



Asia-Pacific
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Union

Technical *Review*

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Cover:
Vietnam Television hosts a successful TC Meeting in Hanoi



Asia-Pacific Broadcasting Union

TECHNICAL REVIEW

From the Editor's Desk



The end of year issue offers an article on archiving systems and an article on the award ceremony at the Technical Committee meeting of ABU held in Hanoi, Vietnam, in addition to technical papers.

There are two technical articles included in this edition. One presents an overview of IPTV-Internet Protocol based Television and the other is on a MIMO based Wireless camera. MIMO is a robust technology for wireless communication and has been deployed by the BBC for developing a mobile wireless camera. Efficacy of the proposed wireless camera was demonstrated using it for coverage of a rugby sport event.

A number of reports on International conferences and a summit are included in this edition. Reports cover IBC and InterBee, provided by the three fellowship recipients and a report by ABU Technology on the Connect Asia-Pacific Summit-2013.

ABU's first "Developing Broadcasters' Excellence Award" was among other five awards presented during Hanoi in October 2013.

We are also happy to report the SMPTE award, received by Dr. Kubota of NHK.

As usual news from the ABU Region, providing an update on digital broadcasting, equipment trends, personalities and posts, makes up the rest of the publication.

I would like to thank all contributors and the ABU Technology team who worked hard to publish this issue of the journal on time.

The ABU Technology team and ABU wish all our readers and the members of ABU a Happy New Year !!!!



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BBC halfRF MIMO Radio-camera Programme Trial – Twickenham Stadium, London

by Tuck Y Poon

British Broadcasting Corporation, Research and Development, London, United Kingdom

abstract

This paper presents the brief technical aspects of a spectrally efficient multiple-input multiple-output (MIMO) prototype radio-camera system developed by BBC R&D. Radio-cameras are usually used to broadcast live coverage of events, and this prototype system uses half of the required channel (usually 10MHz frequency bandwidth) compared to conventional radio-cameras and hence the name of the system 'halfRF'. This has attracted a lot of interest within the outside broadcast (OB) community where frequency spectrum allocated for programme making and special events is limited and under pressure from other users of the spectrum. The halfRF system is mainly based on DVB-T standard but also incorporates advanced features adopted in DVB-T2 and DVB-NGH. The paper describes a programme trial during a high-profile sport event, the Six Nations Rugby Union match between England and Italy at Twickenham stadium (London) in March 2013. The article concludes with the latest development of the system and future research by the team.

Index Terms

Broadcasting, MIMO system, wireless communication, channel coding, field trial.

Introduction

DIGITAL radio-cameras have been very important in programme-making especially in newsgathering and in sports coverage where flexibility for the cameraman to move around freely is necessary. However they generally use frequency spectrum, which is highly sought after by other wireless systems or networks. This inherently puts pressure on broadcasters to make use of the allocated frequency spectrum more efficiently. In recent years the availability of these frequencies has been diminishing in Europe, especially in the UK, and there is a tendency to push radio-camera operation towards utilising higher frequency bands, which are less favourable.

In view of these challenges BBC Research & Development in the UK decided to look at developing techniques to provide robust and spectrally efficient HD radio-cameras at Programme Making and Special Events (PMSE) frequencies, i.e. mainly at 2GHz and 7GHz. The key ingredient in addressing these challenges is to use Multiple-Input Multiple-Output (MIMO) technologies together with Coded Orthogonal Frequency Division Multiplexing (COFDM), which is well understood. The team at BBC R&D has achieved a significant milestone where a prototype MIMO system (named halfRF) was developed and successfully trialed in the field.

The halfRF system delivers HD quality video of 20Mbps payload in 5MHz bandwidth at the 2GHz PMSE frequency

band. Radio-cameras in the UK usually operate in 10MHz channels and this means that two halfRF systems can operate in a single channel allocation. Effectively this is doubling the number of radio-cameras used in the same number of allocated channels. Hence this has attracted a lot of interest in the UK especially by Ofcom, the UK communications regulator, and some industry-wide groups.

This article first outlines the technical aspects of the halfRF system before describing a programme trial of the system in a high-profile sports' event, the Six Nations Rugby Union match between England and Italy at Twickenham stadium (London) in March 2013. The article concludes with the latest development of the system and future research by the team.

The MIMO Approach

Using multiple antennas on both sides of the wireless link (MIMO system) has the potential to increase spectral efficiency and robustness of the system. It is widely acknowledged that MIMO technology will play a key part in the future of wireless communications. MIMO technology has come a long way from just being an academic study and now it is finding its way into new wireless standards such as Long Term Evolution-Advanced (LTE-Advanced), IEEE 802.11ac, Wireless Home Digital Interface (WHDI), WiGig, etc.

For the general case of a MIMO system with m_t transmit and m_r receive antennas, the input and output relationship of the system can be represented by the equation:

$$\mathbf{x} = \mathbf{H}\mathbf{s} + \mathbf{n} \quad (1)$$

where $\mathbf{x}$ is the received vector of size m_r , $\mathbf{H}$ is the $m_r \times m_t$ complex channel matrix, $\mathbf{s}$ is the vector of m_t transmitted symbols chosen from a complex constellation $\mathcal{C}$, and $\mathbf{n}$ is the complex additive white Gaussian noise (AWGN) with variance σ^2 (per receive antenna) of size m_r added to the system.

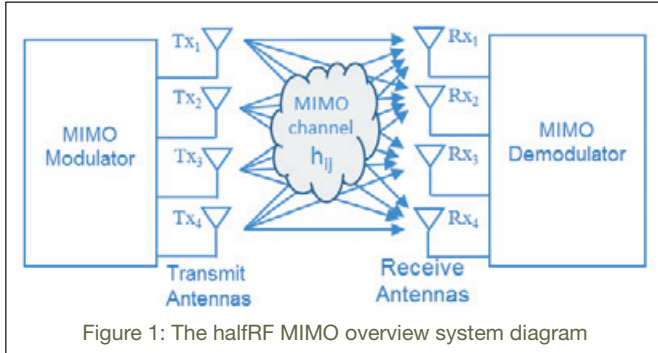


Figure 1: The halfRF MIMO overview system diagram

The halfRF radio-camera is based on a 4-by-4 (4x4) MIMO system as shown in Figure 1. It uses two pairs of linearly cross-polarised antennas at both the transmit and receive ends. This allows the system to work effectively in a high multipath environment (typically indoor) and also in environments where a strong line-of-sight component is dominant (typical of some outdoor locations). The system uses a spatial multiplexing scheme, where the incoming data is split into two streams, but before sending the streams to the transmit antennas a pre-coding matrix is applied to the streams. This pre-coding modifies the signal of one pair of the cross-polarised antennae to minimise the unwanted beamforming effects. The overall system equation is therefore of the form:

$$\begin{bmatrix} x_1 \\ x_2 \\ x_3 \\ x_4 \end{bmatrix} = \begin{bmatrix} h_{11} & h_{12} & h_{13} & h_{14} \\ h_{21} & h_{22} & h_{23} & h_{24} \\ h_{31} & h_{32} & h_{33} & h_{34} \\ h_{41} & h_{42} & h_{43} & h_{44} \end{bmatrix} \quad (2)$$

and the coded transmitted data is given by:

$$\begin{bmatrix} \hat{s}_1 \\ \hat{s}_2 \\ \hat{s}_3 \\ \hat{s}_4 \end{bmatrix} = \begin{bmatrix} 1 & 0 \\ 0 & 1 \\ \frac{1}{\sqrt{2}} & \frac{1}{\sqrt{2}} \\ \frac{j}{\sqrt{2}} & \frac{-j}{\sqrt{2}} \end{bmatrix} \begin{bmatrix} s_{2a}(\text{Tx}_1) \\ s_{2a+1}(\text{Tx}_2) \end{bmatrix}, \quad (3)$$

$$a = 0, 1, \dots, \left(\frac{N_{\text{cells}}}{2} - 1\right)$$

where N_{cells} is the number of cells in an error-correcting codeword. (N.B. identical processing is applied to the pilot cells, as well as data cells).

From equation (3) the transmitted data vector $\hat{\mathbf{s}}$ is generated by pre-coding the data streams s_{2a} and s_{2a+1} . The first two symbols of $\hat{\mathbf{s}}$ are unaltered versions of the original data while the next two give the effect of pre-coding equivalent to circular polarisation.

On the receiving side the halfRF demodulator uses a soft-decision brute-force maximum-likelihood (ML) decoder. This is an optimum decoder which works out the log-likelihood ratio (LLR) of every bit of the transmitted symbols and these LLRs are calculated over all possible symbol combinations.

System Architecture

With intimate knowledge of all the mobile and terrestrial DVB standards the team was able to pick and choose useful elements in those standards for a MIMO radio-camera system. The halfRF system is mainly based on the DVB-T standard but incorporates advanced techniques adopted in DVB-T2 and DVB-NGH standards. The halfRF system comprises a camera-back transmitter and a receive system as shown in Figure 2.

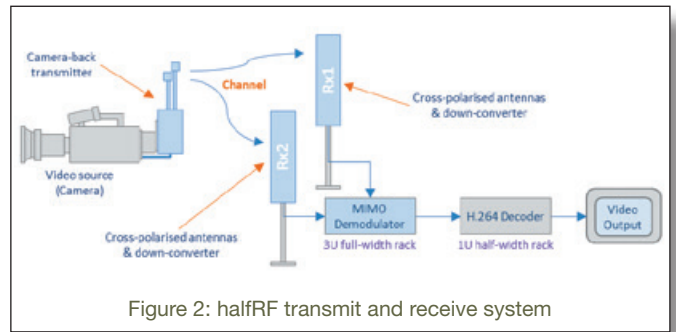


Figure 2: halfRF transmit and receive system

Since halfRF is a prototype radio camera system to show the spectrum efficiency gained by using MIMO technology, the return-link for camera controls and tally are not part of the prototype. The return-link in a conventional radio camera system is usually on a separate radio frequency (RF) link anyway.

The system specification for halfRF is listed in Table 1.

Table 1: halfRF System Specification

MIMO dimensionality	4x4
Operating frequency	2.035 GHz
Spectral occupancy	4.75 MHz
Payload data-rate	20.1 Mbps
Modulation	16-QAM rate-2/3, GI = 1/32
Time-interleaving	0-12.5 ms (adjustable)
Time delay	13 ms + <i>time-interleaving</i>
OFDM carriers	853 (756 data carriers)
Demodulation	Maximum-likelihood decoding (brute force)

The camera-back transmitter architecture is shown in Figure 3.

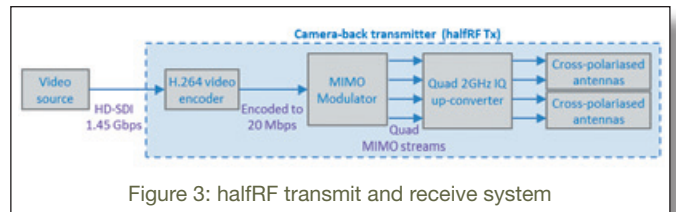


Figure 3: halfRF transmit and receive system

The video output from the camera is connected straight to the H.264 video encoder board via the HD-SDI connector. The encoded video is then passed on to the MIMO modulator board where all the MIMO processing including the pre-coding is done. The up-conversion to 2GHz is carried out on a separate board where filtering and amplification is performed. The amplified signals are then fed to two cross-polar antenna pairs with a +17dBm nominal output power to each antenna.

The receiver architecture of the halfRF system is shown in Figure 4.

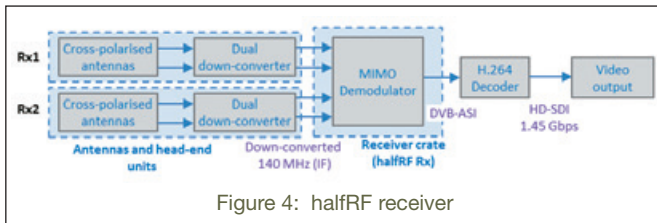


Figure 4: halfRF receiver

The cross-polar patch antennas are attached directly to the head-end unit to maximise the RF performance on the receive end of the system. The head-end units down-convert the received RF signals to an intermediate frequency (IF) of 140MHz before sending it down the cable to the receiver crate which could be a few hundred metres away. The H.264 decoder finally decodes the DVB-ASI transport stream back to HD-SDI before formatting it back to the required video output signal.

Programme Trial

Trial Setup

The halfRF system has been used for a few live BBC programmes in the UK and this paper will highlight the programme trial for the Six Nations Rugby Union match at Twickenham stadium (London) in March 2013. Figure 5 shows the stadium setup for the programme trial and the required pitch-side coverage area. The halfRF system was one of the four radio-cameras used in addition to six fixed wired-cameras for the coverage of the live rugby match.

The receive antennas were placed on two rigging platforms located on the first level gantry separated by about 30 metres. This separation offers a receive diversity advantage for the system and helps to maintain a strong receive signal from the roaming halfRF radio-camera on the pitch. The placement of the receive antennas was not ideal because of the metalwork of the rigging platform (as shown in the inset pictures) but that was the only place where the antenna could have been positioned to avoid obscuring the view from the audience behind, yet still being within the security net of the platform.

When the halfRF camera-back transmitter was in operation, both the Rx1 and Rx2 receive antennas would be picking up the transmitted signals and the head-end units would be downconverting them to the 140MHz IF. These pairs of IF were then fed to the receiver crate located in one of the rigging platforms before sending the DVB-ASI stream to

the Outside Broadcast (OB) Communications truck located outside the stadium via optical fibre. The DVB-ASI stream was then decoded into HD-SDI before feeding it into the video matrix of the OB operation. This was just one way of setting up the system and usually in an OB operation the antenna head-end units would be cabled straight to the OB Communications truck where the receiver crate is mounted. The reason for having the MIMO demodulator on the rigging platform was to allow the team to setup a monitoring station to learn how the halfRF system behaved and to gain practical experience in MIMO transmission.

Coverage

The requirement for the halfRF system was to provide coverage on the pitch, entrance tunnels and also into the players' tunnel as indicated in Figure 5. The halfRF system actually was able to cover the inside of the whole stadium including the entire seating area. There was also limited coverage inside the players' changing room where conventional radio-camera systems are not able to cover at all. Although the stadium is quite open it offered a degree of multipath propagation, which is ideal in a MIMO system, and the system was able to cover substantially more area than other conventional radio-camera systems.

