Asia-Pacific Broadcasting Union

# Technical Review

No.260 October-December 2014







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**Cover:**
*TDM hosts the 2014 TC Meeting in Macau*


Asia-Pacific Broadcasting Union

# TECHNICAL REVIEW


## From the Editor's Desk



This issue of the ABU Technology's Technical Review carries a number of articles from this year's Technical Committee (TC) meetings. The CTO forum of the TC addressed the most important issue for broadcasters; that is the availability of spectrum for future broadcasting and access to spectrum for simulcast.

As usual there are three articles on technology. An article contributed by NHK addresses 4K UHDTV Satellite Broadcast System in Japan. An update on Interactive broadcast broadband technologies and services are discussed in another article with some case studies contributed by NHK and KBS. The third paper presents FIMS, EBUCore and Semantic Web Key features in broadcasting production.

The IBC report provided by the fellowship recipient presents the technology discussions held at the 2014 IBC Conference and Exhibition held in Amsterdam.

The Technical Review also summarises the Technical Committee meetings and awards presented during TC meetings.

It also reports on the ABU Technology's activities at the Pacific Media Partnership Conference held on 17-19 November in Nadi, Fiji.

I wish to remind readers once again that Technical Review can now be downloaded as a pdf file from the ABU Website in Technical Review section on http://www.abu.org.my/Technical-@-Technical_Review.aspx. Previous editions from 2012 are available to download to any platform in addition to view only edition available on Yudu.


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# 4K UHDTV Satellite Broadcast System in Japan

**by Toshiaki Baba, Hitonari Nakada**
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(SKY Perfect JSAT Corporation)

## abstract

Japan launched its first 4K UHDTV satellite channel "Channel 4K" in June, 2014. The first consumer receivers went on sale that same month and two more companies hit the market this October. This article is an overview of Channel 4K and its broadcast system.

## Introduction

In June, 2013, the Ministry of Internal Affairs and Communications published a so-called "Roadmap" as part of a committee report that looked into improving and developing broadcast services in Japan. The Roadmap proposed that 4K and 8K trial services should commence in 2014 and 2016, respectively.

The Next Generation Television & Broadcasting Promotion Forum, or NexTV-F, was formed to lay out the specifics of the Roadmap and to help roll out the services at an early date. It comprises 21 companies in and around the media industry, including broadcasters, cable television operators, telecoms, broadcast equipment and house appliance manufacturers, advertisers, and trading firms.

On June 2nd, 2014, in answer to the Roadmap, NexTV-F launched "Channel 4K," a test transmission platform of 4K UHDTV satellite broadcast.



**4K Play-out Master Control Room**

## About Channel 4K

Channel 4K, operated by NexTV-F, is Japan's first ever 4K television channel (trial broadcast). It is a free-to-air service and can be viewed using compatible receivers and/or television sets. TV tuners have been on sale since June and several thousand sets had already been sold by the end of September.

The channel broadcasts 7 hours a day on weekdays and 12 at weekends. Programming includes music performances, nature programmes, travels, and sports, all in high-quality 4K and produced by member broadcasters of NexTV-F.

NexTV-F serves as the registered general broadcaster of Channel 4K and is responsible for content procurement, programming, and output. The actual output is commissioned to SKY Perfect JSAT Corporation, and it is broadcast on one of their communication satellites. The table below shows the current operational specifications.

Most of the technical specifications are, except for video compression standard, in line with SKY Perfect JSAT's own specifications for digital broadcast on their satellites. Operational rules are taken from the technical reports released by NexTV-F.

**Table 1: Operational Specifications of Channel 4K**

| | |
|---|---|
| Satellite | JCSAT3A (communication satellite on 128 deg east) (Allocated by operator on either of the 128 deg or 124 deg communication satellites) |
| Channel Coding/ Transmission Standard | DVB-S2 (Advanced Narrow Band Transmission System) |
| Source Coding/ Compression Standard | Video: HEVC/H.265<br>Audio: MPEG2-AAC |
| Network | Network_id 0x000A (ARIB STD-B10 appendix N) |
| Service Identification | 502ch |
| Conditional Access | CA_system_id 0x0001 (ARIB STD-B10 appendix J) |

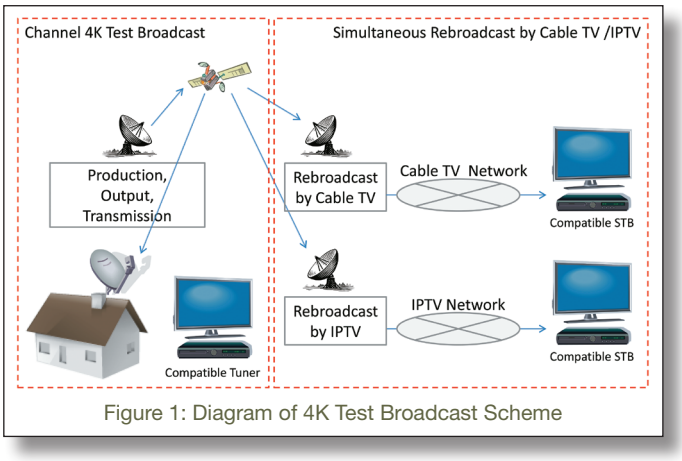



Figure 1: Diagram of 4K Test Broadcast Scheme

Channel 4K broadcast can be received directly at home using corresponding TV tuners and satellite antenna. Furthermore, a number of cable and IPTV networks have been carrying its signal since the service started in June. There are currently more than 60 CATV and 5 IPTV viewing locations nationwide, including public spaces and CATV/ IPTV compounds. Rebroadcast services for the home are scheduled to begin in 2015.

# About the System

## 4K Camera and Production Systems

We picked up 4K equipment that various manufacturers had on offer by the summer of 2013. For 4K cameras, we chose Canon EOS C500 and SONY PMW-F55. We chose CANON CN-E30-300 lenses for the C500 and configured them to enable external lens-gear control using C-motion. At the time, there weren't any lenses available for F55 that met the requirements for 4K broadcast (such as servomechanism), so we decided to use conventional HD lenses and mount them on our F55 using mount adaptors. In addition, we have PROTEC LS750/LS850 systems for each of the C500 and a set of SONY CA-4000 adaptor and BPU-4000 baseband processor for each of the F55 to enable long-distance transmission over optic fibres.

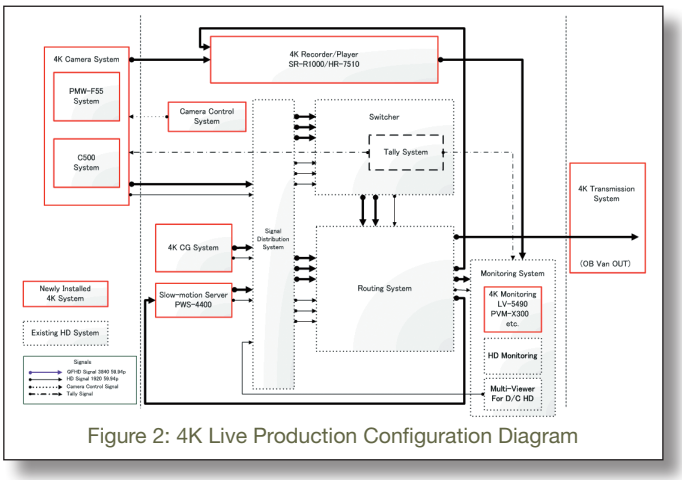



Figure 2: 4K Live Production Configuration Diagram

Our 4K production equipment included 4K monitors, waveform monitors, SONY's multichannel SR-R1000 and Astrodesign's HR-7510 SSD recorders, and HB-7513 real time debayering units for the C500 cameras, also from Astrodesign. We are also using Lambda Systems' 4K subtitling system "Grid-Zero" with sports-coder functionality, and SONY's PWS-4400 audiovisual storage server for slow-motion replay.

## 4K Editing System

The workflow we had in mind for 4K production, editing, and output was basically the same as the file-based workflow for HDTV. At the time of planning (summer, 2013), SONY's XAVC MXF was the most practical 4K-capable file format, so our 4K editing system was designed based on this. Central to our system is the Adobe Premiere Pro CC non-linear editing software, and we have added Blackmagic Design's DaVinci Resolve for colour grading, DVS CLIPSTER for frame-rate conversion, and a large storage for file-sharing between editing machines. See Figure 3 for the editing system diagram.

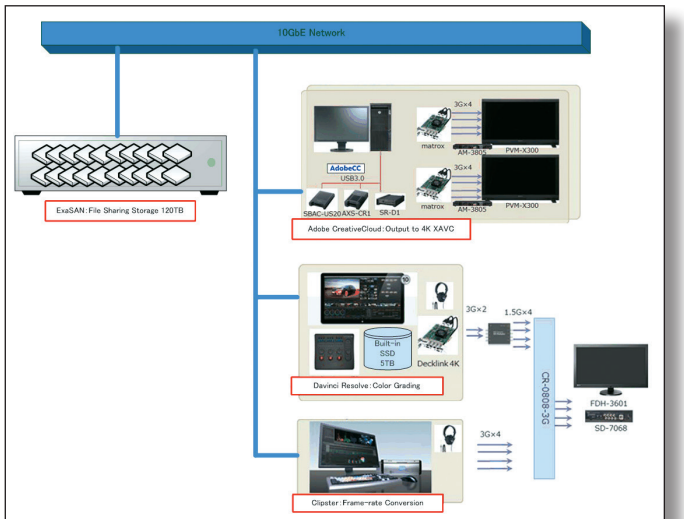



Figure 3: 4K Editing System Diagram

We have also installed a SOHORAID SR4-WBS3+ four-drive storage system (16TB HDD) by STARDOM and a HDUS-TBSSS1.9 portable SSD (1TB) by IO DATA to be used for delivering files, such as edited ready-to-air programmes, to the play-out master-control.

During the testing sessions, we verified that various editing functionalities shadowing HDTV workflow are valid when using any of the major 4K editing formats, namely DPX, Canon RAW, SONY F55 RAW, and SStP, among others. Figure 4 shows the 4K editing workflow and the input/ output formats for each procedure.

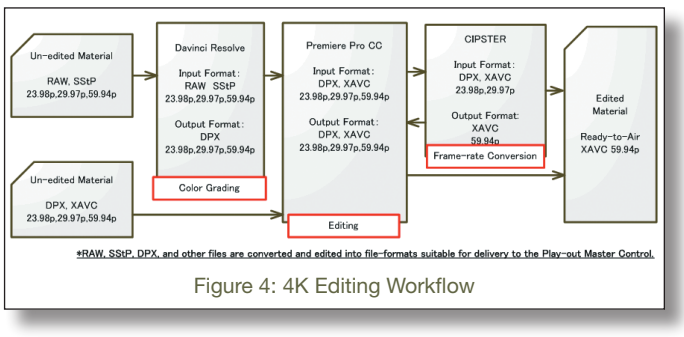



Figure 4: 4K Editing Workflow

## 4K Play-out System

Once the editing is completed, the material, or programme, is loaded onto the 4K Play-out System. The system will automatically play the material out following a pre-programmed playlist.

The play-out facility is configured with main and backup redundancy. The emergency router installed in the final leg enables switching between resources and also emergency play-out.

As for the video and audio interface within the system, we use SONY's XAVC MXF for the file-based format, and Square Division signal for baseband which will be sent via Quad Link 3G-SDI (Level-B).

**Table 2: Audiovisual signal format**

| | |
|---|---|
| Resolution | 3840 x 2160 |
| Sampling | Y/Cb/Cr = 4:2:2 |
| Bit depth | 10 bit |
| Frame-rate | 59.94p |
| Audio | Max. 6ch<br>AES 24bit |

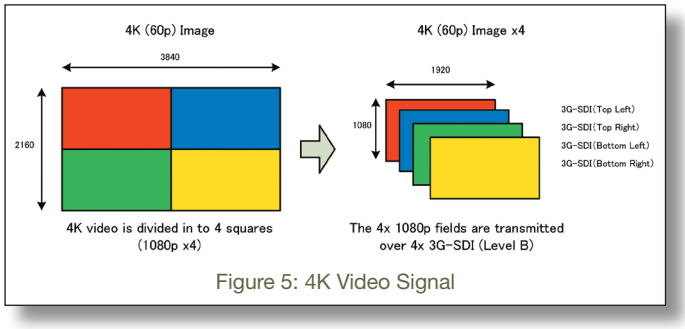



Figure 5: 4K Video Signal

See Figure 6. for a diagram of the Play-out System.

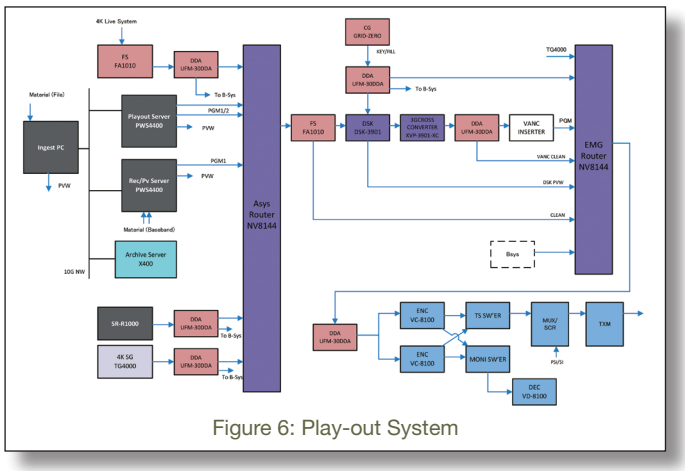



Figure 6: Play-out System

### (1) Ingest Consoles

Each console includes an ingest terminal (Z820 by HP) and a preview monitor. The ingest terminal is used to connect intake media, such as an HDD, and to load the material into the Archive Server or Play-out Server via a network.

The monitor can be used for output from both the Adobe Premiere Pro CC and the Play-out Server.

Taking into account the time it takes to load a material into the servers and to preview it, we have three sets of consoles working side by side.



Ingest Console Area

### (2) Archive Server

This server stores all the programmes aired on Channel 4K, up to 4000 hours of 4K material in XAVC MXF format. We've opted for EMC Isilon's X400 storage with 10-node (1PB) architecture to secure access to files should a node or disk fail. It is also very easy to replace. Each file to be aired will be automatically transferred from the Archive Server to the Play-out Server following a playlist.

### (3) Automatic Programme Controller (APC)

APC is the core mechanism of the Play-out System and controls the output in accordance with the playlist. We've taken the SWEV-N100 automatic play-out application by Sony and modified it for 4K.

The APC controls the Play-out Server, router, and VANC inserter in accordance with the playlist.

### (4) Play-out Server

Sony's PWS-4400 storage is our server to replay material transferred from either the Archive Server or Ingest Terminal. To enable 24-hour round-the-clock play-out, it comprises 4 servers: 3 for standard play-out and 1 for recording and back-to-back play-out immediately afterwards.

Each server has 4 IN/OUT capabilities. We use 1 input and 3 outputs for the servers for standard play-out taking into account the restrictions of CUE UP timing and also the need for previewing. The recording server has 2 inputs and outputs each to enable recording of 2 signals simultaneously.

### (5) CG System, DSK (Downstream Keyer)

We have installed Lambda Systems' Grid Zero CD System and Miranda's DSK-3901 for super-imposing texts and stationary images in 4K format. These are used for basic subtitling during untimed operations and also to deliver emergency subtitles from the master control.

**Table 3: Transmission Parameters for the Inter-Stationary Control Signal**

| | |
|---|---|
| Transmission Method | To be inserted in the SDI signal that transmits the data for the top-left field within the Quad Link 3G-SDI |
| Insertion Line | Lines 20 and 583 of the Y data series of data-stream 1 |
| Insertion Point | Sampling number 0 |
| Audio Mode Designation | Equivalent to ARIB STD-B37 |
| Colourimetry Designation | To be designated within the private area (160th word) as defined by ARIB STD-B37 standard |

### (6) VANC Inserter

The VANC inserter inserts inter-stationary control signals into the video signal to enable switching of audio modes and colourimetry at the encoder. We have modified a DU-182D inserter by Asaca for this purpose.

The insertion point follows the current HD system.



