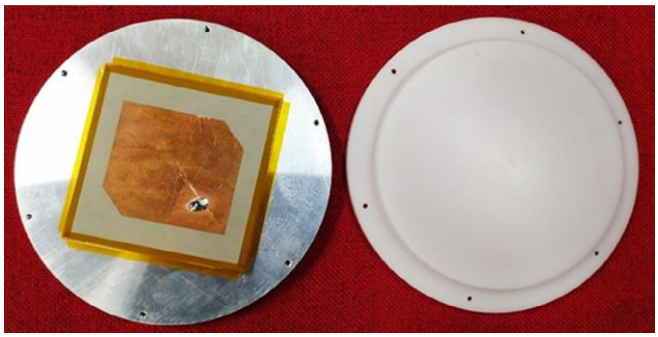
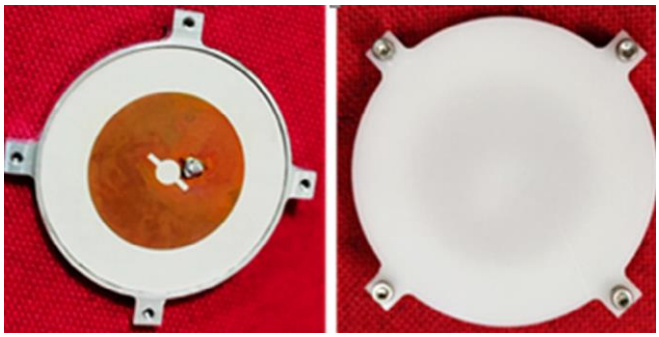
Pseudolite Based Navigation System

Tx Antenna for Pole



Rx Antenna for Pole



Rx Antenna for onboard receiver

Space Applications Centre (SAC) has developed Pseudolite based navigation system (PBNS) which is a standalone ground-based navigation system and provides an alternate means for navigation without using any Global Navigation Satellite System (GNSS). PBNS is a kind of NavIC system on ground with coverage up to 10 km range. Pseudolite Based Navigation System has two major segments which includes Ground Segment and User Segment. Ground segment consists of 10 pseudolite transceivers which generate BPSK modulated navigation signals and transmits them at S-band frequency in pulse-CDMA mode. User receiver which is on-board an aircraft receives signals from ground based transmitters and processes them to compute user position after time synchronization.

Application Areas

The developed system will be helpful in minimizing the impact of the degradation of the GNSS services when used with in combination with GNSS as well. PBNS is also expected to support the positioning services for key operational capabilities for aircraft landing while maintaining full system capacity and also will support GAGAN for Cat III precise landing in future. PBNS will also be useful for navigation of unmanned aerial vehicles in both civil and strategic domains and interplanetary missions such as navigation on Mars as well.

Such a standalone system will also be worthy in scenarios where:

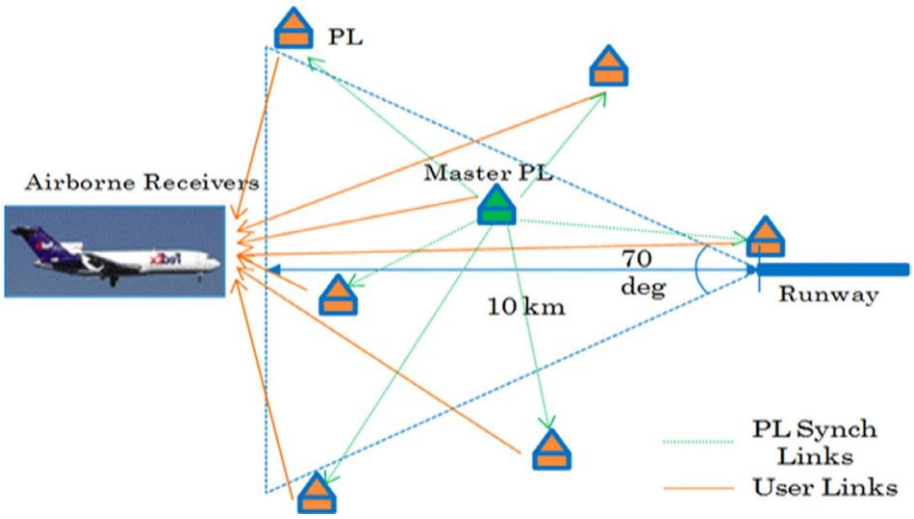
- GNSS is not available
- GNSS is compromised/denied
- GNSS is not feasible to be use

Specifications:

- PBNS is a standalone system which works without any GNSS.
- PBNS works with low-cost pseudolite transceivers and do not use atomic clocks.
- PBNS is a passive ranging self-synchronized system.
- PBNS uses S band ISM license free spectrum.

Parameter	Unit	Value
Transmit Frequency	MHz	2414.28
EIRP	dBW	6 (maximum)
Transmit Mode	0 to 100%	Pulsed
Duty Cycle	%	10

Pseudolite System Parameters



Concept of Pseudolite-Based Navigation System

Technology Transfer from ISRO

ISRO is willing to offer the knowhow of this technology to suitable entrepreneurs / industries in India. Capable manufacturing industries interested in acquiring this knowhow may write with details of their present activities, requirements and plans for implementation, infrastructure and technical expertise available with them, their own market assessment, if any, and plans for diversification to the address given below: