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INTRODUCTION OF A SMART TV OPERATING SYSTEM
INTRODUCING NOVEL KEY PERFORMANCE INDICATORS FOR
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Cover: ABU Technical Committee Meets in Seoul, South Korea

from The Editor

Welcome to the 296th edition of the Technical Review Magazine, proudly published by the Asia Pacific Broadcasting Union (ABU). As we dive into another year brimming with technological advancements and innovations, this issue is dedicated to exploring the dynamic shifts and breakthroughs in the broadcasting sector.

Our journey begins with an exploration of a revolutionary Smart TV Operating System, a beacon of technological evolution that promises to redefine the experience of television viewing. This insightful article delves into the intricate architecture of this operating system, highlighting its security, adaptability, and seamless integration with global technological strides.

We also present a ground-breaking study on novel Key Performance Indicators for TV Transmitter Stations. This piece is a testament to how advanced monitoring technologies and Business Intelligence frameworks are redefining transmitter performance optimization. It's a fascinating read that offers a glimpse into the future of broadcasting maintenance and efficiency.

The ABU Technical Committee Meeting, a cornerstone event for our community, brought together industry leaders and innovators. Hosted by the Korean Broadcasting System, the meeting was a vibrant platform for discussion, collaboration, and the election of new committee members, charting the course for the year ahead.

Our focus then shifts to the realm of digital data and privacy with our webinar on "ICDN and Data Clean Rooms in the Media Industry". This session delved into the critical aspects of secure media collaboration and data sharing in the evolving digital landscape, providing valuable insights into future industry trends.

Another highlight was the "Unlocking the Future of Video" webinar. This event, a collaboration with the IEEE Broadcast Technology Society, saw experts discussing the integration of next-generation video codecs. The session underscored the global impact and collaborative nature of our industry, drawing participants from diverse nations and organizations.

As we navigate through these insightful articles, along with updates on digital broadcasting, equipment trends, and key industry events, our aim is not just to inform but also to inspire. The ABU continues to spearhead innovation in broadcasting, and we are excited to bring these developments to you.

As the editor, I encourage you to engage with the content of this issue, exploring the various ways our industry is evolving and influencing the world. Your participation and feedback are crucial as we continue to strive for excellence in broadcasting.

Thank you for joining us on this journey of discovery and innovation in the broadcasting world.

Warmest regards,
Dr Veysel Binbay
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INTRODUCTION OF A SMART TV OPERATING SYSTEM

ABSTRACT:

TVOS (Smart TV operating system) is a set of intelligent operating system independently developed by China, which is specifically designed for TV terminals. The research and development of TVOS conforms to the trend of technological and industrial development, and builds an open operating system architecture that is secure, controllable, cross-hardware platform, layered decoupling, tailorable and splicable, and has multiple application frameworks. It is a smart operating system tailored for the new generation of smart TV terminals, which not only achieves security and controllability in the industry, but also integrates the world's best open source achievements.

1. INTRODUCTION

In 2010, with the development of new-generation information technologies like mobile internet, the smartification of TV terminals became an inevitable trend and a crucial goal in the broadcast television industry. At that time, China lacked a domestically controlled smart TV operating system, and the development of smart TV terminals was at risk of being dominated by foreign smart operating systems and constrained by foreign technologies. Therefore, it is urgent to develop an autonomous and controllable smart

TV operating system to safeguard Chinese cultural security and ensure industrial dominance. Furthermore, due to the severe fragmentation of cable television network terminals in China, meaning that a cable television set-top box used in one region couldn't be deployed in another, addressing this fragmentation was essential alongside the development of smart broadcast and television terminals. This would provide the technical support needed to integrate the entire cable television network into a single network in China.

Under the guidance and deployment of the NRTA (National Radio and Television Administration), more than 120 organizations were organized by the ABS (Academy of Broadcasting Science) to successfully develop the TVOS, an smart TV operating system with independent intellectual property rights. Currently, TVOS supports 13 chipsets from five domestic companies, and there are over a hundred terminal products. The total TVOS terminals count in the fields of cable television, satellite broadcast, and internet TV exceeds 38 million units. It effectively replaces

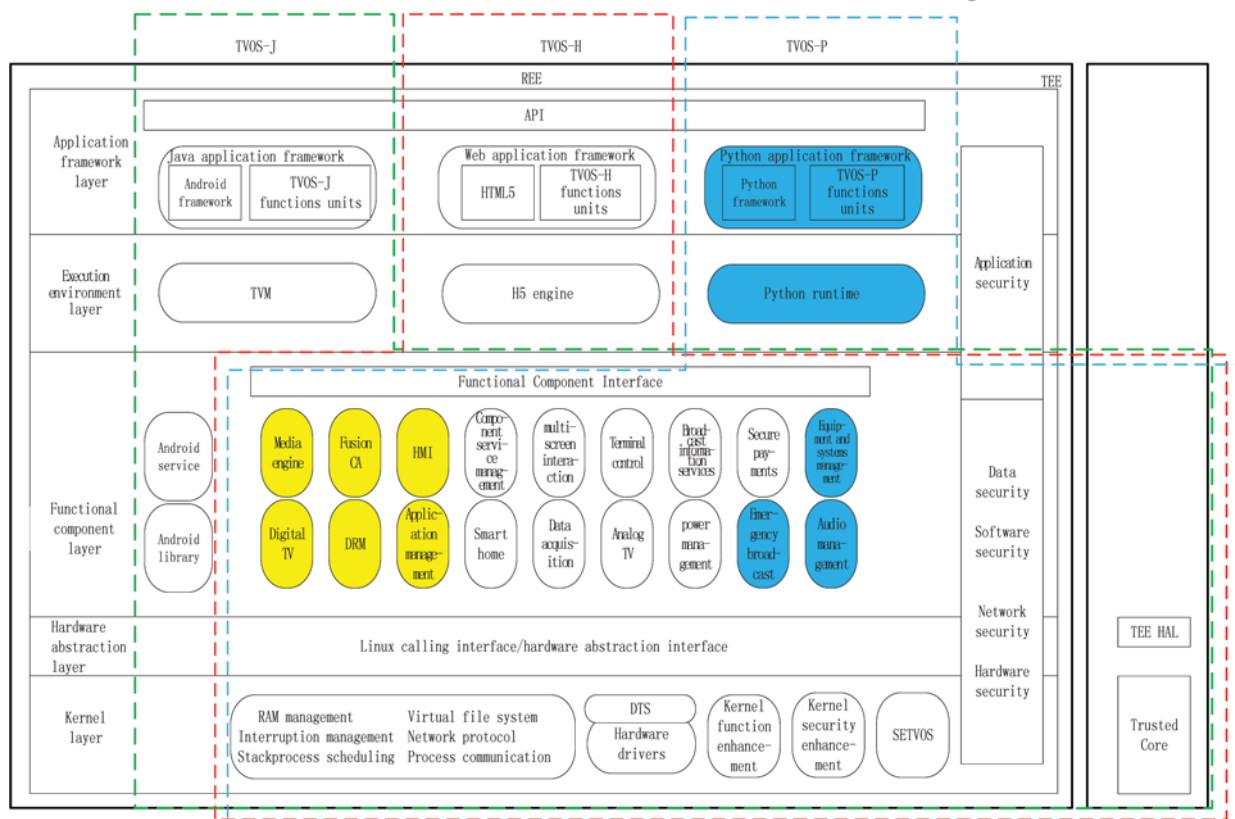


Figure 1 TVOS software architecture

foreign smart TV operating systems, resolves the issue of fragmentation in cable television terminals, lays the technical foundation for the integration of China's cable television network, and prepares China for the accelerated development towards ultra-high definition television.

2. TECHNICAL CHARACTERISTICS

The television operating system (TVOS) consists of the rich execution environment (REE) and trusted execution environment (TEE). The TVOS REE employs a hierarchical and modular software architecture and consists of five functional software layers, kernel, hardware abstraction layer (HAL), functional component, execution environment and application framework in a loose-coupling mode. Each functional software layer consists of multiple software modules in a loose-coupling mode. The TVOS TEE consists of the secure OS, TEE HAL, and trusted application (TApp). The TVOS software architecture is illustrated in *Figure 1*.

2.1 Highly cohesive, loosely coupled software architecture that supports parallel multi-application environments

The TVOS software architecture exhibits characteristics of high cohesion, loose coupling, and supports concurrent operation in multiple application environments. High cohesion in this architecture is manifested in two ways: firstly, it allows various functions to be aggregated into a super functional component in a flexible and extensible manner, providing services to other software modules or applications through standardized interfaces. Secondly, it enables multiple functional components to aggregate into a super-aggregated software module with a specific business function through a component calling mechanism. The functional components initiating and performing the aggregation provide specific business support capabilities to applications.

The loose coupling feature of this architecture is evident in two ways: firstly, there is loose coupling between different software layers, such as the Linux kernel layer, hardware abstraction layer, functional component layer, execution environment layer, and application framework layer, such that changes in one layer do not significantly impact other software layers. Secondly, there is loose coupling between various functional components within the functional component layer, meaning that changes to one component do not have a significant impact on other components. Each functional component can be independently extended, upgraded, replaced, or trimmed.

This architecture supports concurrent operation in multiple application environments. TVOS versions can independently run Web applications, denoted as TVOS-H. It can also independently run Java applications, referred to as TVOS-J, or Python applications, known as TVOS-P. Furthermore, TVOS can simultaneously support the parallel operation of Web and Java application environments, known as TVOS-C, and Web and Python application environments, termed TVOS-HP. It can even support the simultaneous operation of Web, Java, and Python application environments, referred to as the full TVOS version.

2.2 Efficient, flexible and open all-media processing technology based on hardware security

TVOS is built on the GStreamer framework, forming a media engine component. It enhances the processing capability for various media scenarios, including AVS2/3 audio-video codecs, standard-definition/high-definition/4K/8K resolutions, and HLS/HTTP/UDP network video protocols. It accomplishes audio and video parsing, playback, recording, and forwarding for diverse media scenarios, such as digital TV broadcasting, on-demand TV, 3D/VR

videos, local video playback, internet TV, emergency broadcasting, visual communication, cloud video gaming, and more.

This architecture addresses the static and rigid nature of media processing functions and protocol/format interpretation while implementing an adaptive audio-video synchronization mechanism for various scenarios. Additionally, TVOS's media framework supports secure video pathways based on the Trusted Execution Environment (TEE), with the ability to adhere to various digital rights management content protection standards and conditional access systems. It optimizes user experiences during channel switching, on-demand playback, low-latency playback, and makes notable technological advancements. Furthermore, TVOS resolves the issue of insufficient bandwidth for transmitting 8K ultra-high-definition video streams through broadcasting multiple channels reception and demultiplexing technology, supporting 8K ultra-high-definition live television.

2.3 All-round layered security defense system based on hardware security

TVOS has designed a comprehensive hierarchical security defense system based on hardware security, providing all-encompassing security protection from hardware security, software security, data security, network security, to application security. Leveraging the security computation mechanisms under the Trusted Execution Environment (TEE), digital certificate security trust mechanisms, and security trust chain verification mechanisms, TVOS achieves security protection for both the system itself and the applications it hosts, capable of resisting security risks such as unauthorized firmware flashing and the installation of illicit applications.

Additionally, TVOS employs a secure video path mechanism to secure media video content, effectively mitigating issues related to

tampering and illicit recording, thus ensuring the safety of video content. TVOS utilizes open digital television conditional access multi-terminal processing technology, which supports the dynamic download of conditional access terminal applications (App) and trusted applications (TApp), effectively addressing the problem of smart TV terminals being tightly bound to specific conditional access service provider products. Furthermore, TVOS incorporates open video digital rights management multi-terminal processing technology, supporting the dynamic download of digital rights management terminal applications (App) and TApp.

This resolves the issue of smart operating systems needing pre-integrated digital rights management terminals to support corresponding digital rights management systems, enabling intelligent security management of video content rights.

2.4 Multi-Screen Interaction Technology Across Local and Wide Area Networks

TVOS has introduced device discovery and connection technologies in heterogeneous network environments and designed multi-screen interaction protocols across local and wide area networks. This innovation transcends the limitations of local area networks, enabling smart interaction and cross-screen interaction and transmission between smartphones and other intelligent devices, such as TV with TVOS, even when they are located in home Wi-Fi local area networks and 5G or other wide area network environments.

TVOS's multi-screen interaction protocols primarily include discovery protocols, link establishment protocols, control protocols, and transmission protocols. Among these, the discovery protocol accomplishes Bluetooth discovery, local area network discovery, and wide area network discovery. The link establishment protocol facilitates direct connections within local area networks, direct connections

across wide area networks, wide area network relay connections, and link selection. The control protocol enables local resource playback, online resource playback, command control, and coordinated control, while the transmission protocol supports HTTP data transmission, RTP/RTSP data transmission, and HLS data transmission.

2.5 Open Digital TV Conditional Access Multi-Terminal Processing Technology Supporting Dynamic Downloads

TVOS has designed a dynamic download open digital TV conditional access multi-terminal processing technology, which manages various conditional access terminal applications implemented in different forms, such as applications based on the Rich Execution Environment (REE) and trusted applications (TApp) based on the Trusted Execution Environment (TEE). It also supports the collaboration of corresponding App and TApp, providing comprehensive support for conditional access technology. TVOS further enables the dynamic download, on-demand loading, and simultaneous execution of the respective App and TApp for multiple conditional access terminals.

Following TVOS's REE and TEE architecture, the REE and TEE security communication mechanisms, as well as the hardware security protection mechanisms based on hardware security chips at the TEE side, the security-critical components of conditional access terminals are implemented within the TApp, while the less security-critical components are implemented within the App of the conditional access terminal.

Any product from a conditional access service provider can run on TVOS as long as it adheres to the architecture defined by TVOS and the supported API interfaces. Through this approach, TVOS resolves the issue of close coupling between broadcast smart TV receiving devices and specific conditional access service

provider products.

3. TECHNICAL ADVANTAGES

Operating systems similar to TVOS primarily include Android for TV, hereafter referred to as "Android TV." In comparison to Android TV, TVOS holds the following advantages:

- 1) **Support for Live Television:** TVOS inherently possesses the 'genetics' to support live digital television. It comes with digital TV feature component software modules, effectively overcoming the challenge that Android TV faces, which cannot support live digital television.
- 2) **Media Processing Capability:** TVOS excels in its ability to efficiently and securely process various media formats, multiple protocols, encapsulation formats, and encoding standards (such as AVS2/3). In contrast, Android TV has a fixed media player that can only handle specific media protocols, encapsulation formats, and encoding standards. Enabling support for different protocols and formats in Android TV demands significant effort, involving the development of an end-to-end media processing workflow, including hardware drivers.
- 3) **Support for Multiple Application Platforms:** TVOS supports the independent execution of web applications and simultaneous execution of web, Java, and Python applications. In contrast, Android TV lacks support for Python applications, and web applications are dependent on the Java runtime environment to function correctly.
- 4) **Media Security and Protection:** TVOS boasts comprehensive, hardware-based security capabilities, including secure video paths and a unified media resource control mechanism. This ensures the security of media content. Android TV, on the other

hand, relies on user permissions for controlling media content, potentially introducing the security risk of excessive media service permissions.

- 5) **Support for Conditional Access, Digital Rights Management, Emergency Broadcasting, and Live Satellite Services:** TVOS includes integrated support for conditional access capabilities and open digital rights management. It supports domestic technologies like ChinaDRM and national encryption algorithms, as well as features for emergency broadcasting and live satellite services. Android TV lacks these capabilities.
- 6) **Security and Control:** TVOS development and management are led by the TVOS working group, providing control over source code and development direction. In contrast, Android TV is primarily led by foreign companies, which may introduce the risk of external technology control.

4. INDUSTRY ECOSYSTEM

TVOS has established a comprehensive industry ecosystem encompassing chip manufacturers, content and service providers, cable TV network operators, terminal solution providers, and terminal hardware manufacturers.

In terms of chip manufacturers, chip platforms like Hisilicon, Goke Microelectronics, Shanghai Gaoqing, NationalChip, and Megacore have implemented support for TVOS. Regarding content and services, TVOS effectively supports a wide range of digital TV services, including cable, wireless, and satellite broadcasting. It also extends support to IPTV and OTT video-on-demand content. On the terminal side, TVOS has become the preferred solution for leading domestic terminal solution providers and major set-top box manufacturers.

TVOS-based terminal products are available in various forms, such as set-top boxes, televisions, media gateways, smart speakers, and more. The product lineup comprises over 100 models, with support for nearly 200 different service applications.

5. CONCLUSION

TVOS has filled a void in the field of smart television operating systems within the Chinese cable TV industry. It has played a pivotal role in driving the industry's transition to smarter, more intelligent broadcasting solutions.

In addition to this, TVOS has achieved several technological breakthroughs and innovations in areas like software architecture, all-in-one media processing, security provisions, and cross-screen interaction. Moreover, it has fostered the growth of an independent industry ecosystem around TVOS, which has effectively addressed the issue of fragmentation among cable TV terminals in China, thereby laying a solid technological foundation for the seamless integration of cable TV networks across the entire country.

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Zhifan Sheng has been the CTO of Academy of Broadcasting Science (ABS), National Radio and Television Administration (NRTA) of China since May, 2014 and recently appointed as the Vice Chairman of the Technical Committee of Asia-Pacific Broadcasting Union (ABU).

He is also the director general of the National Broadcasting Network Engineering Research Center, and the chairman of the TVOS working group of China, which has more than 130 members including Huawei, Alibaba, Tencent, Baidu, ZTE, Skyworth, Hisense, Changhong and almost all the Chinese provincial cable operators as well as all the Chinese OTT companies. In addition, he is the vice Chairman of ITU-T SG9. He received the BSEE degree from Huazhong University of Science and Technology in 1985, and the MSEE degree from Dalian University of Technology in 1988.

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INTRODUCING NOVEL KEY PERFORMANCE INDICATORS FOR TV TRANSMITTER STATIONS EVALUATION

ABSTRACT:

Modern broadcast transmitters benefiting from advanced monitoring technologies constantly improve their performance indicators and service qualities. A broadcast transmitter is the main component of a complicated system equipped with various sensor types that can provide valuable data on every part of the signal transmission chain. To optimize their performance, we process a comprehensive package of data supplied by operating broadcast transmitters from three different sites in the context of a Business Intelligence (BI) framework. Then we develop an analytic tool to create a value-generating information system to operate a network of three broadcast transmitter sites. By combining the quantitative information obtained from the transmitters' performance, we provide new key performance indicators (KPIs) for timely maintenance and troubleshooting of the sites.

1. INTRODUCTION

Broadcasters depend on their transmitters' performance for a competitive advantage over numerous traditional and New Media platforms. This concern can raise financial and technical complications that call for effective executive decisions. Accordingly, broadcasters use transmitters augmented with advanced monitoring technologies for the quality of services.

Business Intelligence (BI) is a decision support system with a data-driven approach that includes tools for collecting, storing, analyzing, and visualizing data to make fast, reliable, and fact-based decisions. Using BI toolkits, we developed a **BI** system for **Transmitter Stations (BITS)** to exploit data provided by these technologies to facilitate the cooperation of technical staff and the executive managers in resolving problems in the transmitter sites in due time.

We aim to provide executive and technical managers with a key performance indicator (KPI) dashboard, complemented by analytical and intelligent reports based on the data collected from the TV transmitter monitoring system. So, we employ BI in a framework to integrate a team of decision-makers to provide answers to vital questions about their transmitter infrastructure and ensure a competitive advantage in media technologies.

The BITS automatically fetches data from stations by sensors installed on various devices, then integrates it into a database daily. Reports of voltage status, temperature status, and transmission capacity of TV and radio transmitters have been implemented into a management dashboard and are ready for use.

This system will enable the decision-makers to examine local factors that may cause differences in the transmitters' operations. Intelligent historical data processing in different transmitter sites can reveal hidden information on regional and seasonal factors. We use BI toolkits to process data from the signal transmission chain, i.e., sensors, internal and external equipment, monitoring, and relevant human decisions.

