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from the Editor

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Cover: ABU Technical Committee Virtual Meetings 2020

Wishing you all a wonderful and happy new year for 2021. What an unforgettable, challenging and extraordinary year 2020 has been for everyone in every walk of life. Not to say the difficulties are behind us but here's hoping things will improve for everyone soon.

Most of our activities during the year were delivered online through webinars and online meetings. This edition of the TR is coming at the back of the very first virtual General Assembly and Associated Meetings of the ABU. As part of these exciting meetings, the annual Technical Bureau and the Technical Committee meetings were held as virtual events from 23 to 25 Nov 2020. We are extremely happy that this allowed more colleagues from our members to join and benefit from the sessions. We had over 360 colleagues join the virtual TC meeting sessions this year.

As usual this TR edition is focused mainly on the TB and TC annual meetings. A detailed report of the proceedings of the Technical Committee virtual sessions and the decisions from the Technical Bureau are included. We would like to extend our thanks and appreciation to all the speakers and everyone for their excellent support during the online meetings. You will also find the details of this year's winners of the Engineering Awards and the Technical Review Prizes. We would like to extend our congratulations again to all the winners.

This edition also features one article related to technology development and applications contributed by our member Radio Television Hong Kong (RTHK). The article discusses a project that was implemented by RTHK engineers which serves to provide Audio Description (AD) service for selected TV programmes on its digital terrestrial television (DTT) channel, rendering them more accessible to visually impaired people by providing an audio description of the visual images on the screen during gaps in dialogue. This is an important implementation that helps the content to be enjoyed equally well by both visually impaired and visually healthy people.

As usual we conclude with our selection from key industry news, digital updates and the latest in equipment trends from the media industry. We hope the information included will be useful for all our readers.

Ahmed Nadeem
nadeem@abu.org.my

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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Ahmed Nadeem
ABU Technology

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

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Audio Description for communion of visually impaired and normally sighted persons

ABSTRACT

This project serves to provide Audio Description (AD) service for selected RTHK TV programmes on its digital terrestrial television (DTT) channel, rendering them more accessible to visually impaired people by providing an audio description of the visual images on the screen during gaps in dialogue. To achieve communion of visually impaired and visually healthy people, technologies are applied to allow the synchronisation of the AD soundtrack (streamed through internet to the mobile phones of the visually impaired audience) with the regular soundtrack (transmitted via DTT to the TV set). In this way, visually impaired people cannot only enjoy RTHK's TV programmes alone, using AD, but can also share the "viewing" experience while sitting together with their normally sighted friends or family members, who are listening simultaneously to the regular soundtrack from the TV set.

SERVICE DESCRIPTIONS

AD renders TV services more accessible to the visually impaired audience by providing an explanation during gaps in dialogue, of what is happening on the screen, thereby making it easier for them to follow the programme.

Audio descriptions of changes of location, action, facial

expressions, gestures and so on give context and set the scene. They are fitted into the gaps in the dialogue and/or commentary to maintain the flow of the programme.

Since 2009, the Hong Kong Society for the Blind has been promoting AD by organising screenings at cinemas equipped with AD facilities. DVDs of some well-known movies have also been released with AD soundtracks.

However, there are currently only a few TV programmes in Hong Kong that support AD, and so far no TV programmes enable visually impaired people to listen to the AD sound track together with companions listening simultaneously to the regular sound track.

RTHK, as Hong Kong's public service broadcaster, bears the mission of providing Hong Kong people with professional and high-quality radio, television and new media services. Extending such services to the visually impaired community through the adoption of state-of-the-art technology allows RTHK to further its audience reach in Hong Kong and to facilitate the building of a more inclusive and caring society.

AD is especially valuable to certain drama programmes which

may occasionally contain scenes with action, but not dialogue. Providing AD for RTHK's TV programmes would benefit all visually impaired people in Hong Kong, who would be able to enjoy such programmes in the comfort of their own homes.

This initiative goes one step further as it will permit them to enjoy the programmes accompanied by their family members, who can listen to the regular sound track.

TECHNOLOGIES TO BE ADOPTED

The AD is recorded on a separate sound track and streamed in real time during the TV broadcast via the public internet through a content delivery network. Visually impaired people can access AD through a customised mobile application on their mobile phones. Synchronisation between the AD soundtrack and the regular soundtrack can be achieved in real time using the following technologies:

- (i) Achieving a consistent time delay for all households between the mobile phone reception of the AD soundtrack via internet streaming and the TV signal transmitted from the TV broadcast centre.

This is an important step for later synchronisation with the received sound

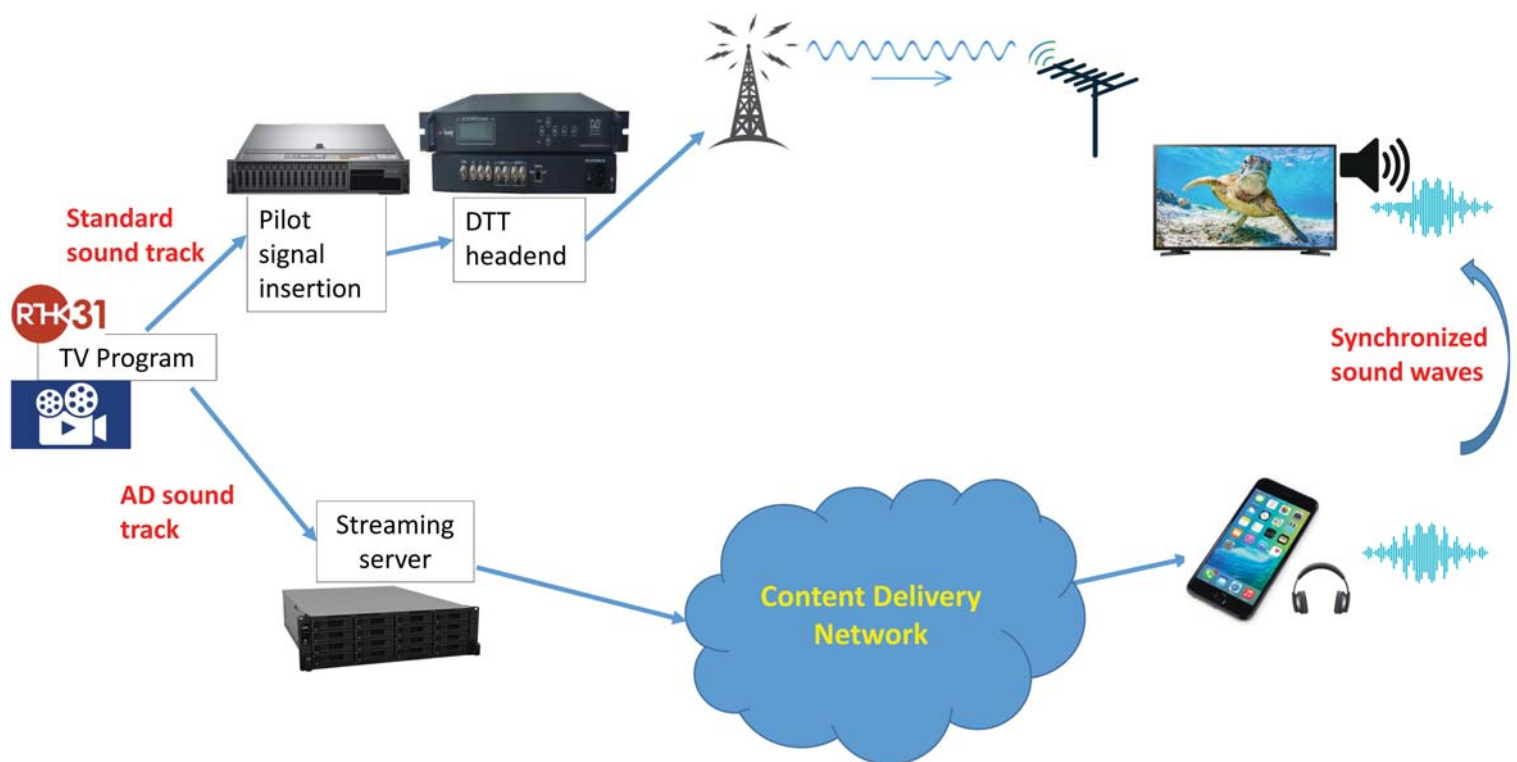


Fig.1 synchronization between the IP streamed AD sound track and the DTT off-air regular sound track

signal from the off-air DTT signal, whose arrival time at the TV set differs from household to household. This is due to variations in off-air transmission delay, dependent on the geographical location and the decoding time delay, which can vary according to the model of TV set or Set-top box.

(ii) **Achieving synchronisation between the streamed AD soundtrack and the off-air regular soundtrack**

This involves the embedding of a pilot signal, inaudible to the listener, within the regular audio soundtrack. The mobile application can “listen” to the pilot signal contained in the TV output sound, allowing it to align the AD soundtrack playing through the mobile application, with the regular

audio soundtrack transmitted via DTT. This enables the visually impaired people to listen to the AD soundtrack on their mobile phones, simultaneously with others who are listening to the regular sound from the TV set.

TECHNICAL CHALLENGES ENCOUNTERED

- Analysis of the timing difference between the two audio signals decoded from TV set and mobile device respectively must be extremely accurate.
- In a noisy environment, or when the sound level of the TV is too low, the pilot signal output from TV set may be difficult for the application to resolve.

- Diverse use of mobile devices with different operating systems, headsets and system clock settings adds to the complexity of consistent synchronisation.

IMPLEMENTATION PLAN

The project involves a combination of both direct purchase and customised development. As the application of the above technology to AD for TV programme is entirely new to the industry, the market research and subsequent tendering exercise involved sophisticated processes, including comprehensive discussions with potential suppliers, demonstrations and proof of concept sessions and evaluation of technical proposals, as well as consideration of total cost of ownership of different solutions from various suppliers.

During the development phase, special focus has been placed on the technical trials and user trials for the prototype product, in order to ensure the developed solution fully fulfills the needs of our target user groups. In fact, there has been a number of modifications and some fine tuning of the solution, based on user feedback.

The project has now entered into the final user trial stage and the service is expected to be launched in early 2021. ■

Author:



C W Leung,
Head of Engineering,
Radio Television Hong Kong (RTHK)

CW Leung is currently the Head of Engineering of Radio Television Hong Kong assuming the responsibility for the engineering development, operation and maintenance of TV, Radio and News broadcasting systems. CW Leung has been working in the Information and Communication Technology industry for over 30 years, specializing in broadcasting, telecommunication and data centre infrastructure. CW Leung is a professional engineer qualified as a Chartered Engineer, a member of the Institution of Engineering and Technology and a member of the Hong Kong Institution of Engineers. He is also a qualified Project Management Professional (PMP) of Project Management Institute and a Certified Information Systems Security Professional (CISSP) of the International Information System Security Certification Consortium.



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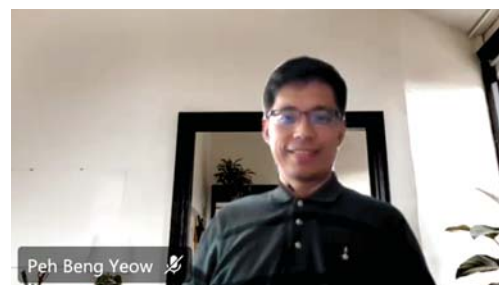
Technical Bureau Annual Meeting

The 2020 Annual ABU Technical Bureau Meeting was held online on 23 November.

Among the topics discussed were the current issues and challenges faced by members amid the COVID-19 pandemic and in what ways the ABU can help.

The Bureau proposed adding a Force Majeure Clause to the Rules of Procedure of the ABU Standing Technical Committee considering the COVID-19 pandemic. It also proposed a recommendation supporting the WBU Cybersecurity Recommendations on Broadcasters' Use of Cloud-based Services.

The meeting was chaired by the Technical Committee Chairman, Mr Hamid D Nayeri of IRIB-Iran. ■





Technical Bureau members given 1-year extension

The Technical Committee agreed that all Technical Bureau members including the Chairman and Vice-Chairmen be given a one-year extension to their current terms. Technical Bureau elections were postponed until next year.

The decision came after the COVID-19 pandemic forced the ABU to hold all its annual meetings online.

The Technical Committee agreed to the move at its annual meeting, which was held online on 24-25 November.

Since this procedure was outside the current Rules of Procedures of the Technical Committee, it was approved by the Technical Bureau on 23 November.

The move came after the ABU Administrative Council postponed its own elections to next year and gave a one-year extension to the term of its current members including the President and Vice Presidents.

All other ABU committees and governing bodies agreed to follow suit. ■

ABU TECHNICAL BUREAU 2018/2021



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ABU Technical Committee Meeting 2020

The ABU Technical Committee Meeting was held as a virtual event from 24-25 November 2020.



OPENING SESSION

The Chairman of the Technical Committee, **Mr Hamid Dehghan Nayeri**, welcomed the delegates and thanked all for joining the first ever virtual meeting. He emphasized that the COVID-19 pandemic had changed the world that the way of working, the way of doing business, the way of communicating, and the way of living lives has been affected. He was happy to note that ABU members have taken the necessary actions and swiftly put together new SOPs to accommodate the new requirements and continue serving the public as before.

He said working remotely had become the new norm for all that new and advanced digital technologies allow such possibilities. What had been seen in the past couple of months is the use of available technologies and implementation of new solutions to allow all to work remotely and stay connected to media facilities in order to deliver broadcasting services.

He noted the fact that the broadcasting industry was now, more than ever, faced with a number of challenges, in terms of keeping its audiences engaged and informed. Media consumption was becoming more and more personal and the use of digital technologies to analyse the preference of audiences was key to gaining an edge over the competition. He opined that broadcasters need to be agile and adopt a more media centric approach taking advantage of the convergence of technologies and digital innovations in media

delivery, intelligence and business operations.

He also briefly highlighted the virtual session of the annual technical bureau meeting held the day before. All bureau members reported the challenges that they were facing and the kind of solutions they had adopted to mitigate the difficulties. He was happy to note that sharing such information helps members to learn from each other in implementing simple but effective measures to overcome otherwise difficult problems.

The bureau had undertaken a comprehensive review of its activities and discussed two key proposals.

Although the time for the meeting was short compared to normal practices in the past years, Mr Nayeri observed that members had been able to accommodate some wonderful and interesting topics. Concluding his brief welcome speech, he invited the ABU Secretary-General Dr Javad Mottaghi to present his opening address.



ABU Secretary-General **Dr Javad Mottaghi** welcomed everyone to the special online session of the Technical Committee. He observed that more than 500 colleagues registered for the annual meetings. He shared that, although COVID-19 is an invisible enemy that has affected the whole world, it had not changed the responsibility of media, and had somewhat amplified the important role of broadcasters. More and more people had turned to public service media to help them get through these tough times. He emphasised that the role of

informing and educating had been key in creating a safe environment for people to get on with their lives.

Recognizing that leading broadcasters developed their own protocols to overcome the difficulties he informed the delegates about the ABU initiatives such as solidarity campaign for COVID-19, COVID-19 specific content exchange and sharing platform using the Asia-Pacific View service. Also the audience was informed that the ABU had launched the ABU Media Academy and expanded its music exchange networks offering copyright free contents.

Dr Javad Mottaghi raised a public concern that social media platforms have become the target for spreading baseless news, with deep and shallow fakes, carrying false information, being created and distributed. Broadcasters need to be alert and make use of advanced technologies and solutions to identify these sources and inform the public for their safety. He observed that the Technical Committee and the Technical Bureau had a very sound structure in place to effectively support the requirements of the ABU membership. Finally, he expressed his wish for productive discussions and deliberations during the two days and lauded technical department for excellent job in adopting the virtual environment and new way of working at the ABU HQ.

ABU Technology Activity Report



Director ABU Technology & Innovation, **Mr Ahmed Nadeem** briefed the meeting on the activities organised by ABU Technology for the benefit of members. He highlighted different capacity building activities organised since the TC2019 in Tokyo. Three physical activities conducted as per the calendar had been:

Regional Workshop on Engineering Fundamentals for Broadcasters, 6-10 January, A20 Global Shortwave Coordination Conference, 24-28 February, and the DBS2020 held on 2-5 March. All these events were held in Kuala Lumpur.

With the start of the lockdown in Kuala Lumpur, due to the COVID-19 pandemic, the secretariat had turned to online events and organised 48 webinar-sessions covering 14 themes. An average of 125 participants had attended these webinar sessions. Besides these was the annual webinar series that included 32 sessions.

He further added that ABU TD had provided direct assistance to members as a part of the advisory service. In the international arena, ABU had attended partner events, such as the ASBU General Assembly in Khartoum and BES2020 Expo in New Delhi. The WBU-TC Conference was an online event and

the ABU had actively contributed to it. Regarding publications, the ABU Technical Review magazine had been revamped and the last printed issue was Q4-2019. Since the Q1-2020 issue, e-versions of the TR have been published and are available on the ABU website for online viewing and download.

Other major activities at the secretariat included the migration of its email system to the Office 365 platform and the trial launch of the Asia-Pacific View (APV), with its final launch targeted for mid-2021. Mr Nadeem concluded his yearly activity report by thanking his TD and IT team members.

BUREAU PROPOSALS

Mr Nadeem briefed the TC meeting on two proposals;

DECISION 1/2020 | Adding a Force Majeure Clause to the Rules of Procedure of the ABU Standing Technical Committee

Considering the current COVID-19 global pandemic the ABU's Administrative Council had taken the extraordinary decision to postpone the election of its members and extend the terms of all its elected members by one additional year, the ABU Technical Committee decides to amend the current Rules of Procedures governing the Technical Committee with a Force Majeure clause under Article 13 as a supplement to accommodate the decision to extend the term of the office-bearers by one year.

RECOMMENDATION 1/2020 | Supporting the WBU Cybersecurity Recommendations on Broadcasters' Use of Cloud-based Services

The World Broadcasting Union's Technical Committee had earlier published two recommendations; namely WBU Core Cyber Security Controls, and Media Vendors' System, Software and Services, to educate and guide broadcasters concerned with cybersecurity measures. Then,

noting that the World Broadcasting Union, with support from its member broadcasting unions, had now developed a third set of recommendations as a guide for broadcasters' use of cloud-based services, the ABU Technical Committee recommended that the ABU members should move ahead to implement the proposed recommendations and be better prepared for potential attacks and threats.

This document provides a comprehensive set of guidelines that can be considered by broadcasters and media organisations to enhance their security profile, specifically when working with Cloud-based services.

The meeting adopted both the Decision and the Recommendation.

INVITED PRESENTATIONS | SESSION 1



Mr Akira Negishi of NHK-Japan presented the session 'Measures for 5G Interference to C-band Satellite.' Briefing the members about the NHK-WORLD channels, he informed that three C-band satellites are used as backbone satellites and two as C-band regional satellites for their global distribution. Intelsat series satellites were the backbone and Asiasat & Galaxy the regional satellites using 3,700MHz to 4,200MHz frequency for downlink. As the band allocated globally for 5G telecom services is up to 3,800MHz and higher in some countries, broadcasting frequencies in C-Band are exposed to severe interference from 5G signals. NHK had taken some immediate measures to avoid such interference such as by receiving a stable signal from safe-zone teleport, migrating to higher frequency transponders, and migrating to terrestrial IP networks, case by case. Some 5G vendors in Japan agreed to provide stable downlink signals to NHK from its safe-zone teleports that are away from 5G coverage areas. In another case, NHK migrated its transponder from 3841MHz to a higher frequency of 4124MHz, allowing sufficient separation from the adjacent 4100MHz 5G band. To provide interference-free signals to some affiliates' premises that previously downlinked from satellites, all the signal payload had been migrated to terrestrial IP networks. These broadcasters would be connected via CDN through appropriate ISP's last mile connection, offering both reliable and cost-effective solution as possible.

The speaker wrapped up his presentation by inviting ABU members to collaborate and reconsider 'ABU Recommendation 1/2018, 'Supporting the WBC

C-band Position' that urges members to take necessary steps to safeguard the C-band spectrum for broadcasting.



Mr Shuang Li of China Broadcasting Network spoke on 'New Broadcasting Based on 5G NR Technology.' CBN operates a nationwide cable TV network as well as 5G network in the 700MHz band, providing cable TV, mobile, fixed broadband, satellite communication services. Broadcasting operators in China have been adopting the Digital Terrestrial Multimedia Broadcast (DTMB) system after digital switchover started back in the early 2010s. A recent survey has shown that technology innovation is essential for fulfilling emerging video demand, as users have formed mobile, interactive, and fragmented video viewing habits, using mobile phones, tablets, wearables and other smart devices to watch videos. So, the broadcasting industry needs to accelerate technological innovation and offer emerging services that serve better signal/device/content coverage, with space for advancement of technology. Two prospective techniques enabling new broadcast services are; first, HTTP-based live streaming, that is emerging to take over traditional broadcast. It is adaptable to multi-screen and all devices, anytime, anywhere. Second, 5G NR multicast/broadcast services (MBS) will evolve into a universal flexible broadcast technique, serving all screens. 5G New Radio (NR) broadcasting can flexibly achieve dynamic and seamless switching between unicast services and broadcast/multicast services and may enable a SIM-less receiving mode to offer better public services. 5G broadcasting also offers potential for new services, like traditional linear TV broadcasting, new interactive video

broadcasting and converged multimedia information broadcasting. New application scenarios via 5G broadcast could be realized in areas like various public services, multimedia live streaming to crowded places/events, massive IoT, V2X etc. A trial with industrial partners is ongoing in China to verify key features such as unicast/multicast/broadcast switching flexibility, non-SIM card reception function in FTA mode, and frequency optimization arrangement. The 5G broadcast network may use mobile cellular base stations and radio & television transmission towers. Mr Li also briefed on the progress of the 3GPP 5G MBS standardization process and CBN's contribution to the process.



Dr Peter Siebert of IEEE BTS delivered a presentation entitled 'Video coding - Latest Developments and Future Codecs.' New video codecs driving the industry, range from MPEG-2 in 1993 to the latest VVC solution standardized by ISO MPEG/ITU. In addition, there are various other codecs from MPEG, AOM and AVS-China. These various codecs have their own performance parameters, and other criteria such as licensing cost, availability of products, hardware codec resources etc. would add to selection features. While MPEG-2 was used for SD Video, AVC/H.264 was designed for HD, HEVC for UHD content and now VVC is expected for the latest UHD-2 and future content. In addition to these mainstream codecs are other industry versions such as VP9 and AV1 from Google, EVC and LC-EVC codecs, and AVS1-3 codec from China. According to a report, the most popular solution today for broadcasting and streaming is H.264/AVC followed by MPEG2 or HEVC, but is expected to be dominated by HEVC in a year or so. The next generation video codecs used for immersive applications are mainly the versatile video coding (VVC)/H.266 jointly developed by the ITU and ISO MPEG, EVC developed by MPEG, AV1 by alliance for open media (AOM) and AVS3 developed by the Chinese standards organisation. A report published in the ITU compares these codecs in terms of bitrate savings at 4K resolution in comparison with HEVC and the savings are, VVC (41.2%), AV1 (19.8%), EVC (27.9%). For similar resolution, another report shows AVS3 to have savings up to 28.2%.

INVITED PRESENTATIONS | SESSION 2



Mr Haeng Un Jung of KBS-Korea delivered a presentation on 'Technical issues of UHD Broadcasting Service in Korea.' Through a video recording presentation, he gave an overview of the UHD broadcasting expansion plan, and issues and challenges facing broadcasters in Korea in Digital TV redeployment. While 470-698MHz was allocated for normal Digital Television (DTV) service, the band plan for UHD was in 700MHz alongside other services like LTE and mobile broadband uses. The ATSC system was used by all four major broadcasters KBS, MBC, SBS and EBS. The digital TV network on ATSC 1.0 used multiple frequency while ATSC 3.0 UHDTV service deploys single frequency networks. The digital channel deployment was conducted in three phases: Firstly, in Seoul on May 2017 and secondly in five major metropolitan cities including for the Pyeongchang Winter Olympic in December 2017. Phase 3 expansion is ongoing nationwide in other cities and provinces, but in a frequency band allocated for DTV.

It is expected that the digital switchover for UHD will be completed by 2027. At the UHD Master Control Room in KBS headquarter, the digital signals are encoded using HEVC Encoders and various programme channels are mixed onto the ATSC 3.0 IP Multiplexer. Then, the multiplexed signal is transported to the transmission site using fibre links for relaying the RF signal into the households. The issues faced were mainly limited spectrum at 700MHz and unavailability of sufficient budget for these broadcasters to redeploy distribution and transmission networks. Limited spectrum led to development of digital on channel repeater (DOCR) receiving RF transmission on the same channel. Ministry of Science & ICT and Korean Communication agency (KCA) managed the implementation part of the redeployment project to use the frequency of the DTV service for the UHD broadcasting stations.

The enhancement of DTV service from ATSC1.0 to ATSC3.0 offered several benefits in terms of picture quality, reception performance, spectrum efficiency, network performance, and ancillary services. It also

opened doors for IP-based converged platform and mobile services. While the 4K terrestrial service could be received via fixed receivers using indoor antennas, the UHD mobile signal could be tapped in by a USB dongle-based external receiver. Plans are underway for availing ATSC 3.0 chipset embedded smartphones in the market and for provision of UHD subway mobile services to watch both FM/DMB and UHD channels. KBS uses TIVIVA for IBB service with provision for remote control and second screen viewing. The service caters for a 24-hour news channel, disaster programming like COVID-19 and Journaline pages.



Ms Emily Dubs of the DVB Project delivered a presentation entitled 'Tackling the next big move'. She gave an overview of different DVB standards representing the media delivery landscape to lead the industry on unifying and bridging technologies. A new umbrella standard DVB-I attempts to bring about seamless hybrid experience towards an IP-centric future. It bridges all foundations, be it terrestrial or satellite, by offering commonalities on the service layer, unified user interface, network scalability & reliability and optimised low latency streaming. The DVB-I reference implementation was published in November 2020 and is being updated to accommodate services on top of 5G release-16 technologies with the DVB-I media layer. So is the rise of DVB-MABR and DVB-DASH for dynamic and adaptive media streaming. Earlier, DVB-TA was released as targeted advertising-signalling for dynamic substitution of Ad contents in linear broadcast.



Ms Ruxandra Obreja of the DRM Consortium provided an update on the take up of digital radio technology by different countries. India, with a recent decision on pure DRM transmissions and with a large base of automotive receivers, led the case. Indonesia is catching up as well, after latest DRM Transmitter installations in the FM band. Pakistan has charted plans for digitalization in the AM/FM band with budget allocation and training of the technical personnel in PBC. Russia is slowly taking up DRM with a few transmissions in AM and demo trial with FM transmission. China is working on its population coverage with DRM shortwave signals and South Africa with DRM/DAB+ standard policy and licensing framework in place. There has been a DRM trial ready and a few tenders being floated for AM and FM transmitters in Brazil. Other countries are showing interest in its take up; Vietnam, Thailand and Iran to name a few in Asia. Ms Obreja updated on the recent ETSI publications and DRM Handbook available for the benefit of broadcasters in the region and touched upon the regular webinars organised with the support of the ABU, the ASBU etc.



