# INTERNSHIP REPORT

**On**

# BROADCAST TECHNOLOGY

**At**

# INDEPENDENT TELEVISION

**Submitted By**

**Abrar Faiyaz**
**ID: 2013-2-55-026**
**Department of Electronics and Communication Engineering**

**Supervised By**

**Md. Ruhul Amin**
**Professor**
**Department of Electronics and Communication Engineering**

# Letter of Transmittal

17th July, 2017

To
Md. Ruhul Amin
Professor

Department of Electronics and Communications Engineering

East West University

**Subject: Submission of internship report for completion of course.**

Dear Sir,
I am pleased to let you know that I have completed my internship at **Independent Television Pvt. Ltd.** The attaché contain of the internship report has been prepared for the completion of the course, Internship (ETE 498). It is great achievement to work under your active supervision.
This project gave me both academic and practical exposures. First of all I learned about the organizational culture of a prominent Television organization of the country. Secondly, the project gave me the opportunity to develop a network with the corporate environment.

I shall be highly obliged if you are kind enough to receive this report and provide your valuable judgment. It would be my immense pleasure if you find this report useful and informative to have an apparent perspective on the issue.

Thank you for your co-operation.

Sincerely Yours,

---
Abrar Faiyaz
ID: 2013-2-55-026
ECE Department
East West University

# Declaration

I hereby declare that the internship report is done by me under the course "Research/Internship (ETE498)". Requisite references are quoted to support my work. It has not been submitted elsewhere for the requirement of any degree or any other purpose except for publication.

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Abrar Faiyaz
ID: 2013-2-55-026
ECE Department
East West University

# Acceptance

This is to certify that Abrar Faiyaz, ID: 2013-2-55-026 Department of Electronics and Communications Engineering, East West University, has done this internship at **Independent Television** as partial requirement for the degree of BSc in ETE. To the best of my knowledge, this report is original in nature and has been prepared by his guidance and was nowhere submitted for any purpose.

_____

Md. Ruhul Amin

Professor

Dept. of ECE

_____

Shaheen Nur Rashid
Manager

Broadcast Technology

Independent Television

# Acknowledgement

First of all, I wish to express my gratitude to the almighty ALLAH for giving me the strength to perform my responsibilities as an intern and complete the report within the stipulated time.
I am deeply indebted to my Faculty Supervisor Md. Ruhul Amin Professor; Department of Electronics and Communications Engineering of East West University for his whole-hearted supervision during my organizational attachment period.

I am also grateful to Shaheen Nur Rashid, Manager, ITV as my organizational supervisor. It would have been very difficult to prepare this report up to this mark without their guidance.

Last but not the least; I would like to convey my gratitude to Md. Fahimul Islam; junior broadcast engineer and Sudipta Saha Sampad; junior broadcast executive, ITV for helping me in furnishing the report. Moreover, I would also like to express my gratitude to my Independent Television pvt. Ltd. fellows, seniors and colleagues who gave me good advice, suggestions, inspiration and support. I must mention the wonderful working environment and group commitment of this organization that has enabled me to deal with a lot of things.

Finally I would like to thank my friends and family member who have given me mental and internship information related support to pursue the whole internship properly.

# Abstract

I have prepared this report based on my three-month practical experience at Independent Television Pvt. Ltd. This internship program helped me to learn about the practical scenario of a Television station. This report has been presented based on my observation and experience gathered from the company. I attend internship on Broadcast Technology (01-01-2017 to 31-03-2017).

Now-a-days Satellite TV is being considered with utmost significance as it has been contributing to every sector of our society. Certain differences have been brought to our life with a wide array of program ensuring several advantages to our day to day life. Now TV programs, broadcasted both in analog and digital format possessing higher quality of sound and picture, can entertain anyone from anywhere based on the availability of Satellite TV connection. It has been a great opportunity for me to gather a complete hand on experience on all the sections of Satellite TV channel during my internship in ITV and this report has been prepared based on the knowledge that I achieved during my working period. The complete illustration of Earth Station and Live Transmission process of ITV channel has been signified here as the core parts of my internship paper.

# Table of contents

# Chapter 1

# Introduction

## 1.1 Introduction

In order to achieve my B.Sc. in Electronic and Telecommunication Engineering, I was required to complete an internship. I interned at **Satellite TV Broadcasting System**.
In this report, I will first describe about Communications Satellite, Satellite TV Channel and how to perform live broadcast.
I have been finished my internship at Independent Television Pvt. Ltd. which is a private 24-hour news channel. It is owned by one of Bangladesh's largest conglomerate Beximco. They are headquartered in Tejgaon, Dhaka. It obtained its license officially from the Government of Bangladesh in March, 2010. ITV uses latest Broadcast Technology in news gathering and program production.

## 1.2 Objectives of the Report

The main objectives of the proposed practical study **'Satellite TV Broadcasting System** at **ITV'** are as follow:

1. TV Studio with Equipment
2. Studio Production Control Room (PCR)
3. Master Control Room (MCR)
4 Play out Automation
5. News room Automation
6. Local & International Feeds (CNN, APTN etc.)
7. Digital Satellite News Gathering (DSNG) Van
8. Digital Mobile News Gathering (DMNG)
9. Live Telecast Technology by BackPack

## 1.3 Overview of the Report

The material in this report begins with a discussion of some of the basic background disciplines and subsystems inherent in **Satellite TV Broadcasting System**.

**Chapter 2** introduces full concept about Communication Satellite. That means Use of Satellite, The main parts of satellite, Satellite Category, Satellite footprint, Satellite look angle, Satellite Sun outage.

**Chapter 3** covers Uplink and downlink procedure, about downlink parameter.

**Chapter 4** introduces all the section of a satellite TV station that means CAR, Earth Station, MCR, PCR and Studio. Also describe about Encoder, Modulator, BUC, SSPA, Antenna, and IRD.

**Chapter 5** covers total live Broadcast System. Workflow of DSNG (Digital Satellite News Gathering), DMNG (Digital Mobile News Gathering) and working process of Fiber link CSI & Backpack.

This intern report has briefly introduced the genesis and characteristic features of communication satellites. A communication satellite is basically an electronic communication package placed in orbit whose prime objective is to initiate or assist communication transmission of information or message from one point to another through space. The information transferred most often corresponds to voice (telephone), video (television) and digital data.

# Chapter 2

# Objectives of the Satellite

## 2.1: What is Satellite?

A satellite is an artificial object or body which has been intentionally placed into orbit around the earth by human endeavor to collect information or for communication. There are about 6,600 satellites have been launched in the space; the latest estimates are that 3,600 remain in orbit. [1]Most of them are used for communication.

