Asia-Pacific Broadcasting Union

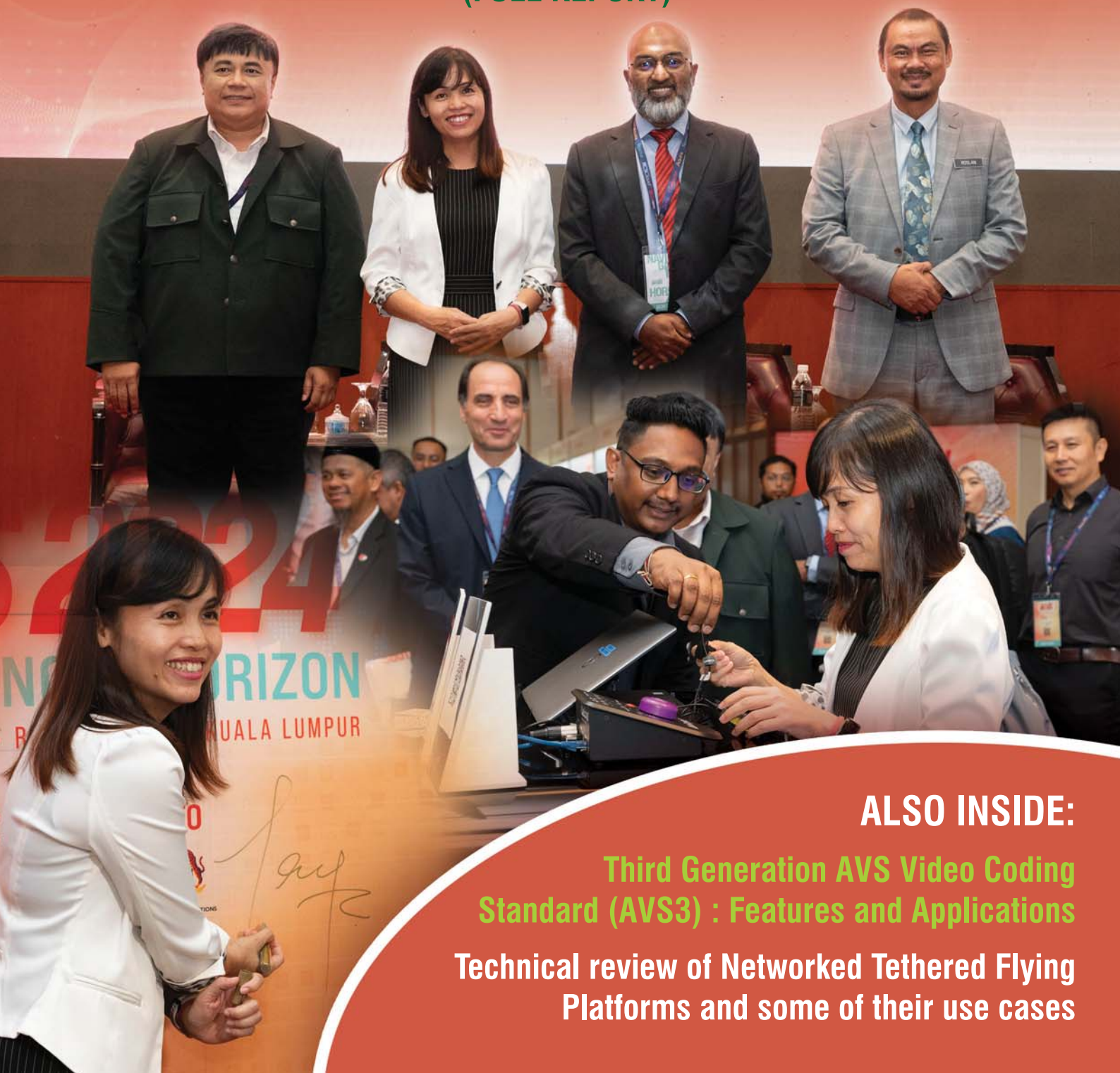
TechnicalReview

NO. 297 JANUARY-MARCH 2024

PP 2412/11/2012 (031331) • ISSN 0126-6209

DIGITAL BROADCASTING SYMPOSIUM

(FULL REPORT)



ALSO INSIDE:

Third Generation AVS Video Coding Standard (AVS3) : Features and Applications

Technical review of Networked Tethered Flying Platforms and some of their use cases

SAVE up to $60,000/yr*

With a new Nautel NX & Orban XPN-AM

Nautel NX Series transmitters combined with an Orban XPN-AM audio processor can provide exceptional AM Power Savings.

And there's more:

- Louder, cleaner, brighter sound
- Peace of mind with a 4 year Tx warranty
- Zero upfront costs other than installation fees**

Estimated savings are based on a leased NX50 replacing a 73% efficiency transmitter running 24/7 at 50 kW and 16 cents per kWh.

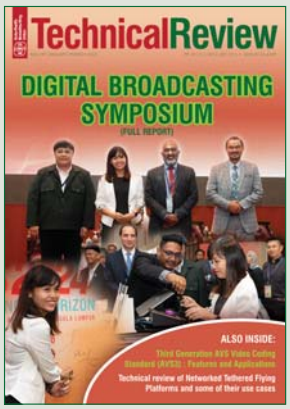
Try the savings calculator, learn more at nautel.com/mdcl-savings or call your representative today

*Estimates based on the typical leasing rates, content format, modulation density and power rates. Variations in any of these factors can impact savings and costs.

**Assumes a leasing plan successfully negotiated with no upfront payments. Leasing plans under this program only available in the USA but MDCL savings are applicable worldwide. Customer is responsible for existing Tx decommissioning and new Tx intstallation.

orban nautel

Inside



Cover: The 2024 ABU Digital Broadcasting Symposium was held at the Royale Chulan Kuala Lumpur.

Asia-Pacific Broadcasting Union

from the Editor

Welcome to the latest edition of the Technical Review Magazine, your quarterly insight into the evolving landscape of broadcast technologies. In this issue, we spotlight the transformative discussions and innovations from the recently concluded Digital Broadcasting Symposium 2024 (DBS2024), held at Royale Chulan Kuala Lumpur from March 4th to 7th.

This year, DBS2024 brought together approximately 1,000 attendees from 300 organizations across 50 countries, affirming its status as a cornerstone event in the global broadcasting industry. Themed "Navigating AI Horizon," the symposium provided a fertile ground for exploring the pivotal role of artificial intelligence in the media and broadcast sector. Our extensive coverage begins on page 5 with the ABU DBS2024 Report, capturing the essence of the discussions that are set to shape the future of broadcasting.

The debates around the impact of AI on media regulation and ethics were particularly engaging, offering a blend of perspectives that underscore the complexities and opportunities of integrating AI technologies. Coverage of these debates can be found on page 19, serving as a critical resource for anyone involved in or affected by broadcast media.

In addition to the symposium highlights, this issue features an insightful technical review of Networked Tethered Flying Platforms on page 35. These platforms are gaining traction for their unique capabilities and potential applications, illustrating the innovative spirit that drives our industry forward.

Furthermore, the significance of timely and effective communication during emergencies cannot be overstated. On page 39, we delve into the ABU-DRM Webinar, which discussed leveraging Digital Radio Mondiale (DRM) technology to deliver emergency warnings, enhancing our preparedness for unforeseen events.

Rounding out our issue, we bring you the latest updates from the ABU region on page 43, digital broadcasting developments on page 46, and a comprehensive list of upcoming events on page 57 to keep you informed and connected.

As we present these discussions and developments, we invite you to engage with the content, reflect on the technological advancements, and consider their broader implications for the industry and society. Your feedback and insights are invaluable to us as we continue to deliver high-quality content that not only informs but also inspires.

Thank you for your continued support and interest in Technical Review Magazine. We look forward to navigating the evolving technological landscape together, armed with knowledge and driven by curiosity.

Warmest regards,
Dr Veysel Binbay
veysel@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.

The ABU Technical Review is published in March, June, September and December of each year.

Subscription rates (annual, 4 issues): Asia-Pacific US$40.00; the rest of the world US$45.00. Advertising and Editorial offices at Kuala Lumpur.

Published by
Dr Veysel Binbay
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
Nur Aqilah Mohd Izam
email: aqilah@abu.org.my
Siti Balqis A Sudirman
email: balqis@abu.org.my

Design & Layout by: **The Vermillion Trading**
Koi Tropika, Block E-08, Jalan Puchong Batu 13 1/2, 47100 Puchong, Malaysia

THIRD GENERATION AVS VIDEO CODING STANDARD (AVS3) : FEATURES AND APPLICATIONS

ABSTRACT:
This paper presents a comprehensive introduction of AVS3, which is developed by Audio and Video Coding Standard (AVS) Workgroup of China and is published as GY/T 368 by NRTA in 2023. In order to improve coding efficiency, AVS3 adopted many novel technologies including block partition, intra/inter prediction transform, quantization and entropy coding and has 50% bitrate savings compared with its predecessor AVS2. AVS3 has been used in China's 8K UHDTV channels and will have more applications worldwide in the future.

1. INTRODUCTION

In recent years, China has rapid development in UHD video industry. With higher resolution, framerate, bit depth, dynamic range and wider color gamut, the data amount of UHD video has increased largely. In order to meet the demand of 4K UHD video services, NRTA published the second generation AVS video coding standard (AVS2) in 2016 *[See GY/T 299.1–2016; High efficiency coding of audio and video Part 1: Video, National Radio and Television Administration, 2016]*. AVS2 has similar coding efficiency with H.265 *[See ITU-T H.265; High efficiency video coding, International Telecommunication Union, 2013]* and is adopted for 4K UHD video coding in China with the bitrate of 36Mbps under the configuration of 3840×2160@50p, 10bit and HDR. However, 8K UHD video brings more challenges and it is necessary to develop new video coding standard to further improve the coding efficiency.

AVS3's standardization process was started in December 2017. The aim of AVS3 is to have 50% bitrate savings with AVS2 under the premise of the same video quality. To promote industrial application, the development of AVS3 is divided into two phases: In the first phase, the primary consideration for the selection of coding tools is the limited decoder complexity, and it was finalized in July 2019 with two year's efforts. In the second phase, it is aimed to future improve coding efficiency based on the first stage. Finally, AVS3 was finalized in 2022. Through the comprehensive evaluation and testing procedure, AVS3 has been adopted as broadcasting industry standard in China and published by NRTA in March 2023 *[See GY/T 368–2023; Advanced and efficient video coding, National Radio and Television Administration, 2023]*. This paper gives an overview of AVS3 standard including key technologies and its application in China.

2. KEY CODING TOOLS OF AVS3

AVS3 adopts block-based hybrid video coding framework as shown in ***Figure 1***. A flexible block partition mechanism is put forward to adapt to higher resolution and novel intra/inter prediction, transformation, quantization, and entropy coding tools are also introduced to highly improve coding performance.

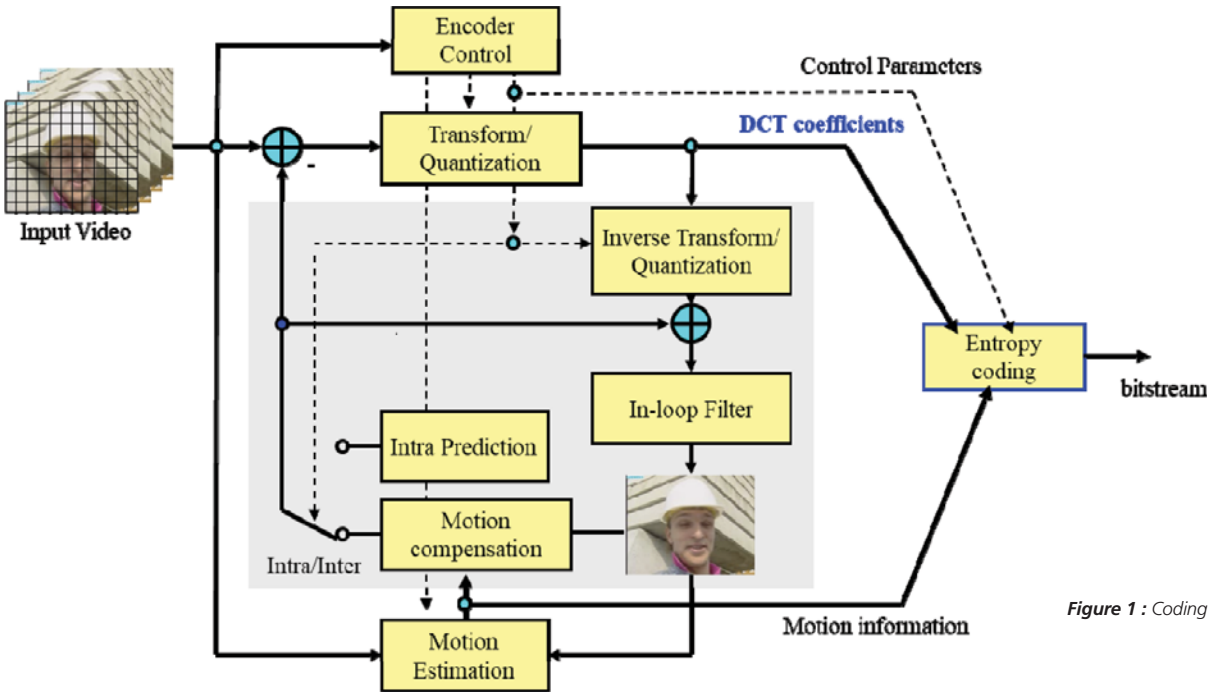


Figure 1 : *Coding framework of AVS3*

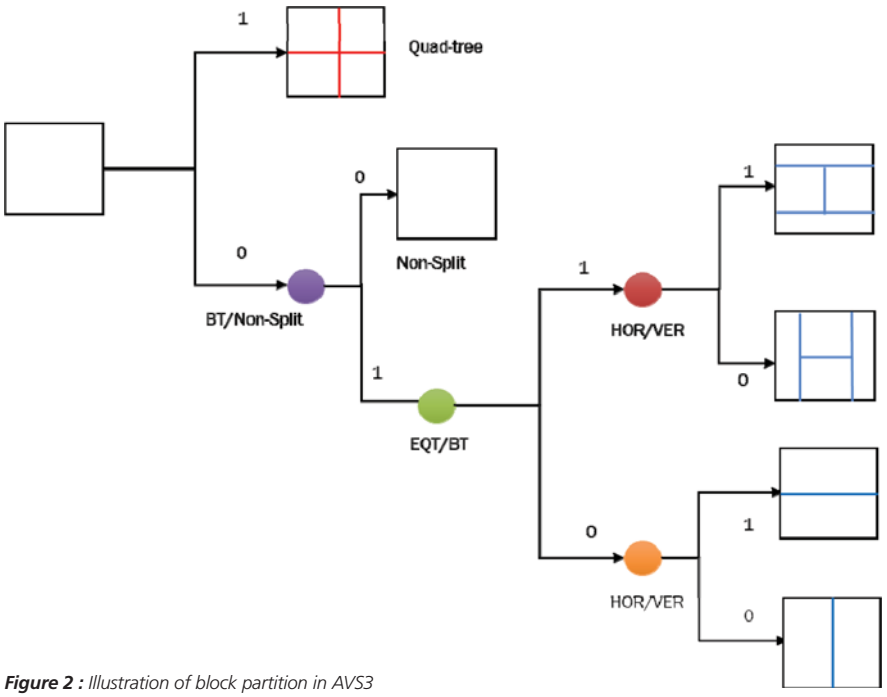


Figure 2 : *Illustration of block partition in AVS3*

2.1 FLEXIBLE BLOCK PARTITION STRUCTURE

AVS3 designs a more flexible block partition structure to adapt for different video resolutions. The coding picture is firstly divided into patches and then are divided into largest coding unit (LCU), the largest size for LCU is 128x128 which is more applicable for UHD video. LCU can be recursively split into coding units (CU) based on partition tree structure. AVS3 adopts quad-tree (QT), binary tree (BT) and extended quad-tree (EQT) partition to decide the final size of CU as shown in ***Figure 2***.

For each LCU, one bit is first used to indicate whether the LCU is divided into QT or not. If not, one more bit is then used to represent whether the LCU is divided into EQT or BT. Through this flexible partition process, CU can be non-square.

2.2 INTRA PREDICTION

AVS3 adopts 66 luma intra prediction including 62 angles prediction modes, DC mode, planar mode, PCM mode and bilinear mode. AVS3 introduces Intra Derived Tree (Intra-DT), intra prediction filter (IPF) and two step cross-component prediction mode (TSCPM) to improve intra prediction.

Intra Derived Tree defines intra coding unit partitioning mechanism vertically or horizontally. The current CU is divided into two or four prediction units (PU) when the current CU apply to intra-DT. Intra-DT has 6 split types.

IPF is a coding tool to improve the accuracy of the intra predicted pixels. The predicted value near the top and left boundary of current CU is filtered to enhance the prediction accuracy.

TSCPM is designed for intra chroma coding, which assumes the linear correlation between the prediction results of luma and chroma components. The linear regression function is first applied to the originally reconstructed luma block to get an internal prediction block. Second, the internal prediction block is down-sampled to generate the final chroma prediction block.

2.3 INTER PREDICTION

In AVS3, Affine prediction mode considers more complex motion instead of translational motion. There are two types of affine motion prediction, one is affine direct mode while the other is affine inter mode. In affine direct mode, an affine candidate list including at most 5 affine models is derived from the motion information of neighboring blocks, an affine model candidate is a 4-parameter affine model or 6-parameter affine model, represented by 2 or 3 motion vectors. When the CU is affine inter mode, it is 4-parameter affine motion model.

Adaptive Motion Vector Resolution (AMVR) is adopted to reduce the coding bits for the motion vector difference (MVD) coding. The MVD is usually coded with 1/4-pel precision. While AMVR allows various resolutions for MVD coding. For instance, 1/4–pel, 1/2–pel, 1–pel, 2–pel and 4–pel resolution are supported.

Ultimate motion vector expression (UMVE) technology is an effective way to express motion vector for skip and direct modes in AVS3. According to the base motion vectors derived from the information of spatial or temporal neighboring candidates, this technique offsets these motion vectors to obtain the motion vectors that are more suitable for the current coding blocks.

Based on the above HMVP and AMVR, an enhanced motion vector resolution (EMVR) mode is carefully designed to avoid the shortcoming of one motion vector prediction (MVP) compared to multiple MVP. EMVR is proposed to bind the AMVR and HMVP, which corresponds the existing AMVR index of current CU with the motion information in HMVP table, and then conducted inter-frame prediction.

Symmetry motion vector difference (SMVD) is used for motion vector difference in inter Bi-directional prediction mode. One bit is used to indicate whether SMVD is adopted when the prediction mode of current CU is Bi-directional prediction mode. When SMVD is used, the motion information in List1 is symmetrical with respect to List0.

2.4 TRANSFORM

Position based transform (PBT) is introduced in AVS3, DST-VII and DCT-VIII are added to transform module. The selection between DCT-II, DCT-VIII and DST-VII are depended on signaling bit and intra block's position. AVS3 introduces a new transform method which uses pre-designed transform sets for four sub-blocks according to their positions. A new CU-level syntax element, PBT flag, is introduced. When PBT flag is 0, the traditional DCT-II transform is used for current CU. When PBT flag is 1, PBT splits the CU into four sub-blocks, and use pre-designed transform set according to their position. In each sub-block, its position number relates to a pre-designed transform set.

