

**PALA '97 - AES Seminar**  
**"The Future of Radio in the Next Millennium:  
Towards Digital Audio Broadcasting"**

Monday, 14 July 1997

Reported by: *Dr. Roland K. C. Tan*  
AES Chairman (Term 1996/97)

The Audio Engineering Society (AES) Singapore Section convened a 3-hour public forum on Monday, 14 July 1997 at the 11th Storey, Conference Room 1, World Trade Centre - Singapore in conjunction with the ninth annual Pro-Audio & Light Asia (PALA '97) exhibition. This is the second consecutive year the local section has been involved in the show. PALA'97 has attracted almost 8000 trade visitors from 35 countries this year that included Asia, America and Europe. The title for this year's AES Singapore forum is "The Future of Radio in the Next Millennium: Towards Digital Audio Broadcasting" which commenced at 2pm in the afternoon and lasting till past 5pm in the evening.

Featuring 3 international and 2 regional speakers, the panelist included *David Robinson*, Vice-President of AES International Region and also Senior Vice-President of Dolby Labs. Inc. (USA); *Stephen Low*, Lecturer from the Electrical Engineering Department at Ngee Ann Polytechnic (Singapore) and who is also Committee Member of the Singapore Section; *Rainer Vogt*, Project Engineer from DAB-Plattform e.V. (Germany); *Gerhard Stoll*, Head Psychoacoustics & Digital Audio Processing from the Institut Für Rundfunktechnik (Germany); *Asaad Bagharib*, Vice-President of Engineering at the Radio Corporation of Singapore. This was also the first DAB seminar to be held in Singapore.

Judging from the overwhelming response once again with a total of 15 members and 83 guests who turned up for the event further confirmed the growing interest in these areas of technology among the audio professionals in these part of the regions. As a general observation a large number of decision makers from the broadcast industry was represented at the forum due to the important and timely topic presented.



*Overwhelming response during registration for the AES public forum on DAB.*

Other participants included audio R&D scientists and engineers from the industries, academic institutions and research centres, audio consultants, studio recording artists, as well as sales & marketing personnel.

*Dr. Roland K. C. Tan*, Chairman of the AES Singapore Section, kick-off the session by giving a 5 minutes opening address that highlighted the objectives of the society. He pointed out that one of the fundamental principles upon which the local section was founded is that the society have an important role to play to promote education in audio technology and its allied arts in Singapore by organizing events such as lectures and seminars. This is also in line with the Singapore Government's emphasis on continuing education and technology

transfer. The AES Singapore Section was officially formed in December 1995 and is affiliated to AES Inc. in New York that has more than 100 sections worldwide in more than 40 countries. The local section has currently a total of 52 members.



*A total of 98 members and guests among the audience at the World Trade Centre Conference Room during the forum presentation.*

After the opening address, it was followed by a stimulating 10 minutes presentation by *David Robinson* on an overview of the past and current practice in digital radio. This is the second time *Robinson* has been invited to act as the moderator for the forum during PALA. Some of the earlier digital radio practices, according to *Robinson*, are the Near Instantaneous Companding (not NICAM) technology developed in the USA; the General Instruments (GI) or latter known as Music Choice that uses Dolby AC-1 in the USA and MPEG codec in Europe; Digital Music Express (DMX) for business that uses Dolby AC-3; the WowWow in Japan; and the DSS/DirecTV, Echostar & Primestar for digital television systems, besides the European Eureka-147 DAB technology.

For the next 45 minutes, *Stephen Low* presented "The Fundamental of Telecommunication and DSP Theories" by first introducing to the audience, basic concepts and principles related to telecommunications and digital signal processing (DSP). *Low* covered on the topics in telecommunication fundamentals that included digital and analogue modulation techniques and wave propagation in the wireless medium. On the main coverage in DSP, he discussed on sampling theory, differences between analogue and digitally coded signals, and components of a typical DSP system related to DAB such as filtering and data compression.

*Rainer Vogt* spent the next 45 minutes discussing the main subject of this year's forum on "Digital Audio Broadcasting (DAB)". *Vogt* told the audience that DAB will be the future digital system for transmitting manifold multimedia services such as audio broadcasting, television, data services, still images, and so on. In all of these applications, which require the rapid transmission of data on the broadcasting principle from one source to a great number of subscribers distributed all over a major service area, it will be possible to use the DAB system.



(L-R): Mr Eric Wong (representing Mr Stephen Low); Mr Gerhard Stoll; Mr Asaad Bagharib; Mr Anthony Chan; Dr Roland K C Tan; Mr David Robinson; Ms Rosalind Ng-Seah; Ms Tham Ruoh Yi; and Mr Rainer Vogt.