## 2.2: History of Satellite

Sputnik 1 the first artificial Earth satellite was launched by the Soviet Union in 1957.At about the size of a basketball, Sputnik 1 was equipped with a radio transmitter that gave off a beeping signal—helping the Soviets to track it on its 98-minute orbit and to signal to the world that the U.S.S.R. was the leader in space.[2]It was put into orbit around Earth and was therefore in geocentric orbit. Artificial satellites originate from more than 50 countries and have used the satellite launching capabilities of ten nations. A few hundred satellites are currently operational, whereas thousands of unused satellites and satellite fragments orbit the Earth as space debris. A few space probes have been placed into orbit around other bodies and become artificial satellites to the Moon, Mercury, Venus, Mars, Jupiter, Saturn, Vesta, Eros, and the Sun. The International Space Station (ISS) is a space station, or a habitable artificial satellite, in low Earth orbit. It is a modular structure whose first component was launched in 1998. Now the largest artificial body in orbit, it can often be seen at the appropriate time with the naked eye from Earth. On Aug. 12, 1960, NASA successfully launched Echo 1, it was the first satellite that was used for communication purpose.

## 2.3 Uses of Satellite

India uses its satellites communication network – one of the largest in the world – for applications such as land management, water resources management, natural disaster forecasting, radio networking, weather forecasting, meteorological imaging and computer communication.
The INSAT-2 satellites also provide telephone links to remote areas; data transmission for organizations such as the mobile satellite service communications for private operators, railways and road transport; and broadcast satellite services, used by India's state-owned television agency as well as commercial television channels.
Satellite used by Airtel Digital TV and Sun Direct DTH to broadcast their DTH services. India launched 3D Weather Forecasting Satellite in 2011. So Satellites are important in: voice communications, video & radio transmission, navigation (GPS), remote sensing (maps, weather satellites).

## 2.4 Parts of a Satellite

Satellites come in many shapes and sizes. But most have at least two parts in common - an antenna and a power source. The antenna sends and receives information, often to and from Earth. The power source can be a solar panel or battery. Solar panels make power by turning sunlight into electricity.

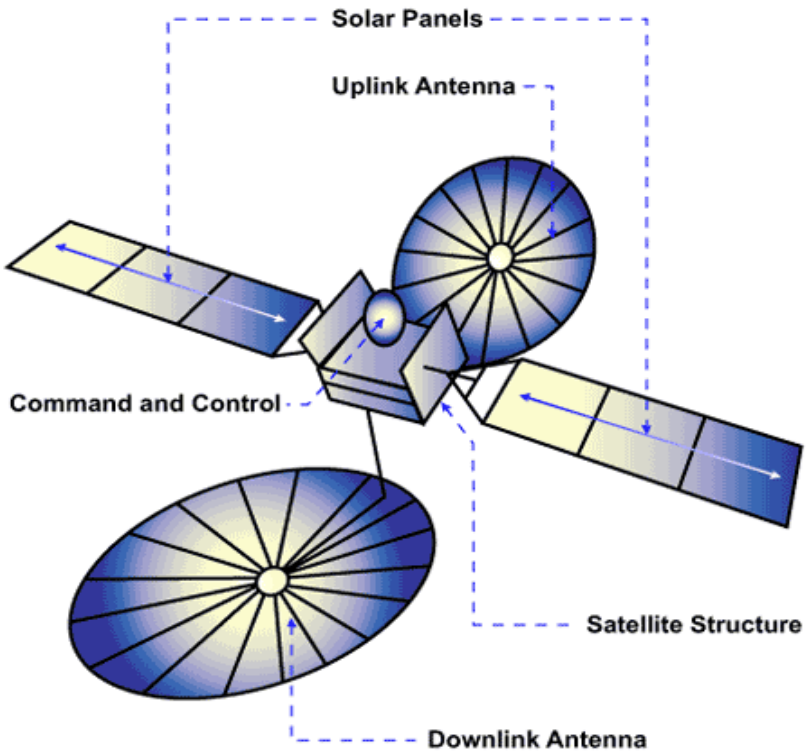


**Fig 2.1: Parts of a Satellite**

## 2.5 Satellite Category

Major types of Satellites-

### 2.5.1: Natural Satellites

 There are about 173 known natural satellites orbiting planets in the Solar System.

 All the planets that revolve around the Sun are Natural Satellites.

 The Moon is the only Natural Satellite of the Earth.

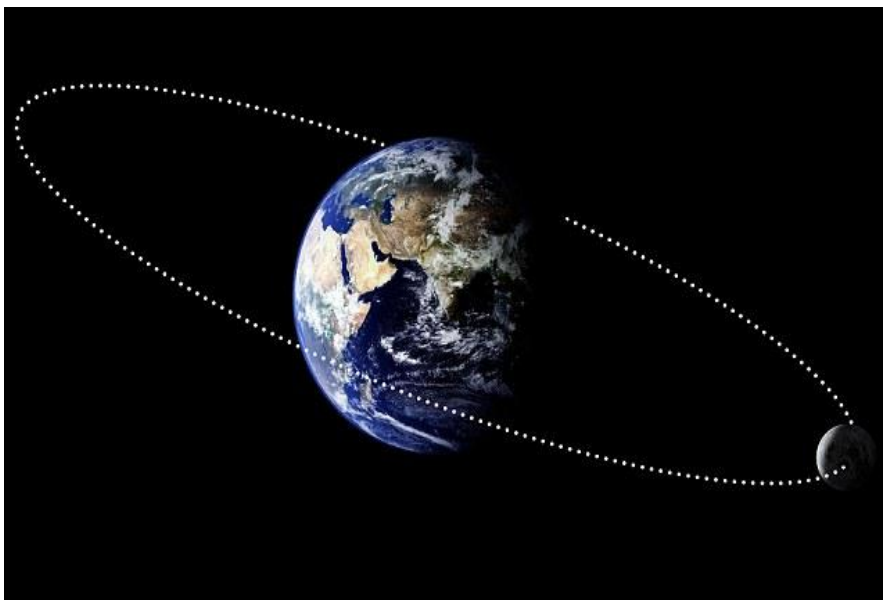

**Fig 2.2: Moon revolving around Earth**

## 2.5.2: Artificial Satellites

Artificial satellite object constructed by humans and placed in orbit around the earth or other celestial body. The satellite is lifted from the earth's surface by a rocket.

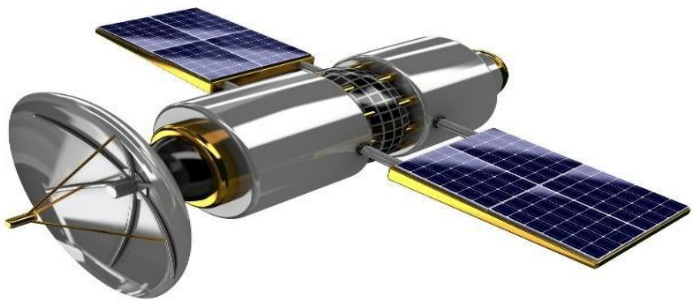

**Fig 2.3: Artificial Satellite**

When a satellite is launched, it is placed in orbit around the earth. The earth's gravity holds the satellite in a certain path as it goes around the earth, and that path is called an 'orbit'. Artificial Satellites can be classified by their functions. Satellites are launched into space to do a specific job.