The outcome provides a reliable interface for an on-site instantaneous decision support system and historical information in periodical records for executive decisions. In this project, we aim to accomplish the following tasks:

- Developing a visual report dashboard
- Detecting malfunctions in equipment and stations
- Reducing troubleshooting and response time
- Comparing stations' performance in a selectable period
- Assist managers in making timely decisions about stations
- Reducing transmitter operation costs

2. TECHNICAL SPECIFICATIONS

We design the data accumulation process as an IoT system to enable the current infrastructure to adopt a next-generation monitoring system over time. To this end, we have acquired databases from three transmitter sites and aggregated, cleared, and preprocessed the data to create the analytical reports.

To provide nationwide broadcast services, IRIB operates thousands of transmitters. Using data from three major operating transmitter sites, we developed a BI framework as a pilot project to evaluate and improve the performance of these systems.

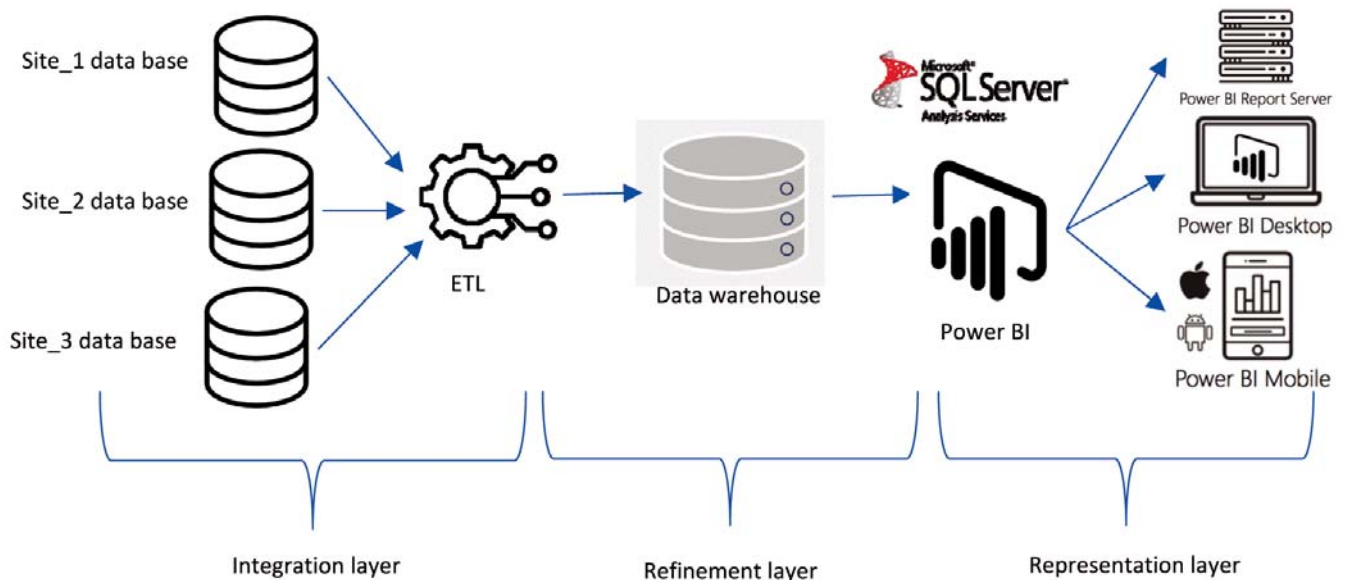


Figure 1 The BITS architecture

Site 1, Site 2, and Site 3 are high-power stations. This TV station broadcasts the programs of analog transmitters, including several FM radio channels and some digital TV transmitters (digital-terrestrial video broadcasting).

2-1. System architecture

The system architecture (**Figure 1**) consists of three layers: an integration layer, a refinement layer, and a representation layer. The core component of business intelligence is the data warehouse. A data warehouse contains integrated structured data from different databases preprocessed for Long-term log storage and retention and sophisticated processing by BI toolkits.

The first preparatory step to creating a data warehouse is to collect data from different sources. Our system obtains data from three operational transmitter sites in database formats in the Integration layer. We integrate the data in the databases through ETL (Extraction, Transformation, and Loading) and store it in a data warehouse.

In the second step, the Refinement layer, we use the data warehouse to pull useful analytical information from various sources. BITS refines this raw data and modifies its structure for integration to prepare for querying and analyzing.

In the Representation layer, we prepare the required reports by OLAP1 and data mining tools and present the results through visualization interfaces.

We use SQL Server, Microsoft Analysis Services, and Power BI to develop the reports and the visualization interfaces.

The report server facilitates access to the interfaces via smart user devices, i.e., workstations or mobile devices.

2-2. Key Performance Indicators

We consider several vital parameters in the analysis and monitoring process of the transmitters. These parameters include the FM and television transmission capacity, AC voltage, and site temperature.

We also introduce default values to define each parameter's normal, warning and critical levels. Tables 1, 2 and 3 show the default threshold levels in our system. A significant advantage of our proposed BI framework is its potential to incorporate Logs and reports provided by other sources, human or artificial agents, for further analytical operations to yield a more profound insight for the decision-makers.

2-2-1. Temperature KPI

Temperature values come from various sensors installed on sites. After performing the necessary preprocessing and data cleaning, BITS computes the average temperature reported by each sensor over a certain period (e.g., for a minute) in the associated logs. Then BITS convert them to discrete values as normal, warning, and critical status based on the threshold values mentioned in **Table 1**.

Table 1: temperature status of transmitter sensor

Status	Temperature thresholds
Normal	Under 27 °
Warning	Between 27° to 30°
Critical	Above 30 °

For temperature values, we log a day as C (critical), W (warning), or N (normal) according to the following criteria:

- If the temperature persists in the critical state above 10% of the day, its label will be C.
- If the temperature persists in the warning state above 10% of the day, its label will be W.
- Otherwise, the day's label will be N for normal.

Based on threshold values defined in Table 1, normal (f_N), critical (f_C), and warning (f_W) functions are defined as follows, where T is temperature:

$$f_N(T) = \begin{cases} 1 & T < 27 \\ 0 & \text{Otherwise} \end{cases}$$

$$f_C(T) = \begin{cases} 1 & T > 30 \\ 0 & \text{Otherwise} \end{cases}$$

$$f_W(T) = \begin{cases} 1 & 27 \leq T \leq 30 \\ 0 & \text{Otherwise} \end{cases}$$

In the following formula, $temp(i, t)$ is the temperature of the i -th sensor in time t , so $1 \leq i \leq k$ and k represents the number of sensors.

N_d , W_d , C_d are the duration in a day that the temperature is in the normal, warning, and critical status, respectively:

$$N_d = \frac{\sum_{i=1}^k \sum_{t=1}^{1440} f_N(temp(i, t))}{k \times 1440} \times 1000$$

$$W_d = \frac{\sum_{i=1}^k \sum_{t=1}^{1440} f_W(temp(i, t))}{k \times 1440} \times 1000$$

$$C_d = \frac{\sum_{i=1}^k \sum_{t=1}^{1440} f_C(temp(i, t))}{k \times 1440} \times 1000$$

Therefore, KPI for temperature is as follows:

$$KPI_{temp}(N_d, C_d, W_d) = \begin{cases} C & C_d > 100 \\ W & W_d + C_d > 100 \\ N & \text{Otherwise} \end{cases}$$

Figure 2 shows the Temperature report page in the dashboard.

In **Figure 2**, critical status is marked with red color, warning with yellow color, and normal with green color. In the dashboard, it is possible to choose different time frames (monthly, yearly, last seven days, current season, previous thirty days, current year, and a previous day). The first chart shows temperature information for site_1, the second chart shows site_2 temperature, and the last one shows the temperature of site_3.

2-2.2. AC Voltage KPI

For the AC Voltage report, first, BITS performs preprocessing operations on the AC voltage meter data for a minute. BITS reports each site's main grid voltage status according to the below KPI.

We define the voltage status as "off-state" when the reported voltage of the transmitter is less than 200 volts, and it will be "on-state" otherwise.

For voltage values, we log a day as C (critical), W (warning), or N (normal) according to the following criteria:

- If the voltage persists in the "off-state" for more than 60 minutes of the day, its label will be C.
- If the voltage persists in the "off-state" for more than 10 minutes of the day, its label will be W.
- Otherwise, the day's label will be N for normal.

$vol(t)$ is the voltage of the main grid at time t .

Based on threshold values defined above, off and on state function is defined as follows, where V is voltage:

$$f(V) = \begin{cases} 1 & V < 200 \\ 0 & \text{Otherwise} \end{cases}$$

S_d is the time that the voltage in one day is in off-state.

$$S_d = \sum_{t=1}^{1440} f(vol(t))$$

Therefore, KPI for AC voltage is as follows:

$$KPI_{vol}(S_d) = \begin{cases} C & S_d > 60 \\ W & 10 < S_d \leq 60 \\ N & \text{Otherwise} \end{cases}$$

Figure 3 shows the AC voltage report of the dashboard page.

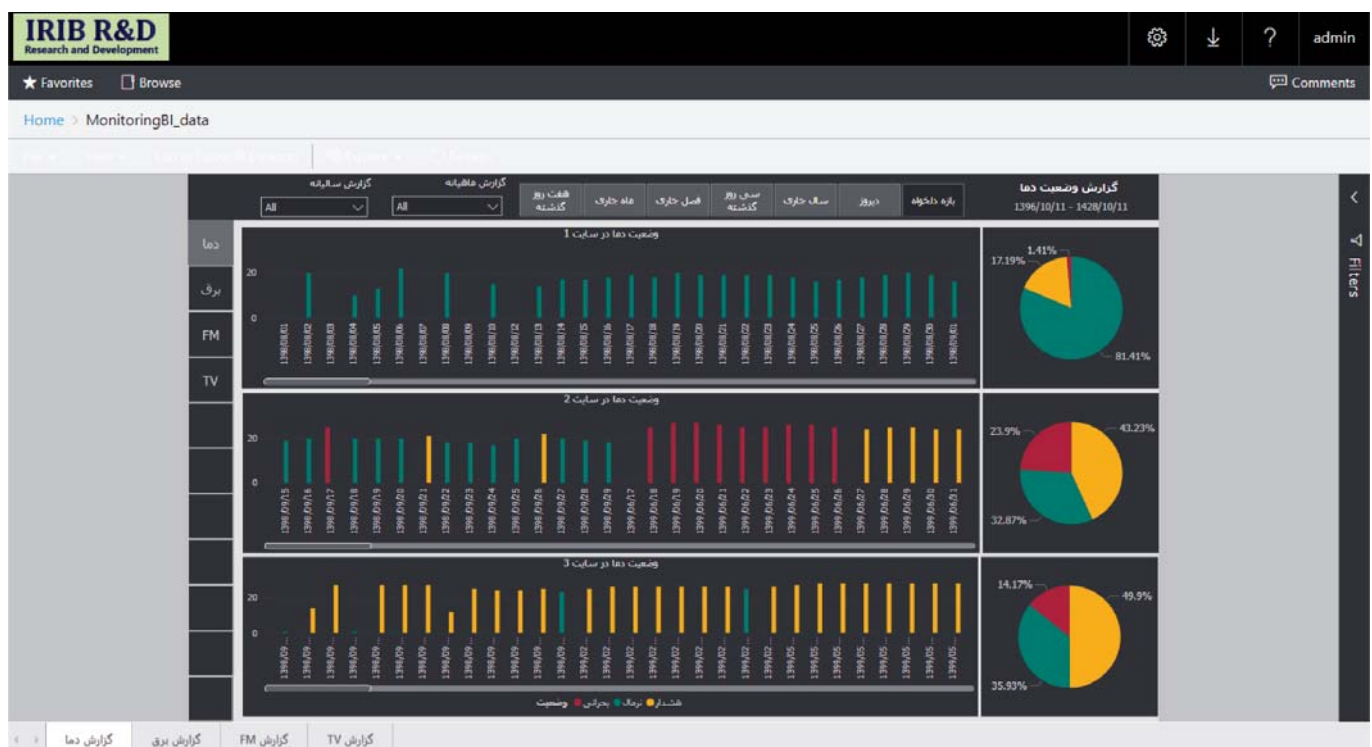


Figure 2 Temperature report dashboard page



Figure 3 AC voltage report dashboard page

2-2-3. FM transmission

In the FM transmitters report, first, BITS performs preprocessing operations on the transmission power data for each channel transmitter in a minute. BITS reports each site's FM transmitters status according to the below KPI.

Power monitoring of an FM transmitter will assume discrete values of *C* (Critical), *W* (Warning), or *N* (Normal) based on output power ranges specified in **Table 2**.

Table 2: power status of an FM Transmitter

Status	Output power
Normal	above 700 watts
Warning	between 100 and 700 watts
Critical	less than 100 watts

For FM output power, we log a day as *C* (critical), *W* (warning), or *N* (normal) according to the following criteria:

- If the power persists in the critical state for more than 10 minutes of the day, its label will be *C*.
- If the power persists for more than 5 in the warning state or more than 3 minutes in the critical condition, its label will be *W*.
- Otherwise, the day's label will be *N* for normal.

Based on threshold values defined in table 2, normal, warning, and critical functions are defined as follows where *P* is output power:

$$f_N(P) = \begin{cases} 1 & P > 700 \\ 0 & \text{Otherwise} \end{cases}$$

$$f_W(P) = \begin{cases} 1 & 100 \leq P \leq 700 \\ 0 & \text{Otherwise} \end{cases}$$

$$f_C(P) = \begin{cases} 1 & P < 100 \\ 0 & \text{Otherwise} \end{cases}$$

In the following formula, $p_i(t)$ is the output power of the *i*-th transmitter at time *t*, where $1 \leq i \leq k$, and $1 \leq t \leq 1440$,

and *k* represents the number of transmitters.

Using normal, warning, and critical functions defined above, we determine the status of the transmitter every minute as follows:

$$N(t) = \sum_{i=1}^k f_N(p_i(t))$$

$$W(t) = \sum_{i=1}^k f_W(p_i(t))$$

$$C(t) = \sum_{i=1}^k f_C(p_i(t))$$

Then, every minute if the transmitter is not in any of the alarm and critical states, it is normal. We show that by $g_N()$ function. $g_W()$ and $g_C()$, also are defined warning and critical state at time *t*:

$$g_N(N(t), W(t), C(t)) = \begin{cases} 1 & W(t) = 0 \text{ and } C(t) = 0 \\ 0 & \text{Otherwise} \end{cases}$$

$$g_W(N(t), W(t), C(t)) = \begin{cases} 1 & W(t) > 0 \text{ and } C(t) = 0 \\ 0 & \text{Otherwise} \end{cases}$$

$$g_C(N(t), W(t), C(t)) = \begin{cases} 1 & C(t) > 0 \\ 0 & \text{Otherwise} \end{cases}$$

N_d , W_d , C_d are the duration in a day that the power is in normal, warning, and critical status, respectively:

$$N_d = \sum_{t=1}^{1440} g_N(N(t), W(t), C(t))$$

$$W_d = \sum_{t=1}^{1440} g_W(N(t), W(t), C(t))$$

$$C_d = \sum_{t=1}^{1440} g_C(N(t), W(t), C(t))$$

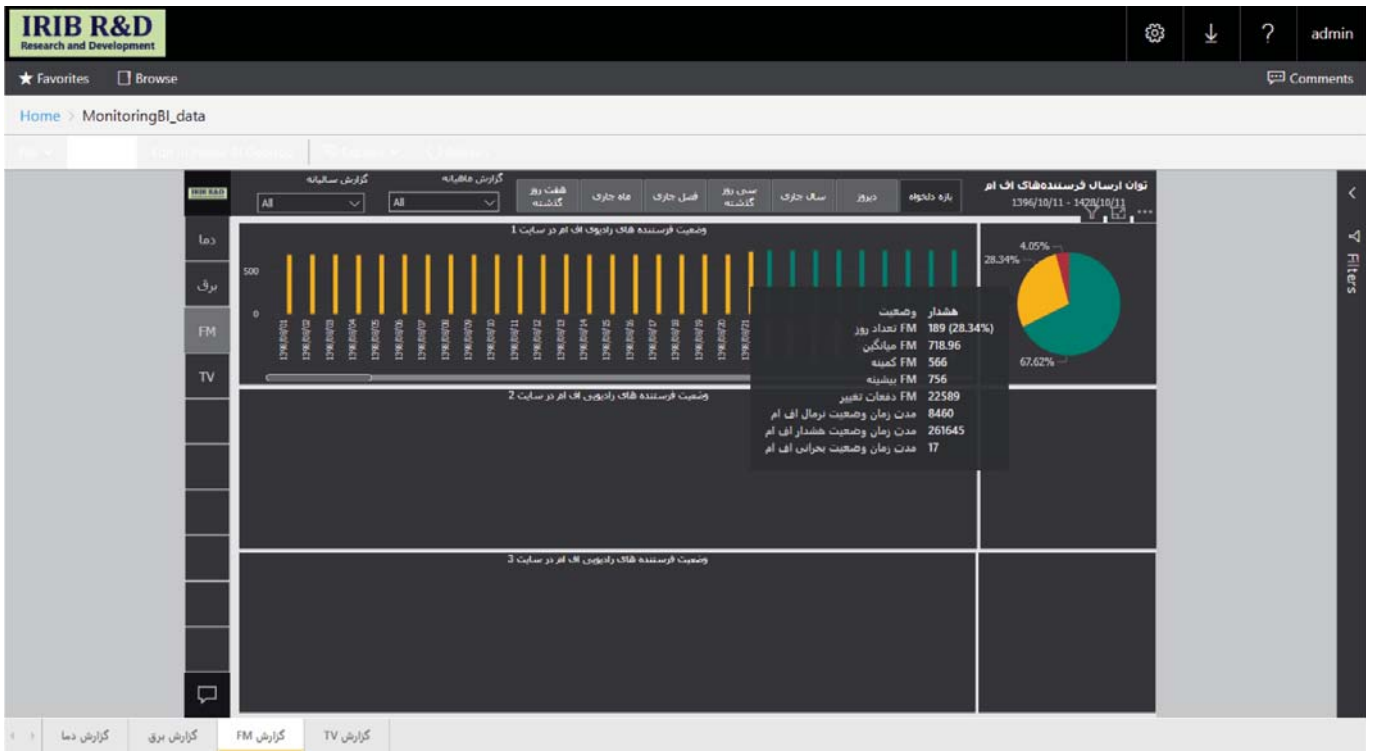


Figure 4 FM transmitters dashboard page

Therefore, KPI for FM output Power is as follows:

$$KPI_{FM_power}(N_d, C_d, W_d) = \begin{cases} C & C_d > 10 \\ W & W_d > 5 \text{ and } C_d > 3 \\ N & \text{Otherwise} \end{cases}$$

Figure 4 shows the FM transmitters dashboard page for site_1 (site_1 has FM transmitters).

2-2-4. TV transmission

Power monitoring of a TV transmitter will assume discrete values of C (Critical), W (Warning), or N (Normal) based on power ranges specified in Table 3.

Table 3: Power status of TV Transmitter Types and their associated backups

Transmitter	Normal	Warning	Critical
Transmitter (Type I)	Above 700 watts	700-100 watts	Below 100 watts
Transmitter (Type II)	Above 700 watts	700-400 watts	Below 400 watts
Transmitter (Type III)	Above 300 watts	300-200 watts	Below 200 watts

Based on threshold values defined in table 3, normal, warning, and critical functions for three transmitter types are defined as follows, where y represents the type of transmitter and P is output power.

$$f_N(P, y) = \begin{cases} 1 & ((y = 1 \text{ or } y = 2) \text{ and } P > 700) \text{ or } (y = 3 \text{ and } P > 300) \\ 0 & \text{Otherwise} \end{cases}$$

$$f_W(P, y) = \begin{cases} 1 & (y = 1 \text{ and } 100 \leq P \leq 700) \text{ or } (y = 2 \text{ and } 400 \leq P \leq 700) \text{ or } (y = 3 \text{ and } 200 \leq P \leq 300) \\ 0 & \text{Otherwise} \end{cases}$$

$$f_C(P, y) = \begin{cases} 1 & (y = 1 \text{ and } P < 100) \text{ or } (y = 2 \text{ and } P < 400) \text{ or } (y = 3 \text{ and } P < 200) \\ 0 & \text{Otherwise} \end{cases}$$

In the following formula, $p_i(t)$ is the power of the i -th transmitter at time t , where $1 \leq i \leq k$, and $1 \leq t \leq 1440$, and k represents the number of transmitters.

