



CURRENT AFFAIRS



Argasia Education PVT. Ltd. (GST NO.-09AAPCAI478E1ZH)
Address: Basement C59 Noida, opposite to Priyagold Building gate, Sector 02,
Pocket I, Noida, Uttar Pradesh, 201301, CONTACT NO:-8448440231

Date - 7 June 2023

NAVIC

This article covers "Daily current affairs" and the topic details "NavIC". The topic "NavIC" has relevance in the Science Technology section of the UPSC CSE exam.

Relevance

For Prelims:

Facts about NavIC?

For Mains:

GS 3: Science and Technology

Importance of NavIC?

Challenges for NavIC?

Why in the news?

The Indian Space Research Organisation (ISRO) launched the first of the second generation satellites for its navigation constellation successfully on Monday morning.

Facts about NavIC?

- **Regional Navigation System** : NavIC is a regional navigation satellite system developed by the Indian Space Research Organisation (ISRO). It is designed to provide precise positioning and timing services in the Indian region.
- **Formerly known as IRNSS** : NavIC was previously known as the Indian Regional Navigation Satellite System (IRNSS). The name was later changed to NavIC, which stands for Navigation with Indian Constellation.
- **Constellation Configuration**: The NavIC constellation consists of seven satellites in total. Three of these satellites are placed in geostationary orbit, while the other four are placed in inclined geosynchronous orbits.
- **Dual-Frequency Signals**: NavIC broadcasts signals in dual frequencies. The Standard Positioning Service (SPS) signals are broadcasted in L5 and S bands, while the Restricted Service (RS) signals are broadcasted in L5 and S bands.
- **Improved Accuracy**: NavIC offers higher accuracy compared to other global navigation satellite systems. The open signals of NavIC are accurate up to 5 meters, while the restricted signals are even more precise.
- **Coverage Area**: NavIC provides coverage over the Indian landmass and extends up to a radius of 1,500 kilometers around it. This regional coverage ensures a strong and consistent signal reception within the designated area.
- **Interoperability**: NavIC is designed to be interoperable with other global navigation satellite systems like GPS (United States), GLONASS (Russia), Galileo (European Union), and Beidou (China). This interoperability enhances the overall efficiency and reliability of satellite-based navigation.

Importance of NavIC?

- **Strategic Independence:** Having its own regional navigation satellite system gives India strategic independence in terms of positioning, navigation, and timing services. It reduces dependence on foreign systems like GPS and ensures that India has reliable and accurate navigation capabilities within its own region.
- **National security:** NavIC plays a crucial role in enhancing national security. It provides reliable and precise positioning information to the defense forces, enabling them to effectively carry out operations, maneuver troops, and navigate in challenging terrains. The Restricted Service (RS) signals of NavIC offer secure and encrypted communications for strategic users.
- **Disaster Management:** NavIC aids in disaster management and emergency response. During natural disasters such as earthquakes, floods, or cyclones, NavIC can provide real-time positioning and timing information to coordinate rescue and relief operations. It helps in mobilizing resources, tracking movement, and providing accurate situational awareness to mitigate the impact of disasters.
- **Transportation and Infrastructure:** NavIC supports transportation and infrastructure development in India. It assists in efficient navigation for road, rail, and air transportation, enhancing safety and reducing travel time. NavIC can be integrated into vehicle navigation systems, helping drivers with accurate route guidance and traffic management. It also aids in the synchronization of power grids, facilitating efficient electricity distribution.
- **Economic Growth:** NavIC has positive implications for India's economic growth. It enables various sectors such as agriculture, fisheries, mining, logistics, and tourism to improve their operations and productivity. Accurate positioning information helps optimize resource allocation, enhance supply chain management, and facilitate precision agriculture. It opens up opportunities for innovation and entrepreneurship in developing applications and services based on satellite navigation.
- **Scientific and Technological Advancement:** Developing and operating a regional navigation satellite system like NavIC demonstrates India's scientific and technological capabilities. It showcases the country's expertise in space research, satellite technology, and atomic clock development. The advancements made in NavIC contribute to the overall progress of the Indian space program and foster technological innovation.
- **International Collaboration:** NavIC promotes international collaboration in satellite navigation. It encourages interoperability with other global navigation satellite systems, allowing seamless integration and compatibility. Collaborative efforts with other countries and organizations enhance India's global presence and cooperation in the field of satellite-based navigation.