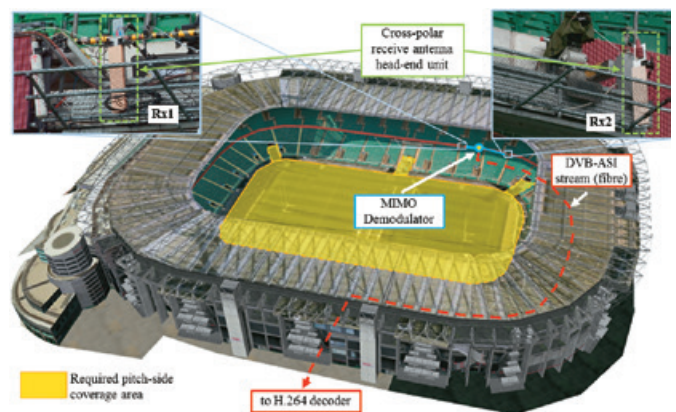


Figure 5: halfRF setup for Twickenham programme trial

From other programme trials, the halfRF system should be able to cover the entire pitch of the stadium with only one of the antenna head-end units and this means that the second pair of antennas can be mounted more strategically if the system is required to cover a more obscure location such as the players' changing room or the stadium's grand entrance to show the players enter the stadium from their coaches.

Result & Feedback

The halfRF system was rigged a day before the match day to ensure that the system performed properly and to check the limitations of the system. The system worked as expected around the pitch, and it was noted by the OB operations team that the system worked at least as well as conventional full-width radio-cameras, with better video quality. This shows that the halfRF MIMO link offers performance with as good range and robustness as



Figure 6: halfRF covering the match

conventional systems, countering a misconception in the industry that MIMO systems are range limited.

This programme coverage was the first sports coverage with the halfRF system and the team were able to gather valuable information on the MIMO system performance. This has helped to refine future research ideas and concentrate on specific elements of the system.

Developments and Conclusion

With the information gathered and lessons learnt from the Twickenham trial and others the team has put a lot of research effort into a new pre-coding matrix and advanced techniques in the MIMO channel estimation to help with the decoding. These developments have been incorporated in the latest halfRF system and initial tests have shown that they bring significant improvements. The time interleaving depth has been increased and a new forward error correction (FEC) code, Low Density Parity Check Code or LDPC, has been fully integrated into the system.

The team is also currently undertaking research a high bitrate system to support 4k radio-camera transmission and to realise a robust radio-camera system operating at higher frequency bands (e.g. 7GHz). Hence more work is required in respect of all parts of the system, especially in antenna design, modulation and coding, system architecture and advanced decoders.



Figure 7: halfRF used for close-up shot

The Twickenham programme trial has proven that the halfRF MIMO technology is able to transmit a reliable HD service in half of the required PMSE channel at 2GHz. Put simply, this advanced modulation technique is able to double the number of radio-cameras used, for the same frequency allocation. This is particularly attractive for very high-profile sporting events such Formula One, major athletics meetings, etc. where there is always a shortage of PMSE frequencies for radio-cameras, especially in the UK. The use of MIMO technology for broadcast radio-cameras has been shown to offer a much more efficient use of the spectrum and we are now looking forward to working with industry partners to take this technology forward to become a fully commercial proposition.

author



Tuck Y Poon

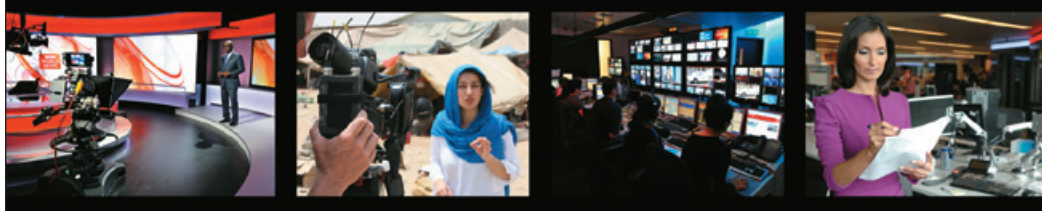
British Broadcasting Corporation, Research and Development, London, United Kingdom

Tuck Y. Poon received a degree in electrical and electronics engineering from Imperial College, London, in 2001.

His main research area is in MIMO systems for broadcasting with special interest in MIMO decoders. In 2009 he was attached to NHK Science and Technology Research Laboratories (STRL) in Tokyo for 6 months researching on sphere decoder and near-optimum decoders. He has also been developing MIMO decoding algorithms for realisation in FPGA. He was involved in technical discussions on the standardisation of DVB-NGH and other European collaborative projects.

Mr Poon was awarded the UK's Royal Academy of Engineering (RAE) Global Research Award in 2009.

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IPTV and its Evolution Over Last Decade

by **Amal Punchihewa**
Asia-Pacific Broadcasting Union

Ann Malsha De Silva
Datacom Systems Ltd

abstract

This article presents a brief review of IPTV technology. Internet Protocol television (IPTV) is a system through which television services are delivered using the architecture and networking methods of the Internet Protocol suite over a packet-switched network infrastructure. IPTV services may be classified into three main groups: Live television; time-shifted programming; and video on demand.

IPTV can be viewed on a display with a set-top box that accesses channels, subscription services, on demand and other interactive multimedia services over a secure, end-to-end operator managed broadband IP data network, with desired QoS, to the public with broadband Internet connections.

This article also discusses the IPTV architecture, network technologies, implementation of IPTV, different types of STBs used in New Zealand, the standards, different business models, hardware and software of IPTV.

I. Introduction

In the 21st century access via broadband internet and downstream data rates of several Megabits per second (Mbit/s) is making a steady progress. An increasing number of households are getting used to video streaming and download, using the Internet Protocol (IP) to enable interactive retrieval of video content from the Web. This type of IP based television service is known as WebTV [1]. However, WebTV does not provide a guaranteed quality of service (QoS). Therefore the telecommunication companies are now making an attempt to overcome the deficiencies of WebTV with the launch of, the so-called, IPTV.

A. What is IPTV?

Internet Protocol Television (IPTV) is system in which a digital television service is delivered over an Internet Protocol network [2]. Werner [1] states that, "IPTV is not a well-defined term and may be a source of ambiguity and sometimes confusion".

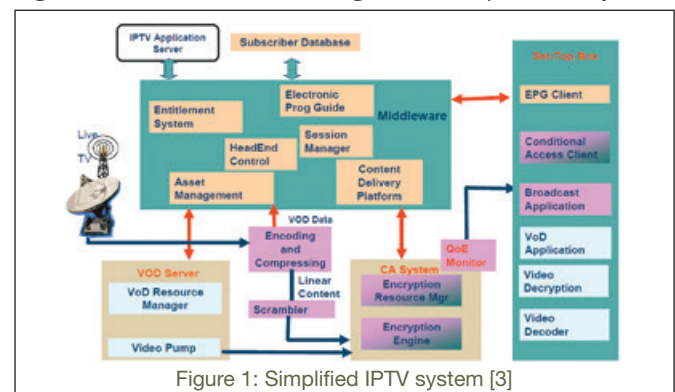
IPTV is a television service where content can be shown on a display via a set-top box that accesses channels, subscription services, on demand and other interactive multimedia services, over a secure, end-to-end operator managed broadband IP data network with desired QoS, to the public with broadband Internet connections.

IPTV system may also include Internet services, such as Web access and VOIP where it may be called Triple Play and is typically supplied by a broadband operator using the same infrastructure. IPTV is not Internet Video which simply allows users to watch videos over the Internet in a

best effort fashion. IPTV technology offers revenue-generating opportunities for the telecom and cable service providers. For traditional telephone service providers, Triple Play is delivered using a combination of optical fibre and digital subscriber line (DSL) technologies to its residential base. Cable television operators use a similar architecture called hybrid fibre coaxial (HFC) to provide subscriber homes with broadband, but use the available coaxial cable rather than a twisted pair for the last mile transmission standard. Subscriber homes can be in a residential environment, multi-dwelling units, or even in business offices.

From the service provider's perspective, IPTV encompasses the acquisition, processing, and secure delivery of video content over an IP based networking infrastructure. The type of service providers involved in deploying IPTV services range from cable and satellite TV carriers to the large telephone companies and private network operators in different parts of the world.

Figure 1 shows us a block diagram of simple IPTV system.



B. IPTV Features

IPTV has number of features. According to [4], these features are:

- (i) Support for interactive TV: The two-way capabilities of IPTV systems allow service providers to deliver a wide range of interactive TV applications such as standard live TV, high definition TV (HDTV), interactive games, and high speed Internet browsing.
- (ii) Time shifting: IPTV in combination with a digital video recorder permits the time shifting of programming content.
- (iii) Personalisation: An end-to-end IPTV system supports bidirectional communications and allows end users personalise their TV viewing habits by allowing them to decide what they want to watch and when they want to watch it.
- (iv) Low bandwidth requirements: Instead of delivering every channel to every end user, IPTV technologies allow service providers to stream only the channel that the end user has requested. This attractive feature allows network operators to conserve bandwidth on their networks.
- (v) Accessible on multiple devices: Viewing of IPTV content is not limited to television receivers. Consumers often use their PCs and mobile devices to access IPTV services.

C. IPTV Advantages

- (i) IPTV signals are 100% digital, so the days of analogue TV are fast fading.
- (ii) IPTV works on any existing internet connection. So we just need to install the set-top-box and switch it on.
- (iii) IPTV doesn't require wires to get its signal. The newest IPTV set-top-boxes work on wireless signals.
- (iv) Programmes can be stored on servers and ready to view with the click of a button on IPTV remote (in contrast to linear broadcast TV).

D. Video on Demand

The idea of video-on-demand is to allow viewers to watch any programme they desire whenever they want to watch [5]. But as the technology advances and costs come down, video on demand (VOD) becomes more and more attractive to service providers.

The basic concept of VOD is based on video programming that is stored and then delivered to a viewer when it is required. This storage can take the form of a centralised server that is equipped to send programming simultaneously to a hundreds of viewers, or it can take the form of more distributed storage throughout the network. At the limit, individual storage devices for each viewer can be located in individual STBs [5].

Unicast connection is set up between the customers' STB and the delivering streaming server. The signaling for the

trick play functionalities (pause, wind, and rewind) is assured by Real Time Streaming Protocol (RTSP). The most common codecs used for VOD are MPEG-2 and MPEG-4.

E. Triple / Quadruple Play

Triple play refers to multiple services being delivered by a single service provider, such as voice (telephony), data (internet access) and television services. Quadruple play adds mobile telephony to the mix [5].

From a service provider perspective, triple play services offer the combined cash flow from three separate services that can be used to pay for a common network that is capable of delivering all of them. Service providers usually offer discounts to customers who buy more than one service, which has proven to be a successful marketing policy.

Triple play focuses on a combined business model rather than solving technical issues or a common standard. Quadruple play is often supported by dual-mode GSM plus Wi-Fi cell phones that shift from GSM to Wi-Fi when they come in range of home wired for triple play service.

II. Current IPTV and its Evolution

A. IPTV Deployment

IPTV is a system of delivering television content to consumers over the infrastructure of the Internet. With the proliferation of broadband networks set up by telephone companies to offer broadband Internet to consumers, IPTV has overcome the problem of having limited bandwidth that was once a major barrier to deployment [6].

Currently there are two different ways consumers can get IPTV. They can buy a "set top box" which will convert an IPTV signal and play it on their television. The other option is to watch on a PC or a mobile device. Many IPTV service providers also offer voice and data capabilities with the IPTV service, making it a true "triple play" use of the broadband network. In the market of broadband applications IPTV is a major upset. With the advent of IPTV, many cable television companies are being expelled from the market of providing low cost television, data and voice broadband applications to consumers.

Business applications are also in development. Services such as streaming video are widely available on IPTV due to the scalability of the medium. The categories within IPTV are still evolving, but possibilities are still wide open as to which of the many versions of IPTV will become standard. Companies are in an initial struggle to become leaders of the market, but at this point it is anyone's game. There is no doubt that IPTV is the next generation for television content, but it has yet to be determined which companies will be the benefactors of the innovations that are now taking place [6].

B. Global Growth of IPTV

Worldwide subscriber base for IPTV services is expected to expand more than 26 times from 2005 to 2010 [7].

According to the Al-khatib and Alams' research [7] global IPTV subscribers were expected to grow from 2.4 million in 2005 to over 63 million in 2010. Figure 2 shows that expected rate of growth of IPTV subscribers.

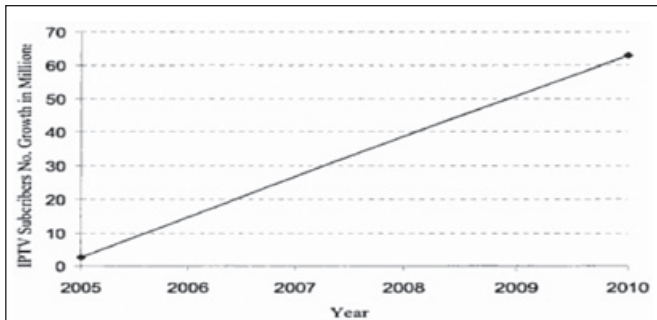


Figure 2a: Expected growth of IPTV subscriber base [7]

The IPTV subscriber base was expected to generate more than \$27 billion in revenue for all IPTV services in 2010 [7]. IPTV subscriptions being poised to grow from over 30 million in 2010 to 68 million by the end of 2014, according to forecasts from analyst from Strategy Analytics [7].

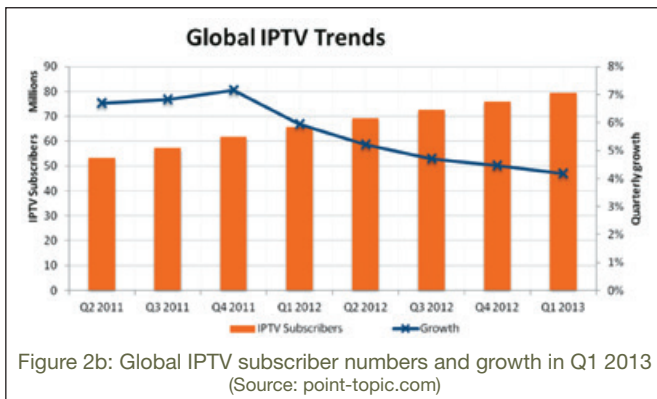


Figure 2b: Global IPTV subscriber numbers and growth in Q1 2013 (Source: point-topic.com)

III. IPTV Building Blocks

Figure 3 shows the basic building blocks that are required for implementing IPTV. The home gateway has to have powerful processing power and enough network bandwidth to provide networking service and to cope with various customers. In order for a system operator to deliver IPTV, it requires encoding, broadcast, and appropriate management before the end user can connect a set-top-box.

