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# NISAR SATELLITE

THIS ARTICLE COVERS 'DAILY CURRENT AFFAIRS' AND THE TOPIC DETAILS OF "**NISAR Satellite**". THIS TOPIC IS RELEVANT IN THE "**SCIENCE AND TECHNOLOGY**" SECTION OF THE UPSC CSE EXAM.

## Why in the News?

The Indian Space Research Organisation (ISRO) has announced that the **NISAR (NASA-ISRO Synthetic Aperture Radar)** Satellite will be capable of observing Earth's tectonic shifts with remarkable accuracy, down to the centimetre. This advanced capability is vital for studying tectonic activities and deepening our understanding of Earth's natural phenomena and environmental transformations.

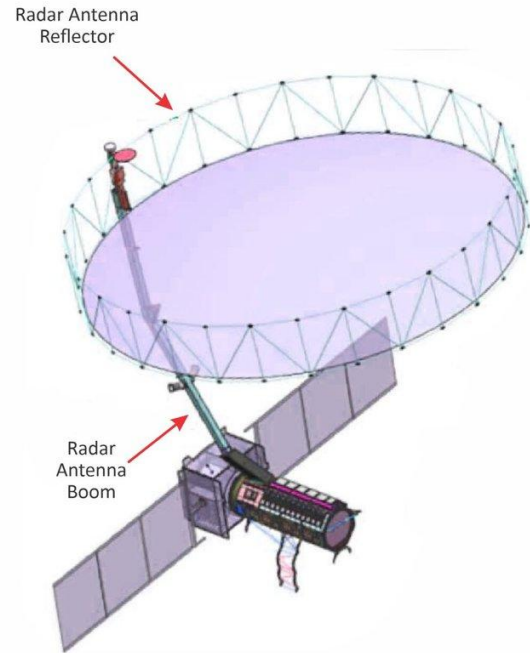
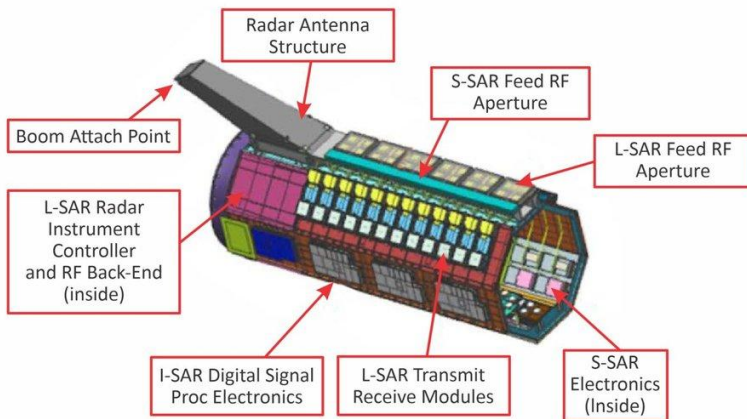
## KEY SPECIFICATION OF NISAR SATELLITE

- **Dual-Band Radar Frequencies:** NISAR is equipped with both L-band and S-band radar frequencies, enabling it to precisely monitor and measure the Earth's surface under all weather conditions, day and night.
- **Large Antenna:** The satellite has a large deployable antenna that spans 12 meters in diameter, significantly improving its capability to capture high-resolution radar images.
- **Fast Coverage:** NISAR is engineered to scan the entire Earth every 12 days, allowing it to track and analyse temporal environmental changes, such as vegetation shifts, ice dynamics, and other vital parameters.
- **Dynamic Monitoring Capabilities:** The satellite will observe Earth's ecosystems and dynamics, including forest biomass, ice sheet movements, and natural hazards like earthquakes, tsunamis, and volcanic eruptions.



### Instrument Subsystems:

- L-Band SAR (JPL)
- S-Band SAR (ISRO)
- Instrument Structure (JPL)
- Radar Antenna (JPL)



## HOW WILL NISAR SATELLITE DATA BE USED TO STUDY THE TECTONICS MOVEMENT?

- **Monitoring Ground Deformations:** The NISAR Satellite will deliver precise measurements of ground deformations resulting from tectonic activities. By examining these changes over time, scientists can gain insights into the patterns and rates of tectonic movements across various regions.
- **Detecting Fault Movements:** The satellite's data will facilitate detecting fault movements and accurately mapping fault lines. This information is essential for evaluating seismic hazards and understanding areas susceptible to earthquakes.
- **Mapping Surface Displacements:** NISAR will provide data to map surface displacements caused by tectonic activities such as earthquakes and volcanic eruptions. These maps are critical for identifying at-risk areas and analysing the consequences of geological events.
- **Studying Earthquake Precursors:** The satellite's data can assist in studying earthquake precursors by monitoring subtle ground movements with centimetre-level accuracy. Variations in ground deformation patterns detected by NISAR may offer clues about stress build-up along fault lines before an earthquake.

