

## Basic Plan for the Advancement of Utilizing Geospatial Information (Cabinet Decision 18th March 2022)

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### Abstract

*On March 18, 2022, the Japanese Cabinet decided on the Basic Plan for the Advancement of Utilizing Geospatial Information (fourth period), which is the Japanese Government's basic plan for promoting the utilization of geospatial information based on the Basic Act on the Advancement of Utilizing Geospatial Information.*

*The Fourth Basic Plan for the Advancement of Utilizing Geospatial Information is a plan that provides general guidelines and specific measures based on FY2022 to 2026 as the planning period in order to create a variety of services that utilize the maximum potential of geospatial information in a variety of fields such as disaster prevention, economics, daily living, etc., and to realize the autonomous, stable and appropriate provision of information through public-private partnerships, based on issues that appeared during the first three basic plans, initiatives to address environmental issue and intensifying disasters, the acceleration of social digitalization, and the evolution of technologies related to geospatial information. In addition, the government is to systematically promote each measure, while focusing on 10 of these as special "symbolic projects".*

*Among these Symbolic Projects, the Geospatial Information Authority of Japan (GSI) is addressing "the promotion of 'national coordinates', a common infrastructure of positional information indispensable in the era of high-precision positioning". By developing a base for positional information and map information, the GSI contributes to the social implementation of projects that utilize G-spatial technology, such as i-Construction, smart agriculture, automated driving systems, smart cities, and so on to achieve an Advanced Geospatial Information Utilization Society (G-Spatial Society).*

### 1. Introduction

In 2007, the Basic Act on the Advancement of Utilizing Geospatial Information (Act No. 63 of 2007, hereafter referred to as the "Basic Act") was enacted in order to realize an Advanced Geospatial Information Utilization Society (G-Spatial Society) in which anyone, anywhere can obtain and utilize geospatial information at any time. It stipulates that more effort should be made to promote the development and utilization of geospatial information in digital format.

The Basic Act provides for the government to formulate a Basic Plan for the Advancement of Utilizing Geospatial Information (hereafter referred to as the "Basic Plan") and develop a cooperation system among relevant administrative organs to implement the Basic Plan.

Based on this provision, the Committee for Advancement of Utilizing Geospatial Information (hereafter, "Committee for AUGI"), comprised of director-general level members of government ministries, was established to promote the utilization of geospatial information in a comprehensive and well-planned manner through partnerships and cooperation among government

ministries. Since the inception of the Committee for AUGI (and its predecessor organization), the GSI has been playing a central role as its secretariat.

So far, the government has formulated and implemented the Basic Plans through 3 periods. Through these Basic Plans, efforts to utilize geospatial information have progressively intensified, from the development of basic infrastructure (first period), to the promotion of utilization (second period), to its implementation in society (third period). On the other hand, it continues to be sets of measures to be implemented in order to further develop and update geospatial information that serves as the basic infrastructure, including the establishment of the seven-satellite constellation of the Quasi-Zenith Satellite System that enables sustainable positioning and the development of high-precision elevation data, and highly precise elevation data, and it is also necessary to accelerate the implementation of measures with the advanced utilization of geospatial information, such as new-age transportation and logistics systems, including the practical use of drones in logistics, and the improvement of the quality of people's lives in society.

Moreover, as the potential for utilizing geospatial information in new industries and services expands, there is a need to develop human resources that can utilize geospatial information, which is important for its implementation in society.

Against this backdrop, the Cabinet decision was made for the fourth period of the Basic Plan on March 18, 2022. In the Fourth Basic Plan, given the changes in social conditions such as the increasing severity and frequency of natural disasters and environmental problems, the acceleration of digitization triggered by the novel coronavirus disease (COVID-19), and the dramatic evolution of technologies related to geospatial information, the plan's aim is to create and provide various services that fully utilize the potential of geospatial information so that anyone can live their own lifestyles anytime and anywhere.

This paper will first provide a summary of the first three Basic Plans and their results. After that, there will be a summary of the Fourth Basic Plan and an introduction to specific measures that the GSI has taken to promote it.

## 2. The previous Basic Plans for the Advancement of Utilizing Geospatial Information

### 2.1 The First Basic Plan— Development of Basic Infrastructure

Geospatial information has been advancing amid growing expectations and possibilities for the realization of a "ubiquitous society" in which anyone can access information networks anytime, anywhere, from anything. Given these social needs and developments in information technology, in April 2008, the first Basic Plan was formulated to realize an Advanced Geospatial Information Utilization Society (G-Spatial Society). The First Basic Plan included measures related to Geographic Information Systems (GIS) such as the development and updating of Fundamental Geospatial Data, measures related to satellite positioning, navigation and timing such as the promotion of the Quasi-Zenith Satellite System plan, and measures for industry-academia-government collaboration related to the promotion of utilization. Based on the plan, various measures were taken, and advanced.

