



ABU DBS 2020

COLLABORATE & INNOVATE

2-5 MARCH 2020 | HOTEL ISTANA KUALA LUMPUR

FULL REPORT INSIDE

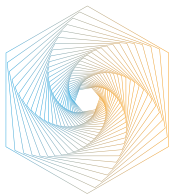
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DIGITAL BROADCASTING SYMPOSIUM 2020: COLLABORATE AND INNOVATE

The 2020 ABU Digital Broadcast Symposium was held on 2-5 March 2020 at Hotel Istana Kuala Lumpur. This symposium, aptly themed 'Collaborate and Innovate', was the sixteenth in the series of symposia organised annually by the ABU.

The three-day conference, together with an exhibition, provided a unique opportunity for attendees to have access to information on various aspects of broadcasting, ranging from technologies to business strategies. The symposium attracted participants representing broadcasters, telcos, regulators, manufacturers and other industry players.



Dr Javad Mottaghi

Opening Session

The ABU Secretary-General, Dr Javad Mottaghi delivered the opening address which was followed by the conference sessions.

Advances in Technologies & Broadcast Standards

The first conference session was moderated by Mr Masashi Kamei, NHK-Japan, and the panelists were Mr Lindsay Cornell, BBC Digital, Dr Peter Siebert, IEEE BTS and Dr Fintan McKiernan, Ideal Systems.

They elaborated on the developments of the various broadcast, telecom and cloud technologies over recent years and the improvements achieved.

Broadcast TV typically means scheduled content delivery for live TV, provided by broadcasters on a 24/7 basis. Non-broadcast TV is classified as, non-live or on-demand content such as provided by Netflix and YouTube. According to statistics, for the past 5 years, daily TV viewing time per Individual based on EBU markets is around 3hrs 40mins and has remained stable. In 2017, the share of total TV viewing time in the UK was 56%, but online content is progressively eating into traditional

TV viewing time. Among youth in the age group 16-34 years, viewing behaviours are rapidly changing and only 33% are watching live TV. The video consumption forecast is that online video is expected to continue boosting total viewing time and the TV set is becoming the main screen for streaming. Broadcast TV will stay with us, though user pattern and behaviour will change. It could be seen from the survey that the trend towards on-demand content is evolutionary and not revolutionary.



From left to right: **Mr Lindsay Cornell**, BBC Digital, **Dr Fintan McKiernan**, Ideal Systems, **Mr Masashi Kamei**, NHK-Japan, and **Dr Peter Siebert**, IEEE BTS.



Broadcasters will have to adapt progressively, even though they are in a good position as trusted brands. Besides, in many countries they are the leading on-demand providers. Overall, the big screen is still the first choice, and now comes with hybrid broadband access.

Delivery via broadcast networks has reached a high degree of sophistication encompassing UHD, HDR, HFR, immersive audio and hybrid interactive solutions combining broadband and broadcast. Standards development organisations, like ATSC and DVB are working on delivery solutions, namely DVB-IPTV for managed networks with QoS, DVB-I for unmanaged networks without QoS and ATSC 3.0 IP based transport layer. Mobile devices, such as tablets and smartphones, are not equipped with a broadcast interface. Nonetheless this is set to change, as broadcast TV reception is now possible with 4G and Wi-Fi by installing a broadcaster specific app. Furthermore, SDOs like DVB and ATSC are working on solutions to make delivery of broadcast content to mobile devices more user-friendly.

With regard to IP and cloud infrastructure, when SMPTE 2110 is ready to roll-out cloud broadcast systems may become a reality soon. However, SMPTE 2110 has its own inherent problems at the moment. With no native camera support for it, a SMPTE 2110 converter and then another converter back to SDI to connect a monitor or vision mixer is needed. The SMPTE 2110 standard is uncompressed and is bandwidth intensive. As it has high latency and jitter requirements, it is almost impossible to implement in a pure software stack and a physical

card is required in order to get it to work. SMPTE 2110 is itself split into standards for video (2110-20), audio (2110-30) and ancillary data (2110-40) together with separate time stream (2110-10) and all of this is defined by a session description protocol (SDP). However, the SDP and how this is controlled is not a part of the scope of SMPTE 2110. Networked Media Open Specification (NMOS) describes how devices on a network can interact with each other, detect what streams are available, and how to connect to other devices. NMOS specifications are the glue that enable SMPTE 2110 to function.

Against this background, cloud broadcast systems will be successful if they offer benefits. Most of the channels are now scheduled playout channels that would benefit from virtualisation. They are already virtualised in the cloud for several reasons, such as faster speed and lower cost to deploy new services. They are perfect for spin-up channels, allowance of micro-services for computing efficiency, shared production and distribution, embedded metadata for further automation consolidation and to drive monetisation, scalability of functions, and easier Integration across value chain services.

In Digital Radio, WorldDAB has

developed newly improved display capabilities for non-Latin scripts. The ETSI TS 103 176 specification defines the framework for using non-Latin text and includes an additional signaling field to provide key complexity indicators. The regional profiles concept is also incorporated to define scope and limits for particular markets. This idea has also been adopted by DRM, which has extended it to include a simplified bidirectional algorithm. The three regional profiles presently are Latin, Full Europe (Latin, Greek Cyrillic) and ASBU (Arabic, Latin).