Each station contains several channels (ch); for high availability, there are primary and several redundant transmitters (G_{ch}) for each channel. We get logs of the main transmitters as well as their redundant.

We define the Normal, Warning, and Critical states of each channel at time t as follows:

$$S_N(t, ch) = \sum_{i \in G_{ch}} \sum_{y=1}^3 f_N(p_i(t), y)$$

$$S_W(t, ch) = \sum_{i \in G_{ch}} \sum_{y=1}^3 f_W(p_i(t), y)$$

$$S_C(t, ch) = \sum_{i \in G_{ch}} \sum_{y=1}^3 f_C(p_i(t), y)$$

For every minute, the state of channel ch is Normal, Warning or Critical based on $g_N(t, ch)$, $g_W(t, ch)$, and $g_C(t, ch)$ functions as follows:

$$g_N(t, ch) = \begin{cases} 1 & S_N(t, ch) > 0 \\ 0 & \text{Otherwise} \end{cases}$$

$$g_W(t, ch) = \begin{cases} 1 & S_N(t, ch) = 0 \text{ and } S_W(t, ch) > 0 \\ 0 & \text{Otherwise} \end{cases}$$

$$g_C(t, ch) = \begin{cases} 1 & S_N(t, ch) = 0 \text{ and } S_W(t, ch) = 0 \\ 0 & \text{Otherwise} \end{cases}$$

Therefor, according to $g_N(t, ch)$, $g_W(t, ch)$, and $g_C(t, ch)$ functions for every channel, for the station S in a minute we define normal, warning, and critical states by $S_N^S(t)$, $S_W^S(t)$, and $S_C^S(t)$ functions as bellow:

$$S_N^S(t) = \sum_{ch \in S} g_N(t, ch)$$

$$S_W^S(t) = \sum_{ch \in S} g_W(t, ch)$$

$$S_C^S(t) = \sum_{ch \in S} g_C(t, ch)$$

Then, $S_N(t)$, $S_W(t)$, $S_C(t)$ define normal, warning, and critical state of station S at time t based on $S_N^S(t)$, $S_W^S(t)$, and $S_C^S(t)$ functions defined above.

$$S_N(t) = \begin{cases} 1 & S_C^S(t) = 0 \text{ and } S_W^S(t) = 0 \\ 0 & \text{Otherwise} \end{cases}$$

$$S_W(t) = \begin{cases} 1 & S_W^S(t) > 0 \text{ and } S_C^S(t) = 0 \\ 0 & \text{Otherwise} \end{cases}$$

$$S_C(t) = \begin{cases} 1 & S_C^S(t) > 0 \\ 0 & \text{Otherwise} \end{cases}$$

S_N , S_W , S_C are the duration a day that the power is in Normal, Warning, and Critical statues, respectively.

$$S_N = \sum_{i=1}^{1440} S_N(i)$$

$$S_W = \sum_{i=1}^{1440} S_W(i)$$

$$S_C = \sum_{i=1}^{1440} S_C(i)$$

For TV transmission, we log a day as C (critical), W (warning), or N (normal) according to the following criteria:

- If the power persists in the critical state for more than 5 minutes of the day, its label will be C .
- If the power persists for more than 2 in the warning state or more than 1 minute in the critical state, its label will be W .
- Otherwise, the day's label will be N for normal.

Therefore, KPI_{TV} is defined as bellow:

$$KPI_{TV}(S_N, S_W, S_C) = \begin{cases} C & S_C > 5 \\ W & S_C > 1 \text{ or } S_W > 2 \\ N & \text{Otherwise} \end{cases}$$

Figure 5 shows the TV transmitters dashboard page for site 1 and site 3.

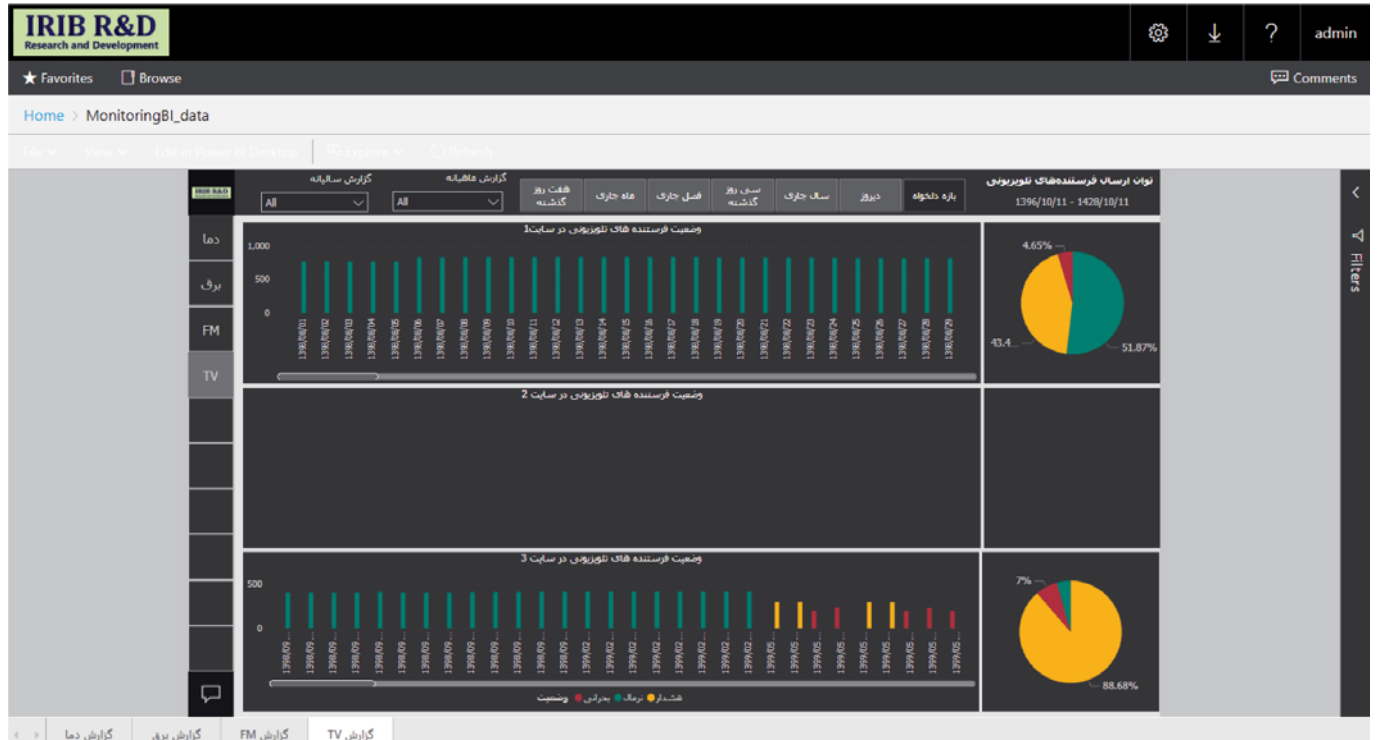


Figure 5 TV transmitters dashboard page

3. CONCLUSION

In the paper, we presented new key performance indicators (KPIs) for the TV transmitter sites based on temperature, AC voltage, FM transmission and TV transmission for timely maintenance and troubleshooting of the sites and compare their performance. To prove these KPIs, we developed a BI system named BITS. This system enables technical and executive managers to evaluate their transmission infrastructure in operation.

The BITS can evolve as user demands for monitoring the signal transmission chain's functionalities increase. The system receives online data from a network of transmitters and processes their data for technical and executive reference and timely decision-making. Long-term data retention in the data warehouse of the platform can provide log management toolkits for seasonal and regional variations and help develop anomaly detection of performance outliers.

AUTHORS



Negin Ayoughi received the B.Sc. degree in computer science from the University of Isfahan, in 2014, and the M.Sc. degree in computer science from Sharif University of Technology, Tehran, Iran, in 2017. In 2017, she joined the R&D Department of Islamic Republic of Iran Broadcasting (IRIB) IRIB R&D, as a Senior Researcher. Her research interests are in Applied AI, Data Analysis, and Cloud Services. Some of her projects include Intelligent Analysis of Transmitter Performance and Efficiency, Survey Data Analysis, Developing Web Applications for Interactive TV, and Crisis Management Operation in Broadcast.



Seyed Hossein Alavi Soltani is head of new media technology department in IRIB R&D and PHD Candidate in Computer Engineering. His specialty is design and development of software systems, hybrid broadcast and broadband, cloud computing and multi-agent systems. His scientific experiences include teaching undergraduate courses such as data structure, compiler, programming languages, and fundamental of computer programming.



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IRIB R&D has made major advances in applying basic research and innovation in media technology. It develops innovative new products and technologies in broadcast/broadband industry that leads the development of future technologies in IRIB. Core research themes at IRIB R&D include deep learning and AI based services, intelligent OTT services, development of transmission via terrestrial and satellite systems, cloud-enabled networking, IP-based content production and contribution. Our R&D projects often involve with public or private entities, including universities, government laboratories, technology start-ups and incubators, research institutes and partner companies. IRIB R&D scientists also partner with local universities to share expertise and resources. IRIB R&D has also succeeded in designing and manufacturing products related to the field of production technology. Audio Mixer, IP Intercom, 12G Distributor, 12G Embedder/De-Embedder and 12G SDI router are among the projects designed and developed so far or in development.

Designing and developing Doherty TV Transmitters instead of old and high consumption transmitters leads to the SDGs implementation. The Doherty amplifier is a highly efficient and modified new technology for DTV transmitters. In this way, the amplifier achieves a high level of linearity while retaining good power efficiency up to %40. Despite available Doherty transmitters in the market, the Iranian liquid cooled designed one can operate in full band mode which is a novelty in this field and results in ease of frequency channel changing without the need to replace the board. The Doherty TV Transmitters are already implemented in the main High Power TV Stations in Iran.



20TH ABU DIGITAL BROADCASTING SYMPOSIUM

NAVIGATING THE AI HORIZON: TWO DECADES OF EVOLUTION AT THE ABU DIGITAL BROADCASTING SYMPOSIUM

The Asia-Pacific Broadcasting Union's Digital Broadcasting Symposium (DBS) has evolved significantly since its inception in 2005. Now, as it celebrates its 20th annual event, DBS 2024 stands at the forefront of the digital broadcasting landscape, addressing the challenges and opportunities that come with the total digital transformation of the industry.

DBS 2024: NAVIGATING AI HORIZON - THE 20TH ANNUAL EVENT

The 2024 ABU Digital Broadcasting Symposium, also known as DBS 2024, is set to take place from 4-7 March at Royale Chulan Kuala Lumpur. Under the theme "Navigating AI Horizon", this milestone event reflects the symposium's commitment to exploring the integration of artificial intelligence into the broadcasting domain. In an era where digital transformation is not just a choice but a necessity, DBS 2024 aims to facilitate a smoother journey for broadcasters throughout the value chain.

20 YEARS OF EVOLUTION: FROM DTV SYMPOSIUM TO DBS

This marks a significant moment in the symposium's history, tracing its roots back to the DTV Symposium in 2005. Over the years, it has transformed into a comprehensive annual gathering that goes beyond television broadcasting to encompass the broader digital landscape.

THE ROLE OF DBS 2024: EASING THE DIGITAL TRANSFORMATION JOURNEY

DBS 2024 recognizes that the journey towards total digital transformation has been long and challenging

for broadcasters in the region. The symposium is positioned as a catalyst, aiding broadcasters in making this transformation more accessible and efficient across the entire broadcast value chain.

CONFERENCE SESSIONS, PANEL DISCUSSIONS, AND WORKSHOPS: A COMPREHENSIVE APPROACH

During the four-day event, global experts will take the stage to lead conference sessions, participate in panel discussions, and conduct workshops and masterclasses. The agenda is set to tackle the myriad challenges faced by broadcasters in the digital era, offering practical solutions and exploring creative content ideas. The overarching goal is to enhance user experiences by staying at the forefront of technological advancements and industry trends.

REDISCOVERING AND REPOSITIONING: FUTURE-PROOFING BROADCAST OPERATIONS

DBS 2024 aims to help broadcasters rediscover and reposition themselves in the current market, future-proofing their operations in the rapidly evolving digital landscape. By addressing the challenges head-on, sharing innovative solutions, and fostering collaboration, the symposium plays a crucial role in ensuring that broadcasters remain competitive and adaptive.

As the Asia-Pacific Broadcasting Union's Digital Broadcasting Symposium enters its 20th year, DBS 2024 stands as a testament to the industry's resilience and adaptability. With a focus on "Navigating AI Horizon", the symposium is set to chart the course for the next decade of digital broadcasting, fostering innovation, collaboration, and growth in the ever-changing landscape of media and communication. ■

20 YEARS
2005-2024

ABU DBS 2024

NAVIGATING AI HORIZON

4 - 7 MARCH 2024

ROYALE CHULAN KUALA LUMPUR

REGISTRATION OPEN!

TECHNICAL COMMITTEE MEETING

28 & 29 OCTOBER 2023

ABU Technical Committee meeting was held from 28-29 October 2023. It was hosted by the ABU full member in Republic of Korea, Korean Broadcasting System within its premises.

The event started with an address by **Mr Hamid Dehghan Nayeri**, Director, International Technical Affairs, IRIB, Iran and ABU Technical Committee Chairman. Some 60 ABU Member delegates attended the meeting.



Hamid Dehghan Nayeri
Director, International Technical Affairs, IRIB

OPENING SESSION

The ABU Technical Committee 2023 Meeting, an associated event at the 60th ABU General Assembly, kicked off on October 28 with a welcome address by **Hamid Nayeri**, the Chairman of the committee. He highlighted the advances in broadcast technologies and the challenges and opportunities they bring. He also introduced the agenda and objectives of the meeting. From

the host, **Kim Byung Guk**, Executive Managing Director at Technology Division, KBS-Korea also welcomed the delegates and invited them to explore and get acquainted with their showcases in UHD, AI Applications, Surround sound and other cutting-edge technologies. ABU Secretary General, **Ahmed Nadeem** delivered an opening address expressing his commitment to serve the ABU Members in technical domain.



Welcome Address from the Host

Kim Byung Guk, Executive Managing Director,
Technology Division, KBS-Korea



2023 ABU 서울총회
60th ABU General Assembly and Associated Meetings



ABU ENGINEERING AWARDS 2023

The meeting continued with the announcement of the winners of the 2023 Annual ABU Engineering Awards and Technical Review Prizes. The awards recognized the distinguished individuals and organizations that have contributed to the development and innovation of broadcasting engineering in various categories. The prizes honoured the best papers published in the ABU Technical Review journal in three categories: Practical Implementation, Research and Case Studies. The winners on five different categories including the Broadcast Engineering Excellence, Engineering Industry Excellence, SDGs implementation, Developing Broadcasters' Excellence, and Young Engineers' Broadcasting awards received certificates and trophies in

the session.

The winners of the Technical Review Prizes 2023 were as follows;

1. Best Article in Practical Implementation category: Ts. Ahmed Shafiq Mirza Bin Mansur of Radio Televisyen Malaysia, Malaysia.
2. Best Article in Research category: Lee Yon-Jae, Choi Seongwoo, Hong Minsoo, Lee Yong-Gun, Kim Nam-Ho and Kim Sangsung of Korea Broadcasting System, Korea.
3. Best Articles in Case Studies category: Ts. Ahmad Fesol Bin Mansor of Radio Televisyen Malaysia, Malaysia

Likewise, the winners of the ABU Engineering Awards

1. The ABU Broadcast Engineering Excellence Award: Mr Chien Pham

Anh of VTV Vietnam

2. The ABU Engineering Industry Excellence Award: Mr Zhifan Sheng of the Academy of Broadcast Science, National Radio and Television Administration, China
3. The ABU Broadcast Engineering Award on SDGs Implementation: Islamic Republic of Iran Broadcasting IRIB-Iran and Hunan Broadcasting System, China
4. The ABU Developing Broadcasters Excellence Award: Mr Purswotam Manandhar of Radio Broadcasting Services, Nepal
5. The ABU Young Engineers Broadcasting Award: Mr Do Anh Duc of Voice of Vietnam, Vietnam

This concluded the award ceremony and the TC Chairman Mr Nayeri congratulated all the winners.







KEYNOTE PRESENTATION

The first day of the ABU Technical Committee 2023 Meeting was packed with insightful presentations and discussions. The keynote presentation by **Masakazu Iwaki**,



Executive Research Engineer at NHK-STRL Japan, on Emerging Technologies for Future Public Media was a highlight of the day. Mr Iwaki provided an overview of NHK's latest research activities in the broadcasting field and shared his insights on the emerging technologies that will shape the future of public media. His presentation was well-received by the audience and they learned futuristic vision towards new adventures and emotional journeys in media technology landscape.

Technical Committee Meeting

28.10.2023 - 13:30-17:00 & 29.10.2023 - 9:00-17:00

ADVANCEMENTS IN BROADCAST TECHNOLOGY & SERVICES

Moderator: Masashi Kamei, Senior Research Engineer, NHK STRL-Japan and Vice-Chairman, ABU Technical Committee

Speaker Panel and Topics:

- Internet TV for Deaf people**
Hamid Dehghan Nayeri, Director, International Technical Affairs, IRIB-Iran
- Lost in Transmission: Exploring the Pitfalls of Broadcast to Mobiles**
Dr Peter Siebert, Adcom Member & VP, IEEE Broadcast Technology Society
- Emergency Warnings: a co-operative approach to disaster alerting**
Lindsay Cornell, Principal Systems Architect, BBC and Chairman, WorldDAB Technical Committee
- Latest updates in DVB media delivery ecosystem**
Peter MacAvock, Chairman, DVB

ABU 2023 SEOUL
10th ABU General Assembly and Associated Meetings
KBS | Conrad Seoul | 2023.10.28 Sat - 11.1 Wed

He talked about current issues and progress in Broadcast Technology and shared NHK's Future vision for 2030-2040. Latest research and development strategies in immersion media, universal services, frontier science etc. were other highlights at the keynote session. Immersive media is a trend in experiencing future content with 360 degrees display and extremely high resolution. Furthermore, web-based broadcast media allows content viewing via a number of applications in a multitude of

devices. There is a growing demand for people centric connection of broadcasting and internet services including supporting technology for accessibility services deploying sign language features. Other such developments in the transition from viewing to experiences are augmented with Automatic program video summarization using AI based image analysis and advanced display technologies for immersive content experiences with life like 3D or holographic display.

TC PROCEEDINGS

Technical Committee Proceeding initiated with confirmation of the TC2023 Agenda and TC-2022 Proceedings. Rapporteurs for the 2-day session were appointed and they were **Warren Robert** from VBTC-Vanuatu, **DaeHoon Choi** from KBS-Korea and **Gul Tuğba Yildiz** from TRT- Türkiye.

Director of ABU Technology, **Dr Veysel Binbay** summarized the Technology Activity Report that took place between November 2022 to October 2023. This included different activities and programs namely: capacity building programs, global collaboration, and the annual technical flagship event - Digital Broadcasting Symposium 2023. The report highlighted the ABU's efforts to promote innovation and excellence in broadcasting engineering and technology. He further introduced a Bureau Proposal to the audience for their review and feedback. The proposal was a decision 1/2023 on implementing attendance policy for bureau meetings. This is to ensure and make sure each bureau member attend either physically or online at least 50 % of the TC Bureau meetings. Failure to do so the said organisation and the TB member will lose the right to seek re-election.