Rack-mounted Transmission System

## 4K Encoder System

The baseband audiovisual signal transmitted from the Play-out Server will then be encoded live with our 4K Encoder System. The amount of information for 4K video is much greater than that of current HD, and we are working with the HEVC coding standard which performs twice as well as the current H.264 in terms of compression.



Rack-mounted Archive Server and Encoders

At the same time, it works as a colourimetry converter. This is because materials are produced based on BT.709 system colourimetry but our transmission system is designed based on BT.2020.

This colourimetry conversion functionality can be switched on and off with the inter-stationary control signal inserted by the VANC inserter. It will be able to handle materials even if they come in with varying colourimetry in the future.

## 4K Platform System

**(Multiplexing, Scrambling, Transmission System)**

The 4K Platform System takes the encoded audiovisual TS signal, multiplexes data such as PSI/SI onto it, scrambles it, and then sends it out to satellite transmission. We've made use of broadcast facilities currently in operation for the SKY Perfect's multichannel service (called SKY Perfect Premium Service) which mainly offers HDTV in H.264/DVB-S2 format.

We've added any necessary equipment beyond the multiplexer. To supplement identifiers like "Service_type" and "Component_type," we've modified the SI play-out system and the NMD (network management database) that centrally manages parameters for the entire platform.

4K broadcast, when seen as a video stream, entails a high level of bit-rate never before experienced in actual operation and we've taken extra care to monitor how the multiplexer and scrambler work with such high bit-rate.

## Conclusion

We introduced the outline of Channel 4K, satellite UHDTV broadcast experiments and its system in Japan. Now, thousands of viewers have been able to enjoy high quality 4K programmes.

NexTV-F has been serving to ensure a stable operation of Channel 4K, expanding its contents. At the same time, we are working towards standardizing the technical specifications for 8K to implement the plans envisioned in the Roadmap. With continued cooperation of our member organizations and other stakeholders, we hope to be a driving force in promoting 4K and 8K broadcast in Japan.

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# Interactive Multimedia Services: IBB Technologies and Standards

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This article will address Integrated Broadcast-Broadband (IBB) *interactive multimedia* services that are integrated with traditional broadcasting. The increasing penetration of the Internet and the increasing performance of broadband have stimulated interactive multimedia services that are not integrated into traditional broadcasting; commonly known as Over-the-Top (OTT) services. Another article in the first quarter of 2015 Technical will address opportunities, challenges and issues that have arisen with OTT for both incumbent operators and new entrants to the broadcast and media fields.

Recommendation ITU-R BT.2037 defines the general requirements of IBB systems. Recommendations ITU-R BT.2053 and ITU-T J.205 Corrigendum 1 define technical requirements based on the concept of Recommendation ITU-R BT.2037. Recommendation ITU-T J.206 defines the reference architecture of the IBB system. As described in these Recommendations, the IBB system is a system in which broadcasting operates in parallel with broadband telecommunication systems and provides an integrated experience of broadcasting with interactivity, by combining media content, data and applications from sources authorised by the broadcaster.

Also based on ITU-R, BT.2037, Internet and Integrated Broadband-Broadcast services are all key technologies that can be used to provide effective and efficient Interactive Multimedia Services. Technically, any service that can facilitate a return path from the viewer to the service provider can enable interactivity. For example, the DVB family of standards and technologies has defined a number of return paths based on various telecommunications technologies such as ATM, PDH and SDH.

In more elaborate forms of interactivity, the return path accesses additional data servers to provide enhanced experience. The up and down streams can be operated via heterogeneous transmission technologies.

IBB systems work with digital broadcasting systems. Interoperability with the existing broadcasting systems is required to minimise the impact of the introduction of IBB services on the existing broadcasting systems and to facilitate the deployment of IBB services. The following are some key considerations for planning and implementing such IBB systems.

IBB systems need to:

i) be interoperable with existing broadcasting systems, mitigating any possible issues,

ii) enhance traditional broadcast operation,

iii) have a provision, if required, to provide mechanisms that offer regionally exclusive services and content – Freeviewplus implementation based on HbbTV in Australia with a large geography is an example of this in the Asia-Pacific region,

iv) explore the possibility of broadcast reception by mobile and portable devices if there is viable business opportunity.

IBB services give broadcasters the opportunity to establish a direct relationship with each member of the audience so the entire service offering can be used to reduce churn, by building brand loyalty.

## Linear Digital Television

Traditional linear broadcast services are offered by both public service and commercial broadcasters as home reception services over terrestrial, satellite and cable networks. As interactive services require a return channel and interactivity with live broadcasts are established using telephone networks, by dialing into the studio. Sending mobile text messages (mobile SMS-Short message service) or responding via web servers also enables either live or off-line interactivity.

In many instances, the caller or texter needs to bear the cost of the return path communication. Another factor that determines which return path they select for television services is the platform of delivery. As satellites can deliver over large geographical areas, web-based feedback is more practical. When the television service is delivered over a terrestrial transmission platform, telephone calls and texting are viable options. In this category, the television service provider will assure the quality of service either directly or through a network provider, having defined service levels (included in an agreement). For more information on digital broadcast services, please refer to the ITU Guidelines[1] for the Migration from Analogue to Digital Broadcasting, 2014 and Recommendation J.205 (01/12) of ITU-T[2].

1 See http://www.itu.int/en/ITU-D/Spectrum-Broadcasting/Documents/Guidelines%20final.pdf
2 See https://www.itu.int/rec/T-REC-J.205-201201-I

Teletext services can also provide limited interactivity. In Teletext additional data is transmitted with the normal video transmission in the same data stream. Buttons on the remote controller allows the user to access a number of data services such as flight, financial, weather information etc. There are other technologies that can be used to deliver linear television broadcast services, mainly for mobile or handheld devices. For instance, one-seg of ISDB-T can be used to receive linear television services on mobile devices, including recent developments and status of mobile multimedia broadcasting for mobile/hand-held terminals. Similarly DVB-T2 Lite can also deliver linear broadcast services to mobile or portable devices[3].

## Wired Integrated Broadband Broadcast

Recently, a combination of broadcast and broadband has been considered to expand the opportunity for new services. This approach is quite natural because this combination has the potential advantage to provide both efficient mass content delivery and personalised services. At the same time, combined use of broadband may bring complexity to the system as well as to its usage due to wide capability and flexibility. Hence integrated broadband Broadcast (IBB) systems are more than just the addition of another delivery channel. Figure 1 shows a system overview of IBB.

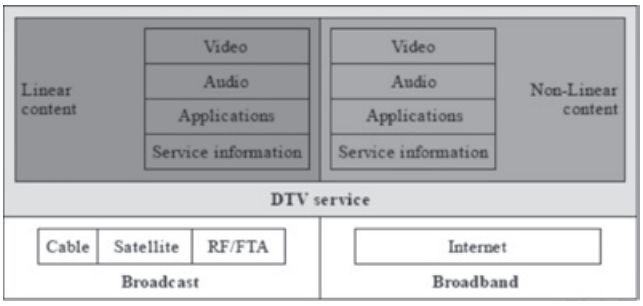



Figure 1: IBB SYSTEM OVERVIEW

There are number of systems that can operate in hybrid configuration. Most of these systems have exploited information and communication technologies to build such a system. Broadcasters have been experimenting with a number of IBB systems.

Recommendation ITU-T J.200[4] identifies the structure, the origins and the specification sources for a harmonised environment, including a set of application programming interfaces (APIs) for interactive television services. Various IBB systems have been considered for standardisation by various global and national standards bodies. This Recommendation was developed primarily for traditional interactive TV services, but the ideas described in the Recommendation can be expanded to IBB systems. The report ITU-R BT.2267 describes several IBB systems[5].

Standards have historically been set on a country-by-country basis (proprietary standards), requiring delivery of specialised hardware or content to each nation. The establishment of a unified standard means content owners and application developers can write once and deploy across many countries. Unfortunately there is no unified global standard yet.

ITU working parties are studying IBB systems to formulate ITU-R and ITU-T Recommendations. The ITU-R SG6 is currently studying the Integrated Broadcast-Broadband (IBB) Systems, and based on the Recommendations established by ITU-T SG9 in July 2013, they established the Recommendation ITU-R BT. 2037: General requirements for broadcast-oriented applications of integrated broadcast-broadband systems and their envisaged utilisation. Then, in February 2014 they established the Recommendation ITU-R BT. 2053: Technical requirements for integrated broadcast-broadband systems.

In addition, the ITU is currently working towards a new Recommendation ITU-R BT. [IBB-SYSTEM], which defines the IBB systems. This new draft Recommendation is being developed cooperatively with ITU-T SG9. Japan proposed the inclusion of their own Hybridcast in the new recommendation and, as of October 2014, this work involves consideration of Hybridcast and HbbTV.

There are three IBB systems, vis. HbbTV, Hybridcast and iCon. A brief overview of three of the IBB systems is given here.

### 1. HbbTV

The Hybrid Broadcast Broadband TV (HbbTV) is a new international standard that is supported by a range of new television sets and can be used by broadcasters and distributors to offer innovative services. These can be offered *directly* on a "Connected TV" or on an appropriate set-top- box or dongle without the consumer having to buy extra equipment.

HbbTV is one of the standards that can provide a direct link between the linear programme and online content. Through this link, HbbTV provides a new service dimension in the provisioning of television programmes and channels. As HbbTV is well standardised, broadcasters and distributors can roll out such innovations without interoperability issues.

HbbTV standards are developed by the "HbbTV Association"[6] and published by European Telecommunications Standards Institute (ETSI)[7]. The HbbTV Association was established in 2009. Hence the standard has been available for five

3 See https://www.itu.int/ITU-D/arb/COE/2012/DTV/documents/doc2.pdf page 45
4 See https://www.itu.int/rec/T-REC-J.200-200103-S/en
5 See http://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-BT.2267-2013-PDF-E.pdf
6 A Swiss not-for-profit organization, for more details see https://www.hbbtv.org .
7 ETSI is officially recognized by the European Union as a European Standards Organization.

years and with the migration from analogue to digital broadcasting its application is on the rise.

The HbbTV association aims at providing an alternative to proprietary technologies and creating an open platform for broadcasters to deliver on-demand services to the end consumer. The association has defined an HTML-based specification to enable broadcasters to associate applications with their television content, allowing consumers to access other video content and additional information. It has been widely adopted by broadcasters and manufacturers.

Figure 2 shows the global adoption of the HbbTV standard.

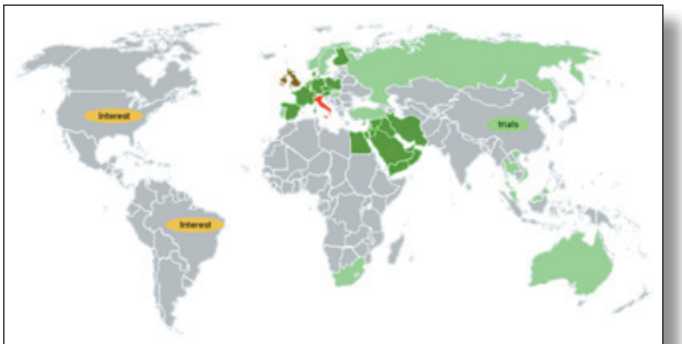



Figure 2: Global Adoption of the HBBTV Standard

Having a European origin the HbbTV standard has been foremost adopted by broadcasters in Europe. HbbTV was also launched in Australia in September 2014 and by New Zealand and Malaysia. The HbbTV standard is also in the process of being tested in Indonesia, Myanmar, Vietnam, Thailand and Singapore. North and South America, and Russia are also considering the HbbTV standard.

A wide variety of HbbTV services and applications have been deployed including service like Video On Demand, Catch up, Start Over, Information services, EPG and shopping services. Several commercial and public broadcasters have developed HbbTV services, including leading European broadcasters like ARTE, M6, NPO, NRJ, RTVE, TF1 and ZDF.

## 2. Hybridcast

The Japanese public broadcaster (NHK) launched the new integrated broadcast-broadband service "Hybridcast" on September 2, 2013. Hybridcast. Like the other systems enhances a broadcasting service with broadband, NHK started by offering the HTML5 application via a TV receiver to provide detailed and useful content such as latest news, weather, sports, and financial information. NHK also provides programme-related services, video on demand services and device linkage services, which use a mobile terminal as a second screen. In the future, any service provider will be able to create applications and distribute them to viewers. Application authentication will be necessary to verify that an application was originated by a trusted service provider and has not been modified in any way.

Hybridcast services are currently provided by using "Broadcast-oriented managed application". When a service is about to start, a broadcaster transmits a control signal to for example terrestrial television receivers to launch an application automatically. The broadcaster creates an application and distributes it to each viewer, so a viewer can feel safe to use it.

In the future, Hybridcast services will also be provided by using "Non-broadcast-oriented managed application". In this case, a service provider who the broadcaster trusts will create an application and distribute it to each viewer who can then launch it at anytime. Therefore, security technologies such as identification, authentication, and digital signature are necessary to ensure reliability of applications. The architecture of the security system for Hybridcast is defined in Hybridcast Specification Ver. 2.0.

Hybridcast Specification Ver.1.0 for broadcast-oriented managed application was standardised at the IPTV Forum in Japan in March 2013. Hybridcast Specification Ver.2.0 for non-broadcast-oriented managed application was standardised in June 2014[8]. In addition, applicability of Hybridcast is extended to UHDTV by ARIB STD-B62 which was standardised in July 2014 at Association of Radio Industries and Businesses of Japan (ARIB).

## 3. iCon

The Korean Public broadcaster (KBS) launched iCon, or Open Hybrid TV (OHTV) in Korea on March 19, 2013. iCon is the first terrestrial hybrid TV service in Korea. The service includes EPG, program search, video clip, vote, etc. The aim of the standard is to integrate digital terrestrial television services with broadband interactivity, as do the two previously discussed standards.

Advertising market share on the Internet has been rapidly increasing and a smartphone is the most necessary device for the under 30's age group. The number of viewers using smartphones while watching TV is increasing in Korea. With iCon KBS intends to respond to these trends in the market. In the future OHTV 2.0 services will be provided. These services use HTML5 and second screen devices such as smartphones or tablets and KBS is planning to launch such VOD services in the fourth quarter of 2014.

Figure 3 shows the various technologies and building blocks to form OHTV hybrid technologies for broadcasting.

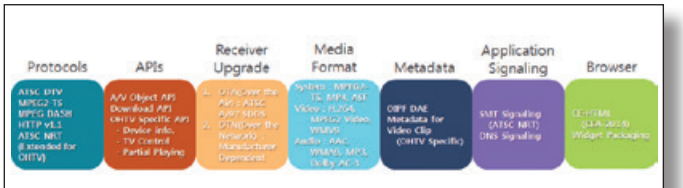



Figure 3: OHTV Specification and Related Building Blocks

8 For more information see http://www.itu.int/dms_pub/itu-r/opb/rep/R-REP-BT.2267-2013-PDF-E.pdf

The figure 4 shows a system block diagram of OHTV system.

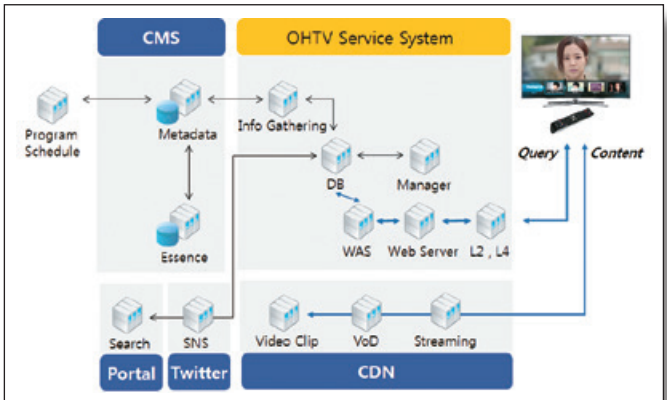



Figure 4: OHTV System Block Diagram

## System Specifications

If the above three IBB systems are compared based on their system characteristics, the majority of the features are found to be common in all three.

Specifications for the three systems can be obtained from the standard documents listed below.

1. HbbTV: ETSI TS 102 796 V1.2.1, "Hybrid Broadcast Broadband TV" and ETSI TS 102 809 V1.2.1 "Signaling and carriage of interactive applications and services in Hybrid broadcast / broadband environments"[9];
2. Hybridcast: IPTVFJ STD-0010, "Integrated Broadcast-Broadband system specification V2.0", IPTV Forum Japan and IPTVFJ STD-0011, "HTML5 Browser specification V2.0", IPTV Forum Japan;
3. OHTV – TTA (Telecommunications Technology Association) TTAK KO-07.0099/R1. (2013.12.18).

