



Asia-Pacific
Broadcasting
Union

Technical *Review*

No.262 April-June 2015



What are DOCSIS 3.1, high dynamic range images sensing and net neutrality?

**TECHNICAL
REVIEW**
Scan code to download



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

SONY

Epic Performance

Unleash the prowess of High Dynamic Range



BVM-X300
30-inch 4K OLED
master monitor

Introducing the first 4K OLED master monitor that delivers High Dynamic Range content in its true values. From pristine blacks to accurate colour gamut to quick response with virtually no motion blur, the Sony BVM-X300 4K TRIMASTER EL™ OLED master monitor leaves nothing out, and certainly nothing to chance.

- Unrivalled High Dynamic Range with accurate blacks and peak brightness reproduction
- Supports wide colour gamut conforming to DCI-P3 and most of the ITU-R BT.2020 standard*
- Multi-format capability in 4K, 2K, HD and Ultra-HD with no scaling processes

* Does not cover the ITU-R BT.2020 colour space in full

For more information, please email us at pro.info@ap.sony.com

TRIMASTER EL 4K

pro.sony-asia.com



Contents

2	DOCSIS 3.1: A Game Changer for Cable TV Broadcasting and High Speed Internet
7	A Review of HDR Sensing and Tone Compression
14	Technical Bureau Mid-Year Meeting
16	ABU Technical Committee Meeting Schedule
17	WBU-TC Meeting
20	Panel of Judges – ABU Engineering Excellence Awards
21	Latest News from EBU Technology & Innovation
24	Interview – Net Neutrality in Asia-Pacific
26	Workshop on Enhancing Digital Transition Experience
27	New Members
31	Training and Workshop on Networking and Information Technologies
33	BroadcastAsia 2015
35	Upcoming Events
36	News from the ABU Region
40	Digital Broadcasting Update
42	Equipment Trends
44	Personalities & Posts



Cover:
What are DOCSIS 3.1, high dynamic range images sensing and net neutrality?



Asia-Pacific Broadcasting Union

TECHNICAL REVIEW

From the Editor's Desk



This, second quarter, edition of the Technical review is dedicated to reporting the Technical Bureau meeting, Broadcast Asia Conference, World Broadcasting Union Technical Committee meeting and European Broadcasting Union Technical Assembly which were concluded in the second quarter of 2015.

Digitalisation, net neutrality, social media and human capacity building are hot topics for the ABU as well as other sister unions. ABU together with WBU-TC is campaigning to secure frequency spectrum for future broadcasting. We believe you have done your duty by talking to respective regulator in your country to secure spectrum for restacking and future broadcasting.

The last three months were very busy period for ABU technology as it actively took part in a number of events including the Asia Media Summit, Broadcast Asia, WBU-TC and EBU-TA. Articles on each of these provide more information on topics discussed and issues raised.

This issue also carries two articles; one on the DOCSIS 3.1 and the other on high dynamic range image sensing. This issue also carries an interview on Net neutrality. From this edition onwards there will be an article from EBU providing an update of European broadcast situation. ABU also publish in the EBU technical journal iTech.



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

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

The reproduction of articles published in this Review is not permitted, except with the prior consent of the Editor. News items may be reproduced provided that the source is acknowledged.

Responsibility for contributed articles published rests solely with the authors and the views expressed are not necessarily those of the ABU.

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

Published by
Dr. Amal Punchihewa
ABU Technology

The Asia-Pacific Broadcasting Union
2nd Floor, IPPTAR Building, Angkasapuri, 50614 Kuala Lumpur, Malaysia
Telephone: (60-3) 2282 3108 Fax: (60-3) 2282 4606

For advertising inquiries, contact
Hamidah Rani
email: hamidah@abu.org.my

Design, layout & printed by:
SP-Muda Printing Sdn Bhd
No. 83, Japan KIP 9, Taman Perindustrian KIP Kepong, 52200 Kuala Lumpur.
Tel: (60-3) 6274 2463 Fax: (60-3) 6277 2863

DOCSIS 3.1: A Game Changer for Cable TV Broadcasting and High Speed Internet

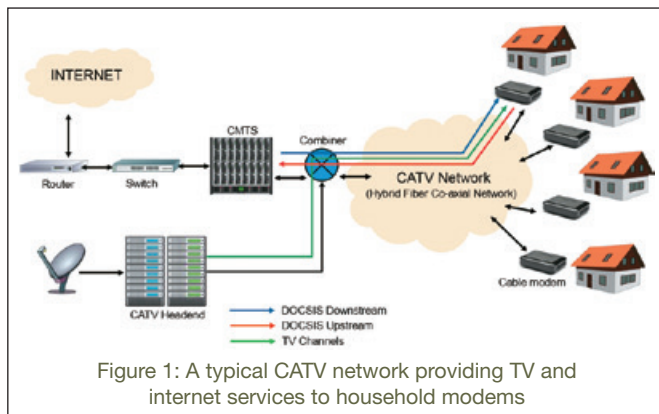
by Dr. Nik Dimitrakopoulos, Peter Lampel & Greg Kregoski
Rohde&Schwarz GmbH

abstract

In this paper we will describe the key improvements of DOCSIS 3.1 against the existing DOCSIS 3.0 for cable networks and how DOCSIS 3.1 is expected to become a game changer for cable operators supporting UHDTV broadcasting and high speed internet access.

Introduction

Data Over Cable Service Interface Specification (DOCSIS) technology was developed by CableLabs and other contributing companies. The first version named DOCSIS 1.0 was released in March 1997 using 64QAM on the downlink. In October 2013 the latest DOCSIS 3.1 was released with major improvements against previous versions. Current cable networks are using DOCSIS technology with some variants. DOCSIS technology is being widely used to offer a mixture of TV and internet services to households via a hybrid fibre-coaxial (HFC) infrastructure or commonly known as cable network (Figure 1).



DOCSIS 3.0: Currently in many countries around the world DOCSIS 3.0, or earlier versions, is widely being used by the cable operators. In Europe, the standard had to be modified (named EuroDOCSIS) in order to be used in 8MHz channel bandwidths. EuroDOCSIS offers higher downlink speeds compared with US and Asia that use 6 MHz. DOCSIS 3.0 is a 2-way communication system whereas the downstream uses a single carrier mode with either 64 or 256 QAM utilizing the ITU-T J.83-Annex B and DVB-C standards [1]

DOCSIS 3.1: DOCSIS 3.1 utilises parts of the PHY layer specification of the DVB-C2 standard with OFDM modulation and very high constellation modes (up to 16K QAM for future use). In addition to this, the downstream bandwidth

can be as wide as 192MHz offering downlink speeds up to 10 Gbps.

The table below summarises the differences between current DOCSIS 3.0 and upcoming DOCSIS 3.1 in both the uplink and downlink.

Table 1:

DOCSIS 3.1 provides major improvements in data rate, error protection and flexibility against currently used DOCSIS 3.0

Characteristics comparison of DOCSIS 3.0 and DOCSIS 3.1 for downstream

Parameter	DOCSIS 3.1	Current DOCSIS 3.0
Modulation	OFDM 4K & 8K FFT similar to DVB-C2	Single carrier using J.83/B or DVB-C
Frequency range	108 – 1218 MHz (1794 MHz)	45 – 1002 MHz
Channel bandwidth	up to 192 MHz	6 MHz or 8 MHz
QAM constellations	up to 4096 (optionally 8K, 16K)	up to 256
Error protection	BCH-LDPC	Reed-Solomon
Downstream capacity	10 Gbps (20 Gbps)	300 Mbps (1 Gbps)

**values in brackets are future extensions*

Characteristics comparison of DOCSIS 3.0 and DOCSIS 3.1 for upstream

Parameter	DOCSIS 3.1	Current DOCSIS 3.0
Modulation	OFDM 2K & 4K FFT similar to DVB-C2	Single carrier TDMA or CDMA
Frequency range	5 – 204 MHz	5 – 50 MHz
Channel bandwidth	up to 96 MHz	up to 6.4 MHz
QAM constellations	up to 4096	up to 64
Error protection	LDPC, BCH	Reed-Solomon, Trellis
Upstream capacity	1 Gbps (2.5 Gbps)	100 Mbps (300 Mbps)

**values in brackets are future extensions*

DOCSIS 3.1

– Business Drive for Cable Operators

DOCSIS 3.1 is believed to be a game changer for cable operators who currently face a lot of competition from Wireless/LTE as well as DSL internet providers. Internet demand keeps increasing and the need for higher bandwidth and better quality of services (QoS) is growing steadily.

Market drivers: There are plenty of market drivers for DOCSIS 3.1 to become a success. High-speed internet access, Business services, Over The Top (OTT) video, 3DTV, 4K and even 8K broadcasting to name a few. Some cable operators in the US are already heavily deploying WiFi over cable. Not only does WiFi come into the consumer household but also some operators, like Comcast, are offering dual hot spots on access points. This means as a Comcast customer one can travel down the road to the park or a local restaurant and still have WiFi access.

Economic drivers: DOCSIS 3.1 offers a better spectral efficiency and the higher constellation modes allow more bits to be transmitted over the same bandwidth (compared with DOCSIS 3.0) thus decreasing the cost per bit transmitted. In addition to this, cable operators can keep existing copper coax infrastructure on the last mile intact for datarates which would never be possible with older versions of DOCSIS.

Flexibility: DOCSIS 3.1 can be easily adapted by Europe, America or Asia since it supports flexible bandwidth configurations.

Legacy: DOCSIS 3.1 is backward compatible with DOCSIS 3.0, which will allow for a smooth transition to this technology minimising the risks and costs for the cable operators.

DOCSIS 3.1

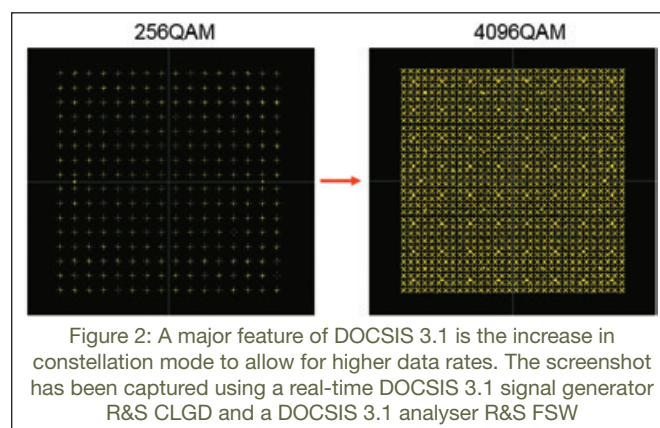
– Technical Enhancements

It was mentioned previously that DOCSIS 3.1 possesses many enhancements over its predecessors. One major difference of DOCSIS 3.1 is that it is based on multi-carrier technology (OFDM) unlike its predecessors that are based on a single carrier. The benefits of adopting this technology are many:

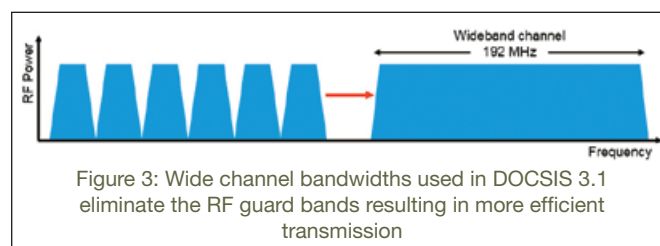
- Improved immunity to impulse noise due to longer symbol times
- Ability to null certain subcarriers to avoid ingress noise
- Ability to use different profiles for managing data in noisy environments
- Can use both time and frequency interleaving to improve immunity against impulse noise and narrowband interference (GSM phones) respectively
- Use of cyclic prefix to avoid inter-symbol interference (ISI)
- Use of symbol shaping to reduce inter-channel interference (sharper spectral edges)

Furthermore, DOCSIS 3.1 uses low-density parity check (LDPC) to reach much higher constellation orders (currently

4096QAM and up to 16KQAM) and thus to dramatically increase the datarate capacity (Figure 2).



Finally, DOCSIS 3.1 can eliminate or reduce the RF guard bands by using wideband channels with up to 192 MHz RF bandwidth (figure 3). This technique has been adapted by the Japan Cable Television Engineering Association group (JCTEA) in Japan to increase the downstream datarate for 8K transmission at high frame rates (8K120p) with HEVC encoding [2]

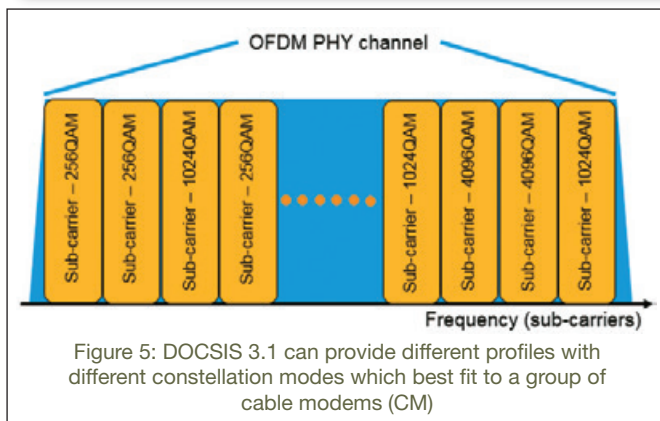
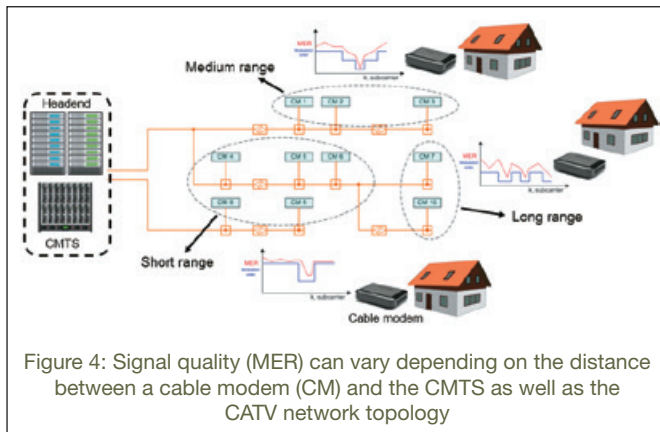


With higher order constellations the increased MER becomes very important for both the upstream and the downstream. Therefore it is very important to maintain and test the cable network with DOCSIS 3.1. One will need sophisticated test equipment to ensure the headend outputs the highest MER. In addition to this, testing the upstream (return path) with high MER is equally as important and analyzed since it is susceptible to noise.

DOCSIS 3.1 Profiles

One very important feature for DOCSIS 3.1 is the use of different profiles that can be adapted to different areas of coverage over the cable network. In a realistic CATV network, some modems (households) are close to the CMTS, other are located at mid distances and finally some others are located at long distances. Depending on the CATV network topology (electrical/optical converters, low noise amplifiers, RF combiners etc), the distance from the CMTS and difference interference situations the downstream as well as the upstream signal quality may vary as depicted in figure 4 below.

DOCSIS profile implies that any OFDM cable channel can have a different constellation order (QAM) for any given subcarrier that best fits a group of cable modems. The idea of this concept is to offer as many CMs as possible the maximum supported constellation (i.e. data rate) for



its given CNR. Without multiple profiles, the CMTS would have to generate a signal with a constellation which is low enough for even the modem with the poorest CNR to reliably decode it. For all other modems this signal would have too good a CNR at the expense of a data rate which is below the maximum possible. This is very similar to Physical Layer Pipes (PLPs) for DVB-T2 where the broadcasting service can adapt to different coverage areas such as rooftop, indoor and mobile reception (figure 5).

Discussion

DOCSIS 3.1 was released in October 2014 and since then it has been gathering a lot of momentum in the US. To date there have been two interoperability test sessions organised by CableLabs in Louisville, CO which gave the opportunity for manufacturers of CMTS and cable modems (CM) as well as T&M providers and cable operators to get together and test their equipment for transmission, reception and general interoperability. Rohde & Schwarz is actively engaged in the DOCSIS 3.1 interoperability tests now taking place; providing state-of-the-art test transmitters and analyzers.

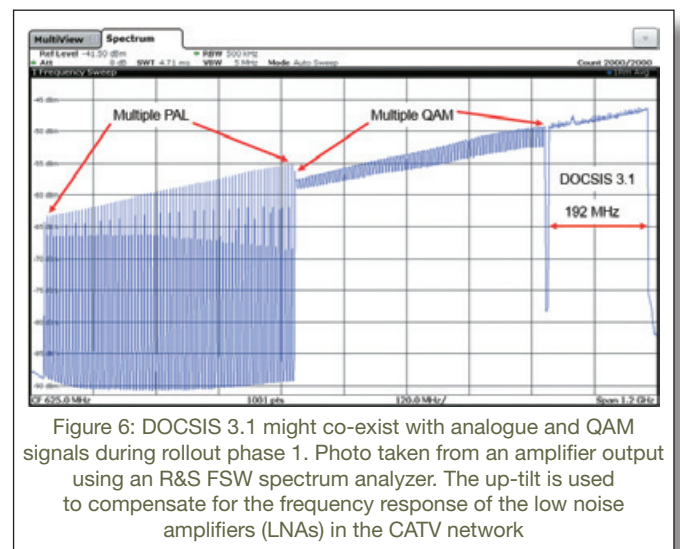
In Japan, as part of the build-up to the Tokyo 2020 Olympic Games, the JCTEA group recently adopted DVB-C2 to be able to deliver 8K services starting in 2016 according to UHD-2 profile (8K at 120fps). Those services will use HEVC encoding and primarily will require approximately 100Mbps. JCTEA suggested some enhancements provided by Sony to the DVB-C2 working group that will allow the standard to be used according to the Japanese government broadcasting regulations. These enhancements are:

- Signaling for Early Warning System (earthquakes etc) – This signal should be contained in L1 signaling due to robustness.
- Clarification of PLP bundling. PLP bundling is currently only briefly described (Annex F of EN 302 769 V1.2.1). It is believed that Japan will be the first country to commercially implement this feature and therefore some additional work is required by both modulator and demodulator product designers to ensure a balanced transmission and reception of the signal.
- New MODCOD combinations to allow for greater flexibility. Currently the MODCODs available in the DVB-C2 standard can deliver 49 Mbps (1024QAM with 5/6 CR) with a reasonable SNR or 56 Mbps (4096QAM with 5/6 CR) for high MER given a 6MHz channel bandwidth.