## BENEFITS OF STUDYING TECTONICS MOVEMENTS BY NISAR SATELLITE

- **Insights into Geological Processes:** By examining tectonic movements, the satellite provides valuable insights into geological phenomena such as plate tectonics, fault movements, and

seismic events. This information deepens our understanding of Earth's geology and aids in evaluating geological hazards.

- **Enhanced Seismic Risk Assessment:** NISAR's detailed data on tectonic activities improves seismic risk assessment, facilitating better preparedness and mitigation strategies for earthquake-prone regions.
- **Monitoring Environmental Changes:** The satellite's observations of tectonic movements enable the monitoring of environmental changes related to geological activities. This includes tracking land deformations, assessing earthquake impacts on landscapes, and understanding the interaction between tectonics and the environment.
- **Water Resource Management:** Data from NISAR on tectonic movements supports water resource management by evaluating water stress, monitoring water bodies, and studying tectonic impacts on water availability. This information is crucial for sustainable water resource planning.
- **Climate Change Studies:** NISAR's precise measurements of tectonic plate movements contribute to climate change research by offering insights into Earth's changing surface dynamics. This data helps in understanding how climate change affects geological processes.
- **Agricultural and Water-related Observations:** The satellite's data enables detailed observations of agricultural changes, water stress patterns, and desertification processes linked to tectonic movements. This information is vital for agricultural planning, water management, and environmental conservation efforts.
- **Disaster preparedness:** Data from NISAR on tectonic activities enables efficient allocation of resources for disaster response. Governments and relief organisations can utilise this information to prioritise high-risk areas, allocate emergency supplies and personnel appropriately, and enhance the efficiency of disaster response efforts during earthquakes or related events.

### JOINT SPACE COLLABORATION BETWEEN ISRO AND OTHER SPACE AGENCY

- **NISAR (NASA-ISRO Synthetic Aperture Radar) Mission:** This collaborative mission aims to create a radar satellite that will provide detailed insights into Earth's ecosystems, ice mass, vegetation biomass, sea level rise, groundwater, and natural hazards such as earthquakes, tsunamis, volcanoes, and landslides.
- **Chandrayaan-1:** ISRO's first mission to the Moon, Chandrayaan-1, featured international payloads and exemplified international cooperation. It received numerous national and international accolades and was crucial in the ISRO-NASA discovery of water on the Moon.
- **Megha-Tropiques:** Launched in 2011, this Indo-French satellite mission studies the tropical atmosphere, cyclones, and other weather phenomena. The data products from this satellite are accessible to the international scientific community.
- **SARAL:** A joint mission with France, launched in 2013, SARAL (Satellite for ALTIKA and ARGOS), focuses on ocean studies using altimetry. The altimeter data are currently available to the global scientific community.
- **TRISHNA:** ISRO and CNES (French space agency) have completed the feasibility study for an Earth observation satellite mission with thermal infrared capabilities named TRISHNA, under Indo-French cooperation.

- **Joint Mission to the International Space Station:** NASA and ISRO have agreed on a joint mission to the International Space Station in 2024, further strengthening their collaboration in space exploration.

## GOVERNMENT EFFORTS TO PROMOTE GREATER SPACE COLLABORATION

### DOMESTIC COLLABORATION

- **Private Sector Participation:** In June 2020, the government ended ISRO's exclusive control over space activities, allowing private companies to engage in comprehensive space projects.
- **Establishing IN-SPACe:** The Indian National Space Promotion and Authorization Centre (IN-SPACe) was established to facilitate and promote private sector involvement in space activities.
- **Access to ISRO Facilities:** The government plans to provide private industry with access to ISRO's space infrastructure, including testing facilities, tracking and telemetry systems, launch pads, and laboratories, through a business-friendly framework.
- **MoUs for Innovation and Venture Development:** ISRO signed a memorandum of understanding with Social Alpha to launch the SpaceTech Innovation Network (SpIN), India's first dedicated platform for fostering innovation and venture development within the space entrepreneurial ecosystem.

