumer engagement. The media landscape is rapidly changing with the mega trend of migrating to digital platforms. There is a changing pattern of content consumption, with people binge-watching and using “snack culture”: the trend of consuming entertainment or other media in brief periods.

Watching regular TV is declining with a corresponding rise in enjoying content via Smartphone. The result is that there is a reduction of the total size of TV ads market for traditional media. Hence, the three major broadcasters in Korea started POOQ as a joint service. POOQ is a Korean broadcasters' OTT platform and supports N screen service – transmission to smartphone, personal computer, tablet or regular TV.



Peh Beng Yeow,  
Mediacorp-Singapore



Lindsay Cornell,  
BBC-UK



Oliver Linow,  
Deutsche Welle

# DVB Workshop: Best Video and Audio Combined with More Interactivity – The New DTT



Dr Peter Siebert, DVB

With hybrid services, OTT and online distribution growing in importance, DVB is applying its expertise and know-how in this all-important domain by introducing DVB-Internet. DVB-I will complement the current DVB standards, that form the basis of the way consumers watch TV today. DVB-I is expected to provide internet TV enablers for the highest quality DVB TV experiences, from traditional big screen TVs to non-traditional devices such as phones, tablets, and laptops.



Mats Ek, PROGIRA



Colin Prior, Enensys



Simon Tsang,  
TestTree



Gino Salocchi, Rover



Dr Leon Mun WY,  
Sony



Mika Kanerva, Sofia  
Digital

A large part of terrestrial TV network costs is related to transmitter sites and comprise infrastructure, transmitters and antennas. It is possible to optimise coverage, and hence reduce costs by switching over to DVB-T2, as there would be a lower number of fill-in sites required, compared with analogue TV. In Sweden, the number of fill-in sites was reduced from about 650 to 500. Single frequency networks (SFNs) require careful planning in order to avoid network problems, including self-interference. A well specified network can reduce uncertainty for the equipment manufacturers and thus the price of equipment.

Self-interference in SFN can be resolved in many ways, such as increasing the guard interval; this however, causes loss of capacity. A more robust system configuration can be utilised, such as lower constellation mode of 64 QAM or by reducing the antenna height of the most distant transmitter. Other methods use antenna tilt and directional antennas, adding artificial delay to the nearest transmitter and installing more low power, low tower (LPLT) transmitters.

DVB-T2 is designed with a powerful Forward Error Correction (FEC) subsystem which combats effects from interference. It is necessary to understand the Modulation Error Ratio (MER) parameter, which determines the amount of margin left before a crash occurs. RF impairments can occur from impedance mismatching in the distribution network at high rise building, impulse noise from electrical motors and propagation conditions.



Jerry Gui, Dolby

Another impairment that needs to be taken into account is the stratification effect, which originates from the antenna height. By varying the antenna height, the signal strength changes significantly, with impact on the Bit Error Ratio (BER) and MER. These different behaviours are due to the different location of the transmitter and the orography of the territory. With the use of proper diagnostic tools, the shape of the signal spectrum can be analysed and steps taken to avoid wave ripples that are too deep. The choice of the antenna and its positioning are crucial, because they determine the quality of the entire system.





# WorldDAB Workshop: DAB+ -Understanding the Business Case



Joan Warner,  
WorldDAB



Grant Blackley,  
SCA



Bernie O'Neill,  
WorldDAB

It is already well known fact that DAB is 10x more cost effective than FM and that IP streaming is not an economic replacement to DAB broadcast. Current European analysis shows that 10% of traffic via IP costs similar to 100% traffic by DAB+ . DAB+ costs less to operate than Full-IP streaming which is in turn less than FM. DAB+ and IP are complementary, thus making Hybrid DAB-IP as the most cost effective multimedia delivery combination.



Cath Dwyer, ABC-  
Australia

A study on using 4G for streaming radio delivery uncovered multiple issues including poor coverage in many rural areas, and high impact of video streaming on cell congestion. The different streaming apps had different responses to loss of coverage, congestion and errors, resulting in audio dropouts. Congestion occurs frequently in densely populated areas mainly during traffic jams and at high density urban areas. It can be concluded that streaming over 4G is not reliable.



Orasri Srirasa,  
NBTC

5G has some really good new capabilities, but still comes up short when compared to broadcasting. 5G is an evolution from 4G, with new technologies gradually being rolled into the existing LTE/4G mobile ecosystem in order to provide improvements, by increasing speed, lower latency and improved reliability. 5G provides improved solutions for massive machine communications for Internet of Things (IoT). It is said to be ultra-reliable, with low latency for IoT. However, all extensions and capabilities are not available at the same time.



Nick Piggott, RadioDNS, and Aaron Alphonso, Macquarie Media

5G retains the basic spectral efficiency of current 4G, with high connection speeds made possible by using more spectrum and carrier aggregation (CA). The highest speeds require, the use of the 3.6 GHz frequency band and the millimetre Wave (mmW) frequency band of 26/39 GHz. The implications on spectrum are that there is significant distance loss impact at high frequencies and long distances. 26/39 GHz is limited to micro/pico cells with maximum range of 0.5 km while 3.6 GHz micro cells have a range up to a few km. Therefore sub 1 GHz band is still needed for macro cells and wide area coverage.

There will be discussions on the acquisition of sub-700 MHz spectrum in the World Radio Conference 2019 – WRC19. Existing mobile frequency operating bands are listed from 450 MHz and higher. Now, the implication is that there will be further compression of terrestrial DTV into UHF band. Compression of UHF bands threatens the ability of DTV to both increase content offerings and video resolution. The loss of spectrum for terrestrial DTV has the potential to threaten the capacity available for DAB+ in VHF Band III.



Do Anh Duc, VOV



Lindsay Cornell, BBC



Steve Ahern, AMT

Report on DBS by Jeewa Vengadasalam, Specialist II, Department of Electrical & Electronic Engineering,  
Lee Kok Chiang, Faculty of Engineering & Sciences, University Tunku Abdul Rahman, Malaysia



# DBS Workshops

## DOLBY

Mr Geoffrey Low, Staff Content Engineer, Dolby, covered the topic Simple Surround Sound Production for Enhancing the Immersive Experience.



Geoffrey Low

## Dalet

Mr Laurent Jardin, Project Manager/Solution Architect, Dalet Digital Media Systems, covered the topic Orchestrated Media Solutions – Innovative Media Asset Management and AI Enable News Operations.



Laurent Jardin

## DRM

Mr Yogendra Pal, Honorary Chairman of the DRM Chapter in India, presented Introducing the DRM benefits and Services to Millions – the India Case.



Yogendra Pal

Mr Alexander Zink, Senior Business Development Manager, Fraunhofer ISS, Germany and Senior Consortium Member, covered the topic How to Transition from Analogue to Digital Radio – Get the Practical DRM Know-how and Experience.

## NTT Data Institute of Management Consulting Inc

Mr Yoshimitsu Tsurimaki, Senior Manager/Social System Innovation, NTT Data Institute of Management Consulting, Inc, presented on Hybrid Technical Update.



## Whiteways Systems

Mr A Raza, Director and Mr Yashovardhan Sharma, Senior Manager Sales, of Whiteways Systems covered Modern OB Van Design Concept.

## Rohde & Schwarz

Mr Stephen Wong, Regional Sales Manager, India & South East Asia, Rohde & Schwarz Singapore, presented Video Over IP: Optimizing IT Technology in Broadcast.



Stephen Wong



Ong Kah Keong

Mr Ong Kah Keong, Solution Architect, Broadcast and Media (Asia-Pacific), Rohde & Schwarz, Singapore, covered HPC, Leading to Smart Storage.



Yashovardhan Sharma



A Raza



## 3D Audio Demos at DBS by Fraunhofer IIS

“Welcome to the new world of 3D Audio for Television!”, was the theme of the special 3D Audio demonstrations that ran among the DBS Masterclasses. The demo sessions organised by Fraunhofer IIS used their 3D soundbar used in a private living room setup with a 65” TV set. Visitors to the demo were able to experience next generation TV broadcasting audio solutions that incorporate MPEG-H technology providing an immersive audio experience just using a soundbar.

The MPEG-H TV Audio System introduces 3D immersive audio based on a 7.1 plus 4 height speaker set-up and, object coding that allows for user interaction, multi-lingual programming and sophisticated sound effects. The system covers to complete signal chain from program production

Mr Kurt Ji Zou, Technical Manager  
Fraunhofer IIS, China,  
Conducting the demo

over distribution networks to the consumer home. The 3D immersive soundbar reference hardware design is equipped with a MPEG-H decoder and Fraunhofer UPHEAR technology (immersive audio virtualization algorithms). It proves that it is possible to recreate immersive 3D sound through a relatively simple and easy to install speaker in the living room.

The demos sessions were conducted by Mr Kurt Ji Zou, Technical Manager, Fraunhofer IIS, China.





# DBS Immersive VR Showcase Offers Delegates a Real Treat in 8K

The ABU teamed up with HTC Vive Malaysia and Funique VR Studio to present a unique immersive experience showcasing state-of-the-art content creation in the Virtual Reality (VR) domain at DBS 2019. The core mission of this immersive experience was to showcase VR as a true form of art to bring an unparalleled experience of storytelling and content creation. In total, eight showcase sessions were delivered over three days from 5 to 7 March 2019.



Ellen Kuo, Funique VR

Thanks to HTC Vive Malaysia, participants were able to experience the latest 8K high quality VR content with the latest headsets from HTC Vive. Each session lasted about 50 minutes, showcasing a selection of VR experiences chosen by Funique VR Studio which is dedicated to realising 8K per eye Stereoscopic VR in the film industry and creating a new generation platform for viewers. Participants also explored how each of the VR content was created, what makes them unique and why they are successful. More than 70 participants joined the immersive VR experience at DBS this year.

The highlights from the VR showcase included an award-winning, live-action comedy titled *Your Spiritual Temple Sucks* directed by John Hsu, which explores the full cinematic potential of virtual reality in storytelling. Another VR film showcased was an 11-minutes VR short film titled *Eyes in the Red Wind* directed by South Korean VR filmmaker Lee Seung-moo. *Eyes of the Red Wind* tells the story of a family that holds a ritual with a shaman to help the soul of a deceased man who was drowned.



Aaron Lim, HTC and Kevin Yu, Funique VR

The showcase also offered a series of episodes from Funique VR Studio's Insect Channel featuring some fascinating creatures that one participant described as "feels being immersed in the National Geographic channel."

This marks the second year that ABU has organised a VR showcase at DBS. Last year for the first time, DBS delegates were treated to an immersive VR experience from World VR Forum (WVRF), an international organisation dedicated to advancing the virtual reality industry.

## MoJo Masterclass at DBS a Major Hit



Viasen Soobramoney

Multiple award-winning South African journalist and trainer Viasen Soobramoney took DBS 2019 by storm as he conducted a Mobile Journalism (MoJo) masterclass series, a first-of-its-kind organised at the ABU Digital Broadcasting Symposium.

He delivered it over the course of DBS as three individual sessions. Participants in each masterclass were taught how to

create professional videos and engaging digital content with their smartphone with the ultimate goal to help them transform the communication workflow of their newsrooms. More than 100 participants took part and benefitted from the three masterclass sessions conducted from 4-7 March 2019 at Royale Chulan Hotel.

"The sessions were tailored to give participants insight into the latest trends regarding mobile journalism. The highlight of the course was the practical nature of the sessions that saw all participants going out and trying the new techniques they had learnt. The engagement was high and very encouraging. Wish the sessions could have been longer!" said Viasen.

The four modules covered Mojo Photography, Mojo Radio, Mojo Video, and Mojo Playbook. Participants learned how to maximize their smartphone's potential when capturing images with tips and tricks and basic smartphone photography principles. They also learned the art of audio broadcast using their smartphones and how to capture audio and the fundamentals of radio storytelling on smartphone.

In addition, participants tried their hands at shooting, editing and packaging broadcast quality video using their smartphones. The biggest attraction of the masterclass was the ultimate guide to tools, apps, tips and tricks to creating content on smartphone shared by the trainer. Participants were delighted to walk away with some quick basic knowledge on mobile journalism that they could apply in their daily work routines.

Based in Cape Town, South Africa, Viasen specialises in the areas of digital convergence and multimedia strategy. He is the founder of Africa's first Mobile Journalism newsroom and a vastly experienced media trainer.

