GSAT-11 Launched

Indian Space Research Organization's (ISRO) heaviest communication satellite GSAT-11 was launched by European Space Agency's (ESA) Ariane-5 Rocket, from Guiana Space Centre, French Guiana, South America.

- ISRO's rocket GSLV III can carry load up to four thousand kilograms. Beyond that capacity, all heavier ISRO payloads are launched by ESA.
- GSAT-11 is part of ISRO's high-throughput communication satellite (HTS) fleet. Two HTSs — GSAT-29 and GSAT-19 are already in space.

GSAT-11

- GSAT-11 is an advanced communication satellite.
- The GSAT 11 has Ka x Ku-Band Forward Link Transponders and Ku x Ka-band Return Link Transponders.
- Mass: 5,854 Kg
- Orbit type: Geostationary Orbit
- Mission Life: 15 Years

Applications

- **Faster Internet Connectivity:** GSAT will play a vital role in providing broadband services across the country. It will enable greater capacity and high data rates over region due to use of the spot beam technology.

  The broadband domain in India is through the underground fiber and covers partial and convenient locations. GSAT will drive the country's Internet broadband from space to untouched areas.

- **Bharat Net Connectivity:** It will provide substantial bandwidth coverage to gram panchayats for supporting e-governance and other platforms.
- **VSAT Terminals:** Very Small Aperture Terminal (VSAT) support high data rate applications for enterprise network and consumer broadband applications.

Spot Beam

> A spot beam is a satellite signal that is especially concentrated so that it covers only a limited geographical area. The narrower the beam greater the power. The satellite reuse beams (signals) several times in order to cover the entire country.

Types of Orbits

In general, there are two types of orbits:

- Polar Synchronous
- Geosynchronous

Polar Orbit

- A polar orbit travels **north-south over the poles** and takes approximately **90 minutes for a full rotation.**
- These orbits have an **inclination near 90 degrees.** This allows the satellite to see virtually every part of the Earth as the Earth rotates underneath it.
- These satellites have many uses such as **monitoring crops, global security, measuring ozone concentrations in the stratosphere or measuring temperatures in the atmosphere.**
- Almost all the satellites that are in a polar orbit are at **lower altitudes.**
- An orbit is called **sun-synchronous** when the angle between the **line joining the center of the Earth and the satellite and the Sun is constant throughout the orbit.**
- These orbits are also referred to as **"Low Earth Orbit (LEO)"** which enables the onboard camera to take images of the earth under the same sun-illumination conditions during each of the repeated visits, thus making the satellite useful for earth resources monitoring.
- **It passes over any given point on Earth's surface at the same local solar time.**

Geosynchronous Orbit

- Geosynchronous satellites are launched into orbit in the same direction the Earth is spinning and can have any inclination.
- When the satellite is in orbit at a specific altitude (approximately 36,000km above the Earth's surface)**, it will exactly match the rotation of the Earth.**
- While, **Geostationary orbits** fall in the same category as geosynchronous orbits, but with that one special quality of being **parked over the equator.**
- In the case of geostationary satellites, the Earth's force of gravity is exactly enough to provide acceleration required for circular motion.
- **Geosynchronous Transfer Orbit(GTO):** To attain geostationary or geosynchronous earth orbits, a spacecraft is first launched into a Geosynchronous Transfer Orbit.

- From the **GTO the spacecraft uses its engines to shift to geostationary or geosynchronous orbit.**