2.5 IN-LOOP FILTERING

Enhanced sample adaptive offset (ESAO) is applied to consider the textural and edge directional features. There are two feature descriptors in the sample classification process. The first one is calculated based on local binary patterns by comparing the intensities of the current sample with its 8 neighboring samples. The second descriptor is derived based on the amplitudes of the current reconstructed samples.

Cross-component sample adaptive offset (CCSAO) is only applied for chroma components. There are two feature descriptors in CCSAO classification process. The first one is based on the difference between the corresponding luma sample and its neighboring samples. The second descriptor is based on the amplitude of the current sample or its corresponding luma sample.

Besides, AVS3 improves adaptive loop filter (ALF), a larger filter shape is enabled with 15 coefficients and 29 taps. To make the filter more adaptive, the reconstructed frame is divided into 16 or 64 categories.

3. CODING PERFORMANCE

In order to evaluate the coding performance of AVS3, a subjective assessment between AVS3, AVS2 and Versatile Video Coding (VVC) was conducted for 8K testing sequences with the parameters of 7680×4320@50P, 10bit, BT.2020, HLG. And the coding bitrate is set 72Mbps, 144Mbps and 72Mbps for these three standards.

At the given encoding rate, AVS3 has 5.3% quality reduction compared with the original sequences, while AVS2 and VVC have 5.0% and 5.3% quality reduction separately. The testing results shows that AVS3 has similar coding performance with VVC and can reach 50% bitrate savings with AVS2.

4. INDUSTRY APPLICATIONS

AVS3 has attracted tremendous attention from industry ever since the finalization of AVS3 Main Profile in March, 2019.The designation and performance-complexity trade-off naturally fulfill the demands and requirements of different use cases. AVS3 has deployed from industrial-grade 8K real-time software codecs to 8K decoder chip for smart-phone, from 8K UHD TV broadcasting service to worldwide large-scale events support.

Based on the Intel scalable video technology (SVT) architecture, a novel AVS3 8K real-time software encoder has been presented, namely SVT-AVS3 *[See H. Ren et al, SVT-AVS3: An Open-Source High-Performance AVS3 Encoder With Scalable Video Technology; IEEE Transactions on Multimedia, vol. 26, pp. 3291-3301, 2024]*. The SVT-AVS3 encoder achieves an optimal trade-off among coding performance, encoding speed, and perceptual visual quality.

AVS3 all-platform open-source decoder "MERAK" has been released. The decoder was developed by the team of Peking University Shenzhen Graduate School, code-named uavs3d, and supports up to 8K/60P real-time video decoding.

In September 2019, Hisilicon Inc. has officially released a new end-to-end solution for 8K contents based on the world's first AVS3 8K decoder chip Hi3796CV300 in International Broadcasting Convention (IBC), which greatly promotes the 8K applications of AVS3.

On February 1, 2021, the China Media Group launched an 8K UHD test channel using the AVS3 video standard. On January 1, 2022, the Beijing TV Winter Olympics Documentary Channel was broadcast using the AVS3 video standard. On January 25, 2022, the 8K UHD channel of China Media Group as broadcast using the AVS3 video standard.

In July 2022, AVS3 officially became one of the next-generation video codec standards in the DVB standard system *[See ETSI TS 101 154 V2.8.1; Specification for the use of Video and Audio Coding in Broadcast and Broadband Applications, European Telecommunications Standards Institute, 2023]*, which means that AVS3 video standard, as an option of video encoding of international organizations, will be of great significance to supporting the future development of the global UHD video industry.

5. CONCLUSION

AVS3 is now opening a new era for 8K UHD video coding in which end-to-end solutions and commercial-level AVS3 codecs have been incorporated and established. Several directions are currently under investigation for future research and applications, including neural-network based video coding technology and machine-vision oriented video coding.

TABLE 1 Subjective Assessment of AVS3

8K Test sequences	Quality Reduction		
	AVS3@72Mbps	AVS2@144Mbps	VVC@72Mbps
1	4.6%	3.6%	4.0%
2	6.7%	6.7%	7.7%
3	4.3%	3.5%	4.6%
4	5.7%	5.6%	4.1%
5	7.5%	6.2%	7.2%
6	3.4%	5.0%	5.6%
7	6.3%	5.5%	4.4%
8	3.8%	4.0%	5.0%
Average	5.3%	5.0%	5.3%

ABOUT AUTHOR

Zhou Yun, Senior Engineer, Academy of Broadcasting Science (ABS), National Radio and Television Administration (NRTA), China

Zhou Yun, received the B.S. and M.S. degree from Beijing University of Posts and Telecommunications. She is currently a senior engineer at Academy of Broadcasting Science, NRTA. Her research interests include video and audio coding, UHDTV and immersive media. ■

DIGITAL BROADCASTING SYMPOSIUM

The 2024 ABU Digital Broadcasting Symposium was held from 4-7 March 2024 at the Royale Chulan Kuala Lumpur. This symposium, aptly themed 'Navigating AI Horizon' is organised once a year by ABU. This year's DBS is the twentieth in the series. Prior to the conference, a workshop by Integriti Padu Sdn Bhd (IPSB) was held in the morning of March 4 followed by a DAB+ workshop in the afternoon. The 3-day conference, 2 masterclass sessions, 8 workshops, together with exhibition booths, provided the unique opportunity for attendees to have access to information on various aspects of broadcasting ranging from terrestrial to IP.

ADVANCEMENTS IN BROADCASTING TECHNOLOGIES AND STANDARDS

The first session was moderated by **Masahi Kamei**, Japan Broadcasting Corporation (NHK) and the panelists were **Emily Dubs**, DVB Project; **Dr Peter Siebert**, IEEE BTS; **Ryo Yasuoka**, NHK and **Lindsay Cornell**, the British Broadcasting Corporation (BBC). They elaborated on the developments of the various broadcast/telecommunication technologies over the recent years and the improvements achieved.

The core DAB standard and modulation technology remains unchanged with the first DAB+ services going on air almost 15 years ago. DAB+ products are reliable, energy-efficient and there are more than 100 million DAB receivers in daily use worldwide. The Service and Programme Information (SPI) specification consists of two parts namely the Metadata Description in XML and the Transport and Binary Encoding.

The Hybrid Digital Radio XML Specification has been further updated to improve the handling of metadata in more languages. Phonemes and aliases for service names can be provided to allow

voice assistants to correctly interpret colloquialisms for radio stations. There is clearer guidance on how to identify and use metadata in different languages. The Transportation and Binary Encoding Specification has been made clearer by restructuring to make it more usable. There are clearer explanations for encoding and decoding and examples have been extended and updated.

Following severe flooding in 2021, German authorities and broadcasters discussed the role of DAB+ in future emergency warning systems. The key issues were that the emergencies did not generally have the same alert area as a DAB ensemble coverage area; using the existing alarm announcement signaling has legacy implications, and random sleep timing will lead to some lost audio at the start of an announcement. Hence, the DAB+ Task Force responded by creating a novel location coding system which is globally applicable and lightweight with high coding efficiency. A new EWS signaling has been defined which identifies the participating groups, stage of alertness, importance and location. The universal location coding system can be used anywhere in the world and does not rely on national or regional location systems. The system has high coding efficiency, simple algorithmic determination and is applicable to low-cost devices.

DVB has focused heavily on IP-centric solutions to facilitate broadcasters' migrations to IP-based platforms and allowed them to build on an integrated broadcast/IP/5G ecosystem. 5G Media Streaming (5GMS) allows 5G networks to be used by third parties for media delivery over unicast, providing opportunities for collaboration beyond merely acting as a bit pipe. DVB-I supports both 5G Broadcast & 5G Media Streaming, and DVB-I service is offered simultaneously over broadcast & unicast.

'DVB-I over 5G' allows LTE-based and NR-based 5G networks to carry services with standardised TV-friendly service layer facilitating commercial success. The seamless use of either 5G NR or 5G Broadcast offers new opportunities for content monetization or mobile networks optimizations.

The combination of heterogeneous

networks such as DVB broadcast, DVB-DASH or DVB-NIP together with 5G networks, enables deployment scenarios where networks can complement each other for their own strengths.

EFFICIENT MEDIA WORKFLOWS WITH AI & CLOUD SOLUTIONS

The moderator was **Kumaran Subramaniam**, the Tun Abdul Razak Broadcasting and Information Institute (IPPTAR), Malaysia withadcastingthe panellists comprising **Fintan Mc Kiernan**, Ideal Systems; **Samuel Bogoch**, Axle AI; **Joe Chu**, Nautel; **Subodh Aggarwal**, TVU Networks, and **Hiroyasu Nagata**, the Japan Broadcasting Corporation (NHK).

Advanced ISDB-T system is IP based, achieves high efficiency with new technologies and offers a wide range of bitrate/robustness, as well as a hierarchical transmission scheme. The video and audio layer consists of VVC (Versatile Video Coding) and MPEG-H 3D Audio, allowing viewing services to be customised for individual preferences. The Transport layer consists of MPEG 2 Media Transport (MMT) which provides a service for tuner-less device and personalised service such as Integrated broadcast and broadband (IBB). IBB services can provide various services regardless of the delivery path, including synchronised viewing of broadcasting and VR/AR.

Advanced ISDB-T system provides flexibility as either Frequency Division Multiplexing (FDM) and Time Division Multiplexing (TDM) or both can be used. It has low latency transmission for emergency information and Single Frequency Network can be operated for spectral efficiency. The channel bandwidth width has been extended to 6 MHz, FFT size extended to 32K and the performance in mobile reception has been improved by an extension of partial reception bandwidth. The Forward Error Correction (FEC) consists of Low-Density Parity Check (LDPC) codes concatenated with Bose Chaudhuri Hocquenghem (BCH) codes, allowing Quasi Error Free operation close to the Shannon limit. The modulation order has been increased to 4096 QAM to cater for UHDTV transmission.

HD Radio turns analog FM channel into digital quality, where the receiver first plays analog FM then blends to HD. HD Radio operates on the main FM spot frequency where the In Band On Channel (IBOC) signal

occupies 400 kHz and is compatible with standard 200 kHz FM channel allocations. Three audio channels are added and only about 5% power in each IBOC sideband is typically transmitted from one transmitter resulting in high efficiency.

DRM FM adds 3 additional audio channels, operates on dedicated spot frequency, and requires 100 kHz bandwidth. It can simulcast the analog FM channel which requires 300 kHz bandwidth, and the digital component can be placed on both sides of the analog FM. DRM is compatible with existing FM allocations and provides better efficiency.

An FM Station has a single audio source, STL link, audio processor and one analog FM modulator and transmitter. Present FM transmitters do not support digital radio today and need to be upgraded. The digital transmitter must support external digital modulator input, or internal digital modulator and comply with HD Radio and DRM FM specification.

SUSTAINABLE TECHNOLOGIES AND MEDIA BUSINESS ECOSYSTEMS

The session was moderated by **Dr Peter Siebert**, IEEE BTS and the panelists were **Datuk Suhaimi Suleiman**, Radio Televisyen Malaysia (RTM); **Dusan Statelov**, Maindata; **Dr Kiatanantha Lounkaew**, Thammasat University; **Yan Yi**, Radio and Television of the People's Republic of China (RTPRC); **Mohd Shamsul Izuan**, Malaysian Communications and Multimedia Commission (MCMC) and **Hubert Czaja**, Germany.
China has developed strategies to upgrade traditional broadcasting services by pushing forward innovative media convergence and forming new synergies for industrial development. The achievements were a smart broadcasting network, a more diversified new ecosystem of broadcasting media and high-quality development of the traditional broadcasting industry.

The Intelligent Recommended Channel (IRC) offers richer program content, simplifies viewing operations and provides more customised content services. The 5G High tech Video Multi-Scene Applications Lab focuses on R&D of tools and software with independent IPR for efficient and secure digital media production and dissemination as well as multi-model intelligent interactive video production. The global AI Governance Initiative proposed by China is a people-centered approach in developing AI. It is an open, fair, and effective global governance mechanism for AI as it puts ethics with multi-level collaboration.

SFN boost and Dynamic Broadcast are two technologies that dramatically enhance satellite broadcast signal delivery. SFN Boost is a cutting-edge solution for significant reduction up to 98% of satellite bandwidth used to feed terrestrial TV transmitters operating in Single Frequency Networks (SFN) mode. It offers single satellite transmission to both

terrestrial TV transmitters (DTT) and satellite home users (DTH). This results in cost-effective delivery of regional TV content to terrestrial TV networks and cost-effective insertion of regional advertisements and Emergency Warning System (EWS). SFN Boost also gives broadcasters the option to choose between centralised and distributed architecture. The distributed solution is compliant with DVB-SIS standard ETSI, while the centralised, on the other hand, follows proprietary solution. The centralised version uses a patented method that performs in-depth content analysis across multiple layers and compresses duplicated packets. The centralised architecture complements and enhances the DVB-SIS standard by offering additional features. For example, it does not rely on GPS synchronisation, which meets the need for critical infrastructure independence.

Dynamic Broadcast introduces a better way of handling TV interruptions due to weather factors. When transmitting a signal throughout a year, signal strength and capacity are dynamically adjusted according to current weather conditions. Dynamic Broadcast improves TV signal availability in bad weather conditions, thanks to the dynamic adjustments of the strength of TV signal. Furthermore, Dynamic Broadcast provides 30% – 80% additional capacity (Mbps) out of the same frequency band (MHz), whether satellite or terrestrial, and thus opens new revenue streams for TV broadcasters.

AI TOOLS & SECURITY IN MEDIA INDUSTRY

The moderator was **Fintan Mc Kiernan**, Ideal Systems with the panellists comprising of **Sean Lee**, Arista; **Dr Ruhi Tas**, TRT and **Tim Xu**, Mediacorp. Traditional help desks often struggle to manage a high volume of support requests, leading to delays in issue resolution. Help desks operate during standard business hours and do not operate around the clock. Manual assignment of support tickets can be time-consuming and prone to errors, leading to delays and inefficiencies. They often deal with a large number of routines, repetitive inquiries that could be addressed more efficiently through automation.

AI-Supported Help Desk refers to a customer support system that leverages artificial intelligence (AI) technologies to enhance and streamline its operations. The integration of AI into a help desk environment aims to improve the efficiency, accuracy, and overall effectiveness of customer service. AI algorithms can analyse incoming support tickets and intelligently route them to the most suitable support agent. AI technologies can handle routine and repetitive customer queries by providing instant responses or guiding users through step-by-step troubleshooting processes. This automation helps in resolving common issues quickly. Unlike traditional help desks with limited operating hours, an AI Supported Help Desk can get assistance at any time, regardless of time zones or business hours.

AI can contribute to the maintenance and improvement of a comprehensive knowledge base by automatically updating information, ensuring that support agents and customers have access to the most up-to-date solutions. Machine learning is incorporated to adapt and improve over time, based on user interactions and feedback. This helps in continuously refining the support process and optimising responses. AI solutions are designed to handle a high volume of requests efficiently, making them scalable to meet the growing demands of customer support in dynamic business environments. By analysing historical data, AI can predict potential issues. This contributes to a more proactive and preventative approach to support. AI systems can automate routine broadcasting tasks, such as video editing and production, to increase efficiency and reduce manual workload. AI can recommend content based on individual preferences as

well as provide real-time language translation for live broadcasts, enabling a more diverse and global audience to engage with content. AI-powered analytics tools could offer valuable insights into audience behaviours, helping broadcasters make data-driven decisions for content creation and scheduling.

NOVEL MEDIA SOLUTIONS: IMPLEMENTATION AND UPDATES

The session was moderated by **Kazim Pektas**, TRT and the panelists were **Nick Piggot**, RadioDNS; **Michiel Saelen**, Skyline Communication; **Ajeet Khare**, Canara Lighting Industries; **Saifuzzaman Yusop**, RTM and **Zahra Sadat Mortazavi**, Islamic Republic of Iran Broadcasting (IRIB).

DevOps is a new way-of-working that improves value delivery for the customer and enables benefits for both development and operations.

DevOps is a software development methodology that combines software development (Dev) with IT operations (Ops). This fusion aims to shorten the system development life cycle and provide continuous delivery of high-quality software. DevOps focuses on collaboration, automation, measurement, and sharing. DevOps primary goal is to improve the flow from an idea towards value for the customer. It is enabled by an environment in which multidisciplinary teams work collaboratively to continuously deliver high quality solutions at a faster pace. It increases the frequency and quality of deployments and releases and realises faster time to market. DevOps practices apply four continuous automation cycles throughout software development and operations processes.

The 1st cycle is continuous integration and streamlining of internal development by integrating code into a shared repository several times a day. Each check in is then verified by an automated build, allowing teams to detect problems early in the cycle. The 2nd cycle is continuous testing which is automating and integrating tests into the software delivery chain, and automatically

executing those tests against each build of the code base. The 3rd cycle is continuous delivery which is the process of delivering code that is production ready and is kept in an always releasable state, so it can be deployed to production at any given time based on business needs. The 4th cycle is continuous operations which is proactively managing the solution based on feedback loops, monitoring and telemetry.

DevOps is an ever-evolving field, and staying ahead of emerging trends is crucial for organisations aiming to remain competitive and efficient. The use of AI and Machine Learning (ML) in DevOps is expected to increase. AI can help with predictive analytics, anomaly detection, and automated issue resolution, while ML can improve automation, security, and decision-making in continuous integration and continuous delivery.

Hybrid Radio is the seamless combination of broadcast and IP technologies to create an experience of radio that is better than can be delivered by using either technology in isolation. It delivers audio over broadcast and is reliable, universal as well as free to air. Hybrid Radio enhances radio by using IP in parallel and adding content, metadata, and interactivity.

NEXT-GEN MEDIA DISTRIBUTION AND RECEPTION

The moderator was **Sharad Sadhu**, Media Specialist, India, with the panelilsts comprising of **Eduard Chizhikov**, Viory; **Dr Les Sabel**, WorldDAB; **Muheki Wasago Aloysius**, UCC, Uganda; **Mats Ek**, Progira; **Richard Lhermite**, ENENSYS Technologies and **Jay Ganesan**, APAC Amagi. Uganda is a landlocked country in east-central Africa, situated north and northwest of Lake Victoria. Uganda Broadcasting Service (UBS) was established & operated as a monopoly before independence in 1962. During 1990 till 2000, market liberalisation took place with private broadcasters being granted licenses. Several radio stations began to stream online, reaching Ugandans in the diaspora. Community radio stations also became prominent, catering to local communities and broadcasting in regional languages. There are 350 Licensed FM Radio Stations providing 95% geographical coverage and 98% population coverage.

The current challenges are the unavailability of FM spectrum, interference in the FM band and Illegal broadcasts. Hence, Uganda considered adopting DAB+, and in 2016 started a feasibility study to assess market readiness. In 2019, DAB+ was implemented with development of a RF Master Plan (2021-2026), and the National Frequency Table of Allocations. A 1.25 kW DAB+ pilot site was set up at Summit View, Kololo, delivering 15 audio channels and providing approximate coverage of 60 Km.