# Masterclass on use of Drones in Professional Video Production



Ming Tse Lin, Fire Phoenix Creative

One of the most interesting masterclasses that the participants looked forward for at the Digital Broadcasting Symposium was the masterclass on using Drones for video coverage. With the theme “Send in the Drones”, these sessions presented the basics of using drones for different kinds of production applications. It also looked at the current drone market space, which is a fast-evolving industry segment, with different kinds and types of drones available at different prices for different kinds of applications. Features and functions of

different types of drones were explained with the kind of technologies available in today’s drones. The session provided a guide on how to select the most appropriate drone for different production projects.

The masterclass also covered drone handling techniques, including how to proceed in critical and emergency situations. Modern drones are well equipped with 4K cameras and built-in collision avoidance systems, obstacle detection sensors to scan the surroundings, wide coverage range and multiple sensors to track a target object and help fly and guide the drone. The sessions also addressed its applications in video and broadcast production including the use of latest 360° video capture devices. Few models of state-of-the-art drones were used to showcase and demonstrate expert techniques. Professional tips and tricks were shared with the participants who had a chance to try to fly a drone themselves. The main point of the masterclass was that, like any other equipment, drones can be used to tell compelling stories. Some stunning footage were also shown on the monitor as examples.

The masterclass was presented by Mr Ming Tse Lin, an experienced cameraman, videographer and drone operator and was supported by Green Speed Pictures.





# Masterclass on Modern Broadcast Camera Techniques, Set-up and Operation



Dr Mohieddin Moradi, IRIB-Iran

The Digital Broadcasting Symposium this year featured an engaging masterclass on Modern Broadcast Camera Techniques, Set-up and Operation. The masterclass covered wide range of topics related to today's broadcast quality cameras including how the image sensors work to produce high-quality pictures in HD, 4K and 8K, how technologies like High Dynamic Range (HDR) and Wide Colour Gamut (WCG) is utilised and how to use the camera for optimum output in various cases. The sessions utilised the state-of-the-art 4K camera and professional monitor provided by Ikegami (model: UHK-430) to demonstrate these technologies, techniques and operations. Having the camera and monitor available made it easy for the participants to appreciate and see the different aspects of these technologies.

The half-day sessions covered all relevant topics when it comes to high quality image capture and representation. It introduced the various elements of quality we perceive for example; HD/UHD which relates to the resolution of the image, Dynamic Range (HDR/SDR) which relates to how well colour is represented, Wide Colour Gamut (WCG) which relates to the extent of colours represented, High Frame Rate (HFR) which effects the smoothness of a moving picture, and then the coding methods and compression which together defines the end quality of the digital signal. These elements collectively address the quality of experience.

Each of these elements was explained in detail starting with the difference in resolution and picture size comparing SD to HD and the two UHD standards 4K and 8K. Where 4K has 4-times for picture details and 8K has 16-times more compared to HD. HDR which is part of the UHD standard providing a more realistic colour variation compared to Standard

Dynamic Range (SDR) which has been part of the SD and HD era. HDR can present a much wider colour range when it comes to shadows, highlights and contrast in an image compared to SDR. The Wider Colour Gamut on the other hand increases the colour representation with a more wider colour space compared to what the industry has been using before. In short it allows to include more of every colour allowing more deeper colours, like more of red, green, blue and other colours, hence the pictures are more vivid and closer to what is perceived by the human eye. It was also explained how High Frame Rate (HFR) will help in creating a much smoother experience for the viewers in reducing motion blur and jitter specially when it comes to fast moving images like in sports applications. All of these combined provides a more realistic and immersive viewing experience but it also requires more storage and higher bandwidths to store and distribute these pictures as it contains a lot more data compared to SD and HD. Hence the need for better compression systems and higher bitrates to retain the quality of the video and the experience.

The sessions also covered various aspects of camera operation specially when it comes to today's 4K cameras which has the ability of capturing highest quality pictures incorporating the above mentioned qualities but at the same time can also be used to capture regular HD pictures with the ability to downgrade them further to SD at the output. This makes these cameras to be more future proof allowing them to be used for current HD production applications, while at the same time through the available multiple levels of settings can also capture the highest quality 4K pictures with HDR and HFR features. These settings and techniques were extensively demonstrated using the available Ikegami camera, including how to setup the camera for different types of lighting and other environmental conditions for optimum performance.

The masterclass was presented by Dr Mohieddin Moradi, a Video Engineer in the Research Wing of Islamic Republic of Iran Broadcasting (IRIB) who is also a lecturer at the IRIB University. He was assisted by Mr Mitsunori Yoshino, an Engineer from Ikegami, who helped with the demonstrations and operations using the Ikegami UHK-430 camera and the 4K monitor.



# Thank you Radio Televisyen Malaysia



## Thank you Media Prima



The ABU would like to extend our sincere gratitude and appreciation for all of the hard work and dedication provided by the AV team from Media Prima throughout the years in delivering top-notch coverage for the conference.

Special thanks go to Dr Ahmad Zaki Mohd Salleh, Group General Manager, for his continued support to the event.

**media prima**



# ABU Technical Bureau Mid-Year Meeting

## 8 March 2019, Kuala Lumpur



Mr Hamid D  
Nayeri, IRIB-Iran



Kenichi Murayama,  
NHK-Japan

The mid-year meeting of the ABU Technical Bureau took place in Kuala Lumpur on 8 March, a day after the 2019 ABU Digital Broadcasting Symposium.

The bureau reviewed the symposium and heard the progress its members are making in the transition to digital broadcasting.

The meeting was chaired by its new Chairman, Mr Hamid D Nayeri of IRIB-Iran. He succeeded Mr Masakazu Iwaki of NHK-Japan.



Akira Negishi,  
NHK-Japan



Dr Kong Bin,  
RTPRC-China



Mr Manoj Gupta,  
DD-India

It saw a high turnout, with bureau members present from RTPRC-China, NHK-Japan, KBS-Korea, DDI-India, RTM-Malaysia, Mediacorp-Singapore, NBT-Thailand, TRT-Turkey, EAP-Sri Lanka, MTV-Sri Lanka and VTV-Vietnam.



Masashi Karnei,  
NHK-Japan



Jamel Sernan,  
RTM-Malaysia



Tue Nguyen, VTV-  
Vietnam

The bureau also discussed the progress reports from the chairmen of its study projects in the areas of production, transmission and spectrum, and agreed on a new selection criteria for the ABU Technical Review Prizes, which are announced annually.



Peh Beng Yeow,  
Mediacorp-  
Singapore



Lasantha  
Samaranyake,  
EAP-Sri Lanka



Pongsaratch  
Rachatavekin, NBT-  
Thailand

Members also gave updates on new projects, future plans and some of the challenges they are facing. Among other issues, the bureau discussed a recommendation on Ku-band satellite issues related to ITU WRC-19.

Members agreed to set up a study project on satellite broadcasting systems, digital radio technologies and to restructure the Training and Services Study Topic Area.



Tharaka  
Mohotty, MTV-  
Sri Lanka



Kazim Pektaş,  
TRT-Turkey



Gül Tuğba  
YILDIZ,  
TRT-Turkey



Augustine  
HONG,  
KBS-Korea

They also discussed arrangements for the Technical Bureau and Technical Committee meetings alongside the ABU General Assembly in Tokyo in November 2019. The Technical Bureau meeting takes place on 17 November and the Technical Committee meeting on 18-19 November.



# Hybrid Broadcast Broadband TV: Can it Save the Broadcasters?

by Fatemeh Fallahi<sup>1</sup>, Juha Joki<sup>2</sup>, Jussi Teirikangas<sup>3</sup>

<sup>1</sup> IRIB Research and development, f\_fallahi@irib.ir

<sup>2</sup> Sofia digital Ltd., juha.joki@sofiadigital.com

<sup>3</sup> Sofia digital Ltd., jussi.teirikangas@sofiadigital.com

## abstract

The growth of the Internet creates opportunities for introducing new services. Broadcasters should use this opportunity to be able to keep their viewers. HbbTV helps broadcasters to integrate services on broadband with Broadcast content. HbbTV brings many benefits for broadcasters but there are some factors that should be given priority consideration by broadcasters, to be successful in its implementation. This article explains these factors in detail.

**Keywords:** HbbTV, Broadband, Broadcast, Starter kit

## 1. Introduction

We are in a new age of TV, where TV industries have moved on from analogue TV, and Digital switchover has happened in most countries. SD channels have changed to HD and now there is growing demand to broadcast UHD1 material. Also we cannot ignore NHK's efforts in producing and broadcasting 8K content in Japan. [1]

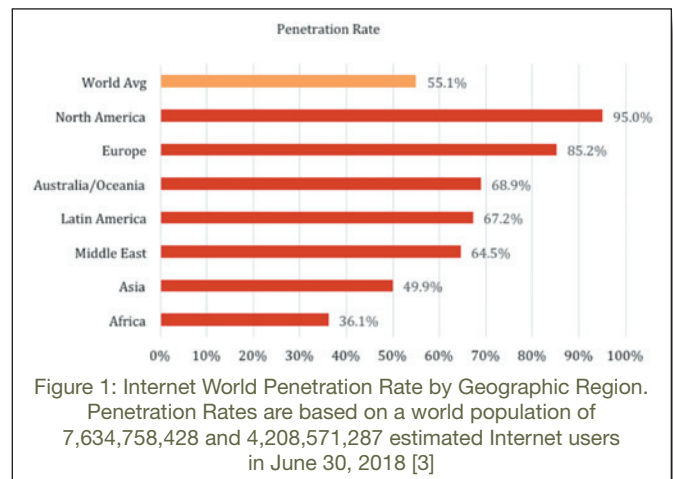
Terrestrial broadcasting had to free up parts of the UHF spectrum as a result of WRC-07, WRC-11, and WRC-15. Meanwhile, new demands to offer higher quality content (HD or UHD with HDR<sup>2</sup> and HFR<sup>3</sup>) lead countries to use heavy compression and develop next-generation modulation technologies to be able to broadcast this higher quality content. So, we are witnessing the gradual expansion of the second digital TV switchover from DVB-T/MPEG-2 and MPEG-4 to DVB-T2 and HEVC all around the world. [2]

But that is not the whole story – fixed and mobile internet is growing fast worldwide. Figure 1 shows the growth of Internet penetration. This has created opportunities for new players in the media ecosystem; OTT service providers. They are attracting many viewers already. Amazon and Netflix are two very big and successful examples of new OTT service providers.

The dream of “any content, anywhere, anytime” is coming true by the power of connected devices in every pocket and home.

These new technologies have also changed video consumption styles. Hours of watching traditional TV are decreasing, and OTT consumption takes its place, especially for younger people. [4] Figure 2 shows decreases in traditional TV viewing trends over 5 years. Despite the growth of penetration in the connected devices market, TV is still very popular device for watching video. [5] Figure 3 shows most of OTT service such as Netflix's OTT are watched on the “big screen” (Living room TV devices).

It is unavoidable that broadcasters feel threatened by OTT service providers as they lose viewers to them. Broadband



has created many opportunities for offering new services and broadcasters have found that they have to use broadband to offer new and attractive services to keep hold of their viewers. Broadcasters have some special programme areas that keep viewer's interest, for example, drama is still attractive. Also, at IBC 2018, Netflix announced that they can't do live sports programmes as well as the broadcasters. “Old” TV shows and sitcoms also maintain their popularity.