Ms Bernie O'Neill presented the WorldDAB Global Update. She informed the audience on the setup of the Asia-Pacific Technical Group to assist the broadcast industry across the APAC region for implementing DAB+. Australia and few countries in Europe have already established DAB+ infrastructure and a few are on the move towards its implementation, including UAE, Qatar, Jordan, Tunisia and Kuwait in the ME region. Malaysia, Thailand, Indonesia and Vietnam have conducted trials in this region with Myanmar and Laos showing interest. Norway switched off FM in 2017 and Switzerland is planning for ASO in 2022-23. Australia has a wide distribution of cars with built-in receivers across 52 vehicle brands. Over 93 million DAB receivers, consumer and automotive models, have already been sold in the market. WorldDAB is focusing on virtual events such as Automotive 2020, technical webinar series, available across many continents.

KEYNOTE PRESENTATION

Mr Sunil, Additional Director General (Engineering) & Head International Relations Prasar Bharati (DD-India) and ABU Technical Committee Vice-Chairman, delivered the Keynote Presentation entitled, 'Direct to Mobile Broadcasting.'

He began with an overview of the future of broadcast technology and the key transformations in Prasar Bharati, where broadcast technology is focused towards having an enhanced audio/video experience for bigger screens and internal savings through mobile portable devices. He said that Prasar Bharati's key transformations are Next Gen Broadcast – Direct to Mobile (DTM) and Next Gen TV with IBB Convergence.

In regard to DTM, Mr Sunil said that 5G technology has accentuated the convergence of broadcasting and mobile broadband technologies, hence broadcasters need to become more responsive towards changes in the consumer's viewing habits to give them a more engaging, interactive and tailored broadcast experience. He noted the challenges faced by broadcasters regarding the lack of collaboration and support from the mobile industry; notwithstanding this, he expressed the view that the focus should be more on how technology is

designed and used, in order to provide the best content to engage the audience.

Mr Sunil reported an exponential rise in per capita video consumption, which will lead to congestion and 'network clogging', therefore 5G broadcast is the next solution to help un-choke video traffic in the mobile networks. He quoted, "*Prasar Bharati shall implement Next Gen broadcasting infrastructure, addressing DTM and develop India's specific standards for DTM in line with emerging global standards and technologies*".

Concerning Next Gen TV IBB convergence, Mr Sunil was of the view that the convergence could offer ample business opportunities for broadcasters in terms of datacasting and mobility. He shared his views about its potential and how the convergence works.

Summing up, Mr Sunil declared that convergence is fundamental to ensure a smooth flow between different delivery platforms, and that it is important for all platforms to offer addressability, mobility, interactivity, good bandwidth, cheap delivery and connectivity to the Internet, to ensure they can withstand any broadcasting challenges in the future.

Exponential rise in per capita Video consumption

Video traffic is fastest growing traffic in mobile network and bandwidth requirement is huge.

Globally, in another 2 years say by 2022, the

Internet video traffic will be 82% of all consumer Internet traffic,

with 1.1 million minutes of video streamed or downloaded every second,

Live Internet video traffic will increase 15-fold between 2020 and 2022.

In India,

Video traffic will be 77% of the Indian mobile data traffic by 2022, compared to 60% at the end of 2020.





ABU VIRTUAL EVENTS
24 – 25 November 2020

Big Data, Personalization and Artificial Intelligence(P/BDAl)



MODEL SELECTION

Design Your Own Neural Network
OR
Choose an Existing Model That Fits Your Project

Some Models:

- ☐ Perceptron(P)
- ☐ Feed Forward(FF)
- ☐ Radial Basis Network(RDN)
- ☐ Long/Short Term Memory(LSTM)
- ☐ Autoencoder(AE)
- ☐ Convolutional Neural Network(CNN)
- ☐ Recurrent Neural Network(RNN)
- ☐ Markow Chain(MC)

DATASET SELECTION

Prepare Your Own Dataset
OR
Choose an Existing Dataset That Fits Your Project

Some Datasets:

- ☐ MNIST
- ☐ IMAGENET
- ☐ Google Audioset
- ☐ MS COCO
- ☐ Voxceleb
- ☐ Sentiment140
- ☐ COIL 100
- ☐ LSUN

FRAMEWORK: Tensorflow/Keras, Pytorch, Theano, Caffe, Chainer, Microsf CNTK, Apache MXNet, DLAI

NEURAL NETWORK PREPERATION

TOPIC AREA CHAIRMAN'S REPORTS

Mr Kazim Pektaz, Chief Engineer, Studio Planning Department, TRT-Turkey and Production Topic Area Chairman, reported that there were five study groups, however only two contributions were received, from Big Data Personalisation and Artificial Intelligence. He provided an update on the latest development of UHD and shared that the EBU had published a new technical document on Colour Bars for Use in the Production of Hybrid-Log Gamma (HDR) UHDTV. He then provided an update on AI networks in which he reiterated the importance of learning the tools and opportunities of AI, which touches every business aspect across all industries, including the daily operations of broadcasters. In closing, he highlighted ITU's publication on AI Systems for Programme Production and Exchange as a reference document.

Mr Kenichi Murayama, Senior Manager, Planning & Management Division, Engineering Administration Department, NHK-Japan, and Transmission Topic Area Chairman, reported on three ongoing projects. On Frequency Planning for Digital Broadcasting, a revised version of the 'Use of Monte Carlo Simulation to Model Interference to DTTB' had been recently published. In regard to the latest analogue

television service situation, he said that Hong Kong would switch off its services on 30 November 2020, to help relieve traffic congestion on indoor mobile hotspots. On frequency policies, he provided an update on the 5G spectrum auction results for The Netherlands, Austria, and Luxembourg.

Concerning Next Generation Terrestrial Broadcasting, Mr Murayama provided an update on the results of the 8K-UHDTV and 4K-UHDTV field experiments with advanced system in urban areas, for Japan and Korea respectively. He also gave an update on China's report on the convergence of broadcasting and communication.

Regarding Integrated Broadcast-Broadband and OTT, Mr Murayama reported on the standardisation of Japan's Integrated Broadcast-Broadband System, studies in ITU-R and ITU-T and cyber security of IoT devices, plus an update on China's content protection.

On Satellite Broadcasting, Mr Murayama delivered an update on ITU-R documents related to satellite broadcasting systems, such as radio regulations, recommendations and reports.



57TH ABU GENERAL ASSEMBLY & ASSOCIATED MEETINGS
VIRTUAL MEETINGS ON CLOUD: COOPERATION AND INNOVATION FOR ANALOGUE AND DIGITAL
ABU VIRTUAL EVENTS: 16 November – 17 December 2020

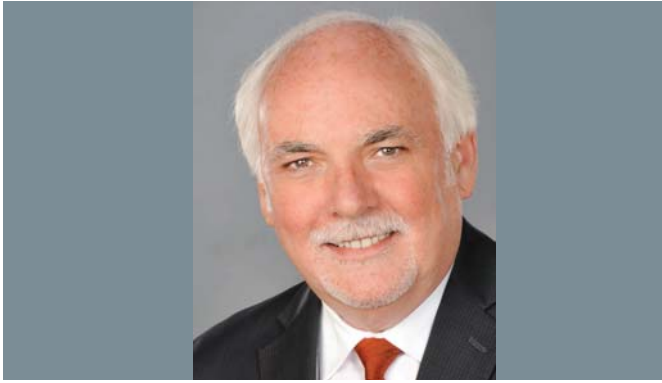
Transmission Topic Chairman's Report

25 November 2020

Topic Chairman: Kenichi MURAYAMA (NHK)
Period of Report: November 2019 to November 2020
Date of Report: 23 November 2020







Mr John Lee, Chairman, WBU Technical Committee, started his presentation with an overview of current cyber threats to the media, and shared some cybersecurity recommendations from NABA and EBU. He noted that the first WBU cybersecurity recommendation was the publication of WBU Cyber Security Recommendations for Media Vendors' Systems, Software and Services, released in January 2018. Thirty-four recommendations were made to industry, addressing communications, authentication, controls, documentation, encryption and network configuration. The second recommendation, Core Cybersecurity Controls or Basic Cyber Hygiene, was approved in October 2018, and offered to prevent up to 70% of cyber-attacks. The third recommendation on Cloud Security, was approved in 2020.

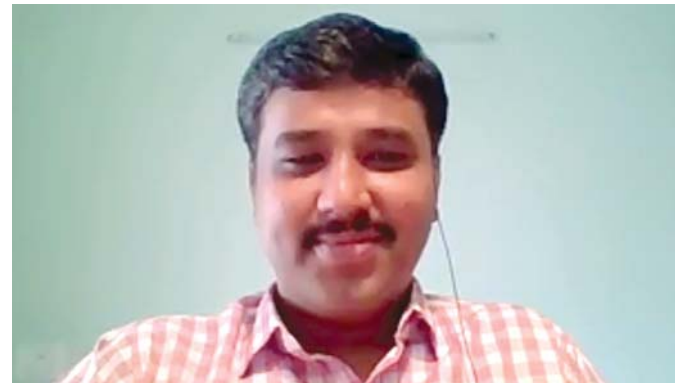
Mr Lee added that cloud security was a shared responsibility between broadcasters and cloud service providers and that there should be continuous training for employees on cloud security, including the conducting of audits for the purpose of mitigating vulnerabilities and security gaps. He continued by providing a brief update on cyber threats to the media/broadcasting industries and noted that "broadcasters are rapidly adopting IP technologies... but that may broaden the threat surface for cyber-attacks." He highlighted that the WBU cybersecurity recommendations were issued to ensure awareness, to make broadcasters less vulnerable to potential cyber-attacks.

Mr Wang Lei, Vice Director of Information & Security Technology Institute, Academy of Broadcasting Science, NRTA, China gave an update on China's standardisation and implementation practices of its video and audio content protection technologies. He said that in terms of content protection, the industry requires content that has a higher level of security, is fit for evolution,

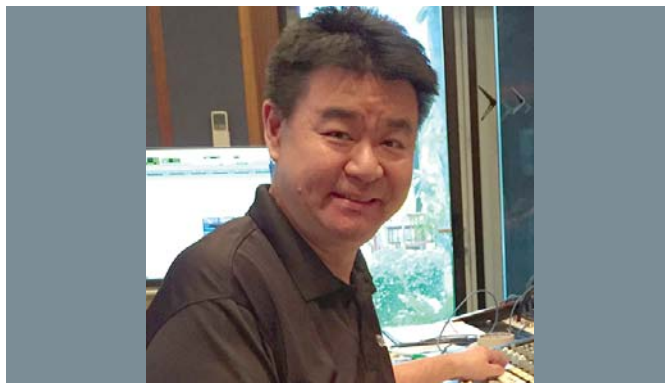
has interoperability, is easily implemented and inexpensive. He said that *"content protection should be the standardised infrastructure of video/audio content eco-system"*.



He shared the digital rights management standards for video/audio content distribution, and gave an update on China's content protection technologies. He concluded by observing that there are 98 domestic and international companies involved in China's DRM implementation support mechanism.



Mr V Ramarathinam, Regional Manager, Benchmark Broadcast Systems, provided an update on DANTE, saying that it is "a combination of software, hardware, and network protocols that deliver uncompressed, multi-channel, low-latency digital audio over a standard Ethernet network". He said that with DANTE, there will be less cabling, multiple audio channels transported over standard devices and cable, flexible audio routing, user-friendly maintenance, better source sharing, savings in cost. Also, it supports redundancy links. He shared the Dante Audio implementation in a broadcast workflow and outlined the design and network considerations. In reference to a question, he responded that DANTE offers a wide range of products and equipment for clients who wish to implement DANTE in their up-and-running studios.



Mr Geoffrey Low, Staff Content Engineer, Dolby, presented an update on Dolby Vision and Dolby Atmos, and outlined how they can contribute to a spectacular content experience and to the future. He explained that Dolby Atmos, produced in audio

format, sets out to bring an immersive experience to the audience, whether in the cinema, living room, or on mobile devices. The technologies ensure that the right sound is presented to the right speaker, and this will future proof content with an ability to render to any channel output. He said that Dolby Vision is the most advanced HDR solution, offering richer colour, greater contrast and sharper details, adding that some legacy content could also be revamped to VISION HDR. In regard to cost, it involves an average of USD2,500 and USD10,000 worth of equipment for Dolby Atmos and Dolby Vision respectively. He concluded by stating that *"Dolby is here to create, distribute and facilitate a spectacular experience with your content"*.

INVITED PRESENTATIONS | SESSION 4



Ms Yinan Wang, Senior Product Manager, Advertising Department, Mango TV, presented the interactive video content production model of Mango TV. Mango TV offers a pioneering, interactive video system, a versatile one-stop service, and fast production.

Ms Wang presented the system architecture and interactive video workflow, which consists of script writing, media resource uploading, interactive editing and interactive broadcasting. She shared details of some of Mango TV's interactive video projects, broadcast in 2020.

In the 5G era, Mango TV is upgrading its services and smart devices and will offer hi-tech videos, smart AI, and create and produce cloud-based and remote content.



Mr Lindsay Cornell, Principal Systems Architect, BBC Design + Engineering, BBC-UK, spoke on how the BBC had been affected by the COVID pandemic, and how it had made changes to radio production in order to adapt to the situation. During the pandemic, the BBC ensured that every employee's laptop was in working order and equipped with the Zoom application to ensure there were no work disruptions. There were fewer staff at the office and studios, however in terms of production, there was a massive disruption in the transmission of planned shows. Live shows continued, but they were simple productions with guests joining remotely. BBC comedy shows, which usually had studio audiences, were also affected. Despite facing various challenges in offering a virtual experience, the BBC has continued to strive towards meeting the expectations of its audience. Mr Cornell concluded by saying, *"We've been able at times to admit much smaller studio audiences, social distancing reduces capacity tenfold, but currently in lockdown two, remote audiences and different formats for comedy programmes are the way we have to work"*.



Mr Phan Tien Dung, Director, Vietnam Digital TV Station, VOV-Vietnam, then shared some insights on how VOV uses low-latency streaming technologies in remote production. He said, “At VOV, we created our own VTC solution that has ultra-low latency”. He added that due to the evolvement of technology, now remote production only requires a simple setup with lighter technology, less movement of materials and machinery, and fewer people involved in production, which also means fewer problems relating to human resource matters. Remote production is cloud-enabled, has ultra-low latency, is secure and reliable and can be used for direct transmission using live streams and players.

Ms Do Hong An, Deputy of IT Dept, VOV-Vietnam, gave the audience an update on VOV’s technical support and activities during COVID-19. She said, “We met a lot of challenges in radio production, like how to keep our audience updated on current news, how to keep them entertained, how to adapt to the ‘new normal’ operations, and how our technical team responds to any situation”. She

briefed on VOV’s plan, which focused on people and infrastructure. Employees were divided into respective groups and asked to work independently, equipped with the necessary technical equipment and technology. A 24/7 technical support line was also set up.



She said that the connection to the Radio Broadcast System had transformed VOV’s radio remote production, in which they were now able to connect to multiple sources immediately, and to allow their employees to create and update content more efficiently; at all times ensuring the audience received quality programmes.

CLOSING

In closing, the TC Chairman thanked all speakers for sharing a glimpse of what the future is offering for broadcasters. He concluded by stating that the decision and recommendation adopted by the ABU Technical Committee will be highlighted in his report to the ABU General Assembly. He then closed the meeting by expressing his appreciation to the ABU Technical Department, especially Mr Ahmed Nadeem, for organising not only the online TC meetings, but also the General Assembly and its associated meetings. ■

TC PHOTO GALLERY



NBC-PNG



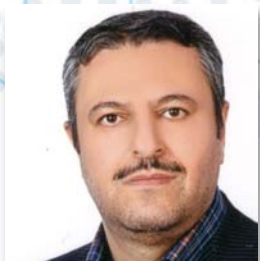
TRT-Turkey



VOV-Vietnam



VOV-Vietnam



IRIB-Iran



Phoenix TV-Hong Kong



VOV-Vietnam



VOV-Vietnam



IRIB-Iran



NRTA-China



BBS-Bhutan



ITU



EBU



TDM-Macau



B-SAT Japan



EAP-Sri Lanka



RNE-Nepal



NRTA-China



RRI-Indonesia



B-SAT Japan



RTA-Afghanistan



BTV-Bangladesh



VOV-Vietnam



MRTV-Myanmar



REPORT OF CHAIRMAN PRODUCTION TOPIC AREA

by **Kazim PEKTAS**, TRT-Turkey

A total of five projects are under the Production Topic Area, as below:

1. Radio & Television Archiving including Metadata for international programme exchange (P/RTA)

Project Manager:

Mr Satoshi FUJITSU (NHK, Japan)

Co-Project Managers:

Mr Wang Yin (Mediacorp, Singapore)

Mr Garry Kum (TVB, Hong Kong, China)

Mr Manoj Gupta (DD, India)

Mr R P Joshi (AIR, India)

Mr Zheng Ruidi (ABS/RTPRC, China)

2. Ultra High Definition TV (P/UHDTV)

Project Manager:

Mr Yoshiro Takiguchi (NHK, Japan)

Co-Project Managers:

Mr Byung Sun KIM (KBS, Korea)

Mr Halil Us (TRT, Turkey)

Mr Zhou Yun (ABS/RTPRC, China)

Mr Hu Xiao (ABS/RTPRC, China)

3. Systems for people with special needs (P/SN)

Project Manager:

Mr Shuichi Umeda (NHK, Japan)

4. IT -based Production System and file-based workflows (P/ITPS)

Project Manager:

Mr Okan Salman (TRT, Turkey)

Co-Project Managers:

Mr Daeyang Kim (KBS, Korea)

Mr Türkay Okan Salman (TRT, Turkey)

Mr Gökhan Tikit (TRT, Turkey)

Mr Nguyen Duc Tue (VTV, Vietnam)

Mr Tomofumi KOYAMA (NHK, Japan)

Mr P S Srivastava (DD, India)

Mr Pradeep Mehra (AIR, India)

Mr Alireza Abedin (IRIB, Iran)

5. Big Data, Personalisation and Artificial Intelligence (P/BDAl)

Project Manager:

Dr Byunghee Jung (KBS, Korea)

Co-Project Managers:

Dr Jun GOTO (NHK, Japan)

Dr Sansung KIM (KBS TRI, Korea)

Mr Li Xiao (ABS/RTPRC, China)

Mr Zhao Ming (ABS/RTPRC, China)

Mr Zheng Ruidi (ABS/RTPRC, China)

For this reporting period (March 2020 to November 2020) we have received two new contributions from the project, (P/BDAl). The following is the compilation of these two updates reports from the Project Manager of (P/BDAl) and some other information related to the Production Topic Area that may be helpful.

REPORTS FROM PROJECT MANAGERS IN TOPIC ON PRODUCTION:

1. Project P/UHDTV (Ultra High Definition TV)

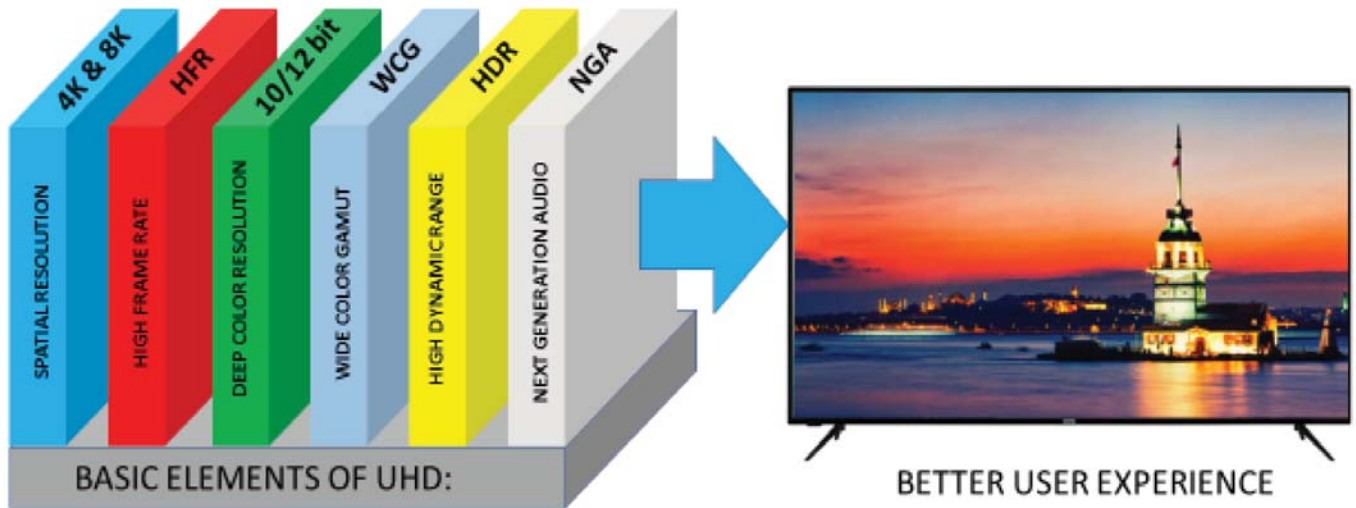
We have not received any reports from projects and we kindly have added some updates from EBU Reports that are related to P/UHDTV project.

As we know UHD ecosystem is based on six fundamental subjects to offer better viewing and listening experience for our audience.

- High Pixel Number
- High Frame Rate

- High Color Resolution
- Wide Color Gamut
- High Dynamic Range
- Next Generation Audio

EBU has published a new technical document that describes color bars for use in the production of hybrid log gamma.



TECH 3373 Version 1.0

Colour bars for use in the production of hybrid log gamma (HDR) UHDTV

This document defines a test pattern for use in creating UHDTV video signals. It contains tests for UHDTV, UHDTV to HDTV conversion, measuring luminance response, visualising saturation and hue shifts caused by monitoring equipment, checking correct installation of SMPTE ST 425-5:2019 (Quad 3G-SDI 2 sample Interleaving) equipment and near-black performance. It should NOT be used for setting the brightness control of a reference monitor.

Another document from EBU is about HDR with HDTV video systems. In most cases HDR is thought as a part of UHDTV but we know HDR productions can be done with HDTV formats also.

EBU Tech 3375 describes best practice guidelines for signalling and transport of HDR and wide color gamut (WCG) video over 3G SDI interfaces. The use of HDR is not tied to the 2160p/50 image format. HDR can also

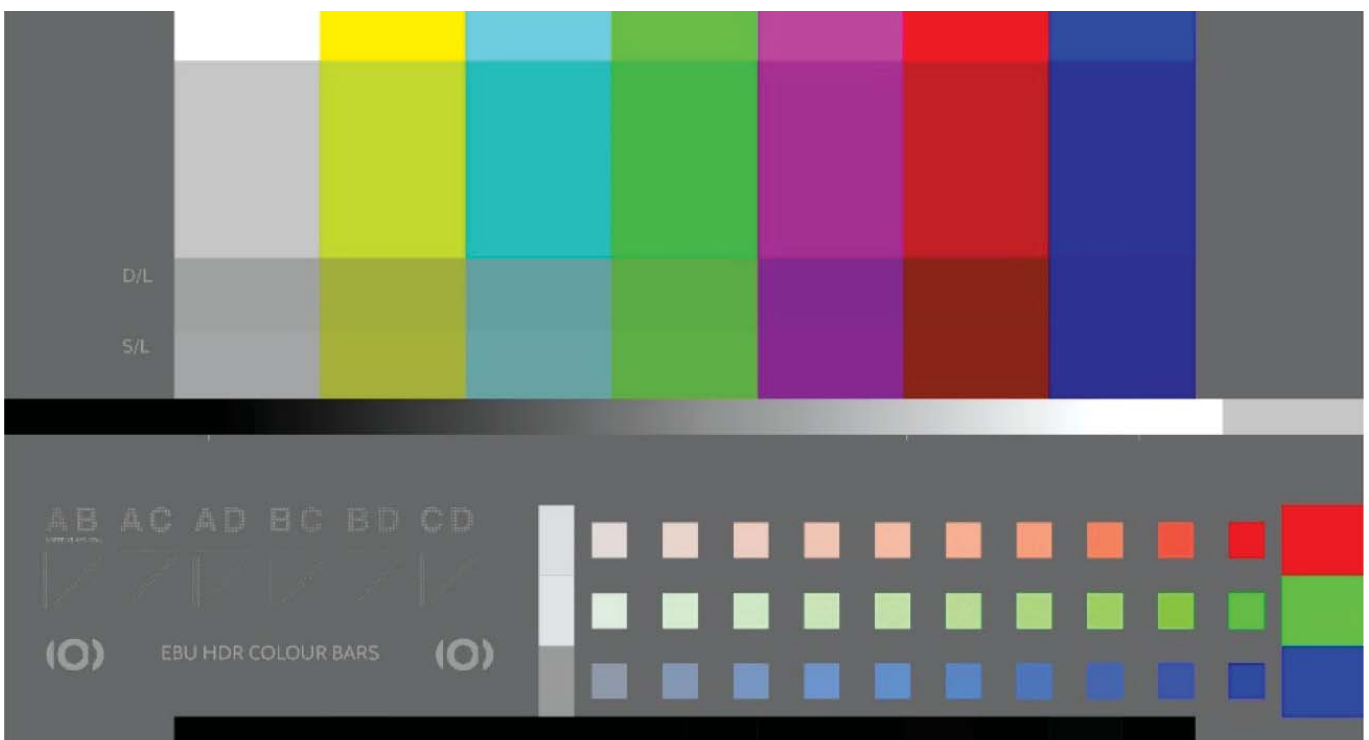
be used with 1080p/50 or 1080p/25 (Mainly used for documentary or film content).

- Signalling of HDR/WCG 1080p/50 using single link 3G-SDI
- Signalling of HDR/WCG 1080p/25 using single link HD-SDI
- 10-bit transparent infrastructures
- Additional signalling in the VANC, based on SMPTE ST 2108
- General recommendations for the transport of 1080p/50 HDR signals over 3G SDI

2. IT-based Production System and file-based workflows (P/ITPS)

All of us are familiar with EBU Technology Pyramid For Media Nodes. EBU has published revised version of **EBU Tech 3371**.

This document describes "Minimum user requirements to build and manage IP based media facility using open standards and specifications.

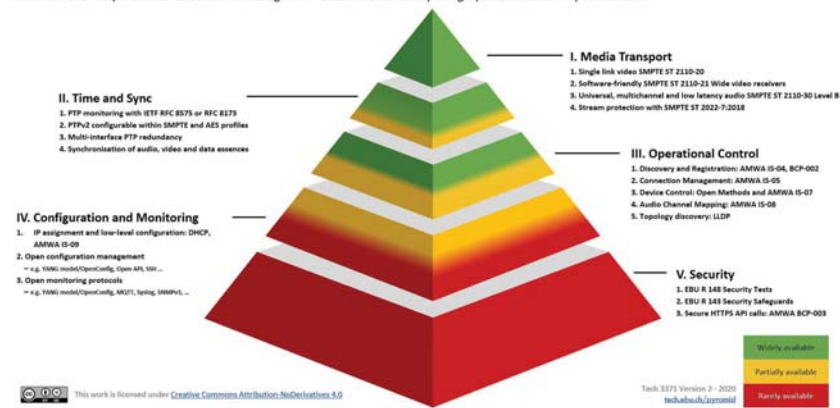


THE TECHNOLOGY PYRAMID FOR MEDIA NODES

Minimum User Requirements to Build and Manage an IP-Based Media Facility using Open Standards & Specifications.

