

Golden Jubilee Year of Independence : Roadmap of Broadcasting in India

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Broadcasting in India during last fifty years, has seen a tremendous growth in terms of its reach and impact. Starting from six medium wave and twelve short wave transmitters in 1947, it has at present a massive network of 192 programme generating centres, 144 medium wave, 52 short wave and 101 FM transmitters for sound broadcasting. On the TV side, it has 41 programme generating centres, 92 high power and 831 low power transmitters. This paper traces the history of this growth and the future of broadcasting in the country.

MEDIUM OF MASS COMMUNICATION

Broadcasting is the most powerful medium of mass communication. Since Marconi's first experimental transmission across the Atlantic in 1901, broadcasting has come a long way. By 1921, the radio broadcasting of today had become the reality. Shortwave broadcasting was further demonstrated by Marconi in 1922. BBC began television broadcasting in 1936. The impact of television broadcasting was demonstrated by the live relay of President Franklin Roosevelt's address of New Years' world fair in 1928^[1]. Initially defined as a point to multi-point transmission system, the technology has brought broadcasting to a stage where the initial definition has blurred, and the future is moving towards an integrated interactive information delivery system merging broadcasting, telecommunication and computers. Broadcasting in India has developed during all these years to new heights, absorbing the advancements in technology, to enlighten, educate and entertain the nation. In this paper we trace the development of broadcasting in India, during the last 50 years.

RADIO BROADCASTING IN INDIA

The history of radio broadcasting in India dates back to 1927 when government of India entered into an agreement with a company named Indian Broadcasting Company to start broadcasting from radio stations at Bombay and Calcutta. In 1935, the Indian State Broadcasting Service was renamed as All India Radio. At the time of Independence, All India Radio had 6 stations at Delhi, Calcutta, Bombay, Madras, Lucknow and Tiruchirapally. At that time, AIR's medium wave transmitters and twelve short wave transmitters covered 2.5%

of the area and 11% of the population of India. Soon after independence a scheme for development of broadcasting, known as the Pilot Project, was drawn up. Subsequently in 1951, with the commitment of the country to centralised planning, AIR's expansion and development was included in the Government's successive Five Year Plans.

The various options available to domestic broadcasting in terrestrial mode of transmission are MW, FM and SW. It is a matter of history that recourse had to be taken to the SW mode along with MW for economic consideration although SW provides only a second grade service. However in a vast country like India, it served the purpose reasonably well since during 60's and 70's, SW spectrum was much less crowded and man-made noise was also low. In India, broadcasting remained confined to AM (except for setting up of FM transmitters at four metropolitan cities) upto to the sixth plan period, so much so that by the end of the sixth plan, medium wave provided coverage to 86% of the area and 95% of population, with SW mainly being a backup service.

Services provided by AIR

When Gandhiji visited AIR to record a special message for the refugees from Pakistan, he exclaimed "This is a miraculous power. I see 'Shakti' the miraculous power of God"^[2]. This power has been harnessed for socio-economic development of the country through 'Home Service' broadcasts. For home services, All India Radio follows a three tier system of broadcasting to cover the nation. This consists of national, regional and local level broadcasting. Home services as on date, broadcast 2300 hrs of programme in 24 languages and 146 dialects daily. The broadcasts are sprinkled with the news services through 288 national and regional news

bulletins in 64 languages/dialects totalling to 39 hrs 10 minutes eachday. The cultural renaissance and the country's point of view is put before the world through the 'External Services' broadcasts. The External Services Division was galvanised into action with the onset of World War II. Among the most noteworthy contributions to the war effort was a daily 5 minute programme called 'Counter Attack' (*Jawabi Hamla* in Hindi). It successfully countered the forceful Nazi propaganda with imaginative and powerful presentations. As on date, this service caters to the international audiences covering 54 countries in 5 continents with a daily broadcast of 73 hours in 16 foreign and 8 Indian languages through 19 transmitters located at nine transmitting centres.

The setup of AIR as on 20th August 1997 consists of 192 broadcasting centres, 52 short wave transmitters, 144 medium wave transmitters, 101 FM transmitters. After the completion of 8th plan projects, AIR network shall comprise of 237 broadcasting centres (Fig 1). A glimpse of few important milestones in this long journey of fifty years are given in Table 1.