The key is that Broadcasters must use broadband to enrich their valuable content while offering their own OTT services. This will prevent other OTT service providers stealing their viewer's eyes and ears. **Hybrid broadcast and broadband TV makes all this possible.**

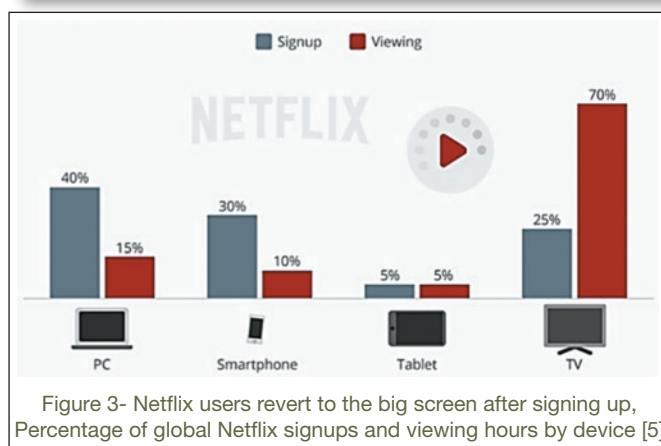
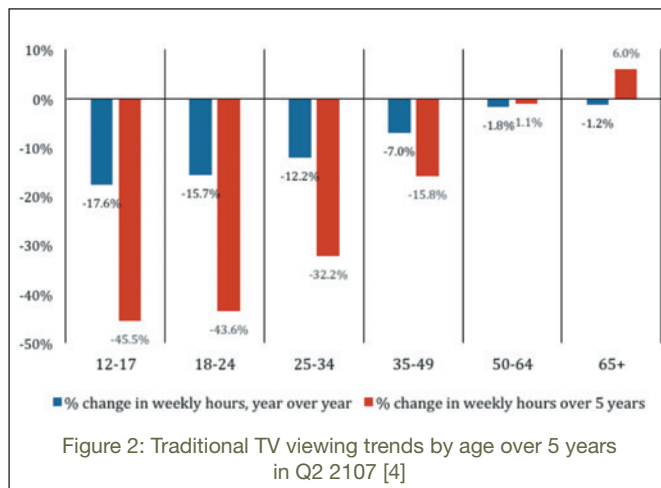
In section 2 of this article, Hybrid broadcast broadband TV is introduced briefly; after that benefits of HbbTV are presented in section 3. Some examples of HbbTV services and their deployment are explained in section 4 and 5 respectively. How broadcasters can gain maximum benefits from HbbTV as

<sup>1</sup> Ultra High Definition

<sup>2</sup> High Dynamic Range

<sup>3</sup> High frequency Rate





HbbTV success factors is presented in section 6. Finally the HbbTV situation in Iran is explained in section 7.

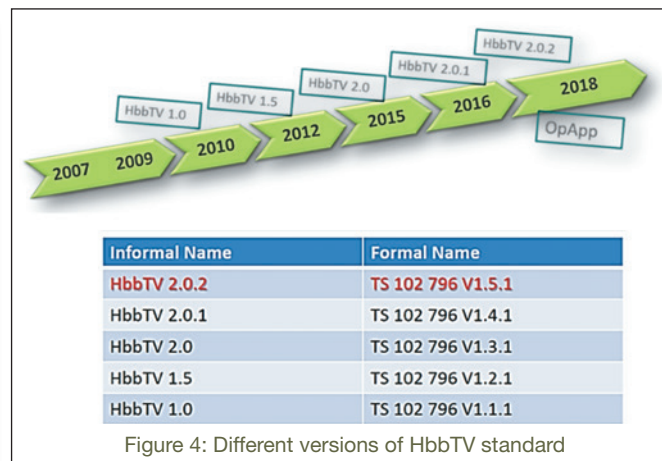
## 2. Hybrid Broadcast Broadband TV

Hybrid broadcast broadband TV (HbbTV) is a global initiative aimed at harmonizing the broadcast and broadband delivery of entertainment services to consumers through connected TVs, set-top boxes and devices with a variety of screen formats. The HbbTV specification has been developed by industry leaders to improve user experience for consumers by enabling innovative, interactive services over broadcast and broadband networks. The specification uses elements of existing specifications from other standards including OIPF, CEA, DVB, MPEG-DASH, and W3C. [6]

The latest version of HbbTV standard, called HbbTV 2.0.2, was published by ETSI in 2018 [7]. HbbTV 1.5 was selected by leading countries in hybrid service delivery, such as Germany and France. HbbTV 2.0.1 has been selected by countries that have recently decided to provide hybrid services. Some countries such as UK and Italy that have introduced interactive services on digital TV based on MHEG and MHP respectively, over several years, are migrating their services to the HbbTV 2.0.1. Leading countries in hybrid services delivery are switching from HbbTV 1.5 to HbbTV 2.0.1, this includes countries in the Nordic region. It is necessary to mention that version 2.0 of the standard was not implemented anywhere, since version 2.0.1 was issued quickly to fix issues in version 2.0. Figure 4 shows the history of different versions of the standard.

## 3. Benefits of HbbTV

- HbbTV is an open standard for broadcasters, operators, and STBs and TVs multisource providers.



- HbbTV is based on web technologies and makes fast & low-cost application development a reality. Anyone who has web developing skills can start developing HbbTV applications as it is not limited to specialist companies or brands.
- HbbTV is independent of the TV manufacturer brand. Broadcasters are not required to develop different applications for different TV manufacturers. Once an application is developed it will be accessible on all HbbTV receivers.
- HbbTV provides seamless merging of Television and the Internet, meaning that the viewer doesn't need to download or update any applications for accessing the service. Viewers don't need to know which application belongs to which programme and where and how they should find it. For example, they don't need to search for a portal to buy advertised goods or find an application or portal to vote in a TV competition. The broadcaster offers its hybrid services by transmitting red button notifications on the TV screen, and viewers will be informed and encouraged to use the new services to enter the hybrid world.
- All mentioned applications will appear at the right time with the start of a related programme and will show the viewers a notification that indicates that HbbTV service is available now and they can interact with it. Viewers don't lose the broadcast and can access the HbbTV service while the broadcasted content is still running. Viewers don't need any special skills to interact with the HbbTV service; they just do it by using their familiar remote control. **This is the real meaning of the Hybrid broadcast and broadband TV.**
- As was mentioned above, Broadcasters are the anchor and gatekeeper of the service and they define the lifecycle of applications; which application, where from, at what time, and how it will be displayed on TV.
- HbbTV also provides the possibility of delivering applications purely through broadcast, without any access to broadband.

## 4. HbbTV Services

Many categories of services are possible with HbbTV. Some of them are programme dependent, such as voting, addressable advertisement, showing different views of sports matches, and rich EPG. Others are programme independent, for example, Catch-up, VOD, weather information, news, Teletext, games and so on.

Figure 5 shows some examples of HbbTV services that were deployed in Finland. Figure A is a programme dependent service. This application is displayed just when the related programme is starting, and the viewer can cast a vote for a participant in

the competition. It also offers additional information related to the programme. Figure B is an application that shows road cameras and weather conditions around the country. This application is not related to the programme and is available all times and is accessible by the red button launcher menu.

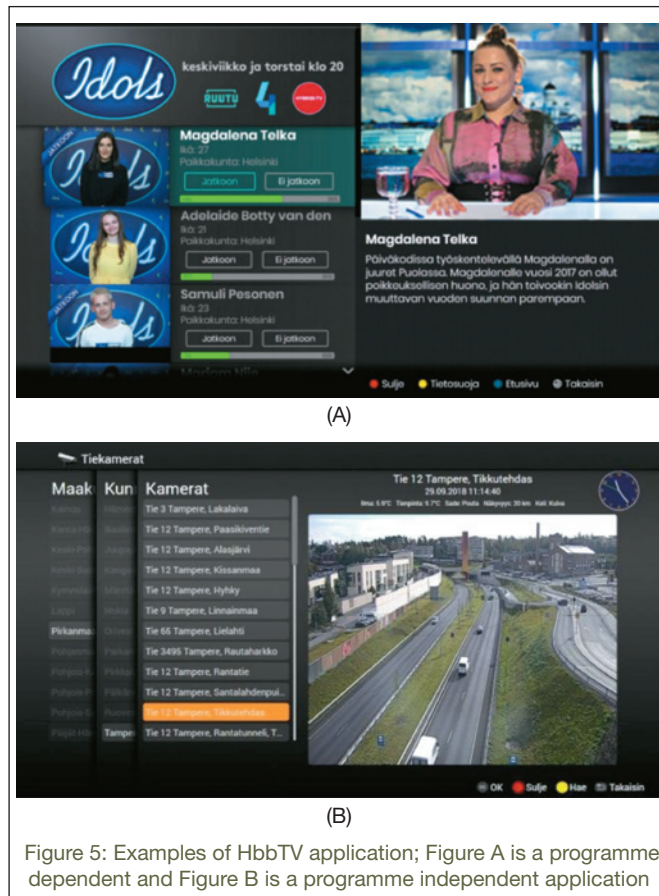


Figure 5: Examples of HbbTV application; Figure A is a programme dependent and Figure B is a programme independent application

## 5. HbbTV Deployment

The benefits mentioned encourage broadcasters to adapt HbbTV. To stay alive, broadcasters have to enter this new game. HbbTV solves many of their challenges in entering the new world and also brings special benefits that could be their winning ticket in the competition with other OTT providers.

As announced by the HbbTV consortium [2], currently 35 countries have deployed HbbTV; for example, *Freeview Play* in the UK, *LOVEStv* in Spain, *tivú* in Italy, *Salto* in France, *FreeviewPlus* in Australia, *TRT ARTI* in Turkey, *Toggle* in Singapore and so on. Also, 44 Italian devices are HbbTV capable and in most European countries almost all connected TV sets have HbbTV as a standard feature. Already 300 million HbbTV applications have been developed.

## 6. HbbTV Success Factors

Maximizing the impact of the benefits of HbbTV, as with any other technology or standard needs some considerations of which broadcasters should notice. They are as follows:

- **Offering of attractive services**  
Broadcasters should discover their viewers' interests, which programmes are popular, and decide how a hybrid service can help them to bring in more viewers? Case studies show that VOD, catch up, TV show content, and sports programmes are popular in all countries. Offering attractive services can help the penetration of new services and encourage viewers to acquire appropriate receivers.

- **Creation of the same look and feel for all applications**  
Broadcasters should create a brand for themselves with a similar look in different applications, similar colour themes, and display the main keys in the same place across all applications. Applications should have a specific pattern for key functionalities in remote control units and assign similar keys for main functionalities such as 'start', 'exit', and 'back'.

In the foregoing way, viewers will be familiar with a broadcaster's applications and services and know where to find content and how to interact with the application. Following this advice prevents confusion across different applications.

- **Assurance of the application functionality**  
Broadcasters should specify which application and specifications will be certificated. Broadcasters should set up a certification process and set up a real test environment for applications. They should also test the functionality of applications in approved receivers. Additionally, they should define a process to ensure that the contents of an application are always updated.

Broadcasters should be sensible about giving permission for an application to be available on HbbTV. It is less important to have many applications than having the right and attractive applications. Offering a bad application and a bad service will damage the brand.

- **Provision of the needed infrastructure**  
Broadcasters should predict the number of their customers correctly and provide the needed infrastructure for their servers to handle the traffic. Experiencing unstable or unreachable services can have a very bad effect on viewers, especially when new technology is introduced. First impressions are extremely important.

Broadcasters should always be sure about the availability of services and always monitor their use. Analytics, and collecting enough statistics and usage behavior, are crucial to improving services.

- **Use of safe signaling**  
The HbbTV standard contains many features but not all of them have been implemented. Broadcasters should use the standard way for signaling of applications to be sure most receivers can show their services. In reality, HbbTV has some limitations for delivering applications via broadcast only, for example the size of an application and its download time. Sometimes using streamed events for synchronisation can lead to complication in application signaling. Alternative ways may be used.

- **Development of a suite of desired specifications for receivers and circulate it to manufacturers**  
One of the most important advantages of HbbTV is the diversity of receivers, but it is also of the most challenging disadvantage of it. There are so many receivers that support HbbTV, but which of them have the desired profile and correct behavior? The broadcasters need a way to be sure about this.

Broadcasters should write receiver specifications based on a country profile, but before that, they should be realistic in determining that profile, since HbbTV standard contains many features, not all of which have been implemented.

Receiver specifications must not be a wish list; they should be feasible, with all features listed clearly. They should be reviewed by other stakeholders to make sure that they are accepted by the manufacturers.

- **Insurance of the availability of the right receivers**  
Some receivers don't even support the primary features.



Such non-standard receivers cause harm to the service penetration and even to the brand of the service. It is important to ensure the availability of compatible receivers thus broadcasters should pay attention to the following steps:

- Define a logo regime
  - Introduce some test centres to test receivers based on official receiver specifications.
  - Define a well-structured test process.
  - Allow the logo to be displayed only on the certificated receivers.
  - Inform the public about the logo and guide the audience to buy only receivers that have the logo.
- **Selection of the right start point for introducing the service**  
The start point of service is important. Broadcasters should arrange all success factors and start with the best service. More applications can be introduced later, but the core service, in the beginning, should be interesting enough.
  - **Identification of the position of new service management in broadcasters structure**  
It is important to identify the following issues related to the new service and technology:
    - Who is responsible for certifying the application? And what is the process?
    - Who is responsible for signaling of service?
    - Who is responsible for updating the content of applications?
  - **Bringing of other OTT service providers and operators to their platform**  
Broadcasters could negotiate with other OTT service providers and operators and make a comprehensive and widely accepted platform. But broadcasters should also make needed restrictions on broadcast resources for them by using the correct signaling.