According to the orbital position artificial satellite are three types-

## 2.5.2.1: Low Earth Orbit (LEO)

Most satellites, the International Space Station, the Space Shuttle, and the Hubble Space Telescope are all in Low Earth Orbit (commonly called "LEO"). LEO satellites are much closer to the earth than GEO satellites, ranging from 320 to 1100 km above the surface. LEO satellites don't stay in fixed position relative to the surface and are only visible for 15 to 20 minutes each pass. A LEO satellite's proximity to earth compared to a GEO satellite gives it a better signal strength and less of a time delay, which makes it better for point to point communication.

LEOs are mostly used for data communication such as e-mail, paging and video conferencing. Because LEOs are not fixed in space in relation to the rotation of the earth, they move at very high speeds and therefore data being transmitted via LEOs must be handed off from one satellite to the next as the satellites move in and out of range of the earth-bound transmitting stations that are sending the signals into space. Because of the low orbit, the transmitting stations do not have to be as powerful as those that transmit to satellites orbiting at greater distances from the earth's surface. LEO telecommunication systems are a promising technology because they provide the ability for underdeveloped territories to acquire satellite telephone service in areas where it is either too costly or not geographically possible to lay land lines.

## 2.5.2.2: Medium Earth Orbit (MEO)

A medium earth orbit (MEO) satellite is one with an orbit within the range from a few hundred miles to a few thousand miles above the earth's surface. Satellites of this type orbit higher than low earth orbit (LEO) satellites, but lower than geostationary satellites. The most common use for satellites in this region is for navigation, communication, and space environment science

The orbital periods of MEO satellites range from about two to 12 hours. Some MEO satellites orbit in near perfect circles, and therefore have constant altitude and travel at a constant speed. Other MEO satellites revolve in elongated orbits. The perigee (lowest altitude) of an elliptical-orbit satellite is much less than its apogee (greatest altitude). The orbital speed is much greater near perigee than near apogee. As seen from a point on the surface, a satellite in an elongated orbit crosses the sky in just a few minutes when it is near perigee, as compared to several hours when it is near apogee. Elliptical-orbit satellites are easiest to access near apogee, because the earth-based antenna orientation does not have to be changed often, and the satellite is above the horizon for a fairly long time.

A fleet of several MEO satellites, with orbits properly coordinated can provide global wireless communication coverage. Because MEO satellites are closer to the earth than geostationary satellites, earth-based transmitters with relatively low power and modest-sized antennas can access the system. Because MEO satellites orbit at higher altitudes than LEO satellites, the useful footprint (coverage area on the earth's surface) is greater for each satellite.

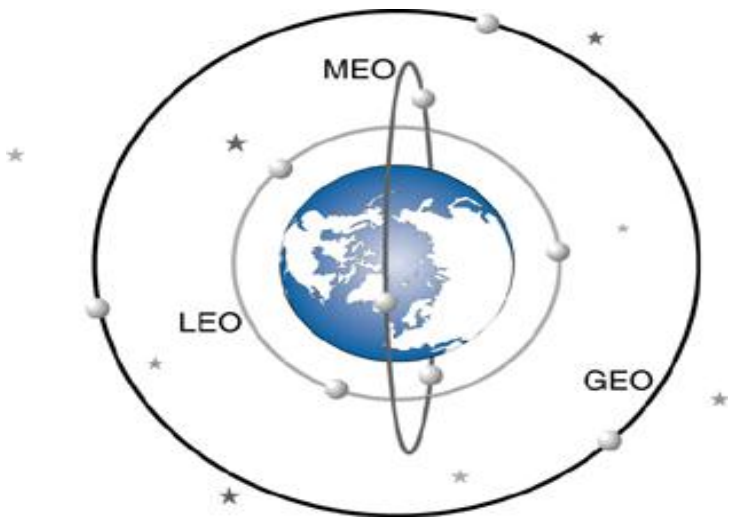


**Fig2.4: Types of Orbit**

## 2.5.2.3: Geostationary Earth Orbit (GEO)

A Geostationary Earth Orbit (GEO) is an orbit whose position in the sky remains the same for a stationary observer on earth. These satellites are in orbit 35,786 km above the earth's surface along the equator. Objects in Geostationary orbit revolve around the earth at the same speed as the earth rotates. This means GEO satellites remain in the same position relative to the surface of earth. A GEO satellite's distance from earth gives it a large coverage area, almost a fourth of the earth's surface. A GEO satellite's distance also cause it to have both a comparatively weak signal and a time delay in the signal, which is bad for point to point communication.

They are tied to the earth's rotation and are therefore in a fixed position in space in relation to the earth's surface. The satellite goes around once in its orbit for every rotation of the earth. The advantage of a GEO system is that the transmission station on earth needs to point to only one place in space in order to transmit the signal to the GEO satellite. GEO systems are used for transmissions of high-speed data, television signals and other wideband applications.

## 2.6: Satellites Footprint

The area of the Earth covered by the microwave radiation from a satellite dish (transponder) is called the satellites footprint. The size of the footprint depends on the location of the satellite in its orbit, the shape and size of beam produced by its transponder and the distance from the earth.[11] There are different footprint for each satellite.
A transponder is a device for receives a radio signal and automatically transmits to a different signal.

