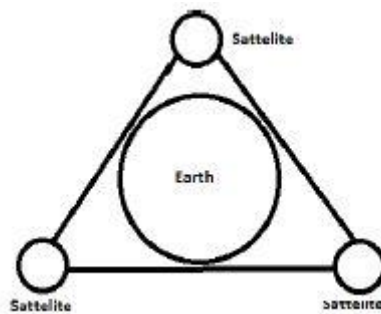


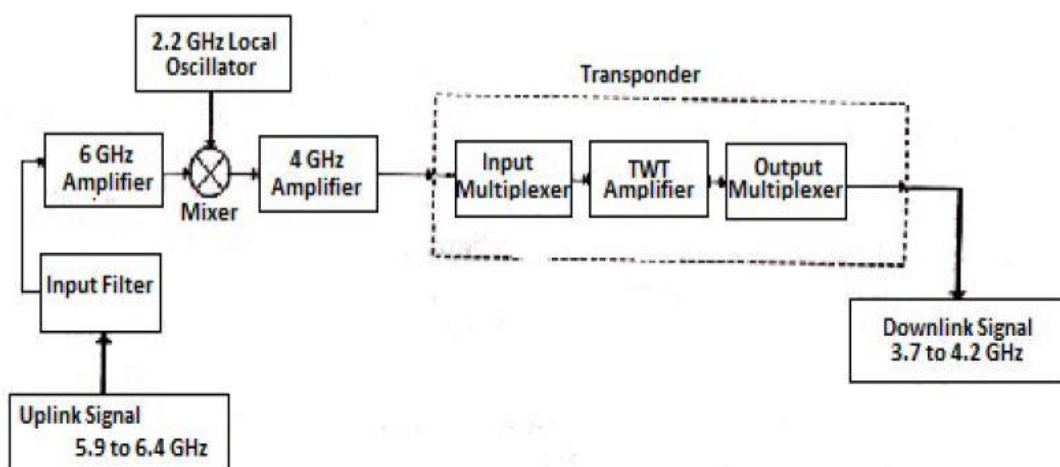
Introduction to Satellite communication

Satellite is powerful long distance and point to multi point communication system. A communication satellite is an R.F (Radio Frequency) repeater. To overcome disadvantage of Line of sight communication which is only 45 55 km, the transmitting antenna is placed on the satellite and the satellite is placed in the orbit high above the earth. The function of satellite is to communicate between different earth stations around the earth, thus with the help of satellite, it is easy to communicate over thousands of km, a com satellite is a combination of ROCKET to put the satellite in the orbit, micro wave electronic devices for the communication, solar cells are used to convert the solar energy into a power supply (ELECTRICAL ENERGY) for the electronic equipment.



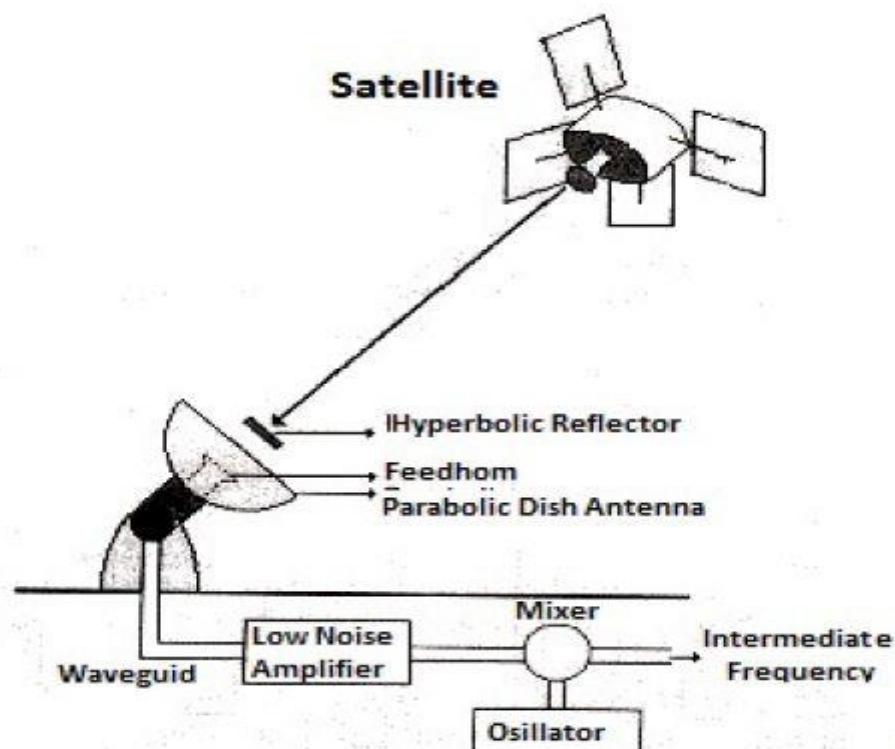
The satellite placed in GEOSTATIONARY and placed at an altitude of 22300 miles or 35900 km above the ground level. The satellite travels at the same speed at which the earth rotates around the sun. The rotation of satellite is synchronized with earth rotation as a result satellite appears to be stationary in the sky w.r.t the earth station is constant. There are 3 satellites are placed at angle 120° in GEOSTATIONARY orbit, they provide 100% coverage from one earth station to anywhere on the earth.