The DRM Technical Committee has been updating DRM's minimum receiver requirements (MRR). The MRR was originally created in 2004, focusing on short wave broadcasting, and was extended in 2012 to include DRM in the VHF bands (DRM+). However, the requirements were made without much field experience and the rapid expansion of DRM in India led to its review in order to ensure that limits and requirements matched current technology capabilities and price points. Thus, simplified functional requirements have been set for lesser used features and methods for measuring performance have been made easier to carry out. It has also begun a review of the DRM system specification, with the



aim to remove complexity from the standard, reducing the likelihood of interoperability issues. Other features will be reviewed, and the expected timeframe is around 6 months.

Evolving Media Business-Strategies and Opportunities

The moderator was Mr Alex Reza Shariman Othman, Radio Television Malaysia, with the panelists comprising Ms Joan Warner, Commercial Radio Australia, Mr Steve Ahern, Ahern Media & Training, Mr Mazlan Mahdi, MYTV Broadcasting, and Mr Joseph Goddard, James & Wilkinson Media.

A recent study of listening habits indicated that live Australian Radio held a share of 61.3% whilst streaming was at 15%. 49% of Australian households have access to a DAB+ device and there are more than 3.8 million listeners. In 2019, time spent listening to podcasts overtook owned music for the first time. The Australian podcast ranker was launched in October 2019 and released every four weeks. Its dual purpose is to increase awareness and grow podcast consumption, as well as to help advertisers understand opportunities within the podcasting space. The ranker lists the most popular podcasts across publishers by downloads. Artificial Intelligence (AI) is progressing, in the form of partnerships with Google and Amazon.

AI makes radio easier to discover and access on mobile phones, voice assisted devices like smart speakers and cloud-based assistants. Google partnership accessibility on current and future Google Assistant enabled devices and smartphones are to be rolled out soon. More than 300 Australian AM, FM and DAB+ digital radio stations are easily accessible on Google Nest devices via voice command.

RadioMATRIX, an advanced industry-wide planning and ad buying platform, was launched enabling advertisers to easily connect with every commercial radio station on a single platform. It updates and synchronises thousands of radio bookings each day. Buyers receive online booking confirmations, can know who is listening, monitor



changes and see where and how frequently their ads have run. Cloud based solutions will allow checking of spots against audience segments, with radio networks able to access real time insights on availability of spots. During the bushfire disaster in Australia, 74% of listeners looked to radio for information. Radio is a vital part of communications plans for the height of emergencies. Stations provided rolling local coverage of news and important information with regional communities. Radio is a reliable means of broadcasting information in times of emergency.

Transmission is now a level playing field with the result that there is no longer any competitive advantage in owning transmitters. Instead of spending money to compete in transmission, it is better to hire the best talent and produce the best content. The balance sheet must be stabilised to become healthier, strengthening the company and ending up in better control of future direction. Shared sites are becoming the norm, with joint ownership of the infrastructure and fixed ratio of cost contributions. OTT and Streaming have a different cost base from terrestrial transmission. Costs are not fixed, as they increase

with audience and there is little competitive advantage in going alone. Therefore, national and commercial broadcasters have formed a joint venture company and most functions of the ABC TV master control are replaced with centralised switching, captioning, watermarking facilities for contribution & playout to transmitters and streams. The ABC and WIN Media hub operates on IP based technology with 150 channels and potential for 300 channels.

In Malaysia, MYTV was appointed to transform the nationwide broadcast system from analogue to digital. It was tasked to develop and operate the Digital Terrestrial Television (DTTV) infrastructure in Malaysia for the next 30 years. DTTV is regarded as a means for improving the living standards of Malaysians with the creation of new digital revenue streams. MYTV is also given the task to execute frequency restacking, as well as clearing up frequencies above 700 MHz. RM1.1 billion was spent on CAPEX and OPEX and 2 million free set top boxes were distributed to the lower income group.

The traditional media of TV, radio and outdoor advertising still dominates with at least 70% reach





across all groups aged 15 and above, and remains relevant for mass marketing. From a recent survey, 87% population watch TV and 73% listen to the radio as means of media consumption. Marketing communications were successful in informing and preparing people for the transition from analogue to digital broadcasting. The primary source of awareness being television advertising, news articles and advertorials.

Feedback from viewers indicated that improved reception and sharper pictures make TV viewing much more enjoyable. It is possible to get HDTV of the same quality as Pay TV, which acts as the benchmark for picture quality. Present services are SDTV, HDTV, Digital Radio and hybrid broadband broadcast television. Future services will be Pay TV for both SDTV, HDTV, HbbTV, OTT and segmented linear services. Other services envisaged are, reception using USB Dongles to be used on android devices and Smart TVs.

