



TECHNICAL COMMITTEE 2026: SHAPING THE FUTURE OF BROADCASTING



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CONTRIBUTION AND MODERNIZING
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Towards GA2026: Technology, Trust and Transformation

Technology rarely stands still. Neither can broadcasting.

Throughout the third quarter of 2026, the ABU Technology community continued to explore the systems, standards and strategies shaping the future of our industry. Yet one message emerged with increasing clarity: progress is no longer measured by innovation alone. It is also measured by whether that innovation strengthens trust, serves audiences and creates meaningful transformation.

This issue of ABU Technical Review captures that balance.

Our webinar on C2PA, identity assertions and media provenance addressed one of the most urgent questions facing broadcasters today: how can audiences know what to trust in an era of manipulated and AI generated content? As misinformation becomes more sophisticated, content authenticity is evolving from a technical consideration into an essential part of protecting editorial credibility.

The ABU, ASBU and WorldDAB Technical Workshop brought industry experts and broadcasters together to examine the future of digital radio. The discussions demonstrated that DAB+ is not simply about upgrading transmission technology. It is about extending reach, improving efficiency and ensuring that radio remains accessible and relevant in an increasingly digital media environment.

Meanwhile, the OTT Engineering Workshop turned attention towards the rapidly changing world of content delivery and streaming infrastructure. As audiences move between traditional broadcasting, mobile devices and on demand platforms, engineers are being asked to build systems that are more flexible, scalable and resilient than ever before.

Across these initiatives, the value of collaboration was unmistakable. No broadcaster can navigate technological disruption, cybersecurity risks, artificial intelligence, changing audience behaviour and new distribution models alone. By sharing knowledge, testing ideas and learning from one another, ABU members are helping to shape solutions that reflect the diverse realities of the Asia Pacific region.

These conversations now lead us towards the 63rd ABU General Assembly and Associated Meetings in Colombo, Sri Lanka, from 30 October to 3 November 2026. Under the theme "Media for Peace and Humanity: Truth, Trust and Transformation," GA2026 will bring our community together at a defining moment for media.

For the technology sector, the theme carries particular significance. Every new platform, production tool and delivery system influences how information is created, distributed and understood. Technology can broaden access, connect communities and strengthen public service. It can also amplify misinformation and deepen inequalities when adopted without responsibility, transparency or purpose.

The challenge before us is therefore not simply to build faster systems or embrace the latest tools. It is to ensure that innovation remains human centred, trustworthy and accessible.

As we prepare for Colombo, I hope this issue encourages further conversation about the kind of media future we want to create and the role technology must play in delivering it.

Transformation is already underway. Trust will determine where it takes us.

Next stop: GA2026, Colombo.

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

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TCODE: REDEFINING MEDIA CONTRIBUTION AND MODERNIZING CONTENT OPERATIONS AT RADIO TELEVISYEN MALAYSIA (RTM)

Gs. Irywan Nizam bin Ramli, Principal Assistant Director, Seksyen Kejuruteraan Digital Interaktif (KDI), RTM

ABSTRACT

This article presents the digital transformation of Radio Televisyen Malaysia (RTM) through the implementation of **Technical Content Delivery (TCODE)**, a centralized digital media contribution platform designed to replace legacy physical media transfer workflows. Historically, content ingestion at RTM relied on the manual delivery of Hard Disk Drives (HDDs) and XDCAM discs, introducing severe logistical bottlenecks, hardware vulnerabilities, and strict operational constraints.

Developed under contract by Ideal Systems, this specific deployment of TCODE was fast-tracked to support the digital media ingestion requirements. Following an intensive execution timeline and a successful pilot project that successfully ingested over 1 Petabyte (PB) of media content, the system concluded its Factory Acceptance Test (FAT) on May 18, 2026, completed stakeholder training on May 19, 2026, and achieved official project handover on May 20, 2026. By shifting to a direct-to-premises online ingestion model, RTM eliminates intermediate cloud dependencies, lowers operational costs, and establishes a scalable, resilient benchmark for public broadcasting operations across the Asia-Pacific region.

1. INTRODUCTION

In today's rapidly evolving digital landscape, public broadcasters face escalating pressure to modernize operational workflows, maximize efficiency, and retire legacy physical infrastructures. For decades, media contribution and content acquisition relied heavily on the physical transport of storage media, a practice that inevitably introduced operational bottlenecks, logistical delays, and heightened security risks.

To address these vulnerabilities, Jabatan Penyiaran Malaysia (RTM) launched a major digital transformation initiative: TCODE (Technical Content Delivery) via <https://tcode.rtm.gov.my>. Purpose-built to serve RTM's demanding operational ecosystem at Angkasapuri Kota Media, TCODE shifts the broadcaster away from rigid, manual entry structures to a fully online workflow. This enables media suppliers, independent external production houses, and government agencies to

securely upload high-fidelity content directly into RTM's infrastructure 24/7.

2. PROJECT BACKGROUND

Historically, RTM's media ingest ecosystem depended on tangible delivery mechanisms. Content providers and partners physically transported Hard Disk Drives (HDDs), XDCAM discs, and portable storage systems to the RTM headquarters at Angkasapuri Kota Media. While this approach served the industry for years, it created severe operational constraints.

In 2024, recognizing the critical need for a more agile, scalable, and sustainable framework, RTM initiated a comprehensive six-month pilot project. The goal was to design an innovative, direct-to-premises digital workflow that bypassed traditional cloud-relay models. This initiative laid the technical foundation for what has now become RTM's primary platform for technical content delivery via <https://tcode.rtm.gov.my>.

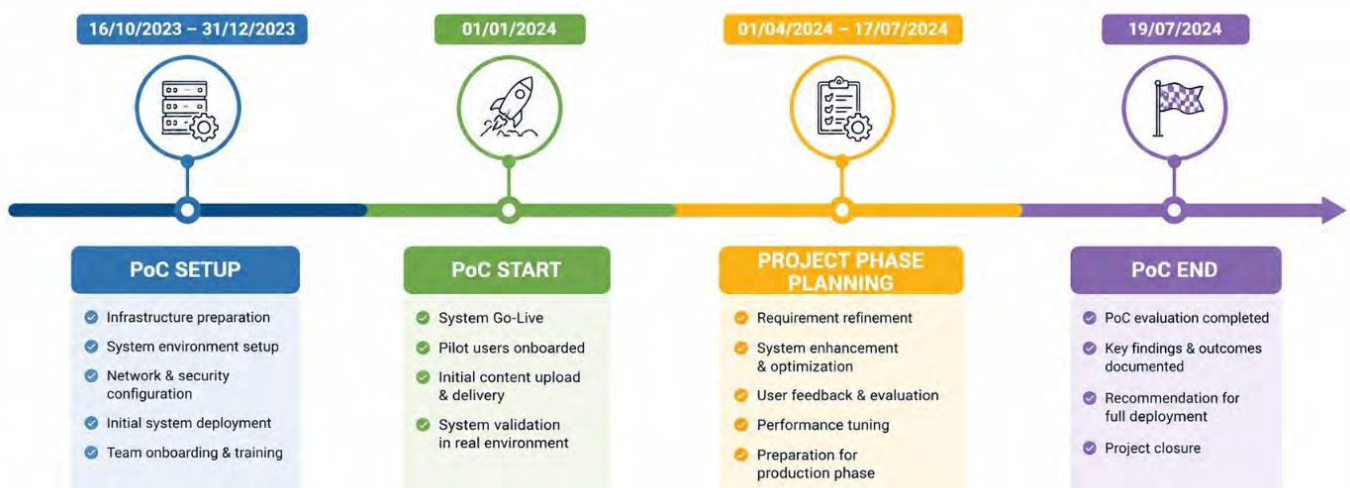


Figure 1: TCODE Proof of Concept (POC) Timeline

To fully operationalize this framework, RTM formalized a commercial agreement with Ideal Systems. The contract was signed on April 9, 2026. The project was executed on an aggressive timeline, starting on April 10, 2026. To accommodate exhaustive system testing and multi-departmental coordination, a 12-day contract extension (EOT) was granted, moving the project conclusion from May 9, 2026, to its final successful handover on May 20, 2026.

TCODE was delivered through a collaborative partnership between RTM and Ideal Systems, combining operational broadcast expertise with workflow engineering and digital transformation capabilities. From the initial concept and pilot implementation through full operational deployment, both organizations worked together to modernize RTM's nationwide content contribution ecosystem and transition from physical media-based workflows to a secure digital contribution platform.

RTM provided operational governance, contribution workflow ownership, evaluation procedures, and day-to-day broadcast operational expertise. Through continuous engagement with operational stakeholders, RTM ensured the platform reflected real-world acquisition, evaluation, scheduling, and content management requirements.

Beyond technology deployment, Ideal Systems worked closely with RTM to redesign traditional content

contribution processes, replacing physical media delivery workflows with centralized digital submission, evaluation, tracking, and notification workflows. The transformation significantly reduced operational dependencies on physical media logistics while improving workflow visibility, collaboration efficiency, content accessibility, and contribution turnaround times.

3. OBJECTIVES

The core strategic objectives driving the implementation of TCODE include:

- **Eliminating Physical Media Dependencies:** Fully phasing out the use of HDDs, discs, and manual hand-delivery to eliminate hardware vulnerabilities and logistical bottlenecks.
- **Optimizing Ingestion Architecture:** Enabling direct content delivery into RTM's on-premises internal storage with minimized latency, removing the need for temporary, intermediate cloud "parking" workflows.
- **Enhancing Operational Agility:** Facilitating round-the-clock (24/7) content submission to accelerate technical review, amendment, and broadcast-readiness cycles.
- **Improving Workflow Transparency:** Providing real-time contribution monitoring and automated notifications to enhance tracking and collaboration between RTM and its external partners.

Criteria	Manual Process	TCODE
Operational Hours	Weekdays, 9 am - 5 pm	24/7 (No Time Constraints)
Media Handover Frequency	Once daily at 3 pm	Real-Time Upload Anytime
Processing Availability	Office Hours Only	Continuous Processing
Delay Risk	High (If missed, delayed by 1 day)	Low (Immediate Queueing)
Lead Time	Longer (Due to time constraints)	Shorter (Real-Time & 24/7 Availability)
Agility and Flexibility	Limited (Time-bound)	High (Flexible and On-Demand)

Figure 2: Efficiency Beyond Speed: TCODE vs Manual Process

4. ARCHITECTURE SYSTEM

TCODE is not just a simple file transfer portal but a secure national media contribution platform. To improve service availability, TCODE is published through two dedicated Internet Service Providers with RTM-managed DNS round-robin distribution.

Access to the public contribution portal is restricted through geographic filtering policies, allowing access only from approved regions based on RTM operational requirements. Backend application and storage services are isolated behind reverse proxy and firewall layers, preventing direct exposure of internal infrastructure to external users.

TCODE is deployed on a **Linux-based Kubernetes** environment, providing a scalable and modular application framework capable of supporting future service expansion and workflow integration.

In addition to digitizing media contribution workflows, TCODE also enforces content standardization requirements across all programme suppliers. RTM currently accepts only completed programme materials delivered in MXF format at Full HD resolution (1920 × 1080). By standardizing submission specifications, TCODE minimizes format incompatibility issues, reduces processing delays, and ensures consistency throughout the ingest, quality control, storage, and transmission chain.

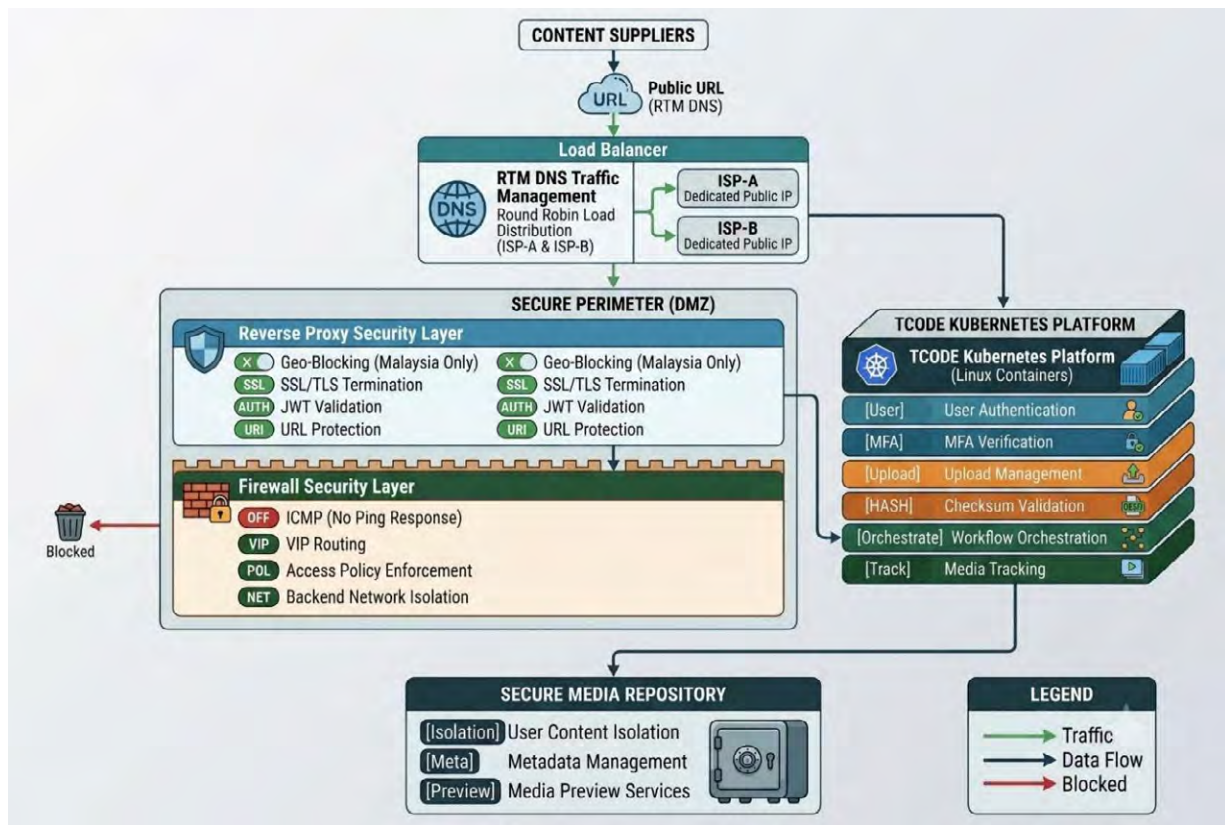


Figure 3: Content Supply Chain Architecture and Security

Parameter	Specification
Accepted Format	MXF
Video Resolution	1920 × 1080 (Full HD)
Submission Type	Completed Programme Material
Delivery Method	TCODE Secure Transfer
Integrity Verification	Checksum Validation
Authentication	MFA + JWT

Figure 4: Content Standardization Requirements

5. PLATFORM RESILIENCE AND OPERATIONAL MAINTENANCE

TCODE is deployed on a Kubernetes-based clustered architecture consisting of twelve backend servers running containerized application services, APIs, workflow engines, and processing components. The platform provides automatic workload redistribution and service recovery capabilities in the event of individual server failures, allowing uninterrupted service continuity without impacting user operations.

PostgreSQL serves as the platform's primary operational database. Automated database backup tasks are

executed daily during off-peak periods and stored within RTM's Dell Isilon enterprise storage environment to support data protection and recovery requirements.

In addition, TCODE incorporates automated operational maintenance processes including cache lifecycle management and application log retention policies. Historical cache data exceeding retention thresholds is automatically removed to optimize platform performance and storage utilization, while recent logs are retained to support troubleshooting, diagnostics, and support operations.

6. SECURITY, ACCESS CONTROL AND DATA INTEGRITY

TCODE was designed with multiple security and data protection layers to support secure nationwide content contribution workflows. User onboarding is performed through a secure registration process where a JWT-based activation link is sent to the registered email address. Users create their own passwords, ensuring that system administrators do not have access to user credentials.

To further strengthen access security, TCODE implements **Multi-Factor Authentication (MFA)**, requiring users to validate a one-time six-digit verification code delivered to their registered email address during login. Access to platform functions and content is controlled through Role-Based Access Control (RBAC) combined with JWT authentication and reverse proxy protection mechanisms. Users are restricted to viewing and managing only their own submitted media assets and associated workflows.

Security Component	Status
SSL/TLS	✓
MFA	✓
JWT Authentication	✓
RBAC	✓
Reverse Proxy	✓
Firewall Segmentation	✓
Geo Blocking	✓
Checksum Verification	✓
Resumable Upload	✓
Content Isolation	✓
Dual ISP	✓
Kubernetes Deployment	✓

Figure 5: TCODE Multi-Layered Security Matrix

All communications between users and the platform are secured using RTM-approved SSL/TLS encryption. To ensure content integrity during file contribution, TCODE incorporates checksum verification, resumable file transfer capabilities, upload pause-and-resume functionality, and final integrity validation prior to marking media submissions as completed. These mechanisms enable reliable transfer of large broadcast media files even across unstable network environments.

7. IMPLEMENTATION STRATEGY

Historically, RTM's technical divisions wrestled with physical transport issues, such as transit-damaged HDDs, incomplete file copies, wear-and-tear on expensive playout decks, and rigid drop-off times that stalled workflows when packages arrived late or on weekends.

RTM adopted a collaborative, phased approach to ensure technical robustness and industry alignment before full deployment:

- **Direct On-Premises Architecture:** TCODE was engineered to leverage the supplier's internet bandwidth, optimizing secure, real-time ingestion straight into RTM's storage environment.
- **Cross-Industry Collaboration:** Throughout the pilot phase, RTM engaged closely with key stakeholders across the Malaysian broadcasting ecosystem. Partners included the Department of Islamic Development Malaysia (JAKIM), the National Film Development Corporation Malaysia (FINAS), selected independent production houses, content suppliers, and technical contribution partners.
- **Operational Paradigm Shift:** Moving away from rigid schedules, RTM instituted an "**ACCESS - UPLOAD - DONE**" philosophy, granting suppliers the autonomy to upload media anytime, anywhere, aligned with contractual milestones rather than office hours.

To prepare the workforce for this operational shift, a comprehensive on-site training program was conducted on May 19, 2026. The module trained 20 key technical personnel from RTM across four essential domains:

- User Access Control (UAC) administration
- Backend system infrastructure management
- Core integration workflows (including MCDSB connections)
- Long-term system operations and preventive maintenance

8. CHALLENGES ENCOUNTERED

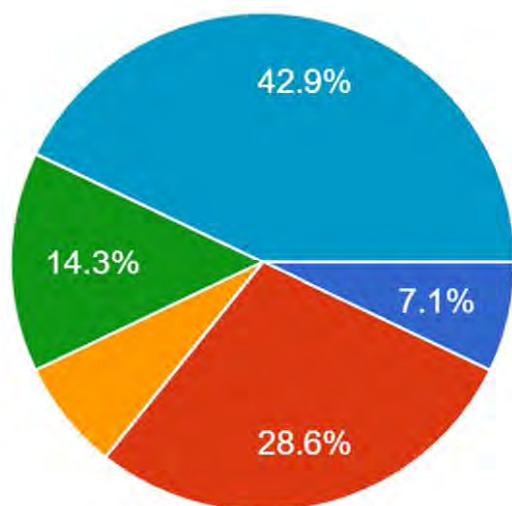
Prior to the launch of TCODE, RTM's technical divisions frequently battled systemic inefficiencies inherent to physical workflows:

- **Hardware Damage & Data Loss:** Incidents of HDD damage during transit, corrupted or incomplete media files, and physical wear and tear on playback equipment frequently delayed operations.
- **Strict Time Constraints:** Media reception was strictly restricted to standard office hours. Missing a delivery window meant next-day processing delays, while weekend arrivals accumulated backlogs that strained scheduling teams.
- **Cumbersome Amendment Cycles:** Whenever a file failed a technical review or required revisions, suppliers were forced to repeat the entire physical courier and manual coordination cycle, magnifying turnaround times and administrative overhead.

9.RESULTS AND OUTCOMES

The six-month pilot project yielded outstanding performance metrics, validating the system's readiness and scalability:

- **High-Volume Capacity:** More than **1 Petabyte (PB)** of media content was successfully uploaded directly to RTM premises during the pilot phase alone.
- **System Reliability:** The media contribution error rate remained remarkably low, staying **below 7%**.



Challenges Identified:

- ⚠️ **Upload Delays:** 43% reported slow upload times due to user ISP speeds.
- ⚠️ **Error 500 Issues:** 7% encountered system errors.
- ⚠️ **Workflow Complexity:** 29% found the workflow difficult to understand.
- ⚠️ **Support Satisfaction:** 14% cited slow response from technical support.

Solutions Implemented:

- ✅ Improved **server stability** & monitoring
- ✅ Provided **enhanced user training & support**
- ✅ Conducted **workflow optimizations** based on user feedback.

Figure 6: Challenges & Solutions from POC Implementation

- **Overwhelmingly Positive User Feedback:** Surveyed ecosystem partners reported high satisfaction across multiple operational metrics:
 - **95%** found the user interface exceptionally user-friendly.
 - **90%** reported immediate improvements in overall operational efficiency.
 - **90%** stated they would enthusiastically recommend the TCODE platform.
 - **85%** experienced quantifiable operational cost reductions.
 - **80%** noted significantly faster content submission speeds.

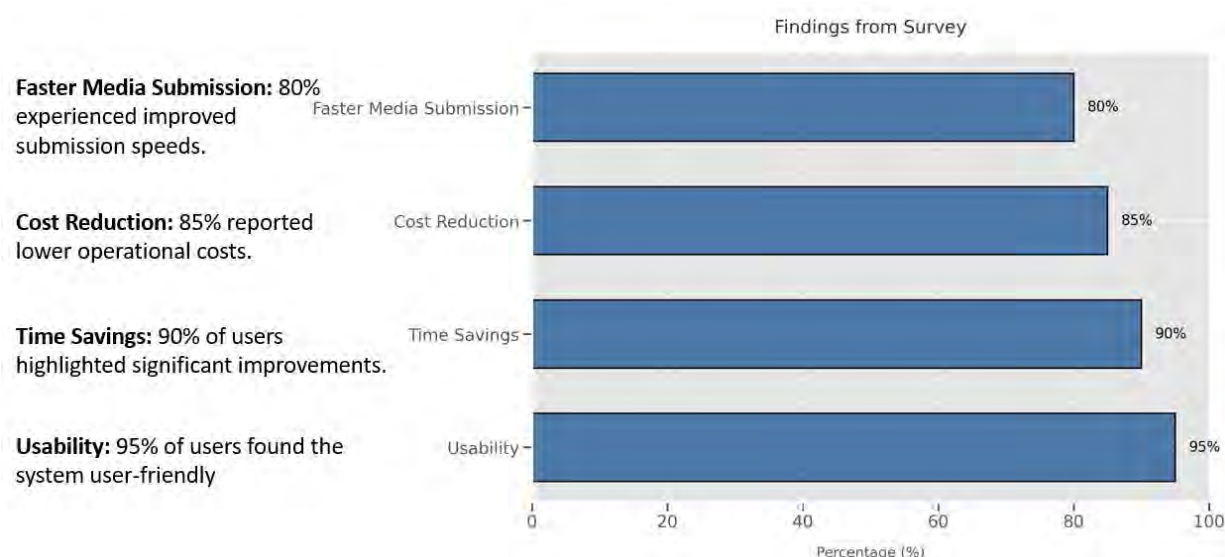


Figure 7: Efficiency Gains: TCODE vs Manual Transfer

Today, TCODE functions as RTM's fully online, centralized technical content delivery ecosystem, completely modernizing broadcast operations and fostering stronger transparency between the broadcaster and its contributors.

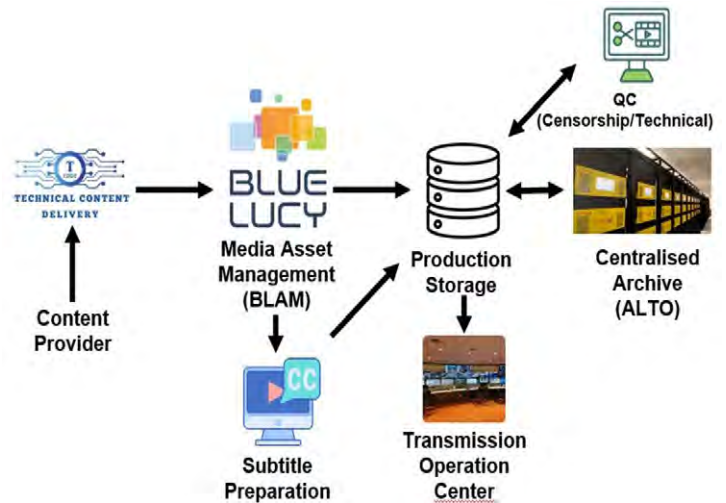


Figure 8: Centralized Technical Content Delivery Ecosystem

10. SCALABILITY AND CAPACITY DESIGN

TCODE was designed to support RTM's nationwide content contribution ecosystem, which involves approximately **400 content supply contracts** (Surat Setuju Terima - SST) awarded every six months to content providers throughout Malaysia. To support large-scale media contribution workflows, the platform utilizes dual Internet Service Providers with network aggregation capabilities, providing up to **4 Gbps inbound** bandwidth capacity for content submissions and approximately **2 Gbps outbound** bandwidth for media preview services.

For efficient remote evaluation workflows, uploaded content is made available through **1080p H.264** proxy media streams at approximately **3 Mbps**, allowing reviewers to access content rapidly without transferring high-resolution master assets. The platform's **Linux-based Kubernetes** architecture provides a scalable deployment framework capable of supporting future growth in user adoption, content volume, and workflow integrations.