MEDIA TRANSPORT

- Single link video: SMPTE ST 2110-20
- Software-friendly SMPTE ST 2110-21 Wide video Receivers
- Universal, multichannel, low latency audio: SMPTE ST 2110-30 Level B
- Stream protection with SMPTE ST 2022-7:2018



TIME AND SYNC

PTP Performance

PTPv2 configurable within SMPTE and AES profiles

Multi-interface PTP redundancy

Synchronisation of audio, video and data essences

CONFIGURATION AND MONITORING

IP assignment and low-level configuration: DHCP, AMWA IS-09

Open configuration management

Open monitoring protocols

OPERATIONAL CONTROL

III.1 Discovery and Registration: AMWA IS-04

Connection Management: AMWA IS-05

Device Control: Open Methods and AMWA IS-07

Audio Channel Mapping: AMWA IS-08

SECURITY

EBU R 148 Security Tests

EBU R 143 Security Safeguards

Secure HTTPS API calls

3. Project P/BDAl (Big Data, Personalization and Artificial Intelligence)

Project Manager:

Dr Byunghee Jung (KBS)

Co-Project Managers:

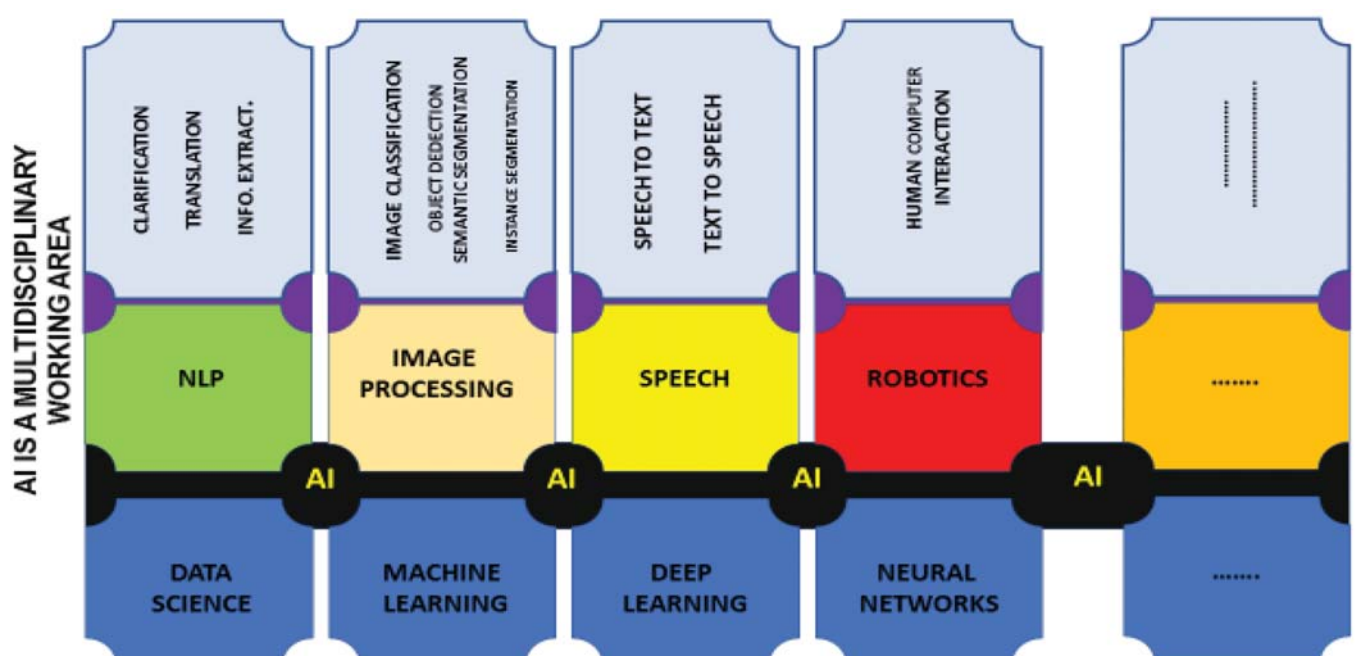
Dr Jun GOTO (NHK),

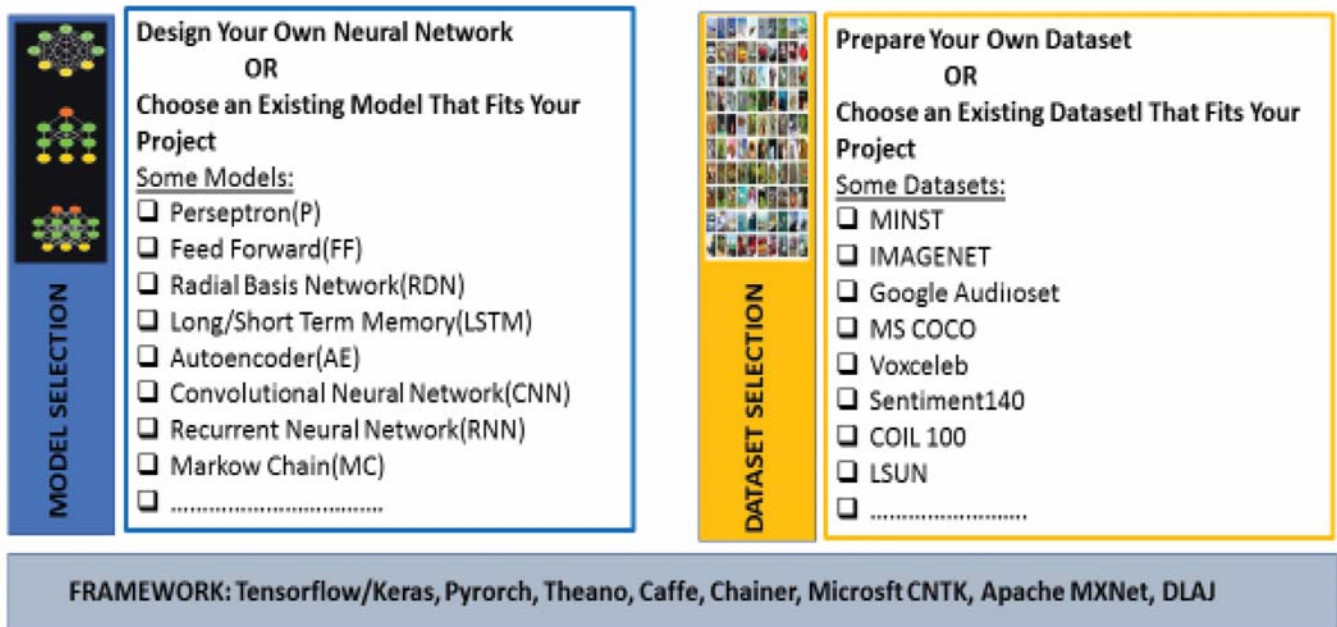
Mr Sansung KIM (KBS)

We see that artificial intelligence will touch every aspect of business in every industry. In broadcasting, AI is already

an integral part of day to day operation. When we want to build an AI based audio/video project we integrate AI science with NLP, speech, image processing and many other related fields. Data science, machine learning, deep learning, artificial neural networks are all subset of AI.

We have not written what we can do with AI, because if we know the tools, opportunities which AI offers/ provides, we can build what we dream. It just depends on our imaginations.





NEURAL NETWORK PREPERATION

We want to give a little bit about artificial neural networks(ANN). When we start a deep learning project with ANN we may create/design our own ANN model or we choose an existing model that fits our goal. Every model has its own processing approach.

For instance, if we want to make a image classification AI application, convolutional neural networks may be powerful. After model selection we need a dataset to train and test our ANN. We may create a dataset or choose from existing datasets. Here we have put some of the ANN models, datasets we can choose and available frameworks that we can work on.

We prepare our dataset, we ingest it to our model and we train the model with the data from the dataset that we choose and we use some part of dataset to test our model. If the test outs are satisfactory we can now use our ANN with real world data.

We have received two contributions, one is from NHK and the other from KBS.

NHK has been developing a commentary generation system using live sports data. They introduced the method of generating sports commentary in 2019 IEEE International Symposium on Broadband Multimedia Systems and Broadcasting.

Conference: 2019 IEEE International Symposium on Broadband Multimedia Systems and Broadcasting (BMSB)

Title: Generation of Automated Sports Commentary from Live Sports Data

Summary: They have developed a method of generating "automated sports commentary" that conveys an objective situation with synthesized speech based on live sports data. Their method can be applied to a wide variety of sports events by preparing "commentary templates" for each of

them. The results of a subjective assessment demonstrated that the automated sports commentary generated with our method is effective for helping listeners understand the game situation. In addition, a public live streaming with the automated commentary showed that our proposed method can provide practical service for live sports broadcasting.

KBS has been implementing a celebrity face recognition AI for video metadata generation. They introduced the process of implementation and performance enhancement in 2020 IBC Conference.

Conference: 2020 IBC (International Broadcasting Convention)

Title: Implementation of a Celebrity Face Recognition AI for Video Metadata Generation

Summary: Face recognition performance has shown significant improvement thanks to deep learning. They implemented a face recognition AI using our customized dataset composed of mostly Korean celebrity faces designed for the content analysis of KBS. Bothersome dataset labeling process was enhanced by using MTCNN face detection and face clustering. Inception-ResNet v1 model was used and test set accuracy was measured with respect to iterations. They compared the model with a commercial cloud-based celebrity recognition AI with which our celebrity database is thought to have about 26% in common. In the experiment, their model showed better performance in the precision.

Information:

<https://www.ibc.org/technical-papers/implementation-of-a-celebrity-face-recognition-ai-for-video-metadata-generation/6765.article> ■



REPORT OF CHAIRMAN TRANSMISSION TOPIC AREA

by **Kenichi MURAYAMA**, NHK

Introduction

Transmission topic area comprises five projects. The matters concerning digital terrestrial television broadcasting, digital satellite broadcasting, Digital Sound Broadcasting and these frequency planning are studied or investigated by these projects. This topic area also covers research on IBB and OTT, including platforms and standards, etc.

This document has been submitted for this Technical Committee Annual meeting.

1. Frequency Planning for Digital Broadcasting (T/FPDB)

Project Manager:

Mr Kazuhiro Kumamaru (NHK, Japan)

Co-project Managers:

Mr YUEN Man (TVB, Hong Kong, China)

Mr Rajeev Kumar (DDI, India)

2. Next Generation Terrestrial Broadcasting (T/NGTB)

Project Manager:

Mr Masahiro Okano (NHK, Japan)

Co-project Managers:

Mr LEE Jae Kwon (KBS, Korea),

Mr Chen Delin (ABS, China),

Mr Halil Us (TRT, Turkey),

Mr Özgür Cosar (TRT, Turkey),

Mr Zhang Yu (ABS, China),

Mr Xiao Jingting (ABS, China)

3. Integrated Broadcast-Broadband and OTT (T/IBBOTT)

Project Manager:

Dr Go OHTAKE (NHK, Japan)

Co-project Managers:

Mr A. K. Mangalgi (DDI, India)

Mr Kazuhiro KUMAMARU (NHK, Japan)

Mr Satoshi FUJITSU (NHK, Japan)

Mr Kinji MATSUMURA (NHK, Japan)

Zhang Dingjing (ABS, China)

Mr Zhang Yu (ABS, China)

Zhang Wei (ABS, China)

He Jing (ABS, China)

Mr Wang Lei (ABS, China)

4. Satellite Broadcasting (T/SB)

Project Manager:

Dr Masashi Kamei (NHK, Japan)

Co-project Manager:

TBD (TRT, Turkey)

5. Digital Sound Broadcasting System (T/DSBS)

Project Manager:

TBD

Co-project Manager:

TBD

Annex 1

Project: Frequency Planning for Digital Broadcasting (T/FPDB)

Project Manager:

Mr Kazuhiro KUMAMARU (NHK, Japan)

Co-project Managers:

Mr YUEN Man (TVB, Hong Kong, China)

Mr Rajeev Kumar (DDI, India)

1.1 ITU-R text related to DTTB coverage and frequency planning

1.1.1 Recommendations (<http://www.itu.int/rec/R-REC-BT/en>)

BT.1306 "Error correction, data framing, modulation and emission methods for digital terrestrial television broadcasting"

BT.1368 "Planning criteria, including protection ratios, for digital terrestrial television services in the VHF/UHF bands"

BT.1877 "Error-correction, data framing, modulation and emission methods for second generation

of digital terrestrial television broadcasting systems"

BT.1895 "Protection criteria for terrestrial broadcasting systems"

BT.2033 "Planning criteria, including protection ratios, for second generation of digital terrestrial television broadcasting systems in the VHF/UHF bands"

BT.2036 "Characteristics of a reference receiving system for frequency planning of digital terrestrial television systems"

1.1.2 Reports (<http://www.itu.int/pub/R-REP-BT/en>)

BT.2035 "Guidelines and techniques for the evaluation of digital terrestrial television broadcasting systems, including assessment of their coverage areas"

BT.2140 "Transition from analogue to digital terrestrial broadcasting"

BT.2209 "Calculation model for SFN reception and reference receiver characteristics of ISDB-T system"

BT.2265 "Guidelines for the assessment of interference into the broadcasting service"

BT.2294 "Construction technique of DTTB relay station network for ISDB-T"

BT.2295 "Digital terrestrial broadcasting systems"

BT.2302 "Spectrum requirements for terrestrial television broadcasting in the UHF frequency band in Region 1 and the Islamic Republic of Iran"

BT.2343 "Collection of field trials of UHDTV over DTT networks"

BT.2470 "Use of Monte Carlo simulation to model interference to DTTB"

1.1.3 Handbook (<https://www.itu.int/pub/R-HDB-63>)

"Handbook on Digital Terrestrial Television Broadcasting networks and systems implementation"

1.2. Latest ASO situations in the region

Hong Kong will switch off analogue television services (ASO) on November 30, 2020 (11.59pm). The spectrum currently being used for analogue TV broadcasting will be vacated to meet the increasing demand for high value-added mobile telecommunications services. A total of 160 MHz spectrum in the 600/700MHz bands will be assigned for indoor hotspots. This arrangement will help relieve congested traffic indoor mobile hotspots, such as MTR stations.

For those audiences that face financial difficulties to replace their aged analogue television set, the Government will subsidy eligible households to purchase a set-top box or basic model digital TV set through DTT Assistance Scheme. After ASO, Hong Kong will have

two SFN and one MFN for 10 terrestrial free television programme.

1.3 Latest topics over frequency policies in the world

1.3.1 5G spectrum auction results in Netherland

The Netherlands' Ministry of Economic Affairs & Climate Policy announced the completion of the country's 5G multi-band auction, allocating nationwide 700MHz, 1400MHz and 2100MHz spectrum under 20-year concessions to the three participants, incumbent mobile operators KPN, VodafoneZiggo, T-Mobile Netherlands, for respectively 416 million EUR, 416 million EUR and 400 million EUR.

Each operator won 2×10MHz in the 700MHz band and 2×20MHz in the 2100MHz band. In the 1400MHz band, KPN and VodafoneZiggo bought 1×15MHz each and T-Mobile acquired 1×10MHz.

Spectrum in the 700MHz and 1400MHz will become available immediately, the 2100MHz licences will be available from early 2021. Licences include coverage obligations of 98% geographic coverage of all domestic municipalities.

The 3.6 GHz auction is planned for 2022 as the band is currently used for satellite communications. Spectrum at 3400-3450 MHz and 3750-3800 MHz is intended to be made available for local use.

In late April, VodafoneZiggo announced the activation of its 5G network across more than half of the Netherlands. In partnership with Ericsson, the operator implemented 5G services via its existing antennas and Dynamic Spectrum Sharing (DSS) technology which allows operators to dynamically allocate some of their existing 4G LTE spectrum to 5G. Rival operators KPN and T-Mobile expect to launch its 5G network in the coming months.

Source: <https://5gobservatory.eu/netherlands-multi-band-5g-auction-raises-1-23-billion-eur/>

1.3.2 5G spectrum auction results in Austria

In September 2020, the Austrian regulator RTR finally completed the delayed multi-band 5G auction. RTR had to postpone the auction due to the Covid-19 outbreak. The second 5G auction in Austria awarded frequencies in the 700 MHz, 1,500 MHz and 2,100 MHz bands, raising 202 million EUR. In March 2019, 3.4-3.8GHz spectrum was auctioned to seven successful bidders generating 188 million EUR.

27 blocks were up for sale, including six blocks in the 700MHz band, twelve in the 2100MHz range and nine in the 1500MHz band.

T-Mobile Austria paid 87 million EUR for 2x20MHz of 700MHz spectrum, 20MHz in the 1500MHz band and 2x15MHz of 2100MHz spectrum. A1 Telekom will pay 66 million EUR for 30MHz of frequencies in the 1500MHz band and 2x25MHz in the 2100MHz range. The incumbent player did not get 700 MHz spectrum. Hutchison Drei won 2x10MHz of 700MHz spectrum, 30MHz in the 1500MHz band and 2x20MHz of 2100MHz frequencies for a total of 50 million EUR.

The government aims to deploy 5G on main traffic routes by the end of 2023 and to reach “virtually nationwide” 5G coverage by the end of 2025. 700 MHz licences will include coverage of 80% of 2,100 underserved communities with download speeds of 30 Mbps and 3 Mbps for upload by 2027, and 90% of federal and state roads should get at least 10 Mbps for downloads and 1 Mbps for uploads.

Source: <https://5gobservatory.eu/multi-band-700-1500-2100-mhz-auction-completed-in-austria/>

1.3.3 5G spectrum auction results in Luxembourg

In the first Luxembourg auction for spectrum assignment, four out of the five bidders have acquired 5G frequencies in the 700 MHz FDD and 3600 MHz TDD spectrum auction, paying a total of 41.3 million EUR (Players’ bids are not available).

The 15+5 year-licenses include strict geographical coverage obligations for 700 MHz spectrum (50% geographical coverage by year-end 2022 and 90% by year-end 2024).

In 3420-3750 MHz frequencies, players have to light up a minimum of 10 sites by year-end 2020, 20 by year-end 2021, 40 by year-end 2022 and 80 by year-end 2024.

Orange, Post and Proximus were each awarded one of the three available lots of 2x10 MHz in the 700 MHz band.

In the 3600 MHz band, Orange and Post each acquired 110MHz of frequencies, Proximus bought 100 MHz and Luxembourg Online 10MHz. Eltrona participated in the auction but failed to secure spectrum rights.

Assignment rules published earlier in March 2020 included spectrum caps of 2x10 MHz in 700 MHz frequencies and of 130 MHz in 3.4-3.8 GHz frequencies.

Source: <https://5gobservatory.eu/41-million-eur-raised-in-5g-multi-band-auction/>

Annex 2

Project: Next Generation Terrestrial Broadcasting (T/NGTB)

Project Manager:

Mr Masahiro Okano (NHK, Japan)

Co-project Managers:

Mr LEE Jae Kwon (KBS, Korea)

Mr Chen Delin (SARFT, China)

Mr Halil US (TRT, Turkey)

Mr Özgür Cosar (TRT, Turkey)

Mr M S Duhan (DDI, India)

2.1 Investigate efforts toward the realization of next-generation terrestrial broadcasting in Japan

2.1.1 Introduction

Next-generation digital terrestrial television broadcasting will be dominated by UHDTV applications. UHDTV broadcasts consist of a huge amount of data and therefore require large-capacity transmission paths.

Japan is conducting research on large-capacity transmission technology for next-generation digital terrestrial broadcasting systems that will provide large-volume content services such as 8K. In order to transmit the 8K signal, which has a resolution 16 times greater than HDTV, it will be essential to utilize new technologies that expand transmission capacity, such as higher order modulation (4096-QAM), orthogonal frequency-division multiplexing (OFDM), and dual-polarized multiple-input multiple-output (MIMO).

This experiment establishes parameters for maximizing transmission capacity. However, in actual implementation, these parameters will have to be decided taking link budget, the transmission network, the receiving environment, and other factors into account.

2.1.2 4K/8K-UHDTV field experiments with advanced system in urban area; Tokyo and Nagoya

2.1.2.1 Overview of advanced DTTB system

The objective of the advancement is to provide improved transmission performance compared to ISDB-T in terms of the increased transmission capacity and the reduced C/N required. The advanced system has been designed to inherit the feature of ISDB-T, i.e. it aims to provide a 4K or 8K UHDTV service for fixed reception and an HDTV service for mobile reception simultaneously by frequency division multiplexing (FDM) within a single channel. It also uses a frequency-segmented structure that allows partial reception. The bandwidth per segment is reduced to increase the number of segments from 13 (for ISDB-T) to 35, allowing for flexible bitrate distribution between layers such as the mobile reception layer and fixed reception layer. The advanced system allows a higher spectral efficiency and/or a transmission robustness with multiple-input multiple-output (MIMO).

A prototype modulator and demodulator for the advanced system were developed and their performances were confirmed through laboratory experiments. The feasibility of the system is being verified through large-scale field trials in urban areas.

Table 2.1.1 Parameters for field experiments of hierarchical transmission in urban area (Tokyo and Nagoya)

Modulation	OFDM	
Occupied bandwidth	5.83 MHz	
Reception scenario	Fixed (Rooftop)	Mobile (Car-mounted)
Number of segments	31	4
Carrier modulation	1024 NUC QAM	64 NUC QAM
FFT size (number of radiated carriers)	16k (15,121)	
Guard interval ratio (guard interval duration)	800/16384(126 μ s)	
Error-correcting code	Inner: LDPC, code rate = 11/16 Outer: BCH	Inner: LDPC, code rate = 7/16 Outer: BCH
Transmission capacity	31.4 Mb/s (SISO) 62.8 Mb/s (MIMO)	1.5 Mb/s (SISO) 3.0 Mb/s (MIMO)
Video coding	HEVC	
Video format	3840 × 2160/60/P (4K)	1920 × 1080/60/P (2K)
	7680 × 4320/60/P (8K)	
Video bit rate	SISO: 25 Mb/s (4K) SISO: 28 Mb/s (8K)* MIMO: 56 Mb/s (8K)*	SISO: 1.0 Mb/s (2K) MIMO: 1.0 Mb/s (2K)
Audio coding	MPEG-H 3D Audio LC level 4	
Audio bit rate	768 kb/s (22.2ch + 3 objects)	192 kb/s (2ch)

* Pre-processed before encoding by MPEG-H HEVC with a state-of-the-art software encoder offline taking plenty of time.

2.1.2.2 Transmission parameters

Field experiments were conducted with the parameters listed in Table 2.1.1. The occupied bandwidth was expanded by about 5% compared to that of ISDB-T to increase transmission capacity. The 31 and 4 segments out of 35 segments were assigned for UHDTV and HDTV services, respectively. As for error-correcting code and carrier modulation, low density parity check (LDPC) code and NUCs were used for both UHDTV and HDTV services to enhance transmission robustness.

2.1.2.3 Field measurements

To evaluate the performance of the advanced system in different propagation environments, large-scale experimental environments were constructed. Two locations (in the Tokyo and Nagoya areas) were selected to have the same scale as the main stations currently used for terrestrial broadcasting. Figure 2.1.1 shows the transmitter sites and assumed coverage areas for the experimental parameters in Table 2.1.1. Table 2.1.2 lists the specifications of the transmission stations. Each transmission station is equipped with two transmitters

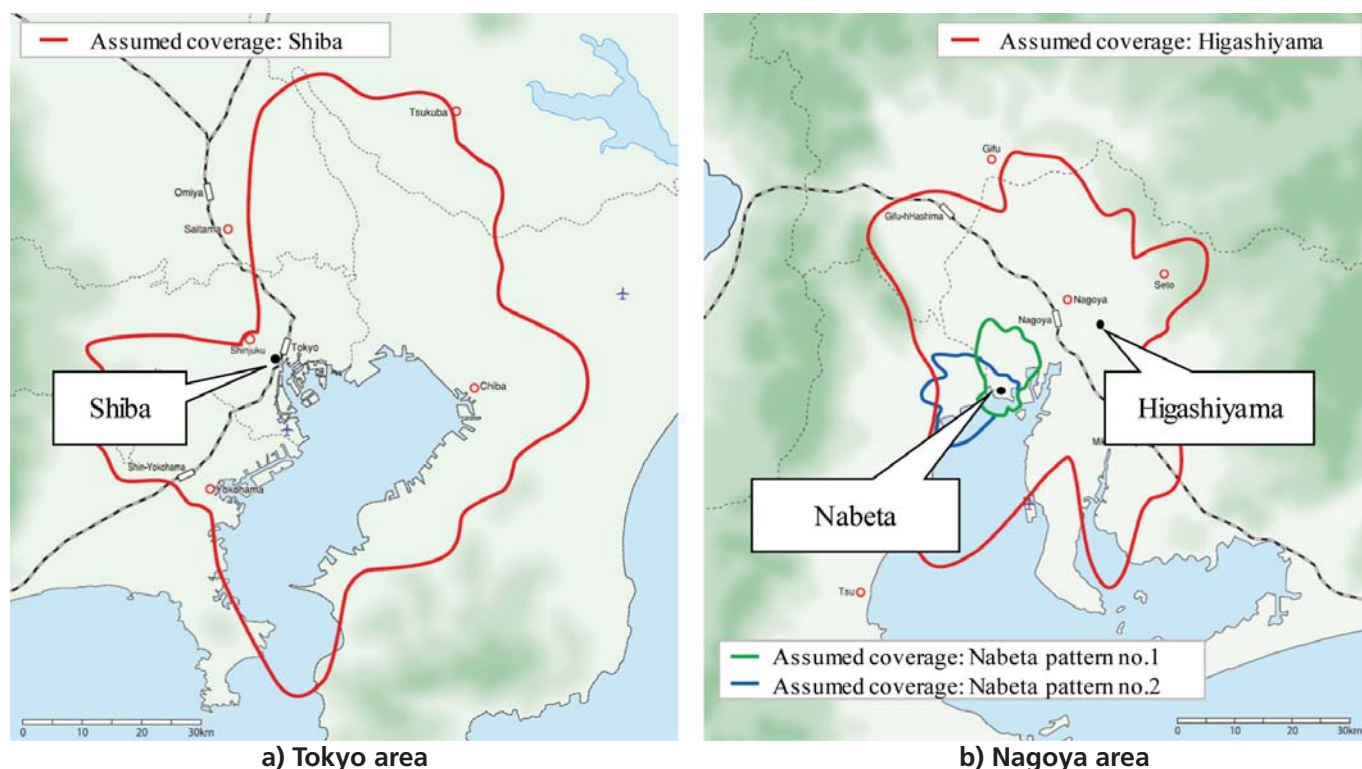


Figure 2.1.1 Experimental environments

Table 2.1.2 Specifications of transmission stations

	Tokyo area	Nagoya area	
Transmitter site	Shiba (main station) (Minato Ward, Tokyo)	Higashiyama (main station) (Showa Ward, Nagoya, Aichi)	Nabeta (relay station) (Yatomi, Aichi)
Transmission frequency	563.143 MHz	605.143 MHz	
Polarization	Horizontal, Vertical		
Transmission power	Horizontal: 1 kW Vertical: 1 kW	Horizontal: 1 kW Vertical: 1 kW	Horizontal: 10 W Vertical: 10 W
Transmitting antenna height	280 m above sea level	203 m above sea level	42.5 m above sea level

and two antennas for horizontally and vertically polarized waves. The directional patterns of transmitting antennas at Nabeta relay station are designed to be selectable.

