Conference reports

More than 104 000 people from 130 countries and 1400 exhibiting companies turned out for NAB 2005 in Las Vegas from 16 to 21 April. Fred Gengaroli represented the ABA at both the conference sessions and the related trade show.

NAB 2005

In his engineering keynote address, Robert Pepper, Chief of Policy Development at the US Federal Communications Commission, summarised the latest technological developments of particular interest to the broadcasting sector. There has been a 70 per cent improvement in the capacity of electronic storage devices; compression technology developments from MPEG2 to MPEG4 are providing nearly twice as much capacity on a given channel; and in Europe, broadband over power lines is being looked at as a possible way of providing high bandwidth capacity to the home via the mains cabling.

Combinations of these developments bring new services to the public. Video on demand (VoD) is growing: Comcast[1] expects to sell 1 billion VoD selections in 2005; broadband connections allow viewers to watch their city's television programs anywhere in the world[2]; compression, the Internet and cheap storage together enable the iPod; and the web becomes one huge TiVo (person to person communication).[3]

Mobile television is generating interest and is predicted to have a very fast early adoption rate. Crown Castle (a UK-based company) has recently bought 5 MHz US-wide for $US12 million to provide mobile television and other media services, using the newest addition to the DVB family of standards, DVB-H.[4]

On the radio front, 59 AM and 205 FM IBOC stations provide local content, and compete against iPods and satellite-delivered services. GPS plus radio gives local information, maps, or localism.

Dr Pepper is optimistic about the opportunity to 'invent the solution'. Currently available engineering and technical solutions enable broadcasters to be creative and reinvent broadcasting for the next 50 years.

1 www.comcast.com/

2 Orb (www.orb.com/) provides secure access to digital media from a home computer through a simple web interface enabling streaming of live television, photos, music and videos to any web-enabled device.

The Slingbox™ (www.slingmedia.com/) enables consumers to watch their television programming from wherever they are by turning virtually any laptop or Internet-connected device into a personal television. The Slingbox™ redirects, or 'placeshifts', the television signal from any cable box, satellite receiver, or personal video recorder to a viewer's location and device of choice – whether in another room in the home or anywhere in the world with a high-speed Internet connection.

3 Bit Torrent provides a more efficient way of using a file server, see: www.bittorrent.com/introduction.html

4 In 2004, Crown Castle paid $US12 million at a government auction for an exclusive terrestrial licence to use 5 MHz of US 'new' L-band spectrum which extends from 1440 – 1790 MHz. It was previously used for weather balloon and weather satellite down-linking.

IBOC

IBOC appears to have made progress in the past 12 months. The National Radio Systems Committee (NRSC) approved the IBOC standard (NRSC-5) on 16 April 2005, after 15 years in development, and forwarded it to the FCC for adoption. As in Australia, these standards are voluntary.

Several IBOC car radio receivers were on display, and home receivers are expected to be available later this year at a price of around $US250.

In Las Vegas, IBOC is being transmitted by four local radio stations, on 840 kHz (AM), and 89.7 MHz, 102.7 MHz and 107.5 MHz (FM).

A new application for IBOC is 5.1 surround sound, and some expect it to do well in the US. The system is fully backwards-compatible with stereo or mono FM IBOC and has been proposed to MPEG for adoption as a standard. HD radio receivers use the additional 16 kbps of data transmitted to generate the 5.1 surround sound information.

Analog AM transmission

The NRSC's AM Broadcasting Subgroup is reviewing the emission standard for AM broadcast transmissions (NRSC-2) in light of receiver developments in the past few years, primarily in the area of audio bandwidth. The subgroup is considering whether a reduction in AM emission bandwidth is possible and to what extent it would minimise interference between MF channels, analog and digital. Thirty receivers have been purchased across the full price range and a test procedure is

due out this month: the test results are expected to be presented at the NAB conference later this year.

International Radio Update – DRM

A number of exhibitors at NAB had DRM products for sale, mainly transmitters. This year's IFA conference in Germany is expected to showcase DRM receivers that will be available for sale.

The DRM consortium has voted to extend the current DRM standard capability to include the low VHF (47 – 72 MHz) and the medium VHF (88 – 108 MHz) bands.

DRM tests are expected to take place in Mexico and Brazil this year, using 10 kHz channels. DRM tests in Macedonia have shown that even the least robust mode of DRM has a 10 dB advantage in signal to noise ratio and a 15 dB advantage in minimum field strength requirements over AM transmissions.