Home Service Broadcast

Broadcasting in medium wave band provides first grade quality service to listeners covering large areas comprising of primary service zone around the transmitters during day time. As such, during third and fourth five year plans, the main thrust was on MW radio stations. Medium wave propagation has in addition to the ground wave component a sky wave component which is capable of providing coverage to long distances during the night time. However, the night time capability of medium wave also causes interference to the other stations operating on the same frequency or adjacent frequency. With the increase in number of channels and man-made /industrial noise, it was ob-

TABLE 1 Important milestones

1952	:	National Programme of Music
1953	:	National Programme of Talks (English)
1954	:	Radio Sangeet Sammelan
1956	:	National Programme of Plays
1957	:	Vividh Bharati Service
1967	:	Commercials on Vividh Bharati
1968	:	National Programme of Talks (Hindi)
1977	:	FM Transmission from Madras
1984	:	Local Radio Station at Nagercoil
1985	:	Hourly News Bulletins
1988	:	FM Stereo Transmission
1989	:	FM Broadcasting Centre at Kottagudam

served at the end of sixth five year plan that the population coverage had gone down from 95% to 60% during night time.

The international fraternity of broadcasters became alive to the interference problem of medium wave in the early 70's itself and therefore ITU decided to prepare a LF/MF plan. Under this plan, AIR obtained 149 medium power/ high power day and night assignments on 114 frequency bands (channels) at 107 places. Besides these, three hundred and fifty two 1kW assignments were obtained. Out of the high power assignments allotted to AIR, the power of 12 medium wave transmitters was upgraded during 6th plan and 29 medium wave transmitters during 7th and subsequent plan. The growth and coverage of medium wave transmitters are given in Figs 2 & 3.

Shortwave broadcasting, in India, was initially used to provide service to areas not otherwise covered by MW transmitters, like the hills and, also as a radio link for centrally relayed programmes like news, commen-

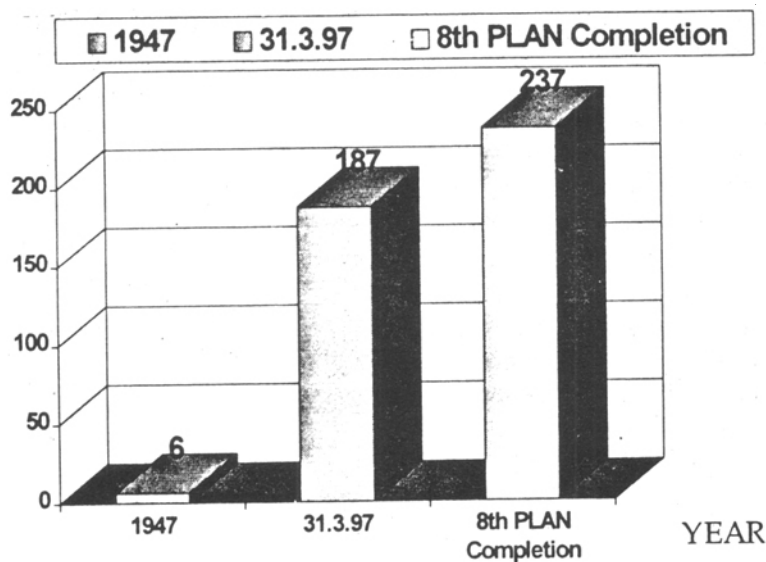
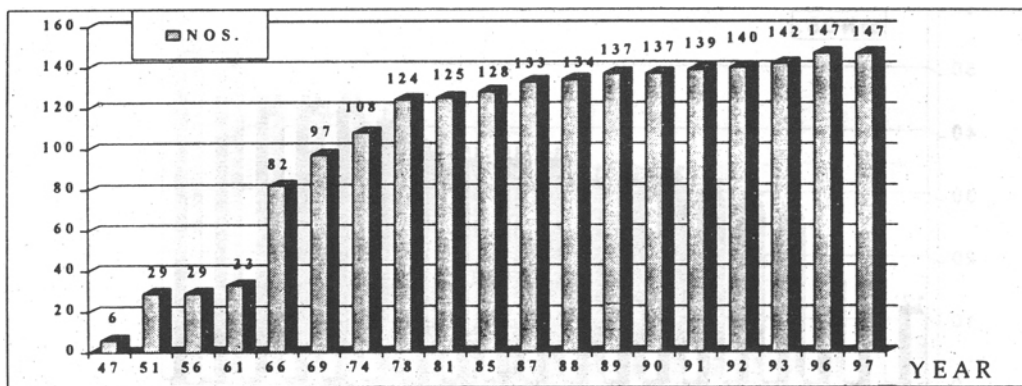