In FY2008, Fundamental Geospatial Data with a 25,000 scale level which can be accessed free of charge from the Internet were almost completed nationwide, and in FY2011, the development of Fundamental Geospatial Data with a 2,500 scale level was almost completed in city planning areas throughout the country. In September 2010, the first Quasi-Zenith Satellite, "Michibiki", was launched. It provided new knowledge such as the possibility of new businesses and new applications through technical and practical testing, and identified issues for their realization. Furthermore, after the establishment of the industry-academia-government Collaborative Council for Geospatial Information consisting of industry-academia-government groups and institutions as well as academics, the Geospatial EXPO attracted approximately 40,000 visitors in September 2010 (Photo 1) which served as a foundation for public awareness and the creation of new services and industries.



Photo 1 Geospatial EXPO

### 2.2 The Second Basic Plan—Promotion of Utilization

With the rapid progress of information and communications technology and the spread of high-performance mobile terminals such as smartphones, even among individuals, expectations were that geospatial information (using GIS and satellite positioning, navigation and timing) would become a tool for solving various social issues facing Japan, such as globalization, maintenance and management of social capital stocks, energy problems, dealing with an aging society and declining birth rates and population, environmental problems and ensuring regional safety and security. The

Great East Japan Earthquake that occurred on March 11, 2011 also served as an opportunity for further utilization of geospatial information for reconstruction, and preparation for future disasters. Against this backdrop, in March 2012, the Second Basic Plan was formulated. The Second Basic Plan included the development of an environment in which geospatial information could be searched, obtained, and used in one setting.

In November 2016, the G-Spatial Information Center was established and started operations, enabling one-stop searches, acquisition, and use of geospatial information arranged by characteristics and fields. In addition, based on the lessons learned from the Great East Japan Earthquake and other disasters, the government had taken initiatives to develop, distribute, and utilize geospatial information as a foundation for realizing a disaster-resilient and sustainable nation, particularly for preparing for a potential Nankai Trough Major Earthquake and Tokyo Inland Earthquake.

In addition, specific efforts are being made in the areas of developing, providing, and updating geospatial information such as Fundamental Geospatial Data, as well as maintaining and strengthening advanced technical infrastructure for satellite positioning, navigation and timing were undertaken.

### **2.3 The Third Basic Plan —Social Implementation**

With the progress of information technology, a variety of information is instantly being collected and stored as "big data" in large amounts by the Internet of Things (IoT), and advanced processing and utilization are being done by Artificial Intelligence (AI). The wave of the "4th Industrial Revolution" has arrived.

The Third Basic Plan was formulated based on this situation in March 2017, with the expectation of the full-scale operation of the four-satellite Quasi-Zenith Satellite System and the progress of information sharing through the aforementioned G-Spatial Information Center. The Plan defined geospatial information utilization technology as a forerunner to the "4th Industrial Revolution", and was designed to realize a new social vision where everyone can experience personal growth and happiness.

During the period of the Third Basic Plan, the

development of Fundamental Geospatial Data and the GNSS network steadily progressed, as did efforts to make data possessed by the public and private sectors open to everyone. The development of an environment in which anyone can freely use a wide variety of data from a data platform built for each field, such as disaster prevention, agriculture, transportation, etc., has progressed. In 2018, a four-satellite Quasi-Zenith Satellite System was established. Operations to provide centimeter-level high-precision positioning services using augmentation information from GNSS Continuously Operating Reference Stations in real time across the country were begun, as were corporate activities utilizing this service such as product development. Furthermore, the use of geospatial information has progressed in both the public and private sectors, such as the visualization of disaster information by mapping activities of local governments, full-scale operation of a system for estimating tsunami inundation damage, development of technical specifications for the Dynamic Maps and the commercial launch of Level 3 automated driving vehicles equipped with automatic operation equipment that utilizes it, and the development of unmanned automated driving systems for remote monitoring of agricultural machinery.

## **3. Summary of the Fourth Basic Plan for the Advancement of Utilizing Geospatial Information**

### **3.1 Composition of the Fourth Basic Plan for the Advancement of Utilizing Geospatial Information**

The Fourth Basic Plan consists of two parts.

Part I describes the changes in social conditions behind the formulation of the Fourth Basic Plan and general guidelines to implement the Plan, and Part II describes specific measures based on the overall guidelines presented in Part I.

