UNIT 7: SOME TECHNICAL CONCEPTS

UNIT STRUCTURE

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7.1 Learning Objectives

After going through this unit you should be able to:

- Describe the organizational set-up of a radio station
- Explain the news room set-up in a radio station

7.2 Introduction

This is the seventh and final unit of block 1 of this course. In the last six units, you have learnt several aspects of radio. However, many things may have been a little difficult for you to understand if you were not familiar with the technical jargons and concepts related to radio.

In this unit we will familiarize you with some such technical terms and concepts which are very necessary for someone intending to pursue a career in radio. These include concepts like broadcasting and narrowcasting, radio transmission etc. Many a time we use these words in our day-to-day conversations with people without knowing the accurate meaning of the terms. So, here we shall attempt to help you understand these terms from the point of view of a professional communicator.

So, let us begin the unit by discussing the concept of broadcasting and narrowcasting.

7.3 Broadcasting and Narrowcasting

Broadcasting

Broadcasting means transmission of sound or images to a large number of receivers by radio or television. It is the distribution of audio and/or video signals through which programmes are transmitted to an audience. Audience here stands for general public or a relatively large sub-audience, such as children or young adults.

Do you know what the term "broadcast" originally means? It originally referred to the sowing of seeds by scattering them over a wide field.The early radio engineers adopted the term from the Midwestern United States to refer to the similar dissemination of radio signals and thus broadcasting came to form a very large segment of the mass media. Dr. Jonathan Sterne of McGill University has defined broadcast as "wide dissemination of content through mechanical or electronic media".

There can be several physical means through which to distribute a broadcast . When it comes directly from the studio at a single radio or TV station, it is simply sent through the air chain to the transmitter and then from the antenna on the tower out to the world. Programming may also come through a communications satellite, whether played live or recorded, for transmission.later and there may be networks of stations to broadcast the

same programming simultaneously which was originally done via microwave link and now usually by satellite.

At the final end of the broadcast distribution chain the signal is to reach the listener or the viewer. The signal may come over the air as in case of a radio station or TV station to an antenna and receiver; or it may come through cable TV or cable radio (or "wireless cable") via the station or directly from a network. The Internet may also bring either radio or TV to the recipient, especially with multicasting allowing the signal and bandwidth to be shared.

You ought to know about the term "broadcast network". The term is often used to distinguish the networks that broadcast an over-the-air television signal which can be received by using a television antenna from the other networks which are broadcast only via cable or satellite television. The programming of such networks is known by the term “broadcast television “. Now that we have understood the term broadcasting let us look into the following aspects .

- Broadcasting is not merely a technology or even a group of technologies, but a set of social, cultural and commercial practices, institutional forms, an industry and of some enduring ideas.

- With the ability to see events as they happen our understanding of time and space has been drastically altered. Immediate broadcasting technologies have erased the boundaries of time and space. It is possible to view anything happening anywhere around the world as it is unfolding. No better example of this is seen than the 24hr news channels or streaming from the internet. Live broadcasting has changed society’s level of expectation for being informed every moment with footage about anything anywhere . Technology has made it possible for instantaneous broadcasting of images.

- Broadcast messages can educate (through specific programming) and control (through propaganda) the people, create social tensions and distort events

(through biased news casts).The average person can now receive content on subjects like politics, law, business, medicine, spots and war etc. An individual gets a sense of belonging through the messages broadcast and becomes aware of sharing a common history and a common trajectory in time and space. The above points show the powerful effect of broadcasting on the common man .

Broadcasting to a very narrow range of audience is called **narrowcasting**.

Narrowcasting:

Narrowcasting involves aiming media messages at specific segments of the public defined by values, preferences, or demographic attributes. Also called niche marketing or target marketing, narrowcasting is the dissemination of information to the particular section of the public rather than to the general public.

Narrowcasting involves communications such as radio or television signals that are confined to the subscription customers or when the signals are otherwise prohibited from being *broadcast*. Thus, broadcasting and narrowcasting are distinguished from each other. Broadcasts are transmitted to the general public or are available for any general receiver capable of capturing the signal(s). But narrowcasting is directed to a particular audience. In other words in narrowcasting a broadcast medium is used to appeal to audiences with special interests.

