



China Launches BeiDou Navigation Satellite System

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Why in News

China has formally launched full global services of its BeiDou-3 Navigation Satellite System (BDS).

Key Points

- **Background:**
 - The name BeiDou comes from Chinese word for the **Big Dipper or Plough constellation**.
 - China's BeiDou navigation project was launched in the early 1990s. The system then became operational within China in 2000 and in the Asia-Pacific region in 2012.
 - The navigation satellite system was completed in three steps: **BDS-1** which provided services to **China**, **BDS- 2** to provide services to the **Asia-Pacific region** and **BDS-3** which provides services **worldwide**.
- **Features:**
 - A hybrid constellation **consisting of around 30 satellites** in three kinds of orbits: **Geostationary Earth Orbit (GEO)**, **Inclined Geo-Synchronous Orbit (IGSO)** and **Medium Earth Orbit (MEO)**.
 - Provides navigation signals of **multiple frequencies**, and is able to improve service accuracy by using **combined multi-frequency signals**.
 - Offers **accurate positioning, navigation and timing**, as well as short messaging communication, international search and rescue, satellite-based augmentation, ground augmentation and precise point positioning, etc.
 - The services are used in various fields by China including **defence, transportation, agriculture, fishing**, and disaster relief.
 - It will be the **fourth global satellite navigation system** after the USA GPS, Russia's GLONASS and European Union's Galileo.
 - It is said to be much **more accurate than the USA's GPS**.
 - **Global Navigation Satellite System (GNSS)** is a general term describing **any satellite constellation that provides Positioning, Navigation, and Timing (PNT) services on a global basis**.

Implications

- **Challenge to the Centrality of the USA:** While China says it seeks cooperation with other satellite navigation systems, Beidou is being seen as a rival to America's GPS, Russia's GLONASS and the European Union's Galileo networks.
- **Military Implications:** The development of its own secure and independent navigation system will boost China's military strength, especially amidst **rising US-China tensions**.
- **Economic Implications:** The **better accuracy and experience** of BDS, as claimed by China will **lure companies** to sign-up for it. As the global market is being increasingly dominated by an **information-based economy**, China is expected to reap huge economic benefit from BDS.
- **China's Hold on Other Nations:** China is promoting its use in the countries signed-up for its **Belt and Road Initiative (BRI)**. Pakistan has already started using BDS. This will certainly give China **economic and political leverage over nations adopting this system**.
- **Edge over India:** This has also given China a competitive edge over India, whose **IRNSS-NavIC** is still a **regional** navigation system.
- **Importance in Covid Times:** The world is becoming heavily dependent on space infrastructure due to the impact of COVID-19 limitations on in-person physical meetings and travel restrictions. Thus, **information and space-based services will gain importance** in present times.
- **China's Authority in Space:** The space program of China has seen rapid advancements in past few years with the launch of **Tianwen-1** rover mission to Mars. China has also constructed an **experimental space station** and sent a pair of rovers to the surface of the moon (**Chang'e-4**). BDS is another step in **marking China's presence in Space**.

IRNSS – NavIC (India)

- **The Indian Regional Navigation Satellite System (IRNSS)**, which was later given the operational name of **NavIC** or **NAVigation with Indian Constellation**, is the **regional satellite navigation system of India**.
- Launched and operated by the **Indian Space Research Organisation (ISRO)**, IRNSS covers **India and nearby regions** extending up to **1,500 km**.
- The constellation consists of **7 active satellites**, out of which three are located in **Geostationary Earth Orbit (GEO)** and four in **Inclined Geo-Synchronous Orbit (IGSO)**.

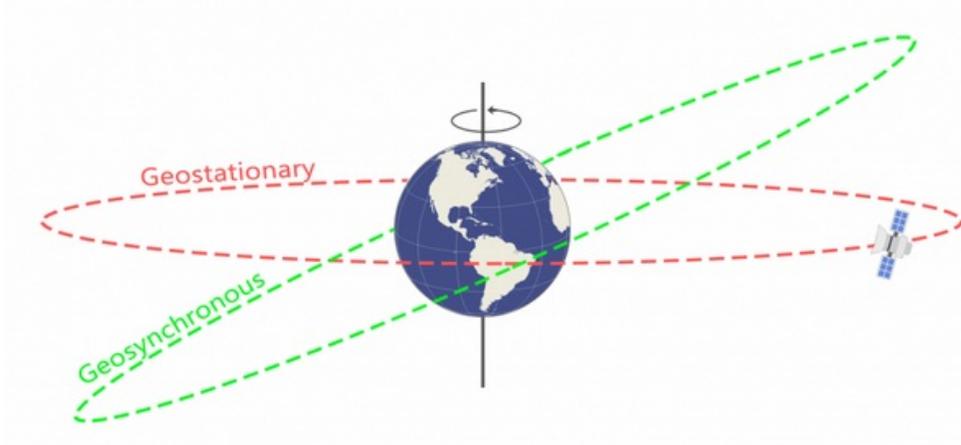
Satellite Orbits

An orbit is a regular, repeating path that an object in space takes around another one. An object moving around a planet in an orbit is called a satellite. According to the height of satellites from the earth, the orbits can be classified as

- **High Earth orbit (mostly weather and communication satellites),**
- **Medium Earth orbit (most navigation satellites) and**
- **Low Earth orbit (Scientific satellites like NASA's Earth observing Fleet).**



- **Geo-Synchronous orbit :** A geosynchronous orbit is any orbit which has a period equal to the earth's rotational period.
- **Geostationary Orbit:** A Geostationary Orbit is a time of Geosynchronous orbit in the same plane as that of the equator.



Source: HT