NavIC enabled IGS stations in India

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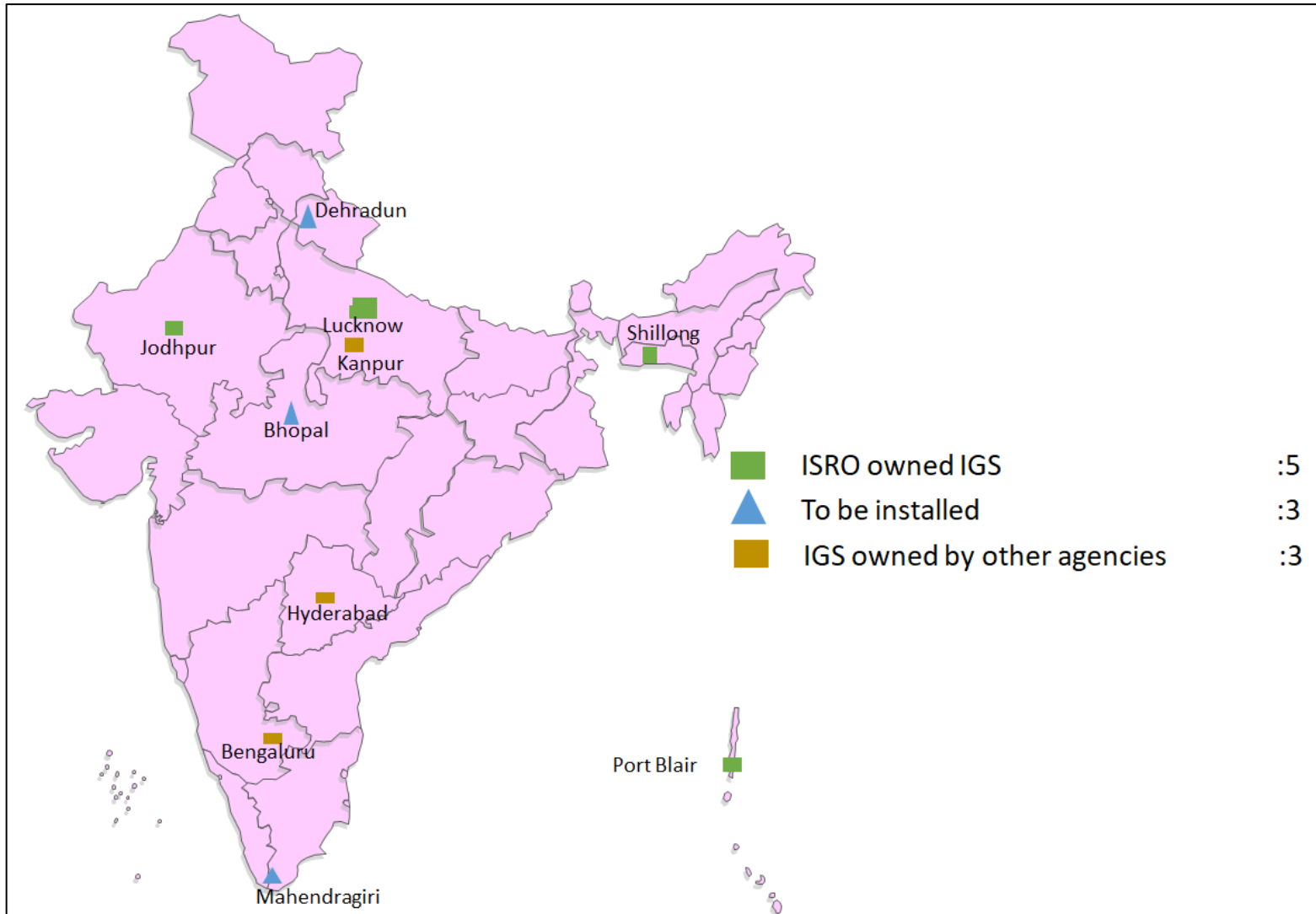
ISTRAC
Indian Space Research Organization (ISRO)

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Outline

➤ IGS: Introduction

➤ IGS in India

➤ General architecture

➤ Performance of NavIC enabled IGS

➤ Planned Augmentation

IGS- INTRODUCTION

➢The International GNSS services (IGS), operates a global network of GNSS (global navigational satellite systems) ground stations (more than 500), data centers and data analysis centers to provide raw data and derived data products that are essential for Earth science research; multi-disciplinary positioning, navigation and timing (PNT) applications.