In the Recommendation ITU-R BT.2053-0 (02/2014) titled, *"Technical requirements for integrated broadcast-broadband systems"* several application types are defined[10]. This Recommendation defines technical requirements for integrated broadcast-broadband systems and aims to harmonise the behaviour and the interaction of a variety of types of applications by broadcast delivery, broadband delivery, pre-installed, via application repository, and home area network delivery.

Recommendation ITU-T J.205[11] titled, *"Requirements for an application control framework using integrated broadcast and broadband digital television"* defines requirements for IBB applications and their environments. From a technical point of view, some important requirements characterising the system were chosen in this comparison and additional items were added from the viewpoint of service provisioning.

9 See http://www.etsi.org/deliver/etsi_ts/102700_102799/102796/01.02.01_60/ts_102796v010201p.pdf

10 See ITU website with URL http://www.itu.int/rec/R-REC-BT.2053-0-201402-I/en

11 See https://www.itu.int/rec/T-REC-J.205-201201-I

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*His research activities include participation in domestic and international standardisation. He has made many contributions and taken initiatives in Japanese digital broadcasting standards, in particular interactive TV standards, including BML, ARIB-J, Hybridcast, and Hybridcast for UHDTV. He also takes a lead role in the development of ITU Reports and Recommendations for interactive TV services in ITU-R SG6 and ITU-T SG9. He is a co-chair of Intersector Rapporteur Group on IBB systems founded by ITU-R SG6 and ITU-T SG9, and Rapporteur for Question 4/9 (API) at ITU-T SG9.*



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*Hitoshi Sanei*
*NHK*

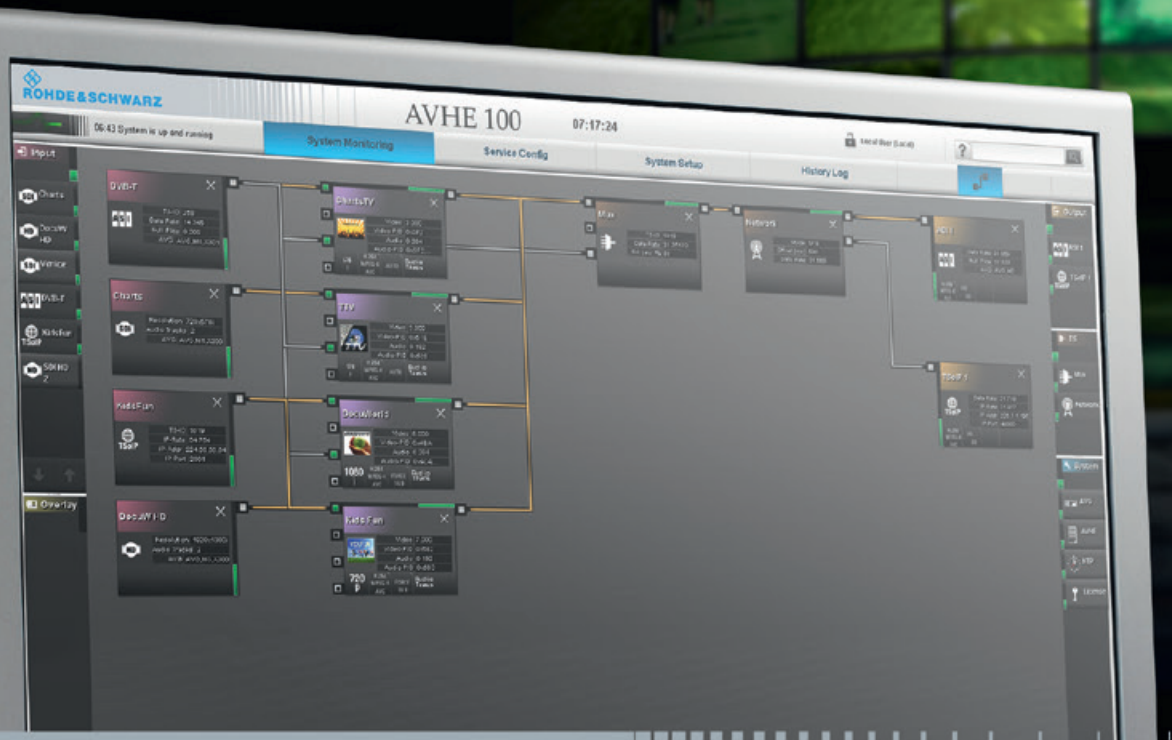
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# FIMS, EBUCore and Semantic Web Key features in Broadcasting Production

**by Jean-Pierre Evain**
European Broadcasting Union (EBU)

## abstract

With increasing user expectations and a proliferation of delivery platforms and formats, business models need to be easily adaptable to sustain the change, support content creativity and technical innovation. Flawless information management is also more critical than ever in handling high value metadata, the lifeblood of digital production. Delivering on promises of interoperability, scalability and agility, service-oriented architectures and metadata solutions can be applied to media, as standardised by AMWA-EBU FIMS and EBUCore, building on semantic technologies from the web.

**Index Terms:** EBUCore, FIMS, interoperability, SOA, workflows, semantic

## Introduction

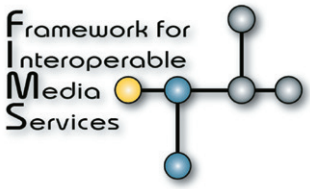
The current media landscape shows a constant acceleration in the rate of change of technologies for media consumption and production, with increasing user expectations and a proliferation of delivery platforms and formats. Business models need to be easily adaptable to sustain the change and support content creativity and technical innovation, such as a shift from file-based to stream-based workflows. Integrated supply chain processes must be put in place for generating and handling large quantities of video and audio in different formats to suit the requirements of different regulatory environments, regional and cultural audiences and distribution platforms. In this context, flawless information management is critical in handling high value metadata, the lifeblood of digital production. AMWA-EBU FIMS and EBUCore, building on semantic technologies from the web, provide solutions for more interoperability, scalability and agility.

## Framework for Interoperable Media Services

### A. FIMS in a Nutshell

The FIMS Task Force is a joint effort of the EBU and the AMWA started in 2009. FIMS is a vendor-neutral common framework for implementing Interoperable Media Services using a Service Oriented Architecture (SOA) based system for use in broadcast, audiovisual production, post production, media distribution, and media archive applications.

FIMS defines open services that are loosely coupled thereby enabling multivendor services to be integrated and creating "best-of-breed" media systems. Implementing FIMS will move facilities to an agile environment that is more easily configured, modified, managed and governed compared to non SOA systems. The FIMS' Framework for Interoperable media Services supports agility, interoperability, interchangeability and reusability of media related services (ingest, transfer, transform, repositories, quality analysis, automatic metadata extraction, and more to come).




FIMS' objectives are set by the FIMS Business Board, a group of users only. These objectives are realised by the FIMS technical Board, a mix of end-users and vendors, which ensures a consistent approach in the development of products. FIMS operated under an IPR framework assuring that all products can implement FIMS compensation and royalty free. As of today, more than 100 companies have signed the FIMS Participation Agreement, including manufacturers, system integrators and broadcasters.

### B. Service Oriented Architecture (SOA) and FIMS

SOA is an architecture that exposes processes as services on a network. This allows designers to build agile systems by combining different services from different vendors. Figure 1 illustrates the situation "before SOA" with fully integrated systems (often proprietary) using so-called glue software between processes versus a FIMS implementation

"after SOA" with an open service based architecture where a common interface is defined for each loosely coupled service.

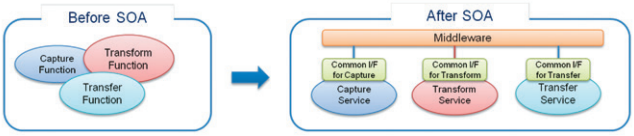



Figure 1: Before (closed) and after SOA (open)

SOA has several recognised advantages:

*Flexibility:* Easy to replace or update parts of the system, less disruptive at lower maintenance cost
*Reusability:* Easy to reuse a service
*Agility:* Easy to implement workflow changes
*Visibility:* Easy to monitor the status of the system in real time

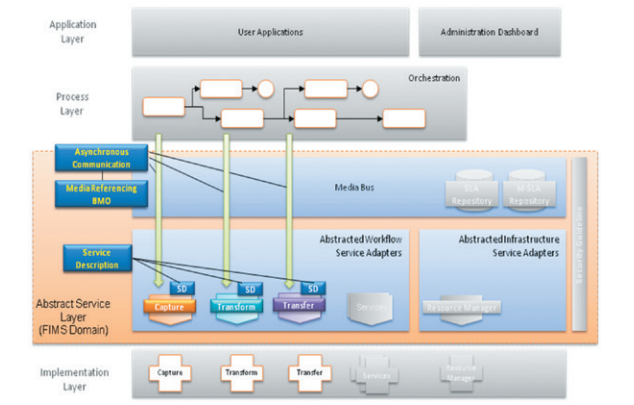



Figure 2: Orchestration system, media services and FIMS

Figure 2 shows an example of reference implementation build around FIMS.

The Orchestration System calls Media Services via FIMS interfaces over the IT network using a web services protocol such as SOAP, or accessing RESTful HTTP resources. It combines services and processes to build agile workflows.

The FIMS specification has been developed for media production with long running processes. FIMS supports processes to run synchronously or asynchronously and associated Job management functionalities incl. control for prioritisation, status monitoring and fault management.

A job request contains all the parameters needed for its execution, optionally a description of the media content on which the command operates, and the execution parameters grouped into profiles. It also provides an extension mechanism for the inclusion of vendor/user specific parameters where needed.

## C. FIMS Service Interfaces

As shown in Figure 3, FIMS interfaces do fulfill a simple mission by exchanging messages such as for job notification, status monitoring or fault management. FIMS interfaces may abstract vendor interfaces but vendors can also natively implement FIMS.

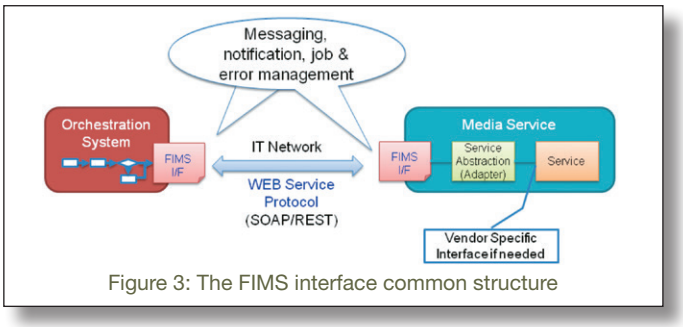



Figure 3: The FIMS interface common structure

FIMS already provides the definition of the following interfaces for basic media services:

*Transfer Service:* to copy or, optionally, move one or more files to another location. Five different transfer protocols are permitted: HTTP, HTTPS, FTP, SFTP and FILE.

*Transform Service:* to alter essence and container formats. The main intended usage is transcoding or transwrapping of media files but it can be easily extended to provide other types of transformations, like cropping, filtering or colour grading.

*Capture Service:* to convert stream-based real-time input such as HD-SDI or RTP to one or more files. It is based on the transform service adding provision for real time input handling, including manual start/stop or bound-to-time events.

*Repository:* The Repository Service provides the basic CRUD (create, read, update, delete) functionalities needed to manage persistent contents and their related metadata. The interface also provides all functionalities that a workflow engine needs to query and retrieve media asset from storage incl. job monitoring and repository capabilities.

*Quality Analysis:* The QA interface provides the basic mechanisms to identify the capabilities of a quality control tool, control commands and also a common report format.

*Automatic metadata Extraction:* The AME interface allows discovering capabilities and driving automatic metadata extraction tools.

Users are invited to join the FIMS Business Board to identify what new interfaces should be defined that are key to implement their business workflows.

## D. FIMS' Metadata Model

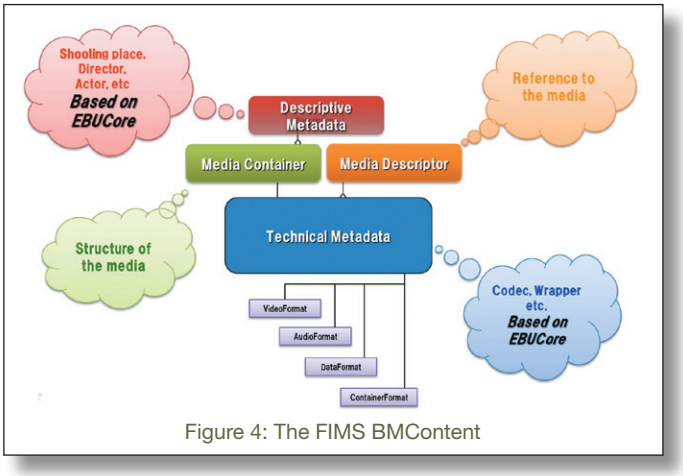



Figure 4: The FIMS BMContent

Another essential feature of FIMS is its data model, which centre pieces are the Business Media Object (BMObject), and the Business Media Content (BMContent). As shown on figure 4, the BMContent provides basic information to reference and locate media files together with their technical parameters. It can also provide descriptive information about the content. Both technical and descriptive metadata are based on EBUCore.

### E. FIMS Specification and Documentation

The most recent version of the specification can be downloaded following the QR code shown Figure 5.

Figure 5: FIMS specification link

FIMS is developing user guidelines. Videos are regularly posted on the "FIMS YouTube channel". There is also a "FIMS User Group" on LinkedIn, which is used to regularly update the community on work progress and events where FIMS is present.

### F. FIMS Members and Users

A lot of useful information can be found on the FIMS homepage at http://fims.tv. This includes a frequently updated list of participating companies as well as information on FIMS users and implementers.

## EBUCore

### A. EBUCore in a Nutshell

The EBUCore is the EBU flagship metadata specification. It is known as the "Dublin Core for Media" meaning it is based on Dublin Core but extended for media. The version 1.5 of the EBUCore specification [2] has been released on 8 April 2014.

EBUCore is the fruit of well-defined requirements and developer feedback. For a standard, user friendliness, easiness, flexibility, adaptability and scalability are more important than richness and comprehensiveness. The EBUCore golden rule is "keep it simple, tailor it for media and facilitate customisation".

EBUCore was designed to be a metadata specification for "users with different needs". Implementers come regularly at EBU technical conferences to present why they purposefully decided to use EBUCore and how they benefit from it sometimes through additional customisation.

EBUcore metadata can be used to describe a variety of business objects like TV or radio programmes, clips, groups of programmes (series, serial), documents, pictures, locations, events, people or any combination thereof. Some of these business and media objects are defined in a companion specification known as the EBU Class Conceptual Data Model (CCDM) [3].

Media objects are usually described by an identifier, a title, a description, a subject or rights like defined in Dublin Core. In the audiovisual industry, people use a variety of identifiers (ISAN, EIDR, UMID, etc.), titles (working title, original title, programme title, etc.), descriptions (summary, script, synopsis, etc.) or rights (copyright, exploitation rights, usage restrictions, etc.), in different languages. As no single standard can provide an exhaustive list of what different users may need, EBUCore extends Dublin Core with an identifier type, a title type, a description type and a rights type, which implementers can use to tailor metadata to their needs.

The two Dublin Core elements that require particular attention are the 'dc:format' and 'dc:type' elements. EBUCore restricts the use of dc:type to the definition of the type of object being described (e.g. a programme or a clip or a series), the genre of the content (e.g. news, or comedy or sports) and the target audience. The extended element "dc:format" contains structured technical information about the instantiation / manifestation of content (does it contain audio, video? how is it encoded? does it contains subtitling, captioning, signing? what is the type and size of the file, where can I find it? etc.).

EBUcore adds a few elements to Dublin Core. The rating element is used for parental rating or user rating. The publication history element is used to collect information on when content was published, on which media and which service, in which format and under which rights. The planning element allows providing information on where and when distribution is scheduled. The part element, supports the description of parts/segments/fragments at a very low level of granularity, either to provide an editorial analysis of the content (e.g. tracks of a record, performances in a show with appropriate contextual information on each performer, episodes in a series), or to generate timelines of dynamic technical parameters, or to define a playlist of different files, or simply to split and organise chunks of related metadata.