11. RETURN ON INVESTMENT (ROI) & COST SAVINGS

Prior to TCODE, content contribution workflows relied heavily on physical media delivery using XDCAM Professional Discs and courier services. Under a conservative assumption of one content submission per supplier, approximately 400 physical media

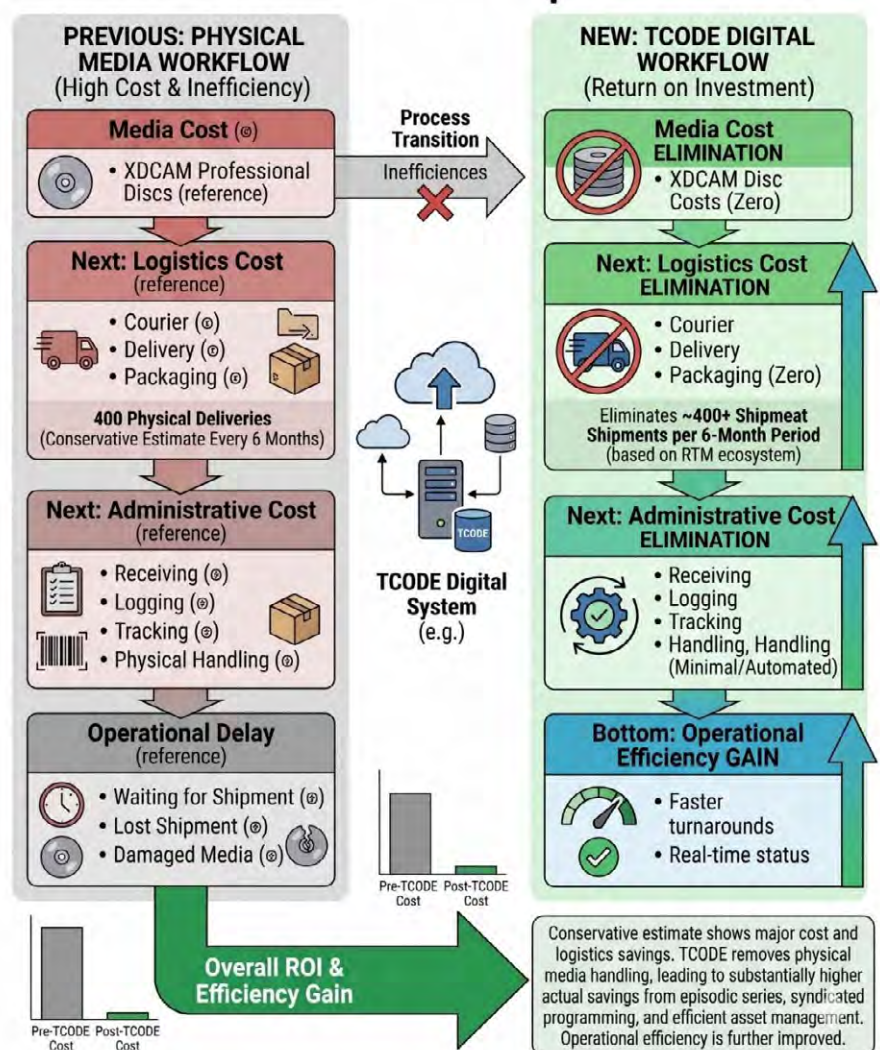


Figure 9: TCODE ROI Analysis for RTM Content Acquisition

deliveries could be eliminated every six months based on RTM's content supply ecosystem.

Actual savings are expected to be substantially higher, as many content providers deliver episodic series, syndicated programming,

and multiple content assets under a single contract period. In addition to media cost reduction, TCODE also removes courier logistics, physical media handling, content receiving, and manual tracking activities, further improving operational efficiency.

12. CONCLUSION

The successful delivery and deployment of the TCODE platform represents a milestone in Radio Televisyen Malaysia's digital transition. Far more than a simple file transfer tool, TCODE successfully transitions RTM from legacy physical logistics to highly optimized, automated digital ingest workflows. By demonstrating how a major public broadcasting institution can modernize its core workflows without relying on costly intermediate cloud parking models, RTM demonstrates a practical and scalable model for public broadcasters seeking to modernize content contribution workflows within the Asia-Pacific region. ■



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Gs. Irywan Nizam bin Ramli has served at Radio Televisyen Malaysia (RTM) since 2001. Appointed as Principal Assistant Director within the Interactive Digital Engineering Section (KDI) in 2025, his expertise centers on signal transmission, satellite architectures, and terrestrial broadcast distribution systems. He holds a Bachelor's Degree in Electrical and Electronic Engineering from Universiti Sains Malaysia (USM).

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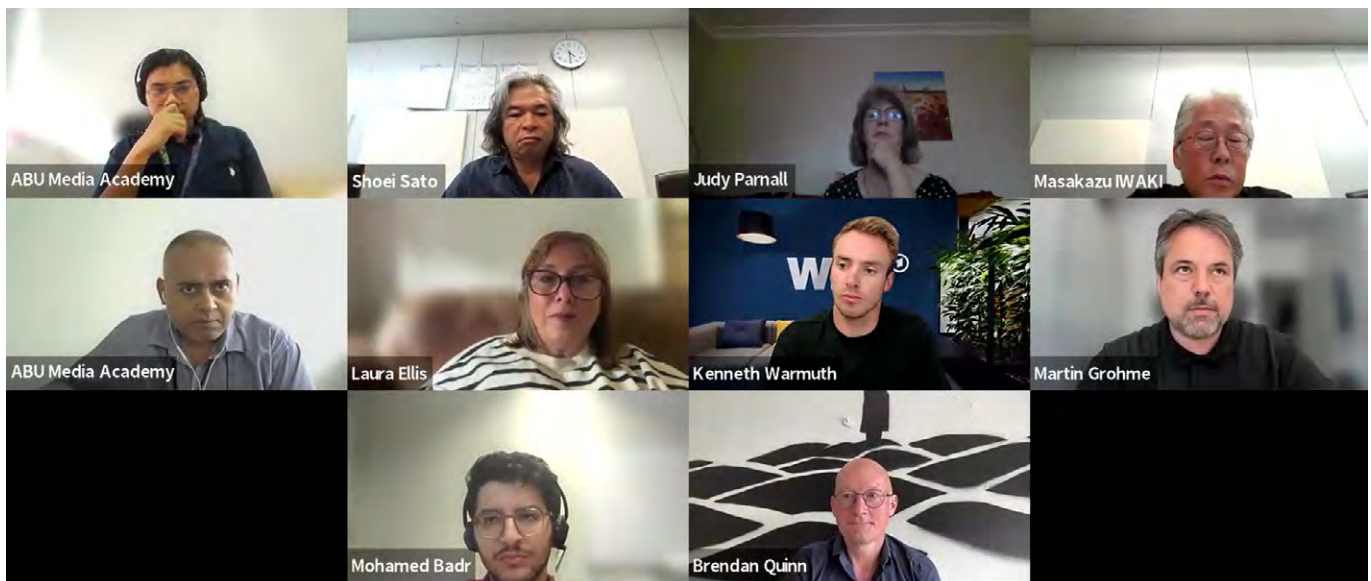


**ABSOLUTELY
FREE**

BUILDING TRUST IN MEDIA: C2PA, CONTENT AUTHENTICITY AND MEDIA PROVENANCE



**Coalition for
Content Provenance
and Authenticity**



ABU Technology hosted a webinar titled "*Building Trust in Media: C2PA, Identity Assertions, and the Future of Media Provenance*" on 14 July 2026 at 3:00 PM (Kuala Lumpur Time). The event brought together broadcasters, technology specialists, standards organisations, and media professionals to explore the latest developments in content authenticity and media provenance.

The webinar attracted 59 registered participants from 14 countries, including broadcasters, technology vendors, standards organisations, and media industry professionals. Notable participating organisations included Nippon Hoso Kyokai (NHK), NTT DOCOMO, Fuji Television Network, J-Stream Inc., WDR/ARD, BBC, ABU, with representatives from Japan, Malaysia, Myanmar, Brunei, India, New Zealand, Switzerland, Germany, Finland, the United Kingdom, the United States, and Estonia.

NHK recorded the highest participation, with 13 registered participants, followed by NTT DOCOMO, Fuji Television Network, and J-Stream Inc., each with three participants. WDR/ARD and BBC each registered

two participants, while ABU was represented by three participants, reflecting a diverse cross-section of the broadcasting and media technology sector.

The session addressed growing concerns surrounding misinformation, AI-generated content, and the increasing difficulty of establishing trust in digital media. Speakers from the EBU, IPTC, WDR/ARD, and BBC Research & Development explored the technical, operational, and strategic considerations involved in adopting media provenance technologies across the media lifecycle.

The webinar opened with **Mohamed Badr Taddist**, C2PA Project Manager at EBU Technology & Innovation and Security4Media, who provided an overview of the Coalition for Content Provenance and Authenticity (C2PA) and its approach to establishing verifiable information about digital content. He examined the technical foundations of C2PA, including its open-source SDK and the use of cryptographically signed provenance metadata to establish a verifiable record of content creation and modification. Badr also highlighted the importance of secure and privacy-



aware implementation, drawing on C2PA projects coordinated by the EBU and industry demonstrations such as those presented at IBC. His presentation positioned C2PA as more than a technical specification, highlighting its potential role in establishing trust throughout the content lifecycle, from production and editing to distribution and consumption.

The importance of **industry standards and collaboration** was explored by **Brendan Quinn**, Managing Director of the International Press Telecommunications Council (IPTC). Quinn discussed the work of the IPTC Media Provenance Working Group and the importance of common standards in enabling interoperability between media organisations, technology providers, and platforms. The presentation highlighted that widespread adoption of provenance technologies requires coordination across the industry rather than isolated implementation by individual organisations.

Practical considerations surrounding the implementation of C2PA within broadcasting environments were examined by **Kenneth Warmuth**, Media Engineer and Technical Project Manager at WDR/ARD. Warmuth shared insights from WDR/ARD's evaluation and pilot implementation of C2PA, addressing the technical and operational considerations

involved in integrating provenance capabilities into established broadcasting workflows. His presentation highlighted challenges associated with incorporating provenance into existing production and content management systems while maintaining efficient operational processes. The experience demonstrated the importance of evaluating provenance technologies not only at the standards-development level but also within real-world production environments.

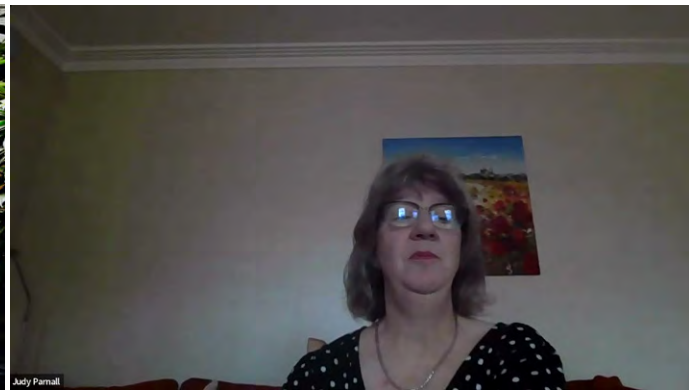
The **application of media provenance to streaming and video-on-demand (VOD) environments** was further explored by **Martin Grohme**, Streaming Architect and Project Engineer at WDR/ARD. Grohme examined the technical requirements for carrying provenance information through modern content delivery workflows, drawing on WDR's work

involving its central live and VOD origin platform and the evaluation and pilot implementation of C2PA for VOD content. The discussion highlighted the need to consider provenance throughout the distribution chain, particularly as broadcasters increasingly rely on cloud-based infrastructure, streaming platforms, and digital content delivery systems.

The relationship between **media provenance, disinformation, and generative AI content** was addressed by **Laura Ellis**, Technologist and Journalist at BBC Research & Development. Ellis examined the challenges presented by the rapid growth of synthetic and AI-generated content, particularly the difficulty audiences face in determining whether digital material is authentic, altered, or artificially generated. Her presentation emphasised the importance of transparent and verifiable information in maintaining audience confidence as generative AI becomes increasingly integrated into media production. The session also considered broader editorial and ethical implications of emerging technologies, including automated journalism, personalised media, and the use of AI in news environments.

The webinar concluded with a strategic perspective from **Judy Parnall**, Principal R&D at BBC Research & Development and a member of the C2PA Steering Board. Parnall discussed the wider implications of media provenance for broadcasters and





the importance of continued engagement with standards bodies, industry organisations, and policymakers. Her presentation provided a broader perspective on how provenance initiatives can contribute to greater trust in news and media, while highlighting the importance of industry education and advocacy in supporting meaningful adoption of provenance technologies.

Throughout the webinar, several key themes emerged. Media provenance was identified as an increasingly important component of building and maintaining audience trust as broadcasters and media organisations respond to misinformation, manipulated content, and the rapid growth of AI-generated media. The C2PA framework was presented as a technical foundation for establishing verifiable provenance

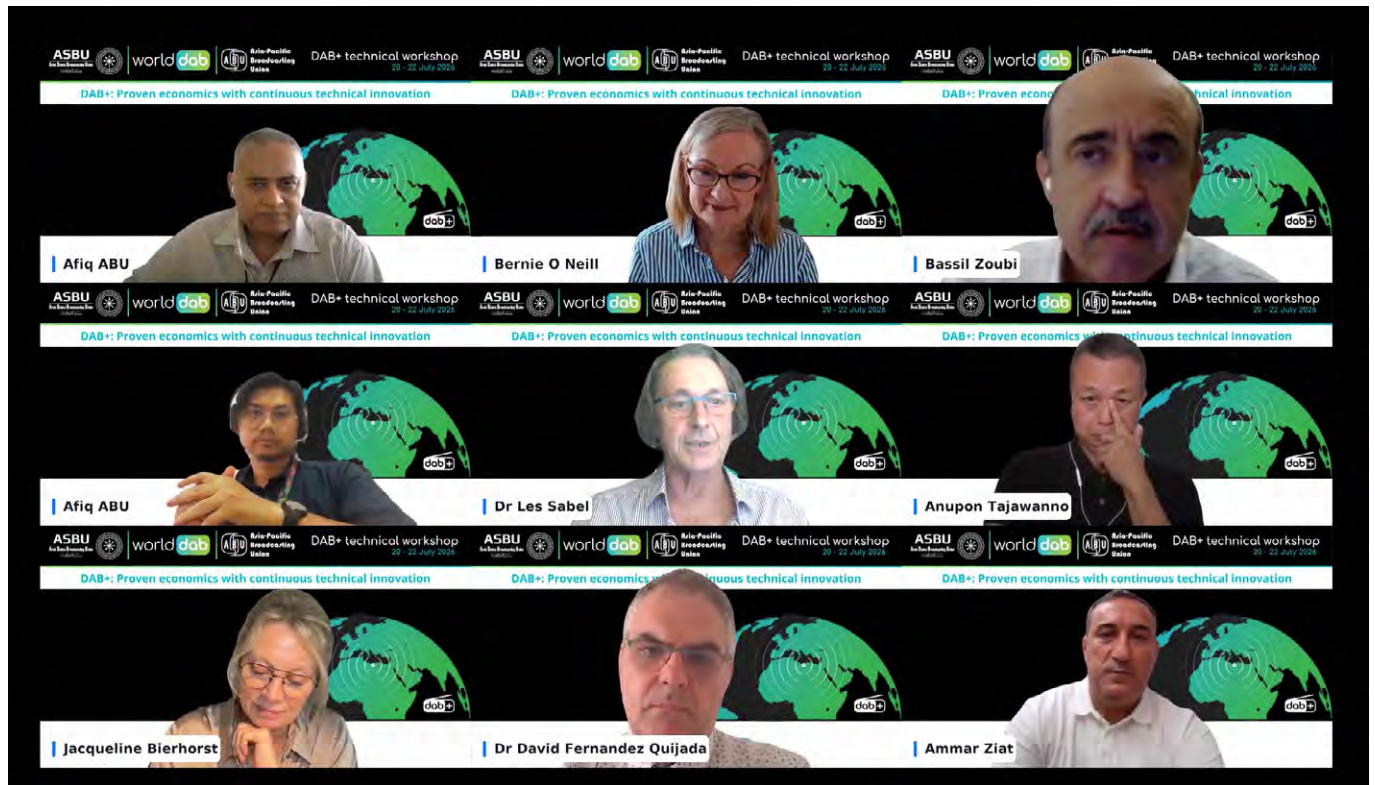
through cryptographically signed metadata. At the same time, interoperability and common standards were highlighted as essential for enabling provenance information to remain useful across different production, distribution, and platform environments.

The speakers also highlighted the practical challenges involved in implementing provenance technologies within existing broadcasting workflows. These include integration with production and content management systems, streaming and VOD platforms, technical infrastructure, and the need to maintain provenance information throughout the content delivery chain. The discussions demonstrated that successful implementation requires both technical planning and industry-wide coordination.

The webinar reinforced the growing recognition of media provenance as a strategic and technical priority for the broadcasting industry. The experiences shared by the EBU, IPTC, WDR/ARD, and BBC demonstrated the importance of collaboration between broadcasters, technology providers, standards organisations, and other stakeholders in developing practical and interoperable approaches to content authenticity.

ABU Technology expressed its gratitude to the speakers for sharing their insights and expertise, and to all participants for their engagement and contribution to the webinar's success. The session encouraged continued regional engagement in media provenance initiatives and highlighted the role of standards such as C2PA in supporting a more trusted and resilient media ecosystem. ■

ADVANCING DAB+: SYSTEMS, NETWORK DESIGN AND DIGITAL RADIO DEPLOYMENT



From 20 to 22 July 2026, the Asia-Pacific Broadcasting Union (ABU), the Arab States Broadcasting Union (ASBU), and WorldDAB jointly hosted a technical workshop on DAB+ digital radio, bringing together 147 participants from 47 countries. Broadcasters, engineers, regulators, and network operators from the Asia-Pacific, Arab States, Europe, and Africa gathered to exchange technical expertise, share practical deployment strategies, and examine the economic and policy considerations shaping the future of digital radio.

The three-day webinar series was structured around three themes: Progress and Policy, DAB+ Systems, and Network Design. The workshop featured 15 expert speakers from WorldDAB, ASBU, and leading industry organizations, covering DAB+ deployment, policy development, system architecture, automotive integration, transmission efficiency, cybersecurity, network design, and emergency alerting.

DAY 1: PROGRESS AND POLICY

The first day focused on the business case for DAB+, policy frameworks, and developments in different markets. Opening remarks were delivered by **Bernie O'Neill**, Project Director at WorldDAB; **Bassil Zoubi**, Director of Technology & Innovation at ASBU; and

Putera Afiq Zulfaqar, Manager of Production & Delivery Technology at ABU. They highlighted the importance of cross-regional collaboration as audience listening habits evolve and recognized the ABU-ASBU-WorldDAB partnership as an established platform for technical knowledge sharing.

A global update on DAB+ adoption highlighted that more than 166 million DAB receivers have been sold worldwide, with cumulative sales continuing to increase. DAB+ is now a standard feature in more than 97% of new cars in Europe, while Türkiye has recently launched DAB+ services. In the Arab States, DAB+ services are operational in 14 cities and five highway corridors in Saudi Arabia, where DAB+ receivers are now required in new vehicles.

O'Neill also introduced the Automatic Safety Alert (ASA) system, which provides a structured approach to public warning through geographic filtering, minimum receiver requirements, and a formal certification scheme. More than 30 devices have already been certified for ASA.

Zoubi presented the findings of an ASBU questionnaire on DAB+ deployment across the Arab region, covering 11 countries. Commercial DAB+ services are operational in Tunisia, Kuwait, Bahrain, and Saudi Arabia, while Algeria is conducting pilot and experimental deployments. Libya, Oman, Mauritania, Jordan, Egypt, and Palestine remain at pre-launch or planning stages, with some targeting service launches between 2026 and 2027. Coverage levels vary considerably, with Kuwait and Bahrain exceeding 80% population coverage, while Mauritania, Palestine, and Algeria remain below 20% as their deployments progress.

The business case for DAB+ was also examined, with the technology offering potential operational cost savings of up to 80% compared with FM while enabling greater audience reach and additional advertising opportunities through multiplexed services. **Jacqueline Bierhorst**, President of WorldDAB, highlighted further benefits in



terms of sustainability, including lower energy consumption and a reduced carbon footprint, as well as improved resilience during power outages and other emergencies.

Examples from established markets illustrated the potential audience impact of DAB+. In Germany, Radio BOB reportedly tripled its audience following its migration to DAB+, while LBC in the UK increased its audience from 1.1 million to 3.6 million listeners after launching on national DAB+. Switzerland is preparing for the eventual shutdown of FM services. In Germany, 89.8% of in-car radio listening is conducted via DAB+, while the country's second most popular station has no FM listeners and broadcasts exclusively on DAB+.

The workshop also compared DAB+ with 5G Multimedia Broadcast Services (5G MBS). While Qualcomm is leading development and some smartphone manufacturers are working on prototypes, commercially available 5G MBS products are not expected until 2028. Mobile network operators have yet to commit to 5G MBS-enabled smartphones, and a viable business case has not yet been established.

Dr. Les Sabel, Chair of the WorldDAB APAC Technical Group, explained that 5G MBS infrastructure would operate alongside existing DAB+ and DTT infrastructure and would require significantly more sites than DAB+ to achieve comparable coverage. He concluded that 5G

MBS would involve higher CAPEX and OPEX than DAB+, while DAB+ and associated emergency warning systems offer established infrastructure and resilience during major crises.

The WorldDAB Public Policy Toolbox was introduced as a resource to assist regulators and broadcasters in developing effective policy frameworks. **Dr. David Fernández Quijada**, Co-Founder and Research Director at South 180, emphasized that public policy can bring stakeholders together, accelerate DAB+ rollout, reduce uncertainty, and encourage investment. The European Electronic Communications Code (EECC), for example, contributed to the deployment of DAB+ in 30 million vehicles that would otherwise have remained with traditional broadcasting methods.

Key policy recommendations included establishing clear public-interest objectives, incorporating resilience into planning, placing audiences at the center of policy decisions, using FM as a baseline for comparison, considering the business model alongside the technology, and regularly reviewing policies.

Thailand's progress provided a regional perspective on DAB+ deployment. Trials in Bangkok began in 2019, followed by an upgrade in 2022 and an expansion to four provinces during 2022–2023. The country's frequency plan was published in the Royal Gazette in 2024, covering 25 frequency blocks across one national, 10



DAB+: Proven economics with continuous technical innovation



Lindsay Cornell

regional, and 34 local networks, with six frequencies allocated to each listening area.

Anupon Tajawanno, Asia Regional Sales Manager at Paneda, explained that the architecture consists of one national multiplex, one regional multiplex, and four local multiplexes per area. A centralized multiplexer and encoder approach was highlighted as a means of improving maintenance, scalability, and cost efficiency.

Algeria's DAB+ deployment strategy was also presented. The country currently operates 400 FM sites with 850 transmitters providing national and regional coverage, alongside 20 AM transmitters. Following the analogue television switch-off in 2022, the VHF Band III spectrum from 174–230 MHz was released for digital radio. Algeria has 41 T-DAB+ allotments and 363 assignments under the ITU GE06 Agreement.

Ammar Ziat, Telecommunications Engineer and Director of Studies and Development at TDA Algeria, outlined a phased deployment strategy covering the completed trial phase, expansion across Greater Algiers and major northern cities, coverage of strategic transport corridors, and eventual nationwide deployment. He emphasized that DAB+ is not intended to replace FM immediately but rather to support a hybrid broadcasting environment in which FM continues to provide local services, DAB+ expands digital services and improves spectrum

efficiency, and AM/DRM supports coverage in remote areas.

DAY 2 DAB+ SYSTEMS

The second day examined the technical foundations of DAB+ systems, including standards development, automotive integration, multiplex functionality, cybersecurity, and transmission efficiency.

Recent developments in DAB technical standards were presented by **Lindsay Cornell**, Chair of the WorldDAB Technical Committee and Principal Systems Architect at BBC Digital. Two developments highlighted were Public Prominence signaling and Push-to-Local, which allows broadcasters to signal preferences for alternative sources carrying the same audio program.

Push-to-Local was developed in response to requirements from French broadcasters seeking

to favor local program variants over national versions in moving vehicles. The technology can support more localized news, weather, and advertising. The session also covered service following and implicit linking between DAB and FM-RDS services.

The future of connected car radio was explored by **Rosemary Smith**, WorldDAB Project Manager Automotive. Research presented during the session indicated that 83% of car buyers listen to the radio in their vehicles, while 62% consider radio a must-have in-car feature. Radio now competes for screen space with streaming services, personal music, and podcasts, increasing the importance of the user experience.

WorldDAB's UX Committee brings together manufacturers, broadcasters, chipset companies, and suppliers to develop a shared vision for the in-car radio experience. Rich metadata, including station logos, slideshows, electronic program guides, and traffic information, was highlighted as an important component. Looking ahead, software-defined vehicles and hybrid radio, combining DAB+, FM, and IP streaming, are expected to enable more seamless listening experiences.

As DAB networks increasingly depend on Internet connectivity, cybersecurity was identified as an essential consideration in system design. **Lars-Peder Lundgren**, CEO of Paneda Sweden, outlined



DAB+: Proven economics with continuous technical innovation



Rosemary Smith

recommended security measures, including TLS/HTTPS encryption for connections, elimination of open-port configurations, user registration without default accounts or passwords, encrypted password storage, role-based user rights, two-factor authentication, valid certificate support, audit logs, and intrusion detection.

Secure VPN-based configurations were contrasted with less secure port-forwarding approaches. Relevant standards and regulatory developments, including ISO 27001 and the EU Cyber Resilience Act, were also discussed, with requirements covering Software Bills of Materials (SBOM), vulnerability analysis, security reporting, and software updates.

Transmission efficiency was examined by **Alexander Kurz**, Sales Director EMEA at GatesAir, who demonstrated recent developments aimed at reducing energy consumption. DAB+ benefits highlighted included the use of VHF Band III, the ability to carry multiple channels within a 1.5 MHz RF bandwidth, and support for high-quality audio and multimedia services.