These commercial requirements were submitted by the DVB-C2 Commercial Module group and approved by the DVB Steering Board in February 2015 [3].

In Japan, JCOM are planning for a DOCSIS 3.1 trial phase towards the end of 2015 when we will see all analogue TV services being switched off in the cable network countrywide. For phase 1 therefore it is expected that QAM (J.83/C) and DOCSIS 3.1 signals will co-exist.

In some of the European countries (e.g. Germany) there is a possibility for phase 1 to see both PAL (analogue), QAM (DVB-C) and DOCSIS 3.1 signals to be co-existent at the same time on the cable network (figure 6). Similar scenario could appear in the US with NTSC (analogue) and J.83/B.



Conclusions

The DOCSIS 3.1 specification is expected to boost the CATV market in the coming years. It can use the same HFC network infrastructure and increase dramatically the uplink and downlink performance (capacity, robustness and flexibility) by using OFDM with high constellation modes, LDPC FEC, wideband channels and frequency extension. DOCSIS 3.1 can provide up to 10 Gbps downlink speed and up to 2.5 Gbps uplink. Such capacities will allow

DOCSIS 3.1 to satisfy high service subscriber demands and will also be able to offer 4K and 8K TV broadcast, making the standard future proof. DOCSIS 3.1 can use the same HFC network infrastructure as of today but operators might be limited to slower data rates in the upstream and downstream. For higher data rates in the upstream they will need to change out diplex filters and filtering in the consumer premises equipment. For higher data rates in the downstream they will have to increase the top end of their cable plant up to 1.8 GHz as well as replacing the LNAs so they can support higher frequencies.

References

- [1] "Recommendation J.83 (1997) Amendment 1 (11/06)". November 2006. Retrieved 2013-06-20
- [2] www.catv.or.jp/jctea/spec/study/index.html
- [3] https://www.dvb.org/resources/restricted/members/documents/CM-C2/CM-C20074_Extended-commercial-requirements-for-DVB-C2.pptx



authors



Dr. Nik Dimitrakopoulos
Rohde&Schwarz Korea

Dr. Nik Dimitrakopoulos received his B.E. (with Honours) in Electronic & Electrical Engineering, MSc. Eng. in Modern Digital Wireless Communications (with Honors) and Ph.D. in RF MEMS from the University of Leeds, UK, in 2003, 2004 and 2008 respectively. From 2008 to 2009 he worked for Amplifier Technology in Bristol, UK designing and testing wideband amplifiers for VHF/UHF and X-Band applications. From 2009 to 2011 he worked for Digital TV Labs in Bristol, UK as an RF specialist responsible for DVB set-top-box/TV testing and field trial measurements. From October 2011 he joined Rohde&Schwarz and currently he is focused on UHDTV deployments in Japan and Korea for terrestrial, satellite and cable TV networks.

Dr. Nik is a member of the DTG RF Group, DVB-UHD group as well as FOBTv forum.



Peter Lampel
Rohde&Schwarz GmbH

Peter Lampel received his engineering degree (Dipl.-Ing.) in Electrical Engineering from the University of Saarbrücken, Germany, in 1995. From 1995 to 2006 he worked as R&D engineer for radio frequency equipment in different companies in the military and consumer electronics industry. Since 2006 he has been working with Rohde & Schwarz as product manager for TV test equipment.



Greg Kregoski
Rohde & Schwarz USA

Greg Kregoski graduated from the University of Michigan in 1981 with a B.S.E.E. He has worked for a variety of broadcast T&M and operations companies including Hewlett Packard, Pinnacle Systems, 360 Systems and Rohde & Schwarz. Greg has held a variety of positions including Application Engineer, Director of Sales, Director of Marketing and Business Development Manager.

Greg is currently focusing on audio and video test and measurement applications, and he is heavily involved with DOCSIS 3.1 in the US.

Maximum efficiency – minimum operating costs R&S®Tx9: The future-proof transmitter generation.



www.rohde-schwarz.com/ad/Tx9

As a broadcast network operator, you need cost-efficient solutions. The R&S®Tx9 generation of transmitters meets all your requirements.

- Enormous energy cost savings through market leading efficiency
- Space savings with the smallest footprint
- Maintenance costs savings thanks to common spare parts platform

Available for FM and DAB(+) as well as digital and analog TV standards.



**E⁵ – Efficiency to
the power of five.**



ROHDE & SCHWARZ

ROHDE & SCHWARZ Malaysia Sdn Bhd

PAT SQUARE

Jalan Pelukis U1/46

Temasya Industrial Park

40150 Shah Alam

Selangor, MALAYSIA.

Phone: +603 5569 0011

Fax: +603 5569 0088

Email: sales.malaysia@rohde-schwarz.com

A Review of HDR Sensing and Tone Compression

by Dr Amal Punchihewa

ABU Technology

abstract

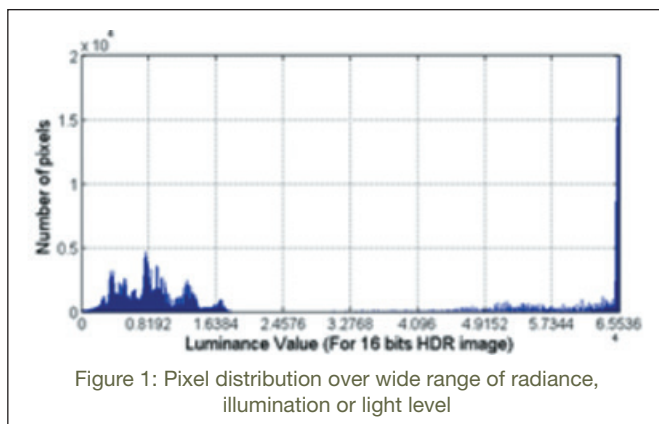
This paper reviews some high dynamic range (HDR) image sensing techniques and briefly, tone compression. It also outlines approaches for imaging which encompass sensing and tone compression based on pixel based high dynamic range image capture using adaptive integration. Luminance domain processing can be explored to design novel system-on-chip (SOC) architecture. Researchers are working on an imaging system for special applications that need to take care of both adaptive HDR sensing and programmable tone compression. Researchers explore the possibility of performing certain signal processing in the sensor integration itself and/or using a FPGA as immediate peripheral circuit operate in a pipeline and parallel process scheme on photo diode output.

Keywords:

high dynamic range sensing; tone compression; adaptive integration; I/O characteristics; active pixel sensor; human vision system

Introduction

Typical scenes to be acquired by means of electronic camera exhibit huge variations of illumination which depend on the ambient light conditions and which can range from 10^{-3} up to 10^5 lux when changing from night to bright sunlight. The capability of an image sensor to measure a scene having very dark and bright regions simultaneously is generally referred to as wide dynamic range (WDR) image sensing, or high dynamic range (HDR) image sensing. Figure 1 shows the luminance histogram of a raw image (shown in Figure 15 of section 8) used to develop and simulate current algorithms that were part of the research.



In industries such as media and security and for applications in entertainment, news, surveillance and security, scene light conditions vary dramatically. If the captured image is not observable, the purpose of the system is lost. Figure 2 shows a scene captured where there is a requirement to monitor movements near an access door. Inside the

building is dark and outside is very bright. In Figure 2(a) we cannot see the person. Hence, sensing system should be able provide an output that shows moving objects clearly. Figure 2(b) shows the HDR image where the image can be displayed to handle full range of lighting conditions.

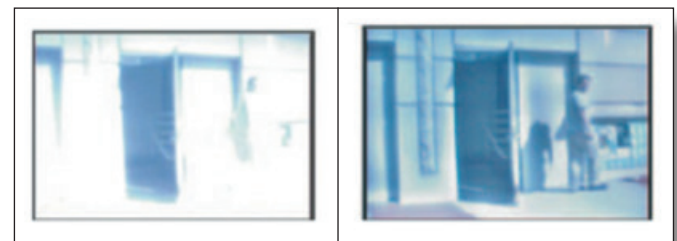
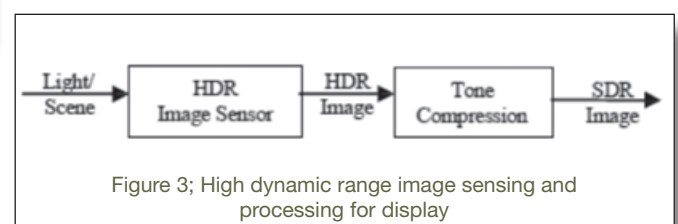


Figure 2: A typical video scenario where people emerge from dark areas into brightly lit areas (a) image without HDR sensing, (b) image captured using a HDR imaging system

We need to handle both still images and sequence of images or video. HDR sensing is applicable in both cases; when dealing with a single picture or scene, it is known as intra-scene high dynamic range sensing and for video it is inter-scene high dynamic range sensing. Wide variations in intra-scene and inter-scene illumination can arise in several situations such as night scenes, scenes from night driving, observation of aircraft landing and in space.



Generally, displays and other processing equipment are not capable of handling the full dynamic range of the HDR image. Hence, tone compression need to be performed preserving the visual contrast and other image features as shown in Figure 3.

Imaging technologies are advancing rapidly to cater for a broad spectrum of application areas such as videography, image processing, computer graphics, and photography. CMOS sensors have received much attention over the last decade, offering the promise of low power, high frame rate and camera-on-chip integration. A decade ago three trends, observed in relation to the CMOS image sensor performance were, improved imaging characteristics with submicron CMOS process, developments that take advantage of submicron processes and high frame rate sensors and applications to still and video imaging [1].

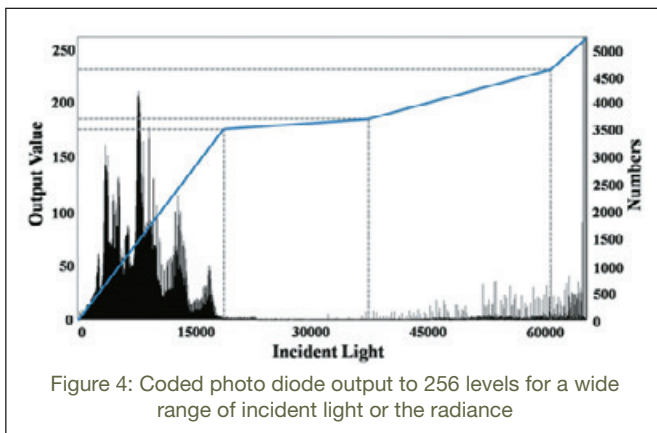


Figure 4: Coded photo diode output to 256 levels for a wide range of incident light or the radiance

Various definitions can be found for the dynamic range. Generally, the image sensor dynamic range (DR) can be defined as the ratio of the maximum non-saturating signal to the minimum detectable. It is an important performance index in imaging technologies. In Figure 4, the x-axis shows a long range of illumination or radiance to the image sensor.

Nayar and Branzoi [2] define the dynamic range of a conventional camera as

$$DR \cong 20 \log_{10} \frac{I_{max}}{I_{min}} \quad (1)$$

where I_{min} and I_{max} are the values of photo diode (PD) current corresponding to the minimum and maximum radiance values that can be captured by the sensor. As explained by Theuwissen [3], the minimum PD current above noise I_{min} is typically set to 1. Therefore, 8-bit sensors or detectors have a dynamic range of 48.13decibels (dB) arising from 256 levels.

High Dynamic Range Image Sensing

Other than in videography, applications such as environment monitoring, surveillance and security, require imaging to be performed under varying degrees of lighting and environmental conditions, as shown earlier in Figure 2. The images need to be displayed with varying bit resolutions to retrieve information. There are many techniques and methods proposed to address this problem. Due to ever increasing

demand for more challenging imaging requirements, this research area is very active. As a background to the current work, some of the techniques are briefly described in this section.

Most of the current approaches process complete images in a similar fashion; in another words all the pixels have the same transfer function. To handle inter-frame imaging, the transfer function is changed between frames bringing about the first level of adaptation. Secondly, the adaptation is done for local regions of the image and the transfer function is changed with time to avoid overflow of charge-wells in the photo-diodes or the saturation of the photo-diodes. Selection of an image region brings about the changes spatially and the adaptation of integration time or the exposure by some means handles the temporal aspect. To incorporate spatial and temporal flexibilities and adaptations, many researchers have proposed a number of techniques either implemented using optical methods [19], circuit design and architecture [20], [21], [22], and post-processing. In recent times, there are smart image sensors proposed by researchers where two functions, image sensing and processing are woven together. They offer additional features such as tone compression built-in. Hence smart sensors possess a complex transducing function. The capture and process chain are integrated into a single chip. They explore flexibilities in spatial, temporal [19], [21] and amplitude (200dB or effective 32 bits [20] domains.

Hamamoto et al. have had taken different approaches and used several techniques to increase the dynamic range and have demonstrated the efficacy of such techniques and approaches [4] – [7]. This paper mainly focuses on CMOS type image sensors, hence analyses done are based on CMOS sensors unless otherwise stated explicitly. The compression of the input photocurrent to output voltage transfer characteristics is one of the early approaches among many that have already proposed so far to enhance the dynamic range of CMOS image sensors.

A. Active Pixel Sensor (APS)

Typical charge coupled devices (CCD) and CMOS active pixel sensors have a dynamic range of 65-75dB. APS is one of the very early developments in addressing the dynamic range of imaging sensors. CMOS devices can offer several advantages over CCD-based imaging sensors, including enhanced functionalities with individual pixel signal processing, lower power consumption and lower cost.

B. Multiple Exposures

The two main sources of HDR imagery are computer renderings and merging of multiple photographs, which in turn are individually referred to as low-dynamic-range (LDR) or standard-dynamic-range (SDR) photographs. This technique is mainly deployed in the photographic industry as it requires a number of images to be captured with varying exposure periods. Careful combination is required to minimize undesirable artefacts and an un-natural appearance. Prerequisite for the technique is that a scene should be stationary while capturing multiple images. If there is any

movement of setup during capture, the reconstructed image may carry motion blur and smear, leading to the purpose of achieving high dynamic range being lost. However, optical methods and split pixel techniques have been proposed to achieve multiple exposures.

Gu et al. [21] proposed a rolling shutter method to sample the 3D space-time volume of scene appearance, which is advantageous in computational photography.

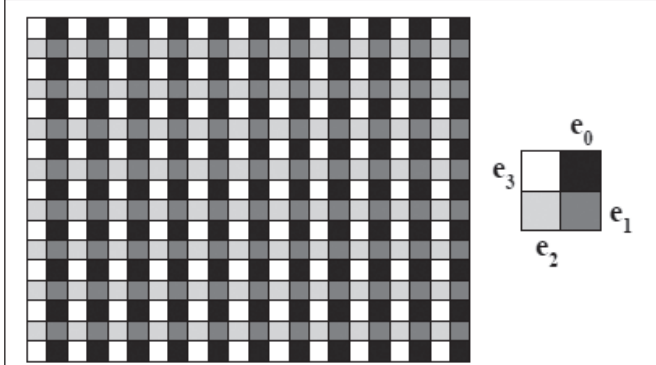


Figure 5: SVE architecture: Each pixel having four segments. Using different sensitivities for each segment of the pixel, exposures can be spatially varied simultaneously. This samples scene radiance along spatial as well as dynamic range dimensions. The captured image is used to compute a high dynamic range image of the scene [9]

Spatially varying pixel exposure [9] is a concept introduced by Nayer and Mitsunaga in 2000 where pixel sensitivities are varied to obtain high dynamic range. This mimics multiple exposures with varying shutter speed. In spatial varying pixel exposure, four values of exposures per pixel are taken simultaneously. As shown in Figure 5 the brightness level associated with each pixel represents its sensitivity, such that, the brighter pixels have greater exposure to image irradiance and the darker ones have lower exposure. In the example shown, four neighbouring pixels have different exposures ($e_3 > e_2 > e_1 > e_0$) and this pattern is repeated over the detector array [9]. Nayer and Mitsunaga referred to the captured image as a spatially varying exposure (SVE) image. As one pixel comprises of four pixel-segments, high dynamic range sensing with SVE comes at cost where, number of pixels per sensor has to be compromised. However, the processed image is free from motion blur as all four captures are simultaneous.

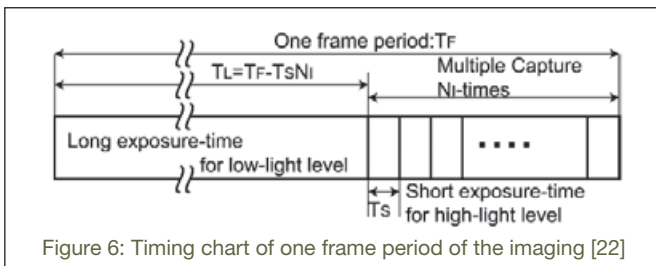


Figure 6: Timing chart of one frame period of the imaging [22]

Sasaki et al. [22] proposed a multiple capture method where exposure time depends on the incident light levels. Low-light levels will be given a long exposure time (TL) and for high-light levels, short exposure-time (Ts) multiple captures are done. As shown in Figure 6 the dynamic range can be increased by a factor of $(T_f - T_s)/T_s$, where T_f is the frame period.

C. Adaptive Integration Period

There are various methods in which the sensor itself provides a means of various integration times and they are common among wide dynamic range imaging techniques [8]-[12].

