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ABU Technical Bureau Mid-Year Meeting in Kuala Lumpur

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Cover:
*ABU Technical Bureau
Mid-Year Meeting
in Kuala Lumpur*



Asia-Pacific Broadcasting Union

TECHNICAL REVIEW

From the Editor's Desk



This edition of the Technical Review reports the ABU mid-year technical bureau meeting, a number of other activities we organised and carried out and some events we partnered.

The Technical Bureau proposed actions and strategies for accelerating the analogue to digital transition of television services, safe-guarding spectrum for broadcasting for the foreseeable future and capacity building for future broadcasting.

There is an article on implementation of digital radio broadcast services, resulting from of discussions which took place during DBS-2016. The article links to a story on a mobile device manufacturer who has implemented a digital radio chip in mobile phone, which is a success story for the Broadcast Unions.

The ABU technical committee schedule and Pacific Media partnership conference and workshop programmes are published as an invitation for ABU members to participate in those events.

This edition also carries reports on BroadcastAsia, CCDDR, collaborations with our sister union, ASBU and a pre-summit workshop organised during the Asia Media Summit on Digitalisation.

A detailed case study on Analogue Switch-off in South Korea is based on a discussion and presentation at AMS-2016 and provides some guidelines for other broadcasters who are planning ASO in their respective countries.



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

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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

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Planning and Implementation of Induction Training for the Programme & Engineering Officials of Prasar Bharati

abstract

Prasar Bharati (India's Public Broadcaster) is one of the largest broadcasting networks in the world. The **National Academy of Broadcasting and Multimedia, NABM (formerly known as Staff Training Institute STI (T))** is its premier training academy. The prime objective of the academy is to develop and nurture the broadcast professionals of All India Radio & Doordarshan for optimum performance in the dynamic ever changing broadcasting environment. Established in 1948, the academy has grown over the years and emerged as training hub for broadcasters in the Asia-Pacific region.

Equipped with state-of-art broadcasting technology, NABM provides quality training to broadcast professional in various area of production, transmission and new media technology. Annually it conducts more than 70 training programmes catering to about 1600 broadcast professionals from India and abroad. Apart from this, the academy collaborates with the Asia-Pacific Institute for Broadcasting Development (AIBD) and Asia-Pacific Broadcasting Union (ABU) to organise training/workshops for the radio and television engineering personnel of various countries in the Asia Pacific region.

This paper highlights the massive exercise and planning done by the National Academy of Broadcasting & Multimedia for the on-going induction training programme (ITP). This experience can be usefully shared among the member countries of the Asia-Pacific Broadcast Union (ABU).



by Mr I I George,
ADG (TRG)

Addl. Director
General (Training) at
National Academy
of Broadcasting and
Multimedia



Mr Shashi Kant

Dy. Director General at
National Academy
of Broadcasting and
Multimedia

1. Introduction

Prasar Bharati, the Public Service Broadcaster of India, a statutory autonomous body established under the Prasar Bharati Act, came into existence in 1997. The objectives of Public Service Broadcasting are achieved through its two wings, namely All India Radio and Doordarshan. Earlier All India Radio and Doordarshan worked as media units under the Ministry of Information & Broadcasting, Government of India. The National Academy of Broadcasting and Multimedia (NABM) is its premier training academy focussing on development and nurture of the broadcast professionals for their optimum performance in the dynamic ever changing broadcasting environment. Earlier this academy was known as the Staff Training Institute (STI). The training activities of the academy are further supplemented by its regional academy/institutes located in different parts of the country. The regional institutes are primarily intended to meet local training requirements. Taking forthcoming challenges into consideration regional academy at Bhubneshwar was recently upgraded to a National level academy.

Before formation of Prasar Bharati there were regular

inductions of young blood in all cadres and continuous training of its employees. However, after the formation of Prasar Bharati the regular recruitment of employees became affected and there was virtually no fresh intakes into the organisation till 2013. This resulted in depletion of manpower and some of the vital functions of the organisation becoming adversely affected. The problem was finally addressed by Prasar Bharati initiating a mass recruitment in 2013. Now the process of recruitment into the large number of vacancies has been completed. More than 1500 engineers and programmers were inducted in one go most of whom have already joined at their respective places of posting. Planning of induction training programme (ITP) for such a massive scale was a big challenge. ITP has to be completed within the fixed time frame, Accordingly the planning & detailed outlining of each and every activity was framed to make training programme a valuable and effective process. The training process has already been initiated & ITP of first fourteen batches of induction training programme is already over.

2. Recruitment

Normally recruitment of staff for the programme and engineering wings was done through in-house recruitments by NABM. However, as the recruitment of personnel was quite large, the responsibility of recruitment was entrusted to the Staff Selection Commission (SSC), which is an autonomous recruitment body under the Government of India. Recruitment of around 1500 personnel in following categories was done.

1. Engineering Assistant
2. Programme Executive
3. Transmission Executive
4. Production Assistant
5. Technician

The recruited staff first joined their respective places of posting from they were called in-turn, to join the ITP. While the recruitment process was under way, NABM focussed on ground work & preparation for foreground challenges. The intention was that induction training had to be provided at the earliest opportunity after the new staff joined.

3. Objectives

Recruitment of new members of a team is a time-consuming and costly process. Accordingly, for Prasar Bharati it was important that the newly recruited staff should start working productively as soon as possible. For effective programme production synergy between programme & engineering staff is of utmost importance; accordingly the objective was to organise ITP involving programme & engineering staff together, with the intention of helping to transform the culture. Earlier practice was to organise independent training for programme & engineering staff. For new entrants induction training is compulsory & has to be successfully completed within the probation period of two years to become confirmed in the Prasar Bharati Service.

The ITP is primarily focussed to groom programme & engineering trainees in production and technical skills by giving them sufficient practical exposure to working in a real programme production environment. From the engineering point of view ITP focusses on both production and transmission technology.

After the completion of induction training programme the participants will:

- a) Have acquired a good knowledge about the organisational structure, culture and work ethics, which will allow them to better integrate into the workplace.
- b) Have acquired knowledge about their job functions; ensuring that new employees are productive as quickly as possible.
- c) Have acquired the technical skills necessary for their job functions.
- d) Develop synergy for effective functioning and team work.

4. Training Scheme

The induction training process for newly recruited programme & engineering staff will continue in batches for almost 2 years and each batch will go through the regress training of nine weeks. During this period they are exposed to all the nuances of Radio & Television Broadcasting along with organisational know-how. To ensure that induction training of all the inducted staff completed within the stipulated time, training is planned at both the NABM i.e. Delhi & Bhubaneswar simultaneously. Secondly, simultaneously training two batches, with an offset of four week is planned at each NABM. The first batch of the Induction Training Programme started on 15th June 2015 and until now fourteen batches of ITP have been successfully completed. The induction training programme of 9 weeks is divided into three modules.

Module-I is of one week. This module is common for programme & engineering trainees. Trainees get general exposure to the role of the public broadcaster and learn about Prasar Bharati, its history, Mandate, structure & functioning in particular. Topics on corporate values, the functioning of All India Radio & Doordarshan its structure, personnel policies, discipline, rules of conduct, benefits and facilities are also covered. The importance of issues like working safely & gender sensitisation are also highlighted. After the completion of this module trainees are well conversed with the organisational setup & their role in the organisation.

Module-II is of five weeks duration. In this module programme & engineering trainees are exposed separately on nuances of programme production & engineering aspects of radio & television broadcasting techniques. They are also given a basic idea of new media & emerging trends in broadcasting. During this period they go through classroom sessions, demos, practical session and field visits to different radio & television facilities operating in the network. After completion of this module trainees develop a basic understanding of programme production & post-production techniques in radio & television. During the module engineering trainees are exposed to both analogue and digital transmission technology & satellite broadcasting. There is explicit focus on use of basic information technologies in the course of production and transmitting the programme during ITP. Important aspects like power supply systems, air-conditioning, fire safety and first-aid are also covered.

The duration of **Module-III** is three weeks. This module is dedicated to practical exposure of the trainees in a real programme production environment. During the module programme & engineering trainees work together under the supervision of expert operational engineers and programme supervisors, who guide them and address their doubts during the production activities. Production teams are formed consisting of programme & engineering trainees. They are given a free hand to select a topic for a short documentary to comprise both studio and ENG production. In this process they develop confidence in script writing, research work, anchoring & role play. The same practice is followed in radio production. The final production of different teams is adjudged by a jury for best production. During the whole process the trainees get in depth hands-on exposure

to both Radio & Television production & post production. Rotating responsibilities during group assignment gives every individual further opportunity for overall grooming. The intention of this practical exposure is to develop the confidence of the trainees to a level from which they can immediately start contributing to production activities upon joining their respective stations.

While programme trainees are busy devising the story and script writing the production, the engineering staff are exposed to hands-on use of television & radio measuring equipment such as waveform monitors, vectorscopes, site master, spectrum analysers, field strength meters, audio analysers, transmitter measurements, earth station measurements and PDA alignment.

5. Feedback and Evaluation of Training Process

The training process has to continue in batches for two years at NABM Delhi as well as at Bhubaneswar. Accordingly the evaluation of the effectiveness of the training has been closely monitored & utilised for decision-making and planning for future training programmes more focused. Continuous feedback methodologies have been adopted to evaluate the overall quality of the training programme. There is weekly feedback focusing on grading & the pros and cons of each training session during the week, which provides valuable information to trainers on specific areas to be improved. At the end of the final session of the nine-week induction training a programme area reaction survey is collected from the trainees, this way 100 percent participation of the trainees is ensured. Trainees are encouraged to actively participate in the feedback sessions. Results of feedback analysis are quantified and tabulated for the whole group.

The questionnaire prepared for the feedback includes:

- Questions on numbered rating system, i.e. 1 to 5,
- Close-ended questions,
- Open-ended questions
- Directed questions requiring more than a Yes or No answer along with space for trainees to write
- Undirected questions or comments on topics that trainees want to address.

This feedback analysis provides valuable input on:

- How the training methodology (topic wise) adopted is working
- Specific problems the trainees are facing
- The effectiveness of trainers in engaging their trainees,

6. Trainees Evaluation & Grading Procedure

The training programme is supported by a well-designed

trainee evaluation & grading system with the intention of motivating the new team members towards optimum learning & overall development. The learning curve and potential of individual trainees is closely monitored so that the same can be useful in future planning of human resources. The evaluation & grading of the trainee is on the basis of a “Cumulative Grade Point Average” (CGPA) system & is based on weekly review test; presentation skill; final examination; practical assessment; class participation, discipline & sports & co-curricular activities.

Further, to integrate the performance of the trainees during the induction course, the performance report is recorded in their personnel files to become a part of the service record. For successful completion of the course the overall performance of a trainee needs to be satisfactory and he or she should score at least five points on CGPA scale. For each batch, during the valedictory function, the best two trainees from programme & engineering receive awards.

The structure for Performance Evaluation is as follows:

Format for Performance Evaluation

Performance Evaluation	Weightage for Grading
Review Test	25%
Final Examination	25%
Practical Training	25%
Presentation skills	10%
Class Participation	5%
Discipline	5%
Sports & Co-curricular activities	5%

7. Training Material

NABM adopted a fresh approach for induction-training programme, involving programme & engineering staff together. Accordingly training manuals are designed to be consistent with the training objectives. All relevant training information on skills, processes, and other information necessary to perform the tasks are made a part of the training documents. Training manuals also cover the desired information on latest broadcast technology, equipment & radio and TV software production techniques. The details of the training manuals prepared are as follows-

Administrative & Finance Management Manuals

1. Establishment & Administration
2. Finance & Accounts

Programme Manuals

3. Basics of Broadcasting for programmers
4. Radio Production – Perspective & Techniques
5. Television Production – Perspective & Techniques

Engineering Manuals

6. Fundamentals of Broadcast Technology
7. Sound Broadcasting
8. Television Broadcasting
9. Basic of Broadcast Technology for Technicians
10. Manual of Safety Precautions (Hindi & English)

8. Focus on Overall Development

During this training all trainees are encouraged and motivated to perform and excel not only in academics but also in developing all-round skills. Trainees are motivated and groomed to show their organising capabilities in planning & team building. For this, during training, responsibilities of class representative (CR)/sports representative (SR)/co-curricular representative and mess representative (MR) are entrusted to trainees who work in close coordination with the committees concerned. For all trainees, staying in the hostel is mandatory. At weekends trainees are involved in evening activities, such as guest lectures from eminent personalities, co-curricular activities, famous artistic film presentations & sports tournaments.

9. Duration

The total duration of the training is 9 weeks, which is divided into three modules of one week, five week & three week respectively.

10. Methodology of Training

Classroom lectures, discussions, demonstrations, practical sessions, hands-on and field visits.

11. Upgrading of Infrastructure

To plan a world-class induction training programme (ITP), it was necessary to develop the state-of-art infrastructure at NABM, Delhi and Bhubaneswar. After a detailed study the required infrastructure augmented as per the project planning & tight time line. The focus of infrastructure augmentation & development was primarily in following areas:

1. Class room
2. IT Lab
3. Broadcasting infrastructure (technical)
4. Library
5. Hostel

11.1 Upgrading of Class Rooms

All the five lecture halls/class rooms of NABM, Delhi have been upgraded with modern modular furniture and classroom accessories. Now, the all air-conditioned classrooms, include a LED/LCD projector, 5.1 surround sound system, multimedia & broadband Internet facilities.

The newly developed air-conditioned conference hall has Audio-Video facilities to conduct special presentations, lectures and webinars. Also there is a small auditorium with capacity to accommodate 75 students for film preview seminars and workshops.

Upgrading of IT Lab

The computer lab & advanced IT lab are fully augmented for training, demo & hands-on of studio automation & other networking topics. Labs have latest computer systems in LAN environment with 10 MBPS internet leased lines, multimedia and media applications, Radio & television automation & non-linear editing software. To further facilitate

the trainees an Internet café with fully fledged facilities is also provided at Hostel with 16 no desktop computers for induction trainees and others.

For managing all computers of office, hostel, classrooms & in different labs in a centralized networking managed environment, domain servers in redundant mode for DNS services, DHCP server for assigning IP addresses automatically & Antivirus server for managing antivirus services of all client computers & servers have been arranged.

11.2 Upgrading of Broadcasting Infrastructure (Technical)

The complete technical infrastructure of Audio & Video laboratories, Radio & Television studios and transmitting equipment have been upgraded with the latest world-class digital broadcast equipment. Similar exercises have also been carried out at NABM Bhubaneswar which got better infrastructure, spacious halls and laboratories. To facilitate independent self-learning and further reference, Internet connectivity has been provided at the institute library and hostel at both the NABM i.e. Delhi & Bhubaneswar. The institute has state-of-the-art Digital radio & Television Studio. Digital cameras are available for both studio production and outdoor recording and for practical training.