### INTERNATIONAL COLLABORATION

- **NASA-ISRO Joint Working Group on Human Spaceflight:** NASA and ISRO have created a joint working group to explore cooperation in areas such as radiation impact studies, micrometeorite studies, and orbital debris shield studies.
- **Discussions on Space Exploration Opportunities:** NASA and ISRO have engaged in discussions about potential future collaborations in space exploration, including possible joint missions to the Moon and beyond.
- **Astronaut Training for the Gaganyaan Program:** Under ISRO's Gaganyaan program, India and the US are exploring cooperation in astronaut training, life support systems, and radiation shielding solutions.

### Prelims Based Question

**Q1. Consider the following statements regarding NISAR Satellite:**

1. NISAR Satellite is an Earth Observation satellite developed with a joint collaboration between ISRO and NASA.
2. It's a Low Earth observatory satellite.

**Choose the correct answer using the codes given below:**

- (a). 1 Only
- (b). 2 Only
- (c). Both 1 and 2
- (d). Neither 1 nor 2

**ANSWER: C**

### **Mains Based Question**

**Q1. What are the primary benefits of international space collaborations, such as those between ISRO and other space agencies, in advancing global space exploration and research?**

[VIKAS](#)

## **PROTECTION AGAINST ARREST AND DETENTION IN CERTAIN CASES UNDER ARTICLE 22**

**THIS ARTICLE COVERS 'DAILY CURRENT AFFAIRS' AND THE TOPIC DETAILS OF "PROTECTION AGAINST ARREST AND DETENTION IN CERTAIN CASES UNDER ARTICLE 22". THIS TOPIC IS RELEVANT IN THE "POLITICAL SCIENCE" SECTION OF THE UPSC CSE EXAM.**

### **WHY IN THE NEWS?**

The Supreme Court of India declared the arrest and subsequent remand of NewsClick founder and Editor-in-Chief Prabir Purkayastha by the Delhi Police as invalid and ordered his immediate release.

A Bench of Justices B.R. Gavai and Sandeep Mehta said neither Mr Purkayastha nor his counsel was provided with the grounds of his arrest in writing. Mr Purkayastha, who was accused of using Chinese funding to promote "anti-national propaganda" through digital media, was arrested by the Delhi Police Special Cell on October 3, 2023. He was remanded in police custody the next day. His lawyer was informed of the grounds of arrest on October 5.



The right to be informed about the grounds of arrest flows from Article 22(1) (an arrested person shall be informed of the grounds of arrest and allowed to consult a lawyer of his or her choice) of

the Constitution. Any infringement of this fundamental right would vitiate the process of arrest and remand,” Justice Mehta, who authored the judgment, held.

Quashing the arrest, the court, however, said its verdict was not a comment on the case’s merits against Mr. Purkayastha. Justice Mehta said, like arrests, the grounds of detention should also be communicated in writing to a detainee. Any lapse would violate Article 22(5) of the Constitution, which mandates that a person under detention should be communicated. The grounds of the detention order and allowed to make a representation against the detention at the earliest opportunity.

Mr Purkayastha was arrested by the Delhi Police Special Cell on October 3, 2023. The police ignored his request for a copy of the FIR and gave him a copy only after a Sessions Judge remanded him in police custody at 6 a.m. on October 4, 2023. The senior journalist’s lawyer, advocate Arshdeep Khurana, was informed about the grounds of arrest on October 5, 24 hours after his client was remanded in police custody.

### **ABOUT PROTECTION AGAINST ARREST AND DETENTION IN CERTAIN CASES UNDER ARTICLE 22 OF THE INDIAN CONSTITUTION:**

Article 22 of the Indian Constitution protects against arrest and detention in certain cases. This Article is part of the Fundamental Rights guaranteed to individuals and is crucial in safeguarding personal liberty. It is divided into two main parts: preventive detention and punitive detention. **Key provisions under Article 22 of the Indian constitution are:**

- Article 22 (1) specifies that an individual taken into custody must promptly know the arrest reasons and can choose and consult a lawyer. Article 22(2) says that an individual arrested must be presented to a magistrate within 24 hours, excluding travel time, and cannot be held beyond this without a magistrate’s approval. **Hence, statement 1 is correct.**
- Article 22(3) specifies that the provisions outlined in clauses (1) and (2) do not apply to (a) any individual currently classified as an enemy alien or (b) any individual who has been arrested or detained under any legislation that allows for preventive detention.
- Article 22 (4) states that preventive detention laws cannot allow the detention of someone beyond three months unless an Advisory Board, made up of current or former High Court judges or those eligible to be, affirms there’s enough reason for it before the three-month period ends.
- Article 22 (5) states that if any person is detained in pursuance of an order made under any law providing preventive detention, the authority must quickly inform them of the reasons for their detention and give them a chance to contest it.
- Article 22(6) states that the authority doesn’t need to disclose facts deemed against public interest under clause (5).
- Article 22(7)(a) states, “Parliament has the authority to enact legislation specifying the situations and categories of instances in which an individual can be held in preventive detention for more than three months without the need to seek the viewpoint of an Advisory Board, as mandated by the conditions set out in sub-clause (a) of clause (4), before making a final determination.”