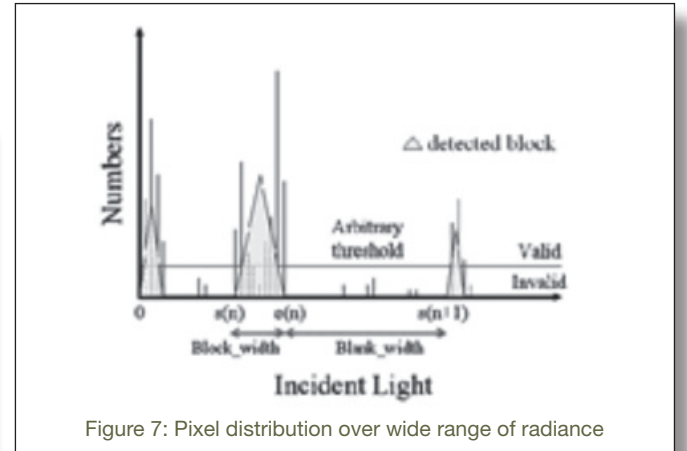


Figure 7: Pixel distribution over wide range of radiance

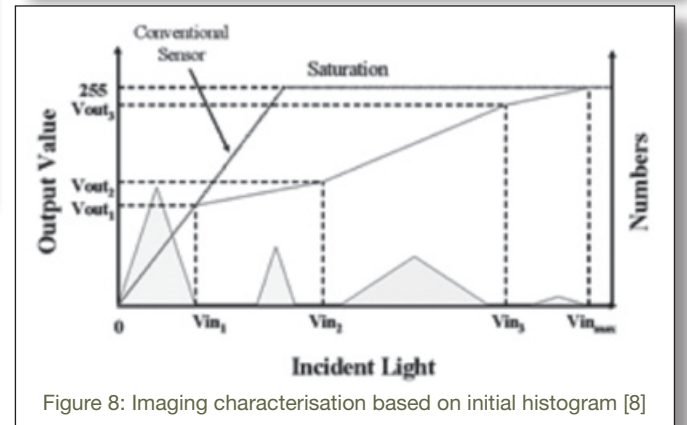


Figure 8: Imaging characterisation based on initial histogram [8]

As shown in Figure.7, an initial histogram that is computed within the 20% of integration time could evaluate the distribution of light levels. Then the algorithm modifies the I/O characteristics for each of block of incident light in histogram [8] as shown in Figure 8. Then built-in hardware computes the final photo detector diode output value in a non-destructive manner.

Tone Compression

Tone-mapping is a key technique for correcting and compressing the dynamic range of images. Tone compression techniques, which reduce overall contrast to facilitate display of HDR images on devices with lower dynamic range, can be applied to produce images with preserved or exaggerated local contrast for artistic effect in photography.

In computer graphics, tone mapping is used to convert floating-point radiance maps into an 8-bit representation or standard dynamic range images suitable for rendering [11]. This process must reduce the dynamic range of each frame while also maintaining a good contrast level for both brightly and darkly illuminated regions. In addition, the transformation between adjacent frames must be consistent to prevent temporal artefacts such as flickering.

Histogram equalisation is one method of non-linear tone mapping and also used to enhance contrast of images. Histogram equalization can be classified into two types; Global Histogram Equalisation (GHE) and Local Histogram Equalisation (LHE) [14]-[17]. Conventional LHE and GHE both suffer from over-emphasis problem more over LHE is computationally intensive.

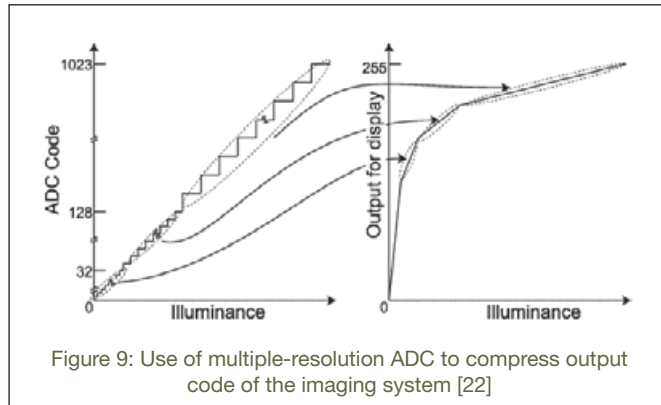


Figure 9: Use of multiple-resolution ADC to compress output code of the imaging system [22]

As described earlier, in the multiple capture method proposed by Sasaki et al. [22] the pixel level in the high-illumination range is compressed as a knee characteristics or piece-wise linear logarithmic characteristic when a wide-dynamic range image is displayed on the monitor. Figure 9 illustrate the allocation of the three resolutions of 10 bit, 8 bit and 6 bit to 8 bit gray-scale in the display.

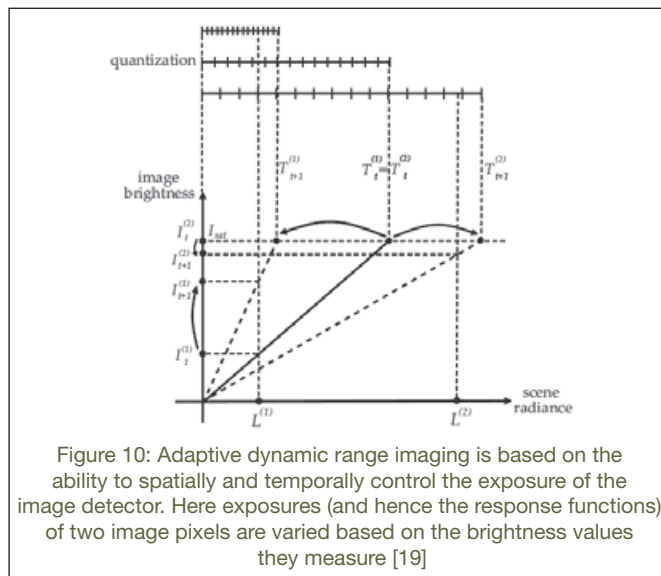


Figure 10: Adaptive dynamic range imaging is based on the ability to spatially and temporally control the exposure of the image detector. Here exposures (and hence the response functions) of two image pixels are varied based on the brightness values they measure [19]

In reference 19 the paper explains in detail an adaptive dynamic range imaging based on the ability to control the exposure of the image detector both spatially and temporally. Here exposures (and hence the response functions) of two image pixels are varied based on the brightness values they measure [19].

Nayer and Branzoi proposed an adaptive dynamic range imaging system where exposure is controlled using a light filter which attenuates the light falling on the image sensor [19]. Traditional 8 bit output from the analogue-to-digital converter (ADC) gives the PD readout value. Final value is computed based on the transmittance of the attenuator and the ADC out. If the attenuation can be varied over a

range of 0 to 255, the dynamic range can be extended to 16 bit imaging as effective dynamic range is the $20\log_{10}(255*255)=96\text{dB}$. Figure 10 illustrates that how varying brightnesses have been allocated 8 bits of uniform quantisation. High radiance has been allocated large steps and low radiance has same eight bits resulting smaller quantisation level. The exposure of a pixel is adapted to scene radiance by using optical attenuator whose transmittance is computed based on the brightness measured by the pixel.

Incorporate Features From Human Visual System

The human retina adapts to lighting variations [18]. Various methods based on retinal and human visual system studies have been proposed though they are too complex to be implemented in system-on-chip architectures. Also they are too complex in real-time application and not completely free from artefacts at the edge of images.

Artefacts and Image Quality

Realistic display of high dynamic range images without introducing any artefacts is a difficult problem. Many local processing methods introduce ugly “halo” artefacts around the high dynamic range edges. Most of the current approaches have had paid little attention to the image quality due to signal processing artefacts. Due to tone compression, the mapping function that maps high dynamic to low dynamic image may generate ripples degrading the image quality. We intend to incorporate current knowledge of the human visual system to mitigate such artefacts without compromising the dynamic range.

In wide dynamic range, image sensing that is accompanied by tone compression aims to quantise with fewer bits at the edge of the integration required to represent visible luminance where a range greater than 12 orders may lead to perceivable contouring artefacts [18].

Traditionally, a rolling shutter was considered to be a disadvantage in sensing systems as it often introduces skew artifacts and degrades the image quality. However, Gu et al. proposed a coded rolling shutter in [21] which address this issue and provide HDR images with better image quality. This is one of recent advances that have taken place and major photographic manufacturers will be incorporating them into their products.

Approaches

There are number of approaches for HDR imaging that can be classified based on the level of processing, the domain of gain of HDR and processing intense or complex integrated circuit design. A wide spectrum of methods and techniques have been proposed by many researchers in the past as described in the review in sections 2 and 3. Within each of these approaches, researchers have proposed techniques that post-process captured data.

The major techniques of dynamic range extensions are:

1. Well Adjusting
2. Multiple Capture
3. Spatially Varying Exposure
4. Time to Saturation
5. Logarithmic
6. Local Adaptation (artificial retina)

The aim has been to adapt sensor data output on pixel-by-pixel basis. Internal circuits detect the light distribution and the temporal and spatial parameters are adopted to capture the full charge without loss and represent the PD output values with an 8 or 10 bit code.

Novel Approaches

A framework and prototype developed by Hamamoto et al. [8] was used for the investigations. First, the proposed tone-compression algorithm was simulated in a software simulation environment (using C language and Matlab). Earlier algorithms of [8] comprise C language functions to simulate saturation detection, resetting the output value, and then reconstruction of the final pixel value. The initial focus of this research was to develop tone compression algorithms that are based on improved local histograms and using differential-luminance histograms. Using 16 bit raw data from the test image, the proposed algorithms were tested. After verifying the visual quality on normal 8 or 10 bit displays, the proposed algorithm to be embedded to the architecture and the algorithms to be programmed in a chip design platform. Hardware simulations were to be carried out on a hardware simulator (FPGA based programmable image sensor platform) to investigate real-time processing capability.

Some Outcomes and Discussion

Adaptive techniques of luminance and differential-luminance histograms aim to process image data in shadow, middle and highlight tones in local areas of images.

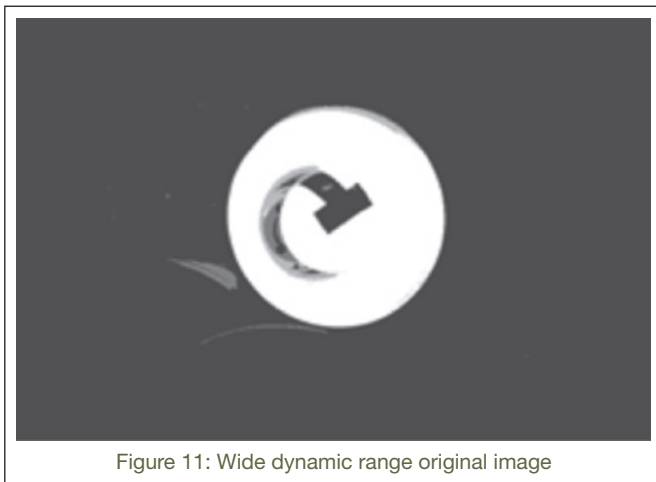


Figure 11: Wide dynamic range original image

A raw 16 bit image was read into the simulation environment. As the original image was too large to handle, it was low-

pass filtered and down-sampled to image sizes that could be handle within the simulation environment.

Figure 12 illustrates performance of the luminance histogram based a tone compression algorithm. In preliminary work, it is observed that our tone compression algorithm produces a low dynamic range image, preserving image details and with minimal artefacts

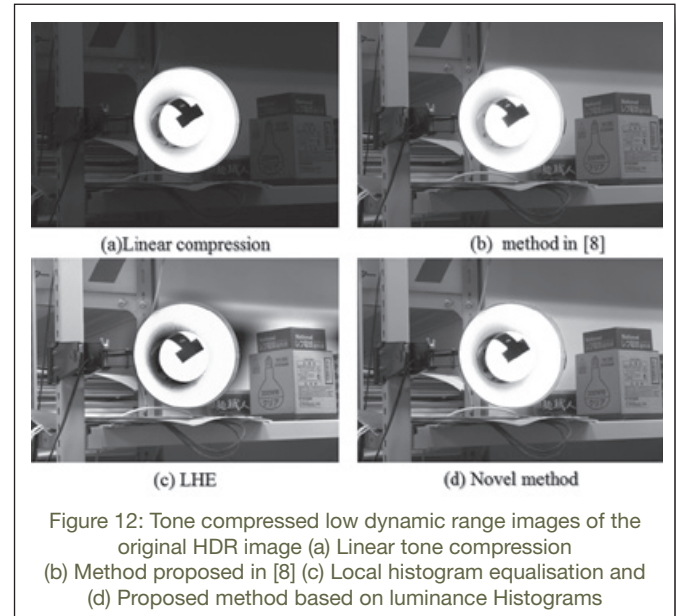


Figure 12: Tone compressed low dynamic range images of the original HDR image (a) Linear tone compression (b) Method proposed in [8] (c) Local histogram equalisation and (d) Proposed method based on luminance Histograms

It can be observed that Figure 12(a) based on linear compression does not give adequate mapping to see details in the image. Figure 12(c) shows the tone-mapped image based on common local histogram equalization technique. It reveals details, mainly in the darker areas. However, it introduces some halo effects around brighter regions that are not present in the original image. Figure 12(d) show on an 8 bit display to suit its spatial resolution that it results in less distortion compressed to the previous method proposed in [8].

Summary and Conclusions

In image processing, computer graphics, and photography, high dynamic range imaging (HDRI or just HDR) is a set of techniques that allow a greater dynamic range of luminance between the lightest and darkest areas of an image than current standard digital imaging techniques or photographic methods.

This wide dynamic range allows HDR images to more accurately represent the range of intensity levels found in real scenes, ranging from direct sunlight to faint starlight. Dynamic range, can be applied to produce images with preserved or exaggerated local contrast for artistic effect.

Initial results presented here shows improved contrast for the tone compressed images using luminance histograms. Proposed luminance histogram based tone mapping outperforms the other three methods that were compared. Further research is being done to improve the tone compression algorithms.

Acknowledgements

The author wishes to thank the Japan Society for the Promotion of Science 2011 programme, Massey University, the Royal Society of New Zealand and Prof Takayuki Hashimoto of Tokyo University of Science for his collaboration.



References

- [1] E. Gamal, "Trends in CMOS image sensor technology and design", International Electron Devices. Digest", pp.805-808, 2002.
- [2] S. K. Nayar and V. Branzoi, "Adaptive dynamic range imaging:optical control of pixel exposures over space and time", Proceedings of the IEEE International Conference on Computer Vision, pp1-8,2003.
- [3] A. J. P.Theuwissen, Solid state imaging with charge coupled devices, Kluwer academic press, Boston, 1995.
- [4] T.Hamamoto, K. Aizawa, "A computational image sensor with adaptive pixel-based integration time", IEEE trans. On Solid-State Circuits, Vol.36, No.4, pp.580-585, Apr. 2001
- [5] S. Kagami, F. Suzuki and T. Hamamoto, "Wide dynamic range image sensor with polygonal-line I/O characteristic adapted to brightness distribution of objects", IEICE Trans. Fundamentals, Vol. E85-C, No.5 , pp518-526, 2003.
- [6] T.Yasuda, T.Hamamoto, K. Aizawa, "Adaptive-integration time image sensor with real-time reconstruction function", IEEE trans, Electron Devices, Vol.50, No.1, pp.111-120, 2003.
- [7] F. Suzuki, T. Hamamoto, "Adaptive-nonlinear imaging characteristic of wide dynamic range for variable integration-time image sensor", IEICE Trans. Fundamentals, Vol. J86-A, No.5 , pp 518-526, 2003 (in Japanese).
- [8] S. Kagami, F. Suzuki, T. Hamamoto, " A study of wide dynamic-range imaging and its compressed representation based on brightness distribution of objects, Japan Workshop on Image Media Quality and Its Applications (JIQA2007), 4pages, 2007 (in Japanese).
- [9] S. K. Nayar and T Mitsunga, "High dynamic range imaging: spatially varying pixel exposures", Proceedings of the IEEE Conference on Computer Vision and Pattern Recognition, pp. 472 -478, 2000
- [10] A.Belenky, A.Fish, O.Yadid-Pecht, "Global Shutter CMOS Image Sensor With Wide Dynamic Range," Electronics, Circuits and Systems, 2006. ICECS'06. 13th IEEE International Conference on, pp. 314-317, Dec. 2006.
- [11] S. N. Pattanaik and J. E. Tumblin and D. P. Greenberg, "Time- dependent visual adaptation for realistic image display", Proceedings of SIGGRAPH 2000, pp47-54, July 2000.
- [12] P. M. Acosta-Serafini, I. Masaki, C. G. Sodini, "A 1/3" VGA linear wide dynamic range CMOS image sensor implementing a predictive multiple sampling algorithm with overlapping integration intervals", IEEE Journal of Solid- State Circuits, vol. 39, pp. 1487-1496, Sept. 2004.
- [13] S. W. Han, et al. "A High Dynamic Range CMOS Image Sensor with In-Pixel Floating-Node Analog Memory for Pixel Level Integration Time Control", 2006 Symposium On VLSI Circuits Digest of Technical Papers, pp. 30-31, 2006.
- [14] A. Morimura, T. Azuma, K. Uomori, "Wide Dynamic Range Image Processing Technology", Journal of ITE,Vol.51, No.2, pp. 92-98 , 1997.
- [15] J. U. Kim, L. S. Kim, S. H. Hwang, "An Advanced Contrast Enhancement Using Partially Overlapped Sub-Block Histogram Equalization", IEEE trans. on Circuits and Systems for Video Technology, vol.11, No. 4, 475-484, Apr.2001
- [16] K. Ueda, M. Ogata, T. Tsuchiya, T. Kubozono, "A Level-Conversion Method for Wide-Dynamic-Range Camera Systems", Journal of ITE, Vol.56, No.3, pp. 123-129, 2002
- [17] S. Shimoyama, M. Igarashi, M. Ikebe and J Motohisa, "Local adaptive tone mapping with composite multiple gamma functions", ICIP 2009, pp 3153-3156, 2009.
- [18] R. Mantiuk, G. Krawczyk, K. Myszkowski and H Seidel, "Perception- motivated high dynamic range video encoding",ACM Transaction on Graphics, Vol 23 Issue 3 , pp.7330741, August 2004.
- [19] S. K. Nayar, V. Branzoi, "Adaptive dynamic range imaging: Optical control of pixel exposures over space and time", Proceedings of the ninth IEEE International conference on computer vision, pp. 1-8, 2003.
- [20] N. Akahane, R. Ryuzaki, S. Adachi, K. Mizobuchi, and S. Sugawa, "A 200dB Dynamic range iris-less CMOS image sensor with lateral overflow integration capacitor using hybrid voltage and current readout operation", IEEE International conference on Solid-state circuits, pp. 1- 10, 2006.
- [21] J. Gu, Y. Hitomi, T. Mitsunga, and S Nayar, "Coded rolling shutter photography:Flexible space-time sampling", IEEE international conference on Computational photography, pp. 1-8, 2010.
- [22] M. Sasaki, M. Mase, S. Kawahito and Y. Tadokoro, "A wide-dynamic- range CMOS image sensor based on multiple short exposure-time readout with multiple-resolution column-parallel ADC", IEEE Sensors journal Vol 7, No 1, pp.151-158, Jan 2007.



author



Dr Amal Punchihewa
ABU Technology

Amal graduated with a BSc (Eng) Hons specialised in Electronics and Telecommunication Engineering from Sri Lanka, an MEng from the Technical University of Eindhoven, Netherlands & a PhD from Massey University in New Zealand. He has published over 100 scholarly articles (peer-refereed technical journal and conference articles) in various journals including IEEE and IET digital libraries and transactions. He has held visiting positions at Tokyo University of Science (Japan) as a visiting associate professor and visiting professor. He was a Royal Dutch fellow of The Netherlands and JSPS of Japan. He has served on technical/programme committees, organising committees and as track/session chairs for many international conferences. He advises on many International conferences including CCBN conference in China, BES in India and BCA in Singapore. Amal is a Senior Member of IEEE, a Chartered Professional Engineer-CEng, Fellow of IET (UK) & Fellow of IPENZ (New Zealand).

