

In a nutshell



Transport



Disaster monitoring



Surveying

Snapshot of the Philippines

The Philippines is a country of South-East Asia in the western Pacific Ocean. It is an archipelago made up of 7,106 islands – 2,000 of which are not inhabited and 2,400 have not even been named. The Philippines is a member of the Asia-Pacific Economic Cooperation (APEC) and the Association of Southeast Asian Nations (ASEAN). It is one of the fastest growing economies in the region, especially since 2010. Economic growth in 2013 hit a record 7.8%, partly due to the introduction of new services (and particularly call centres), whilst the domestic economy heavily relies on agriculture (tobacco, coconuts, pineapples, bananas, rice, etc.). Filipinos working abroad contribute approximately 10% of the GDP.



GNSS opportunities for the Philippines

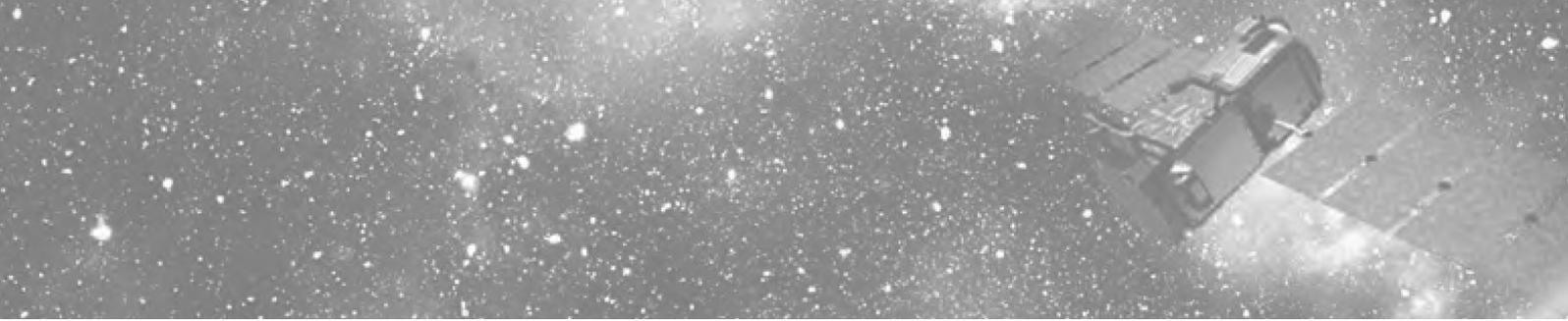
The growing economy goes in par with an advancement of infrastructure. The country has been ranked 95th out of 144 on a survey from the World Economic Forum for infrastructure development. The Asian Development Bank has estimated that an extra income of \$4.5 trillion could be unlocked by 2020 with the appropriate infrastructure. Much improvement is thus still needed in particular concerning information and spatial infrastructures. Nonetheless, authorities are reacting. Since 2010 the government has invested \$31.8 billion in infrastructure, including \$1.4 billion for a commuter rail in Manila in May 2015.

Another critical issue is disaster management. According to the World Risk Index Report 2014, the Philippines is placed second out of 171 countries ranked according to their "risk score" for their exposure to hazards such as earthquakes, floods and storms, drought and sea level rise. Tropical storms or typhoons accompanied by heavy rain and/or strong winds that may result in floods, landslides and storm surge are the most prevalent types of hydro-meteorological hazards in the country. On average 20 tropical cyclones enter the Philippines area of responsibility each year, 9 of which hit the land and 5 of which are considered destructive. There are around 300 volcanoes in the Philippines, of which 23 are active, 26 are potentially active and have recorded 170 eruptions for the past 400 years.

Finally, the insular and mountainous nature of the terrain make it difficult to perform accurate cadastral surveys. As early as 1992, GPS technology has been used to create a national geodetic framework with the support of the Australian government. All these areas translate into opportunities for GNSS stakeholders.

Existing GNSS stakeholders

For the time being the very first space programme of the Philippines does not foresee GNSS. This might change as the Philippine Space Agency is currently being set up. Filipino stakeholders are, however, very eager to get involved in GNSS from an application point of view and put significant efforts into attracting the MGA conference in 2016 to Manila. Partnerships have been built with local institutions, in particular with



the Training Centre for Applied Geodesy and Photogrammetry (TCAGP) at the University of the Philippines (UP) and host of MGA/GNSS-Asia event.

The National Mapping and Resource Information Authority (NAMRIA) carries out water, coastal and land surveys as well as all works related to mapping, remote sensing, information management and statistical services. It is, however, not the only stakeholder in surveying and mapping. There are many other private companies as well as government agencies.

Applications of survey and remote sensing data include forestry, land resource evaluation, coastal and marine resources management, disaster management and preparedness, etc. Users include the Department of Agriculture, the Bureau of Soils and Water Management (BSWM), the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), the Philippine Institute of Volcanology and Seismology (PHIVOLCS), etc. All these services were set-up with substantial foreign help, notably from the Japan Forest Technical Association (JAFTA), Philippine-Japanese cooperation projects, funding by UNESCO and the International Union of Geological Sciences, etc. The PAGASA operates ground receivers of Japanese Meteorological Satellite (GMS) and the National Oceanographic and Atmospheric Administration (NOAA) polar orbiting satellites.

Through the University of the Philippines and other Universities, the Philippines is undertaking critically important programs and projects in space applications, in flood hazard mapping and early warning for mitigation, natural resource assessment, microsatellite development and mapping applications. However, very few GNSS R&D projects have been initiated to date.

Existing PNT systems

Over 450 GPS reference stations have been established all over the country, and these are still densifying. The current plan is to establish an Integrated Geospatial Referencing Facility (IGRF), including 15 DGPS reference stations and 24 dual frequency RTK transmitters, covering land and coast.

Opportunities for EU-Philippines cooperation

- ▶ Industry observers have indicated that countries with archipelagic geography might benefit from Galileo Commercial Service especially in insular areas where there is no critical mass for a local PPP system
- ▶ Multi-GNSS is expected to help with a typical tropical problem: interference from dense tree canopies
- ▶ With its strong cooperation with Japan, there might be opportunities for Europe to build on existing EU-Japan cooperation schemes on GNSS
- ▶ Participants from industry, government agencies, international organisations and academia will come to the Philippines from all over Asia and Europe

Upcoming GNSS events in the Philippines

- ▶ Manila: GNSS.asia Seminar @ MGA Conference / APRSAF – 14th-16th November

