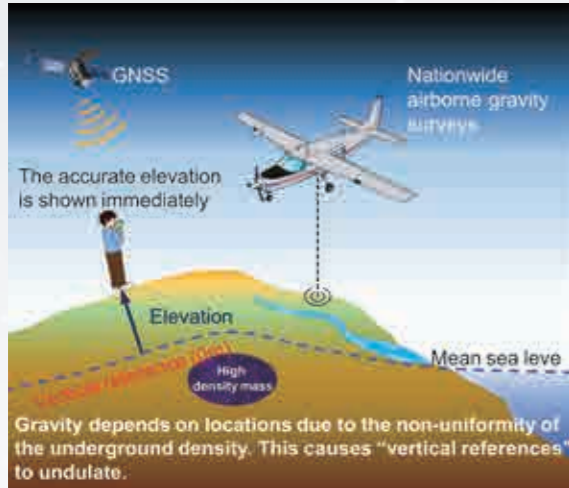


Supporting a High-precision Positioning Society*

~ Working to materialize a society that can use high-accuracy position information in realtime. ~

Toward a society utilizing elevation with GNSS



The "vertical reference (0m)", which is the surface that virtually extends mean sea level to land, is necessary to measure elevations with GNSS which is utilized for position information services such as drone deliveries. There is undulation of the vertical reference, and this undulation has a close relationship with gravity. In order to determine the vertical reference precisely, GSI has been undertaking nationwide airborne gravity survey projects. By using the vertical references determined by airborne gravity surveys, **it is possible to immediately utilize highly accurate elevation data with GNSS.**

Working to achieve a society with more reliable positioning

A high-density GNSS CORS network is required for providing more precise location-based services. To achieve this, GSI has started to integrate private observation stations into the GNSS CORS network to provide more accurate positioning services. In addition, GSI is working to strengthen the disaster resilience of the GNSS CORS network so that their observation data can be stably provided even during a disaster.



GNSS CORS

* High-precision Positioning Society:

A high-precision positioning society is being created through the popularization, high-functionality, etc., of mobile information terminals such as smart phones, as well as through the development of the Quasi-Zenith Satellites System, the development of indoor/outdoor positioning environments and techniques, and so on.

QZSS
"MICHIBIKI"
Source: qzss.go.jp



The GNSS CORS network supports precise positioning with MICHIBIKI

The QZSS operated since November 2018 and called "Japanese GPS," offers Centimeter Level Augmentation Service (CLAS) as one of the particular features to enable precise positioning in real-time. Observation data obtained at GNSS CORSs are used for CLAS, and thus GNSS CORSs become more important than ever for their role to support MICHIBIKI's services expected to be essential in various fields in future.

Delivery of augmentation information.

The control station compiles and sends augmentation information.

Location-based service providers compile and deliver augmentation information.

GSI compiles and provides crustal deformation correction information.

Airborne gravity surveys



GNSS CORS in the private sectors

Operation Center
Collecting and providing data of GNSS CORSs

GNSS CORS

Regularly corrected crustal movement site

A society supported by precise positioning



Physical Distribution Using UAV

Source: ANA HOLDINGS INC.



ICT Construction



Automated Driving

Source: Document distributed at the first business model examination meeting on automated driving around road stations in hilly and mountainous areas



Smart Agriculture

Source: Brochure of the Geospatial Project, Secretariat of the National Spatial Data Infrastructure (NSDI) Committee

Enabling positioning results to immediately be incorporated into maps

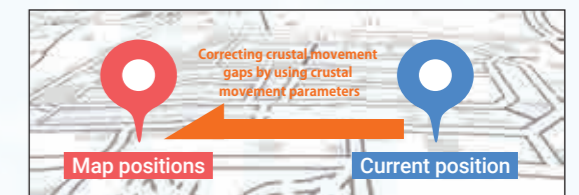
The Earth's surface is constantly moving due to crustal movements. However, because maps are made based on points of time in the past, over time immense gaps form between "current position" and "map position."

In order to correct the gaps that are caused by crustal movements, GSI has prepared a "regular crustal movement transformation site (POS2JGD)" which enables anyone to utilize "map position data" without being aware of gaps caused by crustal movements, even when measurements are taken as "current position".

Framework to support crustal deformation transformation for precision positioning (POS2JGD)
<https://positions.gsi.go.jp/cdcs/>



POS2JGD is the only way to enable you to correct positioning information to be consistent with the map.



Contributing to the realization of DX in every field!!

Physical Delivery Using UAV, Automated Driving, Smart Agriculture, ICT Construction and Understanding complex conditions, etc