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<th>Radio: due for another renaissance</th>
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<tr>
<td>Author(s)</td>
<td>P. S. Sundaram</td>
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Radio : Due for Another Renaissance
by
P.S.SUNDARAM

7thAMIC Conference on "Asia's Information Market
Place: Race for Technology, Content & Competence"
May 21 - 23, 1998 Bangkok

Benefits of Broadcasting.....

- Broadcasting is a Vital Component of
domestic communication infrastructure
of a country
- huge investments have been made
through out the world by public and
private broadcasters
- It provides the most efficient means of
delivering mass message
- Broadcasting offers benefits of
universality and portability
Radio is Great!

- Radio has the best pictures, to the extent the listener can imagine
- Radio forges an emotional link among its listeners
- Radio's local nature is its great strength
- Radio is without competition in an increasingly mobile world
- Radio has a worldwide reach with minimum cost

"Broadcasters are more optimistic than ever about radio. Radio is energised and taking centre stage."

...Eddie Fritts
President, NAB
The Road to the success of radio........

CONTENTS ➔ the consumers need

INFRASTRUCTURE ➔ delivery mechanism

TECHNOLOGY ➔ quality, new services

"Any amount of Technology can not make up for uninteresting content"

Consumer Electronics - market growth
(America, Japan & Asia-Pacific)

<table>
<thead>
<tr>
<th>Year</th>
<th>America</th>
<th>Japan</th>
<th>Asia-Pacific</th>
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</thead>
<tbody>
<tr>
<td>1993</td>
<td>20</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>1994</td>
<td>15</td>
<td>12</td>
<td>10</td>
</tr>
<tr>
<td>1995</td>
<td>25</td>
<td>18</td>
<td>15</td>
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Number of AM radio receivers in millions

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<tr>
<th></th>
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<tbody>
<tr>
<td>World Total</td>
<td>771</td>
<td>1307</td>
<td>1877</td>
<td>2008</td>
</tr>
<tr>
<td>Africa</td>
<td>19</td>
<td>49</td>
<td>108</td>
<td>122</td>
</tr>
<tr>
<td>America</td>
<td>360</td>
<td>566</td>
<td>711</td>
<td>756</td>
</tr>
<tr>
<td>Asia</td>
<td>78</td>
<td>264</td>
<td>566</td>
<td>621</td>
</tr>
<tr>
<td>Europe</td>
<td>314</td>
<td>418</td>
<td>464</td>
<td>481</td>
</tr>
<tr>
<td>Oceania</td>
<td>10</td>
<td>20</td>
<td>26</td>
<td>28</td>
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MARKET AND TECHNOLOGY CONVERGENCE

Broadcast
Telecommunications
Computers
Satellite Communications
Cellular
Wireless

Radio → B/W TV → Color TV → Digital TV
Telegraph → Telephone → Data
Calculations → Computing → Data
Telephony → TV → Data
TV → Digital Audio → Digital TV
2-Way Radio → Pagers → Cellular → Data → TV
Terrestrial Radio Broadcasting

As per ITU regulation, the following terrestrial Radio Broadcasting Services are permitted

- Medium Wave
- Short Wave ........ National / International
- FM (Frequency Modulation)
- Digital Radio Broadcasting (Future)
- Ancillary services such as data broadcasting / additional sound in the above four categories.

NEW TECHNOLOGIES FOR RADIO BROADCASTING
ANALOGUE AM SHOWS SLOW DECLINE IN LISTENING DUE TO:

- LISTENERS DEMAND FOR QUALITY
- FM PROVIDING HIGH QUALITY COMPETITION [CD QUALITY]
- CABLE RADIO
- RADIO USING DTH SATELLITE
- AVAILABILITY OF IMPROVED INTERNET AUDIO

ANALOGUE AM BROADCASTING

DISADVANTAGES:

- VARIABLE PROPAGATION & INTERFERENCE [SW & MW]
- LOW QUALITY AND AUDIO BANDWIDTH
- REQUIRES HIGH POWER TRANSMITTERS
  
  [SW: 100-500 KW] [MW & LW: UP TO 2 MW]
- NO ADDITIONAL DATA CAPACITY FOR STATION NAME, FREQUENCY OF TRANSMISSION OR PROGRAMME CONTENTS.