## 7. HbbTV in Iran

In Iran, the first digital terrestrial transmitter was turned on by IRIB in 2009. IRIB Research and Development department started some efforts on interactive services on digital TV and evaluated different solutions, such as MHEG and MHP, as soon as the digitalization of TV began.

Internet access has been growing in recent years in Iran. The number of connected devices and smart TVs is increasing. New players have entered the media market such as AIO, Filimo and so on. Most of them offer VOD and catch up of IRIB services. The popularity of these new players is increasing.

With regard to this evolution of the media environment, an HbbTV study group was established in IRIB R&D and it began to investigate the standard, services, case studies and different solutions in 2014. Studies conducted by this study group showed that the hybrid broadcast broadband is a unique opportunity for IRIB to take advantage of the broadband capacity. HbbTV will solve many of the challenges IRIB faced at the moment and still does, such as dependency to a company or a solution for application development, or a dependency to a receiver from a specific company. HbbTV also improves viewer awareness about new and exciting OTT services. It offers a multiplicity of services and ways of offering them while resolving the lack of interactivity with linear TV and creating loads of more attractive content.

Thanks to these studies, an HbbTV end-to-end solution using Sofia Backstage® Starter Kit [8] was set up in the laboratory

of IRIB R&D in December 2017. The goal of this trial was the evaluation of different features of the standard and their feasibility, knowing the different services types and knowing the challenges of its implementation before its launch in a larger scale.

This trial, in addition to showing the many advantages of HbbTV, also revealed many important points:

- HbbTV server integration with existing DVB head-end is relatively straight-forward, but the applications are the key. Paying attention to the issues mentioned in this article is vital for the success of a service.
- Despite the IRIB's interest in using the carousel for transmission of application through broadcast and the benefits it brought to the IRIB, there are limitations on the size of applications that can be transmitted in this way and application delivery through broadcast cannot be used as the main service delivery solution.
- Tests on different services with different receivers showed that some receivers have problems with even some primary features of HbbTV such as broadcast video scaling, receiving files via the carousel, stream events, AIT filtering during channel change and dash live playing. These results necessitated the establishment of a test centre and a receiver zoo to ensure that everything works correctly.

After the successful trial of HbbTV and gaining valuable experience in a laboratory environment, a new trial in a city environment is in process. First tests of a HbbTV service have been transmitted via a DVB-T2/HEVC transmitter in Tehran since 31 May 2018, and now it is accessible on Ch. 31 UHF of TV3.

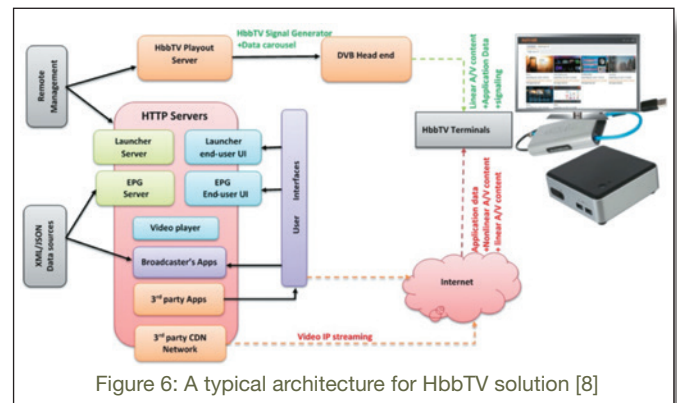


Figure 6: A typical architecture for HbbTV solution [8]

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# authors



**Fatemeh Fallahi**  
IRIB Research and Development, Iran

Fatemeh Fallahi works as a researcher at IRIB R&D. She received her M.Sc degree in electrical engineering from Tarbiat Modarres university in 2009. In that year she joined IRIB R&D and established her career as a researcher on mobile TV, digital switch over and analogue switch off. In 2014 she started research into hybrid broadcast and broadband standards. She was one of the key members of HbbTV team in IRIB R&D who launched trial of HbbTV in the IRIB R&D lab.



**Juha Joki**  
Director, Broadcast and Testing, Sofia Digital Ltd., Finland

Juha Joki works as Director, Broadcast and Testing at Sofia Digital. Juha Joki received his B.Sc. Degree in Computer Science from the University of Tampere in 2014. In 2000, he joined Sofia digital and his responsibilities include DVB Broadcast head-end products and testing and certification services. He is the co-author of the Nordig HbbTV Test Specification and works as the project lead for Cable Ready HD, Antenna Ready and Antenna Smart certification schemes in Finland. He has over 18 years of experience in the field of DVB and HbbTV testing.



**Jussi Teirikangas**  
Product Manager, Sofia Digital Ltd., Finland

Jussi Teirikangas works as Product Manager at Sofia Digital. He received his M.Sc. Degree in Telecommunication engineering from Helsinki university of technology in 2005. In 2000, he joined Sofia digital and his responsibilities include management of HbbTV and OTT app development and user interface design. He specialises in

interactive television, user interface design, HbbTV and smart TV applications, web standards and HbbTV standard. He has 18 years of experience in the field of interactive television and app development.



IRIB Research and development develops innovative new products and technologies in broadcast/broadband industry that will shape tomorrow. Research and development activities could be classified in providing strategic and practical researches, technology trend monitoring, internal production, executing pilot experiments and cooperating technical committees. Till now, a lot of successful projects

have been operated, such as DSN antenna, Master Control System, DVB-T transmitters, Comprehensive Intercom System, Industrial UPS, Switches, Comprehensive New Media Architecture, Social TV and Hbb trial.



Sofia Digital specialises on open standard TV platforms, over-the-top streaming services, and Internet technologies. Sofia Backstage@

Platform is available for powering smart TV apps, interactive TV services including management of any DVB, EPG and HbbTV services as well as TV and VOD metadata integration. Its offering includes also application templates, standalone and customised TV applications. Sofia Digital in co-operation with TV industry and manufactures and as an active member of the HbbTV Association provides the best possible level of interoperability for HbbTV and MPEG-DASH deployed in global TV markets.



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BROADCASTING  
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# The IRIB 15th Annual Media Technology Conference (IMTEC) was held on 20-21 Nov. 2018, at the IRIB International Conference Center (ICC)

The IRIB 15th Media Technology Conference & Exhibition (IMTEC) under the slogan “Iranian Talent, Worldwide Media” which was organised by IRIB (the public broadcaster of Iran) Development & Media Technology Division, provided opportunities for delegates to establish business or research relations and to find global partners for future collaboration.

We are in an age of numerous disruptive technologies that are affecting the whole chain of the broadcast industry. AI, Cloud, HDR, UHD, Next Generation Audio and IP Production, to name just a few. As these innovative and revolutionary tools and systems are going to be the reality of the broadcasters engineering domain very soon (and some of them are already), a knowledge of these areas of technological developments is a ‘must have’ for the broadcast business.

IMTEC is a big event, where all the media industry stakeholders come together to share knowledge, solve challenges and develop future strategies. The aim of the conference is to present new outcomes in the media industry in various aspects of specialised sessions, exhibition of self-sufficiency in the media industry and representation of appropriate and innovative solutions to real technical or creative issues. Also, in recent years, the presentation of systems and equipment has been added to the event.

The Exhibition covers four halls across the ICC and hosts over 120 exhibitors spanning the media, entertainment and technology industry including 40 start-up company for the first year in order to support innovative ideas. It is worth mentioning that, by collaboration with the domestic knowledge-based companies and universities, the IMTEC 2015 exhibition became the biggest venue to unveil the latest development in producing a significant amount of technical equipment in media industry, making the exhibition the ‘must-attend’ broadcast event of the year, in Iran.

This year, the Annual Conference focus was on some major topics and it also included other topics of interest presented, as follows:

## Major Topics:

1. *Content Production Technologies and Media Services*
2. *New Contribution and Distribution Infrastructures*
3. *Artificial Intelligence Applications in Media and Broadcast Industry*
4. *Data Centre and Secure Cloud Infrastructure*
5. *Future Media Architecture*

## Other Topics of Interest Include:

1. *Digital Radio and Television Systems: Terrestrial, Satellite, Broadband Infrastructures*
2. *Immersive and Beyond HD Production, Transmission and Distribution*
3. *Immersive and Next Generation Audio Production and Distribution*
4. *Internet of Things: Function and Applications in Media*



5. *Quality of Experience and Quality of Service*
6. *Targeted Advertising for Broadcasters (TA)*
7. *Hybrid Broadband Broadcast (HbbTV)*
8. *Social Media and Broadcast Industry*
9. *Content and Audience Analysis Tools*
10. *Interactive Media Services*
11. *Cloud based Production*
12. *5G: Media application*
13. *IP Production Facilities*

In this regard, 32 panels, including 70 speakers were planned. These lectures, presented by university professors, representatives of the executive agencies of the country. Also there were specialist panel discussions in the fields of energy management and broadband infrastructure approach with the involvement of national and international experts.

One of the keynote speakers Mr Ahmad Nadeem, the ABU Technology & Innovation Director, presented “Cybersecurity and Media – ABU activities”.

Another keynote speaker was Prof. David Crawford who managed the Future Zone Exhibits at the International Broadcasting Convention (IBC). He presented “New Technology Areas in Content Creation & Broadcasting”. Professor Crawford has been working at the University of Essex with research interests in high capacity networks and broadcasting for ‘beyond HD’ multimedia. He is a Member of the Royal Television Society, Fellow and Council Board Member of the IET, Editor of the EBU Technical Review, Director of a small French start-up, and Executive Producer for the industry’s annual ‘IBC’ Conference in Amsterdam.

On the same day there was another presentation on “Opportunities for AI in Linguistic Science” prepared by Prof Garcia-Bellido from the University of Oxford.

Along with the Annual conference, the efforts of engineers, best companies and individuals were honoured in the fields of best implemented plans and the most innovative and creative ideas. According to the vote of the evaluation committee, selected broadcast engineers in Tehran and Provinces were also appreciated. The organisers hope that the event provided an excellent opportunity to introduce Iranian media industry talent to the world in addition to helping the growth the domestic industry. Also, to open up new markets for Iranian media industry products.



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Director of Engineering,  
Beasley Media Group Detroit



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# How Will Digital FM Transform FM Radio Broadcasting: Suggested Way Forward

by Alexander Zink

Senior Business Development Manager Digital Radio & Streaming Applications, Fraunhofer IIS

by Sharad Sadhu

Media Specialist

## abstract

This paper addresses the introduction of digital radio in the FM band, without disturbing the on-going analogue FM radio services. It discusses the watershed transformation that will take place in FM radio broadcasting business and industry with the introduction of digital FM in a country.

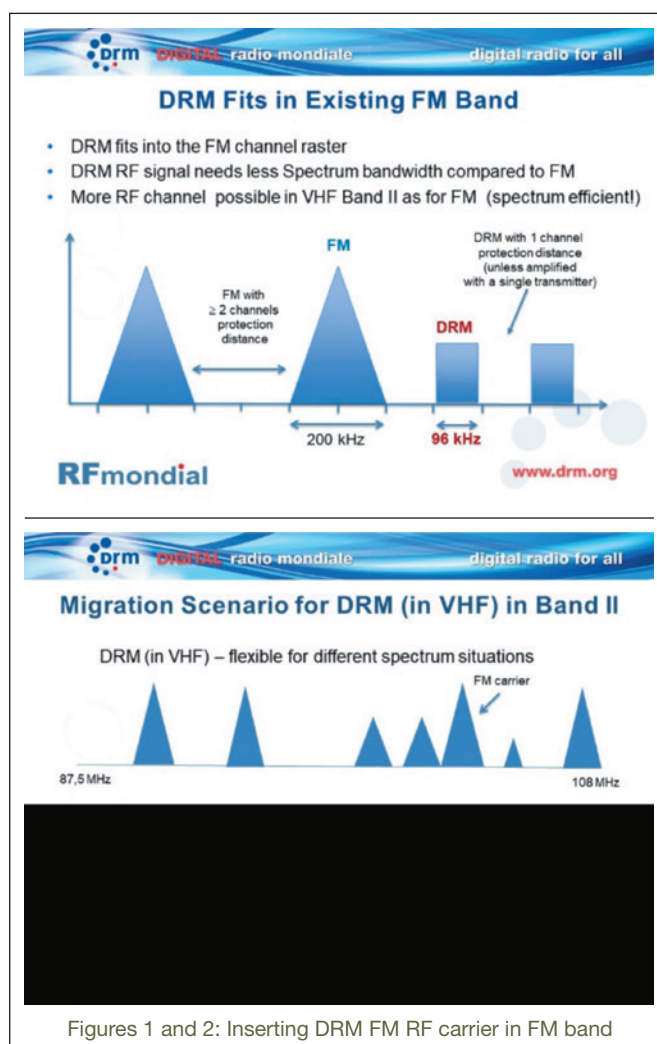
Technology developments in digital radio now enable seamless introduction of digital radio in the FM band without disturbing the on-going analogue FM radio services. With the introduction of digital FM radio, a watershed transformation will take place in the FM radio broadcasting business and industry. This paper considers many of these aspects and offers several suggestions as a possible approach to set up DRM digital FM radio broadcasting in the FM band where there are on-going analogue FM radio transmissions.