### **3.2 Part I Basic Guidelines to implement the Fourth Basic Plan**

#### **3.2.1 Changes in the social situations surrounding geospatial information**

As described in the previous section, through the first three Basic Plans, efforts to utilize geospatial information had progressively expanded from the

development of basic infrastructure (first period), to the promotion of utilization (second period), to the implementation in society (third period), and they gave steady results. At the same time, various changes have been seen in recent years in the social situation surrounding geospatial information.

During the period of the Third Basic Plan, in addition to the occurrence of earthquake disasters, storm and flood damage such as heavy rains occurred frequently. Water disasters and landslide disasters becoming more severe and frequent due to climate change are constantly a matter of great concern, as is the risk of occurrence of great earthquakes.

In addition, as global warming progresses due to human activities and the effects of climate change are becoming clearer, it is becoming an urgent issue to deal with environmental problems such as climate change. In Japan as well, with the aim of realizing a carbon-neutral and decarbonized society by 2050, it is necessary to take proactive measures against global warming and create a sustainable cycle between the economy and the environment. It is expected that the utilization of geospatial information will progress further in various fields such as simulations aimed at understanding and expanding the introduction of renewable energy.

Furthermore, the COVID-19 pandemic has accelerated the digitization of society as a whole. As for geospatial information, the need for real-time congestion information to avoid "crowding" and contact confirmation information with infected people has increased, so that the use of positional information has progressed. In addition, the Digital Agency was established by the government as a new "control tower" to promote measures related to the formation of a digital society.

Moreover, technologies related to geospatial information are also evolving rapidly. Improvements in the accuracy of cameras and sensors have made it possible to obtain large amounts of dynamic geospatial information in real time. The Advanced Land Observing Satellite-2 "DAICHI-2" (ALOS-2) is being used to acquire and accumulate observation and survey data. Furthermore, in the future, it is expected that a seven-satellite Quasi-Zenith Satellite System will be established

to acquire and accumulate high-frequency and wide-area observation data by small satellite constellations. In terms of data processing capacity, it is becoming possible to carry out more detailed, wide range, complex, and quick analyses than ever before due to innovations in algorithms such as machine learning and deep learning, improvements in CPU performance, etc.

### **3.2.2 Visions to be attained through the utilization of geospatial information**

Against this backdrop of changes in social and technological conditions, the Fourth Basic Plan aims to realize a society in which everyone can enjoy their own way of life anytime, anywhere. It was decided to try to create various services that fully utilize the potential of geospatial information in various fields such as disaster prevention, economy, daily living, etc., and to achieve autonomous, stable and appropriate provisions through public-private partnerships. Figure 1 shows a conceptual image.