He said that this concept permits the reception of the signals so transmitted not only with receivers in stationary and portable operation but also with mobile equipment at a very high reliability in transmission. *Vogt* recognized that listeners will be able to enjoy music radio transmission with CD sound quality at homes, offices and even in cars. There is also a greater choice of stations. Broadcaster will benefit from high spectrum efficiency, transmitter power saving, the ability to enhance programmes with creative use of both text and graphics and provide new types of services like weather and traffic reports. Beginning with the system parameters, the future application potentials of the DAB system was also exhaustively presented. This was followed by a brief discussion of the DAB developments in Europe.

One of the most well-known experts in the field of low bit-rate audio coding among the scientific audio community *Gerhard Stoll*. He gave an enlightening and refreshing 45 minutes presentation on "MPEG-2 (ISO/IEC 13818-3) Low Bit-Rate Audio Coding". *Stoll* mentioned that since MPEG-1 audio Layer II is already applied to a wide range of consumer and professional electronics services, MPEG-2 concentrated its work mainly on improvements of the audio quality at bit-rates 64 kbits/s by applying the LSF (Low Sampling Frequency) coding technique and on improvements of the "stereophonic representation" by applying multi-channel audio, based on standards from international organizations such as ITU-R and SMPTE.

He also stressed that the main aspects of MPEG-2, besides low bit-rate, are its high quality five (+1) audio channels and backwards compatibility to MPEG-1 which is the key to ensure that existing 2-channel decoders will still be able to decode the compatible stereo information from multi-channel signals.



*Mr. Gerhard Stoll (centre) talking to keen participants during the MPEG-2 multichannel surround sound demonstration.*

*Stoll* revealed that the ETSI 300 401 Standard on DAB has already included the LSF-coding technique of MPEG-2 Audio Layer II and is finalizing an amendment to the standard (at the time of writing) which describes the backwards compatible extension of the DAB system towards MPEG-2 high-quality digital surround sound.

In the final part of the presentation sessions, *Asaad Bagharib* gave the a 30 minutes discussion on the "Future DAB Services from Radio Corporation of Singapore (RCS)". *Bagharib* began by stating that DAB is the most significant advance in radio broadcasting since the introduction of FM radio in 1949. He disclosed that the RCS shares the view of many industry experts the world over who see DAB as the natural replacement for FM. RCS is also a member of an informal Singapore DAB Group formed in July 1996, chaired by the Singapore Broadcasting Authority (SBA), and representing regulators, broadcasters and research organizations with the objective of launching DAB in Singapore.

Its objective is to study the feasibility and viability of introducing DAB in Singapore within the next 1½ to 2 years. It was also made known to the audience that RCS plans to participate in a Eureka-147 DAB technical trials later this year which considers either the L-Band and/or VHF Band III transmission. The length of the initial trial period is 6 months which may also stretched to one year extension. During the trial period, 2 of their existing 10 RCS stations will be simulcast; that is, simultaneous broadcasting of both FM and DAB transmissions. These shall be increased to 4 stations when regular DAB services are launched.

*Bagharib* said that eventually all existing FM stations will be simulcast on DAB. RCS's intention is to deliver two program audio sources and Programme Associated Data (PAD) while the Non-Programme Associated Data (NPAD) could either be sourced from RCS or through third party sources. PAD includes such things as the song title, lyrics, album cover, news flash, weather and traffic updates. NPAD are the financial information such as stock market quotes, radiotext, paging, electronic newspaper, and even electronic shopping. RCS hopes to launch regular DAB services next year in 1998. *Bagharib* mentioned that the implementation of DAB is not without any risks. First of all, the take up rate of DAB receivers may be low. The subscription radio demand can be difficult to forecast. In addition, licensing and regulating DAB services is a rather complex issue that involves the land transport authority and the traffic police.

Any forum presentation session would not be entirely complete without a practical demonstration to complement the theoretical presentations. *Stoll* who spoke about MPEG-2 audio coding in an earlier session then gave a 5.1 multi-channel sound demonstration in a special area within the conference room by decoding in real-time, using a Philips DVD3315 MPEG-2 multi-channel decoder unit, the MPEG-2 encoded audio bitstream that was pre-recorded earlier from a DAB receiver.

The AES Singapore Section also held a 3-day exhibition during PALA '97 from 14 to 16 July 1997 to promote memberships and the AES publications. Past copies of the AES Journals were distributed to visitors at the AES exhibition booth daily. All 500 copies of the Individual/Sustaining Membership application forms were snapped up before the end of the last day of exhibition. The local section was generally very pleased with the many visitors who had stopped by at the booth. They had also received many questions regarding AES memberships and its activities.

The AES Singapore Section would like to take this opportunity to thank their main sponsor, *Mr. Anthony Chan*, Managing Director, Fast East of IIR Exhibitions Pte Ltd, Singapore, *Ms. Rosalind Ng-Seah*, Project Director, and *Ms. Tham Ruoh Yi*, Assistant Marketing Manager for their support and generosity.



*AES Vice-President International Region, Mr. David Robinson (right), discussing with Mr. Eric Wong, Committee Member of the Singapore Section who was responsible for the multi-channel surround sound equipment setup for the demo.*