Open narrowcasting radio services are those, which have limited reception. This limitation can be defined by several means, some of which are as follows:

- When they are targeted at a special interest group (eg. Religious programming).
- A limited location (ie. Shopping centres, arenas, hospitals, schools, universities etc)
- A limited time period of transmission (ie, community events/festivals)
- Programmes of limited appeal (ie. Ethnic language services).

Examples of narrow casting:

1. One of the most common examples of narrowcasting is cable TV. The encrypted signals can only be viewed on a TV by first running through a descrambler provided by the cable company for a monthly fee.
2. Another example of narrowcasting is the satellite radio. Satellite radio is commercial-free radio, requiring a proprietary receiver or tuner. Satellite radio is also a paid subscription service, but narrowcasting doesn't always involve a fee.
3. The Internet itself includes both broadcasting and narrowcasting. Actually the websites which anyone can visit without registration or subscription are broadcasts. But those websites or subnets that require passwords, registration, or some form of membership are examples of narrowcasting. Mailing lists are also a kind of narrowcasting, as are podcasts that are generally geared towards a highly specific segment of the public. With some exceptions, mailing lists, podcasts, and subscription-centric websites are generally free narrowcasting services.

2. Dr. Jonathan Sterne of McGill University has defined broadcast as_____
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3. Give some examples of narrowcasting.

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b. Broadcasting

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Narrowcast media is more popular with the marketing experts because access to such content implies exposure to a specific and clearly defined prospective consumer audience. Narrowcasting is expected to grow over the coming years and it will be fueled by the Web._____

7.4 Transmission and Reception of Radio Waves

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Let us now discuss how radio waves are transmitted and received. For the propagation and interception of radio waves, a transmitter and a receiver are employed. A radio wave acts as a carrier of information-bearing signals; the information may be encoded directly on the wave by periodically interrupting its transmission (as in dot-and-dash telegraphy) or impressed on it by a process called modulation. The term modulation refers to how sound is encoded on a radio wave called a carrier wave; or, more accurately, how the sound

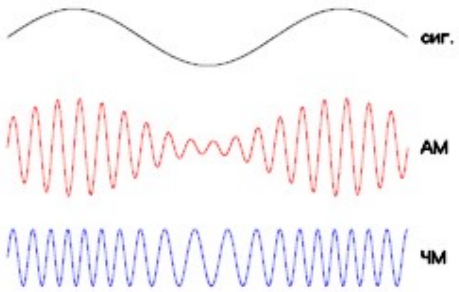
affects the carrier wave so that the original sound can later be detected by a radio receiver. The radio broadcasts we listen to basically takes place in four stages.

a. The radio jockey or singer or artist speaks into a microphone. This microphone converts sound waves into electrical signals.
b. The electrical signal from the microphone changes, or modulates, a radio wave called a carrier radio wave. This carrier wave which contains the sound information is then emitted by the broadcast tower of the radio station.
c. Now, a receiving antenna on a radio tuned to the proper frequency picks up the carrier wave, which then travels to the receiver or radio.
d. Finally, the receiver detects the modulation in the carrier wave and converts it back into electrical signals. The electrical signals are sent to a loudspeaker, which changes them once again into sound waves.

As you have already learnt in Unit 4, the two most common types of modulation used in radio are amplitude modulation (AM) and frequency modulation (FM). Frequency modulation minimizes noise and provides greater fidelity than amplitude modulation, which is the older method of broadcasting.

You have already learnt in detail about FM in earlier units. Let us now concentrate on AM.

AM (Amplitude Modulation)



AM or amplitude modulation, is a mode of broadcasting radio waves by varying the amplitude of the carrier signal in response to the amplitude of the signal to be transmitted.

Until the 1920s, the only form of radio transmission was by way of Morse code, much in the form of dots and dashes. It was of use only to the military, commercial telegraph companies and amateur experimenters.

Subsequently it was found that if the amplitude could be controlled or varied by a much lower frequency then real intelligence could be conveyed e.g. speech and music. It is easy to reverse this process by simple means at the receiving end by using diode detectors. This is called modulation and obviously in this case amplitude modulation or A.M.

