

TELECOMMUNICATION TECHNOLOGIES

¹Aarti , ²Neetu Pundir

1,2 UG, Department of Electronics and communication engineering,
Raj Kumar Geol Institute of Technology for Women, UP (India)

ABSTRACT

Early telecommunication technologies included signals, such as , smoke signals, beacons, semaphore telegraphs, optical heliographs and signal flags .These signals were visual signals. Electrical and electromagnetic telecommunication technologies include telegraph and teleprinter networks, microwaves ,radio ,transmission fibre optics, internet and communication satellites. Other examples of pre-modern telecommunications include audio messages such as lung-blown horns, loud whistles and coded drumbeats. In 1986, the world's effective capacity to exchange information through two-way telecommunication networks grew from 281 petabytes of information and in 1993 it approached to 471 petabytes , to 2.2 exabytes in 2000. It grew to 65 exabytes in 2007 and this is the information is equivalent to the information of two newspaper pages per person each day in 1986, and six entire newspapers per person per day by 2007. Telecommunications play an increasingly important role in the world economy and the global telecommunications industry was about a \$4.7 trillion sector in 2012. Service revenue of the global telecommunications industry was estimated to be \$1.5 trillion in 2010, corresponding to 2.4% of the world's gross domestic product (GDP).

Keywords: Microwave Radio Communication, Mobile Cellular Communication, Video Telephony

I INTRODUCTION

The communication which is done through electromagnetic waves or electrical signals at a distance using technological means is called telecommunication. Beacons, smoke signals, semaphore telegraphs, signal flag and optical heliographs were such visual signals which were included by early telecommunication technologies. Examples of pre-modern telecommunications include audio messages such as coded drumbeats, loud whistles and lung blown horns. Electrical and electromagnetic telecommunication technologies consist of telephone, telegraph and teleprinter, radio, the internet, communication satellites fiber optics and microwave transmission.

II HISTORY

The history of telecommunication began with the use of drums and smoke signals in Africa, the Americas and parts of Asia. The first fixed semaphore systems emerged in Europe in the 1790's. Semaphore as a communication system suffered from the need for skilled operators and expensive

towers often at intervals of only ten to thirty kilometres . So because of this, the last commercial line was abandoned in 1880. It was not until the 1830s that electrical telecommunication systems started to appear. Electrical and electromagnetic telecommunication technologies include telephone, telegraphs and teleprinter, networks, microwave transmission ,fibre optics, radio ,communications satellites and the Internet. Revolution in wireless telecommunications began in the 1900s with pioneering developments in radio communications by Guglielmo Marconi and Nikola Tesla.

III PRIMARY UNITS OF TELECOMMUNICATION SYSTEM

Telecommunication system includes three primary units that are always present in some form: Information is taken and converted into a signal by the transmitter. Signal is carried by the transmission medium which is also known as physical channel. Signal is taken by the receiver from the channel and converts it back into usable information. Telecommunication over fixed lines is called point-to-point communication because it is between one transmitter and one receiver. The telecommunication which is done through radio broadcasts is known as broadcast communication because it is between one powerful transmitter and numerous low-power radio receivers which are sensitive in nature. Multiplex are the systems in which multiple transmitters and multiple receivers have been designed to cooperate and share the same physical channel. There is large reduction in cost when physical channels are shared using multiplexing. In telecommunication networks, multiplexed systems are laid out and at nodes the multiplexed signals are switched through to the correct destination terminal receiver.

IV BASIC ELEMENTS OF TELECOMMUNICATION SYSTEM

Telecommunications have become the major part of our routine life. People make the use of radio alarm to wake up , through tv they get to know about traffic and weather updates, and perhaps telephone are used to call people round the world. Computers are used to check if they have emails or some other business documents delivered in the offices. These all above discussed are forms of telecommunications, and these all have become the important part of modern society. Telecommunication over a telephone line is called point-to-point communication because it is between one transmitter and one receiver.



Fig 1: Elements of Telecommunication System

The telecommunication through radio broadcasts is called broadcast communication because it is between one powerful transmitters and numerous receivers. In a telecommunication system, the transmitter takes the information and the information is converted into a signal, this signal is carried by the transmission medium to the receiver and the receiver which receives the signal and convert it back to the usable information.