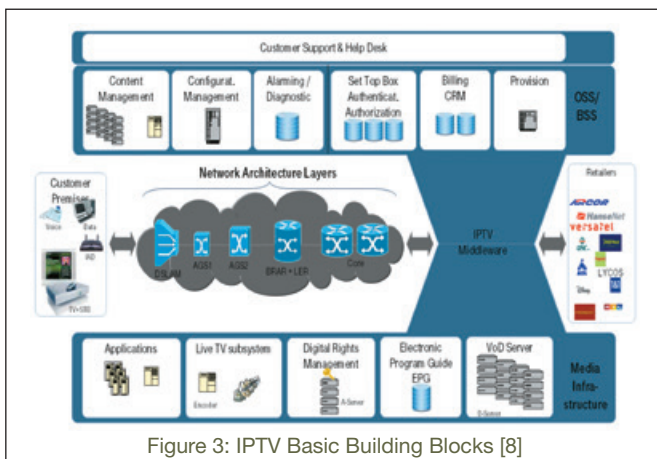


Figure 3: IPTV Basic Building Blocks [8]

IV. IPTV Architecture

A typical IPTV architecture as shown in Figure 4 is comprised of the following functional blocks:

- Super head-end: Where most of the IPTV channels enter the network from national broadcasters.
- Core network: Usually an IP/MPLS network transporting traffic to the access network.
- Access network: Distributes the IPTV streams to the DSLAMs.
- Regional head-end: Where local content is added to the network.
- Customer premises: Where the IPTV stream is terminated and viewed.

For a very large IPTV delivery system, there is often a hierarchy of facilities constructed to deliver video signals across a large territory. One Super Head-end can serve millions of customers by processing the video channels that are common to all subscribers across the serving area. A Video Serving Office is located in each region as required to handle local programming and channels specific to a single city or geographic area. The Remote Terminal can serve as a Regional Head-end that contains the equipment needed to actually deliver the programming to customers in local area.

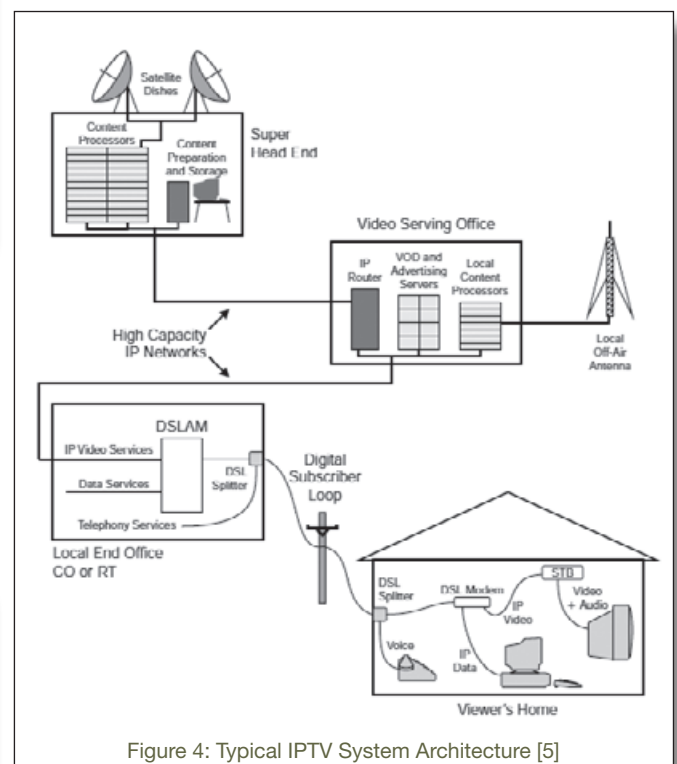


Figure 4: Typical IPTV System Architecture [5]

Broadcast information coming from an antenna or a satellite dish at the Super Head-end is mainly distributed using MPEG-2 multi-programme transport stream (MPTS) to the video service node. The distribution of the actual SDTV or HDTV channel content is performed using various devices on the access network, such as digital subscriber line access multiplexers (DSLAM) and other technologies like fibre-to-the-home (FTTH) can be used to interface with the

user's STB. For IPTV, each channel is distributed using a multicast IP address.

V. IPTV Networking Technology

IPTV technology is part of a new breed of services designed to facilitate access to video entertainment. It provides access to digital TV over the IP transport medium from a head-end device to the end user's TV set-top box (STB). Most service providers use a dedicated transport network to support IPTV.

A. IP Distribution to the STB via DVB IPI

DVB has had a technical ad-hoc committee (TM-IPI) dedicated to IP distribution to the STB since 2000. It has a responsibility to provide a standard for the IP interface connected to the STB. The special feature about this technology in contrast to the other standard bodies and traditional broadcast methodology is that it starts at the STB and then works outwards [9]. The standards bodies of TM-IPI are shown in Figure 5.

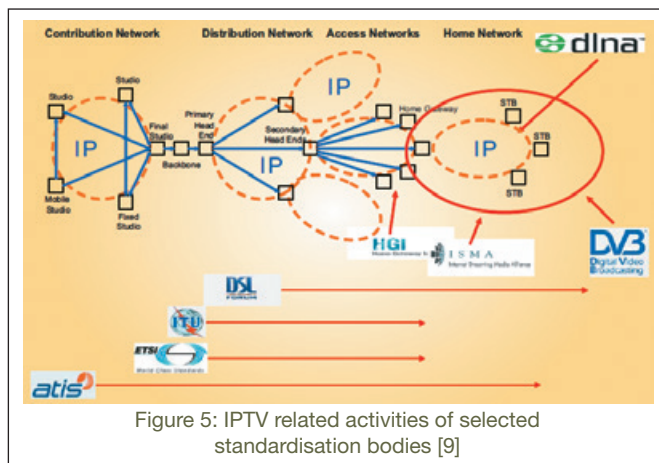


Figure 5: IPTV related activities of selected standardisation bodies [9]

- (i) DLNA (Digital Living Network Alliance) for the home network.
- (ii) HGI (The Home Gateway Initiative) for the standards surrounding the residential gateway between the broadband connection and the in-home network.
- (iii) ISMA (The Internet Streaming Media Alliance) for the transmission of AVC video over IP.
- (iv) DSL Forum for the standards surrounding DSL and remote management of in-home devices including STBs and residential gateways.
- (v) ITU which, via the IPTV Focus Group, is standardising the distribution and access network architecture.
- (vi) ETSI which, via the NGN initiative, is standardising the IP network carrying the IPTV.
- (vii) ATIS which, via the ATIS IPTV Interoperability Forum (ATIS-IIF), is standardising the end-to-end IPTV architecture including contribution and distribution.

B. IPTV over DSL versus DVB over satellite and cable

In contrast to other technologies, the difference in IPTV over DSL is that the client-server architecture used for IPTV sits between the provider backbone and the IPTV home. The difference here is that not a single programme goes automatically into the IPTV home. A simplified comparison of IPTV over DSL with the DVB-S and DVB-C is shown in Figure 6.

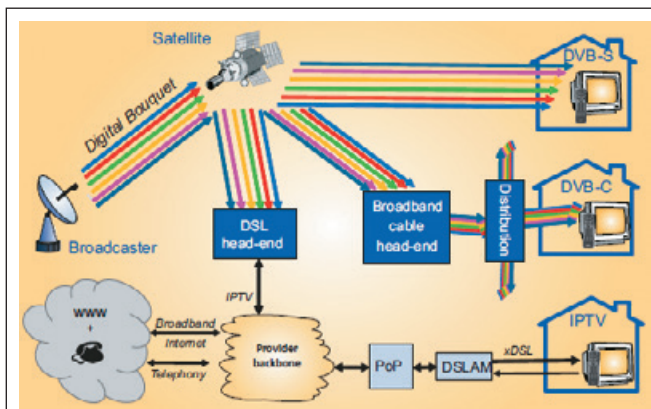


Figure 6: Comparison between IPTV over DSL with the DVB-S and DVB-C [1]

The coloured (if printed in black and white, the different grey lines) lines represent the different television programmes of a digital bouquet that are bundled together in one or more multiplexes. Each of these carries a multi-programme transport stream (MPTS) [1]. Similar to Broadband cable head-end, the DSL head-end picks up the satellite signals and converts them to IPTV signals. But the difference is that when we press the button of an IPTV remote control, it is communicate back via the return channel to the service provider. Then the server routes the requested programme as a single programme transport stream (SPTS), over the backbone to the point of presence (PoP) at the DSL access multiplex (DSLAM). The technical challenge for IPTV is the brief time delay during channel hopping [1].

VI. IPTV Standards and Solutions

Setting standards for IPTV would be difficult at best. There are multiple areas to cover, as IPTV is very broad subject, and the medium was not intended to transport audio and video when it was created. Moreover, some specific features of this medium allow some services while outdated some of the former schemes based on broadcast [10].

Standardisation is important in the telecommunications industry, especially when talking about such a complex and large system as IPTV. So it requires many standards for the user's vote to be securely recorded when pressing the red button on the remote control. The main standards body for IPTV has emerged to be ETSI (European Telecommunications Standards Institute), through the branch that develops standards for the "next generation networks", which many telecom operators are deploying. Table 1 shows the organisations that are working to develop standards for IPTV.

Table 1: The Standards Organisations Driving IPTV [11]

Name	Focus	Type of Organisation	Primary Industry
Open IPTV Forum	End-to-end IPTV service, including interaction and quality of service	Industry consortium	Telecom
ITU-T	IPTV Focus Group	Formal standards organisation	Telecom
ETSI TISPAN	IPTV based on IMS, and referencing relevant standards for the transport layer	Formal standards organisation	Telecom
ATIS	IPTV for cable TV providers	Membership organisation	Cable-TV
SCTE (Society of Telecommunications Engineers)	Technologies related to digital cable television	Industry association	Cable-TV
DVB Forum	IPTV and interactive television, primarily for broadcasters	Industry consortium	Broadcasting

VII. Set-top Boxes

An IP set-top box is a dedicated computing device that serves as an interface between a television set and a broadband network. In addition to decoding and rendering broadcast live TV signals, a set-top box provides functionality that includes video-on-demand (VOD), electronic programme guide (EPG), digital rights management (DRM), and a variety of interactive and multimedia services. Set-top boxes can support additional features such as Web browsing, e-mail and viewing e-mail attachments, advanced multimedia codecs, home networking and PC connectivity including playback and rendering of content stored on the PC (photos, music, and personal videos), gateway functionality, instant messaging (IM), and real-time voice over IP (VoIP). These types of advanced functionalities are in demand by end-users, enable incremental network operator service opportunities, and allow set-top box manufacturers to easily offer a large range of different devices [12].

Also to provide secure delivery of satellite data in IPTV systems, service providers can charge subscription fees by scrambling the programme in conditional access system using control words. At the receiver end, smart card is used to decrypt the control words and transfer them back to set-top box to descramble the scrambled programme. Therefore, secure communication between set-top box and smart card is closely related with the benefit of service providers and the legal rights of users [13].

Current set-top box development is driven by service provider requirements and customer demand for new features. Priorities for service providers include the capacity to deploy, using minimal capital expenditures, new revenue-

generating services and multimedia and entertainment-oriented applications on a set-top box to meet changing customer requirements over time. Service providers also need to ensure that copyrighted content is protected from unauthorised distribution. To accommodate these expectations, the set-top box operating system platform must be extensible and remotely upgradeable, and include both rich multimedia technologies and fundamental security features, such as access control.

A. Basic Functions

The main job of the STB is to receive the incoming IPTV signal and convert it to a video signal that can be displayed on the viewers' television. This also provides the user interface that allows viewers to select the video programming to be viewed. To do these tasks STB has the following functional elements [5]:

- Network Interface, to receive the IPTV signals and transmit user commands.
- Video and audio outputs, which are connected to the viewers' video display and speaker system.
- User interface, both on the front panel of the STB and by way of an on-screen display and remote control.
- Conditional access hardware/software, to support secure viewing of valuable content.
- Hard disk drive, for recording video programmes.

B. TiVo Set-top-box

Telecom New Zealand and Hybrid TV has the exclusive rights of TiVo products and only its broadband customers can have the access to TiVo internet features [14].

A TiVo box acts like a digital tuner, giving the access to Freeview HD channels and the ability to record them. It will also provide internet access to pay-per-view movies and TV shows. Figure 7 shows TiVo set-top box, remote controller and Wi-Fi wireless access device.



Some of the TiVo STB features are summarised below.

- Vital statistics: The TiVo box is 42cm long, 32cm wide and 7.5cm tall.
- Hard disk: 320 GB (up to 250 hours Standard Definition or 120 hours of High Definition, dependent on the station broadcast formats recorded).
- Composite video and stereo out, HDMI output.

TiVo features for Telecom customers [16] are:

- The HD DVR allows viewer to play, pause or rewind live TV and record two programmes at once.

- (ii) The 14-day on-screen TV Guide makes it easy to schedule the recording of free-to-air programmes and see what's coming up on the box. The Now Playing list shows all the programmes that viewer have already recorded.
- (iii) The Season Pass Manager automatically records every episode of the favourite series for the whole season.
- (iv) The WishList search finds and records programmes that feature viewers' favourite actor, director, team or topic.
- (v) Viewers can restrict programmes, lock channels or set ratings to shows that are unsuitable for children with TiVo KidZone.
- (vi) Using the remote scheduling tool via the internet, viewers can set their TiVo to record when they are away from home.

C. My Sky HDI Set-top-box

The MySky HDi is a Personal Video Recorder (PVR), just like the original MySky box. The "i" in MySky HDi refers to interactive offerings; ie: the box is allowed to receive internet-delivered television (IPTV) from Sky [17]. Another feature that differs from the old Sky box is that the stunning High Definition output delivers to HDMI-capable TV sets.

The new box has twice the theoretical capacity of the original MySky (320 Giga Bytes vs 160 Giga Bytes). However, in practice, consumers can only access 160GB to store recorded programmes and the remainder is for operating system software and to store pay-per-view programming downloaded to the box.

The MySky HDi comes with four tuners, but only two are enabled in the first release. So initially you'll be able to record two Sky channels at once, just as offered by the existing box [17].

The My Sky HDI Set-top-Box shown in Figure 8 has a resolution of 1080i and 5.1 Dolby sound [18].



Figure 8: My Sky HDI Set-top-Box and the remote controller [18]

D. TelstraClear Set Top Box

According to [19] TelstraClear STB has the following features.

- (i) 3 Tuners – This allows viewer to record 2 HD (High Definition) channels whilst watching another HD channel OR to watch a pre-recorded programme while recording 2 others.
- (ii) 300GB of hard drive space – To record up to 180hrs of SD (Standard Definition) and 50hrs of HD TV.
- (iii) Up to 1080P HD payout through HDMI 1.
- (iv) TV Guide with picture-in-picture functionality.
- (v) MPEG2, MPEG4, Windows Media, Flash Video and H264 compliant.
- (vi) Dolby AC3, MP2, MP3 and AAC audio compliant – The best options to cover all the best audio formats.
- (vii) Supports future internet video delivery.

