

## In a nutshell



**Agriculture & mining**



**Transport**



**Surveying & construction**

### Snapshot of Australia

Feedback from industry partners and detailed market analyses show that Australia offers a significant untapped potential for multi-GNSS applications, which are expected to become increasingly important in the near future. Australia derives a large fraction of its wealth from the exports of its mining (iron and gold), energy (natural gas and coal) and agricultural (wheat and wool) industries. Operations in these economic sectors take place over very large scales in remote areas. In the agricultural business, for example, a farm can cover 400 km<sup>2</sup>. Typical fuel consumption in planting season can reach up to 10,000 litres a day. Automation and smart solutions are thus critical not only to improve profitability but also to guarantee a safe environment for workers. The same can be said for the elaborate infrastructure (roads, power lines, etc.) needed in a country where the population density is only 2.8 inhabitants per km<sup>2</sup>.



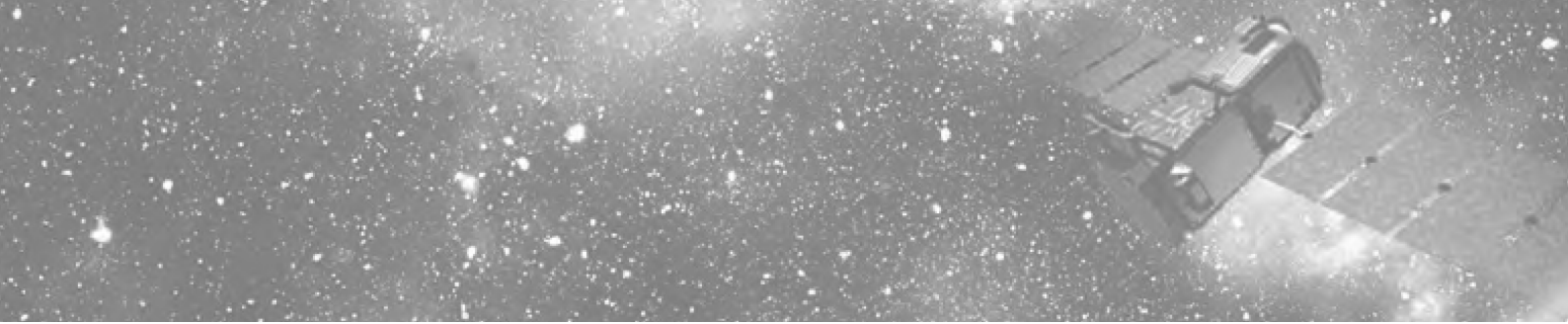
### GNSS Key opportunities in Australia

Due to the aforementioned economic and environmental situation, Australia has traditionally been an early adopter of GNSS solutions, even spawning several precision agriculture solutions. This has resulted in a growing number of economically significant sectors already relying on satellite-based services and applications. This trend is projected to continue and, in many sectors, to accelerate. With multi-GNSS opportunities materialising swiftly, Australia is set to be at the forefront of multi-GNSS application development and cooperation, which will result in an increased accuracy, availability, efficiency and reliability in countless applications. These benefits are expected to generate significant productivity gains in the mining, agriculture, construction, maritime and road transportation sectors. The strategic interest of PNT has been understood by the Australian government, which made it one of the top three priorities of its Satellite Utilisation Policy.

### Existing GNSS stakeholders

After decades of focusing on ground systems only, the Australian government has recently changed course on space systems and applications: The Satellite Utilisation Policy acknowledges the country's critical dependency on space applications posed by the fragility of the space environment. It has recognised that the ability to innovate and to then subsequently commercialise these innovations are crucial determinants of global competitiveness. To ensure national security along with economic, environmental and social well-being, a priority was placed on developing capabilities in EO, SatCom and PNT. Currently, the Space Activities Act of 1998 is being reviewed to ensure that legislation supports rather than hinders entrepreneurial innovation by Australian players.