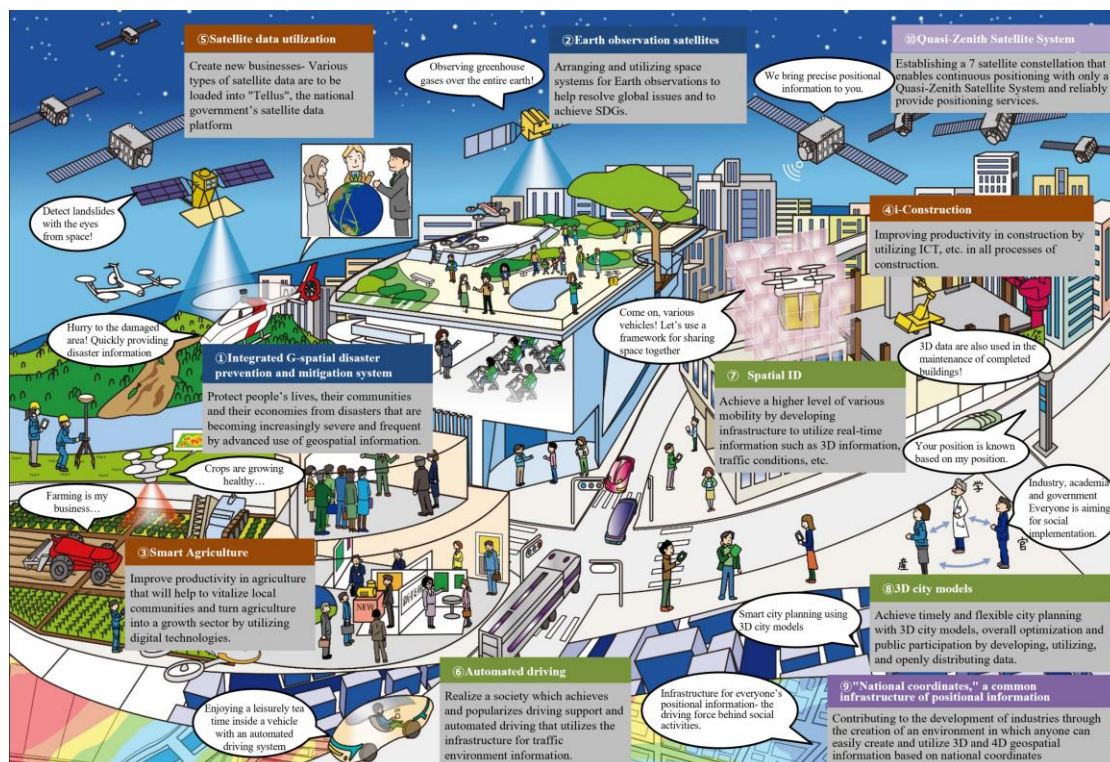


Fig. 1 Form of society as the objective designated in the Fourth Basic Plan for the Advancement of Utilizing Geospatial Information, realized as a result of implementation.

### 3.2.3 Overall guidelines for the Fourth Basic Plan

In the Fourth Basic Plan, the five-year plan period from FY2022 to FY2026 provides for measures to be taken based on the above-mentioned changes in the social situation surrounding geospatial information, the evolution of technology, and visions to be achieved through the utilization of geospatial information. This involves (1) new developments in the utilization of geospatial information, (2) building a sustainable development spiral of businesses utilizing geospatial information, and (3) support for the development and exchange of human resources for geospatial information.

#### (1) New developments in the utilization of geospatial information

Technology related to geospatial information has evolved significantly as mentioned above so that not only the typical static data acquired in the past, but also dynamic and real-time data are being handled by GIS. The

proportion of dynamic and real-time data is increasing. Furthermore, they are interconnected through data platforms developed in each field, leading to the openness of data, and the creation of new value. As for the purpose of use, it is now becoming possible to predict (simulate) the future by combining past data and real-time data, not only to grasp the past situation but also to analyze something based on it.

In this way, based on the fact that the potential of geospatial information as a basic tool for resolving social issues has increased significantly, and the recognition that geospatial information is a next-generation public infrastructure that contributes to the resolution of various social issues, the first guidelines were set as active dissemination of information and making new developments in the utilization of geospatial information. In addition, in order to develop data platforms and create services to be deployed on them, the Basic Plan stipulates that measures should be taken to expand the fields of utilization, including fields where geospatial information

has not been fully utilized despite the latent demand for it, as well as measures to promote the creation of new cross-sectoral businesses and services.

(2) Building a sustainable development spiral of businesses utilizing geospatial information

For projects that should be promoted by the whole nation to create new industries and new services that utilize geospatial information, the second goal was to build a sustainable development spiral of businesses that create diverse values, through the government's support for corporate activities using geospatial information appropriately according to stage of growth - the creation of early adopted use cases, social implementation, and finally the establishment of "ecosystems" in the private sector. In order to establish such a spiral, industry, academia, government, and the private sector are to work together, taking into consideration the characteristics of each project. It was decided to consider setting up a mechanism to do so.

(3) Support for the development and exchange of human resources for geospatial information

In order to resolve social issues and create new services by fully utilizing the potential of geospatial information, it is necessary to develop human resources who would be responsible for the utilization of geospatial information. In particular, it is necessary to nurture human resources who not only can create innovative ideas, that is, "people who can discover value," but also "people who can utilize discovered value." In order to develop such human resources, the government encourages the formation of a community in which diverse groups of people work together to promote commercialization by encouraging people in the information field to jump into other fields and industries, and by attracting people in other fields to the field of geospatial information. The third goal was to provide support for the development and exchange of human resources for geospatial information.

Part II (Fig. 2) presents measures that should be taken based on overall goals: (1) new developments in utilization of geospatial information, (2) building a sustainable development spiral of businesses utilizing geospatial information, and (3) support for the development and exchange of human resources for geospatial information. The specific measures to be implemented are classified into five "sections": "Section 1. Response to natural disasters and environmental issues," "Section 2. Revitalization of industry and economy," "Section 3. Realization of comfortable lifestyles," "Section 4. Continuous development and enhancement of geospatial information infrastructure," and "Section 5. Comprehensive measures to promote the development and utilization of geospatial information".

In addition, the plan provides 10 measures as "Symbolic Projects" that are given special importance from among the specific measures in this Plan. They are described in Section 6.

The contents of Part II are described in detail in the next section.

