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Paper No. 15

Digital Radio: Opening Windows of Opportunity

Dr M G Chandrasekhar
Vice President & General Manager
WorldSpace Asia Pte Ltd



HISTORY OF RADIO

- ▶ Introduced in 1920s
- ▶ Within a short span spread across many countries
- ▶ Major Boost with World War-II
- ▶ Variety of Services - News, Plays, Talks, Sports, Music, Education, Development Communications, Counseling, Programmes for Children, Women, Farmers, Factory Workers,.... Multiple Languages
- ▶ International, Regional, National and Local Oriented



HISTORY OF RADIO (Technology)

- ▶ Solid State Technologies in 1960s - From Valve version to Transistor Version - Reduced size and cost. Battery operated. Portable
- ▶ Medium Wave and Short Wave - Extensively Used. Extremely Congested and Poor Quality
- ▶ FM - improved quality. Limited in reach. Mostly in developed countries
- ▶ Satellite systems for distribution - analogue and limited number of digital systems



Competition to Radio

- ▶ Television has overtaken Radio in many ways in popularity. Radio is a poor cousin. Diminishing base
- ▶ Emergence of specialised dedicated channels - news, sports, education, music, etc.
- ▶ Listener's expectation on quality of audio vetted by the introduction of CDs and Music Systems
- ▶ Listeners want a wide variety and choice not presently available. Multiple broadcasters with competition driving the quality of programmes.



Improvements in Quality of Service - Digital Systems

- ▶ No major quality improvement expected from the present system which is predominantly Analogue and Terrestrial
- ▶ Quantum jump in quality of service possible only through introduction of digital system
- ▶ Over the past two decades considerable efforts have gone into development of digital audio broadcasting systems
- ▶ Eureka-147- terrestrial, WorldSpace - Satellite



Digital Audio Broadcasting - Terrestrial DAB - (Technology)

- ▶ Eureka-147 - Development in Europe
- ▶ To provide six stereo CD quality channels or twelve mono CD quality channels
- ▶ Uses MPEG-2 Audio Coding and COFDM multiplexing. Fade resistant. Aimed at car/mobile market.
- ▶ Systems in VHF - III band, and L-band. Limited Reach. Large number of transmitters and towers required to cover a country.



Digital Audio Broadcasting - Terrestrial DAB - T (Status)

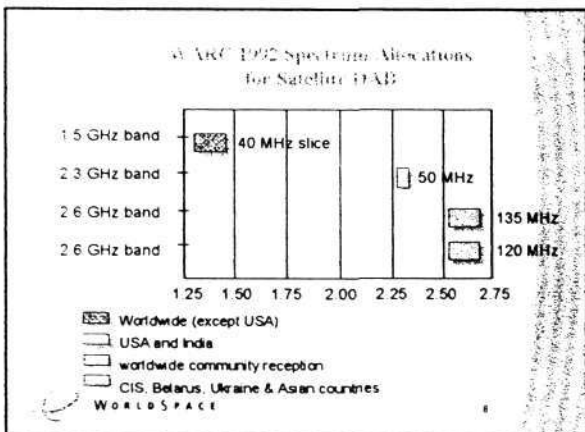
- Operational, Pre-operational and trial systems in some countries.
- WorldDAB forum formed.
- Has not picked up yet as expected. Cost of receivers presently high. Cost of receivers expected to come down with increase in receiver base.

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Digital Audio Broadcasting - Satellite DAB - S

- Potential to reach vast majority of people not satisfactorily covered with quality audio channels recognized in seventies
- Based on WARC-79 derivative studies and Experiments over the Past Two Decades below 3 GHz Band specially in the 1427-1525 MHz Band
- WARC-92 Allocated Frequency Bands for DAB
- WorldSpace, XM Radio (USA), CD Radio(USA) Efforts in other countries Europe, India

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Digital Audio Broadcasting - Satellite DAB - S (Contd.)

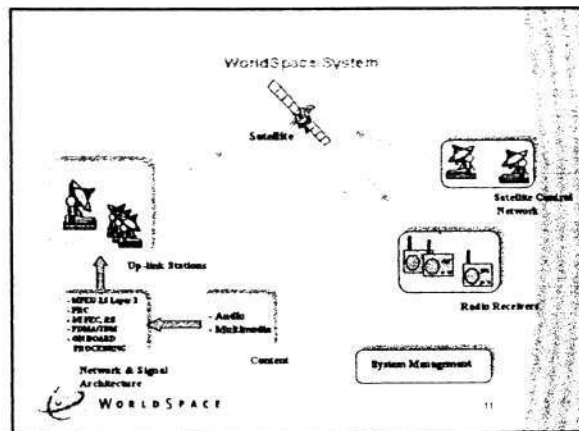
- Enabling Technologies now in place : Fusion of Digital Technology and Satellite Technology
- Phenomenal developments in the areas of digital signal processing, audio compression, computers, communication techniques, LSI Chips, low noise receivers, large power satellites
- MPEG-2 Audio Algorithm, MCPC/SCPC Access Techniques, QPSK Modulation, 1/2 FEC and Interleaving - fade resistant techniques