THE HOST PRESENTS

The first day concluded with a presentation session by the host and there were two presentations provided by KBS and RAPA from Korea.

The first presentation on AI-powered

production: less repetitive, more creative was delivered by **Lee Yoon Jae**, Deputy Manager & Team Leader at KBS Media Technical Research Institute, Korea. He briefed the delegates about use and implications of Artificial Intelligence on Video Editing. He also highlighted processes such as Thumbnail Remaster and Colorization to help innovate media production processes. Transformation to AI triggers innovating media production processes and reducing the creative iteration. AI Thumbnail Remaster deploys AI-face restoration technique for thumbnail creation with ease. Another technique called AI Colorization helps restoring the black and white historical clips and images in color.

An independently executable software called VVERTIGO was developed at the KBS which utilized all these AI based features and functionalities such as AI Video Editor, Thumbnail Remaster and Colorization.

The software was showcased at KOBA 2023, NAB2023, InterBee

2023 etc. Delegates at the ABU General Assembly had opportunity to see and learn the VVERTIGO solution during the 'Inside KBS Tour'.

The second contribution was on the Role and Efforts of Korea for Broadcasting Development in the Asia-Pacific Region by **Joonam Lee**, Deputy General Manager, Radio Wave & Broadcasting Industry Strategy Division, Korea Radio Promotion Association (RAPA). It was about the purpose of the ODA program which is to ensure the broadcasting capacity building for quality broadcasting service.

The support would be provided in terms of the support of broadcasting equipment, technical training, and ex-post support to the broadcasting companies in partner countries.

Mr Lee shared the list of projects and the countries where they had such supports in the past. The projects supported are OB Van, Studio building, Asset management, Post production system.



TOPIC AREA REPORTS

On the second day morning, delegates heard reports from topic area chairmen on different topics: Production, Distribution, Distribution, Training & Services. **Mr Hamid Dehghan Nayeri**, ABU Technical Committee Chairman opened the session and invited first **Mr Kazim Pektas** to present the Production Topic Area report.

PRODUCTION



The Chairman of the Production Topic **Kazim Pektas** of TRT-Türkiye gave a brief explanation of the project's activities over the year, starting with a mention of the four research groups in the production field. Research activities on UHDTV and related immersive media technologies and Systems for people with special needs were mentioned. In addition, he mentioned study cases of broadcasters that are building or have established file-based workflows using IT-based technologies. Lastly, he reported research activities on cases of applying AI and big data analysis technology to broadcasting.

Mr Kazim Pektas expressed his gratitude to NHK and KBS for their contributions. This contribution is about NHK's standardization of immersive content, 3D authoring tool, and automatic program summary technology using AI image analysis. And KBS's contribution was about cases of applying AI to broadcast production, including multi-cam production 'VVERTIGO', application of color restoration technology to broadcasting, and next-generation open archive search service 'BADA'.

DISTRIBUTION

Next, NHK's **Yuji Nagata** presented a report on the topic of Distribution. Distribution topics include next-generation terrestrial broadcasting,

integrated Broadcast-Broadband and OTT, and satellite broadcasting. In next-generation broadcasting, the report covers Japan's investment efforts in next-generation terrestrial broadcasting and Korea's ATSC 3.0 and 5G-broadcast transmission technology.

For Japan's next-generation terrestrial broadcasting, large-scale demonstration of the new DTTB system was conducted in four major cities: Tokyo, Nagoya, Osaka, and Fukuoka. Each transmission station is equipped for MIMO with two transmitters and two antennas for horizontally and vertically polarized waves, the end-to-end demonstrations used the SISO system with horizontal polarization.

Korea's next-generation terrestrial broadcasting is based on the ATSC 3.0 standard and is aiming for nationwide coverage by 2027, and is currently achieving 80% coverage. It was reported that one UHD channel and one mobile HD channel will be serviced simultaneously from 2023, and field tests using ATSC 3.0 and 5G networks simultaneously are in progress this year.

The next project that Yuji Nagata mentioned was Integrated Broadcast-Broadband and OTT. He shared information about Japan's standardization process and updates from international standardization organizations. Additionally, he shared information on cybersecurity issues based on the recent damage case of Virgin Media Television in Ireland. Lastly, what he mentioned was about the satellite broadcasting project. Two new ITU-R standards related to satellite broadcasting standards have been added, and a transmission and reception system using satellite and IP network developed by NHK STRL has been reported. They assumed two 300-MHz-class wideband transponders in the 21-GHz band and developed a wideband modem with the nominal symbol rate of 250 Mbaud.

SPECTRUM

Dr Li Leilei, a member of NRTA's Academy of Broadcasting Planning, is the chair of the spectrum topic area and has given presentations related

to the World Radio Communications Conference (WRC). The WRC is held every three to four years and is hosted by the International Telecommunication Union and is known as an opportunity to review and revise the international agreement on the use of radio spectrum. He conveyed that there are several WRC agenda items, but there are four agenda items related to ABU (Agenda Items 1.2 and 1.19 for satellite broadcasting and Agenda Items 1.4 and 1.5 for terrestrial broadcasting).

One of the notable agenda items during his presentation was Agenda Item 1.5 which examines spectrum use and spectrum requirements in the 470-960MHz frequency band. In particular, it was stated that this agenda could have a significant impact on the Asia Pacific region. This is because the 470 to 694 or 698 MHz band is used in terrestrial digital television broadcasting worldwide, and broadcasting and IMT services require significant separation distances that cannot coexist within the same frequency band. Therefore, if this agenda item is approved at WRC 23, it will be expanded to Region 3, the Asia-Pacific region of the WRC, and expanded to agenda item 1.1 based on historical experience, so caution is needed.

Another agenda item he mentioned, Agenda Item 1.2 deals with the 3600-3800 MHz frequency band for IMT purposes and is related to the 3700-4200 MHz satellite broadcasting band used in broadcasting in the Asia-Pacific region. Although it is currently expected to have a negligible impact on the Asia Pacific region, it was emphasized that efforts for future service standards remain important. Lastly, he added that each ABU member hopes to obtain good results as a broadcaster at the next WRC meeting by discussing with each country's administration after the ABU Technical Committee.

TRAINING & SERVICES

Mr P Das of Prasar Bharati, Chairman of the Training & Services topic area continued a discussion on the ABU Activities. Since he could

not attend the meeting in person, he presented remotely via video presentation. He said that ABU's Technical Committee reported on three different projects, emphasizing the important role of training and service topics in developing the technical skills and knowledge of its members. The Technical Committee regularly surveys its members to understand their needs and priorities, and its activities also include technical advisory services such as online assistance for VOV's National Online Radio platform.

Mr Das outlined the ongoing and completed collaborations with various academies, workshops and training programs. Over the past year, the ABU Academy has conducted workshops on satellite transmission and technical workshops on DAB+ digital radio, archiving and media management. Training programs on non-technical, managerial, financial, occupational safety and upskilling were identified, while notable training sessions included Investigative Journalism, HEC Authentic Leadership Program

conducted in this year's series. In terms of technical capacity building and knowledge sharing, ABU collaborated with industry partners and international events such as ITU, IABM and SMPTE to identify training opportunities applicable to the broadcasting industry. During GA in Seoul, an MOU was signed with the Korea Radio Promotion Association (RAPA), concluding an agreement with the Korean government for ODA support to ABU members.

INFORMATION EXCHANGE AND STATUS REPORTS

ABU Secretariat succinctly presented the information exchange and status reports. Status reports on the technological developments carried out by 12 ABU members over the past year has been compiled, and due to time constraints, he summarized the reports and these are available through the ABU website.

The information documents were categorized into six themes: 1) Production and distribution 2) Next-generation broadcasting technologies 3) 4K UHD & 8K UHD content production and transmission 4) Compression technology 5) Big data, block-chain, AI 6) IP Media workflow and virtualization production.

A total of 11 professional technical information documents were received and briefly presented at the session. ABU expressed its deep gratitude for the contributions of Chinese members and affiliates who worked hard to contribute those documents.

Lastly, the session ended with an introduction by **Leroy Zhang** of the CCBN Organizing Committee about the CCBN event to be held in China in 2024.

BUREAU PROPOSALS

Mr Hamid Dehghan Nayeri, ABU Technical Committee Chairman invited **Dr Veysel** for a final reading of the bureau proposal for Attendance Policy that was proposed in the previous day to the audience.

1. Every Bureau member should attend at least 50% or more of the Bureau meetings held during their term, either online or in person.
2. Member organizations that fail to meet the minimum attendance requirement will lose the right to seek re-election for the upcoming term, and organizations not meeting the minimum attendance requirement will be informed of their ineligibility to seek re-election.
3. An online participation option shall be available for all Bureau meetings.
4. Secretariat will amend the Rules of Procedure of ABU Standing Technical Committee, according to this decision.

As there were no further comment or objections, the ABU decision was approved by the meeting.



TC ELECTION

Next session on election of office bearers saw nominations and election of different seats in the ABU Technical Committee that includes 18 members of the Bureau, the TC Chairman, three (3) TC Vice-Chairmen. While 13 members from the last 2022-2023-year period sought re-election and were confirmed elected from the audience, 2 new members namely SBA-Saudi Arabia and PBC-Pakistan were newly elected for the next 2024-2025 term.

Kazim Pektas from TRT-Türkiye, **Ashok Kumar Jha** from DD (Prasar Bharati)-India and **Zhifan Sheng** from RTPRC-China got elected to the three Vice-Chairmen seats and **Masashi Kamei** from NHK-Japan won the election for the TC Chairman position.



INVITED PRESENTATIONS

In the Afternoon session, the delegates learned multi-speaker presentations on different topics in broadcast technology & services. Advancements in Broadcast Technology & Services session was moderated by Technical Committee Chairman **Mr Masashi Kamei**.

Mr Hamid Dehghan Nayeri drew attention to the topics of Internet TV for Deaf People. A person is said to have hearing loss if they are not able to hear as normal hearing person, which means hearing threshold is 20dB or better in both ears. According to WHO statistics, over 1.5 billion people live with hearing loss in the World. This number is expected to reach 2.5 billion by 2050. Sign language is a gestural language that deaf people have developed to communicate and it provides all the functions of a spoken language. Lack of special TV content and service for deaf people highlights the need for more inclusive media options and accessible programming.

Mr Nayeri recommends that the media must be accessible and establishing Internet TV for deaf people, sharing, exchanging content and technology with different genre, using sign avatar, using AI for producing sign language, using

subtitles for different languages could help. He mentioned some of case studies: one from DEAF Media in America, the other on The American Sign Language Avatar Project (ASL) conducted by De Paul University. The last case was World summit award winner SIMAX (the Sign Language Avatar System) which translates texts into various sign languages.



The second speaker was **Dr Peter Siebert** on the topic of Lost in Transmission: Exploring the pitfalls of Broadcast to Mobiles. He made references to linear Broadcast TV, Non-live on demand content, and the mobile devices to access the content. TV to handhelds using broadcast has been tried often via different networks such as DVB-H, Media FLO, DVB-SH, ATSC M/H, ISDB-tmm, CMMB, DVB-T2. The HPHT schemes are not as successful as they should be due to reasons of restricted Indoor reception, Low end-user interest in watching Broadcast TV on handhelds and Commercial challenges e.g. business

models do not compensate the costs and handhelds are not cheap.

Sinclair Broadcast Group introduced ATSC3.0 enabled smartphones in US market, but it did not gain popularity. Another feasible option for broadcast to mobiles would be the LTE-based 5G Broadcast system. Some of its positive aspects are possible integration with 3GPP unicast multicast system and other 5G networks, cheaper handhelds and support by other mobile networks. Dr Siebert opines to the question of will 5G broadcast to handhelds be a success that it is unlikely that standalone 5G broadcast TV will replace DVB-T2 or ATSC3.0. However, exploring innovative ways to integrate 5G broadcast with other 3GPP features, such as bidirectional unicast, utilizing existing mobile broadband networks are certainly optimistic.



Third presenter was **Mr Lindsay Cornell** who explained a co-operative approach to disaster



alerting with WorldDAB. As the World is in a time of crisis owing to climate changes & wars Broadcasters wanted reliable answers for disaster alerting system. German broadcasters saw this potential and despite the size and strength of German market, they brought a proposal to WorldDAB. The World DAB technical committee worked to define a fully featured EWS and now Germany is setting up a receiver compliance regime to ensure that products meet the forthcoming standards. It is planned to launch EWS ready receivers in 2024. The DAB emergency system consist of alert messages, Sleep & wake-up and geofencing features.

Spoken alert message is for essential information: where, when, what to do. The design accommodates receivers with sleep mode with very low power function to keep listening to DAB signal and maximize battery life. The Wake-up feature is enabled when an alert is detected the receiver transitions to full on mode to on mode to play the spoken message. DAB signals have local, regional or national footprint and A new global location coding allows receivers to perform location matching before Alert playback. For universal location coding system, the earth is divided in to 42 zones and progressively into smaller spherical area identified by a hexadecimal digit code. In order to use localization, the device needs to know its location. The alert area will be represented by a number of location codes. The device compares its location code with each location code provided in the FIC that represents the alert area.



Next speaker **Mr Peter MacAvock** gave latest updates in DVB media delivery ecosystem. DVB is considered as the backbone of other systems: ATSC3.0's RF layer is like DVB-T2 and ISDB is very like DVB-T. Today's media has transitioned to IP and DVB's challenge is to make that transition transparent to the consumers and making sure that IP is not telecom networks alone. To achieve this DVB has developed new technologies and one of these technologies is Native IP Technology. Native IP is very similar to ATSC's IP layer. The other technology is DVB-I Technology. It is designed to facilitate the hybrid operation of broadcast and IP services. It is deployed in Italy, Ireland and Germany and is in trials in Poland and Czech Republic.

Mr MacAvock also mentioned about object-based media, energy-aware delivery and consumption. He concluded his talk by saying traditional broadcast media is threatened as never before. Unlike the commercial sector, public service media could fund new ventures. DVB role is to facilitate technical transitions, promote interoperability, and make technological advancements transparent to the consumers. ABU and its members has a role in shaping the market.

Next session theme was Latest Technology Implementation & Use Cases. The session was moderated by Technical Committee Vice-Chairman **Mr Kazim Pektaş**. The first speaker was Mr Joel Brydon from ABC-Australia and he covered the developments in the digital space at Australian Broadcasting Corporation. ABC's 5-year plan is to transition to a digital-first ABC, where a significant portion of the audience engages with ABC through its digital products. The aim is to achieve so by harnessing talents in digital, collaborating with partners and delivering beyond expectations, which ensures ABC an essential part of daily life for all Australians. The focus of News product is modernizing ABC's digital products, expanding offerings alongside hard news content.

Digital storytelling formats & UI needs to evolve as many people do not discover relevant content. Attracting younger audiences is a challenge. More people are avoiding news content and trust less. ABC learnt that a unified place to access its depth of content is a compelling reason to move away from 3rd party platforms. Content is the audiences care about. Mixed content formats and genres organized by interest and topic is highly valued. ABC sees AI/ML is a long-term strategic lever. He said digital is fundamental and needs to be core competency to deliver a true digital-first ABC.

Next speaker was **Mr Alexander Zinc** and he provided information about DRM digital Radio in Asia-Pacific Region. In Australia, Successful DRM trial was both



Contributed by Rapporteurs
Warren Robert, VBTC-Vanuatu
DaeHoon Choi, KBS-Korea
Gul Tuğba Yildiz, TRT- Türkiye

achieved on AM and FM bands. It covers rest of the population outside of the city centers. A new shortwave transmitter was supplied to Radio New Zealand. Nepal has a website showcasing service with indirect text elements and multiple audio services on a single DRM transmission. Over 6 million cars with DRM capability will be on the roads by 2023 in India. In Pakistan testings are on early stage. Pakistan Broadcasting Corporation (PBC) has approved DRM as a radio standard for use in all frequency bands (AM and FM) in January 2020.

Furthermore, China endorses DRM for domestic AM band transmission. In August 2023 the government organizations NRTA, MIIT & SAMR officially published a joint notice, guiding Chinese automotive industry to support DRM in AM band and encouraging province transmission stations to broadcast domestic DRM services. Indonesia Republic has pronounced DRM as the standard for digital radio broadcast in MW, FM bands and in VHF band III. On technology side, Multi DRM is an update technology, sharing a single transmitter to broadcast multiple, independent DRM signals. There are some benefits of Multi DRM Transmission such as spectrum efficiency, easy installation and compatible with all DRM receivers.

Mei Jianpig from China Media Group enlightened the delegates about 8K UHD TV international public signal production at the Beijing Winter

Olympics and gave details about how they set up the system, placed the cameras and implemented their production. For 8K HDR public signal production, diverse range of equipment sets were used including 4K/8K UHD OB Vans, 4K/8K UHD EFP system. They used OB Vans with JPEG-XS encoding transmission in the whole process.

The 4K/8K production system was based on the ST2110 protocol, the complete IP pathways was built, covering the OB Van, IBC and CMG studio, which allowed for the transmission of one 8K IP signal by four video streams, two audio streams and one auxiliary data stream. The video streams were encoded and packaged to JPEG-XS format IP stream. A typical high-speed track camera system featured a 350-meter track with the maximum speed of 25 m/s and the maximum acceleration of 3.5m/s². The Beijing Winter Olympics was covered live for 89 hours on 4K UHD and for 92 hours with 8K public signal production. More than 2.5 billion views via new media and over 5 billion views on TV had been recorded.

The last speaker of the session was **Ms Ina Lui** from AsiaSat. She shared details of Broadcasting, Content Distribution & Media Solutions at AsiaSat. AsiaSat provides satellite communication services with broadband coverage in the Asia-Pacific region in 5 orbital locations

with 6 in-orbit satellites. It carries over 550 channels, reaches over 850M homes and 490K hotel rooms.

Ms Lui mentioned that changing faces of current Video Ecosystem poses diverse challenges such as rapidly changing viewing habits, new distribution platforms, market fragmentation, compelling content.

AsiaSat is a full-fledged vertical integrator and bridges gaps in the media value chain with end to end media solutions. These include live streaming solutions, Channel distribution platforms on DTH, Cable, IPTV and Cruise Ships including Cloud-based live streaming solutions and satellite & IP -based hybrid end to end content delivery. AsiaSat represents over 100TV channels from around the World, across all genres, in HD and UHD.

At the meeting, it was announced that ABU's 61st General Assembly in 2024 would be held in Istanbul. The host will be TRT (Turkish Radio Television). **Ms Gul Tuğba Yildiz** from TRT was appointed as the TC Honorary Vice-Chair for the event. TC Chairman and representatives of the TRT extended invitation & expressed their wish to see all the members in Istanbul. ■

WEBINAR ON ICDN AND DATA CLEAN ROOMS IN MEDIA INDUSTRY

21 SEPTEMBER 2023

ABU Technology Webinar

The Speakers



Dr Ahmad Moradi
CEO, NETSTAIRS and
Chief Science Officer,
VYPA Corporation /
VYPA Malaysia Sdn Bhd



M. Vijjayandran
CEO, VYPA Corporation
MD, VYPA Malaysia Sdn
Bhd



Dr Francis Teo
Enterprise Architect



Pattrik Ting
General Manager-Sales,
K Media Marketing Sdn
Bhd

ICDN and Data Clean Rooms in Media Industry

ABU Technology organized a webinar session on 21 September, Thursday. The webinar session discussed on diverse and important technical areas focused to ICDN.VIDEO such as data clean room for secure media collaboration; client data platform for redefining data sharing in the post-cookies era; digital media room which is a theater-style box for collaborative viewing.

Through presentations, case studies and a fireside chat session, the experts in the media industry threw lights to discover how post cookies streaming will impact the TV network and the streaming industry. An expert on AI informed the participants on the concept of ICDN and the new revolution on responsive video servers where AI, interactivity, computing power and financial resources converge to shape the digital world.

