



TELEVISION BROADCASTING TECHNOLOGY AND ITS DEVELOPMENT

Dr. Vivek Vishvas

Assistant Professor , Maharaja Agrasen College, University of Delhi, Delhi.

ABSTRACT

“Word Television has been derived from ancient Greek ‘Tele’ meaning ‘far’ and Latin word ‘Visio’ which means ‘sight’.”¹ Television is undoubtedly one of the most revolutionary inventions of this modern time. “Television is a means of communication which enables motion pictures, visuals and sound to reach us. It facilitates us to witness various events from around the world. It not only provides entertainment but also aid us to improve our knowledge. Now, it has also become a powerful tool for promoting education.”² In this modern world life cannot be imagined without a Television. All programs, music, movies etc which can be viewed in a Television has to go through many technical processes. In this paper we are discussing about those very technical facets involved which would help us understand broadcasting technology.



KEYWORDS: Resolution, High-definition television, camera mounting, Editing.

INTRODUCTION

“Television (TV), the electronic delivery of moving images and sound from a source to a receiver. By extending the senses of vision and hearing beyond the limits of physical distance, television has had a considerable influence on society.”³ Broadcasting technology of the most influential medium in society i.e. Television is currently based on optical signals. Firstly electronic cameras convert the visuals into optical signals and then again these optical signals are converted back into visuals by a Television set. Television broadcasting is a very complex system, here one visual, which is as a set of certain sequential frames is converted into electric signals. These electric signals are then broadcasted, to be received as well as converted back to visuals by a television set for a distant viewer to be viewed. The definition and clarity of these visuals depends on quality of camera as well as television which is marked by their ‘Resolution’. Reason being quality of image is measured by the resolution and this resolution is actually the amount of lines present in a frame. More the lines in frame of an image, it produces better resolution as well as better clarity to view. In early days of television, broadcast was done in such a low resolution that even the subject was hard to identify. And also in Mechanical based

¹ Jhingran, Prabhu (1998). Television Ki Duniya. Page-01

² Ojha, D.D. and Satyaprakash (2007). Doorsanchar evam Soochana Praudyogiki. Page-72

³ Fisher, David E. (Jul 26, 1999). *Television*. Retrieved January 03, 2021, from <https://www.britannica.com/technology/television-technology>

television system, rate of scanning per second was so low that the visuals flickered a lot. To overcome this problem, use of Electronic based scanning method was developed, in which rate of scanning was improved by the use of Cathode Ray Tube (C.R.T.). But apart from these technological advancements, broadcasting was still limited to black and white pictures.

The first broadcasting of signals for coloured imagery was the result of experiments which were running before. We can admit that last two decades of 19th century and first three decades of 20th century was the period when this technology was mastered by the hard work and dedication of various scientists. During those days advancement on both Mechanical as well as Electronic based television was happening, but it was Scottish inventor John Logie Baird who was the first to give public demonstration of Television based on Mechanical scanning on 25th March 1925.

The broadcast of Baird Television programs started in low resolution of only 30 lines per frame by B.B.C. in 30th September 1932. By 1936, Baird improved the resolution up to 240 lines per frame. During 1897, German physicist Karl Ferdinand Braun was the first to build Cathode Ray Tube (Braun tube) and this crucial invention paved the way for its use in electronic Television. Based on this technology 'Marconi-EMI system' was developed by EMI research team, which introduced broadcast of 405 lines per frame. With the popularity of Electronic television's better picture quality, resulted to shut down broadcast of Baird Television in 1937. We can now understand the difference between early and modern day television broadcasting by simply comparing Baird's Television programs of 1930's in 30 lines and today's broadcasting of 'High Definition Television System' with equals and more than 1125 lines per frame; and also the broadcast resolution of HDTV is about the same clarity as resolution of motion pictures.

As we have discussed earlier that, picture quality of a television is based on its resolution and this resolution is based on the number of lines in a frame. Considering these specifics various country use different techniques of broadcasting, which lead to mass production of television cameras and television sets.

