NISAR (NASA-ISRO Synthetic Aperture Radar) Mission

Prelims – *Current events of national and international importance.*

Mains (GS III) – *Science and Technology- developments and their applications and effects in everyday life.*

Why in news?

ISRO Chairman V Narayanan has recently confirmed that the satellite is scheduled for launch in June 2025 from Srihari Kota.

- **NISAR** – NISAR is the 1st collaboration between NASA and ISRO for a ***joint Earth observation satellite mission***.
- **Aim -** To deliver exceptionally precise, *high-resolution image of Earth's dynamic surface* to observe and understand natural processes (solid Earth, ice masses, and ecosystems).
- **Launch vehicle** – GSLV-F16 rocket.
- **Key specification**
  - **Dual-band radar** – NISAR uses dual-band radar frequencies (L-band and S-band) to map the Earth's surface.

    L-band (25-centimeter wavelength) detects larger features like tree trunks and penetrates vegetation, while S-band (10-centimeter wavelength) detects smaller features like leaves and rough surfaces.

  - Together, they provide comprehensive Earth observations by capturing different aspects of surface features.
  - **Orbit**– Sun-synchronous, low Earth orbit (LEO) at an Altitude of 747 km.
  - **Repeat cycle** – It will scan nearly the entire *globe every 12 days*.
  - **Mission life** – 3 years.
- **Contributions - NASA** – It provides the *L-band radar*, reflector antenna, deployable boom, communication subsystem, GPS receivers, recorder, and data subsystem.
- **ISRO** – It provides the *S-band radar* and handles calibration and data processing.
- ISRO is also ***providing launching service*** with its GSLV Rocket.
- **Significance** – Measuring *land deformation* from earthquakes, landslides, and volcanic activity.
- It will monitor,
  - The movement of glaciers and ice sheets
  - Forest and wetland changes
  - Soil moisture and water resources

- *Detecting surface changes* with centimeter-level precision through dense clouds and vegetation.
- It provides critical data for both scientific research and *disaster management.*
- The mission will help us to understand the *global carbon cycle*.

References

1. Business Today| Launch of NISAR Satellite
2. Business Today| NISAR Mission