

# GNSS In-Door Application

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# Indian GNSS & Mobile Telecom scenario

- India is implementing an independent regional navigation system IRNSS. IRNSS service is planned in L5 and S bands
- India is also implementing a GPS Augmentation system called GAGAN operating in L1 and L5 bands.
- ISRO/India is also engaged in the development of necessary receivers for IRNSS and GAGAN.
- There are more than 500 million mobile phones in India. The present day phones have GPS chipsets and local maps for navigation.
- 2G & 2.5G services have already come into use and 3G services have been introduced and is available in major cities.

# Enhancement of GNSS performance

- ❖ Integration of Location Based Services with mobile telephony provides an opportunity for higher penetration of GNSS services.
- ❖ In this background, it is recommended that GNSS Performance enhancement for In-Door application shall also be considered.
- ❖ This can be possibly achieved by one or a combination of the following techniques:
  1. Assisted GPS technique
  2. Optimizing the receiver loop bandwidth or Dynamically switching the Receiver loop bandwidth and
  3. Introducing advanced FEC techniques such as, LDPC/LDPCCC.
- ❖ Coupling the GNSS receiver with terrestrial systems such as FM is one possibility.
- ❖ Providing navigation data through internet on hand held phone can also be considered (3GPP).

# Enhancement of GNSS performance-Indian Contribution

- The IEEE 802.16 m System Definition Document (SDD) has recommended investigation of LDPC/ LDPCCC for Future Definition of key technologies for GNSS systems.
- India has developed algorithms for LDPC and LDPCCC for integration in GNSS.

# The Recommendation of the WG-B for GNSS In-Door Applications is suggested as

- ✓ Through Assisted GPS.
- ✓ Through combining the PNT services through terrestrial systems such as FM broadcast.
- ✓ Through internet to a handheld device
- ✓ Using detection threshold extension by FEC techniques such as LDPC/LDPCCC.

Thank you