VIII. Conclusion

IPTV is an evolving technology platform to provide television broadcasting services based on wide range of rapidly advancing technologies. Information about implementation and services in operation for newcomers to observe are becoming available. Caution and careful planning would mitigate the risk of failures. Quality of Experience (QoE) and value for money will be two key issues to be addressed in coming years to make the IPTV services more popular and widely accepted.

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ABU TECHNOLOGY CALENDAR OF EVENTS 2014

14-16 January	BES 2014	New Delhi
20 -24 January	10th Global Shortwave Coordination Conference	Kuala Lumpur
27-30 January	IPTV Training with IPPTAR	Kuala Lumpur
5-7 February	DTV Training (TRAI)	New Delhi
28 February-2 March	ABU-RTM-WorldDMB DAB+ Technology Workshop and Trial	Kuala Lumpur
3-4 March	ABU-IPPTAR Workshop on DVB-T2	Kuala Lumpur
4-7 March	ABU Digital Broadcasting Symposium 2014	Kuala Lumpur
11-13 March	CABSAT 2014	Dubai
5-10 April	2014 NAB Show	Las Vegas
20-23 May	KOBA 2014	Seoul
29-30 May	ABU Technical Bureau Mid-Year Meeting	Kuala Lumpur
4-6 June	Media Summit on Climate Change, ICTs and Disaster Risk Reduction	Jakarta
17-20 June	BroadcastAsia 2014	Singapore
11-15 September	International Broadcasting Convention – IBC 2014	Amsterdam
October	ABU General Assembly	Macau
November	Saudi Media Forum	Jeddah
November	Pacific Media Partnership Conference 2014	Fiji

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What Directions Will The Next Generation of Digital Terrestrial Television Broadcasting Take?

While nations all over the world are making attempts to move forward with digital migration, digital broadcasting technologies are advancing rapidly, challenging the capabilities of some developing nations. This never-ending growth in next-generation technologies is driven by ever expanding human wants and needs, together with rapidly advancing and changing broadcast technologies. Through innovations in research and development by teams around the world, the technology push creates a market for new services and developments. In a cyclic fashion, researchers and developers strive to innovate in order to make broadcast operations smarter and efficient. Whilst this phenomenon creates many challenges to the broadcasters' investment planning they are obliged to embrace selected new technologies to survive, and hopefully to thrive, in the broadcast industry.

Substantial funding needs to be set aside annually to pay the primary power provider of each transmitter site. The total power requirement for a transmission site depends on the number of transmitters required to provide regular multiplex services, the power efficiency of the transmitters and the amount of cooling required. With more compression and by multiplexing services onto fewer multiplexers or transmitters, we require less hardware to offer a given set of services. Having fewer transmitters with more compact hardware requires less space, which

allows us to operate in a smaller geographical area per programme. Such efficiency enhancements steer the broadcast technologies to become more adaptive to environmental issues and to warrant a claim to the title of 'green technology.' Therefore technology providers and manufacturers increasingly promote their products as embracing green technologies. On their part organisations such as ABU and ITU are promoting awareness of environmental issues and climate change and it is incumbent upon us to practice what we preach. In this regard the ABU, with the sponsorship of KOBRA of Korea, is promoting an Engineering award especially in the Green Technology category.

Another area where innovation is required is in Quality of Experience (QoE). QoE will, we believe, be the most important dimension required of all forms of delivery of digital media content, to viewers and listeners, in this decade. This aspect is critical for video and television as these media involve the transfer of enormous amounts of data. Whilst a number of pure research papers have been published on the topic over a period of years, no widely accepted practical system has yet been developed or implemented. However, the ITU and Video Quality expert group (VQEG), who have been working on the topic for some time, have made a number of recommendations for various platforms of media delivery.

From Amal, Nadeem, Kyaw Zaw, Nam, Geraldine, Hamidah and Ramlah



The Managing Director and Executive Director-General of Engineering at Japan's national broadcaster NHK, Dr Keiichi Kubota, received one of the industry's highest awards at a special ceremony in Hollywood.

Dr Kubota received the 2013 Progress Medal of the Society of Motion Picture and Television Engineers at the SMPTE's Annual Technical Conference and Exhibition, Honors and Awards Ceremony.

The SMPTE is the leading technical society for the motion imaging industry, and its technical standards have been widely adopted around the world.

Japanese Engineering Chief receives Top Industry Award

The Progress Medal is presented annually to the individual who has made outstanding technical contributions to engineering in the motion picture, television, or motion imaging industries.

Dr Kubota is the first employee of a Japanese broadcaster to win the award, in recognition of his 37-year career in television science and technology and his significant contributions in the areas of HDTV standardisation. A spokesperson for NHK said he has also played an important part in the rollout of the broadcaster's digital satellite broadcasting service and, most recently, public viewings of the 2012 London Olympics in Super Hi-Vision.

"NHK began research and development of HD technology in 1964, the year of the Tokyo Olympics, and it has since become the international standard," the spokesperson said. "NHK has also taken the lead in satellite broadcasting and digital broadcasting services. NHK will continue to promote additional new broadcasting services in the future."

Dr Kubota joined NHK in 1976. He has been a SMPTE fellow since 1993 and an IEEE fellow since 2008. He was appointed to the post of Managing Director in 2012.

Technical Committee 2013 in Hanoi



The 2013 annual Technical Committee (TC) meeting was held in Hanoi from 25-26 October and the meeting was hosted by Vietnam Television (VTV). The welcome address was delivered by Mr Tran Dung Trinh, Vice President, VTV and Dr Javad Mottaghi, ABU Secretary-General delivered the opening address.



The Technical Bureau and Technical Committee meetings were chaired by Dato' Abu Bakar of RTM-Malaysia.

Dr Amal Punchihewa, Director ABU Technology, reported on the activities of ABU Technology.



The Facilitated Session was chaired by Mr Tharaka Mohotty of MTV-Sri Lanka and Mr Chris Leung of RTHK-Hong Kong with several members providing their input and sharing the experiences and challenges faced within their organisations while implementing new technologies.



The Digital Radio Forum Meeting was chaired by Sunarya Ruslan of RRI-Indonesia. Presentations featured an update on the implementation of digital radio technologies within the region and around the world, including information on new technologies and features that would provide an enhanced experience to listeners. The session also included a presentation on 'e-Radio', the in-house-developed radio workflow and management software by TRT-Turkey.

The Developing Broadcasters' Forum was chaired by Ms Lim Soh Kwang of RTB-Brunei. The Forum was presented with the activities in the past year and those planned for the year ahead. Four informative and interesting presentations, addressing key areas of developments from members, were presented at the meeting. The presentations looked at wireless ENG technologies, intelligent workflow systems, terrestrial broadcast with 4K and a case study on DTB-T2 implementation and SFN Interference. The Forum ended with a Q&A and discussion session from the floor.



The Keynote Presentation at this year's TC, entitled 'Novel Initiatives in UHD TV & Hybrid Broadcasting' was delivered by Dr Yoshiaki Shishikui, Director, NHK STRL. His presentation looked at the history of key developments within NHK's STRL and then looked at the future of television, introducing 8K UHD TV or Super Hi-Vision and the developments within the recently launched NHK Hybridcast hybrid TV platform.



The CTO Forum was chaired by Mr Yeo Kim Pow of MediaCorp-Singapore and the panel discussed their views on 'Broadcasting Technologies for 2020'. The panelists included (from right to left) Dr Yoshiaki Shishikui of NHK-STRL, Phil Laven of DVB, Yeo Kim Pow of MediaCorp-Singapore, Jong Ok Lee of KBS-Korea, Nguyen Duc Tue of VTV-Vietnam and Chris Grey of Sony-Hong Kong.



The Special Topic Session this year was presented by the host, Vietnam Television (VTV) on the topic, 'Moving to a Digital World'. It highlighted some of the major activities being carried out and planned for the future within its development master plan, providing an exciting insight for the delegates. This showcased some of the key areas that VTV, as a developing broadcaster, is working on with their limited resources. The topics presented included File based Workflow for News Department in VTV; Digital AV Archiving in Transition; and VTV's Digital Broadcast at a Glance.



The Interactive Session, which presented developments within the broadcaster members and the industry, presented six papers on key areas including; Advanced applications with DVB-T2; Developments in advanced audio coding and its applications; Technologies for achieving interactivity; Current status and launch of NHK's Hybridcast technology; Rising interference issues in satellite broadcasting; and a look at the future of terrestrial television in FOBTv.



Frederico Alexandre do Rosario, Director and Member of the Executive Committee of TDM-Macau, the host for the next TC meeting, was appointed the Honorary Vice-Chairman of the ABU Technical Committee for 2014.



The committee adopted two decisions and one recommendation proposed by the Technical Bureau to the meeting. These were; RECOMMENDATION 1/2013: Advanced sound systems for programme production for next-generation UHDTV broadcasting services
DECISION 1/2013: Amendment to the Guidelines for the ABU Green Broadcast Engineering Award
DECISION 2/2013: Setting up of a Technical Activity Fund.

Professional Discussion Session at the 50th ABU General Assembly



Crucial Role of Frequencies for Radio and TV Broadcasting

At the General Assembly of the ABU held in Hanoi this year, a Professional Discussion session was held from 14.00 to 15.30 on 29th October. The theme of the session was “Crucial Role of Frequencies in Radio and TV broadcasting”. The background presented to the professional discussion was the case prevalent in almost all counties in the Asia-Pacific where broadcasters are being asked to vacate and relocate their digital broadcasting services and clear frequency spectrum for use by mobile operators.

The process of relocation is known as restacking, which involves a change of operating frequency, re-planning of coverage and networks, using new antennas and in some cases re-location of the transmitter sites. All of which incur huge costs and other burdens on the broadcasters, on top of that of the digital transition, with which they are currently and inevitably faced.

Given the developments taking place it has become increasingly important that broadcasters fight for the preservation of the broadcast frequency spectrum and to bring their cases to the notice of national spectrum regulators and higher levels of their governments. ABU members have taken a step forward by the adoption of a declaration, at the last General Assembly, under the title, “Pledge to Embrace the Digital Wave and Ensure that Digital Terrestrial Television Serves the Public Interest.” This calls for the preservation of existing frequency spectrum that necessary for the future development and implementation of new broadcast services.

The session, spanning ninety minutes, was moderated by Dato’ Abu Bakar Ab Rahim of RTM-Malaysia. Dato’ Abu Bakar highlighted that Broadcasters all over the world are under pressure to give up some of the spectrum allocated to Broadcasting services for use by other services such as mobile phones. This is also the case in almost all counties of the Asia-Pacific where the broadcasters are being asked to vacate and relocate their digital broadcasting services and clear frequency spectrum for use by mobile operators.

Four panelists presented the session, moderated by the ABU Technical Committee Chairman, Dato’ Abu Bakar after whose opening remarks, Dr. Fares Lubbaddeh of Spacelab, Jordan, Ms. Nedra Weerasinghe, Group Director and CEO of MTV, Sri Lanka, Mr Somchai Suwanban, Managing Director, Thai PBS, Thailand and Professor Dr. Du Baichuan, Vice Chairman of the Science and Technology Committee of China’s State Administration of Radio, Film and Television, SARFT, presented their views.



There were number of discussions generated by questions from the audience. The key message at the end of the session was that broadcasters need to change their approach to broadcasting with an appropriate mix of delivery but also need to work with spectrum regulators and the ITU to secure spectrum for future terrestrial broadcasting services as this forms an important part in the mix of delivery portfolio.

“As we develop other new services such as 4K and 8k television broadcasting, we need more bandwidth and new frequencies to deliver these new services terrestrially. Terrestrial broadcasting is the most efficient way of delivering high capacity media services to large markets. Broadcasters will face a problem and users will suffer unless we preserve spectrum for future services”, Dr AMAL Punchihewa Director Technology ABU said.

Technical Awards Presented in Hanoi

The ABU 2013 Broadcast Engineering Excellence Award was presented to Mr Lee Jong Ok, Executive Managing Director, Technology, Korean Broadcasting System, KBS-Korea. In his earlier position as Executive Director of the Broadcast Facility Department, he successfully completed the transition of KBS from analogue to digital, finalising the 100 percent digitalisation of its nationwide production and

transmission systems. Mr Lee is now playing a major role in developing new technology for UHD TV as a member of Korea's next generation broadcasting technology committee. In the field of international cooperation, Mr Lee has overseen the recycling of KBS broadcasting systems, providing an analogue OB van and production system for ABU members.



Mr Myung Nam Kim representing Mr Lee Jong Ok receiving the award from Mr Tran Dung Trinh, Vice President of Vietnam Television

The 2013 ABU Engineering Industry Excellence Award was awarded to Mr Yeo Kim Pow, Senior Vice President, MediaCorp Singapore. Mr Yeo has served the broadcasting industry since 1979 and contributed a great deal to its



Dr Javad Mottaghi presented the award to Mr Yeo Kim Pow

development. From 2000 until 2012, he played a major part in MediaCorp's technological development, including HDTV production, a file-based news production system and 3D TV production. Mr Yeo was a leader of the ABU Technical Committee and Technical Bureau, serving as Vice-Chairman from 2006 to 2010 and as Chairman from 2010 to 2012. In 2012, he was appointed to oversee the infrastructure development for MediaCorp's new campus at Mediapolis which is scheduled to be ready in 2015.



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The ABU Green Broadcast Engineering Awards for 2013 was presented to joint winners, Nippon Hoso Kyokai (Japan Broadcasting Corporation) and to Digital Video Broadcasting Project (DVB).

NHK won the award for establishing environmental protection as a basic philosophy and for its efforts to reduce carbon dioxide emissions. In addition to broadcasting programmes on environmental protection to raise awareness and influence the behavior of viewers on environmental issues, NHK seeks to employ environment-friendly operations. NHK has already brought about a large reduction in CO2 emissions through environment-friendly broadcast centres and the development of energy efficient equipment for broadcasting. This includes the use of wind and solar power in its transmitting facilities and programme production. In 2012, NHK achieved a 31,000-ton CO2 reduction compared with 2010.



Mr Seon-Woong Kim of KBS represented KOBA and presented the award to Dr Yoshiaki Shishikui of NHK-Japan.

DVB was selected for the ABU Green Broadcasting Award in recognition of DVB-T2 as a revolutionary technology that, compared with other terrestrial distribution technologies, has the





Mr Phil Laven accepted the award on behalf of DVB

highest potential to reduce transmission related greenhouse emissions. The tangible benefits that can accrue from the implementation of DVB-T2 by a broadcaster include the fact that transmitters can be reduced in power output. This results in significant reductions in capital expenditure and reduced operational costs resulting from much reduced energy consumption. The implementation of DVB-T2 also offers significant reduction of the carbon footprint. The ABU Green Broadcast Engineering Award is sponsored by KOBA.