Marketing prioritisation within the media industry is critical to having a robust marketing strategy using owned promotional resource. Commercial competitors are agile, addressing audience needs and have very deep pockets whilst PSMs need to serve a wide and diverse national population under government/public scrutiny and must be seen to be relevant but not overly populist. For the rest, marketing budgets are under more pressure than ever before, are not as agile, and work in silo, rarely reaping the benefits of working as a united portfolio. Five factors to shape promotional strategy are, revenue streams, content & services, competitive threats,

brand perception, and audiences. Marketing, airtime sales and programming, likewise, should be on top priority within each business. Selecting campaign categories for each task with enriched value ensures the business objectives are being adhered to.

There are four key factors that influence campaign communication level, such as target audience, lead time to launch and support, channel or media mix, and campaign weight. Applying the model across one's owned, earned and paid media and strategically allocating media and creative resources between these services best fulfils organisational and service requirements.

Integrated Broadcast Broadband Interoperability

T-NET Japan and Internet Initiative Japan, Advanced Warning Response Network (AWARN) Technical Partners and members of the IPTV Forum Japan, conducted a workshop to showcase Japan's initiatives on IBB interoperability from the viewpoint of disaster management. The TV service mission is to be a trusted media during emergencies, when news can be fed without fear, uncertainty and doubt. Live, timely information feed is necessary to maximise disaster mitigation and to save people's lives by complying with interoperability requirements.

Currently, Japan has an early warning broadcasting system, wireless emergency alert system and Asian Disaster Reduction Centre. Some of them are quick to trigger, but there is no geo-targeting capability. Thus, it is proposed to have an advanced emergency warning system, smart disaster information management



system and upgraded Asian Disaster Reduction Centre for much more precise, area-targeted and personalised solutions.

Interoperability is warranted for borderless disaster management where every nation and every language can be included at lowered cost. It is possible with global content creation guidelines, receiver management, content delivery network, and sustainable IP network. IPTV Forum Japan is working with the ATSC 3.0 and AWARN to realise interoperability. Recently Hybridcast and HbbTV 2.0 harmonisation and few initiatives in the ASEAN region are ongoing. These initiatives in IBB domain enable disaster management more advanced and high reach, geo-targeting, public education by datacasting.

Digital Radio, The Podcast Generation & Enhanced Audio Technologies

Moderated by Mr Steve Ahern, Ahern Media & Training, the panelists were Ms Nurulhusna Mohamad Kasim, Radio Television Malaysia, Ms Joan Warner, Commercial Radio Australia, and Mr Nick Piggott, RadioDNS.

Public Service Media core functions are to reach all citizens with their services, make their content accessible everywhere and offer a diverse selection of content. They should keep citizens informed, provide innovative content and services. RTM Malaysia has undertaken many efforts to study and familiarise with the DAB+ system in order to gain relevant experience and confidence before its implementation. Digital radio has modulation and coding robustness as well as power and spectrum efficiency. Increasing demand for FM radio frequencies can no longer be met due to frequency congestion and analogue radio is a bottleneck to innovation. According to a recent survey, 22.4% of radio listeners have heard about digital radio and 73.4% of them were interested to own a digital radio set. There are opportunities to extend brands, launch new services, grow audiences and revenues. Malaysia has a lively radio market with multiple players and services in different languages. Radio remains one of the primary information media and reached 20 million listeners in 2019. Most are listening to radio in the morning and afternoon as they commute between home to office for an average of 13 hours 23 minutes weekly.

Public Service Media (PSM) are frontrunners when it comes to producing and disseminating high quality news, documentaries, fiction and sports coverage. In order to meet society's cultural and social needs, PSM content must be easily accessible on all platforms, networks and devices. The key principles are giving prominence to content of public value, exploiting open internet and free to air broadcast synergies, and preserving the content and signal integrity where content developed by broadcasters must maintain its



From left to right: **Mr Nick Piggott**, RadioDNS, **Ms Joan Warner**, Commercial Radio Australia, **Ms Nurulhusna Mohamad Kasim**, Radio Television Malaysia, and **Mr Steve Ahern**, Ahern Media & Training.

original characteristics at all points of access. Digital intermediaries must not be allowed to alter or exploit content unless authorised by the media service providers.

Over 80 million DAB receivers have been sold worldwide, representing a 15% yearly increase. There are now over 529 million people within reach of a DAB/DAB+ signal and DAB/DAB+ services are now available in 45 countries/territories. New receivers are now incorporated with smart features, Bluetooth and voice technology. As competition for advertising revenue intensifies, commercial broadcasters must keep evolving in order to survive. DAB+ is more spectrum efficient, so broadcasters can launch more stations and develop new commercial partnerships. AM, FM, DAB+ and online streaming all play an important role in the evolving future of commercial radio, where audiences can access radio in multiple ways. Each platform provides benefits for different sections of the community at different times of the day. When combined, they create a successful and thriving radio industry.