For postproduction the editing units are further augmented with Adobe CS5 and Apple FCP to offer sufficient hands-on exposure to the trainees. High-end radio studio equipped with recording, editing and dubbing facilities has been further upgraded with Netia news & studio automation software.

11.3 Library

The infrastructure of the library has also been augmented. It has a collection of more than 10,000 books on various needs of the programme & engineering trainees is having all variety of books on basic electronics, electronics & communication, radio & television transmission technology, television & radio production technology, programme production techniques, Marketing & advertising, PR, event management, print, broadcast journalism, cinematography, video editing, studio lighting, air conditioning, power supply systems, computer, IT, networking, server administration, etc. The library subscribes to professional journals and also stocks award winning documentaries and films.

11.4 Hostel

The hostel complex is equipped with 120 rooms of different categories and is just next to the Academy. Though the hostel is adequately furnished, the facilities are being further augmented to provide more homely and comfortable stays for the induction trainees. Works like the extension of the dining hall, a computer room with 16 computers and broadband facility, renovation of washrooms, health club, recreation room, sports facility, library and provision for laundry etc., are being carried out. All 120 rooms are now air-conditioned and trainees can enjoy comfortable stays during their periods of training.

12. Funds

Intense planning, execution & monitoring was carried out to upgrade the infrastructure of class rooms, laboratories,

studios, hostel and additional office accommodation. Budget estimates, timeline & requirement of fund flow were prepared. Close monitoring for quality & target dates ensured so that the desired infrastructure is ready before the schedule date of commencement of induction training. The estimated cost of the upgrade is as follows:

1. Civil works	: Rs. 6.82 crores (US\$1.01m)
2. Equipment & Machinery	: Rs. 3.20 crores (US\$ 490K)
3. Training related expenditure	: Rs. 2.92 crores (US\$ 450K)
Total	: Rs. 12.93 crores (US\$1.95m)

Throughout this development process Prasar Bharati ensured the desired fund flow.

authors

Mr. I I George, ADG (TRG)

Addl. Director General (Training) at National Academy of Broadcasting and Multimedia

Mr. I I George is an Indian Broadcasting Engineering Service officer of '86 batch. A graduate in Electronics and Telecommunication Engineering, he has Masters in Business Administration, with specialisation in HR. He has 37 years of wide ranging experience in broadcast technology, radar engineering and navigational aids.

Mr George was responsible for the expansion of radio services in the east and northeast part of India during 88-99. Later on he joined the training institute of All India Radio and Doordarshan, where he conducted number of national and international training programmes. He has received four All India Radio awards for technical excellence for the best projects and also for best maintained station. He was also given the best trainer award.

Mr George received training at Harris, and NEC. He also visited M/S RIZ in Croatia for inspection of a DRM transmitter. He has presented a number technical papers at international and national seminars conducted by ABU, AIBD, The Institution of Electronics and Telecommunication Engineers, Delhi and Broadcast Engineering Society, India. His area of interest is digital radio broadcasting. He is a fellow of The Institution of Electronics and Telecommunication Engineers, India and Vice President of The Broadcast Engineers' Society (India). Presently he is Addl. Director General (Training) at the National Academy of Broadcasting and Multimedia, the premier training Institute of Prasar Bharati, Delhi.

13. Conclusion

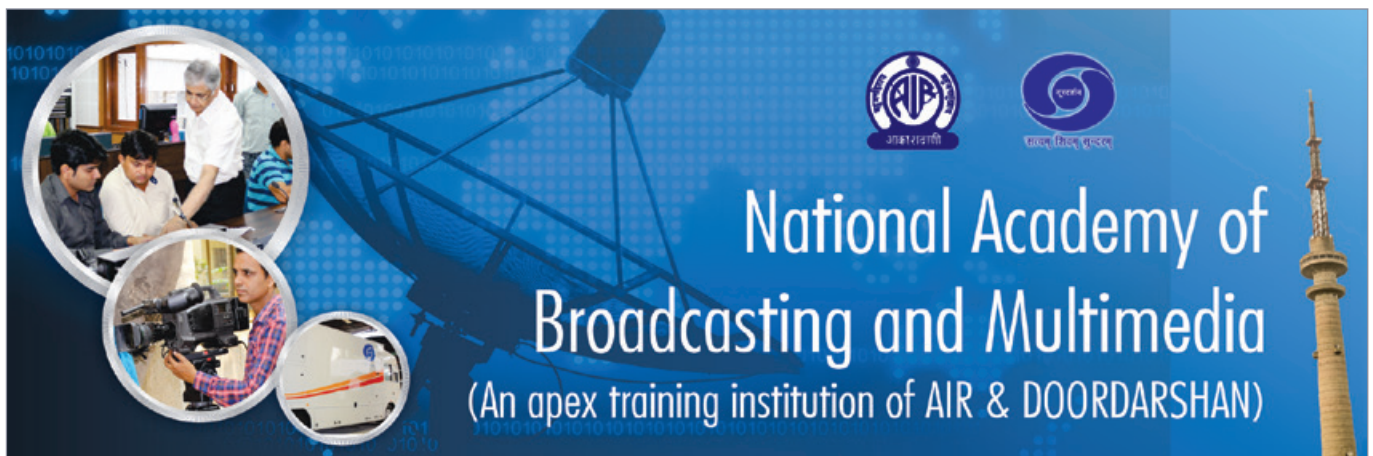
This was the first time in the history of All India Radio & Doordarshan that an induction training programme (ITP) has been planned on such a large scale. The new concept of involving engineering & programme staff together is going a long way to help in developing synergy for effective functioning & team work at the stations. ITP of fourteen batches is already over & results are highly encouraging. NABM is deriving the satisfaction that its commitment is finally helping to nurture a sense pride & belonging among the trainees.

Mr Shashi Kant

Dy. Director General at National Academy of Broadcasting and Multimedia

Shashi Kant, Deputy Director General, is an Indian Broadcasting (Engineers) Service Officer. He is a Broadcast Engineer who has been at the forefront of broadcast engineering for the past 25 years. At present, he is working as faculty member at National Academy of Broadcasting and Multimedia, Delhi, the apex training institute of India's Public Service Broadcaster.

Shashi Kant obtained his Master's in Electronics & Communication from IIT, Roorkee, India & Postgraduate Program in Management from IIM Bangalore, India. He has been involved in pan India operation & maintenance planning of television studios in the network. His experience includes design & evaluation of technical standards and quality assurance of television studio equipment. His areas of interest include the digital divide & public broadcasting & its socio economic impact, gap filler role & public service broadcaster, antecedents of television penetration, television studio automation, DVB-T2 technology, convergence & multi-platform content delivery.



National Academy of Broadcasting and Multimedia (NABM) is the apex in-house training Academy, primarily catering to the training needs of engineering personnel of All India Radio & Doordarshan. The Academy conducts about 120 courses every year and trains around 1,600 engineering personnel. Officials from broadcasting organizations of some neighbouring countries are regular participants in the academy's training programmes.

Mission

- To Train Officers and Staff of AIR & Doordarshan in the dynamic and ever challenging Broadcasting environment
- Creating a Skilled and effective workforce by developing technical competence in the field of broadcasting

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National Academy of Broadcasting and Multimedia
Radio Colony, Kingsway, Delhi-110009, India
Tel : +91 -11-27606128 Fax: +91-11-27607185 Website: <http://nabm.in>
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by **Dr Amal Punchihewa**
Director Technology & Innovation, ABU

How to Plan Digital Radio Broadcasting Services by Mitigating Barriers of Digital Migration



by **Ms Joan Warner**
CEO of Commercial Radio Australia

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Background

The final session of the DAB+ workshop held in Kuala Lumpur on 29th February 2016 ended with discussions by three groups, namely, Regulatory, Technical and Content. Each group discussed the barriers or challenges in planning digital radio migration. The following article summarises the key discussion points for ABU members to share as guidelines to planning digital radio broadcasting services. Dr Amal Punchihewa, Director Technology & Innovation, ABU presents a critical analysis and views based on his experience spanning thirty years and as a global ICT expert. The focus is on impediments to rolling-out digital radio services and how to plan such migration to achieve better results.

Radio Broadcasting Industry

It has been observed that AM (Amplitude Modulated analogue radio services) is heavily compromised due to various factors. One of the dominant factors that leads to discontinuing, shutting down or scaling down AM services is the cost of energy (electricity) needed to operate high power transmitters. Non-availability of spare parts and devices also leads AM stations to go off air.

The other analogue service, FM (Frequency Modulated analogue radio services) gained popularity and penetration thanks to its better quality and affordable cost of ownership for broadcasters. However these benefits, along with poor licensing regimes led to the congestion of frequency bands used for FM services, impacting the future of analogue radio broadcasting services. While introducing FM radio services in 1970s, radio broadcasters and the radio industry had to educate and plan along with all their listeners and stakeholders. Their hard work paid off as populations throughout the world gained access to FM radio services through affordable devices and the ability to receive it on almost every car radio.

Our target for digital transition should have similar goals and will not be easy. However, proper plans and persistent work will enable us to expand digital radio broadcasting services and devices.

The only difference between the technology transition from AM to FM and the transition to digital radio, is that a broadcaster (preferably a country) has to select one of three technology standards. The three technologies are described in the latest the Digital Radio Guide to be published by the World Broadcasting Union Technical Committee (WBU-TC) in October 2016. WBU-TC is a collection of eight broadcasting unions around the world, with one of its goals being to harmonise technologies for the broadcast industry.

As explained in a previous article, published in the first quarter 2016 Technical Review (TR-265), ABU takes a position of technology neutrality in the Asia-Pacific region. What does this technology neutrality mean to the ABU family? It is a principle that ABU leaves it to its members to select the digital radio standard they want. In contrast, in the European region, EBU, through its R138 gives preference to DAB/DAB+. On the 3rd page of the R138 document, it recommends the immediate deployment of digital radio using DAB transmission as defined in ETSI EN 300 401, with DAB+ services as defined in ETSI TS 102 563 for digital radio broadcasting in VHF Band III. In cases where DAB coverage is not possible it recommends using DRM, as defined in ETSI ES 201 980 for digital radio broadcasting in the frequency bands currently used for analogue radio broadcasting, [R138, p3].

Some Guidelines

1. It is recommended that, after careful study and evaluation, each country select its own digital radio standard from the three available. This needs to be done within a reasonable time period and the country must then commit to that standard. Though it is preferred to have a single standard, multi-standard adoption is also possible. This might be done to serve beyond local geographic areas (off shore), or to cater to a scattered population.
2. Each country needs to formulate its own digital radio transition plan with its own digital radio transmission network design.
3. Broadcasters (in collaboration with all other broadcasters

and stakeholders) need to promote digital radio for all forms of delivery; on air, over broadband (online), links to social media (as available in DAB+) and to support digital radio reception on phones (as done by DAB+ with phone manufacturer LG) and in cars.

4. Regulators and the general public (radio listeners) need to be educated that digital radio listening over broadband, or online, will create congestion in mobile broadband networks, especially when large numbers are listening online.
5. Delivery over broadband can be used to complement digital radio broadcasts.
6. Digital radio broadcasting enables hybrid (Integrated Broadcast-Broadband) and social media engagements.
7. It is possible to carry out analogue-switch-off (completely switching off analogue FM broadcast radio services) when digital radio transmission and reception plan targets for national coverage have been met.
8. When a country decides on its digital radio broadcasting standard, initially it is required to transmit both in analogue and digital to service the current audience and switched audiences - this is known as simulcast. However, since broadcasters cannot afford both for too long a period, it is required to make the simulcast period practical and short. This situation is rather different to that of digital television broadcasting. Incentives for both broadcasters and listeners are required to make such a transition. National proposals for a digital radio transition need to be formulated carefully and must involve all stakeholders.
9. The radio broadcast industry needs to work closely with its regulator. As an incentive, regulators may grant free of charge spectrum licences for a limited period of time.
10. It is recommended to negotiate a period of exclusivity (say 6 years) while incumbent broadcasters invest in new infrastructure and human resources.
11. New and appealing content are important factors in rolling out a successful digital radio system.
12. As a practical guideline, the regulator may assign each existing commercial operator a 128kbps allocation per analogue station so they can simulcast as well as offering 2-3 digital services.
13. The value of spectrum must not be underestimated. It is essential to make sure that spectrum will be available when it is time to roll out. Incumbent broadcasters may already have spectrum licences and these should be utilised early.
14. Spectrum efficiency can be achieved by the transmission of multiple programmes. For example, broadcasting DAB+ is 8 to 10 times lower in cost compared with FM.
15. It is recommended to have little or no restriction on format for the digital-only services. It is conducive to have a fair access agreement for all parties if broadcasters agree to offer new digital-only content and promote the standard.
16. Other incentives may include a licence fee freeze for broadcasters who invest in digital, at least for a limited period of time.
17. It is required to build value with the digital platform.

Investments may be financed using future digital dividend by auctioning local/additional capacity.

18. There is risk of more competition if local broadcasters fail to move forward.
19. By existing broadcasters adding new digital services an increase in listeners and revenue can be achieved.
20. Niche formats add new advertisers and extend listening time which is attractive to advertisers.
21. If there is a competitive environment, existing broadcasters should be given priority to build the platform and to migrate their audiences to digital.
22. Fairness can be exercised through one time offers.
23. It is important to ensure reasonably priced receivers are available.
24. It is essential to have cooperation between public and private broadcasters for the successful implementation of a digital radio broadcast migration.
25. Spectrum efficiency can be realised by the transmission of multiple programmes in a given frequency band. (FM requires one transmitter and one antenna per service.)
26. Cost savings can be achieved in infrastructure investments and maintenance. For example, DAB+ can serve 18 stations on a single antenna.
27. Economies of scale come from adoption of common standards and easier frequency coordination with neighbouring countries.
28. Cross boarder discussions with neighbouring countries are recommended for better frequency spectrum management.
29. Broadcast to phones is possible with audio, text, images, URLs, coupons, social media assets, station logos and strap lines. These only using data when users click through.
30. Today, digital radio broadcasting can offer Emergency and Early Warning Broadcasting as a standard feature. Robust network design enables even better resilience than analogue radio broadcast networks.
31. There are business cases to support digital migration. Examples from Australia; include; Coles – station branding and Chemist, Warehouse/Kinderling; new advertisers growing listening time.

Some of the Challenges

1. The process of convincing the commercial broadcasters.
2. The availability of incentives to introduce digital radio services for broadcasters from regulators and receiver manufactures.
3. As experienced in some television broadcasting markets, if analogue radio broadcasters do not take action, other media and ICT players will capture the market.
4. Due to financial constraints and uncertainties in the media market, we can observe defensive investment in the future.
5. As a strategy to accelerate the digital migration process, public service, commercial and wide area community services need to concentrate on the major population centres first.

Key Messages from the Overall Discussion:

1. Using a compelling combination of talent and technology, radio continues to thrive in technology savvy south east Asia.
2. Technology allows radio to continue to innovate and engage with radio audiences in new ways and on new platforms.
3. We have seen demonstrations of exciting opportunities for radio to engage via social assets and to establish a listener profile, which can be ported across different listening devices in different locations throughout the day.
4. Integrating broadcast with broadband offers the best of both worlds for broadcasters and audiences.
5. Radio talent-led social engagements are possible and the use of data has significant cost savings.

6. Hybrid Radio, or the Integrated Broadcast Broadband Radio (IBBR) is more cost effective than full stream broadband. IBBR uses broadband to complement linear broadcast, allowing listeners to catch-up or use on-demand, favourites and reminders.
7. There is now a wide range of receivers digital radio receivers priced from 30USD (for DAB+).
8. RTM Malaysia's test broadcast of DAB+ and RRI/Kominfo expanding the digital radio footprint in Indonesia are signs of action by South East Asia radio broadcasters, complementing those in developed markets like Australia (DAB+) and Japan (ISDB-Tsb).

References

1. R 138, DIGITAL RADIO DISTRIBUTION IN EUROPE, EBU, Geneva, February 2013.
2. EBU-MIS Digital Radio Tool kit, EBU, Geneva, December 2014.

authors

Dr Amal Punchihewa

Director Technology & Innovation, Asia-Pacific Broadcasting Union

Dr Punchihewa has thirty years of experience as a professional engineer in ICT, broadcast industries and academia. Having started his career as a computer engineer, he worked in the broadcasting industry as a research engineer before taking the Head of Engineering position (aka Engineer in Chief or CTO/COO) at the national television broadcaster in Sri Lanka. Dr Punchihewa gained MEng & PhD in Digital Audio & Video Signal Processing. He is a Distinguished Lecturer of IEEE-Broadcast Technology Society in USA. More than hundred and fifty scholarly articles authored can be accessed in IEEE, IET and ResearchGate digital libraries. Dr Punchihewa is a Chartered Professional Engineer (CEng) of UK, Fellow of the IET-UK, Senior Member of IEEE-USA and a Fellow of Institution of Professional Engineers in New Zealand (IPENZ), New Zealand.

Dr Punchihewa authored the chapter on Technology for Interactive Multimedia Services, published by ITU in December 2015. It addresses hybrid television broadcasting, presenting available technologies and potential services in early part of this decade. An updated version will be published in late 2018.

Dr Punchihewa is also the Vice-Chair of Technical Committee of World Broadcasting Unions (WBU-TC)

Joan Warner

Vice President Asia Pacific WorldDAB and CEO Commercial Radio Australia

Joan Warner is the Chief Executive Officer of Commercial Radio Australia (CRA) representing Australian commercial radio broadcasters. Ms Warner is also Vice President of WorldDAB Asia Pacific. In her role as CEO of CRA Ms Warner oversees the whole of industry marketing & brand campaign campaign, the co-regulatory Radio Codes of Practice, audience measurement survey contracts and industry copyright agreements. Ms Warner is responsible for negotiations across a range of regulatory and legislative issues with regulators and directly with Government Ministers.

WE NEED RADIO IN SMARTPHONES! FOUR REASONS WHY THE WBU, ABU, EBU, ASBU, .. ARE WORKING TO ENSURE THIS HAPPENS...



REACH AUDIENCE

Smartphones are becoming the most important platform to consume audio content.



NO GATEKEEPERS

Streaming radio to smartphones effectively makes telecommunications operators gatekeepers. A consequence of this is to undermine the principle of Free-to-Air reception of radio services.



COMPETE WITH NEW PLAYERS

Radio risks losing its central cultural and entertainment role in favour of other digital-native services in smartphones like Deezer, Spotify, Apple Music.



BE MORE EFFICIENT

Traditional broadcasting is still the most efficient means to reach audiences; the use of Internet should be to exploit hybrid content and additional services.

CONTACT SMARTPHONE VENDORS IN YOUR MARKET AND ENCOURAGE THEM TO IMPLEMENT DIGITAL RADIO IN SMARTPHONES TODAY.

More information on the phone please visit Commercial Radio Australia website to read [LG STYLUS DAB+ – THE WORLD'S FIRST SMARTPHONE TO SUPPORT DIGITAL RADIO – COMES TO AUSTRALIA.](#)



Progress, collaboration and growth



DAB+ digital radio is progressing around the world.

- 46 million DAB/DAB+ devices sold worldwide
- The Asia Pacific, Arab States and South Africa have started trials
- World's First DAB+ smartphone, LG Stylus 2, launched in early 2016
- In Australia 3.2 million people listening via DAB+
- In Indonesia, new RRI DAB+ studio goes live in 2016
- In Europe:
 - Norway leads with Digital Switchover in 2017
 - Switzerland planning Digital Switchover in 2020-24
 - France plan 97% DAB+ coverage by 2024



431 million
people covered by DAB/DAB+

1,950
DAB services
on air worldwide



DAB/DAB+ coverage near
FM footprint reaching
99%
of the population in some markets



Australia: DAB+
launched July 2009



China: DAB in
Beijing & Shanghai



Hong Kong:
DAB+ launch 2011



Indonesia: DAB+
trials on air



Malaysia: DAB+
trials on air



NZ: DAB+ trial on
air Auckland



S Korea: interest
in DAB+



Thailand: DAB+
trial 2016



Vietnam: DAB+
trial 2013

In Asia Pacific, 40% of Australians in major capital cities have access to a DAB digital radio. DAB+ launched in Hong Kong in 2011 and several markets, including Thailand, Malaysia, Indonesia and Vietnam are now planning for DAB+.

From trial to switchover, WorldDAB can support the transition from analogue to digital radio. Contact us for assistance with:

- Workshops
- On-air demonstrations
- Technical expertise
- Regulation & licencing
- Network design and roll-out
- Content production
- Receivers

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% New cars with DAB/DAB+



Norway
63%



UK
80%



Switzerland
65%



Germany
13%



Denmark
5%



Netherlands
16%



Italy
24%



France
15%



Australia
25%

1 All figures standard fit except Germany and Italy which also includes cars with DAB+ taken as an option.

Sources: JATO Dynamics 2015 (Norway, Denmark, Netherlands, France), SMMT/CAP automotive Q4 2015 (UK), MCDT (Switzerland), DAT/VDA (Germany, data from interviews with new car buyers Apr - Jun 2015) (Germany), digitalradio.it estimate (Italy), Glass's Automotive Business Intelligence Sep 2015, Commercial Radio Australia (Australia)

To find out more about WorldDAB and events in the Asia Pacific region visit www.worldadab.org



2016 TBM Report

During the Technical Bureau mid-year meeting of 2016, held in Kuala Lumpur, ABU digital strategy, spectrum strategy and technical studies took high priority among other agenda items discussed. Having gone through the common agenda items the rest of the time was spent discussing and refining ABU digital strategy document, which was circulated among the bureau members once again for final comments. The resulting updated document was submitted to the ABU secretariat as a contribution to the items to be tabled at the next ABU planning and strategic group meeting.

The ABU has members from over 50 Asia-Pacific (APAC) countries, of which five have completed Analogue Switch off (ASO), leaving more than 45 countries still to achieve ASO. With the assistance of ITU and a number of organisations, road maps have been prepared for 24 APAC countries.

Incumbent broadcasters can deliver content using broadband technologies in addition to over-the-air broadcasting. However, it not only brings in less income to the broadcasters, it devalues the function of broadcasting. So, the most important consideration for broadcasters is to retain broadcast frequencies to deliver their content by themselves.

Protecting Public Free-To-Air Broadcasting is essential for the ABU. Public Service Media organisations produce a wide range of content and services that are distributed not only as traditional linear radio and TV but also as time-shifted,



on-demand, hybrid and data services. These are distributed by a number of different delivery means across a range of devices, from large TV sets and home radio receivers, to personal computers, tablets and smartphones. However, while recognising that broadband complements over-the-air delivery, free-to-access broadcasting, via radio frequencies, is the most efficient way to deliver content.

Viewers and listeners may have a range of user devices at their disposal, but not all distribution methods are equally suitable for all services. Likewise, not all user devices come with the same capabilities. In some cases this may result in a poor user experience. In addition, sometimes services may be unavailable or the quality level provided may be inadequate, for technical or commercial reasons beyond broadcaster's control.

Having observed that the cost of maintaining an analogue asset base is escalating, increasing demand for high quality content. Audience consumption patterns are changing with the demand for more flexibility to consume content at anytime, anywhere and on any device. For example,





it is becoming common to access a TV programme on a smartphone in time-shifted manner instead of accessing it on a TV receiver via real time broadcast. The competition in the media industry is fierce and the ABU wishes to encourage its members to accelerate the digitalisation process.

ABU-TBM has Discussed and Formulated the Strategies and Actions Listed below to facilitate this process:

1. Further guidance, consultancy and human capacity building
 - (i) Organising training, seminars, forum and workshops on digital radio and television broadcasting technologies and services
 - (ii) Providing Technical Advisory Services and consultancy to ABU members to achieve specific tasks.
2. Promoting Integrated Broadcast-Broadband (IBB) Technologies and related services.
 - (i) Organising training, seminars, forum and workshops on IBB technologies and services.
 - (ii) Sharing success stories from ABU members.
 - (iii) Educating players that broadcasting remain the most efficient and effective way of content delivery for majority of ABU members in decades to come.
 - (iv) Preserving frequency spectrum for future broadcasting requirements
3. Promoting content exchange mechanisms
 - (i) Exploring content exchange deploying evolving storage, network and infrastructure technologies.
 - (ii) Monetising ABU member content via suitable (cost effective, reliable, high quality and secure) platforms.
4. Promoting innovation and dissemination of information.
 - (i) Communicating such information to members via Technical Review and other ABU publications.

Other actions may include usual ABU TD activities such as TAS, consultancy, human capacity building events, in-country activities, internships, collaborations with higher learning institutions, R&D promotion, e-learning and attachments.

In preparation for WRC-19, ABU-TBM formulated the



following Spectrum strategy based on contributions from ABU members.

ABU Spectrum Strategy:

The ABU takes necessary action to extend all possible assistance to its members, to help them understand the importance of spectrum for broadcasting (current and future), including allocation, broadcast network planning, electromagnetic interference and compatibility issues.

Actions:

1. Providing technical expertise to support ABU broadcaster members in APAC.
2. Sharing best practice and transition experiences.
3. Representing ABU member interests at regional and international conferences, such as the APT and ITU.
4. As in leading up to WRC-15, to have a closer cooperation among WBU and other sister unions.

Further actions and interest areas proposed by the Technical Bureau, as the management body of the ABU-Technical committee, are shown below.

- I. Protection of terrestrial TV receivers from disruptive applications such as TVWS devices: Dynamic management of spectrum, coupled with intelligent devices enables use of TVWS (TV White Space) spectrum for providing mobile broadband service by allowing access in places and at times when others are not using it. The issues for broadcasters are multifold, such as interference to existing receiving devices, restriction on future development, monitoring of interference and mitigation of interference. The ABU may initiate studies for providing guidelines to broadcasters in the region.
- II. Broadcast Spectrum and Regulatory issues: TVWS devices have major spectrum regulatory issues with broadcasting applications. In addition, WRC-19 Agenda items have raised concerns for broadcasting spectrum. Accordingly both of these need to be reflected in the strategic area, "broadcast spectrum and regulatory issues".

An important aspect discussed was the revision of the topic study on training and services to be named as Capacity Building. ABU-TBM urges ABU members to contribute to this topic study area covering Health and Safety in broadcasting, Modern Broadcast Engineering Management, IT in Broadcasting, Beyond SD and Automation Systems.

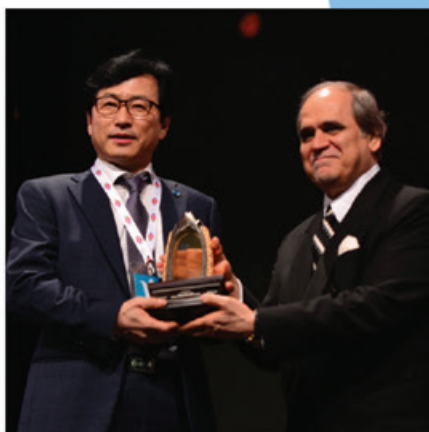




ABU TECHNICAL COMMITTEE MEETING SCHEDULE, Bali, Indonesia 21-22 October 2016

Time/Date	Thursday, 20 October	Friday, 21 October	Saturday, 22 October
9.00am – 10.30am		Venue: Nusantara I OPENING SESSION ABU Engineering Awards Announcements & Presentation of Citations and Technical Review Prizes Director's Report Bureau Proposals WRC-19 & WRC-23 preparations Technological Inspirations UHDTV-1 ATSC 3.0 UHDTV-2 DTH 3.0	Venue: Nusantara I Keynote Presentation NHK/STRL UHDTV-2 and 2020 Olympic media chain Technology Debate Embracing IP for Media Production Summary from Topic Area Chairmen: Production, Transmission, Training & Services and Spectrum
11.00am – 12.30pm			
2.00pm – 3.30pm		Strategic Issues 1. ABU Digital Strategy 2. Spectrum for future broadcasting 3. Enabling TV ASO 4. Digital Radio 5. IBB – Integrated Broadcast Broadband 6. HDR, WCG, UHDTV and HFR 7. Devices for Evolving Media 8. Human capacity building	New in study groups 1. Closed Captioning NGB 2. HDR Standardisation 3. Preparation for WRC-19 and WRC 23 4. Delivery to Disadvantage people 5. Character set for Digital Radio
4.00pm – 5.30pm	Venue: Surabaya 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 Trials – IP for Live Production 5. ASO Networking with ABU TLOs	Useful to know: 1. New members 2. Sister Unions & International Organisations (each organisation maximum of 3 minutes) AIBD, ASBU, EBU, WorldDMB/CRA, DRM, DVB, IABM, NABA, ITU, etc. 3. Updates from Status reports <i>Closing</i>





ABU ENGINEERING AWARDS 2016

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.

KOBA

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 2016 – Call for Nominations

31 July 2016 – Deadline

August 2016 – Judging

21 October 2016 – Announcement of Winners ABU Technical Committee Meeting Bali

24 October 2016 – Presentation of Trophies ABU Prizes Night Bali

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

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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.



Mohammad Rohanudin, Director of Technology and New Media Radio Republik Indonesia (RRI-Indonesia), appointed a member of the panel in June 2016.

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.



Simon Lockington, Director of Professional Services - APAC at Imagine Communications, appointed a member of the panel in April 2016.



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.

Yusuf Yildirim, Head of Studios and Programme Contribution Systems Department, Turkish Radio Television Corporation (TRT-Turkey), appointed to the panel in December 2015.



Doo-Hyung KANG, ABU Technical Liaison Officer, Technology Management, Korean Broadcasting System, appointed a member of the panel in April 2016.



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.



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Training Course Reinforces ABU-ASBU Cooperation

A week-long training course in Tunisia marked strong ties between the ABU and the Arab States Broadcasting Union (ASBU), when fifteen broadcast and IT engineers attended the Integrated Broadcast Broadband Technologies, Standards & Services and OTT course at the ASBU headquarters in Tunis from 14-18 March 2016.

This was the second training organised by ABU. The first course was conducted in 2014. Dr Amal Punchihewa, currently the Director of Technology & Innovation of ABU conducted the course as part of the on-going relationship between two organisations. In 2012, Dr Punchihewa conducted a Digital Television Broadcasting course in Damascus, Syria and, in 2014, on IPTV and Networking technologies for the ASBU in Tunis, Tunisia.

The fifteen participants from Saudi Arabia, Sudan, Algeria Jordan and Tunisia work in the technical and information technology

areas of broadcasting. Examining the use of broadband to complement traditional broadcasting the course covered topics including broadcasting value chain, contributions, distribution and delivery of media, as well as over-the-top (OTT) services and integrated broadcast broadband technologies, standards and services.

Dr Adnan Salhab, Head of Training and Director of Engineering, ASBU-Damascus Training Centre, thanked the ABU and Dr Punchihewa for his continued support in capacity building in the rapidly evolving digital media. Mr Bassil Zoubi, Director of the Technical Department, ASBU said that the participants may have gained understanding of these new concepts, which they could use at appropriate time to plan and implement. Dr Punchihewa said that the ABU was continuing to work closely with the ASBU to share experiences and to assist capacity building in ICT areas.



ABU-SLRC In-country Training & Workshop on

“Preparing for Next Generation Broadcasting”



An in-country training & workshop on “Preparing for Next Generation Broadcasting” was successfully completed with the wide participation of the SLRC officers. One hundred and sixty (160) participants in four different groups attended the event, which spanned four days. The wide range of challenges faced by SLRC was discussed and these discussions lead to various suggestions. Some of the topics discussed were VOD, OTT, Interactivity, catch up and delivery to portable devices.

Based on the discussions the event led to the development of some policy guidelines which could be generalised for other broadcasters. By observing current technological developments and trends, it is important for the relevant technology to be embraced at the right time, including appropriate procedures to be followed. This enables optimisation of limited resources, thus maximising benefits of programme production costs.

Some broadcast stations may have a mix of cameras capable of producing SD or HD video. Noting that majority of captures (Camera and Camcoders) are able to record/operate either in SD or HD formats, the correct mode needs to be determined for the camera during the programme planning itself. Certain selected programmes such as Documentary, Teledrams, Operas and Musical can be captured & edited in HD format and, until HD format transmission facilities are available, television content or programmes can be transmitted (terrestrially) in SD format

by down-converting the HD content. This can be complemented by delivery over broadband (the Internet or public internet), either in HD or SD format, when the broadcaster holds the rights for the video content. A non-stationary logo of the station can be used as a watermark to enable the recognition of misuse of specific content from a given station.

It is strongly recommended to use social media and an active presence on the Internet to promote individual programmes, leading to promotion of the brand of the programme channel and the brand of the station. Promotions on Internet & Social Media should be carried out from the planning stage through and beyond the end of the series. Production staff need to interact and engage constantly and consistently with the audience since a lack of regular and consistent use of social media reduces efficacy.





ABU Media Summit on

Climate Change and DRR *in Krabi*

The second 'ABU Media Summit on Climate Change and Disaster Risk Reduction' was held from 12-14 May in the Krabi Province of Thailand, which was devastated by the 2004 Indian Ocean Tsunami. This media summit is the most visible manifestation of ABU's commitment to Disaster Risk Reduction through media. The event was hosted by the Thai Public Broadcasting Service (Thai PBS).

The success of the summit should be attributed to the exceptional efforts of the host Thai PBS. Their devoted team not only made excellent arrangements for the two-day Summit but demonstrated the famous Thai hospitality which made the event an unforgettable experience for all the participants.

The Summit finished on a high note with the announcement of the winners in this year's ABU Awards for Climate Change and DRR in Krabi, Thailand. The Award Ceremony was preceded by a colourful spectacle based on an old Thai legend. For nearly an hour a group of dancers kept the attention of the Summit delegates. In a fast going narrative, they transformed into a giant dragon, fish, jelly fish, butterflies and high flying birds, princes and princesses to present the eternal theme, the fight between good and evil. The show was followed by a moment of suspense when Mr Anothai Udomsilp, Director of the Academic Institute of Thai PBS and host of the Summit appeared on stage in regal attire to announce the winners.



The Summit adopted the Krabi Media Action Plan as a commitment to translate the meeting's findings into practical projects and link media to all stakeholders in the DRR process. The Plan will be further developed and introduced at the 7th Asian Ministerial Conference on DRR to be held in New Delhi in November 2016.

And the winners:

- The Best Programme on Climate Change: was awarded to ***"Whispers of Warming"***, produced by Mr Anoop Khajuria, DD, India. This is a compelling story about the life of people in the Himalayas who are on the frontline of climate change.
- The Best Programme on Disaster Preparedness and Disaster Risk Reduction: was awarded to ***"Together We Can Do It"***, BBC Media Action, Bangladesh. The producer Mr Shihan Zuberi, conveys an optimistic view on the power of community working together to prepare for future disasters.
- The Most Promising Newcomer: was awarded to Ms Darin Klong – UkKara, Thai PBS, Thailand, for the ***"Wave of Change, Tsunami Lessons from Three Countries"***.
- The Best Human Story: was awarded to the producer of ***"Mission Arctic"***, NRK, Norway, Havard Guldahl. The documentary follows the epic trek of four teenagers to the North Pole to see first hand the consequences of climate change.



The Summit was preceded by ABU/FAO Workshop on Climate Change and Food Security, sponsored by the Asia-Pacific Office of the UN Food and Agriculture Organisation. 18 broadcast journalists from 8 countries had the opportunity to be briefed by two FAO experts on the effects of climate change on food security in the region. They were also presented an account of the challenges and mitigation strategies applied by FAO.



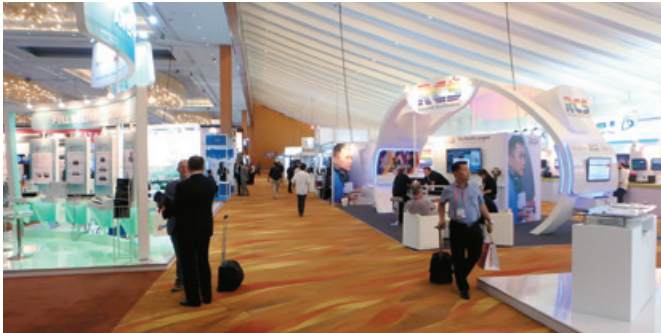
This practical workshop saw the journalists join a field trip to the Krabi Fishery Research Centre and a local fishing community to collect footage and interviews for their reports. During the last two days of the workshop the participating journalists, working in teams, produced 5 short documentaries under the supervision of experienced radio and TV trainers and planned more detailed future programmes related to food security issues in their own countries.

The event was joined by over 280 delegates from 25 countries representing media organisations, academia, and international and community based NGO's. Over 50% were from outside Thailand and most of them contributed to the debate how to establish media as the driving force for climate change adaptation, disaster preparedness and disaster risk reduction. The Summit was provided as a live stream on WebTV of Thai PBS and was also promoted on Facebook and Twitter.



BroadcastAsia2016

– Exhibition and Conference



The four-day BroadcastAsia2016 event, together with CommunicAsia2016 and EnterpriseIT2016, was held from 31 May to 3 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 with a total of 602 exhibitors from 46 countries. The BroadcastAsia show was attended by close to 12,000 trade visitors from 85 countries. Close

to 550 attended the international conference sessions with 130 speakers and experts presenting and sharing their knowledge, experience and expertise in various disciplines of the broadcast industry. This provided an excellent networking opportunity for the delegates. It staged the latest updates across the entire broadcasting and film ecosystem, from acquisition, production, media management systems to post production, distribution and delivery. The ABU also had a booth at the exhibition showcasing some of its events and meeting and providing support to its members at the show.

The show highlighted a multitude of technologies, including:

- Over-the-Top (OTT) and Integrated Broadcast Broadband (IBB) technologies
- UHD-1 and UHD-2 production technologies and systems
- Archiving systems and Media Management
- Cloud Technologies and contribution systems
- Automation systems and many more...

It was interesting to see that many exhibitors presented technologies centred around OTT and connected TV platforms including second screen and social media integration. There was a huge increase in UHD-1, specially a lot of production and workflow technologies supporting UHD-1 and higher resolutions. One could also notice a lot of drones on display with different levels of functionality for different capture and shooting applications. In addition to these, IP based production and delivery systems, advanced LED based lighting systems, wide range of automated and IP controlled consoles both for audio and video, as well as a showcase of advanced broadcast automation systems.



International Conference Highlights

The international conference was organised with two parallel tracks running every day. One track focused on technology themed “Broadcast Engineering and Technology”, while the other focused mainly on content with the theme “Content Capitalisation Strategies”. The technology tracks further split into two after the first day focusing on different applications of technology, providing more focused sessions on specific areas of interest for those attending.



ABU jointly with DVB and SES organised and conducted a full day technology track during BCA-2016 on 1st June 2016, addressing rapid changes in video encoding technologies and their latest developments. It discussed number of relevant topics including standardisation, different UHD formats, Virtual Reality, OTT multicast and the future of terrestrial broadcasting. This track also provided the latest

DVB standards updates to streamline APAC broadcasters' business strategies.

Ten speakers from the Asia-Pacific region and beyond presented 10 sessions elaborating on Standards, Transport streams, VR-Virtual Reality, Immersive sound, video coding, mobile delivery, UHD TV, HDR and the future of television. Executive Director of DVB, Dr Peter Siebert and the Chairman of the track Dr Amal Punchihewa, Director of Technology and Innovation at ABU reiterated that for a foreseeable future, broadcasting will remain as the predominant form of delivery of video and television content.

The broadcasting track 2 on 1st June and five other tracks, including the exhibition, were attended by a large number of ABU members. The ABU also had a booth in the exhibition.

ABU also contributed to the forum themed “Empowering broadcasters to embrace IP” organised by ABU partner APB as a pre-conference forum on 30th May. A large number of ABU members attended the event.

BroadcastAsia 2017, to run from 23 to 25 May 2017, was also announced at the event. Next year's show will run for three days compared with four in past years. It will be held at Suntec Singapore while the CommunicAsia and EnterpriseIT shows will be held at Marina Bay Sands.

Regional Workshop on

Enabling & Enhancing the DTT Broadcasting Experiences

The Second Pre-summit Regional Workshop on Enabling & Enhancing DTT Broadcasting Experiences, took place in conjunction with the Asia Media Summit 2016, from 23 to 26 May – It was organised in association with the ITU and AIBD.

This second pre-summit workshop on digitalisation in conjunction with Asia Media Summit was held in Incheon, Korea. ABU partnered with ITU and AIBD to organise and conduct the workshop on digitalisation of terrestrial television broadcasting services during the summit. The pre-summit workshop aimed to provide broadcasters and other media professionals with a clear understanding of digital broadcasting services. The workshop reviewed, discussed and shared experiences of digitalisation taking place in ASEAN and SAARC countries especially. ABU members from Brunei, Thailand, India, Laos, Cambodia together with ITU experts related their experiences to more than twenty five participants addressing the issues, challenges and possible solutions in carrying out the transition to digital transmission.

The workshop also provided expert knowledge and information on the current status of digital terrestrial

television broadcasting, Interactive multimedia services, Digital broadcasting: issues & challenges as well as sharing some of the case studies and experiences on analogue to digital implementation. The Korean Communication Agency of South Korea shared their analogue switch off process, and the challenges in implementation of the digitalisation process in Korea. A detailed article on this presentation and a case study, based on a discussion, is presented in this edition of the Technical Review.

The workshop achieved its envisaged outcomes such as:

- An update on technology trends and status of digital broadcasting transitions worldwide
- Facilitating smooth transition from analogue to digital terrestrial television broadcasting
- Sharing country experiences on the transition from analogue to digital terrestrial television broadcasting from the participants at the end of the workshop.



Pioneering High Definition Television System and Emergency Warning Code Signal Broadcasting System Receive IEEE Milestones Award

Source: **NHK Press Release on 13 April, 2016**

<http://www.nhk.or.jp/corporateinfo/english/press/pdf/20160414.pdf>



The Institute of Electrical and Electronics Engineers (IEEE) is based in the United States. It is the world's largest engineering body with 430,000 members in more than 160 countries, in the fields of electrical, electronic, computer and telecommunications engineering. The IEEE is the world's largest technical professional organisations dedicated to advancing technology for the benefit of humanity. The IEEE and its members inspire a global community to innovate for a better tomorrow through its highly cited publications, conferences, technology standards, and professional and educational activities. It is the trusted "voice" for engineering, computing and technology information around the globe. The IEEE publishes a third of the world's technical literature in electrical engineering, computer science and electronics and is a leading developer of international standards that underpin many of today's telecommunications, information technology and power generation products and services. Recently the IEEE has formally recognised the NHK developed High Definition Television, and Emergency Warning Code Signal Broadcasting Systems as IEEE Milestones.

IEEE established the Milestones Programme in 1983 to honour the historic landmarks of high international acclaim and which have made great contributions to social and industrial development in the fields of electrical, electronic and computer engineering.

Twenty-six (26) Japanese technologies had received IEEE Milestones up to 2015, including NHK's R&D behind the 2011 award for the First Direct Broadcast Satellite Service for transmitting broadcasts directly to homes.

The following are the contributions of NHK that were cited in the award:

- Many years of R&D which led to the realisation and inauguration of the high-definition broadcasting system

and brought viewers high-definition, wide-screen images with a strong sense of reality.

- Many years of R&D which led to the realisation and inauguration of the world's first emergency code signal broadcasting system in 1985.

The IEEE Milestone plaque was presented at a ceremony in Tokyo on 11th May 2016.