Post-Cookies Era: ICDN.VIDEO's Data Clean Room and Digital Media Room

The digital landscape is undergoing a seismic shift. The

demise of third-party cookies is forcing a fundamental rethinking of how data is collected, shared, and utilized, particularly within the media and entertainment industry. In this context, innovative solutions like ICDN.VIDEO, powered by Netstairs, are emerging as game-changers.

ICDN.VIDEO offers a revolutionary approach to data collaboration in the post-cookies era. It leverages a unique Data Clean Room technology that fosters secure, privacy-compliant data sharing between multiple parties while maintaining data ownership and control. This enables TV publishers and other media entities to collaborate effectively in a way that is compliant with evolving data privacy regulations.

One of the most powerful features of ICDN.VIDEO is its Digital Media Room, a virtual space modeled after physical media rooms. This Theater style Box allows TV publishers and media professionals to host collaborative viewing sessions for various video outputs.



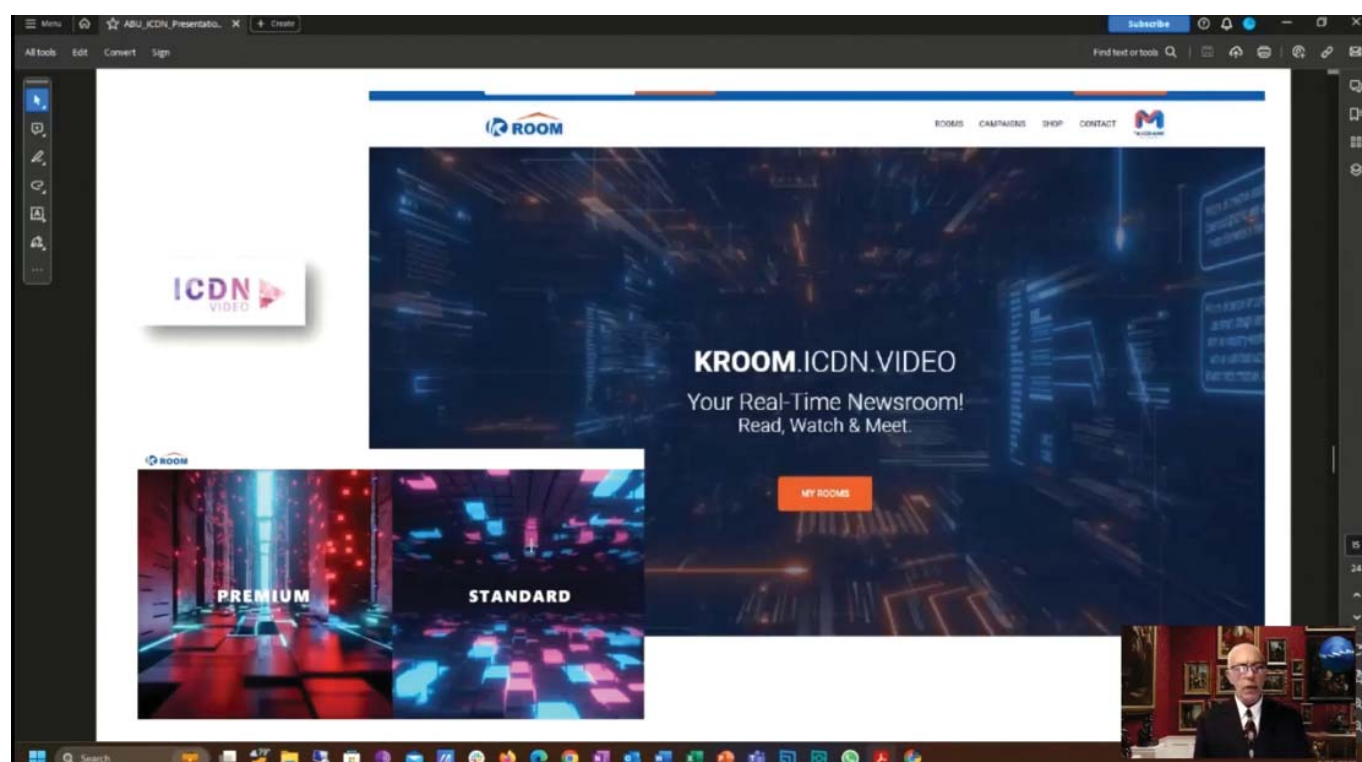
Some of the **key features and benefits of Digital Media Room** are:

- **Multi-modality Support:** Digital Media Room supports a wide range of video outputs, including CDN streaming, YouTube videos, Vimeo links, JWPlayer embeds, and other popular formats. This allows for seamless integration of various content sources within a single collaborative environment.
- **Enhanced Collaboration:** The platform features real-time chat, annotations, and screen sharing, facilitating productive discussions and feedback during viewing sessions.
- **Data Security and Privacy:** ICDN.VIDEO's Data Clean Room technology ensures that all data within the Digital Media

Room is secure and privacy-compliant. This includes role-based access controls, data encryption, and audit logs.

- **Ease of Use:** With a user-friendly interface and no downloads or installation required, Digital Media Room is accessible to all team members, regardless of technical expertise.
- **Scalability:** Digital Media Room can accommodate multiple participants and handle a large volume of data, making it suitable for even the most demanding projects.

In addition to these benefits, there are still some more **motivations for TV Publishers** such as improved content collaboration, enhanced viewer insights, increased efficiency and productivity, reduced costs as highlighted below:





- Improved Content Collaboration: Digital Media Room facilitates efficient collaboration between internal teams and external partners, such as agencies and creatives, streamlining the content creation and approval process.
- Enhanced Viewer Insights: The platform provides valuable data and insights into viewer behavior, enabling TV publishers to make data-driven decisions about their content strategy.
- Increased Efficiency and Productivity: Digital Media Room helps to streamline workflows and boost productivity by eliminating the need for physical meetings and inefficient email chains.
- Reduced Costs: By leveraging Digital Media Room, TV publishers can significantly reduce their travel and accommodation expenses associated with physical media room meetings.

Several leading TV networks and media companies are already reaping the benefits of ICDN.VIDEO's Data Clean Room and Digital Media Room technology. For example, a major sports network used the platform to collaborate with its international partners on a global marketing campaign, resulting in a 20% increase in viewership. Another media company used Digital Media Room to host virtual press screenings for its new show, leading to widespread positive media coverage.

First part of the webinar session concludes with observation that ICDN.VIDEO's Data Clean Room and Digital Media Room offer a powerful solution for secure, compliant, and efficient data collaboration in the post-cookies' era. This technology provides TV publishers and media professionals with a valuable tool for streamlining workflows, enhancing collaboration, and improving viewer engagement. As the media landscape continues to evolve, ICDN.VIDEO is poised to play a pivotal role in shaping the future of data-driven media collaboration.

Future of Customer Engagement: Responsive AI Video with 2D and Holographic Interaction

It was the theme at the second part of the webinar session. The world of media and entertainment is undergoing a

transformative shift, driven by advancements in artificial intelligence (AI) and immersive technologies. One of the most exciting developments in this space is the emergence of Responsive AI Video, which allows viewers to interact with video content in real-time, creating a more dynamic and engaging experience.

The presentation explored the concept of Responsive AI Video, focusing on its potential applications in broadcasting, advertising, and customer service. It delved into the capabilities of 2D and Holographic visual displays, powered by the Netstairs Data Clean Room, that can elevate the impact of Responsive AI Video to new heights.

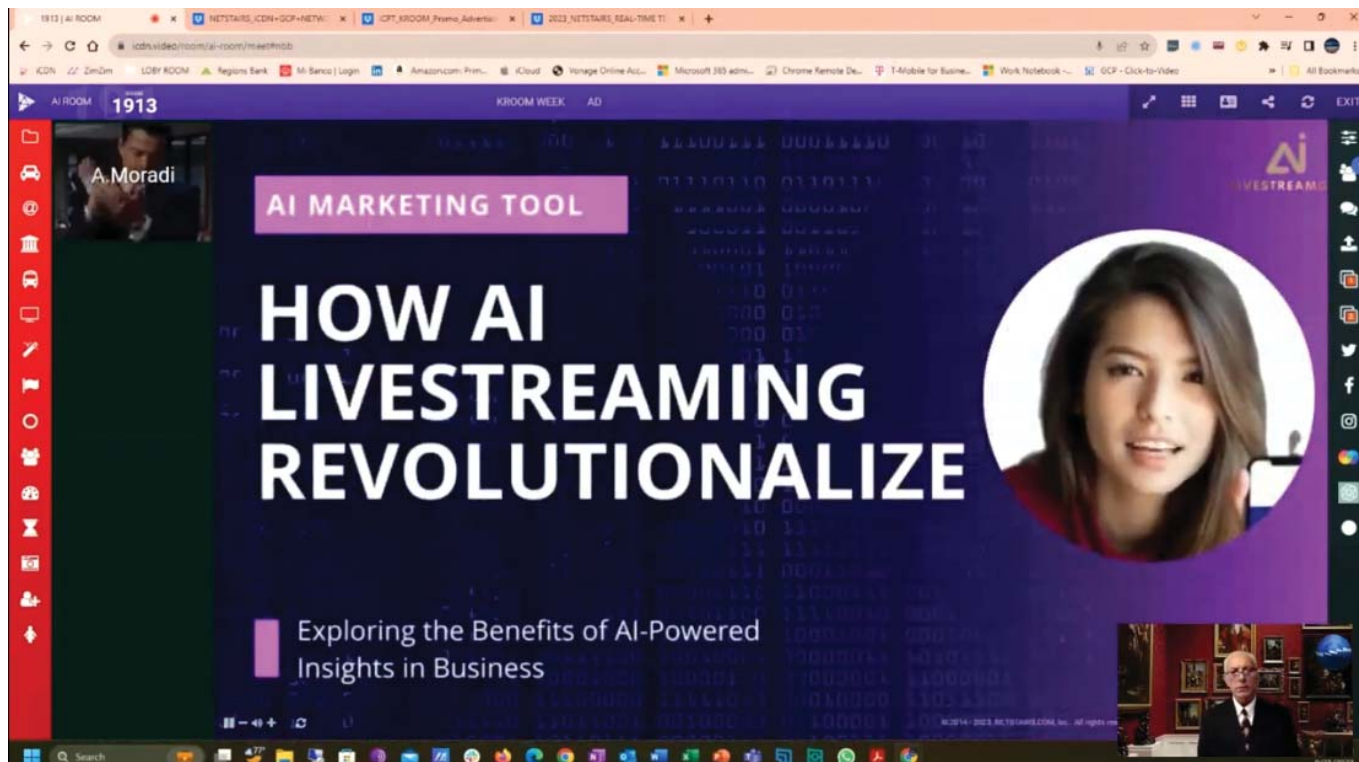
What is Responsive AI Video?

An AI-responsive video avatar with multilingual capabilities and interactive features is a sophisticated project that integrates various technologies for a seamless and intelligent user experience. Leveraging advanced Natural Language Processing (NLP) techniques, such as GPT and LMM, forms the foundation for enabling the avatar to comprehend and respond intelligently to user queries in multiple languages.

- Dynamically adjusting the video narrative based on human interaction. To ensure a lifelike interaction, a robust multilingual Text-to-Speech (TTS) system is implemented, synchronizing the avatar's facial expressions and lip movements with the spoken content. This enhances the overall user experience and contributes to the illusion of a human-like interaction.
- Customizing the appearance and behavior of virtual characters in the video, adapting their expressions and responses to the viewer's emotions and reactions. An interactive user interface that allows users to ask questions from diverse perspectives, promoting engagement.
- Incorporating knowledge base is crucial, empowering the avatar with a wide range of information sourced from external databases, APIs, or existing repositories, creating a more immersive and interactive experience.

The Power of 2D and Holographic Visual Displays

The potential of Responsive AI Video is further amplified when combined with the power of 2D and holographic



visual displays. These technologies can create a more realistic and engaging viewing experience, immersing viewers in the video content and allowing for deeper interaction.

- **2D displays:** High-resolution screens with advanced touch capabilities enable viewers to directly interact with virtual characters and objects within the video, providing a more intuitive and natural way to engage with the content.
- **Holographic displays:** Projecting 3D images into the real world creates a truly immersive experience, blurring the lines between the virtual and the real. This allows viewers to interact with virtual objects in a more natural way, as if they were actually present in the same space.

Netstairs Data Clean Room: The Key to Unlocking Potential

The Netstairs Data Clean Room plays a vital role in powering the next generation of Responsive AI Video experiences. This secure and privacy-conscious platform provides a trusted environment for brands and media companies to collaborate and share data, allowing for the development of personalized and engaging video content. Security and ethical considerations are prioritized throughout the development process to ensure user privacy and responsible AI usage, especially in handling interactive content.

- **Data Cleaning and Aggregation:** The Netstairs Data Clean Room cleans and aggregates data from various sources, ensuring its accuracy, completeness, and compliance with privacy regulations.
- **AI Model Development:** This data is then used to train and refine AI models that can analyze viewer data and predict their preferences, enabling the creation of highly personalized video experiences.
- **Collaboration and Innovation:** The platform facilitates collaboration between brands, media companies, and technology providers, accelerating the development of new and innovative Responsive AI Video solutions.

Applications of Responsive AI Video

With its unique capabilities and immersive nature, Responsive AI Video has the potential to revolutionize various industries, including:

- **Broadcasting:** TV broadcasters can leverage Responsive AI

Video to create personalized news broadcasts, interactive game shows, and even virtual talent shows featuring AI-powered celebrities.

- **Advertising:** Brands can create interactive ads that adapt to individual viewers, showcasing relevant products and promotions based on their preferences and purchasing history.
- **Customer Service:** Businesses can utilize 2D and holographic avatars to provide personalized and interactive customer service experiences, answering questions, resolving issues, and providing product recommendations in real-time.

This part of the session concludes with the takeaway that Responsive AI Video, powered by 2D and holographic visual displays and fueled by the Netstairs Data Clean Room, represents the next frontier in customer engagement. By providing a personalized, interactive, and immersive experience, this technology has the power to reshape the way we consume media, engage with brands, and interact with the world around us. The project involves a holistic approach, combining advanced language models, facial animation, and user-centric design to create an AI-responsive video avatar that excels in multilingual interactions and engages users intelligently across various perspectives. As AI and immersive technologies continue to evolve, the possibilities for Responsive AI Video are limitless, paving the way for a more engaging and personalized future for media and entertainment.

The session was presented by a panel of speakers led by **Dr Ahmad Moradi** from Netstairs/VYPA and other panelists joined were **M Vijayandran** from VYPA, **Pattirik Ting** from K Media in Malaysia and **Dr Francis Teo**, an AI Architect from Singapore. Over Ninety (90) participants attended the webinar. They spanned from 30 countries from Asia-Pacific and elsewhere representing about sixty (60) organizations. ■

WEBINAR ON UNLOCKING THE FUTURE OF VIDEO – ADDING NEXT GENERATION VIDEO CODECS TO THE DVB TOOLBOX

21 NOVEMBER 2023

ABUTechnologyWebinar

The Speakers

Unlocking the Future of Video: Adding Next Generation Video Codecs to the DVB toolbox

Jan Outters is Director, Technology & Standards at Ateame, where he helps the Research & Innovation team develop future technologies for video processing and delivery, and drive partnership projects and standardization. He is also chair of the DVB CM-AVC work group that defines commercial requirements for audio and video encoding. Throughout his 20 years in the television business, Jan has developed new technologies and products for media delivery at SES, defined European Standards for UHD at Samsung Electronics, and defined specifications at Philips (TP Vision). He holds a master's degree in electrical engineering from the Ecole Nationale Supérieure de Radioélectricité et d'Electronique de Grenoble (ENSERG) and a degree in electrical engineering from the University of Karlsruhe.

Dr Peter Siebert's career spans 35 years. He has held various positions within the Broadcast industry, most recently he was the Executive Director at the DVB Project Office in Geneva, where he was responsible for all organizational and technology related aspects of the DVB. Prior to this with Siemens AG, he was influential in the design of the end-to-end IPTV and set-top box solution; at SES-ASTRA he was instrumental in the introduction of digital television via satellite for Europe, based on the DVB/MPEG-2 standards; and at Philips Kommunikations AG, he managed digital audio and visual transmission. He received his M.Sc. degree in 1984 and his Ph.D. degree in 1989 in physics from the University in Frankfurt, Germany.



Jan Outters
Director, Technology & Standards, ATEME and Chairman of DVB CM AVC



Dr Peter Siebert
Adcom Member & VP, IEEE Broadcast Technology Society



Asia-Pacific Broadcasting Union (ABU), in cooperation with IEEE Broadcast Technology Society, organised a webinar on Unlocking the Future of Video: Adding Next Generation Video Codecs to the DVB toolbox. **Jan Outters**, Director of Technology & Standards at Ateame, was the focal presenter in the session that was moderated by **Dr Peter Siebert** who is Vice President at the IEEE Broadcast Technology Society. Over hundred fifteen (115) participants attended the webinar. They spanned from 39 countries from Asia-Pacific and elsewhere representing about sixty-five (65) organizations.

The webinar, which was aimed at professionals in the fields of broadcasting, streaming and telecommunications, took place on November 21, 2023 and was broadcast live. The main topic of the webinar was the latest developments in video compression technologies, such as the highly efficient Versatile Video

Coding (VVC) codec and AVS3. The experts also shared their views on how these technologies can be deployed and what they mean for the future of video delivery.

The presentation was focused on some key aspects, such as DVB Technologies, the process of adopting Next Generation Video Codecs (NGVC), their deployments, and the new ongoing work at DVB. ETSI TS 101 154 is the core specification for DVB deployment in various standards, such as DVB-C, -S, -T and their second-generation versions, as well as other emerging technologies such as DVB-DASH, -I, -MABR, -NIP etc. DVB's Bluebook A001 provides general guidelines for their implementation.

With AVS3 and VVC, DVB enables a new level of encoder efficiency while allowing them to be carried over DVB networks. VVC is the natural successor of H265 with the



Peter Siebert



Jan Outters (Ateme)

highest efficiency. AVS3 enables the potential deployment of DVB technologies in China, which reflects the global reach of DVB. For both systems, an ecosystem is emerging, where Asia seems to be leading the way. DVB's work continues for AV1, NGVC phase 2, Object based Media, Volumetric Video.

The DVB Process flow for NGVC involves specifying commercial requirements, calling for candidate technologies and assessing them commercially and technically, leading to specifications development and validation. Commercial requirements include overall performance, suitability for DVB technologies and

deployment, new capabilities, timelines, selection of codecs etc. Recently, VVC and AVS3 have been added to the DVB video coding Toolbox in broadcasting and broadband applications.

VVC and AVS3 are two video coding technologies that have been adopted by DVB as part of its standards for high-quality video delivery. Both VVC and AVS3 offer more tools and flexibility than HEVC, the previous standard, in terms of how they divide, predict and encode the video blocks. VVC and AVS3 have four conformance points for HDR and HFR video formats, as published by ETSI.

DVB's Building Block principle

DVB [®]	DVB [®] C2	DVB [®] CI	DVB [®] CID
DVB [®] CSA	DVB [®] CSA3	DVB [®] CSS	DVB [®] CS
DVB [®] DASH	DVB [®] DATA	DVB [®] FF	DVB [®] GSE
DVB [®] HB	DVB [®] I	DVB [®] IPTV	DVB [®] M
DVB [®] MABR	DVB [®] MPE	DVB [®] MPEG	DVB [®] NGH
DVB [®] NIP	DVB [®] RCS	DVB [®] RCS2	DVB [®] S
DVB [®] S2	DVB [®] S2X	DVB [®] SI	DVB [®] SIM
DVB [®] SIS	DVB [®] SRM	DVB [®] SSU	DVB [®] SUB
DVB [®] T	DVB [®] T2	DVB [®] TA	DVB [®] TTML
DVB [®] TVA			

ETSI TS 101 154

Central specification
for DVB deployment



WC Deployments in EUROPE?