Mr Chris Grey of Sony presented the award to Mr Mohotty

The inaugural ABU Developing Broadcasters' Excellence Award 2013 was awarded to Mr Tharaka Gajaba Mohotty, Director Engineering, MTV/MBC Channels (Pvt) Ltd. Mr Mohotty has provided long and outstanding service to Sri Lanka's broadcasting industry. He joined MTV in 2002 after working for more than 15 years at the national broadcaster, SLRC. At the time, MTV's facilities had been badly damaged by fire. He helped restore the MCR and studios, and was responsible for introducing innovative technologies across the whole spectrum of broadcast engineering. Mr Mohotty has brought operational savings to MTV through new services, proper resource management and the training of both technical and production staff.



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The Best Article Technical Review Prize was awarded to Dr Ngo Thai Tri, Nguyen Chien Thang and Nguyen Manh Duc of Audio Visual Global JSC of Vietnam, AVG-Vietnam for the article titled SFN Interference (DVB-T2 Standard) AVG's Experiences. Dato' Abu Bakar presented the award to Dr Ngo Thai Tri.



The First Commended Article award was presented to Zungkon Yim, Sungho Jeon, Sanghun Kim, Sangjin Hahm and Byungsun Kim of Korean Broadcasting System for the article titled Experimental Broadcasting for 4K UHD TV via Terrestrial Network in Korea. Mr Masakazu Iwaki presented the award to Soo-Hyun Wang who represented KBS.



The Second Commended Article award was presented to Cemal GAZALCI, Doğuş ÇİFTELER, İbrahim, İzlem GÖZÜKELEŞ and Zeynep YENİARAS PAZAR of the Turkish Radio Television Corporation for the article titled e-Radio.



Mr Raşit BAŞTAŞ accepted the award on behalf of TRT.

New Members

Additional Full Member

Seven Network Operations Ltd, Australia (8 October 2013)

Seven Network Operations Ltd. is a private company established in New South Wales, Australia on 18 July 1991 under the name of The Seven Network Limited. It subsequently changed its name on 25 June 1993 and it is 100 percent owned by holding company Seven West Media.

Seven West Media, Australia's leading multiple platform media company, has a market-leading presence in broadcast television, magazine and newspaper publishing and online. The company is the home of many of Australia's best performing media businesses – Seven, 7TWO and 7mate, Pacific Magazines, The West Australian and Yahoo!7 - and the biggest content brands including My Kitchen Rules, Packed to the Rafters, The X Factor, the Australian Football League, Better Homes and Gardens, Marie Claire, New Idea, Who, The West Australian and FANGO.

The Seven Network reaches 98 percent of Australians and is Australia's most-watched television network. Seven's multiple channel broadcast includes its digital television platform of Seven, 7TWO and 7Mate. Its leadership in Australian production confirms the fundamental strengths of the company's broadcast television business and its future in allowing the company to create and distribute its content across an array of communications technologies.

DVB Multimedia Group, Myanmar (11 October 2013)

DVB Multimedia Group is a private limited non-profit company, initially established in Norway in 1992 under the name of Democratic Voice of Burma Foundation, as an exile Burmese media broadcaster and broadcasting from Norway. DVB returned to Burma and registered the organisation under the name of DVB Multimedia Group on 2 April 2013 and DVB Association in Thailand on 17 June 2013.

DVB is a national free-to-air broadcaster that produces approximately 85% of their own programmes. They began broadcasting via radio frequency from July 1992 to 2005 and TV broadcasting from 25 May 2005. Currently, they broadcast daily from 17:00 hours to 23:00 hours with programmes that include News, Daily Newspaper Roundup, documentaries, human interest programmes on health and beauty, environment, music, literature, books, celebrity news, rights and equality issues, feature films and several other programmes of interest.

DVB's mission is to provide accurate and unbiased news to the people of Burma, promoting understanding and cooperation amongst the various ethnic and religious groups, to encourage and sustain independent public opinion and to enable social and political debate and to impart the ideals of democracy and human rights to the people of Burma.

Affiliate Full Member

Aljazeera International (Malaysia) Sdn Bhd, Malaysia (8 October 2013)

Aljazeera International (Malaysia) Sdn. Bhd. is a private company incorporated in Kuala Lumpur, Malaysia on 27 July 2005. It is a

part of the privately owned Al Jazeera Media Network global news and media broadcaster based in Qatar.

Aljazeera International (Malaysia) Sdn. Bhd. is the Asian hub for the provision of news, programmes and documentary content to the Al Jazeera Media Network. As one of its key bases, the Kuala Lumpur office houses the regions' news gathering and planning crews for Al Jazeera English and Al Jazeera Arabic as well as the production teams of the award-winning programmes Witness and 101 East; the latter being the channel's flagship current affairs show in the Asia Pacific region. All content produced by the Kuala Lumpur office is delivered to the network's headquarters in Doha, Qatar for worldwide broadcast.

General Commission for Audiovisual Media, Saudi Arabia (9 October 13)

General Commission for Audiovisual Media was established in September 2012 in Riyadh, Saudi Arabia, by a Council of Ministers' decision, as an independent autonomous entity. The Board of Directors comprises nine members representing the different ministries and commissions as well as two independent scholars. The president of The Commission is appointed by the King.

The Commission is mandated to regulate the entire audiovisual sector in Saudi Arabia. Their goals are to maintain the social, cultural and religious values of the Kingdom; to provide the public with high quality and diverse audiovisual content; to implement flexible and clear frameworks to license audiovisual media, taking into account the commercial and technical developments; to ensure equal opportunity and fair competition in the media market; to develop the audiovisual media sector in the Kingdom in the areas of production, distribution and delivery; and to support and implement the Kingdom's media policy and national plans.

The Commission is responsible for AV content through all media, new or conventional and works closely with the ICT Commission in matters related to frequencies, AV services provided by telecom networks and relevant equipment approval.

Ericsson Television Limited, Hong Kong (14 October 2013)

Ericsson Television Limited was incorporated in the UK under the name of Tandberg Television Limited and later changed its name to Ericsson Television Limited on 21 January 2010. Ericsson is a UK-based company and has operations across Asia Pacific. Its regional headquarters is in Hong Kong.

Ericsson assist content owners and operators to maximise content and provide consumer value by enabling them to efficiently utilize multi-platform infrastructure and eco-systems to deliver rich, blended multi-screen consumer experiences on all devices. They offer media valued chain of content acquisition, creation, management, exchange and delivery to consumers via their multi award winning products.

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Digital Sound Archive System at the Voice of Vietnam

by Toan

Head of Sound Archive Technology Department, Audio Centre, VOV

1. General Introduction

Audio Centre is a VOV unit which undertakes the production of radio programmes and provides archives, audio signals, video, data files and so on for VOV's six radio channels and other media such as VOV online and VOVTV.



2. Introduction of the Sound Archive and the Development of the Digital Sound Archive System at the Voice of Vietnam

2.1 Before 2005

Before 2005, VOV's audio materials used to be classified into several categories, marked in code, packed in paper boxes and placed on the wooden shelves 4-5 metres high and categorised by size.



The management and preservation of audio materials was done manually. Information and details of the tapes (a limited form of metadata) were stored in books and poster card boxes. Manual searches for specific information, therefore, took a lot of time and caused delays in making reports, as well as producing statistics.



2.2 After 2005

The Audio Centre imported almost all information/data of the audio materials into an excel database and designed new search and management software to replace the manual method.

In 2006, we moved all the tapes from wooden shelves to mobile shelves.



2.3 Indispensable Requirements for Digitalisation

In former days, due to poor environmental conditions, including high temperatures and humidity, many magnetic tapes deteriorated seriously.

In addition, following trends in development, the broadcast industry produced new audiovisual and professional broadcast equipment, stopping production of legacy professional sound equipment, including tape recorders.

Therefore, VOV decided to have its production system digitised for compatibility with its modern technical system.

2.4 After 2007

In 2007, the digital sound archive system came into use.

The main purposes of digitising VOV's sound archive system were as follows:

- Converting audio materials from analogue magnetic tapes (reel-to-reel tapes) into digital audio-files stored on computer hard drives.
- To store digital audio materials in three-component systems (Online, Nearline, Offline) in its digital sound archive system..
- The digitising of metadata information related to audio materials.
- To provide long-term and short-term audio materials with basic information from the digital sound archive system, available to production systems via an integrated production computer network,
- Ability for pre-listening, searching and checking of the audio materials and the multi-criteria search of audio metadata information.
- Changing the mode of the old-fashioned management system to a computer-based management system.
- Changing the mode of the information management system, based on books and poster card boxes, to a database management system.
- Creating a method of approaching and exploiting the stored materials based on the latest technologies and the modern electronic and information technology methods.
- For end users to be able to access to digital the sound archive system from their production workstation, and for multiple users to be able to work concurrently with the digital sound archive system.

3. Digital Sound Archive System

The digital sound archive system in The Voice of Vietnam has two components: An audio digitised system and an audio archive system.

3.1 Digital Audio System

The Digital Audio System is one of the major components of the sound archive systems. This system consists of two digitized workstations. Each workstation comprises

3 reel-to-reel tape machines connected to a computer which is installed with digitizing software.

The main task of the Digital Audio System is to convert audio materials stored on analogue magnetic tapes into digital audio files stored in a computer's hard drive.

3.2 Digital Sound Archive System

All digital audio files are stored in digital audio systems which can also get other sound sources from production networks.

The digital sound archive system is web-based (GUI). The end-users can access the system, searching, pre-listening, monitoring the process, checking audio status (online, nearline and offline), exporting audio / statistics and so on via an internet browser.

Metadata can be enriched (nearly 100 fields for content information).

Audio files are stored in PCM format for long-term archive and the system also creates MP3 files for the purpose of pre-listening.

Audio files are provided to users quickly and efficiently through computer networks.

The sound archive system is integrated with a production network. Reporters and editors can access the system from the production network to get necessary information. Users can search for information and pre-listen to audio files. Audio files in the digital sound archive can be exported or imported to or from the production network automatically and transparently to end-users.



With the digital audio archive system, users can search audio files in the computer network and listen before deciding to use the audio files (pre-listening). Files available for pre-listening are in MP3 format to reduce network congestion, especially when there are many users accessing the network at the same time.

It can be said that the digital audio archive system helps to resolve those limitations of an analogue audio archive system which were mentioned earlier. It also brings a new face for the management, archiving and exploitation of audio materials. The establishment of a digital audio archive system and the introduction of the exploitation methods have opened up a new horizon for local stations in general and for the Voice of Vietnam in particular.

4. Conclusion

The digital sound archive system marks a turning point in the technological development of VOV and the production of digital radio programmes. The application of science, technology and development strategy helps to preserve, maintain and develop the audio archive system.

The digital sound archive system enables us to preserve intangible cultural heritage and acquire new management methods. Additionally, the digital sound archive system plays a very important role in providing the production system with audio files for use in VOV's broadcast programmes.

author



Toan

Head of Sound Archive Technology Department, Audio Centre, VOV

Born in 1980, Toan is a native of Hanoi, Vietnam. He received his Electronic and Communication Engineering degree from the University of Transport and Communications, Hanoi, in 2003 and also holds a Master of Informatics and Electronics engineering degree from the Hanoi University of Science Technology.

Graduating in 2003 he joined the Information Technology Department, Audio Centre, VOV as IT engineer, before working at the Sound Archive Technology Department of Audio Centre, VOV. Since 2009, he has become one of the main personnel responsible for the Sound Digital Archive System at VOV.

Currently Toan holds the position of Head of Sound Archive Technology Department at Audio Centre, VOV.



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International Broadcast Equipment Exhibition 2013

by Lasantha Samaranayake

EAP, Sri Lanka

Inter BEE 2013 and its related content forum was held from 13 to 15 November at the International Conference Hall, Makuhari Messe, Chiba, Japan. This exhibition was held for the 49th time and it was organized by the Japan Electronics Show Association (JESA) with the theme of Next Generation Content – Reliance and Creation. This is one of the largest events in the broadcasting field and was ceremonially opened by Vice Minister, Internal Affairs and Communication of Japan on the morning of the 13th. It mainly focused on the state-of-the art broadcasting technology including 4k and 8k. The exhibition had four main zones i.e. Video and broadcast equipment, Professional Audio equipment, Professional lighting equipment and Cross Media. All leading equipment manufacturers in the broadcasting field participated in the event.

Super High Vision and Next generation 8K imaging technology products were demonstrated, such as UHDTV Cameras, SSD recorders for UHDTV playback and recording and UHDTV colour grading processors, camera image processors etc. Many of the leading companies in the broadcast equipment manufacturing field displayed and demonstrated 4k systems including 60 inch monitors, cameras and related equipment, video recorders and 4K HDMI/SDI to HDMI/SDI/DP Converters. The other key product in the video and broadcast zone was file-based work flow and media asset management. In addition HDTV Systems Cameras, Digital Cinema Cameras, Data Compression Technology, Multiple Monitor Displays, Routing Switchers, Visual Effects, Media Converters, Virtual Studio Systems, Storage Equipment, Multimedia Broadcast, Satellite Broadcasting, Cable Television, Video Delivery Networks, Measuring Equipment, IP based Video/Audio Transport system etc were displayed in this zone. The Professional Audio equipment zone displayed all their audio related equipment.

The Professional lighting equipment zone exhibited broadcast studio lighting systems and professional outdoor TV lighting systems, including LED light panels and related equipment. In the Cross Media zone highlighted Non-linear Editing Systems, Digital Cinema Editing Systems, Computer Graphics etc. The Inter BEE show displayed and demonstrated the world's most advanced technologies by over 900 Japanese and international market leaders in the broadcasting field.

The Inter BEE content forum started with the key note speech by Mr. Toshiyuki Minami on the topic, "Strategy for advancement of broadcasting services". He highlighted the 4k/8k technology, the history of the broadcasting industry and future trends and planning of broadcasting in Japan. Further he talked about the research and development of Super Hi-Vision and the standardisation of SHV transmission



systems and video formats by ITU. Special Session 1 commenced on the afternoon of the 1st day with, "How Loudness Control is Changing the World of Audio." This described the far-reaching implications transparent loudness control will have on audio production at large. It was mentioned how even journalists and video editors can use these revolutionary technologies. It was further highlighted how newly produced pop/rock music rarely sounds good on fine loudspeakers, commercials on TV are annoyingly loud and a visit to the cinema may be a noisy experience.