An update on Hybrid Radio concerned combining broadcast

radio and IP in connected cars. Hybrid Radio delivers audio using broadcast which is reliable, ubiquitous, free to air and economic. Hybrid Radio enhances radio with IP in parallel, by adding content, metadata and interactivity. DNS is the internet address book which converts domain addresses to an IP address that is fundamental to making the internet function. Hybrid Radio leverages DNS to make it work for radio. The listener finds stations by tuning as normal and the radio connects directly to radio station over IP. Hybrid Radio has open standards and interoperability that protect broadcasters and manufacturers from proprietary lockins. It is durable, global and works with FM, HD and DAB+. Hybrid Radio allows switchover from broadcast to streaming or vice versa. It provides streaming URLs for each station where Radio can switch automatically to streaming when broadcast is unavailable. Seamless switching is possible, if streamed audio closely matches the broadcast mode.

The system allows broadcasters to recommend on-demand content, alongside live radio and it is easy to switch from linear to on-demand and back again.





From left to right: **Dr Peter Siebert**, IEEE-BTS, **Mr Roberto Muss**, Vizrt, **Mr Albert Feytons**, MEDIAGENIX, **Mr Emanuele Porfiri**, Tecla System, and **Mr Rob Hopkins**, Openbroadcaster.

Media Management and Advanced Broadcast Applications

The moderator was Dr Peter Siebert, IEEE-BTS with the panelists comprising Mr Roberto Muss, Vizrt, Mr Albert Feytons, MEDIAGENIX, Mr Rob Hopkins, Openbroadcaster, and Mr Emanuele Porfiri, Tecla System.

The importance of an efficient content supply chain was emphasised with four case studies. The first case study tackled the problem of tedious manual processes, lots of issues in getting subtitling and dubbing ordered and delivered. The solution was to integrate with suppliers, automate the entire ordering process, including compliance and transmission, and give visibility from the beginning to the end of the workflow. The benefits accrued were proactive management of missing items made possible by real time status, large reduction in mails, duplication, manual tracking and elimination of most spreadsheets. There was a huge reduction in rush charges and reliable workflow with predictable lead times. The 2nd case study investigated the problem of manual entry of 25000+ sports events per year and keeping them up to date with changes. The solution was to integrate with sports metadata platform for up-to-

date sport event information. The benefits were, the huge reduction in manual entry, and triggering automated workflows when events are postponed. Other benefits include immediate updates to EPG, rights automatically verified when the teams & location are known and better overview of available content per event.

The 3rd case study was about the problem of linear and VOD content, rights, schedules, promotions managed in separate systems and teams. The solution was to merge the workflows managing the linear and VOD supply chains. Among the benefits are huge reductions in manual and double entry, automated catch up based on linear schedule and rights. Additional benefits are, single overview of content available for publication and huge reductions in effort to setup cross platform promotions.

The 4th case study examined the problem of revenue from linear channels dropping with profits when under pressure. The solution was cost reduction by using Artificial Intelligence (AI) to schedule off-peak linear channels. The benefits are freeing up resources, better use of rights and more control over costs by setting limits for the AI engine. Other benefits include better balance between cost vs revenue of the schedule and better competitive offer.

The Emergency Alerting System (EAS), with open source technologies, is available in Canada with Common Alerting Protocol (CAP). It is based on the ITU standard

X.1303 which provides support for UTF8 and indigenous languages. It is far preferable to the proprietary systems from a couple of EAS manufacturers from the US, which come with secret coded firmware. CAP in Canada delivers text, audio and image support for radio and television. The profiles are available in both English and French and CAP feeds are distributed by TCP/IP socket and C-Band satellite. National Public Alerting System entails the CAP alert content flow from alert issuers to aggregators and then from distributors to the public through different channels. Examples are alerts on aggressive wild animals, extreme cold and blizzards, power and telecommunications outages. Other alerts involve evacuation and biohazards, such as the ongoing Covid-19 crisis. The equipment is configured to available languages in the alerting area. Valid CAP message is received matching alerting area polygon and starts with standard alerting tones. Artificial Intelligence plays the message in CAP alert with available recorded phrases and regular detailed messages follow in English and French.

An indigenous alerts solution utilises artificial intelligence with Amazon POLLY voices, with 20 phrases recorded by community members. The framework is available for other countries and as open source for communities. The challenge is that not everyone is located near a cell base-station or has a smartphone. Not only that, equipment manufacturers do not support Indigenous dialects. The alerts are understood by indigenous people in remote communities. Emergency workflow allows priority override of a scheduled show, with public service announcement message delivery to all stations.

A Network Digital Interface (NDI) infrastructure is user friendly, very easy to configure, extremely efficient and easy to manage. NDI is completely interoperable between equipment, applications and standards. NDI video uses compression and has variable bit rate (VBR) where the typical data rate can be up to 250 Mbit/sec. SDI to NDI conversion latency is less than a





frame and NDI compression quality is extremely good with fewer artefacts. NDI contains video, alpha channel, audio, bidirectional control, metadata and is bi-directional. The idea behind NDI is to have a very efficient compression of the sources and to avoid any further recompression until delivery. An NDI stream can be recorded to disk and played back without a recompression cycle.