Fig 1 AIR network growth



After Completion of 8th PLAN : 183

Fig 2 Growth of MW transmitters

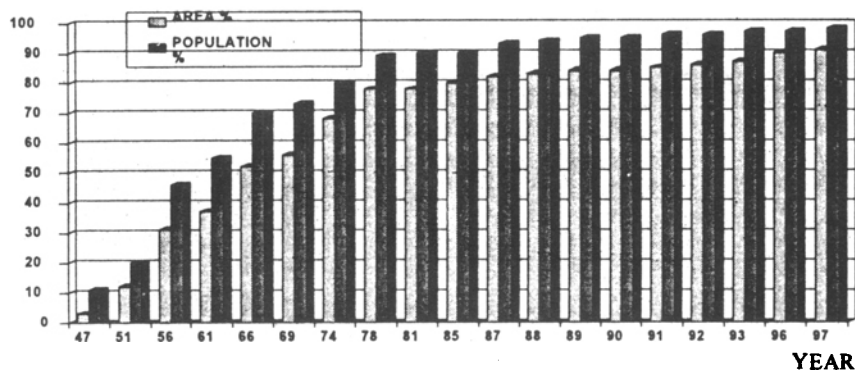


Fig 3 Growth of medium wave coverage

tary, national broadcasts etc. These SW transmitters used a special depole which could provide service with in an area of 500 km radius. Even with all the associated problems of ionospheric propagation viz, fading and deterioration of signal due to solar emission, sun spots, solar flux/flares etc., its wide reach made it popular during sixties. So much so that on the occasion of inauguration of SW transmitter from Calcutta, the noble laureate Shri Rabindra Nath Tagore exclaimed^[3],

“Hark to Akashvani up-surging
From below.
From Earth to Heaven,
Distance conquered.
In waves of light
Flows the music of man’s diving,
Fancy’s flight.”

Shortwave service, even today works as a backup service to satellite links for home service transmitters. The growth of SW transmitter is shown in Fig 4.

External broadcasting

For external services, the technological options till now had been confined to SW broadcast or MW transmissions for those countries that may be situated across the sea. The transmitters used for external services of AIR are given in Table 2.

TABLE 2 Transmitters used for external services

Short wave transmitters		
Aligarh	4 Nos.	250 kW
Bangalore	6 Nos.	500 kW
Delhi	2 Nos.	250 kW
Gorakhpur	1 No.	50 kW
Panaji	2 Nos.	250 kW
Medium wave transmitters		
Calcutta	1 No.	1000 kW
Jalandhar	1 No.	100 kW
Rajkot	1 No.	1000 kW
Tuticorin	1 No.	200 kW

FM broadcasting

FM transmissions are characterised by uniformity of reception both during day and night and also noise free listening besides the advantages of repeatability of frequency, high fidelity, capture effect, possibility of introducing stereophonic transmission and RDS (Radio Data Service). Due to these advantages, AIR introduced FM transmission in a big scale during 7th and 8th plans. The growth of FM transmitters is given in Fig 5.

TELEVISION BROADCASTING IN INDIA

Television service was commercially available elsewhere in the late thirties. All India Radio made a modest

