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US and India Launch Advanced Earth-Mapping Satellite to Monitor Natural Disasters

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The United States and India have launched a cutting-edge radar satellite designed to track subtle changes in the Earth's surface, aiming to improve monitoring of natural hazards like floods, landslides, and earthquakes.

The satellite, known as NISAR (NASA-ISRO Synthetic Aperture Radar), was launched Wednesday from the Satish Dhawan Space Centre in southeastern India. The \$1.3 billion joint mission between the United States' National Aeronautics and Space Administration (NASA) and the Indian Space Research Organisation (ISRO) is intended to offer high-precision surface mapping using advanced radar technology.

Now in orbit around the Earth's poles, NISAR is set to observe the planet over the next three years. It will scan the Earth's surface every 12 days from a height of 747 kilometers (464 miles), capable of detecting surface movements as small as one centimeter (0.4 inches). The satellite will focus on monitoring changes in glaciers, polar ice sheets, and areas prone to tectonic activity.

While it cannot predict earthquakes, NISAR will play a critical role in identifying regions at high risk of seismic activity. "It will help us better understand which areas of the world are most susceptible to significant earthquakes," said Mark Simons, the mission's lead geoscientist, in a statement on NASA's website.

The satellite will also be used to monitor land deformation, ice melt in Greenland and Antarctica, and other environmental events such as wildfires. "We'll see land subsidence and swelling, and we'll have insight into ice dynamics that were not previously possible," said Karen St. Germain, director of NASA's Earth Science division, who called NISAR "the most sophisticated radar we've ever built."

What makes the satellite unique is its use of two radar frequencies: NASA provided the L-band radar, while ISRO developed the S-band radar. Together, these systems allow for detailed, weather-resistant imaging of the Earth's surface. The data is collected through a massive reflector antenna that receives radar signals bounced off the planet.

"The potential applications from the satellite are huge, and the global scientific community is eagerly awaiting the satellite data," said ISRO Chairman V. Narayanan. He emphasized the global importance of the project, noting that "the entire globe is going to benefit from this great accomplishment."

NASA Deputy Associate Administrator Casey Swails praised the collaboration, stating the project "shows the world what our two nations can do." Of the total cost, NASA contributed \$1.2 billion for the L-band radar and antenna, while ISRO provided \$91 million for the S-band radar and spacecraft structure.

This mission marks the largest space collaboration between the two nations and follows a string of recent milestones for India's space program, including its successful Mars mission in 2014 and lunar landing in 2023. Most recently, Indian astronaut Shubhanshu Shukla became the first from the country to reach the International Space Station.