WorldDMB is the global industry forum for the DAB digital radio family of standards

We promote DAB / DAB+

We work globally with broadcasters, network providers, car, receiver, chip and equipment manufacturers, governments and official bodies to help countries plan and move to digital radio.

Through workshops, on-air demonstrations and on the ground technical support, WorldDMB can assist with:

- Regulation
- Licensing
- Technical trials
- Network build out
- Production of new digital radio content
- Marketing

DAB+ is the digital radio standard of choice for broadcasters across the Asia Pacific

The move from analogue to digital radio is important for:

- Future-proofing radio in a digital world
- Enabling more content choice for listeners
- Providing a richer and more interactive radio experience
- Providing access to a huge range of low cost receivers
- Using a greener technology for radio broadcast
- Long term savings on transmission costs
- Creating new revenue opportunities
- Securing valuable spectrum for radio

Please contact WorldDMB at projectoffice@worlddab.org



WORLD



Defining the future of digital radio

www.worlddab.org



Technical Bureau Meeting in Bali, Indonesia

The mid-year technical bureau meeting of the ABU Technical Committee was held in Kuta, Bali on 5th and 6th May. The meeting reviewed the work carried out by the Technical department of ABU and approved the proposed work for the coming year after healthy deliberations. The bureau discussed, in detail, two important studies to be completed and presented before the next bureau and technical committee meetings; namely, early warning signalling, broadcasting and the use of special characters in digital radio.

The back ground to the studies as follows:

1. Assessment of early warning signalling and broadcasting needs of Asia-Pacific broadcasters, especially for digital television delivery.

ABU members will be requested to inform ABU Technology of requirements for second generation EWS – EWS 2.0 of DVB and other DTV technologies.

During DBS-2015 held in Kuala Lumpur, a DVB-T2 workshop was conducted as a pre-symposium event. During that time, DVB indicated that they would like to know the requirements for second generation EWS in DVB. DVB has added an Emergency Warning Flag to the L1 signalling bits for the DVB-C2 specification. The purpose of this bit is to inform the receiver at the physical level about the presence of an emergency situation. Having the information available at



Mr Masaru Takechi,
NHK-Japan



Mr Takahiro Izumoto,
NHK-Japan



Mr Haji Ab Wahid
bin Ab Hamid,
RTM-Malaysia

the physical level facilitates waking up of receivers from stand-by mode. DVB has also decided to add such a flag to DVB-T2 and DVB-S2.

For the time-being DVB has only decided on the introduction of the Emergency Warning bit at the physical level. In addition DVB had a discussion as to whether DVB should also specify a complete EWS solution. It was agreed that DVB should provide an optional reference EWS solution. Administrations should have the freedom to either adopt this reference solution or to request another EWS.

For a reference solution DVB wants to define user cases and requirements. The main application area for such a system will be in the APAC region. As the intention is to cater to the disaster prone region of APAC, DVB sought assistance from the ABU to derive EWS scenarios and requirements from the Asia-Pacific region.



Mr Sunarya Ruslan,
RRI-Indonesia



Ms Hanife Sayilir,
TRT-Turkey



Mrs Zhu Yunyi ,
RTPRC-China

Some of the potential requirements are listed below:

- The solution shall facilitate to wake up receivers from sleep mode.
- The solution shall support authentication for several authority levels to prevent hackers from hijacking the system and triggering false alarms.
- It shall be possible to address a specific region in case of an emergency situation.
- EWS messages can be video, audio or text. Furthermore the receiver can be forced to switch to a different channel.
- In addition to the broadcast channel, an EWS situation could also be triggered via broadband access.

ABU Technology will send out a questionnaire within month of July. The engineers have to collate responses and it is required for presentation to the Technical bureau meeting in Istanbul, followed by Technical committee meetings.

2. Assessment of needs of special character sets for digital radio, to be effective in disaster communication.

A proposal was made to the Technical Bureau meeting that was held in Kuta, Bali, Indonesia to initiate the development of a character set for APAC to support multimedia in digital radio. Technical bureau approved the proposal and requested the technical department to carry out a survey. Engineers from TD will carry out this survey and questionnaire during the month of July to gather input for the Istanbul meeting, together with EWS.

Background to the proposal was a request from Mr Lindsay Cornell, Technical Committee member of both WorldDMB

and DRM, who brought to the notice of ABU that EBU is aiming to form a Latin-based repertoire. Lindsay is leading some work in his World DMB TC Chair role on clarifying the "Complete EBU Latin-based repertoire" character set. Noting the increasing interest in digital radio in the Asia-Pacific region it may be useful for the ABU to consider whether this character set would also be useful for Asia Pacific, or whether a new character set could be developed that would help broadcasters and manufacturers. It is clear that some countries in the region have very specific needs, such as China, Korea, India, Sri Lanka, Thailand and Japan . Indeed these countries may already have some solutions. However, for many other countries, their languages are represented using the Latin alphabet, albeit with different accents and diacritical marks. Please see the annexure page from the ETSI standard with the character set.

We could have two possible options to explore.

1. APAC region could use the EBU character set as it is currently defined. Though countries such as Viet Nam would not be able to adapt.
2. The ABU could collect the requirements from the different member countries for both Latin and non-Latin characters and then the ABU TC could collaborate with WorldDMB TC to develop a new character set.



Mr Sunil, DDI-India



Mr DooHyung Kang,
KBS-Korea



Mr Chiewchan
Nantanapannich,
TPT-Thailand

Responses to the questionnaire and survey will guide us to the path that ABU needs to take in working with international bodies and members. ABU Technology will be looking forward to swift responses from ABU members when the survey questionnaire is administered.





ABU TECHNICAL COMMITTEE MEETING SCHEDULE, Istanbul, Turkey 27-28 October 2015

Time/Date	Monday 26, October	Tuesday 27, October	Wednesday 28 October
9.00am – 10.30am		SADIRVAN B OPENING SESSION ABU Engineering Awards Announcements & Presentation of Citations and Technical Review Prizes	SADIRVAN B Keynote Presentation Technology Debate Future Media Delivery will be only on IP
11.00am – 12.30pm		Director's Report Bureau Proposals Technological Inspirations	Summary from Topic Area Chairmen: Production, Transmission, Training & Services and Spectrum New in study groups 1. API 2. HDR 3. Spectrum 4. EWS
2.00pm – 3.30pm		Strategic Issues 1. Spectrum for future broadcasting 2. DSO+ASO – Leap frogging to DTT 2.0 3. IBB – Integrated Broadcast Broadband 4. UHDTV and EDR 5. Devices 6. Human capacity building	The Host Presents: TRT-Turkey Digital Radio and TV: From production to delivery over IP 1. HbbTV 2. EWB Service 3. 4K Test Trials New Recommendations & Decisions of the Technical Committee
4.00pm – 5.30pm	SADIRVAN B Technical Bureau Meeting 4.00pm – 6.00pm <i>Restricted to Members of the ABU Technical Bureau</i>	Members' Present 1. New services 2. New features 3. New installations 4. New Trails 5. Completion of DSO Networking with ABU TLOs	Useful to know: 1. New members 2. Sister Unions & International Organisations (each organisation maximum of 3 minutes) ASBU, EBU, WorldDMB/CRA, DRM, DVB, IABM, etc 3. Updates from Status reports <i>Closing</i>



World Broadcasting Unions Technical Committee (WBU-TC) Meetings Discuss Critical Technical Issues for Broadcast Unions

The executive members of the technical committee of the World Broadcasting Unions (WBU-TC), which met prior to the European Union Broadcasting Technical Assembly (EBU-TA). WBU-TC, comprises the Technical Directors of eight broadcasting unions and the chairmen of technical bodies of the eight unions.

Mr Abdelrahim Suleiman, Director General of ASBU and Mr Michael McEwen Director General of World Broadcasting Union (WBU) (not in the picture) attended via a conference call.

The meeting was chaired by WBU-TC Chair Mr Bob Plummer. Ten members participated in the meeting with the presence of two vice chairs Dr Amal Punchihewa. Mr Simon Fell and Mr Michael McEwan via conference call. The meeting reviewed the progress of current projects undertaken by WBU-TC and prioritised work for the coming year.

The meeting discussed the fact that some of the sister unions were unable to attend the WBU-TC meeting and to explore the possibilities of getting assistance from the UN. Simon informed that such a request has to go to the UN regional offices and this was confirmed by Amal. Individual unions needed to liaise with regional offices, based on location. However, it was noted that such assistance is generally limited to ITU activities and to its members.

Critical issues affecting individual unions were shared and it was decided to work on number of areas which all unions find relevant and of high priority.

Human capacity building was discussed as one of the critical issues common to all unions. They also discussed issues in relation to spectrum for future broadcasting,

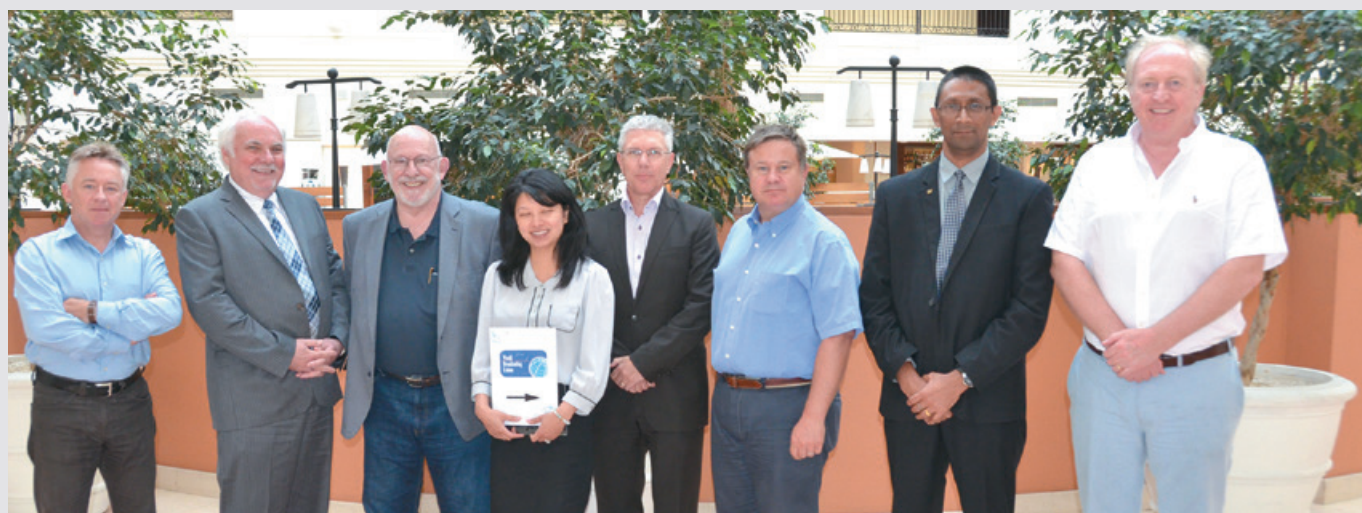
technology migrations and digitalisation. It was decided to share possible training resources and mechanisms in collaboration with IEEE-BTS, IABM, SMPTE and media training institutions such as AIBD and the Eurovision academy. Amal informed that ABU had discussed possible collaborations with head of the Eurovision academy during the Asia Media Summit-2015. It was also advised that the ABU is working in closer cooperation with AIBD to carry out training and other joint activities.

It was decided to explore all possible opportunities to create awareness and make concerns known to regulators on spectrum requirements for future broadcasting. Opportunities at upcoming events including CEPT, EBU-TA, ASEAN broadcasting regulation forum in Bangkok, APG meeting in Seoul, IBC in Amsterdam and just prior to WRC-15 in Geneva would be explored by all Unions to further reinforce the work that unions have been carrying out individually and collectively at WBU-TC, heading to the November WRC-15 meetings.

ABU informed members of the WBU-TC that it will carry out two surveys to ascertain the needs of early warning signalling and broadcasting in next generation broadcast technologies and character sets for digital radio.

A handbook on Digital Radio will be completed by next WBU-TC face-to-face meeting during IBC in September. It will carry updates on DAB and DRM technologies and new chapters on hybrid radio, smart radio concept and hybrid radio.

The WBU letter of intent on the future of radio was reviewed and revised. The revised version was offered to the WBU meeting (meeting of all eight Secretary Generals' and Director Generals' of broadcast unions).



NEW!

NXSeries

The Industry's Most Advanced
5 and 10 kW AM Transmitters

Outstanding Control
86% Efficiency
Compact

Proven NX Series
Technology with over
20 Megawatts
Deployed

 **Radio**[®]
Digital AM & FM

 **drm**



Making Digital Broadcasting **Work.**

Learn more at Nautel.com


nautel

ABU ENGINEERING AWARDS 2015



ABU Green Broadcast Engineering Award

- This award is sponsored by KOBA.
- Awarded for outstanding contributions in developing, implementing and/or promoting green technology in the broadcasting industry.
- The award comprises a trophy and cash prize presented at the opening session of the annual ABU Technical Committee meeting.



ABU Engineering Industry Excellence Award

- Awarded for outstanding engineering contribution made by an individual to the broadcasting industry in the Asia-Pacific region.
- The award comprises a citation plaque and a trophy.

ABU Broadcast Engineering Excellence Award

- Awarded for outstanding contributions in broadcast engineering and related disciplines.
- The award consists of a citation plaque and a trophy.

ABU Developing Broadcasters' Excellence Award

- Established in 2013 to recognise innovation and excellence among the ABU's developing broadcasters.
- Awarded for contributions of an outstanding nature in broadcast engineering made by an individual in a developing broadcasting organisation.
- The award comprises a citation plaque and a trophy.

April 2015 – Call for Nominations

31 July 2015 – Deadline

August 2015 – Judging

27 October 2015 – Announcement of Winners **ABU Technical Committee Meeting Istanbul**

30 October 2015 – Presentation of Trophies **ABU Prizes Night Istanbul**



For more information and nomination forms
www.abu.org.my/engineering-awards

ABU ENGINEERING EXCELLENCE AWARDS

PANEL OF JUDGES

ABU BROADCAST ENGINEERING EXCELLENCE AWARD ABU DEVELOPING BROADCASTERS' EXCELLENCE AWARD



Panel Chairman

Masakazu Iwaki, Head of Human Interface Research Division, Science and Technology Research Laboratories, Nippon Hoso Kyokai, Japan, appointed as Panel Chairman in April 2011. Mr Iwaki is the Chairman of the ABU Technical Committee.

Tharaka Mohotty, Director, Engineering, MTV Channel (Pvt) Limited and Vice-Chairman, ABU Technical Committee, appointed a member of the panel in June 2015.



Sunarya Ruslan, Member of Radio Republik Indonesia's Supervisory Board and a member of the ABU Technical Bureau, has served on the panel since 2009.

Naoki Kashimura, Director of the Board, Managing Director, Product Strategy & Marketing Division, Research & Development, Ikegami Tsushinki Co Ltd, Japan, appointed a member of the Panel in 2008.



imaginecommunications.com

Paul Worman, Senior Solutions Architect, APAC, Imagine Communications, appointed a member of the panel in May 2014.

Sanjay Salil, Managing Director, MediaGuru, appointed a member of the panel in June 2015.



ABU ENGINEERING INDUSTRY EXCELLENCE AWARD ABU GREEN BROADCAST ENGINEERING AWARD



Panel Chairman

Hamid Dehghan Nayeri, Director, International Technical Affairs, Islamic Republic of Iran Broadcasting, appointed as Panel Chairman in June 2015. Mr Nayeri is Vice-Chairman of the ABU Technical Committee.