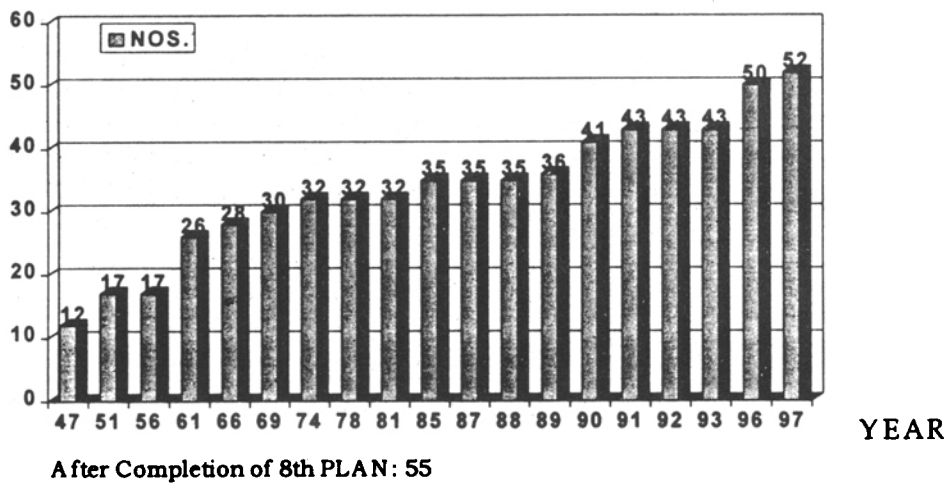


Fig 4 Short wave network growth

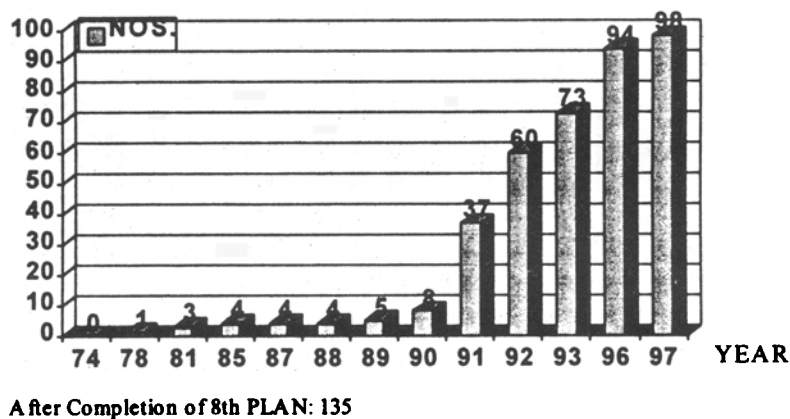


Fig 5 Growth of FM network

beginning in this field on September 15, 1959 when the Indian republic was barely nine years old. One hour long, twice a week experimental television service was provided at New Delhi which was available within a radius of 25 km from Akashwani Bhavan located at Sansad Marg. The regular one hour a day service commenced on August 15, 1965. The Government of India was rather reluctant to support television broadcasting in this country, presumably due to the huge capital cost of setting up a television station and heavy expenditure involved in running such a facility. The second television station in the country was set up at Mumbai 13 years after the inception of the experimental service at New Delhi. By 1982, only 25% of the then Indian population could receive television programmes.

Satellite Instructional Television Experiment (SITE)

The Department of Space and Doordarshan made use of communications satellite ATS-6 lent by NASA in 1975-1976 to study the impact of television on the Indian people. Television posts capable of receiving programmes directly from this satellite were set-up at

2400 locations in six states. SITE is really an important landmark in the history of Indian television as it laid the foundation of satellite television service in the country.

Birth of Doordarshan

Television broadcasting was entrusted to a new department on April 1, 1976 by an act of parliament. Doordarshan was mandated to exploit the power of this audio visual medium of mass communication to bring about socio economic changes.

The growth of television in India

Notable growth of television began in the year 1982. Doordarshan made use of Indian National Satellite 'INSAT 1A' for the first time to telecast the prime minister's independence day speech from the ramparts of Red Fort. Incidentally, this occasion also marked the beginning of the color television transmissions. During 1982, Doordarshan successfully covered the first international event - the Asian games, for the national and international television networks. Encouraged by the excellent performance of Doordarshan, government

of India decided to expand the national television network. A world record was created in 1984 by All India Radio and Doordarshan engineers and PSUs by commissioning 180 television transmitter at a rate of one transmitter a day. Presently, Doordarshan is not only a prime player in the national field but also one of the largest television networks in the world, with 831 transmitters. Doordarshan's programmes can be received with a simple and low cost yagi antenna by over 86% of the population. Doordarshan is currently also supporting as many as 19 satellite television channels in various languages. These services are available throughout the length and breadth of India without discrimination of the terrain. India has adopted 625 line PAL-B color TV standards. Growth of TV transmitters of Doordarshan is depicted in Fig 6.