The OpenStack solution in cloud systems offers flexibility, resource optimisation and cost saving supporting multicast services. OpenStack is a cloud operating system that controls large pools of resources throughout a datacentre, such as computing, storage and networking. All these are managed and provisioned through APIs with common authentication mechanisms. Beyond standard infrastructure as a service (IAAS) functionality, additional components provide orchestration, fault management and service management, amongst other services, to ensure high availability of user applications. OpenStack services are Cinder, Neutron etc where Cinder is a block storage service for OpenStack and Neutron is an SDN networking project focused on delivering networking as a service (NaaS) in virtual compute environments. An example of an OpenStack solution is HPE MWM Orchestrator Manager which is an IT orchestration approach for managing, not only broadcast software app like MAM, playout and encoding, but also the complete OpenStack infrastructure via API.

Advanced Broadcast Delivery Systems and 5G Technology

The session was moderated by Dr Les Sabel, S-Comm Technologies and the panelists were Mr Pavel Kokoshka, Progira, Mr Masashi Kamei, NHK-Japan, and Mr Colin Prior, ENENSYS. Broadcasters and broadcast network providers want their content to be

received by handheld terminals in the form of mobile phones, tablets or in cars. 5G Broadcast may offer such a possibility in fully evolved multimedia broadcast multicast service (FeMBMS). However, the vexing question is whether the existing conventional broadcast networks are suitable. Broadcast networks can be subdivided in 3 different categories, such as HPHT-High Power High Tower (DTV and FM Stations); MPMT-Medium Power Medium Tower (DAB SFNs) and LPLT-Low Power Low Tower at less than 1kW and lower than 100m. In Denmark, the task is to plan a 5G Broadcast network (FeMBMS) SFN based on 3GPP Release 16 using the existing terrestrial DAB infrastructure. All T-DAB VHF transmitters are converted to FeMBMS network at UHF to provide handheld reception for indoors and outdoors. For outdoor handheld reception, the T-DAB infrastructure can provide up to 10-15 Mbit/s covering 95% of population. For indoor handheld reception, the T-DAB infrastructure can provide Indoor handheld coverage using 5G Broadcast SFN, up to about 3 Mbit/s, covering 70% of population. It must be noted that 5G Broadcast offered in FeMBMS has no frequency and time interleaving, which exists in all digital broadcast systems; i.e. DVB-T/T2, T-DAB and ATSC 3.0. Thus, degradation of required C/N is nearly 10 dB for portable indoor and mobile reception. It is difficult for most broadcast network providers with HPHT or MPMT networks as additional infrastructure is needed, increasing network cost. It is also hard

to compete with mobile network operators using LPLT cellular networks for providing 5G broadcast to handheld terminals.

Japan started regular HDTV via 12GHz band digital satellite broadcasting nationwide in 2000 with the development of ISDB-S for multi HDTV programs in a single 34.5MHz transponder channel. In 2003, Japan also started regular HDTV via UHF band DTTB in three major cities with the development of ISDB-T for simulcasting both HDTV and mobile programs in a single 6MHz channel. In 2018, Japan progressed further with regular UHDTV via 12GHz-band digital satellite broadcasting nationwide with development of ISDB-S3 for 8K UHDTV programmes in a 34.5MHz transponder channel. For Diverse Vision, a future broadcasting service in Japan, high capacity transmission beyond UHDTV would be required in 21GHz-band. Among the improvements are higher efficient modulation from 8PSK to 16APSK, sharper roll-off filter from 0.35 to 0.03 and LDPC code to decrease required reception C/N. Most Asian countries have to consider severe rain attenuation in the 21GHz band compared to 12GHz band. A solution to this problem is to increase satellite EIRP in large rain attenuation areas, while keeping nominal EIRP in other areas. This can be conducted by a variable radiation pattern in accordance with rainfall by on-board array fed antenna.

Latest trends show OTT video not only generates a lot of revenue



From left to right: **Dr Les Sabel**, S-Comm Technologies, **Mr Colin Prior**, ENENSYS, **Mr Masashi Kamei**, NHK-Japan and **Mr Pavel Kokoshka**, Progira.

but also an enormous amount of internet traffic. When popular events create Content Storms and in such cases scalability of the CDN deems essential. Quality of Experience is key for customer retention for faster start up time and better quality video leading to longer user engagement. OTT@Scale Multicast ABR aims to provide solutions on how to compete effectively in the OTT video market. With a fully virtualised and end-to-end portfolio, it relies on multicast ABR architecture with multicast controller, server and agent. It scales and manages busy hours and peaks of traffic, switches automatically between unicast and multicast, scales and manages busy hours at much lower costs, and reduces latency. The portfolio is also said to enable a wide range of applications with OTT video delivery for cable and broadband, telecom, mobile network, terrestrial and satellite DTH operators.

Media Personalisation – Applications to Big Data and Artificial Intelligence

The Moderator was Dr Fintan McKiernan, Ideal Systems and the panelists were Mr Hiroki Okamoto, NHK-Japan, Mr Andrew Kunaseelan, TechKnow Solutions, and Mr Colin Prior, ENENSYS.

