



# NISAR: Joint Earth Observing Mission of NASA and ISRO

## Why in News

NASA and ISRO are collaborating on developing an **SUV-sized satellite called NISAR**, which will **detect movements of the planet's surface as small as 0.4 inches** over areas about half the size of a tennis court.

- The satellite **will be launched in 2022 from the Satish Dhawan Space Center** in Sriharikota (Andhra Pradesh) **into a near-polar orbit.**

## Key Points

- **The Name 'NISAR':** The name **NISAR** is short for **NASA-ISRO-SAR.**
  - **SAR** here refers to the **Synthetic Aperture Radar** that NASA will use to measure changes in the surface of the Earth.
  - It refers to a technique for producing **high-resolution images.** Because of the precision, the radar can penetrate clouds and darkness, which means that it can **collect data day and night in any weather.**
- **Function:** It will scan the globe **every 12 days** over the course of its **three-year mission** of imaging the **Earth's land, ice sheets** and **sea ice** to give an unprecedented view of the planet.
- **Role of NASA:**
  - [National Aeronautics and Space Administration \(NASA\)](#) - space agency of the USA) will provide one of the radars for the satellite, a high-rate communication subsystem for science data, GPS receivers and a payload data subsystem.
  - **NISAR** will be equipped with the **largest reflector antenna** ever launched by **NASA.**
- **Role of ISRO:**
  - [Indian Space and Research Organisation \(ISRO\)](#) will provide the spacecraft bus, the second type of radar (called the **S-band radar**), the launch vehicle and associated launch services.
- **Primary Goals:**
  - Tracking subtle changes in the Earth's surface,
  - Spotting warning signs of imminent volcanic eruptions,
  - Helping to monitor groundwater supplies, and
  - Tracking the rate at which ice sheets are melting.
- **Expected Benefits:**
  - NISAR's data can help people worldwide **better manage natural resources and hazards**, as well as providing information for scientists to better understand the **effects and pace of climate change.**
    - The images will be detailed enough **to show local changes** and broad enough to **measure regional trends.**
  - As the mission continues for years, the data will allow for better understanding of the causes and consequences of **land surface changes.**

- It will also add to our **understanding of our planet's hard outer layer, called its crust.**

### **S-Band Radar**

- **S band radars** operate on a wavelength of 8-15 cm and a frequency of 2-4 GHz.
- Because of the wavelength and frequency, S-band radars are not easily attenuated. This makes them useful for near and far range weather observation.
- The **drawback** to this band of radar is that it requires a **large antenna dish** and a **large motor** to power it. It is not uncommon for a S-band dish to exceed 25 feet in size.

**Source: IE**

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