INDUSTRIAL VISIT

DAYANANDA SAGAR UNIVERSITY



Department of Computer Science Engineering
School of Engineering

INDUSTRIAL VISIT
"ISRO-URSC Bengaluru"

Date: 17 February, 2025

Time: 9:00 am – 2:30 pm

ORGANISERS:

Dr. Gopalsharma R Joshi, Professor, Space Research & CSE

Dr. Rajesh TM, Associate Professor, CSE

Dr. Renuka Devi M N, Assistant Professor, CSE

Industrial Visit Agenda:

- To gain knowledge about satellites and rockets.
- To visit the URSC exhibition and see the prototypes of satellites and rockets.
- Doubt clarification session.

Faculties Visited:

1) Dr. Rajesh TM
2) Dr. Renuka Devi M N
3) Dr. Praveen Kulkarni

Industrial Visit Details:

On **17th February 2025**, faculty members and students from the **CSE Department** had the opportunity to visit the **UR Rao Satellite Centre (URSC) in Bangalore**, a leading facility for satellite development and space research in India. The visit provided an insightful look into the various stages of satellite development, from initial design and manufacturing to final launch preparations.

An expert at the exhibition guided us through a detailed session, explaining **the role of India's national leaders and scientists in shaping the space program**. We were also shown an **informative audio-visual presentation on ISRO's Chandrayaan mission**, which highlighted the challenges faced and the innovative solutions implemented by ISRO. Additionally, she provided an overview of **ISRO's upcoming space missions** and advancements in satellite technology.

Observation of the Industrial Visit:

The visit covered a wide range of topics related to **satellite technology and space exploration**, including:

- **Satellite Prototypes and Models**
  The exhibition showcased **scaled models** of various satellites, illustrating their design principles and functionalities. Some of the key models on display included:
  - **Aryabhata** – India's first satellite, launched in 1975, marking the country's entry into space research.

- **Bhaskara** – A remote sensing satellite used for Earth observation and resource mapping.
- **Solar Sail** – A concept based on light pressure for propulsion, demonstrating an alternative method of space travel.
- **Mangalyaan (1:5 scale)** – A model of the Mars Orbiter Mission, which made India the first country to reach Mars on its maiden attempt successfully.
- **Astrosat (1:5 scale)** – India's first dedicated space observatory for multi-wavelength astronomy.
- **IRNSS Series** – India's regional navigation satellite system, offering independent GPS-like services.
- **INSAT-2** – A satellite from India's multipurpose communication and meteorological satellite series.
- **RISAT** – Radar imaging satellites designed for Earth observation, including defense and disaster monitoring.

Phases of Satellite Development:

The ISRO team provided a structured overview of the **satellite development lifecycle**, which includes:

1. **Design & Conceptualization:** This phase involves defining mission objectives, selecting payloads, and determining orbit requirements. Satellites are designed based on their function—whether for **communication, navigation, Earth observation, or space exploration**.
2. **Engineering & Development:** Engineers work on developing key subsystems, including **structural, thermal, power, propulsion, and communication systems**. The satellite's architecture is designed to withstand extreme space conditions.
3. **Manufacturing & Assembly:** Components such as solar panels, antennas, and onboard computers are fabricated and integrated to ensure seamless functionality.
4. **Testing & Quality Assurance:** A crucial phase where satellites undergo rigorous environmental testing, including **thermal vacuum tests, vibration tests, electromagnetic compatibility checks, and deployment simulations** to ensure they can survive space conditions.

5. **Launch & Deployment:** The satellite is integrated with a launch vehicle and sent into orbit. The process involves **trajectory calculations, fuel loading, and mission simulations** before the final launch.

Ongoing Projects:

During the visit, the ISRO team provided insights into their upcoming missions and technological advancements. A key highlight was the **Next Generation Launch Vehicle (NGLV)**, which is being developed as a successor to the existing launch systems. Designed for **higher payload capacity, reusability, and cost efficiency**, NGLV aims to support a wide range of missions, from **satellite deployments to interplanetary exploration**. This next-gen launch system represents a major step in **India's vision for sustainable and advanced spaceflight**.

Meeting Takeaways:

Q&A session with ISRO experts allowed us to delve deeper into various aspects of **satellite technology and mission planning**. Key discussions included:

- **Satellite Power Systems:** The use of **solar panels, battery storage, and power management units** to ensure continuous operation in space.
- **Communication Mechanisms:** How **radio waves, transponders, and ground station networks** facilitate data transmission between Earth and orbiting satellites.
- **Propulsion Systems:** The role of **chemical and electric propulsion** in adjusting orbits, station-keeping, and deep-space maneuvers.
- **Payload Configurations:** How payloads are customized based on mission goals, whether for **imaging, data relay, scientific research, or navigation services**.

The visit provided a **firsthand experience of ISRO's technological advancements**, strengthening our understanding of **India's contributions to space exploration and satellite applications**. It was an inspiring experience that showcased **the precision, innovation, and dedication** behind every mission launched by ISRO.

Group photo before leaving the DSU campus.

Entrance URSC-ISRO


URSC
SPADEX-MAKING & DOCKING
GPS Map Camera
Bengaluru, Karnataka, India
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