EBUCore provides room for extensions for users with additional specific needs. EBUCore allows users defining their own specific technical metadata elements for audio, video, pictures and documents. The EBUCore schema is also strictly organised around xml complex types, which can be redefined and customised.

Finally, EBUCore 1.5 integrate the new EBU Audio Definition Model (ADM) [4] shown on Picture 6, which supports current channel-based audio configurations (e.g. Dolby 5.1, NHK 22.2) and also 3D object audio (so-called immersive audio). EBU audio and metadata experts are promoting this model in different international organisations such as the AES (Audio Engineering Society), ITU (International Telecommunication Union) and SMPTE (Society of Motion Picture Engineers working on immersive audio).

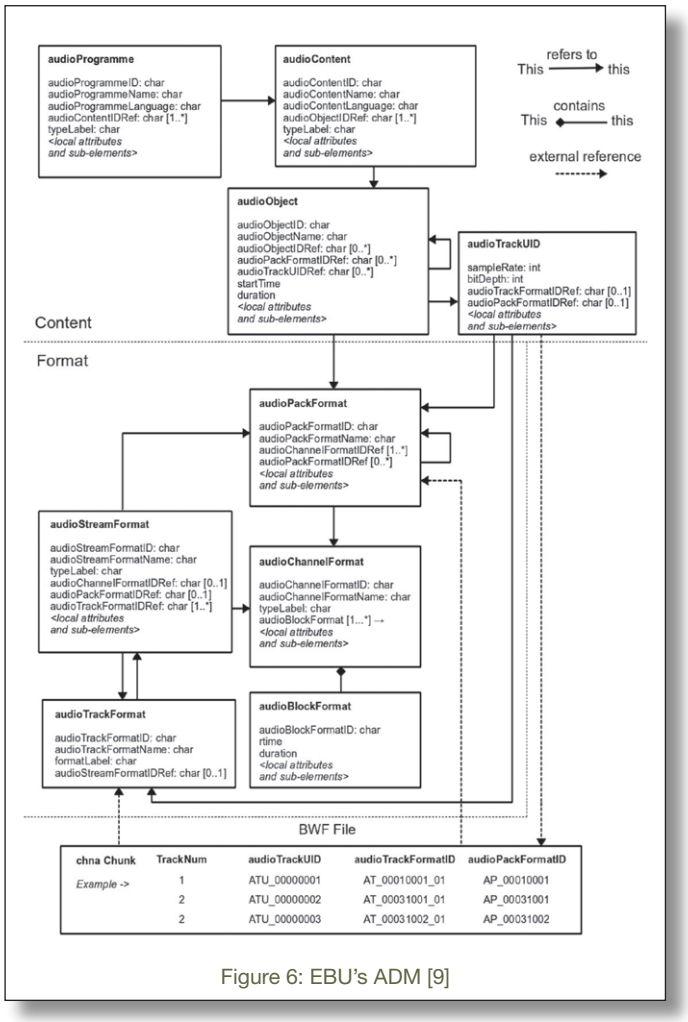



Figure 6: EBU's ADM [9]

## B. Where is EBUCore?

EBUCore is used by several European archive projects like EUSCreen, the European portal to public broadcasting archives also contributing to Europeana, the European Digital Library.

In addition to FIMS, EBUCore is used by broadcasters like RAI (Italy), France-television (France), RIA in Ireland or libraries such as the Library of Wales. Mediacorp, Singapore, has adopted and adapted EBUCore in its internal operational metadata framework under the SMMCore namespace. The Nordic broadcasters (Denmark, Finland, Iceland, Norway, Sweden) also use EBUCore as a common metadata format for programme exchange.

The AES (Audio Engineering Society) has published EBUCore as AES 60 and ISO/IEC MPEG (MP-AF) supports EBUCore for media preservation. W3C's Media Annotation ontology is based on the EBU Class Data Model and provides a direct mapping to the EBUCore ontology classes and properties. EBUCore is registered in SMPTE where it is also taken as a reference to develop the SMPTECore, a project led by EBU.

There are many other places where EBUCore is used like for the archives of the Eurovision Song Contest, or for inserting International Standard Recording Codes (ISRC) in Broadcast Wave Format (BWF) audio files as recommended by the Music Producer Guild.

"egta", the European association of sales houses, has co-developed with EBU an EBUCore based metadata schema, egtaMeta [5], for the file exchange of commercials between sales houses, post-production houses and broadcasters.

In Switzerland, the national archive project Memoriav has selected EBUCore as a metadata export format and this data is accessible from the Memoriav website [6].

EBUCore also comes with tools. MINT4EBUCore (developed National Technical University of Athens) is a mapping tool to convert in-house schemas into EBUCore, accessible from http://ebu.io. qEBU is an intuitive editor developed by students of the University of Turin. The widely used MediaInfo file metadata parsing tool provides an extensive mapping to EBUCore and future developments will includes an export of UK DPP AS-11 metadata into EBUCore.

The main advantage of using a standard like EBUCore is that developers and implementers benefit from all new developments around its xml schema and rdf/owl ontology. The EBUCore is developed and maintained by the EBU metadata community, which is open to all metadata developers including non-EBU members. EBU-MM (Metadata Models) [7] is a project group of the EBU MIM (Media Information Management) strategic program [8].

# Semantic Web EBUCore RDF, EBUSport

## A. The Semantic Web and Linked Data concepts

Semantic technologies are undoubtedly the next step in media information management as it naturally solves many of the issues that broadcasters have been facing for the last 15 years like "How could all information across production silos be brought together in a common interoperable form, which could be queried to retrieve content and other resources?" Semantic technologies do provide an elegant and powerful solution. This will be a major paradigm shift for information management but, paradoxically, it may be simpler and make things easier.

The peculiarity and strength of an ontology are that any complex model can be represented using simple statements, called "triples", taking the form of basic sentences made of a "subject", a "verb" and an "object". All information from different metadata silos (databases, XML or otherwise) can ultimately be expressed, linked, combined or mapped in the form of triples. Relations between data from heterogeneous origins will also be stated in this format e.g. "x relatesTo y". This provides seamless interoperability.

Such semantic models can be easily extended or customised. Once this is done, querying and retrieving assets across a single organisation becomes easier, reducing costs and maximizing revenue through cross-media exploitation.

## B. Example: The Book Analogy

If someone were to describe what a book is, he may say (among other options):

– A book has a title.
– A book is organised in chapters.
– A chapter has a number
– A chapter contains paragraphs, etc.

The corresponding semantic representation of a book description could be:

– Book (class) hasTitle (dataProperty) value (datatype string)
– Book (class) organisedIn (objectProperty) Chapter (class)
– Chapter (class) hasNumber(dataProperty) value (datatype integer)
– Chapter (class) contains (objectProperty) Paragraph (class), etc.

The above example exposes all the basic principles around semantic web:

– A model can be expressed using simple statements or triples (subject/verb/complement)
– Subject are classes, i.e. key structural components of your model (Book,Chapter, Paragraph)
– objectProperties are used to link classes
– dataProperties are used to characterise classes (e.g. a title or a number).

## C. Linked Data

Linked data is about connecting resources in a machine-friendly way. Like URLs pointing to a human readable website, also called a "landing page", URIs – uniform resource identifiers – link to related processable data, which in turn can also link to more data. This linking process offers wide possibilities for data enrichment. For example, an archivist processing information mentioning the name of a person will find a biography of that person on the internet, either as a simple webpage and/or containing hidden machine-processable information.

The proposal is very attractive. Implementation must take account of the following considerations:

– Linked data doesn't have to be open and can be managed in a controlled environment;
– Persistence of references to linked open data must be considered seriously;
– The editorial quality of linked data must be verified (for disambiguation, quality and correctness of the data);
– If you are able to expose your model simply and logically, you are good to go and take all benefits that come from semantic technologies.

DBPedia and Wikidata are good representative sources of Linked Data for data enrichment, which can be queried through their respective Sparql endpoints.

SPARQL [13] is a powerful language used for querying semantic databases known as "triple stores". Queries are made in the form of triples. The simple query "? ? ?" ("tell me everyting about anything that has any property associated with any value") would dump you database.

## D. EBUCore RDF/OWL

As shown in Figure 7, EBUCore can be represented using RDF/OWL. An EditorialObject describes a TV program. MediaResources are the actual renditions, i.e. files in different formats. The program can be segmented in parts or segments such as chapters. Contributors are represented as Agents (Contact/Person or Organisation).

Relations between classes are object properties. All other EBUCore properties are reproduced as data properties.

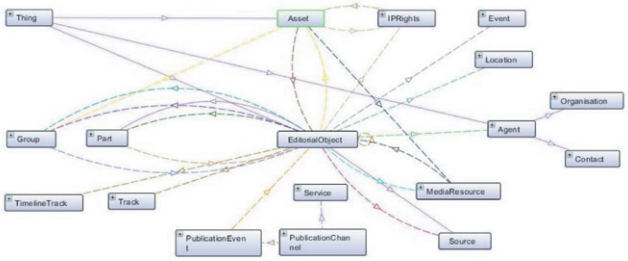



Figure 7: EBUCore's RDF/OWL model

EBUCore is used to describe all business objects that can be found in broadcasting production: audio and/or content, pictures, documents, etc. EBUCore is used in CCDM and EBUSport introduced below.

## E. EBU Class Conceptual Data Model (CCDM)

The EBU CCDM [3] is expressed in RDF/OWL [11, 14], which comes in complement to the EBUCore ontology also available in RDF/OWL. The use of semantic technologies paves the way for more expressivity, richer queries and linked data (open or not).

## F. EBUSport Ontology

Events as complex as sport events can be described in a series of triples representing the relations between competition events, athletes, results, media resources, etc.

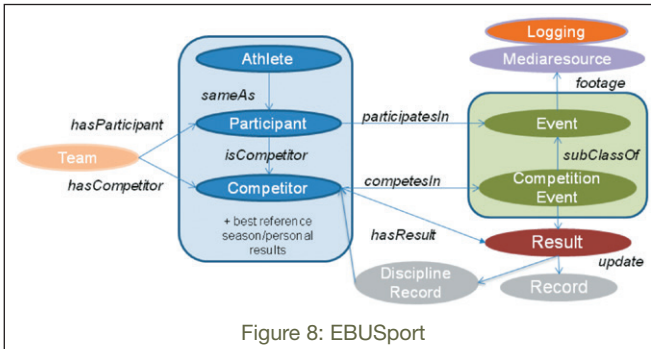



Figure 8: EBUSport

The combination of EBUSport and EBUCore leads to the seamless description of "content in context". The metadata usually associated with a video would consist of logging information. As shown in Figure 9, all the metadata about the competition is also linked to each and every media resource including videos, documents, images, interviews, etc.

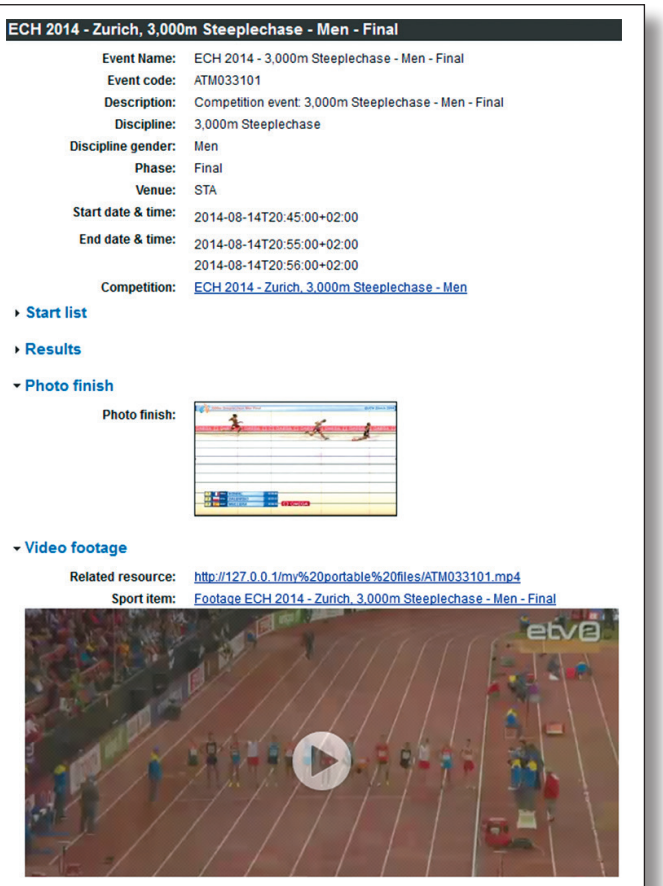



Figure 9: An EBUSport archive application

## Conclusion

Combined together the three technologies presented in this paper offer a fantastic opportunity to move broadcast and audiovisual production to the next level of productivity. FIMS is already a reality and it uses EBUCore schema. The next step will consist of implementing metadata in a semantic framework around FIMS. As shown in Figure 10, a FIMS workflow will take direct benefit from metadata interoperability across processes and production silos

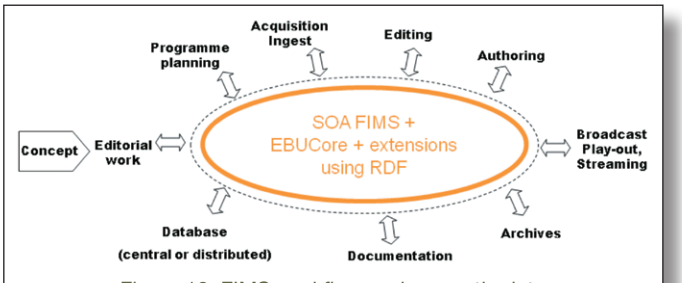



Figure 10: FIMS workflow and semantic data

## Acknowledgment

The author would like to thank all the FIMS participants for their excellent work in delivering the interoperable production framework that the broadcasting industry has been so much expecting.

The author also would like to thank all the media information management experts who contribute to the successful publication of high level standards within the EBU metadata community.

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## author



*Jean-Pierre Evain*
*European Broadcasting Union (EBU)*

*Jean-Pierre Evain joined the EBU's Technical Department in 1992 after several years spent in the R&D laboratories of France-Telecom (CCETT) and Deutsche Telekom (FI/FTZ). As Principal Project Manager, he is now looking after "Media Fundamentals and Production Technologies" and coordinates all EBU technical activities concerning metadata and new production architectures. He is the co-author of several EBU metadata specifications (e.g. EBUCore) and the EBU Class Conceptual Data Model (CCDM). He is actively promoting the use of semantic web technologies in broadcasting. He is the EBU Project Manager of the joint AMWA-EBU FIMS Project on Service Oriented Architecture. He represents EBU in many standard groups and industry forums like AES, ETSI, IPTC, MPEG, SMPTE, W3C, among several others."*

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# Technical Committee 2014 Meets in Macau




The 2014 annual meeting of the ABU Technical Committee took place in Macau on 24 and 25 October. The meeting was hosted by Teledifusão de Macau, SA and the Welcome Address was delivered by Mr Masakazu Iwaki, Senior Manager, Planning & Coordination Division, Science & Technology Research Laboratories, Nippon Hoso Kyokai and ABU TC Vice-Chairman, who was Acting Chairman on behalf of the Chairman, Dato' Abu Bakar Ab Rahim who was unable to attend.

The Opening Address was delivered by Dr Javad Mottaghi, the ABU Secretary-General.

The Director Technology, Dr Amal Punchihewa, presented his report on the activities carried out by the Technology Department since the previous meeting in Hanoi.

## Special Invited Presentation

A special presentation on NHK's Vision for the Future of Broadcasting was delivered by Mr Yasuto Hamada, Managing Director, Executive Director-General of Engineering of NHK-Japan. Mr Hamada said NHK planned to launch 8K Super Hi-vision and 22.2 3D Audio in 2016. The intention was to use 8K to broadcast the 2020 Tokyo Olympics. He described how NHK had used 8K Super Hi-Vision to cover selected matches at the 2014 FIFA World Cup in Brazil, with public viewing at venues in both Brazil and Japan.




Mr Yasuto Hamada, NHK-Japan

## Keynote Presentation

Mr Simon Fell, Director of Technology & Innovation of the European Broadcasting Union delivered the Keynote on the Next Generation TV Production and Delivery.