Terrestrial and satellite television channels

Doordarshan is utilising the VHF and UHF band of frequencies for terrestrial transmissions. The satellite television service is in 'S', 'C' and 'extended C' band of frequencies. Doordarshan utilises the transponders in the INSAT system of communication satellites for supporting its 19 services. 'Ku' band is yet to be harnessed for the transmission of programmes directly into the homes (DTH). Programmes are transmitted in the analog format and are free to air. The Gulf war of 1991 made satellite TV popular in India.

Cable television

Elsewhere cable television transmission systems have been in operation at least 12 years before the advent of satellite television. The communication satellites together with cable transmission systems have made multiple choice television programming a reality. Cable television transmission systems are well suited to crowded urban areas. Cable television transmission network started mushrooming in India in a big way in 1993. The cable television networks were regularised through a comprehensive act of parliament in 1995. Satellite and cable television systems have since created

lot of jobs in the private sector.

The programmes

Doordarshan has three tier programme service - the national, regional and local. Its programmes fall under three distinct categories, education, information and entertainment.

Programme generation

Currently Doordarshan originates 1300 hours of programmes per week on its various terrestrial and satellite television channels through 41 programme production centre. To meet the demands of globalisation, it has launched an international channel. Doordarshan programmes are currently being watched in 50 countries in Asia and parts of Africa and Europe. This service will soon be made available to most parts of the globe thanks to international satellite systems like Intelsat and PanAm Sat etc.

Educational television

Doordarshan is committed to the task of acting as catalyst for social change. To this end, it started the first educational television service at New Delhi in 1961. ETV programmes are currently being produced and telecast from Chennai, Delhi and Mumbai as well as from several other centres. University Grants Commission's countrywide classroom programme is also being supported on the national channel of Doordarshan with a view to putting quality education within the reach of small villages and towns. Syllabus based programmes for the students of Indira Gandhi National Open University are being telecast by Doordarshan.

Information programmes

Doordarshan telecasts news bulletin in English, Hindi as well as regional languages. It has a number of programmes on current affairs as well as on agriculture, rural development, health, family welfare, consumer

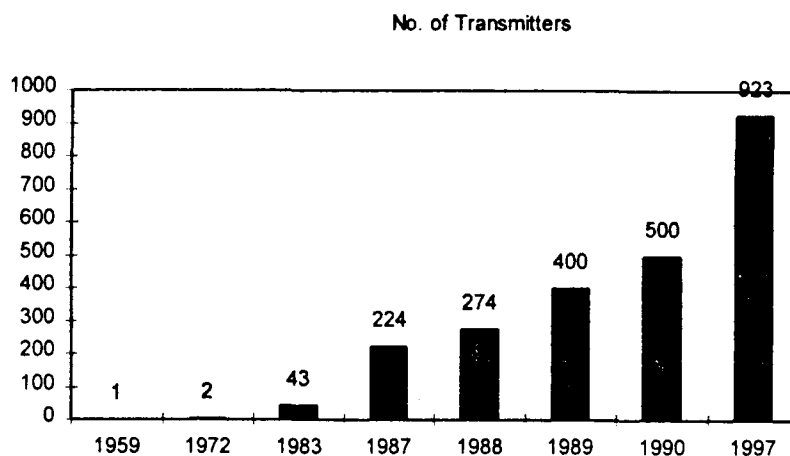


Fig 6 Growth of TV transmitters

rights and environment etc. Doordarshan brings to the viewers all the major national and international sports and games through live telecasts.

Entertainment

The entertainment programmes include music, movies, dance, plays and serials.

The teletext service

Data transmission of information along with the picture in the invisible vertical blanking interval was introduced in Doordarshan in 1985. This service provides information on public facilities like timings of train and air service, stock market rates and weather forecasts etc. This information can be retrieved by a decoder which is required to be interfaced with the normal television receiver.

Television viewership

The phenomenal increase in the availability of television programmes of numerous commercial channels operating from outside India have greatly increase the television viewership in the country. An estimated 52 million homes in the country have now television sets.