Mr Raşit BAŞTAŞ Acting Head of Studios and Programme Transmission Systems Department, Turkish Radio Television Corporation (TRT-Turkey), appointed to the panel in March 2013.



Mr Robin Kim, Myung Nam, KBS-Korea, Manager, Technology Management Department Korean Broadcasting System, appointed a member of the panel in June 2015.



Lim Chin Siang, Director, Infrastructure and Technology Division, Media Development Authority, Singapore, appointed a member of the panel in 2010.

Fintan Mc Kiernan, CEO, Ideal Systems Singapore, appointed a member of the panel in June 2014.



Charles Sevier, Chief Technology Officer (APJ region) for Isilon, a part of the Emerging Technology Division of EMC2. Appointed a member of the panel in June 2015.



LATEST NEWS

FROM EBU TECHNOLOGY & INNOVATION

by **Shannon Frame**

Technical Editions Manager (EBU)

It's been a busy few months here at EBU. This year's Digital Radio Summit marked the 8th anniversary of such an event and included many exciting discussions about the promise of digital radio in today's crowded consumer electronics marketplace. For the first time, EBU RadioHack partnered with ITU to host our annual freeform workshop where developers, engineers and so-called "radio geeks" come together to experiment with the latest tools and techniques in digital and hybrid radio.

Our annual BroadThinking event also reached record participation in March. EBU Director of Technology & Innovation, Simon Fell, kicked off the event stating that he was "Proud that the EBU is involved in the development of HbbTV." Version 2.0 of the popular HbbTV standard was released only weeks before the event and was the main highlight. Access services, user interfaces, migration paths for interactive TV and MPEG-DASH were also discussed in detail by participants.

Our Members have also been busy. Together with iMinds and the EBU, VRT has been evaluating a shared vision of on premise collaboration in the ecosystem of a broadcaster. In its 'Sandbox' experience, companies and technologies are being embedded within a broadcaster, giving them the opportunity to improve collaboration and gain access into a wide variety of use cases, technologies and insights.



To find out more, visit our website at tech.ebu.ch or follow us on social media:

Twitter – @EBU_TECH, **Facebook** – EBU Technology & Innovation or
Linkedin – EBU Technology & Innovation.

JOIN US AT OUR NEXT EVENT!

EBU @ IBC 2015

10 – 14 September, RAI Amsterdam

IBC is Europe's largest annual conference and exhibition dedicated to broadcast media technology. As usual, the EBU will be present with demonstrations, presentations and sessions at the stand to ensure that public service media remains at the forefront of technology and innovation.

<https://tech.ebu.ch/events/ibc2015>

DevCon 2015

06 – 07 October, EBU, Geneva

In today's media world, it's all about being agile. Join us at our 3rd EBU Developers Conference and get hands on with current software development and deployment tools, share best practice and learn from the pros.

<http://tech.ebu.ch/events/devcon15>

Forecast 2015

20 – 21 October, EBU, Geneva

Our annual seminar dealing with broadcast technologies, spectrum management and related topics attracts more than 100 broadcasters, policymakers and other industry stakeholders each year.

<http://tech.ebu.ch/events/forecast15>

EBU-TA European Broadcasting Union Technical Assembly held in Krakow, Poland



The 21st Technical Assembly of the European Broadcasting Union held in Krakow on 11th and 12th June and was hosted by Polish Television (TVP-TELEWIZJA POLSKA). Nine sessions spanning two days discussed a wide range of topics, including the transformation of broadcast media due to technological developments in the professional consumer domain, HbbTV, Digital radio, LTE, IP in studios, security, UHD TV-2, Agility, HDR, HFR, 5G, Spectrum, Net neutrality, cloud, Big data, meta data, and networked media.

The panel discussion session entitled “Meet the Completion” addressed the issue of rate of adoption; with the question, “Are broadcasters adapting quickly enough to changes in media delivery”. ABU, DTG, TVP and NPO were in the panel, which discussed the impact of social media, use of social media and integration with broadcast operation, copyright issues and accessibility. The challenges introduced by new entrants to the media market as over-the-top (OTT) players were discussed and the need to augment broadcast services using broadband was emphasised.

ABU-ASBU-AIBD

Collaborations

During the Asia Media Summit-2015, a meeting was held to discuss collaborative work among three institutions - ABU, ASBU and AIBD. ABU and ASBU have been discussing to organise ABU-ASBU Technology week in Tunis for last two years. Due to the large number of activities, ABU Technology could not initiate this event. In the year 2016, the first ABU-ASBU Technology week will be held in Tunis during its exhibition time. The event, which will be held between 4th and 6th May, will become an annual ABU event.



The greatest energy efficiency.
The most standards supported.
The simplest operation.

**The lowest
total cost
of ownership.**



DAB+

DAB

DRM



HD Radio

ISDB-T

**The Leading Choice for Digital
Over-the-Air Solutions Worldwide**

Harris Broadcast
is now

GATESAIRTM

GatesAir.com

Connecting What's Next

Nam interviews Amal on Net Neutrality

The following article is based on an interview and associated discussion between Nam, Senior Engineer at ABU Technology and Dr Amal Punchihewa, Director Technical ABU, who he interviewed as an ICT global technical expert. Nam invited Dr Amal to present the APAC perspective of net neutrality contrasting global developments. The responses made by him are based on analyses carried out by him, of publically available data.

Nam: What are your views on the issue of net neutrality? Can you explain net neutrality in detail?

Amal: The concept of net neutrality is yet to be understood by many media and telecommunication stakeholders. It will be refined as it is implemented in various countries and regions. Regions where clear rulings have been issued have tried to provide an interpretation of the concept, which is pre-requisite to the effective administration of such a policy framework.

If you study net neutrality from the point of view of the issues and challenges that it offers, a considerable background needs to be analysed.

The key issue in net neutrality and other competitive issues arises from vertical integration or revenue sharing arrangements between telecommunications and content providers, including traditional broadcasters. Having the media made available over the Internet with a high level of interaction has created competition, which leads to regulatory concerns.

If we carefully analyse actions that challenge net neutrality the telecommunications service provider may have an incentive to enhance or degrade certain OTT content, either because it competes with its own content services (i.e. discrimination arising from vertical integration) or because the telecommunication service provider has revenue sharing arrangement with other content services that use its network. Both vertical integration and revenue sharing arrangements have become more popular in recent years as telecommunications service providers seek new revenue streams and endeavour to avoid becoming merely network service providers.

With the evolution of OTT over the years, new entrants to the media market have started offering content over the Internet. OTT providers and end user groups have argued strongly for net neutrality laws to prevent telecommunication service providers from discriminating against unaffiliated OTT video and audio data transport.

It is harder to prescribe a single policy to net neutrality – regulators should treat net neutrality as a competition and access issue, and should ensure that the level of regulation is managed in a given consumer market. For net neutrality to be effective, the policies should address at the retail level of the telecommunication services/ISP market.

Net Neutrality is one of the most highly debated topics globally. In February 2015, the Federal Communications Commission (FCC) introduced new net neutrality rules. The European Commission (EC) and European Broadcasting Union (EBU) have been discussing the topic too. In April 2014, the European Parliament voted in favour of a new net neutrality regulation

limiting the power of ISPs to charge third parties for premium network access. The regulation defines key concepts such as 'net neutrality' and prohibits offering premium network access to third parties if that premium access hinders the availability or quality of normal Internet access services. Internet providers are only allowed to slow or block internet access for the purpose of enforcing a court order, preserving network security or preventing temporary network congestion. Even so, measures must be, "transparent, non-discriminatory and proportionate" and cannot be applied longer than necessary.

Although the European Union's regulation on net neutrality appears to enforce quite a strict understanding of the principle, the regulation requires agreement from the Council of the European Union, which has been difficult to achieve. In January 2015, the current rotating presidency of the European Council (Latvia), issued a new proposal for net neutrality regulation that would exempt, "services which require a specific level of quality" from net neutrality obligations.

Need for clear legislation is evident from the request of the EBU to the EU legislators for strong and clear rules on net neutrality at EU level, as the process of finalising the proposed European Telecommunications Single Market Regulation enters a crucial stage.

Media, device and telecommunication technologies, infrastructures and services are converging. Hence, it is challenging to draft rulings for net neutrality. The net neutrality rules of FCC or the Open Internet Order applies equally to both fixed and mobile broadband services. The rules prohibit broadband providers from blocking access to lawful content, applications, services or non-harmful devices, throttling traffic on the basis of content, applications, services or non-harmful devices and prioritising traffic in exchange for payment which has analogy to fast lanes with toll. The rules also impose certain transparency obligations on broadband providers in relation to promotional rates, fees, surcharges and data caps. However, the rules allow broadband providers to engage in, "reasonable network management". Services that do not go over the public Internet, such as VoIP from a cable system and dedicated heart-monitoring services, are also exempt from the scope of the rules. The FCC has reserved the authority to address, on a case-by-case basis, practices that unreasonably interfere with the ability of consumers to access lawful content.

Significantly, the new Open Internet Order reclassifies broadband Internet access services as "telecommunications services" under Title II of the Telecommunications Act, although the FCC has refrained from imposing utility-style regulation in respect of broadband services. The 2015 Open Internet Order supplements the 2010 Open Internet Order, which was partially struck out by the United States Court of Appeals for the District of

Columbia Circuit in January 2014. The 2010 Open Internet Order continues to require broadband providers to disclose their network management practices and performance characteristics.

Nam: What are some of the broader implications as you may think?

Amal: Some regional broadcasters or telecommunication operators feel the issue is not a pertinent one yet. One reason for that is that maybe audiences still prefer to watch long-form television over terrestrial or satellite in their homes. Over-the-air broadcasting still offers adequate choice for the audience. Currently broadband penetration is low and speeds (or bandwidths) are not yet appealing enough to offer over-the-Internet services.

Nam: What are the consequences of net neutrality for the broadcast industry?

Amal: In recent times, we can observe number of telecommunication operators or network providers in the APAC introducing or augmenting their services by vertical integration. At the same time, due to increasing penetration of broadband, new entrants to the media market as content service providers are offering video services over the Internet. These services can be classified as OTT where content provider has no (or should have no) relationship to the network operator through which the audience accesses content. Net Neutrality will provide an additional route for traditional broadcasters to reach and connect with its audience. The catch-up and on demand services introduce by a number of broadcasters are examples for of such opportunities. The extra video traffic that flows through the networks will create some loading but will provide additional revenue to network operators by increasing the utilisation of the infrastructure.

Nam: Do you think there is a possibility that regulators in APAC will introduce similar rulings?

Amal: Regulatory approaches to net neutrality need to be adjusted to take into account a given market, i.e. local conditions. The most important factor is the level of

competition at the retail level of the telecommunications services market. That involves the feelings of the general public about pricing and access to broadband. In markets that are competitive (e.g. because of a robust access regime in place of telecommunications service providers), it may not be required to impose net neutrality rules. In these markets, barriers to end users switching between ISPs will be low, in turn providing a market incentive for ISPs not to discriminate against unaffiliated OTT content. However, in regulation frameworks with less competitive intensity, regulatory intervention may be required in relation to net neutrality.

The requirement for high level of regulation or rulings is required when competition is not adequate.

The level of regulation varies from observer options such as transparency requirements or minimum quality of service requirements to more involved regulation such as no-blocking or no-discrimination rules applied to the management of Internet traffic. Countries like Australia, Republic of Korea and New Zealand are cautiously observing the market. The USA, Singapore, EC and Netherlands are actively reforming their policies.

Latest developments on net neutrality appear to favour a more active reform in some key jurisdictions, with the United States and the European Union recently embracing net neutrality principles, albeit to varying degrees.

Nam: Finally, how would APAC regulations impact Asia-Pacific specifically?

Amal: Asia-Pacific players will have the opportunity to observe the developments in USA and Europe. This will give them some confidence in formulating guidelines for best practices and effective policies in a given policy framework within APAC. Broadly my previous explanation indicates possible impacts of different policies in Asia-Pacific. This is a topic that we have been debating in World Broadcasting Unions, of which ABU is a member. Both ABU, and collectively WBU, will be able to come up with positions in the near future.



ABU Asia-Pacific Broadcasting Union

PACIFIC MEDIA PARTNERSHIP CONFERENCE 2015

PARTNERING FOR BROADCASTING

APIA, SAMOA • 25 – 27 AUGUST 2015

Asia Media Summit:

Pre-Summit Workshop on *Enhancing Digital Transition Experience* an Eye Opener for Television Broadcasters in APAC



In collaboration with ITU, ABU organised the DTV broadcasting pre-summit workshop with AIBD (Asia-Pacific Institute for Broadcasting Development) during Asia Media Summit, major annual event of AIBD. The workshop was held in Kuala Lumpur on 25th May.

The Asia-Pacific Broadcasting Union (ABU), the International Telecommunication Union (ITU) and the Asia-Pacific Institute for Broadcasting Development (AIBD) with support from the Department of Communications, Australian Government, the Ministry of Internal Affairs and Communications (MIC-Japan) organized and carried out an ABU-ITU-AIBD Workshop on “Enhancing Digital Terrestrial Television Broadcasting Transition Experience”. The workshop was held at the Shangri-La Hotel, Kuala Lumpur, Malaysia on Monday 25 May 2015, as a pre-summit workshop of the Asia Media Summit 2015.

The workshop provided an opportunity to 45 participants from 23 countries in understanding the various types of digital terrestrial television technologies that are used around the world, ATSC, DTMB, ISDB-T, and DVB T/T2, future trends of interactive multimedia services in Asia-Pacific, various platforms that media stakeholders could use such as OTT, IPTV, Mobile TV. They also learnt from experiences of Japan, Australia, New Zealand, who have already completed Analogue Switch Off (ASO) in their implementations of the digital Terrestrial Television broadcasting transition.

ITU with ABU and AIBD has extended various forms of assistance and provided guidance to countries in preparation

of digital 24 road maps. The Department of Communications, Australian Government, MIC-Japan, MSIP/KCC-Republic of Korea, and NBTC Thailand had supported the preparation of some of the road maps. The representatives from 4 countries namely Bhutan, Cambodia, Lao PDR, and Timor-Leste described their progress and shared the issues and various challenges that each country had faced in making the digital transition. The workshop also discussed emergency warning broadcasting and capabilities and features of digital transmission technologies such as ISDB, DVB, ATSC and FOBTv.

Mr Chang Jin, Director of Asia-Pacific Institute for Broadcasting Development (AIBD) commended ITU and ABU for organising such a workshop, which provided an opportunity to share experiences and discuss the challenges faced by the broadcasters in their respective countries. Opening remarks from ABU highlighted the need for television broadcasters to act promptly in planning and implementing the digital transition. ITU informed the participants of contributions made by the ITU in assisting countries to commence digital transition. An ITU expert presented a case study from the Pacific as an example to the participants. The presentations materials from the workshop can be accessed from the ITU digital platform via the following URL: <http://www.itu.int/en/ITU-D/Regional-Presence/AsiaPacific/Pages/Events/2015/May-ITU-AIBD-ABU/home.aspx>.

ABU Technology also presented during the summit, with the session entitled, ‘New Technology/New Tools to Connect,



Share and Network.' Evolving multimedia technologies, standards and services were presented, highlighting what they could offer to traditional broadcasting. Such Integrated Broadcast Broadband (IBB) services can be used to augment traditional broadcasting by exploring broadband as a return channel. The session generated discussions with the audience

as interactive services are now a reality with connected devices and hybrid broadcasting services. Australia and New Zealand have already commenced their IBB services based on HbbTV technology where viewers can access on demand and catch-up content supported by an electronic programme guide (EPG) to the past and future 7 days.



New Members

Additional Full Members

Nauru Media, Department of Telecommunications & Media Republic of Nauru – (5.5.15)

Nauru Media, Department of Telecommunications & Media, located in Yaren District of the Republic of Nauru, is government-owned. Established in 2008, Nauru Media has three main sections: Nauru Television (NTV), Radio FM 105 and Newspaper (Mwinen KO). The Department strives to provide independent and commercially viable radio, television and newspaper services to the general community.

Nauru Television, the only television company in the country is free-to-air and broadcasts 24 hours a day – increased from 5 hours a day when it was first launched in 1991. It operates on a System B PAL (*Pacific Islands Television Survey Report 2002*) service transmitted through 1x10w and 2x100w transmitters. The TV News is presented in a mixture of English and Nauruan language. In addition to local programmes, it broadcasts programmes from the Australian Broadcasting Corporation's Australia Network and from New Zealand television.

Radio Nauru FM 105 delivers a broadcasting service using modern and digital equipment acquired in 2010 right around the island. The station broadcasts local content and programmes from Radio Australia and the British Broadcasting Corporation.

MwinenKO / Newspaper is a community based news-magazine published and distributed on a monthly basis. The paper contents include news and stories from around the island and also column contributors from other departments and Nauruan communities overseas. Nauru Media has established

a collaborative working relation with the Department of Immigration and Australia Citizenship (DIAC). DIAC is a new contributor for NTV and *Mwinen KO* on public awareness for job vacancies and activities at RPC.

Kalang Advertising Limited (FM100), Papua New Guinea – (25.5.15)

Kalang Advertising Limited, located in Port Moresby, Papua New Guinea, was established on 18 December 1987. It is a private company and is a subsidiary of Telikom PNG, the only telecommunication company in Papua New Guinea.

Kalang Advertising Limited pioneered a commercial radio in PNG in 1982 under station name of Radio 2FM. They subsequently changed the station name to Kalang FM in 1987 with further station rebranding in 1999 to become FM100. It provides a range of programmes designed to appeal to listeners between the ages of 23 and 40 plus, creating opportunities for advertisers to target the right audience with their products.

FM100 broadcasts 24 hours daily to 95 percent of Papua New Guinea nationwide as well as providing an online radio streaming service via its website www.fm100.com.pg. It broadcasts latest news, information, music and current events. Kalang Advertising Limited has introduced a new radio station known as Hot97FM to cater to teenage to young adults who like music from the 90's to the current hits. They have also worked on new projects to support the music industry in recording songs on cassettes and compact discs of local artists which will be made available in the near future.