REQUIRES MULTIPLE FREQUENCIES TO ENSURE DELIVERY IN CASE OF DIFFICULTY PROPAGATION [SW]
DIGITAL SYSTEM IN AM BROADCASTING NETWORK

EXPECTED IMPROVEMENTS:

- IMPROVED, MORE CONSISTENT QUALITY
  [BANDWIDTH \sim 9\,\text{kHz} INDEPENDENT OF PROPAGATION EFFECT]
- LOWER HF POWER REQUIREMENT
  [BROADCASTERS]
- LESS FREQUENCIES PER PROGRAMME IN SHORT WAVE USE
- AUXILIARY DATA POSSIBLE [STATION NAME, FREQUENCY TRANSMISSION OR PROGRAMME CONTENTS]

DIGITAL SYSTEMS IN AM BROADCASTING NETWORKS

DISADVANTAGES:

- NEW RECEIVERS REQUIRED BY LISTENERS
- MINOR MODIFICATION FOR NEW GENERATION TRANSMITTERS OR REPLACEMENT OF OLD GENERATION TRANSMITTERS
- TRANSITION PERIOD
DIGITAL AUDIO BROADCASTING

(DAB)

- Digital audio broadcasting - the technology of tomorrow permits transmission of multiple audio programmes of "CD quality" from satellite or terrestrial transmitters
- The technique to be adopted like Digital Compression using Psycho-acoustic modelling and new modulation technique (COFDM) would make mobile reception reliable & enjoyable
- The problems of multipath reflections in FM will be overcome by DAB
- Ideally suitable for satellite / terrestrial to home / portable /fixed as well as well reception in vehicles
- DAB is spectrum efficient and permits broadcasters to transmit multiple programmes within the limited bandwidth
Current World Scenario in Radio Broadcasting

Digital Audio Broadcasting (DAB) Technology

- Provides multiple channel CD quality sound through satellite and terrestrial medium
- Uses special modulation techniques to provide mobile reception
- Eureka 147 (Europe & Worldspace (USA) systems are in experimentation/field trial

Implications

- Cost of receiver is presently high
- Cost is likely to come down in near future

DAB TRANSMISSION SYSTEM
BLOCK DIAGRAM
World Space System Objectives

- Satellite broadcast of radio programs with quality selectable from mono-AM to CD
- National, regional or global broadcasts
- Direct uplinking from where the action is
- Easy transition to narrow-band video and multi-media reception

Satellite Broadcasting Principle
**DIGITAL HF BROADCASTING**

**CONSUMERS**

TWO BILLIONS OF RECEIVERS IN THE WORLD

ANNUAL POTENTIAL MARKET: AROUND 100 MILLION

OF RECEIVERS DURING 20 YEARS

**PROFESSIONALS**

20,000 AM TRANSMITTERS INCLUDING 2500 SHORT

WAVE TRANSMITTERS

**POGRANMMES**

BENEFIT FROM NEW DIGITAL TECHNOLOGY
RADIO DATA SYSTEM (RDS) & DATA RADIO CHANNEL (DARC)
RDS & DARC Technology

- Data transmission on an FM sub-carrier (57 KHz) in the worldwide common FM band 87.5 - 108 Mhz
- FM coverage is available anywhere in the world
- RDS protocol is a Multi-applicative standard
  - RDS Car radio and Traffic message channel
  - Radio text and Paging
  - Dedicated applications (DGPS, EWS....etc)
- Data transmission at 1,2 Kbit/s with a bandwidth of the subcarrier of 4 KHz
DARC Technology

- Developed initially by NHK in Japan
- European equivalent: System for Wireless Infotainment Teledistribution (SWIFT) which involved France, Sweden and Norway on partnership
- Data transmission on the 76 KHz FM Sub-carrier with a bandwidth of 35 KHz
- High speed data transmission: 16 kbits/s
- Application: Traffic information services, Text and Data services, DGPS, Radio Paging
Current World Scenario in Radio Broadcasting

Data Broadcasting

Technology
- Uses existing spectrum and network infrastructure
- Applications - educational and information services

Benefits & Implications
- To disseminate information nationwide through information booths
- Special decoder/receivers needed
- Will revolutionise information dissemination

WHAT DO WE NEED?

'A NON-PROPRIETARY SINGLE WORLDWIDE STANDARD FOR DIGITAL BROADCASTING IN THE SHORT WAVE, MEDIUM WAVE AND LONG WAVE BANDS'

LIKELY AGREEMENT ON SUCH A STANDARD WITHIN THE NEXT TWO TO THREE YEARS
CONVERGENCE - a Reality

◆ MERGER OF
  • Telecommunication
  • Broadcasting Media
  • Computer Industries

is becoming a reality

◆ Convergence Industries use broadcasting, telecommunication, cable TV and satellite as communication paths

Conclusion

• Amidst several new broadcast services such as Digital Television, DTH and Communication technologies - V-SAT, Cellular etc., radio broadcasting will continue to play a dominant role.

• The digital technology will lead to Digital Radio Broadcasting to provide multiple and high quality services
Conclusion (Contd.)

- Data broadcasting through radio is likely to become popular for dissemination of information
- Standardization of Digital Transmission services is essential to bring in affordable receivers and related consumer products

Thank You