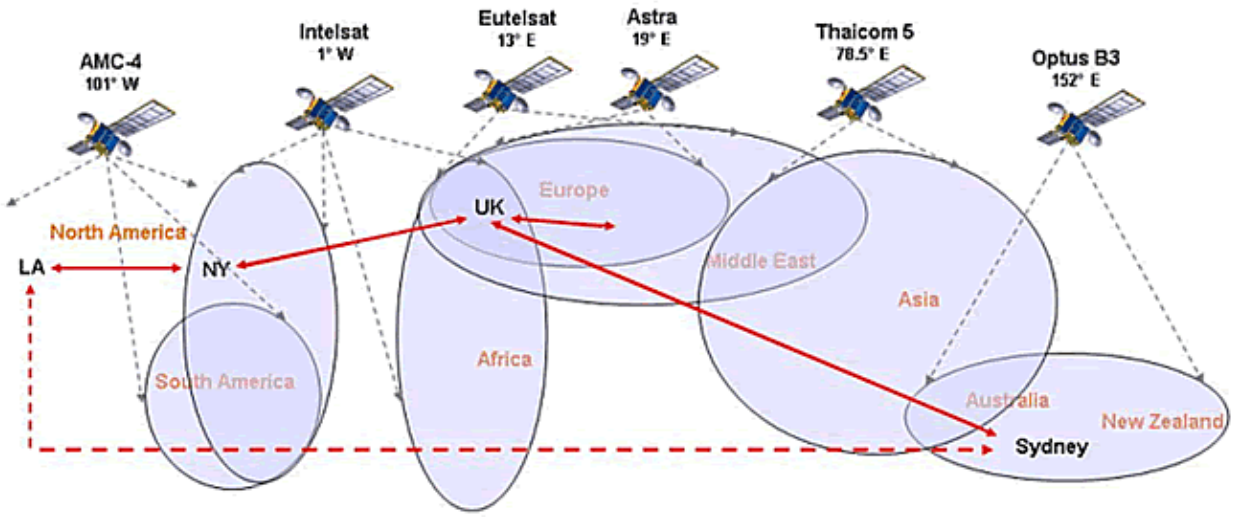


**Fig2.5: Satellites footprint**

## 2.7: Satellite look angle

The look angles for the ground station antenna are Azimuth and Elevation angles. They are required at the antenna so that it points directly at the satellite. Look angles are calculated by considering the elliptical orbit. These angles change in order to track the satellite.

For geostationary orbit, these angles values do not change as the satellites are stationary with respect to earth. Thus large earth stations are used for commercial communications, these antennas beam width is very narrow and the tracking mechanism is required to compensate for the movement of the satellite about the nominal geostationary position.
The look angles for the ground station antenna are the azimuth and elevation angles required at the antenna so that it points directly at the satellite. In order to track a satellite located in low earth orbit (LEO), the look angles have to change because the satellite is faster than the Earth. But, in the case of satellite located in geostationary orbit no tracking is needed because the satellite is stationary with respect to the Earth.

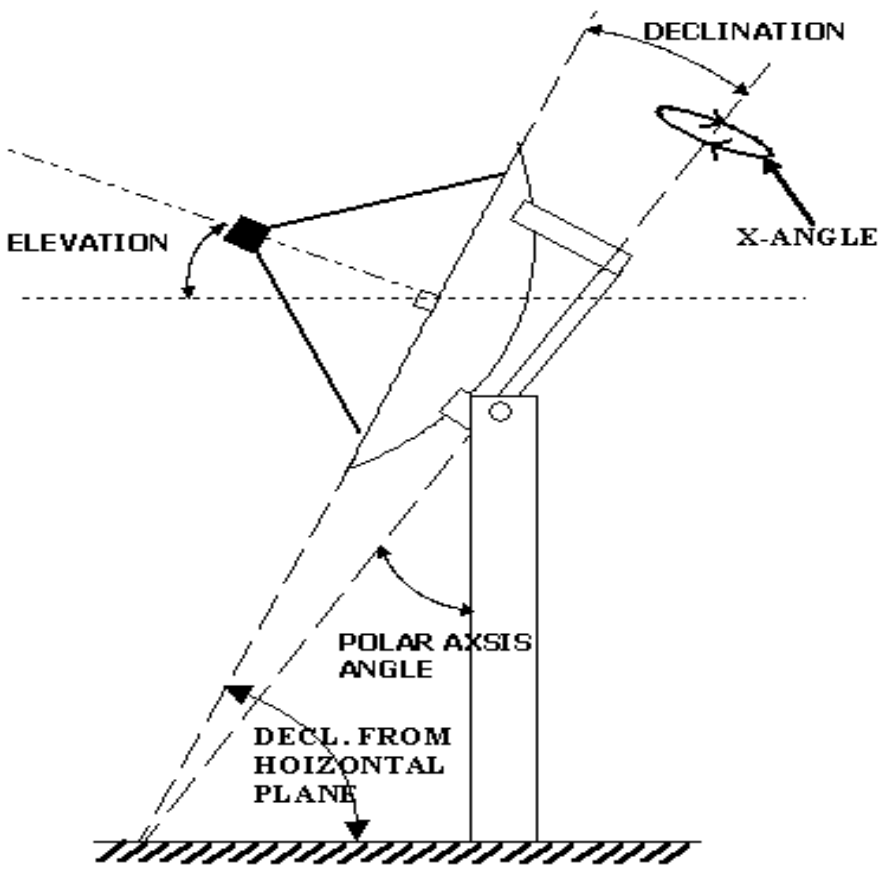


**Fig 2.6: Satellite look angle**

## 2.8: Satellite Sun Outages

Geostationary satellites are fantastic means of communication except for one little problem called sun outage. It is an interruption of geostationary satellite signals caused by interference from solar radiation. Because the sun is a powerful broadband microwave source and has a noise temperature. The elevated temperature of the sun causes it to transmit a high-level electrical noise signal to the receiving systems. This natural illusion happens twice a year when a satellite and a receiving earth station come directly in line with the sun. In the northern hemisphere, sun outages occur before the March (February, March) and after the September (September and October).

A sun outage occurs because the earth station cannot distinguish between the energy from the sun and its intended communication signal.

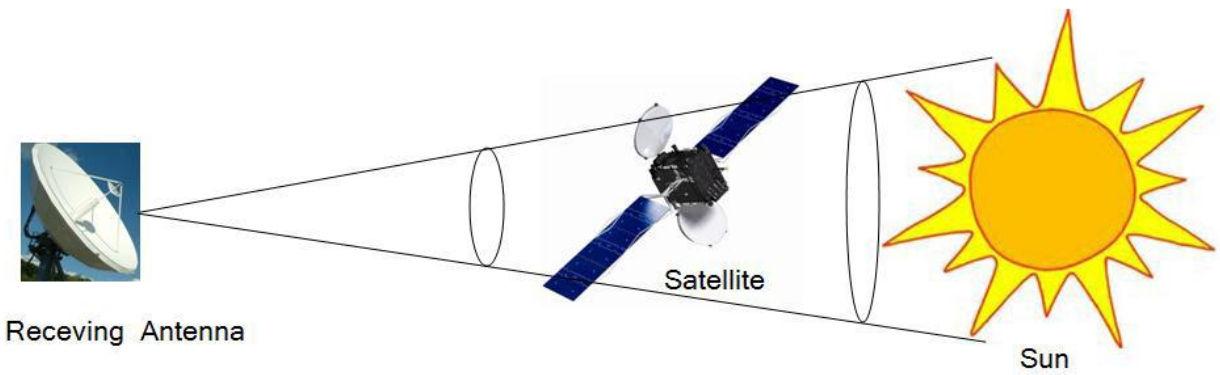


**Fig 2.7: Graphical representation of sun outage problem**

# Chapter 3

# Satellite TV Station

# And

# Uplink-Downlink

## 3.1 Satellite TV

Satellite television is a system of supplying television programming using broadcast signals relayed from communication satellites. The signals are received via an outdoor parabolic reflector antenna usually referred to as a satellite dish antenna and a low-noise block (LNB) down-converter. A satellite receiver then decodes the desired television program for viewing on a television set. Satellite television provides a wide range of channels and services, especially to geographic areas without terrestrial television or cable television.

