



Late Shri Vishnu Waman Thakur Charitable Trust's
VIVA Institute of Technology
At: Shirgaon, Virar (East), Tal: Vasai, Dist: Thane-401305, Maharashtra.



REPORT

INDUSTRIAL VISIT

Indian Space Research Organisation (ISRO)

SAC, Ahmedabad

19th January, 2017



Organized by:

Prof. Meena Perla
IETE Co-ordinator

Department of Electronics & Telecommunication Engineering
VIVA Institute of Technology
Shirgaon, Virar (E)

Objective of Visit:

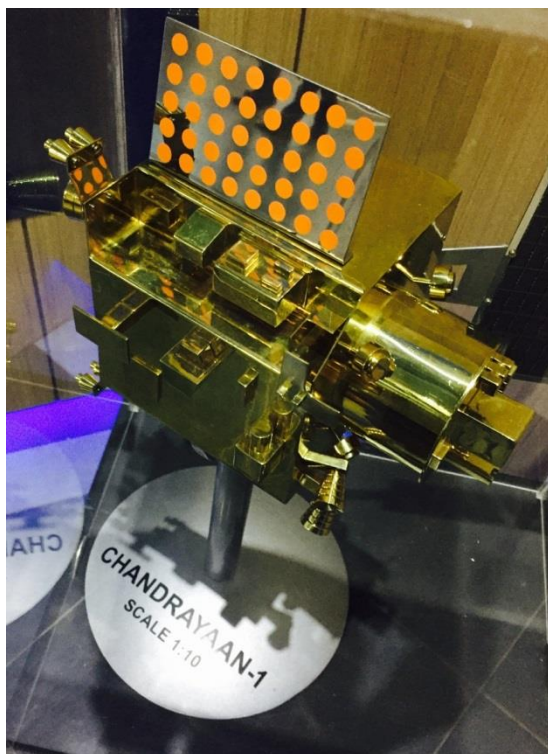
The main objective of this visit is as a part of Electronics And Telecommunication Engineering Curriculum, the students need to know the practical fundamentals, working, idea and the mechanism of the antennas. To get the knowledge of different components involved, hardware-software design, data analysis etc.

About ISRO:

Vikram Sarabhai Space Centre (VSSC) is the largest among the ISRO facilities. It is a centre for the design and development of satellite launch vehicles and associated technologies. The centre pursues research and development in a host of distinct technology domains including aeronautics, avionics, and composites, primarily for the purpose of advancing the development of launch vehicle technology in India.



The Vikram Sarabhai Space Centre (is a major space research centre of the Indian Space Research Organisation (ISRO), focusing on rocket and space vehicles for India's satellite programme. The Vikram Sarabhai Space Centre is one of the main research and development establishments within ISRO. VSSC is an entirely indigenous facility working on the development of sounding rockets, the Rohini and Menaka launcher.



Space Applications Centre (SAC) is one of the major centres of the Indian Space Research Organisation (ISRO). It is a unique centre dealing with a wide variety of disciplines comprising design and development of payloads, societal applications, capacity building and space sciences, thereby creating a synergy of technology, science and applications. The Centre is responsible for the development, realisation and qualification of communication, navigation, earth & planetary observation, meteorological payloads and related data processing and ground systems. Several national level application programmes in the area of natural resources, weather and environmental studies, disaster monitoring/mitigation, etc are also carried out. It is playing an important role in harnessing space technology for a wide variety of applications for societal benefits. The organisational structure continues to remain dynamic, responding to the needs of the hour. SAC operates and maintains Ahmedabad Earth Station and the Delhi Earth Stations.

SAC is a host institution for the training programmes related to Satellite Communication, Satellite Meteorology and global change under the Centre for Space Science & Technology Education in Asia and the Pacific (CSSTEAP) affiliated to the United Nations (UN).

Their team member explained us about controlling of satellite in space and what is orbit and how it's allocated to the various satellites like communication, weather casting, and military etc. furthermore we really amaze of seeing live reporting of weather satellite and how its work. Moreover we are also seen space suite, charts of various country satellites in orbit.

Lastly started the session with 25 minutes 3D documentary presentation by their team member and after completion of documentary, students and faculties are realize the main working function of ISRO. Secondly with small group of students we started the visit of center and we seen first launching satellite of India (Aryabhata), multiple launching vehicle, single launching vehicle, and many more related space technology. Most amazing things are each and every where there technical presenter are supporting us for important of each and every model.

GEOSTATIONARY SATELITE



The GSAT satellites are India's indigenously developed technologies of communications satellites, used for digital audio, data and video broadcasting .The GSAT series of geosynchronous satellites is a system developed by ISRO with an objective to make

India self-reliant in broadcasting services. The repertoire of 10 GSAT satellites, a total of 168 transponders (out of which 95 transponders are leased out to provide services to the broadcasters) in the C, Extended C and Ku-bands provides services to telecommunications, television broadcasting, weather forecasting, disaster warning and search and rescue operations. As of November 2015, 13 GSAT satellites have been launched by ISRO.

India's latest communication satellite, GSAT-18 was inducted into the INSAT/GSAT system on October 06, 2016 from Kourou, French Guiana by Ariane-5 VA-231. Weighing 3404 kg at lift-off, GSAT-18 carries 48 communication transponders to provide Services in Normal C-band, Upper Extended C-band and Ku-bands of the frequency spectrum. GSAT-18 carries Ku-band beacon as well to help in an accurately pointing ground antennas towards the satellite.