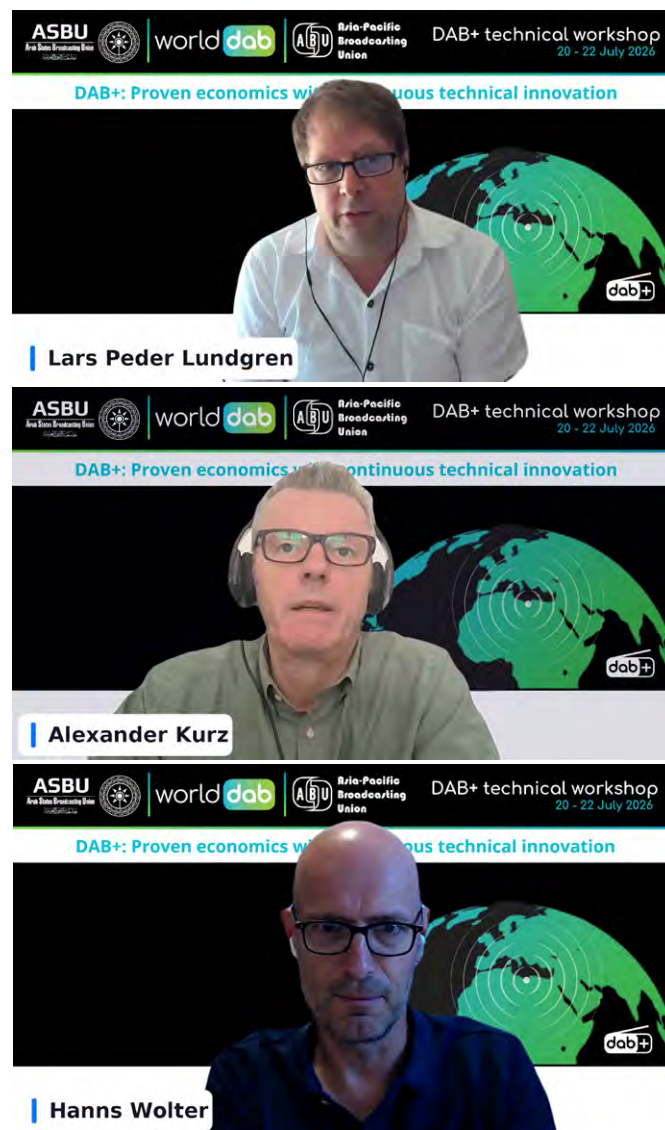
A comparison involving 18 radio programs with equivalent coverage illustrated the potential energy savings. The FM configuration required 18 transmitters and 18 frequencies, with total energy consumption of 238 kW, while the DAB+ configuration required one transmitter and one frequency, with total energy consumption of 5 kW. The resulting annual energy cost was estimated at approximately USD 312,700 for FM compared with USD 6,400 for DAB+.

Kurz also highlighted developments in transmitter efficiency. New transistor technologies can increase efficiency by approximately 5–10%, depending on power level, while GatesAir's High Efficiency Series provides improvements over previous-generation equipment. A 1RU transmitter, for example, can achieve 250 W at 49–50% efficiency, compared with 150 W at 29–33% efficiency for earlier equipment.

Further developments included the application of Doherty power amplifier technology at lower power levels, with typical MER performance of 31–35 dB across power levels. GatesAir's Maxiva series and the Saudi Broadcasting Authority's DAB+ deployment were presented as examples of current implementation, with transmitters deployed across nine major cities and highway routes under Saudi Vision 2030.

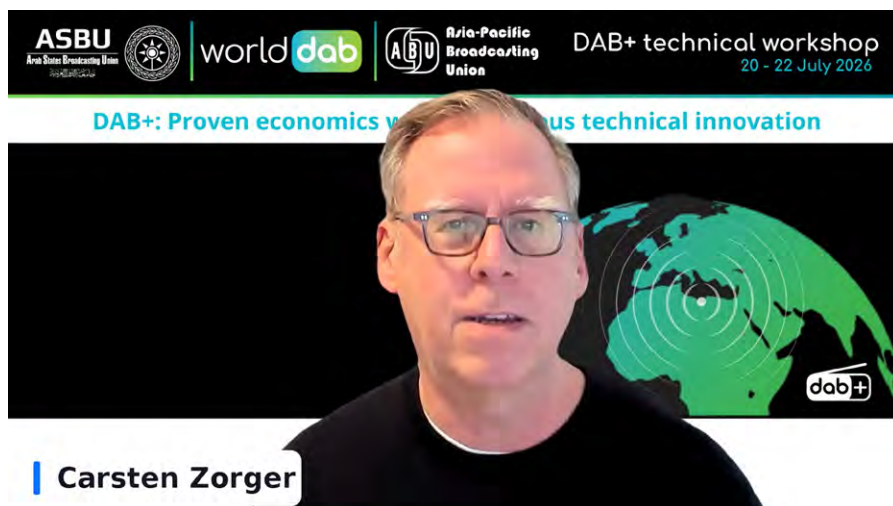
DAY 3: NETWORK DESIGN

The final day focused on network design, emergency alerting, and distribution resilience. The technical differences between the Multi-Frequency Network (MFN) and the Single-Frequency Network (SFN) approaches were examined by **Dr. Les Sabel**. MFNs use different frequency blocks across coverage areas, while SFNs transmit the same content on the same frequency across wider areas. MFN design must meet specified coverage targets while managing co-channel and adjacent-channel interference. SFN design introduces additional requirements relating to accurate timing between transmitters.



Sabel also addressed protection ratios, terrain and building clutter, field-strength variation, and Time of Arrival differences, all of which influence the planning and performance of DAB+ networks. Resilient SFN transmission strategies were explored through the experience of DAB Italia. **Hanns Wolter**, Technical Director of DAB Italia and Chair of the WorldDAB Spectrum and Network Implementation Committee, explained the distinction between redundancy and resilience. Drawing on the Italian network, he demonstrated how multiple transmission sites can provide inherent resilience through overlapping coverage.

A comparison of resilience and redundancy costs indicated that a resilient three-site configuration can cost less than a fully redundant configuration in both CAPEX and OPEX, highlighting the importance of network architecture in balancing reliability and investment. Germany's implementation of the Automatic Safety Alert (ASA) system demonstrated how DAB+ can support national public-warning infrastructure. **Carsten Zorger**, Director of Digitalradio Büro Deutschland, explained that the system was developed following the 2021 Ahr Valley flood, during which conventional communication networks failed.



Carsten Zorger

Based on ETSI TS 104 089, ASA incorporates spoken announcements with recommended actions, synchronization, geofencing, switchover, wake functionality, and the ability to dismiss an alert after its first playback. Approximately 35 ASA-certified radios are already available in Germany, with implementation in car radios in preparation. Germany is scheduled to begin ASA operations in September 2026, with Deutschlandradio allocating 32 kbit/s for a dedicated ASA DE channel.

The importance of reliable distribution infrastructure was also highlighted as a key component of resilient DAB+ networks. **Christian Werner**, Senior Product Manager at Media Broadcast, described an approach combining established technology, redundancy, power, and environmental resilience, monitoring, and field-service capabilities. Service-level commitments can range from 99.0% to 99.999% availability, with even short periods of downtime potentially resulting in significant financial losses. The DAB+ production chain covers contribution, provisioning, distribution, transmitter services, and antenna access, with distribution options including dedicated network lines, PAD/nPAD via FTP, LTE, and satellite.

Media Broadcast's ISO 9001:2015, ISO/IEC 27001:2022, and ISO 14001:2015 certifications were also highlighted as part of its operational and quality framework. Throughout the workshop, the Q&A sessions addressed practical issues including ASA software updates, receiver affordability, automotive integration, energy efficiency, and sustainability. ASA software updates, for example, can be implemented without hardware changes, while DAB+ receivers are increasingly available at consumer prices of approximately USD 15–20.

Across the three days, several recurring themes emerged. DAB+ has developed into a mature digital radio platform with established

deployments, increasingly efficient transmission technologies, and expanding applications in automotive and public-warning systems. At the same time, successful national deployment requires more than transmission infrastructure alone, with policy frameworks, spectrum planning, resilient network architecture, cybersecurity, distribution infrastructure, and compelling content all contributing to long-term sustainability.

In their closing remarks, representatives from ABU, ASBU, and WorldDAB welcomed the strong participation and engagement throughout the three-day workshop. They highlighted the importance of continued cross-sector collaboration and strategic planning to support national DAB+ rollouts that are scalable, resilient, and environmentally responsible.

The workshop demonstrated that the future of digital radio will depend on the continued integration of technical innovation, robust infrastructure, effective policy, and audience-focused services as broadcasters adapt to changing listening behaviors and an increasingly connected media environment. ■



Christian Werner

ANNUAL ABU TECHNICAL COMMITTEE MEETING 2026 TO BE HOSTED BY MTV CHANNEL (PVT) LIMITED IN SRI LANKA

The ABU Technical Committee's annual gathering is scheduled for 30- 31 October. MTV Channel (Pvt) Limited (MTV) will host it in Colombo, Sri Lanka, as part of ABU's 63rd General Assembly and Associated Meetings.

The meeting will open with a welcome address, followed by the Technical Committee's main agenda and proceedings. The session will include announcing the winners of the annual Engineering Award and Technical Review Prizes, along with a keynote address from an industry expert. The Committee will also discuss key technical and administrative matters, including updates and recommendations from the Technical Bureau, as well as other matters of interest to members. The session will give members an opportunity to review ongoing activities, exchange views, and discuss areas of interest and collaboration within the technical community.

The invited presentations at TC2026 will focus on "*AI in Broadcasting: From Experimentation to Real-World Deployment*" on day one. Presenters will explore how broadcasters are moving from AI experimentation to practical applications across production workflows, media provenance, and broadcasting operations, sharing current use cases, experiences, challenges, and considerations for responsible adoption. The first

day will conclude with the customary "Host Presents" session, offering the host an opportunity to showcase key technological projects and developments shaping their organization and the broader industry.

Day two will begin with updates from the Chairpersons of various study topics, covering ongoing projects in Production, Distribution, Spectrum, and Training & Services. This will be followed by a second keynote address delivered by a distinguished speaker.

Another highlight will be the second part of the invited presentations, focusing on "*Innovation and Advancement Technologies in Broadcasting*" and a panel discussion featuring experts in broadcasting and AI on session titled "*AI in Broadcasting: Practical Application and Operational Impact*". The meeting will conclude with a members' update session to share information and appoint the Honorary Vice-Chairperson for the host of the ABU General Assembly 2027.

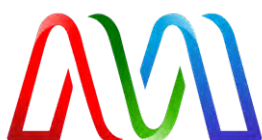
The annual Technical Committee meeting provides a valuable platform for engineers, technology enthusiasts, and industry experts to share experiences, exchange knowledge, and discuss key issues within the community.



TECHNICAL COMMITTEE MEETING

09:30-17:00 30 OCTOBER 2026 | 09:00-17:00 31 OCTOBER 2026

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MTV Channel (Private) Limited

WELCOMES ABU MEMBERS TO 63RD GA 2026 SRI LANKA

CORPORATE OVERVIEW

The Capital Maharaja Group (CMG) is one of Sri Lanka's most diversified and renowned corporate groups, with a history spanning nearly a century.

Founded in 1930 by Subramaniam Mahadevan and Sinnathamby Rajandram, CMG is today Sri Lanka's largest privately owned group of companies, with more than 225 brands operating across a wide range of sectors and partnerships with global leaders in many fields.

CMG's operations are organised across five primary sectors: Manufacturing, Media, Services, Leisure, and Technology.

THE MAHARAJA MEDIA NETWORK

The Maharaja Media Network forms the media and entertainment arm of CMG and comprises MTV Channel Pvt Ltd, MBC Networks Pvt Ltd, M Entertainments, News 1st, Stein Studios and Convention Center, the Depanama Broadcast Center, and Gammadda.

The network has an extensive reach across Sri Lanka and to audiences worldwide and is recognised for its internationally award-winning productions and news coverage.

MTV CHANNEL PVT LTD

MTV Channel (Pvt) Ltd. is a pioneer of private television broadcasting in Sri Lanka, with a history dating back to 1992. Today, MTV Channel operates three television stations, one in each of Sri Lanka's three languages: Sirasa TV, Shakthi TV, and TV1.

MBC NETWORKS PVT LTD

MBC Networks (Pvt) Ltd. is a pioneering Sri Lankan radio broadcasting organisation that commenced operations in 1993.

The network operates five radio stations in three languages, supported by 15 transmission stations nationwide, providing extensive terrestrial FM coverage throughout Sri Lanka.

M ENTERTAINMENTS

M Entertainments is Sri Lanka's largest music management and distribution company, overseeing locally produced music titles across multiple languages.

The company also supports emerging artists by providing the tools and resources needed to develop their craft and fostering a thriving community of artists.

NEWS 1ST

News 1st is arguably the most fiercely independent team of journalists in Sri Lanka. Taking pride in its motto, "#WithThePeople", News 1st provides a unique news service in three languages across all the Maharaja Media Network's TV, radio, and digital platforms. Its 24/7 operation ensures the rapid dissemination of local and international news wherever and whenever it happens.



The combined newsroom, located at the Head Office in Colombo, comprises dedicated sections for Digital, Sinhala, Tamil, English, Sports, Breaking News, and Radio.

The core team of journalists is supported by a network of more than 200 trained and equipped provincial correspondents, enabling real-time coverage of events across Sri Lanka.

HEAD OFFICE

The seven-storey Head Office in the heart of Colombo houses the corporate offices of the Maharaja Media Network and is located adjacent to the Capital Maharaja Group's head office.

The building includes the Newsroom, a News Studio, a dedicated studio for talk shows, a podcast studio, several radio news transmission suites, and a television library.

STEIN STUDIOS AND CONVENTION CENTER

Stein Studios and Convention Center is one of South Asia's largest studio complexes and serves as a venue for corporate events, musical shows, and productions for the Maharaja Media Network.

The complex comprises five studios with a combined floor area of more than 28,000 square feet. It also hosts the network's game, talk, and talent shows and is equipped with advanced systems for cameras, lighting, drones, and other production requirements.

DEPANAMA BROADCAST CENTER

Established in 1992, the Depanama Broadcast Center serves as the Maharaja Media Network's integrated

hub for broadcasting, production, digital, technical, and content preservation operations, supporting the delivery of media content to audiences across Sri Lanka.

Located in the suburb of Depanama, southeast of Colombo, the facility supports a comprehensive range of radio, television, digital, production, technical, and administrative operations.

GAMMADDA

Launched 15 years ago by journalists of the Maharaja Media Network to create a direct and positive impact on the lives of people in rural communities, Gammadda has grown into Sri Lanka's largest humanitarian initiative.

Its team members are trained in disaster management, search and rescue, and emergency response, enabling them to operate in challenging conditions such as cyclones, floods, and droughts. The initiative delivers assistance and conducts rescue and relief operations by land, water, and air.

The strength of the programme was particularly evident during Cyclone Ditwah in November and December 2025, when the team worked amid hazardous conditions to provide rescue and relief to hundreds of thousands of displaced people across Sri Lanka.

The word 'Gammadda' refers to the centre of a village. Throughout the year, the programme undertakes more than 50 projects across all 25 districts of Sri Lanka, including the construction of schools, libraries, hospitals, roads, bridges, drinking water facilities, sanitation facilities, and electric fencing to protect villages from wild elephants.





DOMESTIC TELEVISION AND RADIO CHANNELS

The Maharaja Media Network operates three television channels and five radio stations, with a strong presence across major social media platforms in Sri Lanka. Its services offer a diverse mix of news, entertainment, sports, talk shows, talent shows, and game shows.

The network broadcasts eight popular game and talent show, five of which are internationally franchised productions. It also holds the rights to almost all major global men's and women's sporting events and has, in recent years, broadcast major international events including the FIFA World Cup, Rugby World Cup, and ICC Cricket World Cup.

TELEVISION

- Sirasa TV – Sri Lanka's number one TV station, broadcasting in the Sinhala language.
- Shakthi TV – The largest Tamil language TV station in the country.
- TV1 – The Maharaja Media Network's pioneering television station, launched in 1992 and serving the English-language audience.

RADIO

- Sirasa FM – Sri Lanka's number one radio station, broadcasting in the Sinhala language.
- Y FM – A Sinhala-language station catering to the younger generation.
- Shakthi FM – Sri Lanka's largest Tamil language radio station.
- YES 101 – An English language station that provides listeners with contemporary global and local hits.
- Legends 96.6 – An English-language throwback station featuring popular hits from the 1980s, 1990s, and 2000s.

SOCIAL MEDIA

The Maharaja Media Network's social media platforms collectively generate well over one billion views per month across more than 100 countries.

The network operates multiple services across YouTube, Facebook, WhatsApp, Instagram, TikTok, X, Threads, mobile SMS, and multiple websites, extending its reach across a broad range of digital platforms.

DIGITAL SERVICES AND PRODUCTIONS

The Maharaja Media Network produces eight major entertainment shows, comprising five internationally franchised productions and three local productions. These include The Voice, The Voice Teens, Money Drop, Catchpoint, Sri Lanka's Got Talent, Sirasa Dancing Star, Sirasa Super Star, and Sirasa Lakshapathi. The programmes are produced before live audiences at Stein Studios.

The network is also recognised for its documentaries exploring significant events, people, communities, heritage, wildlife, environmental issues, and other aspects of life in Sri Lanka.

Its documentary productions include:

- An exclusive interview with former President of South Africa, Thabo Mbeki.
- A production featuring an exclusive interview with the Governor-General of Australia, Sam Mostyn.
- 'Wewa', an exploration of Sri Lanka's unique, centuries-old irrigation system, including the harvesting of rainwater and river water through ancient man-made tanks and reservoirs.
- 'Sri Lankan Leopard', which explores the subspecies of leopard

found in Sri Lanka.

- A series of productions featuring Sri Lanka's ancient archaeological sites, including Sigiriya, Yapahuwa, and the Temple of the Sacred Tooth Relic.
- A production celebrating Sri Lanka's Malaihar Tamil community, which has served the plantation sector for two centuries.
- A series exploring the human-elephant conflict.
- Productions featuring Sri Lanka's diverse religious traditions and annual ceremonies, including Buddhism, Hinduism, Islam, and Christianity.
- Maritime productions addressing environmental issues, including destructive bottom-trawling fishing practices and the destruction of coral reefs.

The network has also expanded into film production. A notable example is the Sinhala-language crime thriller 'Dharmayuddhaya 2' (2026), which broke box-office records in Sri Lanka.

FACILITIES AND TECHNICAL INFRASTRUCTURE

MTV CHANNEL (PVT) LTD

MTV Channel (Pvt) Ltd. is a pioneer of private television broadcasting and UHF television transmission in Sri Lanka, with a heritage dating back to 1992.

Today, MTV Channel operates three television channels, Sirasa TV (Full HD), Shakthi TV, and TV1, supported by state-of-the-art broadcast engineering infrastructure. This includes a modern Master Control Room (MCR), television studios, production facilities, transmission systems, and other critical broadcast infrastructure.

The channels are delivered islandwide primarily through

the company's terrestrial transmission network, complemented by IPTV and satellite distribution platforms. This multi-platform distribution infrastructure provides extensive nationwide coverage and reliable delivery of broadcast content.

Terrestrial Transmission Network

MTV Channel's three television services are transmitted from 14 strategically located transmission sites, providing UHF terrestrial coverage across Sri Lanka. The network has been progressively expanded to strengthen coverage and improve service availability across the island.

Transmitter Stations

1. Depanama – Western Province
2. Mt. Oliphant – Central Highlands / strategic island-wide coverage
3. Gongala – Southern Province
4. Hunnasgiriya – Central Province
5. Gammaduwa – North Central and North Western coverage
6. Union Place – Western Province
7. Hanthana – Kandy City and surrounding areas
8. Chunnakam, Jaffna – Jaffna Peninsula
9. Kilinochchi – Northern Province
10. Namunukula – Eastern Province
11. Rathnapura – Sabaragamuwa Province
12. Madolsima – Eastern coverage
13. Single Tree – Nuwara Eliya City
14. Mathugama – Kalutara District

The transmission network is designed to provide reliable UHF terrestrial delivery of all three television channels, extending the reach of MTV Channel services to viewers throughout Sri Lanka.

IP and Microwave Contribution Network

The transmission sites, Master Control Room, and news and production facilities at Stein Studios are interconnected through a combination of IP-based and microwave contribution links.

These interconnected facilities provide resilient pathways for the distribution of programme feeds, news content, live events, and other broadcast services between the central production facilities and remote transmission locations.

The integration of IP and microwave technologies provides operational flexibility while supporting reliable contribution and distribution of broadcast content across the network.

International Content Reception – TVRO

MTV Channel is equipped with a state-of-the-art TVRO (Television Receive Only) facility for the reception, decoding, and processing of international television feeds.

The TVRO infrastructure enables the organisation to receive and integrate international sports, entertainment, news, and other programme content into its broadcast operations.

Multi-Platform Distribution

MTV Channel's television services are distributed through

multiple platforms, providing viewers with flexible access beyond the terrestrial transmission network.

DISTRIBUTION PLATFORM	TELEVISION SERVICES
IPTV – SLT PEOTV	Sirasa TV HD, Sirasa TV, Shakthi TV, TV1
Satellite – Dialog TV & Freesat	Sirasa TV, Shakthi TV, TV1

This multi-platform architecture enables MTV Channel to maintain broad audience access and service continuity while extending the reach of its terrestrial television services through IPTV and satellite distribution.

Broadcast Engineering Infrastructure

The combination of terrestrial UHF transmission, IP and microwave contribution networks, centralised broadcast operations, TVRO reception facilities, and IPTV and satellite distribution form an integrated broadcast delivery ecosystem.

This infrastructure supports MTV Channel's objective of delivering high-quality, reliable, and resilient television services to audiences across Sri Lanka, while providing the technological foundation for continued evolution towards next-generation broadcast and media delivery platforms.

MBC NETWORKS (PVT) LTD

MBC Networks (Pvt) Ltd. is a pioneering Sri Lankan radio broadcasting organisation with a heritage dating back to 1993.

Today, MBC Networks operates an extensive radio broadcast engineering infrastructure comprising radio studios, production and editing facilities, audio distribution systems, transmission sites, contribution links, and supporting technical systems.

The network operates 15 transmission stations nationwide, providing extensive terrestrial FM coverage across Sri Lanka. Central broadcast operations are supported by the Depanama Broadcast Center (DBC), with news production facilities connected to the Head Office of the Maharaja Media Network.

Radio Channel Network

MBC Networks commenced broadcasting with YES FM, a dedicated English-language music channel. The company subsequently expanded its radio portfolio to five national services: YES FM, Sirasa FM, Shakthi FM, Y FM, and Legends FM.

Together, these stations provide programming in Sinhala, Tamil, and English, covering a broad range of music, entertainment, news, and youth-oriented content.

The network configuration uses two frequencies for YES FM, Sirasa FM, and Shakthi FM, while Y FM and Legends FM operate on a single frequency. The transmission infrastructure has been developed

to provide broad FM coverage while addressing the geographical challenges associated with Sri Lanka's varied terrain.

Radio Frequency Allocation

The five MBC radio services operate through a combination of FM frequencies and transmission locations.

Station	Frequency	Transmission Locations
YES FM	100.8 MHz	Mount Oliphant, Hunnasgiriya
	101 MHz	Union Place, Gongala, Hantana, Kurunegala, and Jaffna
Sirasa FM	106.7 MHz	Hunnasgiriya, Kalutara, Nayabedda, and Mount Oliphant
	106.5 MHz	Union Place, Gammaduwa, Gongala, Hantana, Jaffna, Ratnapura, and Kurunegala
Shakthi FM	103.9 MHz	Mount Oliphant, Hunnasgiriya, Kalutara, Kilinochchi, Nayabedda, Vavuniya, and Trincomalee
	104.1 MHz	Union Place, Gammaduwa, Gongala, Hantana, Jaffna, and Mannar
Y FM	92.7 MHz	Union Place, Gammaduwa, Gongala, Nayabedda, Kalutara, Kurunegala, Hantana, and Ratnapura
Legends FM	96.6 MHz	Union Place, Gongala, Kurunegala, and Hantana



Radio Studio and Production Infrastructure

MBC Networks operates technologically advanced radio studio facilities designed to support the complete program production and broadcast workflow.

The studio infrastructure includes:

- Continuity studios
- Drama studios
- Talk studios
- Editing studios
- Multi-track production facilities

These facilities support live broadcasting, programme production, recorded content, drama production, interviews, talk programmes, editing, and multi-track audio production.

The integration of these facilities enables MBC Networks to maintain a continuous workflow from programme production through to final broadcast transmission.

Audio Library and Content Infrastructure

MBC Networks maintains an extensive audio library containing more than 100,000 tracks in Sinhala, Tamil, English, and Hindi.

The audio library forms an important component of the organisation's content infrastructure and supports the diverse programming requirements of its five radio services.

The availability of a large centralised audio archive enables the stations to manage music programming across multiple languages and genres while maintaining access to a comprehensive collection of local and international content.

IP and Contribution Network

The central broadcast facilities, news studios, production facilities, and remote transmission sites are interconnected through broadcast

contribution and communication systems.

These interconnected facilities provide pathways for the distribution of:

- Programme audio
- News content
- Live broadcasts
- Studio feeds
- Recorded programmes
- Live outdoor productions for local and international operations.

The integration of contribution systems enables programme content generated at central production facilities to be transported to remote transmission locations for terrestrial FM broadcast.

The network's architecture also supports operational flexibility through IP networks, allowing content and broadcast feeds to be distributed between geographically separated facilities.

News and Production Facilities

MBC Networks’ broadcast operations are supported by connected news and production facilities located at the Head Office.

These facilities form part of the wider broadcast infrastructure and support the preparation, production, and distribution of news and other programme content to the radio network.

The connection between the news facilities, central broadcast operations, and transmission network enables content to be integrated into live radio services and distributed to audiences nationwide.

Interactive and Visual Radio

MBC Networks has played an important role in the development of interactive radio in Sri Lanka.