## DRM FM Considerations by Regulators and FM Radio Broadcasters

In many places such as in capital cities and other large cities, existing frequency spectrum in the FM band is highly congested. It has been clearly established that even in these situations, DRM FM digital radio services based on the open ITU endorsed Digital Radio Mondiale technology<sup>1</sup> can be operated without impacting the ongoing analogue FM services, as shown through field trials in Batam in Indonesia, Johannesburg in South Africa, Edinburgh in the UK, et al<sup>2</sup>.

It has been positively demonstrated that the DRM digital FM transmissions can be inserted in the guard-bands between two analogue FM radio carriers without disturbing (or impacting in any way) operation of the ongoing analogue FM radio services. It can be emphasised that in any proper introduction of DRM FM in analogue FM spectrum (say in big cities), there will be no adverse impact on the ongoing services in that band.

It has also been established that each of the 96 kHz wide DRM FM transmissions can provide up to three high-quality stereo radio services plus text and multimedia components



Figures 1 and 2: Inserting DRM FM RF carrier in FM band

(as against one single FM quality analogue service from the existing analogue FM slots with a frequency consumption of at least 200 kHz). Importantly, it may be pointed out that

<sup>1</sup> For more information see the DRM Consortium's web site: [www.drm.org](http://www.drm.org)

<sup>2</sup> Please see the Annex at the end of this document.

among other advantages, three radio services provided by DRM digital FM can be employed to reduce the prevailing congestion in the FM band existing in major cities and to allow broadcasters to diversify their target audience.



Figure 3: RF spectrum plot with DRM FM carrier inserted between two analogue FM carriers [Batam, Indonesia]



Figure 4: RF spectrum plot of DRM FM carrier [Johannesburg]

In fact, the additional channels offered by DRM FM digital radio can be utilised to meet growing channel requirements of the existing FM operators. Many of the national spectrum regulators are considering the possibility of further reducing the congestion in the FM band in major cities and towns. As such, these additional channels can be used to reduce pressure of FM analogue services on the FM spectrum, reduce or eliminate interference and at the same time provide good audio quality programmes.

It has been conclusively demonstrated that in many cases the current FM radio operators may be able to use their ongoing analogue FM service transmitting equipment for the newly added DRM digital FM service, including sharing site, combiner and antenna infrastructure, and in some cases even upgrading analogue FM exciters to simulcast operation. (This was very well demonstrated in the Batam DRM FM experiment in 2017 as well as in many similar field trials

in other countries.)<sup>3</sup> Existing FM radio stations with FM transmitters of recent vintage can in many cases be used for DRM FM digital radio with only minor modifications. This leads to the conclusion that virtually all those FM transmitter sites can accommodate the DRM digital FM signals with very limited or even no additional transmitter infrastructure investment for adding DRM digital FM services at those locations. In other places, maintaining the analogue FM transmitters un-touched while adding a small-power DRM digital FM exciter (providing the same or larger coverage) with antenna combining will be the most economical way to upgrade to DRM FM digital radio.

It may also be pertinent to use low-power DRM FM digital radio to replace those analogue FM radio stations operating at the top edge of the FM band to effectively avoid interfering in sensitive services, such as near airports.

## Suggestions for Implementation by Regulators and FM Radio Broadcasters

Keeping the developments stated above in mind, it may be a good time to set up one or more pilot DRM FM digital radio broadcasting services in countries wanting to test or adopt this technology.

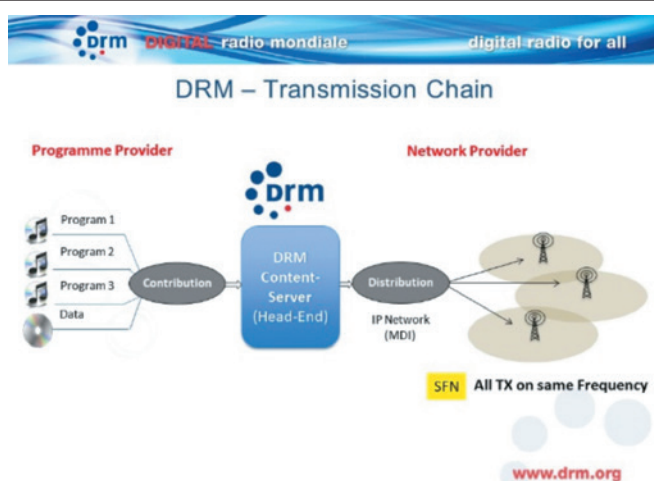
The following steps are suggested for consideration:

1. The National Regulator may initiate a study to verify the efficiency and effectiveness of DRM FM digital radio broadcasting in major towns, also to determine how DRM FM digital radio can reduce congestion and interference in the currently existing FM analogue transmissions.
2. The Regulator may consider setting up an 'All Stakeholders Group' to verify the advantages provided by DRM digital FM broadcasting in the currently obtained FM band, with the participation of all existing FM broadcast stakeholders. The objective would be to supervise the setting up of one or two DRM FM radio pilot broadcasting stations in large cities.
3. The Regulator may consider assigning frequency slots (100 kHz wide DRM slots in the FM band) for these two DRM digital FM pilot transmissions according to the published ITU planning parameters<sup>4</sup> for DRM digital FM radio broadcasts. There would be no need to make any changes to the existing FM analogue frequency channels.
4. As DRM FM radio broadcasting according to the ITU planning parameters requires substantially less EIRP for the same coverage (compared to analogue FM) and does not contribute to any additional interference, accommodation of DRM digital FM frequency slots will not pose any problems.
5. The Regulator may also consider identifying other operating parameters for these two DRM digital FM pilot broadcasting stations.

<sup>3</sup> Please see the Annex at the end of this document.

<sup>4</sup> Document ITU-R BS.1660: <https://www.itu.int/rec/R-REC-BS.1660-7-201510-I/en>





### DRM in FM Band: Transmission System

Most important DRM signal parameters

| General Parameters     |                                                       |
|------------------------|-------------------------------------------------------|
| Frequency Range        | 47 MHz to 254 MHz                                     |
| RF Channel Bandwidth   | <b>96 kHz</b> , conform to FM raster (100kHz nominal) |
| Audio Coding           | MPEG xHE-AAC, MPEG4 HE-AAC (5.1 surround)             |
| Data Rate              | <b>37 kbit/s to 186 kbit/s</b> (scalable)             |
| Modulation             | COFDM, 216 carrier                                    |
| Sub-Carrier Modulation | 4 QAM / 16 QAM                                        |
| Transmission Power     | -8 dB to -20 dB to coordinated FM Power               |
| Services               | <b>Up to 3 services</b> plus Multimedia (Audio, Data) |

www.drm.org

Figures 5 and 6: DRM FM system – transmission chain and signal parameters

6. As explained, the proposed DRM FM digital radio pilot broadcasting stations can make often use of the existing sites, transmission equipment and antennas. In this case, only two additional pieces of equipment are required for each DRM FM transmission station. These are:

1. DRM ContentServer (studio equipment to encode the digital DRM signal content)
2. Low-power DRM-ready Exciter with DRM Modulator

In fact, the DRM Modulator will often be a built-in part of the DRM Exciter already. This way we can insert the ready-made output signal of the DRM Exciter into the FM combiner, without the need to modify an existing analogue FM transmitter.

7. Procurement of the DRM ContentServers and DRM-ready Exciter will be required before the two DRM FM pilot services can be started.

8. With all the steps (1 to 7) in place, it is possible to start the two DRM digital FM radio pilot broadcasting services. (The regulator might require some assistance and guidance in setting up the pilot transmitting stations. It is possible to arrange this assistance in this regard e.g. with the DRM Consortium.)

9. As a next step, sufficient field measurements are required to assess the DRM FM radio transmissions. Also to verify absence of any interference in the ongoing analogue FM radio services. For this step a professional monitoring receiver with full support for DRM digital FM and analogue FM signals is to be procured.

10. DRM digital FM roll-out: For the following mass-market roll-out of DRM digital FM services, affordable digital consumer radio receivers are an important component. Various manufacturers have developed consumer receivers for DRM digital FM and are ready for mass-scale production; these include software based and tablet based digital radio receiver solutions. Several countries have already announced that the DRM digital FM standard will be used for digitising radio services in the FM band<sup>5</sup>. This movement is expected to grow.

#### Annex

#### DRM FM field trials in FM Band

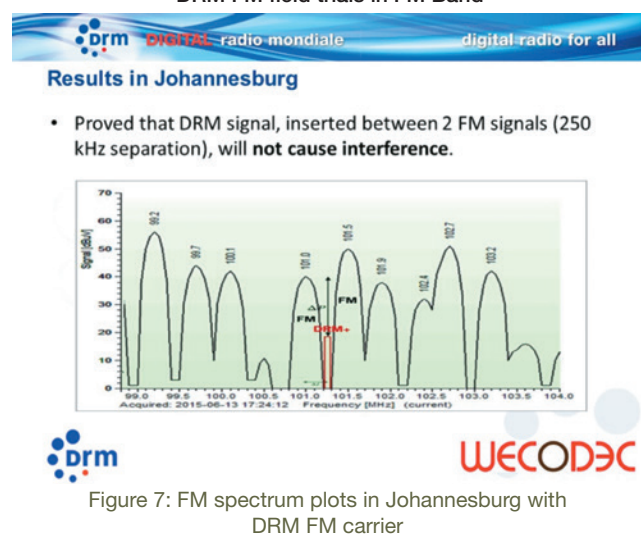


Figure 7: FM spectrum plots in Johannesburg with DRM FM carrier

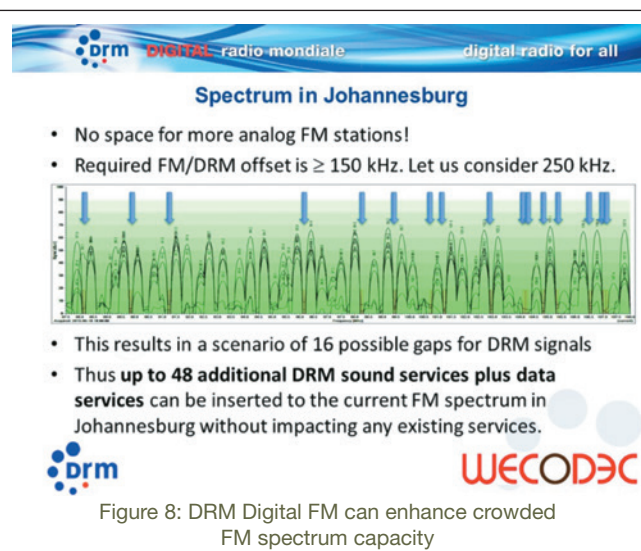


Figure 8: DRM Digital FM can enhance crowded FM spectrum capacity

<sup>5</sup> Russian Republic: <https://ria.ru/amp/society/20180911/1528303185.html>; South Africa Policy RfC: <https://www.doc.gov.za/newsroom/media-releases/communications-invites-comments-digital-sound-broadcasting-policy-directive>

<sup>6</sup> Source: DRM Handbook (Version 3): [http://www.drm.org/DRM\\_Handbook\\_2018.pdf](http://www.drm.org/DRM_Handbook_2018.pdf)

# authors

## Alexander Zink

Senior Business Development Manager Digital Radio & Streaming Applications, Fraunhofer IIS



Since 2000, Dipl.-Ing. Alexander Zink, MBA, has worked at the Fraunhofer Institute for Integrated Circuits (Erlangen, Germany) as Senior Business Development Manager Digital Radio and Streaming Applications.