Transmission experiments were conducted in the two experimental urban areas. Experiments were launched in November and December 2018 in the Nagoya and Tokyo areas, respectively.

The experiments involved field trials of hierarchical transmission of UHDTV/HDTV using a single channel based on the advanced DTTB system. The UHDTV (4K or 8K) content for fixed reception and HDTV (2K) content for mobile reception shown in Table 2.1.1 were recorded in advance in a player, and the video and audio streams were played back at the experimental stations. The block diagram of transmitting and receiving system is shown in Figure 2.1.2. UHDTV and HDTV streams from the player are multiplexed by the remultiplexer (remux) into a single IP stream and input to the advanced DTTB modulator. The frequency of two output signals from the modulator are converted and power-amplified by the transmitter. The audio of UHDTV was an object-based audio that

transmitted a 22.2 channel audio encoded by MPEG-H 3D Audio and three narration objects in Japanese, English, and French. For the HDTV content, the video was encoded by HEVC and the stereo audio signals were encoded by MPEG-4 AAC.

Figure 2.1.3 shows the locations of the transmitting and receiving points in the Tokyo area. The NHK Science and Technology Research Laboratories (NHK-STRL), which is approximately 12 km away from the Shiba station, was selected as the receiving point. On the receiving side, the received spectrum was observed by a spectrum analyser, and the delay profile was confirmed by a signal analyser. The UHDTV signal output from the demodulator was decoded in real time by the HEVC decoder and displayed on a 4K/8K LCD monitor. The 22.2 channel audio was decoded in real-time by MPEG-H 3D Audio decoder, converted to 7.1 channel audio, and reproduced using a commercially available sound bar. The HDTV signal was converted from multicast to unicast, then transmitted via WiFi router, and decoded by an MMT player installed on a tablet or smartphone. Figure 2.1.4 shows the spectrum of the received signals. Figures 2.1.5 and 2.1.6 show

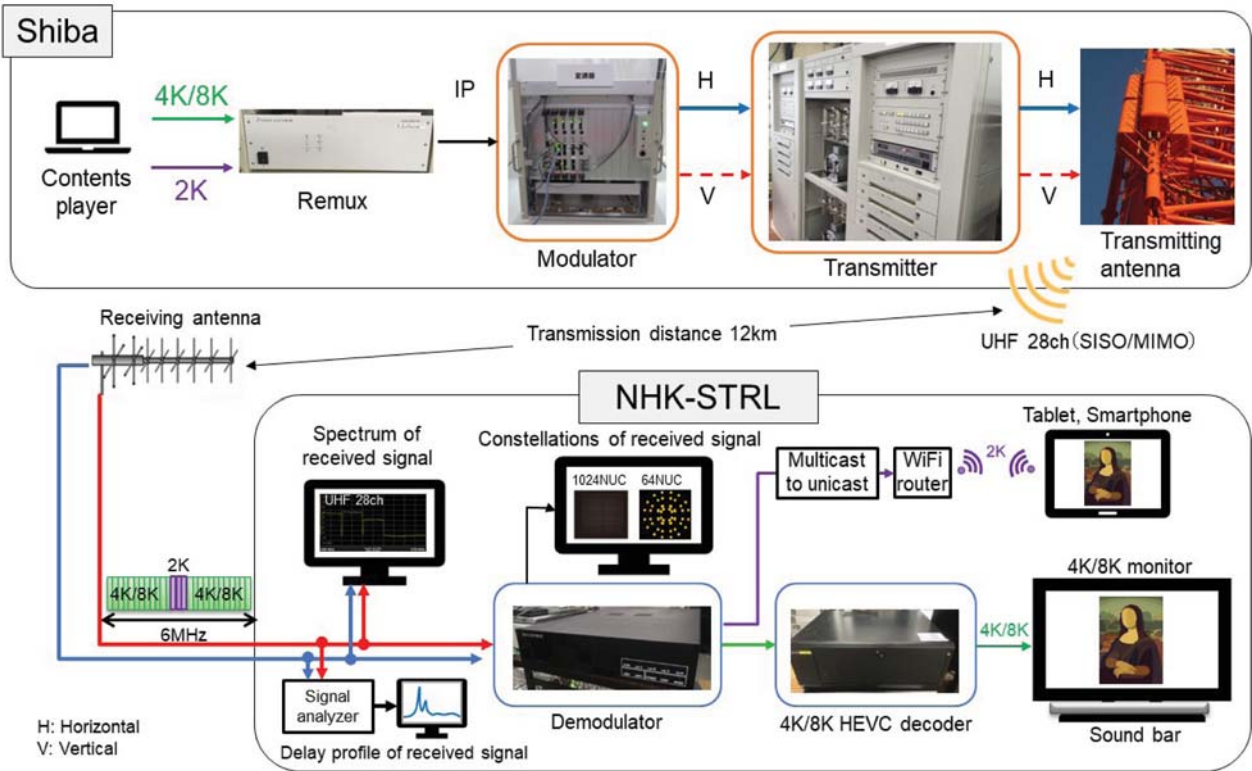
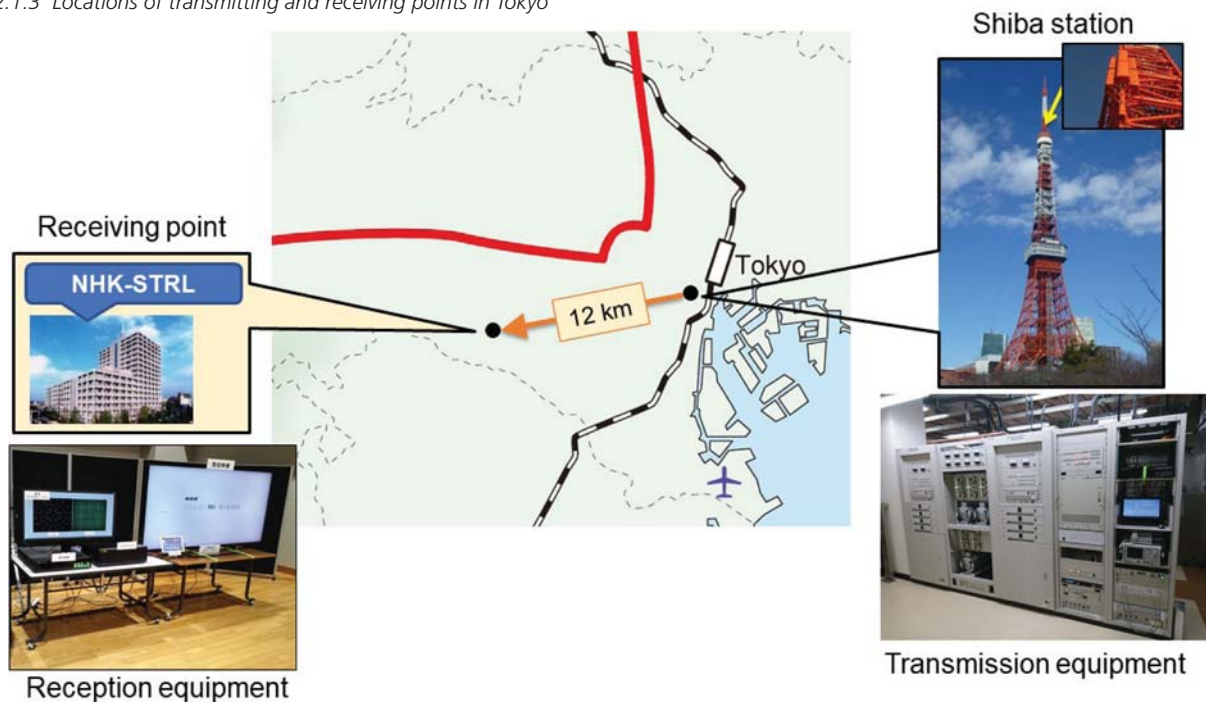


Figure 2.1.2 Block diagram of transmitting and receiving system in Tokyo

Figure 2.1.3 Locations of transmitting and receiving points in Tokyo



the delay profile and constellation of the received signal of SISO transmission using horizontal polarized wave. As for the delay profile, almost no reflected waves were confirmed as shown in Figure 2.1.5 In this experiment, it was demonstrated that UHDTV and HDTV contents can be successfully received with the advanced DTTB system.

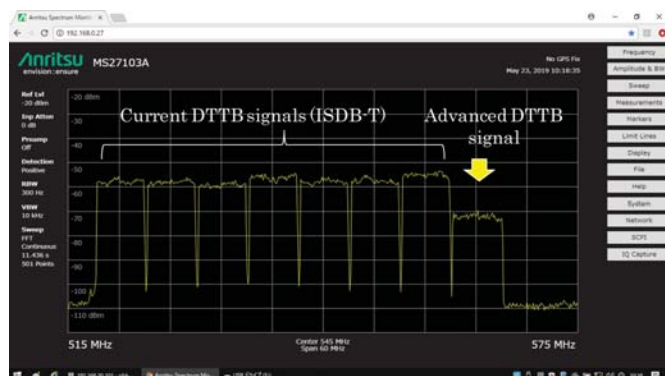


Figure 2.1.4 Spectrum of received signal at NHK-STRL (SISO)

Note: The advanced DTTB signal was allocated upper-adjacent to the current DTTB signals. The difference in the received power between the advanced DTTB signal and the current DTTB signals is due to the different transmitting power and the transmitting points.

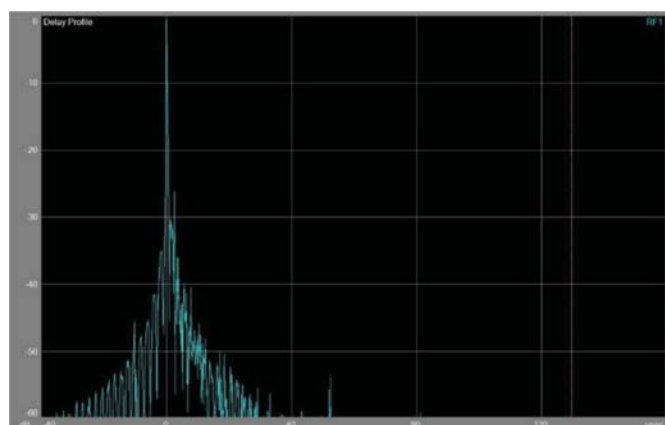
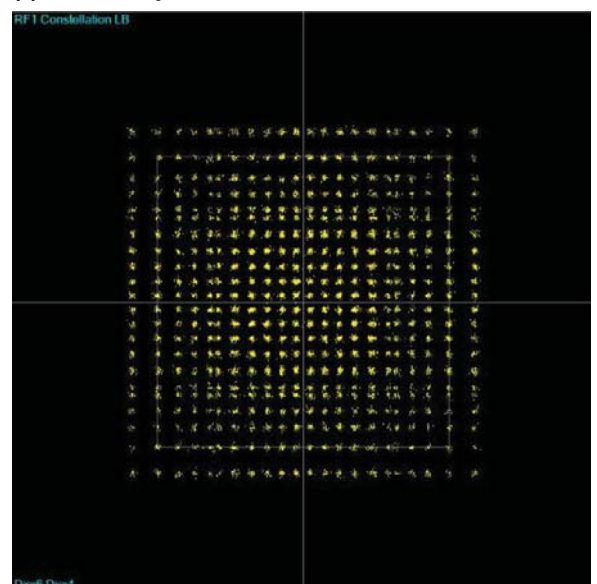


Figure 2.1.5 Delay profile of received signal at NHK-STRL (SISO)

(a) 1024 NUC QAM for UHDTV



(b) 64 NUC QAM for HDTV

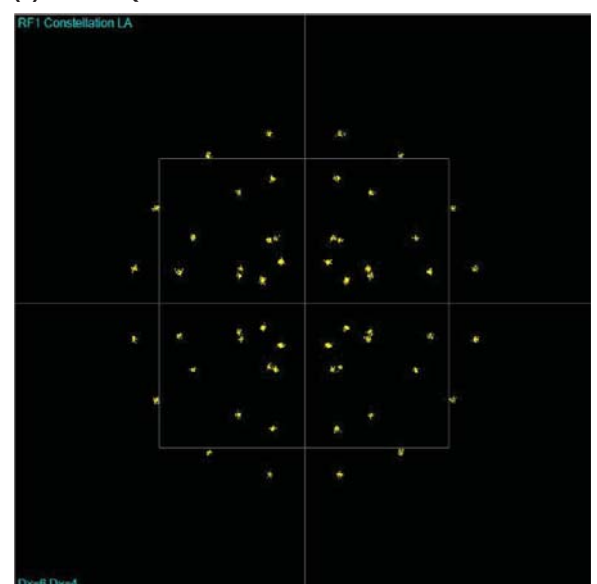


Figure 2.1.6 Constellations of received signal at NHK-STRL (SISO)

The block diagram of transmitting and receiving system in Nagoya is shown in Figure 2.1.7. Figure 2.1.8 shows the locations of the transmitting and receiving points in the Nagoya area. As a receiving point, the Nagoya port building, which is approximately halfway between the Higashiyama and Nabeta experimental stations, was selected. The remultiplexer was installed at the Higashiyama station and the IP packet was sent to the two modulators installed at the Higashiyama and the Nabeta stations. A 200 Mbit/s bandwidth secured line was used as the IP line between the Higashiyama and Nabeta stations. The radio waves were emitted from the two stations to carry out the transmission experiments in a SFN environment. The modulated signals were generated at each transmission timing.

At the receiving point (the Nagoya port building), the receiving antenna was installed facing the Nabeta station. Additionally, the transmission power of the Higashiyama station was adjusted to demonstrate severe SFN reception conditions. As an example, the desired-to-undesired signal ratio (DUR) of 3.2 dB and 1.9 dB for horizontal polarization and vertical polarization between the Nabeta station (D) and the Higashiyama station (U) was demonstrated with the reduction in the transmission power of the Higashiyama station by 5 dB for both polarizations. Regarding the delay setting of the remultiplexer, the transmitting timings of the Higashiyama and the Nabeta stations were aligned at the same time. As the Higashiyama station is geographically 500m closer to the reception point than the Nabeta station, it was expected that the transmitted signals from the Higashiyama station would arrive 1.6 μ s earlier than the signals from the Nabeta station. However, it was confirmed that the signals from

the Higashiyama station arrived about 2 μ s later than the signals from the Nabeta station. The delay was caused by a feedback compensation circuit installed in the transmitters at the Higashiyama station.

Figures 2.1.9, 2.1.10 and 2.1.11 show examples of the spectrum, delay profiles, and reception constellations of the received signals for MIMO transmission using horizontal and vertical polarizations. For the reception spectrum, ripples caused by the undesired signals from the Higashiyama station were confirmed. For delay profiles, horizontal to horizontal, horizontal to vertical, vertical to horizontal and vertical to vertical components are shown in blue, green, yellow and pink, respectively. The Higashiyama station is located in the direction opposite to the main lobe of the receiving antenna; therefore, many reflected signals transmitted by the Higashiyama station were observed. The demonstration of UHDTV/HDTV reception with the advanced DTTB system in the SFN environment was presented to the press. It was confirmed that even under severe SFN reception conditions, the UHDTV/HDTV video and audio could be received without any transmission errors.

Transmission performance of the advanced system is being verified assuming a fixed rooftop reception with a reception antenna at a height of 10 metres and a mobile reception with vehicular external aerials at a height of 2 metres in the Tokyo and Nagoya areas.

The plan is to evaluate the transmission characteristics not only of single-input single-output (SISO), but also MIMO to confirm the gain in the capacity and required C/N achieved with the advanced system in actual urban reception environments.

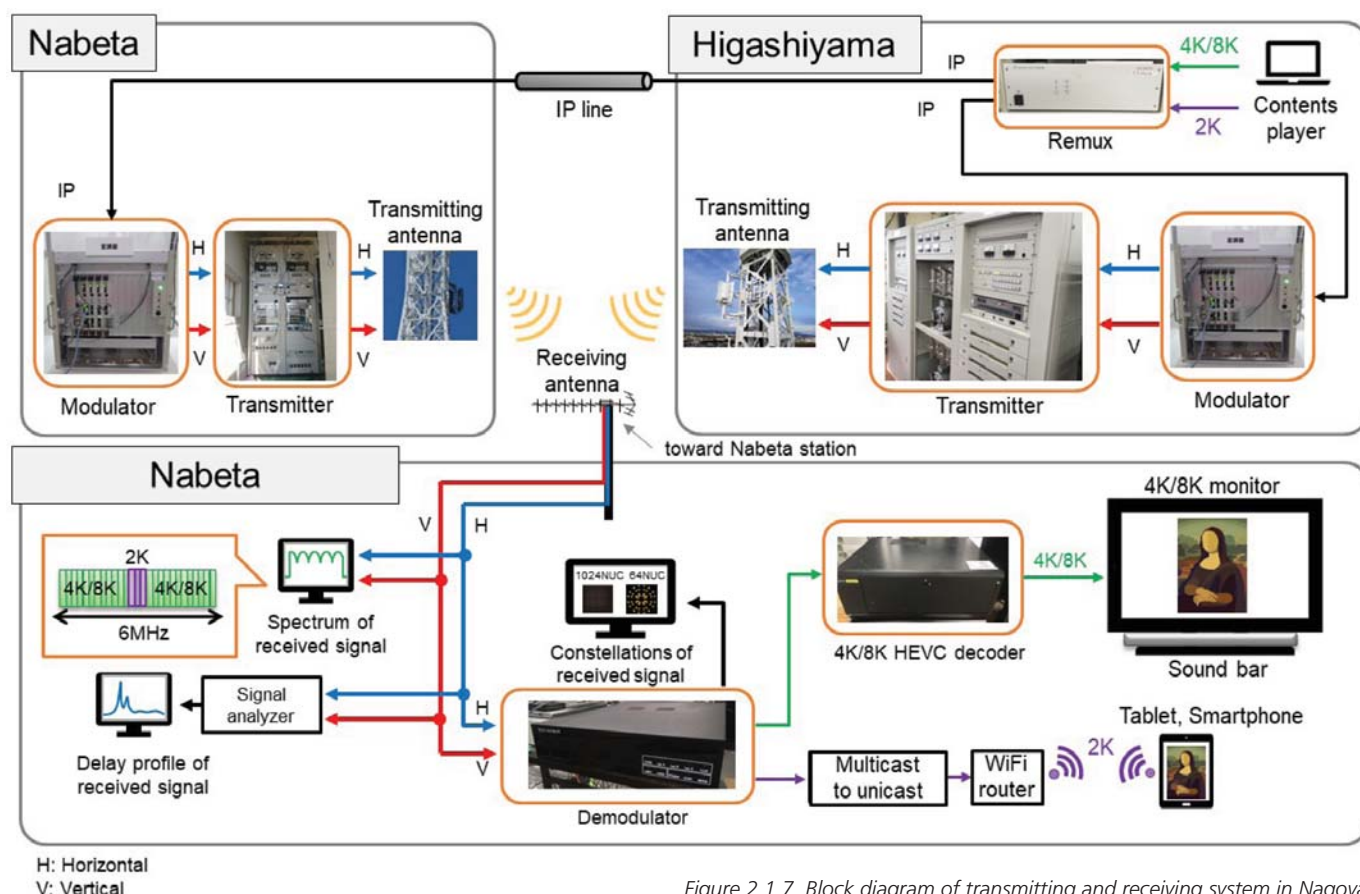


Figure 2.1.7 Block diagram of transmitting and receiving system in Nagoya

Figure 2.1.8 Locations of transmitting and receiving points in Nagoya

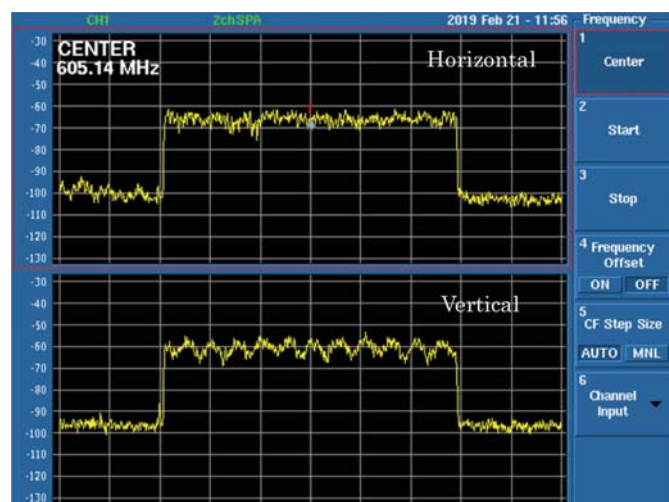
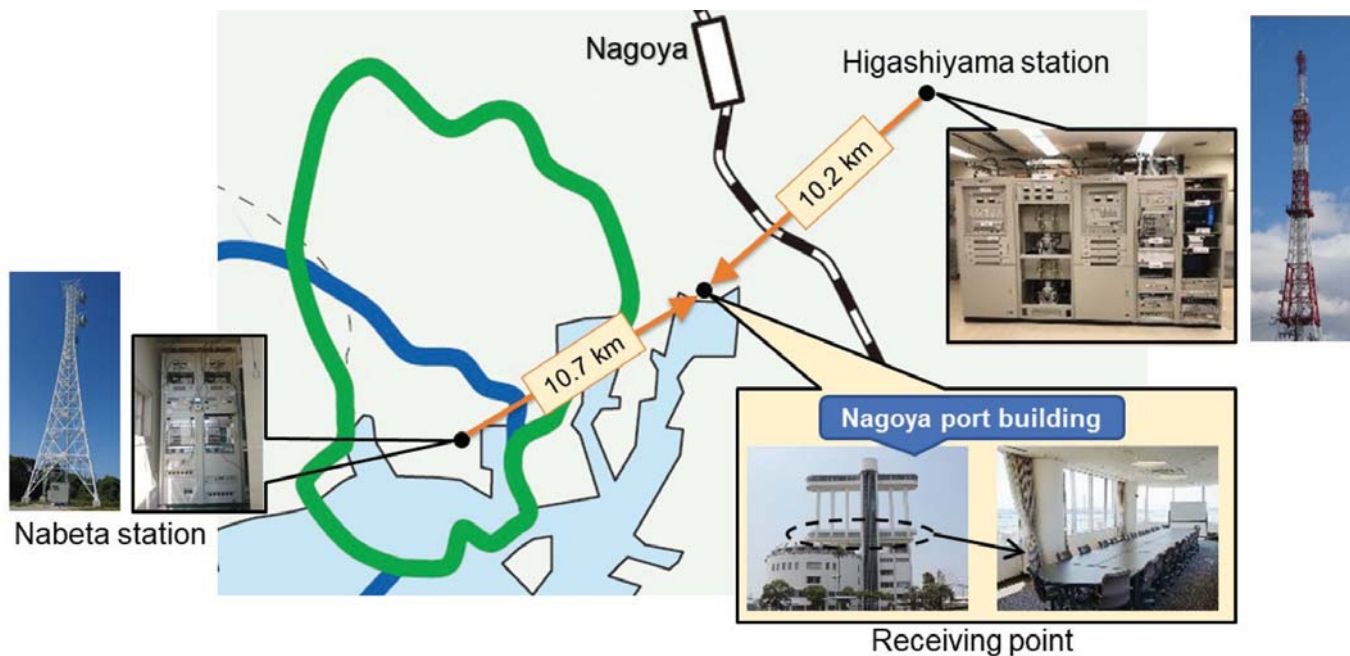


Figure 2.1.9 Spectrum of received signals at Nagoya port building (MIMO)

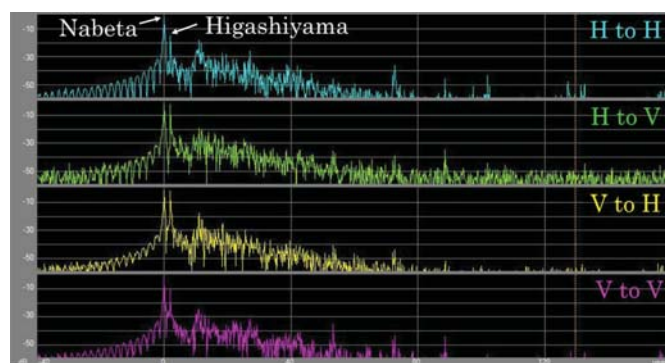
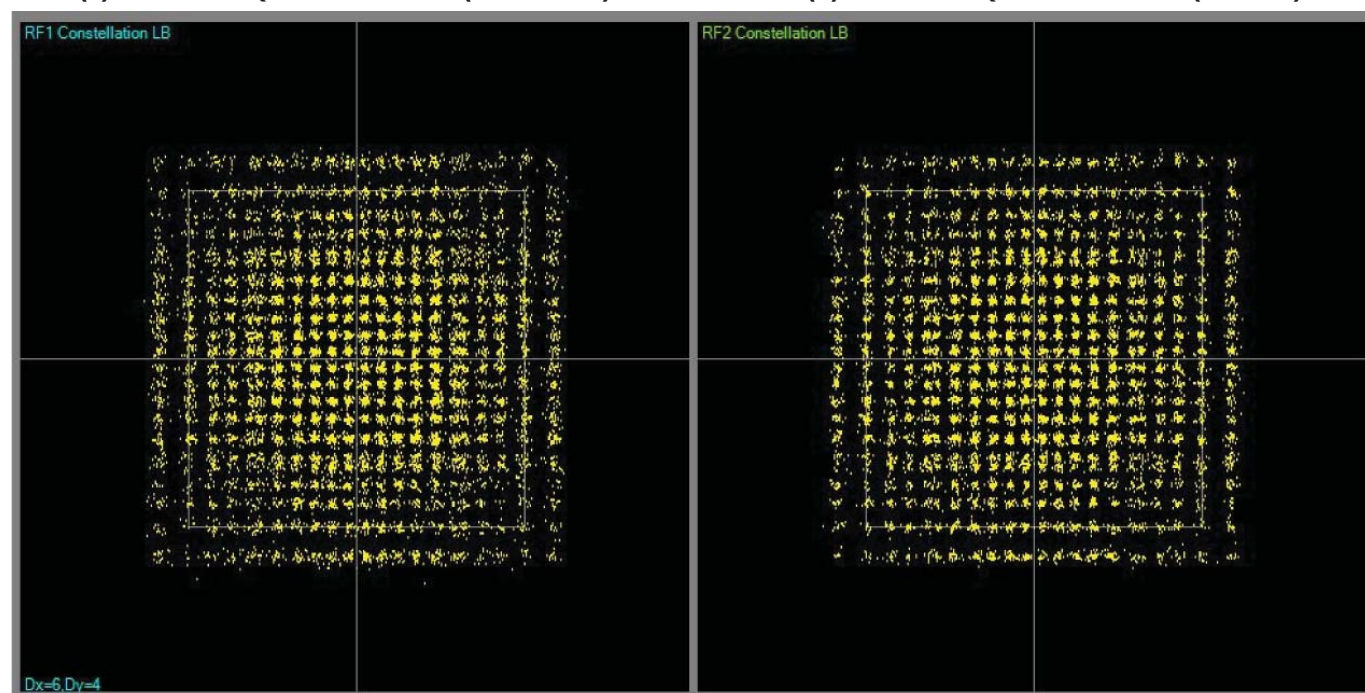


Figure 2.1.10 Delay profile of received signals at Nagoya port building (MIMO)

(a) 1024 NUC QAM for UHDTV (Horizontal)

(b) 1024 NUC QAM for UHDTV (Vertical)

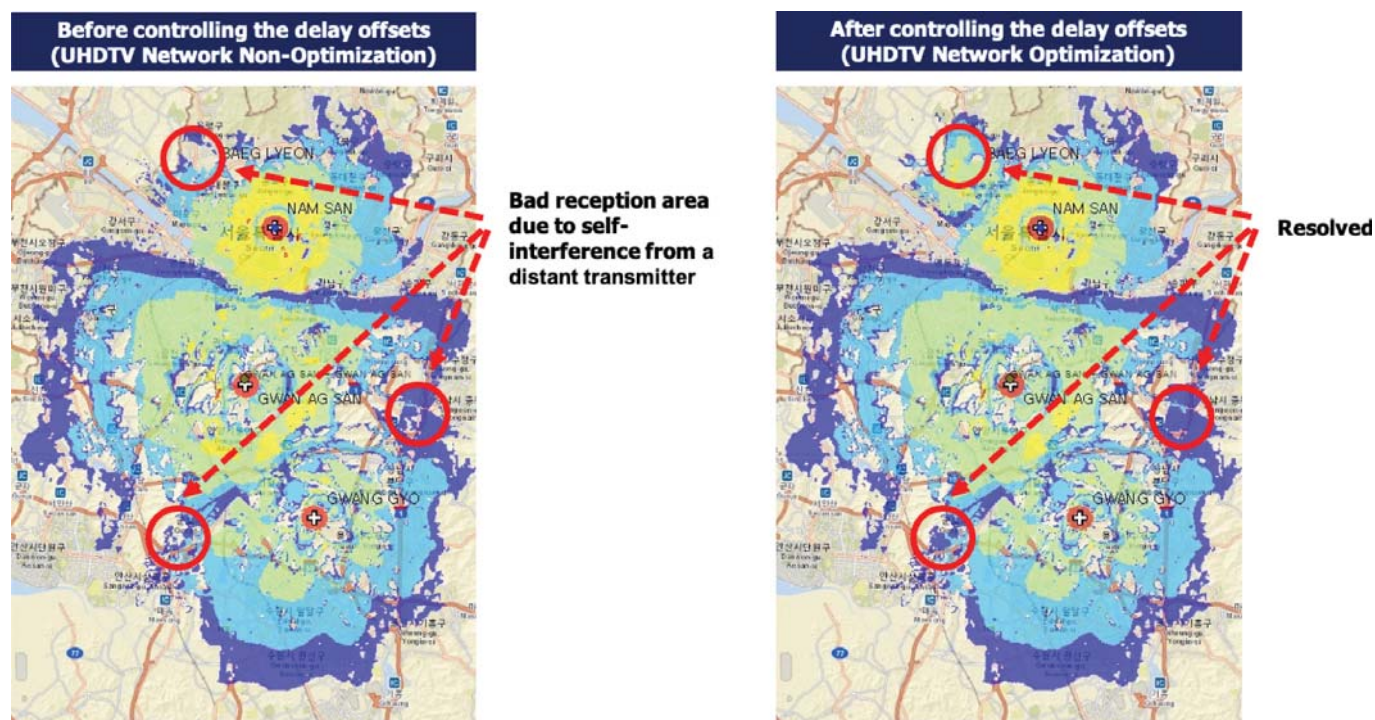


(c) 64 NUC QAM for HDTV (Horizontal)

(d) 64 NUC QAM for HDTV (Vertical)

Figure 2.1.11 Constellations of received signals at Nagoya port building (MIMO)

Figure 2.2.1 Simulation results of the 4K-UHDTV network planning optimization and non-optimization



2.1.6. Summary

In the field of broadcasting, 8K-UHDTV has the potential to succeed HDTV.

Japan has launched an R&D project aiming at developing an advanced DTTB system and evaluating its performance through field trials in large-scale experimental environments constructed in urban areas.

These field experiments will show the feasibility of terrestrial 8K-UHDTV transmission using several key technologies, including dual-polarized MIMO, 4096-QAM carrier modulation, LDPC code, the 2×2 MIMO STC-SFN method, and NUC. The 8K-UHDTV system to be used in Japan will be selected on the basis of further consideration and examination of various technical possibilities and future trends.

More information such as transmission parameters, experimental results was described in the Rep. ITU-R BT.2343-4. (<http://www.itu.int/pub/R-REP-BT.2343>)

2.2 4K-UHDTV field experiments in the Seoul metropolitan area for SFN optimization

2.2.1 Introduction

The next-generation terrestrial broadcasting standard, also known as ATSC 3.0 standard, can support high-throughput services in a fixed rooftop environment and robust-reception services in a mobile environment, simultaneously in a single radio channel. The terrestrial broadcasters of the Republic of Korea launched the ATSC 3.0-based commercial 4K-UHDTV broadcasting service in May 2017 and have been deploying the transmitters to expand the broadcasting coverage nationwide.

From a 4K-UHDTV network configuration point of view, an SFN deployment has been considered in the terrestrial broadcasting network to increase the spectrum utilization efficiency. However, it is required to optimize the SFN deployment for minimizing the unwanted self-interference.

This report briefly describes ATSC 3.0-based 4K-UHDTV network optimization planning and shows the field experiments in the Seoul metropolitan area for SFN optimization.

2.2.2 ATSC 3.0-based 4K-UHDTV network optimization planning

In the SFN deployment, all the transmitters broadcast the same information simultaneously at the same frequency. However, a long-delayed signal can arrive from a distant transmitter in the large SFN deployment. If the signal delay is longer than the guard interval, unwanted self-interference from a distant transmitter may inevitably cause performance degradation in the ATSC 3.0 receiver. In order to assist in resolving these problems, the transmitter identification (TxID) technique has been introduced in the ATSC 3.0 standard.

The TxID technique's objective is to obtain the channel impulse response (CIR) independently to support the adjustment of the delay offset of individual transmitters. By controlling each transmitter's delay offset, the unwanted self-interference can be easily avoided, and so that 4K-UHDTV network planning quality and efficiency can be improved.

Figure 2.2.1 shows the example of the simulation results of the 4K-UHDTV network planning optimization and non-optimization. As shown in Figure 2.2.1, the bad reception area of 4K-UHDTV service can be reduced by controlling each transmitter's delay offset so that all the transmitted signals lie within the guard interval.

2.2.3 4K-UHDTV field experiments in Seoul metropolitan area

From 2017 to 2019, the Republic of Korea has installed ten 4K-UHDTV transmitting stations in the Seoul metropolitan area. Figure 2.2.2 shows the geo-location of 4K-UHDTV transmitting stations and their facility.

In order to estimate the CIR from each transmitter to a

Figure 2.2.2 The geo-location of 4K-UHDTV transmitting stations and their facility



Figure 2.2.3 The geo-location of 4K-UHDTV transmitting stations and their facility

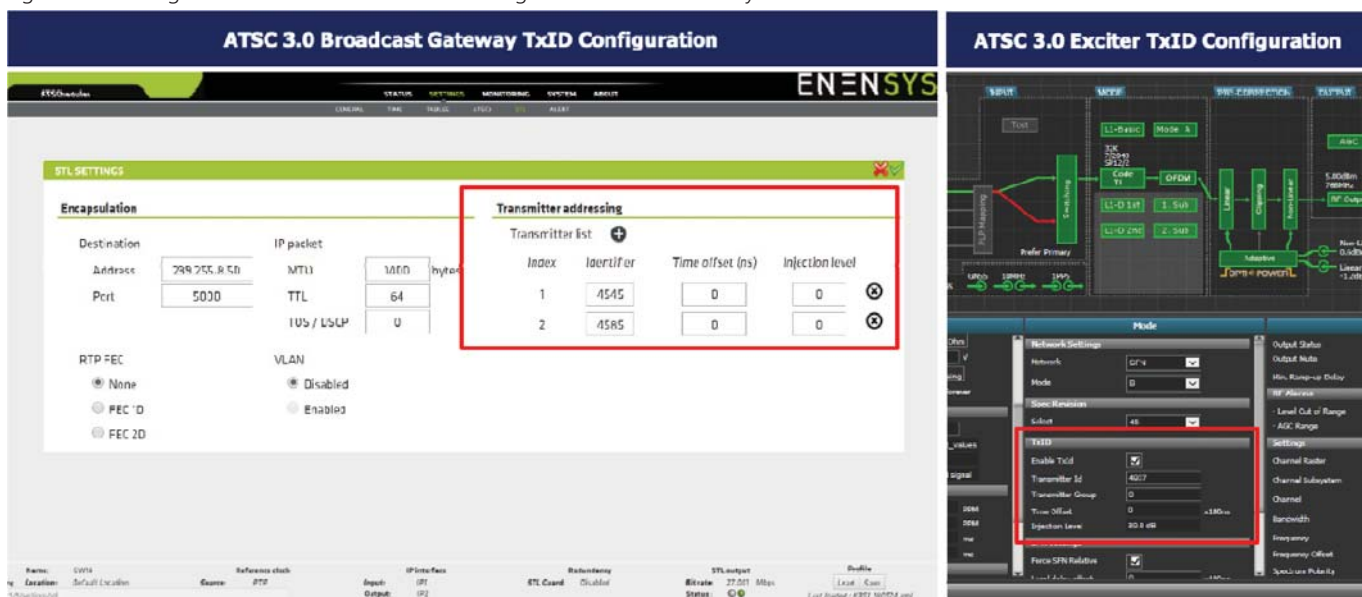


Figure 2.2.4 The geo-location of 4K-UHDTV transmitting stations and their facility



receiver independently, the ATSC 3.0 broadcast gateway system assigns different TxID addresses to all transmitters during the field experiments. The ATSC 3.0 exciter system generates the TxID signal, and it is embedded into the ATSC 3.0 host signal.

Figure 2.2.3 shows the example of the ATSC 3.0 broadcast gateway and exciter system configurations. Here, the red-box explains the setup information for the specified TxID address.

Figure 2.2.4 shows the example of the TxID signal detection results. In this case, four transmitted signals which use the same frequency and information but different TxID addresses, are overlapped in time-domain. Also, each TxID signal detection result has a different position of the maximum amplitude level, which means that each transmitter's appropriate delay offset can be extracted efficiently from these detection results.

2.2.4. Summary

Since the beginning of the commercial terrestrial 4K-UHDTV service in May 2017, KBS has been conducted many field experiments to design effective 4K-UHDTV network planning. In this report, we have briefly explained the major drawback of SFN deployment and analyzed the effect of SFN optimization through network planning simulations. Also, this report contains the test results of TxID signal detection results in the Seoul metropolitan area. It shows that the TxID technique can assist choose the most appropriate delay offset of each transmitter in SFN environments.

From these results, the designed 4K-UHDTV network can be optimized by controlling each transmitter's reasonable delay offset to minimize the unwanted self-interference.

2.3 Convergence of broadcasting and communication

2.3.1 Service Requirement: Convergence of broadcasting and communication

By adopting bi-directional, point-to-point (PTP) link and cellular structure, mobile communication network is suitable to transmit personalized content or provide interactive service, while the coverage is smaller when comparing with broadcast network and the transmission efficiency is low when it is used to provide multicast/broadcast services. Broadcast network adopts uni-directional, large coverage (usually with high transmission power) and point-to-multipoint (PTM) or multicast/broadcasting mode, which is suitable to the transmission of public media service (PMS), however, it does not have uplink return channel, which can not realize personalized and interactive services such as Video-on-Demand (VoD), Virtual Reality (VR) and conversational video.

With the development trend of video content to ultra-high definition (UHD), multi-dimensional (3D or VR) and conversational, network video will bring more and more traffic to the network. In the communication network, when a lot of users watch video programs at the same time, the limited spectrum resources and transmission capacity will not be able to withstand the high traffic load and high concurrent level requirements. Therefore, it is necessary to aggregate the same video stream and transmit it by multicast/broadcast, which will greatly reduce the traffic load, save bandwidth and release spectrum resources of network.

With the convergence of broadcast and communication, video content can be transmitted to the mobile terminal in a way compatible with the underlying technology of mobile communication. One modem chip can not only send/receive communication signals, but also receive broadcast signals. Users can watch broadcast TV programs anytime and anywhere without generating any data traffic cost. Broadcast and communication converged network not only can provide common content and public services with broadcast mode, provide personalized and interactive services with communication mode, but also can schedule content and handover user between the two modes, and optimize the use of transmission resources according to the content favorite degree, user mobility and network coverage.

2.3.2 Service Requirement: Emergency Broadcast

5G communication network cannot effectively deal with the risks brought by natural disasters and provide emergency communication services. Due to the high construction density of 5G base stations and the small coverage of the base stations, natural disasters such as earthquakes and floods will seriously affect the external communication services of the disaster area, and the property losses will also be huge. In order to improve the disaster resistance of the communication network and reduce the construction cost, 5G broadcast can have much longer inter-site distance or larger coverage. The 5G broadcast adjacent to the disaster area can cover part of the disaster area and provide broadcast services uninterruptedly and will play an important role in public warning system and emergency communications.

2.3.3 Solution: High Power High Tower broadcast based on 3GPP Release 16 "5G Broadcast"

3GPP Release 16 set up a work item (WI) named "LTE-based Terrestrial 5G Broadcast" which is usually called "5G Broadcast". This project is finished together with 3GPP release 16 which is evaluated and adopted by ITU-R as IMT-2020/5G standard in July 2020. 5G Broadcast supports Sub-carrier Space (SCS) equal to 0.37, 1.25 and 2.5kHz thus has longer Cyclic Prefix (CP) equal to 300, 200 and 100us which can provide more protection for Inter-symbol Interference (ISI) then support Inter-site Distance (ISD) to 100, 60 and 30km. It can support High Power High Tower (HPHT) broadcast and can meet broadcaster's requirements.

It is noticed that 3GPP also set up two work items (WIs) "5G Multicast Broadcast Service" (Acronym: FS_5MBS) in Service and Architecture aspect (SA), "NR Multicast Broadcast Service" (Acronym: NR_MBS) in Radio Access Network (RAN). Till Dec. 2020, FS_5MBS will output a report TR 23.757 and the specifications will be made based on the solutions provided in this report during the first half of 2021. NR_MBS will be frozen in Dec. 2021, which is said to be postponed by 9 months.

The working mechanism of NR_MBS is as same as that of Single-Cell Point-to-Multipoint (SC-PTM) in 3GPP Release 13. It setup multicast group based on bi-directional communication link of each participating User Equipment (UE). In release 17, NR_MBS does not support narrow SCS such as 1.25kHz, does not support Free-to-Air (FTA) and Receive Only Mode (ROM), does not support Multicast Broadcast Single Frequency Network (MBSFN). Essentially it enable a kind of mobile communication service and is not for broadcasting service.

Project: Integrated Broadcast-Broadband and OTT (T/IBBOTT)

Project Manager:

Dr Go OHTAKE (NHK, Japan)

Co-project Managers:

Mr A. K. Mangalgi (DDI, India)

Mr Kazuhiro KUMAMARU (NHK, Japan)

Mr Satoshi FUJITSU (NHK, Japan)

Mr Kinji MATSUMURA (NHK, Japan)

Zhang Dingjing (ABS/RTPRC, China)

Zhang Yu (ABS/RTPRC, China)

Zhang Wei (ABS/RTPRC, China)

He Jing (ABS/RTPRC, China)

Wang Lei (ABS/RTPRC, China)

Status report

This clause describes recent updates on IBB and OTT standards and related technologies identified and studied by this project. And it describes also recent update on standards and technologies of information security for broadcasting services and cyber security in broadcasting industry for protecting the broadcasting systems.

3.1 Standardization of Integrated Broadcast-Broadband System in Japan

IPTV Forum Japan standardizes specifications of Hybridcast in Japan. Technical specification of Hybridcast is composed of two technical standards and an operational guideline listed below and the latest versions are published in November 2020.

- IPTVFI STD-0010 'Integrated Broadcast-Broadband System Specification', version 2.3
- IPTVFI STD-0011 'HTML5 Browser Specification', version 2.6
- IPTVFI STD-0013 'Hybridcast Operational Guideline', version 2.9

In the revision in November 2020 several new features were added to the Hybridcast technical specifications. Major updates are as follows:

- Addition of the new application type named "Broadcast-independent managed application" An application of this type runs in the state that no broadcast channel is being tuned so that service providers can offer application services regardless of their broadcasting area.
- Enhancement to the streaming video playback function The CMAF*¹ is added as a supported container format of streaming video, including low-latency playback features. Support for stream event delivery mechanisms such as an 'event message' (msg) box and an 'Event' XML element of MPEG DASH*² are also added.
- Enhancement to the companion device function UHDTV broadcasting services, i.e. 4K and 8K satellite broadcasting in Japan, are added to the available channels for tuning from a companion device.
- Addition of the three-dimensional audio codec support The enhanced AC-3*³ is added to the available audio codecs for video streaming.

- *¹ ISO/IEC 23000-19 "Multimedia application format (MPEG-A) – Part 19: Common media application format (CMAF) for segmented media".
- *² ISO/IEC 23009-1 "Dynamic adaptive streaming over HTTP (DASH) – Part 1: Media presentation description and segment formats".
- *³ ETSI TS 102 366 "Digital Audio Compression (AC-3, Enhanced AC-3) Standard".

3.2 Studies in ITU-R

ITU-R WP6B is working for the study on IBB systems. The working party is now studying on harmonization of IBB systems by making comparison of Hybridcast2.0 (Japan), HbbTV2.0 (Europe), TOPSmedia (South Korea) and Ginga (Brazil).

At the meeting held in April 2019 in Geneva, the working party developed the comparison of application life-cycle and application transition of the IBB systems, and revised Report ITU-R BT.2267 "Integrated broadcast-broadband systems" to add a new part on the harmonization of Integrated Broadcast-Broadband (IBB) systems' applications. To allow the exchange of services covered by the IBB systems and to deploy these services in an area where other systems are used, it is important to harmonize the IBB systems, to ensure compatibility with the IBB applications and interoperability across systems.

At the meeting, the working party revised Report ITU-R BT.2342 to replace information on TTML Text and Image Profiles for Internet Media Subtitles and Captions 1.0 (IMSC1.0) with the updated IMSC1.1 and to update a list of current EBU specifications pertinent to the content of the Report.

At the meeting held in July 2019 in Geneva, the working party revised Report BT.2267 to add the companion application to execute the application on a receiver. The working party also developed the new use cases of IBB system which provides object-based sound services via MPEG-DASH streams.

The working party also developed the global platform. The working party revised Report ITU-R BT.2400 "Usage scenarios, requirements and technical elements of a global platform for the broadcasting service" to add the specific reference to the ATSC 3.0 standard and some examples to show its Internet Protocol-based capabilities to integrate broadcast and broadband services. New digital terrestrial transmission standards such as the ATSC 3.0 system can help effectuate a converged broadcast and broadband platform, which is an important aspect of a global platform for broadcasting services.

At the meeting held in October 2020, the working party revised Recommendation ITU-R BT.2075 to update an application execution mechanism of Hybridcast, with which a companion device sends a command to a receiver to tune to a designated channel and launch a Hybridcast application.

3.3 Studies in ITU-T

ITU-T SG9 is also working for the study on IBB system applied to Cable Digital TV. At the meeting held in

November 2018 in Bogota, Colombia, the Study Group started the work to revise IBB system Recommendation (ITU-T Recommendation J.207 “Specification for integrated broadcast and broadband digital television application control framework”) to add the function of device collaboration with companion devices in Hybridcast. Recommendation J.207 is a twin of IBB system Recommendations in ITU; Recommendation ITU-R BT.2075 is another twin on this topic. So, the Study Group continue to work to revise the Recommendation according to revision of Recommendation ITU-R BT.2075. The Study Group is studying the work of smart TV operating system for hybrid cable Digital TV services including IBB DTV service provided by cable television operators and third-party providers. At the Bogota meeting, the study group make progress the work of the architecture of smart TV operating system. The study group consent the Recommendation of “The functional requirements of smart TV operating system” as ITU-T Recommendation J.1201.

At the meeting held in June 2019 in Geneve, the study group consent Recommendation J.207 to add the function of device collaboration in Hybridcast. The study group also make progress the work of drafting new Recommendation “Harmonization of Integrated Broadcast-Broadband DTV application control framework”. As for the smart TV operating system, the study group consent the Recommendation of “The architecture of smart TV operating system” as ITU-T Recommendation J.1202. In addition, making a new Recommendation for the specification of smart TV operating system was started in the study group.

3.4 Cyber Security on IoT devices in Japan

The Ministry of Internal Affairs and Communications (MIC) of Japan and the National Institute of Information and Communications Technology (NICT), in cooperation with telecommunications carriers, started the “NOTICE (National Operation Towards IoT Clean Environment)” project on February 20, 2019, to survey vulnerable IoT devices and to alert users to the problem. Outline of the “Notice Project” is as follows:

- 1) NICT surveys IoT devices on the Internet and identifies vulnerable devices, such as those with weak password settings.
- 2) NICT provides the information of the devices to the telecommunications carriers.
- 3) The telecommunications carriers identify the users of the devices and alert users to the problem.

In addition to NOTICE, MIC, NICT, and ICT-ISAC have been working on other initiatives to investigate devices that may be misused in cyberattacks and to alert users of such devices. In the “Issues to Be Immediately Addressed to Strengthen Japan’s Cybersecurity (Urgent Recommendations)” released by MIC in January 2020, it was reported that it is necessary to promptly investigate whether IoT devices installed at important domestic facilities are placed

in a condition that is subject to attack in addition to those efforts by NOTICE. This survey (Critical IoT Device Investigation) will be conducted by NTT Communications Corporation, Yokohama National University, and ICT-ISAC who can easily identify their operator names and uses from the Internet. They are expected to urge the owners and operator of the devices in question and other parties to take precautions and implement measures.

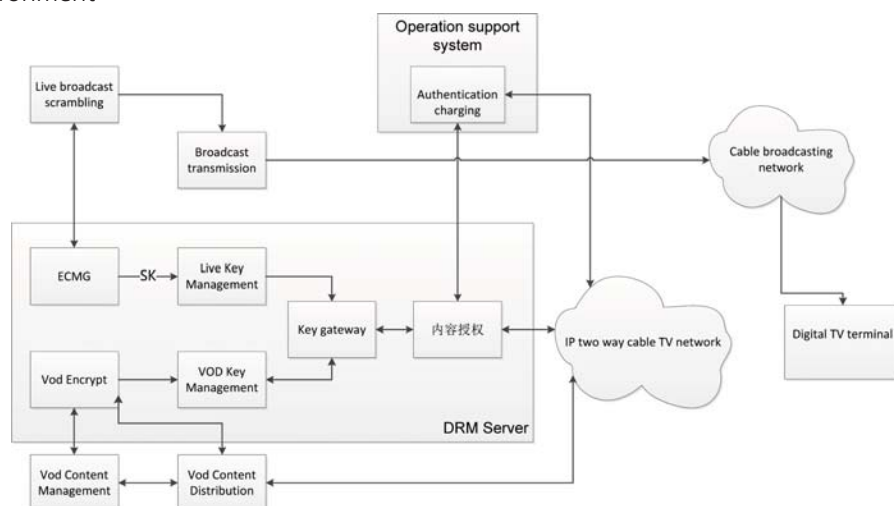
<https://notice.go.jp/en/>

3.5 Content protection of China

Currently, for content protection of IBB and OTT, DRM technology needs to ensure that in a variety of network modes, multiple file packaging formats and multiple encoding formats, the DRM technology can support content encryption under multiple technical architectures with the same technical architecture, can play with multiple different terminals, and have the same or similar experience. In addition, with the improvement of content quality, the requirements for content encryption are also gradually improved. These requirements include not only the performance improvement of content encryption, but also the improvement of security requirements for content protection. China has made technological attempts and innovations on several levels, issued DRM specifications[1] (ChinaDRM[2]), and has achieved certain industrial demonstration and verification.

3.5.1 The head-end system includes the key gateway, and the content key is synchronized in different network systems

In the IBB network model, for a high-quality content, the most important security guarantee is not to decrypt in the middle of the transmission link, but only to transfer the content key and code stream data safely, which can achieve the purpose of delivering high-quality content without disclosing the content key. The process is as follow:



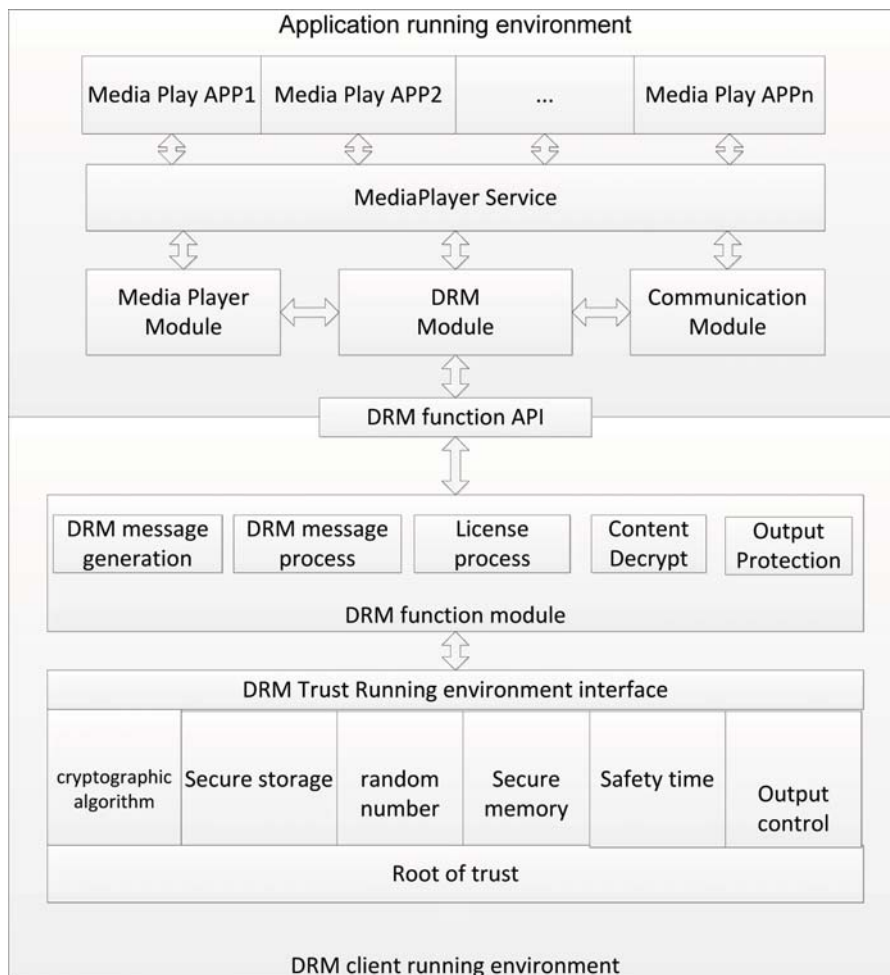
The transmission on the DRM service is guaranteed by the key gateway's isolation of content authorization and key management server. The DRM client doesn't need to add additional business logic to support the key gateway.