The Satellite TV station block diagram is given below-

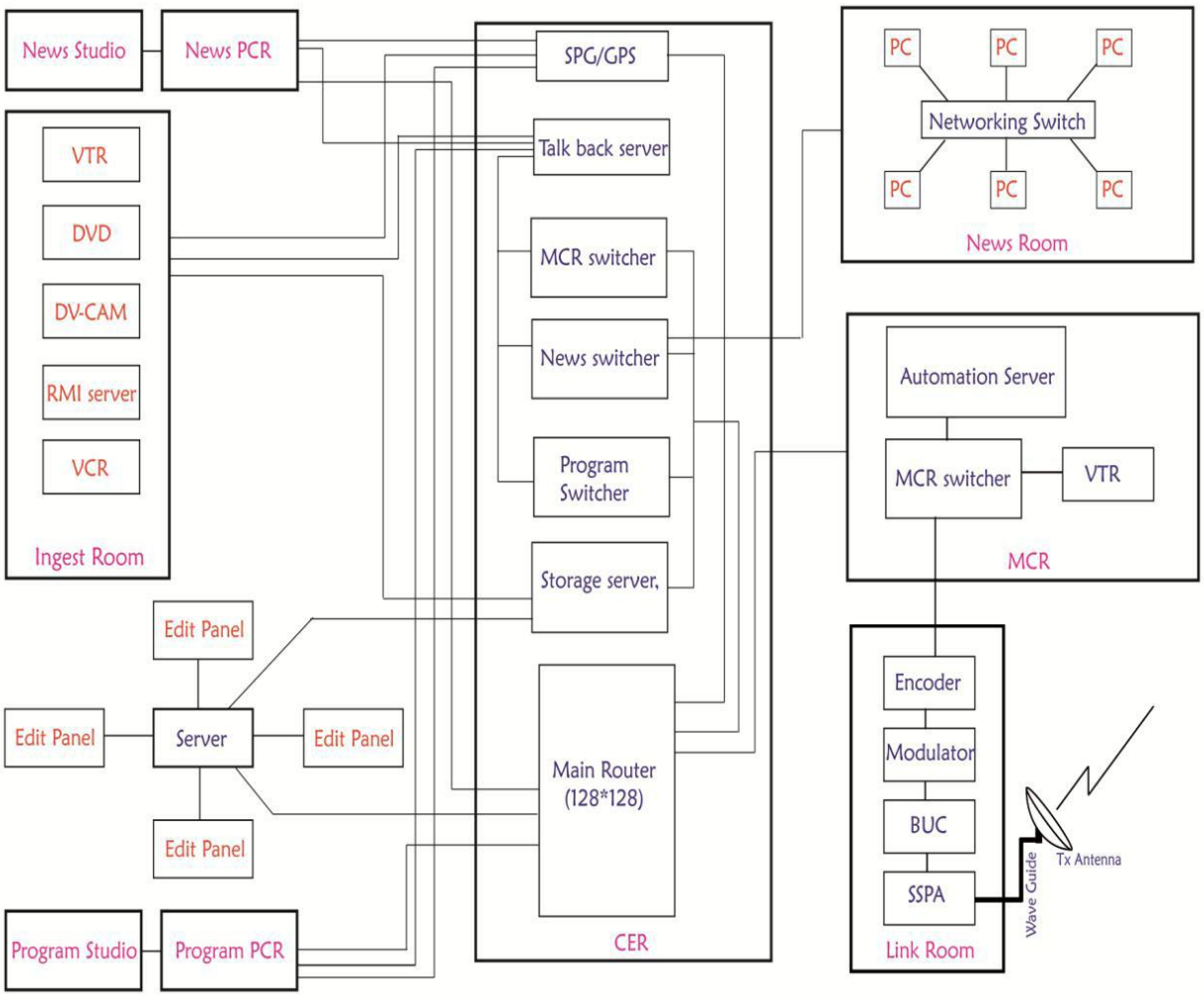


**Fig 3.1: Block Diagram of a Satellite TV Station**

## 3.2 Uplink & Downlink

The communication going from a satellite to ground is called downlink, and when it is going from ground to a satellite it is called uplink.

### 3.2.1 Uplink Procedure

Final video signal which will be on-aired, that means transmitted to satellite, comes from MCR (Master Control Room) – which signal format is SDI (Serial Digital Interface). SDI signal embedded both audio and video. So MCR master out enters encoder as an input. Then encoder encodes the SDI signal to ASI signal. At the broadcast center, the high-quality digital stream of video goes through an MPEG encoder, which converts the programming to MPEG-4 video of the correct size and format for the satellite receiver in our house. Encoding works in conjunction with compression to analyses each video frame and eliminate redundant or irrelevant data and extrapolate information from other frames. This process reduces the overall size of the file.