Broadband developments

In his all-industry open keynote address, Ivan Seidenberg, CEO of Verizon Communications, gave his view on the future for the broadcasting and telecommunication sectors against the backdrop of broadband developments and convergence.

He considers that what used to be separate domains – phone calls, photos, music, movies, games and video – would unite in a continuous stream of bits and bytes. Examples include phone calls over cable; radio and television through the Internet, television on both the smallest handsets and the biggest plasma screens imaginable; communications embedded in many electronic devices and home appliances; interactive devices with the potential to turn consumers into broadcasters and everyday life into reality television. Speed, mobility, and interactivity will all be controlled by a new breed of customer, media-saturated multi-taskers who expect to get what they want, wherever they are, on whatever device they happen to have in hand.

Mr Seidenberg stated that since 2000, Verizon has invested more than any other telecom or cable company in America taking broadband to the mass market, deploying DSL throughout their landline network and first-generation data capabilities in their wireless network.

Verizon claims to be the first wireless company in the US to deliver a true wide-area broadband experience through a wireless technology, Ev-DO (Evolution Data Optimised) which will expand to reach 150 million people by the end of 2005. It also claims to be the first communications company to make a major commitment to taking fibre all the way to homes and businesses. This network, called FiOS (Fibre Optic Services), delivers super-fast data and Internet access. Verizon has started to deploy this new technology in 100 communities across the US, planning to reach three million homes by the end of this year and to continue to expand as fast as the technology and the marketplace will allow.

The tremendous capacity on a fibre system provides ample room for local programming and high-definition content. HDTV and DVR functionality can be provided through the whole house, not just one television set. The upstream speeds on FiOS will let customers create and share their own multimedia experiences. For the television industry, this opens all kinds of exciting new possibilities to extend and enhance the relationship with the audience.

Digital television transition worldwide

Japan

Seven satellites transmit HDTV programs and three transmit SDTV. The HDTV quota for digital terrestrial television broadcasting is more than 50 per cent. DTTB take-up was 18 million households (35 per cent) in December 2004; 27 million households (57 per cent) by December 2005; and expected to be 37 million households (79 per cent) by December 2006. All broadcasters provide databroadcasting (datacasting) services.

Korea

Korea has adopted the ATSC digital television standard and HDTV is mandatory. Terrestrial coverage is expected to be 80 per cent by December 2005 and the analog system is due to terminate in 2010.

DMB (digital media broadcasting) is provided terrestrially on VHF band III and on satellite in the 2.6 GHz area. Current services include 12 video, 22 audio and two premium channels.

China

The digital television standard is in development, and services are expected to start in 2008. A China-Japan-Korea digital television collaboration is promoting digital television in general and HDTV specifically: although the systems differ technically, they a share a similar business model. There are 340 million households in mainland China alone. The plan is to first convert cable services to digital, then satellite and finally terrestrial. Analog switch-off is 2015.

Europe

Europe now believes that HDTV is going to be an unavoidable component of digital television, but the European Broadcasting Union believes that a low risk route should be taken in the form of digital satellite pay TV first, perhaps driven by sports content. Once public purchase awareness reaches sufficiently high levels then the broadcasters would commence their HDTV services.

HDTV digital satellite broadcast services are expected to commence in spring 2006 with services from BSkyB, TPS and CanalPlus.

The table shows the road to high definition in Europe.

1st Generation HD (1G)	720p or 1080i	MPEG 2 video coding	Present
2nd Generation HD (2G)	720p or 1080i	MPEG 4 video coding	2 to 5 years
3rd Generation HD (3G)	1080p	MPEG 4 video coding	6 to 12 years

The DRM Symposium held in Wellington, New Zealand from 27–29 April 2005, opportunity for broadcasters in the Asia–Pacific region to discuss issues related to Digital Radio Mondiale (DRM), and view live on-air demonstrations of DRM reception using a range of DRM receivers, reports Shanthilal Nanayakkara who represented the ABA.

DRM Symposium

On day one, speakers from the BBC, Deutsche Welle and the Asia-Pacific Broadcasting Union (ABU) gave an overview of the DRM system. The second day was dedicated to detailed discussions and demonstrations of technical aspects of DRM and demonstrations. The final day had mobile demonstration of DRM reception in hilly terrain within the estimated coverage of the DRM service from Titahi Bay, Wellington.

Participants at the symposium were particularly interested the ability of the audio coder and receivers to intelligibly reproduce a stereo quality sound within an AM bandwidth of 9 kHz.