From Smart Cards to Multiscreen



What happens when content and audience connect is an everyday magic. More than 350 digital TV operators in over 85 countries rely on us to sustain that magic by protecting their content and revenue.

The unified content security head-end Conax Contego™ provides pay-TV operators with a future-proof and flexible platform to introduce new services. Conax Contego™ is a sophisticated, modular and fully scalable content security solution that supports any business model for any TV operation and a multitude of consumer devices; tablets, smartphones, CAM, PC/MAC and STBs, with or without smart cards. All consumer devices are pre-integrated and easily managed in the highly intuitive user interface in Conax Contego™.

At Conax we work hard to innovate so that consumers can experience everyday magic; on any device, anytime, anywhere. So let the magic begin!

securing content - sustaining magic

conax.com



RAI Amsterdam

Conference 10-14 September : Exhibition 11-15 September



IBC2015 Discover More

IBC stands at the forefront of innovation, drawing more than 55,000 creative, technical and business professionals from over 170 countries. It couples a comprehensive exhibition covering all facets of today's industry with a highly respected, peer reviewed conference that helps to shape the way the industry will develop.

Also, take advantage of a variety of extra special features included as part of your registration at no extra cost:

- **Touch & Connect**
IBC's simplified networking tool for all attendees, structured to keep you connected year round
- **IBC Awards**
celebrating the personalities and the organisations best demonstrating creativity, innovation and collaboration in our industry
- **IBC Future Zone**
a tantalising glimpse into the future of tomorrow's electronic media
- **IBC Big Screen Experience**
providing the perfect platform for manufacturer demonstrations, ground breaking screenings and insightful, free to attend conference sessions focusing on the latest developments in digital cinema
- **IBC Content Everywhere Europe**
Featuring:
 - IBC Content Everywhere Hub
 - IBC Content Everywhere Technology in Action Theatre
 - high quality exhibition

www.ibc.org

IBC Third Floor, 10 Fetter Lane, London, EC4A 1BR, UK
t. +44 (0) 20 7832 4100 f. +44 (0) 20 7832 4130 e. info@ibc.org

**Register now at
www.ibc.org/register**

Making Connections at IBC2015



IBC sits at the heart of the global electronic media and entertainment industry, proving a vibrant meeting place for more than 55,000 attendees from 170 countries. Held at the world-class venue of the Amsterdam RAI every September, it hosts an industry leading Exhibition, featuring over 1,700 key suppliers and innovators spread across fourteen themed halls. IBC also features an agenda setting Conference that attracts 300 of the highest calibre international speakers along with thought-leaders and visionaries from around the world.

With a full programme of special events and carefully curated feature areas that reflect the very latest technological and business trends within the industry, from the IBC Future Zone through to the IBC Big Screen Experience, IBC is always at the forefront of innovation. The show provides valuable insights for companies at all stages of their evolution and people at all levels of the industry, whether start-up or multinational, student or CEO. And, it goes without saying, that the networking opportunities it offers are second to none, allowing attendees to connect across countries, technologies and industry sectors.

Part of the same heritage of innovation that drives its progress can be seen with the establishment of IBC Content Everywhere Europe, a dedicated 'show within a show' that

examines the astonishing growth and opportunities inherent in the content everywhere model as video over mobile networks and IPTV explodes in territories around the globe.

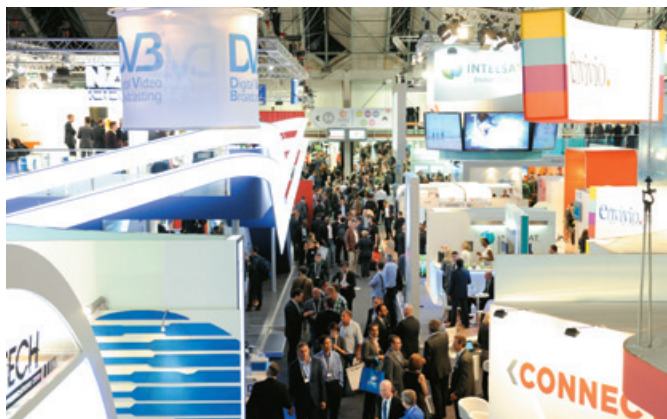
IBC Content Everywhere Europe combines a dedicated high quality exhibition with a range of engaging Feature Areas showcasing case studies, panel discussions and exhibitor demonstrations. All of these are designed to help visitors get quickly up to speed on the latest trends, strategies and developments in rich media production, devices, apps, digital marketing, social media, content personalisation, big data, cloud services, second screens, investment and more.

It is a sector evolving with astonishing rapidity, and one which the free programme's at the IBC Content Everywhere Hub and the new IBC Content Everywhere Technology in Action Theatre seek to explain. All in all IBC Content Everywhere is the best destination to find out how these developments will affect you and your business, as consumers get to grips with the very latest technologies and deliver their verdict on emergent business models.

IBC Content Everywhere Europe also held the highly successful trial of IBC's ground-breaking Touch & Connect technology last year, a NFC-based system (Near Field Communications) for sharing contacts and information that dramatically enhances the tradeshow experience for visitor and exhibitor alike and is now being rolled out to all IBC attendees.

Each visitor pass now enables attendees to collect contacts, marketing material, catalogues and much more when touched to a specific contact point on participating exhibitor stands or via the App. What's more it also provides users with access to the Touch & Connect Portal, an online community that allows visitors and exhibitors to make appointments, exchange information, view all of their content and contacts and engage with high level IBC content 7 days a week, 365 days a year.

The journey, as always, starts in Amsterdam where IBC2015 runs from 10-15 September. Head to www.ibc.org/register for more details and to secure your registration.





Myanmar Human Capacity Building to Handle ICT in Broadcasting

The Technology department of ABU facilitated a Training and a Workshop on Networking and Information Technologies for Forever Group in Yangon, Myanmar.

This event aimed to provide the information technology and broadcasting staff of Forever Group, a member of ABU and a radio and television broadcaster in Myanmar, some knowledge of the latest information and broadcasting technologies and enhance and update knowledge and skills in ICT, as used in broadcast operations. New media, traditional media and information technology (IT) departments were working together with the training department to enhance the skills of staff in the latest developments in the media industry. Twenty four trainees from IT, new media and broadcasting departments benefitted from the capacity building event held from 11th to 16th May 2015 in Yangon. Trainees were exposed to a wide range of topics, including Integrated Broadcast Broadband (IBB), Over-the-top (OTT) and IPTV, the principles of operations as well as the planning and implementation issues of such digital broadcasting services.

Exposure to a wide range of topics highlighted the rapid changes that are taking place in the media and telecommunication industries and their convergences in technology, infrastructure and services. Broadcasting has to compete with mobile operators and telecommunication



service providers who are commencing media services as bundled services with increasing penetration of IPTV. Basic knowledge imparted to the trainees would be useful in planning and operating their own systems, easier troubleshooting and compliance with broadcast requirements.

The event, held at MMDC, the training centre of Forever Group, provided a conducive environment to impart both basic and fundamental knowledge as well as practical knowledge of the latest technologies and trends in IT, networking, digital radio and television broadcasting.. The knowledge gained during the workshop and training will guide and provide confidence to both broadcast and IT staff in the better use of new technologies and adaptation of appropriate technologies.

Ms Su Mon Htwe, Head of training and the manager of MMDC, the training centre of Forever Group expressed her gratitude to ABU for enabling such human capacity building event in a demanding area. She also thanked the resource person for dedication and time spent in educating and training the Forever Group staff.

REACH THE TOP BROADCASTERS IN THE ASIA-PACIFIC AND AROUND THE WORLD

Advertise now in the ABU Technical Review

The ABU Technical Review is a quarterly publication with a circulation of over 1,000. It is mailed directly to the senior technical management in broadcasting organisations, prominent industry personalities, academics and students. Since 2010, the Technical Review has been available to the broadcast industry and general public on the ABU website, free of charge. This approach has significantly enhanced the exposure of the magazine, bringing more value to the advertisers.



Position	Insertion	ABU Members	Non-Member
Premier -Inside front cover full page -Back cover full page -Inside back cover full page	Annual Rates	US\$500 x 4 issues = US\$2,000	US\$600 x 4 issues = US\$2,400
	Per Edition Rates	US\$550	US\$650
Inside Full Page	Annual Rates	US\$450 x 4 issues = US\$1,800	US\$500 x 4 issues = US\$2,000
	Per Edition Rates	US\$475	US\$525
Inside Half Page	Annual Rates	US\$275 x 4 issues = US\$1,100	US\$400 x 4 issues = US\$1,200
	Per Edition Rates	US\$300	US\$325

Advertisement Specifications

Full Page

Page size: (A4) = 29.7 x 21 cm (bleed 30.7 x 22 cm) and the ad should be hi-res PDF/EPS/JPEG with fonts and images embedded together.

Half Page

Page size: 14.8 x 21 cm (bleed 15.8 x 21.5 cm). The ad is horizontal and the size is A4 and it should be in hi-res PDF/EPS/JPEG with fonts and images embedded together.

Issues and advertisement material deadlines:

Jan/Feb/Mar issue	deadline 1 Feb
Apr/May/Jun issue	deadline 1 May
Jul/Aug/Sep issue	deadline 1 Aug
Oct/Nov/Dec issue	deadline 1 Nov

For enquiries contact:

The Editor:
Dr Amal Punchihewa
Director Technology
Asia-Pacific Broadcasting Union
2nd Floor IPPTAR Building
Angkasapuri
50614 Kuala Lumpur
MALAYSIA

E: amal@abu.org.my
T: +6 03 2282 3108
F: +6 03 2282 4606
www.abu.org.my

Circulation: The ABU is based in Malaysia and the countries that the Technical Review is distributed to include Afghanistan, Argentina, Australia, Azerbaijan, Bangladesh, Barbados, Belgium, Bhutan, Brunei, Cambodia, Canada, China (including Hong Kong and Macau), Egypt, Fiji, France, Finland, Germany, India, Indonesia, Iran, Italy, Mexico, Maldives, Mauritius, Micronesia, Mongolia, Myanmar, Nepal, Netherlands, New Zealand, Norfolk Island, Norway, Pakistan, Papua New Guinea, Philippines, Portugal, Qatar, Russia, Samoa, Saudi Arabia, Singapore, Senegal, Sri Lanka, South Africa, Sweden, Switzerland, Taiwan, Thailand, Timor Leste, Tonga, Tunisia, Turkey, United Kingdom, United States, Uruguay, Uzbekistan, Vanuatu, Vietnam, Yemen and West Indies.

BroadcastAsia2015 – Exhibition and International Conference

The four-day BroadcastAsia 2015, one of the largest and most prominent regional broadcast and ICT expos, comprising the CommunicAsia, EnterpriseIT and SatComm events, was held from 2 to 5 June at the Marina Bay Sands in Singapore. The event showcased the latest developments and trends across the broadcast, ICT, satellite, multimedia and entertainment industries.



As usual, the BroadcastAsia exhibition showcased and presented revolutionary products and technologies from international manufacturers including over 640 companies and 11 group pavilions. It featured the latest updates across the entire broadcasting and film ecosystem, from acquisition, production, media management systems to post production, distribution and delivery. The show covered a multitude of technologies, including:

- Over-the-Top (OTT) technologies
- Integrated Broadcast Broadband (IBB) systems
- SmartTV and ConnectedTV applications and STBs
- Multi-Screen Streaming Platforms
- Cloud Technologies and contribution systems
- Archiving systems, Media Asset Management (MAM) and Storage
- Automation systems and many more...

It was interesting to see that many exhibitors presented technologies centred around the OTT and connected TV platforms including second screen and social media integration. These included new systems as well as recent updates to existing applications to incorporate such functionality. In addition to technologies related to connected media, advanced LED based lighting systems were widely available on display, as well as advanced automated camera systems. The other area widely represented was 4K technology, including imaging systems, production workflow and media management systems with native 4K support.

International Conference Highlights

The international conference was organised with a choice of two or three parallel tracks running every day. After each day's opening a plenary session was offered to the participants, to select which of the two or three tracks they would attend. The tracks addressed two main areas, one track looking mostly at content and user experiences under the main theme "Content Capitalization Strategies", while others focused mainly on technology related topics under the theme, "Broadcast Engineering and Technology".

The sessions on the first day addressed two specific tracks under the two main themes. "The Road ahead for OTT", looked at new



developments in OTT, how OTT services; were expanding and new business drivers. The technology track, entitled "Immersive TV Technologies", looked at new technologies such as HEVC, High Dynamic Range, Connected TV, new delivery systems, 8K super Hi-Vision and 3D Audio. There was also a session on Spectrum issues.

The second day had three tracks, with "Second Screen and Social TV" theme on the content related track while the other two tracks covered, "Next Generation Workflow and Digital Asset Management" and "Digital Broadcasting – Standards, Technologies and Implementation". The content related track examined topics like 'Social TV Engagement', 'Connected Entertainment Experience', and 'Monetising TV Everywhere Services'. The technology tracks addressed topics such as improving workflow efficiencies, Next Generation workshop management and Digital MAM systems. A Digital Standards track specifically presented topics related to advancements in digital broadcasting standards.

The third day of the conference also had three parallel tracks. The content track focused on the theme "Get Smart with your Data – Innovating TV Services," which covered data related areas like convergence models, interactive advertising, big data applications for media and broadcasters and viewer interaction models. The two technology tracks under the themes "Cloud Distribution and Network Virtualization" and "Radio Broadcasting and Audio Technologies" explored technology topics, focused on CDN technologies, network virtualization, radio broadcasting and online delivery, as well as advanced audio technologies and applications.

The last day of the conference included two half-day workshops. One workshop addressed the topic "Repurposing Content to Enhance Viewer Engagement on Multiple Platforms" and the other featured "Enhancing Efficiencies in Your Data-Intensive 4K Workflows". Both workshops looked at modern tools and strategies in content development and workflow management with 4K content.

In addition to the regular international conference there were additional sessions organised by system proponents, manufacturers and other industry players which focused on new technologies available for their products as well as new product launches and announcements. The event also housed the 6th Creative Content Production Conference, which attracted content developers from around the region.

The BroadcastAsia event alone was attended by over 12,000 delegates from 70 countries and the combined event with CommunicAsia and associated events attracted over 48,000 delegates from more than 100 countries from around the world, to attend the exhibitions, conferences and meetings. A couple of hundred industry experts came together at the international conference sessions to share their knowledge, experience and expertise in various disciplines of the broadcast chain, providing an excellent networking opportunity and platform for the delegates.



ABU DIGITAL BROADCASTING SYMPOSIUM 2016

INNOVATING DIGITAL CONNECTIONS



Conference Workshops Exhibition



Save the dates **29 February-3 March 2016**



www.abu.org/dbsymposium

For information, email Dr Amal Punchihewa, Director ABU Technology - amal@abu.org.my

UPCOMING EVENTS



17 August – 21 September, 2015

The ABU Technology Webinar Festival is a series of online webinars offered free of cost to those interested in broadcast technology. The month long festival will include presentations on different aspects and applications of broadcast technology.

The webinar sessions will provide information on new technologies and developments in the industry. They are open to participation by all ABU members and those in the industry who are interested in broadcast technologies and their applications.

HOW DO THE WEBINAR SESSIONS WORK

Each webinar session will last around 90mins with content taken from various recent ABU Technology Department events. The webinar sessions will start at 0130hrs GMT (9:30am KL/Sin/HK time) each day and will be repeated at 0700hrs GMT of the same day (3:00pm KL/Sin/HK time). This is to facilitate the participation from different time zones.

WEBINAR TOPICS & SCHEDULE FOR 2015

The webinar sessions have been grouped under the following main themes, with a total of 24 days webinar sessions presented throughout the month long festival.

- Spectrum Issues in Broadcasting
- Workflow and Media Management: IP production, Archiving, Delivery
- Media Evolution: Integrated Broadcast-Broadband, Over-The-Top, UHDTV-1 (4K), Cloud
- Digital Radio Technologies, Implementations and Updates: Hybrid Radio, DRM, DAB+
- Digital Television: HbbTV, Next Generation TV

For more details, please go to
www.abu.org.my/webinarfest2015

Regional Workshop on OTT and IBB Hybrid Technologies for Broadcasters 29th September – 1st October 2015, Kuala Lumpur

We are pleased to inform you that the ABU has organised a regional workshop on Over-The-Top (OTT) and Integrated Broadcast Broadband (IBB) Hybrid Technologies for broadcasters. This will be of significant interest to all broadcasters in the region.

OTT and IBB Technologies can be regarded as an opportunity for broadcasters, many of whom are embracing the platforms. Implementing these technologies can help increase a broadcaster's reach and at the same time provide an enhanced experience for the audience.

The three-day workshop will introduce the IBB technologies and address some of the main issues that broadcasters may face when wanting to introduce OTT and IBB services within their portfolio. It will not only explore the technology but also look at other value added services and business opportunities that broadcasters can explore to attain a competitive edge in the market place.

INVITATION

We are delighted to invite colleagues involved in technical and production operations as well as others interested in OTT and IBB technologies in their organisations, to participate in this workshop.

REGISTRATION

Please register by latest 11 Sep 2015. As the number of positions is limited, early registration is advised.

For more details, please go to
www.abu.org.my/ott

News

from the ABU Region

Australia

Australia Releases Report on Future of Spectrum

The Australian Government has released a report, prepared by the Department of Communications, on the future directions for spectrum management that outlines recommended changes to improve Australia's spectrum management framework.

The Spectrum Review Report highlights the need to simplify the current framework to remove prescriptive regulatory arrangements and to support the use of new and innovative technologies and services across the economy.