- > Strong Interest from DVB members
- > Tests conducted with European Broadcaster
- > VVC provides the necessary leap in Efficiency
- > Good Timing with UHD content / production

- > Strong Install Base of HEVC / AVC
- > Progress in HEVC Encoder Efficiency



- WRC-23 outcomes / beyond 2030 horizon?
- DVB-T2, 5G, 5G broadcast?
- France T2 HEVC UHD launch 2024
- Italy just transitioned to T2 / AVC



- DVB-I Take off as an opportunity?
- „Automatic“ HbbTV inclusion



- Overwhelming majority in AVC / MPEG-2
- Sometimes triple Simulcast?

Potential „Accelerators“ for VVC?



Green Initiatives



Immersive / AR / VR



VVC has a growing ecosystem of hardware and software solutions, including open source tools like TSDuck, ffmpeg and VLC. VVC has also been deployed or trialed by several service providers, such as Youku, MX TakaTak, KDDI research and a Brazilian consortium. VVC has attracted interest from DVB members and European broadcasters, as well as from ATSC and CTA-WAVE. VVC could benefit from green initiatives and immersive applications.

AVS3 has a strong presence in China, where it builds up with several SoCs and Tencent AVS3. AVS3 is mainly focused on 8K video delivery, and has been used for the

Beijing TV winter Olympics documentary channel and the Migu Video 6.0.7.00 mobile app. AV1 is another video coding technology that DVB is working on to enhance its internet service delivery. AV1 could increase the flexibility and interoperability of DVB solutions in internet streaming applications.

However, DVB's codec work faces some difficulties, such as ensuring scalability, security, and compatibility with IDTV and Targeted Ads. DVB is also working on harmonizing accessibility terms across its specifications and with HbbTV. ■

Q & A

Unlocking the Future of Video: Adding Next Generation Video Codecs to the DVB toolbox



ABU Technology Webinar

News from the ABU Region

NHK PRESENTED NEW TECHNOLOGIES AT IBC 2023

NHK showcased recent R&D advances at International Broadcasting Convention 2023, held from September 15-18 in Amsterdam, the Netherlands. The annual IBC exhibition is Europe's largest trade show for broadcast and media technology; like last year, this year's exhibition was convened on-site with participants from over 170 countries.

NHK's booth presented several cutting-edge technologies, including: spatial-imaging techniques for bring the world of immersive-media content to life in three dimensions; methods for delivering content through a variety of web-based applications optimized for specific settings and objectives; and novel services allowing video and audio content to be customized for individual preferences and viewing devices. In addition, NHK's new AI-based automatic program video summarization system was featured in IBC's Tech Zone, a special exhibition reserved for technologies deemed particularly revolutionary and ground-breaking. Visitors responded enthusiastically to the service images and concepts—and offered a host of insightful suggestions to spur international collaborations.

At the conference accompanying the IBC exhibition, NHK researchers delivered talks on technologies including an automatic program video summarization system and live content creation based on object-based audios. More information on NHK's presentations at IBC 2023 may be found on the STRL website.

Going forward, NHK will continue to communicate the fruits of advanced R&D initiatives – and to advance collaboration and shared understanding with overseas

research institutions – to promote the development of media technologies.

[\[NHK STRL\]](#)

KOREA'S KBS RELIES ON RTS FOR MULTI-LOCATION IP-NETWORKED INTERCOM

Headquartered in Yeouido, Seoul, the Korean Broadcasting System (KBS) is the national broadcaster of South Korea. KBS recently underwent large-scale renovations to its communications infrastructure, including an extensive installation of RTS intercom solutions to implement a 100% IP-networked connection between 12 of its broadcast locations around the country.

The system utilises the uniquely powerful and flexible OMNEO IP technology for audio transmission and control. With full support for Dante, OCA, ST 2110, and AES67/70, OMNEO provides users with seamless interoperability and scalability to interface with thousands of other devices throughout their network.

The RTS equipment list includes an ADAM full-size modular matrix at the heart of the system, equipped with OMI OMNEO matrix interface cards. A pair of TM-10K trunkmasters serve as central nodes in the system, leveraging another unique RTS technology – RTS Trunking – to optimize connectivity between/via intercom matrices at the various other locations, effectively creating a single virtual working location. 77 RTS keypanels and 47 OEI-2 OMNEO external interfaces complete this mega-installation of RTS hardware; 18 VLink virtual matrix software licenses allow remote access to the system.

Hyudo Kwon of KBS and Taewan Kim of system integrator Hyundai AutoEver worked with RTS key dealer BEEEx Korea and Donggyu Lee

and Edward Lim of RTS to ensure the project's success. [\[Content +Technology\]](#)

SOLOMON ISLANDS LAUNCH COUNTRY'S FIRST TV SERVICE

November 17th marked the inauguration of the Solomon Islands' first national television service, the Solomon Islands Broadcasting Corporation (SIBC) TV Service. SIBC's SBD18.5M TV Service was officially launched on 17 November by Prime Minister Manasseh Sogavare, MP, who is also the Minister responsible for SIBC, 71 years after the founding of the national radio broadcaster.

The Prime Minister's mission is to provide a policy and framework where broadcasting is available, affordable, and accessible to everyone in the Solomon Islands, supporting equal participation in the nation's social, cultural, economic, and political life. He recalled a meeting with the SIBC board in early February, where he affirmed the government's support and pledged assistance for SIBC to launch the country's first national TV service in time for the Pacific Games. He expressed profound gratitude to the Kingdom of Saudi Arabia, which funded the majority of the SBD18.5 million project, and acknowledged the technical assistance received from MMG Communications Limited of New Zealand.

Emphasizing the significance of the new national TV service, PM Sogavare highlighted SIBC's responsibility to deliver content with utmost professionalism. He affirmed the citizens' right to information, stressing that SIBC's adherence to a code of ethics ensures this. The Society of Professional Journalists' Code of Ethics, he noted, states that public enlightenment is the precursor of justice and the foundation of democracy, and outlines the principles of ethical journalism: seeking truth and reporting it; minimizing harm; acting independently; and being accountable and transparent. [\[ABU News\]](#)

KOREA EBS QCS INGEST AND PLAYOUT WITH TERRA

Iterra Systems, a provider of

content QC, monitoring, and analysis solutions to the digital media industry, has announced that Korea Educational Broadcasting System (EBS) recently deployed the company's award-winning BATON AI/ML-enabled automated QC platform and BATON Content Corrector (BCC). Using BATON, EBS can now consistently and accurately perform comprehensive quality and compliance checks for media content in its ingest and playout workflows to ensure an exceptional quality of experience (QoE) for viewers. BATON Content Corrector (BCC) is being used by EBS to correct loudness issues automatically, guaranteeing compliance with EBS' audio quality specifications.

Housed within EBS' production infrastructure facility – and integrated with the company's media asset management solutions via API – BATON thoroughly checks XDCAM HD422, Apple ProRes, and UHD files at ingest for compliance, video and audio defects, and audio channel mapping. Before sending assets to playout servers, BATON ensures their integrity and that timecodes are in sync. If a file's loudness deviates from EBS' standards, Interra Systems' BCC solution automatically rectifies it. BCC addresses the need to correct content verified by BATON by enabling users to get a list of content that BATON has performed QC on, correct errors, and schedule the content for QC by BATON once again. In addition, corrected content can be played back in Interra Systems' BATON Media Player – the company's industry-grade media player for enhanced debugging – to analyse the corrections that have been carried out. [\[Content +Technology\]](#)

ITU WINS EMMY AWARD FOR HDR-TV STANDARD

ITU has won the Engineering, Science & Technology Emmy Award for the development of a radiocommunication standard for High Dynamic Range Television (HDR-TV). The award, given by the Television Academy, recognizes the groundbreaking work done by engineers and other experts within ITU Radiocommunication Study Group 6 to develop a global HDR-TV

standard that provides viewers with an enhanced visual experience. This is the third Emmy Award received by ITU Radiocommunication Study Groups.

ITU's latest Emmy Award highlights the colour and vision that ITU brings to our everyday lives, said ITU Secretary-General Doreen Bogdan-Martin. This award is the product of the strong collaboration between ITU, member states and our members in the private sector and academia that enhances global technology standards and practices, elevating digital technology quality and accessibility worldwide.

Recommendation ITU-R BT.2100 was released in 2016. The standard centres around image parameter values for high dynamic range television for use in production and international program exchange.

The standard enables the reproduction of a wider and more accurate range of colours resulting in more vibrant and true-to-life colours and video images. The application of the standard specifications significantly enhances viewer experience by making bright parts of the image much brighter and more detailed. It also improves the visibility of details in darker areas of the image.

The HDR-TV standard ensures that content creators, broadcasters, and manufacturers follow specific guidelines to deliver a consistent and improved viewing experience to consumers. In its announcement, the Television Academy stated that the influence of the HDR-TV standard extends across the television industry, 'from cameras, post-production (especially in colour processing), delivery through traditional broadcasting, OTT (over-the-top) streaming services, and both professional and consumer display/television products'.

Two previous awards received by ITU's Radiocommunication Bureau include the Technology and Engineering Emmy Award for standardizing Loudness Metering in Broadcast Audio in 2012. In 1983, the CCIR (now ITU-R) received the

Emmy Award for establishing a common world standard for digital television studios. [\[ITU News\]](#)

KBS KOREA AND ARK VENTURES LAUNCH XR/VP STUDIO

Established in 1927, the Korean Broadcasting System (KBS) is one of the leading television and radio broadcasters in South Korea, operating seven radio networks, ten television channels, and multiple internet-exclusive services. Recognising the power of virtual production and XR technology to create immersive and dynamic sets for live broadcast applications, KBS has partnered with Ark Ventures Korea to create the XR/VP studio for live broadcast at KBS facilities. Powered by industry-leading Tesseract SX40 LED processors, the studio features a ROE Visual LED wall and makes KBS the first broadcasting company in the country to implement this successful blend of ROE Visual and Brompton Technology, setting them apart from other South Korean broadcasting stations.

To ensure their studio was of the highest calibre, KBS enlisted the services of Ark Ventures, a leading XR and virtual production environment construction specialist, to create a cutting-edge facility featuring ROE Black Pearl LED panels and a 4K Tesseract SX40 LED processor.

The final LED installation boasts a 10m by 4.5m ROE BP2V2 LED wall, along with a Tesseract SX40 and two Tesseract XD 10G data distribution units that work seamlessly together to produce incredibly realistic visuals and support even for the largest and most ambitious KBS projects.

Tesseract features such as Frame Remapping, which allows multiple cameras to view different content on the same LED screen simultaneously, and the ShutterSync feature, which tunes the LED refresh rate to the camera's shutter speed to prevent artefacts from appearing, provide the KBS team with a comprehensive solution that transforms typically complicated multi-camera virtual production setups into a seamless and effective workflow. With the project completed at the end of April, both KBS and the Ark

Ventures team are delighted with the new studio, with Oh expressing his excitement about the prospect of continuing their collaboration on numerous upcoming projects. [\[Content +Technology\]](#)

INDIAN DRM STAKEHOLDERS URGE THE GOVERNMENT TO MANDATE DRM FOR THE FM BANDS AND INCLUDE IT IN CELLPHONES

Key DRM stakeholders in India, and other parts of Asia and the world, gathered virtually for a news-packed meeting on October 12th stressing once again the need for the Government to take a decision on the FM band digitisation. The 40 key participants represented the automotive industry, public and private Indian broadcasters, chipset, module and receiver manufacturers from India, China, UK and Germany; other important decision-makers interested in the success of digital radio DRM in India also took part.

The event offered a unique opportunity to get the latest and important DRM news from Asia. They refer to the Indonesian government pronouncing DRM as the standard for Digital Radio Broadcasting in MW and FM bands, and in VHF Band III, China's commitment to DRM and the recommendation for the automotive industry to include DRM AM receivers in cars, as well as the firm commitment to DRM in all bands and its rollout in Pakistan.

The update on digital radio in India and the latest TRAI recommendations, as well as the extra services offered by DRM (like Emergency Warning Functionality) and the new revenue possibilities opened up by DRM were at the heart of the presentation. The new DRM1000 module of CML Micro/Cambridge Consultants, its integration into new Gossell receivers, the developments announced by the Indian company, Inntot, and the global perspective brought by NXP (NXP) rounded up a strong event. This underlined the growing strength of digital radio (in the AM and FM bands), the continued investments in DRM and the need for completing the Indian DRM roll-out.

The conclusion of the meeting was that the Indian government needs to take a clear decision on digitising the FM bands. There was also the suggestion made to the government to add to the recent cell phone recommendation (to include FM) that of adding DRM and EWF requirement. At the end of the meeting the Indian and other major DRM stakeholders committed once again their support and readiness to get involved in the full DRM roll-out in India. [\[DRM\]](#)

ABC SIGNS MOU WITH VANUATU BROADCASTING AND TELEVISION CORPORATION

The Australian Broadcasting Corporation (ABC) and the Vanuatu Broadcasting and Television Corporation (VBTC) have exchanged a Memorandum of Understanding (MOU). The agreement was signed recently in Port Vila during the Asia Pacific Broadcasting Union's Pacific Media Partnerships Conference hosted by VBTC and reflects both national broadcasters' enduring commitment to a collaborative relationship.

Under the MOU, the ABC and VBTC recognise both organisations' role in supporting independent media and contributing to democracy in the Pacific, as well as their value as leading cultural institutions and shared commitment to serving the public interest through information, education and entertainment. More broadly, the MOU also seeks to promote mutual understanding and friendship between the people of Australia and Vanuatu and builds on a long and robust relationship between ABC and VBTC.

VBTC presently provides FM transmission services to the ABC for the broadcast of ABC Radio Australia in Vanuatu on 103FM and the ABC and VBTC are developing a pilot local journalism project to foster the creation and sharing of ni-Vanuatu stories. [\[ABC News\]](#)

TBS JAPAN DEPLOYS LIVEU'S ON-SITE PRODUCTION SOLUTION WITH STARLINK FOR LIVE TV VARIETY SHOW

LiveU announced the successful deployment of its On-Site Production

solution combined with Starlink satellites for TBS Japan's live production of the Japanese TV variety show, "Ousama no Brunch". Produced by TBS ACT, the production arm of Tokyo Broadcasting System Television. (TBS), the popular prime-time show was broadcast live from one of Japan's largest theme parks to millions of viewers nationwide.

LiveU's On-Site Production solution, with its Mobile Receiver and, in this case, Starlink integration, enables a cost-effective, wire-free set-up with extreme resiliency in crowded outside locations. The integration expands the possibilities for on-site productions in areas where wired network lines are not available and network conditions are challenging. The solution is part of LiveU's network-agnostic EcoSystem, enabling LiveU's set of IP-video solutions to be connected with other best-of-breed IP and satellite networks.

High-quality live feeds were delivered from numerous LiveU field units, LU800s and LU600s, around the park straight into the LiveU receivers installed in the production truck using multiple mobile and satellite networks. LiveU supported the overall deployment and pre-tests at the on-site production venue with local partner, NTT Communications Corporation which assisted the set-up and mobile network connectivity. [\[LiveU News\]](#)

FREE TV AUSTRALIA CAMPAIGNS HIGHLIGHTING THE CHALLENGE WITH FINDING FREE LOCAL TELEVISION SERVICES ON CONNECTED TV

Free TV Australia has launched a new campaign aimed at highlighting the challenge with finding free local television services on connected TVs. Global deals between TV manufacturers and international streaming giants have given global subscription services the most prominent positions on home screens and remote controls, while local TV services are difficult or sometimes impossible to find.

The campaign, "Don't Let Big Tech Take Your Free Away", will include TV ads on all commercial free-to-air

television networks and will highlight the importance of the Federal Government introducing legislation to ensure people can easily find their local free TV channels.

Free TV channels are asking the Federal Government to introduce new laws that require manufacturers to provide free of charge: Access to all TV channels provided by Australia's free local networks, Installation of all local TV apps in the first positions on home screens, and Free local TV content first in search results and recommendations. [[Free TV Australia](#)]

TELSTRA BROADCAST SERVICES AND BT ANNOUNCE STRATEGIC ALLIANCE TO ENHANCE GLOBAL NETWORK CONNECTIVITY

Telstra Broadcast Services (TBS) and BT have entered into an initial five-year strategic alliance to bring together each company's global media network teams, pooling their vast network infrastructure and localised expertise.

The deal will increase TBS' global footprint by 50% and expand its customer-base to more than 170 broadcast and media organisations worldwide. As part of the deal, customers of both TBS and BT will have access to the best unified operations of the two Global Media Networks via a product offering headed up by Telstra, including key Asia-Pacific regions with India, Malaysia, and Hong Kong, and other countries.

Customers will benefit from Telstra's high-capacity media networks, generating expanded reach and distribution of their content. This will be supported by an increased local team in APAC and access to the broader suite of TBS products and services, including field services, special events teams, and broadcast operations centers in Sydney, Melbourne, Hong Kong, London, and Pittsburgh. Telstra and BT customers will continue to access the same high-quality media delivery service with the additional opportunity to drive greater global reach and visibility of their content.

TBS is continuing to build a strong

team of media and broadcast specialists in the Asia-Pacific region to provide customers localised knowledge and support. To ensure a seamless experience for all customers, dedicated partner managers based locally in the APAC region will work closely with the team and BT customers. For Telstra, the collaboration supports its ambition to grow its team, reach and investments in technology and innovation across APAC, the UK and other regions globally, a key tenant of its T25 strategy for growth. [[Telstra News](#)]

ENENSYS COMPLETES DELIVERY OF ONEBEAM™ SYSTEM TO VIETNAM TELEVISION FOR REGIONAL DVB-T2 NETWORK

ENENSYS Technologies, designer and manufacturer of digital TV transmission technologies, has announced that it has completed delivery of its OneBeam solution to Vietnam Television (VTV) for their DVB-T2 digital terrestrial TV network. OneBeam optimises network capacity by using standard satellite DTH technology to also provide DTT transmitter distribution in a single satellite feed.

The new VTV regional network builds on the existing DVB-T2 transmissions, covering 37 new transmitter sites operating in Single Frequency Network (SFN) throughout Vietnam. Completion of the last phase of the project provides terrestrial TV reception upto 98% of Vietnamese households and enabled analogue switch-off to be completed.

ENENSYS SmartGate OneBeam and seamless switches are installed at the Hanoi head-end, with distribution to transmitters over satellite and IP links. The OneBeam solution enables the DTH satellite service to be used to feed the DVB-T2 transmitters, delivering significant savings in satellite transponder capacity and operational costs. ENENSYS TxEdge units at each transmitter site build the T2 multiplex for transmission, enabling SFN operation of transmitters.

The OneBeam system implements the DVB-SIS 'Single Illumination System' and was the first live deployment

of this standard. The system has been supplied and integrated by VIETCOMS, the leading Vietnam systems integrator and reseller of ENENSYS. [[Enensys News](#)]

TVU BRINGS LIVE CLOUD-BASED REMI TO FISU WORLD UNIVERSITY GAMES

The FISU World University Games, recently held in Chengdu, China, brought together 6500 college athletes from around the world for twelve days of competition, showcasing the power of youth and sports. The organisers turned to TVU Networks, a pioneer in cloud-based workflow solutions for live content production and distribution, to help with live coverage of the entire volleyball competition. It marked the first time FISU World University Games used a cloud-based REMI solution to transmit gameplay to a remote studio. The professional broadcast with high-quality video was transmitted from the arena to the International Broadcasting Centre (IBC) for production and distribution to OTT platforms and linear channels.

Event organisers used the fully integrated remote production suite of TVU RPS Link, TVU RPS One, and TVU Producer. The onsite production team set up four separate camera positions around the venue to capture different angles of the competition. RPS Link and RPS One were deployed at the venue and used to provide synchronised primary and backup multi-camera transmission to the IBC. The live video was fully produced and distributed in the cloud at the IBC using Producer, a laptop, and a standard internet connection. The organisers used Producer to mix the audio, add scoreboard graphics, switch cameras and add slow-motion replay to the production. [[Content +Technology](#)]

RCS TO HANDLE SELECT FUTURI PRODUCTS INTERNATIONALLY

Broadcast AI specialist Futuri Media has signed an international distribution deal with broadcast automation software developer RCS for the Futuri AudioAI and SpotOn products.