### 3.3 Part II Specific policies and measures for the Advancement of Utilization of Geospatial Information

<p><b>1. Response to natural disasters and environmental issues</b></p> <p>【Symbolic Projects】</p> <p>①Promoting the construction of an integrated G-spatial disaster prevention and mitigation system</p> <p>②Contributing to the solution of global-scale issues such as climate change etc. using earth observation satellites</p>
<p><b>2. Revitalization of industry and economy</b></p> <p>【Symbolic Projects】</p> <p>③Promoting the utilization of digital technology, including acceleration of smart agriculture</p> <p>④Promoting the utilization of 3D data through the promotion of i-Construction</p> <p>⑤Project to promote satellite data utilization</p>
<p><b>3. Realization of comfortable lifestyles</b></p> <p>【Symbolic Projects】</p> <p>⑥Promoting the development and diffusion of automated driving systems</p> <p>⑦Developing 3D spatial information infrastructure containing "Spatial ID"</p> <p>⑧Project for development, utilization, and open data creation of 3D city models "PLATEAU"</p>
<p><b>4. Continuous development and enhancement of geospatial information infrastructure</b></p> <p>【Symbolic Projects】</p> <p>⑨Promotion of "national coordinates," a common infrastructure of positional information indispensable in the age of high - precision positioning</p> <p>⑩Promotion and development of the Quasi-Zenith Satellite System (QZSS) and improvement of its positioning capability</p>
<p><b>5. Comprehensive measures to promote the development and utilization of geospatial information</b></p>

(1) Promoting the construction of an integrated G-spatial disaster prevention and mitigation system

In order to mitigate the damage from disasters that have become more severe and frequent in recent years, "G-spatial disaster prevention technology", which is a technology of the advanced utilization of geospatial information related to disaster management that is collected by the national government, local governments, etc. for disaster prevention and mitigation, is to be implemented at each stage of the disaster prevention cycle, in conjunction with national resilience efforts.

(2) Contribution to a green society by utilizing geospatial information

The government is to steadily develop and utilize space systems for observing the global environment and visualize information on renewable energy, biodiversity, etc. as geospatial information in order to contribute not only to the resolution of global issues, but also to the creation of green societies at the local level.

Fig. 2 Specific policies and measures for the Advancement of Geospatial Information Utilization

**4. Specific promotion measures based on the Fourth Basic Plan – Part II of the Fourth Basic Plan**

Part II of the Fourth Basic Plan defines specific measures to be promoted based on the Fourth Basic Plan. Part II consists of six sections, from Section 1 to Section 6. Each section introduces the basic concepts of measures and the specific measures taken by the GSI.

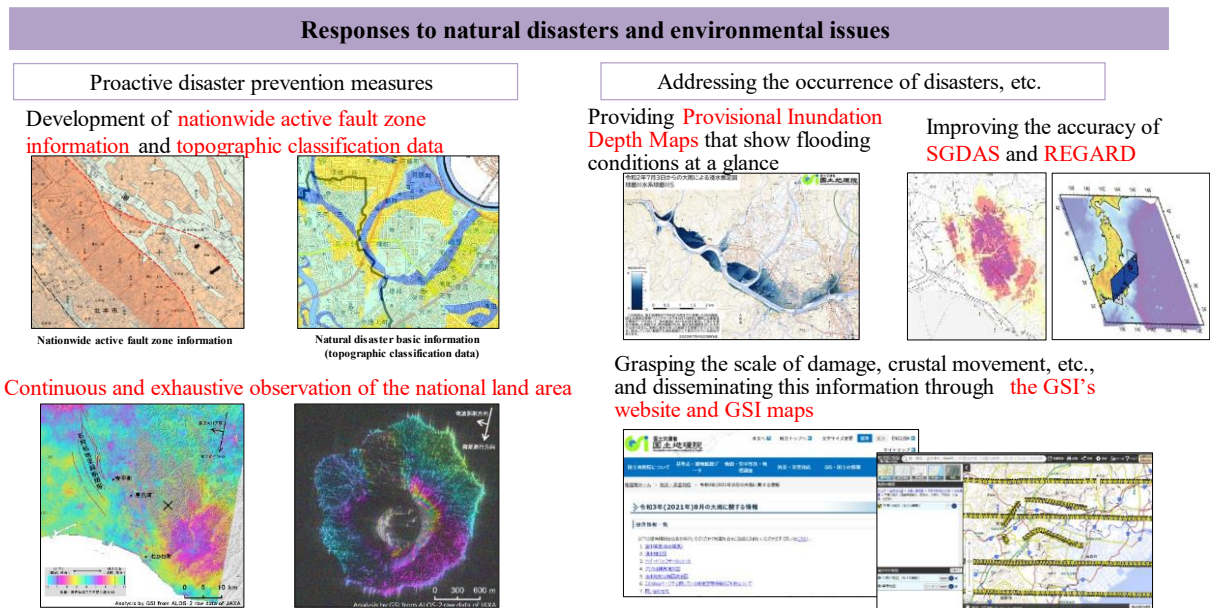
**4.1 Response to natural disasters and environmental issues**

**4.1.1 Basic Concepts**

Part II, Section 1, "Response to natural disasters and environmental issues," describes "Promoting the construction of an integrated G-spatial disaster prevention and mitigation system," a "disaster prevention and mitigation system" and "contributions to a green society by utilizing geospatial information". The basic concepts of each measure are as follows.