Mr Simon Fell, EBU

He began by taking a look back on various technologies beginning from the late 1960's with the 2" video tape, colour television, and following on through different video cassette formats, digital standards like Rec. 601, compression, digital VTRs, SDI, HD, iPlayer and then on to the future with 4K and 8K transmissions.

Simon touched on some of the challenges yet to come, with higher frame rates, higher colour palette, higher dynamic range and also spectrum challenges for distribution and production and what security for your content if it's stored by a third party data centre or in the cloud.

He summarised saying that the past teaches us to always move on. Technology needs to be replaced, but we need to make sure we keep our editorial and quality values.

# Forum Meetings


Mr Sunarya Ruslan


Ms Kathryn Brown


Ms Ruxandra Obreja


Dr Fintan Mc Kiernan


Mr Wong Kit Hung


Dr Rex Cui


Mr Jean-Pierre Evain

Mr Sunarya Ruslan of RRI-Indonesia chaired the Digital Radio Forum meeting where workshop presentations were made on DAB+– Outlook in the Asia & Pacific, A Case Study on Digital Rollout in Indonesia and DRM in the Asia-Pacific and Beyond. The presenters were Ms Kathryn Brown of Commercial Radio Australia, Mr Ruslan himself and Ms Ruxandra Obreja of DRM respectively.

Ms Lim Soh Kwang of RTB-Brunei chaired the Developing Broadcasters' Forum and began by going over the activities for the past year. The workshop presentations included What the New Wave of Broadcast Technologies means for Traditional Broadcasters, How would UHDTV-1 (4K) Impact Broadcasters and Metadata, New Generation Coaxial Broadband Solution HINOC and New Production Architectures (FIMS). Presenters were Dr Fintan Mc Kiernan of Ideal Systems, Mr Kit Hung Wong of Sony Corporation of Hong Kong Ltd, Dr Rex Cui of RTPRC-China and Jean-Pierre Evain of the EBU.

# Technical Studies

The Production Topic Area report was presented by Mr Ahmed Nadeem as there was no Production Topic Chair at this point.

The Chairman of the Transmission Topic Area, Mr Takahiro Izumoto of NHK-Japan, gave a summary of the four projects under this topic i.e. DTTB coverage and frequency planning, Mobile Digital Multimedia Broadcasting, Standardisation of API for DTTB and Delivery using Network and Content Protection.

Mr Tharaka Mohotty of MTV-Sri Lanka provided a briefing on the Training & Services Topic which he chairs.

The Chair of the Spectrum Topic Area, Mrs Zhu Yun Yi, summarised the factors reinforcing the importance of TV broadcasting and what actions the industry should do to protect the spectrum.

Mr Il-Soo Kyung of KBS-Korea who heads the Next Generation Broadcast System Study Group then provided his updates.


Mr Takahiro Izumoto


Mr Tharaka Mohotty


Mr Il-Soo Kyung

# New Line-up of the ABU Technical Committee



The Scrutineers, Mr Paul Treleaven, IABM-UK and Mr Calvin Lim, MDA-Singapore

Mr Masakazu Iwaki of NHK-Japan was unanimously elected as Chairman of the ABU Technical Committee in place of Dato' Abu Bakar Ab Rahim who was not seeking re-election.

Mr Hamid D Nayeri of IRIB-Iran was re-elected as Vice-Chairman while Mr Tharaka Mohotty of MTV-Sri Lanka and Mr Lasantha Samaranayake of EAP-Sri Lanka were elected as the new Vice-Chairmen.

The full line-up can be seen on page 31.




# CTO Forum:
# Do We Need Spectrum for Future Broadcasting?

*Report from the CTO Forum ABU-TC 2014*

by **Mr Lindsay Cornell**
Principal Systems Architect, BBC Future Media, UK

Dr. Amal Punchihewa introduced the session. The many panellists showing how important this spectrum issue continues to be.

First to speak was Zhu Yunyi, chair of the ABU Spectrum Committee. She introduced an old Chinese saying: "If the skin is gone, to what can the hair attach itself?" as an analogy to, "If the spectrum is gone, to what can the content attach itself?" She recounted briefly how, since 2000 TV, spectrum in UHF had shrunk back to give way to IMT services. Some countries had phased out analogue TV, but not so many… Many would not complete the process before 2020. Even after ATV to DTV, then would come transitions from SD to HD, HD to UHD, etc. These changes would require simulcast periods, so additional spectrum would be needed along the way. However this was not happening, because new mobile services were also competing in and winning the battle for, spectrum.

Current WRC work had been specifically looking at spectrum below 6GHz for IMT, but after WRC-15 they also intended to look above 6GHz. TV however had ONLY the UHF band, whereas IMT had MANY bands already. And broadcasters and consumers had already invested heavily in the TV business.

Ms Zhu emphasised the higher efficiency of broadcast over mobile: one-to-many vs one-to-one. She said that consumers also expected higher quality, free-to-air, TV: they bought bigger screens and wanted higher resolution; so it was essential for broadcasters who wanted to fulfil their consumers' expectations to press their national administrations for enough spectrum and to set out their plans for upgrades and improvements.

Next Dr Fares Lubbadeh talked about the broadcasting situation in the Arab world; satellite delivery being the main delivery platform for TV in the Arab world, comprising more than 90% of primary receivers. In 2013, the penetration of satellite pay-tv was 75% vs 25% for IPTV, though Connected TV was increasing. High income Arab countries already had high quality fast internet, but in other countries internet performance was low. DTT was developed in some states, with DVB-T and T2, others were just starting on digital and yet for others it was still some way away. The picture was different in different places. But UHF spectrum was the oxygen for terrestrial TV and it was still needed across the Arab world. WRC-12 allocated 700 MHz as co-primary broadcast and IMT having a huge impact on many Arab countries. Also, programme Making and Special Events (PMSE) should not be forgotten: UHF being the primary band for wireless microphones, in-ear monitors, talkback, etc. And with less UHF for TV distribution there was less space left for wireless audio PMSE. Dr Fares Lubbadeh concluded that spectrum was needed for the future of TV broadcasting because it was the only way to evolve and develop the terrestrial TV platform.

Abdelrahim Suleiman described that after the Geneva 2006 spectrum agreement, there had been many meetings to plan for digital TV. Some broadcasters had got off to a quick start, but fewer than 50% of ASBU's members had yet to

made the transition to DTV. Satellite was strong because the Arab states shared a common language. ASBU knew that broadcasters must work with their administrations to find a solution for the UHF spectrum and had reached an agreement that they must work towards the release of the 800 and 700 MHz bands while hoping to get agreement that 470 – 694 would stay as broadcast only. ASBU members had also to work with neighbours like Iran, Italy and Spain to get agreements on spectrum use.

Masakazu Iwaki introduced some topics that were specific to Japan. He also emphasised that good quality interference free spectrum was very important. The Japanese ASO had been completed in 2011, all VHF TV spectrum was given up and UHF spectrum use reduced from a total of 370 MHz to 240 MHz.

Simon Fell then presented the EBU approach to defending spectrum for broadcasting. He emphasised the need for an inter-disciplinary group made up of technologists, strategists, political movers. The work had resulted in the Lamy Report to the European Commission, which was a well-informed view of the future of UHF spectrum for broadcasting. Data showed that Europeans watched about 4 hours TV per day, and over 80% was linear. But the picture of DTT use was dramatically different between different EU countries. Simon presented a wealth of statistics about the use of TV, mobile, etc. He suggested that the mobile industry made a lot of claims that could not be substantiated and that everyone needed to be vigilant to defend spectrum for broadcasting. He further encouraged all participants to work together.

Federico of TDM presented that Macau was a very small country, only 30 km2 in area, and had very close neighbours. It was highly populated with many tall buildings, buildings taller than the hills for transmission towers. But now fibre optic cable was being rolled out to every household in Macau for completion in 2017, so that TV distribution, which was still analogue, would be fully digital and would not require UHF spectrum for distribution.

Next Dr Riyadh Najm stated that some years ago, governments had been convinced that there was a lot of money to be made in selling spectrum currently used by broadcasters to mobile operators and that, at that time, the broadcasters had not really been able to speak out. The panel had provided all the information about what was going on and what had happened. The most important thing to emphasise was that these issues were not to be solved by technologists alone – there needed to be proper political lobbying and there needed to be joined up, shared thinking amongst the broadcasters to be able to give a stronger voice and with more coherent arguments.

Dr Amal Punchihewa summarised the discussion sayin that we needed spectrum for production; we needed spectrum for contribution and we needed spectrum for distribution, whether that be by terrestrial or satellite. The broadcasters had done a lot to come together to present a more unified position, resulting in the WBU statement in July, but all broadcasters needed to speak to their national administrations.

Phil Laven of DVB said he was passionate about spectrum but he had detected that there were still many broadcasters who were too complacent about the outcome of the WRC-15. The broadcasting unions were doing the most they could, but it was national administrations that were the powerful voices in the ITU and every broadcaster had to convince their own administration that without spectrum for broadcasting the whole culture would be affected.



Sabrina Cubbon of AsiaSat supported Mr Laven's comments. She also wanted to emphasise that it was not just UHF terrestrial broadcasting that was under threat but also spectrum for satellite services that the mobile industry was targeting.

Finally, Dr Cho Sam Mo of SBS Korea reminded delegates not to forget cross-border issues – the Korean administration having told SBS that, since Japan had allocated 700MHz to mobile and Korea was to use it for UHD TV, there would be interference issues. Similar situations would also occur elsewhere in the world. We needed to work together, said Dr Cho.

## Special Topic Session on

# Digital Radio and TV Workflows in TDM

## presented by Teledifusão de Macau S A

Mr Frederico Alexandre do Rosário, Director and Member of Executive Committee TDM (Teledifusão de Macau) and ABU Honorary Vice Chairman, moderated the Special Topic Session on Digital Radio and TV Workflows in TDM.

The first speaker, Mr Cheang Kong Pou, Acting Controller of Engineering and Technological Innovation Division, TDM, spoke on The Development of Tapeless TV Workflow in TDM by first recapping the historical developments of TDM and the snapshot status of the current DTT technical architecture and programme channels.

He then introduced the Network Operation Centre (NOC), Media Asset Management (MAM) where the stages involved in the workflow such as ingestion, non-linear editing, subtitling, playout, archiving, and quality check were elaborated. Following this Mr Cheang highlighted the system architecture of the workflow, its characteristics and distinct features.

Facilities such as the Central Playout Storage, Master Control Room (MCR), TV Studios, OB Vans and web media platform were also described.

He then shared the key prospects and ongoing development of the TV workflow in TDM.

The second speaker was Mr Chan Peng Kuan, Specialist Technician of Engineering and Technological Innovation Division, TDM, who presented The Development of Digital Radio Studio Workflow in TDM.

Mr. Chan began with a brief introduction on the history of the development of the Radio Macau FM and the existing studio facilities. He then touched on the statistics of the audience's listening habits, the historical development of the radio studio from the analogue stage to the digital stage with highlights on how the redundancy, on-line storage and workflow were being addressed. Mr Chan also mentioned the latest developments related to new media such as apps development.




**Mr Cheang Kong Pou, Mr Frederico Alexandre do Rosário and Mr Chan Peng Kuan**

He then walked through each stage of the workflow management system currently adopted in TDM, to enable the audience to understand how the workflow management application had assisted the various activities involved, such as browsing, scheduling and content management.

Mr. Frederico Alexandre do Rosário concluded that TDM had achieved tapeless workflow completely. He reiterated the importance of the central storage system and Media Asset Management.

# International Organisations Updates



**Mr Abdelrahim Suleiman**



**Mr Philip Laven**



**Dr Riyadh Najm**

Updates from international organisations were provided by Ms Ruxandra Obreja, the DRM Consortium Chairman, Mr Abdelrahim Suleiman, the Director of Engineering of the Arab States Broadcasting Union ASBU, Mr Simon Fell, Director of Technology & Innovation, EBU, Mr Philip Laven, Chairman of the DVB Project, Mr Paul Treleaven, Technology Consultant of IABM, and Dr Riyadh Kamal Najm, President of the General Commission for Audiovisual Media, Saudi Arabia.






# Technical Bureau Meeting

The annual meeting of the ABU Technical Bureau was held a day before the TC meetings. The Bureau proposed four recommendations to the Technical Committee which were:

**RECOMMENDATION 1/2014:**
Loudness Management – Creating Awareness on Needs for Loudness Management and a Recommended Target level for ABU Members

**RECOMMENDATION 2/2014:**
Integrated Broadcast Broadband Systems – Creating awareness on IBB and OTT for ABU Members

**RECOMMENDATION 3/2014:**
FOBTV – Findings of the Survey to Prioritise Features of Future Broadcasting

and

**RECOMMENDATION 4/2014:**
Addressing Spectrum Issues for Future Broadcasting




























# Record
## of Thanks and Appointment of TC Honorary Vice Chairman for 2015

At the closing session of the TC meeting, Mr Masakazu Iwaki expressed the Technical Committee's deep appreciation to the outgoing Technical Committee Chairman, Dato' Abu Bakar Ab Rahim of RTM, Malaysia.

Dato' Bakar served as chairman for the past two years and was responsible for major changes in the way the TC operates. He reduced the duration of the TC from three days to two, and simplified the TC programme to make it much more efficient and focused.

As Deputy Director of RTM, Dato' Bakar has provided invaluable support to the annual ABU Digital Broadcasting Symposium, from ensuring the Information Ministry's presence to chairing conference sessions and providing sponsorship support.

Dato' Bakar stepped aside as TC Chairman after being promoted to Director General of RTM. The Technical Committee congratulated him on his promotion and thanked him for the superb work he has done as TC Chairman.

Mr Iwaki mentioned that ABU Technology, on behalf of the TC, will present Dato' Bakar with a token of appreciation.

Mr Iwaki also thanked Mr Frederico Alexandre do Rosário for his excellent hosting and arrangements for the ABU Technical Committee meeting and presented Mr Rosário with a gift.

Mr Iwaki announced that Ms Kiymet Erdal, Chief Engineer of Turkish Radio Television Corporation, has been appointed the Honorary Vice Chairman for 2015. Ms Erdal joined TRT in 1998. She has worked in the Information Technologies Department since 2008 where she is responsible for the audio equipment in television and radio studios, planning and acoustics.



Ms Kiymet Erdal of TRT-Turkey.



Mr Masakazu Iwaki presenting a token of appreciation to Mr Frederico Alexandre do Rosário.




Dr Amal Punchihewa presenting Dato' Abu Bakar Ab Rahim with a token of appreciation at RTM-Malaysia.




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# ABU Engineering Awards 2014

## ABU Developing Broadcasters' Excellence Award sponsored by SONY

Mr Lasantha Samaranayake, Director of Engineering at EAP Network Sri Lanka, won the ABU Developing Broadcasters' Excellence Award for his role in implementing a new frequency reallocation for EAP in a limited time frame and with minimum interference to signals.



The citation reads:

*Lasantha Samaranayake of EAP Networks (Pvt) Ltd wins the ABU Developing Broadcasters' Excellence Award 2014 for his outstanding role in implementing a new frequency reallocation for EAP in a limited time frame.*

*Overcoming many challenges, he handled the frequency planning for all three of EAP's FM channels. The exercise was successfully completed on time with a minimum of interference to signals despite limited human and physical resources and funds.*

Mr Samaranayake received the Developing Broadcasters' Excellence Award trophy from Dr Javad Mottaghi, ABU Secretary-General, at the ABU Prizes Night held on 27 October 2014 at the Sheraton, Macau.

## ABU Engineering Industry Excellence Award

The ABU Engineering Industry Excellence Award, was presented to Mr Frederico Alexandre do Rosário, Director and Member of the Executive Committee of TDM Macau, for his leadership of TDM's migration to digital and the implementation of a completely tapeless working environment.



The citation reads:

*Frederico Alexandre do Rosário wins the ABU Engineering Industry Excellence Award 2014 for his outstanding leadership of TDM's migration from analogue to digital broadcasting.*

*He led the implementation of a completely tapeless working environment in the television station in 2009, from production to broadcasting. The new system changed totally the way TDM TV operated.*

Mr do Rosário received the trophy from the ABU Acting President, Dr Ahmad Jailani Muhamed Yunus, Deputy Director-General (RTM), at the ABU Prizes Night held on 27 October 2014.