FUTURE BROADCASTING IN INDIA

The advent of digital technology and standardisation of MPEG II^[4], is leading towards convergence of telecommunications, computing and broadcasting. In the future, one can see television channels carrying more sound capabilities, multi-channel surround sound, multi-lingual broadcasts etc. DTH service in Ku/ Ka band is already in the offing. Broadcasting, which is going digital, will be able to use twisted pair cables to provide service using ADSL^[5] technology. All India Radio and Doordarshan are planning to use the following types of services.

Digital Audio Broadcasting (DAB)

DAB is considered as the future of radio broadcasting. This is because of its capability for :

- CD quality multiple programme channels
- Higher RF spectrum efficiency
- Substantially higher performance in a multipath and shadowing environment
- Utilising common receiver for terrestrial and satellite reception
- Value added services
- Uniform reception throughout service area
- Compatibility with information super highway and multimedia technologies of the future.

DAB can support 6 stereo/12 mono audio channels in a DAB multiplex of 1.5 MHz bandwidth. BBC has already started DAB service w.e.f. September 1995. All India Radio has also been carrying out experimental DAB service for around past one year.

Radio Data System

The frequency modulation service uses a large bandwidth to provide a programme service of high fidelity. It is possible to transmit various types of information on it in addition to the main programme and this additional information is not required to be related to that programme. Such applications includes transmitting traffic information, the control of receivers, operation of display devices built into the receiver or operation of a separate display device such as a television receiver. Additionally it is possible to make use of the system for monitoring purposes. Taking advantage of this fact, a system called Radio Data System has been developed. It has been established that reliable reception of the supplementary information is possible within at least the same coverage area as provided for monophonic sound transmission. The supplementary information is digitally coded and amplitude modulated on a sub-carrier 57 kHz and multiplexed with the main carrier using an encoder. The receivers are required to be equipped with an in-built decoder to retrieve the information at listener's will. All India Radio introduced radio paging service in the year 1995 using this technology.

Direct To Home (DTH) service

Advent of the improved compression techniques allow more than one TV channel to be accommodated on a single TV transponder. With a small size dish (Ku band DTH) of the order of 0.6 to 0.8 meter and an IRD (Integrated Receive Decoder), the viewer can receive a number of TV channels and select a particular channel of interest. The transmission being in digital mode, the sound and picture both are of extremely high quality. Due to better quality transmission, DTH will have a direct impact on broadcasting in the country.

Multipoint Multichannel Distribution System (MMDS)

Multipoint Multichannel Distribution System (MMDS) is used for transmitting TV programmes which originate from a variety of sources as at the cable ends. All satellite delivered signals after they are processed to base-band formats are demodulated and converted to microwave frequencies of the MMDS. Terrestrial broadcast signals are passed through a heterodyne processor before being upconverted to the MMDS frequencies. MMDS uses omni-directional antenna having line of sight. The maximum range of a transmitting antenna can vary from 50 to 55 kms depending on the broadcast power which may be in the range of 1 to 100 watts per channel. Typically a 10 watts transmitter would cover a radius of 25 kms.

Due to it's very good picture quality, high reliability and ease of installation, Doordarshan is planning to introduce this service.

Internet broadcasting

Internet, the network of networks, with 80 million connections is fast becoming the global Information Superhighway. It is now capable of delivering multimedia data including audio, video, text & graphics. While earlier, it was not suited for audio and video delivery due to high compression requirements and long downloading time, the recent development of buffering, codec and streaming technologies have made possible, the delivery of audio/video data using Internet. The buffering and streaming allow the multimedia data to be played immediately after receipt of few packets, without waiting for the full file to be downloaded.

AIR ushered in the era of Internet audio broadcasting on 13.1.97 on experimental basis. The news and other data is uploaded daily on a server hired in USA. This service allows user to receive the programme at a time convenient to him [6].

CONCLUSION

All India Radio and Doordarshan India have seen a

tremendous growth during last fifty years. With the responsibility of acting as a vehicle for social upliftment and transformation of the country, the broadcast media has to play a responsible role in future too, as hitherto. The media has been using the technology based on its effectiveness and economy. Lot more in terms of technological development shall take place in future with maturing of video servers, digital compression standards viz. MPEG-4, MHEG-6 etc.

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