

In a nutshell

India, the 10th largest economy by nominal GDP in the world, has maintained a strong economic growth during the last few years (+7%). The GDP grew at 7.6% in 2015-16 compared to 7.2 % for 2014-15. The growth is expected to accelerate to 7.8 % in the fiscal year 2017, characterized today by large modernisation plans like Digital India, Make In India, Start-up India and increasing openness to foreign investments. India has capitalised on its large educated English-speaking population to become a major exporter of information technology enabled services and software developments. Indian Space Research Organization (ISRO) has successfully put the seventh and final satellite of the Indian Regional Navigation Satellite System (IRNSS) into a Sub-Geosynchronous Transfer Orbit (Sub-GTO). The final launch has thus given India, its own navigation system.



Key opportunities



Whilst the uptake of GAGAN is still slow there is an increasing interest in the development of multi-GNSS receivers. In this context joint efforts for GPS+GALILEO+SBAS receivers should be a prime objective in the short term. India has shown a great interest in benefitting from European know-how in both the level of certification or in SBAS market uptake in non-aviation sectors.



India is the world's second fastest growing automotive market and boasts the sixth largest automobile industry. The main opportunities arise in telematics, and especially in transport, logistics tracking, fleet management and built-in navigation devices on luxury cars (25% growth in recent years). There is also a need for standardisation and certification.



India has the 3rd largest railway network in the world but it is largely underdeveloped. Governmental plans for the introduction of GNSS-based railway solutions have been put forward in the 2012-2013 budget plan. Together with the announcement on allowing foreign direct investment in railways (September 2013) this creates a multitude of opportunities for industrial cooperation.



There is a strong interest in introducing SBAS solutions for precision farming. Mahindra is the leader in this sector. Several universities are conducting research in this field and are making use of remote sensing technology, the physiographic map, soil map and land use map.



Collaboration between European and Indian industry in surveying will create several opportunities in a wide range of applications – siting of terrestrial mobile towers, laying of optical fibre links for back-haul connectivity, cost-effective land surveys for roads and railways, and building national infrastructures like nuclear power plants, dams, new highways etc.

Strengths

- ▶ Emerging and open market with large untapped potential
- ▶ Easy access to latest technology – great software development and frugal innovation capabilities
- ▶ Growing smartphone usage
- ▶ India's commitment to Space Programmes
- ▶ India's programmes such as Make in India, Digital India, Start-up India

Weaknesses

- ▶ Market driven largely by governmental policies
- ▶ Lack of awareness on GNSS technology amongst researchers, solution providers and potential users
- ▶ Fragmented industry sectors
- ▶ Technology base for GNSS ground segments is underdeveloped

GNSS industry

- ▶ Indian industry has the capability of producing Multi-GNSS receivers (e.g. GPS/Galileo/GLONASS/GAGAN).
- ▶ Several software companies are engaged in chip designing services (for domestic and export, mainly US), e.g. Qualcomm, SiRF, and Accord.
- ▶ GNSS system integrators concentrate mainly on Location Based Services such as tracking & geo-fencing e.g. iGate, Tech Mahindra, Magnasoft, Fargo, Happiest Minds plus numerous small players like Oxys Tech, Mihir and Ei Labs. Many internationally are active players in content / broader geo applications and mapping – e.g. Infotech Ltd.
- ▶ The market for vehicle navigation systems shows steady growth and is led by players such as MapmyIndia, SatNav, Blaupunkt, TomTom, Garmin and NNG.
- ▶ Innovative GNSS-enabled solutions motivated by specific Indian societal challenges are increasingly being introduced in applications such as the protection of women (Q's Bond), ATM cash dispenser vehicles, electronic personal safety devices (ePSD) for school kids, telematics data based vehicle insurance schemes, etc.
- ▶ Modernisation of national infrastructure is generating opportunities in safety-critical sectors such as air navigation services, e.g. GAGAN project and railways (e.g. anti-collision devices).

Most relevant GNSS actors

| Institutions | Chipsets/Receivers | Applications/System Integrators/Solution Providers |
|---|--|--|
|   Ministry of Civil Aviation Government Of India  Institutions |      |      Applications/System Integrators/Solution Providers |

Contribution to Multi - GNSS

| System | IRNSS | GAGAN |
|-------------------|---|---|
| Space Segment | 7 GEO+GSO satellites (36.000km) | 3 GEO |
| User segment | L5-Band 1176,45 and S-Band 2492,028 and IRNSS receivers | GAGAN (WAAS) receiver with PRN 127/128 in L1 and L5 bands |
| Position accuracy | < 10m over mainland India | Horizontal: 1,5m - Vertical: 2,5m |
| Current Status | Constellation completed 2016 | 2 GEO operational |

GNSS.asia

India

GNSS.asia partner: IIRA Consultancies Pvt Ltd

Next event: Indian GNSS Opportunities in Railways at Hyderabad, August/September, 2016.

For more information on the ongoing activities of GNSS.asia, specific queries concerning the GNSS markets and matchmaking opportunities please contact Mr Ravikumar at ravikumar@iira.in, Phone: +91 80 41665548 or visit <http://india.gnss.asia/home-india>