

Technical Report of Laboratory Visit -M.Tech Students 2021-2023

Department of Applied Physics

Laboratory name: U R Rao Satellite Centre (URSC), Bengaluru

Date of Visit: 01/06/2022

Total number of students visited: 10

Specialization of M.Tech: LEOC, OCP, ST

We visited U R Rao Satellite Centre (URSC), Bengaluru, formerly known as ISRO Satellite Centre (ISAC), the lead centre for building satellites and developing associated satellite technologies. These spacecrafts are used for providing applications to various users in the area of Communication, Navigation, Meteorology, Remote Sensing, Space Science and interplanetary explorations. The Centre is also pursuing advanced technologies for future missions. URSC is housed with state-of-the-art facilities for building satellites on an end-to-end basis. ISRO Satellite Integration and Test Establishment (ISITE) is equipped with state-of-the-art clean room facilities for spacecraft integration and test facilities, including a 6.5 Metre thermal vacuum chamber, 29 Ton vibration facility, and Compact Antenna Test Facility and acoustic test facility under one roof. Assembly, Integration and Testing of all Communication and Navigation Spacecraft are carried out at ISITE. A dedicated facility for the product ionisation of standardised subsystems is established at ISITE.

Since its inception, URSC has built more than 100 satellites for various scientific, communication, navigation, and remote sensing applications. Many private and public sector industries are also supporting ISAC in realising standard satellite hardware.

We saw the enormous clean rooms for satellite fabrication and huge testing chambers. Their satellite museum contains all the scaled replicas of the satellites; of 5:1, and 10:1 demo structures; ISRO has worked on. The session was very moving and empowering.

ISRO develops and delivers application-specific satellite products and tools to the Nation: broadcasts, communications, weather forecasts, disaster management tools, Geographic Information Systems, cartography, navigation, telemedicine, and dedicated distance education satellites being some of them.

In the process, it has become one of the six largest space agencies in the world. ISRO maintains one of the largest fleets of communication satellites (INSAT) and remote sensing (IRS) satellites, that cater to the ever-growing demand for fast and reliable communication and earth observation respectively

They have explained the role of different offices of ISRO, as a video demonstration.

- URSC at Bangalore is engaged in developing satellite technology and implementing satellite systems for scientific, technological and application missions.
- ISTRAC, at Bangalore, is responsible for providing Space Operation services that include spacecraft control, TTC support services and other related projects and services, for the launch vehicle and low earth orbiting spacecraft and deep space missions of ISRO and other space agencies around the world.
- MCF at Hassan in Karnataka and Bhopal in Madhya Pradesh monitor and control all the geostationary satellites of ISRO.
- Laboratory for Electro-Optics Systems, in Bangalore, is engaged in the design, development and production of Electro-Optic sensors and camera optics for satellites and launch vehicles
- Vikram Sarabhai Space Center, Trivendrum; The design and development activities of satellite launch vehicles and sounding rockets are carried out and made ready for launch operations.
- SHAR, at Sriharikota, is responsible for the satellite launch.
- Liquid Propulsion Systems Centre (LPSC), at Trivendrum and Bangalore, is the centre of excellence in the area of Liquid Propulsion for ISRO's Launch Vehicle and Spacecraft Programmes.

- Space Applications Centre (SAC) at Ahmedabad is spread across two campuses having multi-disciplinary activities. The core competence of the Centre lies in the development of space-borne and airborne instruments/payloads and their applications for national development and societal benefits.

This facility here takes up the component-wise build, verification and chamber testing. Having different size chambers for different size equipment. Partly assembly is done in the assembly rooms, which are class 100 cleanrooms. Final assembly is done before the launch. Then, equipment is transported to other facilities for the particular requirement and checked. There is thorough technical auditing done in each process so there is no mismatch or discrepancy in the requirement and final product functioning.