Challenges for DAB+ implementation include the need for substantial upfront investment and cost of compatible DAB+ receivers. There is a predominant use of older motor vehicles with built-in FM radios and the need to cultivate awareness and garner acceptance among the populace. Content innovation and adjustment to digital formats is necessary. Intense competition from existing and emerging online platforms is also another factor. In addition, post-pandemic economic constraints have affected consumer purchasing power.

The National Broadcasting and Telecommunication Commission, NBTC, commissioned the T-DAB+ project to provide mobile and indoor overage in Thailand. Thammasat University undertook a cost-benefit analysis, market demand and number of services needed. The roll-out plan is to cover 50%, 80%, 90% and 95% of the population.

The requirements were for National, Regional and Local networks where the National Network was originally intended as national SFN. However, this approach proved to be difficult because of SFN Self interference due to the size of the network, irregular

transmitter spacing and loss of flexibility. Therefore, the National Network will use different frequencies in different parts of the country.

The advantages are the same infrastructure for all layers (national, regional and local) and more effective frequency allocation. However, the disadvantages are that sub-regions are larger than a province and sufficient frequencies are needed for provincial local transmissions in sub-regions.

AI DRIVEN PERSONALISATION & AD MANAGEMENT

The session was moderated by **Otto Othman**, RTM and the panellists were **Aale Raza**, Whiteways; **Mardhiah Nasir**, IPSB; **Abdul Haleem**, Accedo; **Ashwin Sashital**, Harmonic; **Michele Lai Chin**, Qvest and **Jim Vinh**, Quickplay.

AI has the potential to significantly impact the world of television viewing. AI-driven data mining enables predictions about viewers' preferences and attitudes toward video content. Machine learning algorithms segment viewers based on their habits, allowing for personalized recommendations. AI optimizes video quality for users based on network speed. For instance, Netflix's smart video compression technology adjusts settings to minimise buffering interruptions. AI also assists in quality assurance by ensuring media content aligns with technical parameters and adheres to local age restrictions and privacy laws. It can identify and remove inappropriate elements from videos, safeguarding viewers and brands.

AI-powered voice assistants enhance convenience in the connected TV environment. Users can control viewing experiences through voice commands, eliminating the need

for traditional remotes. Voice interactions drive personalisation and encourage natural communication with Connected TV devices. AI plays a crucial role in programmatic ad buying and selling. By automating ad placements based on behavioral patterns, it optimises deals between publishers and advertisers. Audience hyper-segmentation using machine learning ensures targeted ad delivery, enhancing overall advertising effectiveness.

AI's capacity to handle massive datasets streamlines outcome prediction and facilitates real-time communication among connected TV ecosystem stakeholders. It frees up human capital to focus on strategic aspects and creative production. AI is revolutionising TV viewership by enhancing content recommendations, optimising streaming quality, enabling voice control, and transforming advertising practices. As technology continues to evolve, AI's impact on the entertainment industry will only grow stronger.

Sora is a text-to-video model developed by OpenAI that can create realistic and imaginative scenes from text instructions. Sora can generate videos up to a minute long, while maintaining visual quality and adherence to the user's prompt. Sora uses a neural network that can take written descriptions of a scene and turn them into high-definition video clips up to 60 seconds long.

Creating great content used to be the domain of TV stations. The content could be distributed using social media, websites and apps while the power to create content very much belonged to know that ability is being overtaken by AI which will have a huge and potentially irreversible impact on our industry.

AI USE CASES AND INNOVATION IN REMOTE & VIRTUAL PRODUCTION

The moderator was **Aale Raza**, Whiteways and the panellists were **Dr Ahmad Moradi**, VYPA; **Louis Clovis**, Broadcast Elements; **Dr Mohieddin Moradi**, IRIB University and **Ken ichiro Nagano**, NHK World.

Virtual productions (VP) combine physical and virtual filmmaking techniques to create cutting-edge media. The tech artist uses real-time 3D game engines to create photorealistic sets in green screen type studios. The style of shooting is changing and while the cost of shooting big budget TV commercials is too high. VP demands more with broadcast graphics and brings down the costs of commercial job cost. Extended sets can be created even when the studio is small and there is no need for huge green screen studio. Today's video games systems such as the Unreal Engine 5 can render graphics in real time that are similar to those seen in Hollywood movies and TV shows.

Virtual Production is where the physical and digital worlds meet. It is the ability to mix live footage and computer graphics to get real-time feedback and interaction on set. VP uses technology to join the virtual world with the physical world in real-time. Green screen virtual production has been around for ages, but now, a new shooting method with in-camera VFX using LEDs is beginning to attract attention.

The in-camera VFX method, the camera in the virtual space moves in the same way according to the position information of the camera, and the image projected by the virtual camera is displayed on the LED wall, along with the subject in the foreground. It is a mechanism in which a real camera records in normal

settings. The advantages are that there is no restrictions on location, weather or time, and it is possible to shoot in places that are not realistically possible.

The LED walls encompass the entire set and specifications are based on brightness, scan rate, refresh rate, viewing angle, bit depth, wide color gamut, deep black coating, anti-reflection coating and pixel pitch. If brightness is lower than 1000 nits – therefore, it will not be able to effectively display the self-luminous characteristics of the LED display screen. The number of scans is the ratio between the number of lines that the LED screen drives current scans and lights up in the unit and the total number of lines of the screen module. The smaller the denominator of the scan number, the better the screen performance, and the lower the probability of black lines and horizontal stripes appearing during shooting.

The refresh rate is the speed at which the screen is refreshed. A low refresh rate will cause the image to flicker and shake. The higher the refresh rate, the better the picture effect presented by the camera. Two common refresh rates for LED displays are 1920 Hz regular refresh and 3840 Hz high refresh. The 3840 Hz display can meet most shooting needs. Viewing angle is the maximum angle at which the display can be viewed without experiencing significant degradation in image quality. The viewing angle of the Led wall for virtual production is preferably above 160°. Direct view LED displays are constructed from a dense matrix of pixels each incorporating an individual red, green and blue LED emitter.

INNOVATIVE WORKFLOWS ACROSS THE MEDIA SUPPLY CHAIN

The moderator was **Lindsay Cornell**, BBC Digital with the panellists comprising of **Dr Simon Keens**, Digital Radio Mondiale (DRM); **Micheal Low**, RCS Malaysia; **Amirah Jaafar Mad Ariff**, RTM; **Sanjay Das**, Cite De Memoire and **Zahedah Farshad**, IRIB.

Digital Radio Mondiale is a mature technology, as it has been tested and deployed in many countries. A single digital transmitter can output numerous streams and both mobile and stationary receptions are available. Broadcasters have varying goals which include increased content, new revenue and adding emergency warning systems. They also face challenges including rural vs urban coverage, mountainous terrain, and operating costs. Previously, 3-5 audio services were available from a digital transmitter operating in the FM band. Digital radio innovation has provided the opportunity to multiplex in a single transmitter by reusing existing infrastructure and 12-18 audio services per FM band transmitter with higher coverage are now available.
DRM reduces the energy required by AM transmissions in both the MW and SW band. DRM transmissions remove the need for a carrier frequency and all energy is used to transmit information which means power is not wasted. Average power for digital transmission is up to 66% lower than for analogue transmission. Digital signals have greater crest factor, resulting in lower requirements of receiver field-strength. In addition, DRM's error correction means crystal clear stereo sound right up until signal is lost.

DRM provides a better Emergency Warning System because the alarm signal triggered by authorities is picked up from current DRM Service by all running DRM receivers and switched to emergency broadcast. Inactive receivers may switch on automatically and as a result, all DRM receivers present the audio content of the emergency programme. In addition, DRM receivers with text screen present detailed information and instructions with Journaline (a text-based data service) and text-headlines.

5G Multicast Broadcast Services (MBS) allows the network to select the most suitable among point-to-multipoint (PTM) or point-to-point (PTP) delivery based on requirements set by either

service providers or network operators and considering concurrent user demand. MBS is the combined streaming of unicast, multicast, broadcast media services (linear, VOD and personal). The choice of PTM or PTP is based on the requirements of the service provider or operator, the number of concurrent user requests and meeting the condition of being a member of the multicast group. Multicast is suitable for popular online television and radio services whereas broadcast is suitable for localised services.

IMMERSIVE MEDIA & NEXT GEN AUDI-VISUAL TECHNOLOGIES

The moderator was **Dr Mohieddin Moradi**, IRIB R&D with the panellists comprising **Kazuhiro Yamagata**, NHK; **Shunto Yamshita**, NHK; **Toni Fiedler**, Fraunhofer IIS and **Mohamad Reza Hasanabadi**, IRIB.

Digital Audio is based on standards that include MPEG: Mono/Stereo 5.1–3D, 3GPP: Enhanced Voice Services (EVS) and Bluetooth: Low Complexity Communications Codec (LC3). MPEG provides perceived transparent quality at lowest possible bitrate and has evolved from four generations of audio codecs into the latest comprising xHE-AAC and the MPEG-H 3D Audio System. 3GPP EVS is full band instead of narrow (3.5kHz) and wide (7kHz) band audible bandwidth. It delivers improved transmission error robustness through concealment, and Immersive Voice and Audio Services (IVAS) is under preparation. Bluetooth: LC3 is a High-quality, low-power audio codec with new features including support for hearing aids.

The BBC has documented regular complaints about speech that was difficult to understand. The audience preferred volume difference between dialogue and music & effects depending on personal taste. In 2020, a study by Westdeutscher Rundfunk (WDR) and Fraunhofer IIS showed that 68% of all participants, and 90% of the subjects aged 60 and above, often have problems understanding speech on TV. Most study participants preferred the possibility of switching to a dialogue-enhanced version.

Source Separation, especially dialogue separation and speech enhancement, have been major research topics for decades. Recent developments with artificial intelligence (AI) and deep learning brought significant improvements. Dialogue separation in legacy material is supported by AI and the separated audio elements can be processed with Object Based Audio (OBA) system.

Dialogue separation can be applied to any digital audio format and is suitable for legacy stereo recording. During automatic remixing the separated stems are remixed according to a trained model with MPEG-H interactivity feature. The digital audio processor provides global and time-varying background attenuation, or a combination of both. Dialogue separation knows the sound elements to be separated and remix algorithm knows how the new mix should sound. Automatic Metadata Authoring delivers audio and metadata for an object-based workflow.

Deep-learning-based Dialogue Enhancement is available as library and standalone software for Windows and MacOS. It automatically creates a new audio version with clearer dialogue out of any existing stereo broadcast mix. Dialogue Enhancement is based on a deep neural network, trained with original TV material and can be adapted to various content types including documentaries, sports programmes, and feature films. It allows for manual adjustments, but it is not recommended for processing pure music material.

SUSTAINABLE AND EVOLVING PRACTICES IN MEDIA

The session was moderated by **Emily Dubs**, DVB Project and the panelists were **Sharad Sadhu**, Media Specialist, India; **Satriyo Dharmanto**, Televisi Republik Indonesia (TVRI) and **Richard Lhermite**, ENENSYS Technologies. D2M (Direct to Mobile) is a new type of broadcasting service which addresses mobile phones directly in broadcasting mode. The mobile phones receive broadcasts, renders content on screens and speakers. It is a viable concept as the broadcasts potentially target a huge population of mobile phones. The requirements are that mobile phones must have direct broadcast receiving capability, video and audio processing software and battery power for longer time period usage.

Platforms including ATSC 3.0 and DVB-I that can carry multimedia products, video and audio are being considered. D2M transmissions require High-Power High-Tower (HPHT) and for providing cover signals and Low-Power Low-Tower (LPLT) for mobility and indoor coverage. The mobile screen size is small and only requires a very low bitrate for video. Therefore, a large number of services can be delivered in each DTV spectrum slot. Content and innovation will determine the success or failure of D2M. At least one large country is mooting to replace the entire terrestrial TV, DTV by D2M. According to industry sources, front-end technology and chipsets are currently available. Phone manufacturer take-off relates to market demand. The frequency spectrum to be selected is less than 694 MHz (broadcast) and greater than 700 MHz (mobile bands).

Collaboration between broadcasters and mobile operators who control the mobile market is needed. 5G delivers multimedia content in broadcasting mode where the 5G is the basic layer while the broadcast transmission is the physical layer. 5G platform enables mobile devices to receive 5G broadcast services with SIM-less devices. Direct access to mobile phones and TV sets with SIM-less devices boosts consumer population. Delivery by RF broadcast does not need mobile connectivity and the technology has been thoroughly tested in Europe.

Many countries received sub-700 MHz spectrum for mobile phones and 5G Broadcast transmitters and mobile 5G New Radio could share the same spectrum. Therefore, 5G broadcasts will have RF access to both TVs and mobile phones. ■


powered by NETGEAR
BRAINSTORM
KILOVIEW
NETGEAR AV


CamTrack


Synchronization Solutions
Comprehensive video and audio test solutions for analysis, quality control, live, and post-production.
5G&Cloud-Ready
CLOUD/AI BASED SOLUTIONS FOR LIVE CONTENT


AEQ


SoLoMo
TECHNOLOGIES
NETSTAIRS.COM

DBS2024 INDUSTRY DEBATE – IMPACT OF ARTIFICIAL INTELLIGENCE IN MEDIA, REGULATION & ETHICS

Moderator: **Mardhiah Nasir**, *IPSB Technology*

Panellists: **Sharad Sadhu**, *Media Specialist, India;* **Jade Wang**, *Director of China Media Group;* **Aale Raza**, *Whiteways Systems;* **Fintan Mc Kiernan**, *Ideal Systems* and **Lindsay Cornell**, *BBC Digital*.

Distinguished group of broadcasters and experts offered insights into the global adoption of AI within the media landscape. They delved into the pros and cons of deploying AI tools within the complex media environment, addressing future consequences and challenges. The panellists emphasised that AI can be exercised responsibly to propel media innovation while upholding ethical standards and regulatory integrity in the digital age.

AI is perceived as new technology and there is resistance to change as well as apprehension that it will take over jobs. Despite this, the media sector remains unfazed by AI, since it has survived technological advancements such as mobile phones. AI is instead expected to generate employment by requiring human expertise to create avatars, and the audience will value the interactivity. AI can handle low-end repetitive tasks effectively, so only jobs in this industry are impacted.

AI will manage bandwidth, produce content quickly in cloud, and guarantee low latency even for HDTV. However, the solution architect must understand the end-to-end environment and the need to integrate with the legacy system without having silos. Broadcasters need to upskill their workforce by investing in training and development programmes, that help workers acquire the skills needed to effectively use AI, while also maintaining a healthy work-life balance.

Content is being rapidly uploaded onto cloud and made available on social media, Free ad-supported TV (FAST) and other platforms. There is a need to monetise content but searching for information scattered across multiple silos is an immense task.

AI search software uses natural language processing, machine learning algorithms, understands the intent behind each query search and continuously improves relevance of results. It saves individual employees time that would have otherwise been spent trying to track down the documents, data, or information they need to get their work done.

The BBC has been accumulating content over many years and storing it into its digital archive. Content can be maximised by translating to other languages. The task is immense, and it is not possible to justify the cost using human translators. Fortunately, AI can do this and BBC caveats this by informing the audience that the content was translated by AI.

The BBC has potentially opened its journalism to a mass of people, who might otherwise miss out because they cannot read English. Articles that have previously been copy-and-pasted into translation websites could soon be converted much more easily.

Millions of people use sign language, but the methods of teaching this complex and subtle skill have not evolved as quickly as written and spoken languages.

Thankfully, artificial intelligence (AI) can translate sign language into text and vice versa, allowing people who are deaf and mute to communicate in real time with people who are not familiar with sign language. ■

DBS WORKSHOP

IPSB WORKSHOP: UNLEASHING THE POWER OF CLOUD AI, DATA-DRIVEN WORKFLOW STRATEGY & MONETISATION IN BROADCASTING

The first session was moderated by **Alia Sarah Zainal Abidin**, IPSB Technology, Malaysia and the panelists were **Mardiah Nasir**, IPSB; **Samuel Bogoch**, Axle AI; and **Jay Ganesan,** Amagi. Data Lifecycle Orchestrator (DaLO) is a platform that unifies the content chain by managing assets, metadata, workflows, and processes across multiple and diverse production and distribution systems. Specially tailored for media workflows, this unique technology platform helps broadcasters and media professionals increase their productivity while providing operational and business visibility.

A central, unified multimedia content catalog manages rich media assets across the organisation enabling seamless collaboration. Workflow specific, task-oriented tools have native access to this central catalogue, facilitating every aspect of content creation, management, and distribution. The platform brings several important functional enhancements and major technology innovations that augment media operations and create new forward-thinking business models. DaLO uses Artificial Intelligence (AI) across the workflow and hybrid infrastructures with on-premises and cloud deployments.

Enterprise Storage Archiving System (ESAS) is a hybrid cloud storage solution that offers flexible, pay-as-you-go pricing and scalability provision for unlimited growth. It has the ability to increase and decrease storage capacity on demand. ESAS is a combination of simplicity in deployment and management with enterprise-grade protection and security to help broadcasters eliminate silos and consolidate their workloads. ESAS is designed specifically for next-generation apps that demand massive unstructured data storage capacity with economies of scale.

Free Ad-supported Streaming TV (FAST) is increasingly replacing cable TV as the preferred linear content programming experience for audiences worldwide. FAST is a form of streaming that delivers programming like cable, satellite or traditional TV. FAST TV content can be viewed on virtually any device at no cost; the only tradeoff is that the user must watch commercials. ■


20YEARS ABU DBS 2024
NAVIGATING AI HORIZON
MAJOR SPONSORS
SUPPORTING SPONSORS & EXHIBITORS
All video will be searchable.
2023
2024
2025
2026
axle.ai

WORLDDAB WORKSHOP: SUSTAIN, STRENGTHEN, SUPPORT-DRIVING THE CASE FOR DAB+

The moderator was **Dr Les Sabel**, with the panellists comprising of **Bernie O'Neill**, WorldDAB; **Lindsay Cornell**, Chair, WorldDAB; **Lars-Peder Lundgren**, Paneda; **Oscar Hu**, GatesAir; **Dr Kiatanantha Lounkae**, Thammasat University, Thailand; **Gabriel Kwofie**, National Communcations Authority, Ghana; **Muhamad Sujai**, Radio Republik Indonesia and **Christopher Lessnau**, AVT Audio Video Technologies.

DAB+ offers lower costs of distribution than FM, lower energy requirements, and greater resilience in emergencies. DAB+ is established as the core future platform for radio in Europe and 96% of new cars are equipped with DAB receivers to comply with mandatory standards from 2022.

Interest in DAB is growing worldwide with activities in South Africa, Tunisia and Middle East. DAB+ is a green solution as studies by BBC UK have determined that DAB is 33% more efficient than FM.

High-efficiency transmitters are the cornerstone of low Total Cost of Ownership (TCO), though many other factors are equally important. Selection of a reliable transmitter that will provide cost effective operation throughout the life of the product depends on the major drivers of total cost of ownership which include reparability, modularity, footprint and several other factors.

Total cost of ownership (TCO) is an analysis that places a single value on the complete life cycle of a capital purchase. This value includes every phase of ownership: acquisition, operation, and the softer costs of change management that flow down from acquisition such as documentation and training.