Smart Production is underway at NHK for high quality TV programme production using AI and other technologies. Social Media Analysis System (SMAS) analyses tweets and messages circulating in social media for content that can be broadcast to viewers. It gives an at a glance understanding of what is happening and where. News producers can find the information they need more quickly and respond quickly to the viewers. SMAS can detect incident related object from images on tweets through a BOT agent. A BOT is an agent that communicates more or less autonomously on social media, often with the task of influencing the course of discussion or the opinions of its readers. However, it can be detected by SMAS and there are algorithms to prevent BOT. Some BOT accounts post non-valued tweets and their tweets disturb viewers of already reported incidents. By reference to their post's constancy, SMAS estimates their BOT likeliness.



BOT behavior evaluation algorithms gather tweets from target accounts and count appearances on timestamps. The algorithms evaluate timing randomness by appearance mean-to-variance ratio and if random, the account is handled by humans. BOT posts more regularly than human and auto-correlation by one day difference is a helpful indicator. Detection ability becomes more robust against BOT, with micro time noise. BOT detection expected as a part of fake detection; but misinformation or fake spreading is often manually handled. BOT is not always evil and fake issues need to be considered also in a non-technical perspective.

Localisation of content for production and broadcast normally uses machine translation and not automatic speech recognition. It is not intended for the hard of hearing and needs to maintain consistent timing. Machine translation can translate existing subtitles, add non- domestic subtitles at marginal cost and enable producers and distributors to extend their reach. Automatic Speech

Recognition (ASR) automatically turns audio into timed text in many languages using NLP and NER that supports automatic tagging and categorisation of content fragments. Centralised transcription and logging of material facilitates faster cataloguing, better search and offline edit. Automatic creation of subtitles provides benefits, including a 50% cost saving compared to manual subtitling. In this way, the producers can create subtitles themselves, whilst retaining the rights of those subtitles.

TV Advertising is the media to address millions of users instantly but every household receives the same ads, creating hurdles for local advertisers to access to TV media. There is no real time access to media consumption and campaign measurement and at the same time there are regulation constraints protecting other media. Targeted advertising can be realised by dynamic ad insertion at suitable points along the transmission chain. Centralised architectures require



From left to right: **Dr Fintan McKiernan**, Ideal Systems, **Mr Hiroki Okamoto**, NHK-Japan, **Mr Andrew Kunaseelan**, TechKnow Solutions, and **Mr Colin Prior**, ENENSYS.

delivery of as many multiplexes as regions, consuming huge bandwidth in order to distribute the regional multiplexes to transmission sites and high OPEX costs. On the other hand, Regionalised architectures operate on transmission sites, without the need to duplicate national content and result in lesser CAPEX costs with fast ROI. In order to facilitate targeted and addressable advertising, the DVB-TA standard was specified in liaison with HbbTV in February 2020.

Advanced Production Technologies and All-IP Infrastructure

The session was moderated by Mr Lindsay Cornell, BBC Digital and the panelists were Dr Kong Bin, NRTA-China, Dr Mohieddin Moradi, IRIB-Iran, and Mr Thomas Gunkel, Skyline Communications. The presentations of Dr Kong Bin and Dr Mohieddin Moradi were pre-recorded.

National Radio Television Administration (NRTA) China forms the world's largest broadcasting transmission and coverage system, which not only caters for domestic broadcasting but also international broadcasting. The number of DTV subscribers has reached 140 million. serviced by 450 HDTV channels and two 4K UHD TV channels. The Emergency Broadcasting System of China (ChinaEBS) supports the broadcasting of emergency information through various platforms such as satellite, FM, AM, DTMB, DVB-C, and IP. ChinaEBS satisfies the technical requirements of emergency information by terminal activation, timely response, zone control, and end to end information authentication. Since the Lushan Earthquake on 20 April 2013, Emergency Broadcasting has been a very important part of the public service system, and the pilot construction of emergency broadcasting has been promoted on a full scale. Emergency broadcasting system plays an important role in providing effective and efficient emergency services in emergencies such as earthquake and flood. China's standard system of video and audio content digital rights management (DRM) supports various forms of platform, including digital TV, IPTV and Internet TV. The system fulfils the current demand

for integrating media, ensuring a positive advancement of the media content industry. NRTA China encourages other institutions to promote the standardisation of video and audio content and digital rights management. Future planning includes mobile priority strategy by promoting the integration of national cable TV networks and 5G infrastructure. China's intention is to make radio and television available to every village and household and mobile access to every person. For all-IP Infrastructure, the PTP standard has been designed for engineered environments. The Precision Time Protocol (PTP) is a protocol used to synchronise clocks throughout a computer network. There is to be no packet delay variation (PDV), no asymmetry and perfect timestamps. The mechanisms to alleviate these sources of errors involves creating timestamps in hardware, using QoS to prioritise PTP traffic and fine tuning PTP settings. Common sources of errors are typical configuration issues, device issues and network issues including missing or corrupted event messages and increased packet delay variations (PDV). There are solutions with automated PTP provisioning and PTP monitoring & control. Automated PTP provisioning automatically detects new PTP aware devices, automatically extract PTP topology, define and apply certain configurations. Likewise, PTP monitoring & control monitors every single PTP metric on all PTP nodes, monitor PTP performance, monitor PTP multicast-traffic and apply PTP security workflows.

