

In a nutshell

Taiwan is a key player in semiconductors, electronics and terminal devices. It is one of the largest manufacturers of GNSS products, such as portable navigation devices (with an estimated global market share of 64% in 2015 for this mature segment) and more recently, smart handhelds. As a world leader in the information and communication technology (ICT) industry, Taiwan is developing innovative applications linked to satellite navigation systems. This makes Taiwan a key partner in the development of Galileo end-user devices and applications. Due to its consolidated manufacturing base and full range of first-tier products, Taiwan's manufacturing sector enjoys a significant competitive advantage. Taiwan is home to a comprehensive ICT industry chain comprising upstream, midstream and downstream manufacturers.



Key opportunities



Taiwan's components technologies relating to Micro- and Nano electronics are considered to be the priority domain for EU-Taiwan cooperation. In particular, there are two major technology trends and opportunities: Sensor Fusion (e.g. imaging-, inertial- and GNSS data) and multi-GNSS integration.



Taiwan's industry can offer anything ranging from receivers up to complete devices. The entire supply chain in the LBS segment has a strong focus on the handhelds sector, most notably smartphones & tablets. While Taiwan has shown good performance in ICT hardware sector, its software business is less developed. Europe's industry has strong capabilities in software development, which provides an opportunity for EU-Taiwan cooperation.



Electric Mobility - Vehicle ICT (i.e. Automotive Electronics, Telematics, Intelligent Transportation Systems) is Taiwan's first priority for industrial diversification and also one of Europe's key strengths. The introduction of GNSS receivers into "black boxes" for automobiles in conjunction with different communication and sensing technologies will be an interesting trend to follow in the future.



There is a growing interest in Taiwan's public and private sectors to develop better solutions for natural disaster protection, search & rescue and crisis management. These solutions require more efficient and accurate GNSS services that can be applied in sectors such as Road Transport, Maritime Systems and Aviation.



Taiwan can be seen as the gateway to other Asian markets, notably to China. Taiwan is gradually transforming itself into a global innovation centre and Asia-Pacific trading hub. Taiwan can become an ideal location for establishing R&D centres, value-added production units and operating headquarters.

Strengths

- ▶ LBS Devices
- ▶ Worldwide system integrator and exporter
- ▶ ICT industrial leadership
- ▶ Unique ecosystem for semiconductor manufacturing
- ▶ Gateway to China, as an end-user market
- ▶ EMS and ODM/OEM business models

Weaknesses

- ▶ S/W business is less developed (e.g. sensor fusion algorithms, embedded software...)
- ▶ Oriented towards technology development rather than development of applications
- ▶ Lack of MEMS technologies (catching up slowly)
- ▶ No GNSS Agency
- ▶ Limited expertise on GNSS in Agriculture & Aviation



Opportunities

- ▶ Road sector: ITS and Telematics applications
- ▶ Growing interest in Natural Disaster prevention and crisis management
- ▶ ICT diversification: ICT for Automobile, Remote Health Monitoring, ICT for "Niches", etc.
- ▶ Automobile "black boxes" (domestic & regional market)
- ▶ Multi-sensing and multi-GNSS integration
- ▶ Large base of SMEs

Threats

- ▶ Evolution in manufacturing smartphones & tablets: HTC losing momentum, SAMSUNG gaining leadership, etc...
- ▶ Difficulties in gaining access to domestic public procurement in Taiwan (despite WTO/GPA signature)
- ▶ "Chaiwan GNSS": Evolving China-Taiwan business collaborations and interests (Beidou, market priorities...)

GNSS industry

- ▶ **A highly integrated ecosystem and supply chain** (from IC design to application services) for electronic components, devices and systems.
- ▶ **Semiconductors, Micro- and Nano Electronics:** Strong capability to design and produce GNSS receivers, as well as other semiconductor chips, including their integration (System-on-Chip and System-in-Package). Key opportunities for the European industry are:
 - IC Design: Partnerships with one of the 260 design houses in Taiwan, particularly active on design kits for local and global smart handhelds manufacturers (e.g. HTC, Chinese Brands, Apple, White Boxes...)
 - IC Front-End: MEMS for inertial modules and combo
 - IC Back-End: 3D (SiP) capabilities in Taiwan for sensor fusion and multi-GNSS receiver integration
- ▶ **Smartphones and Tablets**
 - LBS segment as primary target including devices integration, with a strong focus on smart handhelds sector, e.g. smartphones and tablets
 - Software integration and applications development
 - System integration of components
 - ODM/OEM Business Model (including Greater China go-to-market)
- ▶ **Road segment:** A priority for diversification for the Taiwanese ICT industry
 - ITS & Telematics applications, systems and solutions (e.g. V2X, eBUS, fleet management, uBike)
 - Automobile "black boxes" including fusion of communication and sensing technologies

Most relevant GNSS actors

Institutions									
									
Chipsets/Receivers									
									
Applications/System Integrators/Solution Providers									
									
									

Contribution to Multi - GNSS

Taiwanese semiconductor manufacturers are able to provide a combination of small, low-cost, flexible receivers equipped with multi-GNSS constellation abilities.

Taiwanese system integrators possess the benefit of turn-key solutions required to expand their businesses to different emerging markets, integrating multi-GNSS solutions.

Taiwanese are increasingly solicited by Chinese players to develop Beidou systems and multi-GNSS related businesses.

GNSS
asia

Taiwan

GNSS.asia partner: European Chamber of Commerce Taiwan

For more information on the ongoing activities of GNSS.asia, specific queries concerning the GNSS markets and matchmaking opportunities please contact Ms Angela Hsiao at angela.hsiao@ecct.com.tw ,Tel: +886-2-2740-0236 ext 226 or visit <http://taiwan.gnss.asia/home-taiwan>