Sirasa FM and Y FM are widely recognised for introducing interactive and visual radio features to the country’s broadcasting landscape. These developments have expanded the traditional radio experience by incorporating greater audience interaction and visual elements into programming.

This approach reflects the evolution of radio broadcasting from a conventional audio-only medium towards a more interactive, multi-platform environment.

MBC Networks’ engineering infrastructure provides

the technological foundation for reliable, high-quality radio broadcasting while supporting the organisation’s ongoing evolution towards modern digital, IP-based, and multi-platform technologies.

STEIN STUDIOS – TECHNICAL EQUIPMENT & PRODUCTION FACILITIES SPECIFICATION

STEIN Studios provides a comprehensive range of studio, production, broadcast, audio, lighting and transmission facilities supporting professional television production, live events, field production and other broadcast applications. The facility is equipped with multi-camera studio systems, electronic field production cameras, digital cinema systems, professional audio and video production equipment, extensive lighting resources, centralized recording and storage infrastructure, and fibre-optic transmission capabilities.

Studio Facilities

STEIN Studios comprises five principal studio spaces. The RR Studio, comprising Studio 04, Studio 05 and Studio 06, is the largest facility, providing 14,400 sq. ft. of floor space with a 24 ft grid height and two 120-ton chiller systems. The RR Studio also features a 3,600 sq. ft. balcony with a 12-ft-grid-height grid. The Gamini Fonseka Studio (Studio 01) provides 5,194 sq. ft. floor space with a 21 ft grid height and is supported by two 30-ton package systems. Studio 02 provides 3,000 sq. ft. with a 14 ft grid height and one 30-ton package system, while Studio 03 provides 2,400 sq. ft. with a 14 ft grid height and four 5-ton ceiling-type systems.

Studio	Dimensions	Floor Area	Grid Height	Air-Conditioning
RR Studio (Studio 04 + Studio 05 + Studio 06)	180 ft × 80 ft	14,400 sq. ft.	24 ft	Two 120-ton chiller systems
RR Studio – Balcony	180 ft × 20 ft	3,600 sq. ft.	12 ft	—
Gamini Fonseka Studio (Studio 01)	98 ft × 53 ft	5,194 sq. ft.	21 ft	Two 30-ton package systems
Studio 02	60 ft × 50 ft	3,000 sq. ft.	14 ft	One 30-ton package system
Studio 03	60 ft × 40 ft	2,400 sq. ft.	14 ft	Four 5-ton ceiling-type systems



Camera Systems

The camera facilities are designed to support both studio-based multi-camera production and field operations. The studio inventory includes 12 Grass Valley Focus 70 studio camera chains for professional multi-camera television production, while six Sony PXW/PMW-400 professional camcorders support electronic field production (EFP), electronic news gathering (ENG) and outside production. The facility is equipped with Sony FX3 and Sony PMW-F3 digital cinema systems, together with Canon DSLR cameras for photography, video and field production.

Camera System	Type / Application	Quantity
Grass Valley Focus 70 Studio Camera Chain	Professional multi-camera studio television production	12
Sony PXW/PMW-400 Professional Camcorders	EFP, ENG and outside production	06
Sony FX3 Cinema Camera	Cinematic, creative and high-quality television production	01
Sony PMW-F3 Professional Digital Cinema Camera	Cinematic and creative television production	01
Canon EOS 5D Mark IV / Mark III	DSLR photography, video production and field production	03
Total Camera Units / Chains		23

Lenses

The camera systems are supported by a range of broadcast zoom, cinema and DSLR lenses. The Grass Valley and Sony PXW/PMW-400 systems use Fujinon TV zoom lenses with an 8.5–170mm focal length range. The Sony FX3 is equipped with Sony G Master lenses, while the DSLR and Sony PMW-F3 systems are supported by Canon EF and Sony / Compact Prime lenses respectively.

Camera System	Lens Model	Focal Length / Specification	Quantity
Grass Valley Studio Camera	Fujinon TV Zoom Lens	8.5–170mm	12
Sony PXW/PMW-400	Fujinon TV Zoom Lens	8.5–170mm	06
Sony FX3	Sony FE 50mm F1.4 GM	—	01
Sony FX3	Sony FE 16–35mm F2.8 GM II	—	01
Sony FX3	Sony FE 70–200mm F2.8 GM OSS II	—	01
Canon DSLR	Canon EF 16–35mm	—	01
Canon DSLR	Canon EF 24–70mm	—	02
Canon DSLR	Canon EF 70–200mm	—	02
Sony PMW-F3	Sony Compact Prime CP.2	21mm	—
Sony PMW-F3	Sony Compact Prime CP.2	25mm	—
Sony PMW-F3	Sony SCL-T20	35mm	—
Sony PMW-F3	Sony SCL-P-T20	50mm	—
Sony PMW-F3	Sony SCL-P-T20	85mm	—
Sony PMW-F3	Sony Compact Prime CP.2	135mm	—

Note: The source specification lists the six Sony PMW-F3 lens models and focal lengths but does not state individual quantities.

Camera Support & Grip Equipment

STEIN Studios provides a comprehensive range of camera support and grip equipment for studio, field and dynamic camera operations.

Equipment	Brand / Model	Technical Specification	Quantity
Professional Camera Tripods	Libec / Vinten	Camera support systems equipped with 100mm / 150mm fluid heads	24
Jimmy Jib System	Triangle Jimmy Jib	40-foot camera crane system for elevated and dynamic camera movements	03
Gimbal Stabilization System	DJI Ronin RS3 Combo	Professional 3-axis camera stabilization system for smooth handheld and moving-camera shots	02
Professional Drone	DJI Mavic 3 Pro	Professional aerial imaging platform for high-quality aerial photography and video production	01
FPV / Aerial Drone	DJI Avata 2	FPV drone system for dynamic aerial cinematography and immersive video production	01

Production Control Room & Video Production

The production control room is equipped to support professional multi-camera live television production, video signal routing, programme monitoring and signal quality control. The core video production infrastructure includes a Grass Valley Karrera 4 M/E video production switcher and a Ross 16 × 16 video router. Monitoring facilities comprise two multiviewer panels and Sony 19-inch professional technical monitors, while a Leader video signal measurement and calibration system supports video signal analysis, calibration and quality control.

Equipment	Technical Specification
Grass Valley Karrera 4 M/E Video Production Switcher	Professional 4 M/E production switcher for multi-camera live television production
Ross 16 × 16 Video Router	16-input × 16-output video signal routing and distribution
Multiviewer Panels	Two panels for simultaneous monitoring of multiple video sources and programme signals
Sony 19-inch Professional Technical Monitors	Professional-grade monitors for video signal and programme output monitoring
Leader Video Signal Measurement & Calibration System	Professional test and measurement equipment for video signal analysis, calibration and quality control

Audio Production

Audio production facilities include professional digital mixing, monitoring, recording, surround sound and noise-reduction systems. The facility is equipped with a Midas PRO 9 digital audio mixing console and Genelec professional audio monitors, together with a Dynacord surround sound system, Midas M32 digital audio mixing console, Logic Pro multitrack recording and audio production system, and CEDAR DNS 4 professional noise-reduction processor.

Equipment	Specification	Quantity
Dynacord Surround Sound System	32:1 configuration with Dante interface	01
Midas PRO 9	Professional digital audio mixing console	01
Midas M32	Digital audio mixing console	01
Logic Pro	Multitrack recording and audio production system	01
CEDAR DNS 4	Professional noise-reduction processor	01

PA System

The PA system provides extensive sound reinforcement capability for studio, stage and live-event applications.

Equipment	Specification	Quantity
EV Line Array – Top	2,500 W	22
EV Subwoofer	3,000 W	12
EV Surround / AV Monitors	800 W	24
FBT Stage Monitors	Professional stage monitor system	06

Microphone & Monitoring Systems

The microphone inventory supports drum, percussion and instrument recording, direct injection, in-ear monitoring and FM microphone applications.

Equipment	Brand / Model	Quantity
Drum Microphone Kit	AKG	08
Drum Microphones	Beyerdynamic Opus Series	08
Percussion / Instrument Microphone Kit	AKG	08
Direct Injection (DI) Boxes	—	16
IEM Bodypack Receivers / Transmitters	Sennheiser	08
IEM Bodypack Wired	Fisher Amp	11
FMC Transmitters	Sennheiser	08
FMD Transmitters	Sennheiser 2000 Series	06
FMD Transmitters	Sennheiser G3 Series	04

Recording, Storage & AV Signal Processing

The recording and storage infrastructure includes a Geevs / EditShare server with 240 TB of centralized video recording and storage capacity. Ten Blackmagic HyperDeck recorders support ISO and programme recording, while a Sony T2 Recording System provides backup recording for the Master Programme (PGM) output.

The recording media format is based on MXF, with 4:2:2 video sampling and an 8-bit bit depth. AV signal processing is supported by an Evertz Densité 2-Frame system, a modular frame-based platform for professional audio/video signal processing, conversion, distribution and interfacing. Production, engineering and studio communication is supported by a Zeus Digital Matrix intercom system.

Equipment / System	Technical Specification
Geevs / EditShare Server	240 TB centralized video recording and storage system
Blackmagic HyperDeck Recorders	10 units for ISO recording and programme recording
Sony T2 Recording System	Backup recording system for Master Programme (PGM) output
Recording Container Format	MXF
Video Sampling	4:2:2
Bit Depth	8-bit
Evertz Densité 2-Frame System	Modular frame-based platform for professional audio/video signal processing, conversion, distribution and interfacing
Zeus Digital Matrix Intercom System	Centralized digital matrix communication system for production, engineering and studio communication

Lighting

Lighting control is provided by MA Lighting grandMA2 systems, including a grandMA2 Full-Size professional lighting control console with Art-Net networking capability and a grandMA2 professional lighting control system for studio and live-event lighting.

Lighting Control

Equipment	Brand / Model	Technical Specification	Quantity
Lighting Control Console	MA Lighting grandMA2 Full-Size	Professional lighting control console with Art-Net networking capability	01
Lighting Control Console	MA Lighting grandMA2	Professional lighting control system for studio and live-event lighting	01

Lighting Inventory

The extensive lighting inventory comprises conventional Fresnel and PAR fixtures, LED fixtures, moving heads, HMI lights, audience blinders, follow spots, pixel bars, colour strips and other specialist lighting equipment.

No.	Lighting Equipment	Brand / Model	Quantity
01	2kW Fresnel Light	Arri, Canara, Aultra	25
02	Colorado 1P LED Light	Chauvet	37
03	LED PAR Light	Yellow River	49
04	PAR 64 1kW PAR CAN Light	Yellow River	125
05	300W Fresnel	Arri	02
06	Profile Light 750W	Yellow River	29
07	Moving Head	Yellow River	48
08	Moving Head	Light Sky	35
09	LED Moving Head Light	Yellow River	26
10	LED Audience Blinder	—	31
11	PAR 64 1kW PAR CAN Light	—	60
12	LED PAR Light	Yellow River	45
13	Pixel Bar	Polar Light	80
14	Color Strip	Chauvet	18
15	5kW Fresnel Light	Pollux	01
16	1.2kW HMI Light	—	01
17	2.5kW HMI Light	—	04
18	650W Fresnel Light	—	04
19	Cool Light (4 × 55W fluorescent)	—	10
20	Follow Spot 4kW	—	02
21	Colorado 1P VW LED Light	Chauvet	13
22	Colorado 6P LED	Chauvet	10
23	LED Moving Head Light	Yellow River	12
24	Strobe Light	—	02
25	Photon Beard UK Light	—	02
26	Mini Bee LED Beam Light	Light Sky	04
27	Disco Light	—	02
28	Battery Light	—	04
29	LED 2KW Light	—	01
30	LED 1KW Light	—	01
31	LED 1KW Light	—	05
32	1kW Fresnel Light	Arri, Canara, Aultra	05
33	Dimmer Pack	—	12



Transmission

The transmission infrastructure comprises three professional fibre-optic transmission links equipped with Harmonic encoders and decoders. These systems support high-quality video and audio signal transmission.

DEPANAMA BROADCAST CENTER

Established in 1992, the Depanama Broadcast Center (DBC) functions as the main broadcasting and operational centre of the Maharaja Media Network. It brings together a wide range of broadcasting, programme production, content management, digital, technical, engineering, archival, and administrative operations within a single facility.

The centre provides the following key operations and facilities:

- Five radio channel operations
- Three television channel operations
- Master Control Rooms for all five radio channels
- Master Control Rooms for three television channels
- Shakthi TV Programme Division
- Three television studios
- Dubbing Division
- Subtitling Division
- Radio and Television Commercial Production Divisions
- Radio Scheduling Division
- Radio Digital Division
- TV Library
- Radio Library
- Engineering Teams for radio and television
- M&E Division

- IT Division
- Maintenance Division
- Administration Division

Radio Channels and Operations

Five radio channels operating in Sinhala, Tamil, and English are operated and supported from the Depanama Broadcast Center. The Master Control Rooms (MCRs) for all five radio channels are located at the centre, which also provides the necessary facilities and workspaces for their respective teams.

Television Channels and Operations

The Depanama Broadcast Center houses the Master Control Rooms (MCRs) for all three television channels, providing centralised control, monitoring, and coordination of television broadcasting operations.

Shakthi TV Programme Division

The Shakthi TV Programme Division operates from the Depanama Broadcast Center and supports the channel's programme production activities.

The centre houses three television studios used for live and recorded productions, providing facilities for a range of television programming requirements.

Dubbing Division

The Dubbing Division is responsible for the Sinhala dubbing of programmes, dramas, and films. It contributes to the production of Sinhala-language versions of popular

international and local content for Sri Lankan audiences.

Subtitling Division

The Subtitling Division provides subtitles for television dramas, programmes, films, and other audiovisual content. Subtitles are produced in Sinhala, Tamil, and English according to the requirements of the content and its target audience.

Commercial Production Divisions

The Radio and Television Commercial Production Divisions produce a range of commercial and promotional content for the network, including:

- Commercial advertisements
- Promotional productions
- Channel-related commercial content
- Other commercial productions required by the network

Radio Digital Division

The Radio Digital Division plays an important role in extending the reach of the radio channels beyond traditional broadcasting and engaging audiences through digital platforms.

The division manages the digital operations of all five radio channels, supporting their presence and content distribution across digital platforms.

TV Library

The TV Library maintains a large collection of previously produced television programmes and other audiovisual content, together with newer content generated by the network.

Modern archiving practices support the preservation of valuable television content while enabling efficient management, retrieval, and utilisation of archived material when required.

Radio Library

The Radio Library contains a significant archive of radio productions and content accumulated over many years. The collection is being preserved using modern archiving methods and technologies to support long-term preservation, efficient management, and easier access to archived content. ■

ABU Engineering Awards

Panel of Judges

- ABU Broadcast Engineering Excellence Award
- ABU Young Engineers' Broadcasting Award
- ABU Broadcast Engineering Award on SDGs Implementation

- ABU Engineering Industry Excellence Award
- ABU Developing Broadcasters' Excellence Award



Mr Masashi Kamei, Senior Research Engineer, **Nippon Hoso Kyokai (NHK-Japan)** and Chairperson of the ABU Technical Committee. Appointed a member of the panel in March 2019.



Mr Nguyen Duc Tue, Deputy Director General - Technical Center, **Vietnam Television (VTV-Vietnam)** and Vice-Chairperson of the ABU Technical Committee. Appointed a member of the panel in August 2026.



Dr Mohieddin Moradi, Director General (R&D Department), **Islamic Republic of Iran Broadcasting (IRIB-Iran)** and Vice-Chairperson of the ABU Technical Committee. Appointed a member of the panel in August 2026.

RTPRC-China



Mr Zhang Wei, Radio and Television of the People's Republic of China (**RTPRC-China**) and Vice-Chairperson of the ABU Technical Committee. Appointed a member of the panel in August 2026.



Mr Prakash Veer, Deputy Director General (Global Outreach), **Prasar Bharati (PB-India)** and a Topic Area Chairperson of the Technical Bureau. Appointed a member of the panel in July 2025.



Mr Peh Beng Yeow, Lead, Content Preparation of **Mediacorp-Singapore** and a member of Technical Bureau. Appointed a member of the panel in July 2024.



Mr Jongwon Oh, Engineer - Technology Infrastructure Planning, **Korean Broadcasting System (KBS-Korea)**, and a member of Technical Bureau. Appointed a member of the panel in July 2025.



Mr Fintan Mc Kiernan, Chief Executive Officer - South East Asia, **Ideal Systems, Singapore**. Appointed a member of the panel in June 2014.



Ms Emily Dubs, Head of Technology, **DVB Project Office**. Appointed a member of the panel in July 2025.



Ms Mardhiah Nasir, Executive Director, **Integriti Padu Sdn Bhd (IPSB Technology)**. Appointed a member of the panel in July 2025.



Mr Aale Raza, Director, **Whiteways Systems, Singapore**. Appointed a member of the panel in July 2024.



Dr Peter Siebert, VP, **IEEE Broadcast Technology Society**. Appointed a member of the panel in July 2025.

ABU ENGINEERING AWARDS 2026

Winners will be announced on
30 October 2026
at the ABU Technical Committee,
Sri Lanka.



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FIFA WORLD CUP 2026: WHEN RTM TAKES CENTRE STAGE AS MALAYSIA'S OFFICIAL BROADCASTER

Author: Dr. Mohd Rizman Sultan Mohd

ABSTRACT

The FIFA World Cup is undoubtedly one of the world's largest and most widely watched sporting events, attracting audiences across continents regardless of time zones. For a national broadcaster entrusted with bringing this global spectacle to audiences at home, delivering every match seamlessly requires meticulous technical preparation, robust infrastructure, and coordinated teamwork behind the scenes. For FIFA World Cup 2026, Radio Televisyen Malaysia (RTM) takes centre stage as Malaysia's official broadcaster, placing significant responsibility on its technical teams to ensure reliable and uninterrupted delivery of the tournament. At the heart of this operation is RTM's Satellite Broadcast Services Section, which plays a key role in receiving and managing the international broadcast feeds used for the live transmission of the matches. This article presents the technical preparations, system configuration, satellite broadcast reception, and operational setup undertaken by RTM for the FIFA World Cup 2026. It also highlights the implementation and on-air results achieved throughout the broadcasting operation, including the technical considerations and challenges involved in delivering a major international sporting event to Malaysian audiences. Beyond the technology and infrastructure, the article captures the journey, teamwork, technical expertise, and collective commitment of the personnel working behind the scenes. Their efforts represent an important milestone for RTM, demonstrating the technical capability, operational readiness, and collaborative spirit required to bring the excitement of the FIFA World Cup 2026 to viewers across Malaysia.

1. FROM RIGHTS TO READINESS

It all started when the Satellite Broadcast Services Section of RTM received confirmation of RTM's role in broadcasting the FIFA World Cup 2026. This was more than the acquisition of broadcast rights; it marked the beginning of a major technical undertaking to deliver one of the world's most watched sporting events to Malaysian audiences.

The FIFA World Cup 2026 was hosted across three countries; the United States of America (USA), Mexico, and Canada with a total of 104 matches scheduled across multiple venues and time zones. For RTM, the official broadcast schedule became the common reference point for both the technical and production teams, defining the nature and timing of each transmission, whether as a live broadcast or a delayed transmission.

The scale of the tournament also introduced a unique operational arrangement. RTM and Unifi joined forces to deliver the complete tournament coverage through both RTM and Unifi channels. While the content was distributed across multiple platforms, the technical responsibility for receiving the international match feeds was handled by RTM's Satellite Broadcast Services Section.

1.1 PLANNING THE SIGNAL PATH

Before the first match could reach a Malaysian television screen, a technical foundation had to be established. The planning process involved several key considerations, including the satellite selected for downlink, transmission waveform and modulation, channel allocation, match schedule, video and audio formats, and additional operational requirements from management and other stakeholders.

These parameters became the baseline for the overall technical architecture, serving as a common reference from the opening match through to the FIFA World Cup Final. The principal satellite downlink parameters are summarised in Table 1.

PARAMETER	VALUES
Type of Modulation	NS4 16APSK
Min Channel per Carrier	2
Max Channel per Carrier	4
Video Standard	HD 1080i 50Hz
No. of Audio Channel	16

Table 1: Satellite Downlink Parameters

The selection of the transmission waveform was particularly important because the available satellite bandwidth had to accommodate multiple programmes feeds efficiently while maintaining the required signal quality and reliability. For a tournament of this scale, every megahertz of satellite capacity represents a valuable operational resource.

Satellite communication systems have evolved from conventional Phase-Shift Keying (PSK) schemes towards higher-order Amplitude Phase-Shift Keying (APSK) and Quadrature Amplitude Modulation (QAM), driven largely by the need for greater spectral efficiency. DVB-S, for example, employed Quadrature Phase-Shift Keying (QPSK), while subsequent standards such as DVB-S2 introduced higher-order modulation schemes including 16APSK and 32APSK, together with Adaptive Coding and Modulation (ACM).

Further development through DVB-S2X enabled even greater spectral efficiency and more flexible operating modes, including higher-order modulation and very-low-SNR profiles for challenging link conditions. Alongside these open standards, proprietary waveforms such as NS4 have been developed to further optimise satellite transponder utilisation through higher spectral efficiency and tightly controlled roll-off characteristics.

For the FIFA World Cup 2026 operation, NS4 16APSK was selected as the transmission format for the downlink. This configuration provided the required balance between spectral efficiency, channel capacity, and link performance, allowing multiple programme feeds to be accommodated within the available satellite resources.

The importance of this efficiency becomes particularly apparent during major international sporting events. A single tournament may involve numerous simultaneous programme feeds, including match coverage, international feeds, alternative feeds, and associated production signals. With satellite capacity typically allocated according to transponder bandwidth, efficient use of the available spectrum becomes not only a technical consideration but also an operational and economic one.

1.2 FROM PLAN TO OPERATION

With the technical parameters established, the next challenge was translating the planning assumptions into an operational system capable of handling the complete tournament schedule. The downlink infrastructure had to be configured, tested, monitored, and prepared to respond to changes in match schedules and transmission requirements.

The preparation therefore extended beyond simply receiving a satellite signal. It involved establishing a reliable end-to-end workflow in which the correct feed could be identified, acquired, monitored, routed, and delivered to the production and transmission chain at the required time. The objective was straightforward: when the referee's whistle signalled the start of a match, the corresponding international feed had to be available, stable, and ready for broadcast.

This transition from planning to execution became the real test of the technical preparation. The following sections describe how the system was implemented, operated throughout the tournament, and ultimately translated into the pictures and sound delivered to Malaysian viewers.

2. TECHNICAL EXECUTION: BUILDING THE DOWNLINK SYSTEM

Once the transmission details and technical parameters had been established, the next stage was to translate the plan into an operational system capable of supporting the entire FIFA World Cup 2026 broadcast schedule. The system was designed by considering both best-case and worst-case operating scenarios, with reliability and continuity of service as the primary considerations.

As a standard practice, each channel received from the international source was provided with a main and backup signal path. This approach ensured that a

failure in any critical component or signal path could be managed without interrupting the live transmission.

2.1 ASIASEAT 5 AS THE DOWNLINK PLATFORM

For the Asia-Pacific region, the international World Cup feeds were delivered through AsiaSat 5, a geostationary communications satellite operated by Asia Satellite Telecommunications Company (AsiaSat) and positioned at 100.5° East. Its C-band coverage provides extensive reach across the Asia-Pacific region and is widely used for international television contribution and distribution, including live sporting events.

The use of C-band was particularly advantageous for the World Cup operation because of its relatively robust performance under adverse weather conditions. This characteristic is important for a live broadcast operation in Malaysia, where heavy rainfall can potentially affect satellite links, particularly at higher frequencies.

The AsiaSat 5 coverage footprint used for the World Cup transmission is shown in Figure 1.

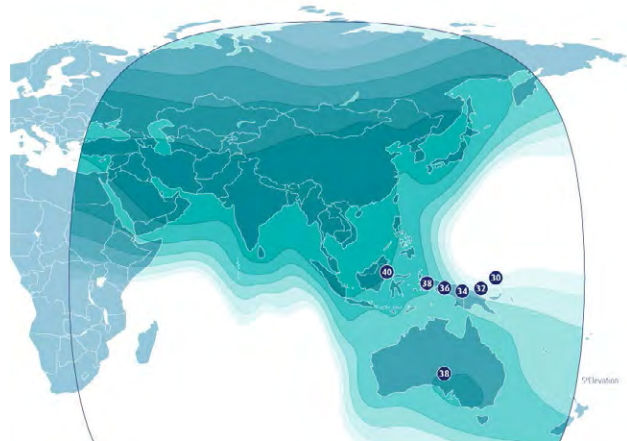


Figure 1 – AsiaSat 5 coverage footprint

For RTM, the satellite downlink system was designed around three antenna resources to provide different levels of operational protection:

- Main antenna: 11 m
- Backup antenna: 7.5 m
- Standby antenna: 7.6 m

The antenna allocation is shown in Figure 2.

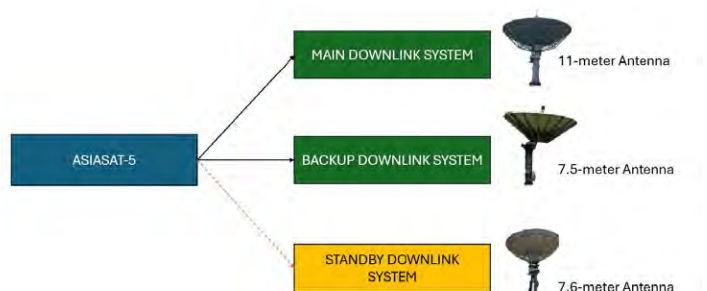


Figure 2 – Antenna allocation for FIFA World Cup 2026 feeds

2.2 DESIGNING FOR CONTINUITY

The World Cup presented a particular challenge for the Satellite Broadcast Services Section: the system had to remain reliable throughout the tournament while continuing to support other concurrent broadcasting events handled by the section. Therefore, the technical design could not rely solely on dedicated equipment for the World Cup. Instead, a combination of dedicated and flexible equipment was implemented.