For example, the transmitter is the broadcast tower, the transmitting medium is free space and the radio is the receiver in radio broadcast. The telecommunication systems are often two-way with a single device acting as both a transmitter and receiver or called as transceiver. Taking an example of a mobile phone which acts as transceiver.

V ANCIENT SYSTEMS OF TELECOMMUNICATION

5.1 Telegraph and Telephone

Early telegraphs used several wires connected to a number of indicator needles. First commercial electrical telegraph was constructed in England by Sir Charles Wheatstone and Sir William Fothergill Cooke. For fixed services, a microwave radio relay technology complementary to that of communication cables is provided by communications satellites. For mobile applications, microwave radio relay technology is used for communications in ships, planes, hand-held terminals, vehicles and for TV and radio broadcasting.

Based on earlier work with harmonic telegraphs, The electric telephone was invented in the 1870s. The Commercial telephone services were first set on both sides of the Atlantic in the cities of New Haven and London. After this point, the technology grew quickly with built intercity lines and by the mid-1880s, telephone exchanges in every major city of the United States.

5.2 The Satellite

In 1958, project score was the first U.S. satellite to relay communications, which store voice message in tape recorder and forward that messages. Christmas greeting was send a to the world from U.S. President Dwight D Eisenhower. In 1960 NASA launched a Echo satellite; the 100-foot (30 m) aluminized PET film balloon served for radio communications as a passive reflector. In 1960, Philco's Courier 1B, was launched, which, was the first active repeater satellite of world. Telestar was the first active, direct relay commercial communication satellite. Belonging to AT&T as part of a multi-national agreement between AT&T, Bell Telephone Laboratories, NASA, the British general post office, and the French National PTT (Post Office) in order to develop communication through satellite. From cape Canaveral, this was launched by NASA on July 10, 1962. On December 13 1962, Relay 1 the first privately sponsored space was launched. That on November 22, 1963 became the first satellite to broadcast across the pacific.

The first and historically most important application for communication satellites was in intercontinental long distance communication. Relays telephone was the fixed public switched telephone network that calls from land line telephones to the earth station, where they transmitted the receiving satellites dish via a geostationary satellite in Earth orbit. In the late 20th century, by the use of fibre optics improvements

in submarine communication cables can caused some reduction of satellites's use for fixed telephony .But they still provide service to remote islands such as Ascension Island , saint Helena ,Diego Garcia , and Eastern Islands where no submarine cables have serviced. Some continents and some regions of countries are also there where landline telecommunications are rare to nonexistent, for example Antartica, plus large regions of Australia, South America, Africa, Northern Canada, Russia and Greenland.

For the purpose of telecommunications a communications satellite or Comsat is an artificial satellite sent to space. A variety of orbits are used by Modern communications satellites including elliptical orbits and low (polar and non-polar Earth orbits) , Molniya orbits and geostationary orbits for fixed services, a microwave radio relay technology complementary to that of communication cables is provided by communications satellites . This technology is also used for mobile applications such as communications in ships, planes,vehicles , hand-held terminals and for TV and radio broadcasting.

5.3 Mobile Cellular Communication

Initially, mobile communication was restricted to certain official users and the cellular concept was never even dreamt of being made commercially available However, with the development of newer and better technologies, there has been an astronomical growth in the cellular radio and the personal communication systems. Wireless services have since then been experiencing a 50% per year growth rate.

5.4 Microwave Radio Communication

Microwaves are widely used for point-to-point communications .Microwaves have small wavelength and the receiving antenna receives the narrow beams as directed by the conveniently sized antenna. So because of this, same frequencies are used by nearby microwave equipment without interfering with each other,as lower frequency radio waves do. Microwave radio transmission is commonly used in point-to-point communication in communications, in satellite communication and on the surface of the earth.

5.5 Video Telephony

The development of video telephony involved the historical development of several technologies which enabled the use of live video in addition to voice telecommunications. In the late 1870s in both the United States and Europe, the concept of video telephony was first popularised. Video telephone, or videophone was the device in which video telephony was first embodied and it evolved from intensive research and experimentation in several fields of telecommunication, notably electrical telegraphy, radio, telephony, and television.