Within the Australian space policy, coordinated by the Department of Industry, Innovation and Science, PNT falls under the responsibility of Geoscience Australia. The latter chairs the Australian Government PNT working group, which directly reports to the Space Coordination Committee. One of the responsibilities of Geoscience Australia is to develop and implement a National Positioning Infrastructure. It is advised in that task by the National Positioning Infrastructure Advisory Board, which was established in 2014 with representative members of key user groups (land and maritime transport, aviation, engineering and construction, agriculture, surveying and mapping, and device manufacturers).



The International GNSS Society Inc. (IGNSS) acts as an advocacy and networking group for downstream GNSS stakeholders in Australia and organises regular conferences and workshops. Attached to the IGNSS society is the eGNSS Alliance, a special interest group for R&D in GNSS. There are numerous downstream GNSS companies. One of the early players is GPSat, based in Victoria, operating since 1993. It has since its inception developed products for diversified applications such as RTK container positioning, race horse tracking, and open-pit excavator systems. Other companies mostly offer guidance, auto-steering and machine control solutions for surveying, agriculture and mining. These include for example Position Partners (Topcon's exclusive Australian partner), M2Mconnectivity, GlobalPos, and Beeline Technologies (acquired by Hemisphere GPS in 2009 for 21 million US\$). Another important local actor is Locata Corporation, which provides solutions for LBS in urban areas and indoor applications. Most of the international players, such as Topcon, Trimble, and Navco are represented through local distributors and installers. European SMEs successfully export to Australia (e.g. Ovinto its freight train monitoring solutions)

Several Australian universities are also active in GNSS research. These are the University of Melbourne (Department of Infrastructure of Engineering), the RMIT University (Satellite Positioning and Navigation Lab), the University of New South Wales (School of Civil & Environmental Engineering and the Australian Centre for Space Engineering Research), or the Curtin University (GNSS Research Centre).

## Existing PNT systems

The governmental organisation Geoscience Australia operates and maintains about 100 Continuously Operating Reference Stations (CORS) in collaboration with universities. These are part of three different networks: The Australian Regional GNSS Network (ARGN), which provides the geodetic framework for the spatial data infrastructure, the South Pacific Regional GNSS Network (SPRGN), which mostly aims at monitoring climate and sea levels, and the AuScope GNSS Network, focusing on continental deformations. The states of New South Wales, Queensland and Victoria also operate one network of CORS each. On top of these, there are four privately operated CORS infrastructures: AllDayRTK by Position Partners, Trimble/OmniSTAR, RTKnetwest, and SmartNet.

Australia does not operate its own SBAS yet, but has been the second principal user of data derived from the Japanese SBAS, the MTSAT Satellite Augmentation System (MSAS). SmartPath, the GBAS developed by Honeywell and the only one to have received approval from the FAA, is currently being used at Sydney airport. Eventually, it should be used all around the country. Moreover, early validation experiments involving the Japanese QZSS for precision farming in Australia have been performed by Hitachi Zosen Corporation, Hitachi, Ltd., and Yanmar Co. Ltd. Demonstration tests have been conducted using the advanced positioning signals to control a self-steering robotic tractor and perform actual farm work in a paddy field. It should be noted that one of the master stations of QZSS is located in Canberra. There are also at least three BeiDou stations on Australian territory. Since 2014 the discussion about an Australian SBAS have started again with cost benefit analyses and expert consultations. Also European players have offered their support and conducted respective workshops in Australia.

## Opportunities for EU-Australia cooperation

- ▶ Galileo, the EU's high-accuracy GNSS, is set to be a key contributor to multi-GNSS solutions. The EU industry is actively looking to contribute to cooperation possibilities on interoperability, application development, enhanced coordination, and mutual exchange of GNSS and PNT (Positioning, Navigation and Timing) expertise.
- ▶ Through Europe's Satellite-Based Augmentation System EGNOS, the European industry has built up valuable technologic and business know-how. Numerous SBAS-based European applications have considerably improved GNSS accuracy and availability in the fields of aviation, agriculture and road transportation, and have been successfully introduced internationally.
- ▶ GNSS.asia will be present in Australia at the ITS World Congress 2016 in Melbourne from 10-14th October.

## Upcoming GNSS events in Australia

- ▶ ITS World Congress 2016 in Melbourne from 10th - 14th October 2016