This discovery led to the emergence of a whole lot of new industries manufacturing radio parts, receiver manufacturers, radio stations, news agencies, recording industries etc and thus revolutionized the world of communication .

AM stations were the earliest broadcasting stations to be developed. AM radio transmitters can transmit audio frequencies up to 15 kHz but most receivers are only capable of reproducing frequencies up to 5 kHz or less.

Both AM and FM radio signals have their own set of advantages and disadvantages. The advantage of AM is that it is suitable for long distance transmission. This is because AM carrier waves have much longer wavelengths, and therefore, they can bend around obstacles like mountains and buildings more efficiently and thus travel greater distances. FM on the other hand is not capable of doing so. It can travel upto a maximum distance of about 70 kms.

Again, in case of AM transmission, because information is coded in the amplitude of an AM carrier wave, interference from external signals are

more likely to influence the amplitude and, therefore, they are more likely to interfere with the wave. This causes noise and distortion of the original sound. However, in case of FM,

CHECK YOUR PROGRESS – B

1. Explain the process of transmission and reception of radio waves.

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2. What are the two most common types of radio transmission?

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3. Name one major advantage and disadvantage of AM.

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since it is much less likely that the frequency of an FM carrier wave might be accidentally modulated, the quality of the sound is better.

4. Name one major advantage and disadvantage of FM.

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7.5 New Developments in radio

There have been significant new developments in Radio communication which have been used for all kinds of data transmissions. Morse code, the earliest radio application, can still be heard today. Experiments in sending pictures and text go back to the early days of radio with a variety of clock signals being broadcast. The coded transmission of information by national governments in times of peace and war is another early use of the radio. For example, during the Cold War the USSR and the governments under its influence had national programs to block shortwave and other frequency transmissions by using jamming techniques. One signal known as Russian woodpecker suddenly appeared on July 4, 1976 and just as suddenly disappeared at the end of 1989 . It is still considered of a mystery. More and more radio frequencies are being used to send digital packets of information of varying degrees of complexity. An early form of digital radio broadcasting was packet radio, which combines digital information with traditional radio broadcasting over the air.

Digital radio broadcasting originally emerged, in Europe (the UK in 1995 and Germany in 1999), and then in the United States, France, Holland, South Africa and many other countries . The simplest system is DAB Digital Radio, or Digital Audio Broadcasting, which uses the public domain EUREKA 147 (Band III) system. DAB is used mainly in the UK and South Africa. Among other countries, Germany and Holland use the DAB and DAB+ systems and France use the L-Band system of DAB Digital Radio.

However , digital radio isn't used in the same way as Europe and South Africa - instead the IBOC system is named HD Radio and owned by a consortium of private companies

called iBiquity. An international non-profit consortium Digital Radio Mondiale (DRM), has introduced the public domain DRM system.

It is expected that for the next 10 to 20 years, all these systems will co-exist, while by 2015 to 2020 digital radio may predominate, at least in the developed countries.

Internet radio

Internet radio is known as web radio, net radio, streaming radio and e-radio). It is an audio broadcasting service transmitted through the Internet. Broadcasting on the Internet is usually called webcasting since it is not transmitted broadly through wireless means. Internet radio involves a streaming medium that presents listeners with a continuous "stream" of audio over which they have no control, much like traditional broadcast media. In this respect, it is distinct from "on-demand" file serving. Internet radio is also distinct from podcasting, which involves downloading rather than streaming. Many Internet radio "stations" are associated with a corresponding traditional (or "terrestrial") radio station or radio network. Internet-only radio stations are independent of such associations.

Internet radio services are usually accessible from anywhere in the world—For example, one could listen to an Australian station from Europe or America. Some major networks however like Clear Channel in the US and Chrysalis in the UK restrict access only to the respective country because of music licensing and advertising concerns. Internet radio remains popular among the expatriates and the listeners whose interests local radio stations cannot adequately serve. Some of these programmes are progressive rock, ambient music, folk music, classical music, and stand-up comedy. Internet radio services offer news, sports, talk, and various genres of music—everything that is available on traditional radio stations.