The dedicated equipment was permanently assigned, configured, and labelled for the World Cup feeds. This

provided a clearly identifiable and stable signal path for the tournament. Flexible equipment, meanwhile, was maintained as an additional operational resource that could be deployed when required, particularly during equipment failure, maintenance, or overlapping events.

This approach allowed RTM to maintain the necessary level of redundancy without compromising the Satellite Broadcast Services Section's ability to support other ongoing broadcasting commitments. The standard workflow for the satellite downlink process is shown in Figure 3.

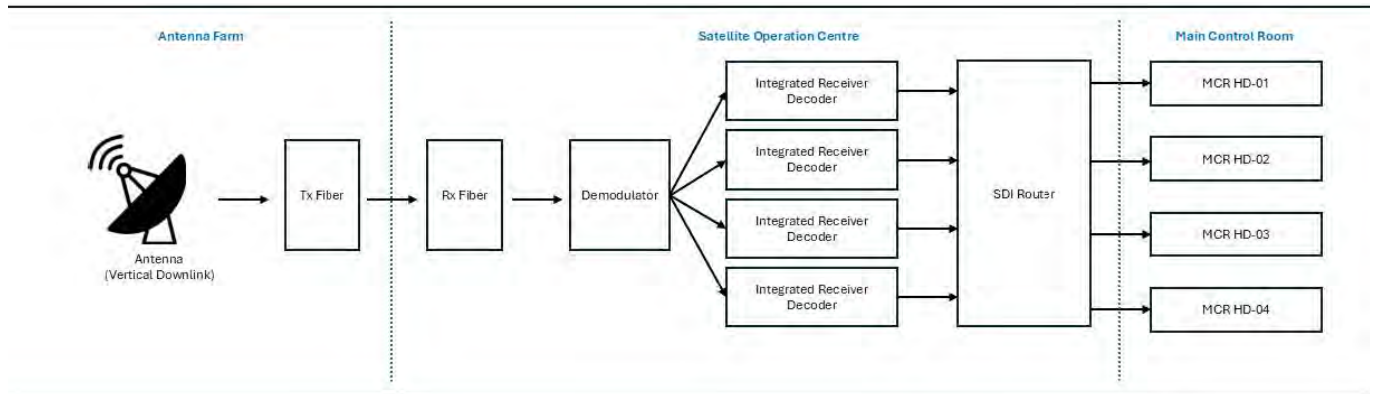


Figure 3 – Standard workflow for the satellite downlink process

2.3 MAIN, BACKUP AND STANDBY ARCHITECTURE

The final technical architecture was designed around multiple layers of redundancy. As shown in Figure 4, the World Cup setup incorporated two primary antenna paths, two demodulation paths, and a dedicated group of Integrated Receiver Decoders (IRDs).

The use of separate main and backup signal paths provided protection against a failure at the antenna, demodulator, or downstream receiving stage. Rather than depending on a single chain, the architecture provided alternative routes that could be activated when required.

The third antenna, designated as the standby system, provided an additional layer of protection. It was connected to both the main and backup fibre routes, allowing it to be integrated into either signal path when required. The standby configuration was maintained in a hot-swappable state throughout the operation, enabling the technical team to respond rapidly to a fault without requiring a lengthy system reconfiguration. The overall technical setup for FIFA World Cup 2026 is illustrated in Figure 4.

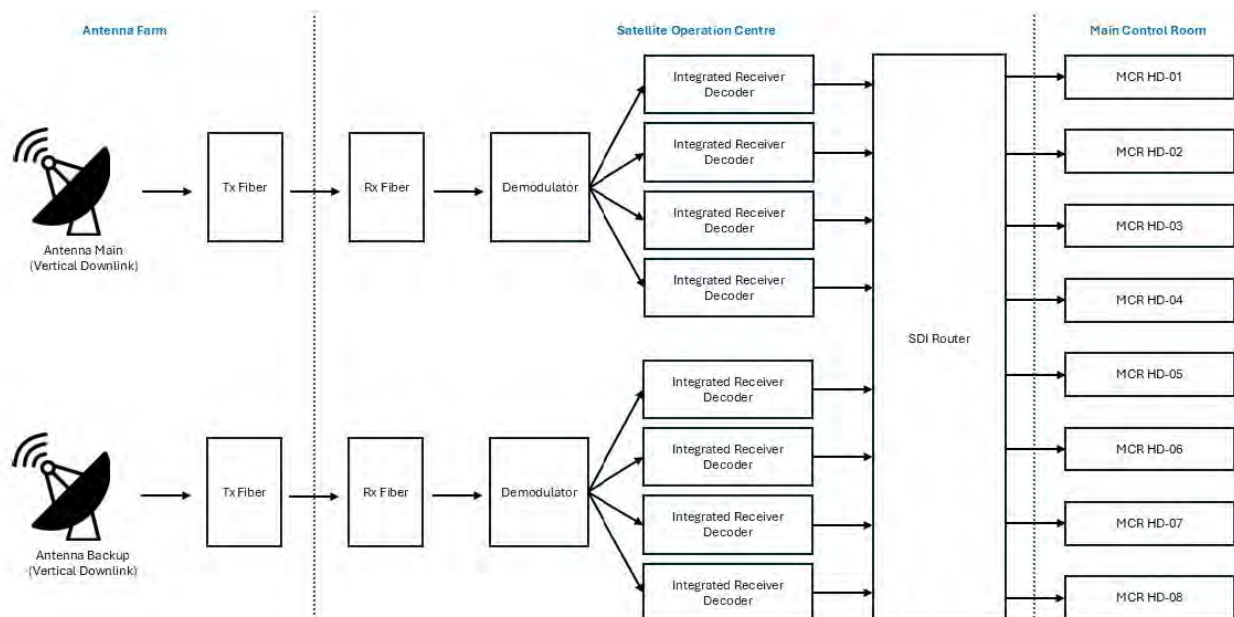


Figure 4 – Technical setup for FIFA World Cup 2026 at RTM's Satellite Broadcast Services Section

The architecture can therefore be viewed as a three-layer protection strategy: main operation, backup operation, and standby recovery. This configuration was not designed merely to provide additional equipment; it was intended to minimise the possibility that a single equipment or signal-path failure would become an on-air interruption.

For a live event such as the FIFA World Cup, this distinction is critical. There is little opportunity to repeat a match, and even a short interruption can become immediately visible to viewers. The technical objective was therefore simple: ensure that every match feed remained available, stable, and recoverable throughout the live transmission.

3. RESULTS: FROM DOWNLINK TO SCREEN

After the downlink system was configured and all signal paths were tested, the international feeds were received and monitored at the Satellite Broadcast Services Section before being handed over to the subsequent broadcast chain. The received signals were continuously monitored to ensure that the correct programme feed, video format, audio channels, and signal quality were maintained throughout the transmission.

The effectiveness of the technical setup was ultimately reflected not only in the measurements and monitoring

systems, but also in the pictures delivered on screen. Figure 5 shows an example of the actual FIFA World Cup 2026 programme feed received through the RTM satellite downlink system.

The image represents the final visible outcome of the entire technical chain, from the international satellite transmission and antenna reception to demodulation, decoding, routing, and monitoring. What appeared as a live match on the screen was therefore the result of multiple interconnected systems operating together behind the scenes.

Throughout the tournament, the technical team maintained continuous monitoring of the received feeds and remained ready to switch to the backup or standby path whenever required. This operational readiness was essential in ensuring that technical issues could be addressed without affecting the continuity of the live broadcast.

The successful reception and delivery of the World Cup feeds demonstrated that the technical planning and redundancy strategy established prior to the tournament could be translated into a reliable operational system. The final picture on screen was, in many ways, the simplest representation of a much larger technical operation taking place behind it. ■

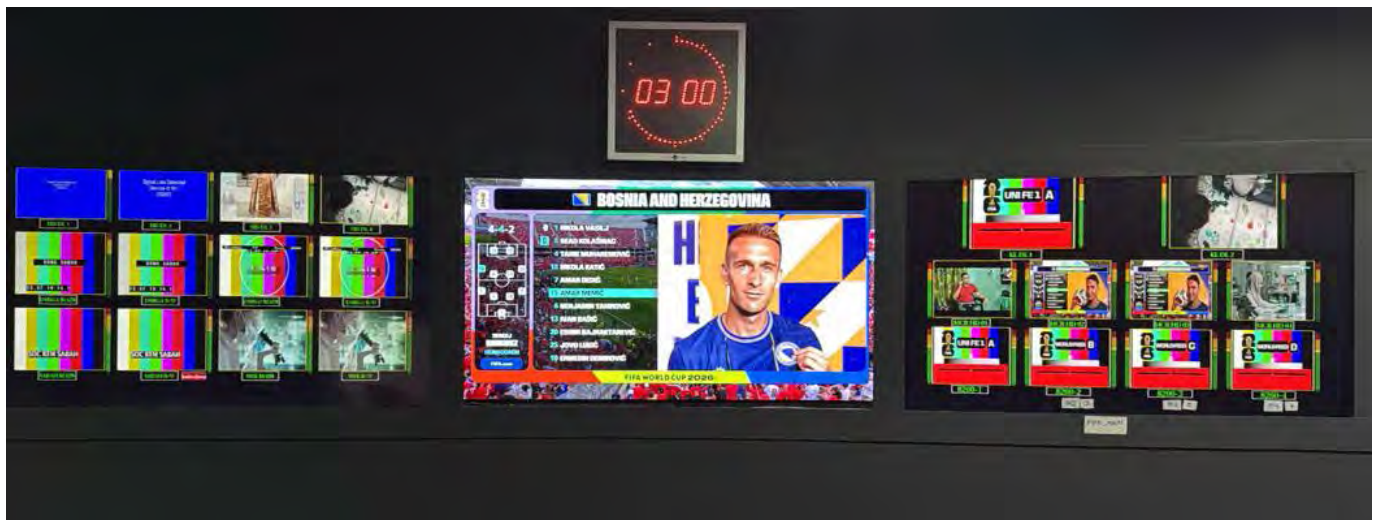


Figure 5 – FIFA World Cup 2026 programme feed received through RTM's satellite downlink

ACKNOWLEDGEMENT

The author would like to express his sincere appreciation and gratitude to the entire team of the Satellite Broadcast Services Section, RTM, for their outstanding dedication, professionalism, and teamwork in successfully managing the technical operations and delivery of the FIFA World Cup 2026 broadcasts. Their commitment and tireless efforts behind the scenes were instrumental in ensuring the smooth and uninterrupted delivery of the tournament to Malaysian audiences.



First setup planning and checking.



LNB Setup for the feeds



The final video feeds from the venue



Antenna Maintenance and Setup for the feeds.



Antenna Maintenance and Setup for the feeds.



Feed monitoring



Behind the scene team of the Satellite Broadcast Services Section



Dr. Mohd Rizman Sultan Mohd
Satellite Operations Engineer at
Radio Televisyen Malaysia - RTM

ABOUT THE AUTHOR

with over 12 years of experience in the broadcasting field, Dr. Mohd Rizman Sultan Mohd holds a Ph.D. in Electrical Engineering, specializing in Artificial Neural Networks.

His expertise is demonstrated by several professional credentials, including being a Professional Engineer (Electronics Engineering) registered with the Board of Engineers Malaysia (BEM), a Professional Technologist in Telecommunication and Broadcasting Technology registered with the Malaysia Board of Technologists

(MBOT), and a Professional Member of the Institution of Geospatial and Remote Sensing Malaysia (IGRSM).

His areas of interest include satellite communications, digital broadcasting systems, signal transmission, geospatial applications, and artificial intelligence. He is actively involved in modernizing and upgrading RTM's satellite broadcasting facilities, including implementing advanced video encoding technologies, transmission systems, and next-generation satellite broadcasting solutions.

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ABU–IPPTAR WORKSHOP: ADVANCING OTT ENGINEERING AND STREAMING INFRASTRUCTURE



The Asia-Pacific Broadcasting Union (ABU), in collaboration with the Institute of Broadcasting and Training (IPPTAR), organised the ABU–IPPTAR Workshop on OTT Engineering: Content Delivery and Streaming Infrastructure from 11–13 August 2026 at Dewan Dinamik, IPPTAR, Kuala Lumpur. The three-day workshop brought together 37 participants from 18 organisations, including 25 participants from ABU member organisations representing seven ABU member organisations. Participants included broadcasting and media professionals from organisations such as RTM (Malaysia), Whiteways (Singapore), Mediacorp (Singapore), TVRI (Indonesia), NBT (Thailand), MNL (Papua New Guinea), and Walesi (Fiji). The workshop also featured 10 speakers who shared technical expertise, industry perspectives, and practical experience across OTT engineering, content delivery, streaming infrastructure, and digital media operations.

The workshop aimed to strengthen participants' understanding of Over-the-Top (OTT) technologies, content delivery systems, and streaming infrastructure, while offering practical insights into developing, enhancing, and operating OTT services within broadcasting organisations. Throughout the three-day programme, participants explored key areas of

OTT engineering, network technologies, and the broader digital media ecosystem, while gaining practical perspectives on the technical, operational, and commercial considerations involved in delivering digital services. The workshop also provided a platform for participants to exchange experiences and engage with broadcasters, technology providers and industry experts on the evolving challenges and opportunities in OTT and digital media.

DAY 1: SCALING AND BUILDING OTT PLATFORMS

The workshop opened with remarks from **Mr Mohammad Yusari Ameer Bin Mohd Yusoff**, Head of Academic, IPPTAR, and **Mr Ahmed Nadeem**, Secretary-General of ABU. Both welcomed local and international participants and emphasised the importance of knowledge-sharing and industry collaboration as broadcasters navigate the rapidly evolving OTT and streaming environment.

The first day focused on the technical infrastructure, operational requirements, and business considerations involved in developing and scaling OTT platforms. The sessions featured insights from speakers from **IPSB Technology, AWS, Bitmovin, Ateme, and Whiteways System**.

INSIDE RTMKLIK: STREAMING FIFA AT SCALE

The first technical session, “*Inside RTMKlik: Streaming FIFA at Scale*,” provided a technical and operational overview of how RTMKlik was prepared to support the delivery of the FIFA World Cup 2026 to a large Malaysian online audience. **Ms Mardhiah Nasir** (IPSB Technology), **Mr Aswin Chanthrakswan** (AWS), **Mr Saravanan Silvarajoo** (Bitmovin) and **Mr Jayson Hor** (Ateme) presented different aspects of the technology ecosystem supporting large-scale live streaming.

The presentations demonstrated how large-scale live streaming depends on an integrated technology ecosystem involving the broadcaster, system integrator, cloud infrastructure, media processing, and streaming delivery platforms. The session outlined the respective roles of the different components within this ecosystem: RTM as the broadcaster, IPSB Technology as the solution provider and system integrator, AWS as the cloud infrastructure layer, Ateme for live encoding and media processing, and Bitmovin for playback, analytics, and observability.

Several key technical considerations were highlighted, including elastic cloud capacity, edge caching, high-availability origin architecture, efficient encoding, continuous Quality of Service (QoS) and Quality of Experience (QoE) monitoring, early load testing, and rapid troubleshooting.

The presentations also highlighted the growing adoption of emerging technologies such as AI-assisted monitoring, AI-powered search and recommendations, AI-generated live captions, AV1 encoding, HDR, spatial audio, dynamic subtitling, and server-side ad insertion.

A key takeaway was that reliable OTT delivery at national scale cannot depend on a single technology or platform. Instead, it requires coordinated planning across infrastructure, media processing, content delivery, security, monitoring, and operations. Load testing,



redundancy, elastic capacity, and real-time operational monitoring are particularly important when preparing for high-profile events with potentially unpredictable audience demand.

BUILDING AND MONETIZING OTT PLATFORMS FOR BROADCASTERS

The workshop continued with a presentation by **Mr Aale Raza** (Whiteways System), titled “*Building and Monetizing OTT Platforms for Broadcasters*.” The session examined how broadcasters can transition from traditional television operations towards digital and OTT platforms by combining robust technical infrastructure with audience-focused business strategies.

The presentation covered two interconnected areas: the infrastructure required to deliver reliable OTT services and the strategies needed to build audiences and generate sustainable revenue. As viewing behaviour continues to shift towards digital platforms, broadcasters increasingly need to compete not only with other

broadcasters but also with a wide range of digital content providers.

From a technical perspective, a successful OTT service requires an integrated workflow covering encoding, adaptive bitrate streaming, content packaging, Digital Rights Management (DRM), origin infrastructure, Content Delivery Network (CDN) distribution and multi-device playback.

From a business perspective, OTT platforms give broadcasters greater opportunities to build measurable relationships with audiences and develop alternative revenue streams. These may include advertising, subscriptions, pay-per-view, sponsorship and content licensing.

The session emphasised that OTT development should not be viewed solely as a technology project. Successful implementation requires broadcasters to consider infrastructure, content strategy, audience behaviour, analytics, monetisation and long-term operational sustainability as interconnected elements of an overall platform strategy.



FIGHTING PIRACY ON SPORTS STREAMING

Mr Dennis Wong of MediaKind presented "*Fighting Piracy on Sports Streaming*," addressing the challenges of protecting high-value live sports content from unauthorised redistribution.

The presentation examined several piracy threats, including illegal restreaming, CDN leeching, stolen DRM keys and HDMI re-encoding. Given the commercial value of sports broadcasting rights, the session emphasised the importance of implementing multiple layers of protection throughout the content delivery chain.

A layered security approach can combine Digital Rights Management (DRM), CDN access controls, geo-blocking, access tokens and VPN/proxy detection to restrict unauthorised access. The use of AB watermarking was also highlighted, enabling individual viewer streams to be identified and traced if content is leaked.

When piracy is detected, real-time CDN revocation can quickly block or terminate the distribution of a compromised stream. Together, these technologies provide multiple layers of protection before, during, and after a live event, helping broadcasters safeguard valuable content rights and associated advertising and subscription revenues.

DAY 2: LIVE SPORTS STREAMING AND NEXT-GENERATION MEDIA PLATFORMS

Day 2 centred on strategies for delivering high-value live content, especially sports, while exploring how broadcast infrastructure is evolving into next-generation media platforms. Industry experts from MediaKind and Grass Valley led sessions, sharing insights into the latest technological advancements and operational practices.

THE NEW PLAYBOOK FOR LIVE SPORTS STREAMING

Mr Pathman Palaniveloo of MediaKind presented "*The New Playbook for Live Sports Streaming*," focusing on the technical and commercial considerations involved in delivering live sports content to increasingly digital audiences.

The presentation examined approaches to improving fan engagement, audience monetisation, streaming quality and content security. Advanced features such as multiview, low-latency streaming, high-quality video, HDR, immersive audio, and server-side multiview were highlighted as technologies that can deliver more engaging and interactive viewing experiences.

Another major focus is streaming reliability and scalability. Event-based workflows can be configured to support requirements such as video quality, HDR, low latency,

watermarking, regional delivery, and DVR windows for individual events. These approaches allow broadcasters to adapt infrastructure according to each event's requirements while improving operational efficiency and managing cloud costs.

The session further highlighted the role of multi-CDN, multi-region and multi-cloud architectures in improving reliability and reducing the risk of service disruption during high-demand events. By distributing delivery across multiple infrastructure environments, broadcasters can minimise buffering and improve service resilience when audience traffic increases significantly.



BUILDING THE NEXT GENERATION MEDIA PLATFORM

The final session of Day 2 featured **Mr Nagarajan Subramonia Pillai** of Grass Valley, who presented *"Building the Next Generation Media Platform."* The session explored how broadcasters can modernise their media infrastructure through software-defined, scalable and flexible approaches.

The presentation examined the evolution and transition from traditional hardware-centric broadcast environments to software-defined and hybrid media architectures. It highlighted the growing role of cloud technologies and software-based platforms in supporting production, content management, playout, and live media operations.

The session also included practical customer deployment experiences, demonstrating how next-generation media platforms can help broadcasters improve operational efficiency, flexibility, and business agility. The discussion reinforced the need to design media environments that can adapt to changing production requirements while supporting the increasing integration of cloud technologies into broadcast operations.

DAY 3: INTERNET RADIO AND OTT RADIO WORKFLOWS

The final day shifted the focus towards modern radio streaming and the technologies supporting internet-based radio services. The sessions featured Mr Brian Ong and Mr Cheong Yen Nam of Broadcast Communications International (BCI).

CUTTING-EDGE INTERNET RADIO STREAMING

Mr Brian Ong and **Mr Cheong Yen Nam** of Broadcast Communications International (BCI) presented *"Cutting-edge Internet Radio Streaming, from Encoding, over Metadata to Distribution,"* providing a technical overview of the technologies and workflows involved in delivering modern radio services over IP networks.

The session examined the key components of internet radio streaming, from audio encoding and metadata management through to content distribution. Topics included modern audio codecs, streaming formats, metadata insertion, and audio processing and distribution workflows, giving participants an understanding of how these elements work together to support reliable, efficient online radio services.

The presentation also demonstrated how radio streaming has evolved beyond simply placing a traditional broadcast signal on the internet. Modern services increasingly incorporate efficient audio codecs, richer metadata, adaptive delivery, automation, and multi-platform distribution to support different devices, networks, and audience requirements.

OPTIMISING YOUR OTT RADIO WORKFLOWS WITH AIXSTREAM

The session also explored *"Optimizing your OTT Radio Workflows with aixstream,"* focusing on the optimisation of radio workflows for OTT delivery.



The presentation offered practical insight into how broadcasters can streamline the processing and distribution of multiple radio outputs while maintaining consistent audio quality and metadata. An integrated and modular workflow enables broadcasters to manage a common content source while generating multiple outputs suited to different platforms, devices, and distribution requirements.

The discussion reinforced the importance of workflow efficiency as radio services expand across digital platforms. Automation, metadata management, encoding efficiency, audio quality, and scalable distribution all contribute to the reliable operation of modern OTT radio services.

TECHNICAL VISIT TO MYTV

Following the workshop sessions, participants visited MYTV Broadcasting to gain practical insight into OTT content delivery and operations.

During the visit, the MYTV team introduced participants to MYTV Mana Mana, its OTT platform, and provided an overview of the platform's current operations and workflow. The session gave participants a practical understanding of how an OTT service is managed, including the overall workflow involved in preparing and delivering content to audiences.





The MYTV team also provided an overview of its operational setup and demonstrated how the different workflow components work together to support OTT content delivery. This provided a practical complement to the technical discussions during the workshop, allowing participants to relate the concepts presented to an operational OTT environment.

Participants also toured MYTV's facilities and observed the technical and operational environment supporting its services. The visit also provided an opportunity to engage directly with the MYTV team, exchange questions and experiences, and gain further insight into the practical considerations of operating an OTT platform and managing its associated workflows and facilities.

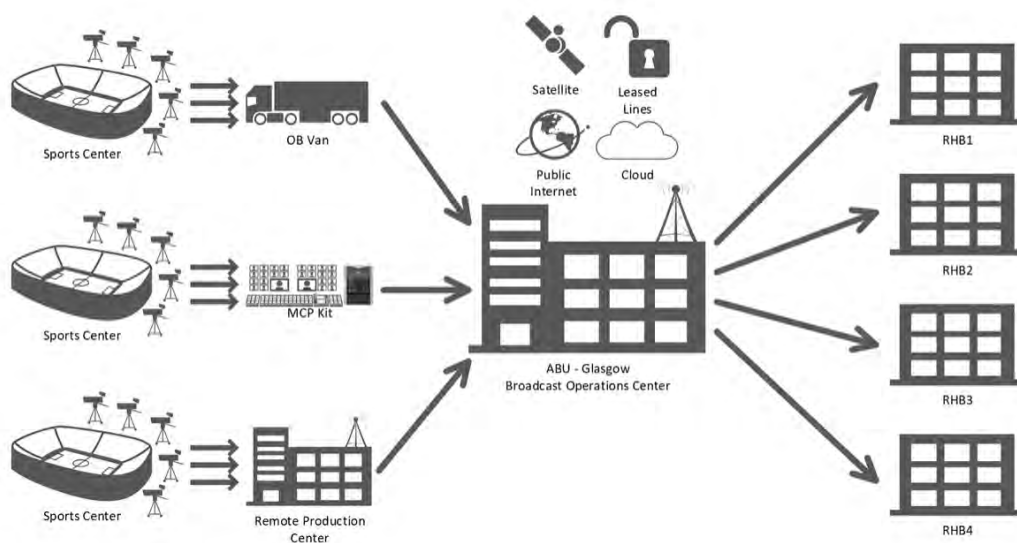


The ABU-IPPTAR Workshop on OTT Engineering: Content Delivery and Streaming Infrastructure provided participants with a comprehensive overview of the technologies, infrastructure, and operational considerations shaping modern OTT services. Over the three-day programme, the sessions showed that successful OTT delivery requires more than simply placing broadcast content online. Broadcasters must consider scalable infrastructure, efficient media processing, adaptive delivery, CDN architecture, content protection, monitoring, audience engagement, monetisation and operational resilience as part of an integrated strategy.



The workshop also highlighted the growing convergence between broadcasting and digital media, with technologies such as cloud infrastructure, AI, advanced codecs, immersive media, software-defined workflows and data-driven audience services increasingly becoming part of mainstream broadcast operations. The combination of technical presentations, industry case studies, and the practical visit to MYTV gave participants both strategic and operational perspectives on OTT implementation, helping broadcasters assess their digital capabilities and develop services that are scalable, reliable, audience-focused, and adaptable to the evolving media landscape. ■

ABU TECHNOLOGY EXPLORES PRACTICAL IP DELIVERY FOR BROADCASTING



ABU Technology successfully hosted a focused webinar titled "IP Delivery in Action: Glasgow 2026" on 17 September 2026. The event brought together broadcasters, engineers, technologists, and production professionals from across the region to explore the practical implementation of IP-based delivery for live sports broadcasting, drawing directly on ABU's production of four multilateral/multi-feed channels during the Commonwealth Games 2026 in Glasgow.