In the latter half of the 1920s, the development of crucial video technology first started in the United Kingdom and the United States, spurred notably by AT&T's Bell Labs and John Logie Baird. This process occurred in part, at least by AT&T, and it served as an adjunct by supplementing the use of the telephoneIt was believed by large number of organizations who believed that video telephony would be superior to plain voice communications. But video technology was to be deployed in analog television broadcasting long before it could become practical—or popular—for videophones.

From the mid-to-late 20th century, video telephony was developed in parallel with conventional voice telephone systems. In the late 20th century with the advent of powerful video codecs and high-speed broadband did it become a practical technology for regular use. As the internet gained rapid improvement and popularity, it became widespread through the use of webcams and videoconferencing, which was frequently utilized in business and internet telephony, where by using telepresence technology that helped to reduce the need to travel.

VI FUTURE OF TELECOMMUNICATION

Tele-computing has several implications. The first is that it should be tailored to the person at work or at home. The goal is to serve employees and residential users. This means it is end-user-driven. Technology must not be cumbersome. It must be very easy to use. Further, it must be reliable. Once people count on these PC-based devices for all their information needs, the devices and supporting networks cannot ever fail.

Our PCs will become video telephones; using flat panel displays. The PCs will also become more portable and wearable. They must, however, have a more reliable operating environment than Windows 95/98/ME and even Windows NT/2000. We will have special-use systems aimed at a primary function or two. They will be small but will make loud sounds and will have big displays most important PCs will be wearable. As many cell phones are worn on the hip today, PCs will be part of garments in future.

6.1 Telecommunications and Telephony

All telephony will migrate to IP networks (for instance, the Internet). The voice telephone network as we know it is history. It is being transformed into a high-speed IP delivery system between distribution networks. Distribution networks will cover the last mile to the home or office using telephone wire, coaxial cable, radio frequency channels, or power wiring. On communications, each household will compete and will spend vigorously for the around \$200 per month. Various services will cater to business needs and consumer needs.. Those that master these technologies have the dollars of investment behind them, and meet present and future needs will become the Microsoft like companies of tomorrow and those who do not master these technologies will be absorbed like Digital Equipment Corporation.

6.2 Residential Telecommunications

Residential services will depend on high-speed Internet access. 100 Kbps to 900 Kbps is the high speed. In the future it will increase FROM 1 Mbps to 10 Mbps for each house. The entertainment industry can drive it by selling video over the Internet. Firstly, downloading a movie for several hours is acceptable. But later on, only a it takes few seconds. Several residential communications technologies like cable modems, radio frequency channels, Telephone Company and electric power distributive channels will compete for communications spending of customer. Prices will drop because these services can be delivered effectively with less number of employees. These services must be highly reliable and efficient. The industry that provides high efficiency, high reliability, high-speed, and low cost will dominate the market in the geographical areas they serve. This means that people will no longer be bound to cities for high-paying jobs,

provided high-speed communications are universally available in rural and urban areas. It will entirely change the way in which we work and manage workers.

6.3 PC in the Kitchen

They could be productively employed for tracking household inventories, counting calories, preparing grocery lists of various items, purchasing essentials commodities, presenting different recipes and entertaining the cook. My guess is the large monitor. Flat panel monitors are increasingly become very cheaper and of better quality. So soon, PCs connected with special kitchen-oriented software will appear and of course they are connected with refrigerators. When anything is changed that is added up or reduced in refrigerator, food in inventory list is updated by it.

The inventory will be based upon special detectable tags and not bar codes. So when the door closes, the kitchen PC will hold roll call to see who has been added and who is missing and presumably eaten. It could then connect on-line to the grocery store and update our shopping list from the weekly specials or stores with the lowest prices. Also, the "Shame on us" message for eating too many calories would appear with the appropriate sonic alarm.

VII CONCLUSION

Modern technology has made staying in touch easier than ever. Nowadays most people are making use of these technologies. It was not too many years ago that when we have to write a letter to someone a paper, a pen, an envelope and a postage stamp were needed. And then it took several days for the recipient to receive the letter. But today technologies have grown so much that today's communication is instantaneous. Today's communication technology makes it possible to communicate at speed of light. Although modern technology has made communication simpler, easier and faster as compare to last few years.

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