Special session 2 started under the heading of, "Latest Trends in Video Delivery in the HTML5 Era." Four speakers delivered their presentations. "Commentary on "MPEG-DASH" Delivery Standards with HTTP" was the first section. "MPEG-DASH – The Background and Objectives" was part 1. The current situation surrounding DASH, structure of DASH and its benefits was discussed. Part 2 was "Dynamic Adaptive Streaming over HTTP (MPEG-DASH)". This presentation provided a high level description of MPEG-DASH and DASH-AVC/264, their technical and market advantages, and the current state of the industry. The second section pursued the theme, "Example Applications of HTTP Video Delivery Technologies Gaining Attention." Part 1 was entitled, "Instant Video Clip Creation by Playlist Editing" and part 2, "Independent Development Useful in the Video Analysis of Sports". These two presentations gave an overview and case studies of the Web service, "Share Cast Playlist Editor" which makes it possible to create video clips just by editing the playlists of one of the HTTP video streaming formats called "HTTP Live Streaming" and a report on the method of applying this to MPEG-DASH. This presentation looked at the section and meta-data at the centre of this system, as well as players and cameras aimed toward sports. This special session 2 ended with a panel discussion on the topic of "Possibilities and Technical Challenges of Video Streaming in the HTML5 Era".

On the 2nd day a special session and a visual symposium was held at the event. "Key business and technology developments in the broadcast and media industry" was the

topic of the special session. This presentation overviewed the current business climate for technology suppliers to the broadcast and media industry and identified key enablers contributing to the technology revolution. Further it looked at new end-user priorities when making purchase decisions.

The visual symposium theme was, “Current Situation of New Broadcasting Media Services and Future Development – Expectation to the Content of Super Hi-vision (4k, 8k), Smart TV and Radio”. Five interesting presentations were made and the first presentation was “Toward Broadcasting’s First Century” – Expectations and Problems for 4K, 8K and the Smart TV Age”. The way that the results of new technological innovations could be used in services and what would become of the roles of “broadcasting” and “TV” in an aging and mature society and the creation of attractive next-generation services was discussed. The next presentation was entitled, “Concerning content production in super hi-vision (4K and 8K)”. It discussed differences between 4K cameras and 8K cameras, introducing the production of 4K / 8K works by RED ONE, F65 and SHV and 4K / 8K content production points based on the speaker’s experience of making 2K dramas with CINE ALTA and C300, etc

The topic of the third presentation was “Why does NHK begin Hybridcast?”. The speaker asked why broadcasters were working on Hybridcast? and how would the TV viewing experience change? He then went on to introduce the latest strategy of Hybridcast development and organisation. The fourth presentation was on the topic, “Changing Television Advertising in Multiscreen Broadcasting Services,” The Multiscreen Broadcasting Study Group aims not only to develop the value of programmes but to give value to commercials and improve the profitability of the entire television business. Their aim is to give television a second screen function as a shared broadcasting system instead of at the level of each programme or each channel.

The final presentation was, “On Radio Services in Digital Age”. It dealt with the sequence of events leading to their establishment, current status, issues and future goals. The session ended with a panel discussion.

The final day began with a special session, “Current SET moment and future vision for industry” by president of SET society. It discussed the SET society, its goals, activities, challenges and visions about industry’s future. The next topic was “Digital TV in Brazil: Its Past, Present and Future.” It provided a brief summary of the introduction of Digital TV in Brazil and why it was decided to choose ISDB-T as the standard. Current threats and opportunities for the broadcasters in Brazil and South America were also discussed. The final special session started with the topic, “An Optimised Storage Architecture for Live TV Workflow”. This presentation examined the different cases used for 4K production, from feature films to live sports, entertainment and news telecasts and 4K down-converted to HD. Specific focus was given to evolving standards for physical interfaces, codec considerations, storage considerations and advanced architectures that assist with the unconstrained throughput needed in a live 4K television production workflow.

The afternoon session, the audio symposium, had the theme “Realities and Challenges in the First Year of Loudness Operations” and four presentations were made. “Have Loudness Operations Been Successful?” was the first one and considered the realities of loudness operations and attempt to consider what is important in the creation of sound friendly to people. The next presentation was the topic, “Reconsidering the Meaning of Mixing to Achieve a Target Loudness Value”. It revealed the aggregated data and sharing information from a survey on on-site staff in post-production, how they feel and what work they are doing with regard to loudness standards. It looked at the issues that have come to light, as well as to rediscover the original purpose of the loudness standards, which are to “produce the target level as the goal.” The third presentation was on “Loudness and Mixing from the point of Post Production: Introducing Cases in Nagoya”. It looked at the current situation in relation to loudness in Nagoya and quoted examples of changes and operations in technologies and awareness before and after application. Furthermore, a report on the problems faced in the field and points that will require improvement in the future. The last presentation was on the topic “Current Situation of Loudness Meter Operation”. This talk was on the future of loudness metering over momentary, short-term and loudness range analysis techniques, as well as loudness controller and additional file-based functions.

Apart from the above, a loudness workshop was held at the exhibition hall by Japan Post Production Association. At the Cross Media Theater, the Asia Contents Forum, Next Generation Radio Group IPDC Forum and Design Extreme Seminar were held. Inter BEE is an exhibition for professionals in audio, video and communication field. Inter BEE delivers the latest industry information in various disciplines of the broadcast chain across Japan and around the world and is the world’s most state-of-the-art broadcast technology exhibition.



The Future of Radio Broadcasting as Observed at IBC-2013

by Tias Anggoro of Radio Republik Indonesia

This year's International Broadcasting Convention, IBC was held from 12th to 17th September. The following summarises radio broadcasting developments as presented in conference and exhibition sessions.

These are exciting times for radio. There is renewed momentum across Europe behind the transition to digital radio, and more to come as integration into smartphones improves. In parallel, a hybrid radio approach combines the power of both broadcast (DAB+, DRM, FM) and broadband while maintaining the simplicity and universality of radio

Digital radio is here and happening. Lots of countries in Europe are rolling out digital services while some even have plans for switching off analogue FM services.

Plans for a switchover from FM to DAB/DAB+ digital radio are on-going or are under discussion in UK, Norway, Sweden, Denmark and other territories. The world in which radio competes is changing, with traditional radio under pressure from new content delivery mechanisms.

The way in which Radio is consumed changing across the world, and radio broadcasters are using technology in many different ways to help shape its future.

Digital radio opens the door to new programming, improved and simplified reception, and enhanced data services. Receiver technology has progressed dramatically and prices have dropped. When one buys a portable radio nowadays, it is very often digital by default. Additionally, hundreds of broadcasters have activated hybrid radio for their services, bringing further benefits for the listener and broadcaster alike.

Broadcasters are making increased use of visual functionality to provide information on programming, now playing, promotion of broadcasters web sites, competition and registration features. For the first time, radio is able to compete with TV in offering visuals which can be used for advertising and promotional purposes. Advertisers can use

colour screens to display special offers, product photos, advertisers logos, store location, opening hours. All of this new content can be delivered efficiently and effectively via the broadcast medium.

Functionality which is now familiar to consumers from digital TV, smartphones and tablets is also available on digital radio devices. Pause, rewind, record, and Electronic Program Guides (EPG), on radios with colour touch screens and enhanced user interfaces implemented on an App running on a smartphone or tablet is becoming increasingly mainstream.

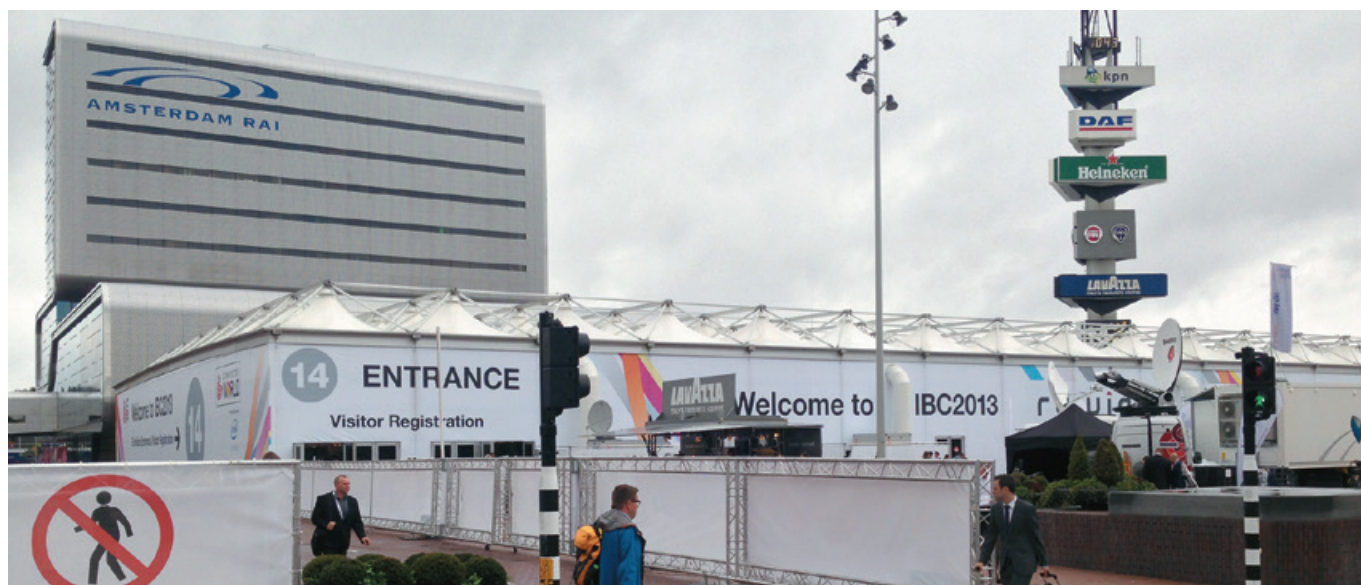
Radio is taking advantage of the connectivity that surrounds us all through network connections, often wirelessly. This connectivity provides increased offerings in terms of content to the listener and also provides the potential for interactivity which opens up a broad range of possibilities for exciting new services, such as real time voting, to be available via the radio.

Factors driving the development of radio receivers for the future include:

- Increased content format offerings from broadcasters
- Increased broadcast of data content
- The availability of interactive services
- Innovation in semiconductors allowing for increased number of devices at lower costs
- Consumer behaviour changes, especially in younger demographics

Radio will continue to integrate with the rest of the digital world and will become a standard feature within products as the cost of internet connectivity reduces. Today, with connectivity standards such as Bluetooth and WiFi available in smart devices, standalone radios will cleverly integrate themselves with these devices using Apps, resulting in an immersive user experience of the smart device with the benefits of an enhanced radio experience.





Amsterdam RAI IBC 2013 Report

by **Nou Sovanna**

TVK, Cambodia

It was Amsterdam RAI IBC2013, on the first day at 9:30 in morning and I joined the conference, 'Broadcast and Beyond' which considered that reshaping the media ecosystem broadcasting presented a new world of unlimited choice and ever-increasing competition from new players. The session also asked, 'How serious are the threats and how great the opportunities from multiple devices, proliferating screens and rise of the Over the Top (OTT) operators?'

This curtain raiser to the IBC 2013 Conference was slated as a global, strategic look at the future of the traditional broadcasting model and the issues that keep broadcasters awake at night – within an overarching theme of media convergence. The conference asked, "As we move headlong towards a connected future, how do we broadcast for the Internet age and how are the industry players positioning themselves to stay ahead of the curve?"

Four highly influential speakers addressed these critical topics from the perspective of multi-channel ownership, independent production, digital development and that of advertisers and marketers. On the same day at 11:30 to 13:00 the 2nd Conference, 'Cutting Edge' featured High Dynamic Range Video: The sessions highlighted some of the newest ideas in advanced media technology, many being experimental concepts, still in the lab, others being ambitious prototypes or novel applications. All were exciting and all thought-provoking. The first session examined the potential of high dynamic range (HDR) video and looked at a range of HDR production issues. One of the most fundamental techniques considered was motion estimation in digital video processing, which influences the quality of standards conversion, the efficiency of image compression and the performance of the processes such as slow-motion and noise reduction.



IBC 2013 also gave a chance for visitors to get up close and exposed to the latest 4k Ultra HD technology. Among the exhibitors we visited were Sony, Panasonic, Microdolly, Datavideo, Tektronix, TEM Italy, Miranda Technology, Harris Broadcast, Grass Valley, Rohde & Schwarz and Danmon Group.

Especially impressive was the state of the art auditorium, designed to IBC's specifications and featuring the very latest in cinema technology. It was the centerpiece of the IBC experience, with capacity for 1,700 people and boasting facilities for 4k and stereoscopic 3D digital projection with Dolby 7.1 surround sound. The IBC big screen was the perfect place to see and hear the latest technical advances. Looking at the all equipment and technologies through the entire IBC 2013 was like looking at the last of the analogue age. Technical trends being overwhelmingly towards digital broadcasting.

IBC2013 really opened my eyes on what is happening in the broadcast world. As a young broadcast engineer the opportunity to attend such a huge event, on a par with the JEIT (JAPAN), BIRTV (CHINA) and NAB (USA), was highly rewarding. I would like to express my appreciation to IBC for making my visit to RAI Amsterdam possible.

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News

from the ABU Region

Australia

Australia Completes Digital Switchover

After 57 years of analogue television, Australian viewers have made the change to the digital era relatively seamlessly. This week's analogue switch-off in Melbourne and remote Central and Eastern Australia marks the end of a huge project to convert 8.7 million households and more than 1,000 transmitter sites.

Broadcasters funded 100 new gap-filler sites so that as many viewers as possible can receive digital terrestrial television and the VAST satellite service has ensured all Australians continue to have access to free-to-air television. The government has raised nearly \$2 billion from the sale of digital dividend spectrum with around another billion dollars expected from future sales. This project has been a genuine partnership between television broadcasters and government – from the planning stages, through to implementation and finally, completion.

(Digital TV News)

ABC to Monetise VOD Content

The Australian Broadcasting Corporation has announced it will launch a pay-to-view on-demand service in late 2014. Viewers who access current programmes for free on iView will also be able to revisit ABC programmes from the past with the pay-to-view service. In collaboration with ABC Commercial, the ABC library will be opened up to allow viewers instant access to recent and archival programmes.

ABC TV recently announced its 2014 production slate featuring Australian content and event television. Programming highlights include new dramas such as 'Anzac Girls', 'The Code', and 'Old School'. In entertainment and comedy, viewers will see the return of 'Spicks and Specks'.

Also in 2014, ABC TV will premiere the entire run of a major new Australian series on iView coinciding with the launch of the first episode on television. For the first time, iView will premiere two programmes created especially for the online service. The broadcaster says the move is designed to cater for younger audiences' growing hunger for binge viewing.

