

# India

## Agenda Item – 10

### Global Navigation Satellite Systems

#### **Madam Chairperson and Distinguished delegates,**

Indian delegation is happy to note the importance attached to the topics related to global navigation satellite system by this subcommittee, and by the General Assembly. On this occasion, the Indian delegation would like to update this Sub-Committee on the progress of India's satellite navigation programme since last session.

#### **Madam Chairperson,**

India pursues two paths as part of its Satellite navigation programme, viz., GAGAN and IRNSS. The GPS Aided GEO Augmented Navigation (GAGAN) is a Satellite Based Augmentation System (SBAS), while the Indian Regional Navigation Satellite System (IRNSS) is an independent regional system.

GAGAN has been established by Indian Space Research Organisation (ISRO) in association with the Airports Authority of India (AAI) to provide increased position accuracies required for civil aviation applications and better air traffic management. The GAGAN Signal-In-Space (SIS) is available through GSAT-8, GSAT-10 and GSAT-15 satellites, which are transmitting GAGAN signals on 24x7 basis. The system now broadcasts GAGAN signals from all three GAGAN GEO's GSAT-8 (PRN 127), GSAT-10 (PRN 128) and GSAT-15 (PRN 132). The Directorate General of Civil Aviation (DGCA), India certified the GAGAN system to RNP 0.1 (Required Navigation Performance, 0.1 Nautical Mile) and later it was certified for APV 1.0 (Approach with Vertical Precision) for services over Indian landmass. With the certification of GAGAN for approach and landing operations, India has become the third country in the world to have such capabilities. GAGAN is the first SBAS system in the world to serve the equatorial region. GAGAN is also providing Satellite-based Navigation services with accuracy and integrity required for civil aviation applications and is also providing efficient air traffic management services over the Indian Airspace. GAGAN service has been extended with an innovative application viz. "GAGAN Message Service" to broadcast messages through three GAGAN GEO satellites for fishing community in deep seas, meteorological information, alert/early warning messages on the occurrence of natural disaster, calamity, search & rescue, relief & humanitarian related message for the safety of life within GAGAN coverage area.

Directorate General of Civil Aviation of India has mandated that all the aircraft being imported for registration on or after 30 June 2020 shall be suitably equipped with GAGAN equipment.

**Madam Chairperson,**

In addition to SBAS, Indian Space Research Organisation (ISRO) has implemented an independent regional navigation system called 'Indian Regional Navigation Satellite System (IRNSS)' now called as NavIC, NavIC – (Navigation with Indian Constellation) to provide satellite based navigation service. It is an independent system designed to provide accurate position information service to users in India as well as in the region extending up to 1,500 km from its boundary, which is its primary service area. NavIC is envisaged to provide a position accuracy of better than 20 m in the primary service area. NavIC consists of a constellation of seven satellites, three satellites in Geostationary Equatorial orbit (GEO) and four in the Geo Synchronous orbit (GSO). ISRO has deployed eight satellites, viz., IRNSS 1A to IRNSS 1I in orbit using the India's Polar Satellite Launch.

The entire ground systems have been established and is operational. ISRO has established IRNSS Network Timing (IRNWT) facilities which is an ensemble of Atomic clocks. The IRNWT is physically realized and exercise of the algorithms to generate, synchronize and steer the resulting IRNWT time scale to Coordinated Universal Time (UTC) is provided by National Physical Laboratories of India.

Signal-in-Space (SIS) Interface Control Document (ICD) has been placed in public domain to enable the production of the NavIC user receivers. Using the first generation receivers, the capabilities of the system have been successfully tested and demonstrated to various users in road, rail, marine, fisheries and aviation sectors in the country.

The NavIC-based emergency messaging system is established for fishermen and boats to provide information on impending disasters such as cyclone, wave heights, and also Potential Fishing Zone (PFZ) information through a mobile app connected to the NavIC receiver. IRNSS-1A is presently being used exclusively for messaging services. The details of the messages have also been placed in public domain. India has also developed Distress acknowledgement message system using a combination of NavIC and Distress Relay Transponder Payload system. This system will be operationalised shortly for the fishermen's safety of life.

In addition, India is pursuing collaboration with other service providers to evolve a common messaging format for a pan-World emergency warning system (EWS).

Incorporation of NavIC in addition to other GNSS operators has the potential to provide meter-level accuracy. This has been validated through various field tests conducted at different locations within the country.

India appreciates the excellent work carried out by the UN Office on Outer Space Affairs (UNOOSA), as the Executive Secretariat for the International Committee on Global Navigation Satellite Systems (ICG) and the Providers Forum to bring synergy among global players in satellite navigation. India participates regularly in the meetings of ICG. India, under guidance from the UNOOSA, organised the 14th meeting of the ICG and 23rd meeting of the Providers Forum at Bengaluru in December 2019. The ICG was attended by 258 delegates, including nearly 150 delegates from various governmental, intergovernmental and non-governmental organisations. India presented service updates of the NavIC/IRNSS system to the International community while participating in the parallel working group sessions related to service volumes, interoperability, etc.

In the area of capacity building, United Nations (UN) affiliated Centre for Space Science and Technology Education in Asia and the Pacific (CSSTEAP) hosted by India at Dehradun is offering long-term Post Graduate course on 'Global Navigation Satellite System (GNSS)' every alternate year since 2016.

**Madam Chairperson,**

In conclusion, Indian Delegation assures its continued commitment to this Sub Committee and the ICG global forum in addressing the issues of common interest for Satellite Navigation System providers and also in taking the benefits of GNSS to all countries, especially to the developing countries.

**Thank you Madam Chairperson.**