In a nutshell

Japan's GDP has kept a robustly positive growth figure of about 1.1% in 2018, but its economy is facing serious challenges, with falling birth rates, an accelerating ageing population, low inflation and a global context of slowing growth and trade frictions. In spite of these challenges, Japan remains a significant innovator and a world-class leader in many high-technology areas. In 2018, Japan and the EU signed an Economic Partnership Agreement, which is expected to boost trade relations between the two blocs.

Key opportunities

Agriculture

Agriculture is traditionally a highly-subsidised industry in Japan. Similar to other countries, Japan is struggling to sustain the required number of farmers, given an exodus of youth from rural communities towards the megacities and technology/service-driven sectors. Thus Japan needs to develop technological means to improve agricultural productivity and efficiency with relatively fewer farmers. This includes precision agriculture, driven by the expected benefits of the centimetre-level precision of QZSS.

Road

Smart mobility and autonomous vehicles are key market segments for GNSS applications, and the Japanese government forecasts that the main impact of QZSS will be felt in the car navigation, mobile terminal and value-added mobility application segments. Several leading Japanese firms are active in the development and use of GNSS-enabled automotive systems, including for autonomous vehicles and high definition mapping.

LBS **IoT**

As an established leading global player in digital technologies, such trends continue to extend across Japanese society via Location-Based Services, Internet-of-Things and smart applications. Japanese devices have shown a clear trend towards low-power and multi-GNSS solutions, particularly due to the challenges of urban megacities. As Japan seeks to counter its ageing demographics via increased artificial intelligence and robotics, such applications will also rely on multi-GNSS to provide the location-information needed for their operation.

Emergency warning

Japan's QZSS is capable of distributing emergency warning messages in situations of crisis and natural disasters, for instance earthquake and tsunami warning, landslide monitoring and emergency message forwarding. These services are expected to offer high value in disaster mitigation and prevention plans. Japan and the European Union have closely been working together in this area towards a global EWS-standard, with initial tests to use QZSS for emergency warnings in Melbourne, Australia.

GNSS.asia is funded by the European Union within Horizon 2020, the EU Framework Programme for Research and Innovation, under grant agreement no 776332

Strengths & opportunities

- Technology-driven GNSS industry, with emphasis on excellent digital infrastructure for both outdoor and indoor navigation.
- A highly educated, progressive, homogenous and wealthy end-consumer base, hungry for new, value-added applications.
- Growing future expectations to use Galileo in Japan at the private sector level may become an opportunity for niche receiver makers.
- Significant government investment into space and space-enabled businesses.

Weaknesses & threats

- Large, established firms in highly-competitive industries can make it difficult for new entrants.
- Challenges for foreign firms to enter the Japanese market, due to language and cultural barriers.
- Established market position of QZSS / GPS may create scepticism of the added value of new services.

Japanese GNSS industry

- QZSS is Japan's own satellite-based positioning system, which launched operations in November 2018. It will provide services including centimetre-level accuracy to drive new applications for receiver-makers, systems integrators and solution developers. The operationalisation of QZSS represents Japan's current top priority in GNSS.
- Japan is spearheading R&D projects under QZSS in the Asia-Oceania markets through the Multi-GNSS Asia organisation and annual conference. These activities aim to promote development of multi-GNSS applications across the region, including for LBS, Intelligent Transport Systems (ITS), precision agriculture, disaster management and atmospheric monitoring.
- The highly competitive domestic market for receivers and applications is dominated by Japanese companies, including the dominant position of the traditional large conglomerates.
- Recognised European players have begun to develop partnerships and make headway into the Japanese market, including HERE Technologies, u-blox and STMicroelectronics. There exists much further potential for further European-Japanese cooperation.

GNSS.asia is funded by the European Union within Horizon 2020, the EU Framework Programme for Research and Innovation, under grant agreement no 776332

Key GNSS stakeholders

Institutions

内閣府 Cabinet Office, Government of Japan
JAXA
SPAC
INCJ
ENRI
MGA

Chipsets / Receivers

FURUNO
HITACHI Inspire the Next
SEIKO
EPSON
SONY
TOPCON

Applications / System Integrators / Solution Providers

MITSUBISHI ELECTRIC
Panasonic
NAVITIME
ジョルダン株式会社
clarion
Mapion
AISIN AW
DYNAMIC MAP PLATFORM
FUJITSU TEN
KOMATSU
Japan Asia Group KOKUSAI KOGYO CO., LTD.
ISEKI ISEKI & CO., LTD.
MSJ Magellan Systems Japan, Inc.

Contribution to multi-GNSS in Asia-Pacific

System	QZSS	MSAS
Space Segment	4 GSO satellites (approx. 32,000 – 40,000km)	2 GEO satellites
User segment	6 signals (L1-C/A, L1C, L2C, L5, L1-SAIF, LEX). Can also send short emergency warnings.	L1
Position accuracy	To centimetre-level.	Metre-level.
Current status	4-satellite constellation in 2018. An additional 3 satellites to be launched and operational by 2023.	Operational for aviation since 2007.

GNSS.asia Japan

GNSS.asia local partner: EU-Japan Centre for Industrial Cooperation

EU-Japan Centre for Industrial Cooperation 日欧産業協力センター

For more information on the ongoing activities of GNSS.asia and specific queries, please contact **japan@gnss.asia** or visit **www.gnss.asia**

GNSS.asia is funded by the European Union within Horizon 2020, the EU Framework Programme for Research and Innovation, under grant agreement no 776332