Futuri Founder and CEO Daniel Anstandig said, that Futuri has

driven the conversation about the adoption of AI in the broadcast industry, and the response they've had from companies worldwide that want strategic AI solutions has been vast. RCS President and CEO Philippe Generali responded that expanding upon the collaboration with Futuri, they leverage respective strengths to propel new technology on a global scale. The partnership represents a noteworthy milestone in the evolution of audio creation and consumption.

Futuri AudioAI (formerly called RadioGPT) offers an AI DJ/presenter/show host along with segment/show and podcast production tools. It is already compatible with RCS' Zetta automation system. SpotOn is an AI-driven one-stop ad spot producer. [\[Redtech.pro\]](https://www.redtech.pro)

FUTUREPROOFING RNZ'S PACIFIC BROADCASTING – AMPEGON TRANSMITTER SHIPPED TO NEW ZEALAND

The futureproofing of Radio New Zealand's short-wave service being beamed into the Pacific has taken the next step with renewal of a thirty-three-year-old transmitter with a new digital DRM model. RNZ has powered down its oldest 34-year-old shortwave transmitter, for the last time: This system, known as "Transmitter 1", is one of two shortwave transmitters that deliver both analogue and digital radio broadcasts to the Pacific region and is being retired after decades of service. The shutdown is part of the preparation for the installation of a new Swiss-made Ampegon shortwave transmitter at its Rangitaiki site.

This project is a milestone for RNZ: For the past 75 years, it has been using shortwave radio to broadcast to the vast Pacific region. Replacing the old transmitter marks a significant step in futureproofing this service, guaranteeing availability for years into the future. Transmitter 1 was installed just outside of Taupō in 1989, just in time for the Commonwealth Games held in Auckland in 1990. Only capable of transmitting in analogue, servicing Transmitter 1 became an increasingly challenging task with many of

the parts for the transmitter now obsolete and unavailable after more than 30 years.

Its replacement, a newest-generation TSW-2100 100kW Ampegon shortwave transmitter capable of switching between both digital DRM and analogue transmission modes, is currently being shipped to New Zealand after being built in Ampegon's factory in Switzerland. To facilitate installation of the new system, Transmitter 1 has been switched off and is being decommissioned to make space. Any useful parts will be kept as spares.

Once Transmitter 1 is replaced, RNZ will have two Ampegon transmitters capable of both analogue and digital transmissions, ensuring complete redundancy should one of the transmitters stop working. [\[Ampegon\]](https://www.ampegon.com)

GEOBROADCAST TESTS TRANSMISSION TECHNOLOGY IN INDIA

India's national public broadcaster Prasar Bharati has an audience that can be described as polyglot. In that sense radio broadcasting's traditional approach – one broadcast fits all – is not the best fit. Fortunately, technologies are arising to offer solutions.

GeoBroadcast Solutions and its Indian partner Geo Global Banad Pvt. Ltd. are working with the public broadcaster to test a new transmission approach, ZoneCasting. According to GeoBroadcast, ZoneCasting technology enables the targeted delivery of content to specific geographic zones, optimizing the listener experience. The tests will take place in the capital city New Delhi and in Bangalore, in southern India.

Also being tested is GeoBroadcast's MaxxCasting broadcast technology for countering geographic difficulties. [\[Redtech.pro\]](https://www.redtech.pro)

IDEAL SYSTEMS PROVIDE LIVE VIDEO DISTRIBUTION SYSTEM ABOARD 4,000-TON GO EXPLORER SHIP

Ideal Systems announced that it has designed and installed a brand-

new NDI® based Video Distribution Solution for real-time video feed selection of live video streams from multiple sub-sea Remote Operated Vehicles (ROV's) on the maritime support vessel Go Explorer while docked in Singapore.

ROVs are underwater robots controlled by operators aboard Go Explorer, who perform maritime support tasks such as valve operations, hydraulic functions and other sub-sea operations for the oil and gas industry. The ROV's are equipped with a still camera, video camera, and lights to transmit images and live stream videos back to the ship.

Ideal Systems used the latest NDI standard of video over IP for its video distribution solution which comprises of components from BirdDog on a Netgear IP fibre network core. This new system allows crew to easily switch video sources at any location on the ship using a monitor remote controller to select their desired video feeds. Using the new NDI based system means the days of frequent intercom calls between cabin crews and control room operators requesting changes to the video source routing for each cabin are gone. Now, control over video source switching is in the hands of each cabin crew using their own monitor remote controllers, thanks to the flexibility offered by the NDI based system which provides reliability with ease of use and convenience.

The reduction in complexity due to using NDI architecture, helped increase the delivery speed which was a major benefit to the local video engineering team from Ideal Systems, who had to complete the entire installation within a fixed two-week schedule while the Go Explorer was docked in Singapore. [\[IdealSys News\]](https://www.ideal-sys.com/news) ■

DIGITAL BROADCASTING *Updates*

WORLD RADIOCOMMUNICATION CONFERENCE REVISES THE ITU RADIO REGULATIONS TO SUPPORT SPECTRUM SHARING AND TECHNOLOGICAL INNOVATION

Member States of the International Telecommunication Union (ITU) agreed on revisions to the global treaty governing the use of the radio frequency spectrum, both on Earth and in space, at the close of the World Radiocommunication Conference 2023 (WRC-23) in Dubai, United Arab Emirates. The agreement on updates to the Radio Regulations identifies new spectrum resources to support technological innovation, deepen global connectivity, increase access to and equitable use of space-based radio resources, and enhance safety at sea, in the air, and on land.

A total of 151 Member States signed the WRC-23 Final Acts. The Final Acts constitute a record of the decisions taken at the conference including both the new and revised provisions of the Radio Regulations, all Appendices, and the new and revised Resolutions and ITU-R Recommendations incorporated by reference into the treaty by the conference.

Among the decisions, WRC-23 identified spectrum for International Mobile Telecommunications (IMT), which will be crucial for expanding broadband connectivity and developing IMT mobile services, also known as 4G, 5G and, in the future, 6G. That new spectrum includes the 3 300-3 400 megahertz (MHz), 3 600-3 800 MHz, 4 800-4 990 MHz and 6 425-7 125 MHz frequency bands in various countries and regions.

WRC-23 also identified the 2 GHz and 2.6 GHz bands for using high-altitude platform stations as IMT base stations (HIBS) and established regulations for their operations. This technology offers a new platform to provide mobile broadband with minimal infrastructure using the same frequencies and devices as IMT mobile networks. HIBS can contribute to bridging the digital divide in remote and rural areas and maintain connectivity during disasters.

For non-geostationary fixed-satellite service Earth Stations in Motion (ESIMs), the conference identified new frequencies to deliver high-speed broadband onboard aircraft, vessels, trains, and vehicles. These satellite services are also critical following disasters where local communication infrastructure is damaged or destroyed. Provisions were included to protect ship and aircraft mobile service stations located in international airspace and waters from other stations within national territories.

To support the modernization of the Global Maritime Distress and Safety System (GMDSS), WRC-23 took regulatory actions including the implementation of e-navigation systems to enhance distress and safety communications at sea. The conference provisionally recognized the BeiDou Satellite Messaging Service System for GMDSS use, subject to successful completion of coordination with the existing networks and elimination of interference.

Overall, WRC-23 approved 43 new resolutions, revised 56 existing ones, and suppressed 33 resolutions. To prepare for future world radiocommunication conferences, the WRC-23 also adopted several resolutions that mandate the ITU Radiocommunication Sector Study Groups to undertake studies on specified topics. WRC-23 also approved the agenda items for the next World Radiocommunication Conference (WRC-27) and the provisional agenda for WRC-31. The conference, which took place in Dubai from 20 November to 15 December, was hosted by the Telecommunications and Digital

Government Regulatory Authority (TDRA) of the UAE. [\[ITU News\]](#)

UPDATED EBU RECOMMENDATION STRENGTHENS MEDIA INDUSTRY RESILIENCE AGAINST CYBER THREATS

The latest version of EBU R 160 outlines a comprehensive procedure for managing vulnerabilities in the media industry. It covers pre and post-purchase stages for both buyers and vendors, and includes security and testing guidelines. EBU is dedicated to supporting its Members and vendors in implementing these measures, enhancing industry resilience against potential cyber threats.

The surge in cyberattacks is a pressing concern affecting a wide array of industries, and the media sector is no exception. Attackers are capitalizing on vulnerabilities within IP-based systems, underscoring the critical need for heightened security measures.

To fortify defenses, every organization within the media industry should join a network of security contacts, working collaboratively to swiftly respond should a vulnerability be discovered within a product or any of its components. This collective effort is pivotal in preempting potential attacks.

In its latest iteration, EBU Recommendation 160 – “Vulnerability Management for Media Companies and Media System Vendors” – now provides a framework for this. This procedure should be rigorously followed by media organisations both prior to and after the procurement of a media product, and throughout its entire lifecycle. Likewise, vendors are urged to adhere to this procedure before and after the release of a product.

This framework harmonizes with established best practices in vulnerability management within the realm of Information Technology. This includes adhering to the CVE process, ensuring the distinctive identification and assessment of vulnerabilities.

R 160

VULNERABILITY MANAGEMENT FOR MEDIA COMPANIES AND MEDIA SYSTEM VENDORS

The recommendation also encompasses a set of security and testing guidelines that media organisations and vendors can follow to test their media systems' security.

[\[EBU News\]](#)

IMPROVED CONFORMANCE TOOL HELPS ENSURE INTEROPERABILITY FOR DASH DELIVERY

A freely available tool that validates the conformance of DASH content to relevant media specifications has been improved. The DASH-IF Conformance Tool is available as either an online service or open-source software.

DASH is a streaming technology that

allows receivers to automatically choose the best quality video stream based on the device's capabilities and the speed of the internet connection, allowing viewers to enjoy the best possible video quality without buffering or interruptions. While the MPEG DASH (Dynamic Adaptive Streaming over HTTP) specifications describe client behaviour, conformance of DASH content is important for interoperability.

The Conformance Tool was launched by the DASH Industry Forum over a decade ago and has been continuously updated and extended to test against relevant specifications from other bodies. A joint project

undertaken over the past two years has improved the tool, making it more reliable and accessible. Along with DASH (including DVB-DASH) content conformance, the new tool has options to check for CMAF and WAVE requirements, and for HLS (HTTP Live Streaming) requirements as well.

The updates to the tool were funded by the JCCP (Joint Content Conformance Partners), a group of five organizations including the DVB Project, DASH-IF, the Consumer Technology Association WAVE (Web Application Video Ecosystem) Project, the HbbTV Association, and ATSC.

[\[DVB\]](#)



RESULTS OF COMPARATIVE TESTS MOVE ATSC 3.0 PHYSICAL LAYER INTO FINAL TEST PHASE FOR BRAZIL'S NEXT-GEN TV SYSTEM

The Advanced Television Systems Committee (ATSC) announced recently that the Fórum Sistema Brasileiro TV Digital Terrestre (SBTVD Forum) has selected the ATSC 3.0 physical layer as one of two technologies to advance from Phase 3 lab testing to Phase 3 field testing, the final phase of evaluation scheduled to conclude in early 2024 that will inform a recommendation for the over-the-air transmission component of Brazil's "TV 3.0" broadcast standard.

Other elements of the ATSC 3.0 suite of standards have already been selected for Brazil's TV 3.0 system, including ROUTE/DASH transport, MPEG-H Audio, IMSC1 captioning and Advanced Emergency Messaging. As the anchor component of a broadcast/broadband transmission system, a high-performance over-the-air physical layer is a key requirement for Brazil's TV 3.0 system.

ATSC has participated in the SBTVD Forum's TV 3.0 testing program since its inception in 2020. ATSC has just learned that, in the recent physical layer testing conducted by the Fórum's Lab, the ATSC 3.0 transmission system performed well in all relevant basic tests and in advanced configurations, such as Multiple Input Multiple Output (MIMO) transmission with channel bonding and Layered Division Multiplexing (LDM).

According to Brazil's Phase 3 lab tests, ATSC 3.0 equipped with LDM and MIMO technologies achieves best-in-class spectral efficiency, enabling optimal coverage and capacity, targeting both fixed indoor and high-speed mobile outdoor reception.

The ATSC 3.0 next-generation television broadcast standard, with its state-of-the-art physical layer transmission technology, is considered the world's leading IP-based broadcast platform, which encompasses broadband and broadcast television delivery and,

as an IP-based system, is uniquely capable of supporting emerging datacasting services. It now reaches over 80 percent of South Korean homes and more than 100 million households in the United States. And, with nearly 10 million ATSC 3.0 televisions shipped in the U.S. alone, and services launching in Jamaica and in Trinidad and Tobago, ATSC 3.0 is poised to serve as a model for the future of broadcasting around the world. [\[ATSC\]](#)

NOVEL STRL TECHNOLOGIES FOR AUTOMATED LANGUAGE PROCESSING AND WIRELESS TRANSMISSION USED TO PRODUCE BROADCAST PROGRAMMING

Researchers at NHK Science & Technology Research Laboratories (STRL) have been studying new technologies to assist in program production, including algorithms for analyzing textual data and large-capacity transmission technologies capable of transmitting three-dimensional and 360-degree video signals.

Algorithms for analyzing textual data

Language-processing algorithms developed at STRL were used to analyze historical documents for the NHK special Historical Discovery! Briefing Notes of Lectures for Emperor Hirohito: The Unknown Diplomatic Battles of World War II, which aired on August 7, 2023. This program was based on notes and memoranda left behind by Michikazu Matsuda, an official (goyou-gakari) in Japan's Imperial Household Ministry responsible for briefing Hirohito, Japan's Showa Emperor, on international affairs over a multi-year period beginning in 1933 and continuing into World War II. Matsuda's extensive sequence of reports to Hirohito were highly influential in shaping the Emperor's decision-making process throughout these years – including both the events leading up to Japan's involvement in the Pacific War and later developments anticipating the eventual cessation of hostilities – and the written notes furnish an invaluable historical resource for researchers seeking to understand Hirohito's thinking.

STRL's language-processing tools analyzed the text of Matsuda's reports – and, separately, Hirohito's questions – to yield quantitative data, including tables of occurrence frequencies for specific phrases and visualizations depicting the geographical distribution of topics arising in historical documents. These resources were then interpreted by historians to furnish context for understanding the actions of Japan's wartime government.

The documents, written in an antiquated pre-modern form of official Japanese, posed a number of challenges for automated language-analysis algorithms, including obscure spellings – combining both kanji characters and English letters – for proper nouns such as names of nations, people, and other named entities. Consequently, computer analyses were supplemented where necessary by manual analysis to avoid any risk of misinterpretation and ensure fully objective results.

Millimeter-wave 4K wireless camera

NHK's music program 'Live Yell 2023: A New Summer', which aired on August 12, 2023, utilized a new technology made possible by STRL research: a millimeter-wave 4K wireless camera system.

Following the broadcast of NHK 73rd Kouhaku Uta-Gassen song festival on December 31, 2022, STRL researchers combined an STRL-developed large-capacity millimeter-wave-band wireless transmission equipment with an ultra-low-latency 4K codec to realize this new wireless camera system, which is capable of transmitting 4K video with high quality and low latency.

To achieve stable wireless transmission of 4K signals, STRL engineers exploited practical insights gleaned from the Kouhaku to cover both the stage and portions of audience seats area of NHK Hall using four receiving antennas. After confirming the quality of the transmitted signal in rehearsal, the system was deployed for on air of the Live Yell 2023. The 4K wireless-camera technology allowed a total of 17 distinct shots – including

scenes depicting performing artists from all angles – to be captured, and delivered a high-quality dynamic video experience that would be difficult or impossible to replicate with conventional wired cameras. Going forward, STRL will continue applying the fruits of cutting-edge research to the challenges of program production – and feeding back insights gleaned from the program-production process to tackle R&D problems. [\[NHK STRL\]](#)

ASIA, THE NEXT BASTION FOR STREAMING SERVICES TO CAPTURE MORE SUBSCRIBERS

By the end of 2023, over 40% of the world's streaming subscribers will be found in Asia, offering streaming services an opportunity to capture more viewers in the diverse Asian region that is expected to continue growing.

Delivering this statistic at the recent Asia TV Forum, Ampere Analysis also pointed out that while perfecting content strategy is key to competing in Asia, there is no one-size-fits-all strategy for success in such a diverse marketplace.

For instance, viewers in countries such as China, India, Japan, and South Korea prefer locally-produced content, while those in the Philippines, Indonesia, Malaysia, and Thailand are more likely to lean towards foreign-language content.

To cater to the latter group, the correct subtitling and dubbing strategy is imperative for any streaming platform in the region to best cater to the demand for imported content, said Ampere Analysis.

Where content genres are concerned, viewers in the region also have eclectic tastes – 18 to 24-year-olds are 25% more likely to enjoy Anime and 19% more likely to enjoy Horror than average. Within demographic groups however, there is no universal trend. While Anime is widely enjoyed in the Philippines and is highly favoured in Japan, it is less favoured in Australia and India. [\[APB News\]](#)

INTER BEE 2023 ENDS WITH OVER 45,000 VISITORS AT MAKUHARI MESSE

The Japan Electronics and Information Technology Industries Association announced that Inter BEE 2023 held from November 15 to 17 with the Makuhari Messe exhibition has concluded. The exhibition at Online venue concluded on December 15, and altogether the total number of visitors was 45,694.

Inter BEE is widely recognized by industry professionals as one of Japan's largest comprehensive media events, bringing together not only professionals related to audio, video, broadcasting, communications, lighting, and

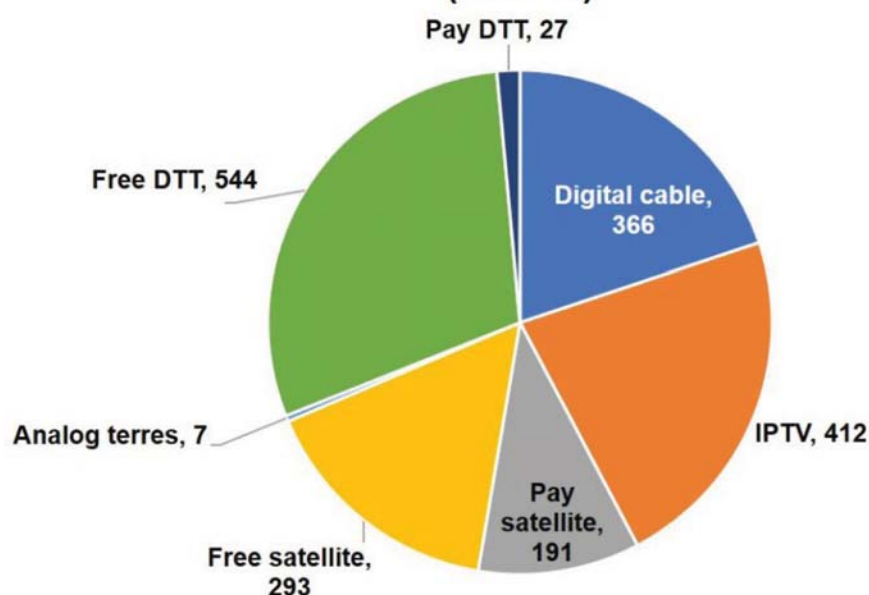
distribution, but also technicians, creators, and stakeholders in the media and entertainment industries. Inter BEE provides a business space that encompasses all aspects of content creation (production), delivery (transmission) and reception (experience). The next Inter BEE 2024 will be held at the Makuhari Messe venue for three days from November 13 to 15, 2024, and applications for exhibitors are scheduled to open on March 1. [\[Inter BEE\]](#)

GLOBAL PAY TV SUBSCRIBER NUMBERS HOLD STEADY

The number of pay TV subscribers across 138 countries will remain at just under 1 billion. Digital TV Research forecasts a slender decline until 2025, with a small recovery thereafter. Global pay TV penetration reached 56% of TV households by end-2023, falling slightly to 54% by end-2029.