The webinar attracted participants from across the Asia-Pacific region, representing a diverse cross-section of broadcasters, technology vendors, standards organisations, and media industry professionals. Key participating member organisations included Radio Televisyen Malaysia (RTM), Myanma Radio and Television (MRTV), and TVB Limited (Hong Kong), People's Television Network (Philippines), Virtual University of Pakistan, Radio Television Brunei, MTV Channel (Sri Lanka), and Radio Television Brunei (Brunei).

EXPLORING IP DELIVERY FOR LIVE SPORTS BROADCASTING

The webinar addressed the growing strategic importance of IP delivery as the broadcasting industry shifts away from conventional satellite and hardware-

centric models toward software-defined, internet-based workflows.

The session began with welcoming remarks from ABU Technology, underscoring the growing importance of IP delivery as an operational and strategic topic for broadcasters across the Asia-Pacific. As concerns about cost efficiency, flexibility, and resilience in live production continue to grow, the webinar provided a timely platform to understand how IP delivery frameworks are being deployed at major international sporting events and what practical lessons ABU members can draw for similar migrations.

D Brandon Ching, representing SpaceLabs Technology Sdn Bhd, opened the session by introducing his background. He highlighted his team's award-winning credentials, establishing the practical, hands-on context for the presentation that followed.

GLASGOW 2026: A PRACTICAL IP DELIVERY DEPLOYMENT

Ching then provided a comprehensive overview of the Glasgow 2026 project. ABU Sports was tasked with producing four multilateral/multi-feed channels during the Commonwealth Games 2026, held from 23 July

to 2 August 2026. ABU had two options: produce the multilateral channels on-site at the Broadcast Operations Centre (BOC) based in BBC Scotland or bring all signals back to a remote Program Control Room. Because of rate-card costs and logistical considerations, ABU chose to produce on-site and send signals to the SpaceLabs International Broadcast Centre (IBC) for redistribution to the RHB takers.

Ching explained the technical parameters in detail. All productions were transmitted in HD-SDI, 1080i50, on four audio tracks, encoded at 15 Mbps H.265 (HEVC), a decision driven by the high cost of internet bandwidth rate cards. The total scale of the operation was significant: about 16 hours per day per feed × 4 channels × 3 takers × 2 feeds per channel (main and backup) × 11 days, totaling 4,224 hours of airtime. In bandwidth terms, the operation required approximately 450 Mbps, including headroom.

The presentation then contrasted conventional broadcast methods, satellite uplinks, OB vans, and hardware-centric workflows with the new IP-based approach. Ching positioned IP delivery not as the future of broadcasting, but as something already happening, with the real challenge being the seamless integration of technologies, protocols, and workflows. He introduced managed services and video cloud architectures, including Haivision Video Cloud, adaptive bitrate RTMP and HLS delivery, and the importance of deciding where broadcast operations should sit: on-site, remote, or cloud based.

UNDERSTANDING LATENCY AND COST

A significant portion of the presentation focused on latency. Ching explained that satellite delivery has a best-case latency of approximately 500–650 milliseconds, with end-to-end latency potentially reaching 500–6,000+ milliseconds depending on the number of satellite hops. Each satellite hop adds about 120 milliseconds, and total latency depends on encoding, decoding,

End-to-end workflows – From content source to final delivery



and the network path. IP delivery, by contrast, offers significantly lower latency with proper configuration, though it depends on network path, buffer settings, and protocol choice.

Cost comparison was another key theme. Ching presented the satellite rate card, showing HD/SD Mobile KU-band mobile uplink at \$2,500 per day, overtime at \$150 per hour, and additional engineering and IFB costs. Example satellite costs ranged from \$300 for 3 hours at 400 Kbps to \$3,000 for 3 hours at 4,000 Kbps. By contrast, 10 Mbps IP VPN plus local access ranged from approximately \$1,300 to \$2,900 per month depending on country, while 10–20 Mbps business broadband was approximately \$150 per month. The economic case for IP delivery over satellite was clear, particularly for high-volume, multi-feed, multi-taker events.

COMPARING IP DELIVERY PROTOCOLS

Ching then provided a detailed comparison of IP protocols. SRT (Secure Reliable Transport) was presented as open source, with strong packet-loss handling and low latency, though it requires compatible encoders and decoders. RIST was also open source and simple, but with a less mature ecosystem. RTMP was ubiquitous and widely supported but suffered from latency and was not designed for unreliable networks. Zixi was robust and enterprise-grade but proprietary with licensing costs. WebRTC offered ultra-low latency but was browser-based and not

suited for contribution. MoQ (Media over QUIC) was noted as very new and emerging. The key takeaway: for contribution over the public internet, SRT and Zixi are the two serious contenders, with RIST emerging.

Ching explained why SRT was selected for Glasgow 2026. The problem was clear: high-quality video needed to be sent over the public internet with unpredictable packet loss. Dedicated Internet Access (DIA) was highly recommended where available. After evaluating SRT, RIST, and Zixi, SRT won on several counts: it is open source with no vendor lock-in; it is widely supported across encoders and decoders; it offers flexible latency control through buffer management; and its packet recovery via ARQ (Automatic Repeat Request) works well. The trade-offs were also noted: SRT requires understanding of buffer settings, and not all devices support it natively.

TECHNICAL ARCHITECTURE AND REDUNDANCY

The Glasgow deployment's technical architecture was presented in detail. Twelve HD-SDI cables from the Host Broadcaster fed into the ABU BOC, where technical operations included program quality control, linear playout, recording and archiving, and master control. Signals were encoded via Main and Backup encoders at H.265 1080i50, then passed through SRT Gateway Main and Backup, and delivered via SRT to ABU Members. The architecture included main and backup paths

Video Codecs

MPEG PROGRESS EVERY 10 YEARS

1996	MPEG-2 Part 2		H.262	
2006	MPEG-4 Part 10	AVC Advanced Video Coding	H.264	• 2x Bandwidth Efficiency • 8x Processing Required
2017	MPEG-H Part 2	HEVC High Efficiency Video Coding	H.265	• 2x Bandwidth Efficiency • 8x Processing Required

at every stage, encoders, gateways, and decoders, ensuring continuity even under failure conditions.

Ching also presented practical lessons from implementing IP distribution systems. He emphasised that SRT is a household name in the broadcast industry right now, not the only option, but effectively feasible and viable. He discussed challenges and workarounds: packet loss above 5% requires buffer adjustment, ARQ, and consideration of lower bitrate; firewalls and NAT require careful caller/listener mode configuration and port management; jitter requires buffer tuning, not too big (adds latency), not too small (causes stutter); bitrate spikes require CBR or capped VBR; monitoring relies on SRT stats (packets sent/received, loss, RTT); and multiple streams require separate ports or multiplexing. He also mentioned network aggregation and multi-cellular bonding as alternative approaches, as well as converting and transcoding VBR into CBR.

COMPRESSION EVOLUTION AND THE GLASGOW DECISION

The presentation covered compression evolution, noting that MPEG progresses roughly every

ten years: MPEG-2 Part 2 (H.262) in 1996, MPEG-4 Part 10 (H.264) in 2006 with 2x bandwidth efficiency and 8x processing required, and MPEG-H Part 2 (HEVC/H.265) in 2017 with the same 2x efficiency gain and 8x processing requirement. HEVC delivers the same quality at 50% bandwidth, or 2x quality at the same bandwidth, but requires 8+ times CPU processing power. This was the basis for the Glasgow decision to use H.265 at 15 Mbps.

SELECTING THE RIGHT IP DELIVERY SOLUTION

Ching concluded with key decision factors for selecting the right IP delivery solution. He emphasised that there is no "best", only "best for your use case." Considerations include where broadcast operations should be located (on-site, remote, or cloud), the balance between physical/conventional and cloud-based approaches, latency requirements, flexibility to expand, AV sync, system control and correction capability, cross-conversions, adaptation, and monitoring. He noted that some cases favour sending entire DX feeds to the cloud and switching there, while others favour routing and switching on-site to allow QC and ad-hoc situations.

Throughout the webinar, the presenter explored several key themes. IP delivery was positioned as a mature, feasible, and viable technology for live sports broadcasting, with SRT as the current de facto standard for contribution over the public internet. Cost efficiency was highlighted as a major driver, with IP delivery over business broadband offering dramatic savings compared to satellite for high-volume events. Redundancy and resilience were emphasised as essential architectural principles. Buffer tuning, protocol selection, and monitoring were presented as critical operational disciplines. The Glasgow 2026 deployment was positioned as a proven case study demonstrating that IP delivery is no longer experimental; it is already operational at major international events.

In closing remarks, ABU Technology thanked D Brandon Ching and SpaceLabs Technology Sdn Bhd for their valuable insights and expertise, and all participants for their engagement and contributions to the event. The session successfully reinforced the role of IP delivery as an essential component of a modern, resilient, and cost-effective broadcast ecosystem. ■

AI IN VIRTUAL PRODUCTION

Author: Roman Nikitin, Head of the VFX & 3D Graphics Department, RT

It seems the future has once again arrived so quickly that some people are struggling to come to terms with it — and the arts have, yet again, split into two opposing camps: those against AI and those in favor of its use. This echoes the late 1990s and early 2000s, when 3D graphics firmly established itself as a mainstream tool and began to push traditional 2D animation aside. It appeared to be the end of an era. Artists who had spent years honing their craft started to fear for their livelihoods. Generations' worth of experience were at risk of becoming obsolete overnight, and many feared they simply would not be able to adapt to the new reality.

What actually happened? The industry absorbed this change and readjusted. Classical animation has not disappeared; it is still alive and keeps on evolving, now equipped with brand-new tools and possibilities. It is true that a large body of traditional work lost its relevance in the face of changing trends and viewer interests — but that very same shift has also made the "classics" timeless. On top of this, classical visual aesthetics applied in tandem with contemporary tools are highly valued.

Now the 3D animation, design, and film production sectors are approaching a similar cycle. The scale of the shift is larger this time, but the essence is the same. New tools will replace older ones; workflows will transform. That does not mean the transition will happen overnight, though — and in some well-established processes, change may not be seen at all.

Virtual Production — a relatively young field in film and television — seemed poised to replace classical production with its physical shoots, hand-drawn elements, and frame-by-frame assembly, but that was only until the industry realized that things just did not work that way. Many processes are not easy to change, and even the most advanced technologies come with their own technical quirks and limitations. Now, as the recent AI craze appears ready to sweep all that preceded it, we might want to take a closer look at what we are dealing with.

Every tool has its pros and cons, whether we are talking about classical production, VP, or AI. They affect production time, financial resources, and creative possibilities.

Classical production demands expensive equipment, high shooting costs, lengthy production cycles, and limited flexibility. Its major advantage, however, is a predictable, high-quality result that has been perfected over decades.

Virtual Production is no cheap alternative either, and its production timeline is not much shorter. What's more, the end result doesn't offer quite as many possibilities. However, VP offers significant benefits to the actual shooting process, such as the ability to shoot same-day or to go live on television with virtually unlimited runtime. You can re-shoot without post-processing or keep broadcasting for as long as needed, while achieving a predictable outcome.

In terms of financial and labor costs, AI is king. Its creative possibilities are practically limitless, but weak outcome predictability and limited runtime (for now) present serious downsides when compared to the first two methods.

The middle ground in which our team operates, delivering live television broadcasts, is Virtual Production — primarily because we are in the news business, and live broadcast is our main product.

This format draws on all the classical methods of content production, with the cinematographer, programmer, director and their creative vision still playing a central role in shaping output. At the same time, it allows for the use of a broad range of AI-powered tools, from those already up and running to those that are just around the corner.

It's a modern, agile technological process that is evolving in its own right — but it does not stand alone. In that sense, VP offers a holistic framework, the kind that brings together all the new technologies while honoring the time-tested industry standards and workflows.

There is no need to walk you through the entire technological pipeline, especially since the classical stages of production have already been covered in detail in dozens, if not hundreds of articles and books. Instead, I will try to focus on the key aspects that seem particularly important to us in the context of the final result — and, specifically, the use of new solutions based on the use of artificial intelligence tools.

BLESS FOR 3D

Virtual Production is a filmmaking technology that blends live-action shooting with the creation of digital 3D worlds in real time.

To build these three-dimensional environments, designers rely on powerful visualization tools that have been refined over the past fifty years. These solutions open up nearly limitless possibilities for bringing creative ideas to life in the realm of 3D graphics.

The human factor remains crucial as flexibility of thinking, artistic vision, muscle memory, and raw talent all vary from one expert to another — this is why the same task can be approached in multiple ways and take different amounts of time depending on who is handling it.

So how do you tackle this kind of challenge with AI? A solution exists, but it calls for a different, more methodical approach.

Here's how it works:

The designer formulates a detailed prompt describing the desired visuals and obtains a 2D draft.

That output is then fed into another AI system, which converts the flat image into 3D geometry.

These tools unlock virtually limitless artistic possibilities and can deliver striking results. The key advantage is time: it takes AI minutes to generate what might take a human designer a week to produce.

Of course, as you might expect, this process is not so straightforward. The technology has its limitations: the quality of the output depends heavily on how precise the original prompt is, and complex or unconventional tasks often require manual fine-tuning.

AI is not yet capable of following all the rules of 3D mapping. What you get is a raw draft that needs to be cleaned up, optimized, and refined.

This is especially true in the case of objects intended for animation, which has its own strict requirements for 3D models. Often enough, AI-generated objects have to be rebuilt almost from scratch. This raises a fair question: would it not be more efficient to have a designer create the model manually from the very start?

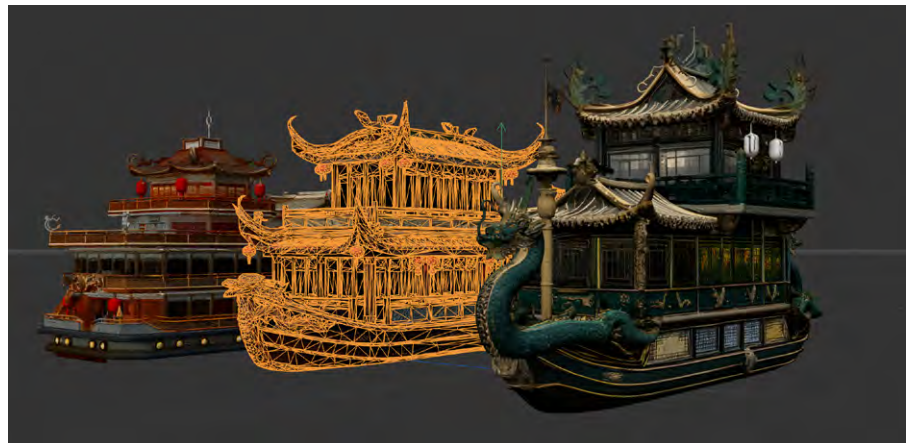
For our Chinese New Year project, we used generative 3D objects with complex visual structures but no complex animation. We placed them in the background and midground, where the object's technical parameters are not a critical factor. This approach offered us the benefit of AI generation's speed while achieving the overall quality of visual output we aimed to achieve.

Current AI-based solutions cannot yet deliver the necessary level of detail and optimization, but the trend is already clear, and integration of AI into the designer toolkit is accelerating. The old approach of manually entering numerical parameters is giving way to prompt-based editing.

Such systems are more than just web applications — rather they are integrated add-ons within the software. How does this work? By creating simple primitive objects and describing the desired outcome in detail, you build a bridge between the AI agent and the 3D program. The system then visualizes the requested result as an image or video complete with reverse integration where primitive placeholders are replaced with three-dimensional models.



Virtual Production project for News



AI generated 3d models



Source for Generative blackout

These workflows are still in their early stages of development and are not fully intuitive or convenient to use — they will either be refined or completely revised with time. Many people have still not come to terms with the idea that in certain aspects of production, manual labor will not just be discouraged but rather virtually prohibited. The commercial market, always eager to cut production time and costs, will be the first to feel these changes.

CODE MODE ON

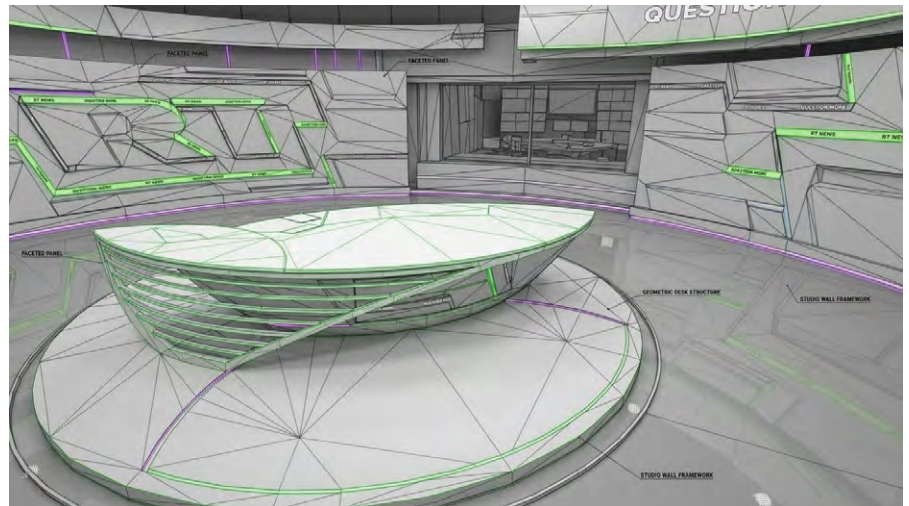
Virtual Production in news making is not only defined by live broadcasts or long takes — it is also heavily focused on interactivity. A nice backdrop is not enough; there always needs to be something dynamic happening on screen. Take election coverage, for example, a parliamentary or a presidential race. This generally necessitates interactive maps, voting data displayed in charts and tables, candidate bios — all kinds of infographics that need to be integrated into the broadcast. Behind the scenes, all of this is powered by complex, pre-programmed workflows that handle a constant stream of real-time data from multiple sources. This data needs to be interpreted correctly and updated instantly as the numbers change.

This is where AI assistants come in handy. They can help fix or generate chunks of code for these kinds of tasks — and, more impressively, you can describe what you need in plain language and get entire functional modules back, ready to be used for your project. Our developers have pointed out that these AI tools are basically giant knowledge base engines. You can think of them as a freshly graduated junior developer with straight A's — a brilliant student who is still prone to applying their knowledge in ways that may not quite fit the situation. They need direction and hands-on mentoring to actually prove useful.

That's why having a seasoned human programmer on the team isn't optional — it is a must. One bad piece of code slipped in by an AI assistant is enough to create a problem that nobody on the team will be able to diagnose.



Generative blackout



Generative 3d objects from Generative blackout



Special Coverage for Bundestag Election



Art of AI Coding

AR OFFLINE

Our creative development team came up with an interesting solution. Why wait for new technologies to fully mature when there are tools that can deliver results right now? And why stop there — why not turn the news studio into a real testing ground for emerging technologies, rather than limiting it to one format?

Many are already using AI for video generation, which has unlocked dazzling creative possibilities. Virtual Production's current limitations in terms of content production time and visual rendering quality are easily compensated by the advantages AI offers. What you get is a lot more just 3D graphics; it looks like reality, like actual cinema, and it's frankly stunning — almost like magic.

Still, the drawbacks are evident: short runtime and a single-use quality due to limited flexibility. Nonetheless, this tech is trending; it will improve and become more deeply integrated — to the point where those limitations can be bypassed altogether. This will be the next stage.

WHAT IS NEXT?

Now I would like to turn your attention to technology that was recently announced by developers and is promising to put generative processes and Virtual Production at the forefront of change across the film and television industry. As I mentioned earlier, this middle ground is where the future is taking shape.

The rendering of real-time computer graphics still lags behind both classical production and AI generation. Current hardware capabilities are simply unable to calculate realistic physical rendering processes on the fly, and we are still a long way from getting a 100% natural look. Some bright minds have come upon a genius solution: why not use the latest video generation technologies in post-processing and, in a way, create an AI filter that can brush up the final VP scene, correcting all the imperfections and limitations



Augmented reality with AI



Augmented reality with AI

in terms of lighting, materials and looks, pushing everything toward photorealism — all in real time?

Flexible control tools will allow designers to manage the process, deciding which elements need more detail.

THE END IS NEAR

Our projects are fueled by the passion and drive of our team of designers who are pushing themselves to learn something new every single day in the rapidly shifting industry landscape. They are professionals with a clear vision, who explore the versatile media

environment from every angle, from cinema to video games and traditional art, looking to find new and productive ways to apply their knowledge in the fields of Virtual Production and Augmented Reality.

It pains me to see the frustration of some of my fellow designers who know firsthand that true artistry, often born through struggle and labor, is what produces genuine masterpieces. It is painful when years of hard-won experience and a finely honed artistic vision are rendered obsolete by the arrival of new



Example of the future realistic AI rendering. Before and After

formats, when one finds oneself powerless against a market that is changing so rapidly that the future is shrouded by fear.

But after taking a step back and looking at this with a clear head, it becomes obvious: this isn't a curse — it's a gift. Those days and nights spent learning to do things that stop trending overnight can now be replaced with new technology. New tools will help us reach heights we dared not dream of before. We can stop wasting valuable time and efforts, allowing us to maybe — finally — free up our potential to invest it in ourselves and in what truly matters to us. ■



Roman Nikitin

ABOUT THE AUTHOR

Head of VFX & 3D Graphics Department, RT

Roman Nikitin leads the team responsible for the network's VFX, AI, and Augmented Reality projects, and manages the entire production pipeline, including the work of all VFX artists. He oversees all 3D graphics elements produced for newscasts, programs, and special projects alike.

He possesses in-depth knowledge of Unreal Engine and a wide range of specialized hardware and software tools. Together with a team of programmers and engineers, he has developed custom in-house tools tailored to specific production challenges. His personal focus as an artist is on lighting and compositing, as well as implementing AI technology into existing production workflows for virtual production in a news environment.



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QUESTION MORE

News from The ABU Region

MEDIACORP AND PARTNERS TRANSFORM THE COMMUTER EXPERIENCE FROM SCREENS TO STATIONS

In a significant move aimed at transforming daily travels in Singapore, Mediacorp, Moove Media, and SBS Transit have entered a memorandum of understanding (MOU) to foster greater connectivity and engagement for commuters. The collaboration, formalized at Dhoby Ghaut MRT Station, aligns with the vision of "Unlocking Possibilities – Creating Value Through Connections."

This partnership targets the ever-evolving nature of audience interactions, which increasingly traverse digital, social, and physical realms. By leveraging SBS Transit's extensive public transport network—which accommodates three million passenger journeys per day—Moove Media's transit media, which captures 70% of daily commuter journeys, and Mediacorp's rich content and audience insight, the three organizations aim to cultivate a more integrated ecosystem. This initiative seeks to enhance the commuting experience while also delivering valuable advertising opportunities.

The collaboration focuses on three main areas:

1. Consumer Engagement: By providing trusted content and experiences directly to commuters, the initiative hopes to enrich daily travels.

2. Joint Advertising Solutions: The partnership intends to roll out integrated, cross-platform offerings that capitalize on the combined strengths of the organizations for advertisers.

3. Platform Collaborations: The three entities will explore innovative ways to leverage their collective capabilities.

For commuters, the agreement promises a more informative and engaging environment during their travels. Selected Mediacorp content will be made readily available across the public transport network, including MRTs, buses, and taxis. This approach is expected to deliver curated content experiences and reliable news updates that not only brighten transit spaces but also foster stronger community connections.

Advertisers will benefit from the initiative through integrated advertising solutions that encompass Mediacorp's content ecosystem and Moove Media's out-of-home transit network. Potential offerings may include bundled advertising options and customized cross-platform campaigns coupled with improved audience measurement capabilities. This would allow brands to resonate with consumers across various platforms and settings more effectively.

Tham Loke Kheng, CEO of Mediacorp, emphasized the commitment to providing trusted, engaging content to audiences, whether at home, online, or on the go. She expressed enthusiasm for partnering with both Moove Media and SBS Transit to enhance the vibrancy and informational quality of Singapore's transit spaces.

Jeffrey Kwek, CEO of Moove Media, noted the transformation of out-of-home media from mere reach to the creation of connected and measurable audience experiences. He asserted that the collaboration would enrich the commuter journey, enhancing the effectiveness and accountability of advertisers.

SBS Transit's Group CEO, Jeffrey Sim, highlighted that the partnership aims to deliver more than just screens or content—it seeks to add substantial value to passengers' everyday commutes. By pooling strengths, the initiative aspires to provide timely, relevant, and engaging content across all 67 MRT stations on the North East Line and Downtown Line, enhancing the informal yet invaluable moments of daily travel.

Overall, this collaboration marks an important step towards redefining what it means to be a commuter in Singapore, introducing a future where journeys become not only more connected but also increasingly enjoyable and rewarding. [[Mediacorp](#)]

PAKISTAN TAKES SIGNIFICANT STEP TOWARDS ACCELERATING BROADCAST DIGITISATION

Pakistan is set to achieve a breakthrough in the modernization of its broadcasting industry. The government has outlined plans to fully digitise the analogue transmission networks of Pakistan Television (PTV) and the Pakistan Broadcasting Corporation (PBC) as part of its Annual Plan for 2026–2027.

This initiative builds upon the progress achieved in the previous fiscal year, which saw the upgrade of three PTV stations and several PBC transmission facilities to digital systems. The upcoming phase aims to complete the digitisation process, which is expected to enhance broadcast quality, improve operational efficiency, and establish a more resilient national broadcasting infrastructure.

In conjunction with the digitisation programme, the government has proposed the establishment of a National Centre for Brands Development (NCBD). This centre aims to strengthen Pakistan's national image and support export-led growth through strategic branding initiatives.

Additionally, plans have been revealed for a Creative and Culture Industry Strategy, which seeks to promote Pakistan's cultural and digital content on an international scale and expand the country's global media presence.

Although these proposals demonstrate a strong dedication to improving the broadcasting and creative industries, specific plans for implementation, funding structures, and delivery timelines have yet to be announced.