**4.1.2 Specific measures taken by the Geospatial Information Authority of Japan**

The measures promoted by the GSI of Japan regarding "Responses to natural disasters and environmental issues" are as follows. All of these measures are related to "Promoting the construction of an integrated G-spatial disaster prevention and mitigation system" (Fig. 3).



**Fig. 3** GSI's measures related to "Response to natural disasters and environmental issues"

- Development of geospatial information for disaster mitigation such as nationwide active fault zone information, which provides risk information on earthquake disasters, and landform classification data, which provides risk information on floods, etc.
- Surveillance of the national land area by interferometric SAR analysis using ALOS-2 and ALOS-4 data.
- Prompt provision of Provisional Inundation Depth Maps that estimates the extent and depth of inundation using aerial photographs and images posted on SNS, and displays them on maps.
- Research and development to improve the estimation accuracy of "SGDAS" (Seismic Ground Disaster Assessment System), which is a system that estimates the occurrence area and scale of ground disasters such as landslides and liquefaction immediately after an earthquake and automatically distributes this information to relevant ministries and agencies, and of REGARD (Real-time GEONET Analysis System for Rapid Deformation Monitoring), which is a system that instantly estimates crustal movements, fault positions, etc., and automatically distributes the information to relevant ministries and agencies.

- Grasping the scale of damage, crustal movement, etc., and disseminating this information through the GSI's website and GSI maps.

## 4.2 Revitalization of industry and economy

### 4.2.1 Basic Concepts

Part II, Section 2 "Revitalization of industry and economy" consists of 2 pillars: "Improving productivity and operational efficiency through digital transformation (DX)," and "Creation of new services utilizing advanced geospatial information, etc." The basic concepts of each pillar are as follows:

- (1) Improving productivity and operational efficiency through digital transformation (DX)

The government is to promote the utilization of satellite data navigation and timing, and 3D data by sharing and interconnecting among different entities, utilizing remote sensing technology, etc., automation, labor-saving, and efficiency improvements in various operations by utilizing satellite positioning technology, thereby strongly promoting smart industries and economics. Through these DX promotion activities, the government will contribute to the revitalization of industry and the economy through increased productivity,



while also helping to reduce the environmental burden.

(2) Creation of new services utilizing advanced geospatial information, etc.

The government is to promote the creation of new industries and new services by providing useful information using various types of geospatial information such as satellite data and human flow data, and by supporting the development of solutions that contribute to the improvement of industrial productivity.

#### **4.2.2 Specific measures taken by the Geospatial Information Authority of Japan**

The GSI has contributed to the implementation of the measures described in this section by steadily implementing the measures provided in the Basic Plan in Section 1 "Response to natural disasters and environmental issues", and Section 4 "Continuous development and enhancement of geospatial information infrastructure".

### **4.3 Realization of comfortable lifestyles**

#### **4.3.1 Basic Concept**

The basic concepts of Part II Section 3 "Realization of comfortable lifestyles" are as follows.

The government is to contribute to the development of smart cities that embody Society 5.0, and help everyone to realize rich and safe lifestyles using geospatial information. For this purpose, the government is to promote social implementation and the utilization of services that will help to improve convenience by utilizing high-precision positional information and 3D data in fields familiar to everyone, such as transportation, logistics, and urban development, while improving the necessary environments, etc.

#### **4.3.2 Specific measures taken by the Geospatial Information Authority of Japan**

The GSI has contributed to the implementation of the measures stated in this section by steadily implementing measures provided in the Basic Plan in Section 1 "Response to natural disasters and environmental issues", and Section 4 "Continuous development and enhancement of geospatial information

infrastructure".

### **4.4 Continuous development and enhancement of geospatial information infrastructure**

#### **4.4.1 Basic Concepts**

Part II, Section 4, "Continuous development and enhancement of geospatial information infrastructure" consists of four pillars: "Development and advancement of fundamental geospatial information and promotion of GIS", "Promotion of the development of the Quasi-Zenith Satellite System, etc.", "Promotion of geospatial information distribution and utilization", and "Overseas development and international contributions of geospatial information infrastructure." The basic concepts of each measure are as follows.