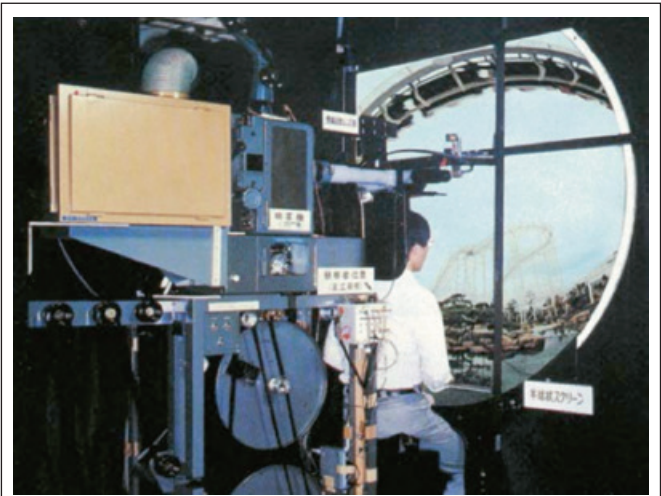


Figure 1: Testing the effects of viewing angle on the sense of reality

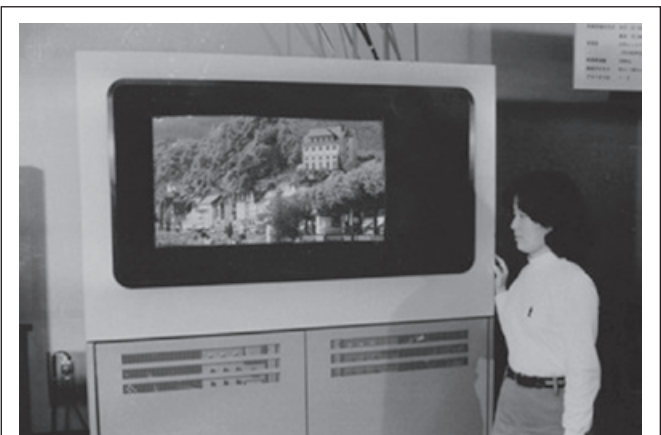
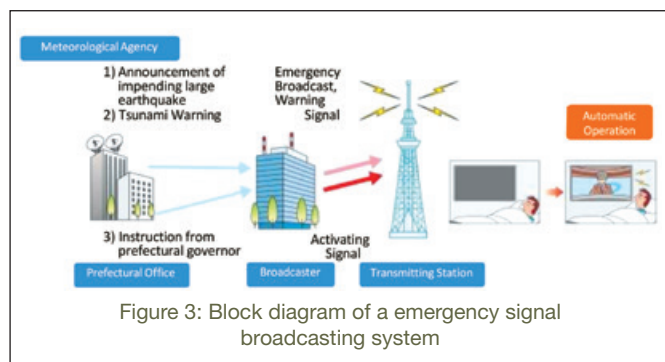


Figure 2: Wide screen display with 1,125 scanning lines



High Definition Television System:

- NHK commenced basic research on high-quality television in 1964, engaging in wide-ranging studies from psychophysical experiments to system development.
- The basic technology was proven by the world's first regular experimental broadcasting via satellite, which commenced in 1989 with a high definition, 1,125 scanning lines on a 16:9 ratio screen.
- The format of 1,125 scanning line system was made the unified global standard in year 2000 as high-definition television spread worldwide.

Emergency Signal Code Broadcasting System:

- NHK realized the emergency signal code broadcasting system, which turns on TV and radio sets automatically and conveys warning signals when a major earthquake, tsunami, or other disaster impends.
- The system has been incorporated in global standards for both satellite and terrestrial broadcasting.
- The emergency signal broadcasting system continues in current use in support of disaster-related broadcasts.



Major Milestones

Japan

Theme	Year of Award
TPC-1 Transpacific Cable System, 1964	2014
International Standardization of G3 Facsimile, 1980	2012
Development of Electronic Television, 1924-1941	2009
The First Word Processor for the Japanese Language, 1971-1978	2008
Development of VHS, a World Standard for Home Video Recording, 1976	2006
Pioneering Work on Electronic Calculators, 1964-1973	2005
Tokaido Shinkansen (Bullet Train), 1964	2000
Mount Fuji Radar System, 1964	2000

Overseas

Theme	Year of Award	Country
Invention of Stereo Sound Reproduction, 1931	2015	UK
Birthplace of the Bar Code, 1948	2012	U.S.A
Grumman Lunar Module, 1962-1972	2011	U.S.A
Birthplace of the Internet, 1969	2009	U.S.A
Compact Disc Audio Player, 1979	2009	Netherlands
Volta's Electrical Battery Invention, 1799	1999	Italy
Manufacture of Transistors, 1951	1989	U.S.A



UPCOMING EVENT

PACIFIC MEDIA PARTNERSHIP CONFERENCE 2016: *Collaborating for Broadcasting* 24-27 August 2016, Port Moresby, PNG **PROGRAMME OVERVIEW**

DATES	PRE-CONFERENCE WORKSHOPS
DAY 1 24 August	Opening & Welcome
	WORKSHOP 1 TUNAnomics Reporting Fisheries workshop for PNG media/broadcasters
	WORKSHOP 2 Digital Broadcasting
	WORKSHOP 3 Journalism in Modern Media
DAY 2 25 August	WORKSHOP 1 TUNAnomics Reporting Fisheries workshop for PNG media/broadcasters
	WORKSHOP 2 Digital Broadcasting
	WORKSHOP 3 Journalism in Modern Media

PACIFIC MEDIA PARTNERSHIP CONFERENCE

DAY 3 26 August 09:00 - 10:00	OPENING SESSION Welcome Speeches Chairperson of PMP Ms Faiesea Lei Sam-Matafeo EMTV Mr Bhanu Sud, CEO, EMTV ITU Welcome ABU Welcome Dr Javad Mottaghi, Secretary General of ABU Keynote Address Hon. Peter O'Neil, CMG, MP Prime Minister of Papua New Guinea Vote of Thanks Sheena Hughes EMTV
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10:00 - 10:30	<i>Morning tea break</i>
10:30 - 12:00	Regulatory Implications of WRC-15 and preparations for WRC-19 & WRC-23 Col. Dr. Natee Sukonrat, Vice Chair of the National Broadcasting and Telecommunications Commission and Chair of the National Broadcasting Commission, Thailand Summary and outcomes from the TUNAnomics Reporting Fisheries workshop for PNG media/broadcasters TUNAnomics DSO Challenges ITU/ABU
12:00 - 13:30	Lunch
13:30 - 15:00	Digital Broadcasting Technologies - Serving Disadvantaged Mr Masakazu Iwaki, Head of Human Interface Research Division, Science and Technology Research Laboratories, NHK (Japan Broadcasting Corporation) Challenges in System Integration of Modern Broadcast Facilities Mr Aale Raza, Director, Whiteways Systems Pte Ltd Panel Session - Media Industry Perspective of Future of Broadcasting (The convergence of media, the growth of digital and mobile, and the re-invention of radio) Mr Francis Herman-PACMAS, Mr Bhanu-EMTV, Mr Masakazu Iwaki-NHK, Dr Javad Mottaghi-ABU,
15:00 - 15:30	Afternoon Tea
15:30 - 17:00	Modern workflows with latest generation of Ingest & Playout Servers Mr Nils Ahrens, Rohde & Schwarz Nexus between Telcos & Broadcasters Dr Amal Punchihewa, Director of Technology & Innovation, ABU Environment, Climate Change and Media Ms Nanette Woonton, Head of Communications and Outreach unit. The secretariat of the pacific regional environment Programme (SPREP) - Samoa Announcing PMPC-2017 <i>Closing</i>
DAY 4 27 August 09:00 - 12:00	Visit to a broadcast station and a cultural experience

NOTE: This programme overview can be/is subject to change.

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**DRAFT 2.2**

**ITU-ABU Pacific Media Partnership Conference
2016
Collaborating for Broadcasting**

**Workshop 2: Capacity Building for Digital
Broadcasting**

**24-25 August 2016
Port Moresby, Papua New Guinea**

Hosted by:

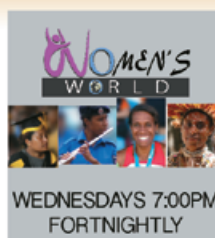


Supported by:

**AGENDA****Objectives:**

- a) To share country experiences and best practices on transition from analogue to digital terrestrial television broadcasting
- b) To create awareness and discuss challenges on new technologies and services for digital television and radio broadcasting
- c) To build skills enabling smooth transition from analogue to digital terrestrial television broadcasting

WEDNESDAY 24 AUGUST 2016 Workshop 2: Capacity Building for Digital Broadcasting (Day 1)	
0830-0900	REGISTRATION
0900-0915	Opening Session: <i>Welcome Remarks:</i> EMTV & ABU <i>Opening Remarks:</i> ITU
0915-0930	GROUP PHOTO
0930-1030	Session 1: Digital Terrestrial Television Broadcasting Implementation in Asia-Pacific <i>This session will present the current status of the digital terrestrial television broadcasting implementation in Asia and the Pacific including an updated from Australia DTTB experience.</i> Speakers: Mr. Wisit Atipayakoon, Programme Officer, ITU Regional Office for Asia and the Pacific Mr Andrew King, Director, BroadSpectrum, Australia
1030-1100	COFFEE BREAK
1100-1200	Session 2: Interactive Multimedia Services : Trend & Insights <i>This session will provide an overview of the key technologies and standards for delivering these interactive multimedia services including Over-the-Top (OTT) services: business, policy and regulatory trends. It will also discuss other complementing delivery technologies, platforms, standards and services. This is based on the ITU study published in December 2015.</i> Speaker: Dr. Amal Punchihewa, Director Technology and Innovation, ABU
1200-1330	LUNCH BREAK



1330-1500	Session 3: Digital Content and Communication Challenges for Pacific <i>This session will present industry view point in a holistic approach to discuss communication and digital content which also includes role of media in education in environment, climate change, and disaster mitigation.</i> Speakers: EMTV PACMAS SPREP TUNANOMICS
1500-1530	COFFEE BREAK
1530-1630	Session 4: Digital Broadcasting Technologies and Spectrum Management <i>This session will provide a short summary of the WRC-15 results related to broadcasting frequency including broad overview of broadcasting technologies and services including spectrum management in digital terrestrial television broadcasting. SFN in DVB-T2 with Low power Transmitters and Total cost of Ownership in Transmission networks.</i> Speakers: ITU Mr Nils Ahrens, Rohde & Schwarz, Australia
1630-1700	Summary of Day 1 Q & A (ITU Experts, ABU, Regional office ITU, EMTV, PACMAS, SPREP, Tunanomics)
THURSDAY 25 AUGUST 2016 Workshop 2: Capacity Building for Digital Broadcasting (Day 2)	
0900-0945	Session 5: The Development of Digital Broadcasting in the Pacific <i>This session will provide an updated on the Digital Broadcasting Transition in the Pacific (PNG, Samoa, Tonga)</i> Speaker: Mr Andrew King, Director, BroadSpectrum, Australia



- Studio Hire
- Merchandising
- Video Productions
- 2D & 3D Animations

- TV Commercials
- Sound Recording
- Graphic Print & Video
- Video Library Footage

- Dubbing
- Web Design
- Photography

0945-1030	Session 6: Digital Terrestrial Television Broadcasting: Challenges & Way forward <i>This session will be shared by countries' representatives that have undertaken or are undergoing transition from analogue to digital terrestrial television broadcasting.</i> <u>Panel Discussion</u> Moderator: Dr Amal Punchihewa, Director Technology and Innovation, ABU ITU Expert: Mr Andrew King, Director, BroadSpectrum, Australia Country Representatives: <u>Group 1</u> • Fiji • Papua New Guinea • Samoa • Tonga
1030-1100	COFFEE BREAK
1100-1200	Session 7: Digital Terrestrial Television Broadcasting: Challenges & Way forward (Con't) <i>This session will be shared by countries' representatives that have undertaken or are undergoing transition from analogue to digital terrestrial television broadcasting.</i> <u>Panel Discussion</u> Moderator: Dr Amal Punchihewa, Director Technology and Innovation, ABU ITU Expert: Mr Andrew King, Director, BroadSpectrum Country Representatives: <u>Group 2</u> • Kiribati • Micronesia • Solomon Islands • Vanuatu
1200-1330	LUNCH BREAK

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1330-1500	Session 8: Modern workflows with latest generation of Ingest & Payout Servers and Immersive viewing with HDR, HFR & HEVC for HD and UHD-TV <i>This session will provide information on the latest developments in digital television broadcasting. High dynamic range, high frame rate, H.265 or High efficiency Video Coding and beyond HD will be discussed.</i> Speaker: Mr Nils Ahrens, Rohde & Schwarz, Australia
1500-1530	Session 9: Digital Broadcasting for Disadvantaged <i>This session will discuss the accessibility to technologies and services in view of the disadvantaged.</i> Speaker: Mr Masakazu Iwaki, Head of Human Interface Research Division, Science and Technology Research Laboratories, NHK (Japan Broadcasting Corporation)
1530-1600	COFFEE BREAK
1600-1700	Session 10: Panel Discussion: Future of Digital Broadcasting <i>This session will discuss the key findings from each session and brainstorm ideas on how to be successful on A to D implementation.</i> Panel Discussion Moderator: Dr Amal Punchihewa, Director Technology and Innovation, ABU ITU Expert: Mr Andrew King, Director, BroadSpectrum, Australia

For updated programme, please click
on http://www.abu.org.my/Event_-_PMPC2016.aspx

NOTE: This event agenda can be/is subject to change



Upcoming Events



4th REGIONAL WORKSHOP ON OTT AND IBB TECHNOLOGIES AND SERVICES FOR MEDIA

27th September to 30th September 2016, Kuala Lumpur

30th September – Field visit to a broadcast station

(Places for the field trip are limited to the first 20 confirmed ABU members only)

We are pleased to announce that the ABU, in collaboration with Asia-Pacific Institute for Broadcasting Development (AIBD) and International Telecommunication Union (ITU) have organised the 4th Regional Workshop on Over-The-Top (OTT) and Integrated Broadcast Broadband (IBB) technologies and services.

This three day workshop, followed by a field visit, will introduce these technologies and address some of the main issues that broadcasters face when they want 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 they can introduce to attain a competitive edge in the market place. This year's workshop will also address social media and regulatory aspects. Case studies from Asia-Pacific region will be presented with some reference to European implementations.

We are delighted to invite colleagues involved in technical and production operations, as well as others interested from your organisation, to participate in this "OTT and IBB Technologies & Services for Media" event.

The workshop will take place at Hotel CaPITOL Kuala Lumpur. We have made arrangements for participants to stay in the same hotel at the special rate of MYR220 nett (approx. USD56.00) per night. As the number of rooms is limited, early registration is advised.

There are no registration/participation fees for ABU members.

Non-members are required to pay a registration fee of USD100.00 to cover meeting costs for the three days.

All expenses for the travel and accommodation of your nominee are to be borne by your organisation.



ABU FESTIVAL OF TECHNOLOGY WEBINARS

15 August – 09 September, 2016

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 & Innovation 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.



Conference 8 – 12 September : Exhibition 9 – 13 September
RAI, Amsterdam

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IBC2016: The World's Leading Electronic Media Event



IBC is the leading global tradeshow for professionals engaged in the creation, management and delivery of electronic media and entertainment. The event's unparalleled exhibition and agenda setting conference encompass the very latest developments in broadcasting, mobile TV, IPTV, digital signage and R&D making it essential for everyone's understanding of the industry and its future.

