

DON BOSCO INSTITUTE OF TECHNOLOGY

DEPARTMENT OF ELECTRONICS AND TELECOMMUNICATION

Report on “Industrial Visit to BSNL Satellite Earth Station”

Topic: Industrial Visit to BSNL Satellite Earth Station

Date & Time: April 9, 2019. 10:00 a.m. – 04:00 p.m.

Venue: Satellite Earth Station, Yeoor, Thane (W)

Audience: 73 students from BE-EXTC and Ms. Gejo George, Ms. Aparna Telgote and Ms. Anjum Khan.

Description:

The Industrial Visit began with a short prayer followed by an introduction session by Mr. Dharmendar Tiwari. He briefed us about the need for satellite communication and the basics of satellite communication, the various frequency bands used for instance the C band has an uplink frequency of 6 Ghz while its downlink frequency is of 4 Ghz, their properties and applications. The two most commonly used antennas are the Cassegrain antenna and the Gregarian antenna. Another important aspect of satellite communication is the transponder. The transponder is basically a repeater that amplifies and regenerates the signal obtained. Mixers and oscillators present in the satellite and operating at the C band use a frequency of 2.225 GHz for down conversion of the signal. We were also informed of the various earth orbit satellites such as the Low earth orbits are at a height of 160 to 2000 kms, the Medium earth orbits are at a height of 2000 to 10,000 kms while Geostationary earth orbits are at a height of 35,678 kms with a time duration of 23hr, 56min and 4.1 sec. For communication to take place it is crucial that the relative velocity between the two bodies must be 0. Geostationary satellites cover 1/3 rd of the entire earth. The difference between the geostationary and geosynchronous satellites is that geosynchronous sateliites are placed on an angular plane.

We were then shown a feeder and were told about its functions, losses etc and how the transmitted and the received signal are seperated by OMT (Optical Mode Transmission) with a guard band frequency of 4 GHz. He went on to explain the

importance of a beacon as it helps figure out the path traced by the signal and the satellite alignment and has a value of 32.8 db. We were shown the block diagrams of the C-band antenna and the Antenna Tracking system and each block was explained in detail. We were then split into 3 groups to observe the C-band antenna, the IPStar laboratory and the antennas. The C-band antenna has a diameter of 11m while the IPStar antenna has a diameter of 8.1m. We observed the various components of the antenna and calculated the time delay of 24ms for satellite communication. In order to prevent total breakdown of the network under extreme conditions of rain, another satellite earth station is set up at Pune and in case of failure in communication in Mumbai, the entire data is sent via optic fiber link. A Satellite has approximately 12 transponders with a BW of 36 Mhz. The satellite GSAT-16 can cover the entire area of India while the satellite IPStar is used for Thailand communication.

The tracking system has the following parameters for GSAT-16:

Update time interval: 30 mins

Step size: 0.02 degree

Azimuth angle: 177.254 degree

Elevation angle: 66.961 degree

Polarization: -3.00

Towards the end of the visit we were shown the various antennas placed on their base station and were told about the various losses they face.

Event Photographs:



Report Prepared by: Ms. Rochelle Caren D'Sa (BE EXTC- 08)

Report Approved by: Ms. Gejo George