Following are the major broadcasting techniques and systems adopted by various countries:-

1. **NTSC (National Television System Committee)** - this system was introduced in United States. In this standard frame scan rate is 30 (i.e. frames per second or FPS), each frame is composed of 525 lines and has an aspect ratio of 4:3. Later on, this standard was also adopted by Japan and Korea.
2. **PAL (Phase Alternating Line)** - is a colour encoding system which was first adopted by Germany. In this system frame rate is 25 FPS and each frame has 625 lines with an aspect ratio of 4:6. In India, this was adopted as broadcast television system.
3. **SECAM System (Séquentiel couleur à mémoire)** - which means 'Sequential Colour with Memory' in English. This system was developed and first used in France, where frame rate is 25 FPS; each frame is composed of 625 lines and has an aspect ratio of 4:3.

All the above mentioned systems are based on SDTV (Standard-definition television) resolution standards, but in recent years popularity of HDTV (High-definition Television) resolution is gaining rapidly throughout the globe. This HDTV standard is based on digital system of telecommunication. Here user gets the option to choose from various levels of resolutions ranging 720, 1080 and even higher line counts; here frame rate is also optional from 24 to 60 FPS. HDTV came into existence in 80's, but it was during 90's it gained global recognition and popularity. From 1996 broadcasting of HDTV started and after that third generation of broadcasting initiated in form of 3D television. These days experimentations with 3D Television is going on, in which 3D television can be enjoyed without 3D glasses.

If we talk about cameras used for television broadcasting then during early stages of Mechanical Television cameras used for broadcasting were very heavy and huge. Due to its size and weight they were stationary and were only used inside the studio. During those days, tripod or handheld cameras were beyond imagination and camera movements like panning, tilt etc were out of the question. With the advancements in electronic technology, size and weight of the cameras also started reducing and with the facilities of camera mounting like tripod etc. simplified camera operation. Despite these advancements, many cameras during that period weighed about 100 pound or even more and operating

them on tripod or shoulder was not possible. This resulted in development of many special 'camera mounting' devices to ease the operation of those large cameras. Eventually tripod with wheels came into existence, which paved a new way towards camera operation methods. Then came the Pedestal Track and Trolley, Crane and 'Jib' was developed for big production programs with help of which camera can be moved vertically, horizontally, or a combination of both.

An interesting fact related to television broadcasting is that in early days of television program due to lack of recording facilities television programs were telecasted live. Programs used on start on its scheduled time and was continuously telecasted live till its scheduled end. There was no scope for any kind of correction in errors. Once the program starts, its quality totally depended on the expertise of director, crew members and other artists. But this drawback was overcome with the introduction of video tape (video recording technology), now program directors had the opportunity to convey their full artistic potential. Video editing in television programs opened unlimited doors to creativity. Although today's prosperous television broadcast technology seems beyond imagination, but first 29 years of television broadcast was done without the use of storage or recording system.

Simultaneously with these technological advancements the nature of television broadcasting kept on changing; which can be stated in following phases: -

Initial Stage (Terrestrial Broadcasting)

During initial stage (Terrestrial Broadcasting) a simple television antenna was used which received electrical waves from television broadcast centers and enabled viewers to view television programs in their own televisions sets. As this was an inexpensive mode of viewing television programs, even now it is the most popular broadcasting technology used in remote and distant areas.

Cable Television

In this technology, television broadcast signals are carried via television cable to home televisions sets of every viewer. The invention of cable technology was the result to overcome the problems faced in receiving television broadcast signals through an antenna. In plain region television broadcast signals were easily received but landscapes with high relief, skyscrapers etc. faced the problem of signal loss. To solve this problem in television broadcast, cable television technology was introduced, which helped in uninterrupted viewing experience. Cable television is also known as satellite broadcasting and it uses "C-Band" signal.