Challenges for NavIC?

- **Limited Coverage:** NavIC is primarily designed to provide coverage over the Indian region and its surrounding areas within a radius of 1,500 kilometers. Outside this coverage area, the signal strength may diminish, leading to reduced accuracy and reliability.
- **Interference:** Interference from natural or man-made sources can affect the quality of NavIC signals. Sources such as atmospheric disturbances, buildings, and electronic devices can weaken or disrupt the signals, impacting the positioning accuracy.
- **Compatibility with Global Systems:** While NavIC is interoperable with other global navigation satellite systems, ensuring seamless compatibility and integration with existing systems can be a challenge. Harmonizing different signal frequencies, protocols, and standards requires coordination and cooperation among multiple countries and organizations.
- **User Awareness and Adoption:** The successful utilization of NavIC depends on the awareness and adoption of the system by users. Ensuring that the public, businesses, and relevant sectors are aware of NavIC's capabilities and encouraging the integration of NavIC into devices and applications requires effective communication and promotion efforts.

- **Technological Upgrades:** As with any satellite-based system, technological advancements and upgrades are necessary to keep NavIC up-to-date. Upgrading the infrastructure, satellite capabilities, and user equipment to leverage the latest technologies and ensure compatibility with evolving requirements pose ongoing challenges.
- **Satellite Maintenance and Replacement:** NavIC's satellite constellation requires regular maintenance, including monitoring their health, ensuring accurate timekeeping with atomic clocks, and replacing aging satellites. Managing the lifecycle of the satellites, maintaining their functionality, and launching replacements when needed are crucial for the continuity of the system.
- **Funding and Investment:** Developing, maintaining, and upgrading a satellite navigation system like NavIC requires significant financial resources. Securing funding for research, development, infrastructure, and ongoing operations is a challenge that requires support from the government, industry partnerships, and effective resource allocation.

Source:

<https://indianexpress.com/article/explained/explained-sci-tech/new-navic-satellite-launching-today-why-a-regional-navigation-system-matters-to-india-8633947/>

Q.1 Which of the following statements regarding NavIC (Navigation with Indian Constellation) is/are correct?

1. NavIC is a regional navigation satellite system developed by the Indian Space Research Organisation (ISRO).
 2. NavIC provides positioning, navigation, and timing services in the Indian region and its surrounding areas.
 3. The constellation of NavIC consists of six satellites placed in geostationary orbit.
- (a) 1 and 2 only
 (b) 2 and 3 only
 (c) 1,2 and 3
 (d) None of the above

Answer: (a)

Q.2 Which of the following statements accurately describes the range of NavIC (Navigation with Indian Constellation)?

1. NavIC provides coverage over the entire Indian landmass and up to a radius of 1,500 kilometers around it.
 2. NavIC offers accurate positioning and navigation services within a radius of 5 kilometers from the user's location.
 3. NavIC's range extends beyond the Indian subcontinent, covering parts of Southeast Asia and the Middle East.
- (a) 1 only
 (b) 2 and 3 only
 (c) 1,2 and 3
 (d) None of the above

Answer: (a)

Q.3 Discuss the significance of NavIC for India's strategic, economic, and technological development. Examine its potential applications in sectors such as defense, transportation,

agriculture, disaster management, and innovation. Also, highlight the challenges and future prospects of NavIC in further strengthening India's satellite-based navigation capabilities.

Rishabh