The report recommends simplifying processes for new and existing spectrum users and increasing opportunities for market-based arrangements, including spectrum sharing and trading. The report is the outcome of a review conducted by the Department of Communications in conjunction with the Australian Communications and Media Authority, and included extensive stakeholder consultation.

The Government is currently considering the report and will prepare a response in due course. Stakeholder feedback on the report is welcomed.

(C+T)

Better Communications for Quality Programming

Australian broadcast network ABC has installed the Riedel Artist Trunk Navigator system to support a VoIP-based communications network connecting producers, journalists, and presenters working at ABC bureaus across Australia. The system facilitates simpler, more efficient, and more reliable communications between sites during production and broadcast.

For example, operators can now make direct calls from an executive producer's panel in Perth to an executive producer's panel in Melbourne. Presenters on the studio floor are equipped with a Riedel Artist RCP-1112 control panel that enables them to create their own IFB sub-mixes and make direct calls to production staff at busy times. Autocue operators are now able to create their own presenter mixes. Edit suite operators have the audio output of their editing stations interfaced into the Riedel Artist system, so they can listen back to the assets they are editing and be on communications during a news broadcast. ABC also uses local panel APIs to interface camera tallies out in the field. In Canberra, ABC has linked its Parliament House

and Northbourne site with a 15-kilometer redundant fibre link that allows technical staff to administer the entire system from either site.

(ABU News)

Hong Kong

AsiaSat Announces UHD Broadcast Initiative in Asia

Asia Satellite Telecommunications Co. Ltd. (AsiaSat) has announced a plan to deploy Asia's first dedicated Ultra HD (UHD) broadcast platform in the next few months. Initially using a C-band transponder on AsiaSat 4 at 122°E, the UHD platform, based on DVB-S2 and HEVC solutions, will be able to deliver 2-5 full time UHD channels. Transmissions will be in a free to air format, available for reception by terrestrial TV stations, pay TV platforms and home viewers across Asia which possess appropriate decoding equipment and a C-band antenna as small as 2.4 metres.

The UHD Research Laboratory was established at AsiaSat's Tai Po Earth Station in Hong Kong. This initiative is aimed at promoting and incubating the reception of UHD content under the AsiaSat footprint. The Lab is tasked to evaluate UHD solutions including the technical compatibility of satellite reception and transmission, playout and compression technologies, as well as content providers. Over the past few months, tests were successfully conducted on a variety of HEVC encoding equipment, including off-air and real-time transcoding of channels at various bit rates.

(onscreenasia.com)

TVB – Hong Kong Invests in New Technology

Since October 2014 TVB is still investing heavily in new technology to maintain its competitive edge in the industry. It has recently acquired 20 units of Sony HDC-2000 3G double-speed multi-format cameras to improve its variety shows. It has also invested in 9 units of HDC-2400 multi-format camera for its drama studio productions.

TVB, a commercial TV station in Hong Kong is one of the largest producers of Chinese language programming in the world. Many of its programmes are dubbed into other languages and distributed worldwide including Asia, Australia, Europe, North and South America accessible to over 300 million households.

In Hong Kong, TVB has 5 free-to-air digital channels and also operates a pay-TV service. In 2007, TVB introduced High Definition to its viewers in Hong Kong. And in 2012, it embarked on a newsroom transformation to a file-based workflow. The file-based workflow is critical not just to get content on air quickly and efficiently, but vital for TVB to help it stay abreast with the rapid developments in the broadcast industry.

(ABU News)

India

Tata Sky Selects Ericsson to Enhance Video Services

Ericsson has announced that Tata Sky, India's leading direct-to-home (DTH) operator, has chosen the Ericsson AVP 4000 System Encoder to enhance TV viewing experience for its customers. Tata Sky has upgraded and expanded its entire DTH platform to the AVP 4000 System Encoder, Ericsson's video compression platform. The upgrade enables Tata Sky to substantially increase the bouquet of channels offered to subscribers while maintaining the highest quality of viewing experience.

Ericsson is one of the leading providers of video compression solutions in the Indian satellite broadcast and DTH arena with four out of the seven DTH operators being based on Ericsson's video compression technology. In March this year, Ericsson supported Tata Sky to launch the first commercial 4K video service in the subcontinent. Customers subscribing to the 4K service could watch video up to four times the resolution of the standard high definition (HD) video currently available.

Ericsson predicts that total mobile video traffic over the next six years (2015-2020) will be more than 17 times that of the last six (2009-2014). With availability of more content for an ever increasing number of video-enabled devices, it is critical to maximise video delivery over available bandwidth and multiple networks.

(tvtechnology.com)

Doordarshan implements Fully-Integrated MAM and Archive Solution

Tedial, one of the leading independent MAM technology solutions specialist, has announced a major sale of its Tarsys enterprise MAM system to Indian public service broadcaster, Doordarshan. The Tedial system, installed at Doordarshan's Kolkata facility provides its operators with core and browser-based desktop media tools as well as a fully integrated archive system, able to scale in volume and throughput. The Tedial archive will connect to Doordarshan's sites in other regions as well as its central archive in Delhi. The installation was carried out by Tedial's Indian partner MediaGuru.

Doordarshan provides television, radio, online and mobile services throughout metropolitan and regional India and

overseas through the Indian Network and also Radio India. As well as delivering a fully equipped archive, Tedial's Tarsys MAM will enable Doordarshan to ingest its existing U-matic, Betacam SP, DVCPR050 and XDCAM HD422 programme content stored on tapes and optical disc media, into the system in both high and low resolution formats. Tarsys is fully integrated with 30TB of HP Online Storage and a 48-slot HP LTO6 tape library as well as Tektronix Cerify QC for automated quality control of file-based content. It enables operators at the facility to browse, catalogue, search and store content via the Tedial web-client.

(C+T)

Japan

World's First Public Presentation of 8K Super Hi-Vision Satellite Broadcasting Experiment

This year's NHK Science & Technology Research Laboratories Open House presented the latest research achievements to the public for four days from May 28 to 31. The world's first public presentation of the satellite broadcasting experiment was one of its highlights. Anticipating the start of test 8K broadcasting in 2016, 8K signals transmitted from the NHK Broadcasting Centre in Shibuya via the broadcasting satellite currently used for BS satellite broadcasts will be received in 8K at the venue of upcoming STRL Open House.

Video coding equipment (the next-generation HEVC*2) compresses 72Gbps 8K signals to 85Mbps for decoding on a newly developed real-time decoding device. The system uses an MMT*3 with coding and decoding functions for 22.2-multichannel sound system for use with MPEG-4 AAC*4 to perform the combined, multiplex transmission of video and sound with satellite transmission modulation at the high transmission efficiency of 16APSK*5 to transmit at roughly 100Mbps. By incorporating technical elements for the realisation of 8K broadcasting, this public demonstration will enable visitors to gain the advance experience of next year's test 8K broadcasts.

(ABU News)

Malaysia

Media Prima Upgrades with HARMAN

Media Prima, Malaysia's leading integrated media investment group, recently purchases five HARMAN Soundcraft Si Expression 2 digital audio consoles for its Fly FM Radio commercial production studio.

According to FLY FM's Engineering Manager, Simon Lee, the Si Expression 2 is feature-packed and highly versatile. "I'm very impressed with the compact design, flexible fader configuration, and built-in Lexicon processors," he said. "Its scalability makes it suitable for use in our production studios, recording suites, or for live PA."

According to Mahajak Trio Senior Manager, Sales & Project, Lee Chin Kah, the Soundcraft Si Expression console is very user-friendly and easy to teach, suitable for all applications where audio mixing is required, including broadcast, PA, houses of worship, music venues, recording and tour sound. "People with less experience in sound mixing can learn it very fast because of its intuitive design," Chin Kah noted. "The expansion slot also allows many digital option formats."

(C+T)

Myanmar

ABU Music Exchange Initiated

Music Exchange is a new ABU activity due to start soon. Agreements on the scope and methodology of operation of this new initiative were reached yesterday in Yangon, Myanmar among several ABU members participating in 2015 RadioAsia Conference. Radio Romania was nominated by members to play an important role in the music exchange project.

The ABU Secretariat will develop an Internet-based platform for music exchange where content will be easily accessible to members. Additionally, the participants decided to initiate a new project to set up a CD dedicated to the UNESCO World Cultural Heritage, by collecting from each interested member one music item per country part of this world heritage.

(ABU News)

Nepal

ITU Deploys Emergency Communication Equipment in Nepal

ITU has deployed emergency telecommunication equipment in Nepal following the 7.8 magnitude earthquake that hit the country on 25 April 2015. The emergency equipment includes 35 satellite mobile phones and 10 satellite Broadband Global Area Network terminals along with solar panels and laptops to support relief coordination efforts.

According to the UN Office for the Coordination of Humanitarian Affairs (OCHA), initial government reports confirm that 30 out of 75 districts in the country have been affected in the Western and Central Regions, including Kathmandu Valley. This includes mountainous and hilly terrain in areas where rural populations are widely dispersed as well as some very densely populated cities – the greater Kathmandu area, Bhaktapur and Pokhara.

At the Third UN Conference on Disaster Risk Reduction held in Sendai, Japan, ITU addressed the importance of linking information and communication technologies to disaster risk reduction. ITU considers emergency telecommunications an integral part of the post-2015 development agenda.

(ITU)

Singapore

Laughing Out Loud with Toggle Laughs

Toggle which is MediaCorp's bilingual portal with entertainment and lifestyle content is bringing to its audience a series of new content from side-splitting parodies, comedy classics to foul ups, bleeps and bloopers.

Toggle has also teamed up with the creators of the award winning series The Noose, to provide new and exclusive material – only on Toggle Laughs. So whether it's short clips from popular series or entire episodes of comedy classics such as The Ra Ra Show, Under One Roof, and Phua Chu Kang, Toggle viewers will discover a whole new world of comedy all under one roof.

(onscreenasia.com)

MediaCorp Singapore goes with Octopus Newsroom

Singapore's leading media company, MediaCorp, has selected Octopus7 to be at the heart of its multi-lingual newsrooms. The new production system went live in February 2015, replacing the previous newsroom system.

MediaCorp operates numerous local, national and regional TV, radio and interactive channels. It therefore needs an efficient, flexible, and cost-effective news solution to manage its news production demands. Octopus was awarded the project after an extended period of testing to assess its core functionality, multi-lingual proficiency. This was particularly important as MediaCorp serves an audience that is exceptionally diverse. Octopus Newsroom has native support for non-Latin scripts, making it ideal for multi-lingual environments. One key stipulation for the MediaCorp installation was support for a software suite that enables its journalists to create, edit, convert and publish Tamil content on Windows and Mac OS X operating environments.

Octopus is now integrated with the broadcaster's other third party editing software, and MOS-compliant systems, including automation, graphics, subtitling, archive and video servers. Supplied, installed and integrated by Benchmark Broadcast Systems, the new system is now on-air. The Octopus7 system caters to its studio-based news journalists and operators. Mobile clients are also being supplied to enable remote production, publishing, and rundown access.

As a next-generation solution, Octopus has sophisticated Twitter and YouTube connectivity, analysis and interactivity built-in. This will enable MediaCorp and its journalists to engage with audiences throughout the region both in terms of journalistic research and multi-platform delivery. In another development, Octopus Newsroom now gives MediaCorp users the ability to create a Quick Story to add a news item to an existing rundown. With the rundown open, journalists can drag and drop a Quick Story to the rundown, without having to open, edit and manage the rundown. This way of working is exceptionally

slick, giving newsrooms the ultimate flexibility in fast-moving stories.

(octopus-news)

Southeast Asia

Panasonic Opens Four Showrooms in Southeast Asia

Towards improving market visualisation, Panasonic Asia-Pacific and its group companies opened four showrooms in Myanmar, Indonesia, and Cambodia in the first half of 2015. The three showrooms in Yangon and Mandalay, Myanmar; and Phnom Penh, Cambodia; which showcase the company's full array of Business-to-Consumer (B2C) products and Business-to-Business (B2B) solutions, are integrated with service centres. Panasonic Business Showroom in Jakarta, Indonesia, is a dedicated B2B showroom targeted at government and business partners.

As fast-growing countries with sizeable young populations and untapped opportunities, Myanmar; Indonesia; and Cambodia are key markets for Panasonic in the Asia-Pacific region. Panasonic aims to create a better life and a better world by enhancing quality of living through innovative electronics that cater to different lifestyle needs. These include home and cooking appliances, beauty and grooming products, televisions, audio-visual products and cameras.

(C+T)

App Usage on the Rise for Kids Watching TV

In Southeast Asia, children are moving more and more to digital platforms to watch their favourite TV programmes. In its New Generations survey, Turner Asia Pacific looked at the behaviour and spending power of children aged four to 14. Not surprisingly, multi-screen content experiences continue to be key with Southeast Asia's junior consumers. While the study found TV to be the top medium, with 92% of kids watching TV in the last month, digital platforms followed closely at 89%.

Co-viewing was also up, with seven in 10 children regularly viewing movies, cartoons and comedy programs with their parents. And aside from their peer groups, TV and online were also the most important media for kids to find out about things that appeal to them. Of all the Southeast Asian households surveyed, 94% now have a smartphone and 76% of kids have access to, or own a mobile device. Notably, children are using apps more often than websites. Roughly 86% of children in the region are using an app at least weekly, up 34% from last year. Additionally, the study found kids engaged with at least five apps per month.

The report showed that children are also increasingly taking control when it comes to how they access the internet, and are asserting their influence on household purchases. The report evaluated more than 1,500 online responses from

child-and-parent pairs from affluent households in Manila, Singapore and Jakarta.

(ABU News)

Thailand

NationTV Selects Brightcove Video Cloud

Brightcove, a leading global provider of cloud services for video, has announced that NationTV, an SD News Digital TV channel operated by the Nation Broadcasting Corporation Public Company Limited, has partnered with Brightcove to launch its brand new website, NationTV.TV using Brightcove Video Cloud. Video Cloud will enable NationTV to rapidly deliver high-quality video experiences to satisfy audiences across a multitude of platforms and devices.

With a longstanding history of being a popular source of news and other content for audiences in Thailand, NationTV also caters to a wide range of tastes and demographics across Thailand, with local and international news from across the globe. With Brightcove Video Cloud, NationTV will continue to provide news online via the launch of a newly designed and dynamic website. This implementation comes at a time where digital content and consumption is surging in Thailand and NationTV will leverage Brightcove Video Cloud to take advantage of this growth by delivering high-quality video experiences to all users.

(Nextvasia.com)

Thaicom with First 2nd Screen Platform in Thailand

Thaicom, one of Asia's leading satellite operators, alongside a joint venture between Kantana Group and Intouch Holdings has announced the launch of its first 2nd Screen platform deployment in Thailand. The service will first be used to air Gossip Girl, licensed from the Gossip Girl TV series in the USA, on one of Thailand's biggest broadcasters: the Channel 3 Television Network.

Whether it be for emailing, texting, shopping, social networking or web browsing, Tablet and Smartphone owners are often using their mobile devices while watching television. The 2nd screen service will actually encourage viewers to use their Smartphones while watching the show.

The second screen platform will enhance users' viewing experience by giving them access to additional content on a mobile device while watching the show on their television. Additional content will include on-demand video including uncensored versions of the show and bonus scenes, additional information about characters, actors and plotlines, as well as games, quizzes, shopping and social networking opportunities.

The 2nd screen service will be available for download in Apple Store & Play Store at the end of June. The eighteen-episode series of Gossip Girl will air in early July on Thailand's Channel 3 Television Network at 11pm every Thursday.

(realwire.com)

Digital Broadcasting Update

1. DVB-C2 Prepares For Tokyo Olympics



The DVB Steering Board recently approved a number of extensions to its DVB-C2 specification. These include the new extensions requested from Japan for its envisaged use of DVB-C2 for UHD-2 services during the 2020 Tokyo Olympics. Others include the GSE-lite signaling protocol allowing the efficient encapsulation of IP and other network layer packets over DVB-C2.

The next work items on the agenda for the DVB-C Technical Module will include: guidelines for the usage of channel bundling and the implementation and usage of the Early Warning System (EWS) signaling information.

(DVB)

2. First UHD-1 Phase-2 Trials Using Higher Frame Rate with HEVC Temporal Scalability over DVB-T2 in Spain

Researches of the Mobile Communications Group (MCG) of the Institute of Telecommunications and Multimedia Applications (iTEAM) of the Universitat Politècnica de València in Spain, have carried out the first transmission trials using the DVB-T2, and the Ultra High Definition format known as “UHD-1 Phase-2”, nowadays under study within the DVB Commercial Module.



The novelty of this trial is the use of Higher Frame Rate (HFR) with temporal scalability of 50fps and 100fps. Scientific studies conducted by the BBC, ITU and EBU, have concluded that for large screens, a temporal resolution of 50/60 fps can cause problems for motion portrayal, such as flicker, motion blur, and jerkiness. So a higher resolution demands also higher temporal resolution.

However, the high bitrates needed for the encoding of such HFR formats can be an issue for devices with limited

computation capability, such as tabs or smartphones. For this reason, the temporal scalability encoding can arise as a reasonable and helpful solution for these scenarios.

The temporal scalability is already included in HEVC Version 1, with a sub-layer concept very similar to the temporal level concept in the scalable extension of H.264, denoted as SVC (Scalable Video Coding). This feature allows a simple backwards compatibility for the “UHD-1 Phase-1” IRD, being able to decode the lower temporal resolution of 50/60fps by discarding all NAL units with temporal sub-layer larger than zero, from a 100/120fps bit stream. Other approaches for backward compatibility can be implemented, such as the use of different PIDs for different temporal layers.

In the trial, the 3840x2160 sequences were encoded using a HEVC Level 5.2 with a bit rate of 20Mbps and a GOP structure of 8 frames. The service was delivered by means of the DVB-T2 standard using the mode 8 MHz 16K 1/16 PP2 64QAM 2/3 which enables error-free reception at C/N 13.5 dB in AWGN channel.