Only Parliament has the exclusive authority to legislate preventive detention laws concerning defence, foreign affairs, or the security of India. Meanwhile, under the Concurrent List, the Parliament and the State Legislatures share the power to legislate preventive detention measures to preserve public order or ensure the provision of essential supplies or services to the community.

The 44th Amendment Act of 1978 reduced the period of detention without the advice of an advisory board from three months to two months. However, this change has not been implemented yet, so the original detention period of three months is still in effect.

In India, various legal frameworks, such as the National Security Act (NSA) from 1980, the Unlawful Activities (Prevention) Act (UAPA) established in 1967, and state-specific statutes like the Maintenance of Internal Security Act (MISA) and Public Safety Acts (PSA) in particular regions, allow for the preventive detention of individuals. These laws permit the detention of individuals for a set duration, typically not exceeding 12 months, without the need for formal charges or a trial. A designated official or authority carries out the issuance of a detention order, with an advisory board conducting regular reviews of the detention.

The Preventive Detention Act of 1950 allows for holding an individual based on defence, foreign affairs, or state security concerns. Section 151 of the Criminal Procedure Code, 1973 (CrPC) allows for police to detain individuals preemptively based on the suspicion that they might engage in wrongful acts.

A police officer has the authority to detain a person without needing a Magistrate's order or a warrant if they receive information suggesting the person may commit a crime. This action is taken as a preventive measure based on suspicion.

In the 1950 A K Gopalan v. State of Madras case, the Supreme Court strictly interpreted Articles 21 and 22. It declined to assess any procedural deficiencies in the law, maintaining that the constitution's articles were independent. The court justified the petitioner's detention under the 'procedure established by law,' disregarding the claims of rights violations under Articles 19 and 21, and adopted a limited view of 'personal liberty' and 'law,' ignoring natural justice principles.

In Maneka Gandhi v. Union of India, the judiciary significantly expanded the interpretation of the term "personal liberty," understanding it broadly. The judgment clarified that Article 21 is not separate from Article 19; therefore, any legislation restricting personal freedom must meet both criteria.

### **Supreme Court guidelines for Article 22:**

1. An individual can only be detained under preventive detention legislation if there are concerns that the person threatens the broader community, impacting "public order." Simply engaging in cheating or criminal breach of trust, which falls under 'law and order' issues, would not justify such detention.
2. The government should avoid indiscriminately employing preventive detention to handle all "law and order" issues, which can be addressed through regular legal processes.
3. In all such cases, the court must consider a crucial question to determine the action's legality: Was the regular law of the land adequate to address the situation? If the answer is yes, then the detention order will be deemed unlawful.
4. Preventive detention should be strictly confined to the parameters of Article 21, which mandates due process of law. It must also be interpreted in conjunction with Article 22, which protects against arbitrary arrest and detention, and the relevant legislation.

### **CONCLUSION:**

Article 22 holds significance as it navigates the fine line between personal freedoms and state enforced security measures. It offers essential protections to individuals from random arrests and detentions, simultaneously allowing the government the authority to detain persons preemptively

for the sake of national security and maintaining public peace. This Article embodies the intricate equilibrium the Indian Constitution aims to achieve between the individual's liberty and the state's obligations to uphold public safety and order.

### PRELIMS PRACTICE QUESTIONS:

#### Q. CONSIDER THE FOLLOWING STATEMENTS:

1. Right to freedom under the Indian Constitution ensures that no person is arrested or detained without being informed in writing.
2. Both Parliament and State Legislature have powers to enact laws regarding preventive detention.

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

- A. Only 1
- B. Only 2
- C. Both 1 and 2
- D. Neither 1 nor 2

ANSWER: C

### MAINS PRACTICE QUESTION:

- Q. Discuss the exceptions to the protections provided under Article 22. How has the Supreme Court of India interpreted the provisions of Article 22 regarding human rights and personal liberty?

[AMIT PRADHAN](#)