IBC is a fixture on the calendar of the global media industry, attracting over 55,000 professionals and 1,600+ exhibitors from more than 170 countries. Among them are the industry's most senior executives who choose IBC's highly respected conference to set and challenge the media agenda. The event plays host to a wide array of free to attend Industry Insight sessions, product demonstrations, big-screen movie presentations and the prestigious IBC Awards Ceremony. Innovations such as the IBC Future Zone and IBC Content Everywhere Europe showcase technology at the cutting edge. New initiatives, keep the show at the forefront of innovation and industry attention. With all this and more, IBC is the place to learn and lead.

RAI Amsterdam

Conference: 8-12 September 2016

Exhibition: 9-13 September 2016

IBC.org



Case Study: Analogue Switch off in Korea

This article introduces the Korean case study for analogue television switch off. The article is based on a discussion between Dr Amal Punchihewa, Director of Technology & Innovation of ABU and Dr Bongkyu Yi of Korean Communication Agency (KCA).

On the 31st of December 2012, South Korea successfully turned off its analogue TV system and Korean audiences have been enjoying the benefits of digital TV. From 2014 to 2015, KCA, cooperated with Inter-America Development Bank (IDB) in order to produce a textbook for DTV switchover, especially for a Korean case study on DTV switchover.

Amal:

Can you share some information on formulating policies and implementing such policies for digital switchover in Korea?

Bongkyu:

Let me present the information of the case study in two parts. The first part is the general introduction to DTV Switchover which contains the reasons why analogue TV has to be replaced by digital TV and then the current status of other countries regarding DTV switchover. The second part, concerns the specifics of the Korean case-study for DTV switchover.

Amal:

To commence with a general introduction to analogue to digital transition, can you explain what DTV Switchover is?

Bongkyu:

Due to spectrum efficiency and development of video & audio compression, DTV can carry more programme channels than analogue TV and DTV switchover will free up frequency channels, which then can be used for a range of services. In this regard, DTV switchover is considered to be the latest broadcasting revolution due to its overarching impact on daily life. Following the digitalisation of communications and the Internet, the digitalisation of broadcasting will facilitate the convergence of broadcasting and telecommunications services, and will bring new opportunities for all allied industries.

Amal:

What are the reasons for DTV switchover?

Bongkyu:

The first reason is that DTV switchover can improve viewer experience through high quality broadcasting services. Compared with analogue TV broadcasting, DTV broadcasting offers much higher quality services to viewers, providing better value with five times better image quality and CD-quality sound. Additionally DTV offers several value added

services, such as Multi-Mode Service, data broadcasting service, interactive broadcasting services etc. DTV broadcasting is expected to play a key role in creating new growth industries that contribute to economic performance by facilitating associated industries such as programme production, broadcasting services and equipment related to TV. Also the creation of demand for DTV associated industries mostly encompasses digital content.

So DTV switchover helps job creation due to the enlargement of the digital content industry. The value chain of digital broadcasting is enormously wide and so the value added by DTV switchover will be great. DTV switchover increases the efficiency of radio frequency utilisation. By acquiring the spectrum freed up by DTV switchover, known as the *digital dividend*, finite radio frequency resources can be used more efficiently. Once DTV switchover is complete, the digital dividend can be used for existing broadcasting or reallocated for commercial use. Additionally, it can be licensed to broadcasting business operators.

Amal:

What is the current state of DTV switchover worldwide?

Bongkyu:

Currently, almost every country is reported to be involved at some stage of the process of DTV switchover. Leading countries have already converted to digital transmission.

Some countries have just begun the implementation process. Some developing countries have consulted with experts to initiate a transition plan. Among the digital broadcasting standards, DVB is common worldwide, however Korea adopted ATSC from the US and Latin American countries are following Japan's ISDB-T, or DTMB from China.

Amal:

Now, can you tell more about Korean case study for DTV switchover?

Bongkyu:

In 1997, the Korean government set up its "Plan for Terrestrial Broadcasting digital Transition" which included the development of related equipment and technology, over two years test of DTV broadcasting, and then completion of DTV transition in 2010. However it took seven more years to select ATSC as a DTV standard, based on the original master plan. Conflicts and controversy over the selection between ATSC and DVB-T were combined with the lack of



by Dr. Bongkyu Yi
Public Spectrum
Management Bureau,
Korea Communications
Agency

powers to encourage and provide incentives to the related parties to proceed with DTV switchover. The atmosphere for late DTV transition continued through 2008. At that time, awareness rate of DTV switchover was just 34.9% and penetration rate of DTV was 30.3%. So the Korean government could not delay any further decided to enact the “DTV Special Act” on the digitalisation of terrestrial TV Broadcasting and the Activation of Digital Broadcasting, and to shut down analogue TV in 2012.

Korea had to try to achieve DTV switchover with every effort, although the due date was in just five years. After the DTV Special Act 2008, a huge event was held every year for propelling DTV switchover. In 2009, a “Master plan for DTV transition activation” was established in order to pave the way for a successful DTV switchover. In 2010, Korea implemented a pilot project for identifying success factors. In 2011, Korea focused on viewers and supported vulnerable social groups such as the low-income group, the elderly group, the disabled group etc. Also in order to minimise error, Korea endeavored to advertise supporting policies and public promotions. Through these arduous efforts analogue TV termination was successfully completed in 2012.

Finally, in 2013, DTV switchover was finalised and secured 108MHz in bandwidth digital dividend. To overcome stalled progress and delays on the DTV switchover and to find proper solutions to smooth DTV Switchover, the Korean Government took consideration of major issues and challenges. At first, Korea considered two separated phases; planning and implementation.

In the planning phase, Korea considered legislative proceedings, strategic development, institutional framework, and budget and financing. In the implementation phase, supply side dynamics, demand side dynamics, pilot projects, and monitoring, update and feedback. At each step of both phases, Korea asked itself, “What is the problem?” or “How can we do this?” In this way Korea prepared solutions, or ways of finding them. This was about ‘Legislative proceedings’ at the first step of the planning phase. The issues and solutions discussed above were developed and put into a legislative form to provide a legal authority for facilitating the switchover process through compulsory and supportive measures for every party.

The Korean government enacted “the DTV Special Act” in March 2008. It is believed to be one of the most suitable legislative actions for the implementation of DTV. The DTV special Act contains features related to strategic planning, dedicated organisations, ATV termination date, mandatory embedding of digital tuners, aid scheme and the obligations of broadcasters.

We now come to ‘Strategic Development’ in the second step of the planning phase. Well organized but flexible strategies needed to be established to resolve the challenges and difficulties outlined above. Particularly, strategic development was focused on the transition period from 2008 when DTV switchover proceeded in earnest, nationwide. The vision was announced to achieve a result of a, “Digital Korea enjoying digital broadcasting”. The four major initiatives for achieving the DTV Switchover vision were: paving the way for ATV termination; raising public

awareness and creating digital infrastructure; improving reception conditions; and supporting disadvantaged groups. The initiatives and assignments were inserted into a detailed roadmap for the 5 years from 2009 to 2013. The roadmap consisted of four sequential phases: Raising Public Awareness, Pilot Projects, Implementation and Review and follow-up measures.

Now, about ‘Institutional Framework’ at the third step in planning phase. It was necessary to establish a dedicated organisation to play a key role in managing the digital switchover work and changing the views of related parties, including local governments, broadcasters, manufacturers, and academia. The main highlight was ‘public private partnership (ppp)’ incorporated into the DTV Switchover Steering Committee. The DTV Switchover Bureau of the government, Korean Communication Commission (KCC) and DTV Korea were principle actors in the Steering Committee along with the Local DTV Switchover Support Centre, broadcasters, manufacturers, distributors, and other parties. The executive organisation of the Korean DTV switchover was ‘DTV Korea’ which performed DTV switchover publicity activities and operated DTV call centres. DTV call centres were operated to provide information and governmental support for those households without DTV receiving facilities. Also, DTV Switchover Support Centres were established in 17 locations all over the country to facilitate the provision of DTV receivers.

Concerning ‘Budget and Financing’ at the fourth step of the planning phase. Korea estimated the budget based on the entire process of DTV switchover from planning to implementation, all of which involved financial costs. The total budget required for the entire DTV switchover process was estimated at about 2.8 billion USD for the five years from 2009 to 2013. The matter of how to raise funds to secure a budget was an essential and even critical issue. Usual financing methods included self-funding from broadcasting companies, government aid, revenue from auctioning radio spectrum with Digital Dividend and TV license fees paid by viewers. In case of Korea, it was decided that the broadcasting companies would principally raise the money for their required investment with the help of government policy measures such as expansion of loan, increase of TV license fees and improvement of advertising policy.

Up to now I have described finding solutions in the planning phase. Now I will introduce how we found solutions in the implementation phase. The first step of the implementation phase concerned ‘Supply side dynamics,’ The Digital switchover was not carried out at once. Analogue TV channels were scattered throughout CH 14-69. In order to launch DTV simulcast with analogue TV, Korea found DTV channels in the same spectrum bands of as used for analogue TV. Before the day of analogue TV shut down, analogue and digital TV broadcasting services coexisted. After the analogue TV shut down, DTV channels occupied CH 51~69 relocated from the vacated analogue TV CH 14~50. Finally, in October 2013, Korea reserved 108 MHz of bandwidth from the Ch 51 to CH 69 digital dividend for new services. The Korean government introduced methods to support broadcasters, which were programmes for tariff reduction, loans and financial compensation. From 2008 a total of 36 digital broadcasting facilities benefited from 50% tariff reduction until the completion of the digital transition.

The government ran a loans programme to support the broadcasters who were required to accept switchover costs and to promote digital broadcasting industries. Also some broadcasters were eligible to receive financial compensation where a loss was incurred as a result of the analogue to digital transition, specifically due to spectrum reallocation.

'Demand side dynamics' were considered at the second step in implementation phase in the form of support programmes for viewers. Korea developed interconnected online and offline support systems to help disadvantaged groups and promote digital switchover. The web-based support system was easily accessed and used by the disadvantaged groups as well as general households. Off-line public places such as post offices and community centres were used to provide access points to the governmental support system. Central government not only conducted publicity campaigns to residents directly but also asked local government's assistance in implementation. Community Centre officials under local centres were trained on the central government support content; such as how to receive applications and use the government system in order to support vulnerable social groups. Additionally, the government chose local companies to provide complete solutions to support the installation of digital converters and antenna hardware.

Over a period of five years, organisations made 14 separate TV advertising campaigns and televised promotions 1,419 times with advertising charges. Public agencies and administrations put up posters and notices about support system for the economically disadvantaged and ordinary households around apartments, community centres, village halls, senior citizen centres, post offices, and other publicly visible areas. The key point for encouraging distribution of digital broadcast receivers was to designate products which had competitive and reasonable prices. The government designated four types of entry-level digital television sets. The designated DTV sets were eligible to display a government certification mark and had price adjustments to reflect the change in the market. Also, it designated digital to analog converters and antennas, to be provided to the economically disadvantaged.

The government launched a comprehensive one-stop website for distributing information on digital broadcasting receivers. This website was designed to give information on all the designated and qualified receivers such as entry-level DTV sets, digital-to-analog converters and antennas. In particular there were so many apartments used as public residences in Korea. With over 50% of Korean the population living in that kind of residence Korea concentrated on improving Master Antenna Television systems in consideration of the peculiarities of the Korean residential environment where apartment housing is dominant.

'Pilot Projects' were at the third step in implementation phase. In Korea, in order to choose proper regions for implementing the pilot project, three criteria were applied and finally four regions such as Danyang, Uljin, Gangjin, Jeju were selected. The DTV switchover pilot project provided insights from technical testing and viewer satisfaction surveys. So these were valuable to the planning process for the national DTV switchover in 2012.

Finally, 'Monitoring, Update and Feedback' took place at the fourth step, in the implementation phase. As part of the DTV switchover process, base line data would be needed to assess necessity for governmental support and consequently to prepare for effective support plans. Korea conducted annual or bi-annual surveys, continually checked the state of DTV switchover, and used the data for implementing policies. Finally analogue TV was successively shut down in 31st December 2012. According to the spectrum relocation plan, DTV channels were confirmed sequentially for three separate regions of Korean territory at each planned time. From recent surveys DTV penetration rate is over 95% over all provinces. Briefly speaking, after deciding the DTV standard, it took only 5 years to complete the DTV switchover in Korea which is a very impressive result compared with other advanced countries.

Amal:

To conclude the discussion, let me ask four more questions.

What was the most difficult thing about implementing DTV switchover in Korea?

Bongkyu:

Briefly speaking, there were three difficulties. First was choosing DTV transmission technology standard. It took over 5 years to select the ATSC DTV Standard for Korea, which is the same as the US DTV standard. Second, the question of when and how to promote DTV switchover would be implemented to the public. In order to introduce this information to the public, Korean government, broadcasting companies, DTV related organisations and local government cooperated with each other. Finally, there was the determination of how to finance the cost of switch over. There were several costs associated with the DTV switchover such as promotional costs, supporting the cost of set-top box to low income and elderly and compensating the cost to the broadcasting companies which result from changing channels from temporary channels. However, the Korean government introduced a special act that allowed use of the spectrum auction revenue from the Digital dividend. Even though there were many difficulties for the progress of the DTV Switchover, due to the cooperation with the public, Korea achieved a successful DTV Switchover.

Amal:

After the DTV Switchover in Korea, Could you tell me what was real and visual effect from the DTV Switchover?

Bongkyu:

You know, Korea has Korean Wave. One of them is K-POP. Another is K-Drama. The all of them could possibly be based on digital content. So many countries love Korean Wave and Korean Electronic Devices as a result of the DTV Switchover.

Amal:

After the DTV Switchover in Korea, how does Korea use the Digital Dividend?

Bongkyu:

As other countries turned off analogue TV and made the DTV transition, Korea held 108 MHz bandwidth Digital Dividend from 698 to 806 MHz. Out of the Digital Dividend 40MHz bandwidth was allocated to mobile services in IMT, another 40MHz was assigned to National Public Broadband Network which is commonly used for emergency communication like PPDR, public protection and disaster relief, train control and communications, and e-NAVI in near future.

Amal:

Based on the DTV switchover in Korea, what is the most important thing you can share that developing countries should consider for successful results?

Bongkyu:

Unfortunately, I cannot find one precise answer, because there are so many difficulties and variables in implementing

DTV Switchover. Also the broadcasting environment like market, race, language, territory and so on, differ between countries. So if I say one thing is important and other thing is unimportant, it is not necessarily true. However I think one thing I must choose as an important thing to DTV switchover, is the promotion to the public of your countries' decision regarding the DTV switchover day. What should not happen is that that the public fail to get information about the DTV transition and, lose access to the broadcasting services.

