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Development of Satellite Technology and Its Impact on Social Life

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Abstract
The development of satellite is one of the latest technology invented by man in the telecommunication sector. Satellite Communication is a method of communication between terminals to their terrestrial networks. The satellite has it scope of coverage, global, regional, or national. The wider the areas of coverage, the more satellites are involved in a single network system to enable its coverage effectively. The satellite technology varies from its satellite-base and its terrestrial wireless communication that affect design. The heart of satellite communication system is its antenna in a stable orbit above the earth. Satellite technology came in various stages, thus Telstar, Synchronous orbit satellite Comsat, INTELSAT, and Domestic Satellite system. This paper will examine the satellite technology and how it affects our social life. The key operational definition will also be explained.

INTRODUCTION

Communications satellite which (sometimes called ComSat) is an artificial satellite stationed in space for the purposes of telecommunications. A communications medium is using satellites as the major links between the terminals for its efficiency in transmission, which earth stations, or terminals, are said to be the ends of Satellite links. Communications usually take place via terminals to terrestrial network.

Satellite technology in an equatorial circular orbit at a distance is approximately 42,164km from the earth station, i.e. approximately 35,787km above mean sea level, which has a period equal to the earth's rotation on its axis and would remain geostationary over the same point on the earth equator.

The satellite collects its information from the earth station (dish) and sends it back to the satellite in space. It communicates via terminal to their terrestrial network, i.e. the satellites has its earth station (dish) with the satellite in space which receives and send back signals for transmission. The dish connection of the satellite has to be direct since the signal travel direct to the satellite for transmission. Any alteration of wrong direction of the dish can lead to lose of signal in transmission. Satellite is a method of commutation via satellite technology. This may also involve the use of satellite fleet.

Operational Definition of key concepts

Satellite - an earth-orbiting communication spacecraft designed to send and receive data from other satellites or earth stations. This data may carry voice, audio, video, or other information. It is the basis for satellite television certain kinds of internet access and cell phone use, Hoffmann, 2007:256).

Orbit – the orbit may be circular with the center of the circle at the center of the earth, or elliptical, with the earth's centre at one of the two foci of the ellipse. A satellite may also orbit around the earth in different planes, WCS Manual, bjbe@gcal.ac.uke

Dish Antenna - an antenna is in the shape of a circular dish and is in a parabolic form, used to receive satellite broadcasts. The lower the power of the satellite, the larger the diameter of dish is required, Hoffman (2007:104).

Geostationary Satellite – is a term describing the placement of satellites so that they orbit the earth at the same speed that the earth rotates, effectively parking the satellites in one sport.

Microwave - is a signals send out to a number of different destinations, Rodman (2006:278).

Earth station – this is a centre through which communication takes place by use of radio with a space satellite.

LEO – Low-Earth Orbit: The LEO transmit signal about 200 – 1,000 miles up and has no signal delay in its transmission. It is a smaller satellite which is cheaper to launch.

MEO - Medium Earth Orbit: The MEO is a satellite technology that normally transmit signal at about 5,000 – 10,000 miles up. The MEO requires more satellite for a global coverage.

GPS – Global Positioning System: The GPS enables one to show direction particular when you mount such technology in your car. It is one of the long distance wireless communication that use the satellite technology.

Downlink – Transmitting an electronic Signal from a satellite to a ground facility, Folkerts and Lacy (2004:451).

Uplink - Transmitting an electronic signal to satellite for storage or further distribution, (Ibid, p.447).

THEORETICAL FRAMEWORK

Scholars noted that since mankind have ventured into space; they have embraced "The Big Sky Theory." The theory holds that space is so big, that you could launch anything into orbit, and it wouldn't collide with anything else.

LITERATURE REVIEW

CONCEPTS OF SATELLITE TECHNOLOGY

The satellite technology varies from one stage to another. According to scholars by 1945 there was a proposal on geostationary communication satellite by Arthur C. Clarke. In his proposal, he predicted the future of geostationary satellite communications which was published in the wireless world magazine in 1945.

Telstar

Bitner (1989) posits that the modern era of communication Satellites stated in July 10, 1962, where on that night political figures in England, America, and France waited as a NASA- A.T & T launched payload which is named Telstar roamed through the outer space. Its antennas homed in our television signals from North America, amplified it sometimes ten million times, and retransmitted it back to earth to receive the signals for information disseminations. The telecast lasted less than an hour, because the satellite passed out of sight of the signals (loss of signals) from earth stations. Telstar was said have made international history during this marriage of satellite technology and broadcasting in television in the 1960s which seized every opportunity to use this technology for its programming. During this period, the European audiences was said to have watched the American reaction to the unveiling of the Mona Lisa at the National Gallery of Art. The Olympics in Japan which traveled around the world via the use of Telstar.

