



# GPS Aided GEO Augmented Navigation

## Why in News?

Recently, [Airports Authority of India \(AAI\)](#) Successfully conducted a light trial using **GAGAN {GPS (Global Positioning System) Aided GEO Augmented Navigation}** based **LPV (Localizer Performance with Vertical Guidance) Approach Procedures**.

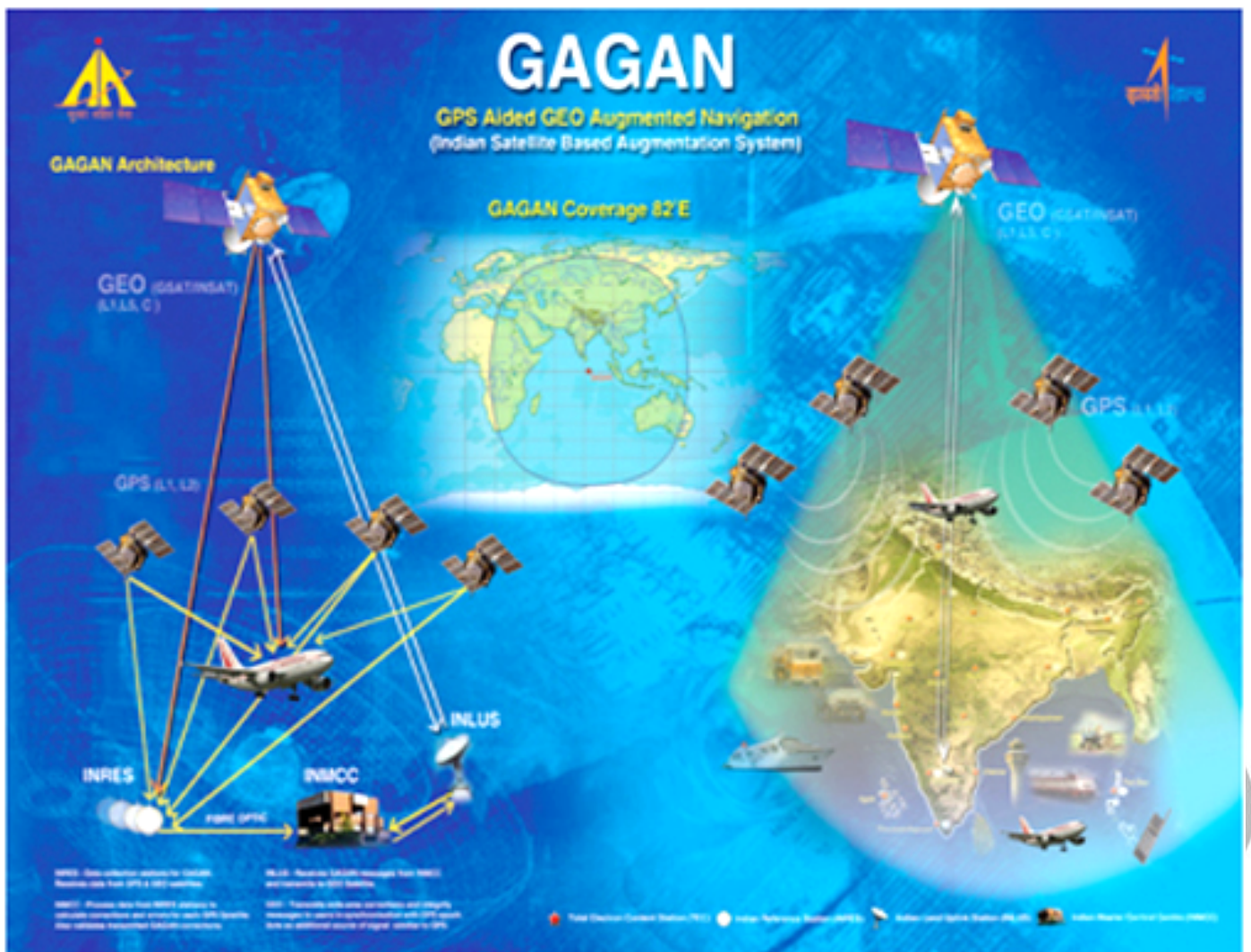
- Many airports including the ones under [Regional Connectivity Scheme](#) are being surveyed for the development of **GAGAN-based LPV Instrument Approach Procedures**.
- This is being done so that **suitably equipped aircraft can derive maximum benefit** in terms of improved safety during landing, reduction in delays, diversions and cancellations, reduction in fuel consumption, etc.

## What is LPV?

- LPV is a **Satellite Based Procedure** which has been used by aircraft **for landing purposes**.
- LPV approaches make aircraft possible **to land at airports not equipped with expensive Instrument Landing Systems**, which includes many small regional and local airports.
- Lowering the decision height up to 250 ft provides a **substantial operational benefit in poor weather and low visibility conditions**.
- Thus, any airport which hitherto would require higher visibility minima, will be able to accept aircraft benefiting remote airports which are devoid of precision approach capability equipment.

## What is GAGAN?

- **About:**
  - It is a **Space Based Augmentation System (SBAS)** jointly developed by [ISRO \(Indian Space Research Organisation\)](#) and AAI to provide the best possible navigational services over Indian FIR (Flight Information Region) with the capability of expanding to neighboring FIRs.
  - GAGAN is a **system of satellites and ground stations that provide GPS signal corrections**, giving you better position accuracy.
  - It is the **first such system developed for India and neighboring countries in the equatorial region**.
  - GAGAN System was **certified by DGCA (Directorate General of Civil Aviation) in 2015 for Approach with Vertical Guidance (APV 1) and en-route (RNP 0.1) operations**.
    - There are only four Space-Based augmentation systems available in the world namely **India (GAGAN), US (WAAS) Europe (EGNOS) and Japan (MSAS)**.



▪ **Services Offered:**

- Aviation, Forest management, Railways signaling, Scientific Research for Atmospheric Studies, Natural Resource and Land Management, Location based services, Mobile, Tourism.

▪ **Coverage Area:**

- GAGAN GEO footprint **expands from Africa to Australia and GAGAN system has capability to cater 45 reference stations** for expansion to neighboring countries.
- GAGAN provides **a civil aeronautical navigation signal consistent with [International Civil Aviation Organization \(ICAO\)](#) Standards and Recommended Practices (SARPs)** as established by the Global Navigation Satellite System (GNSS) Panel.

**What is a Global Positioning System?**

- GPS is a **satellite navigation system, used to determine the ground position of an object.** It is a U.S.-owned utility that provides users with Positioning, Navigation, and Timing (PNT) services.
- It is a **network 24 satellite** which provides service to civilian and military users. The civilian service is freely available to all users on a continuous, worldwide basis. The military service is available to U.S. and allied armed forces as well as approved Government agencies.

**Source: PIB**

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