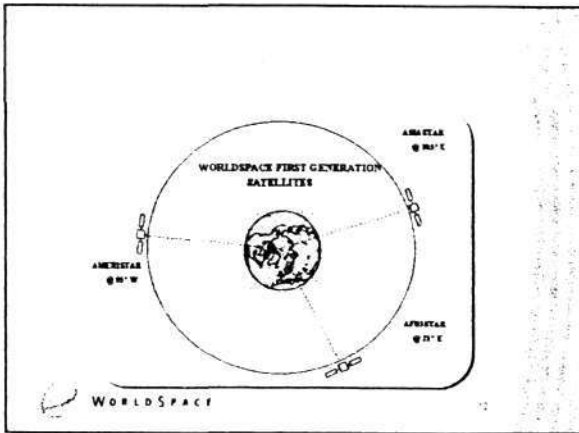
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Satellite Digital Audio Broadcasting WorldSpace

- WorldSpace has taken the lead in establishing the first global satellite system for digital audio and multi-media broadcasting to new generation of personal and portable receivers
- Educational, Informational and Entertaining programmes to 122 countries with total population of 4.6 billion in Asia, Africa, Middle East, Mediterranean basin, Latin America, Caribbean

WORLDSPACE





WorldSpace System

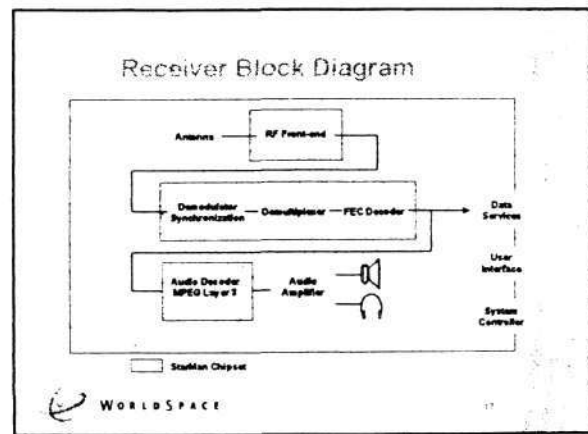
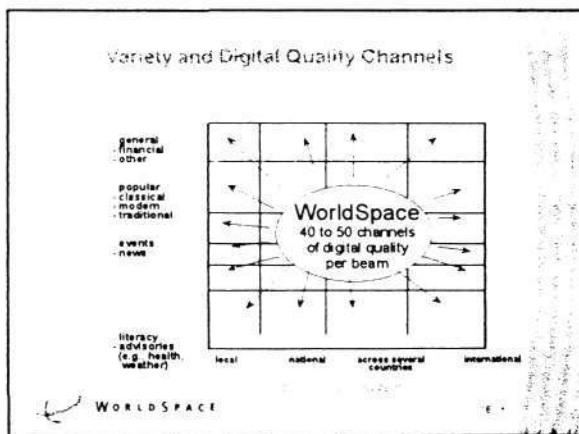
- Efforts over the past Eight years. Establishment of the System nearing Completion
- AfriStar the First Satellite Successfully Launched on 28 October 1998
- Satisfactory Satellite Performance. Undergoing detailed In-Orbit Tests, Total System Verification Tests and Field Trials with Production Model Receivers from Four Manufacturers
- AsiaStar and AmenStar scheduled for launch 1999/2000
- The system is recognised in ITU as System-D

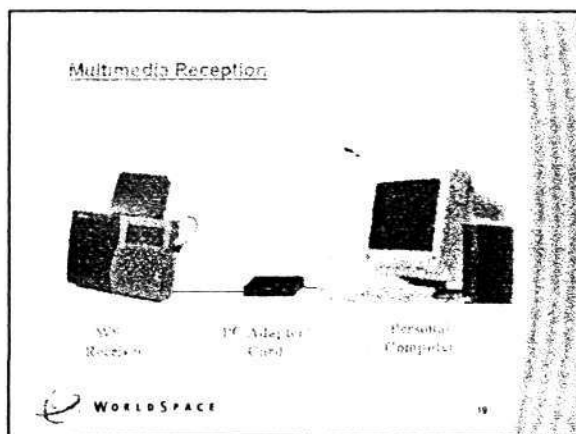
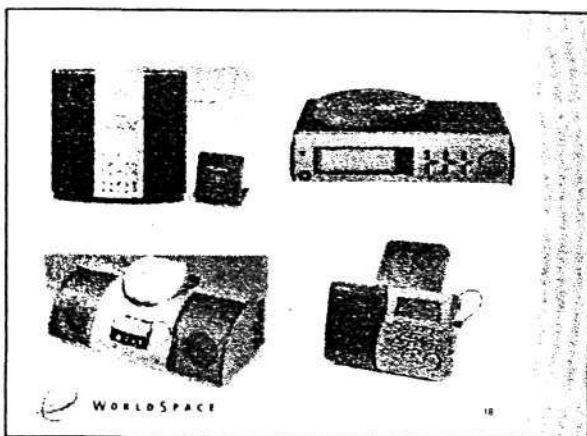
System Capacity