Introduction

The use of the audio coder, aacPlus which is suitable for limited bandwidth applications, in DRM transmissions is giving an impetus to broadcasters to have a fresh look at the use of medium frequency band in future digital radio applications as a complement to other available digital radio services. There is also an upsurge of enthusiasm for the capability of DRM by broadcasters, following the recent announcement by the consortium to extend the DRM specifications from the current 30 MHz limit to 120 MHz, encompassing the International FM Band from 88 – 108 MHz.

DRM trials in the region

Radio New Zealand, with the aid of several sponsors, has started a DRM trial in Wellington. The trial uses an operating Radio Rheema medium frequency (MF) on a time-sharing basis and Radio New Zealand plans to extend the DRM tests on short wave (HF) to assess the useability of DRM HF program links to Pacific Island FM services instead of the expensive satellite links. DRM tests were conducted in June 2004, in Bangkok, under the auspices of the ABU and Deutsche Welle.

In an attempt to promote DRM in the region, the ABU proposes to commence a series of DRM 'roadshows' this month to introduce the concepts and benefits of DRM to several Asian-Pacific countries, following their successful trials in Bangkok last year.

Why digital?

There is a world-wide trend towards the adoption of digital technology in radio and communications, particularly for distribution and transmission purposes. The limited coverage offered by FM in the 88–108 MHz band is prompting broadcasters to consider the advantages of a complementary digital broadcast system, below 30 MHz but the limited fidelity of existing AM services is causing listener concerns.

The impetus to digitise the existing analog transmissions, from both broadcasters and listeners' point of view could be the ability to offer numerous facets that are not possible with analog radio. The ability of digital radio to provide diverse and value-added information, along with the digital receiver's ability to provide superior sound quality equivalent to FM signals without multipath and fading experienced with medium wave receivers could become main attractions for future users.

AM receiver capabilities in the Medium-Wave Band

One of the issues confronted by the broadcasters relates to the existing AM receiver performance in the presence of a DRM signal within existing or modified transmission mask.

As the International Telecommunications Union (ITU) Region 3 (Asia–Pacific Region) has been allowed an MF transmission mask of 18 kHz for AM transmissions, including Australia and New Zealand within the medium wave band, it is expected that simulcasting DRM transmissions along with existing analog transmissions will be relatively easier, in terms of mitigating interference to potentially affected adjacent services, than in Europe. This is because the AM radio receivers, which are manufactured for European consumption, are used in the region without custom designed radio receivers for Region 3.

Audio quality and data capacity

Figure 1 illustrates the relationships between audio quality, data capacity and channel bandwidth as related to audio coding used.

DRM coverage and receiver availability

The DRM trials on medium-wave band conducted previously in Spain and Thailand indicate that the coverage could be greater than its equivalent AM service on the same band. This could be

attributed to the lower minimum field strength requirement of DRM.

Currently, there are receivers available for 700 Euros (Mayah) but this year DRM believes that the price of DRM receivers may drop down further to about 200–275 Euros. Computer software receivers are also available for $A400–500, but a professional DRM receiver, price Euro 10,000, is recommended for DRM tests.

Future extension of DRM to 120 MHz

It is not clear, at this stage, what drove DRM to announce the extension of DRM to 120 MHz although there is speculation that there was some pressure from Latin American countries. This work is scheduled to commence in 2007 and be completed in 2010. According to knowledgeable sources the push would be to achieve higher bit rate with the increased bandwidth. However, the increase in bit rate may not necessarily be to improve the audio quality but could lead to introducing multi-channel sound (5.1) or multi-lingual broadcasts or extending the coverage of the service. The target bit rate is speculated to be around 70–100 kbps. Some also believe that there is also a likelihood of an improved audio coder down the track, perhaps with more improvements to the existing AAC source coder.

Planning for the future

In Australia, the medium markets are competitive, particularly in metropolitan and some major regional cities. Therefore, any future DRM planning strategies for medium wave broadcasts would need to address the issue of continuity of the existing AM services during a test periods of DRM. In that sense, simulcasting would be preferred by broadcasters.

The medium wave broadcasters are currently permitted to operate with a transmission mask of 18 kHz. If a broadcaster wants to conduct a DRM trial on simulcast basis, certain preliminary spectrum and interference management strategies would need to be put in place before simulcast trials. Prior to development of these strategies, it is important to determine the extent listener impact of a reduced transmission mask which could pave way to accommodating a 9 kHz DRM bandwidth.

These DRM simulcasting strategies would also need to be worked out to mitigate interference to existing neighbouring country medium wave services.

The tests so far conducted are mainly DRM only tests without simulcasting. Even, the RNZ test is limited to DRM however, there is an opportunity for RNZ to extend these tests to simulcast trials in the future.