➢Crucial IGS products include:

a.   GNSS satellite ephemerides (.sp3 files)

b.   Earth rotation parameters (.erp files)

c.   Global tracking station coordinates and velocities (.snx files)

d.   Satellite and tracking station clock information (.clk files)

e.   Zenith tropospheric path delay estimates (.zpd files)

f.   Global ionosphere maps (.ion files)

IGS in India

ISRO owned IGS : 5
To be installed : 3
IGS owned by other agencies : 3

IGS (ISRO) in India

S.no.	Station ID	Location	Signals tracked	Data available @
1	LCK3	Lucknow	GPS+ GLONASS+ Galileo+ NavIC (L5)+ QZSS+ Beidou + SBAS	1. https://data.gnss. ga.gov.au 2. CDDIS
2	LCK4	Lucknow		
3	PBR4	Port Blair		
4	JDPR	Jodhpur		
5	SHLG	Shillong		
6	DRDN	Dehradun		ISTRAC (ISRO)

➢ Stations at Jodhpur (JDPR00IND) and Shillong (SHLG00IND) are established and approved for inclusion in IGS network by IGS CB in September 2022.

➢ IGS station in Dehradun (DRDN00IND) has been established and is going through internal validation phase.

➢ Towards, NavIC enabled IGS stations outside India, it is planned to establish IGS stations in Mauritius, Australia, Japan and Antarctica. Discussions have been initiated.

➢ Currently, we are using Leica AR25 (R3) and Septentrio TWIVC6050 antennas in IGS stations.

General Architecture
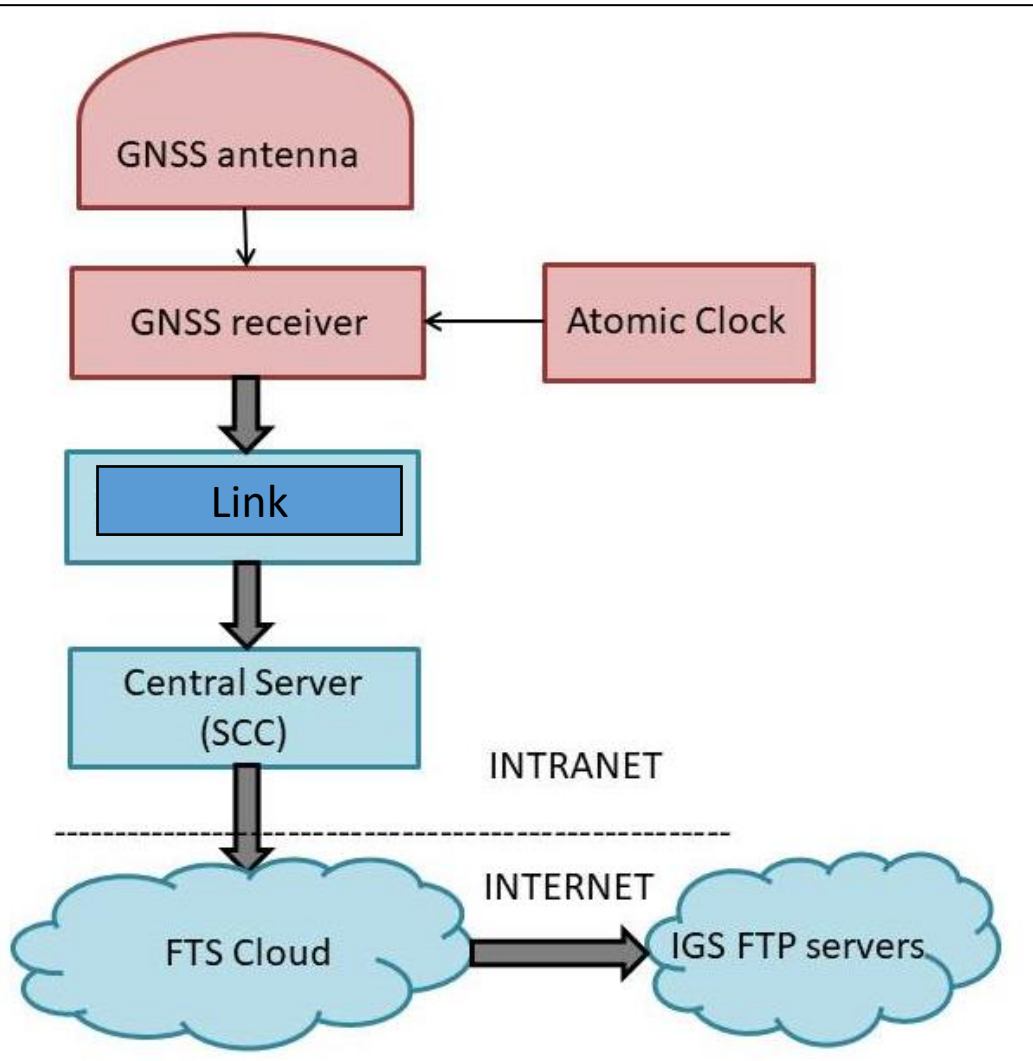
- IGS station mandates to submit GNSS observation file in 3 formats:
- Daily (24hr) file
- Hourly files
- Real time data transmission