3.5.2 Common encryption methods can be supported in a variety of stream formats as well as encoding codec

In the OTT network, the common formats are including HLS, DASH and other streaming media packaging, at the same time for broadcast networks to use TS packaging format, ChinaDRM described different encryption methods, and in accordance with international standards, the encryption characteristics of CENC is used in ChinaDRM, and other DRM business solutions in the industry can be achieved multi-encrypt technology.

3.5.3 Provide platform-independent DRM client SDK, which is open source components to fit multiple device scenarios

In the terminal market situation, the form of various types of terminals, hardware and software platforms are different, in order to ensure that a variety of terminal equipment, different chipset platforms can achieve the fit of the scheme, ChinaDRMLab[3] provides a platform-independent DRM client SDK, the SDK is open source to the certified members, its structure is as follows:



Huawei has completed the relevant fitting and deployment of mobile devices based on the ChinaDRM client SDK, enabling mass production of more than 20M devices.

3.5.4 Set three security level, meets the content providers' requirements

The DRM client defined by this standard is divided into three security levels: software security level, hardware security level, and enhanced hardware security level. Software security level refers to the implementation of some or all DRM client runtime based on software security mechanism; Hardware security level refers to the implementation of DRM client execution environment based on hardware security mechanism; Enhanced hardware security level refers to upon hardware security level DRM client execution environment should also have capabilities like side channel attack defense, forensics watermark, etc.

3.5.5 Security technology system of interoperability between server and client

ChinaDRM constructs a security technology system for client and server interoperability from the following aspects:

1. ChinaDRM standard defines the protocol and license format of interaction between client and server;
2. The client reference design is provided, which not only supports the terminal rapid integration, but also provides the security capability and interoperability compatibility with the server;
3. Establish the authentication system of client and server, control the security of server and classify the security of terminal;
4. Establish trust system based on trusted certification center to realize the trust construction between different vendors.

References:

- [1] GY/T 277-2019 Technical specification of digital rights management for video audio content distribution



GYT277-2019
Technical specific

- [2] ChinaDRM
<http://www.china-drm.net>
- [3] ChinaDRMLab
<http://www.chinadrmlab.org>

Project: Satellite Broadcasting (T/SB)

Project Manager:

Mr Masashi KAMEI (NHK, Japan)

Co-project Manager:

TBD (TRT, Turkey)

4.1 ITU-R documents related to satellite broadcasting systems

4.1.1 Radio Regulations

ARTICLE 23 Section 2 "Broadcasting-satellite services"

APPENDIX 30 "Provisions for all services and associated Plans and List for the broadcasting-satellite service in the frequency bands 11.7-12.2 GHz (in Region 3), 11.7-12.5GHz (in Region 1) and 12.2-12.7 GHz (in Region 2)

APPENDIX 30A "Provisions and associated Plans and List for feeder links for the broadcasting-satellite service (11.7-12.5GHz in Region 1, 12.2-12.7 GHz in Region 2 and 11.7-12.2 GHz in Region 3) in the frequency bands 14.5-14.8 GHz and 17.3-18.1 GHz in Regions 1 and 3, and 17.3-17.8 GHz in Region 2

RESOLUTION 506 "Use by space stations in the broadcasting-satellite service operating in the 12 GHz frequency bands allocated to the broadcasting-satellite service of the geostationary-satellite orbit and no other"

RESOLUTION 507 "Establishment of agreements and associated plans for the broadcasting-satellite service"

RESOLUTION 528 "Introduction of the broadcasting-satellite service (sound) systems and complementary terrestrial broadcasting in the frequency bands allocated to these services within the range 1-3 GHz."

RESOLUTION 536 "Operation of broadcasting satellites serving other countries."

RESOLUTION 548 "Application of the grouping concept in Appendices 30 and 30A in Regions 1 and 3"

RESOLUTION 552 "Long-term access to and development in the frequency band 21.4-22 GHz in Regions 1 and 3"

RESOLUTION 553 "Additional regulatory measures for broadcasting-satellite networks in the frequency band and 21.4-22 GHz in Regions 1 and 3 for the enhancement of equitable access to this frequency band"

RESOLUTION 554 "Application of pfd masks to coordination under No. 9.7 for broadcasting-satellite service networks in the band 21.4-22 GHz in Regions 1 and 3"

RESOLUTION 555 "Additional regulatory provisions for broadcasting-satellite service networks in the frequency band 21.4-22 GHz in Regions 1 and 3 for the enhancement of equitable access to this frequency band"

RESOLUTION 557 "Consideration of possible revision of Annex 7 to Appendix 30 of the Radio Regulations"

4.1.2 Recommendations (<https://www.itu.int/rec/R-REC-BO/en>)

BO.1213 "Reference receiving Earth station antenna pattern for the broadcasting-satellite service in the 11.7-12.75 GHz band"

BO.1408 "Transmission system for advanced multimedia services provided by integrated services digital broadcasting in a broadcasting-satellite channel"

BO.1516 "Digital multiprogramme television systems for use by satellites operating in the 11/12 GHz frequency range"

BO.1659 "Mitigation techniques for rain attenuation for broadcasting-satellite service systems in frequency bands between 17.3 GHz and 42.5 GHz"

BO.1696 "Methodologies for determining the availability performance for digital multi-programme BSS systems, and their associated feeder links operating in the planned bands"

BO.1724 "Interactive satellite broadcasting systems (television, sound and data)"

BO.1774 "Use of satellite and terrestrial broadcast infrastructures for public warning, disaster mitigation and relief"

BO.1784 "Digital satellite broadcasting system with flexible configuration (television, sound and data)"

BO.1900 "Reference receive earth station antenna pattern for the broadcasting-satellite service in the band 21.4-22 GHz in Regions 1 and 3"

BO.2063 "Alternative BSS earth station antenna radiation pattern for 12 GHz BSS bands with effective apertures in the range 55-75 cm"

BO.2098 "Transmission system for UHDTV satellite broadcasting"

4.1.3 Reports (<https://www.itu.int/pub/R-REP-BO/en>)

BO.2007 "Considerations for the introduction of broadcasting-satellite service of high-definition television and ultra-high-definition television systems in the band 21.4-22 GHz"

BO.2071 "Broadcasting-satellite service system parameters between 17.3 GHz and 42.5 GHz and associated feeder links"

BO.2101 "Digital satellite broadcasting system (television, sound and data) with flexible configuration"

BO.2102 "Multiple-feed BSS receiving antennas"

BO.2397 "Satellite transmission for UHDTV satellite broadcasting"

4.2 Latest topics on satellite broadcasting

4.2.1 4K/8K Broadcasting in Japan

Japan has laid out a future vision for 4K/8K broadcasting roadmap and started providing 4K/8K programs via satellites, cable, IPTV. The launches of 4K/8K broadcasting via satellites are as follows:

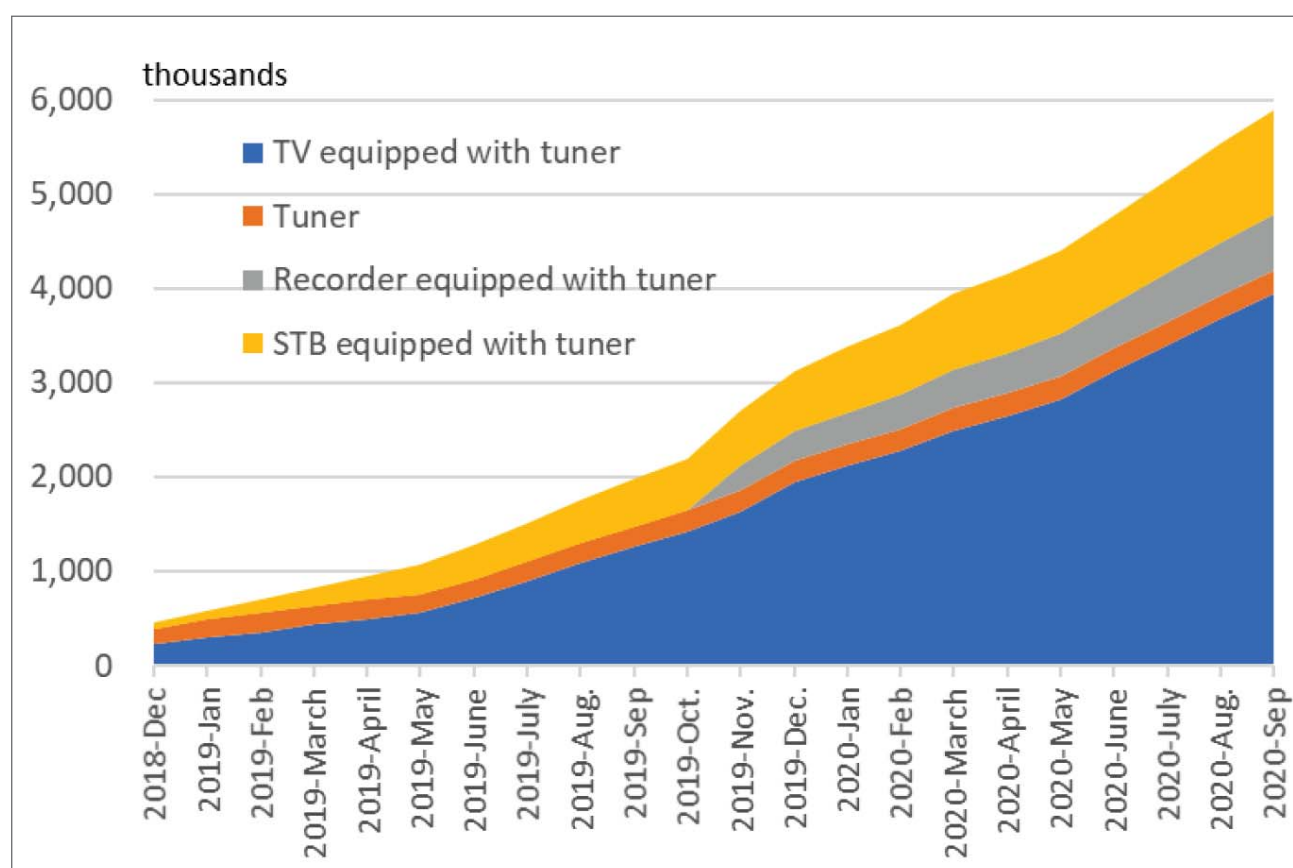
2014 June 4K test broadcasting via communication satellites of 124/128E

2015 March 4K full broadcasting via communication satellites of 124/128E
2016 August 4K/8K test broadcasting via broadcasting satellites of 110E
2018 December 4K/8K full broadcasting via broadcasting satellites of 110E

The technical specification of the transmission system called "ISDB-S3" for 4K/8K full broadcasting is shown in Rep. ITU-R BO.2397 as follows:

Frequency	Uplink: 17GHz-band Downlink: 12GHz-band
Bandwidth	34.5 MHz
Symbol rate	33.7561 Mbaud
Roll-off factor	0.03
Modulation	16-APSK
Inner coding rate (LDPC)	7/9
Information bit rate	100.0 Mbps
Multiplexing	MMT
Video coding	H.265/HEVC
Audio coding	MPEG-4 AAC

4K/8K television ownership has been increasing. It reached to 7.8% in March 2019, 9.9% in July 2019, 14.4% in May 2020, respectively. The number of the shipment of 4K/8K receivers has been increasing to about 6 million units as of September 2020. ■



2020 ABU Engineering Awards

The 2020 Technical Awards were held virtually on 24 November during the ABU Technical Committee.

ABU
ENGINEERING AWARDS
2020

The Engineering Awards consist of the ABU Broadcast Engineering Excellence Award, the ABU Engineering Industry Excellence Award, the ABU Green Broadcast Engineering Award and the ABU Developing Broadcasters' Excellence Award.

The ABU Engineering Awards were judged by two panels of judges.

Mr Hamid D Nayeri chaired the Broadcast Engineering and Developing Broadcasters' awards panel and Dr Kong Bin chaired the Engineering Industry and Green Broadcast awards panel. The panel members were Mr Sunil, DD-India, Mr Masashi Kamei, NHK-Japan, Ms Hong, Young-Kyung, KBS-Korea, Dr Fintan Mc Kiernan, Ideal Systems, Mr Charles Sevier, Dell EMC, Mr Asaad Sameer Bagharib, Thinking Tub Media, Mrs Putri Jolaina bin Yaacob, RTM-Malaysia, Mr Naoki Kashimura, Ikegami-Japan, Mr Peter Bruce, PBruce Consultants and Mr Alexander Zink, Fraunhofer-Germany.

KOBA

The sponsor of the 2020 ABU Green Broadcast Engineering Award is KOBA. We highly appreciate their support. Our thanks also to KBS for initiating the sponsorship.



Mr Iwaki Masakazu

The **ABU Broadcast Engineering Excellence Award**, which recognises contributions of an outstanding nature in broadcast engineering made by an individual in a broadcasting organisation was awarded to **Mr Iwaki Masakazu** of NHK-Japan. Mr Iwaki is Senior Director at Senior Director of NHK Engineering System Inc and won the award for his promotion of AI technologies for programme production and his outstanding contributions to the ABU Technical Committee and ABU activities.



Expressing his gratitude, Mr Iwaki told the meeting he had spent most of his career as a research engineer at the NHK Science &

Technology Research Laboratories (STRL).

He recalled that his first research and development project had been to develop an ice-zone microphone system to pick up the sound of ice skating. The system had been used at the Nagano Winter Olympics in 1998. Mr Iwaki said he had recently managed the promotion of the effective use of AI technologies for programme production.

The laboratories were focusing on the AI transcription system, AI announcer, AR/VR technologies for sports events and so on.

Mr Iwaki held important posts in the ABU Technical Committee for more than a decade. These included transmission topic chairman, vice chairman and chairman.

The **ABU Engineering Industry Excellence Award**, which recognises the most outstanding engineering contribution made by an individual to the broadcasting industry in the region, was awarded to **Ms Zhang Hong**, Director General, Radio and Television Administration of Guangxi Zhuang Autonomous Region, RTPRC-China who won the award for her outstanding leadership of the broadcasting industry of Guangxi Zhuang Autonomous Region.

Ms Zhang Hong thanked the ABU for recognising China's Smart Broadcasting project and her work and for giving her this great honour.

She said the honour also belonged to the policy projected



Ms Zhang Hong



by NRTA-China and the leadership of the government of Guangxi and the teamwork of the Guangxi broadcasting group.

Ms Zhang Hong said that for two years, difficulties had been overcome by working diligently to use all resources available to keep the mission firmly in mind.

Smart Broadcasting was creating not only a non-contact economy pattern but also a non-contact way of living. "What is in front of us is not only television but also the infinite wisdom of humankind."

The **ABU Green Broadcast Engineering Award**

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

The 2020 winner was the Radio, Film & TV Design and Research Institute, China who won the award for promoting environmental protection measures and green initiatives in the design and construction of the Guangzhou TV Tower.

Mr Pan Guolin on behalf of DRFT said the award was an honour for every participant in the project. DRFT had undertaken almost all the design works of China aid projects and domestic projects related to radio and TV.

He said DRFT would accept the award as an opportunity to strengthen technological capacity and would continue to contribute to the Chinese development characteristics and ecological concept of green environmental protection in modern architecture in China.

There were no nominees for the ABU Developing Broadcasters' Excellence Award this year.



Mr Pan Guolin



ABU TECHNICAL REVIEW PRIZES 2020

The ABU Technical Review Prizes were awarded for articles contributed to the Technical Review from October 2019 to September 2020. The prizes were judged by the ABU Technical Committee Chairman and Vice-Chairmen.

Three prizes were presented each from the categories of Practical Implementation, Research and Case Studies.

The winners for the **Best Article on Practical Implementation** are **Mr R. Arul, Mr S. Gurumanickam** and **Mr K. Balaji** of Doordarshan India who co-authored the article titled Indigenous News Automation Software at DDK Chennai which appeared in the April-June 2020 issue of the ABU Technical Review.



The **Best Article on Research** was co-authored by **Dr Kazuyoshi Shogen** of B-SAT, Japan and Mr Thong Pham Viet of ITU-R. Their article titled Effectiveness of Frequency Sharing Criteria in the Broadcasting Satellite Link appeared in the October-November-December 2019 issue of the ABU Technical Review.

The winner of the **Best Article on Case Studies** is **Mr M S Duhan** of Doordarshan-India who authored the article titled Seminal motives for Digital TV: Metamorphosis of ATT into DTT, which appeared in the January-March 2020 issue of the ABU Technical Review. ■





WorldDAB and the ABU hosted a three-day virtual DAB+ technical webinar series at the end of October, aimed at broadcasters and other radio stakeholders in the Asia-Pacific region.

Over 100 people per day took part in the real-time online event. The webinar addressed all aspects of implementing DAB+ digital radio, giving practical advice and guidance for broadcast stakeholders in the Asia-Pacific region planning to digitise radio.



Speakers from across the radio industry took part in the event, discussing a wide range of topics.

Joan Warner, WorldDAB Vice President & Asia Pacific Committee Chair, opened the event with the commercial business case for DAB+ and emphasised the importance of radio during emergencies. She also announced the launch of the WorldDAB Asia-Pacific Technical Group.

Les Sabel from S-Comm Technologies gave a technical overview of DAB, as well as covering a number of other topics in sessions on hybrid radio, the importance of

transmission and monitoring system capabilities and RF coverage planning considerations.



Drawing on her extensive knowledge gained from working in the Australian commercial radio sector, **Kath Brown** from S-Comm Technologies shared her knowledge on how to establish a DAB+ market, and where DAB+ sits alongside other platforms in a competitive media environment. She gave advice on how to approach the regulator as an industry with an agreed plan and she emphasised the importance of working closely with the automotive and retail sectors.



NBTC Thailand's **Orasri Srirasa** gave an overview of the status of the DAB+ trial and implementation in Thailand. Thirteen stations are currently broadcasting as part of the

trial that went on air in Bangkok in April 2019.



Using Hit and Triple M Digital Radio as examples, Southern Cross Austereo's **Adam Williscroft** described how DAB+ has helped SCA extend its brand and reach leading to increased revenue. Thanks to DAB+, SCA has increased reach with people aged 10 and over by 8.3 percent.

Andrew Bolton from Special Broadcasting Service (SBS) told delegates how DAB+ enabled them to offer more and diverse programmes, grow audiences and support SBS's purpose of promoting social cohesion.



Albert Tseng from Keystone Semiconductor gave insights on the different DAB+ receivers available to

consumers and how to build a local DAB manufacturing industry, which will give guidance on the technical aspects of implementing DAB+ digital radio, with help and advice that is tailored specifically to the needs of the region.



Roger Lancot from Strategy Analytics updated delegates about developments related to connected cars and their impact on the radio industry. With growing competition

within the media industry, digital radio's place in the car is all but secured, and content providers need to know who their listeners are, and what meaningful content sounds like to them across different delivery modes, he said,



Paneda's **Lars Peder Lundgren** explained DAB+ encoding and multiplexing systems and the solutions offered by Paneda, a DAB multiplexing system supplier with over 100 systems on-air worldwide.



Rich Redmond from GatesAir International told delegates about new developments with DAB transmission networks that allow for network design flexibility, and how energy consumption and costs can be impacted depending on the type of transmitters used.

The webinar series concluded with an invitation from the chair of the new Asia Pacific Technical Group, Dr Les Sabel, to all webinar attendees to join and contribute to the inaugural TG meeting on 2 December. ■



Asia-Pacific
Technical Group

WorldDAB's new Asia-Pacific Technical Group kicks off

WorldDAB has launched the WorldDAB Asia-Pacific Technical Group (APAC TG), a forum dedicated to assisting broadcast radio industry stakeholders in the Asia-Pacific region implement DAB+.

The group's first meeting took place online on 2 December 2020, bringing together more than 20 attendees over two hours.

Several members provided overviews of the status of DAB+ digital radio in their country, including updates on the significant trial activities in Thailand and Vietnam.

WorldDAB is the global industry association responsible for defining

and promoting DAB digital radio.

The technical group offers participants the opportunity to discuss and work together on all technical aspects of DAB+ digital radio, with information tailored specifically to the region.

The group aims to ensure all activities are aligned with the DAB standards and will refer sustained new ideas or thinking back to WorldDAB Committees.

Membership is open to broadcasters, governments, regulatory bodies, network providers, equipment and receiver manufacturers – both members and non-members of WorldDAB.

The group will meet up to four times per year, with most meetings held virtually. There will be at least one physical meeting every year. Meeting attendance and activity is voluntary.

"The launch of the Asia-Pacific Technical Group is a testament to the growing interest in DAB+ across the APAC region," said WorldDAB Vice President & Asia Pacific Committee Chair Joan Warner.

"Through this group, WorldDAB will be able to plan and deliver practical, on the ground assistance to countries moving forward with DAB+." ■

ABU assists Voice of Vietnam with **Multiplatform Broadcasting**

A Technical Advisory Service mission to train Voice of Vietnam personnel on multiplatform broadcasting took place online on 7 October 2020.

A team of experts from Benchmark Broadcast Systems (S) Pte Ltd, a system integration company based in Singapore, conducted the training.

Benchmark Broadcast Systems (S) Pte Ltd of Singapore is a Leading System integration company. Headquartered in Singapore, and a key member in the ABU secretariat, Benchmark was tasked by the ABU to provide a technical workshop to VoV (Voice of Vietnam) who were looking for an expert to deliver an online training course on multiplatform broadcasting.

The Areas to be covered were:

- Radio Distribution on Internet (Mobile, website, social, podcast)
- Technology for Multiplatform Radio Production: Video, Text, Picture, Audio.

Technical solutions to create radio programmes which would be more interactive with listeners. (Also, to introduce some software formats used by Broadcasters around the world)

- Audio streaming technology for Internet platforms. (Additionally, introducing some software and hardware solutions.)
- The technology of live broadcast, live streams on social platforms.
- The issue of Content Distribution, copyright to effectively distribute radio programmes on multiple platforms. (For example, the technology that would allow content to only be accessed within Vietnamese territory. Or, user cases for dealing with copyright infringement...)

Execution

Based on the ABU request, Benchmark Formed a Task force comprising experts in respective domains and provided a comprehensive plan for webinars on all the above-mentioned topics. Some highlights of the webinars included concepts of IP Radio and its benefits, how Radio and TV could be monetised in a more efficient way, technologies involved in the radio domain, including visual radio and social media Integrations

Also covered were, DRM and Multi Broadcast Radio with technologies for radio distribution over IP and Satellite.

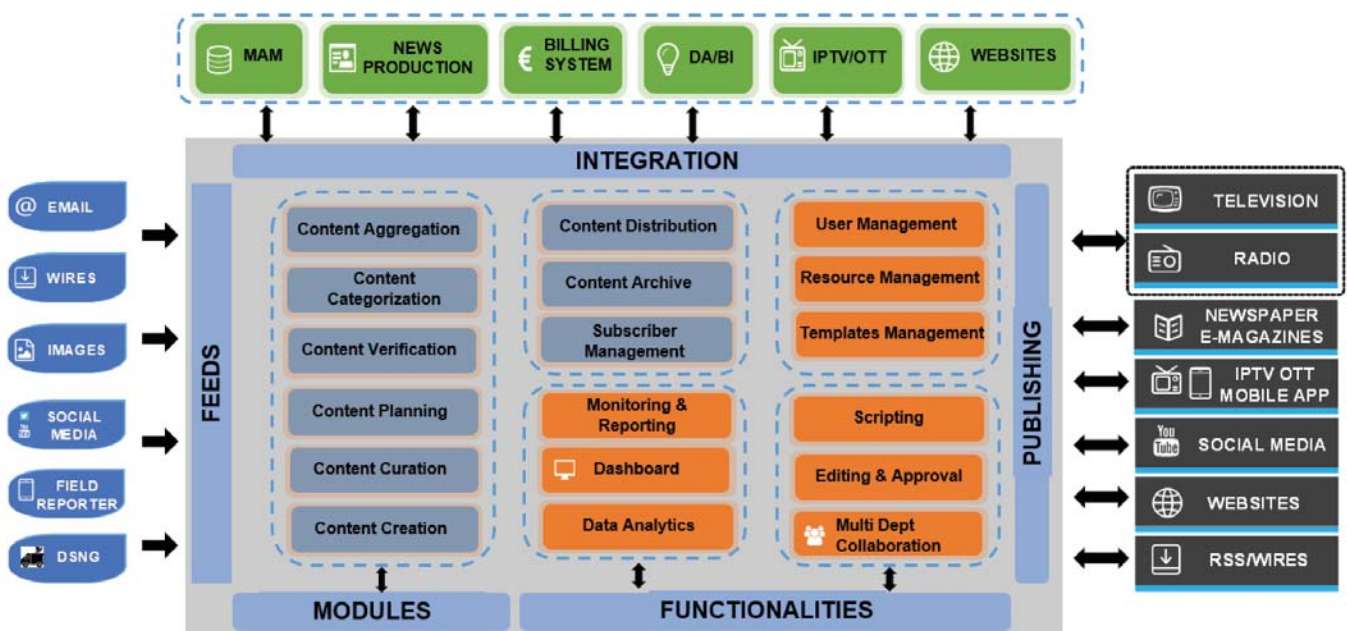
A lot of emphasis was given to the convergence platform, where the users can integrate all their daily workflow activities, including aggregation, verification, editorial planning and tasks. Also covered was content creation and management, along with multi asset management and cross channel publishing and monitoring from a single window.