Initially he developed the mobile and location-based information system UMIS (Universal Mobile Information System). From 2001 on he focused on the professional broadcast systems "Fraunhofer DRM, DAB ContentServer". Since 2002 he is project director for Journaline, an interactive text based information system for digital radio.

In addition he works in the fields of AudioServers, software defined radio, transmission protocols, technology development and standardization, and IP management and licensing.

For Digital Radio Mondiale (DRM) he acts as Vice-Chairman of the DRM Consortium and Vice-Chairman Technical Committee. In addition, he is an active member of the WorldDAB Technical Committee and various DAB and DRM work groups.



## Sharad Sadhu

Media Specialist

Sharad's career in the media industry spans more than 50 years. He was the Director Technology of the Asia-Pacific Broadcasting Union till 2013. Sharad has previously worked as Director Engineering in Doordarshan-India, General Manager in TCIL and as Professor in the Film and TV Institute of India. Currently he is a Technical Consultant helping out in projects on digital TV and radio broadcasting, OTT and radio streaming, and on VoLTE in mobile phone industry.

He has received extensive exposure internationally in broadcasting technologies and spectrum regulation. He also served the ITU's WRC conferences in several capacities since 1988 and has contributed as a senior expert in many ITU projects, including for the ITU Akademie.

Sharad has authored a large number of papers on topics of current interest and has made presentations at eminent conferences in four continents.

His profile is available at: <http://sharad-sadhu-profile.weebly.com>

## ABU TECHNOLOGY CALENDAR OF EVENTS

### 2019

|                        |                                                                              |              |
|------------------------|------------------------------------------------------------------------------|--------------|
| June                   | Workshop on Satellite Technologies for Broadcasters                          | TBC          |
| 18-20 June             | BroadcastAsia2019                                                            | Singapore    |
| 8-12 July              | ABU-ASBU-AIBD WorldDAB Digital Radio Workshop                                | Kuala Lumpur |
| July                   | Regional Workshop on Radio Studio Automation                                 | TBC          |
| 15 August-13 September | ABU Technology Webinar Series                                                | Online       |
| 13-17 September        | International Broadcasting Convention 2019                                   | Amsterdam    |
| September              | Regional Workshop on OTT and IBB Technologies & Services                     | Kuala Lumpur |
| October                | ABU-AIBD-DRM Regional Workshop on Digital Radio 2019                         | Kuala Lumpur |
| 17 November            | ABU Technical Bureau Annual Meeting                                          | Tokyo        |
| 18-19 November         | ABU Technical Committee Meeting                                              | Tokyo        |
| 21-22 November         | ABU General Assembly                                                         | Tokyo        |
| 13-15 November         | Inter BEE 2019                                                               | Japan        |
| November               | 16th Iran Media Technology Conference                                        | Tehran       |
| December               | Training Course on Engineering Fundamentals for Broadcasters 2019 (ABU-AIBD) | Kuala Lumpur |





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# Audience Readiness for Ultra High Definition TV Among Malaysians

by Ramachandran Ponnar

School of Media and Communication and School of Computing and IT, Taylor's University, Taylors University, Malaysia

by Azween Bin Abdullah

School of Media and Communication and School of Computing and IT, Taylor's University, Taylors University, Malaysia

## abstract

There is intense discussion on how Ultra High Definition Television (UHDTV) services should be introduced in a competitive broadcasting market. Given that persistent conflicts have surfaced among audience-electronics companies, telecommunication carriers, terrestrial broadcasting companies and Pay-TV companies in the media industry. This study explores the state of readiness for the adoption of UHDTV by the Malaysian Television Industry and its audience through the economic model of audience's rights. The study analysed the Korean UHDTV audience's reception being the frontrunners in this sector of TV broadcast. The Malaysian TV industry is analysed next, as a late adopter of this innovation. This empirical study conducted a market survey on the penetration of UHDTV in Malaysia and conducted interviews with technology manufacturers, electronic companies and broadcast vendors who participated in the 2014 and 2018 ABU Digital Broadcasting Symposiums in Kuala Lumpur. The poor penetration of UHDTV is attributed to economic and cultural factors. The principles of universal accessibility and consistency were not mandated. That aside, inefficient broadcasting practices were being adopted as high definition broadcasting got underway. This study proposes strategies that would assist the audience to navigate their cultural conflicts from the inevitable technological disruptions.

## 1. Introduction

The implementation of HDTV (High Definition Television) and 3DTV (3-Dimensional Television) followed by UHDTV (Ultra High Definition Television) and other standards have been a bone of contention in the industry. It was observed that *show-off* and *self-expression* have implications for adoption among audience in Malaysia (Park, 2006). Similarly, Lee (2014) found that a user's interest and rights in the latest innovations in television broadcasts, social status and the desire to show-off are directly related to the high cost of UHDTV. This means the users' characteristics in terms of their choices, are critical when distinguishing between adopters and non-adopters. Meanwhile, the state of readiness between the forerunners, Korea and Malaysia as a late the adopter, are inconsistent and poles apart.

## 2 Issues and Challenges

Convergence, the Internet of Things and the growth of personal media have liberated audience's choices about how they wished to consume media products. The convergence of broadcasting technologies is accelerating changes to audience's choices of TV screens. The proliferation of broadcast formats and the evolution of screens have further spoiled audience's choices. Engineers and manufacturers are continuously racing to commercialise their inventions. The problem with this scenario is, the 'in the pockets' of consumers whose standards of living may not commensurate with the economic development and cost of living. The affordability factor of the masses would result in a slow take-up of any new innovation to TV screens, which would then gradually contribute to a failed implementation of innovation. Next, the impact between the audience's rights or consumer

sovereignty? Audiences are treated as a homogeneous commodity whose individual tastes are neglected. Their individual choices and collective rights turn out to be different from what is desired. Strategic interventions by The Malaysian Communication and Multimedia Commission are also slow and lack translucency in their consultancy interactions with consumers.

### 2.1 The Study is Guided by the Following Questions:

What is the state of readiness for the adoption of UHDTV services in Malaysia?

What are the issues affecting the audience's rights to subscribe to UHDTV services?

What interventions can defray audience's concerns about the implementation of UHDTV services?

### 2.2 Economic Model

The origins of the public interest standards of Radio and TV can be traced from as early as, "*The 1928 Statement*" (Krasnow and Goodman (1998) to the landmark Red Lion Broadcasting v FCC decision in 1969 which upheld the "right of the viewers ...". Therefore, the rights of audiences have long been clear elsewhere. Sunstein supported the audiences' rights and cited an economic model as "a well-functioning television market would promote the idea of consumer sovereignty" (2000, p 156), in the three guiding factors pertaining to audience's rights:

- Broadcasters tend to present the audience to advertisers as a commodity for sale in terms of audience numbers, programmes' ratings, and popularity;
- Broadcasters tend to treat the audience as being homogeneous



in their taste for choices; assuming that, the audience will almost surely consume products made for them;

- Audience Collective Action Problems. When information is a public good, the problem is not that the audience chooses unwisely as individuals, but that the collective consequences of their choices often turn out to be very different from what they desire or anticipate.
- These rights are somewhat endowed as consumer rights in Malaysia, but not enforced as audience rights.

### 3. Method

This empirical study conducted a market survey on the penetration of UHTV in Malaysia and conducted interviews with technology manufacturers, electronic companies and broadcast vendors, who were mostly from Korea, Japan, Taiwan, and Malaysia, who participated in the 2014 and 2018 ABU Digital Broadcasting Symposiums in Kuala Lumpur. This study analysed the audience's reception of the Korean UHDTV (secondary data), being the forerunners in this sector of TV broadcast as well as the Malaysian TV industry (primary data) who are comparatively late adopters of the technology.

### 4 UHDTV

Interest in 4K Ultra HDTV (now even greater) since 2012, has significantly increased in Korea, one of the countries which is spearheading the use of the new media (Song, 2013) and the first to broadcast UHDTV in the world (KBS World Radio, 2018).

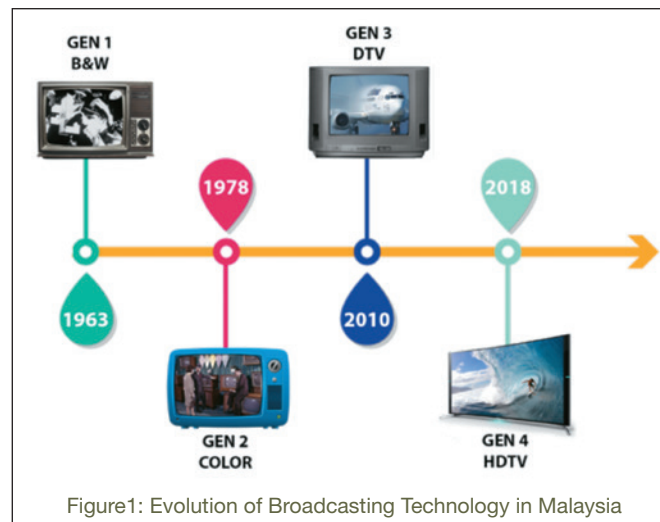
UHDTV provides image clarity, greater texture and an almost photographic appearance of smoothness. James (2013) stressed that 4K Ultra HD TVs (UHD TVs) provides eight million pixels and delivers four times the details of 1080p Full HD. UHDTV has established itself as the new paradigm in audience TV broadcast reception (Chang & Kim, 2014). Media experts believe that UHD TVs will be adopted extensively for the rest of the decade and possibly beyond, similar to the standard HD (Breznick, 2014; ABU, 2014 and 2018).

UHDTV has revolutionised not only the big screen TV market and the Internet movie streaming services but gaming experiences as well (Leather, 2013). Knight (2014) claimed that consumer demands for 4K TV are on the rise (Knight, 2014). According to KBS (2018), UHDTV sales increased from under 150 000 units to 1.1 million between March 2012 and March 2014 (Park, 2014). Kraus & Sappington (2014) noted that 4K TV prices will reach the mass-market levels within three years and top 80% of the households in approximately 10-12 years, unlike HDTV, which took 15 years to reach similar levels.

After the digital switchover was completed in 2012, Korean Broadcasting Services had diversified to digital satellite, digital cable, and IPTV (Kim et al., 2006). It was claimed by the Korea Electronics and Telecommunications Research Institute that Chinese manufacturer, TCL, has produced UHDTV models that were cheaper than the available Samsung HD sets. By 2018, a further drop in the prices of UHDTV was expected (Lee, 2013). It is understood that the TV market has achieved sustainable development that meets the social needs because of the development of new technologies (Lee, 2014). As a result, more than 99.7% of the approximately 17 million households watched terrestrial digital TV broadcasting by the end of December 2012 (Lee, 2013).

While most technologies and critical talents for broadcasting are still being imported, so is the latest in UHDTV. The TV industry in Malaysia has only evolved gradually (Figure 1). Malaysians who did not fully grasp the need for the conversion to the colour TV in 1978, asked why was it necessary for them to change when the Black & White version worked fine. Their issue was the hidden cost: four times more for a household to convert then. Audiences or consumers of TV technologies are

now grappling with the development of multiple platforms of broadcasting such as cable networks, terrestrial networks and a combination of IPTV networks and terrestrial networks. Television content is currently received in 4:3; 16:9; postcard and scope formats. In the near future, the audience will receive HDTV and UHDTV quality transmission. Meanwhile, broadcasters and manufacturers are not at all relenting on their promotions of newer technologies such as Over-The-Top (OTT) and Integrated Broadcast Broadband (IBB) as emerging delivery technologies.