- The key feature of IGS station is to achieve 100% data availability within the latency mandated by IGS CB.

- It is also planned to install in-house designed MET stations in IGS stations.

Performance of NavIC enabled IGS

NavIC

Plot shows C/No values observed for NavIC , GPS, and GLONASS satellites as tracked from IGS station LCK300IND on 5th Oct 2022

GPS

GLONASS

Planned Augmentation
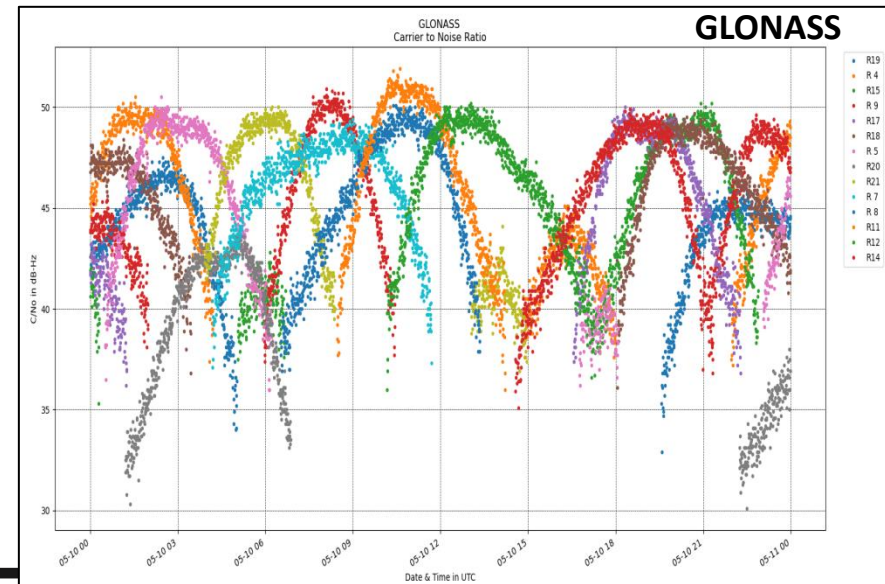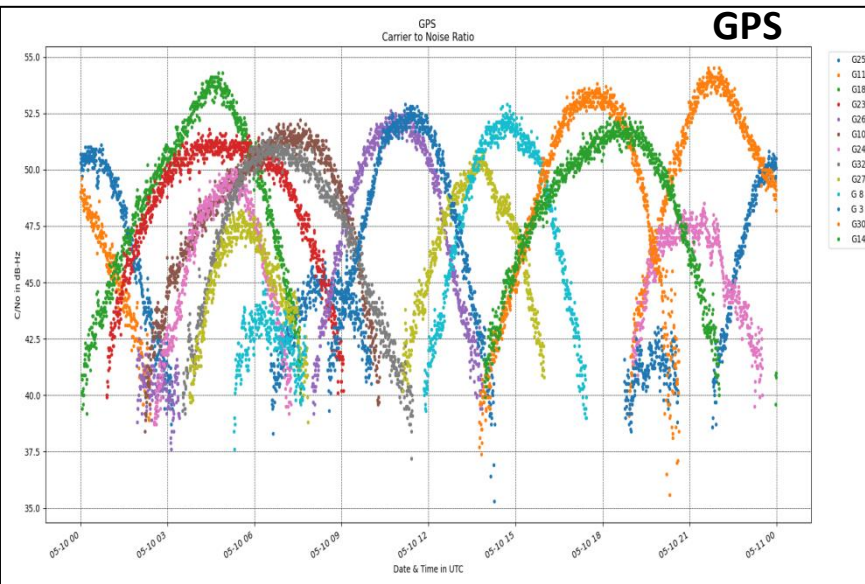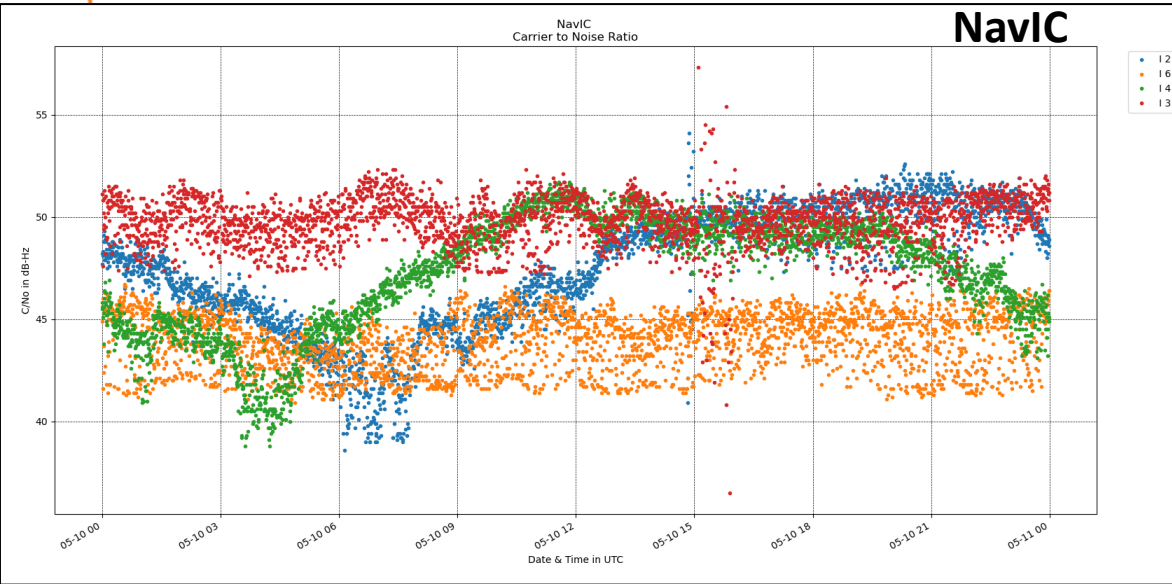
➢ To meet the strict guidelines of IGS CB, real time data transmission is mandatory. ISRO is planning to enable this.

➢ Establishment of NavIC enabled IGS stations outside India.

➢ Installation of in house developed MET stations in IGS stations.

➢ Calibration and installation of in house developed "All-in-view" antenna to enable S band tracking in IGS stations.

Thank You

ISRO