



## NISAR Mission

**Prelims:** NASA, ISRO, S band radars, GPS, Synthetic Aperture Radar.

**Mains:** NISAR Mission, Achievements of Indians in Science & Technology.

### Why in News?

Recently, [NISAR \(NASA-ISRO Synthetic Aperture Radar\)](#) has received a send-off ceremony at the [NASA's \(National Aeronautics and Space Administration\) Jet Propulsion Laboratory \(JPL\)](#) in California, USA.

- NISAR will be the **first radar of its kind in space to systematically map Earth**, using two different radar frequencies (L-band and S-band) **to measure changes in our planet's surface less than a centimeter across.**

## What is the NISAR Mission?

### ▪ About:

- NISAR has been built by space agencies of the US and India under a partnership agreement signed in 2014.
- It is expected to be launched in January 2024 from Satish Dhawan Space Centre into a **near-polar orbit**.
- The satellite will operate **for a minimum of three years**.
- It is a [Low Earth Orbit \(LEO\)](#) observatory.
- NISAR will **map the entire globe in 12 days**.

### ▪ Features

- It is a 2,800 kilograms satellite consisting of both **L-band and S-band Synthetic Aperture Radar (SAR)** instruments, which makes it a **dual-frequency imaging radar satellite**.
- While **NASA has provided the L-band radar, GPS**, a high-capacity solid-state recorder to store data, and a payload data subsystem, [ISRO \(Indian Space Research Organisation\)](#) **has provided the S-band radar, the [Geosynchronous Satellite Launch Vehicle \(GSLV\)](#)** launch system and spacecraft.
  - S band radars operate on a wavelength of 8-15 cm and a frequency of 2-4 GHz. Because of the wavelength and frequency, they are **not easily attenuated**. This makes them useful for near and far range weather observation.
- It has a **39-foot stationary antenna reflector**, made of a gold-plated wire mesh; the **reflector will be used to focus “the radar signals emitted and received by the upward-facing feed** on the instrument structure.
  - By using SAR, NISAR will produce **high-resolution images**. SAR is **capable of penetrating clouds** and can collect data day and night regardless of the weather conditions.
- NASA requires the L-band radar for **its global science operations** for at least three years. Meanwhile, ISRO will utilise the S-band radar for a minimum of five years.

## What are the Expected Benefits of NISAR?

- **Earth Science:** NISAR will provide a **wealth of data and information about the Earth's surface** changes, natural hazards, and ecosystem disturbances, helping to advance our understanding of Earth system processes and climate change.
- **Disaster Management:** The mission will provide critical information to help **manage natural disasters such as earthquakes, tsunamis, and volcanic eruptions**, enabling faster response times and better risk assessments.
- **Agriculture:** NISAR data will be used to improve **agriculture management and food security** by providing information about crop growth, soil moisture, and land-use changes.
- **Infrastructure Monitoring:** The mission will provide data for infrastructure monitoring and management, such as **monitoring of oil spills, urbanization, and deforestation**.
- **Climate Change:** NISAR will help to monitor and understand the impacts of climate change on the Earth's land surface, including **melting glaciers, sea-level rise, and changes in carbon storage**.

## UPSC Civil Services Examination, Previous Year Question (PYQ)

### Prelims

**Q. Consider the following statements: (2016)**

**The Mangalyaan launched by ISRO**

1. is also called the Mars Orbiter Mission
2. made India the second country to have a spacecraft orbit the Mars after USA
3. made India the only country to be successful in making its spacecraft orbit the Mars in its very first attempt

**Which of the statements given above is/are correct?**

- (a) 1 only
- (b) 2 and 3 only
- (c) 1 and 3 only
- (d) 1, 2 and 3

**Ans: (c)**

### Mains

**Q1. What is India's plan to have its own space station and how will it benefit our space programme? (2019)**

**Q2. Discuss India's achievements in the field of Space Science and Technology. How the application of this technology has helped India in its socio-economic development? (2016)**

**Source: TH**