Synchronous Orbit Satellite

The satellite itself is however, were not as important as their sophisticated control and guidance systems is. The Engineers at Hughes Aircraft Company tried their first launch of a synchronous orbit satellite in February 1963. The synchronous orbit satellite, if successful, would reach a point in space where it would rotate at a speed that would synchronize with the speed of the earth's rotation. The satellite would appear stationary in the space, though traveling at several thousand miles per hour in its position. This attempt, syncom I, ended in failure due to some technical reasons, however, Undaunted, Hughes engineers tried again with Syncom II in July of that same year. The re-launch their satellite technology and was successful, and at 23,300 miles in space over the equator and the Atlantic Ocean, synchronous orbit was achieved. The U.S. Navy ship Kingsport, sailing off the coast of Nigeria, received the loud and clear message. The message read; this is Lakehurst, New Jersey, how do you hear me? This is what led to the second era of satellite communication technology's achievement then.

Comsat and Intelsat

The development of communication satellite has made the world taking an active interest in satellite development. In the United States of America, Congress had created the quasi-governmental Communications Satellite Corporation (COMSAT) with passage of the Communications Satellite Act of 1962. COMSAT has become the early planner of satellite system on an international scale. The consortium established itself under two international agreements originally signed by 14 countries and eventually ratified by 54. In 1974 it became the International Telecommunication Satellite Organization (INTELSAT) with membership of more than 80 nations and presided over by a secretary general. Today it has approximately 100 members and is responsible for about 95 percent of the world's communication traffic.

Bitner further stated that on April 6, 1965, the first INTELSAT satellite was launched into orbit. This followed by a long series of INTELSAT spacecraft which now orbiting the earth and provide its worldwide communication system. The satellites utilize improved technology which is called the beam separation. Beam separation, allows the same frequency to be used for transmitting a signal both from the earth to the satellite, and creates more efficient use of the frequency. Moreover, the improved antenna systems of the satellite permit a more directed "beam" to earth stations eliminating the power normally wasted by beaming signals over ocean areas.

Domestic Satellite Systems

There are numerous Domestic Satellite Systems (DSS) along with the global communication of the INTELSAT Satellites, The (DSS) started on December 1973, and began its operation by RCA, which formed a wholly owned subsidiary company to operate its domestic satellite system, RCA American Communication, Inc. (RCA Americom). This became part of the RCA Communications group. A network of earth stations complements the RCA system. The RCA Satcom Satellites use an antenna system that faces the sun whenever it is in view, thus improving the power of the satellites. When the sun is not in sight, the satellites are powered by nickel cadmium batteries. Western Union operates a domestic satellites system called Westar which is capable of carrying different types of information including video, data, and voice. Along with mobile facilities, sending and receiving earth stations operate in major metropolitan centers. General Telephone and Electronics (GTE) developed a domestic satellite system in 1981 with the first launch in 1984.

The United States' space station was scheduled to be operational in the early 1990s will aimed at adding new dimension to space-based communication system. Using the space shuttle to construct the space station, engineers will eventually be able to build and provide maintenance for communication facilities in space. The space station is designed to contain pressurized modules permitting people to live and work in space.

International cooperation is one of element in the planned venture with European and Japanese modules to be part of the station. With the help of solar panels the space station will generate and distribute 75,000 watts of power, and if it is successful, the space station idea could resulted in larger and more powerful space for communication systems which can change the technology that is use in receiving signals on earth. Using smaller antenna such as satellite dish antennas replacing the larger consumer models now in use can change the media's habits on how we use both mass and more personalized communication systems. Bitner, (1989:271-4)

Satellite technology have change the way through which information are being disseminated. Flor instance the president of the United States of America (USA) and other officials of the drug's manufacturer, Johnson and Johnson was able to sit down for a satellite teleconference, that is a news conference, where news makers and reporters in different locations joined through the use of satellite hookup. A teleconference is also known as the videoconference or satellite media tour (SMT) which is not only used for information dissemination, but also in a diverse ways, such as allowing a business executive to be interviewed by various reporters from different parts of the country and is from one studio controlled by the company or the organization.