Amal:

Thank you for the introduction to Korean experience, which will be helpful to our ABU members in planning and implementing their analogue to digital transition. The ABU believes that this information will inform their countries' transition experience for going digital and making a better environment for the convergence of broadcasting and communications.

author

Dr. Bongkyu Yi
Public Spectrum Management Bureau, Korea Communications Agency

Dr. Bongkyu Yi is a team leader of Public Spectrum Management Bureau in Korea Communications Agency which has researched and developed implementation policies of spectrum management in Korea as a think tank for spectrum related. He introduced 'Korean case study of DTV Switchover' in Fiji 2015, as a specialist engaged by ITU. He cooperated with IDB (Inter-American Development Bank) in 2014 to produce a textbook 'DTV Switchover in Korea' for middle American countries, as a technical advisor and consultant on spectrum management in Peru in 2012. He studied economics in PhD programmes at University of Virginia and State University of New York in Binghamton.

New Members

Re-Joined ABU

SBS – Australia

SBS-Australia resigned from ABU membership in May 2015 due to budget cuts. With their situation is improving, they decided to re-join the Union as Additional Full Member.

SBS is a a well-known Free-toAir national public broadcaster in Australia. They provide broadcasting services of a national character in Australia, including the production and commissioning of a high volume of their own programming output. Their principal function is to provide multilingual, multicultural and indigenous radio, television and digital media services that inform, educate and entertain all Australians, reflecting Australia's diverse society.

Associate Member

KFRS – Korea

K-Force Radio Station is a national Free-to-air radio channel also known as Friends FM in South Korea. Since its creation in 1978, it has operated under the Ministry of Defence which also runs a TV channel, a public relations organisation, a cinema production unit, a military newspaper and a media agency.

Their target audience is specific. It includes the military forces and those people who are interested in military life as well as families who have a close relatives in the army. KFRS broadcasts 18 hours of programmes which they produce themselves and six hours of Korean Broadcasting System (KBS) programmes.

Some of their best and most popular programmes are: 'It's a Good Day', 'Love and Happiness', 'Together with the People and Soldiers' and 'Cheer Up! TheYoung Soldiers'.

Christian Television Service – Korea

CTS- Christian Television Service is a satellite television station from Seoul, South Korea, providing Christian shows. It produces and airs Christian Gospel teachings, services and educational shows. It has 10 million subscribers in South Korea and its programmes are broadcast worldwide.

Founded in 1995, CTS comprises of four companies: CTS TV, CTS NETWORK, CTS International and Z Road. They reach audiences in South Korea through their Cable TV (Analogue and Digital) as well as with their Sky Life Satellite Broadcasting channel. Several Satellite Service companies such as Direct TV in America, KBN (Mongolia) and IPTV-MEGATEL (New Zealand) transmit CTS signal to international audiences.

CTS broadcasts news as well as local and international programmes. The most popular programmes are, amongst others, "Staying Joyful Everyday"- a talk show where well known Korean figures are invited to share and discuss their lives, helping their audiences to stay positive throughout the day. Another programme, Consultation 1004 Live", focuses on law, health, and family, where experts in each field communicate live with their audiences.

THE LATEST NEWS FROM EBU TECHNOLOGY & INNOVATION

Shannon Frame

Technical Editions Manager (EBU)

Internet services are of growing importance for public broadcasters. Audiences are using different types of devices to access media and more media is being delivered via broadband networks. Over the Top (OTT) techniques can help public service media continue to reach their audiences on new platforms.

Our EBU BroadThinking event kicked off this year with a keynote from Egon Verharen (NPO) on the state of OTT services for public service media. He stated that, "Media companies are becoming more IT-centric... We are now more data-driven than ever before and we need to be in order to serve new demands from our audiences. When it comes to audience expectations, online is as important as linear broadcasting."

But, a number of challenges still exist. Although public service broadcasters are moving to IP-based production and distribution, finding the expertise and resources to achieve this is not easy. It was clear in the discussion that EBU Members are part of a race to keep pace with rapidly developing technology. Do we differentiate our services for online and different platforms? Can we provide all our services in HD quality for free? These were some of the important questions raised during the Conference.

Speaking about online services, the winner of this year's 2016 EBU Award for Technology & Innovation was the VRT Sandbox LiveIP Studio. An IP- and IT-based studio, using open standards, was built at the headquarters of VRT (the public service broadcaster for Flanders in Belgium). The LiveIP Project is a collaboration between the VRT and EBU along with ten technology partners. In the future, the award will be given annually, based on an evaluation of factors such as impact and innovation.

Our Members have also been busy. Phil Tudor of the BBC gives us the latest on future content trends and object-based production in our latest [tech-i magazine](#). This issue also takes a closer look at the advantage of IMF, accelerating the digital radio roll-out, creating a recommendation platform, and more!



To find out more, visit our website at
tech.ebu.ch

or follow us on social media:

Twitter:

[@EBU_TECH](https://twitter.com/EBU_TECH)

Facebook:

[EBU Technology & Innovation](#) or

Linkedin:

[EBU Technology & Innovation](#)

JOIN US AT OUR NEXT EVENT!

EBU @ IBC 2016

09-13 September, EBU, Geneva

IBC is Europe's largest annual conference and exhibition dedicated to media broadcast technology. As usual, we will be present at this year's IBC Conference with demonstrations, presentations, conference sessions and more at the stand to ensure that public service media remain on the agenda and that the EBU is at the forefront of technology and innovation. <https://tech.ebu.ch/events/ibc2016>

DevCon 2016

01-02 November, EBU, Geneva

This year will mark the third anniversary of our annual EBU Developer Conference. A unique opportunity to learn more about best practices in software engineering and get hands-on current development and deployment tools. Participants will brainstorm new ideas for running software-driven broadcast infrastructures and improving engineering workflows. The event is also a great place to meet experts who are addressing similar challenges on a daily basis. <https://tech.ebu.ch/events/2016/devcon>

News

from the ABU Region

MEASAT to Offer New Video Distribution Services in India

Viewers in India will benefit from more HD and 4K/UHD offerings following an agreement reached between MEASAT Satellite Systems and PLANETCAST Media Services Limited.

The agreement will provide PLANETCAST with premium video distribution services across India with the potential to expand across the Asia Pacific. Under the terms of the agreement, PLANETCAST has signed for capacity on MEASAT- 3a's global C-band beam. The satellite is located at 91.5°E, Asia's preferred HD and 4K/UHD neighbourhood.

PLANETCAST is a market leader in providing managed services to the broadcasting industry in India and neighbouring countries with a rapidly growing footprint across Southeast Asia. Through this agreement, PLANETCAST is able to leverage MEASAT's industry-leading video expertise and can now offer top-class HD and 4K/UHD video distribution solutions from the region's leading video hotspot. *(onscreenasia.com)*

VTV-Vietnam Committed to Offer High Quality OTT Content

Vietnam Television – VTV, the country's leading broadcaster, is using state-of-the-art equipment to support efficient delivery of high-quality content, including premium sports events, via its new live OTT offering.

VTV has augmented its existing installation of Harmonic gear with a new Polaris Play channel-in-a-box automation system, Spectrum ChannelPort integrated channel playout system, Electra X2 advanced media processor and ProMedia Package multiscreen stream packager, along with Kaltura's OTT TV, content management, service delivery platform and user experience management to accelerate deployment and the launch of new OTT services.

"OTT TV has quickly become a popular choice among consumers in Vietnam, but the success of such services still depends on delivery of compelling content characterised by exceptional visual quality," said Dr. Pham Anh Chien, Managing Director of the VTV Digital Centre. "Harmonic addresses these requirements with its acclaimed portfolio of low-latency IP video products, which ensure that we can deliver even fast-paced live sports events with remarkable picture quality. As a result, we're equipped to offer the best possible service to our OTT customers watching here in Vietnam and in overseas markets."

(newsoneplace.com)

MediaGuru Honoured for Outstanding Contribution in Content Digitisation

MediaGuru recently received the 'Outstanding Contribution' award from the Society of Cable Television Engineers (SCTE), in recognition of the role it has played towards digitisation of audio-video content globally. The award was presented at the SCTE India Award Ceremony held at the 24th edition of Convergence India Conference and Exhibition. The event was attended by executives from the broadband, broadcast, and telecom industry, along with dignitaries from business, government, and trade media.

MediaGuru, over the years has worked with broadcasters and content owners on digitisation, archiving and preservation of audio-video content of historic value, as well as management of media assets being produced every day. Some of its recent projects include large scale digitisation for a Qatar based Govt. agency, establishing digitisation infrastructure at Doordarshan, Kolkata, and media management for all of Times Group TV channels and radio stations.

(C+T)

SBS Australia refreshes its On-Demand Video

SBS-Australia will refresh its OTT service and extend its reach across more devices this year. The Australian broadcaster re-launched the SBS On Demand website in June last year and together with Accedo will now look to continue to roll-out the fresh video experience across all existing platforms.

Accedo is helping take the SBS On Demand video experience to the next level by simplifying the complexities of delivering a consistent, dynamic user experience across every screen. As audience consumption habits continue to evolve, SBS On Demand is central to SBS's commitment to exploring and celebrating diversity through inspired entertainment using cutting edge technology.

The refreshed SBS On Demand experience will offer an uncluttered and engaging new interface that will make it even easier for viewers to explore and enjoy the 4000 hours plus videos available.

(tvtonight.com.au)

ABS-CBN Philippines goes for New Digital Production Facility

ABS-CBN Corporation is the leading media and entertainment company in the Philippines and the first to launch digital TV services within the country. They have recently acquired an extensive future-proof transcode farm, which will act as the

central file ingest and conversion hub for all the company's needs. The Vantage transcode farm will be installed at the customer's Quezon City-based iPost (Integrated Post Production) post production facility.

The order was secured by Telestream working in partnership with local channel partner, Techtwist. ABS-CBN operates two national TV channels, two regional radio networks, 11 cable channels and six international channels.

(telestream.net)

Ideal Systems Introduces Studio Camera Robot

Electric Friends, a new Norwegian-based manufacturer that has developed the next generation of robotic camera systems for broadcasters, and Ideal Systems, has launched their latest technology to the APAC. The invention is the first easy-to-use, intuitive robotic control system with a seven-axis robotic camera arm. The robot is operated through an intuitive control surface by which each camera axis can be manipulated by a touch screen with a live video underlay so that the operator gets instantaneous feedback.

The robotic system has been developed for a variety of applications including studios, especially those with a space constraint, which addresses a big issue in Tokyo, Hong Kong, and Singapore. It can also be used for outside broadcast and film production. The robot replaces a staffed jib or small crane and is aimed toward repeated trajectory takes in news and sports studios. Electric Friends provides various different hardware and software configurations suitable to any virtual or physical studio as well as outside broadcast.

(C+T)

New Zealand Selects Ericsson for Live Captioning

Ericsson has announced that it has won an exclusive multi-year access services contract with the Office of the Clerk of the House of Representatives in New Zealand. The contract will see Ericsson remotely deliver live captioning services for the Parliament TV broadcasts of the sittings of the New Zealand House of Representatives. The new captioning service will be available on Parliament TV for the first time from August 2016.

In March, Ericsson announced multi-year captioning contracts with Australian public service broadcasters, ABC and SBS. In November, Ericsson also announced a multi-year news captioning contract with ANC, Australia's leading 24-hour multi-channel, multi-platform news service provider. As part of the contract, Ericsson provides captioning services for SKY NEWS-produced bulletins on Qantas flights.

Ericsson's closed captioning business is one of the largest in the world, with hubs in Australia, the UK, France, Germany, Spain, the Netherlands and the US. Ericsson has been providing captioning services for over 30 years and

delivers 230,000 hours of captions every year, 100,000 of which are live. It is also the world's largest provider of TV audio description and sign-language translation.

(thebroadcastbridge.com)

Australia Reviews TV Captioning

The Australian Communications and Media Authority has begun a review of the captioning rules for television broadcasters. It is calling for public submissions to a consultation paper.

The captioning rules for Australian television broadcasters are set out in the Broadcasting Services Act 1992 (BSA) and include: targets for the amount of programming that must be captioned; reporting and record-keeping requirements; exemptions from captioning requirements; and requirements about quality set out in the Captioning Standard.

The BSA also requires the ACMA to conduct the review before 31 December 2016 and to provide a report to the Minister before 30 June 2017. The captioning of Australian television broadcasts is essential for many Australians, and the ACMA encourages all interested parties to make a submission to the review.

(C+T)

ABC Selects Grass Valley for Nationwide News Equipment Upgrade

Grass Valley has entered into a contract with the Australian Broadcasting Corporation to provide one of the largest single system technology upgrades ever undertaken in Australia. The long-term project represents a major technology refresh and replacement in its studios across all Australian states.

The cornerstone of the system will be Grass Valley's GV STRATUS video production and content management system solutions that include EDIUS nonlinear editing software, K2 Summit 3G media servers and other Grass Valley core technologies. NETIA will provide NETIA Radio-Assist 8, while the Associated Press will provide its AP ENPS 7 scripting system. Both will be deeply integrated into the GV STRATUS system.

The process involved a multi-year tender process and negotiation covering nine separate aspects based on a detailed and exhaustive evaluation of available technology and vendors. After careful consideration, as well as both a testing phase and a proof of concept phase, Grass Valley was selected as the exclusive solution provider.

The installation will be implemented over two and a half years in each of the Australian Broadcasting Corporation's major news and current affairs facilities. Grass Valley will be responsible for all facets of the design, planning, implementation, commissioning, training and ongoing support of all systems.

(C+T)

Digital Broadcasting Update

1. Mobile and Broadcast Converge in New ETSI Specification Group



ETSI has unveiled a new Industry Specification Group, the Mobile and Broadcast Convergence (MBC) ISG.

ETSI MBC ISG will explore the deployment and business models of converged networks from the perspectives of all interested parties, including broadcasters, satellite, mobile and terrestrial broadcast network operators, content owners and providers, network infrastructure vendors and manufacturers of consumer equipment and consumers. The group will study the means to support delivery of media including linear and non-linear elements over converged networks, taking into account the potential benefits and challenges from a commercial and technical perspective.

TV delivery has traditionally been dependent on one-way, one-to-many delivery networks to fixed TV sets (i.e. broadcasting). Nowadays, an increasing number of consumers watch linear or non-linear content on their traditional home screens as well as on their smartphones and tablets. Although much of this content is currently delivered via WiFi networks, these new forms of media consumption dramatically increase the load on mobile networks. This situation may require new solutions, such as the leveraging of a one-to-many broadcasting approach.

While the ISG will not make recommendations about spectrum allocation, spectrum authorisation models which impact the regulatory framework and/or business model may need to be considered in the ISG work.

Participation in the Mobile and Broadcast Convergence Industry Specification Group is open to all ETSI members as well as organisations who are not members, subject to signing ISG Agreements.