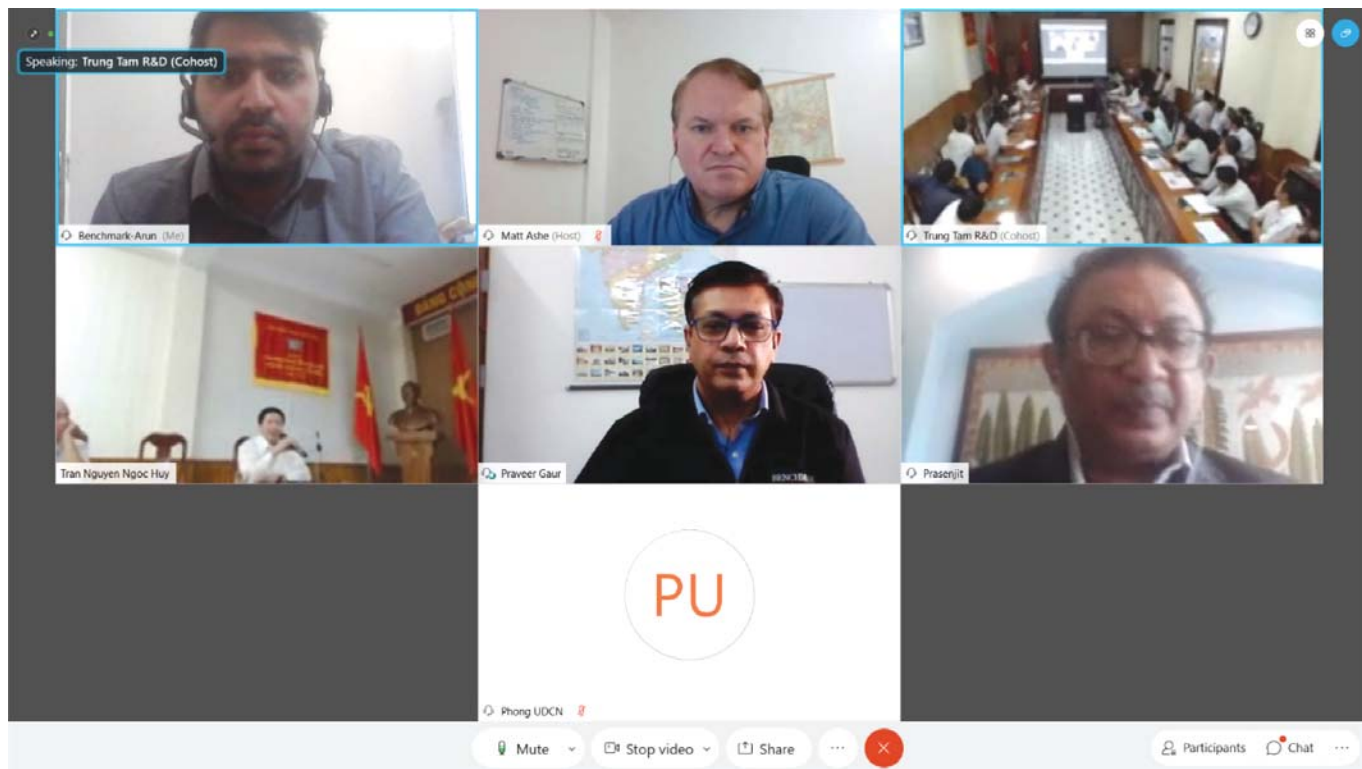
The Topics also extensively covered the use of the convergence platform for Radio, TV and Print media from a single interface, minimising the work for content creators and managers.

Cloud Radio Production on Multiplatform was again a highlight due to recent trends and the pandemic situation. For instance, how to handle remote production in a easy and efficient way.

The team on the three-hour interactive webinar session included radio broadcasters from other regional bureaux and companies associated with Voice of Vietnam. The total participant count was more than 50. ■

Convergence Platform





Benchmark Presenters



VOV Chairman's Inauguration Speech



Meeting in Action



TAS Participants

The Benchmark Broadcast Systems (S) Pte Ltd Team of Experts



Praveer Gaur
Strategic Accounts



Prasenjit Sengupta
Principal Consultant



Arun N
Lead Engineer



Matt Ashe
Regional Manager



Inter BEE 2020 held as online event

Inter BEE 2020, an international broadcast equipment exhibition, took place online as a three-day live event on 18-20 November.

More than 17,000 people registered for the event and visited the site. In all, it attracted more than 27,000 visitors including return visitors. The annual event is usually held in Japan.

Inter BEE 2020 will still be open to visitors until 26 February 2021. They can browse through exhibitor information and view presentations and conference sessions through archived videos on demand.

The event, now in its 56th year, is a comprehensive media event that brings together the latest information and innovation in video, broadcasting, communications, audio, lighting and media business, encompassing the content-based domains of "Create (production)," "Delivery (transmission)" and "Receive (experience)."

It is organised by the Japan Electronics and Information Technology Industries Association, JEITA. ■



IMTEC 2020 looks at key media issues

17th Iran Media Technology Exhibition & Conference (IMTEC 2020) under the slogan "The Second Phase of the Revolution: Media Technology Development" was held on 29 November-1 December.

Organised by the Deputy of Development and Media Technology Division at the IRIB International Conference Center, it provided opportunities for delegates to establish business or research relations and to find global partners for future collaboration.

The conference showcased new, exclusive content and senior level insights from across the media industry as well as unveiling latest technical developments in media technology and broadcasting. It was a key event for CIOs, heads of media, security specialists, tech experts, governmental entities, private companies and universities in Iran.

Mr Ahmed Nadeem, Director ABU Technology & Innovation, presented a paper on Cybersecurity & Media. Dr Veysel Binbay, ABU Senior Engineer – Broadcast Systems, gave a presentation on 'AI for Broadcasters, the future has already begun'. ■



**World
Broadcasting
Unions**

WBU-TC discusses spectrum, cybersecurity

Spectrum and cybersecurity issues came under the spotlight when the Technical Committee of the World Broadcasting Unions (WBU-TC) met online on 14 December 2020.

The two-hour meeting took place on Zoom and was chaired by John Lee of the North American Broadcasters Association, NABA.

Other issues discussed included Security of Personnel Working in the Field and NABA Social Engineering Recommendations.

Participants also heard a report on the Broadcast Technologies Futures Group 2020, set up by the European Broadcasting Union.

The group brings together senior broadcasting staff from media research and development laboratories. They share insights on possible future technologies that may be part of, and help shape, the media experience in the coming years.

The WBU represents all the world's major regional broadcasting unions. ■

CALENDAR *of Events*

JANUARY

Satellite Technologies for Broadcasters | Webinar
[ONLINE](#)

FEBRUARY

Training Course on Engineering Fundamentals for Broadcasters
[ONLINE](#)

5-8 APRIL

ABU DBS 2021 | Virtual Symposium
[ONLINE](#)

APRIL

Workshop on IP Infrastructure & Applications | Webinar
[ONLINE](#)

MAY

Workshop on OTT & IBB Systems for Broadcasters
[KUALA LUMPUR](#)

JUNE

Broadcast Asia 2021
[SINGAPORE](#)

ABU Technical Bureau mid-year Meeting
[SINGAPORE](#)

JULY

Workshop on Archiving and Media Management
[TBA](#)

AUGUST-SEPTEMBER

Annual Webinar Series 2021 | Webinar
[ONLINE](#)

OCTOBER

ABU Technical Bureau Annual Meeting
[HANOI](#)

ABU Technical Committee Meeting
[HANOI](#)

ABU General Assembly
[HANOI](#)

New
Member

The Research and Training Institute

The Research and Training Institute (RTI) of National Radio and Television Administration (NRTA) is the largest training institution in China's radio, TV, online media and audio-visual industry. Serving both Chinese and overseas professionals within the industry, the RTI shoulders the implementation of NRTA training programs and international media seminars, as well as the organization of training programs for media management, program producers and technical professionals. ■

News from The ABU Region

TVRI Indonesia Upgrades to Etere 30.3

Indonesia's state-owned TV station, Televisi Republik Indonesia (TVRI) upgrades to Etere 30.3 to tap on the latest innovations and to optimise the performance of their broadcast system. The station has been on-air with Etere since 2005. Etere empowers TVRI with a system driven by fully-customisable workflows, enabling their system to be perfectly in tune with their business and operational needs. As part of its customer support contract, Etere provides unlimited software upgrades and updates to meet evolving industry challenges. With a quick and easy software download, one can ensure the system is always ready to run with the latest features.

TVRI's broadcast production workflows, including media asset management, archive, playout automation, airsales and traffic management, are based on the flexible and scalable Etere Ecosystem which seamlessly integrates and connects all internal and external activities of a media company. Etere Ecosystem features a flexible framework that manages and tracks the complete workflow, embracing: financial management, supply chain and CRM, deal and contract management, work orders, production, dubbing, ingest, editing, indexing, subtitling, resource allocation, operational costs, air sales, user permissions, digital rights, multi-format and multi-platform content delivery, licensing, domestic and international sales, distribution and billing. With its precise controls, fault-resilient performance, advanced automation tools, real-time inter-connectivity and customisable workflows, Etere Ecosystem enhances operational efficiency and provides a smarter way to get things done for less. [\[Etere\]](#)

AIR to Expand Pure DRM Radio Services

After the disruption caused by the pandemic, All India Radio (AIR) decided not only to restart transmissions in pure digital mode but also to expand DRM MW Digital Radio services. According to a recent decision of AIR, the stations with single DRM MW transmitters are to carry two digital audio channels

in simulcast mode and three audio channels in pure digital mode with Journaline.

Timings of the pure digital mode are likely to be announced shortly. In the meantime, all the DRM MW stations have been asked to carry out test transmission immediately, to ensure readiness and sustainability of the transmitters for regular transmission of DRM in pure and simulcast modes. This will be an opportunity to carry out field survey.

Whether in simulcast or pure DRM, the first channel will be News 24x7. In pure DRM the third channel will be the popular Vividh Bharati music programme. It has further been decided that five major stations (Delhi, Mumbai, Chennai, Kolkata and Rajkot), which have 2 MW DRM transmitters each, will operate one of these transmitters in pure Digital mode throughout the day.

Six more stations (Hyderabad, Vishakhapatnam, Jagdalpur, Bhawanipatna, Sambalpur and Jeyapore), which have digital ready MW transmitters, have also been asked to test these transmitters for DRM digital transmissions. Infact test transmission in DRM has already started from Hyderabad and Vishakhapatnam. [\[asiaradiotoday\]](#)

Radio Pakistan Prepares to go Digital with DRM

The Pakistani public broadcaster (PBC) recently announced a three-stage plan to digitise its operations using the DRM technology. The budget for each phase of the project is currently under the consideration of the government.

Radio Pakistan has now decided in principle to install a 100KW digital (DRM) transmitter on the land of Sariat Quetta. This will be a welcome service for the large number of locals who have long been hoping for a modern digital transmitter in this area to listen to good audio quality programmes and local artists in their mother tongues. Once a budget has been allocated to the project, a tender will be put out publicly in order to acquire the transmitter. [\[asiaradiotoday\]](#)

First Virtual Edition of ConneCTechAsia an Enriching Experience

ConneCTechAsia, Asia's annual Infocomm Media and Technology event, concluded on October 2 after three days of insightful conference sessions and exhibitions on the latest solutions and trends empowering the digital economy. More than 6,800 attendees participated in the first fully virtual iteration of the event that featured 200 conference sessions, 280 speakers and 323 exhibitors. ConneCTechAsia also expanded its content to include new shows, conferences, competitions and award ceremonies.

Spread across four main virtual exhibition halls and 12 international group pavilions, the 323 exhibiting companies showcased their latest innovations and solutions and connected with attendees through videos, online chat and presentations.

One of the highlights of the event, the inaugural CommunicAsia Awards, recognised innovations and achievements by service providers from across the globe. The virtual award ceremony was held on September 30 and featured winners in the following categories:

- Best RAN Technology, won by Huawei Technologies with its Massive MIMO Enabling Superior 5G Experience.
- Most Innovative 5G Trial in APAC, went to the Faculty of Medicine Siriraj Hospital of Thailand for its implementation of 5G to build a secure, reliable and smart 5G hospital in Thailand.
- Telecom Service Innovation in Response to COVID-19, awarded to Robi Axiata for its Crisis Igniting Innovation Project.
- Most Significant Contribution to Edge Computing, won by SK Telecom for its multi-cloud 5G edge platform and services. [\[APB News\]](#)

Sony Acquires Nevion to Enhance its Portfolio

Sony Imaging Products & Solutions Inc. announced that it is acquiring Nevion AS, a leading provider of virtualised media production solutions, to further enhance its portfolio, providing end-to-end IP and cloud-based production solutions for broadcasting and other applications. Sony, which has been a minority shareholder in Nevion since July 2019, is purchasing the remaining shares in the company, and making it a subsidiary.

Sony has been at the forefront of IP-based production innovation for the past decade. In recent years, there has been an increasing demand in broadcasting and other business areas for remote production solutions and remote integration (REMI), as they allow resources such as equipment, facilities and even staff to be shared across locations in real-time, resulting in greater efficiency and effectiveness. The spread of COVID-19 has accelerated this trend, and the need of combining on-premise facility and cloud processing, enabling remote work and resource sharing, has become the basis of business continuity planning for the broadcast and production community. Since June 2019, Sony has had a strategic partnership with Nevion, and both companies have been collaborating to address those markets. This investment will enable Sony to build a much closer relationship with Nevion and lead to the delivery of more integrated solutions. [\[Sony\]](#)

South Asia Satellite will Help BBS Expand its Reach

BBS Radio and TV would soon reach every nook and corner of the country. This would be made possible with the help of the South Asia Satellite, which was launched in May 2020. The information and communications minister Lyonpo D. N. Dhunghyel said the ground works are currently underway to construct a satellite ground station.

At the introduction of the Bhutan Information Communications and Media Bill 2016, members of the National Council asked the minister about what was being done in regard to BBS's reach in the remote areas. He said the country's mountainous landscape poses daunting challenges. However, with the help of the South Asia Satellite, he added, the problem would soon be solved. The funds have been mobilised and planning is being done, drawings are being made and are hopeful of finishing the construction of the South Asia Satellite ground station in the next six months, after which every house will have access to BBS Radio and TV services.

The South Asia Satellite- a gift from India to its neighbouring countries- will be used by Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal and Sri Lanka. The satellite technology will also enable Bhutan to venture into new areas such as Navigation & GIS systems, and earth observation, and help overcome the challenges to progress in the scientific field. [\[BBS News\]](#)

Kazakh TV Distribution Expands with HD Distribution over MEASAT

In the most recent upgrade with the channel, Kazakh TV distribution service will commence in HD over the MEASAT-3a satellite with the help of iKO Media Group.

With HD distribution from iKO, Kazakh TV will be able to offer its channel, including live streaming, in HD quality to all its viewers around the globe. This upgrade to HD for Kazakh TV is part of iKO Media Groups' overall strategy to offer top of the line, advanced services to its client base. Upgraded services such as HD, 4K as well as a wide variety of streaming solutions are available.

Kazakh TV is the first national satellite TV channel of the Khabar Agency in Kazakhstan. It broadcasts internationally 24 hours a day in 5 languages via major satellite platforms including HotBird 13B, Galaxy 19, AsiaSat 5 and Yamal 401. The broadcast is available in 118 countries including North and Central America, Western and Eastern Europe, Asia, Australia and Oceania, North Africa and the Middle East. iKO Media Group, a global end-to-end service provider for broadcasters and content owners, has been collaborating with Kazakh TV, Kazakhstan's first national satellite television channel, for over 3 years. [\[MEASAT\]](#)

South Korea Partners with MBC on eLoran and 10-cm GPS

The government of South Korea signed an agreement for its new eLoran system to support digital radio and television broadcasts. The Memorandum of Understanding (MOU) also provides for the government to use commercial radio and television infrastructure to transmit GNSS integrity and correction information. Titled "Utilization of Next Generation Maritime PNT Information," the MOU is between the Ministry of Oceans and Fisheries and the public broadcaster Munhwa Broadcasting Corporation (MBC).

Timing signals from GPS/GNSS are often used to enable digital broadcasts. These signals have been regularly blocked by jamming from North Korea in the past. MBC officials report that using eLoran timing signals will allow the company to continue operations when signals from space are not available or reliable for whatever reason. Also in the agreement is the government's use of MBC's network to transmit GNSS integrity and correction information as part of a project to enable 10 cm location

accuracy. [\[ABU News\]](#)

Government Unveils Mega Plan for Digitalization of PTV

The Government of Pakistan is planning a major digitalisation of terrestrial network of PTV for the financial year 2020-21 that contains the expansion of Cable TV network to rural and far-flung areas, Over The Top (OTT) mass media platform which distribute Television content and related material along with film distribution and Direct to Home TV (DTH).

Associated Press of Pakistan said that the role of mass media is increased as it is more evident during the coronavirus pandemic. The media became more professional and shared constructive stories in the crisis. According to APP, a budget was passed which is worth Rs 440.51 million. The allocated budget was reserved for four ongoing projects and two new projects related to transmission, enhancement in audio/video signals, more coverage area, and refining production.

The PTV project "Moderation of Camera and Production Equipment" is the main digitalization project for the upgrading of the system from SD to HD along with better video and audio quality. At the moment 7 Pakistan Television stations are active in the country and 110 TV Transmitters, 33 Radio Stations, 57 FM Transmitters, 4060 Cable TV licenses and 234 FM Radio Licenses issued. Total TV viewership is 144 million and in those 144 million, the Cable and Satellite viewership stands at 96 million. [\[www.aboutpakistan.com\]](#)

Radio Voice of Vietnam Targets Internet Users with New Digital Platform

National radio broadcaster Voice of Vietnam (VOV) launched VOV Live – a digital platform that offers users unlimited access to the diversified content produced by VOV, including its huge archive of radio shows aired over the past 75 years. The latest news about Vietnam and the rest of the world, music and story-telling shows can also be found on VOV Live, which is available on several platforms such as Web, Wap (Wireless Application Protocol), Mobile App, and social media.

The broadcaster also revealed its new logo as part of the new Corporation Identify Programme (CIP) and to mark its 75th anniversary. At present, VOV has eight channels featuring specific topics such as breaking news, culture, music,

world, traffic and health. In addition, the national radio broadcaster is also the operator of Vietnam Digital Television (VTC) and VOV TV. The e-newspapers vov.vn and vtc.vn, and the newspaper Tieng Noi Viet Nam are also under VOV. [\[ABU News\]](#)

AsiaSat Awarded ISO/IEC 27001:2013 Certification for Information Security

Asia Satellite Telecommunications Company Limited (AsiaSat), Asia's premier satellite solutions provider, has been awarded the ISO/IEC 27001:2013 certification, a globally recognised international standard for Information Security Management System (ISMS) for its hosting service provided from AsiaSat's teleport in Hong Kong.

The certification validates the company's commitment to continually enhancing its service security and integrity to customers. AsiaSat received the certification following a security compliance audit validated by an independent audit firm, covering areas of operational and security control; information security policies and procedures; risk assessment and management; monitoring, measurement and evaluation.

AsiaSat's teleport is located at the Tai Po Industrial Estate of Hong Kong. This world-class facility includes nineteen C-, Ku- and Ka-band antennas and more than 50 TVROs to offer a wide range of value-added services to data and video customers including signal downlink, turnaround and uplink, fibre connectivity, transmission platforms and related services. [\[Asiasat\]](#)

NHK Developing 8K Camera on the Martian Moons eXploration (MMX) Spacecraft

The Japan Aerospace Exploration Agency (JAXA) and Japan Broadcasting Corporation (NHK) have decided to jointly develop a "Super Hi-Vision Camera" that is capable of filming 4K and 8K images in space for JAXA's Martian Moons eXploration (MMX) mission. This would be the first time in history that 8K ultra high definition images of Mars and its moons are taken in proximity. By combining the actual flight data of the MMX spacecraft and the images taken by the Super Hi-Vision Camera, the exploration of the MMX spacecraft around Mars and its moons (the Martian system), 300 million kilometers from the Earth, will be recreated.

JAXA is currently developing the MMX spacecraft to be launched in JFY 2024, with the aim of clarifying the origin of the Martian moons and the evolutionary process of the Martian system. MMX is an internationally high-profile sample-return mission that aims to conduct scientific observations of the Martian moons, Phobos and Deimos, and of Mars, as well as land on Phobos to collect "sand" from its surface to return to Earth.

NHK is developing the Super Hi-Vision Camera in order to visualize MMX's challenges in ultrahigh definition images and broadcast them widely, with cooperation from JAXA. Images taken at regular intervals are partially transmitted to Earth to create a smooth image. The original image data is planned to be stored in a recording device in MMX's return capsule and brought back to Earth.

By filming MMX's mission in the Martian system with the newly developed Super Hi-Vision Camera, JAXA and NHK will work together to convey the appeal of a new horizon that has never been seen in detail before, to many people in a vivid and inspiring way. [\[NHK News\]](#)

Effective Spectrum Management Key to an All-inclusive Digital Economy in Asia-Pacific Countries

Experts and officials from the Asia-Pacific Region met virtually to discuss implementation of WRC-19 decisions. The ITU Regional Radiocommunication Seminar 2020 for the Asia-Pacific Region (RRS-20-Asia-Pacific) was held virtually from 19-30 October.

The seminar provided participants with an opportunity to learn the basic concepts of spectrum management at national and international levels and their connection to the provisions of the ITU Radio Regulations. Also discussed were future radio-frequency spectrum requirements for radiocommunication systems in the context of outcomes of the ITU World Radiocommunication Conference (WRC-19) held in Sharm el-Sheikh, Egypt, in 2019.

The Seminar covered the regulatory framework for both terrestrial and space services and the procedures for recording frequency assignments in the Master International Frequency Register (MIFR). It also included basic training on software tools developed by ITU for frequency notices for those services and for technical examinations. Various tutorials also enabled

participants to familiarise themselves with ITU notification procedures, as well as with the software and electronic publications made available by the ITU Radiocommunication Bureau to the Administrations of Member States and the ITU Radiocommunication Sector (ITU-R) Members.

RRS-20-Asia-Pacific concluded with a Forum entitled WRC-19 outcomes: challenges and opportunities for the Region. The Forum featured panel sessions about diverse radiocommunication services and systems, including among others: digital TV, broadband satellites (GSO and non-GSO), IMT and other wireless broadband technologies, high-altitude platform stations (HAPS), Radio Local Area Networks (RLAN)/Wi-Fi, maritime and aeronautical systems, intelligent transport systems (ITS), emergency communications, 5G spectrum pricing, and the WRC-23 agenda. The seminar drew more than 300 participants from over 30 countries, as well as 10 international organizations, and representatives of the telecommunication industry, operators, international organizations, associations, and academia from the Asia-Pacific Region. [\[ITU News\]](#)

NBC PNG Launches Transmitter Projects

The Papua New Guinea National Broadcasting Corporation launches a million-kina transmitter project to improve the National Radio Service in the entire Highlands and parts of the Momase region.

Eastern Highlands province which shares borders with Highlands and Momase regions will host the transmitter at Fimito. The NBC Fimito Medium Wave Transmitter project will also benefit parts of the Momase region, as well as the Gulf province. Information and Communication Technology Minister Timothy Masiu and Eastern Highlands Governor Peter Numu officially did the groundbreaking ceremony at Fimito a few kilometers out of Goroka town.

Minister Masiu said Papua New Guineans still lack vital information and communication services. This is largely due to the aging existing NBC communication infrastructure around the country including that of the Highlands region hence Radio Services via NBC provincial stations network to some parts of the country were affected. [\[ABU News\]](#) ■

DIGITAL BROADCASTING *Updates*

DVB-I and DVB-MABR published as ETSI standards

ETSI has published two of DVB's new landmark specifications as formal standards. TS 103 770 specifies service discovery and programme metadata for DVB-I services and TS 103 769 is for adaptive media streaming over IP multicast. Both DVB-I and DVB-MABR featured during the DVB DEMOS 2020 event with live demonstrations of implementations from several different vendors.

DVB-I

The DVB-I service discovery specification defines the mechanisms to be used to find sets of linear television services delivered through broadband or broadcast mechanisms, as well as methods to retrieve electronic programme data for those services.

DVB-I services can be consumed on any device with a suitable internet connection and media player, including TV sets, smartphones, tablets and media streaming devices. While they may be delivered by broadcast or broadband, DVB-I services are more likely to be those delivered via broadband IP using DVB-DASH.

Multicast ABR

While unicast streaming is well suited to unsynchronised media consumption, or consumption

of linear streams by smaller audiences, multicast streaming enables IP-based linear media distribution that is both efficient and scalable to very large audiences.

DVB-MABR (Multicast Adaptive Bit Rate) specifies a reference functional architecture for an end-to-end system that delivers linear content over IP networks in a scalable and standards-compliant manner. Scalability is achieved by means of IP multicast operating in parallel with and alongside conventional unicast delivery. [\[DVB\]](#)

Two DRM specifications published by ETSI

ETSI TS 101 968 – DRM data applications directory: This fully backward compatible update and simplification of the core DRM standard itself contains updates to the table of FAC (Fast Access Channel) application identifiers to include SlideShow and the special indicator that allows lower power monitoring for emergency warning receiver wake-up.

ETSI TS 103 771 – DRM regional text profiles: This is a new specification for the regional text profiles, which include the Core Indian profile. This new specification is meant to support the DRM roll-out worldwide by ensuring proper receiver support for local Unicode scripts in various countries. It is a companion specification that will become fully effective when the main DRM system specification, ES 201 980, is approved and published, because that has all the definitions for better text handling, the clean-up of the coding and modulation and the extra details for the low-power emergency warning monitoring. [\[DRM\]](#)

BBC research shows DAB is the most energy-efficient radio platform

At worldDAB General Assembly, the BBC's sustainability data scientist Chloe Fletcher presented the findings of a BBC study looking at the energy footprint of BBC radio. Using the BBC's listening figures from 2018, the research compared the energy consumption of the BBC's radio stations across all analogue and digital platforms.

The research – which compared AM, FM, DAB, IP and DTV radio services – found that DAB radio services have the lowest energy consumption per device hour, and determined that in the long-run, retaining DAB and IP only would lead to the largest energy savings.

According to the results of the research, FM had the highest levels of energy consumption, claiming around 31% of the total energy. AM had the lowest at 8%, while DAB had about 20%. However, as pointed by Fletcher, not all platforms were used equally in 2018, and this particular figure did not take into account the usage of each individual platform, with FM and DAB having a much higher listening share than other platforms – particularly AM and DTV.

When looking at energy consumption levels per device per hour, the research indicated that DAB radio services have the lowest energy consumption compared to other platforms, at 9-Watt hours (Wh). The study also found that FM radio services use approximately 40% more energy per hour than DAB – “mainly because of the higher power consumption of the FM

transmitter network”, as well as the fact that “DAB radios tend to have a lower standby power on those devices” said Fletcher.

The research modelled a variety of scenarios to determine where exactly energy could be saved, and while most scenarios showed energy saving potential, retaining DAB and IP – and switching off analogue services and – led to the largest energy saving by far. The study also underlined the importance of reducing electronic device standby energy consumptions, as these are the biggest contributors to the total energy consumption.

This work forms part of the BBC’s commitment to reducing the environmental footprint of media services and technology through the BBC Greener Broadcasting strategy.

By taking a system-wide approach, the BBC has highlighted the complexities across the radio chain and potential interventions to reduce the negative environmental impacts within it. The findings of this research are now being shared far and wide to educate the community and seek change through industry collaboration. [\[WorldDAB\]](#)

ITU completes evaluation for global affirmation of IMT-2020 technologies

The radio interfaces that will be used in full-scale commercial deployment of fifth generation mobile communication networks have achieved global validation with the successful evaluation by ITU of three new technologies that conform with the International Mobile Telecommunications 2020

(IMT-2020) vision and stringent performance requirement. The technologies are: 3GPP 5G-SRIT and 3GPP 5G-RIT submitted by the Third Generation Partnership Project (3GPP), and 5Gi submitted by Telecommunications Standards Development Society India (TSDSI).