It is essential to note that even with the presence of multiple broadcast offerings, terrestrial broadcasting is very much dominant in Malaysia. While the monopoly of broadcasting has been democratised, there were emerging issues with compliance and governance for broadcasters on the one end and the escalating cost for accessibility of information for audiences at the other end. At the same time, the support from the local manufacturers is almost nil because all TV related products and services are imported as can be observed from annual exhibitions (ABU Digital Symposiums, Kuala Lumpur and Broadcast Asia, Singapore) leaving local audience with little choice than to adopt changes cascading down from the industry to the audience one way or the other. Retail prices for new HD and UHDTV sets in the Klang Valley are four times the cost of standard definition (SD) sets. This is not affordable for the average wage earner in a developing country like Malaysia with RM38,887 national average 2016, per capita income (Department of Statistics, 2016).

### 5. Challenges in the Adoption of Innovation

Despite the indications of positive and early adoption of UHDTV services, the programming for new channels is faced with a lack of UHD content. So is the consumer purchasing trend of UHDTV sets, any indication of readiness for the adoption of the innovation. What is clear is the service still has many challenges to be resolved.

#### 5.1 Low UHD TV Penetration Rate

Few bought the UHD TV which was four times the price of the existing TV in 2014 (James, 2014). It is expected that the prices of UHDTV will drop below the current price in two years. (Kim, 2015). Another reason is the 4K resolution on a screen size of 70 inches provides almost no visible benefits at normal seating distances. Viewers need to be at least 6 feet away and further (Katzmaier, 2014).

UHD TV penetration in South Korean households is estimated to be at 1.1% although it is expected to increase to 17% by 2018,

with leading manufacturers such as Samsung and LG driving strong demands in their domestic market (Lynn, 2014). The take up in Malaysia is still limited to Klang Valley, and its numbers are negligible. Korea Electronics and Telecommunications Research Institute (ETRI) expects that terrestrial broadcasters will start UHD broadcasting only by 2020.

## 5.2 Lack of 4K Content and the Fear of Obsolescence

The creation of UHD content is becoming popular in the film industry (Lee, 2014). However, readily available 4K broadcasts and 4K disc format such as Blu-ray are rare. The gap between 4K/UHD TV sales and content availability is that content providers are not convinced by the incentives to make the content available in HD format. According to Archer (2014), even Netflix lacks 4K movies as the studios are looking into the financial viability of 4K masters. Film studios are seriously concerned by the impact of original 4K quality being video pirated (Archer, 2014).

The huge costs of 4K production, including new cameras, improved data storage capacity, high-powered mastering systems, extra broadcasting capacity, and infrastructure appeared to be a barrier for broadcasters. They are also aware that the standard definition and HD channels can be carried in the same broadcast space as a single 4K (Archer, 2014).

## 5.3. Delays in UHD Broadcasting Standardisation

For UHD standards should be established systematically to enable this to happen (Kim, 2015). Korea has been experiencing problems in standardising UHDTV, evidenced by technical problems in the 2014 broadcast of the World Cup. The lack of standardisation has increased the costs of Samsung and LG TV sets. Meanwhile, Chinese and Japanese companies have been working to increase competitiveness, as Japan plans to provide UHD broadcasting by 2020. While Korea is expected to follow closely. On the same note, a UHD ecosystem has to be existent before broadcast can take off in Malaysia. The brisk sale of UHD TV sets is like putting “the cart before the horse.”

## 6. Strategies to Achieve Economic Goals

It is inevitable that UHDTV broadcast will become mainstream broadcast format in the future. However, in Malaysia, the TV industry will experience challenges before the full commercialization. The primary concern of broadcasters is the scarcity of UHD content. Broadcasters must create a large pool of UHD content for economically viable broadcast operations. Broadcasters’ media technologies and a media

assets management workflow should be in place. And finally, the audience must be made aware of the changes to the broadcast reception technology.

The MCMC needs to develop diverse policies to support related broadcast industries. In this regard, a “public interest standard in television broadcasting” alone is inadequate to protect the interest of audiences, nor is the statute sections and 212 in MCMC 1998. MCMC has the discretion to formulate and revise the meaning of public interest obligation as circumstances changed.

It is vital to set up a system that allows the cooperation between the government, industry, and broadcasters for related policies and support, foundation technique procurement, and to enable diffusion of UHDTV. Lee’s (2018) proposition for the protection of audiences’ rights is being adapted for this study:

1. Media education support is essential to create awareness to and action by the audience in their choices in decision making about broadcasting content and technology. The audience is not homogeneous in their taste in as far as choices are concerned. They should be afforded choices in the way they consume products made for them.
2. It is essential to secure audience’s rights before implementation any innovations and that public interest in broadcasting is to be respected. The move would save much cost and despair among broadcasters and audience.
3. That public should be able to afford access to all quality broadcast from time to time with so many innovations constantly pouring into the living rooms of the audience. To manage the deluge of innovations and choices confusing audience, there should be in place sufficient provision in governance and enforcement by MCMC.

## 7. Conclusion

While some success in UHDTV penetration in Malaysia is achieved before the broadcast is commissioned, social and cultural reasons have been highlighted for the delay and poor take-up of the technology. It also means that the critical principles of universal accessibility are not being followed. It is now more important than ever before that universal access to quality media products and their affordability is guaranteed.

Audience reception rules and conditions are not merely the prerogative of broadcasters. They no longer remain within an institutional domain and instead, they are evolving into a negotiated space for the audience by the audience. In response to such trends, The Malaysian Communication and Multimedia Commission (MCMC) could promote and protect audience’s rights through the provision of media experience education before the introduction of innovative products such as the UHDTV.

## authors



**Dr. Ramachandran Ponnar**  
Associate Professor at the School of Media and Communication, Taylor’s University, Malaysia

*He has been a practicing broadcaster at the National Radio TV station for over thirty years. He teaches and publishes on broadcasting related subjects.*

Email: ramachandran.ponnar@taylors.edu.my



**Dr. Azween Abdullah**  
Associate Professor of Computer Science and Cyber Security at the School of Computing and IT, Faculty of Innovation and Technology, Taylor’s University

*He has more than thirty years of experience as an academic in institutions of higher learning and as director of research. He has contributed vastly as a professional development alumni of Stanford University and MIT. He is vice-president for educational consultancy services, fifteen years in commercial companies as Software Engineer, Systems Analyst and as a computer software developer and IT/MIS consultancy and training. He hold several grants, his works are widely cited.*

Email: azween.abdullah@taylors.edu.my



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## 25th BES Conference & Expo, New Delhi

The Broadcast Engineering Society of India (BES) held its 25th International Conference & Exhibition on Terrestrial and Satellite Broadcasting on 17-19 January 2019. The conference and exhibition took place at the Pragati Maidan of New Delhi, where nearly 300 companies from 25 countries displayed their products and services. The event also included an international conference on broadcasting technology topics and trends.

The theme of this year's BES Expo was "Next Gen Broadcasting in the IT World", which is very relevant to the way the current industry is developing and how

broadcasting as an industry is integrating its product line and services with IT.

The ABU made presentations in two sessions on the topics of "Cybersecurity and Media" and "Big Data for Broadcasters" in addition to chairing the themed session of the conference. The conference sessions discussed many pressing matters within the industry and experts from around the world were among the speaker line-up. The ABU has a long-standing partnership with the BES and the BES Expo, and has regularly contributed to the conference in the past.

## 1<sup>st</sup> India International Broadcast Conclave

The ABU was represented at the 1st International Broadcast Conclave held by Prasar Bharati on 18-19 March in Hyderabad.

This forum provided a platform for the Indian media and entertainment industry including the public service broadcasters All India Radio and Doordarshan, which operate under the Prasar Bharati umbrella, to discuss and explore the developments taking place within the broadcast and media industry and to understand the importance and influence of the new media platforms of the modern age.

The theme of the conclave was Technological Innovations in the Broadcasting Sector. Among the objectives was to discuss and learn about the various advancements in the field of broadcasting.

The Director of ABU Technology made a presentation on the topic "Broadcast Technology Trends", which addressed modern technology trends within the industry also looking at the disruptions and challenges from the new media age platforms and the need for new business ideas for broadcasters.

The forum was attended by experts from the international



broadcast community along with professionals from the broadcast and media industry in India. The Conclave was opened by the Chairman of Prasar Bharati and the Information and Broadcasting Secretary from the Ministry of Information.

The forum saw presentations from international speakers as well as excellent contributions by high-level officials from the Indian Ministry of Information and Broadcasting, Prasar Bharati, All India Radio, Doordarshan and private media organisations in India. The conclave also saw Awards presented for 'Best Technical Papers' authored by colleagues from AIR and DD-India.



# News from the ABU Region

## MEASAT Distributes Nepal's Himalaya TV Across Region



MEASAT Satellite Systems has announced the launch of Himalaya TV HD (“HTV”) for distribution across Nepal and the Asia-Pacific region via the MEASAT-3 satellite.

HTV, founded in 2010, is a Nepalese private television company based in Kathmandu. It produces news and entertainment programmes.

“We are pleased to collaborate with HTV to distribute Himalaya HD to an audience across Nepal and Asia Pacific,” said Yau Chyong Lim, Chief Operating Officer, MEASAT.

“The addition of Himalaya HD, the latest HD and widely embraced infotainment channel in Nepal, greatly enhances the line-up of high quality HD genres on our key video slot at 91.5°E.”

“It gives me immense pleasure that Himalaya HD are on the MEASAT platform”, said Dharma Raj Bhusal, Chairman, HTV.

“MEASAT-3 was selected for distribution because of its excellent coverage, reliability and expanding presence in the region’s HD video neighbourhood.”

The addition of the Himalaya HD regional feed increases MEASAT’s video neighbourhood in Nepal to eight channels featuring news, general entertainment and factual programming.

The 91.5°E prime video hot slot is home to the MEASAT-3, MEASAT-3a and MEASAT-3b satellites, forming the region’s strongest video neighbourhood.

From 91.5°E, MEASAT supports broadcasters and DTH operators to distribute UHD, HD and SD channels to audiences across Asia, Australia, East Africa and South-Eastern Europe.

## Singapore’s CNA Marks 20th Anniversary

Singapore’s Channel NewsAsia has celebrated its 20th anniversary by changing its brand name to CNA and dropping the TV-centric reference to “channel”.

Speaking during the dinner celebrations, Mediacorp Chairman



Niam Chiang Meng said CNA had been “working hard” to transform itself into a transmedia company, available on every platform that the public was using, to stay relevant in today’s media landscape.

Prime Minister Lee Hsien Loong, speaking at the same gala dinner, said the media landscape had become a far more cacophonous space, and it was precisely in this new environment that trusted news sources like CNA were more important than ever.

Mr Lee noted that from a single channel, CNA had become a multi-platform digital news source, including television, online and radio.

“You have experimented with video, podcasts, interactive graphics and augmented reality, and even used drones to capture live footage, to engage viewers and enhance your storytelling,” he said.

“CNA today is one voice amongst many. It is much harder for you to hold your audience’s attention. You have to fight to get your voice through.”

[CNA]

## NHK Launches 1st 8k Channel

NHK, Japan’s national broadcaster, partnered with Eutelsat Communications to launch the world’s first 8K network, BS8K. The live broadcast took place on Dec 2, 2018 from the Vatican where images were transmitted to Tokyo via Eutelsat 12 West B satellite with a mobile uplink provided by M-three Satcom.

NHK relied on DVB-S2X modulation, in 16APSK, and High Efficiency Video Coding (HEVC) encoding. The images (7680 pixels over 4320 lines, or 33.3 million pixels per image) were shot at 60 frames per second in BT2020 colour space, with 10 bits of colour depth (1 billion colours) and high dynamic range Hybrid Log Gamma (HLG), combined with 22.2 channel audio.

Airing the footage in Japan, BS8K features 8K Ultra High Definition (HD) footage of major cultural and sporting events, museums and natural landscapes, providing viewers with broadcast 12 hours a day. The channel will allow for further experimentation with 8K prior to the large-scale deployment of the format for the Tokyo Olympics and Paralympics games in 2020.

[Via Satellite]

# Digital Broadcasting Update

## ETSI Releases Cybersecurity Specification to Secure Sensitive Functions in a Virtualised Environment



The ETSI Technical Committee on Cybersecurity (TC CYBER) has just released ETSI TS 103 457, that tackles the challenge of secure storage – where organisations want to protect customer data whilst still using a cloud that is not under their direct control.

Many organisations need to protect this data, but when it is held in a virtual network or cloud, the organisation often doesn't have control of this storage solution. TS 103 457 solves this problem, by standardizing an interface between a “secure vault” that is trusted and a cloud that could be anywhere, where such sensitive data is stored in the vault. This allows a sensitive function to exist in a lower security environment, with data held securely.