## ABU Broadcast Engineering Excellence Award

The ABU Broadcast Engineering Excellence Award was bestowed on Mr Sunarya Ruslan, Chairman of the Supervisory Board of RRI Indonesia, in recognition of his outstanding contribution to the development of RRI and to broadcasting regulations in Indonesia.



The citation reads:

*Sunarya Ruslan of Radio Republik Indonesia wins the ABU Broadcast Engineering Excellence Award 2014 for his outstanding contribution to the development of RRI and broadcasting regulations in Indonesia.*

*He first proposed a multiplex broadcasting and frequency allotment for public broadcasting using 20 percent of the existing frequencies – a move incorporated into government broadcasting regulations. Among other innovative measures, he was responsible for introducing an early warning system at RRI.*

Mr Sunarya received the trophy from Dr. Manuel Pires, Vice-Chairman of the Board of Directors and Chairman of the Executive Committee, at the ABU Prizes Night held on 27 October 2014.

## ABU Green Broadcast Engineering Award sponsored by KOBA

CCTV China was the winner of the ABU Green Broadcast Engineering Award 2014 in recognition of the reduction of its carbon footprint and promoting the protection of the environment through the introduction of its file-based workflow.





The citation reads:

*CCTV-China wins the ABU Green Broadcast Engineering Award 2014 for reducing its carbon footprint and promoting the protection of the environment through the introduction of its file-based workflow.*

*CCTV sets environmental protection as a basic philosophy, in addition to producing a range of programes designed to raise public awareness on environmental issues*

Mr Il-Soo Kyung, Director, KBS-Korea who represented KOBA, presented the award to Dr Mei Jianping, Director Radio and Television of the People's Republic of China who accepted the award on behalf of CCTV.

## ABU Technical Review Prizes

The winner of the **Best Article Prize for 2014** is NHK-Japan for the article titled UHDTV System Colourimetry and Technical Development for its Implementation.

The authors are Mr Kenichiro Masaoka, Mr Takayuki Yamashita, Mr Takuji Soeno, Mr Yukihiro Nishida, Mr Yuichi Kusakabe, and Mr Masayuki Sugawara of the NHK Science & Research Laboratories.



Mr Kenichiro Masaoka



Mr Takayuki Yamashita



Mr Takuji Soeno



Mr Yukihiro Nishida



Mr Yuichi Kusakabe



Mr Masayuki Sugawara

At the TC Meeting on 24 October 2014, Mr Frederico Alexandre do Rosário, Director and Member of the Executive Committee, TDM and TC Honorary Vice Chairman, presented the certificate to Dr Narichika Hamaguchi who accepted on behalf of NHK-Japan.

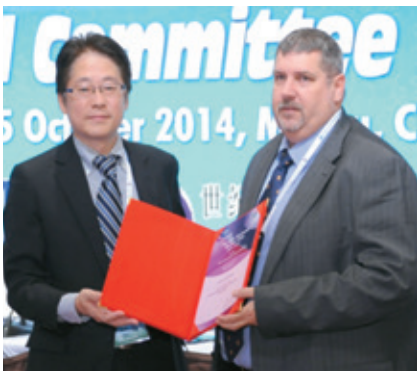




At the ABU Prizes Night on 27 October 2014, Mr do Rosario presented the certificate to Mr Masakazu Iwaki, the newly elected TC Chairman, who accepted on behalf of NHK-Japan.



The **First Commended Article Prize** was awarded to Television New Zealand for the article titled Technical Aspects of Analogue Switch Off in New Zealand Zealand authored by Mr Wayne Huggard.



Mr Masakazu Iwaki, TC Acting Chairman presented the certificate to Mr John West, Exec. VP Sports, TVNZ, who accepted on behalf of Mr Huggard at the Technical Committee Meeting Opening Session on 24 October.



The **Second Commended Article Prize** was awarded to the Islamic Republic of Iran Broadcasting for the article titled How the ICT Application Can Improve Management of Archiving Systems authored by Mr Alireza Bahadori.



Mr Masakazu Iwaki, TC Acting Chairman presented the certificate to Mr Hamid Nayeri, Director Technical Affairs and TC Vice Chairman who accepted the certificate on behalf of Mr Bahadori during the ABU Technical Committee Opening Session on 24 October.

# ABU Distinguished Service Award 2014



Dr Keiichi Kubota was presented with the ABU Technology's highest accolade, the ABU Distinguished Service Award.

Dr Kubota, President & CEO of NHK Integrated Technology Inc, was recognised at the opening day of the ABU Technical Committee meeting which took place during the ABU General Assembly and Associated Meetings in Macau, China.

The ABU Distinguished Service Award recognises the outstanding achievements and contribution by an individual to the broadcasting industry. During his 38-year career in broadcasting, Dr Kubota has made significant contributions in the area of HDTV standardisation. He was instrumental in advances in the areas of satellite and terrestrial transmission systems, as well as in signal processing for HDTV. Dr Kubota also played a leading role in the rollout of NHK's digital satellite broadcasting service and the coverage of the 2012 London Olympics in Super Hi-Vision.

In his speech Dr Kubota said he had spent a major part of his career at NHK's laboratory developing the HDTV and Ultra-HDTV systems. During this period he had made many friends in Asia and around the world through various engineering projects and standardisation activities. Dr Kubota said he was happy to witness the huge changes in the broadcast industry during his 38-year career, and felt lucky that he could overcome all sorts of difficulties during the transition with his colleagues around the world. Dr Kubota promised to continue working as a bridge between the Japanese broadcast industry and the broadcast industry in Asia and the Pacific.

# ABU, EBU Call for Action to Protect Spectrum

The ABU and the European Broadcasting Union, the EBU, have demanded global action to protect spectrum to guarantee the future of broadcasting.

The call was made on the closing day of the ABU General Assembly in Macau in October.

EBU Director General Ingrid Deltenre told delegates that 250 million Europeans relied on spectrum to watch digital terrestrial TV (DTT).

"DTT remains the backbone to public TV access. We cannot allow the mobile industry's insatiable appetite for spectrum resources to hijack this precious resource."

Ms Deltenre was supported by ABU Secretary-General Dr Javad Mottaghi, who highlighted the essential service that terrestrial TV plays in regional areas of the Asia-Pacific.

"Terrestrial broadcasting remains a crucial tool in emergency situations," Dr Mottaghi said. "It is often the only technology which continues to function and can reach a mass audience despite difficult external conditions."

A number of spectrum related activities carried out, lead or associated by the ABU are listed in the ABU website in the technical page under URL
http://www.abu.org.my/Technical_Events-@-Spectrum_Related_Activities.aspx



The ABU Technology recommends you to actively take part in these spectrum related activities. Currently, the ABU Technology is administering a questionnaire to ascertain spectrum requirements in individual ABU member countries and current usage of spectrum in 67 ABU member countries. We expect to have your responses as soon as possible. The ABU Technology will present its proposals to a regional event to be held in Bangkok early next year and then take matters up at the ITU WRC-15 in 2015 November.

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## About Us

BECIL a profit making Government of India, PSU established in the year 1995 provides consultancy and turn-key solutions in the Broadcast Engineering and IT related fields. BECIL has a pool of in-house specialists and vast reservoir of experts in Radio, Television broadcasting and related fields BECIL works on national & international level. BECIL advises MIB and TRAI in various broadcasting related policy matters.

## Our Services

- Establishing Radio & TV Transmitting facility including frequency and coverage planning, prediction etc.
- Setting up studio facilities for Audio & Video including connectivity for transmitting live content and data.
- Establishment of Cable TV systems and HITS (Head End in The Sky).
- Custom design of interiors and acoustics of conference rooms, auditoriums and broadcast studios to confirm to international standards.
- Turnkey Solution for Establishing Community Radio Stations.
- Electronic Media Monitoring solutions (Radio & TV Terrestrial or Satellite) and security related Surveillance Setups for GSM, CDMA & VSAT.
- Sales and support for all type of broadcast engineering equipments/ system.
- Design and integration of outside broadcast vans (DSNG) with state-of-the-art technology.
- Providing O&M services for various type of Broadcasting setups.

## Major Achievements

- Establishment of Multiplexed FM Transmission at 87 centres across the country for 245 Private FM channels of Phase-II scheme as System Integrator.
- Revamping and Restoration of Print Media, Radio and Television Network in Afghanistan.
- Design and establishment of State of the Art Electronic Media Monitoring Centre for 24x7x365 monitoring and logging of 300 Satellite TV channels.
- Designed, integrated and supplied Ku/C-band DSNG Van to Doordarshan, India.
- Supply of security equipment like Laser Range Finder, Real Time Viewing System, VSAT Monitoring etc. to Para Military, Military, State Police Depts. Etc.
- Establishment of TV studio for IGNCA, Edusat setup for Delhi Technical University and Sangeet Natak Academy.
- Manpower outsourcing for specialised service to Doordarshan and AIR News Unit Delhi, RNUs and EMMC.
- Establishment of Main Press Centre of Commonwealth Games 2010 for PIB.
- Designed and created broadcast compounds & facilities for Prasar Bharati, the host Broad-caster of Commonwealth Games 2010.
- Supply & installation of studios production equipment for Bangladesh TV for an amount of US $ 2.1 Million.

## On Going Projects

- Supply & commissioning of 2 nos. of 1000 kW MW AM DRM Operational Super Power Transmitters to AIR for their external services.
- Upgradation of 3 Camera T.V. Studio at Jamia Milia Islamia University.
- Supply, upgradation & commissioning of combiner cable and antenna system, including strengthening of tower aperture at 4 metro & 15 other site for DD.
- Setting up of Video Recording Studio, PCR, MCR & Post Production Facility for NIOS.
- Supply, installation, testing & commissioning of HDTV Studio setup for Rajya Sabha's RSTV Channel.
- SITC of Log Periodic Antennas between 3 to 30 MHz for monitoring setup at three (3) sites of ARC.

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Outlook

# Spectrum, Spectrum and Spectrum...

It is again time to write on the subject of spectrum and remind of you of the importance of this matter to broadcasters. Please give close attention to WRC-15 spectrum issues.

Television broadcasters have been developing and trailing next generation (NGN) broadcasting including delivery technologies. UHDTV (Ultra High Definition Television), immersive audio and EDR (Extended Dynamic Range) are attractive features of NGN TV. Having more pixels will provide enhanced viewing experience coupled with immersive audio. But extra data require extra bandwidth. Increased spatial resolution and temporal resolution will increase the raw data rates by four-fold to sixteen-fold increases. With advanced compression techniques, four-fold increases in raw data rate due to spatial resolution can be reduced to less than doubling of data rate of full HD. However for sports programmes and action filled content, little compression can be achieved in temporal domain compared to full HD.

UHDTV-1 services are now being offered via satellite and cable to selected audiences. Due to lack of penetration of cable infrastructure, over the air (OTA), especially in form of terrestrial, is the most effective and efficient way to deliver content to mass audiences. Currently no mobile technology is even capable of delivering content to television viewers in full HD form.

What we see is that there is increasing demand for television broadcasting services and with a demand for more bandwidth than full HD to offer appealing content in higher spatial resolution (4K) at high frame rate with extended dynamic range to accommodate extended colour gamut and wider intensity range.

Coming back to spectrum, having migrated to digital we can compress number of standard definition channels to single carrier depending on the type of content (news to sports) and the quality that is required data rates from 1 to 2 Mbps can be achieved using an AVC codec. Full HD will require more bandwidth as data rate will be higher, again depends on content and quality – about 2 to 4 Mbps. UHDTV with EDR demands more data to be conveyed and may be require the assignment of a complete multiplexer with say 8MHz bandwidth for UHDTV-1.

On the other hand, broadcasters have been constantly trying to achieve better compression and channel coding techniques for transmission efficiencies and the broadcast industry has in recent years, been deploying more spectrally efficient technologies.

As reported by some of the studies, in Asia Pacific and in other regions, allocated IMT spectrum has not yet been fully deployed. If there is a demand as claimed by spectrum seekers in other industries, they must fully deploy already allocated IMT spectrum.

In summary, the broadcast industry also anticipates increased demand for television services and such services including UHDTV with EDR require more bandwidth. Hence, the spectrum freed after digitalisation cannot be fully re-allocated to evolving services other than broadcasting. Broadcasting needs higher bandwidth than any other service due to the nature of the content (video) and no current technology can counter this effectively and efficiently in a commercially viable form in near future. Hence, until 2050, here must be adequate spectrum available for broadcasters to enable the digital transition from analogue and then to introduce new services on UHDTV with EDR.

We have heard about live streaming trails on LTE. LTE can handle high bit rates or high bandwidth data such as video. But high bandwidth means we need more spectrum. The question here is not just the technical capability of the delivery technology but how long a user will watch video while they are mobile. Mobile television has shown good response for short form viewing. Video streaming is good for live programmes. This poses fewer technological issues from spectrum or bandwidth points of view. As pointed out in the SK telecom studies, latency is a problem. Even low latency is still critical for content such as sports. It is a very complex mix. If the requirement is to deliver video content to mobile viewers, technology will soon be available in broadcast form. The same broadcast that delivers video content to home could deliver to mobile as well. We will be discussing a number of these technical issues in a full day workshop just prior to our 2015 Digital Broadcast Symposium in Kuala Lumpur.

**From Amal, Nadeem, Kyaw Zaw, Nam, Geraldine, Hamidah and Farah**

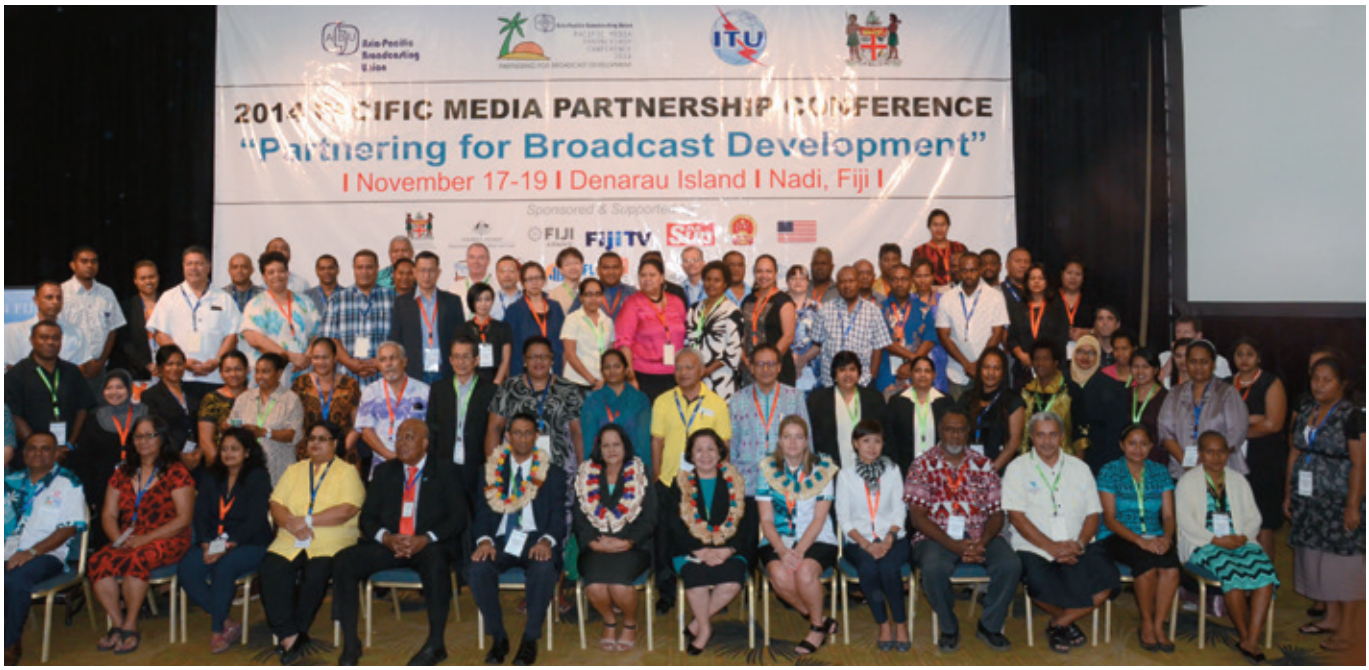
# WORKSHOP ON OVER-THE-TOP (OTT) & INTEGRATED BROADCAST BROADBAND (IBB) HYBRID TECHNOLOGIES

OTT – Over-the-Top, is a widely talked about topic in the media industry. Such services have been seen as a threat to the incumbent broadcaster and, while proactive broadcasters are already offering such services to enhance their audience experience and to build strong relationship to those audiences, questions have been asked how profitable they are. ABU Technology conducted a workshop on Integrated Broadcast Broadband (IBB) and Over-the-Top Services in Kuala Lumpur from 30th September to 2nd October aimed at educating ABU members in evolving hybrid technologies and services that they could offer for survival and to thrive in the media industry. 62 participants from 16 countries shared their experiences in the technology area of IBB and OTT services. 12 sessions over three days addressed various technologies, infrastructures and services connected with IBB and OTT. Participants valued the sharing of experiences of operating OTT services and technologies that could support hybrid broadcast-broadband services.