The most common way to distribute Internet radio is through the streaming technology using a lossy audio codec. Popular streaming audio formats include MP3, Ogg Vorbis, Windows Media Audio, RealAudio and HE-AAC (sometimes called aacPlus).

Internet radio was pioneered by Carl Malamud who in 1993, launched "Internet Talk Radio" which was the "first computer-radio talk show,in which each week interviewing a computer expert was interviewed " However, as late as 1995, this service was not available via multicast streaming; it was distributed "as audio files that computer users fetch one by one."

A November 1994 Rolling Stones concert was the "first cyberspace multicast concert." Mick Jagger opened the concert by saying, "I wanna say a special welcome to everyone that's, uh, climbed into the Internet tonight and, uh, has got into the M-bone. And I hope it doesn't all collapse."

On November 7, 1994, WXYC (89.3 FM Chapel Hill, NC USA) became the first traditional radio station to announce broadcasting on the Internet. WXYC used an FM radio connected to a system at SunSite, later known as Ibiblio, running Cornell's CU-SeeMe software. WXYC had begun test broadcasts and bandwidth testing as early as August, 1994. WREK (91.1 FM, Atlanta, GA USA) started streaming on the same day using their own custom software called CyberRadio1.

Some of the first Internet-only commercial radio stations emerged in 1995. NetRadio "was one of the Internet's original Webcasters," eventually "streaming more than 100 channels including both music and spoken material." Nonetheless, NetRadio Corporation ceased operations in 2001.

In 2002, the Copyright Arbitration Royalty Panel (CARP) system was initiated by the United States Congress in order to oversee decisions regarding royalty rates and terms, particularly in regard to digital distribution of audio. Many webcasters believed the 2002 proposed royalty structure to be overly burdensome and intended to disadvantage independent Internet-only stations. CARP was later phased out in favor of the Distribution Reform Act of 2004.

WorldSpace Radio

WorldSpace is a global satellite radio service offering great range of programmes, through a compatible satellite radio with a special antenna which has to be installed outside the house and must have a free line of site to the satellite without any trees or walls in between.

WorldSpace is not new to India. Its earlier version was a free channel. You just needed then a satellite receiver and the cheapest one, a Hitachi, was then available for Rs 4,999. It didn't become popular with the listeners then. It has been relaunched as a pay channel.

Apart from the cost of the radio, one has pay Rs 1,800 a year to be able to hear over 39 different stations. The company does not give out figures of its subscriber base.

When it was a free service, WorldSpace offered music ranging from western to country, jazz, western classical and hip hop even including a few Hindi and local language channels.

Today, when FM is in full blast and almost everything is available on the net, the non-portable WorldSpace seems less attractive look as great , though it must be said, it offers an interesting range in its 39 stations.

Apart from the earlier choices, you have Farishta for old Hindi songs, and even Kannada, Telegu, and Bengali channels, Bollywood hits, and Hindi classical music. For those who want to listen to news (something you can't get on FM) you have an array of choices, from

5. In 1993, Malamud launched _____which was the "first computer-radio talk show, each week interviewing a computer expert."
6. Which popular English rock band's concert was the first ever cyberspace multicast concert and in which year did it take place?

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7. Which was the first traditional radio station to announce broadcasting on the Internet and when?

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8. Name the first Internet-only commercial radio station.

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9. What is WorldSpace radio?

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NDTV to BBC and CNN WRN.

7.6 LET US SUM UP

1. Broadcasting is the distribution of audio and/or video signals which transmit programs to an audience. Narrowcasting has traditionally been understood as the dissemination of information (usually by radio or television) to a narrow audience, not to the general public.
2. The radio broadcasts we listen to basically take place in four stages.

a. A microphone converts sound waves into electrical signals.
b. The electrical signal from the microphone modulates a carrier radio wave which is then emitted by the broadcast tower of the radio station.
c. A receiving antenna on a radio tuned to the proper frequency picks up the carrier wave, which then travels to the receiver or radio.
d. Finally, the receiver detects the modulation in the carrier wave and converts it back into electrical signals. These signals are sent to a loudspeaker, which changes them once again into sound waves.