Transmitter efficiency is affected by losses in the Automatic Voltage Regulator (AVR), mask filter and transmission line. Fixed losses occur in the control system and exciters while varying losses occur in the power amplifier (PA), drivers, cooling system and power supplies. Most older designs used Class AB PAs with efficiency in the range of 23% to 33% but new designs use High-Efficiency Doherty PA's with an efficiency over 50%.

In the case of cooling systems, older less efficient transmitters used large high volume and pressure blowers whereas new systems use variable speed fans and pumps and have less heat to remove. Electricity prices have increased worldwide, and we need to go green with high efficiency DAB+ transmitter and save total cost of ownership.

New features for car receivers are continually being developed and hybrid based with DAB+ & IP. They include station selection by logo and voice control, alternative audio and images and targeted content. There is an increasing range of domestic receiver products with the use of colour screens and prices continue to decline. ■

EARLY WARNING FOR ALL - BRIDGING THE LAST-MILE FOR SAVING LIVES

United Nations Office for Disaster Risk Reduction (UNDRR) and World Broadcasting Union (WBU) have jointly launched a project named WBU/UNDRR Global Media Saving Lives Initiative. The multi-activity programme for the Asia Pacific region aims to enhance the capacity of all ABU broadcast members, to ensure the continuity of broadcast services during disasters by making their physical networks resilient.

The broadcasters' services should be linked to their national disaster management authorities. Members should issue timely, accurate and relevant early warning messages by developing up-to-date broadcast emergency plans. ABU members should broadcast mainstream climate change adaptation and disaster prevention in their news, current affairs, and general programmes. Despite the 20 years of effort by UNDRR, broadcast-delivered emergency warning has not been implemented widely.

Natural emergencies cause severe psychological issues for people who need to be consoled and help reduce trauma by finding surviving family members and relatives. The broadcasters' task for upcoming disasters is to inform the public with utmost speed, and maximum reach to cover all affected people in the areas. All relevant information about post-disaster support and wellness services should be provided with easy accessibility.

Analogue radio fulfils some requirements, but digital radio offers all essential services in all stages. Digital Radio covers larger areas, reaches people with reliability by sounding the audio alarm and displaying on-screen text information and graphics.

New types of broadcasting are capable of Emergency Warnings Delivery. Both D2M broadcasting (Direct to Mobile) and 5G broadcasting can be much more effective for universal delivery of emergency warning to public, and mobile phones. D2M will access mobile phones directly and carry emergency alerts in various formats such as radio, video, and SMS. 5G Broadcast will address mobile phones directly with more versatile formats for emergency alerts and related services. ■

AI POWERED DIGITAL MEDIA ROOMS - SAFEGUARDING MEDIA CONTENTS AGAINST SCAMS & FRAUD

AI can both be a friend or foe to broadcasters. AI is leveraged for scams as its algorithms can craft convincing phishing emails, deepfakes and synthesize voice. The latest development to counter these threats is the Natural User Interface tool which uses AI. Natural User Interfaces (NUIs) approach has become popular for its ability to reduce the separation between humans and the digital world.

A Natural User Interface is an interface design that uses human behavior to make technology approachable and familiar. Contrary to conventional interfaces where users must adapt to machine-oriented controls, NUIs make attempts to close the gap between human cognition and digital interface, so that machines will be more accessible and friendly to the user.

A Natural User Interface (NUI) is a term that describes an interface design pattern which allows machines to communicate with humans in a humanistic manner that feels or looks familiar and like real life. Unlike the old UIs which used buttons, and menus most, these new ones focus on natural elements of communication such as active hand movements, voice commands, touch, and eye movements.

Using touch, gesture, voice, and biometric inputs, NUIs create immersion and engagement in the users across many applications and industries. Although NUIs have numerous benefits in terms of usability, accessibility, and efficiency, there are some challenges that include accuracy, privacy, feedback, environmental factors, and user adaptation. ■

ALTO: ARCHIVE INNOVATION & GLOBAL STANDARDS FOR DATA PRESERVATION

Film & TV Archive and Preservation faces several challenges. There is an increasing demand for hours driven by growth in production as files are becoming massive driven by higher resolutions. Film is scanned in UHD for re-purposing and content may be locked into unplayable data tapes. Therefore, it is wise to migrate to futureproof media or face obsolescence as video tapes, optical disks and data tapes are all disappearing.

A high proportion of data is at-rest and accessed infrequently, while online spinning-disk storage is expensive to own and operate. Flash Storage cannot replace HDD and is difficult to secure. Disk in cloud is unaffordable and impractical for media whilst data tape storage is perceived as the only low-cost medium. However, the reality is that tape has many hidden costs, and it is difficult to manage well.

Robotic Tape Libraries also face several challenges. It can be considered as low-density storage with a large physical footprint. High capital outlay is needed to build a clean and humidity-controlled environment with specialist project disciplines. Expensive hierarchical storage management (HSM) and Archive Management requirements to optimise tape to drive contention is the major issue. Unmanaged contention in cloud tape limits suitability for archiving as first-come-first served principal results in 5-10 hours latency. Studies have indicated tape libraries have the highest lifetime cost due to mandatory tape migration, service costs, environmental and other hidden costs. Linear Tape-Open (LTO) Tape duopoly has already caused supply issues and eventually tape drive monopoly could pose a future threat.

ALTO (The Alternative to LTO) is available in the form of scalable cold storage for infrequently accessed media storage, optimised for the needs of television and film production, preservation and archival. The ALTO Technology is equally applicable for any structured or unstructured data, adapted at the Application Layer for best-of-breed solutions. ALTO replaces outdated data tape libraries and replaces or complements optical or cloud offerings in open, standards-based systems with the lowest lifetime cost of ownership, superior performance and outstanding environmental credentials. ■

REVOLUTIONIZING MEDIA PRODUCTION WITH AI AND AUGMENTED REALITY TOOLS

In the evolving landscape of media production, the integration of augmented reality (AR) and artificial intelligence (AI) tools is revolutionising the way news and visual effects (VFX) are created and delivered.

Augmented reality technologies are reshaping the visual aesthetics of news broadcasts and VFX production. This enables the creation of ultra-realistic visuals that enhance viewer engagement. Russia Today (RT) stands out as a player in this field, leveraging diverse design services within its organisational workflow, including broadcast design, crafted design, and 3D & VFX designs.

These initiatives highlight the growing trend towards integrating AR technologies into newsrooms and production studios, with a focus on creating immersive and visually-compelling content.

Creative design plays a pivotal role in news production, with a focus on enhancing the visual appeal of news titles, channels, and animations. Similarly, sound design is recognised as equally essential in shaping the overall viewer experience. Maintaining a consistent standard and quality throughout TV news content is essential, with an emphasis on utilising studio lighting, colour selection, and real-time graphics engines to enrich the visual narrative.

The advent of AI and automation technologies has accelerated video production processes, streamlining tasks such as title insertion and news generation. Telegram, a popular messaging platform, has emerged as a key tool for automating workflows and integrating AI-driven tasks into media production pipelines.

The integration of AI tools into media production workflows has made content creation more convenient and accessible than ever before. Modern tools and diverse platforms offer tailored applications that simplify communication and automate business processes. Telegram bots, in particular, offer a wide range of features for working with videos, images, and AI integration, including comment filtering and speech-to-text conversion. ■

DVB: ADVANCING IP-BASED BROADCAST TECHNOLOGIES

DVB-I is an Internet-centric media delivery system, and it is not a broadcast system based on IP. In the past, broadcast and broadband were operating in silos, but now DVB-I can help deliver DVB's broadcast like experience on broadband. DVB-Native IP is a converged media delivery system where IP based delivery is handled via broadcast, multicast, and unicast networks.

DVB-I underpins the converged ecosystem targeting the full range of devices. It breaks down the barriers between broadcast and broadband words. DVB-I can reach wider audiences and more devices. Common services can be deployed across devices without agreements with manufacturers. DVB-I offers higher interoperability and lower distribution costs due to optimised network usage.

AVS specifications address the commercial needs of China and other markets with a special focus on a user-friendly IPR policy. AVS always strives to improve for 30% to 40% in compression compared to previous generation video standards.

AVS next-generation high-efficiency immersive audio compression methods have now been published. It supports lossy audio coding, 3D Audio and metadata. Digital Video Broadcasting has accepted the AVS3 as one of the next generations of video codec standards in the DVB standard system, aiming to promote the application and development of UHD video industry.

DVB Single Illumination Satellite (DVB-SIS) standard provides a solution for DVB-T2 terrestrial broadcasters using satellite to deliver signal to terrestrial transmitters either in MFN or SFN. DVB-SIS enables 98% satellite capacity savings for each additional DTT multiplex and permits regional advertisement as well as Emergency Warning signals.

France Television has selected Eutelsat to transmit UHD signals on both terrestrial and satellite networks using the new DVB-SIS (Single Illumination System) transmission technology standard. They will be distributed to terrestrial transmitters across the French territory, as well as DTH via the Fransat platform. ■

USAGE OF ARTIFICIAL INTELLIGENCE IN RADIO STUDIOS AND AUTOMATED SUBTITLING FOR CONTENT CREATORS

The advantages of AI are that it simplifies work processes, reduces turnaround time, and manages stress. Automatic Speech Recognition (ASR) automatically turns audio into timed text in 150 languages. Named entity recognition (NER) is a natural language processing (NLP) method that extracts information from text. NER involves detecting and categorizing important information in text known as named entities.

AI uses different speech-to-text engines, allowing the balance of speed and accuracy in any language. Transcription includes speaker segmentation and advanced punctuation. To achieve the best result, words added to the custom dictionary will be recognised by preference. The result of automatic transcription is displayed in editable form, allowing the editor to review the transcript, to remove or correct words, and adjust punctuation and timing before publishing it.

AI converts audio into high-quality subtitles, saving time and cost of conventional subtitling, and allows the broadcaster to retain the intellectual property rights. Subtitling and localisation services run in the cloud. After uploading the content, subtitles are available for review and post-editing within seconds.

MASTERCLASS: DESIGNING A VIRTUAL PRODUCTION STUDIO BY LED WALL

Virtual production is where the physical and digital worlds meet. It is the ability to mix live footage and computer graphics to get real-time feedback and interaction on set. This is a collaborative process that requires the visual effects department, production designer, camera department, as well as producers, and directors to prepare well in advance. In-camera VFX, also sometimes referred to as on-set virtual production or OSVP is a new methodology for shooting real-time visual effects during a live action film shoot. With this technique, live-action shooting takes place on a huge LED stage or volume, which displays an environment generated by the real-time engine on its walls and ceiling.

LED walls enable the integration of in-camera visual effects (ICVFX), which enhances the creative possibilities of virtual production. With ICVFX, visual effects are generated and displayed in real-time on the LED walls, allowing directors, cinematographers, and VFX artists to make immediate decisions and adjustments during the shoot. This real-time feedback loop empowers creative collaboration and enables more efficient production processes, resulting in higher quality visual effects and a smoother overall workflow. Generally speaking, the price of purchasing a high-resolution LED display is much higher than that of a green screen. However, the post-production of green screens requires more capital and human input than LED displays, and every event needs to consider this factor, and green screen production is not cheap.

The Virtual Production LED Wall is a high-tech display system that utilises LED technology to create a virtual environment for filmmaking and other media productions. It can create anything from large outdoor backdrops to entire virtual sets. All scenes can be created without traveling to multiple locations or trying to find locations. ■

MASTERCLASS: EXPLORING THE POTENTIAL OF NEXT-GENERATION PLATFORM SHARING THROUGH ATTRACTIVE SERVICE SCENARIOS

Internet Initiative Japan (IIJ), Japan's largest backbone network, has data centers and network operation centers across Japan. In addition to this, IIJ provides network and system integration operation services in 11 major cities around the world.

As an independent ISP, IIJ has built its backbone using the lines of different carriers to provide high fault tolerance. Connections can be made not only with domestic ISPs and IXs, but with major ISPs in the US, Asia, and Europe. IIJ brings reliable and scalable cloud exchange network services to you through partnerships with most major cloud providers.

IIJ has visualised a project concept to develop a common service platform of NextGen TV for broadcasters in ABU to exchange services. However, matters that need to be clarified include discovering effective service scenarios, sharing use, marketability, and standardisation.

Disaster information should be shared but each country has their own disaster management system and operation. It is a challenge sharing information, so that evacuation and other emergency measures can be undertaken.

Meteorological data can be accessed by phones using hybrid connection and medical aid for the victims be made available. ■

CCBN

April. 23th-26th.2024
Beijing, China

2024

Hosted by:
Academy of Broadcasting Science, National Radio and Television Administration, PRC

TECHNICAL REVIEW OF NETWORKED TETHERED FLYING PLATFORMS AND SOME OF THEIR USE CASES

ABSTRACT:
Airborne communications can be done via free-flying platforms and tethered flying platforms. Free-flying platforms, such as unmanned aerial vehicles (UAVs) and high-altitude platforms (HAPs), have been used to communicate in some places. However, they lack endurance and backhaul capacity. Network-connected flying platforms, on the other hand, take advantage of free-flying platforms and overcome their limitations by providing a constant power supply and data stream via a tether. They are also cost-efficient. NTFPs have wide applications beyond communications, such as energy harvesting, entertainment, science, research, public safety, disaster relief, government, and defense.
This paper provides an extensive overview of the types of NTFPs, their components and characteristics, their applications, advantages, and challenges. It also provides some case studies that have been used and the major companies related to NTFPs.

1. INTRODUCTION

Since the dawn of time, humans always needed communication. Today, its importance has increased. Furthermore, the unavailability of both public broadcasting technology and internet access, even temporarily, leads to numerous issues for individuals. During epidemics, communication is vital. For instance, the COVID-19 pandemic enforced remote learning and broadcasts. In areas where there is currently no internet and broadcast access, and in areas where communication has been destroyed during natural disasters, communication access must be provided quickly.

There are different ways to provide Broadcast and Broadband coverage, each with its advantages and disadvantages.

- Terrestrial communication: expensive and suitable for users at lower altitudes
- Satellite communications: Extensive coverage, especially low orbit (LEO) satellites, but its launch cost is very high and its deployment time is long, in addition to long delays due to the satellite distance from the user
- Air communications: include various items (this paper examines air communication).

Air communication has recently attracted much attention from researchers due to its features that allow broadcast and broadband coverage. They combine some of the terrestrial and satellite communication systems' best characteristics while avoiding many drawbacks. Air communication has the advantages of satellite communication systems, featuring flexibility of network planning and construction, wide bandwidth, wide coverage, and terrestrial communication systems that ensure timely supply meeting the demands, easy maintenance, and so on.

These air communications include different types of flying platforms. Some of these flying platforms are:

- Unmanned aerial vehicles (UAVs) fly at lower altitudes
- High-altitude platforms (HAPs) fly at higher altitudes

Airborne platforms are vehicles that can fly in the air by opposing the force of gravity using either a static lift or a dynamic lift. They are classified into two types as shown in ***Figure 1***:

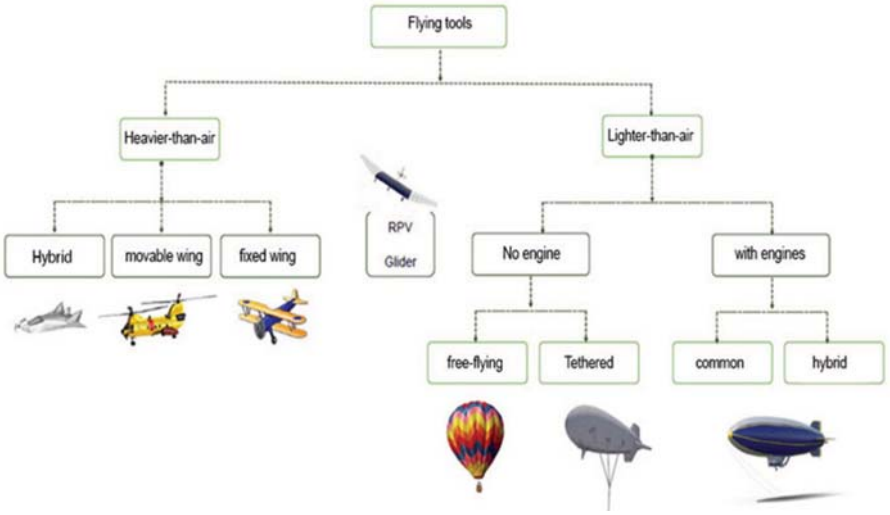
- Lighter-than-air (LTA): They use static lift or aerostatic lift; they are filled with a low-density LTA gas such as helium or hydrogen
- Heavier-than-air (HTA): They use dynamic lift or aerodynamic lift; their lift is produced by the relative motion between the HTA platform and the air, which pushes the platform upwards by Bernoulli's principle.

These flying platforms overcome some of the limitations of satellite and terrestrial communications such as the items listed in **Table 1**.

Table1: Advantages and Disadvantages of flight platforms

Advantages	Disadvantages
Low installation cost	Low stability
Low delay	Low endurance
Low deployment time	Backhaul connection

***Figure 1**: Types of flying platforms*



Taking account these restrictions, another type of flight platform is currently used by governments, militaries, and telecommunication companies: Networked Tethered Flying Platforms (NTFPs).

NTFPs are flying platforms tethered to a ground unit and data and its power are supplied from the ground unit continuously. Due to the existence of this tether, it eliminates many problems that exist in free flying instruments and provides advantages for NTFPs. These advantages are:

- Cost-efficient and inexpensive
- Endurance and persistence
- Backhaul capacity, endurance, persistence, constant
- Power supply, and security

2. TYPES OF NTFPS

In this article, only NTFPs lighter than air are considered. They are filled with low-density gases such as helium. The difference between the density of the air outside the envelope (envelope) and the density of the LTA gas creates buoyancy based on Archimedes' principle. The most popular LTA (lighter than air) NTFPs are balloons and blimps:

2.1 BALLOONS

The cost of their design and construction is low. The height at which they are placed and the load they bear is also less. This model of tied balloons shown in ***Figure 2*** can withstand wind speeds of about 20 to 40 km/h.

***Figure 2**: Balloons*

2.2 BLIMPS

This type of NTFP can carry heavier loads and withstand high-speed winds at higher altitudes (***Figure 1***). Blimps vary in size, height and load-bearing capacity. TCOM Company categorises them into three classes. [See *https://repository.kaust.edu.sa/items/aa86f135-cda6-4074-b2ea-b7e36c6a570b*]:

- Tactical Class: These balloons are 20 meters long, can carry 27kg at 300m height, and are quickly installed. The deployment duration at altitude is 7 days, and can withstand winds up to 100 km/h. ***Figure 3*** shows its use by the US military in Iraq and Afghanistan. It has also been utilised for monitoring the US-Mexico border.

***Figure 3**: Tactical TCOM blimp*

- Operational Class: The balloons are of medium size, approximately 30 meters (***Figure 4***). They are highly portable and flexible, allowing for quick deployment and recovery. They can carry a load of up to 200 kg and can be installed up to a maximum height of 1 km. The duration of installation at a height is about two weeks. This type of balloon is suitable for monitoring operations in areas where land operations are not possible, such as the sea and borders, and can withstand speed of up to 130 km/h.