(ScreenPro)

Cambodia

Cambodian DTV Operator Expands Offering

The first nationwide Cambodian digital terrestrial operator,

One TV, launched in 2012 has expanded its offerings with two brand new channel packages. The original "Aka" and "Serey" packages featuring new anticipated content were released on December 1st. The main idea of the One TV new packaging is to create an affordable and in-demand offer for those Cambodians in rural areas who already comprise almost 50% of the operator's audience. The cost of one package is a mere US\$1. With the average income in Cambodia equalling to \$200-\$300 a month per household, Cambodians are in need of quality TV with attractive affordable pricing.

(C&T Magazine)

Hong Kong

TVB Hong Kong Upgrades its Workflow

PlayBox Technology has completed a major upgrade to the playout facilities at the studios of Hong Kong's largest independent broadcaster, Television Broadcasts Ltd (TVB). The project, which also included customer training, was completed together with the engineering team from Mediatech (International) Ltd, the local PlayBox Technology partner, and was finalised with the installation of 26 servers at the network's headquarters in TVB City, Kowloon. The installation encompassed nine high definition 24/7 channels. Seven of them are already on air and the others are in pre-commission testing.

Twenty of the servers installed are for playout with character generation and graphics. Eighteen are configured with 1:1 redundancy level for main and back-up operation on the nine high-definition channels. Control of the nine high-definition channels is via Multi Playout Manager, a fully assignable monitoring and control system. Two redundant Multi Backup Manager servers were added to manage redundancy switching. An additional pair of servers has been installed for use in staff training, again as main and backup.

(BroadcastShow)

Indonesia

Indonesia's Orange TV Launches Over-The-Top Services

Orange TV has launched its over-the-top (OTT) service with the use of Irdeto Rights to provide studio-grade security for the services across a range of unmanaged consumer devices. Irdeto Rights, part of the Irdeto Media Protection suite integrates into an operator's existing content distribution infrastructure

and protects premium content in a multi-screen environment. Orange TV was officially launched in March 2012 and is the first and only pay TV operator in Indonesia to offer a prepayment system. Orange TV has over 20,000 points of sale where customers can purchase prepaid vouchers. Orange TV also holds national broadcasting rights for the Barclays Premier League for the next three seasons, beginning 2013/2014.

(C&T Magazine)

Malaysia

Bloomberg Television Enters Into Partnership In Malaysia

Bloomberg Television has announced it has entered into a partnership with Encorp Group. Bloomberg Television and Encorp Group will cooperate to create the first business news channel in Malaysia in 2014. Bloomberg Television Malaysia will combine the resources of Bloomberg with locally produced content to broaden coverage of Malaysia's business scene.

Malaysia's business sector and capital markets have gone from strength-to-strength in recent years and have been fundamental in Malaysia's economic transformation. It is one of the largest centres in the world for Islamic finance and an increasingly important hub in ASEAN for key strategic industries. This has driven global and local demand for comprehensive business news from Malaysia, providing an exciting opportunity for Bloomberg Television Malaysia to play a role in meeting that need.

Encorp Group will build Bloomberg TV Malaysia's studios in Encorp Strand and will develop anchors and reporters in Bloomberg Television's reporting style.

The Malaysia partnership continues Bloomberg Television's momentum in Asia, following the launch of Bloomberg TV Indonesia and Mongolia in the past year and the company's ongoing investment in news coverage and product development in Malaysia.

(C&T Magazine)

Mongolia

Mongolia Goes DVB-T2

Mongolia Digital Broadcasting (MNBC) has launched Mongolia's first-ever DVB-T2 service. MNBC has deployed the service with the use of multi-channel SD encoders, multiplexer and video processor with embedded DVB-T2 gateway. Installed at the broadcaster's headend facility in Ulaanbaatar, the network have enabled MNBC to migrate to a DVB-T2/MPEG-4 operation in order to accommodate more channels and increase its competitive advantage.

Launched in 2007, MNBC was Mongolia's first digital terrestrial TV network operator and is currently the market-leading terrestrial channel. By migrating to DVB-T2/MPEG-4, MNBC will now be able to broadcast up to 120 digital TV channels over five UHF transponders to maintain its number one position in the market and compete effectively with Mongolia's national satellite operator.

(Digital TV News)

Myanmar

International Broadcasting Centre For Myanmar SEA Games

Professional video and audio systems integration firm, Advanced Broadcast Solutions (ABS), recently announced it has been selected as the premier AV technology provider for the International Broadcasting Center (IBC) for the 27th Southeast Asian (SEA) Games in Myanmar. More than 1,000 media personnel are expected to cover the games, and ABS has been on location for more than three months preparing for the event.

In conjunction with Asia Mega Link, a telecommunications company based in Yangon, ABS was tasked with designing, building, and supporting video and audio for the media in all venues. It will also produce HD coverage of all athletic events, as well as the opening and closing ceremonies. Each venue includes an area for stand-ups, a 'mixed zone' for interviews with athletes, and predetermined ENG camera positions with wide views of the field of play.

(C&T Magazine)

Singapore

Arqiva Opens Singapore Office

UK transmission services provider, Arqiva, has heralded a new era of Asia-Pacific expansion with the establishment of an office in Singapore. Arqiva says the company is looking to recruit booking personnel and will have in-house Asiasat 5 capacity as well as access to teleport services within the Hong Kong Stanley teleport on Asiasat 5 and other Asian satellites. There will also be in-house international SD and HD fibre to the region (Hong Kong, Singapore and Sydney) through an agreement with Australian telco Telstra.

Arqiva's previous incarnation, NTL, had operations in Australia (now Broadcast Australia) and Singapore (which, following a management buy-out, became On).

(C&T Magazine)

Vietnam

VTV to upgrade VHF and UHF Antennas

Jampro Antennas has been awarded another contract by Vietnam Television (VTV) to supply two high-power broadband antennas, one for VHF Band III transmission, the other for UHF. Both antennas will provide coverage of Can Tho, the fifth largest city in Vietnam, and the largest city in the Mekong delta.

The JHD-HV4 is a half wave spaced, horizontally polarised flat panel, dual-dipole high-band VHF antenna that can broadcast on Band III at 174 to 230 MHz. The JUHD UHF antenna was selected by VTV for two primary reasons. Due to a modular design, it gives VTV flexibility to configure various elevation patterns so coverage can be customised to suit the topographical challenges of Vietnam which range from flat deltas to mountainous areas exceeding 3,000 metres. Secondly, the JUHD antenna's robust stainless steel construction has proven reliable in hot, wet tropical climates.

(BroadcastEngineering)

Digital Broadcasting Update

1. DVB Ratifies New CI Plus Specification

The DVB-CI Plus specification has been approved by the Steering Board and the DVB BlueBook A165, "DVB Extensions to the CI Plus Specification (CI Plus V1.4)," is now available for download on the DVB website.

DVB-CI Plus 1.4 adds new features such as extensions to the CI Plus browser and the handling of multiple encrypted streams (multi stream). Other new features include the ability to route high-bandwidth IP streams through the Conditional Access Module (CAM), the ability for the CAM to control those IP streams, the new "Online Service Descriptor Table" (OSDT), and support for IP Multicast. These new features enable IPTV straight to the television set without the need for a set-top box.

(DVB Scene eNews)

2. World's First Showing of DVB-T2 Delivering Both HEVC Encoded 4k Ultra HD and Mobile Services in a Single Channel.

New CI Plus Features Make Debut in IPTV Demo

At this year's IBC, visitors to the DVB stand witnessed the groundbreaking demo of DVB-T2 delivering a wide range of resolutions from 4k Ultra HD down to the smaller screen resolutions typically found in mobile devices. The presentation underlined the power and flexibility of this second-generation standard. In another demo DVB highlighted the new features provided in the forthcoming DVB-CI Plus specification. The specification incorporates the latest feature set introduced by the CI Plus Extensions and enables IPTV to be delivered directly to the television set, without the need for a set-top box.

Using the DVB-T2 terrestrial transmission standard, a 4k UHD TV service utilizing HEVC encoding, and a mobile service are delivered in a single 8 MHz channel. This is enabled through the use of Multiple PLPs (Physical Layer Pipes), a feature of DVB-T2, which allows for the separate adjustment of the robustness of each delivered service within a channel to meet the required reception conditions. The PLP transmission parameters for the mobile service are compliant to the T2-Lite parameter set. The 4k and mobile contents were transmitted from the Alticom Tower in Amsterdam covering the entire IBC exhibition area.

(www.dvb.org)

3. DVB Demonstrates Satellite, Cable 4K Transmission with Second-generation Standards

DVB along with Eutelsat and Kabel Deutschland demonstrated delivery of 4K UHD TV via DVB-S2 and

DVB-C2 during the IFA consumer electronics trade fair in Berlin Sept. 6-11.

The demonstrations included what DVB is described as the world's first-ever showing of DVB-C2 delivering 4K video. The DVB-C2 transmission system consisted of a C2 modulator and demodulator used for the transport of 4K content. The 4K content for the demonstration was provided via the Eutelsat 10A satellite and Sky Deutschland. A Broadcom receiver decoded the content, which was shown on an LG 4k display.

(broadcastengineering.com)

4. DVB-T2 Strong Contender for ATSC 3.0

Following the ATSC (Advanced Television Systems Committee) call for proposals for a Next-Generation TV Broadcasting Technologies in March, ten Initial Physical Layer Proposals were submitted, most of which are based on the DVB-T2 second generation terrestrial standard.

Detailed proposals are due Sept. 27. Initial proposals for the ATSC 3.0 physical layer have been submitted by: Coherent Logix and Sinclair Broadcast Group (SBG), Communications Research Centre (CRC) and Electronics & Telecommunications Research Institute (ETRI), Digital Video Broadcasting Project (DVB), LG Electronics, Zenith and Harris Broadcast, Allen Limberg, National Engineering Research Center of Digital Television (NERC), Shanghai Jiao Tong University (SJTU), Shanghai Advance Research Institute, (SARI) and Bell Labs, Alcatel-Lucent, Power Broadcasting, Qualcomm and Ericsson, Samsung and Sony, Technicolor.

With its most efficient use of spectrum and fast-growing global deployment, DVB-T2 is a strong contender to become the core element of ATSC 3.0.

(www.dvb.org)

5. UHD TV Update

The DVB Steering Board has recently approved the Commercial Requirements for a first ultra high definition broadcast format (UHD-1 Phase 1) and the 'baseband' specification should be prepared in the coming months. This is intended for those beginning services in 2014/15.

In the run-up to the preparation of the requirements for second level, UHD-1 Phase 2, by DVB, for those intending services in 2017/18, there have been two major meetings providing insights that will help the DVB discussions.

The first was the autumn ITU-R meetings at which there were agreements to add several elements to the 'high frame rates' included in the baseline UHD TV Recommendation, BT 2020,

including the 100Hz that earlier DVB meetings suggested was needed. In addition, a new landmark Recommendation for advanced audio was agreed – this audio system may be useful for DVB UHD-1 Phase 2, and any future Phases.

The second event was an EBU Fact Finding Workshop, which brought together representatives from Europe, Japan, the US, DVB, the SMPTE, the ITU, the CEA, DE, and the national UHDTV platforms, to try to see how clear or misty the UHDTV ‘roadmap’ is. The conclusions were that ‘the weather ahead is partly clear and partly cloudy.’

(www.dvb.org)

6. Steering Board Ratifies DVB-GSE Lite Specification

At the 75th meeting of the DVB Steering Board, held on 20 November, the new DVB-GSE-Lite (Generic Stream Encapsulation) specification was ratified. The specification has now been submitted to the European Telecommunications Standards Institute (ETSI) for formal standardization. A GSE-Lite BlueBook will be published shortly.

The DVB-GSE protocol allows for efficient encapsulation of IP and other network layer packets over the second generation DVB physical layer specifications – DVB-S2, DVB-C2, DVB-T2, and DVB-NGH. The first generation of DVB standards only supported data transport using the MPEG format with a Transport Stream packet multiplex (MPEG-TS). DVB-GSE maximizes the efficiency of IP datagrams transport, thereby reducing the overhead by a factor of 2 to 3 with respect to DVB-MPE over MPEG-TS. This is achieved without any compromise of the functionalities provided by the protocol owing to the variable length Layer 2 packet size that is suited to IP traffic characteristics.

(*DVB Scene eNews*)

7. EBU Forms Strategic Program on Digital Radio Platforms

The European Broadcasting Union (EBU) Strategic Program on Digital Radio Platforms (SP-DRP) was recently created to help members to clarify their strategies, to identify work to be done, and to exchange ideas on technologies for digital radio that now exist.

SP-DRP is actually the only group under the EBU Technical Committee focused specifically on radio matters. It is chaired by Javier Sánchez Pérez of RNE (Spanish National Radio).

A number of new trends are under discussion in the context of SP-DRP. These include:

- Hybrid Radio: How do systems connect? What is the experience? How to produce content and services? Could there be a “Second screen” for radio?
- Mobile Integration: Collaboration with the Universal Smartphone Project; use cases.
- Production: Automation of processes, metadata extraction, visual radio production.
- Advanced Audio applications for radio: Use of binaural and surround in radio; use cases, showcases.

(radiomagonline.com)

8. ATSC Establishes Candidate Standard for Interactive TV

The Advanced Television Systems Committee (ATSC) has elevated the A/105 “Interactive Services” system to Candidate Standard. A key element of the emerging ATSC 2.0 standard, A/105 is designed to enable the marriage of Internet-delivered and broadcast content. “Candidate Standard” status is a major step toward becoming a “Proposed Standard,” and then on to consideration as a full-fledged ATSC Standard.

A/105 provides for the extension of these services to second screens, such as tablets and smartphones, and provides for delivery of needed resources via the Internet path. In addition to services already part of traditional terrestrial broadcast television, future interactive services with A/105 will include personalization, service usage reporting, receiver access to web-based servers, and support for automatic content recognition.

(atsc.org)

9. LTE Broadcast Demonstration



An LTE Broadcast solution was used for a recent LTE broadcast demonstration in Australia.

The demonstration was said to be “world’s first” LTE broadcast on a live network Australian telecommunications provider Telstra has completed what it calls the “world’s first” LTE broadcast session on a commercial LTE network. Ericsson’s LTE Broadcast solution was successfully activated and tested on Telstra’s live network with the transmission of concurrent video feeds and large files to enabled devices.

During the demonstration, the devices received different video feeds, including a sports match replay, sporting network news, horse-racing coverage and news.

(www.apb-news.com)

10. ITU Produces Draft Of ‘Interactive’ TV, Radio Sound Standard

Move over 5.1 surround sound. The International Telecommunications Union Monday announced that it has come up with a draft recommendation for the next generation in “immersive” and now “interactive” TV (and radio) audio.