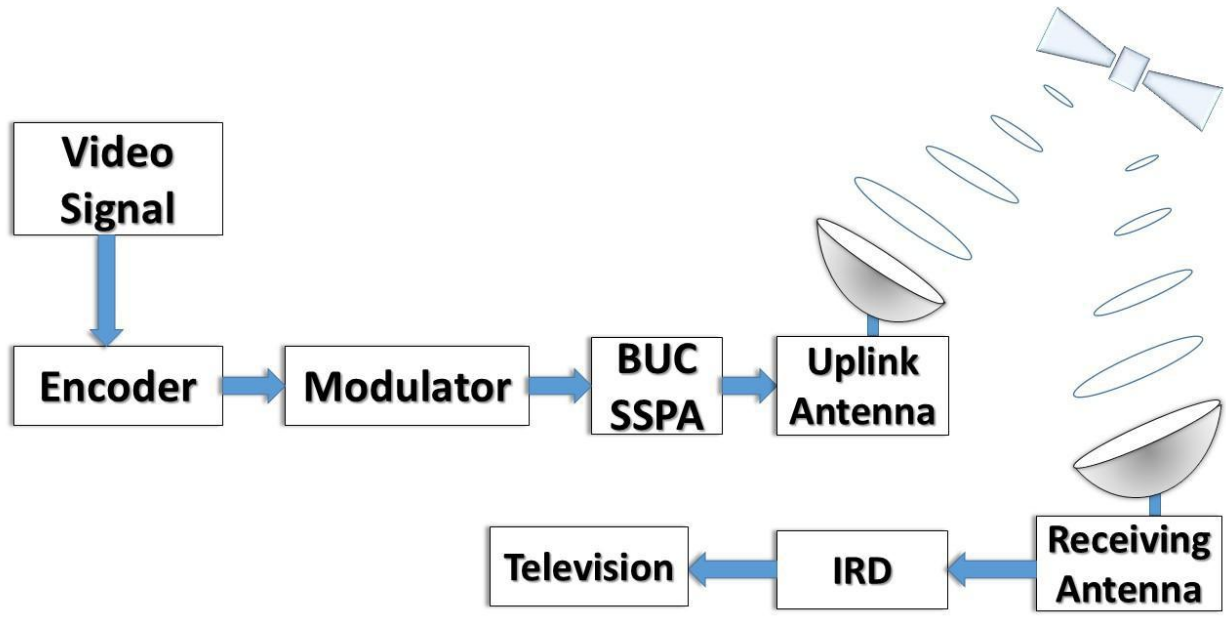


**Fig 3.2: Uplink and Downlink Procedure**

The ASI out from encoder then enters the modulator as input. A modulator is a device that performs modulation. In telecommunications, modulation is the process of conveying a message signal, for example a digital bit stream or an analogue audio signal, inside another signal that can

be physically transmitted. Modulation of a sine waveform transforms a baseband message signal into a pass-band signal. Here in ITV they use QPSK as modulation technique. Modulator output is L-Band RF signal.

To transmit the RF signal in satellite, the frequency range should be higher. So it's needed to increase the frequency range from L-Band to any other Band which has high range frequency. Every satellite TV channel in our country use the C-Band frequency. A Block Up Converter (BUC) is used in the transmission (uplink) of satellite signals. It converts a band of frequencies from a lower frequency to a higher frequency. Modern BUCs convert from the L band to Ku band, C band and Ka band. Older BUCs convert from a 70 MHz intermediate frequency (IF) to Ku band or C band.

SSPA (Solid State Power Amplifier) - a high-power amplifier which provide useful amplification at gigahertz frequencies. After step up the frequency, its need to increase the power to transmit it to the satellite due to reduce the percentage of loss. The final C-Band frequency goes to uplink antenna from SSPA through wave guide.

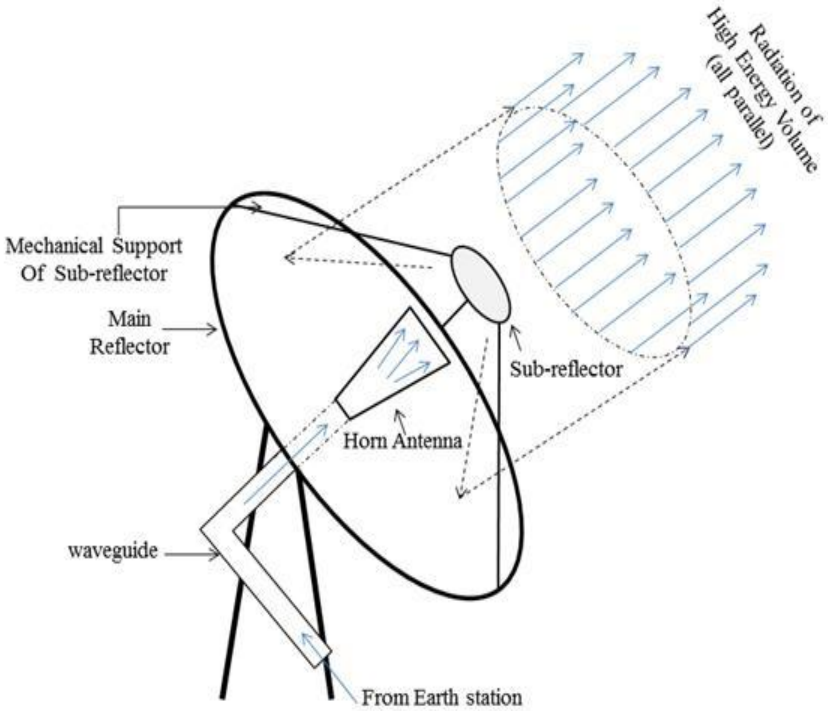


**Fig 3.3: Radiation sequence from the antenna system**

After transmitting the signal, then it's received in satellite. More specifically it's received by the transponder. A transponder is a wireless communications, monitoring, or control device that picks up and automatically responds to an incoming signal. The term is a combination of the words transmitter and responder. In communication satellites, the transponder receives the signal from earth. Then it removes the noise, amplifies the same signal, converts the signal to downlink frequency and transmits it to earth. At the broadcasting station or studio, they transmit the signal in

uplink frequency to the satellite. The satellite transponder receives the signal; recover the content by removing noise. Then it amplifies the signal and converts it into downlink frequency and transmits to earth. The receiver receives the signal. Usually uplink frequency is different from downlink frequency. Uplink frequency is high and downlink frequency is low. It is mainly used in satellite communication to transfer the received signals.

**A transponder is typically composed of:**

- An input band pass filter

- An input low-noise amplifier (LNA), designed to amplify the (normally very weak, because of the large distances involved) signals received from the earth station

- A frequency translator (normally composed of an oscillator and a frequency mixer) used to convert the frequency of the received signal to the frequency required for the transmitted signal

- An output band pass filter

- A power amplifier

## 3.2.2 Downlink Procedure

First, tracking the satellite with the receiving antenna. Once the satellite is tracked then the given downlink parameter of desired channel is inputted in the IRD (Integrated Receiver and Decoder). When we receive any channel, we downlink the frequency as C-Band frequency. But there is a LNB (Low Noise Block converter) mounted with the antenna feed horn which converts the C-band frequency to L-Band frequency by subtracting the C-band frequency with the Local Oscillator frequency. 'IRD' is compact and professional receiver. When the 'IRD' receives the L-Band RF signal, then it first demodulate the signal and then decode it, after that we got the video signal which is transmitting from the TV station. It took 3 seconds to complete the whole uplink and downlink process.

## 3.3 ITV Downlink Parameter

Complete downlink parameters for ITV are given below:

**Satellite Name:** Apster7

**Orbital Position:** 76.5° E

**Transponder:** C10A

**Symbol Rate:** 2900 k Symbol/s

**Uplink Frequency:** 5977.5 MHz

**Downlink Frequency:** 3752.5 MHz

**FEC:** 3/4

**Modulation Technique:** QPSK

**Polarization:** Horizontal

**Carrier Type:** MPEG-4, DVB-S2

# Chapter 4

# Equipments of Broadcast System

## 4.1 CAR

In broadcast facilities, Central apparatus Room (CAR) is where shared equipment common to all technical areas is located. This room may also be known as a central Equipment room (CER), and is also referred to as a data or server room. This include SPG/GPS, Talk back server, MCR switcher, News switcher, Program Switcher, Main Router, Digital Audio Processor, Storage server, Networking equipment, Cisco Switch Rack etc. It should be air-conditioned; however low-noise specifications such as acoustical treatments are optional. Equipment is connected either directly with an attached foldout monitor, keyboard and mouse or remotely via KVM switch, VLAN, or remote desktop. It is head of a TV station.