***Figure 4**: Operational TCOM blimp*

- Strategic Class: These balloons have a size range of 50-75 meters and can carry up to 2300 kg of cargo, making them the largest NTFPs (***Figure 5***). These objects are capable of staying airborne for up to 30 days, reaching a height of 4.6 kilometers, and surviving a maximum wind speed of 166 kilometers per hour. They are designed for long-term surveillance missions and are useful in detecting low-altitude aircraft and cruise missiles.

***Figure 5**: Strategic TCOM blimp*

The differences between the parameters of NTFP types are summarised in **Table 2**.

Properties	Balloons	Blimps		
		Tactical	Operational	Strategic
Payload	5 Kg - 50 Kg	27 Kg	200 Kg	2300 Kg
Altitude	150 m - 700 m	300 m	1 Km	5 Km
Wind Speed	20 Km/h - 40 Km/h	74 Km/h - 100 Km/h	92 Km/h - 130 Km/h	130 Km/h - 166 Km/h
Flight Duration	1 day - 7 days	7 days	14 days	30 days
Deployment Time	Low/Moderate	Moderate/High	Moderate/High	Moderate/High

Table 2: Comparisons among types NTFPs

3. COMPONENTS OF NTFPS

NTFPs have various components that are described in this section:

3.1 ENVELOPE/SHELL

The balloon is made of synthetic materials such as polyester, polyurethane, and polyvinyl. It also contains laminates to prevent damage from UV rays and abrasions. These blimps are powered by wind. Some envelopes have spherical forms (balloons), others have a fish-shaped or streamlined forms (blimps).

3.2 LIFTING GAS

The envelope contains lift gas, which creates buoyancy by being less dense than air and following Bernoulli's principle. Hydrogen and helium are the most common and lightest gases:

- Hydrogen is the lightest gas and can be produced easily, but it is very flammable.
- Helium is the second lightest and non-flammable gas, but it is very expensive, scarce and a non-renewable resource. Helium is the most common gas for NTFPs.

Some companies design using hydrogen and helium.

3.3 PAYLOAD

The weight that the blimps can bear at the desired height, excluding its weight and the weight of its tether. The total payload capacity is divided into two categories:

- The support payload includes all the necessary equipment to launch the platform.
- The operational payload includes equipment related to the mission (the type of equipment varies from one mission to another).

3.4 TETHER

The tether connects the winch to the envelope or shell of the non-rigid lighter-than-air (LTA) craft. Typically made of synthetic fibers, the tether's length, diameter, strength, and weight vary depending on the type and size of the LTA craft. The tether serves several purposes:

- Maintain and stabilise the platform in the air from the ground.
- Supply power to the platform through the power line.
- Transmit data to the platform through the optical fibers.

The strap must be resistant to weather conditions (temperature, humidity, rain, snow, lightning, etc.).

3.5 MOORING STATIONS AND ANCHOR UNITS

A system for maintaining the balloon's envelope before launch, after a flight and during maintenance. These stations vary in size, shape, and complexity depending on:

- The size of their balloons.
- The environment in which the NTFPs will be used.

3.6 ANCHOR POINTS

The unit to which the balloons are anchored and holding them in place above the ground. This unit also has different types and sizes.

3.7 WINCHES

A winch is a device that is used to release and adjust the tether during launch, as well as pull it back during the recovery process. The size and type of winch used varies depending on the size and height of the blimps. Winches can be operated manually, electrically or with a motor. *[See P. K. Chopra et al, A New Topology for Telecom and Broad Band Services in Spars, Remoteand Hilly Areas; WSEAS Transactions on Communications]*

3.8 GROUND CONTROL STATIONS

These stations serve as operational bases for NTFPs and for:

- Platform height control.
- Storage and in some cases process of mission-related data such as videos and images.

Depending on the mission type, it can be a vehicle, a container, or a tent that also acts as a shelter *[See B E Y Belmekki, M S Alouini; On the Usage of Networked Tethered Flying Platforms for Massive Events -Case Study: Hajj Pilgrimage]*. All components of the balloons are shown separately in ***Figure 6***.

4. COMPANIES RELATED TO NTFPS AND CASE STUDIES

In America, the TCOM Company started working on aerostat systems as a global authority in airborne persistent surveillance solutions in 1971. The balloons were originally used for TV and FM radio broadcast, radio repeaters, and microwave relays. Later, in the HALLMARK project, the US Coast Guard utilised the same balloons to search for drug smugglers and illegal drug shipments. Among other projects of this company are BORDER PATROL, from the Department of Homeland Security (DHS), and Customs and Border Protection (CBP), used to monitor difficult situations in the US-Iraq wars, as well as to monitor Texas's southwest borders. These systems provide the possibility of quick monitoring in a wide radius. *[See https://tcomlp.com/hallmark-aerostat-system/]*

In Russia, RosAeroSystems operates in the field of blimps and also offers low-cost alternatives to satellites called TA. Payloads and connected equipment can transmit digital signals for TV, internet, communication, and radio, as well as monitor surveillance cameras and display advertisements. The Lynx model from this company is capable of remaining airborne for up to 15 days. Its wind resistance is approximately 100 kilometers per hour. For longer missions, the aircraft requires a brief landing of 1-2 hours to perform maintenance and address any issues that may arise. *[See http://rosaerosystems.com/]*

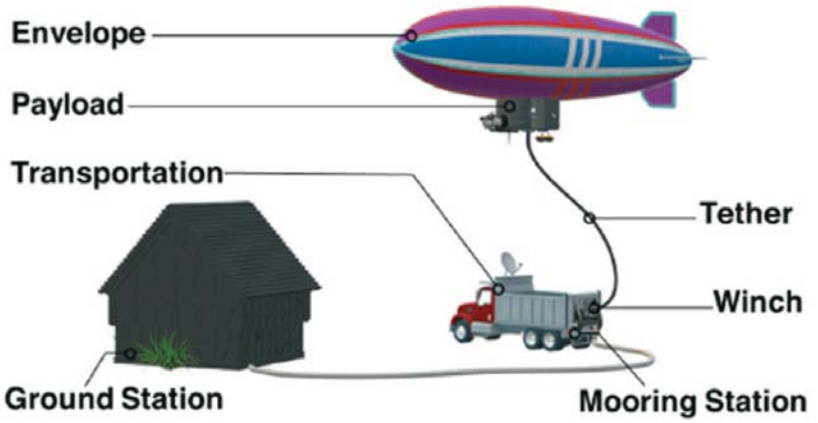


***Figure 6**: Components of NTFPs*

***Figure 7**: Blimps of RosAeroSystem*

***Figure 8**: Blimps of A-NSE*

In France, the A-NSE Company manufactures this type of balloon for its customers, particularly African countries. Most of the products sold have been used to monitor the borders of countries such as the Ivory Coast or to monitor fires in some parts of France, such as around the Marseille River. The company offers a variety of balloon models based on payload weight and required height. *[See https://www.a-nse.com/products/tethered-balloons/]*.

The Iranian Space Research Institute, which operates under the Ministry of Communications and Information Technology, has developed a product that has been utilised in various instances. The institute has created different models of the product, namely BAM 15, BAM 50, and BAM 300. The differences between these models are highlighted in ***Figure 9***.

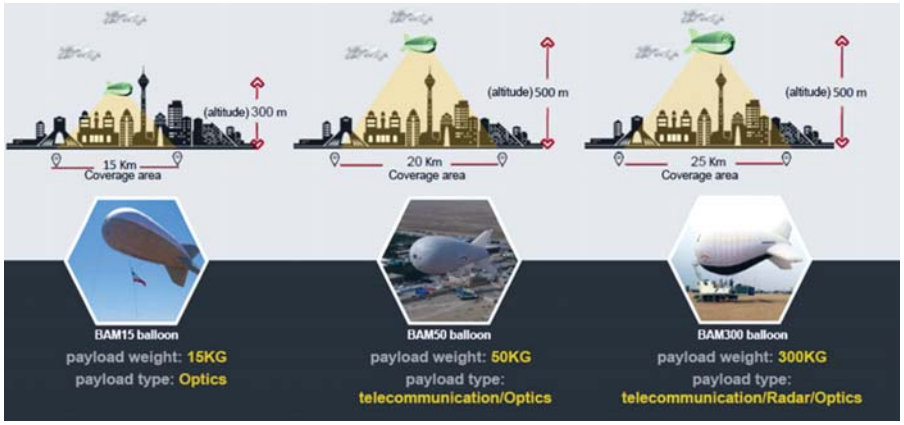


***Figure 9**: Types of Blimps made by Iran*

Blimps manufactured in Iran have been utilised in disaster relief efforts, equipped with cameras to capture images and videos of affected areas, as well as antennas to provide cellular and internet coverage. A cable is used to transfer information between the balloon and the ground station. This enables people in critical situations to communicate with their families and access important news. To explore the possibility of providing TV coverage in crisis areas, Broadcast is currently conducting feasibility studies on installing DVB-T/T2 transmission equipment on these balloons. *[See Iranian Space Research Center (ISRC); https://www.isrc.ac.ir/L9PO4]*

5. CONCLUSION

In this paper, NTFPs were reviewed in general. Its types, components, advantages, and disadvantages were investigated. Several manufacturers were introduced and several cases of their use in the world were described. NTFPs are suitable for natural disasters due to quick setup and energy/data provision via backhauls.

ABOUT AUTHOR

Mahrokh Shojayee
Senior Researcher, IRIB R&D, Iran

Mahrokh Shojayee works at the IRIB R&D department as a senior researcher from 2001. She holds a BS in Electronic Engineering from Amirkabir University and has been involved in the Digital Radio (DAB/DAB+, DRM, DNS) projects and was active in researching and supervising the construction of their equipment such as MUX, Receiver, Transmitter (DAB, FM, Doherty). She is also active in MPEG Media Transport (MMT), High Altitude Platform Station (HAPs) and Radio DNS review projects. ■

ABU – DRM WEBINAR ON DELIVERING EMERGENCY WARNINGS WITH DRM

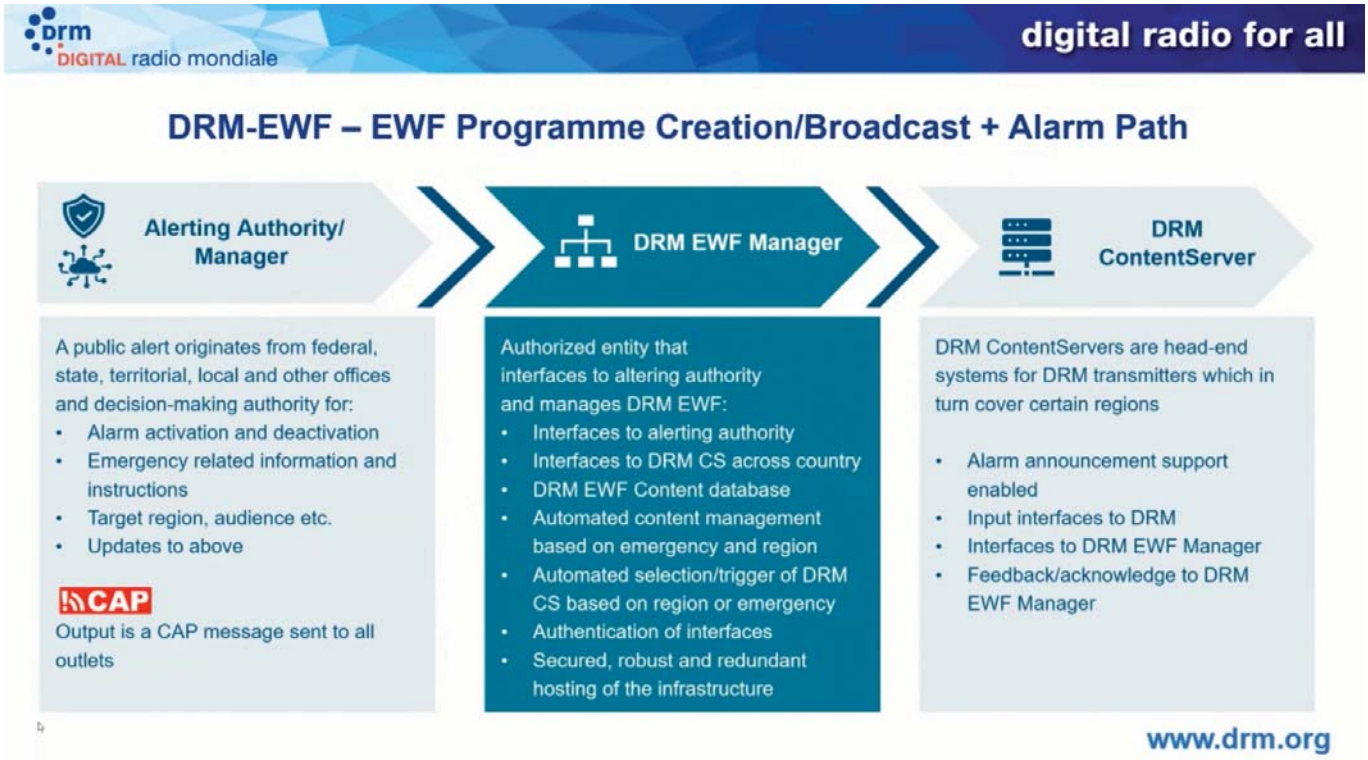
(BUILD UP YOUR DEFENCES AGAINST EMERGENCIES WITH DRM DIGITAL RADIO)

7 FEBRUARY 2024, WEDNESDAY

The Asia-Pacific Broadcasting Union (ABU), in cooperation with DRM Consortium, organised a webinar on 'Delivering Emergency Warnings with DRM'. The webinar was streamed live on February 7, Wednesday. Around 70 participants representing over 58 organisations from 26 countries in the Asia-Pacific, Arab region, Europe and elsewhere attended the event. Speakers' line-up from DRM Consortium included **Ruxandra Obreja**, **Alexander Zink**, **Radu P. Obreja** and **Yogendra Pal**. They discussed Emergency Warning Functionality (EWF) of DRM Digital Radio for enhancing disaster response and communication.

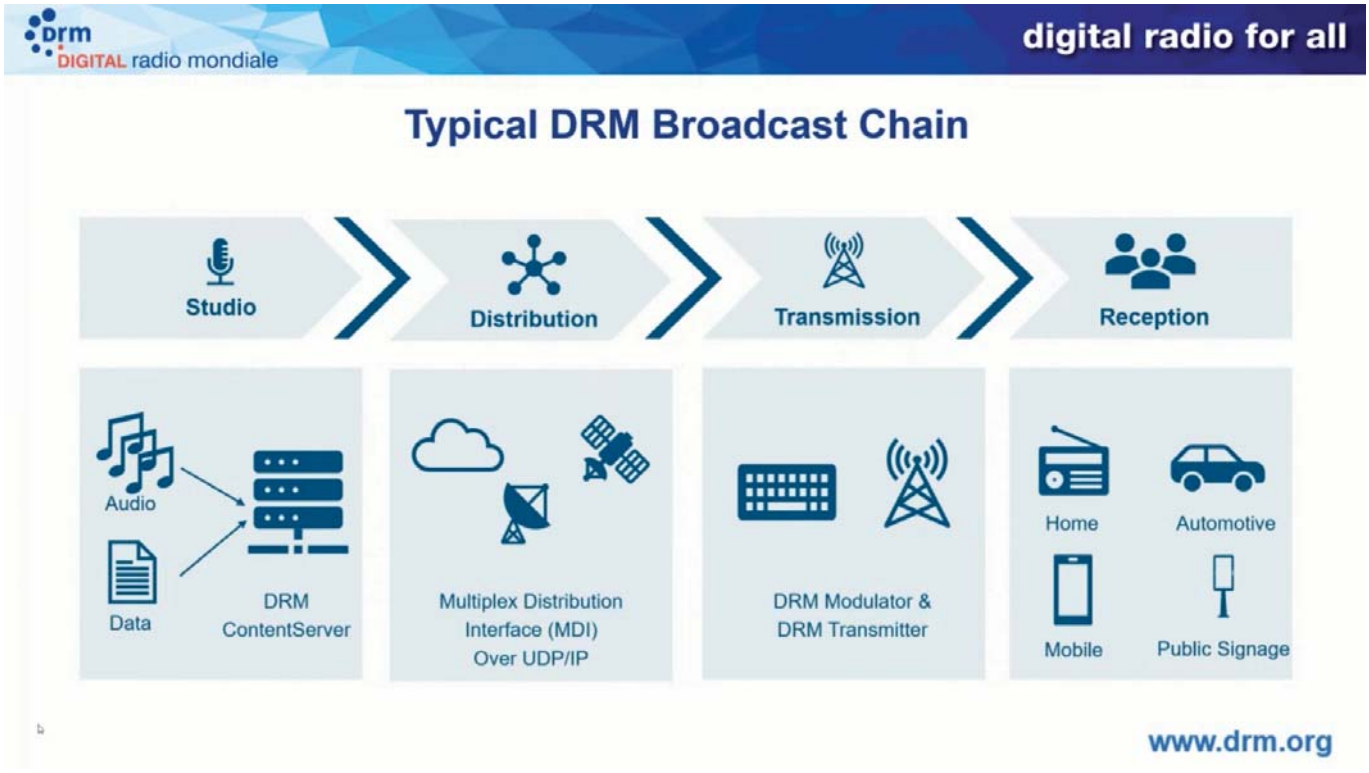
The ABU-DRM webinar detailed how DRM Digital Radio can complete and enhance existing national emergency infrastructure using its Emergency Warning Functionality (EWF). During the interactive webinar session, DRM experts discussed and demonstrated how built-in features of the DRM standard can be efficiently used to deliver emergency warnings only to the affected areas, in several languages in both audio and text. The experts also engaged the online audience with illustrations of the EWF functionality.