“A single coherent approach was needed that could provide sufficient flexibility to allow a variety of techniques to co-exist,” said ITU. “The newly agreed system has now achieved this.”

An ITU Study Group has tentatively approved a new standard, compatible with current stereo and 5.1 speakers or add speakers for a more “immersive” experience, says ITU, adding “The system enables an environment where the user can interact with the receiver to create the audio landscape that he or she wishes.

(www.multichannel.com)

Equipment Trends

1) Audio Recorder



A dependable digital audio recorder/player featuring programmable timer and LAN control. Support for 24-bit, 96-kHz audio achieves even higher sound quality for both recording and playback. Use of AES/EBU output connectors also enables high-quality digital output. XLR connectors have been added for audio output, enabling worry-free use in a wide array of applications.

For storage, in addition to Compact Flash memory, the AR-3000SD is also equipped with a slot for an SD memory card. Using a single memory card as two virtual cards lets you record up to 2,000 phrases. You can even backup and restore data using a USB flash drive.

(www.rolandsystemsgroup.com)

2) HD/SD Portable Video Switcher



HVS-XT100 (bottom) and HVS-XT100OU (top)

The HVS-XT100 and the HVS-XT110, the newest additions to FOR-A's Hanabi series of portable video switchers, boast exceptional cost performance. Both mixers inherit and improve upon the diverse functions and features of the popular HVS-300HS, including mixed HD/SD input, frame synchronizing, re-sizing engine, 2.5D wipe effects, DVE, Chroma keyer and DSK. The HVS-XT100 and HVS-XT110 also have a built-in Web server that lets you change settings from a PC or a tablet. A clip memory feature has been added to the still store to support playback of video or animations and enhances productions through the use of CG wipes, while the multi-viewer meets a diverse range of monitoring needs. The equipment can be used in all types of locations, including live events, sports, news studios, OB vans, editorial offices and presentation venues, making it the ideal tool for shaping the imaginative ideas of video creators.

The HVS-XT series comes in two models: one with separate main unit and control panel, and one with compact, integrated design, both of which can be adapted to a wide variety of applications and operation configurations.

(www.for-a.com)

3) UltraStudio 4K With Thunderbolt 2

The UltraStudio 4K is a rack mount capture and playback device based on Intel's Thunderbolt 2 technology. It features a machined aluminium front panel with an integrated colour LCD as well as fast to use video and audio input buttons. The rear panel includes video and audio connection such as 6G-SDI, HDMI 4K, analogue component/s-video/composite, as well as balanced analogue and AES/EBU digital audio.



Now with the 20 Gb/s speed of Thunderbolt 2, UltraStudio 4K has even more bandwidth to work with higher quality video and frame rates. Now users are able to capture and playback Ultra HD 4K YUV video at 60 frames per second and Ultra HD 4K RGB video at 30 frames per second via the 6G-SDI video connections. The Thunderbolt loop thru allows connection of up to six devices, so users can connect fast disk arrays for massive amounts of video storage with a single Thunderbolt connection to their computer.

UltraStudio 4K supports Final Cut Pro X, Avid Media Composer 7 Adobe Premiere Pro CC6, Adobe Photoshop CC6, Adobe After Effects CC6, DaVinci Resolve and more. It also includes a free SDK, as well as hardware SD and HD keying and hardware up down and cross conversion on playback. It features capture/playback of side by side, line by line, top and bottom and dual stream 3D via SDI.

(www.tvtechnology.com)

4) Multichannel Audio Decoder



The Dolby® DP564 is the multichannel audio reference decoder for DTV broadcast, postproduction, and DVD-authoring applications. The Dolby Multichannel Audio Decoder DP564 is the monitoring tool for all quality-control applications. Using the DP564, you can decode and monitor programs with Dolby Digital, Dolby Digital Surround EX™, and Dolby Pro Logic® and Pro Logic II, as well as regular two-channel PCM soundtracks.

Inputs and Outputs

There are three digital inputs (one a Toslink™ optical) and an Ethernet port for RTP streaming Dolby Digital audio. A linear timecode (LTC) output allows DVD facilities to check A/V sync between audio encoded in Dolby Digital and uncompressed video. Front- and rear-panel serial interfaces, along with the Ethernet port, facilitate software remote control (supplied) and software updates via a PC. A rear-panel GPI/O port also offers remote control from the Dolby GPI/O Controller CAT549 or other external source.

(www.dolby.com)

5) Wireless Camera System

Nucomm's Connect Live, combines the ultimate in COFDM wireless camera technology and bonded cellular, Wi-Fi and Satellite technology to produce a live news wireless camera system. The system is packaged with a 5-inch high resolution, touch LCD monitor designed to mount on a camera.



For day to day news story coverage, the bonded Cellular link can be used to transport live HD video back to the studio. Depending on your needs latency vs. video quality can be quickly tuned between three preset modes (Interview, Balanced & High-Quality) can be done through an intuitive touch LCD display.

With a boot up time of less than 30 seconds, rapid deployment is possible. In COFDM mode the unit covers the entire 2GHz frequency band from 1.98-2.7GHz. Additionally the unit can be provided in the 5.8GHz nonlicensed band. Available formats include 480i, 576i, 720p and 1080i. The unit can be configured to accept composite, HD-SDI and SD-SDI. Audio capabilities include 2x balanced analogue and embedded audio.

(www.imt-broadcast.com)

6) Handheld Monitor, COFDM Diversity Receiver



The RF Central Direct VU HD is a COFDM (DVB-T compliant) diversity handheld receiver/monitor. It offers exceptional RF performance and durability, combined with true ease of operation and superb MPEG-2/MPEG-4 decoding. The unit displays COFDM video transmissions using a built in internal 9 inch 16:9 format screen using bright, high resolution LCD screen. The display also features an easy-to-use menu-driven interface designed with the user in mind.

Much more than a COFDM handheld receiver, the Direct VU HD can send video over Ethernet to remote software or hardware decoders. This allows multiple remote viewers to monitor the same video simultaneously. An SDI output

enables the user to view the incoming video on an external monitor if needed.

(www.imt-broadcast.com)

7) DSLR Prompter



The prompter mounts to a standard set of 15mm rails in front of the DSLR, making it extremely lightweight and enabling the user to mount a range of accessories onto the rails. There is also an optional bar at the top of the hood with a number of 1/4 BSW threads to accommodate further accessories like on-camera lights, microphones and magic arms.

Autocue sells its own 15mm rail camera mounting kit if you don't have one of your own. This kit ensures easy access to the lens and the ability to rapidly raise or lower the camera mount to accommodate all DSLR models.

Autocue will range two variants of the DSLR prompter – a universal tablet mount (iPad, iPad Mini and other tablets) and an 8" monitor. In addition to the traditional on-camera set-up, the package includes a detachable straight-read mount for simple applications (magic arm required). The iPad version can be teamed with Autocue's brand new prompting app, iAutocue or any other prompting app. Autocue's QStart software is included free of charge with the 8" package.

(www.autocue.com)

8) Wirelessly Transmits Your Sound



The Living LV-HUB is a multi source transmitter which wirelessly transmits your sound in CD quality to all Living loudspeakers. Living LV-HUB becomes the heart in your wireless multiroom sound system. Connect up to 4 audio sources and easily choose from which source you want to play. With dual optical inputs (TOSLink) you can connect your flat TV/ sat-cable receiver and at the same time have an Apple TV® connected for AirPlay® music streaming. With the 3.5 mm stereo input you can connect any source with audio output (such as headphones out).

Living LV-HUB transmits all audio in CD sound quality to all Living wireless speakers. So you can enjoy all your music and sound in best audio quality. And installation is super simple, no software installation or fuzz, just plug in and start playing your music wirelessly.

(www.audiopro.com)

Connect Asia-Pacific Summit 2013



The Connect Asia-Pacific Summit 2013 on the theme of *Asia-Pacific: Smartly DIGITAL* was held in Bangkok on 18th November with the aim of creating a movement to mobilise ITU member countries to move towards maximum connectivity within their societies. As a close partner of ITU, the ABU was invited to the high level panel.

In a separate statement to the conference, ABU Director of Technology Dr. Amal Punchihewa said the ABU was working on a number of projects that addressed current issues around information and communication technologies (ICTs). These included: capacity building on digitalisation to handle policies, regulation and human resources skills; providing expertise in new media technologies and Internet Protocol (IP) delivery; frequency and coverage planning and setting-up Emergency Warning Broadcasting Systems (EWBS) to save lives.

He added that – through face-to-face and online regional seminars and workshops – the ABU was helping broadcasters understand the implementation of digital broadcasting standards with careful planning and optimal use of scarce resources.

In 2014, in collaboration with ITU, ABU Technology will continue its projects, including a project titled: Convergence in Digital Broadcasting.

Many countries in the world are drawing up their ICT Strategies linked to economic and social development of the respective nations. ABU member nations in Asia-Pacific are also working on digitalisation plans that set out roadmaps to deliver better services, reduce waste, encourage innovation and improve ICT deployment across nations effectively, to be competitive globally while maintaining sustainable growth. Broadcasting is an integral and important component of such strategy. The strategies and roadmaps are intended to help align processes to achieve at least an acceptable level of digitalisation for broadcasters, within their time targets.

Current Information and Communication Technologies will enable nations to leverage on broadband infrastructure, to utilise cloud, mobile and wireless technologies, and to engage social and other media in sharing data for improving the quality of life of citizens in of those countries.

However, the Asia-Pacific requires some assistance in implementing digital broadcasting strategies and plans towards building such infrastructures. Working with the ITU, ABU will be carrying out projects to create awareness on the need for ICT, especially in a time when a high degree of convergence has taken place among information technology, communication and broadcasting. Such projects will address various issues and are expected to assist the ABU membership in the Asia-Pacific in capacity building; providing expertise in new

media technologies and IP delivery. Other activities include; frequency and coverage planning; setting-up Emergency Warning Broadcasting Systems (EWBS), to mitigate and manage risk due to disasters and save human lives; making broadcasters understand the implementation of digital broadcasting standards for careful planning and optimal utilisation of scarce resources through face-to-face and online regional seminars and workshops.

ABU Technology has identified the following six key areas to work with the ITU in a converged media world.

Access to ICT/Digital Divide – The Asia-Pacific Broadcasting Union has a broader membership that can collectively act in mitigating the digital divide to increase the impact of our combined efforts. While some nations and members have made good progress in digital migration, we observe that number of others still need assistance and guidance. In collaboration with the ITU, ABU has been carrying out many activities to enable a smoother transition to digital for every nation.

Partnership – ABU Technology works with a number of partners that help us to execute our plans with greater success. The ABU believes that partnership is the best way forward as it will bring together regional as well as relevant global players to address such issues.

Role of Broadcasters – Broadcasters play a key role in the social and economic development of all nations with improved access to information and communication technologies. At a time where there have been so many disasters happening, broadcasters have been performing their duty in communicating preparedness for such disasters, disaster management and post-event communication. The ABU with its partners is also working on issues related to climate change and mitigation.

Convergence – True convergence of telecommunications, information technology and broadcasting can be observed in our society today. Converged technologies are offering converged services and infrastructures. They offer both challenges and opportunities to all the stakeholders in the digital society.

Inclusiveness – ABU Technology has recognised and focused its attention to serve people with special needs, growing elderly populations and disadvantaged groups including youth, men and women and the underprivileged.

Green – ABU Technology promotes green technologies and has been working on such issues for a number of years. Through its networks and associations with other forums, technological innovations have been fostered to develop more affordable and environmental friendly technologies, using various mechanisms. This work is now being recognised.

WorldDMB General Assembly Appoints New Leadership Team



Patrick Hannon



Joan Warner



Jorn Jensen

The 19th WorldDMB General Assembly in Amsterdam, The Netherlands has appointed Patrick Hannon, VP of Corporate Development at Frontier Silicon as its new President, taking over from outgoing President, Jorn Jensen of NRK Norway.

ABU members Joan Warner, CEO of Commercial Radio Australia and Joachim Kraus of ARD Germany were elected new Vice-Presidents.

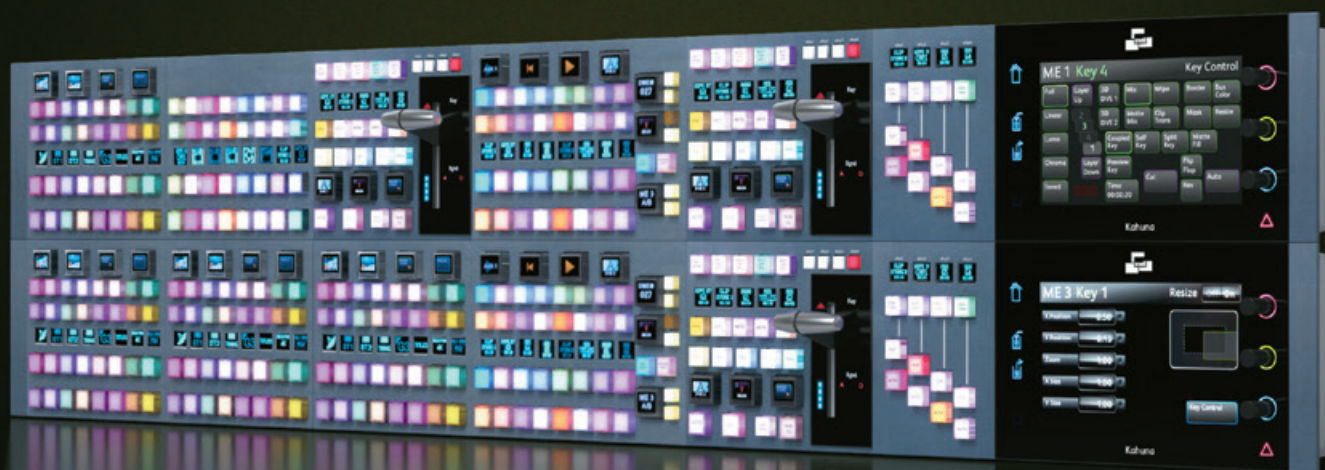
Much of the general assembly revolved around the issue of digital switchovers and delegates also heard about significant progress that has been made in the automotive sector, with most major automotive brands now offering line-fit DAB.

There was also a major focus on the integration of digital radio into mobile phone handsets, a significant strategic objective for WorldDMB, which is offering technical support on a consistent user interface and coordinating initiatives in the area.

Mr Hannon said: "DAB/DAB+ is rapidly extending its footprint across Europe. A similar story is emerging in the Asia Pacific region. Our key objectives now are to continue the roll-out of DAB into new markets and to accelerate the uptake of digital radio in cars and mobile phones. I look forward to working with all WorldDMB members to ensure we meet these goals."

WorldDMB is the global industry forum for digital radio promoting DAB, DAB+ and DMB.

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