These initiatives reflect a broader vision to modernise state media institutions and bolster Pakistan's cultural and economic soft power. As the nation continues its digital transformation, the successful execution of these plans is anticipated to play a crucial role in enhancing public service broadcasting and positioning Pakistan's media industry for future growth. [\[ABU News\]](#)

MAGNA SYSTEMS AND CANARA LIGHTING PARTNER TO EXPAND REGIONAL LIGHTING SOLUTIONS

Magna Systems has been appointed as the technology partner and distributor for Canara Lighting in Australia and New Zealand. This collaboration aims to provide customers in these regions with a unique blend of global lighting expertise and reliable local support.

With a rich history dating back to 1972, Canara Lighting boasts over five decades of experience in specialized lighting. The company has established a strong reputation for delivering end-to-end solutions suitable for a range of applications, including TV studio lighting, film studio systems, auditorium and theatre lighting, stadium lighting, and architectural projects.

The architectural lighting applications offered by Canara include facade lighting, musical fountains, musical fountains with water screen projection mapping, sound and light laser shows, and 3D projection mapping.

Ajeet Khare, Managing Director of Canara Lighting, expressed confidence in the partnership, stating that "Magna Systems is the ideal partner to represent Canara Lighting in Australia and New Zealand." He emphasized Magna System's excellent reputation for professionalism, technical competence, and customer support, alongside decades of experience in these critical markets.

Khare highlighted the advantages beyond product availability for customers in Australia and New Zealand, mentioning that Magna Systems brings established regional relationships, consultative sales expertise, systems integration capabilities, and a knowledgeable team that understands the local operational, technical, and commercial realities.

Matthew Clemesha, Group CEO of Magna Systems, reinforced the significance of the partnership, describing it as an excellent match for both companies and, importantly, for customers in Australia and New Zealand. He noted that Canara Lighting offers a comprehensive lighting portfolio and a proven ability to deliver complete solutions from concept to commissioning.

Clemesha added, "At Magna Systems, we bring the regional experience, customer relationships, engineering mindset, and market knowledge needed to help those solutions succeed locally." Together, Magna Systems and Canara Lighting aim to offer customers a highly professional and dependable path to enhanced lighting outcomes across various sectors, including broadcast, production, live venues, and architectural projects. [\[APB News\]](#)

ABC EXPLORES AI WRITING TOOLS FOR NEWSROOMS AMID TRUST CONCERNS

The Australian Broadcasting Corporation (ABC) has embarked on plans to incorporate artificial intelligence (AI) into its operations, prompting cautious optimism from experts and the journalists' union. However, concerns have also been raised about the potential erosion of public trust in the broadcaster if AI is misused.

To address the skepticism that surrounds AI technology among many Australians, the ABC is set to implement AI tools for its staff. Recent communications from executives revealed updated AI guidelines, a partnership with Anthropic, the developers of Claude AI, and trials aimed at converting regional radio bulletins into online articles using AI.

ABC representatives have emphasized the advantages of AI in journalism, suggesting it could enhance efficiency in routine tasks and free up time for more original newsgathering. An ABC spokesperson highlighted that the integrity of the news remains firmly with the journalists and that AI cannot replicate unique, original journalism.

The ABC's focus has shifted from debating the integration of AI to determining how to do so in alignment with its core values. Managing Director Hugh Marks and Chief People Officer Deena Amorelli conveyed this perspective in an all-staff email, announcing plans to adopt Anthropic's Claude AI as a standard enterprise-wide tool, alongside existing tools from Microsoft and an internal chatbot. A pilot program is set to launch in July with 100 selected "AI Champions," followed by a gradual rollout.

Currently, the ABC utilizes AI for various functions, including third-party tools for production tasks like transcription and its proprietary AI, ABC Assist, which aids in story research and production. A notable use of AI in public-interest journalism was demonstrated when it helped identify patterns of negligence in Indigenous deaths in custody.

To ensure the safe implementation of AI tools, the ABC is recruiting an AI Adoption Specialist and an Enterprise AI Operations and Assurance Lead to focus on training, monitoring AI integration, and developing AI agents.

One specific project involves using ABC Assist to convert regional radio bulletins into digital articles, with local journalists overseeing this process to ensure multiple levels of review, including checks by editorial leaders and sub-editors. The ABC believes this approach will expand

its audience outreach without overburdening newsroom staff, thereby maintaining its commitment to human oversight in journalism.

Despite the potential benefits of AI, concerns about job security and audience trust persist among ABC staff. Cassie Derrick, Director of Media for the Media, Entertainment and Arts Alliance (MEAA), acknowledged that while AI could enhance the journalism process by enabling journalists to engage in critical analysis and connect sources, there are concerns about job stability. Although some commitments have been made to consult on AI use in recent negotiations, management has not agreed to provisions to ensure AI does not replace human employees.

As trust in mainstream media continues to decline, the ABC remains Australia's most trusted news source according to polling data. However, public sentiment towards AI usage in journalism is mostly skeptical, with surveys indicating widespread wariness. Michael Davis, a research fellow at the University of Technology Sydney's Centre for Media Transition, noted that the ABC is taking a more cautious approach to using generative AI for audience-facing applications compared to other media organizations, such as Nine, Seven, and News Corp, which have rapidly adopted AI tools in their news delivery. [[ABC News](#)]

KBS EXPANDS AI ECOSYSTEM ACROSS BROADCAST OPERATIONS AND PRODUCTION

Korean Broadcasting System (KBS) expanded its use of artificial intelligence (AI) across both workplace operations and content production in 2026, establishing an integrated AI ecosystem through its KAIROS platform and the AI Production Hub.

KBS launched KAIROS on July 1, 2026, providing employees with access to AI tools tailored to their daily work. The platform combined KBS's production expertise with AI technologies and was developed as an evolving system, with new features introduced through an agile approach and refined based on user feedback.

Among its key applications were task-specific chatbots supporting editorial and production workflows. Journalists could use reference materials to generate analyses of key facts, verification points, and areas requiring further research. In contrast, producers could generate interview outlines and suggested questions based on background information. The platform was operated through an independent security cloud developed with a domestic technology partner, helping to protect sensitive internal and production data.

KBS further expanded its AI capabilities by launching AI Production on August 3, 2026. The dedicated hub provided content planning, production consulting, workflow development, quality control, and staff training, supporting the practical application of generative AI throughout the production process.

One of the hub's initial projects was the historical drama Great King Munmu, scheduled to premiere in November

2026. Generative AI was planned for use in creating large-scale battle scenes, previsualizing complex or hazardous sequences, and producing visual effects such as fire. These applications were intended to improve production efficiency and on-set safety while supporting greater visual realism.

AI was also being introduced into KBS's audio workflows. More than 10 announcers agreed to contribute their voices to speech synthesis technology for use in radio news and narration. Beginning August 10, KBS News and Current Affairs also started piloting AI-generated voiceovers for selected reports on News 12, utilizing text-to-speech models trained on the voices of consenting journalists.

Together, KAIROS and AI Production represented KBS's approach to integrating AI across both office-based workflows and end-to-end content production, covering areas from research and planning to production, post-production, and broadcasting. The initiatives demonstrated a broader shift towards embedding AI capabilities within established broadcast workflows while maintaining security, human oversight and production requirements. [[KBS News](#)]

TVRI PARTNERS WITH ETERE TO DELIVER WORLD CUP 2026 ACROSS INDONESIA

Televisi Republik Indonesia (TVRI) has undertaken an ambitious initiative to deliver coverage of the 2026 World Cup to viewers across Indonesia via its TVRI Nasional and TVRI Sport channels. This operation runs on the Etere Ecosystem, which has been implemented in collaboration with Etere's distributor, PT Galva Technologies.

The deployment includes a new LTO9 archive and aims to streamline TVRI's workflows under a single central control system. Etere's integrated database is touted to ensure consistent, high-performance delivery of the tournament on a nationwide scale.

Three core components constitute the deployment. The Etere ETX serves as an IT-based video management and playout platform, integrating multiple input and output capabilities into a single interface. This includes functions for mixing, character generation, branding, and audio/video operations.

In addition, the Etere Transcoder handles critical processes such as decoding, encoding, transcoding, muxing, demuxing, filtering, and frame-rate conversion across various standards. The Etere Multichannel Ingest facilitates the ingest and playback of 4K/Ultra HD (UHD), HD, and SD content from various sources, including NDI, SDI, and IP feeds, with the capacity for up to six simultaneous streams.

Moreover, Etere has expanded its publishing capabilities with the integration of WordPress for its media asset management (MAM) platform and Nunzio Newsroom. This enables users to publish content directly to self-hosted WordPress sites without navigating away from the Etere interface.

This integration is part of the Etere Social Media Package, allowing users to configure and log in once to enable auto-publishing. Additionally, they can assign categories and tags to optimize content organization and discoverability. Notably, news stories can also be published to WordPress automatically once they go on-air in the rundown.

Etere claims that this WordPress integration presents a unified workflow, effectively bridging broadcast and digital publishing. This innovation enables stories to reach audiences across multiple platforms as they air, enhancing the overall viewer experience. [\[APB News\]](#)

ENENSYS TECHNOLOGIES CERTIFIES SAMSUNG XCOVER7 PRO FOR EMBMS PUBLIC SAFETY APPLICATIONS

ENENSYS Technologies has completed the certification of the Samsung XCover7 Pro for use with its eMBMS middleware in public safety networks, following a series of integration and performance tests.

The certification, completed on 23 March 2026, validated the integration of ENENSYS Technologies' CubeAgent CC middleware, version 2.3.17, with the Samsung XCover7 Pro. The device, running Android 16 and powered by a Snapdragon 7s Gen 3 processor, successfully completed integration tests covering both Northbound and Southbound interfaces.

The certification comes as public safety communications networks in parts of South and Central Europe continue to transition to LTE and 5G-based broadband infrastructure. In these environments, the efficient distribution of high-volume multimedia content is becoming increasingly important, particularly for emergency and mission-critical communication applications.

eMBMS multicast technology enables simultaneous content distribution to multiple devices, potentially reducing the network resources required compared with individual unicast connections. According to ENENSYS Technologies, the technology offers several advantages for frontline public safety operations:

- **Service Availability:** Multicast delivery can reduce the risk of network congestion during major incidents by distributing a single data stream to large numbers of devices. This can help maintain connectivity for multiple field operatives when network demand is high.
- **Coordinated Information Delivery:** Mission-critical content, including live tactical video feeds and real-time mapping, can be distributed simultaneously to multiple devices. This supports synchronized access to information among response teams operating in the field.
- **Sustainable and Cost-Efficient Infrastructure:** By transmitting a single data stream to multiple recipients rather than separate streams for each device, multicast delivery can reduce network resource requirements. This may help limit the need for additional infrastructure and reduce associated energy consumption.

The certification is particularly relevant to public safety scenarios where large numbers of users may require access

to the same high-bandwidth content simultaneously. Applications such as live video, mapping and other situational-awareness tools can place significant demands on broadband networks during emergency operations.

ENENSYS Technologies stated that the certification demonstrates the XCover7 Pro's ability to support demanding multimedia applications when integrated with its CubeAgent CC middleware. Samsung Electronics Iberia similarly highlighted the device's combination of ruggedized hardware and network capabilities for frontline applications.

The certification forms part of ENENSYS Technologies' broader work in eMBMS and LTE-Broadcast technologies, including device certification, software integration, technical consulting and validation for critical communication environments.

The development illustrates the continued use of broadcast and multicast technologies within LTE and 5G networks, particularly for scenarios requiring reliable, simultaneous delivery of multimedia content to large groups of users. For public safety organisations, these technologies could offer an alternative way to manage network capacity during high-demand emergency situations. [\[ENENSYS\]](#)

RTM EXPANDS PORTFOLIO OF INTERNATIONAL SPORTS BROADCASTS

Radio Televisyen Malaysia (RTM) has expanded its portfolio of international sports coverage, building on its successful broadcast of the 2026 FIFA World Cup. The public broadcaster was appointed the official broadcaster for the Glasgow 2026 Commonwealth Games, held from July 23 to August 2, further strengthening its role in delivering major international sporting events to Malaysian audiences.

RTM provided nearly 100 hours of Commonwealth Games coverage, including live broadcasts of the opening and closing ceremonies, daily live competition coverage, and highlight programs featuring Malaysian athletes. Coverage was available through RTM's free-to-air television channels, RTMKlik, and its digital platforms, providing audiences with broad and accessible access to the Games.

RTM is also expected to announce the acquisition of broadcasting rights for several additional world-class sporting events in the coming months, further reinforcing its commitment to delivering premium sports content to Malaysian audiences. This expansion reflects RTM's continued dedication to high-quality sports broadcasting and enhancing public access to major international competitions.

The move is part of RTM's wider efforts to expand its lineup of high-profile international sporting events and diversify its programming across traditional and digital platforms. By securing and delivering premium sports content through multiple channels, RTM continues to strengthen audience engagement while reinforcing its position as Malaysia's public service broadcaster for major international competitions. [\[ABU News\]](#) ■

DIGITAL BROADCASTING *Updates*

FREEVIEW NZ TO LAUNCH WORLD'S FIRST NATIONWIDE DVB-I SERVICE

Freeview New Zealand has announced Freeview NextGen, a new service expected to become the world's first nationwide free-to-air TV platform based on DVB-I, the open standard for internet-based TV service discovery and programme information.

Scheduled to launch before the end of the year, Freeview NextGen will deliver linear TV channels over broadband without requiring a dedicated app, satellite dish or aerial. For households with both an antenna and broadband connection, the service will combine broadcast and IP-delivered channels into a single TV guide while automatically removing duplicates.

The service will integrate into the TV's native interface, allowing viewers to access internet-delivered channels through the normal TV setup and viewing experience. It will initially launch on selected TCL and Hisense TVs, with wider adoption expected as more manufacturers support DVB-I.

The launch comes as DVB-I deployment expands internationally. Eutelsat has already adopted DVB-I for its Sat.tv service, while trials and implementation activities are underway in Italy, Germany, Ireland, Australia, France and Spain.

Freeview NextGen marks an important step for DVB-I, showing how broadcast and broadband delivery can combine to provide a seamless, future-ready free-to-air television experience. [[DVB](#)]

DVB DEVELOPS FILECASTING TO ENABLE BROADCASTERS TO DELIVER ANYTHING

DVB is developing filecasting, a new capability that extends the role of broadcast networks beyond traditional live television. Instead of delivering only linear video, filecasting would let broadcasters distribute a wide range of digital content, including

video-on-demand, audio, software and game updates, digital magazines, e-learning materials, applications, and other file types. The concept leverages the one-to-many efficiency of broadcasting, where content can be delivered to many receivers within the broadcast coverage area at a relatively fixed network cost.

The technology builds on DVB-MABR (Multicast Adaptive Bitrate) and DVB-NIP (Native IP), combining broadcast networks with IP multicast. Under the proposed push-and-pull model, content providers push files into the network. At the same time, client applications select and retrieve the content they require based on the available catalogue and user or service context. This lets the same broadcast infrastructure handle files of different types and sizes without requiring the network to be aware of the specific content being delivered.

DVB is currently developing the approach in two phases. The first focuses on standardising the DVB-MABR interface for file delivery, while the second could extend filecasting across multiple multicast networks, including DVB-S2/S2X and DVB-T2. Ultimately, filecasting could transform existing broadcast spectrum into a general-purpose, cost-efficient content delivery layer for the IP world, offering broadcasters another way to distribute large volumes of digital content, particularly to audiences with limited or unreliable broadband connectivity. [[DVB](#)]

ATSC STANDARDS UPDATE: NEW DOCUMENTS APPROVED AND PUBLISHED

Since the previous issue of The Standard newsletter, one updated ATSC Standard and two updated Recommended Practices have been published:

- A/327:2026-08 – Guidelines for the Physical Layer Protocol, updated with Errata and Signal Propagation.
- A/360:2026-08 – ATSC 3.0 Security and Service Protection, updated with OCSP.
- A/361:2026-08 – Security and Content Protection, updated with OCSP Clarifications.

Several documents were also under ballot, covering Service Announcement, Digital Rights Management (DRM), and Captions and Subtitles.

In addition, TG3/S32 reached consensus to update A/324, Scheduler / Studio to Transmitter Link, with the revised document expected to be published shortly. [[ATSC](#)]

FMTS PLATFORM A FRIENDLY, UNIFIED TOOL TO FIGHT AI-ENABLED PIRACY

Friend MTS has launched the FMTS Platform, a unified anti-piracy solution designed for content owners, broadcasters and OTT service providers.

The platform brings together monitoring, watermarking, social media tracking, blocking, intelligence, enforcement and analytics in a single system. Its AI engine analyses activity across the open web, social platforms, streaming services and closed IPTV networks to identify patterns associated with piracy and provide actionable intelligence.

Users can investigate and manage infringement cases directly from the platform, including issuing takedown requests, filing claims and escalating cases through its API. Friend MTS says the platform is supported by its piracy experts and draws on 26,000 hours of content captured and processed daily. [\[APB+\]](#)

SUITEST AI-POWERED TESTING AND QUALITY ASSURANCE CAPABILITIES

Suittest has introduced the latest developments to its AI-powered test automation platform for OTT providers, operators and device manufacturers.

The platform combines automated testing, live video monitoring, performance analytics and device certification to help organisations identify issues earlier, accelerate software releases and improve streaming reliability.

New capabilities include a compact AI-accelerated HDMI capture device, an expanded Public Device Cloud supporting platforms such as Samsung Tizen, LG webOS, Android TV, Google TV, Fire TV and Roku, as well as AI features including MCP server and AI Sight support for Android applications. Suitest is also expanding its object-based automation technology for Apple TV.



For operators and pay-TV providers, the platform provides continuous live video monitoring and Android TV testing, with automated detection of issues such as playback freezes, black screens and visual artefacts. Integrated performance analytics also help engineering teams identify bottlenecks and troubleshoot issues.

Suittest is further expanding automated device certification for smart TV and set-top box manufacturers, supporting operator-specific requirements including Freely and DVB-I. Remote diagnostic tools allow engineers to access logs, run debugging commands and perform software updates without physical access to devices.

These developments aim to make OTT quality assurance, service monitoring, and device certification faster, more automated, and more cost-efficient across the TV ecosystem. [\[Content+Technology\]](#)

TRUSTED MEDIA: C2PA IN DYNAMIC LIVE AND ON-DEMAND STREAMING

Unified Streaming has introduced Trusted Media, a solution that lets broadcasters, streaming platforms, and content owners add verifiable authenticity information to live, on-demand, and virtual channel content during the streaming preparation process.

The solution integrates C2PA (Coalition for Content Provenance and Authenticity) information into existing just-in-time streaming workflows. This can include publisher identity, source attribution, editorial context and disclosures relating to AI-generated or manipulated content.

Built into Unified Streaming's Origin and Packager technology, Trusted Media supports live, VOD and virtual channel workflows without requiring organisations to rebuild existing distribution pipelines or reprocess their entire content libraries.

The provenance information is added dynamically before content is delivered to the CDN, allowing players to validate authenticity in real time. This is particularly relevant for fast-changing content such as live channels, virtual channels and breaking news, where maintaining reliable provenance across distribution platforms can be challenging.

Unified Streaming said the solution is designed to help media organisations strengthen content authenticity and respond to growing concerns around AI-generated content, misinformation and the preservation of media provenance. [\[Unified Streaming\]](#)

TAG ENHANCES ITS MXL & CONTAINERISED DEPLOYMENT WITHOUT DEDICATED BOXES

TAG Video Systems is introducing new platform capabilities focused on Media eXchange Layer (MXL) workflows and containerised deployment, supporting more flexible and scalable cloud-based production environments.

The company has made its Multi-Channel Monitoring (MCM) and Media Control System (MCS) components available as Docker containers, enabling automated, on-demand deployment across cloud and virtualised infrastructure.

TAG will also demonstrate MXL interoperability with AWS and a collaborative MXL implementation with Sony. The platform now supports low-latency ST 2110 monitoring, with latency reduced to as low as 1.5 frames at 50fps and 2 frames at 59.94fps. Cyclic Intra Refresh (CIR) encoding further enables monitoring and quality control within live and cloud production workflows.

Support for Mellanox ConnectX-7 network cards allows the platform to monitor 200Gbps and 400Gbps links and scale across multiple ST 2110 video streams, targeting high-density uncompressed production environments.

TAG said these developments reflect the industry's shift from dedicated hardware towards software-defined, containerised and cloud-based production, allowing monitoring systems to be deployed and scaled more efficiently. [\[APB+\]](#)

NON-GEOSTATIONARY SATELLITE ORBIT (NGSO) LICENSING FRAMEWORK TOOLKIT

A new NGSO licensing toolkit has been developed to help regulators and policymakers review, update or establish licensing frameworks for Non-Geostationary Satellite Orbit (NGSO) systems, particularly Low Earth Orbit (LEO) constellations.

The toolkit outlines 32 key regulatory issues and approaches, covering areas such as market access, spectrum use, earth stations, user terminals and services including direct-to-device (D2D) connectivity. It also includes a summary checklist to help administrations adapt regulatory frameworks to their legal requirements, institutional capacity, market conditions and connectivity goals.

Beyond licensing, the toolkit addresses related areas including space-station reviews, EPFD limits, consumer protection, regional harmonisation, cross-border terminal enforcement and orbital sustainability.

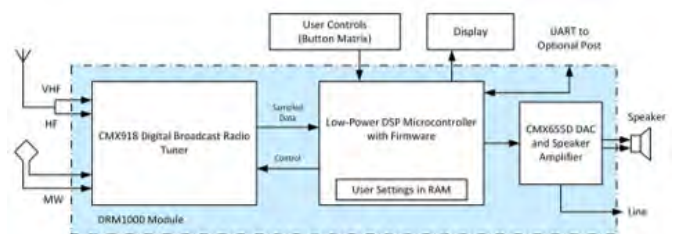
For more details, the toolkit can be downloaded from the ITU website. [\[ITU\]](#)

DRM TECHNOLOGY EXPANDS INTO EARBUDS AND CONSUMER AUDIO DEVICES

Digital Radio Mondiale (DRM) technology is expanding beyond traditional radio receivers, with a new compact receiver module developed by CML Micro that can be integrated into consumer audio products such as wireless earbuds, headphones, Bluetooth speakers and TV soundbars.

The DRM1000 module is designed to provide DRM digital radio reception while maintaining a small size and low power consumption. By embedding the receiver directly into wireless audio devices, DRM could become more accessible through everyday consumer products rather than requiring a dedicated digital radio receiver.

The technology also introduces a hybrid approach between broadcasting and connected devices. The wireless audio device can receive the DRM broadcast signal, while a connected smartphone or tablet can provide the user interface through a companion application. This could allow listeners to access radio services together with additional features such as text, graphics and interactive services.



Beyond entertainment, the technology has potential applications in e-learning and emergency communications. DRM's ability to distribute information to large audiences through broadcast networks could be particularly useful in areas where internet connectivity is limited or unreliable. The development therefore demonstrates how digital radio technology could evolve from traditional radio listening toward connected, interactive and multi-purpose broadcasting services. [\[RadioWorld\]](#) ■

Equipment Trends

GATESAIR MAXIVA™ XTK EXCITER/MODULATOR

The broadcast industry continues to evolve rapidly, with broadcasters demanding more flexible, reliable, and future-ready transmission solutions. GatesAir has responded to this need with the introduction of the all-new Maxiva™ XTK Exciter/Modulator — a powerful, truly software-defined platform engineered to deliver exceptional performance, unmatched stability, and long-lasting durability. Building on a rich legacy of groundbreaking innovations developed over decades, the Maxiva XTK combines cutting-edge technology with GatesAir's proven expertise to meet the dynamic needs of broadcasters worldwide.



At the heart of the Maxiva XTK is its state-of-the-art Advanced Adaptive Pre-Correction (AAPC) technology, which ensures optimal signal quality, enhanced linearity, and maximum efficiency across all types of power amplifiers. What sets this system apart is its ability to adapt intelligently to changing environmental conditions and operational variables, maintaining superior on-air performance under diverse circumstances. Whether operating in extreme temperatures, high humidity, or varying elevation levels, the XTK consistently delivers reliable, high-quality transmission.



The software-defined architecture of the Maxiva XTK is designed to evolve with broadcasters' changing needs, offering unparalleled flexibility for today's broadcast environments. It supports SMPTE ST 2110, Transport Stream over IP (TSoIP), and software-defined modulation for ATSC 1.0 and ATSC 3.0, enabling flexible deployment while simplifying infrastructure upgrades. The SMPTE 2022 standardized IP transport protocol reduces overall infrastructure costs while ensuring seamless, reliable signal delivery. Its modular architecture is also designed to support future enhancements, including optional internal satellite and RF input capabilities coming soon.

The Maxiva XTK is engineered with increased processing capacity and sophisticated Adaptive Correction techniques to deliver optimal signal quality across a wide range of RF amplifier configurations. It is frequency agile, supporting UHF Band IV and V as well as VHF Band III, ensuring compatibility with diverse broadcasting requirements. The exciter also features an available internal GNSS (GPS/GLONASS) receiver for precision frequency control and timing required for Single Frequency Network (SFN) operations.

In a compact 1RU design, the Maxiva XTK offers dual redundant front TSoIP inputs with seamless auto-switching, ensuring uninterrupted signal delivery. It also features convenient dual redundant front transport stream inputs for ASI with seamless auto-switching. The intuitive web GUI interface, built on HTML5, provides broadcasters with easy access for configuration, monitoring, and diagnostics. Advanced monitoring and diagnostic capabilities allow for proactive maintenance and quick troubleshooting, minimizing downtime and ensuring continuous on-air performance.