(1) Development and advancement of fundamental geospatial information and promotion of GIS

In order to implement the measures listed in Sections 1 to 3 of Part II, it is essential to continue to develop basic geospatial information such as Fundamental Geospatial Data, which have been addressed since the first Basic Plan. The government is to steadily develop, update, maintain, manage and upgrade geospatial information to ensure that it does not become obsolete with the passage of time and that the value of its use does not decline, while promoting the provision of geospatial information that meets various needs for utilization through web maps, etc., and the development of GIS.

(2) Promotion of the development of the Quasi-Zenith Satellite System, etc.

Japan's own system for satellite positioning, navigation and timing, the Quasi-Zenith Satellite System, officially went into service with the four-satellite constellation in 2018, and its successor was launched in 2021. As an important social infrastructure that provides positional and time information indispensable for the realization of a G-Spatial Society, the government is to continue to develop the seven-satellite constellation that enables sustainable positioning, and steadily provide the service. Also, the government is to study the ideal system for satellite positioning, navigation and timing in Japan from a medium-to long-term perspective in order to

maintain and improve the positioning capability of the Quasi-Zenith Satellite System.

(3) Promotion of geospatial information distribution and utilization

Allowing a wide variety of geospatial data to be interconnected and promoting the openness of data will lead to the creation of new information and new value. To this end, the government will promote the use of data platforms that allow users to easily access information, and develop mechanisms and rules for the distribution and utilization of geospatial information, taking into consideration its accuracy, reliability, safety, and versatility for mutual use.

(4) Overseas development and international contributions of geospatial information infrastructure

Through active participation in the international standardization of geospatial information, etc., efforts will be made to contribute to the development of the global geospatial information infrastructure and advancing its utilization. Furthermore, the government will promote the overseas development of high-precision positioning augmentation services, etc., using Japan's unique Quasi-Zenith Satellite System, mainly in the Asia-Pacific region, to promote private-sector investment and enhance Japan's presence in the international community.

#### **4.4.2 Specific measures taken by the Geospatial Information Authority of Japan**

The measures promoted by the GSI regarding "Continuous development and enhancement of geospatial information infrastructure" are as follows (Fig. 4).