3. AM or Amplitude Modulation, is a mode of broadcasting radio waves by varying the amplitude of the carrier signal in response to the amplitude of the signal to be transmitted.
4. Both AM and FM radio signals have their own advantages and disadvantages. AM is suitable for long distance transmission. But suffers from noise interference. FM on the other hand cannot travel long distance, but the quality of the sound is better.
5. Internet radio (also known as web radio, net radio, streaming radio and e-radio) is an audio broadcasting service transmitted via the Internet.

7.7 FURTHER READINGS

- Basic Audio Visual Media: Shipra Kundra
- Broadcasting in India: P C Chatterjee

7.8 ANSWERS TO CHECK YOUR PROGRESS

A)

1)

a) Narrowcasting: Narrowcasting can be defined as the dissemination of information (usually by radio,television or internet) to a narrow audience, not to the general public. It is a term used for communications such as radio or television signals that are limited to subscription customers or otherwise prohibited from being *broadcast*. Broadcasts are transmitted to the general public, available for any general receiver with the capability to capture the signals. Narrowcasting is directed to a particular audience.

b) Broadcasting: Broadcasting is the distribution of audio and/or video signals which transmit programs to an audience. The audience may be the general public or a relatively

large sub-audience, such as children or young adults. Broadcasting forms a very large segment of the mass media.

2) Wide dissemination of content through mechanical or electronic media.

3) One of the most common examples of narrowcasting is cable TV. Another example of narrowcasting is satellite radio.

B)

1) The radio broadcasts we listen to basically takes place in four stages.

- The radio jockey or singer or artist speaks into a microphone. This microphone converts sound waves into electrical signals.
- The electrical signal from the microphone changes, or modulates, a radio wave called a carrier radio wave. This carrier wave which contains the sound information is then emitted by the broadcast tower of the radio station.
- Now, a receiving antenna on a radio tuned to the proper frequency picks up the carrier wave, which then travels to the receiver or radio.
- Finally, the receiver detects the modulation in the carrier wave and converts it back into electrical signals. The electrical signals are sent to a loudspeaker, which changes them once again into sound waves.

2) Amplitude Modulation and Frequency Modulation.

3) The advantage of AM is that it is suitable for long distance transmission. This is because AM carrier waves have much longer wavelengths, and therefore, they can bend around obstacles like mountains and buildings more efficiently and thus travel greater distances. Its disadvantage is, because information is coded in the amplitude of an AM carrier wave, interference from external signals are more likely to influence the amplitude and therefore more likely to interfere with the wave. This causes noise and distortion of the original sound.

4) The advantage of FM is that the quality of the sound is much better than AM. Its disadvantage is that it cannot travel long distances. It can travel upto a maximum distance of about 70 kms only.

C)

1) Digital radio broadcasting first emerged in Europe. It made its first appearance the UK in 1995 and then in Germany in 1999). Later on it appeared in the United States, France, Holland, South Africa and many other countries worldwide.

2) Internet radio is an audio broadcasting service transmitted via the Internet. Broadcasting on the Internet is usually referred to as webcasting since it is not transmitted broadly through wireless means.

3) Web radio, net radio, streaming radio and e-radio.

4) Popular streaming audio formats are MP3, Ogg Vorbis, Windows Media Audio, RealAudio and HE-AAC (sometimes also known as aacPlus).

5) Internet Talk Radio.

6) Rolling Stones, in November 1994.

7) WXYC (89.3 FM), on November 7, 1994.

8) NetRadio

9) Worldspace radio is a global satellite radio service which offers a large range of programs, through a compatible satellite radio with a special antenna which has to be installed outside the house and must have a free line of site to the satellite without any trees or walls in between.

7.10 POSSIBLE QUESTIONS

1. FM radio is better than AM radio. Do you agree? Why ?
2. Write a short note on WorldSpace Radio.
3. What is the difference between broadcasting and narrowcasting?

4. Explain the process of radio transmission.
5. Write short notes on :

a) Internet Radio

b) Amplitude Modulation