For live IP production, the IP world

of broadcast and media routing includes IP video routers, modular switches, Precision-Timing-Protocol for synchronisation. IP video routers must have very large bandwidth, must handle all the port bandwidths at the same time and at full capacity, increased IP switch stream capacity, must be IGMPv3 compliant and must support protocol independent multicast. Modular switches are high-performance and high-density switches with interconnections using small form-factor pluggables (SFP) of multiple different variants. The media industry is constantly looking for workable solutions, such as unchanged operator workflow, deterministic low latency and jitter, zero packet loss, Video/ Audio end point sync and lock with micro-sec accuracy, fast and clean switching, better system availability and network security.

Live studio production using IP technology means to run networked devices with standard and open API in an IP network. In media service management and orchestration, the orchestrator glues the entire operation together and sets up the workflows as the user wants. It may be provisioned in two approaches; using a broadcast controller with orchestration capability, or using individual broadcast controller and orchestrator. The orchestrator monitors, controls and manages one or multiple physical, logical and virtual devices or functions in such a way that it is aware of the availability, capability, and capacity. The controller sends commands to one or more physical or logical devices to execute single or multiple actions using manual or automated



Mr Lindsay Cornell, BBC Digital and Mr Thomas Gunkel, Skyline Communications.



From left to right: Mr Aale Raza, Whiteways Systems, Ms Mardiah Nasir, IPSB Technology, Mr Mika Kanerva, Sofia Digital, and Mr Chao Yin Loong, Akamai.

processes. Thus, media flow is orchestrated in all imaginable manners, by controlling sources, switching fabrics and endpoints directly, by using multiple vendor-optimised SDN controllers, or a mixture of the two. Some examples are Skyline DataMiner's media-over-IP monitoring and SDN orchestration, and Grass valley's GV convergent broadcast controllers.

The motivations, business benefits and real world rollout of SMPTE ST2110 suite are flexible workflows, maximum efficiency, reduced bandwidth, assured interoperability and future-proof investment. However, IP-based systems still have a few inherent problems, like orchestration and monitoring software's issues and broadcast controller licenses issues.

Content Delivery Methods, OTT Platforms and IBB Systems

The session was moderated by Mr Aale Raza, Whiteways Systems and the panellists were Ms Mardiah Nasir, IPSB Technology, Mr Mika Kanerva, Sofia Digital, and Mr Chao Yin Loong, Akamai.

OTT and Streaming content are being delivered faster with ultra-low latency. It is possible to reduce latency without shortening segment duration. In fact, latency can be decoupled from segment duration. Common Media Application Format (CMAF) is an ISOBMFF fragmented mp4 container that can be simultaneously referenced by HLS or DASH presentations. It was standardised by MPEG and supported across the Apple and DASH ecosystem. Competing codecs,

protocols, media formats, and devices make the already complex world of live streaming infinitely more so. In addition to causing a headache, the use of different media formats increases streaming latency and costs. What could be achieved with a single format for each rendition of a stream, instead requires content distributors to create multiple copies of the same content. In other words, the streaming industry makes video delivery unnecessarily expensive and slow. The number of different container files alone is exhaustive: .ts, .mp4, .wma, .mpeg, .mov and the list goes on. Hence competing technology providers have agreed on a standard streaming format across all playback platforms. CMAF brings us closer to the ideal world of single-approach encoding, packaging, and storing. What's more, it promises to drop end-to-end delivery time from 30-45 seconds to less than three seconds. Ultra-low latency over streaming standards is possible today and chunked encoding and transfer encoding is a key technology that has been adopted by DASH and DVB. A common basis of a CMAF container holding chunk encoded content holds the foundation for interoperable low latency playback.

DVB-Internet or DVB-I makes linear television over the Internet as user-friendly and robust as traditional broadcast television. The DVB-I specification defines requirements for television services that may be delivered through broadband and/or broadcast mechanisms. It also defines the methods to retrieve electronic programme data for those services, and also the internet content delivery

format based on DVB-DASH with multicast adaptive bit rate and low latency support. Consumer devices can present an integrated list of services and content, combining broadband and broadcast services, giving users the best of both worlds. Broadcasters can deploy common services across a wide range of devices. OTT providers can increase their offer's visibility and audience reach. Manufacturers can create a single consistent user experience for all video services. DVB-I is the first major specification to benefit from DVB's new verification and validation activity that aims at accelerating the implementation of its technologies in the marketplace. A recent media survey found seven key areas to be critical, when assessing consumer appetites for on-demand and streaming content.

First and foremost is that content is still 'king' and it flows in push or pull modes or through search engines. Getting answers to what should one watch and how much time a user spends on given content is getting difficult. Second, is the language and locality i.e to offer different genres and category of program contents in a specific country or region. Platform is another honourable 'queen' to deliver and publish media e.g in instagram, YouTube, Netflix, Tiktok etc. Broadcast technologies such as digital, satellite, OTT etc are impacting an expanding device landscape and continue to do so with big screens, like connected TVs, smart TVs to smaller screens and mobile technologies.

