



Helicopter Navigation Demo with GAGAN Satellite Tech

Why in News?

India achieved a significant milestone in the [aviation sector](#) by conducting **Asia's first demonstration of performance-based navigation for helicopters**.

- The demonstration, which utilised the **state-of-the-art GAGAN satellite technology**, was conducted for a flight from **Juhu in Mumbai to Pune**.

What is Performance-Based Navigation?

- Performance-based navigation (PBN) is a **modern concept of air navigation that allows aircraft to fly accurately along a predefined route** using advanced onboard navigation systems and satellite signals.
- PBN improves the **safety, efficiency and capacity of air traffic management** by reducing the reliance on ground-based navigation aids and allowing more flexible flight paths.

What is GAGAN Satellite Technology?

- **About:**
 - GAGAN, which stands for **GPS Aided GEO Augmented Navigation**, is a **space-based augmentation system** jointly developed by the [Indian Space Research Organisation \(ISRO\)](#) and the [Airports Authority of India \(AAI\)](#).
- **Features:**
 - The system adds greater accuracy to the output of GPS navigation by providing **local geographical positioning**, thereby improving the precision of aircraft location for more efficient traffic management.
 - It enhances the **accuracy and integrity of the GPS signals by correcting the errors caused by atmospheric disturbances, clock drifts and orbital deviations**.
 - This satellite technology also helps aircraft/ helicopters with **guided landing at airports that do not have instrument landing systems** for low-visibility operations.
- **Benefits:**
 - **Enhanced safety:** By providing accurate and reliable navigation information, **GAGAN reduces the risk of human errors, collisions, terrain strikes** and controlled flight into terrain (CFIT) accidents.
 - It also improves situational awareness and emergency response capabilities for pilots and air traffic controllers.
 - **Improved efficiency:** By allowing optimal flight paths and reduced separation standards, **GAGAN enables more efficient use of airspace and fuel**, resulting in lower emissions and operational costs.
 - **Increased capacity:** By increasing the number of flights that can be accommodated in a given airspace, GAGAN enhances the capacity and connectivity of the aviation network.
 - It also **enables access to remote and underserved areas** that lack

conventional navigation infrastructure or have challenging terrain.

- In addition, GAGAN will provide **benefits beyond aviation** to all modes of transportation, including **maritime, highways, and railroads**.

UPSC Civil Services Examination, Previous Year Question (PYQ)

Q.1 Which one of the following countries has its own Satellite Navigation System? (2023)

- a. Australia
- b. Canada
- c. Israel
- d. Japan

Ans: (d)

Q.2 With reference to the Indian Regional Navigation Satellite System (IRNSS), consider the following statements: (2018)

1. IRNSS has three satellites in geostationary and four satellites in geosynchronous orbits.
2. IRNSS covers entire India and about 5500 sq. Km beyond its borders.
3. India will have its own satellite navigation system with full global coverage by the middle of 2019.

Which of the statements given above is/are correct?

- (a) 1 only
- (b) 1 and 2 only
- (c) 2 and 3 only
- (d) None

Ans: (a)

Mains

Q.1 Why is Indian Regional Navigational Satellite System (IRNSS) needed? How does it help in navigation? (2018)

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