IPTV is the pay TV winner. IPTV will add 36 million subscribers between 2023 and 2029 to take its total to 412 million. IPTV overtook pay satellite TV subscribers in 2018 and will overtake digital cable in 2024. Between 2023 and 2029, 82 countries will add pay TV subscribers and 56 countries will lose subscribers. The US will be the biggest loser – down by 10 million subscribers. [\[Digital TV Research\]](#) ■

**Split of TV households by platform in 2029
(million)**



Equipment Trends



SMALLHD ULTRA 7

SmallHD has launched the Ultra 7, an addition to their Smart 7 Series of monitors. The Ultra 7 is not only exceptionally bright but also boasts robust construction. It is crafted using the same technology found in SmallHD's premium 4K production monitors and is compatible with the newly introduced Teradek Bolt 6 wireless system. This monitor is designed to meet the rigorous demands of various production environments.

The Ultra 7 features a high-precision, color-accurate touchscreen with a luminance capacity of up to 2300nits, ensuring clear visibility under different lighting conditions. It is equipped to

handle the dynamic requirements of cinematic production, with 6G-SDI inputs that facilitate the processing of 4Kp30 video signals. This enables detailed focus and pixel-level inspection. The monitor is versatile in its power options, offering dual 2-pin connectors for external device power supply. It incorporates the award-winning PageOS software, accessible via touchscreen or joystick, and includes large, customizable buttons for enhanced functionality.

The Ultra 7 is SmallHD's first monitor to achieve an IP53 rating, signifying its defense against liquid and particle ingress. It features a sealed heat management system, allowing operation in temperatures ranging

from 0°C to 40°C. The monitor's durability is further bolstered by a machined chassis with raised edges for screen protection and silicone bumpers designed to absorb shocks from drops and impacts.

The Ultra 7's ergonomic design is complemented by a newly engineered quick-release sunhood, sold separately. This hood attaches effortlessly to the monitor's front, utilizing hidden magnets for rapid attachment and conversion. The sunhood is crafted with an anti-reflective felt interior that serves as a protective cover for the monitor's glass.

The Ultra 7 is available with an in-built Teradek Bolt 6 transmitter or receiver, maintaining the standard model's size. These integrated models come with a durable antenna cap to minimize damage and are available in both the Bolt 6 750 and 1500 range variants. The Ultra 7 RX kits also include additional accessories such as handles, a padded strap, and a Wooden Camera Micro Battery Plate (GM, VM, or B-mount).

The Ultra 7 offers enhanced connectivity options, featuring an integrated Ethernet and 5-Pin USB port for comprehensive and intuitive camera control through PageOS. This functionality is compatible with ARRI, RED®, and Sony VENICE cameras. Additionally, the TX and RX models support wireless camera control over the 6GHz spectrum, providing clear and efficient remote operation.

[SmallHD.com](https://www.smallhd.com)



STUDIO TECHNOLOGIES MODEL 362A

Studio Technologies has released the Model 362A Listen-Only Beltpack, utilizing Dante audio-over-Ethernet technology. This device is capable of headphone monitoring of two audio channels and is applicable in a range of settings, including sports and entertainment broadcasting, web streaming, as well as in corporate and government AV environments and post-production studios.

The Model 362A employs Dante technology to ensure excellent connectivity via Ethernet and versatile

configuration in a robust, compact design suitable for both studio and field use. With just a Power over Ethernet (PoE) connection and headphones or an earpiece, it's possible to set up a complete broadcast talent cue or audio monitoring station. It features both ¼-inch and 3.5 mm stereo headphone jacks, accommodating a variety of stereo headphones, broadcast headsets, and earpieces or earbuds.

Designed for individual use, the Model 362A can be seamlessly incorporated into production workflows by integrating multiple units. It is

also compatible with other high-performance Dante-enabled devices from Studio Technologies, including an array of broadcast-focused products such as party-line intercom and IFB interfaces, intercom belt packs, on-air belt packs, and announcer consoles. Due to Dante's inherent compatibility, the Model 362A can be effectively utilized alongside products from various other manufacturers.

Operation of the Model 362A is streamlined with two rotary controls for selecting the desired volume on the 2-channel headphone output. Four LEDs indicate the operational status of the unit clearly. The device's casing is crafted from a durable, lightweight aluminum alloy, and it features a stainless steel belt clip for easy attachment to clothing. The operational parameters of the

Model 362A, including input channel assignment and level control, are configured using the STcontroller software application. Provided free by Studio Technologies, STcontroller facilitates quick and convenient configuration of the device's features and is compatible with both WinOS and macOS operating systems.

<https://studio-tech.com/>



JVC FIRMWARE VERSION 3 FOR KY-PZ510 AND KY-PZ510N

JVC Professional Video has unveiled Firmware Version 3 for its acclaimed KY-PZ510 and KY-PZ510N CONNECTED CAM PTZ Cameras, enhancing their functionality significantly. This latest update, offered at no additional cost, introduces five distinct Auto Tracking settings: Standard, Area, Stage, Wide Area, and Fine Adjustment. Additionally, the firmware enables users to establish presets for various parameters like exposure, color, and image settings. This feature is now available across all NDI-enabled JVC PTZ cameras.

The updated KY-PZ510 Series PTZ cameras now boast advanced auto tracking capabilities, designed to focus on a single individual within its view, which is particularly useful in educational, corporate, and religious settings. The new firmware aims to expand the creative possibilities offered by these cameras, enhancing their application in various environments.

Key enhancements include:

Standard Auto Tracking: Allows users to specify the tracking system's designated position, adjusting headroom and framing options such as focusing on the upper body or above the chest. It also includes a vertical alignment feature for adjusting space above the presenter.

Area Setting: Users can define a specific area within the camera's field of view. The camera remains stationary unless the speaker exits this predefined space, with the capability to set multiple such spaces.

Stage Setting: This function determines the panning limits to the left and right of the cameras, catering specifically to stage environments.

Wide Area Setting: Designed to focus the camera positioning towards the center stage, minimizing motion distraction, especially when the subject moves beyond predefined borders.

Fine Adjustment Mode: Enables the camera to adjust framing to a preset position within a maximum of six seconds.

Additionally, the JVC RM-LP100 Remote Camera Controller and its web interface have been updated to support these new auto-tracking features. Users can now send tracking commands through the WEB API and

control individual tracking and ON/OFF functions via a simple lever on the controller.

The KY-PZ510 Series is known for its super-wide horizontal view (80 degrees) and a focal length range of 21.8 to 261.8 millimeters. It incorporates Vertical Interval Time Code (VITC) with Network Time Protocol (NTP) for synchronized multi-camera setups. The cameras leverage HEVC technology for high-quality video streaming at lower bitrates, suitable for remote production over the internet (REMI). The KY-PZ510N model also supports simultaneous output in NDI, SRT, and RTMPs, facilitating hybrid local/remote workflows for quality distribution.

The firmware updates also introduce new preset options for exposure, color, image, and PTZ settings, extending these features to all NDI-enabled JVC PTZ cameras, including the KY-PZ400N and KY-PZ200 Series. These series have also been upgraded to NDI Version 5 with their respective firmware updates.

<https://www.jvc.com/>



IKEGAMI UHK-X600

Ikegami has unveiled the UHK-X600, a new multi-format portable camera, with the capability to upgrade from HD to UHD through a license-key based option as needed. This camera also supports various high-frame-rate capture modes in HD, including 2x, 3x, and 4x, along with an optional 4K format (3840x2160/50p) delivering 2000 TVL resolution. Additionally, it offers hardware-based options such as a SMPTE ST 2110 compatible media-over-IP interface board and 12G outputs.

The UHK-X600 is a response to the growing demand for technology that can adapt to the increasing standards in mastering and delivery. The license-key upgrade feature allows users to align their equipment with evolving production requirements without the risk of obsolescence. This feature is particularly relevant for high-budget productions, especially considering the potential of ATSC 3.0 for 2160p direct-to-home transmission in the USA.

Another significant feature is the high-frame-rate video capture option, beneficial for applications requiring slow-motion footage like sports or wildlife documentaries. The camera also caters to the rising popularity of HDR content among video streaming services. The UHK-X600 comes equipped with Hybrid Log Gamma, including options to switch between BT.2020 and BT.709 color spaces. Its global shutter imagers are adept at minimizing artifacts in various lighting conditions, such as LED screens or flash-illuminated stages.

As part of Ikegami's Unicam XE product line, the UHK-X600 is versatile for studio, OB, or over-the-shoulder location production. It features three 2/3-inch CMOS global shutter imagers, offering 1000 TVL resolution, minimal aliasing, and a high sensitivity of F11 @ 2000 lux in 50p mode. The camera is compact and lightweight, compatible with all B4 ENG/EFP lenses, and supports various lens corrections and remote control functionalities. When used with Ikegami BSX-100 or CCU-X100 control units, it can provide simultaneous UHD and HD video outputs.

The UHK-X700, a variant in the same series, includes all features of the UHK-X600 but also offers UHD-frame

rate operation as a standard feature and can operate at 2x speed in 4K/ UHD or up to 8x speed in Full HD.

In 2023, the UHK-X700 saw significant adoption, with notable purchases by the State Radio & Television Corporation of the Dominican Republic (CERTV) for use on the RTVD 4 channel. These cameras are linked via hybrid SMPTE fiber cable to Ikegami BSX-100 UHD/ HD base stations in the production control gallery. The choice was based on Ikegami's reputation for high signal quality, durability, and excellent support, aligning with RTVD 4's transition to HD production and digital transmission.

Singapore's RE:LIVE Productions also invested in the UHK-X700 systems, including base stations, control panels, and viewfinders. These systems are used in their studio projects and rental services. The decision to upgrade to the UHK-X700 was influenced by their positive experience with Ikegami's HDK-55 systems and the consistent support provided by Ikegami. The UHK-X700 systems allow RE:LIVE Productions to produce content in various formats, catering to a broad range of customer requirements.

<https://www.ikegami.com/>



IKAN LBX8-POE AND LBX10-POE

Ikan has introduced innovative lighting products that incorporate Power over Ethernet (PoE) technology, streamlining the setup process for lighting. The new LBX8-POE and LBX10-POE models can be powered using a single Ethernet cable, specifically Cat6 RJ45 24AWG

or higher. This breakthrough design by Ikan simplifies setup by eliminating the need for extra wiring or power outlets. This development not only saves time but also cuts down on installation costs and the need for additional electrical work or permits for new ceiling outlets.

These lighting products, the LBX8-POE and LBX10-POE, are noted for their high-quality illumination. They are equipped with 97 CRI LED chips and a soft panel, producing a smooth, diffuse light. The lights feature a 110-degree beam angle, ensuring wide and uniform coverage, ideal for creating consistent, shadow-free lighting.

The LBX8-POE and LBX10-POE have a color temperature range of 3200K to 5600K, making them versatile for various environments such as professional studios, conference rooms, classrooms, and on-location shoots. The LBX8-POE is specifically designed for spaces with low ceiling clearance, enhancing its flexibility.

These models are compatible with the IEEE 802.3bt Type 4 PoE++ standard, which ensures efficient power delivery over networks. They also support ArtNet and sACN DMX

VIDEOSYS BROADCAST NEW CONTROL SYSTEM FOR THE MEDIAEDGE QDCAM

Videosys Broadcast has recently launched a new control system designed for the MEDIAEDGE QDCAM high-speed box camera, enhancing its integration into broadcast production workflows.

This new fibre-based, plug-and-play system fits easily into a standard equipment rack and features intuitive software that automatically sets up the camera and control unit (ccu) for the selected format. This user-friendly solution allows broadcasters to efficiently use the QDCAM box camera for 4K productions and high-speed slow-motion (x4 SloMo) shots.

The company has developed a Remote Control Panel (RCP) for MEDIAEDGE QDCAM, aimed at enhancing the camera's attractiveness to broadcasters, especially in sports production where high-resolution 4K and high-speed slow-motion capabilities are essential.

This new RCP and fibre implementation address previous challenges related to the camera's setup and physical design, making

it more suitable and appealing for broadcast applications. The expectation is that this advancement will garner significant interest from broadcasters, facilitating the integration of QDCAM into their standard production processes.

Sports production often requires multiple high-speed cameras for multi-angle or free viewpoint video production. With the increasing demand for affordable and reliable cameras capable of UHD production, QDCAM presents a valuable option. Key features of QDCAM include superior image quality, remote camera/lens control compatible with micro 4/3 lenses, and a Global Shutter CMOS Image Sensor that

ensures precise imaging without the distortions typical of rolling shutter devices.

The QDCAM also boasts an Optical Transmission system that utilizes standard SMPTE fibre optic camera cables, which are commonly installed in stadiums and other sports broadcasting venues.

Broadcasters interested in the new control system for QDCAM are encouraged to contact Videosys Broadcast for a demonstration.

www.videosys.tv ■

protocols, facilitating integration with various DMX control systems. The LBX10-POE additionally offers support for traditional DMX512 in and out (3 Pin).

The LBX8-POE is designed with a low-profile, suitable for areas with limited ceiling space and includes a baby 5/8" and junior 1 1/8" combo pin for versatile mounting options.

Both models are equipped with a web-based graphical user interface (GUI) for adjusting ArtNet & sACN settings. This includes setting DMX addresses and universes, as well as configuring IP address settings. The combination of high-quality CRI LED chips and a 1/2-stop soft diffusion panel in these lights is intended to provide consistent color and brightness for a range of applications.

<https://ikancorp.com/>





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New WorldDAB President



Jacqueline Bierhorst is a distinguished figure in the realm of commercial radio, having made significant contributions since 1987. Her expertise lies in distribution, marketing, and content creation. With a noteworthy career in launching and leading successful commercial television and radio channels in The Netherlands and Belgium, Bierhorst's impact on the industry is substantial. From 2011 to 2015, she played a pivotal role as the project leader overseeing the rollout of the DAB+ network in The Netherlands. Since 2015, Bierhorst has served as the project director for Digital Radio NL, a collaborative effort involving public and commercial broadcasters, the Ministry of Economic Affairs, and various stakeholders. As the owner of Jacky B Entertainment Solutions and Vice President of WorldDAB, she has been an active ambassador for digital radio across Europe.

Recently, Bierhorst reached a milestone by being elected as the President of WorldDAB, taking over from Patrick Hannon after his ten-year tenure. This leadership transition occurred at the annual WorldDAB Summit in Munich, Germany, marking a new chapter in her continued commitment to advancing digital radio globally. ■

New Technical Liaison Officers

Odbayar Baatargun is a stalwart in the broadcasting industry, serving as a Technical Engineer in the Engineering Department at TV5 Mongolia for over two decades. Since 2002, he has played a pivotal role in the technological evolution of TV5, ensuring the seamless delivery of high-quality content.

Odbayar's enduring commitment and expertise make him an integral part of TV5 Mongolia's success story. ■



Emosi Vitilevu Toga, the Team Leader for Broadcast Engineering and Pactok at Fiji Television Limited, brings five years of valuable experience in the broadcast industry. With a Bachelor's degree in Commerce focusing on Information Systems & Marketing, Emosi combines strategic and technical expertise in his role. As a leader, he has driven technological advancements at Fiji Television, positioning the company as a leader in the dynamic media landscape. Emosi's vision revolves around seamlessly integrating broadcast technology with audience needs for an immersive viewing experience.

Beyond his professional endeavors, he is passionate about community engagement and talent development in the broadcast sector. Emosi's dedication to excellence, innovation, and mentorship is shaping the future of Fiji Television Limited and making a lasting impact on the broadcast landscape in Fiji. ■



Nilupa Ranaweera is our new TLO from EAP Broadcasting Company Limited (EBC), Sri Lanka. His position in EBC is Director of Engineering. His educational journey includes completing the Engineering Council Examination in the UK, a National Diploma in Engineering Sciences, an Information Technology Diploma in Management Information Systems, a Diploma in Network Engineering, and a Diploma in Mobile phone repairing. Throughout his career, he has held key positions such as Group Director Engineering for leading broadcasting companies and currently serves as the Director Engineering at Hiru TV. His career highlights include roles at MGM Networks, Navini Networks in the USA, ART Television Broadcasting Company, and Dynavision Broadcasting Company. As a leader, Nilupa directs technical aspects of MCR, Transmission, Outdoor, and Studio productions, and has spearheaded innovative projects like file-based content workflow and terrestrial transmission network initiatives.

Recognized with awards such as the “American Global Excellent Award” and “Asia’s Outstanding Broadcast Engineering and Technology Award,” he has been a key player in groundbreaking projects like the first file-based workflow for HiruTV and the development of media infrastructure and live election coverage. Nilupa has also represented Sri Lanka in the “Art Performances of the 16th Asian Games 2010” in Guangzhou, China. Additionally, he has undergone training programs in China and Japan, and beyond broadcasting, he actively engages in the media city project in Sri Lanka, showcasing his commitment to shaping the future of broadcast technology. Nilupa’s journey stands as a testament to innovation and excellence in the dynamic field of broadcast engineering, with global recognition for his outstanding contributions. ■



Ritesh Bilash’s educational foundation includes a Diploma in Electronics Engineering from the Fiji Institute of Technology in 2004. Joining in October 2017, he initially handled the Networks Operations Center (NOC) and was subsequently promoted to Team Leader Technical Operations in April 2022. His key responsibilities involve overseeing technical project requirements, developing work schedules, ensuring transmission services’ uptime, identifying cost-effective operations, liaising with vendors, and maintaining clear communication with internal and external parties. Noteworthy achievements include leading the Digital TV Project since 2017, orchestrating the Digital Switch Over Project in 2021, implementing successful VSAT projects, establishing the Education Channel during Covid in April 2020, setting up the Election Channel for general elections in December 2022, pioneering the Pay-per-view channel, launching radio channels on STB and App, and introducing an HD channel.

Ritesh has led various projects such as the FM Project rollout, satellite bandwidth upgrade, terrestrial site enhancements, Walesi App upgrades, and the Market Wi-Fi initiative. Recognized with the Employee of the Month award in November 2018 and promoted to Team Leader in April 2022, Ritesh has undertaken diverse training programs, showcasing his commitment to continual learning. His journey in the technology landscape of Fiji is characterized by innovation, leadership, and consistent growth. ■

Farewell to Irfah Hazirah: Bridging Tech Brilliance with Motherhood Magic

In a bittersweet farewell, the Asia-Pacific Broadcasting Union bids adieu to **Irfah Hazirah**, our exceptional Systems Support Officer. Joining in September 2021, Irfah leaves an indelible mark on our Technology Department. Her technical acumen, warm demeanor, and collaborative spirit have been integral to our success.

As she gracefully exits on December 27, 2022, Irfah embraces a new role – motherhood. Stepping away to focus on her 10-month-old bundle of joy, we extend our heartfelt wishes for this exciting chapter. Irfah, your impact is immeasurable, and you’ll always be a cherished member of the ABU family. Best of luck! ■





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ABU TECHNOLOGY CALENDAR *of Events*

2023

17 October	ABU Technical Bureau Annual Meeting	Online
28-29 October	ABU Technical Committee Meeting	Seoul, Korea
31 October/ 1 November	ABU General Assembly	Seoul, Korea
15-17 November	Inter BEE 2023	Japan
21 November	ABU-IEEE BTS Webinar on Unlocking the Future of Video: Adding Next Generation Video Codecs to the DVB toolbox	Online

2024

15-19 January	HFCC A24 Conference	Kuala Lumpur
7 February	ABU-DRM Webinar on Delivering Emergency Warnings with DRM	Online
15-17 February	28 th BES Conference and Expo	New Delhi, India
4-7 March	ABU Digital Broadcasting Symposium 2024	Kuala Lumpur
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
September	Webinar Series on Member Innovations	Online
13-16 September	International Broadcasting Convention 2024	Amsterdam
October/ November	ABU Technical Bureau Annual Meeting	Istanbul, Türkiye
October/ November	ABU Technical Committee Meeting	Istanbul, Türkiye
October/ November	ABU General Assembly	Istanbul, Türkiye
13-15 November	Inter BEE 2024	Japan

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