The teleconferencing satellite technology allows 600 reporters from 30 different cities. It has also noticed that officials of a company Johnson and Johnson explains to reporters the extra-ordinary precautions to protect their customers.

Turow (2003:474) note that the Direct Broadcast satellite was introduced in 1994 to allow the household to received more than one hundred channels through a satellite digital signal which can be delivered to a small dish installed on one side in the house which can be used at home on television (TV). The DBS satellite operates from orbits directly above the earth's equator and is over 22,000 miles up.

SATELLITE TECHNOLOGY

The communications satellites are microwave relay stations in orbit around the earth. It transmit signal from the ground station to a satellite station on space. Is the uplink while the reverse side is the downlink of transmission of the signal from the satellite station on space down to the earth station. Williams and Sowyer (2007:332) note that the communication satellite is the basis for what is called the global positioning system (GPS), they further stated that the communication satellite system at time occupy one of the three zones in the space such as: GEO, MEO and LEO.

GEO this refers to as the Geostationary Earth Orbit which is about 22,300 miles up in the space and in directly above the equator. The communication satellite normally travelled at the same speed with the earth. However, scholars have shown that the microwave which generated from the earth station can always be able to beam signals to a fixed location to the satellite in space. The orbiting Satellite normally has its solar panel which powered the transceivers to enable it receive the signal and the amplified such signal and retransmit it back to the earth stations. Most high orbiting system, fewer satellites are required to give a global coverage. If the positions of the earth and the satellite in space shift there will be a loss of signal and can cause inefficiency in transmission.

The MEO is the Medium Earth Orbit is 5,000 - 10,000 miles up in space which is lower than that of the GEO. The MEO requires more satellite for global coverage than that of the GEO. Meanwhile the Lower Earth Orbit (LEO) as the name implies range from 200 – 1000 miles up and in fact has no signal delay as that of the two states above. It was noted that the early users efforts of these satellites where being frustrated by some balky equipment and the derby in transmission of signals.

According to Williams and Sawyer (2007:333) the GPS consists of twenty four (24) earth orbiting satellites which are constantly transmitting time radio signals which can be used to identify earth location.

HOW THE GPS WORK

The GPS satellite network was developed and implemented around the 1970s by the United States military as a military navigation system and later on May 1,2000 the Federal Government opened to everyone. The solar powered the satellite which circles the earth twice a day at an altitude of 11,000 nautical miles. The two scholars further stated that, the GPS receivers either handheld or mounted on a vehicles, plan or boat normally picks up transmission from any of the four satellites interpret the information from each of them and can pinpoint the receivers longitude, latitude and altitude. The system can be effective within 30-50 feet and with 10 feet which is said to be the standard, Williams and Sowyer (2007:332)

HOW THE GPS IS USED

There are two broad ways through which the GPS is used that is to move information through the air at a long distance on radio frequencies, while another way is through typified by the satellite navigation system. The GPS is a technology installed in vehicles which serves as onboard navigation systems. It is also used in different types of vehicles such as trucks, buses taxis etc, which is used in tracking of stolen vehicles, orienting hickers

and sometimes in aiding surveying where an aerial camera is connected to GPS receivers and can automatically tag photos with the GPS coordinates. The GPS is useful in surveyors, managers, search and rescue mission team archaeological discoveries and so on. The GPS can also be used in various ways not only in vehicles. Williams and Sawyer (2007:334) note that there was a woman who uses GPS unit with a Braille Keyboard and voice output to find her way around a park, while others use it in their n3writ watch which is reported to be the first wristwatches to receive a steady stream of news, weather information and other information via a Microsoft MSN direct subscription service. Various researchers have engaged them in the use of GPS for research purposes, where someone like Brian sniatkowski in Kekeout Researvoir forest hold a unit of the GPS, in geocaching hunt of GPS users participants all over the world in order to share the locations via the internet services.

It also important to note that the GPS satellite is used by most scientists to watch over a Hawaiian volcano, Mauna Loa, and to capture infinitesimal movements that may be used for the prediction of eruptions of the volcano, (bid, p.335). The GPS technology in cellular carriers used E-911, i.e. the enhanced 911 which is capable of locating tiny GPS receivers which is embedded in the user's digital cellphones, and the position of the person making an emergency 911 cell, (ibid, p.335).