(iTEAM)

3. First Ultra HD Transmission at High Dynamic Range



SES and Samsung have demonstrated the world's first DVB broadcast of high dynamic range Ultra HD (UHD) TV that uses High Dynamic Range (HDR) technology.

The transmission from an SES satellite at 19.2 degrees East uses existing DVB UHD Phase 1 specifications and BBC Research & Development's High Dynamic Range (HDR) technology directly to a Samsung SUHD TV.

Developed by BBC R&D, the Hybrid Gamma (HDR) technology enables simultaneous delivery of Standard Dynamic Range to existing UHD TVs and High Dynamic Range to new generation UHD TVs from the same content payload.

The demo took place at the annual SES Industry Days in Luxembourg. The demonstration is a major milestone for

the Ultra HD broadcast chain and its use of existing DVB Broadcast Networks.

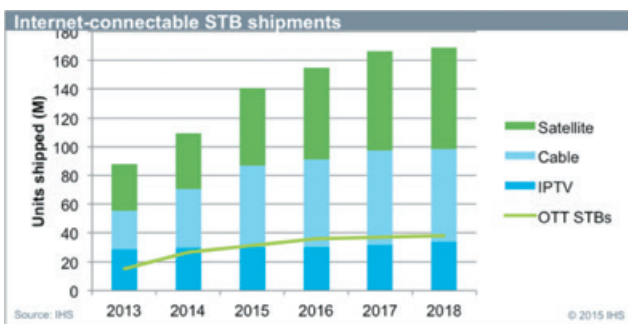
(Broadbandtvnews)

4. Retail OTT Set-Top Boxes Will Overtake Telco IPTV Set-Top Box Shipments in 2015

Global shipments of over-the-top (OTT) set-top boxes (STBs) sold at retail – including Apple TV, Chromecast and Roku boxes – will overtake shipments of IPTV STBs used for pay-TV services in 2015, according to a new report from IHS. This year, 31 million retail OTT STBs will be shipped, compared to 30 million IPTV STBs shipped by telcos.

Based on the latest information from the *Set-Top Box Market Monitor* report from IHS Technology, the success of OTT STBs can be attributed to the content strategies of their respective vendors. Apple, Google and Roku have been much more aggressive in adding new content sources and apps to their STBs than TV and gaming console vendors have to their devices.

Pay-TV operators have also embraced OTT by deploying their own Internet-connectable STBs and OTT services designed to compete with OTT video providers. Operators are increasingly relying on OTT capabilities in their STBs to enable catch-up TV, larger video-on-demand (VoD) libraries, as well as search, recommendation and other content discovery features. This level of functionality has become a consumer expectation for pay-TV services. Some Belgacom, Dish Network, Virgin Media and other pay-TV operators have even started providing access to Netflix and other OTT video providers' services.



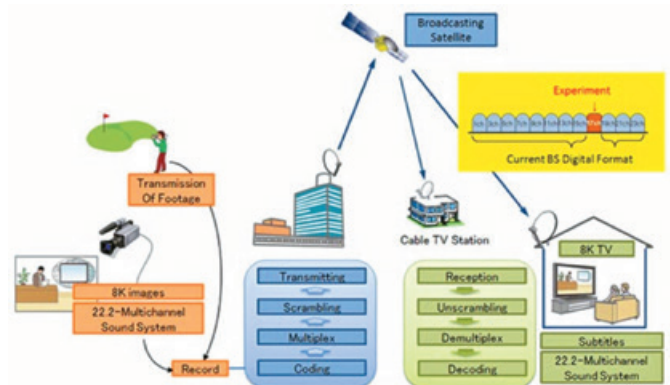
Total shipments of connectable pay-TV STBs, which include Internet protocol television (IPTV) STBs, as well as cable TV STBs and digital terrestrial television (DTT) satellite STBs, have far outpaced shipments of OTT STBs. In 2018, connectable pay-TV STB shipments will grow to 169 million units, compared to 38 million retail OTT STB shipments. (IHS)

5. NHK presents public demonstration of 8K

One of the main highlights features the world's "first" public presentation of the satellite broadcasting experiment. Anticipating the start of 8K test broadcast in 2016 in Japan, 8K signals transmitted from the NHK Broadcasting Center in Shibuya via the broadcasting satellite currently used for BS Japan's satellite broadcasts will be received in similar resolution at the venue of upcoming STRL Open House.

For the presentation, HEVC (High Efficiency Coding)/H.265 video coding equipment compresses 72Gbps 8K signals

to 85Mbps for decoding on a newly developed real-time decoding device.



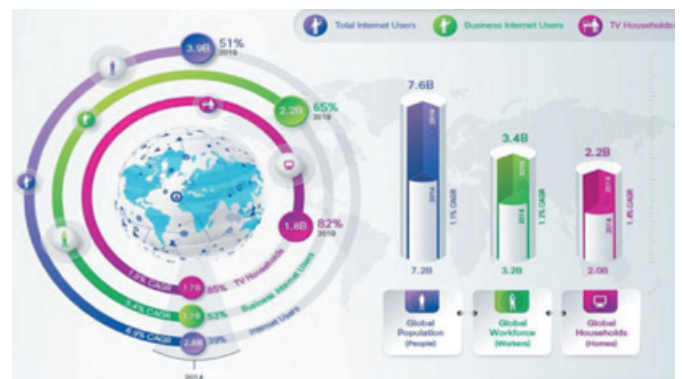
The system uses an MMT (MPEG Media Transport) with coding and decoding functions for 22.2-multi-channel sound system, for use with MPEG-4 AAC to perform the combined, multiplex transmission of video and sound with satellite transmission modulation at the high transmission efficiency of 16APSK to transmit at roughly 100Mbps.

By incorporating technical elements for the realisation of 8K broadcasting, the public demonstration aims to present visitors with an advance experience of next year's 8K test broadcasts in Japan.

(NHK)

6. IP Video to Account for 80% of Global IP Traffic within the Next Four Years

Internet Protocol (IP) video is forecast to triple between 2014 and 2019, when it will reach a record two zettabytes, according to a recent report from Cisco. The 10th annual Cisco Visual Networking Index (VNI) Forecast report indicated that IP video will represent 80% of global IP traffic by 2019 – more than two-thirds of all global IP traffic.



The report further highlighted that more than 14% of monthly global IP traffic will come from cellular connections and 53% of monthly IP traffic will come from Wi-Fi connections, and pointed out that differentiated and monetisable mobile strategies would be important for all service providers.

Cisco reminded IP networks to be "intelligent and flexible" enough to support the constant introduction of new/updated applications for fixed and mobile networks, and urged service providers to collaborate with application and content developers to differentiate their services.

(APB)

Equipment Trends

1. Pure Digital Highway 300Di



If your car isn't already fitted with a digital radio, this is a handy aftermarket option. The Pure Highway 300Di consists of three parts: a main unit with all of the connections, which sits behind your dashboard or in the glovebox and is wired into your existing stereo, a windscreen-mounted aerial, and a controller.

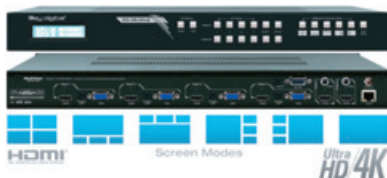
Installation is a complex job so needs to be done by a professional. In addition to DAB, the main unit also has connections for iPods, standard USB memory devices and a 3.5mm aux-in, and your installer should be able to route the appropriate cables to where you need them.

Once done, you'll be able to listen to DAB radio, and music from your iPhone/iPod/USB stick, through your existing car stereo.

(Whathifi)

2. Multi-View Series 4K Matrix Switcher

Key Digital's Multi-View Series KD-MLV4x2 is a seamless matrix switcher with UHD/4K resolution up-scaling, multi-view window processing, analogue to digital conversion of incoming VGA or YPbPr with analogue audio signals, audio de-embedding, and independent audio from video matrix selection.



KD-MLV4x2 is designed to fit a wide variety of professional video installation and live-event needs. It is ideal for digital signage, video wall, conference & board room, class room, home-theater, and bar/restaurant applications.

The KD-MLV4x2 simplifies 4K multi-view installations by offering all video, audio, and control capabilities needed for the most technical applications and is backed with a lifetime warranty.

(Key Digital)

3. Next Generation of Video Wall Controllers

Seneca prysmHDplus video wall controllers powered by Matrox Mura MPX capture & display cards.



The prysmHDplus is an all-in-one hardware platform that provides a versatile solution for video walls, control rooms, projection installs, and kiosk displays.

Special Features and Benefits of the prysmHDplus:

- Up to 28 inputs and 28 outputs of full HD video in a single box
- Compact controller with only a 20" depth
- Tuned OS, custom BIOS, and balanced drivers ensure best-in-class performance
- Available as turnkey appliance with up to 7 Matrox Mura MPX cards and MuraControl Software
- Validated by Matrox

(Matrox)

4. The World's First DOCSIS 3.1 Cable Modem System-on-a-Chip (SoC)



The BCM3390 cable modem SoC delivers video content with a nearly 50 percent increased efficiency on existing spectrum allocations and allows for the delivery and use of a new range of content and services. The single device supports high-speed data rates exceeding 1 Gbps. The BCM93390 modem reference design with integrated Wi-Fi provides up to 2 Gigabit speeds in the home, providing a path for cable operators to transition to all-IP video.

Key Features of the BCM3390

- Full compliance with full DOCSIS 3.1 specification, including:
- Two OFDM 196 MHz downstream channels
- 32 single-carrier DOCSIS 3.0 QAM downstream channels
- Two 96 MHz OFDM-A upstream channels
- Eight single-carrier DOCSIS 3.0 QAM upstream channels

- Includes full software support for packet cable voice and e-router applications, including emerging RDK-B software for broadband modem solutions

(Broadcom)

5. New GLD Chrome Edition

The Chrome Edition GLD-80 and GLD-112 mixers have been redesigned with a new metallic livery, while the AR84 and AR2412 AudioRacks have received a sleek black finish.



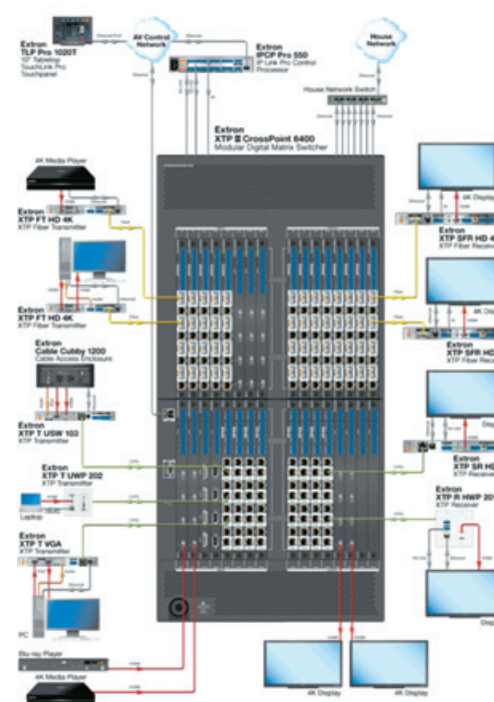
The automatic mic mixer (AMM) can be configured to work across all 44 microphone sources, allowing the user to select which inputs should be auto-mixed without the usual restrictions of a 16 channel insert based system. The AMM can be set to work in two modes – ‘D-Classic’ dynamic gain sharing for a simple quick set-up, and ‘Number of Open Microphones’ (NOM) logic gate technology for a more flexible and sophisticated auto mix. A Best Mic Lock system detects cross talk between different sources and limits open microphones.

GLD Chrome firmware includes a unique new DEEP Plug-In architecture that allows users to select from a number of different processing units on every input and mix channel. Two new RMS-VCA inspired compressor models, the 16T and 16VU, are included. Integrated within the mixer's channel processing, all six compressor models can be selected on any of the input and mix channels on the fly, without burning valuable FX slots or adding latency.

(allen-heath)

6. XTP II CrossPoint Series with 50 Gbps Switching Backplane

The XTP II CrossPoint® Series modular digital matrix switchers represent a monumental leap in engineering and product design, providing unmatched, high performance routing of video, audio, bidirectional control, and Ethernet in a future-ready integrated solution. The 50 Gbps digital backplane easily exceeds the data rate required to distribute 4K/60 video with 4:4:4 chroma sampling at 16 bits per color. This offers an immediate path to support emerging formats and higher resolutions. These matrix switchers can be configured with a variety of boards, including the XTP II HDMI input and output boards that support HDMI 2.0 and HDCP 2.2, the family of XTP 4K fibre optic boards and endpoints, and any of the existing XTP Systems® family products. To streamline system installation, they are loaded with proven Extron technologies and feature hot-swappable modular components, easy-to-use system configuration software, and advanced 24/7 system monitoring and control capabilities. They are available in three configurable frames for I/O sizes from 4x4 to 16x16, 32x32, and 64x64 to meet the application needs of today's AV switching and distribution systems. XTP II CrossPoint



Delivers AV Infrastructure for 4K and Beyond

is the definitive AV industry standard you can depend on now and in the future to meet the challenges of 4K and beyond. XTP Systems® with XTP II CrossPoint Series matrix switchers are designed to ensure continuous, troublefree operation in the most critical 4K video applications.

(Extron)

7. 4K System Camera with Three 4K Image Sensors



The new HDC-4300 is the world's first camera to use three 2/3-inch 4K image sensors. It supports the same B4-mount lenses as well as the same control surfaces as Sony's industry leading HDC-2000 series cameras. The existing HDLA-1500 series, control and shading systems, viewfinders and master set-up units are all interchangeable between the HD and 4K systems. Directors and operators can keep their approach to live events – including camera angles, zoom ranges and iris settings – while using familiar camera technology.

The new HDC-4300 is capable of 4K/HD operation, with 2x, 3x Super Slow Motion as standard, and higher speeds up to 8x available, to produce high-quality replays and specialty programme effects.

The camera uses ultra-high-precision alignment technology to realise three 4K sensors on a new prism. This allows the support of the next-generation ITU-R BT.2020 broadcast standard's widened color space for future-proof masters or post production options for today's productions, shown on tomorrow's 4K services

(Sony)

Personalities & Posts



Mr Masakazu Iwaki
Promotion for ABU TC Chairman

The Chairman of the ABU Technical Committee, Mr Masakazu Iwaki, has been promoted at NHK-Japan. He is now Head of the Human Interface Research Division in the NHK Science & Technology Research Laboratories, STRL. The division handles such services as user-friendly information presentation, speech recognition for closed captioning, speech and audio signal processing for the elderly, and language processing for barrier-free services. Mr Iwaki was formerly Senior Manager in the STRL's Planning & Coordination Division. The ABU congratulates him on his promotion.



Mr Kentaro Higashijima
ABU Transmission Topic Area Chairman

Mr Kentaro Higashijima has taken over as Chairman of the ABU Transmission Topic Area. He succeeds Mr Takahiro Izumoto, who has been promoted to another division at NHK. Our sincere thanks go to Mr Izumoto for his services to the ABU Technical Bureau. We wish him well in his new role, in which he will be involved with 8K production and public viewing.

We warmly welcome Mr Higashijima as the new Chairman of the ABU Transmission Topic.



Muhammad Javed Bashir
Pakistan Television Corporation Limited

Mr Muhammad Javed Bashir has been appointed the ABU Technical Liaison Officer of Pakistan Television Corporation Limited. He is Deputy Controller Engineering of Planning & Procurement. Mr Javed is experienced in both Satellite

Communication and Radio Television Broadcast Engineering. He received his Bachelors degree in Electronics Engineering from Dawood College of Engineering & Technology, Karachi & Masters degree in Project Management from COMSATS Institute of Information Technology, Islamabad. During his career Mr Javed has worked closely with the ABU Technology Department on many activities



Changes in Engineering Awards Judging Panels

The ABU Engineering Awards judging panels have changed. The new line-up can be found in this issue of the review. The ABU is pleased to welcome the new judges, Mr Hamid Dehghan Nayeri of IRIB-Iran, Mr Tharaka Mohotty of MTV-Sri Lanka, Mr Robin Kim, Myung Nam of KBS-Korea, Mr Sanjay Salil of MediaGuru-India and Mr Charles Sevier of EMC2. We wish to thank the past judges, Dato' Abu Bakar Ab Rahim of RTM-Malaysia, Mr Chris Grey formerly of SONY-Hong Kong, Mr Seon Wong Kim of KBS-Korea and Professor Du Baichuan of RTPRC-China, for their huge contributions.



Charles Sevier
EMC2



Chris Grey
Sony-Hong Kong



Dato' Abu Bakar Ab Rahim
RTM-Malaysia



Hamid Dehghan Nayeri
IRIB-Iran



Professor Du Baichuan
RTPRC-China



Robin Kim
KBD-Korea



Sanjay Salil
MediaGuru-India



Seon Wong Kim
KBS-Korea



Tharaka Mohotty
MTV-Sri Lanka



ACT NOW...

Don't let this happen to your content, act before it's too late.
Talk to us for end-to-end digital archiving solutions.

DIGITIZE. ARCHIVE. MONETIZE.

77 Robinson Road, Level 34, Robinson 77, Singapore 068896
marketing@mediaguru.com | www.mediaguru.com | [@mediaguru](https://twitter.com/mediaguru)



Call Now!

+65 68092247



Panasonic

THE DVX 4K



AG-DVX200 NEW 4K CAMCORDER

Artistic Image quality by 4/3" Sensor

Shallow Depth Of Field, Variable Frame Rate (120fps: FHD, V-Log L (12stop:TBD))

Easy to Use & Mobility by Opt 13x Fix Lens

Leica Dicomar Opt 13x Fix Lens, Wide28mm, Intelligent Auto Focus, 5axis Image Stabilizer

Super High Resolution 4K/60p REC

4K/UHD (MP4/MOV), SD Card REC

4K
PROFESSIONAL