Through our partnerships, ABU attracted 6 industry speakers and 4 speakers from the ABU broadcast membership. Director ABU Technology provided an introduction to, and moderated discussions on, three key IBB technologies viz. HbbTV, Hybridcast and OHTV, and services such as catch-up, on-demand and live streaming that could offer through the Internet as OTT. Challenges faced by broadcasters in planning and implementing OTT services were discussed extensively. The complexity of monetising was highlighted by an industry speaker reinforcing the context provided by Amal regarding the diversity in ABU membership in Asia-Pacific Region. Industry speakers described the roles that cloud service providers could play in providing OTT services.

ABU received expressions of appreciation from all participants for organising the workshop. This was the second workshop in a series on the topics of OTT and IBB, starting with the first event in November 2013.






# Conference Promotes Pacific Broadcasting

The development of broadcasting in the Pacific was the key focus of the Pacific Media Partnership Conference 2014, held in Nadi, Fiji on 17-19 November.

Organised by the ABU and the International Telecommunication Union (ITU), and hosted by the Fiji government, the conference brought together more than 140 participants from 25 countries.

With the theme 'Partnering for broadcast development', the conference examined the needs of broadcasters in the Pacific and sought to build a sense of belonging among them.

The ITU supported two full-day workshops. One addressed ICT and gender issues. The other looked at the digitalisation plans of 10 Pacific countries. Nine countries along with experts from New Zealand, Australia and the Philippines gave progress reports.

The ABU Secretary-General, Dr Javad Mottaghi, moderated a session on 'Public Service Media and Broadcasting in Pacific Countries: Challenges and Opportunities', at which several CEOs and senior broadcasting executives presented their views.

Dr Amal Punchihewa, Director ABU Technology, moderated a number of sessions addressing ICT issues and the need for clear implementation plans based on road maps drawn up over the last few years.

He reiterated the commitment given by Dr Mottaghi to assist in the digitalisation process. Plans have already been drawn to provide human capacity building in Tonga and Samoa in March and August 2015 respectively.

The US Ambassador to Fiji, Ms Frankie Reed, told the conference there needed to be a variety of people in the




continued on page 35

continued from page 34

media from all races and cultures to be able to better understand issues on the ground.

She said she firmly supported a free press but one that also reported responsibly.

Fiji's Minister for Women, Children and Poverty Alleviation, Rosy Akbar, said there was an obvious gender disproportion in the ICT sector, and Pacific countries needed to commit themselves to changing the tide.

The Head of the ITU's Regional Office for Asia and the Pacific, Iowane Korovuki, said it was integral to any country's development to open up options for women in ICT.

The conference was the fifth in a series that started in 2010 in Tonga, followed by conferences in Samoa, Tonga and Vanuatu. Next year's conference will take place in Samoa in August.




# New Members

## Associate Membership

### ASIAN BROADCASTING NETWORK (M) SDN BHD (ABN), MALAYSIA – (5.11.14)

Asian Broadcasting Network (M) Sdn Bhd (ABNxcess) is a private limited company, registered on 23 May 2000 in Kuala Lumpur. It was Malaysia's first digital cable network and has the aim of supporting the development of knowledge-based communities throughout the nation by reducing the digital divide with affordable access to content, whether through internet or TV. In 2011, ABNExcess was awarded a license to operate the Digital Cable Network which included 'triple play services' such as Video, Data and Voice. It is fully committed to offer fixed high-speed internet connectivity and high definition TV at unbeatable value.

The principal activities of the company are the provision of subscription based television and radio services, radio broadcasting, production and distribution of film and television programming; publication and distribution of magazines, provision of interactive and multi-media services; voice and data connectivity services and other network and content application services; provision of broadband communication services, satellite communication services, internet access solutions and related services.

ABNxcess' Hybrid Fibre Coaxial (HFC) technology allows its customers to enjoy fixed, stable, high-speed internet service and high quality TV broadcasts, supporting speeds of up to 300 Mbps, TV broadcast of over 500 channels and other IP based multimedia services over a single cable.

## Affiliate Membership

### BROADCAST TECHNOLOGY LTD (BTL), HONG KONG – (5.11.14)

Broadcast Technology Ltd (BTL) was established in Hong Kong on 2 April 1986. It is a private company and is one of the major broadcast system integrators and equipment distributors based in Hong Kong. It has serviced Hong Kong, China and some South-East Asia countries for over quarter of a century. BTL is ISO9001:2008 Quality Management certified and specialises in TV and radio broadcast system integration and equipment supply.

Broadcast Technology Ltd's scope of services consist of broadcast systems integration and the provision of turnkey systems to broadcasters and facility houses. Its services include systems design, installation and commissioning. The company supplies broadcast equipment supply to broadcasters (television units, cable television and radio), dealers and other business partners. In-house engineers [bhkprovide after sales support for the systems.

BTL has established landmark projects in Hong Kong, China, Philippines, Indonesia, Malaysia, Myanmar and Vietnam as well as in Dubai and Egypt. Projects are supported by representative offices and sales teams in Hong Kong, China and Myanmar.

### CHILDREN'S TELEVISION FOUNDATION OF BANGLADESH (CTFB), BANGLADESH – (1.10.14)

CFTB, a non-government organisation, was established on 28 July 2005 in Dhaka, Bangladesh. It is the product of the united effort of a group of television personalities who started their adolescent careers in different TV channels of the country. Their experience and feelings about the importance of a children's voice in media committed them to support children and to, "let them speak in media".

The organisation supports disadvantaged children to get them organised under this platform to build their capacity and confidence, and to present their voice to the nation through electronic media.

CTFB produces and broadcasts several programmes including 'Kanastara' a weekly news programmes on BTV and Channel 1 for the children. 'Shisur Chokhe,' a news segment, is produced by and for the children via prime time news of the satellite channel ATN Bangla. They have also produced 13 episodes of 'Alo Chayar Khela' documentaries made by young directors for Boishakhi Television.

### DUNA (DONA) EST. FOR MEDIA PRODUCTION AND DISTRIBUTION, SAUDI ARABIA – (1.10.14)

Duna (Dona) Est. for Media Production and Distribution was established in 1990 in Riyadh, Saudi Arabia.

The company produces radio and television series as well as radio and television programmes. They have participated in many media events regionally and internationally and they have produced a number of artworks for Saudi Television and several private channels.

### SAUDI ARABIAN PRODUCERS & DISTRIBUTORS ASSOCIATION, SAUDI ARABIA – (1.10.14)

Saudi Arabian Producers & Distributors Association was established in 2007 in Riyadh, Saudi Arabia to provide service and support to companies and institutions working in the field of media production and information technology.

The Association is the first to be given a media license from the Ministry of Culture and Information to support the activities of artistic production and radio, television and film and theatre as well as service importers and distributors of films and taped documentaries, audio CDs and studios and radio producers and distributors of computer programmes.

The Association renews media licenses, applies for necessary visas from the Ministry of Foreign Affairs and the Ministry of Information, maintain contracts of companies after ratification to assist with resolution for disputes, provide an opportunity for members of the Saudi media to obtain all rights and privileges. It assists with the fight against fraud, with all permits for filming inside the Kingdom and checks that all protocols have been signed with international associations approved by the Association to provide the same rights and privileges for the counterparts in those countries.

### TI COMNET INTERNATIONAL VISUAL WORKS, JAPAN – (3.10.14)

TI ComNet International Visual Works, a private company, was incorporated on 1st February 2001 in Sapporo, Japan although it was first founded in 1998. The organisation is an independent production company specialising in translation, voiceover, narration services, content acquisition and sales and international TV production coordination.

For over 15 years, TI ComNet Japan has accumulated an impressive catalogue of programmes with many award-winning documentaries, dramas and series available in a variety of languages. They have a long-standing relationship and solid track record with NHK as well as smaller regional television networks and independent broadcasters in Japan. They represent numerous Japanese broadcasters including Hokkaido TV, Hokkaido Broadcasting, Hokkaido Culture broadcasting, East Japan Broadcasting, Tohoku Broadcasting, Asahi Broadcasting, Sapporo TV, Ishikawa TV, and many more; acting as their international content distributor.

TI ComNet Japan helps their clients to sell their programmes to the world at international content markets including MIPCOM, Sunny Side of the Doc, ASD, ATF, TIFFCOM, BCWW, etc. They are also the exclusive Japanese representative to the New York Film Festival, assisting the Japanese broadcast and production community with festival's submission process for their productions. They also represent other award competitions such as the International Emmy Awards.



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# Saudi Media Forum 2014

## "The next generation of ever-evolving broadcasting and digital media"

The Saudi Media Forum 2014 was held on 26-27 November in Jeddah, Saudi Arabia. The event was organised by the General Commission of Audiovisual Media of Saudi Arabia in association with the Arab States Broadcasting Union (ASBU) and the Asia-Pacific Broadcasting Union (ABU). The two-day conference brought together participants from broadcasters, operators and other media and entertainment providers from Saudi Arabia, across the region and around the globe.

The forum, which started in 2011 and is now in its 4th year, brought together the most inspired minds in broadcasting, entertainment production and other sectors of the media industry. The forum offered delegates the chance to interact with the latest products, explore technological innovations first hand and hear from experts who shape the industry at every stage. It also focused on social media as an area of growing influence in the media industry, along with an emphasis on the role of Saudi women in media with the aim of encouraging their participation in, and contribution to, the industry.

The Forum was inaugurated by the Minister of Hajj and Acting Minister of Culture and Information of Saudi Arabia, Dr Bandar bin Mohammad Hajjar. In his opening address he reviewed the history of development of the media, noting that there are a few channels that seek only profitability and spreading sectarianism, prejudices and hatred. He also noted that the current era is marked by the proliferation of a vast number of channels and we need to study ways to organize and filter them for the benefit of the viewers.

Dr Riyadh Najm, president of the General Commission for Audiovisual Media, in his keynote address said that the forum aims to create a platform for decision-makers in the Saudi media sector, and for the exchange of ideas and strategies to face future challenges. He also provided an insight into the media industry in Saudi Arabia and the licensing regime of new TV channels.




Public service broadcasting discussion panel




Next generation technologies panel

The conference included presentations on many topics relevant to the industry, highlighting advanced technologies, content production and delivery and a key emphasis on social media integration and how it is changing the media landscape in the region. The topics covered areas such as the ITU digital switchover plan and its implications, discussion on future challenges and opportunities of the middle east media industry, developing content for new media platforms, strategies for IPTV, VOD and OTT platforms, role of social media in redefining a new generation of broadcasting, social media and news delivery and technology related topics such as Beyond HD and Next generation broadcasting technologies.

Panel discussion sessions included within the conference programme provided an excellent platform for interaction among the delegates. These panel sessions, with experts from different areas of the broadcast and content distribution value chain, included interesting topics such as; 'Public service broadcasting in the region. – Do they represent value in the digital media age?'; 'Censorship vs freedom of expression'; 'Investigating copyright and intellectual property laws'; 'Role of universities and educational institutions in developing the Saudi media industry'; 'Exploring the role of Saudi women in media to encourage greater involvement and participation'.

Two of the highlighted areas within the conference sessions included integration of social media and how it is changing the gathering and distribution of news and other content as well as the role of Saudi women in media. Also interesting was the discussion on the role of universities and other educational institutions in bringing out professional graduates with enough practical know-how to embark on a career in media and production.

The event was supported by top industry players and was attended by over 100 delegates, representing broadcasters, channel operators, regulators, manufacturers and other service providers from the industry.

# Report on IBC 2014

**by Palitha Gallege**
Director Transmission of SLRC, Sri Lanka




The International Broadcasting Convention 2014 (IBC 2014) was held from 11th to 16th September at the RAI Amsterdam Convention Centre, Amsterdam, Netherlands. This year the total number of attendees at IBC was above 55,000. Of these 33,600+ were visitors and 21,300+ were exhibitors. The number of companies showcasing their products & solutions was above 1,500. Conference sessions at IBC 2014 were held from 11-15 September while the Exhibition was held from 12 -16 Sept 2014.

One of the attractive, special features introduced at IBC 2014 was Touch & Connect technology. With this attendees were able to exchange contacts and participate in electronic networking with their devices via the associated touch and connect portal.

At this time some Broadcasters are already in the process of, and others are considering, transforming traditional linear TV broadcasting services to more innovative services like hybrid, interactive and multi-screen, on-demand services etc. So, during this exciting seven days they were able to update their knowledge and get insights into trends in future broadcasting.

Some of the significant themes at the IBC this year were Cloud, Media Workflow, IBB & HPB TV solutions and the UHD (4K) TV experience.

Major vendors in the media industry exhibited several cloud based technology solutions which can enable broadcasters to transform from traditional linear broadcasting to more innovative & interactive services such as multi-screening etc. in more cost effective ways. Even amongst the conference topics, adoption of cloud by an increasing number of broadcasters was at the centre of interest, despite the fact that, even with high efficiency coding schemes such as HEVC/H.265, there is still a number of concerns about whether such networks can handle the bandwidth requirements of UHDTV-1 (or 4K) Television.

Media workflow management solutions were one of the other major attractions among visitors to IBC 2014. At the exhibition they were able to learn and experience how, in contrast to legacy systems, Media Workflow solutions could help broadcasters to get real-time visibility into the production process workflow for easy management and control. Further, broadcasters could get insights into how they would be benefitted by such media workflow solutions to meet changing needs. This was contrasted with legacy systems, which do not integrate well with each other, despite effort and money spent to maintain them.

In the areas of IBB, HPB and OTT solutions a number of leading vendors showcased their solutions.

The IBC Big Screen Experience was also a good opportunity for broadcasters to gain knowledge of the ways in which cinema and traditional broadcasting are merging, and the latest developments in that area, enabling broadcasters to think about available options for integrating cinema into relevant business strategies.

In addition there were significant numbers of leading vendors showcasing the new high efficiency video codec system HEVC/H.265, targeting HD (2K) and UHDTV-1 (4K) television, multi-screen encoders, media asset management and schedule applications.

Further, there were several vendors offering managed-services by which broadcasters are able to mitigate the initial cost of server hardware, operation and managing complex servers and networks. Instead hardware is operated at data centres of managed-service providers. Depending on the requirements of the broadcaster services can be obtained through dedicated or virtual servers and distributed over several servers or otherwise. One of the most significant advantage of such a managed service is flexibility, as the customer can upgrade or downgrade, enabling adaptability to changing requirements.



# ABU DIGITAL BROADCASTING SYMPOSIUM 2015

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# News
## from the ABU Region

## Australia

### ABC Radio Melbourne Turns 90

Australian public broadcaster ABC has celebrated a special birthday. Local radio 774 ABC Melbourne last month week turned 90. In the 1920s, the station was known as 3LO before undergoing a name change. It turned 90 years old on 13 October. 774 3LO first went on air on 13 October 1924, with an outside broadcast of a performance of 'La Boheme' featuring Dame Nellie Melba, from His Majesty's Theatre in Melbourne.

In 1928, the Sydney-based Australian Broadcasting Company took over the station, and in 1932, the Australian Broadcasting Commission (ABC) was established and took control of the two Melbourne stations.

*(radioinfo)*

### 3 Million Australians Listen to Digital Radio

Three million people are now listening each week to DAB+ digital radio in Australia's five metropolitan capitals, according to a survey figures released by Commercial Radio Australia (CRA) in a new format info graphic (link to graphic) that will be released each quarter to reflect the most up-to-date data on digital radio in Australia.