ORGANIZATION OF CABLE SATELLITE

For satellite viewers to have clear signals, the need a receiver and a satellite dish. Internet viewers need to have a computer and a modem cable satellite system is structured differently from those of conventional television. There are three different main components in a cable system, thus;

1. The head end,
2. The distribution system
3. The house drop

- The head end consist of the antenna and other related equipment that receive signal from distant television station, process it and send it to the subscriber's home, where their studio may also be located.
- The distribution system consists of the actual cables that deliver the signals to subscribers. The cables can be buried or hang on the telephone poles. The main cable is called the trunk which has several feeder cables down Side Street or to other outlying areas.
- The house drop is a section of the cable that connects the feeder cable to the subscriber's television set, Dominick (2009:2263)

SATELLITE SYSTEM ELEMENTS

The entire satellite system consists of five elements which include the following:

1. Content provider such as ESPN or local broadcast stations, which send their signal.
2. A broadcast centre which takes the programming and transmits it.
3. Geosynchronous communication satellite, it receives the program from the broadcast centre and send it back.
4. A small satellite receiving dish (STRD) which picks up the signals and transmit it.
5. A satellite receiving which transforms the signal so that it can be viewed on a conventional television set, Dominick (2009).

HOW DOES IT AFFECT SOCIAL LIFE?

Satellite communication affects our social life in various ways, thus;

(a) Through our selective perception i.e. the way through which each person process messages differently.
(b) Selective retention p- the way we retain those message selected from our perception.
(c) It has directly affected the speed with which the society evolves.
(d) It gives the ability to talk back, i.e. to receive as well as transmit messages, e.g. makes the telephone interactive, Biagi (2005:25, 26)
(e) It affects the society both politically, economically, culturally and socially.
(f) It affects the society both positively and negatively.

SATELLITE GRAVEYARD

The satellite graveyard is known as the satellite junk in the space. In recent time research shows that in 1978, Donald Kessler (ret.) of National Aeronautics And Space Administration (NASA) Orbital Debris Office, foreseen that within three (3) decades random collisions between manmade objects will create smaller debris that would become increasingly hazardous to spacecraft where the satellites are, which he call it as the Kessler

Syndrome. This according to him is as a result of chain reaction which would create exponential expansion clouds of debris which could alter space exploration.

Over the last 50 years, research shows that thousands of satellites have been launched into space, but due to some debris problems only some that are still operational in the spacecraft, once it stop functioning, then it will be left in the orbit. That is a lot of junk which is estimated that LEO contains upto 6,000 tons of space link and the GEO is home to about 400 dead satellites parked into a higher graveyard orbit, where they will remain un-functional for millions of years. At times the all these manmade satellites fall out of orbit and burn up in the atmosphere regularly. However, it is noted that not all objects decay upon re-entry because those that survive normally fall to earth at very high speeds.

The upper phase of rocket bodies normally weigh several tons which make up a good portion of the junk in space as related objects like cast-off bolts or O-rings. The reset are said to be miscellaneous fragments; de-exploded rockets, left over fuel, and the list goes on.

It very important to note here that in LEO the satellite operators normally experience what they called "close approaches" – this according to them, two satellites passing within just a few short miles of one another which can happen around 1,500 time a day. http://www.spacejunk3d.com/spacejunk101.html

HOW TO TRACK SPACE JUNK

Research shows that the United States of America (USA) Space Surveillance Network have gathered data from 25 sites around the world, tracks and catalogs thousands of pieces of manmade space objects which are 10 centimeters in diameter (baseball size) or larger. NASA's Orbital Debris Program Office accomplishment in 1979, measured the increase amounts of hazardous debris shows that it was too small to be detected by conventional tracking methods. http://www.spacejunk3d.com/spacejunk101.html

SUMMARY AND CONCLUSIONS

Satellite technology is one of the latest technology ever invented by man. It gives man the opportunity to have a wide coverage in information gathering and dissemination. The use of satellite technology has made the world a global village in information processing and dissemination. Through the use of satellite technology someone in a remote village can be able to listen to news over the radio and acquaint him/herself with the latest happening of the world.

The impact of satellite technology can be felt in our every day's life, especially in the new world of mass communication where people seek information about the happenings around the globe. The wireless technology often called wi-fi an abbreviation of wireless fidelity are some of the new technology that are emerging to allow the user access any technology in any location without wires, this simple means that you can watch movies, listen to radio, read newspaper and magazine, e-books, etc; on your portable computer, a device you can easily carry and pocket it, this is to say that you and your mass media are totally mobile, Biagi (2005:5).

The impact of the satellite technology can be felt by every person in the society and the world at large.

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