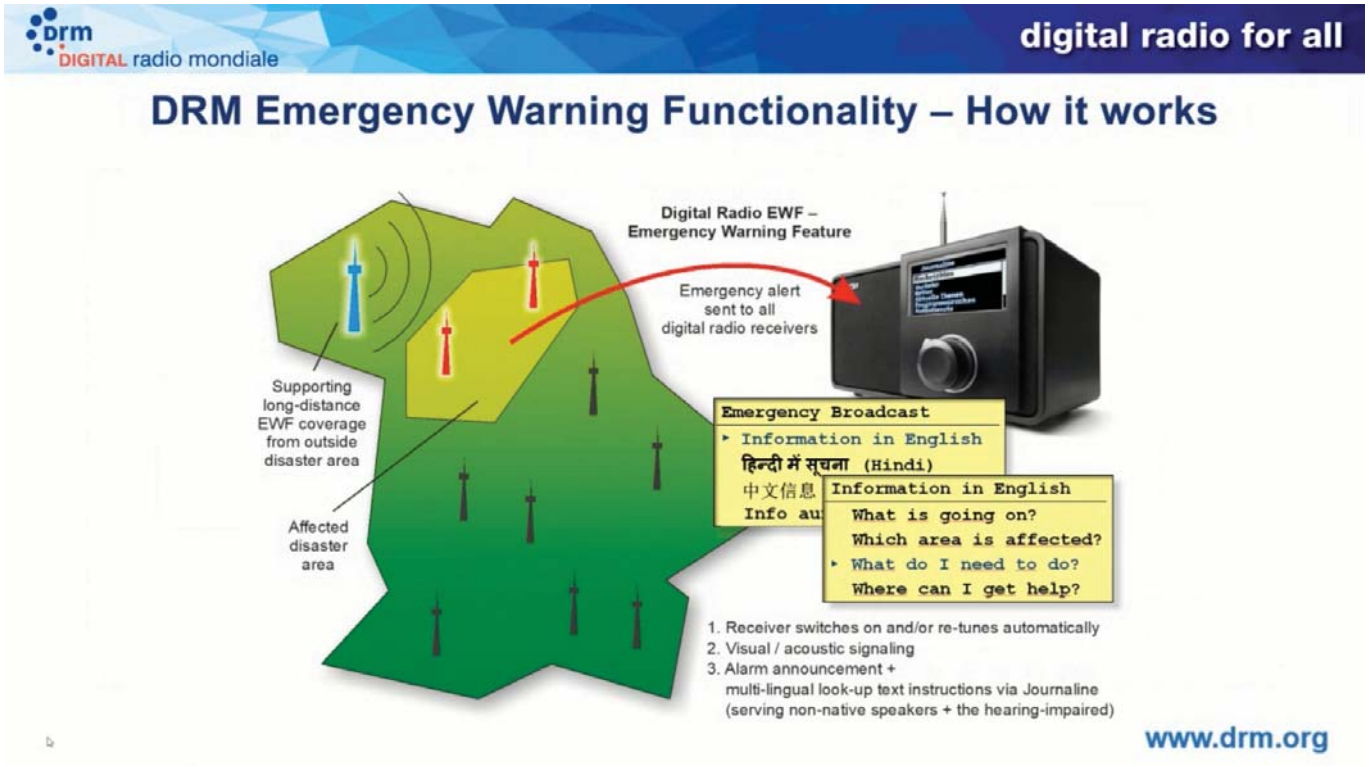
In times of disaster, maintaining effective communication



channels is essential for disseminating critical information and ensuring public safety. While traditional media like radio have long been relied upon during crises, the advent of Digital Radio Mondiale (DRM) has brought about significant progresses in emergency warning functionality (EWF). Radio remains a resilient communication medium during disasters due to its independence from local infrastructure. Even when other forms of communication such as the internet, telephones, and power supplies falter, broadcast radio continues to serve as a reliable source of information.

DRM Digital Radio is an open system that incorporates all necessary tools for swift and comprehensive mass notifications during disasters. It supports all frequency bands and coverage needs, serving as a digital successor to analogue AM/FM radio. Key features such as multimedia capabilities, automatic tuning, and support for multiple languages enhance its effectiveness in disseminating emergency information. DRM EWF is an application within the DRM standard, enabling receivers to automatically switch to emergency broadcasts and present audio and text information. This functionality ensures that affected populations receive timely and relevant alerts, regardless of their location or language ability. Additionally, DRM Public Signage Service enhances text content accessibility for a broader audience, including non-native speakers and the hearing- impaired.





The typical DRM broadcast chain involves studios generating audio and text, content servers creating digital radio signals, and modulators/transmitters broadcasting these signals. In the case of EWF, a central authority triggers alarms across relevant radio stations, with content servers inserting alarm signals for dissemination. Regionalisation of alarms occurs through distinct region definitions embedded within the broadcast signal. It ensures targeted delivery to affected areas.

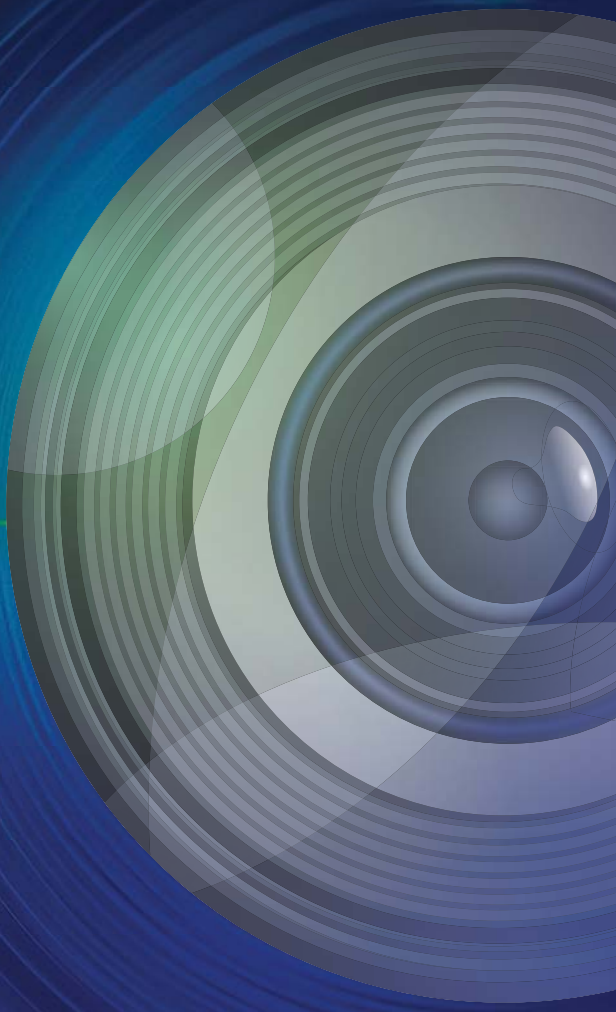
The Common Alerting Protocol (CAP) serves as the international standard for emergency alert dissemination. CAP files, containing relevant event information in XML format, are used as a source for DRM EWF programmes.

Integration with national/regional alert systems, CAP compatibility, and full EWF compliant broadcast infrastructure are essential for its implementation and effectiveness. Successful implementation of DRM EWF necessitates government decision-making, identification of coordinating agencies, language selection, and preparation of additional text information.

Furthermore, effective communication with the receiver industry is crucial to ensure full incorporation of EWF features into DRM-enabled devices. ■

30th ANNIVERSARY CABSAT

21 - 23 MAY 2024
Dubai World Trade Centre



CONSCIOUS CONNECTED CREATIVE

MEASA'S LEADING MEDIA, ENTERTAINMENT & SATELLITE TECHNOLOGY EVENT

Tap into new business potential as thousands of key buyers, thought leaders and decision makers from over 120 countries come together to design, shape and co-create the future.

ORGANISED BY

مركز دبي التجاري العالمي
DUBAI WORLD TRADE CENTRE

Get in touch with us to exhibit, sponsor or visit: www.cabsat.com

@cabsatofficial

#CABSAT

News from the ABU Region

COLLABORATION ON VOLUMETRIC VIDEO TECHNOLOGY IN NHK'S NEW TV PROGRAM – FRONTIERS

NHK's new TV program – Frontiers – shows off a new world soon that has only been visible to pioneers of dynamic videos that utilise the latest shooting technologies.

The second episode of the program broadcast on NHK BS used volumetric video shot at the Meta Studio, a volumetric capture studio, developed by Science & Technology Research Laboratories (STRL).

Volumetric video is created in two steps: volumetric capture, which models objects by obtaining their 3D shapes and textures moment by moment from video shot using multiple cameras surrounding the object, and rendering, which performs virtual photography of the obtained models and other CG models placed in virtual space. A major feature of Meta Studio is its ability to understand textures that change depending on viewing angle, such as glossiness on the surface of an object. This increases the realism and makes it possible to freely change the viewpoint and lighting conditions later in the rendering process.

In the TV program, the performances of two child actors using small props (a ball, a basket, and a box) were shot using 26 surrounding cameras to give an easy-to-understand explanation of a psychological test called the "Sally-Anne test". A free viewpoint video was then created as if the actors and small props that should be the focus were being shot without any cuts from various angles by a single camera.

STRL has now developed "real/virtual seamless switching technology" that can switch between real video and volumetric video without any positional displacement to deliver ultra-high definition of 4K real video and the freedom of rendering of volumetric video. A homography (projective transformation) is applied to the real video that correctly maintains the sense of perspective to suit the shooting field of view of the volumetric video and, during broadcast, video created by chroma key compositing is used for filling the background. Furthermore, a dynamic performance is realised using fast changes of viewpoint while suppressing any uncomfortable sensations of being shaken during viewing by applying viewpoint movement that suppresses jerk in some of the camera motion.

Meta Studio is expected to not only offer special effects such as free-viewpoint video, but also increase the efficiency of program production workflows, such as by taking the shooting and lighting performance that could previously only be done on site and turning it into post-production, which is performed at a later stage, and one-source multiple-use, where video that is obtained in a single shooting is used in a wide range of media. In the future, STRL will establish volumetric capture technology from the perspective of program production that offers both ease of use and high quality and realism, contributing to efficient content production. [NHK STRL]

SINGAPORE IS INVESTING AHEAD IN 10G NATIONWIDE BROADBAND NETWORK (NBN)

The Infocomm Media Development Authority (IMDA) will invest up to S$100 million to upgrade the Nationwide Broadband Network (NBN), enabling it to remain future-ready. More than half a million households are expected to sign up and benefit from higher speeds of up to 10Gbps by 2028.

Digital technologies are developing rapidly, ranging from areas such as artificial intelligence (AI), immersive digital experiences, and autonomous devices. A higher-capacity broadband network provides the foundation to enable these future innovations and opportunities. It is important for Singapore to invest ahead in foundational connectivity infrastructure, even as use cases continue to develop and evolve, to be future-ready. The upgraded NBN will form the backbone of future applications and innovation, at speeds up to 10 times faster than today.

Singapore's past investments in the first generation NBN in 2006 laid the foundation for a reliable and high bandwidth connectivity infrastructure. This has in turn supported the rapid pace of digital transformation. These early investments enabled our people and businesses to realise many of the benefits of digital technology that we enjoy today. This was also evident during the COVID-19 pandemic where the NBN allowed the whole of Singapore to seamlessly connect and continue to work and learn from home. The NBN runs in all homes, with more than 85% of residential homes on at least 1 Gbps services.

It has been 18 years since the first NBN investments. It is timely to upgrade the infrastructure, to ensure it continues to be future ready. The investment will support the upgrading of both the back-end network and front-end user equipment to enable up to 10Gbps services and innovative offerings, at more competitive prices to businesses and consumers.

The upgrade of the NBN will take place from mid-2024 to 2026. Together with the roll-out of 5G mobile services and faster Wi-Fi networks, the 10G NBN will provide more symmetric end-to-end 10 Gbps connectivity. This will support maintaining Singapore's global competitiveness and unlocking further economic opportunities. [Infocomm Media Development Authority]

MEASAT TO DISTRIBUTE STARLINK SERVICES

MEASAT Global Berhad, Malaysia's premier satellite solutions provider has officially signed with Space Exploration Technologies Corp

(SpaceX) to become the Official Authorised Reseller for Starlink Hardware and Services in the markets that MEASAT serves. The agreement was formalised in December 2023.

The Official Authorised Reseller status enables MEASAT to solidify its position as a one-stop provider for customers in pursuit of the most suitable satellite services and solutions that address their needs. Meanwhile, Starlink will be able to benefit from MEASAT's established market presence and strong on-ground customer service and technical support, including a 24x7 helpdesk operated by in-country personnel and onsite support and maintenance. MEASAT's customers have long benefited from end-to-end inclusive packages for last mile logistics and installation services, as well as repair and maintenance, which will now extend to Starlink products offered by MEASAT. [MEASAT News]

WBU INTERNATIONAL MEDIA CONNECTIVITY GROUP FORUM HIGHLIGHT ADVANCES IN BROADCAST TECHNOLOGY

Satellite connectivity, integration and interoperability of cloud services to regulation and standards shaping the future of broadcasting are some of the topics featured at the 2023 WBU-IMCG Forum. Experts explored new developments with a Starlink equipment demonstration, and showcased UEFA match broadcasting over OneWeb LEO satellites. This underscores continuous evolution and importance of satellite technology in broadcasting.

A panel on impending World Radiocommunication Conference's impact on broadcasters' use of spectrum delved into regulations and standards that could shape the future of broadcasting. The integration and interoperability of cloud services sheds light on challenges and opportunities to harmonize cloud technologies with broadcasting. It is crucial with digital transformation and growing reliance on cloud-based solutions.

The Forum also saw sustainability in broadcast connectivity as a pivotal topic reflecting the global shift towards environmentally-conscious practices. The WBU-IMCG Forum 2023 in Tunis provided a platform for industry leaders to share insights, discuss challenges, towards a more interconnected and technologically advanced media landscape. ABU Technology Director, Dr Veysel Binbay, attended the forum hosted by the Arab States Broadcasting Union (ASBU) in Tunis. [ABU News]

TELSTRA WORLD FIRST 340 MBPS UPLINK OVER 5G

Telstra announced it has achieved a new global record for 5G uplink speed of 340Mbps, using the latest software, spectrum and technology innovation with partners Ericsson and Qualcomm Technologies, Inc. The new speed record is 100 times faster than the typical 3G uplink speed.

This world first achievement will enable Telstra customers to enjoy faster and more reliable data uploads on their 5G Standalone (SA) devices, enhancing their experience of sharing videos, photos and livestreams. The new 5G Standalone uplink capability combines Telstra's mid-band spectrum holdings to create a massive 140MHz channel for sending data from the device to the network.

This is complemented by a 240MHz channel for receiving data from the 5G SA network to the device, delivering up to 3.6 Gbps in downlink speed and an uplink speed of 340 Mbps – the fastest in the world using spectrum under 6 GHz. The tests were done using a mobile test device powered by Qualcomm Technologies' latest Snapdragon® 5G Modem-RF System and an existing in-market NetGear Nighthawk M6 Pro Mobile Broadband device in the live commercial network on the Gold Coast.

The latest software from Ericsson brings together different combinations of frequency ranges and types to enable a single 5G uplink and downlink data channel. By aggregating carrier bands, it considerably increases the uplink speeds, while the ability to use low band carriers in these combinations of frequencies delivers improved coverage and performance enhancements for the 5G SA Network.

To test and validate this capability, Telstra worked with long-term partners Qualcomm Technologies, one of the world's leading wireless chipset companies, and Ericsson, the global leader in 5G network equipment. [Telstra News]

EMTEK SELECTS COMPLETE ENENSYS SOLUTION FOR INDONESIA DVB-T2 DEPLOYMENT

ENENSYS Technologies, a provider of media delivery solutions, has announced that it has delivered a complete distribution solution for EMTEK's new DVB-T2 digital terrestrial TV network. The first phase covered Jakarta and other major cities, and went on-air in late 2022, with the second phase to provide services throughout Indonesia and to be completed in 2024. The system has been supplied through PT Digital Broadcast Media, the Indonesian systems integrator and reseller of ENENSYS, after extensive testing by EMTEK and SCTV teams.

ENENSYS' OneBeam T2 solution enables DVB-T2 transmitters to be fed using standard transport stream distribution over satellite or IP networks. Adaption from transport stream to T2-MI is performed at transmitter sites with the ENENSYS TxEdge. The DVB-T2 transmitter configuration and SFN timing are controlled with ENENSYS SmartGate OneBeam units at the head-end.

The system is fully redundant and ENENSYS ASIIPGuard and IPGuard seamless switches are used for main/backup switching. TestTree EdgeProbe Advanced monitoring probes are used at some transmitter sites to monitor both the T2-MI input as well as the transmitter RF output. [Enensys News]

MORE THAN 100 NEXTGEN TV PRODUCTS AVAILABLE TO CONSUMERS IN 2024

Another prominent television manufacturer is joining the NEXTGEN TV bandwagon, with the announcement that TCL is planning new TV models equipped with integrated NEXTGEN TV capability. More than 100 NEXTGEN TV products will be available for US consumers in 2024. ATSC 3.0 is the over-the-air broadcast standard powering NEXTGEN TV, the voluntary upgrade to U.S. TV broadcasting that delivers

an enhanced video and audio experience and seamless delivery of over-the-top streaming content from local stations to augment new over-the-air services. The technology is also being deployed in international markets.

The Consumer Technology Association announced industry results for 2023 sales and projections for the coming year, with the cumulative U.S. installed base of NEXTGEN TV receivers topping 10.3 million and consumer sales of NEXTGEN TV products expected to increase by 45% in 2024. In addition to TV models from Sony, Samsung, Hisense, and TCL, the number of available accessory receiver models is expected to double in 2024, and will offer consumers with existing TV sets several affordable options for upgrades. [ATSC News]

LIVEU TECHNOLOGY SELECTED TO LIVE BROADCAST OF PACIFIC GAMES 2023

The Solomon Islands has successfully broadcast live the 2023 Pacific Games to viewers in numerous participating countries in the region using LiveU's IP-Video Ecosystem. LiveU's technology was selected for its cost-effective and flexible technology, underpinned by LRT (LiveU Reliable Transport), enabling live broadcasts to be distributed with the highest resiliency to a disparate array of broadcasters and other takers across the Pacific islands as well as Australia and New Zealand.

Historically, the Pacific Games feed was transmitted via satellite and produced centrally with selective content. The organisers turned to LiveU for cost-effective and reliable IP distribution over the open internet using LiveU Matrix's fully managed service with multiple feeds, encompassing all the content, produced at the different venues.

In addition, LiveU's compact 5G LU300S encoders were deployed for point-to-point transmission, LiveU Ingest for cloud recording on-site and the rack-mount LiveU Transceivers for uplinks and point-to-point transmission. The games took place from November 19 to December 2, 2023. [APB News]

TVU NETWORK'S NEW CLOUD PLATFORM CAN HANDLE BOTH IP AND SDI ENVIRONMENTS

TVU Networks has unveiled TVU MediaHub, a cloud-driven platform the company says is poised to transform the broadcast industry with its unmatched versatility and efficiency in managing video signals in both IP and SDI environments.

Marking a departure from traditional hardware-dependent routers, TVU MediaHub's cloud-centric and hybrid architecture supports multiple inputs and outputs, managing intricate signal matrices in both SDI and IP formats. This advancement signifies a major shift towards cloud-based digital media workflows, enhancing the quality and efficiency of broadcasting.

Additionally, TVU MediaHub is a key component of TVU Networks' broadcast ecosystem, integrating AI-powered ingestion, advanced graphics, and streamlined live production and ad management tools. This approach, according to TVU Networks, tackles a wide range of media supply chain challenges, offering an integrated, powerful broadcasting solution. [Digital TV Europe]

TVNZ BRINGS ELECTION COVERAGE TO LIFE WITH VIZRT 3D AND AR GRAPHICS

TVNZ brought its October 2023 election coverage to life with data-driven 3D and augmented reality graphics powered by Vizrt technologies. Some 1.4 million viewers – over 40% of the 3.5 million registered voters in New Zealand – tuned in to watch TVNZ's coverage of the general election held in October 2023.

According to reports, the network's 1News elections coverage was New Zealand's highest-reaching and highest-rating TV program of the night in both key commercial demographics and total audience. The network also scored big online, with the live stream on TVNZ+ generating more than a quarter of a million (268,378 to be exact) streams, helping the platform deliver its single biggest day in its history.