Block Diagram of Satellite Communication System



The uplink frequencies (5.96.4 GHZ) are used for T/N from the earth station to the satellite and down link frequencies (3.7—4.2GHZ). The above frequencies are used for T/N from the satellite to the earth station , the uplink frequencies are converted to lower frequencies by the mixer and local Osc, the com satellite acts as a repeater station it receives the signal, amplifiers it and then transmitted over a next frequencies to avoid interference between the uplink signal and down link , the two way communication is established with the help of transponder , a com satellite has multi transponder per satellite has increased over the year ,a satellite with 2 transponder can support a signal T.V channel or 240 telephone lines , a satellite with 48 transponder can accommodate 4000T.P CKTS and 2 T.V channels nowadays in satellite using a digital tech , due to which One satellite can handle 120,000 T.P4 channels and more than 500 T.V channels.

Satellite Communication Earth Station



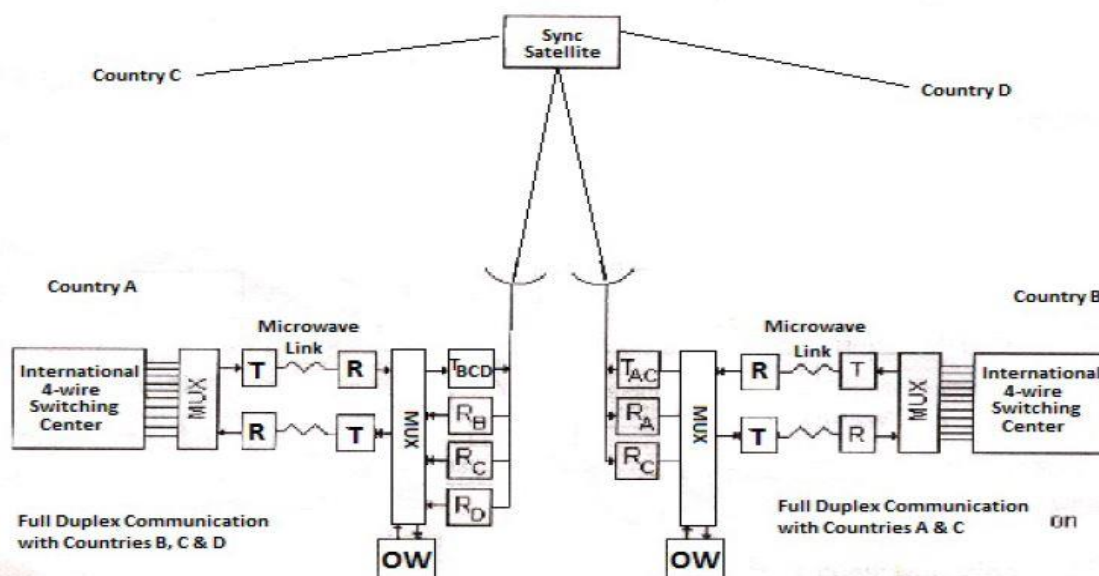
The equipment used in satellite earth station are shown in fig , the earth station consist of a dish antenna transmitter which can transmit a high frequencies (5.9—6.4GHZ) micro wave signals, some earth stations also called ground station , which can transmit and receive the signals while others can only receive signals. A high directive and a high gain antenna is necessary at the earth station , because the losses over the long T/N path is very high , the signals power reaching back to the earth station from satellite is very small . therefore at receiving end a parabolic dish antenna with 61m diameter provides a high gain and thus amplify the signal power , it is important to have a low noise amplifier before the mixer stage in the receiver C,K,T at the satellite earth terminal.

Geostationary Satellite

The satellites were placed in low earth orbit. as a result the satellite at a such high speed that it visible to the ground only for a short time at each day , the satellite appeared below the horizon and dies appear below the opposite horizon , the ground station was cut off for long time in day , to maintain the communication link another station had to be activated , this problem was solved by placing the satellite in circular orbit of approximately 22300 miles or 35900 km radius, as the satellite height increases from the earth surface , the speed of satellite decreases by the same manner , at that height the angular velocity of satellite will be proportional to the angular velocity of earth , the satellite rotates with the same speed as that of the earth due to which the satellite will always be at the same place where it has been fixed , this type of satellite is called geo stationary satellite

Telephone Link via Satellite

The satellite communication can be used for Telephone telecom. Around the world, the block diagram of such a system is shown in fig. The block diagram of earth station working with three satellites here, the national long distance Telephone network of a 4 countries (A,B,C,D,) through international switching centre are connected, consider country “A” the 0/p of the Telephone exchange is applied to the MUX, the multiplexed signal is send to the microwave station and from there to the satellite earth station , at the earth station the signal is multiplexed and directly applied to the modulator stage of earth station where it demodulated with a high frequency signal and transmitted towards the satellite as uplink , in other case the earth station “A” receive three down link signal , the 3 carriers are demodulated and then transmitted toward the microwave station and from there international switching centre. Many earth stations are designed to transmit several carriers from direct communication with other station through one satellite; the other wire (OW) facilities are transmitted for message carriers from the band of 300HZ-12KHZ.



Merits and Demerits of the Satellite Communication

Following are the merits and demerits of satellite communication system:

Merits

1. No tracking is required by Geostationary Satellites.
2. Multiple access points are available in Satellite communication
3. 24 hour communication can be achieved with the help of satellite.
4. The signal quality of Satellite communication is higher.
5. To put more information on the carrier a broad band can be used.
6. Satellite Communication is used for long distance communication or across oceans.
7. low transmitting Power and low receiver sensitivity is required by the Satellite in close elliptical orbits.

Demerits

1. The transmitter and receiver used in satellite communication requires high power, most sensitive transmitters and large diameter antenna's.
2. Satellite communication is disturbed by solar activities and cyclones in the space.
3. Due to ageing effect the efficiency of Satellite components decreases.
4. The longer propagation times (APPOX,300 ms) is one of a disadvantage of satellite communication.
5. The cost for Initial design and launching of the satellite in the orbit results in extremely high