**Fig 4.1: The rack in CAR of ITV**

## 4.2 Earth Station

An Earth stations use dish-shaped antennas to transmit and receive microwave signals to and from satellites. There is a ground-based receiving or transmitting/receiving station in a satellite communications system. Earth stations use dish-shaped antennas. An earth station is generally made up of a multiplexor, a modem, up and down converters, a high power amplifier (HPA) and a low noise amplifier (LNA). Almost all transmission to satellites is digital, and the digital data streams are combined in a multiplexor and fed to a modem that modulates a carrier frequency in the 50 to 180 MHz range. An up-converter bumps the carrier into the gigahertz range, which goes to the HPA and dish. Down-convert, Demodulate and De-multiplex For receiving, the LNA boosts the signals to the down-converter, which lowers the frequency and sends it to the modem. The modem demodulates the carrier, and the digital output goes to the de-multiplexing device and then to its destinations.

**Fig 4.2: The rack in Earth Station of ITV**

This include Local Receiver, Modulator, Encoder, Antenna Controller, L BAND Splitter, FiberLink server, IRD, Spectrum Analyzer etc.

### 4.2.1 Encoder

An encoder is a device that converts information from one format to a coded value. In Telecommunications encoder is a device that used to change a signal or data into a code and TV broadcast system encoder convert SDI (Serial digital interface) video signal to ASI (Asynchronous Serial Interface).


**Fig 4.3: Thomson encoder**

### 4.2.2 Modulator

In telecommunications, modulation is the process that combines the message signal to a carrier signal. ITV use QPSK modulation. The device that performs modulation is called modulator.

### 4.2.3 BUC

A block up-converter (BUC) is used in the transmission (uplink) of satellite signals. It converts a band of frequencies from a lower frequency to a higher frequency. Modern BUCs convert from the L band to Ku band, C band and Ka band. Older BUCs convert from a 70 MHz intermediate frequency (IF) to Ku band or C band.

### 4.2.4 SSPA

Solid Sate Power Amplifiers highly increase power level of the BUC output signal for transmit to satellite.

### 4.2.5 Antenna

A satellite dish is a dish-shaped antenna designed to receive electromagnetic signals from satellites, which transmit data transmissions or broadcasts, such as satellite television. There are 5 antennas in ITV. The uplink antenna diameter is 1.8 meter and downlink antenna diameter is 4.8 m. One of them use for uplink purpose and others are for different channel from different satellite.

**Fig 4.5: Uplink antenna of ITV**

## 4.2.6 IRD

IRD stand for Integrated Receiver Decoder. This is ultimately a signal receiver. The operational sequence of IRD is reverse than that of the earth station. The received RF signal by LNB (low noise blocker) is converted to L-band frequency; that is operational for IRD. The IRD process this L-band frequency then demodulate it and then decode it according to the encoding system. And thus the desired base-band signal is recovered.


**Fig 4.6: Integrated Receiver Decoder (IRD)**

## 4.2.7 Video switcher

Video switcher is a device used to select between several different video sources and in some cases compositing (mix) **video** sources together to create special effects.

**(a) Tricaster video switcher**

**(b) Grass valley video switcher**


**(c) kahuna video switcher**

**Fig: 4.7: Some kinds of video switchers**

## 4.2.8 Automation playout

There is a software for automation play out at night as most of the time at noght the recorded programs are played. ITV use "Omnibus Columbus" software for automation play out.


**Fig: 4.8 Automation play out device**

### 4.2.9 Ingest VTR

There are some kinds of recording devices which records all the programs of a TV channel. This tool is mainly used to archive the programs and at night they can play the programs from the device directly if there is any kind of problem in automation play out. Thus we can say it can also be used as a backup device.


**Fig: 4.9 VTR Ingest devices**

### 4.2.10 Miranda

Miranda server provides logo to the final out which is being on-aired.


**Fig: 4.10 Miranda server of ITV**

### 4.2.11 Router

Router is used to destine the received signal to a suitable interface.


**Fig 4.11: Router**

## 4.3 MCR

Master control Room is the technical hub of a broadcast operation common among most over-the-air television stations and television networks. It is distinct from a production control room (PCR) in television studios where the activities such as switching from camera to camera are coordinated. MCR is the 'heart' of our operations with full bank of monitors, VTR, Automation Server, communications equipment and computers with complete built-in redundant systems. MCR is the final point before a signal is transmitted over-the-air with channel Logo.

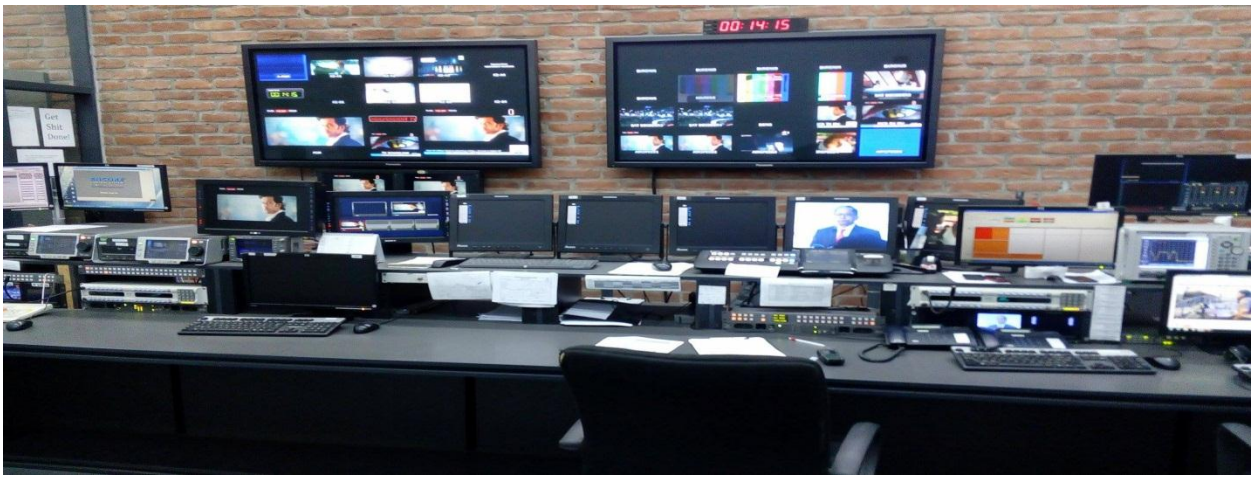

**Fig 4.11: MCR of ITV**

## 4.4 PCR

Production control Room is a room where finally program or news execute from camera to MCR. It designed specifically for the time-critical, chaotic, and pressure-filled environments of television broadcast and live production, which works with your choice of equipment, grows and adapts to your changing control needs, and provides easy-to-use, precise, reliable, and repeatable control. Production control systems scale from simple VTR or video server play out. To production switcher control of rundown play out of VTRs, Video Servers, Routers, Production Switchers, Master Control Switchers, Audio Mixers, Camera Pedestals, Multi-viewers.