(ETSI)

2. Extended High Efficiency AAC (xHE-AAC) Licensing Program Announced



Via Licensing Corporation has announced that a patent pool license for Extended High Efficiency AAC (xHE-AAC) is in the final stage of development.

xHE-AAC is the most recent update to the Advanced Audio Coding (AAC) family of technologies standardised by ISO MPEG. xHE-AAC combines an optimised speech coder with a high-performance general audio coder resulting in a single audio coding system capable of achieving exceptional results at low bit rates with any type of audio content, whether speech, music, or ambient sounds.

xHE-AAC is ideally suited for radio broadcast, which combines a variety of content from talk radio to voice over music or sound-effects to purely musical program content. Apart from radio broadcast, xHE-AAC is well suited for radio streaming services, especially over congested networks. Due to its coding efficiency and scalability, with stereo bit rates as low as 12 kilobits per second xHE-AAC enables streaming services over 2G networks such as those found in emerging markets, and it can save bandwidth costs for service providers and consumers even on 3G and 4G LTE networks.

Royalties for the xHE-AAC license are expected to be as follows:

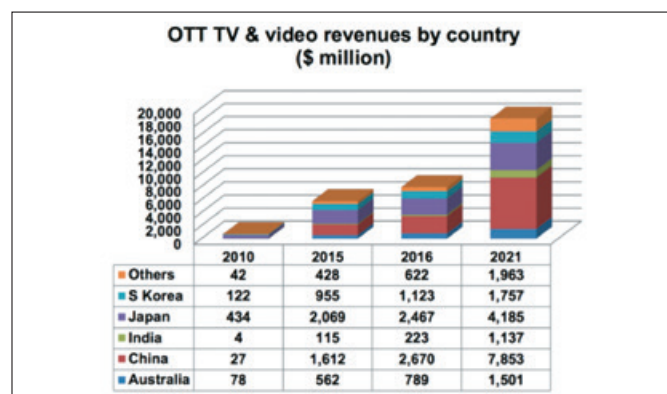
Volume (per unit/annual reset)	Per-Unit Fee*
For the first 1 to 500,000 units	\$1.08
For 500,001 to 1,000,000 units	\$0.88
For 1,000,001 to 2,000,000 units	\$0.78
For 2,000,001 to 5,000,000 units	\$0.70
For 5,000,001 to 10,000,000 units	\$0.67
For 10,000,001 to 20,000,000 units	\$0.47
For 20,000,001 to 50,000,000 units	\$0.45
For 50,000,001 to 75,000,000 units	\$0.40
For 75,000,001 and more units	\$0.35

• Preliminary; subject to change, pending availability of the license

(Via Licensing)

3. Asia-Pacific OTT TV & Video Revenues to Triple

OTT TV and video revenues for 17 countries in the Asia Pacific region will reach \$18,396 million in 2021; up from \$707 million in 2010 and \$5,741 million in 2015. The new report from Digital TV Research, The Asia Pacific OTT TV & Video Forecasts, estimates that China will overtake Japan in 2016 to become market leader.



Advertising on OTT sites will remain the main revenue source, bringing in \$8,745 million by 2021 – up by \$6 billion from \$2,609 million on 2015. China will supply \$4,911 million of the 2021 total, with Japan providing a further \$1,475 million.

SVOD revenues will rocket from \$1,816 million in 2015 to \$6,439 million in 2021. China will add \$1,838 million in revenues between 2015 and 2021 – nearly sextupling its total.

Download-to-own/electronic sell-through movie and TV revenues are forecast to be \$1,904 million in 2021 (with \$692 million from Japan), up from \$691 million in 2015. OTT TV and video rental will climb to \$1,307 million in 2021.

(Digital TV Research)

4. 4K Set-Top Box Market to Quadruple in 2016; Remains One Bright Spot in Challenging Set-Top Box Market

ABI Research forecasts the 4K set-top box market will quadruple from less than two million units in 2015 to more than 7 million in 2016, and then grow by 46% annually through 2021. However, the overall set-top box market is on the decline, expected to drop by about nine percent in 2016 to less than \$16 billion in revenue, with both Pay TV and free-to-air boxes losing value.

Set-top box providers are increasing in scale due to recent mergers and acquisitions, including market leader Arris taking over Pace and Technicolor acquiring Cisco's set-top box unit. Additionally, Huawei, at just more than \$1 billion in revenues, leaped ahead of a number of vendors that faced a difficult year with drops of 25 to 40% in revenues, including EchoStar and Humax.

Regionally, China, which overtook the U.S. as the largest set-top box market by units in 2010, remains in the lead. India passed the U.S. just last year as a failed

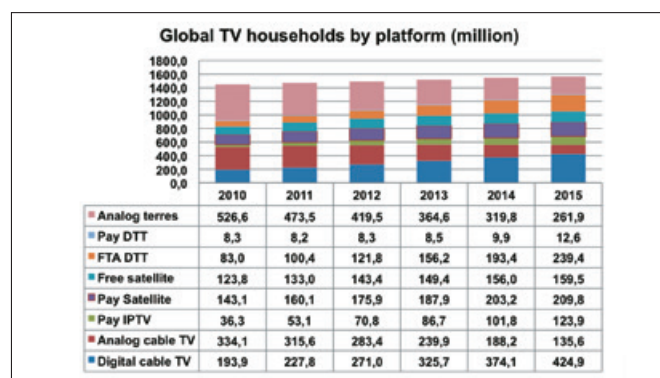
digital cable transition spurred a large amount of satellite set-top box shipments. Given market circumstances, ABI Research predicts India will continue to grow its set-top box shipments and likely surpass China as shipment leader in 2018 or 2019.

(ABIresearch)

5. Three-quarters of the World's TV Households are Digital

Global digital penetration climbed from 40.4% of TV households at end-2010 to 74.6% by end-2015, according to the latest edition of the Digital TV World Databook.

About 584 million digital TV homes were added in 138 countries between 2010 and 2015. This doubled the digital TV household total to 1,170 million.



From the 584 million digital homes added between 2010 and 2015, 156 million came from primary DTT [homes taking DTT but not subscribing to cable, satellite TV or IPTV]. Digital cable contributed a further 231 million. There were more pay IPTV additions (88 million) than pay satellite TV ones (67 million). However, there were still 398 million analog TV households (terrestrial and cable) by end-2015, although this was down from 863 million at end-2010. From the digital TV households additions between 2010 and 2015, 381 million were in the Asia-Pacific region; more than doubling its total to 608 million. China became the largest digital TV household nation in 2010, rising to 339 million digital TV homes (29% of the world's total) by end-2015.

The number of pay TV households (analogue and digital) reached 907 million by 2015, up from 716 million in 2010. Asia Pacific increased by 126 million – or two-thirds of the global additions – during this period to bring its total to 520 million.

The number of global digital pay TV subscribers doubled from 382 million in 2010 to 771 million in 2015.

China had the most pay TV subs, at 264 million by end-2015 (up by 69 million on 2010). India added a further 32 million pay TV subs.

Pay TV revenues [subscriptions and PPV revenues from movies and TV episodes] reached \$206 billion in 2015, up by 19.4% from \$172 billion in 2010. The US recorded pay TV revenues nearly ten times as high as second placed China.

(Digital TV Research)

Equipment Trends

1. The Next Generation of Robotic Camera Systems for Broadcasters



Electric Friends, a Norwegian-based manufacturer that has developed the next generation of robotic camera systems for broadcasters, and Ideal Systems are launching their latest technology to the APAC market at BroadcastAsia 2016.

The new robotic system is developed for a variety of applications including studios, especially those with a space constraint, which addresses a big issue in Tokyo, Hong Kong, and Singapore. It can also be used in outside broadcast and film production. This new broadcast and film solution delivers a giant leap forward in terms of productivity, flexibility, and cost efficiency. The new robot replaces a staffed jib or small crane and is ideal for repeated trajectory takes in news and sports studios. Electric Friends provides various different hardware and software configurations suitable to any virtual or physical studio as well as outside broadcast.

(Ideal Systems)

2. Worldwide Radio Reception Chip



Building upon the market-proven Octopus 3, Parrot “03+” takes digital and analogue radio reception to the next level. The current generation is already deployed through major European, Japanese and Chinese OEMs and enables global radio reception: AM, FM, DAB, DAB+, DRM, DRM+, DVB-T2 Lite and HD Radio (*Requires iBiquity agreement*) standards. Aside from this worldwide tuner, the **Octopus 3+** embeds an ARM Cortex-A5 processor with a fully-featured Linux system running Parrot well-known connectivity middleware

for Bluetooth, telephony, voice recognition, media, etc. The chip also features an Ethernet, CAN and USB interface.

The **03+** is running the state of the art processing algorithms that made the success of the Octopus Chip Series: fast and accurate channel estimation, multipath rejection, Doppler Effect compensation and MRC diversity. Thanks to its background scanning and diversity capacities, the Octopus 3+ is also an all-in-one high-end radio solution. As a result, it enables best-in-class reception of radio in motion, even at very high speeds. The **Octopus 3+** addresses all major radio standards deployed throughout the world, thus providing car makers with a single solution for global deployment, lowering R&D, testing and qualification costs. The **Octopus 3+** plays its part in building an increasingly connected in-vehicle environment at an affordable cost.

In addition, this universal component delivers the processing power required by any variation of smart antenna or media box application. The **Octopus 3+** is offered to all major Tier-1 auto suppliers as a reference design.

(Parrot Automotive)

5. High-Power GV Series FM Transmitters



Nautel has introduced the GV60 and GV80, the newest members of Nautel’s award-winning GV Series. As with the other products in this series, the 60 kW GV60 and 80 kW GV80 offer the highest IBOC performance and efficiency along with powerful instrumentation and functionality.

GV Series transmitters offer unique audio management and processing tools previously unavailable in high power transmitters. Features such as MER instrumentation, HD PowerBoost, SNMP support, SHOUTcast™ and IceCast streaming input, PUSHRADIO™ with scheduler and play lists, Axia Livewire™ IP audio support, MPX over AES functionality, and optional Orban Inside™ onboard audio processing are available to users. All GV Series products can achieve -16 dB hybrid power at the transmitters’ nameplate power rating.

(Nautel)

Personalities & Posts

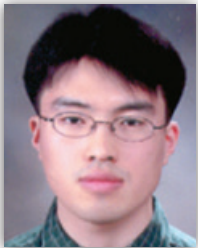


Mr Simon Lockington
Joins Awards Panel

Simon Lockington of Imagine Communications has joined the ABU Engineering Awards Panel. The panel selects the annual winners of the ABU Broadcast Engineering Excellence Award and the ABU Developing Broadcasters' Excellence Award. Simon is Director of Professional Services - APAC at Imagine Communications. He succeeds his former colleague Paul Worman on the panel. We welcome Simon and thank Paul for his contributions these past few years.



New ABU Technical Liaison Officers



Mr Jinyoung Jang
SBS-Korea

Jinyoung Jang has been appointed the new Technical Liaison Officer of Seoul Broadcasting System (SBS), Korea. Mr Jang holds a Bachelor's Degree in Electrical Engineering from Korea University. He has been working at SBS as System Engineer in the DTV master control room and is in charge of technical planning, policy and external relations in the Technical Planning Team. Mr Jang replaces Dr Sammo Cho who has moved from the Technical Department to the UHD Planning Office at SBS.



Dr Ahmad Zaki Mohd Salleh
TV3-Malaysia

Dr Ahmad Zaki Mohd Salleh, Group General Manager, Engineering, TV Networks, Media Prima Berhad, is now the ABU Technical Liaison Officer for TV3. Dr Zaki replaces Mr Tan Kwong Meng who has retired. Dr Zaki is in charge of all engineering operations, production and planning in Media Prima Berhad including all aspects of engineering with regards to DTV implementation.



Mr Mohammad Rohanudin
RRI-Indonesia

Mr Mohammad Rohanudin is Radio Republik Indonesia's new ABU Technical Liaison Officer and Member of the ABU Technical Bureau. Mr Rohanudin, who is Director of Technology and New Media, succeeds Mr Sunarya Ruslan in the ABU positions.

Farewell to Sunarya Ruslan



Mr Sunarya Ruslan

Mr Sunarya Ruslan, who has retired from Radio Republik Indonesia, played a long and distinguished role in ABU activities. He served as ABU Technical Liaison Officer from 2006 and as a Member of the ABU Technical Bureau from 2008. Mr Sunarya was the Honorary Vice-Chairman of the ABU Technical Committee when the ABU General Assembly was held in Bali in 2008. Mr Sunarya was very active and served as the Chairman of the ABU Digital Radio Forum for many years. He was the winner of the ABU Broadcast Engineering Excellence Award in 2014. Until his retirement, Mr Sunarya was Member of the Supervisory Board of RRI. Among his many achievements was introducing digital broadcasting technology to the Indonesian government through seminars and workshops from 1999. He also played a key role in introducing and applying a disaster early warning system at RRI. We thank Mr Sunarya for his fine record of service to the ABU and wish him well in his future endeavours.

ABU DIGITAL BROADCASTING SYMPOSIUM 2017

DIGITISE, DIGITALISE & DOMINATE

6–9 March 2017
The Royale Chulan Kuala Lumpur



We are excited to announce the next ABU Digital Broadcasting Symposium 2017, which will take place at the The Royale Chulan Kuala Lumpur from 6-9 March 2017.

The DBS2017 with the theme “**Digitise, Digitalise & Dominate**”, will focus on the importance of embracing and implementing digital technologies in every aspect of the broadcast and media value chain, from infrastructure to content development and its delivery, in order to be a dominant player in the current market space.

The 4-day composite event with its international conference, industry exhibition and focused workshops will showcase and present advancing technologies, content strategies, and effective business ideas and solutions to address current and future challenges within the industry. With the industry's leading solution providers and experts it will provide a platform to share expertise, learn from experiences and network with like-minded colleagues. The DB Symposium, now a prominent event within the industry calendar, provides international and regional exposure to our members and industry partners.

Please mark the dates (6–9 March 2017) and follow the website www.abu.org.my/dbsymposium for more information and developments. Please contact dbs@abu.org.my for further information.

We look forward to your participation and contribution to the event.



THE BEST WAY TO PREDICT THE FUTURE IS TO CREATE IT. PETER F. DRUCKER



Why are we watching the global Television shipment data ?

Because the size, format and brightness of the television sets being sold have a direct influence on viewer behaviour. That, in turn directly affects the system design of current or future television channels (and transmission head ends). Larger screens, UHD TV, smart TV in more homes will change viewing habits irrevocably. Broadcasters need to make sure that they are leading the change.

We specialise in building broadcast facilities that are digital, IP centric, automated, 4K ready, transmitting over multiple formats and capable of handling dynamic business models.

LET'S NOT TRY TO PREDICT THE FUTURE, LET US CREATE IT !!

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BroadcastAsia2016