"There are many views about its inception, but most of the views suggest that it was introduced by a television vendor of Pennsylvania, United States. After observing his sale of many years, he realised that most of his consumers belonged to a particular part of city and in his inquiry he found that people living other side of a small hill were having problem receiving broadcast signals. Due to unclear picture and sound people of that area didn't spent much on television. That clever vendor installed an antenna at peak of the hill and via cable he provided uninterrupted broadcast signals to their television sets."⁴

DTH (Direct to Home)

DTH or 'Direct to Home' is a type of television broadcasting technology where a small dish antenna and a set top box are used for television sets to receive all the channels. Apart from television channels various channels of Radio can also be accessed through DTH. DTH technology signal works on KU Band. Here in this technology various channels can be received directly from satellite to our television set. Introduction of this technology consumed the role of cable operators to a large extent. This broadcast technology is not only useful in urban areas but also for remote areas where cable television network could not reach.

Advent of DTH technology expanded the scope of various features in television technology like viewers are getting more and more interactive features. If the viewer is busy or two programs which viewer wants to watch are telecasted at same time then in DTH technology he has the feature to record

⁴ Ojha, D.D. and Satyaprakash (2007). Doorsanchar evam Sookhana Praudyogiki. Page-80

to watch it later and he can even pause a live broadcast. In DTH movies, music, games and other various features are also available on demand.

I.P.T.V.

IPTV i.e. Internet Protocol Television provides television programs for home TV sets through internet protocol. For using this technology a different set top box is needed. In India, IPTV service was given acceptance by Central Government on 21st August 2008. “Technological advancements in TVs such as 4K TV, HDTV and IPTV, which enhance the viewing experience of the people are promoting consumers to buy TV household, which further bolsters the demand for television services.”⁵

CONCLUSION:

Technological development simplified the process of television program production. With replacement of very big to hand held cameras, as well as inventions like camera mounting devices and video tape enabled program directors/producers to express their creative potential. This resulted in constant enhancement and change in television broadcasting technology. From earliest Mechanical Technique, then Electronic and now HD broadcasting technology is being used, which has a direct impact on more popularizing television. In this modern time, television industry is in a progressive transition phase between traditional broadcasting and broadband broadcasting. In coming years, the rise in global internet user base will undoubtedly bring many changes in the field of television broadcasting.

REFERENCE BOOKS AND WEBSITES:

1. Aiyer, Balakrishna (2005). *Digital Television Journalism*. New Delhi: Authors Press.
2. French, David, and Richards, Michael (2000). *Television in Contemporary Asia*. New Delhi: Sage Publications.
3. Ghos, Avik (2006). *Communication Technology and Human Development*. New Delhi: Sage Publication India Pvt. Ltd.
4. Hussain, Zahid & Rai, Vanita (2007). *Media and Communication in Third World*. New Delhi: Kanishka Publishers.
5. Jhingran, Prabhu (1998). *Television Ki Duniya*. Lucknow: Bharat Book Centre.
6. Kumar, Keval J. (2008). *Mass Communication in India*. Mumbai: Jaico Publishing House.
7. Ojha, D.D. and Satyaprakash (2007). *Doorsanchar evam Soochana Praudyogiki*. Delhi: Gyan Ganga Publications.
8. Sharma, Seema (2005). *Development of Journalism*. New Delhi: Anmol Publication pvt. Ltd.
9. Vilanilam, J.V. (2003). *Growth and Development of Mass Communication in India*. New Delhi: National Book Trust, India.
10. <https://www.britannica.com/technology/television-technology>
11. <https://www.globenewswire.com/news-release/2020/12/15/2145096/0/en/Worldwide-Television-Services-Industry-to-2027-Technological-Advancement-in-the-Television-Devices-Presents-Opportunities.html>

⁵ (December 15, 2020). *Worldwide Television Services Industry to 2027 - Technological Advancement in the Television Devices Presents Opportunities*. Retrieved January 03, 2021, from <https://www.globenewswire.com/news-release/2020/12/15/2145096/0/en/Worldwide-Television-Services-Industry-to-2027-Technological-Advancement-in-the-Television-Devices-Presents-Opportunities.html>