**Fig 4.12: PCR of ITV**

# Chapter 5

# Live Broadcast System

## 5.1 Drive-Away DSNG

DSNG represents a whole new way of flexible news gathering. Digital Satellite News Gathering (DSNG) system is used as mobile earth station. To perform live broadcasting from a remote place where any physical link like optical fiber, transmission wire, radio link are not available, then the satellite link is the only way to send the raw footage to the TV station.

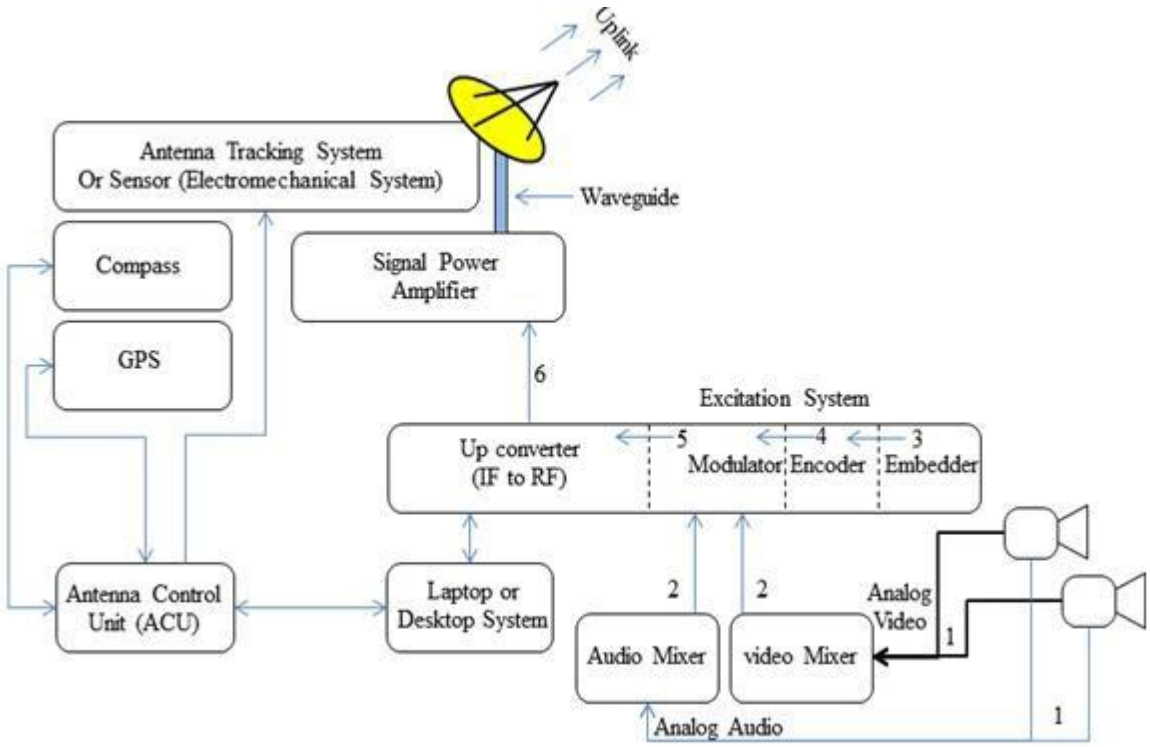


**Fig 5.1: Block diagram of DSNG system workflow**

The DSNG system is approximately similar to the earth station system. The signal flows in the DSNG system as like as before.
TV station can use the same satellite or different satellite for main up-link and DSNG system.
After transmitting the raw footage by DSNG, main station receives that signal. It comes to the base band section, processed and then made ready for final on-air through the main up-link antenna.


**Fig 5.2: DSNG of ITV**

## 5.2 DMNG

DMNG stands for Digital Mobile News Gathering. Where cable connection is unavailable and satellite link is unnecessary in that situation DMNG is used. DMNG is basically a mobile app.

## 5.3 Fiber link CSI

Communication Specialties, Incorporated (CSI) named by its company. The Fiber link CSI transmitter transmits 3G, HD or SD-SDI through Optical fiber. It is too much easy and reliable process because it doesn't use satellite. ITV occurred so many live in this process. Its wave length is 1310 nm. CSI transmitter properly transmits HD signal within 22-25km and SD signal within 25-28km.


**(a)** **(b)**

**Fig 5.3: (a) Fiber link CSI Transmitter**

**(b) Fiber link CSI Receiver**

This process as like as point to point fiber optic connection. The CSI transmitter power actives with +12v. The camera SDI signal input to CSI transmitter. CSI transmitter convert it SDI to Optical signal. Then this signal transmits to ISP office through optical fiber cable. ISP office increase signal power level and retransmit to ITV office. It is very costly process and can't perform from long distance.

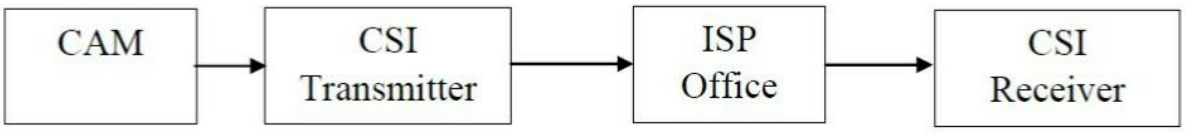


**Fig 5.4: CSI transmit and receiving procedure**

**Fig 5.5: Live from book fair 2017 using CSI Link**

## 5.4 Quick link Merlin Backpack

Quick link merlin backpacks the ultimate combination of quality and mobility, with boot time under a minute. It's essential for the mobile journalist always on the go. The most advanced bonding technology offering the highest quality output with lowest delay.


**Fig 5.6: Live from Paltan using backpack**

The Quick link Merlin Backpack has been designed through innovation, research & development and customer feedback. It transmits via bonded 3G/4G, satellite, ADSL & Wi-Fi to a Quick link server direct to the newsroom or website.

# Chapter 6

# Conclusion

## 6.1 Conclusion

In this intern report, the main parts of the satellite television have been discussed in ITV. How a signal is transmitted accurately from earth station to satellite, and how it will down form satellite to earth station. The total workflow or working processes of a TV station that means several sections of the station like MCR, PCR, CAR, Studio and Antenna have been experimented thoroughly and their functions have been achieved. The operation of various broadcast related equipment have been learned properly. Live broadcast from outdoor or indoor Studio.

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