

GAGAN

GAGAN stands for GPS Aided GEO Augmented Navigation. It is an initiative by the Indian government to provide the country's first satellite-based navigation systems. It is a system that provides reference signals to enhance the precision of a global navigation satellite system (GNSS) receiver.

It is a Space Based Augmentation System (SBAS) developed collaboratively by ISRO as well as AAI to provide the best available navigational services across the Indian FIR (Flight Information Region) further with capacity to extend to neighbouring FIRs. The ICAO's navigational standards for accuracy, integrity, and availability are not met by GPS alone. GAGAN rectifies for GPS signal faults caused by ionosphere disturbances, timing, and satellite orbit issues, as well as providing critical information about each satellite's health.

Applications of GAGAN

- Using a GAGAN enabled GPS SXTREO-T51, the GAGAN technology is being utilised for effective wildlife resource management and ecological monitoring.
- It can assist Indian railways with navigational support, such as signalling when a train approaches an unmanned railway crossing as well as track alignment.
- The Road Asset Management System (RAMS) will most likely be created for all of the country's national highways, as well as a modern management system based on the GAGAN platform.
- Signals by GAGAN could also be used to prevent traffic congestion by managing traffic in real time.

How GAGAN works?

GAGAN enhances the precision and reliability of location estimations by providing enhanced information to GPS receiving modules. The architecture of the GAGAN system is divided into two parts: the ground component and the space component. The ground component now comprises of 15 reference stations dispersed across India, as well as three main control centres. These 15 reference stations receive GPS signals and are located at various permanent locations. The survey carefully selects the sites of reference stations in order to discover any inaccuracies in GPS signals obtained.

The INMCC receives the GPS data provided by these 15 reference stations via a ground or satellite communication network. GPS data is analysed and rectification (augmentation) signals are created at INMCC. These corrective (augmentation) signals are relayed to INLUS (Indian Land Uplink Station), that uplinks them to the GSAT-8, GSAT-10, and GSAT-15 geostationary communication satellites. These rectification messages are sent on a GPS-like signal by the GEO satellites. This GPS-like signals with corrective signals may be received by any SBAS enabled GPS receiving module as an extra source for calculating the user's position with a precision of better than 7.6 metres.