For TVNZ, this huge success was the culmination of more than a year of planning and putting its election machinery into motion. Beginning in August 2022, up to 280 people – including 60 journalists – were involved in the election process to produce the debates and the main election coverage across broadcast, digital, and social platforms. [Content+Technology]

LEADING KAZAKH BROADCASTER BEGETS USER-FRIENDLY TV CENTRE FROM CINEGY

Cinegy GmbH, the Germany-based provider of software technology for digital video processing, asset management, video compression and automation, and playout, has provided all the core functionality for a new broadcast centre for the TV and Radio Complex of the President of the Republic of Kazakhstan (PTRK). The project, led by DNK Kazakhstan, Cinegy's systems integration partner in that country, brings all aspects of two major channels – Jibek Joly TV and Silk Way – into a new building in Almaty.

Jibek Joly and the international service Silk Way were previously based in separate locations, and used a variety of systems for production and playout. In moving to a new headquarters, the aim was to provide a common working environment for news, production, playout and archiving. The solution is unique in being able to provide everything needed in a single environment.

DNK Kazakhstan developed a proof-of-concept system for PTRK, then supplied all the hardware and software licences for the full system. It includes Cinegy Air PRO for playout, Cinegy Convert PRO for signal processing, along with the Cinegy Multiviewer, Cinegy Route, Cinegy Prompter and Cinegy Archive Enterprise. More than 75 Cinegy Desktop licences are also included. [APB News] ■

DIGITAL BROADCASTING *Updates*

UPDATES TO DVB-I SPEC AND IMPLEMENTATION GUIDELINES PUBLISHED

The most recent meeting cycle of DVB's Technical and Commercial Modules led to the approval for the publication of updates of two DVB BlueBooks related to DVB-I, the internet-centric mechanism that signals and discovers television services, whether they are delivered over IP networks or broadcast networks. BlueBook A177r6 is the latest version of the DVB-I service discovery specification, while BlueBook A184r1 is the first revision of the implementation guidelines for DVB-I.

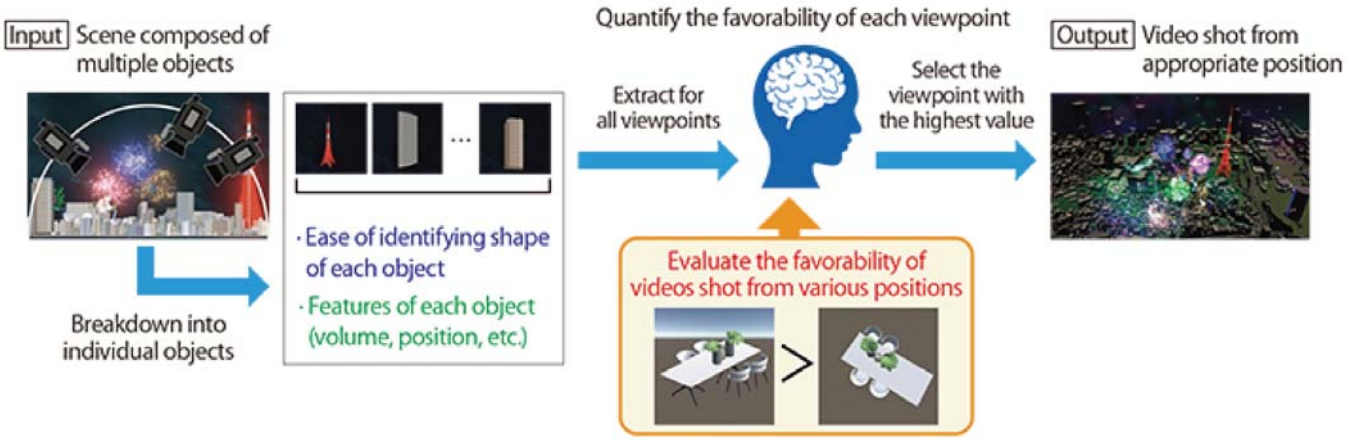
The new release of the DVB-I specification itself includes the following updates:

- Signalling of accessibility services and of HbbTV applications for accessibility;
- Signalling of a service provider's homepage;
- Support for signalling of 5G services, addressing gaps that had been identified in the deployment guidelines for DVB-I over 5G (TR 103 972 V1.1.1); and
- Bug fixes and clarifications arising from industry trial activities.

BlueBook A177r6 will be submitted to ETSI for publication as TS 103 770 v1.2.1 in due course, pending further progress on verification and validation (V&V) activities.

The updated specification is accompanied by a parallel update to the DVB-I implementation guidelines, BlueBook A184r1. Additions to this first revision of the guidelines include:

- Examples of the use of the extensibility mechanism provided in the DVB-I Service List;
- Information on how an app should obtain service lists for regions where the user is not currently located in (i.e., when roaming);
- Clarifications on the use of parental rating information at service selection and programme boundaries; and
- Information on the anticipated use of the service provider homepage information. [DVB News]



NHK DEVELOPS ALGORITHM FOR AUTOMATIC SELECTION OF SHOOTING POSITION IN 3D SPACE

NHK STRL has developed a new shooting position selection algorithm that can be applied to scenes made up of multiple objects. Going forward, the team at STRL aims to expand the scope of possible shooting positions and improve the accuracy of the algorithm to achieve more efficient video production.

The use of 3D computer graphics (3DCG) has become commonplace in video production in recent years. Producing a video with 3DCG involves placing 3D objects consisting of multiple surfaces in virtual space and shooting 3D scenes formed inside a computer using a virtual camera. Because a virtual camera can be placed in any position, with no physical restrictions, there are a lot more potential shooting positions than when shooting in the real world. However, manually selecting the best virtual camera position to suit the creator's intent is a burdensome, time-consuming task. Automating this task would make video production more efficient, which is why STRL is working on developing an algorithm to automatically select the appropriate shooting position.

It is known that when observing an object or scene, the preferred viewpoint is a position that makes it easy to grasp the complexity of the shape, such as viewing from diagonally above. Several viewpoint selection algorithms have been proposed in the past, which estimate the preferred viewpoint by quantifying the ease of

identifying the shape based on the number and area of surfaces that can be seen from a given viewpoint, from among the multiple surfaces that make up the object. However, these algorithms are designed for scenes consisting of a single object, rather than scenes composed of many objects, as used in video production.

This algorithm uses a dataset of human evaluations of favorability of videos shot from different positions, which enables it to learn to what extent features such as the volume and position of objects affect people's preference. First, a scene is broken down into individual objects and an existing viewpoint selection algorithm is used to calculate the ease of identifying the shape and features for every viewpoint. Next, these calculated values are multiplied by the feature importance to quantify the favorability of each viewpoint. Finally, the viewpoint with the highest value is selected and the video shot from that position is output. [NHK STRL]

ATSC STANDARDS UPDATE: THREE NEW DOCUMENTS PUBLISHED

ATSC membership have approved three new documents namely A/336:2024-02, A/344:2024-02, and A/362:2024-02, A/336:2024-02, "Content Recovery in Redistribution Scenarios", includes a recently passed amendment titled, "Improved Timeline Recovery". This amendment, approved by the ATSC membership on 15 February 2024, updated A/336 for the purpose of improving the reliability of media time recovery from the video watermark in reduced-quality redistribution environments.

A/344:2024-02, "ATSC 3.0 Interactive Environment," is a revision of A/344 that was approved by the ATSC membership on 13 February 2024. This annual update of A/344 reflects recent work to refine and expand the ATSC 3.0 interactive environment.

A/362:2024-02, "Digital Rights Management (DRM), which includes a recently passed amendment titled, "DRM Operation for MMT". This amendment, approved by the ATSC membership on 14 February 2024, describes recommended practices for DRM for use with content delivery based on the MMT protocol. A/362:2023-03 considered DRM for use with content delivery based on the ROUTE/DASH protocol, but not MMT. [ATSC News]

DRM DIGITAL RADIO EXPANDING IN INDIA AND ASIA

The Digital Radio Mondiale (DRM) Consortium had is most ambitious BES presence so far at the 28th international BES Expo on Broadcast & Media Technology in New Delhi, India between 15-17 February 2024. The DRM Consortium and several of its Indian and international members and partners welcomed for three days hundreds of visitors to its booths.

On the 15 February, the DRM Consortium showcased DRM Digital FM reception on a mobile Android phone. What was shown was that DRM Digital FM reception does not depend on proprietary receiver technology. It can be received on a mobile phone using an existing, off-the-shelf analogue FM tuner chipset, as already used in billions of devices.

A car parked in the spacious DRM booth gave visitors the chance to compare old analogue sound with excellent live DRM digital Medium Wave audio and text in a car. During the exhibition there was also great interest for the CML Micro new energy and cost-saving all-band DRM1000 receiver module to be made available in volume soon.

NXP, whose chipsets are already used in millions of Indian cars, presented its new, enhanced version of one-chip solution for automotive radio and audio, commercially available from 2025. Live DRM medium wave and FM band broadcasts were received at the booth on several Gospell radios. Fraunhofer IIS exhibited its latest innovation for DRM transmission and reception including DRM Content Server and Multimedia Player technologies, showcasing a series of applications like emergency warning and public signage services, vital for users and listeners.

RFmondial, a company offering professional products and services for the digital broadcasting industry, demonstrated the advantages of their DRM multichannel single-transmitter solution for maximum cost-efficiency when digitising the FM band. For STARWAVES the BES exhibition was the place to demonstrate its newest W2401 receiver with built-in Wi-Fi hotspot. The BES conference held in parallel with the exhibition included two DRM contributions on Digital Radio – Ingredients of Success detailing the success of DRM in Asia and Digitising FM – the Way to a Win-Win Solution focusing on the great opportunities of DRM when introduced in the FM broadcast band. [DRM News]

WORLDDAB LAUNCHES EXPERT GUIDE TO SUCCESSFUL DAB+ FIELD TRIALS

In response to significant interest from new territories in developing DAB+, WorldDAB has published a guide to establishing a successful field trial – a key step in laying the groundwork for a future rollout, and fully implementing digital broadcast radio.

The new expert factsheet – "DAB+ digital radio: a guide to a successful field trial" – covers all aspects of undertaking a trial. Technical aspects include drive testing for coverage checks and feature testing and how to conclude field trials activities.

The guide was published at the ABU Digital Broadcasting Symposium 2024 in Kuala Lumpur, where WorldDAB held an expert DAB+ seminar and hosted a digital radio pavilion with WorldDAB members AVT, GatesAir, Paneda and RadioDNS joining the pavilion.

It forms part of the free comprehensive resources on launching and operating DAB+ offered by WorldDAB on its website, including the 118-page ebook "Establishing DAB digital broadcast radio", now available in both English and French. The guide sets out that field trials provide valuable opportunities for radio stakeholders to experience DAB+. Different stakeholders will have different perspectives – for example, the focus may be audio quality for broadcasters and listeners, transmission planning parameters for network operators, and capacity and interference requirements for regulators. [WorldDAB News]

EBU LAUNCHES EUROVISION SPORT STREAMING PLATFORM

The EBU has launched a pioneering digital streaming platform, underpinning its commitment to enhance the amount of free public access to sports content across Europe.

Eurovision Sport is the EBU's first direct-to-consumer service and marks a watershed in live sports broadcasting. Thousands of hours of content are set to be streamed in a single digital destination - complementing existing coverage provided by public service media – and showcasing every second

of a wide variety of events.

Eurovision Sport will work alongside the EBU's network of public service members to ensure audiences can enjoy end-to-end coverage of a host of Olympic sports from athletics to gymnastics, skiing, swimming and many more. It will feature events from World to European Championships, multi-sport events and national championships and be the first sports streaming service to provide true gender equality across all its live sports content. [EBU News]

SOUTHEAST ASIA'S BALANCING ACT IN NEXT PHASE OF STREAMING GROWTH

Total subscriptions for paid over-the-top (OTT) video streaming services in Indonesia, Malaysia, the Philippines, Singapore, Thailand and Vietnam are projected to exceed the 50 million mark by the end of 2024, representing market value equivalent to US$1.9 billion.

According to new analysis presented by S&P Global Market Intelligence, estimated annual revenue growth for subscription streaming services in South-east Asia rose at a faster rate of 38% to $1.53 billion compared to 21% for total paid subscriptions, which amounted to 44 million at year-end 2023.

Many streaming platforms in Southeast Asia recalibrated their pricing strategies to extract more value from new and existing subscribers. Subscriptions to streaming services have generally remained affordable in the region, providing enough room for services like Disney and Netflix to raise or introduce new fees in some major markets. S&P Global Market Intelligence added that advertising and partnerships with local third-party operators and content producers will continue to play critical roles in powering growth for streaming services in the emerging region.

However, paid ad-supported streaming tiers might not gain much traction in Southeast Asia in 2024 as most consumers in the region continue to embrace the freemium model championed by local and regional platforms. Global services are more likely to continue relying on mobile-only plans as the cheaper alternative to encourage untapped price-sensitive consumers to sample their platforms. [APB News]

ITU'S AI FOR GOOD GLOBAL SUMMIT 2024 PUTS TECH TO THE TEST FOR PEOPLE AND PLANET

Global leaders and innovators in artificial intelligence (AI) will join the humanitarian community at the AI for Good Global Summit 2024 in Geneva, Switzerland on 30-31 May to explore how new technology can drive sustainable development. This year's edition of the AI for Good summit event will showcase innovations in generative AI, robotics, and brain-machine interfaces that can accelerate progress in areas such as climate action, accessibility, health, and disaster response.

Summit speakers, including some of the world's foremost AI luminaries, will explore the latest breakthroughs in AI and examine actions to ensure that AI works to humanity's benefit. On 29 May, discussions dedicated to AI governance will explore the surge in global efforts to craft AI policy, regulation, and governance frameworks. AI Governance Day – bringing together representatives of governments, companies, academia, civil society, and UN agencies – aims to forge pathways to transform dialogue around AI governance into impactful action.

The UN platform for AI powered by ITU

AI for Good identifies practical applications of AI to accelerate progress toward the UN Sustainable Development Goals and connects AI innovators with public and private-sector decision-makers to help scale up AI solutions globally.

ITU, the UN specialized agency for information and communication technologies, organizes the yearly AI for Good Global Summit together with 40 partner UN agencies. The event is co-convened by the government of Switzerland.

AI for Good discussions foster international cooperation and innovation to create equitable access to new technologies. The discussions support ITU in spurring timely policy exchanges, developing best practices and technical standards, and catalysing partnerships for AI solutions to contribute to sustainable development.

Thought leaders and thought-controlled machines

In addition to talks by AI thought leaders, this year's summit will host machine learning masterclasses, curated by experts for experts, covering topics from deepfakes and climate change to brain-machine interfaces, AI for public services, explainable AI, and machine learning in communication networks. Start-ups, young people and creatives will demonstrate their ideas at the AI for Good Innovation Factory Grand Finale, Robotics for Good Youth Challenge, and Canvas of the Future art contest.

The summit's exhibition space will feature an array of cutting-edge demos, including AI for accessibility, collective drone swarms, bio-inspired rescue robots, a RoboCup robot football tournament, performance-boosting exoskeletons, and AI-inspired art. Exhibition highlights will include demos of brain-machine interfaces – an AI advancement that promises to open new frontiers for neurotechnology. A press conference on brain-machine interfaces will highlight new technologies enabling mind-controlled movement and communication for persons with disabilities, offering insights on how progress in the field could impact the future of human performance, mental health, and wellbeing. [ITU News]

ROHDE & SCHWARZ DEMONSTRATES 5G BROADCAST IS READY FOR REVENUE

Rohde & Schwarz (R&S) is ready to demonstrate a complete ecosystem for the 5G Broadcast standard that delivers valuable new revenue streams for broadcasters and network operators. 5G Broadcast is a one-to-many transmission standard, part of the 3GPP specifications. It creates opportunities for both media and data transmission. It is an ideal way to broadcast live content to large numbers of mobile devices simultaneously, such as pop-up channels for sports and music events. Media broadcasts can be received on suitable mobile devices without a SIM card. The format also provides data broadcast, making it ideal for updating IoT devices or automotive applications.

Rohde & Schwarz has taken a significant role in its standardisation, including working with ETSI JTC Broadcast and 5G-MAG, to ensure widespread acceptance of the technology. ITU has now endorsed 5G Broadcast as a next-generation DTT standard worldwide. The result is a more agile use of the full UHF band, and a step towards a more sustainable and environmentally-conscious future for the industry. [Rohde & Schwarz News] ■

Spark Your Creativity

2024 KOBA

32nd Korea International Broadcasting Media, Audio & Lighting Show

21-24 May, 2024
COEX KOREA

Organizers
Korea E & Ex Inc.
Korea Broadcasting Engineers & Technicians Association

Contact. Korea E & Ex Inc.
Tel. +82-2-551-0102
E-mail. koba@kobashow.com

www.kobashow.com

Equipment Trends

BLACKMAGIC URSA CINE 12K AND PYXIS 6K CAMERAS

Blackmagic Ursa Cine 12K Camera:
This camera features a 36 x 24mm RGBW sensor with substantial photo-sites, allowing for 16 stops of dynamic range. It is compatible with interchangeable PL, LPL, and EF lens mounts and supports both Lemo and Fischer connections. Additionally, it incorporates 8TB of high-performance storage and facilitates rapid networking capabilities for media uploads and integration with cloud-based storage solutions.

Key attributes of the Ursa Cine 12K include an adaptable lens mount system, resolutions up to 12K without sensor cropping, a 5-inch HDR touchscreen monitor, and external LCD for colour status. The camera supports high-resolution recording with real-time accessibility over a 10G Ethernet network and allows for the simultaneous creation of smaller H.264 proxy files during shoots.

Features of the Ursa Cine 12K:
- ✓ Large format sensor capable of capturing extensive dynamic range.
- ✓ Durable, lightweight body with standard industry connections.
- ✓ Various mount options with high-quality image coding.
- ✓ Advanced colour science technology.
- ✓ Efficient optical low-pass filter for clarity.
- ✓ Integrated neutral density filters.
- ✓ High frame rate capabilities.
- ✓ Extensive built-in recording storage.
- ✓ Compatibility with various media docks.
- ✓ Versatile connectivity options including high-speed internet and live streaming capabilities.
- ✓ Bundled with professional editing software.

Blackmagic Pyxis 6K Camera:
This camera features a 36 x 24mm 6K sensor offering 13 stops of dynamic range, housed within a customizable frame. It supports dual CFexpress media recorders and offers choices among L-Mount, PL, or Locking EF lens mounts.

The Pyxis also boasts a 4-inch high-resolution HDR touchscreen, customizable function buttons, dual media recorders, and a USB-C port. Similar to the Ursa, it supports the creation of H.264 proxy files to facilitate immediate editing workflows.

Features of the Pyxis 6K:
- ✓ Full-frame sensor with high-resolution recording capabilities.
- ✓ Versatile format options for diverse cinematic projects.
- ✓ Choice of lens mounts.
- ✓ High frame rate recording in different resolutions.
- ✓ High brightness display screen.
- ✓ Supports both raw and proxy formats.
- ✓ Dual fast media recording options.
- ✓ Connectivity for remote streaming and monitoring.
- ✓ Optional viewfinder and professional audio input.
- ✓ Comprehensive live streaming features.
- ✓ Supports high-capacity batteries.

The vision behind these camera models emphasizes their innovative sensor technology, versatile designs, and seamless integration into professional workflows, aiming to revolutionize all stages of production. These cameras are crafted to meet the demands of high-end filmmaking, offering a range of sophisticated features and connectivity options.

https://www.blackmagicdesign.com/

VISLINK DRAGONFLY V
Miniature HEVC HDR COFDM Transmitter

The DragonFly V stands as a miniature HEVC wireless video transmitter designed to capture real-time, high-quality video. Its primary uses include deployment with point of view cameras, UAVs, body-worn devices, concealments, and static sports cameras, making it a versatile tool in the broadcasting and content creation industries.