DAB+ figures show that listening and sales of digital radios continue to outperform expectations. There are now over 23% of the population of the five state capitals where DAB+ is available, listening on a DAB+ digital radio device. Sales of DAB+ devices have reached more than 1.7 million and with the addition of the number of vehicles sold with DAB+, it brings the total number of DAB+ devices in the market to 1.9 million. Twenty vehicle manufacturers in Australia are now including digital radios (up from 16 reported in August) and more than 125,000 (125,181) vehicles with DAB+ have been sold. Commercial radio plus ABC and SBS, support digital radio and the industry has suggested that the Federal Government establishes a Digital Radio Industry Planning Committee which would work on a timetable for phased rollout of services, possibly starting in 2017.

*(commercialradio.com.au)*

### Netflix to Launch in Australia-New Zealand

Netflix, Inc., the Internet-based movie and TV subscription service, is heading down under, announcing it will expand into Australia and New Zealand in March 2015. Internet-connected users in Australia and New Zealand will be able to subscribe to Netflix and instantly watch a curated selection of movies and TV shows in high-definition or even 4K where available.

Netflix, available on hundreds of Internet-connected devices, will also be home to documentaries such as Virunga and Mission Blue, and stand-up comedy specials 'Uganda Be Kidding Me', among others. As well as a curated selection of films and TV shows, the service will employ advanced personalisation technology enabling users to "create their own viewing experience". Netflix will be available at launch on smart TVs, tablets and smartphones, computers and a range of Internet-capable game consoles and set-top boxes. Potential new users will be offered a one-month free trial. The company says it will announce additional details of pricing, programming and supported devices at a later date.

*(business insider)*

## China

### Lao and China Broadcasters Sign a Content Deal

Lao National Television (LNTV) and the Guangxi People's Broadcasting Station of China have partnered to produce television programmes under the theme, 'Chinese theatre'. This initiative aims to strengthen socio-economic ties between Laos and China, NexTVAsia reports.

The two broadcasters signed the agreement, valid for two years, on November 5. As per the agreement, Chinese theatre productions would be broadcast on LNTV twice each week. LNTV will switch from analogue to digital transmission using China's DTMB system. The cost of transition is estimated at USD 130 million.

*(ABU News)*

## India

### Doordarshan Adds Six Channels to Satellite Service

India's public service television broadcaster Doordarshan has added six channels to its free-to-air (FTA) satellite service DD Freedish. India TV, ABP News, Focus News, Cinema TV, 9XM and Maha Movies have been added to the DD Freedish direct-to-home satellite line-up in November.

Public broadcasting statutory body Prasar Bharati will be holding its 17th online e-auction to fill more DD Freedish channel slots on 12 November 2014. The six new slots were filled from a similar e-auction on 28 October, for which the reserve price was US$603,456 per slot.

*(nexttvindia)*

### Radio station in India Marks Silver Jubilee

Indian national broadcaster All India Radio's (AIR) FM station in Kochi in the southern state of Kerala is all set to celebrate its silver anniversary. According to sources, AIR Kochi was the first FM station in the city offering information and entertainment in the local language – Malayalam. It began broadcasting on November 1, 1989.

The station is planning to mark its 25th anniversary with a number of new programmes and events, including an audio-history of Kochi, a series of stories called, a poetry show, a folk fest, a seminar on women's issues and a get-together of the station staff, including retired broadcasters, Asia Radio Today reports.

According to AIR, the station remains popular due to the quality of its content, despite many private players entering the market.

*(newslocker)*

## Mongolia

### Mongol TV Upgrades with Latest PlayBox

Mongolian broadcaster, Mongol TV, has upgraded the PlayBox Technology system at its headquarters in the country's capital city. New playout servers and integrated software were installed by engineering staff from the PlayBox Technology Asia Pacific office in Kuala Lumpur, Malaysia.

Two AirBox servers in main and redundant configuration have been performing successfully at Mongol TV right from the network's commencement in 2008. These have been replaced with the latest versions, which provide extra features such as automatic control over the on-air playlist. This is particularly appreciated by the station's staff as it reduces the level of human intervention required.

A new feature integrated into the system at Mongol TV is AirBox MPO (Multi Parallel Output), which can be used to deliver HD-SDI, SD-SDI (with real-time rescaling) and IP streaming, or (for example) output H.264 (MPEG-4) plus MPEG-2 at the same time. Changes to the AirBox playlist can be made while on-air. Order changes are performed seamlessly without interrupting the current playout session. Live productions are controlled via a Live Show Clipboard which allows insertion and/or execution of various events or live streams.

*(tvbeurope)*

## Malaysia

### RTM to Commence Digitisation Trials in Q3 2015

State broadcaster Radio Televisyen Malaysia (RTM), announced it will pilot digital terrestrial television in the third quarter of 2015. RTM has scheduled the overall completion of digital terrestrial television broadcasting infrastructure by 2016. Malaysia is likely to switch off analogue signals by 2017 or 2018.

Various preparations with regard to the studios, cameras and other aspects had been made, except for the Digital Terrestrial Television Broadcasting infrastructure platform which had yet to be completed. The overall infrastructural preparation is planned to be completed by 2016. The country had earlier planned to kick start the digitisation programme in 2012.

*(newslocker)*

## Philippines

### ABS-CBN Selects Cloud Technology

Brightcove Inc., a global provider of cloud services for video, announced that ABS-CBN UAAPsports.tv, an online TV channel owned by the Philippines' largest multimedia conglomerate, the ABS-CBN Corporation, has selected the Brightcove Video Cloud online video platform to power coverage of top local sports leagues from the University Athletic Association of the Philippines (UAAP) online.

The announcement comes on the back of the launch of the networks' newly re-designed sports website that extends its free-to-air channel of the same name and its sports cable TV channel, Balls, to create a unique and engaging sports hub for all Filipino sports fans.

ABS-CBN UAAPsports.tv will leverage Video Cloud to manage and deliver both live and on-demand games from basketball to volleyball, football and badminton. With Video Cloud Smart Players, ABS-CBN UAAPsports.tv can seamlessly deliver video in Flash or HTML5 across smartphones, tablets and more, depending on the viewer's device capabilities. The ability to easily and reliably deliver engaging, a high-quality video experience to more devices, and on social media platforms like Facebook and Twitter, will enable ABS-CBN UAAPsports.tv to enhance fan engagement and maximise opportunities to reach and grow their audience, wherever they may be.

*(C+T News)*

## Vietnam

### Vietnam to launch TV channels for expats

Vietnam is planning to launch more than 20 television channels and four radio channels by 2020 to cater to expats. The country will introduce ten channels between 2015 and 2017 and ten more channels from 2018 to 2020, as part of a scheme for providing TV and radio services on Internet for overseas Vietnamese around the world.

Nguyen Tan Dung, Prime Minister had approved a budget of USD 19 million for the service. The channels will be transmitted based on Internet TV technology on the web, television and mobile devices, NexTVAsia reports.

The scheme covers the provision of internet TV and radio services for overseas Vietnamese, producing quality TV and radio programmes and evaluating and examining the provisions of the service.

*(ABU News)*

# Digital Broadcasting Update

## 1. DVB Prepares For HEVC

The process of adopting HEVC into DVB standards is already well underway, with the completion of a new version of TS 101 154. This specification provides a 'toolbox' for video and audio coding in DVB applications based on the MPEG Transport Stream, used for cable, satellite and terrestrial broadcasting as well as many IPTV systems. The newly finalised TS 101 154 v2.1.1 defines HEVC conformance points for both UHD-1 Phase 1 (2160 x 3840 resolution at 50 or 60 frames per second) and 1080p HD. A total of five conformance points have been defined for HEVC:

- 1080p HD, 8-bit, 50fps
- 1080p HD, 8-bit, 60fps
- 1080p HD, 8-bit or 10-bit, 50fps
- 1080p HD, 8-bit or 10-bit, 60fps
- 2160p UHD-1 Phase 1, 8-bit or 10-bit, 50 or 60 fps

It is expected that new set-top boxes and IDTVs capable of supporting DVB compliant HEVC will be deployed from early 2015, with OTT streaming services possibly starting even earlier than that. DVB is now working on further enhancements to enable UHD-1 Phase 2 services to be launched in 2017/18, including both higher frame rates and higher dynamic range.

*(DVB)*

## 2. First Broadcast Services Using DVB UHD-1 Phase 1

Following the approval of the DVB specification, UHD trials and tests have been taking place in Europe and Korea and now commercial broadcast services have been launched by DirecTV in the US. At the time of the launch, DirecTV's offering consisted of around 20 movies with the promise of more titles being added. Customers will need an Internet-connected Genie HD DVR (HR34 and above), and a Samsung UHD TV that is DIRECTV 4K Ready. Pricing for 4K movies will range from $3.99 – $15.99, and will be on a per-movie-basis.

DVB continues to develop requirements for DVB UHD-1 Phase 2, which will have additional features such as higher frame rates and a wider range of colours. These will further increase the viewer's immersion in the image.

*(DIRECTV)*

## 3. DVB Steering Board Approves Components of Companion Screen Specifications

The 78th meeting of the DVB Steering Board (SB) took place on 20th November in Geneva. The SB approves all DVB specifications and offers them for standardisation to the relevant international standards bodies.

At previous meetings, the SB approved Part1, Part 2 and Part 3 of the Companion Screens and Stream (CSS) specification suite. This is the core document for CSS which describes how to identify broadcast content and how to synchronise playback between a personal and a display device.

The SB also approved the GEM Companion Screen Service Framework, which is addressing the Phase 1 and 1+ of DVB's companion screen requirements. These requirements request extensions of the GEM middleware specification ETSI TS 102 728 to support information exchange and synchronisation between the companion screen and the primary service.

The specifications have now been passed to ETSI for standardisation and BlueBooks are available online on the DVB website under Interactivity (A167-1, A167-3) and Middleware (A170).

*(DVB)*

## 4. Over-the-top (OTT) pay TV expected to soar to $10B by 2018

Market research firm Infonetics Research released excerpts from its latest ***Pay TV Services and Subscribers*** report, which forecasts and analyzes the cable TV, satellite TV, and telco internet protocol television (IPTV), and over-the-top (OTT) services markets.

**PAY-TV MARKET HIGHLIGHTS**

- Over-the-top (OTT) pay-TV revenue is forecast by Infonetics to grow from $5.8 billion in 2014 to just over $10 billion in 2018
- The global pay-TV market totaled $117 billion in the first half of 2014 (1H14), an increase of 3.9% from the first half of 2013
- Satellite and telco pay-TV service revenue continues to grow, driven by new subscribers and increased average revenue per user in North America and Western Europe
  - However, much of the increased revenue per user is being offset by ever-increasing content costs
- Pay-TV subscribers reached 837 million in 1H14, growing 10% over 2013, with the strongest growth again coming from the telco pay-TV segment

*(Infonetics Research)*

# Equipment Trends

## 1. 2MP GenLock Full HD Broadcast Camera



The Full-HD **CV360-CGB** Genlock Broadcast Camera offers fast frame rates (up to 60fps) to provide clear video with smoother motion for all types of Broadcast Multimedia A/V applications. This camera offers multiple output options such as HDMI, HDSDI, 3GSDI and CVBS as well as control functions such as White Balance, Gain Control, Gamma Control, Paint Adjustment, Iris Control, etc.

*Source: www.lcdracks.com*

## 2. Sony Introduces the α7 II, the World's First Full-Frame Camera with Optical 5-Axis Image Stabilization



Sony has released the α7 II (ILCE-7M2), the next in the α7 series of interchangeable-lens models and the world's first camera with optical 5-axis image stabilisation designed for a full-frame image sensor.

The camera offers outstanding image quality in a compact size and light build, and it carries on the traditions of the α7 series, which includes the world's smallest and lightest interchangeable-lens full-frame camera (α7R). A 24.3 effective megapixel 35 mm full-frame Exmor® CMOS sensor moves along five axes to compensate for camera shake, providing optical image stabilization equivalent to up to 4.5 steps faster shutter speed of correction for still images. Shooting sharp handheld stills and video is now possible under conditions that may have required a tripod in the past.

*Source: www.photoxels.com*

## 3. HDMI-HDBaseT Transmitter and Receiver

Roland has introduced two HDBaseT products to augment its Pro Video product lineup including the XS series of matrix switchers.



The two new models-HT-TX01 HDBaseT transmitter and HT-RX01 HDBaseT receiver-convert HDBaseT signals to and from an HDMI signal. They transmit or receive audio, video and RS-232 control information up to 100 meters over Cat-5/6e cable. The TX/RX pair is ideal for extending HDMI signals over long distances in both live productions and fixed applications.

The HT-RX01 is the receiver for an HDBaseT output coming from any XS series multiformat matrix switcher a series designed for fixed installations requiring high-quality integrated video and audio conversion and switching. Using the RS-232 signal transmission function of the XS series lets you transmit RS-232 signals from the XS series unit along with video and audio signals to the receiving device. An included cable allows the RS-232 signal to be broken out at the receiver end to connect to the destination device.

*Source: www.tvtechnology.com*

## 4. Verify MIPI D-PHY interface compliance with R&S RTO oscilloscopes from Rohde & Schwarz



Seven new modules have been added to the R&S OSP open switch and control platform from Rohde & Schwarz. Users now have altogether 28 modules at their disposal for implementing a variety of RF wiring configurations between test instruments and DUTs. This allows them to reproducibly configure even automatic path switchovers in complex RF test systems and control them via Ethernet. The modular R&S OSP gives test engineers in production facilities, test labs and R&D departments a wide range of options for quickly setting up RF wiring configurations and controlling them manually or via a computer. As opposed to manually reconnecting RF lines, the test system switches between the connected instruments, DUTs, filters and antennas fast, reliably and reproducibly.

*Source: www.rohde-schwarz.com*

# Personalities & Posts

## Appointment of Executive Director-General of Engineering, NHK, Japan



### Mr Yasuto Hamada
Executive Director-General of Engineering, NHK, Japan

Mr Yasuto Hamada has been appointed Executive Director-General of Engineering at Japan's public broadcaster, NHK. Before taking up his new position he was Head of the Engineering Administration Department from 2012 until 2014. Mr Yamada joined NHK in 1980 after graduating from Waseda University. He has contributed greatly to the planning and development of a transmitting and receiving system at NHK's Engineering Administration Department. Mr Hamada worked at the NHK Paris Bureau from 1991 to 1995, where he was in charge of technical operations and engineering in Europe, Africa, Russia, and the Middle East. From 2009 to 2011, he was the Director of NHK's Transmission & Reception Engineering Center.

## RTM's New Director-General



### Dato' Abu Bakar bin Ab Rahim
Director-General of Radio Television Malaysia

Dato' Abu Bakar bin Ab Rahim has been appointed Director-General of Radio Television Malaysia, the country's national broadcaster.

Dato' Abu Bakar took up the position in October 2014. As a result, he has stepped down as Chairman of the ABU Technical Committee.

Formerly RTM's Deputy Director-General (Broadcast Operations), he was TC Chairman for two years and was responsible for major changes in the way the Committee operates. He reduced the duration of the TC from three days to two, and simplified the TC programme to make it much more efficient and focused.

As Deputy Director of RTM, Dato' Abu Bakar also provided invaluable support to the ABU Digital Broadcasting Symposium, helping it grow to become one of the premier broadcasting events in the region.

Dato' Abu Bakar joined RTM after graduating from the University of Reading, UK, in Electrical Engineering in 1980. He was responsible for the planning and operations of RTM's broadcasting technology. He led the team undertaking the digitalisation programme for the radio engineering division and the RTM digital TV trial conducted in 2006.

We congratulate Dato' Abu Bakar on his promotion and thank him for the superb work he has done as TC Chairman.

## New ABU Technical Liaison Officer for SBS-Korea



### Sammo Cho
Director, SBS-Korea

Dr. Sammo Cho is Director at Seoul Broadcasting System (SBS), one of the three major terrestrial broadcasting companies in Korea. He has held the position since January 2014. Dr. Cho is responsible for technology planning. His interests include digital multimedia broadcasting and ultra HDTV. He holds a Ph.D. degree from the Information and Communications University, Korea.

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