This new specification offers multiple use cases. For instance, this interface can be used with new network function virtualisation (NFV) technology to allow secure authentication of users for billing purposes. Virtualisation means that processing can happen anywhere and might be untrusted, therefore these secure vaults are needed to protect sensitive functions and data. This is more common than ever as NFV technology becomes widespread.

The interface can also be used to search databases that hold private data. Another feature defined in the specification is a logging function that allows queries of customer data to be audited, making it easier to detect data breaches, which in turn deters malicious activity.

This standard proposes a new interoperable interface, so that an organisation may change “vault” or cloud provider and still achieve the same functionality; vital in a world of evolving technology.

(ETSI)

## WorldDAB Released Updated UX Design Guidelines



The document details how to deliver “best possible digital radio user experience” in the car

“Drivers expect a great, simple user experience, with a

radio button to access DAB easily and quickly,” reveals the updated WorldDAB User Experience (UX) Design Guidelines for automotive manufacturers and broadcasters. The organisation announced the availability of this latest version at the Automotive Workshop, held Feb. 12 in Geneva during the European Broadcasting Union's Digital Radio Week.

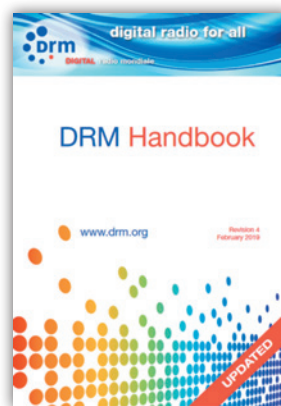
The document, which WorldDAB says is part of ongoing work, details how to deliver the “best possible digital radio user experience” in the car.

The updated guidelines include:

- A clearer direction to implement hybrid radio for a great digital radio user experience in connected cars with DAB
- Clearer signposting to other research and guidance on features such as voice controls, logos, and DAB test routes
- The detail of the design guidance has been updated in several use cases to reflect feedback from car manufacturer partners

(WorldDAB)

## Digital Radio Mondiale Launches Version 4 of its Comprehensive Handbook



The Digital Radio Mondiale has launched the fourth revision of its comprehensive and freely available DRM Handbook.

This e-Handbook is aimed at the management of broadcasting organisations and regulators in areas of policy making, as well as in programme making and technical planning. It explains in some detail the advantages gained by radio broadcasters wishing to introduce the DRM® Digital Radio Mondiale™ technology and some of the technical and commercial considerations they need to take into account in formulating a strategy for its introduction. The Handbook includes information on technical and regulatory aspects for the introduction of DRM, be it for large coverage or local coverage, as DRM is the only digital audio broadcasting standard covering all broadcast bands (AM and VHF). It also includes links to reports and articles on an extensive range of DRM trials.

The DRM Handbook has been updated to keep pace with the extensive new real-life findings of DRM tests and demonstrations and includes updated MER (Modulation Error Ratio) figures for DRM for local coverage and other small updates.

(DRM)



# Equipment Trends

## GatesAir to unveil HD Radio Importer and Exporter Solutions



GatesAir, a global leader in wireless, over-the-air content delivery solutions for radio and TV broadcasters, is to unveil three configurations of its Flexiva FMXi 4g embedded HD Radio solution soon. It combines Importer and Exporter functions into a single embedded device that provides dynamic time, level, and phase correction. The FMXi 4g employs integrated HD Radio Diversity Delay control software that ensures proper time alignment between your analogue and digital signals and improves the listener experience by removing objectionable blending artefacts. This embedded solution eliminates boot-up processes, problematic operating system upgrades, and troublesome PC-based applications. Broadcasters no longer require a standalone, computer-based Importer or Exporter, which also removes moving parts from a particularly sensitive element within the architecture.

The FMXi 4g accepts, manages, and multiplexes all HD Radio Advanced Applications Services (AAS). This includes supplemental audio channels into the HD Radio data stream that are combined into the main programme services and sent to the exciter. The FMXi 4g can provide new revenue with additional data services and multiple audio programmes. GatesAir will demonstrate the FMXi 4g as part of its complete HD Radio Gen4 solution at NAB from April 8-11 in the Las Vegas Convention Centre.

*(Gates Air)*

## IKEGAMI's New 4K and 8K Cameras



Ikegami, a leader in HD and UHD cameras and production equipment for TV broadcasters, networks, and other HD content creators, introduced new technology and exhibited its latest systems.

Ikegami is debuting the new UHK-435 camera, which stands as the world's first 2/3-inch 3-CMOS sensor 4K/HD full studio camera. It provides Ikegami's superb imagery in true 4K via three 2/3-inch 4K (3840x2160) CMOS sensors with RGB prism optics, for "Real 4K" resolution from 24 million pixels. The UHK-435 captures the extended depth-of-focus of the 2/3-inch format and permits use of the full range of B4 studio and field box lenses. It delivers wide dynamic range and wide colour gamut, fully supporting HBR. The viewfinder can be positioned close to the extended line of the optical axis. In addition, interfaces are available for a wide range of 4K signal protocols including Quad 3G-SDI, 12G SDI and IP.

Likewise, Ikegami's new product is SHK-810 8K ultra high-definition television (UHDTV) camera. Developed in collaboration with Japan Broadcast Corporation (NHK), the SHK-810 is a breakthrough camera notable for the significant size reduction and lightweight design that it brings to field and live production, operating with the same ease as current broadcast cameras.

The SHK-810 employs a 33 million pixel Super 35mm CMOS sensor with PL lens mount, achieving a limiting horizontal resolution of 4000 TV lines. This portable camera utilises standard SMPTE hybrid camera cable between head and CCU with available portable and



SHK- 810 Camera

studio viewfinders. Pictures from the SHK-810 can be viewed on a prototype Ikegami designed 55-inch full 8K resolution LCD monitor. *(IKEGAMI)*

## Sony's 8K TV: XBR-98Z9G



Sony XBR-98Z9G

Sony has recently introduced Bravia 98" 8K HDR LED Smart Android TV. It is the one of Master Series product TVs that creators can explore their imagination and see their vision reproduced in the home. Major features of the Product are:

- Pictures and sound in perfect harmony with true-to-life pictures and acoustics to match. Beautifully detailed images combine with the Sound-from-Picture Reality™ for a captivating audio-visual performance.
- A truly authentic experience exclusively powered by X1™ Ultimate processor. One can enjoy immersive big screen entertainment with four times the resolution of 4K and high brightness specially developed for 8K. Pictures are rich in depth, texture and detail, filling your field of view with unparalleled realism.
- With 8K X-Reality™ PRO, images are upscaled closer to true 8K quality. Pictures are sharpened and refined in real time, revealing details in the architecture of the building that were previously difficult to see.
- Picture Processor X1™ Ultimate detects hundreds of different objects on-screen and intelligently enhances brightness, detail and colour so everything you watch is clear, bright and incredibly realistic.
- Backlight Master Drive, a full-array LED backlight technology that combines an ultra-dense LED structure, a spectacular algorithm and an optical design. Powered by the Picture Processor X1™ Ultimate, this technology delivers incredibly deep black, dazzling lights and more vibrant colour.
- TV centre speaker mode means the centrepiece of breathtaking sound. Simply connect a home theatre system to unleash an immersive cinematic experience.
- Beautifully clear with X-Motion Clarity™: the X-Motion Clarity technology keeps fast action smooth and clear. Moving images are precisely controlled to minimise blur. Even during high speed scenes, pictures stay true with no loss in brightness.
- Embrace the thrills of the theatre as Dolby Vision™ brings scenes vividly to life for authentic viewing, while Dolby Atmos™ fills the room with immersive surround sound.

*[Sony]*

# Personalities & Posts



## Mr Abdul Muis Shefi appointed DG of RTM-Malaysia

Mr Abdul Muis Shefi took up the position of Director General of Radio Televisyen Malaysia in January 2019. He has worked for Malaysia's national broadcaster for more than 35 years. Before becoming Director General, he was Deputy Director General of Strategic Broadcasting, a post he held from August 2017.

Mr Muis' forte has been news and current affairs. He began his career at RTM in 1983 as a journalist. He later managed several units in the news department, including a stint as the State Director of Broadcasting in his home state, Terengganu.

Mr Muis holds a Master's degree in Corporate Communication and has presented papers at various international conferences on issues relating to journalism, ranging from politics to disaster management.

He attended international fellowship programmes at Wolfson College in Cambridge, UK, and at CNN Atlanta in Georgia in the US.

An active participant in the news and broadcasting field, Mr Muis was Chairman of the ABU News Group from 2017 to 2018. The group sets policy for the Asiavision daily news exchange and oversees all ABU news activities. He stepped down from the post after being appointed RTM's Director General.

A prolific scholar, Mr Muis lectures at local universities and agencies on journalism and is a lifetime member of Chevening Scholars Alumni and Universiti Putra Malaysia (UPM) Alumni.

# New Members

## Additional Full Members

### Kiribati Adventist Hope RADIO – Kiribati

Kiribati Adventist Hope RADIO is free-to-air service broadcasting to more than half the Kiribati population living in South Tarawa and Betio and plus those in the outer islands and abroad via internet sharing through informative, educational and entertaining programs and uplifting music. Ninety-five percent of the programs will be targeting the local audience. The rest of the time slots will be filled with English programs. KAH Radio will accomplish this with a 600-watt transmitter and antenna affixed onto a 50-meter tower, fully equipped FM quality studio, the financial support of listeners, and a dedicated team on the ground.



### Radio Tarana

Radio Tarana is a New Zealand radio network, broadcasting in Auckland, Hamilton and Wellington. It broadcasts a mixture of music, information, news, sports, culture, events coverage and lifestyle features. The station was the first commercial full-time New Zealand radio station targeting migrant communities.



The station was set up in 1996 for Auckland's Indian and Hindi-speaking community. It now targets a broad range of Indian, Pakistani, Bangladeshi, Sri Lankan and Fijian migrants around New Zealand. The network aims to foster mutual understanding between different migrant groups with diverse interests, religions and ethnic origins.

## Affiliate Members

### INFOTECH SOLUTIONS – Indonesia

Infotech address the needs of television, radio, print, internet, mobile, pay TV, cinema, digital signage and telecom media as well as advertisers,



content creators and associated service providers in an integrated manner. Infotech also provides e-Commerce, mobile and social media applications and support.

Over 18 years, Infotech's Gen21-BMS manage processes for broadcast, advertising and content for well over 250 channels in some of the largest Media Groups around Asia.

### JAPAN INTERNATIONAL BROADCASTING Inc. – Japan

Japan International Broadcasting Inc. (JIB) was established in 2010 under the Broadcast Law of Japan to support the operations of NHK World-Japan and to take initiative as a 'private sector' in transmitting Japan news to the rest of the world.



株式会社 日本国際放送  
Japan International Broadcasting Inc.

For the founding objectives, Jib was set up as a subsidiary of Japan Broadcasting Corporation (NHK) and NHK is the largest shareholder of JIB. JIB is however, also supported by a variety of private subscribing companies, such as private-owned television stations, trading companies, banks, and telecommunications companies.

### THE RIGHTS EXCHANGE -TRX – Singapore

TRX is the world's first online marketplace where licensing deals can be processed securely online – from discovering and screening programmes, checking avails to negotiating rights and price through TRX's unique deal grid all the way through to signing a contract.



More Deals. Less Hassle

TRX currently lists over 70,000 hours of high quality programming previously either difficult or impossible for many broadcasters to access in a traditional way.

As a free service for TV acquisitions executives, TRX is an invaluable tool to access multiple television catalogues in one place 24/7 whilst maintaining direct contact with the individual.



**ABU**  
ENGINEERING AWARDS  
**2019**

# CALL FOR NOMINATIONS



## **ABU Broadcast Engineering Excellence Award**

For outstanding contributions in broadcasting engineering and related disciplines.

## **ABU Green Broadcast Engineering Award**

For outstanding contributions in developing, implementing and/or promoting green technology in the broadcasting industry.

## **ABU Engineering Industry Excellence Award**

For outstanding engineering contributions made by an individual to the broadcasting industry.

## **ABU Developing Broadcasters' Excellence Award**

For contributions of an outstanding nature in broadcast engineering made by an individual in a developing broadcasting organisation

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July 2019 – Judging

18 November 2019 – Announcement of Winners ABU  
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