During the multi-year development and evaluation process by the ITU Radiocommunication Sector (ITU-R), these technologies were deemed to be sufficiently detailed to enable worldwide compatibility of operation and equipment, including roaming.

The outcome of this first release of IMT-2020 supporting 5G is a set of terrestrial radio interface specifications which are incorporated into a global standard in the ITU-R Recommendation titled ‘Detailed specifications of the radio interfaces of IMT-2020.’ This is in final approval to the 193 Member States of ITU.

The evaluation of the candidate technologies was not carried out by ITU-R alone. It was a highly collaborative process with substantial input from and coordination with ITU Member States, equipment manufacturers, network operators, and involved national, regional, and international standards development organizations, partnerships, the academic community and fora, since ITU-R provides a unique global framework to discuss the capabilities of new radio technologies.

In early 2012, ITU initiated the development of “IMT for 2020 and beyond”, setting the stage

for 5G research activities and in 2015 established the vision and requirements for the globalisation of 5G. Under ITU’s ongoing IMT programme, ITU membership is continuing its long-standing contribution to mobile communications, facilitating its mission to be “committed to connecting the world.” [\[ITU News\]](#)

Enhanced Free-To-Air Viewing by Eutelsat

Sat.tv, the enhanced electronic programme guide for free-to-air (FTA) TV channels brings unique value, enabling broadcasters to target specific markets from Eutelsat’s video hotspots and engage with massive audiences.

Channels are referenced in FTA set-top-boxes, with prominent channel numbering for each relevant market, comprehensive programme information, content search and reminders, maximising the conversion of massive satellite reach into real TV audience. Unique features for the FTA world, such as a channel line-up that is both regionalised and always up-to-date, give audiences an enhanced user experience with relevant content to watch.

Available at Eutelsat’s 7/8° West orbital position, the leading TV neighbourhood for the Middle East and North Africa reaching over 56 million homes, Sat.tv is being progressively deployed at other Eutelsat video neighbourhoods. [\[Eutelsat\]](#)

NAB Show and AES Convention to Co-locate in Fall 2021

The NAB Show and Audio Engineering Society fall convention are heading to Las Vegas, as the two conventions

will co-locate for their 2021 editions set to take place in October.

The NAB Show in Las Vegas has moved its usual spring schedule to fall as a result of the ongoing coronavirus pandemic. AES convention for pro audio professionals has co-located with NAB Show New York from 2017-2019 -both events took place virtually in 2020- but will now share the stage with NAB's signature event for 2021. [\[tvtechnology\]](#)

NHK Research on Space-Sharing Content Viewing System Using VR and AR

NHK Science & Technology Research Laboratories (STRL) is conducting research on new media technologies for the future, including new viewing styles utilizing virtual reality (VR) and augmented reality (AR) technologies. STRL has developed a space-sharing content viewing system that enables users to view content as if a person at a distant location is together with them in the room.

A user of the system can, for example, enjoy VR images of an aquarium with the feeling that a friend, who is actually at a distant location, is sitting beside them. 3D images of the friend at the distant location are composed with the aquarium VR images and presented on a head-mounted display (HMD), creating an experience that feels like the friends are together at the aquarium.

3D images of the friend at the distant location are captured in real time using a camera with a depth sensor and transmitted to the user. Similarly, 3D images

of the user are also captured, sent to the friend, composed with the aquarium VR images, and displayed. Thus, the friends can view the content while communicating with each other through conversation, hand gestures, and body language.

AR technology combined with the use of a camera-equipped HMD can be used to compose 3D images of performers as if they are in the user's own room. These 3D images can then be viewed while communicating with a friend at a distant location. [\[NHK STRL\]](#)

Sony Electronics Launches Groundbreaking Spatial Reality Display

Sony Electronics Inc. announced the debut of the Spatial Reality Display (SR Display), a groundbreaking new product made with Sony's award-winning Eye-Sensing Light Field Display (ELFD) technology.

The display, initially shared with attendees at the Consumer Electronics Show in January 2020, does not require virtual reality glasses or a headset. The SR Display enables creators across a variety of industries, from automotive and industrial design, to Computer Graphics (CG) and Visual Effects (VFX) designers and creators in film to bring ideas to life in stunning 3D displays.

Using spatial reality to combine the virtual and physical world, the Spatial Reality Display creates an incredible 3D optical experience that is viewable to the naked eye. This is made possible by several technologies such as High-speed Vision Sensor, Real-time Rendering Algorithm, Micro Optical Lens.

Sony's dedicated SDK makes it easy for designers to create content for the SR Display. The SDK is compatible with industry-standard tools Unity and Unreal Engine, so creators can work within an already-familiar production environment and can be used to develop interactive applications in gaming, VR, construction, and automotive design. [\[Sony\]](#)

Society of Broadcast Engineers Releases ATSC3.0 Specialist Certification

The Society of Broadcast Engineers, in its continuing effort to advance its programme of certification, has added a new Specialist Certification to its offerings: The ATSC3.0 Specialist. In addition to various certification levels that require a certain time of professional career experience and cover a broad knowledge base, the SBE offers several Specialist Certifications, each one focusing on a specific understanding of a technology. The SBE began its programme of certification in 1975.

The new level of certification was developed by the Society of Broadcast Engineers Certification Committee with direct assistance from the Advanced Television Systems Committee.

The initial idea to create the SBE ATSC3.0 Specialist Certification began in 2018. The SBE Certification Committee worked closely with key ATSC members for input on suitable information to include in the exam. The Certification Committee also worked with several SBE members with direct experience installing ATSC 3.0 systems.

The first SBE Specialist Certification was offered in 2005. The existing Specialist Certifications are the 8-VSB Specialist (8-VSB), AM Directional Specialist (AMD) and Digital Radio Broadcast Specialist (DRB). To apply for a specialist certification, an individual must currently hold certification on the Broadcast Engineer, Senior Broadcast Engineer, Professional Broadcast Engineer or Broadcast Networking Engineer Certification level. [\[ATSC\]](#)

Global Survey from Dolby Reveals New Trends in Home Entertainment Consumption

Dolby Laboratories Inc., a leader in immersive entertainment experiences, released findings from a new global survey illustrating a significant shift in consumer entertainment behaviour. Findings include a strong intent from consumers to pay more for enhanced picture or sound quality, new ways of interacting with friends and family while enjoying entertainment, and insights that people are investing more in their home entertainment.

From this survey, it remains clear that consumers continue to want, demand, and are willing to spend more on enhanced experiences, now more than ever.

Consumers seek out better audiovisual experiences and new ways of interacting with friends and family. Globally, 87% of people who connected over entertainment virtually did so for the first time ever in the last six months.

The survey, in partnership with Wakefield Research, polled 5,000 respondents from China, France,

India, and the U.S. – examining consumption behaviour, device buying decisions, and new habits being formed in the wake of this unprecedented year.

With more time than ever before to watch and engage with entertainment, consumers are accelerating their interest in immersive content and new experiences. [\[Dolby News\]](#)

MPEG-H 3D Audio format to Denon & Marantz Home Theatre Components

Fraunhofer IIS, primary developer of the MPEG-H Audio standard, announced the immediate availability of the MPEG-H 3D Audio format across a wide range of home theatre products alongside Sound United LLC, parent company to Denon, Polk Audio, Marantz, Definitive Technology, HEOS, Classé, and Boston Acoustics. The selected Denon and Marantz AV amplifiers and AV preprocessors will receive MPEG-H support via a firmware update.

MPEG-H Audio, primarily developed by Fraunhofer IIS, is an open ISO standard and the industry's most advanced audio system for UHD-TV and streaming. It supports both immersive sound and the ability for users to adjust elements in the audio to their preferences. MPEG-H has been on the air since 2017 on all TV networks in South Korea under the ATSC3.0 standard. It was also selected for new broadcast standards to be launched in Europe, China and Brazil.

With support for MPEG-H in Denon and Marantz AVRs, consumers can now enjoy immersive and personalized

audio in the highest quality and faithful to the creative intent of the creator. This will especially enhance the consumer experience for sports, music, TV drama, and film content.

Sound United will also leverage the Fraunhofer MPEG-H Audio System Trademark Programme to test its MPEG-H Audio home theatre products and ensure interoperability with other manufacturers' products that carry the MPEG-H Audio logo. [\[Fraunhofer IIS News\]](#)

Freesat adds BBC Sounds app

BBC Sounds has launched on the Freesat platform, not long after making its debut on the Freeview terrestrial TV service. Freesat, the UK's free to air satellite TV platform, has just added BBC Sounds to its latest range of 4K TV Boxes and growing portfolio of apps.

The BBC Sounds app offers over 80,000 hours of music, radio and podcasts, live and on demand, from the public service broadcaster.

Freesat said that as the first lockdown hit and more people began working from home, it saw a resulting change in listening habits as a greater number of customers began to access radio content through its set top boxes. Customers now average 11.6 hours per month listening to the radio, up from just over 9 hours per month prior to the pandemic.

BBC Sounds, which has around 3.5 million weekly users has been available on the Humax Freeview Play range of recorders from September. [\[csimagazine\]](#) ■

Equipment Trends



SingEx teams up with Ideal Systems for Singapore event

SingEx, the company that operates Singapore EXPO & MAX Atria, selected Ideal Systems to provide a NewTek NDI® solution for its first hybrid event since the outbreak of COVID-19.

The third edition of Industrial Transformation ASIA-PACIFIC – A HANNOVER MESSE event (ITAP 2020) took place in Singapore EXPO & MAX Atria with full COVID-19 precautions, safe distancing, safe entry

and Singapore's TraceTogether mobile app.

Due to COVID-19 travel restrictions and health concerns, the event was changed to a hybrid physical and online event with local and virtual attendees and panelists.

There were over 5,000 registered attendees, while 100 invited guests were physically present for the opening ceremony. For greater interactivity and audience engagement, Ideal Systems was selected to

provide critical NDI® and AV infrastructure for the event.

The solution Ideal Systems provided was based on NewTek™ NDI® at the heart of the event control and command center. The system used the advanced functionality of the new NewTek™ TriCaster 2 Elite which provided a key feature called "Live Call Connect".

This allowed for the seamless integration of multiple remote panelists who joined by video-call using Zoom, Skype TX and Microsoft Teams.



This was done by converting their video calls into unique NDI® IP inputs which could be switched, mixed and controlled independently by the TriCaster 2 Elite.

This enabled the virtual panelists to be presented together in their sessions with the local moderator and local panelists on the stage screen in the main event theatre.



Fintan Mc Kiernan, CEO of Ideal Systems Singapore, said: "This was a great experience for us to use the latest NewTek NDI® IP video technologies to drive a live international event of this scale and we are honoured to work with companies like SingEx who have great technical foresight to leverage these new IP video technologies to overcome the challenges presented by COVID-19."



G&D improves remote access to KVM systems

With their new product RemoteAccess-GATE, KVM manufacturers Guntermann & Drunck (G&D) enable their customers to remotely operate KVM systems via LAN, WAN and the Internet. A stand-alone device that links the two worlds of KVM systems and the networks, the RemoteAccess-GATE provides unblocked, BIOS-level access to connected computers worldwide. It opens up new ways for remote operation from remote locations and also improves the ways of providing IT support and collaboration between employees.

Using software or web clients on a PC, operators can establish a secure connection to the RemoteAccess-GATE via the Internet, WAN or LAN to provide remote access to the KVM installation and the connected computers. G&D offer three different web clients in order to get the best possible result.

The RemoteAccess-GATE supports 4K and Ultra-HD resolutions at 30Hz with a 4:2:2 sampling rate as well as HD resolutions up to 1920 x 1200 at 60Hz with a 4:4:4 colour depth. The stand-alone device uses HDMI video signals and embedded HDMI audio (digital). Adapters are available for VGA, DVI, Mini DisplayPort and USB-C. With the use of additional hardware, USB data can be transferred from the remote workstation via the RemoteAccess-GATE and the KVM installation to the local computer. The RemoteAccess-GATE provides configurable bandwidths to work over the Internet, LAN or WAN and to enable remote IT support at any time. You can use the device to connect to a single remote computer or to the entire KVM system. In addition, it allows simultaneous access for up to

eight users. Configuration is possible via HTML browser or the serial service interface.

The new RemoteAccess-GATE meets even the highest security requirements and includes AES encryption, IP access control, user and group permissions, KVM session encryption and other security features.

More information on G&D's new RemoteAccess-GATE is available on <https://www.gdsys.de/en/kvm-solutions/digital-kvm-matrix-systems/remotegate/>

RemoteAccess-CPU Awarded As Product of the Year

System Contractor News Names G&D's New Product Top Solution of 2020

Integrating virtual machines in KVM installations and operating them remotely – with this solution, G&D's RemoteAccess-CPU impressed the jury of this year's System Contractor News Innovation Awards. The US magazine awarded the innovative KVM system as Product of the Year 2020.



With their product launch, KVM experts Guntermann & Drunck GmbH (G&D) are hitting the nerve of the times by supporting cloud computing and virtualisation processes in

companies in order to enable hybrid infrastructures. The new modules establish a connection between matrix systems and virtual machines, which can be accessed remotely via network protocols (RDP, VNC and SSH). This way, hybrid systems with real and virtual computer infrastructures can be optimally implemented.

The RemoteAccess-CPU gives users a convenient solution with high integrity. Users simply select the desired source from a standardised select menu (target list) on the on-screen display – regardless of whether the computer is available in the server room, via network protocol or in the cloud. With its integrated thin client functionality, the RemoteAccess-CPU offers users a highly integrative connection setup without having to use a separate thin client.

More secure and focussing on usability

But how exactly is a connection established? In hybrid systems, the RemoteAccess-CPU acts as a remote gateway to access virtual machines (remote targets). Users can choose between and operate all available virtual machines, but only one at a time. But what would happen if multiple users wanted to operate a number of virtual machines from multiple RemoteAccess-CPU's? And what if important connections to critical servers need to be kept free at all times? With their pooling function, G&D provide an innovative and rock-solid solution. Thanks to this function, specific remote targets can be combined with one or more RemoteAccess-CPU's to form a remote pool. This means that the selected remote gateways are always exclusively kept free for these targets. As a result, predefined virtual machines remain accessible at all times. [[gdsys.de](https://www.gdsys.de)]

Malaysia's Merdeka Race a halo for AJA HELO

The annual Merdeka Race sped off at the Sepang International Circuit on Malaysia's Independence day, 31 August. With more than 100,000 viewers garnered across the globe, the keenly watched race was streamed live with the support of AJA HELO H.264 streaming, encoding and recording devices.

Due to the pandemic, fans across the world were inhibited from travelling to the circuit for the live action; thus, Malaysia Speed Festival (MSF), the event organiser, enlisted production services providers, TWMR Productions and Blonde Robot, to produce and deliver comprehensive coverage of the two-day event via local satellite TV channel Astro Arena, as well as a Facebook Live stream.

"Merdeka only takes place once a year, and this year's race was especially important, as it marked the first local return of sports since the start of the COVID-19 pandemic," shared Blonde Robot's Territory Manager, Azrina Jane Abdullah.



The annual Merdeka Race on Malaysia's Independence day was streamed live with the support of AJA HELO H.264 streaming, encoding and recording devices.

"With the competition closed to spectators, the event organisers wanted to ensure audiences could tune into every second online, which meant streaming full coverage of the event via Facebook Live, in addition to highlights shared on local channels, and HELO proved the perfect tool for the job."

TWMR provided an OB truck outfitted with a host of equipment including a combination of traditional and RF cameras, which captured HD footages of the event that was distributed via fibre or RF to a production switcher. Upon mixing graphics overlays with audio, a 1080i output of the combined feed was then sent through AJA HELO and encoded to H.264 at 1080p 25fps and distributed to Facebook Live.

Deploying HELO's intuitive web based user interface, the operator was able to control the device and monitor the feed for the event organisers from a laptop stationed at a safe distance from others on-site.

Given limited bandwidth, the footage was then redistributed to other content delivery networks with help from the Restream.io service.

Apart from supporting encoding and live streaming for the event, AJA HELO also allowed TWMR and the event organiser MSF to record the event for archival and on-demand viewing purposes. [\[Asia Pacific Broadcasting\]](#)



Haivision's Makito X4 video encoder Stream Sync technology makes it easy to synchronise incoming encoded video sources, enabling broadcast engineers and producers to receive multiple live video and audio streams from a remote venue while maintaining sync for immediate use in live production workflows.

Contribution Adds Reliability to the Concoction

As more journalists and producers work remotely, the central broadcasters will receive multiple feeds of information from video to audio. Therefore, it is essential that the contribution network is efficiently planned out to ensure synchronisation of all the feeds during a live broadcast.

Maag highlights to APB+: "Remote production necessarily relies on many different video, audio and data sources being received at the central broadcast facility from the remote location, and assuring synchronisation between incoming streams is critical.

"Haivision's Makito X4 video encoder Stream Sync technology makes it easy to synchronise incoming encoded video sources, enabling broadcast engineers and producers to receive multiple live video and audio streams from a remote venue while maintaining sync for immediate use in live production workflows."

"By sending all of the multi-camera feeds to the broadcast centre for live production, broadcasters dramatically reduce the amount of on-site personnel and equipment required."

Eddershaw, introducing an avant-garde technology, says: "Shotoku will be part of that innovation through enabling more automation, thus requiring less human intervention (remote or local).

"Our AutoFrame face tracking is a prime example – live on-air adjustments to the camera position can be made automatically without the need for a dedicated operator at any location."

"Remote support capability is also an important requirement and our systems are being enhanced in this area too, so engineers are even less likely to have to travel to a remote site in case of problems." [\[Asia Pacific Broadcasting\]](#)



With Shotoku's AutoFrame face tracking, live on-air adjustments to the camera position can be made automatically without the need for a dedicated operator at any location.

"Shotoku will be part of [the avant-garde technology] through enabling more automation, thus requiring less human intervention (remote or local)... Remote support capability is also an important requirement and our systems are being enhanced in this area too, so engineers are even less likely to have to travel to a remote site in case of problems."

– **James Eddershaw**,
Managing
Director, Shotoku
UK ■



ABU GA Technical Team

Working from scratch, through trial and error, led by Mr Ahmed Nadeem, the GA Technical Team rose to the challenge and delivered the online ABU General Assembly and Associated meetings to all our members and participants. The ABU Secretariat is proud of the team who had the daunting task of catering to the requirements of the meetings of all departments.



Sports Group Media Content Committee
Sports Finance Committee Meeting
Women With the Wave Forum
Quality Management Workshop
Sports Group Meeting
Technical Bureau Meeting
Technical Committee Meeting
Planning & Strategy Group Meeting
Programme Bureau Meeting
Radio Working Party Meeting
ABU Presidency Meeting
ABU Media Academy Task Group Meeting
Administrative Council Meeting
ABU Prizes Award Presentation
ABU TV Song Festival
ABU General Assembly

Ahmed Nadeem, Director Technology & Innovation



Veyssel Binbay, Senior Engineer – Broadcast Systems



Shree Bhadra Wagle, Manager – Production & Delivery Technologies



Siva Kumar, Manager – IT Department



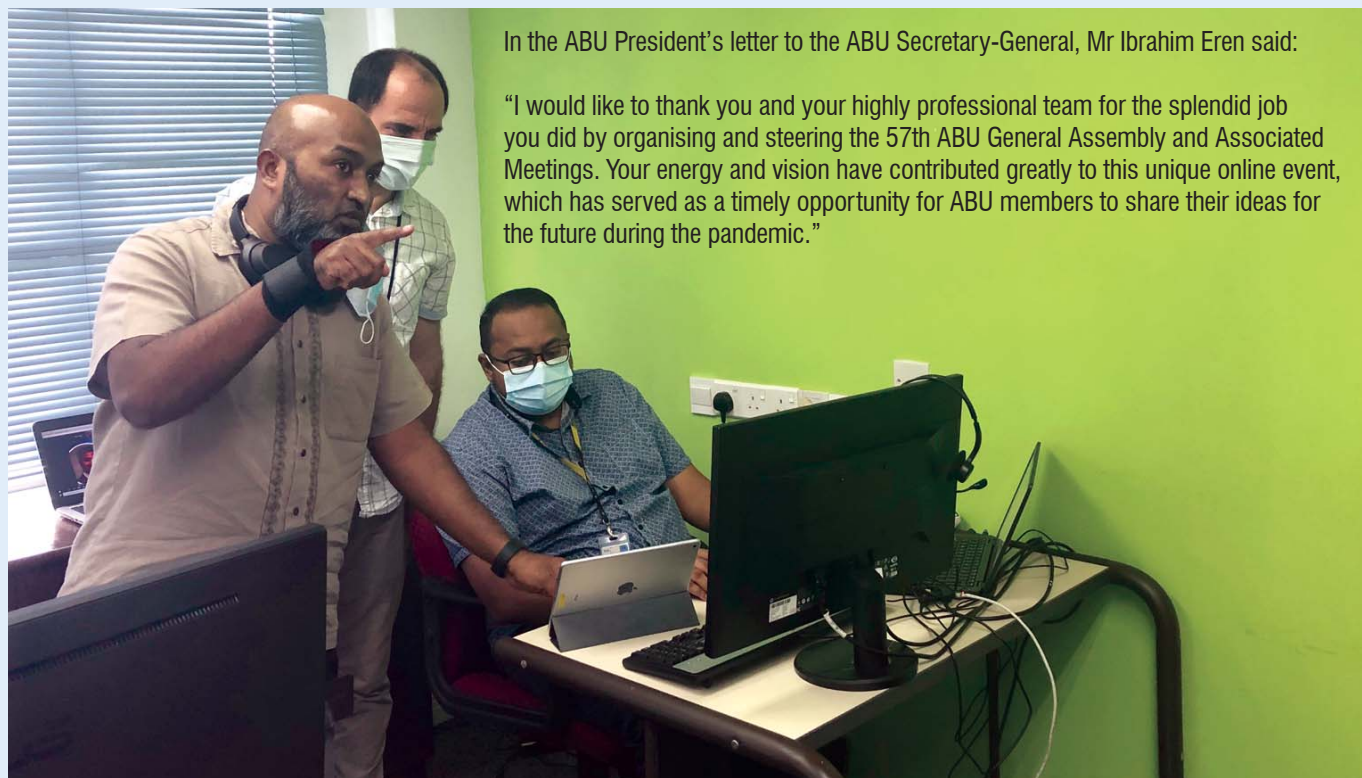
Saravana Kuma Ramalingam, Project Manager – Media Streaming and Web Applications



Muhammad Hafiz, Systems Support Officer



Mohamed Inaz Farouq, ABU IT Intern, A final year student at Taylor's University, Bachelor of Computer Science (Honours) with specialisation as Cybersecurity and an extension in Data Science

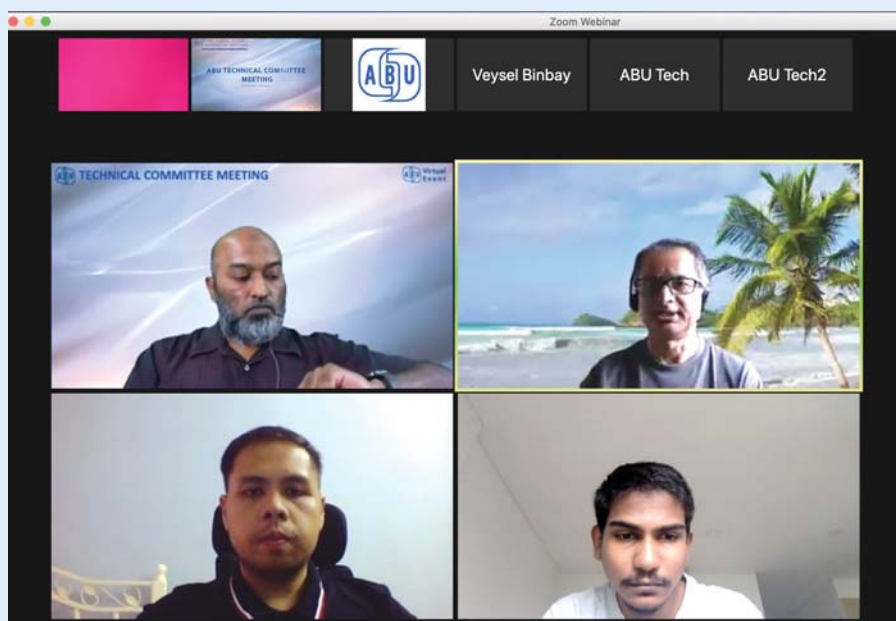


Practice sessions

In the ABU President's letter to the ABU Secretary-General, Mr Ibrahim Eren said:

"I would like to thank you and your highly professional team for the splendid job you did by organising and steering the 57th ABU General Assembly and Associated Meetings. Your energy and vision have contributed greatly to this unique online event, which has served as a timely opportunity for ABU members to share their ideas for the future during the pandemic."

The Technical Department was named the ABU Department of the year for its role in the annual meetings.



Dry runs

Personalities & Posts



New DG of RTM-Malaysia appointed

Datuk Ruzain bin Idris has been appointed Director-General of Radio Television Malaysia, the country's public broadcaster. Datuk Ruzain has long experience in government service. Before joining RTM in October, he was Selangor State Development Director. On taking up his new position, he said he wanted to see RTM continue to carry out its mission as a channel for people's information.

Datuk Ruzain joined the Ministry of Information in 1988 and went on to hold senior positions in several ministries and government departments. He holds a BA (Hons) degree in Geography from Universiti Malaya in Kuala Lumpur and an MBA in International Business from the University of Birmingham in the United Kingdom.

He is married with two children. ■

Newly Appointed ABU Technical Liaison Officers



Deutsche Welle

Hubert Czaja, Head of Distribution Systems is the new ABU Technical Liaison Officer at Deutsche Welle. Hubert joined Deutsche Welle in 1992 and has more than 20 years' experience in planning and operating the distribution systems of the international German broadcaster. Since 2016 he has headed the Distribution Systems team, which ensures worldwide content distribution via satellite, Internet, FM, shortwave and third-party platforms.

Deutsche Welle (DW) is Germany's international broadcaster and one of the most successful and relevant international media outlets. In 2020, DW's journalistic offerings in 30 languages reach a weekly audience of 249 million. ■



ZDF German Television

Mr Ralf Martin, has been appointed the new ABU Technical Liaison Officer for ZDF German Television. Ralf has more than 17 years of broadcasting experience in program distribution, new distribution technologies and frequency management. His experience includes the analogue terrestrial TV switch-off project in Berlin, the nationwide roll-out of the digital terrestrial transmission system DVB-T and its successor DVB-T2 and the clearance of the 700 MHz and 800 MHz frequency band.

Ralf is currently active in the field of next-generation technologies for broadcasting, production and contribution. He works in the Information and System Technology Department and is a graduate physicist from the University of Mainz. ■

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Contact . Korea E & Ex Inc.

T.+82 2 551 0102 E.koba@kobashow.com



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