

In a nutshell

Taiwan is a key player in semiconductors, electronics and terminal devices and one of the largest manufacturers of GNSS products. Its share of the global production of portable navigation devices reached 85% in 2017, and its share of smart handhelds has been steadily increasing. As a world leader in the information and communication technology (ICT) industry, Taiwan is developing innovative applications linked to satellite navigation systems, making Taiwan a key partner in the development of GNSS end-user devices and applications. Its location and flexible market makes it a valuable entry point to the Asia Pacific market. Furthermore, its development towards high-technology digital sectors such as smart cities and smart mobility can be powered by multi-GNSS solutions, and act as drivers for further uptake in other countries.



Key opportunities



LBS

IoT

Taiwan's ICT industry is a key global player, and can drive developments in other countries due to early adoption of technologies in its chipsets and receivers. It is a leading global supplier of satellite-based navigation chipsets and portable devices. Furthermore, its devices power a Location-Based Services (LBS) ecosystem focused on the handhelds sector, most notably smartphones and tablets. LBS and Internet-of-Things (IoT) are increasingly being pursued by the Taiwanese government as a means to modernise the economy. It has made considerable investment in initiatives such as the Asia Silicon Valley and Smart Machinery Industry Promotion Plan to achieve these digitalisation goals.



Road

Intelligent Transportation Systems (ITS) and telematics are seen as key opportunities for further growth in Taiwan. Furthermore, applications such as smart mobility, Mobility-as-a-Service (MaaS), Advanced Driving Assistance Systems (ADAS) and autonomous vehicles are gaining traction and will represent new avenues for multi-GNSS applications in Taiwan.



**Agriculture &
Environmental
protection**

There is increasing use of GNSS-enabled geospatial information for agriculture and environmental protection in Taiwan. Such uses include for field measurements, animal tracking, geo-traceability and navigation and positioning in Taiwan's forests and mountains for the purpose of patrolling, monitoring and enforcement of bans on illegal acts damaging lands, forests or protected animals.



**Emergency
response**

Natural disasters, such as earthquakes, typhoons, floods and forest fires, happen frequently in Taiwan. As such, early warning systems, especially those provided by or utilising GNSS systems, can offer significant opportunities. In addition, GNSS-enabled devices can help emergency response and rescue operations. For instance, the Taiwanese forestry bureau already uses remote sensing and GNSS-enabled devices to monitor and combat forest fires.

Strengths & opportunities

- World leader in semiconductor, electronics and terminal devices. As such, can drive multi-GNSS adoption by including such solutions in chipsets.
- Significant government investment in several high-technology sectors, identified by the 5+2 Industrial Transformation Plan.
- Desire to develop regional digital leadership via establishment of Asia Silicon Valley.
- Taiwanese industry is traditionally focussed on hardware development, providing opportunities for collaboration on applications.

Weaknesses & threats

- Rapid regional development of BeiDou may lead to an early BeiDou adoption and low uptake of Galileo.
- Soft barriers to market entry such as non-compatibility with local communications protocols and human language barriers.
- Difficulties for SMEs to enter Taiwanese automotive market due to inertia and strong market position of traditional players.
- Limited domestic demand compared to other large markets in Asia.

Taiwanese GNSS industry

Taiwan is a world leader for many electronic components and systems. For instance, in 2016 its combined share of notebook computer, motherboard and LCD monitor products accounted for over 60% of the global market. This ecosystem is highly integrated and covers the full scope of electronics development.

It is also one of the largest manufacturers of GNSS products with an estimated global market share of 85% of the production of portable navigation devices.

Growth is continuing across the ICT value-chain. In 2017, Taiwan registered an annual growth of 24.1% in ICT and audio-visual exports, while electronic parts and component exports increased by 20.8% and semiconductors by 20.5%.

Taiwanese industry is also a key driver towards multi-GNSS and multi-sensor navigation solutions. Such devices are intended to power the next generation of digital systems, for instance in smart cities and autonomous vehicles. The digitalisation of the automotive industry remains a key target market for Taiwanese companies, with its strength in telematics now be extended to include ITS-enabling systems.

Key GNSS stakeholders

Institutions



Chipsets / Receivers



Applications / System Integrators / Solution Providers



Contribution to multi-GNSS in Asia-Pacific

- Taiwanese semiconductor and chipset manufacturers drive global trends via adoption of selected new technologies. As such, they are key partners for the incorporation of multi-GNSS solutions in consumer and industrial electronics devices.
- The heritage of GPS, coupled with the rapid uptake of BeiDou, may lead to challenges in promoting Galileo adoption for domestic consumer applications.
- Nonetheless, the unique features of Galileo in signal authentication and civil ownership may offer attractive advantages to Taiwanese institutions and industry.



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