For on-site service access, the exciter includes a dedicated front RJ45 input, while the rear RJ45 WAN/LAN support interface offers customer-selectable static IP. The front Ethernet port is DHCP-enabled, providing convenient customer access with a fixed IP address. The main RF output connector is a rear SMA, 50 ohms, with a maximum +20dBm (100mW), while the RF input samples for Adaptive Correction utilize two rear SMA, 50 ohms connectors with a dynamic range of -20 to +10 dBm. Transport stream inputs consist of two front HD-BNC, 75 ohms connectors supporting ASI/SMPTE 310M, along with a front HD-BNC monitor output.

For synchronization, the XTK provides a 10 MHz reference input/output (rear BNC, 0 to +18dBm) and a 1 PPS reference input/output (rear BNC, TTL level), complemented by a rear Type N female GNSS antenna input for GPS/GLONASS. Network connectivity includes two front RJ-45 10/100/1000 BaseT inputs for TSoIP, one front RJ-45 for Ethernet (DHCP enabled, fixed IP), and rear LAN and WAN RJ-45 interfaces. A front USB 2.0 port is provided for mass storage, and the autoranging AC power input accepts 90 to 264 VAC, 47 to 63 Hz. The exciter operates in temperatures from 0° to 45°C (32° to 113°F) at elevations up to 4,500m (14,764ft) AMSL, with derating of 2°C per 300m of elevation, and functions in humidity up to 95% relative humidity, non-condensing.

For ATSC operation, the Maxiva XTK complies with ATSC A/53, A/153, and A/110:2011 standards, delivering a maximum average power output of +20dBm (100mW) with output power regulation of <0.25dB. Pilot frequency stability is ± 150 Hz/month (2.3×10^{-7} ppm) without precision frequency control/GPS, with frequency setting in 1Hz increments across the entire band. Typical performance includes frequency response variation of 0.2dB, group delay of 2ns, phase noise of <104dBc/Hz @ 20kHz offset (ATSC A/64), EVM of 1% or better (4% specification), and a signal-to-noise ratio of 35dB typical for 8VSB modulation. [\[GatesAir\]](#)

TELYCAM MIX ONE: ALL-IN-ONE VIDEO SWITCHER FOR PTZ-FIRST PRODUCTION

Telycam has introduced the Mix One, an all-in-one video switcher designed for PTZ-centric workflows. The device combines professional switching, graphics, recording, streaming, and PTZ control into a single compact unit, targeting creators and small teams for live content production, including podcasts, live streams, interviews, webinars, and education.



The Mix One supports up to six simultaneous video inputs, offering flexibility for hybrid production environments. It includes two HDMI inputs, USB-C and USB host inputs, and IP video input protocols such as NDI®HX3, SRT, RTMP, and RTSP. This allows the switcher to integrate IP streams with traditional HDMI and USB-C sources without requiring external converters. Outputs are available via two professional HDMI outputs (program and auxiliary), USB, or over IP using NDI®HX3, SRT, RTSP, and RTMP protocols.



A key feature of the Mix One is its integrated 8.8-inch touchscreen, which provides unified control for video switching, audio mixing, graphics, and system settings. A hall-effect joystick, rocker controls, and multifunction knobs offer precise PTZ camera control with adjustable speeds, allowing operators to store up to six presets per camera directly on the switcher. PTZ control is supported via RS232/RS485 (Visca) and IP (NDI PTZ, Visca over IP, UDP/TCP). When away from the device, a comprehensive WebUI mirrors the same experience across the network, giving operators full setup and control without changing how they work.

The switcher includes a professional audio section with a balanced XLR input featuring 48V phantom power, stereo line-in/out, and embedded audio from video inputs. Audio-Follows-Video (AFV) and a built-in audio mixer with per-input gain control and muting are supported. For live streaming, the Mix One supports PoE++ over a single Ethernet connection and can stream

directly to YouTube, Twitch, Facebook, or any custom RTMP/SRT destination.

Keying and graphics capabilities include upstream and downstream keyers for chroma, luma, and pattern keying, as well as picture-in-picture (PIP). Media tools include titles, lower thirds, clocks, and rolling subtitles, with layer presets for quick recall. Recording is supported to USB drives and SD cards in MP4 (H.264 + AAC) format with file splitting for long-form capture.

The Mix One is powered by DC 12V (5A) with a power consumption of 22W (idle). Its dimensions are 390.9 x 189.5 x 124 mm. System management includes configuration import/export and support for time zones -12 to +13. With its integrated design and focus on IP and hybrid workflows, the Mix One offers a compact production hub for creators requiring a PTZ-first live production solution. [\[Telycam\]](#)

AUVITRAN AXC-AES67: HIGH-PERFORMANCE AES67 BRIDGING CARD FOR AUDIO TOOLBOX

AuviTran has expanded its AxC card range with the introduction of the AxC-AES67, a new interface card designed for the AVBx3 and AVBx7 Audio ToolBox platforms. The card enables seamless connectivity between AES67 networks and any other audio or network protocol within the rack, expanding the capacity to build and bridge complex audio systems for demanding applications such as studio production, live sound, and public address.



The AxC-AES67 supports up to 64 input and 64 output channels at 48kHz (or 32 in/out at 96kHz) over AES67 and is fully compatible with RAVENNA protocols. It features an integrated gigabit switch with four Ethernet ports, including two Neutrik EtherCon connectors (Primary/Secondary) for connection in switch or redundant mode and two additional RJ45 ports for expanded connectivity. The card supports the industry-standard SMPTE 2110 and ST2022-7 Seamless Protection Switching, ensuring reliable operation in critical broadcast environments. NMOS IS-04 and IS-05 support enables discovery, configuration, and control via WebUI, NMOS, Ravenna, SAP, or ANEMAN.

The card occupies a single slot in the Audio ToolBox platform and can be combined with other AxC cards—such as mic/line preamps, analog outputs, or other



AoIP bridges—to build flexible, custom configurations. It can function as a virtual soundcard with standard ASIO, WDM, or Core Audio interfaces and can be managed remotely using AVS-Monitor software. PTPv2 synchronization (IEEE-1588-2008) is supported in Master or Slave mode.

The AxC-AES67 is designed to operate within the Auvitrans Audio ToolBox ecosystem, offering a modular and sustainable approach to audio networking. With its low-latency performance, extensive channel capacity, and robust protocol support, the card provides a scalable solution for broadcasters and audio professionals requiring high-performance AES67 bridging and network integration. [[Auvitrans](#)]

SOLID STATE LOGIC TCA TOUR: COMPACT FLY AWAY AUDIO PRODUCTION SYSTEM

Solid State Logic has introduced the TCA Tour, a compact fly-away audio production system built entirely from System T components. Engineered in a bespoke, desktop portable format, the system is designed for rapid deployment across broadcast, touring, and live production environments. The TCA Tour comprises a desktop-format control frame with 16 faders and fully integrated onboard I/O, packaged for immediate use.



The system includes eight mic/line inputs, four line outputs, headphone monitoring, and a built-in network switch. A custom adjustable mount accommodates a touchscreen and a PC running SSL's Tempest Control App. Available in two fader tile options—DFT and DFT+—the DFT+ version adds per-fader OLED displays and individual fader metering. Ruggedized etherCON and opticalCON connections provide fast, secure links to external racks housing Tempest Engines and I/O, ensuring reliable setup on the road or on-site.

Fully compatible with all System T DSP engines (TE1, TE2, and VTE), the TCA Tour works seamlessly with the full range of SSL Network I/O, as well as third-party Dante, AES67, and ST 2110 devices. The system supports fader expansion utilizing SSL's range of System T Remote Fader Tiles and can be extended with dedicated monitor and main fader controls through the addition of a Remote Master Tile. This flexibility makes the TCA Tour suitable for corporate, broadcast, and live sound providers who need to bring their own console to an event without compromising power, workflow, or sonic performance.



The TCA Tour can be deployed alongside other SSL Remote Fader Tiles for additional faders and is also suitable for temporary second operator positions or to provide remote control of a main console. Optional flight cases are available for life on the road. With its standard and complete System T feature set, the TCA Tour delivers a truly flexible solution for modern production workflows. [[Solid State Logic](#)]

AUDIO-TECHNICA D50 DIGITAL UHF WIRELESS SYSTEM

Audio-Technica has introduced the D50 Digital UHF Wireless System, a next-generation wireless solution designed for professional broadcast, live production, and corporate environments. The system delivers robust RF performance, superior audio quality, and comprehensive network control, addressing the demands of complex and congested RF environments.



The D50 system offers a full tuning bandwidth of up to 244 MHz (up to 138 MHz in the U.S.), enabling flexible channel planning. Users can switch between Standard mode (17 frequencies per 6 MHz TV channel) and High-Density (HD) mode (47 frequencies per 6 MHz TV channel) for congested urban environments. The receiver features switchable diversity modes—Normal (Antenna Combining) and Robust (MRC True Diversity)—for superior RF stability. The system supports AES256 encryption for secure transmission and offers a range of onboard DSP, including a high-pass filter, 4-band EQ, and compressor settings per channel.

The half-rack receiver is available in two versions: a 4-channel Dante model (ATW-DR3240DAN) and a 2-channel Audio-Technica LINK model (ATW-DR3220LK), offering up to eight channels in a single rack space. The Dante model supports Dante redundancy, daisy-chaining, and 96 kHz sampling. The receiver features a network port for monitoring and configuration via Wireless Manager software and can be powered by the included AC adapter or PoE+ for redundancy. A built-in spectrum analyzer and IR sync functionality simplify setup, while the Wireless Manager software provides advanced tools for configuring detailed EQ, compression, and walk testing for visual confirmation of multiple RF conditions.



Three transmitter options are available. The body-pack transmitter (ATW-DT3201) features a rugged cH-style 4-pin connector, external control buttons, an OLED display, and the SideTrack function for switching between two outputs. The handheld transmitter (ATW-DT3202) comes with an ATW-C510 cardioid dynamic capsule and is compatible with additional Artist Elite capsules. The desk stand transmitter (ATW-T3207) features a 3-pin XLR-F connector for gooseneck microphones, a selectable talk button, and LED indicators. All transmitters are powered by custom lithium-ion batteries with extended battery life (up to 17.5 hours for the handheld) and are charged via dedicated charging stations (ATW-CHG6 for body-pack/handheld, ATW-CHG7 for desk stand) or USB-C. A multipoint receiver function allows a transmitter to be detected by multiple networked receivers, with Wireless Manager automatically switching to the best signal. Seven-color LEDs and physical color rings make channel identification easy.

The D50 system is TAA-compliant (U.S.) and RED cybersecurity-compliant (EU). Firmware updates are performed via Wireless Manager. With its combination of high channel density, robust audio processing, and advanced networking, the D50 Wireless System offers a scalable and secure solution for professional wireless audio applications. [\[Audio-Technica\]](#)

QUICKLINK STUDIOPRO™ ANYWHEREALLY: CLOUD-ENABLED REMOTE TALLY SOLUTION

QuickLink has unveiled the StudioPro™ AnywhereTally system, a new remote tally solution designed for distributed live production environments. The system extends tally control beyond traditional local workflows, delivering real-time on-air indications over the internet for multi-camera productions operating across multiple locations.



StudioPro AnywhereTally integrates natively with QuickLink's StudioPro™ Proton and StudioPro™ Fusion control panels, creating a unified workflow across software, control surfaces, and remote tally devices. The system supports 4, 8, or 12 tally light configurations, providing flexibility for compact studio setups to large, distributed productions. It is designed as a cloud-native solution while also supporting traditional on-premises environments, making it adaptable to various production workflows.



The system delivers high-performance wireless reliability with up to a 7,200-foot range, strong wall penetration, and 20 ms low-latency response, achieved through the use of military-grade wireless technology. This ensures dependable tally performance, even in demanding production environments. The tally units are built for long production days, providing 20 to 40 hours of battery life, with USB-C charging and a clear battery status indicator. Its compact, lightweight aluminum alloy design supports both hot-shoe and 1/4-inch mounting for fast, flexible deployment.

A key feature of AnywhereTally is its cloud-controllable operation through StudioPro Cloud instances, enabling production teams to stay coordinated and connected regardless of physical location. This bridges the gap

between cloud-based and traditional production environments, allowing tally control to be extended globally.

The StudioPro AnywhereTally represents a significant advancement for live production, particularly for remote and distributed workflows. By combining real-time remote tally, seamless ecosystem integration, and professional-grade wireless performance, the system enables more connected, flexible, and efficient production operations. For broadcasters and production teams, this means improved communication between operators and talent and new levels of flexibility in multi-camera environments. [[Quick Link.TV](#)]

BLACKMAGIC ULTRASTUDIO MINI 12G FAMILY: COMPACT THUNDERBOLT CAPTURE AND PLAYBACK

Blackmagic Design has introduced the UltraStudio Mini 12G family, a new range of compact video capture and playback solutions for Thunderbolt computers. The family comprises three models—UltraStudio Mini Recorder 12G, UltraStudio Mini Monitor 12G, and UltraStudio Mini Replay 12G—each engineered for professional broadcast use. All models support SD, HD, and Ultra HD video standards up to 2160p60, making them suitable for a wide range of production and post-production workflows.



The UltraStudio Mini Recorder 12G is an input-only model designed to capture video from 12G-SDI and HDMI sources in SD, HD, and Ultra HD. It is suited for live streaming applications using software such as Open Broadcaster, archiving from legacy broadcast decks into editing software, and recording from game consoles. The UltraStudio Mini Monitor 12G is an output-only



model designed for playback to 12G-SDI and HDMI displays, providing a monitoring solution for popular editing software. It features dual 12G-SDI outputs that support fill and key for broadcast graphics, automatically converting alpha channels in graphics to a key output for seamless integration with live production switchers.

The UltraStudio Mini Replay 12G is a 12G-SDI-only model capable of simultaneous capture and playback, making it suitable for using computers as real-time AI processors or for live action replay with DaVinci Resolve. The replay



model includes a 12G-SDI input for monitoring a switcher multiview, dedicated 12G-SDI fill and key outputs for connection to a switcher's downstream keyer, and a separate 12G-SDI monitoring output, allowing operators to set up the next replay while on-air. This configuration enables live replay with auto stingers, broadcast graphics overlay, and real-time video processing.

All models feature fast Thunderbolt 4 connections, providing massive data speeds to handle high resolutions, deeper bit depths, and advanced frame buffer formats such as 4:2:2:4 and 4:4:4:4. The Thunderbolt link is bidirectional, enabling the UltraStudio Mini Replay 12G to capture, process, and output video in real-time. This allows computers to function as real-time graphics or AI processors, overlaying broadcast graphics or AI-based effects over live video inputs. The unit uses the DeckLink API, ensuring compatibility with almost all video software, including DaVinci Resolve, Fusion, Final Cut Pro, Media Composer, and Premiere Pro. It also supports the Desktop Video SDK for developing custom solutions on Mac, Windows, and Linux platforms.

With support for true 10-bit broadcast video quality and a range of codecs including Apple ProRes, DNxHD, and 10-bit uncompressed, the UltraStudio Mini 12G family provides a portable and powerful solution for broadcast capture, playback, and replay workflows. The included Media Express software allows for capture and playback in uncompressed YUV 4:2:2, ProRes, DVCPRO, and MJPEG file formats. For broadcasters and content creators, the UltraStudio Mini 12G family offers a compact, high-performance interface for integrating Thunderbolt computers into professional video production environments. [[Blackmagic Design](#)]



MIRI V410 4K LIVE ENCODER/DECODER

Miri Tech has introduced the V410, a compact 4K live encoder/decoder designed for streaming and AV-over-IP applications. The unit bridges the gap between ease of use and professional-grade performance, catering to both less technical operators and experienced broadcast engineers.

The V410 supports a wide range of input and output interfaces, including HDMI 2.0 (up to 4K Ultra HD at 60 FPS), 3G-SDI (up to 1080p at 60 FPS), and USB webcam input. On the network side, it supports NDI High Bandwidth, NDI HX2, and NDI HX3 for both encoding and decoding. The integrated NDI Bridge allows for secure transport of NDI streams across different networks.

For encoding, the device supports H.264 and H.265 in profiles up to Level 5.2 and 5.1, respectively. Streaming protocols include SRT, RTMP/RTMPS, HLS, TS over UDP, and RTSP. The unit can deliver two independent sets of encoding parameters at up to 40 Mbps each, with simultaneous streaming to up to eight platforms. In encoder mode, it can process one 4K source or two 2K QHD sources simultaneously. In decoder mode, it can handle two 4K sources simultaneously, with one output available over HDMI and another down-converted to HD over 3G-SDI. Decoding support also includes OMT.

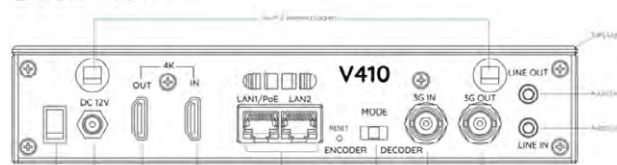
Connectivity features include dual Gigabit Ethernet ports (one with Power over Ethernet) and built-in Wi-Fi 7 for high-performance wireless connectivity in congested RF environments. Audio interfaces include a 3.5mm headphone jack, line in, and line out.

Control and monitoring are facilitated via a front-panel LCD screen with menu and shortcut buttons, a browser-based web UI, and API support for integration into existing control systems. SNMP monitoring is also

Front View



Back View



available. The unit includes a large tally light, front-panel VU meters, and a 3.5mm headphone output for audio monitoring.

Additional utility features include onboard recording to microSD/TF card or external USB storage, support for up to eight text or image overlays, and scheduled streaming/recording. The V410 measures 210 mm x 142 mm x 43.5 mm, weighs 847 g, and requires a 12V/2A power supply.

The V410 is suited for a variety of live production scenarios, including remote broadcasting, sports production, corporate events, and distributed IP workflows. Its combination of 4K capability, flexible format support, and robust networking options makes it a versatile addition to modern broadcast and AV infrastructures. [\[MIRI Technologies\]](#) ■

Personalities *& Posts*

INTRODUCING PRESIDENT & CEO OF B-SAT, KENJI TERADA



Kenji Terada

President & CEO of B-SAT (Broadcasting Satellite Systems Co., Ltd.) since June 2026.

From the 1990s, Mr. Terada was involved in developing HDTV equipment as an engineer at NHK (Japan Broadcasting Corporation), significantly contributing to the spread of high-definition HDTV content and services through Japan's satellite and terrestrial digital broadcasting. He was also involved in planning the launch of 4K8K broadcasting for practical use.

As Japan's only infrastructure company specializing in broadcast satellite services, B-SAT is working to maintain the stability of satellite broadcasting while strengthening the resilience of its facilities to increasingly severe extreme weather and earthquakes. Mr. Terada is also leading a crucial management initiative for procuring the next-generation satellite, which is scheduled to begin operations in 2030.

He also serves as president of the Institute of Image Information and Television Engineers (ITE), contributing to industry-government-academia collaboration in research and development across various scientific fields in Japan. ■

New Technical Liaison Officer

Mr. Satoshi Uzawa, Senior Manager and Engineer, Global Strategy Division, NHK WORLD Department at NHK (Japan Broadcasting Corporation), has taken over from Mr. Tatsuya FUJII as the ABU Technical Liaison Officer.

Mr. Uzawa joined NHK in 1997. He started his career at NHK, developing the Earthquake and Tsunami broadcasting system in the News Center. And then, he has mainly been involved in designing and setting up video network systems from NHK's overseas bureaus. He has also engaged in transmitting 4K/8 K HDR live programs, including major sporting events such as the Olympics and the FIFA World Cup.

From 2023 to 2026, he served as the Head of the Network Operation Center at NHK. ■



ABU Secretariat welcomes Adil Siddiqui



Adil Siddiqui joined the ABU Secretariat as Broadcast Engineer in the Technology & Innovation Department. He brings over 20 years of broadcast media experience, including work in Pakistan, the UAE, and Papua New Guinea. Adil's expertise covers satellite operations, IP network design, playout automation, system migration, and team leadership. His background in operations shapes his practical, solutions-focused approach to technology.

Previously, Adil was Broadcast Operations Manager at Digicel (PNG) Ltd, managing 24/7 earth station operations for seven years. He led major technical transitions, including migrating Sky Pacific and HiTRON to Digicel Play, implementing Simulcrypt in Fiji, and designing robust IP networks for remote sites. He also managed the Master Control Room team and ensured uninterrupted service delivery.

Adil helped launch Digicel's first OTT streaming service, PlayGo, in Papua New Guinea, bringing live sports, news, and entertainment to viewers. This experience deepened his expertise in hybrid satellite and IP-based delivery systems.

Earlier, Adil worked at Physique TV in the UAE, supporting automation, HD upgrades, and channel launches. In Pakistan, he led analog-to-SDI migration at Media Times Limited, and his background as a software developer and technical consultant helps him bridge IT and broadcast technology.

He also served as General Manager at StarPak Trading in Papua New Guinea, leading digital transformation and operations, skills that now inform his project management.

Adil holds a Master's in Information Technology and a Bachelor of Commerce. He is fluent in English and Urdu. ■

THE ABU ENGINEERING AWARDS JUDGING PANEL WELCOMES NEW EXPERTS

ABU
ENGINEERING AWARDS
2026

We are pleased to welcome the Technical Bureau's Vice Chairpersons: **Mr. Nguyen Duc Tue** (VTV, Vietnam), **Dr. Mohieddin Moradi** (IRIB, Iran), and **Mr. Zhang Wei** (RTPRC, China) to the judging panel. Their valuable expertise and experience will further strengthen the panel and contribute to the continued success of the ABU Engineering Awards.



Mr. Nguyen Duc Tue



Dr. Mohieddin Moradi



Mr. Zhang Wei

We would also like to extend our sincere appreciation to our previous panel members: **Mr. Kazim Pektas** (TRT, Türkiye), **Mr. Ismail Sulaiman** (RTM, Malaysia), and **Dr. Leilei Li** (RTPRC, China), for their dedication, commitment, and expertise, which have greatly contributed to the awards.



Mr. Kazim Pektas



Mr. Ismail Sulaiman



Dr. Leilei Li

We warmly welcome our new panel members and thank our outgoing members for their outstanding contributions to the ABU Engineering Awards.



CALENDAR *of Events*

2026

17 September	IP Delivery In Action: Glasgow 2026 Webinar	Online
13 October	Media Provenance Summit Japan	Tokyo, Japan
16 October	Technical Bureau Annual Meeting	Online
30-31 October	Technical Committee Meeting	Colombo, Sri Lanka
November	Member Innovation Webinar	Online
December	Member Innovation Webinar	Online

2027

18-22 January	HFCC A27 Conference	Texas, USA
February	ABU Industry Connect: Webinar with Industry Partners	Online
22 - 25 March	ABU Digital Broadcasting Symposium 2027	Kuala Lumpur, Malaysia
26 March	ABU Technical Bureau Mid-Year Meeting	Kuala Lumpur, Malaysia
April-May	Engineering Fundamentals Level 1	Online
27 - 29 May	Broadcast Asia 2027	Singapore
June	Members Innovation Webinar	Online
July	Institutional Partners Webinar: WorldDAB-ABU-ASBU Workshop	Online
August	Technical Workshop	Kuala Lumpur, Malaysia
September	Members Innovation Webinar	Online
October	ABU Technical Bureau Annual Meeting	Shanghai, China
October	ABU Technical Committee Meeting	Shanghai, China
October	ABU General Assembly	Shanghai, China
November	Members Innovation Webinar	Online
November-December	Engineering Fundamentals Level 2	Online

Call for Contributions: ABU Technical Review

The ABU Technical Review invites submissions from broadcasters, industry professionals, researchers, academics, and technology practitioners in the media and broadcasting sector to submit articles.

Submit articles on any of these topics:

- Technical research and development
- Emerging technologies and innovations
- New broadcasting systems and workflows
- Case studies and practical implementations
- Industry trends and best practices
- Digital transformation initiatives
- Member projects and success stories
- Other topics of interest to the broadcasting and media technology community

Published quarterly, the ABU Technical Review is distributed to ABU members, industry partners, broadcasters, technical professionals, and organisations engaged in media technology and communications. While engineers and technical specialists form our primary readership, we also present industry news and developments of broader interest.

You may submit articles of any style or length. Add photographs, illustrations, diagrams, or other visuals. Ensure all images are at least 2 megapixels for publication quality.

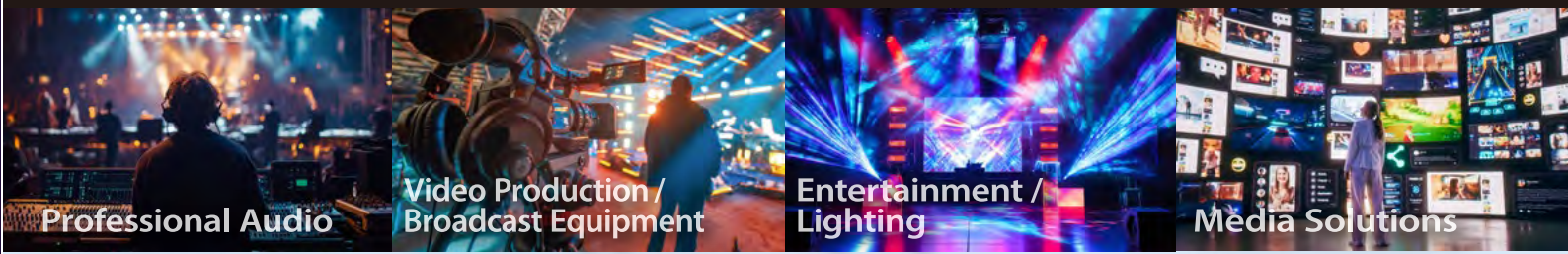
We publish articles on a voluntary basis and do not offer an honorarium. However, if we select your contribution, particularly those covering technical research and innovation, we will provide a complimentary half-page advertisement. We will place the advertisement immediately following your article, giving your organisation additional visibility.

In addition, articles submitted by ABU members in the Case Studies, Research, and Practical Implementation categories will be considered for the annual ABU Technical Review Prizes, which recognise outstanding contributions with a certificate and cash award.

Join us in shaping the future of media technology by submitting your article. Your work can influence industry progress and reach the global ABU community. For further information, please contact balqis@abu.org.my



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