However, ultras and fans have a say in it as audience autonomy blurs the boundary between audiences, content producer and monetisation. A recent PWC study shows 65% of TV watchers prefer to watch live streaming, up from 53% last year. Sixth, money out of consumers' pocket means the battle for wallet share is getting intense now, with offers and payment tiers and multiple revenue source for operators. Lastly, media companies ought to think big, start small and scale fast. To serve the audience and consumers' appetite, the major requirements are branding, centralisation, technology, and strategy. ■

DBS2020 Industry Debate

The Changing World of Broadcasting - Challenges, Opportunities and Strategies

The debate session was moderated by **Mr Steve Ahern**, Ahern Media Training, and the panelists were **Dr Peter Siebert**, IEEE BTS, **Dr Fintan Mc Kiernan**, Ideal Systems, **Mr Aale Raza**, Whiteways Systems, **Ms Mardiah Nasir**, IPSB Technology, and **Mr Thomas Gunkel**, Skyline Communications.

The moderator started the debate by conducting an online poll survey of the audience. They were to select two pertinent matters that broadcasters should discuss from a number of issues, ranging from cost, technology, staff, management to training. Money and Management were identified as key challenges faced by broadcasters. There was growing concern regarding OTT platforms, as FAANG (Facebook, Amazon, Apple, Netflix and Google) has been intruding and cashing in on areas and content traditionally the domain of broadcasters. Netflix and others have made inroads with live feeds, even into developing countries, especially with non-English programmes that cater for Asian mass audiences. They are also exploiting the advantage of their non-linear platform, allowing



Mr Steve Ahern



Mr Aale Raza



Dr Peter Siebert



Ms Mardiah Nasir



Dr Fintan Mc Kiernan



Mr Thomas Gunkel

viewers to pause for a break or snack between viewing times.

Production costs for broadcasters are going up and it is wise to invest in cloud systems. Cloud systems are coming of age with several benefits, such as lower maintenance cost, higher compression ratios and a move from client servers to cloud servers, which has made single servers possible. A suggestion was made that public service broadcasters (PSB) could charge in some way, even for free to air (FTA) services to their audiences, as there are costs incurred throughout the delivery path from

studio to viewer. The telcos are benefitting from this situation as they own the delivery paths and can monetise the usage per minute. One of the ways of recovering costs is by charging per set-top-box and earning through targeted advertising. PSBs need more investment to be empowered to reach their next level goals.

It is not advisable to think only of money when investing in infrastructure, but to collaborate on sharing it. Broadcasters should also not invest in silos, but instead strive to generate and aggregate more content, and



venture into multiplatform. They should put money into content that can better satisfy end users. New technologies, such as High Dynamic Range (HDR), High Frequency Range (HFR) and Immersive Sound, can extend the life of broadcasters. Podcast is another long-term business venture that can reap profits for them.

The pace of technology is changing and a lot more training is needed. Training must be regular and technical certification

is needed. It could be preferable to do on-line training, so that costs can be reduced. The ABU could be a good starting point, as it conducts short courses all around the Asia Pacific. These courses are up-to-date, delivered by industry professionals and provide hands on experience.

Public Service Broadcasters (PSB) must change outdated regulations, that are no longer valid in these challenging and competitive times. They need to get involved in developing

future standards and in exploiting the benefits of 5G technology. However, PSBs are still relevant, as they are trusted brands and can provide accurate news, especially in an era of rampant fake news circulation. Fake news travels fast and PSBs must learn to monitor situations and take control. There have been cases of unfortunate incidents caused by rumours on Social Media and this is where PSBs can step in to broadcast the real facts and present balanced opinions to viewers. ■



DBS Exhibition

The DBS Exhibition was held on 3-5 March. The 12 exhibitors who took part were Tiara Vision, TechKnow Solutions, T-Net Japan, Radio Frequency Systems, Whiteways Systems, Canara Lighting, Ideal System, MEASAT, MEDIAGENIX, Blonde Robot, Stagetec Asia and PROGIRA. We thank them for their support. ■





DBS Lucky Draw and Best Booth Award

The DBS Lucky Draw was sponsored by GlobeCast, Malaysia Healthcare Travel Council, Ideal Systems, Hotel Istana Kuala Lumpur and Holiday Inn Express Kuala Lumpur. The Best Booth was awarded to Blonde Robot who will receive a complimentary booth at DBS2021. ■



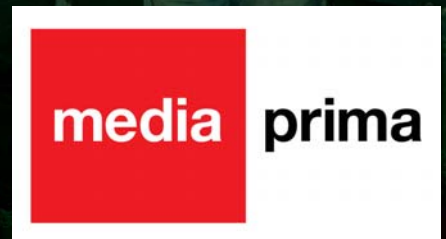
Thank you Radio Television Malaysia



Thank you Media Prima



The Media Prima camera crew posing with Mr Masashi Kamei, Vice-Chairman, ABU Technical Committee and Senior Research Engineer at NHK Science and Technology Research Laboratories.



Report on DBS2020 by Jeewa Vengadasalam, Specialist II, Department of Electrical & Electronic Engineering, Lee Kok Chiang, Faculty of Engineering & Sciences, University Tunku Abdul Rahman, Malaysia



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