This device is engineered to be compact and lightweight, weighing less than 55 grams. It features a low power consumption which minimizes heat production and maximizes battery life, ideal for extended use in the field. The advanced encoder of the DragonFly V supports video formats up to 1080P-50/60 HDR, integrating smoothly into most live

broadcast workflows.

With both HD/SDI and HDMI input capabilities, the DragonFly V offers flexibility in camera connectivity. It boasts a maximum COFDM output power of 50mW, ensuring reliable high-definition HDR video transmission even in compact packages. This makes it particularly suited for bespoke portable applications where space and weight are critical.

Despite its small size, the DragonFly V delivers powerful performance. It supports high-definition HDR video transmission with low latency and accommodates video formats up to 1080P-50/60 HDR. The device is a testament to innovative engineering, aimed at empowering broadcasters and content creators to capture footage from previously inaccessible angles.

Key Features of DragonFly V:

- ✓ Innovative Miniature Design: Offers unmatched portability and ease of use without compromising quality or functionality.
- ✓ HEVC HDR Encoding: Handles up to 1080P HD video, ensuring crisp, clear images vital for modern broadcast environments.
- ✓ Flexible Connectivity: Equipped with either HDMI or SDI inputs, it caters to a broad array of camera types.
- ✓ Ultra-Reliable Transmission: Features a 50mW COFDM output power for stable and secure video transmission under challenging conditions.
- ✓ Energy-Efficient: Designed for efficient power use to support prolonged operational periods.
- ✓ Comprehensive Control Options: Includes Wi-Fi and RS232 remote control capabilities, enhancing operational flexibility.

The DragonFly V is set to redefine standards in live broadcast technology, offering innovative solutions that enhance the capture and transmission of live events, ranging from electronic news gathering to live sports broadcasting. Its small size, combined with its robust capabilities, makes it an essential tool for professionals seeking to push the boundaries of video capture technology.

https://www.vislink.com/

SONY PDT-FP1

Portable data transmitter with 5G, mmwave and sub6 capabilities

Sony introduces the PDT-FP1, a cutting-edge portable data transmitter designed to enable high-speed, low-latency video and still image data transport over 5G networks. This device is especially useful in scenarios that demand rapid data transfer from image capture to delivery, such as news coverage, event photography, and broadcast video production. It offers reliable mobile data communication both indoors and outdoors, even in environments without Wi-Fi, streamlining workflows efficiently.

The PDT-FP1 supports a broad spectrum of 5G networks, both domestic and international, thanks to its sophisticated antenna structure. It features a 6.1-inch OLED display and incorporates a cooling fan to ensure stable operation under various conditions. Connectivity options include HDMI input, LAN port, USB Type-C® port, and a USB Type-C charging terminal, complemented by a camera-mounting screw hole.

Versatile Applications of the PDT-FP1:

Media Transfer and Delivery: Functions as a modem for transferring media to any FTP destination and integrates with Sony's Creators' Cloud for Enterprise app. This allows for uploading media from compatible Sony cameras to various Sony Cloud services, thus enabling media viewing and uploading even while the camera is actively used or stored away.

Live Streaming Capabilities: Enables live streaming from any connected camera using RTMP, allowing direct streaming to platforms like YouTube™ through USB-based streaming and stable 5G networks.

Network Monitoring: Features an app that visualizes network and communication conditions during shoots to ensure content delivery optimization.

Main Features:

High-Speed, Low-Latency Communication: Employs a unique antenna structure that supports a wide range of 5G bands, including sub6/mm Wave and standalone networks, facilitating high-speed, low-latency communications globally. It also offers dual SIM functionality, including eSIM support, and can automatically select the best network connection based on environmental conditions.

Enhanced Cooling for Stability: Features a sophisticated cooling fan and duct structure to maintain operation up to 40 degrees Celsius.

It offers various operational modes to optimize for different environments, including auto, cooling priority, and silent priority.

Efficient Data Transfer Workflow: Integrates seamlessly with Sony cameras, simplifying setup and shortening preparation times. The OLED display shows both communication quality and file transmission status, enabling monitoring during shoots to ensure key moments are captured without interruption.

Robust Connectivity and Storage: Includes multiple connection options and built-in storage of 8GB (RAM) and 256GB (ROM), with support for microSDXC cards up to 1TB for extensive data handling.

The PDT-FP1's design is tailored to complement camera setups, featuring a secure mounting screw hole, a strap hole for cable management, and the ability to stream and transfer data simultaneously using an external power source. This device is set to enhance the flexibility and efficiency of professional broadcasting and photography workflows, making it a valuable tool for content creators requiring robust and versatile transmission solutions.

https://pro.sony/

PROTON CAM

The PROTON CAM, though compact at just 28mm by 28mm and weighing a mere 24 grams, sets new standards in the miniature camera market with its advanced specifications. This camera features a 12-bit sensor and utilizes advanced FPGA technology, ensuring high resolution and dynamic range that capture every detail with extraordinary clarity. Its ability to provide a wide-angle view of up to 120° and superior low-light performance without any image distortion enhances its versatility, making it ideal for a wide range of broadcasting needs.

Unique among similar market offerings, the PROTON CAM includes a tally light and offers stereo audio functionality, rather than the more common mono audio. These features broaden the camera's applicability, making it suitable for both spontaneous action shots and more structured productions that require synchronized audio capture and awareness of the camera's operational status.

The PROTON CAM's efficient power consumption is another notable advantage, allowing for extended battery life and reduced heat generation. This ensures reliable performance in various environments, even those that pose operational challenges.

Its compact design, low power consumption, and superior imaging capabilities make the PROTON CAM a good choice for drone cinematography. The camera's attributes are perfectly suited to capturing stunning aerial footage for everything from live sports to cinematic productions. Additionally, its small size and performance open new possibilities in sports broadcasting, offering immersive, up-close perspectives when mounted on players, referees, or integrated into sports equipment.

Beyond sports, the PROTON CAM's discreet profile is beneficial for live concerts, events, reality shows, and film and television productions. It enables cinematographers and directors of photography to capture dynamic, high-quality footage across diverse environments, thus providing a powerful tool for storytelling and visual creativity.

The PROTON CAM exemplifies the culmination of decades of expertise in the development of miniaturized cameras, representing a leap forward in design and functionality.

https://proton-camera.com/

QUASAR SCIENCE OSSIUM LADDER

A New Flexible Rigging Solution for Volume Lighting

Ossium Ladder, an innovative tube light rigging solution that enhances volume lighting for creators in various spaces. Developed in collaboration with G-Force Grips, the Ossium Ladder was recently showcased for the first time, highlighting its utility for both small and mid-sized studios.

The Ossium Ladder is engineered to be hung from any overhead fixing point, allowing for the rapid setup of up to sixteen 2', 4', or 8' Rainbow tube lights. This setup is facilitated by a built-in NATO rail, enabling users to manage up to 768 addressable pixels across connected Rainbow fixtures. This feature is particularly beneficial for Virtual Production setups, allowing for the creation of dynamic light walls that enhance immersive lighting experiences without the need for additional LED walls.

Despite its lightweight and compact design, the Ossium Ladder is constructed from high-quality materials, ensuring durability and reliability on set. It can support a maximum weight of 330 lbs, providing a safe and stable platform for various lighting configurations. The design also accommodates optional T12 clamps, which expand compatibility to other tube lights such

as the Crossfade X.

The Rainbow series stands at the forefront of linear LED lighting technology, ideal for motion picture and content creation. These lights are capable of illuminating both actors and environments with realistic lighting effects. The series features multiple individually controlled RGBX pixels that produce both high-quality tunable white light and rich, saturated colors. The lights ensure super smooth, flicker-free dimming and are designed to maximize lighting impact even in confined spaces. The Rainbow 2 (R2) and Double Rainbow (RR) models are especially noted for their efficiency and versatility on set.

The Double Rainbow (RR) model, with its dual rows of high fidelity RGBX pixels, excels in creating vibrant colors and intense white light. Its sleek design allows for powerful lighting outputs while occupying minimal space. The units offer both wireless and wired data connectivity, eliminating the need for external data boxes, receivers, or transmitters. The integrated Ossium Mounting System (OMS) provides flexible rigging options, and the lights are equipped with AC/DC inputs to ensure continuous power availability.

Overall, the Ossium Ladder and Rainbow series represent significant advancements in lighting technology, offering adaptable, efficient, and high-quality solutions for the creative industry.

https://www.quasarscience.com/

ASTERA PROJECTIONLENS FOR ITS PLUTOFRESNEL

Astera has launched the ProjectionLens, an innovative addition to its recently released PlutoFresnel. This new accessory enhances the functionality of the battery-powered, LED-based PlutoFresnel by transforming it into a powerful Profile Spotlight. This conversion can be achieved in under a minute by attaching the ProjectionLens, enabling the light to offer a variable beam range of 16° to 36°. Manual control of the projection zoom is possible via the lens barrel or two focus wheels, and an E-size Gobo holder is incorporated for custom logo projection.

Constructed with Astera's hallmark precision and durability, the Profile Lens facilitates precise control over lighting from any distance, featuring crystal clear optics and a four-leaf shutter design to tailor the beam as required.

The PlutoFresnel itself is a testament to the advantages of LED technology, combining high output strength, precise colour control, and energy efficiency within a lightweight, wireless setup. Initially designed to emulate traditional Fresnel lighting with a more practical form, it offers a beam angle from 15° to 60°, while consuming only 80W to produce an output equivalent to 300W.

Weighing just 4.6 Kg and featuring a built-in battery, the PlutoFresnel is versatile in mounting and perfect for a variety of uses across film, TV, and events. The addition of the ProjectionLens further expands its capabilities, allowing it to function as both a Fresnel and a Profile Spotlight, thus enhancing focus and definition in any production.

At the core of both configurations is Astera's renowned Titan LED engine, which ensures unmatched colour fidelity and consistency, spanning a colour temperature range from 1,750 to 20,000 Kelvin and incorporating Full Spectrum RGB+Mint+Amber colors. The system supports coordinated lighting setups with quick and versatile control options, including Wireless DMX, CRMX, or BluetoothBridge connectivity to the Astera App, enriched by new control features like 'WhiteRemote' and 'FXRemote'.

Astera's new dual-functionality technology emphasizes the company's dedication to producing versatile, efficient, and space-saving lighting solutions. The integration of the ProjectionLens with the PlutoFresnel exemplifies a commitment to innovation that minimizes the need for auxiliary equipment and excessive wiring, allowing lighting professionals to unlock greater creative potential with a compact and effective toolkit.

The ProjectionLens, coupled with the PlutoFresnel, provides a transformative solution that serves dual purposes, significantly enhancing the flexibility and creative possibilities for lighting technicians and event planners. Whether used for key lighting, fill lighting, back lighting, interviews, special effects, documentary filmmaking, or location shots, this hybrid system offers a powerful, efficient, and versatile solution in one compact package.

https://astera-led.com/ ■

A24 GLOBAL COORDINATION CONFERENCE TAKES PLACE IN MALAYSIA

From January 15 to 19, 2024, the Asia-Pacific Broadcasting Union (ABU) hosted the A24 Global Coordination Conference in partnership with the High Frequency Coordination Conference (HFCC) and the Arab States Broadcasting Union (ASBU) at the Royale Chulan Kuala Lumpur.

ABU member representatives from esteemed organizations such as LPP Radio Republik Indonesia, Turkish Radio Television, Nippon Hoso Kyokai, and other organisation including Radio Miami International, the U.S. Agency for Global Media, Reach Beyond Australia, Vatican Radio, Broadcast Belgium, and THALES, among others, gathered to lend their expertise. Their mission was to harmonise shortwave frequency schedules for the impending summer season, ensuring seamless communication across continents.

About 60 delegates, representing a staggering 90 percent of shortwave frequencies used for global broadcasting, attended the week-long dialogue. Their collective wisdom and shared vision promise to shape the future of broadcasting, transcending borders and bridging cultures. The B24 Conference will be held in Tashkent, Uzbekistan from August 26 to 30, 2024. ■

DBS2024 TEAM

ABU celebrated its 20th DBS with **Dr Veysel Binbay** leading the Technology Department as its Director. Dr Veysel and his team have shown remarkable commitment and hard work in ensuring that the 20th edition of DBS was conducted successfully.

DBS2024 was held at the Royale Chulan Hotel Kuala Lumpur, setting its sights on exploring the theme of "Navigating AI Horizon". As artificial intelligence continues its exponential growth and profoundly impacts our daily lives, it was only fitting that this transformative subject takes centre stage.

In line with the central theme revolving around AI, a captivating video was unveiled, showcasing Dr Veysel and his virtual counterpart engaging in a thought-provoking discussion. They discussed the ethical considerations surrounding interactions with AI avatars and the broader implications of AI development. The avatar was developed by the VYPA team, a major sponsor of DBS2024, and the recording was created using Open Broadcaster Software (OBS Studio), a freely accessible open-source tool.

Delegates were also provided with the DBS2024 e-Programme, a comprehensive guide in the form of a web app. It offered detailed information about the symposium's layout, including the programmes, speakers, and exhibitors, and served as a handy reference for the delegates.

The conference sessions also became more interactive as Slido, an online Q&A and polling app, allowed the delegates to engage during the presentations.

Among the array of other noteworthy hardware utilised included Blackmagic Design's ATEM Mini Pro, DataVideo PTZ-140, ezcap HDMI video capture device, and Logitech Spotlight Presentation Remote. ■

Personalities & Posts

New Technical Liaison Officer

Before joining Media Niugini Limited-EMTV in 2009 as a technician, **Mr Jilu Pisinga** graduated from Papua New Guinea University of Technology with a Bachelor of Science in Applied Physics with Electronic and Instrumentation.

Throughout Mr Pisinga's tenure at EMTV, he held senior roles, starting as Broadcast Technician from 2008 to 2012, advancing to Broadcast Engineer from 2012 to 2015, and further promoted to Senior Broadcast Engineer from 2016 to 2023. In mid-2023, he briefly served as Supervisor Engineer, followed by a promotion to Engineering Manager until early 2024. Currently, Mr Pisinga has been holding the position of Technical Manager since March 2024, showcasing consistent career growth and leadership within the company.

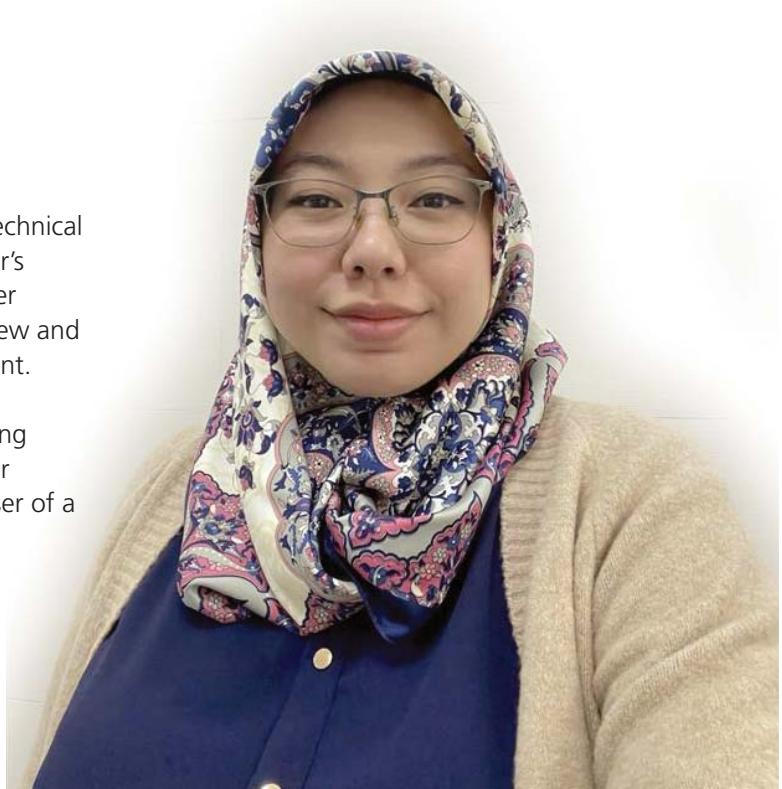
Throughout his career at EMTV, Mr Pisinga has been executing several major projects, including the Outside Broadcast TV production of the World Cup 2017 Port Moresby Leg and serving as Electrical and Instrumentation Coordinator (EIC) for the Pacific Games in 2015 (Port Moresby, Papua New Guinea) and 2019 (Apia, Samoa). Moreover, Mr Pisinga conducted in-house trainings for engineering department trainees, fostering skill development within the organisation.

Mr Pisinga currently leads a team of contractors in the construction of an 80m tower for the company, overseeing the relocation of the company office and EMTV studio from Garden City to Telikom Rumana, showcasing his leadership in strategic projects and initiatives aimed at enhancing operational efficiency and infrastructure development. He is currently pursuing a Master's in Business Administration (Management) at Divine Word University Papua New Guinea, further enhancing his leadership capabilities and business acumen. ■

New staff at ABU

Siti Balqis Binti A Sudirman recently joined the Technical Department as Team Assistant. She holds a Bachelor's Degree of Arts (Hons) in Applied English Studies. Her responsibilities include compiling the Technical Review and assisting with administrative tasks for the department.

Prior to joining ABU, she worked in an event/ticketing company that partnered with Malaysian broadcaster Astro. She also served as the supervisor and appraiser of a used luxury store. ■



ABU TECHNOLOGY CALENDAR *of Events*

2024

15-19 January	HFCC A24 Conference	Kuala Lumpur
7 February	ABU-DRM Webinar on Delivering Emergency Warnings with DRM	Online
15-17 February	28th BES Conference and Expo	New Delhi, India
4-7 March	ABU Digital Broadcasting Symposium 2024	Kuala Lumpur
9 April	Webinar Series on Member Innovations	Online
23-24 April	ABU Technical Bureau Mid-Year Meeting	Beijing, China
23-26 April	China Content Broadcasting Network show (CCBN)	Beijing, China
21-23 May	CABSAT	Dubai
21-24 May	KOBA Show	Seoul, Korea
29-31 May	BroadcastAsia 2024	Singapore
July	Cloud Technologies Workshop	Kuala Lumpur
August	IP Workflows and Remote Production for Broadcasters Workshop	Kuala Lumpur
26-30 August	B24 Conference	Tashkent, Uzbekistan
September	Webinar Series on Member Innovations	Online
13-16 September	International Broadcasting Convention 2024	Amsterdam
October	ABU Technical Bureau Annual Meeting	Istanbul, Türkiye
October	ABU Technical Committee Meeting	Istanbul, Türkiye
October	ABU General Assembly	Istanbul, Türkiye
13-15 November	Inter BEE 2024	Japan

CALL FOR SPONSORS

ABU
ENGINEERING AWARDS
2024

Be a Sponsor of the 2024 Engineering Awards

The winners will be announced during the
ABU Technical Committee Meeting Opening Session
in Istanbul, Türkiye

For more details, contact us at: **engineering.awards@abu.org.my**