- Each satellite with three beams. Each beam covering 14 million sq km
- Each beam has two TDM carriers. Each TDM has an aggregate of 1 536 Mbit/s capacity
- Each Beam can provide: 192 channels of AM Quality to 24 Channels of Near CD Quality or anything in between. Trade-off between Quality and Quantity. Broadcasters Choice.

Feeder Link (Uplink) Stations

- Small VSAT type earth stations meter that can be installed in programmer's premises for uplinking. Up to four to six programme channels. 2.4 or 3.8 meter antennas. Large number of earth stations in a beam.
- One Hub type of earth station per beam. Shared by multiple broadcasters. Programmes to be brought to the hub location, multiplexed and uplinked. 4.5 meter antenna.
- Vehicle mounted earth stations. Transportable.





Satellite Digital Audio and Multimedia Broadcasting Creation of New Medium and Opportunities for the 21st Century

- Global - A broadcaster anywhere on earth can reach four fifth's of Earth's inhabitants
- Provides Quality Audio Signal - Digital quality. No fading. No noise. No co-channel interference
- Large Capacity - The number of broadcast channels is large. It will be able to create information affluence for even people in the remote corners of the world.
- Digital and Flexible - This medium offers the capability to mix images and data with audio - Multi media

WorldScope : A Responsible multimedia

To be positioned as a judicious and economical supplement to internet, broadcasting and other and interesting information suitable for the entire family from the best online sources, packaged in an appealing manner, directly to the Home PC.

- Possible contents in association with appropriate partners
 - The contents include : News, Film, Features, career guidance, technology updates, Music etc

Special services to Closed User Groups

To be accepted as a unique and valuable service that helps keep members of professional and business communities as well as educators & students abreast of the latest happenings, through the dissemination of syndicated and community knowledge bases, effortlessly and economically.

- Possibility exists for a number of closed user groups
Examples are financial, educational, legal and medical

Satellite Digital Audio and Multimedia Broadcasting - Creation of New Medium and Opportunities for the 21st Century

- Infrastructure in place by early 2000
- The system has immense applications for educational, informational and entertainment programmes
- Data broadcasting capability can be advantageously exploited for distance education, development communications and a host of new information services
- Provides opportunity to introduce new digital audio and multimedia broadcast services in the shortest time.

Radio's Role in 21st Century - Technical

- ▶ "If Radio remains an analogue medium it will look increasingly old-fashioned against every other means of providing information, entertainment and education." - World DAB
- ▶ To play a meaningful role Radio has to transform progressively into digital. Analogue and Digital will coexist for quite some time.
- ▶ Terrestrial and Satellite systems can co-exist. While one addresses local market the other offers wider reach, choice and capability to address dispersed niche markets. Over the years receivers with dual capability.
- ▶ Satellite systems provide instant reach while terrestrial systems can grow in a phased manner.

Radio's Role in 21st Century - Content

- ▶ The challenge before the broadcasters is how to use large number of digital quality channels to remain an acknowledged and powerful medium of meeting the communication requirements of the 21st century society.
- ▶ Entertainment, information and education still continue to be the main services. But several sub-sects in each of these services will emerge with dynamically varying requirements on content, presentation, timeliness and reach.
- ▶ Scope to do things which otherwise was not possible with the restrictions on program time in the present system allows programmers to meet the above requirements in innovative ways.

Radio's Role in 21st Century- Content (Contd.)

- ▶ New methods of programming have to emerge to address dedicated specialized channels (news, sports, music, education, women, children, music channels) with dynamically varying requirements.
- ▶ Radio should emerge as one of the important components of information technology.
- ▶ Radio programs need not be restricted to audio alone. Judicious use of multi-media broadcasts will make programs more effective.
- ▶ Radio should continue to address the needs of the social sector with dedicated channels on development and education. Best mode to reach millions of illiterate sections of society.

Thank you

**INFORMATION TECHNOLOGY: ENHANCING OR LIMITING
DEMOCRACY IN ASIA?**

By

ALWI DAHLAN
Former Minister of Information
Indonesia

MARIE A. MATER
Nanyang Technological University
Singapore

K.A. RAJU AND VASANTHI RAJENDRAN
National Institute of Rural Development (NIRD)
India