GSAT-18 is designed to provide continuity of services on operational satellites in C-band, Extended C-band and Ku-bands. GSAT-18 was launched into a Geosynchronous Transfer Orbit (GTO) by Ariane-5 VA-231 launch vehicle. After its injection into GTO, ISRO's Master Control Facility (MCF) at Hassan took control of GSAT-18 and performed the initial orbit raising maneuvers using the Liquid Apogee Motor (LAM) of the satellite, placing it in circular Geostationary Orbit. The designed in-orbit operational life of GSAT-18 is about 15 years.

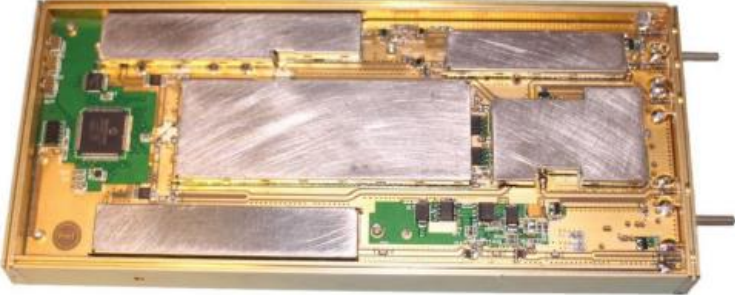
DTH



DTH is an acronym for 'Direct to Home' service. It is path-breaking in terms of broadcasting of satellite channels on our televisions. In general, DTH service is the one in which a large number of channels are digitally compressed, encrypted, uplinked and beamed down over a territory from a very high power satellite. The DTH signals can be received directly at homes with the help of a small sized dish receive unit containing a Dish Antenna of diameter 60 to 90 cm installed at the building's roof-top or on the wall facing clear south and one indoor INSAT has been a major catalyst for the expansion of television coverage in India. Doordarshan is a major user of INSAT satellites for providing television services over the country. At present, 33 Doordarshan TV channels are operating through C-band transponders of INSAT-3A, INSAT-3C, and INSAT-4B. Around 1415 transmitters of Doordarshan are working through INSAT system to cater to DD-1 network, DD-News network and Regional services. 59 Doordarshan and Private TV channels are operational through DTH service DTH services are becoming popular with the introduction of premium services like HDTV services, About 75 Ku-band

transponders from INSAT/GSAT and Leased satellites are catering to DTH television services.

PMT

S-Band T/R Module 10.9 to 11.7 GHz Low Cost	PmT-T/R Module Model: PmT-T/R-Module
	

A Multi-Channel S-Band Transmit/Receive Module [T/R] has been designed, and produced for future satellite communication application. The module consists of two independent receive channels and a single transmit channel with dual for the LHCP and RHCP application. The design of the module consists of a large number of MMICs in various technologies which are useful for low noise, power and high efficiency operation. The digital logic for the T/R module is implemented locally using a powerful, low cost microcontroller and has fully capability of on demand telemetry for health status and operational parameters such as low noise and power amplifier currents, temperature and other built in tests.

DVB-S modulator



The SENCORE SMD 989 professional satellite modulator is ideal for MPEG Transport Stream transmission using DVB-S/S2/S2X or Broadcom TurboPSK modulation. Leveraging the latest modulation technology, the SMD provides high-value solution with unmatched signal quality. Support for DVB-S2X and Multistream with Variable Coding and Modulation (VCM) ensures the SMD will be ready for the future of S2 modulation. Integrated processing features

such as TR 101 290 error checking and BISS scrambling make the SMD an ideal solution for video delivery. The optional, built-in L-Band upconverter enables the SMD 989 to provide an IF or L-band output. This eliminates the need for multiple pieces of equipment and provides a compact solution for facilities housing multiple modulators or for insertion into L-band inter-facility links. The chassis has two bays allowing for a variety of configurations, including two independent modulators for density, redundant power supplies for reliability, or DC BUC power for truck installs.

APPLICATIONS:

- 1. Telecommunication**
- 2. Resource management**
- 3. Military**
- 4. Academic**
- 5. Telemedicine**
- 6. Biodiversity Information System**

REMOTE SENSING

Remote sensing is the acquisition of information about an object or phenomenon without making physical contact with the object and thus in contrast to on-site observation. Remote sensing is used in numerous fields, including geography and most Earth Science disciplines (for example, hydrology, ecology, oceanography, glaciology, geology); it also has military, intelligence, commercial, economic, planning, and humanitarian applications. In current usage, the term "remote sensing" generally refers to the use of satellite- or aircraft-based sensor technologies to detect and classify objects on Earth, including on the surface and in the atmosphere and oceans, based on propagated signals (e.g. electromagnetic radiation). It may be split into "active" remote sensing (i.e., when a signal is emitted by a satellite or aircraft and its reflection by the object is detected by the sensor) and "passive" remote sensing (i.e., when the reflection of sunlight is detected by the sensor). Design and development of Indian Remote Sensing Satellite, IRS-1A and the successful operation of the space and ground segments of IRS-1A over the past three years form a major milestone in the Indian Remote Sensing Programme.

APPLICATIONS

- Space Based Inputs for Decentralized Planning (SIS-DP)
- National Urban Information System (NUIS)
- ISRO Disaster Management Support Programme (ISRO-DMSP)
- Biodiversity Characterizations at landscape level
- Pre-harvest crop area and production estimation of major crops.
- Drought monitoring and assessment based on vegetation condition.
- Flood risk zone mapping and flood damage assessment.

- Hydro-geomorphological maps for locating underground water resources for drilling well.
- Irrigation command area status monitoring
- Snow-melt run-off estimates for planning water use in downstream projects
- Land use and land cover mapping
- Urban planning
- Forest survey
- Wetland mapping
- Environmental impact analysis
- Mineral Prospecting
- Coastal studies
- Integrated Mission for Sustainable Development (initiated in 1992) for generating locale-specific prescriptions for integrated land and water resources development in 174 districts.

Total Students: 60

Total Faculty: 4