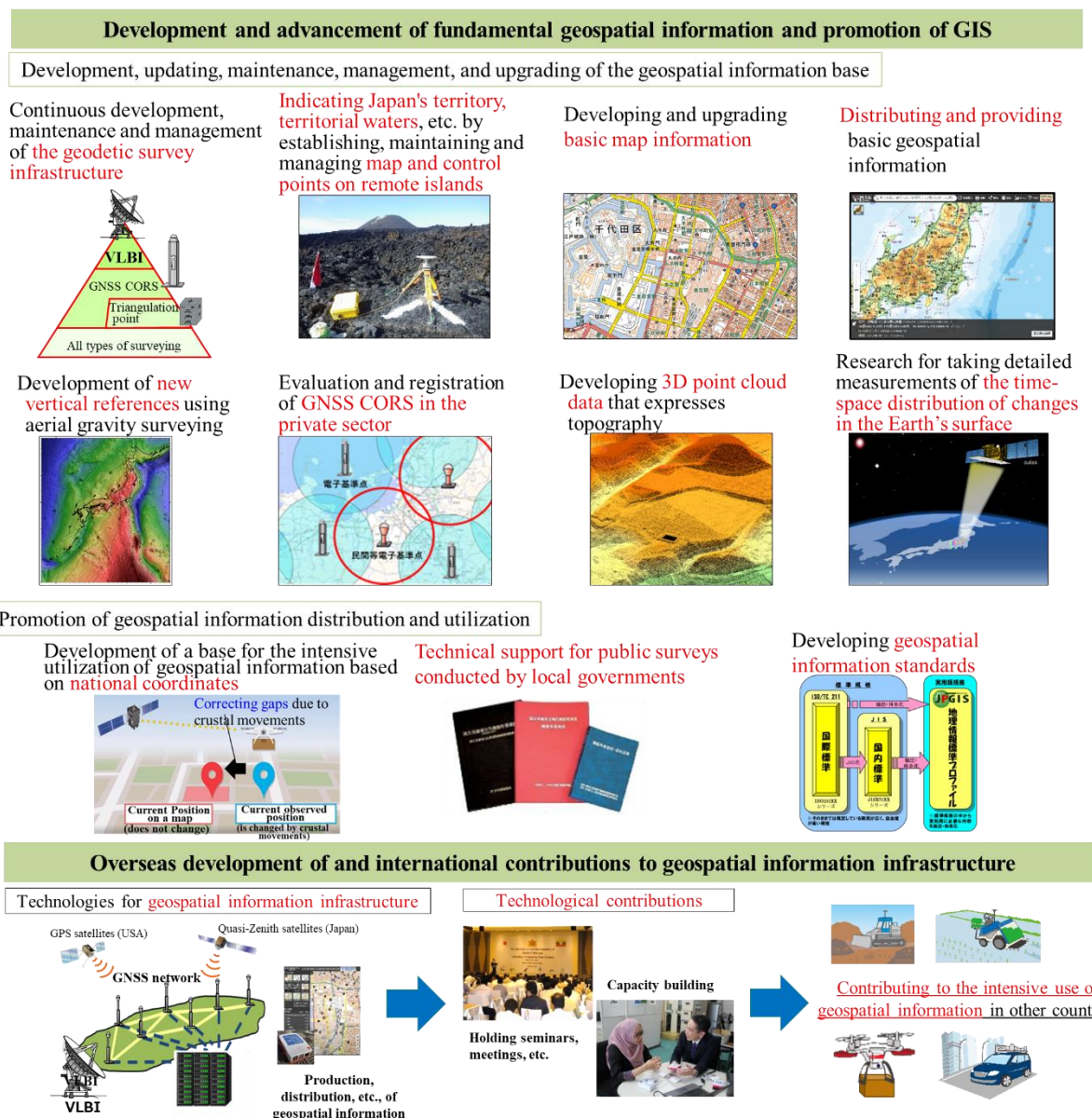


Fig. 4 GSI's measures related to the continuous development and enhancement of geospatial information infrastructure

(1) Development and advancement of fundamental geospatial information and promotion of GIS

- Continuous development and management of geodetic survey infrastructure, including the maintenance and management of highly accurate national positional references based on VLBI observations, and the stable operation and advancement of the continuous GNSS observation network by GNSS CORSs (GEONET).
- Establishment, maintenance and management of control points on remote islands in order to accurately indicate Japan's territory, territorial waters, etc.
- Development of new vertical references using airborne

gravity surveys.

- Development of 3D point cloud data that can be used to develop 3D maps, by utilizing aerial laser surveying, etc.
- Performance evaluation of GNSS continuous observation stations installed by private companies, etc., and registration as GNSS CORSs in the private sector.
- Continuously develop and update map information including Fundamental Geospatial Data, ortho images, place name information, etc., which is the standard for locations on these electronic maps.
- Research on detailed measurements of the spatio-temporal distribution of ground surface deformation,

automation of feature extraction from images using AI, etc.

- Provision of highly reliable and fresh geospatial information such as the Digital Japan Basic Map.
- (3) Promotion of geospatial information distribution and utilization
- Establish a system for crustal deformation transformation that will allow easy use of positional information consistent with national coordinates anywhere.
  - Provide technical advice for public surveys conducted by local governments, etc.
  - Maintain the Japan Profile for Geographic Information Standards (JPGIS) systematized based on the latest ISO standards and JIS.
- (4) Overseas development and international contributions to geospatial information infrastructure
- Participation in ISO international standardization work for geospatial information.
  - Technology transfer necessary for accurate latitude and longitude measurements for the realization of the Global Geodetic Reference Frame (GGRF) adopted by the United Nations General Assembly.
  - Provision of technical support for the establishment of GGRF with the services such as the International VLBI Service for Geodesy and Astrometry and the International GNSS Service in response to the efforts of the United Nations Committee of Experts on Global Geospatial Information Management (UN-GGIM), etc.
  - Support for the construction and operation of geospatial information infrastructure in the field of surveying, including the GNSS network.

#### **4.5 Comprehensive measures to promote the development and utilization of geospatial information**

##### **4.5.1 Basic Concepts**

The basic concepts of Part II Section 5 "Comprehensive measures to promote the development and utilization of geospatial information" are as follows.

In order to create various services that fully utilize the potential of geospatial information in various fields such as disaster prevention, economics, and daily life, and

to develop the necessary geospatial information infrastructure, the government is to work to resolve various issues related to the utilization of geospatial information through Committee for AUGI and working groups established thereunder, and strengthen coordination and cooperation among national and local government organizations, as well as industry, academia, government and the private sector.

In addition, in order to develop human resources who will be responsible for the next generation G-spatial society and to create use cases in various fields, including fields where geospatial information has not been fully utilized so far, the government is to work with industry, academia, government and the private sector to organize various events and actively disseminate information, while also involving the communities in related fields.

Furthermore, to encourage new developments in the utilization of geospatial information, the government is to strategically promote research and development in collaboration with the Council for Science, Technology and Innovation, work for the verification and effective dissemination of research results, and establish a mechanism to facilitate implementation in society.

##### **4.5.2 Specific measures taken by the Geospatial Information Authority of Japan**

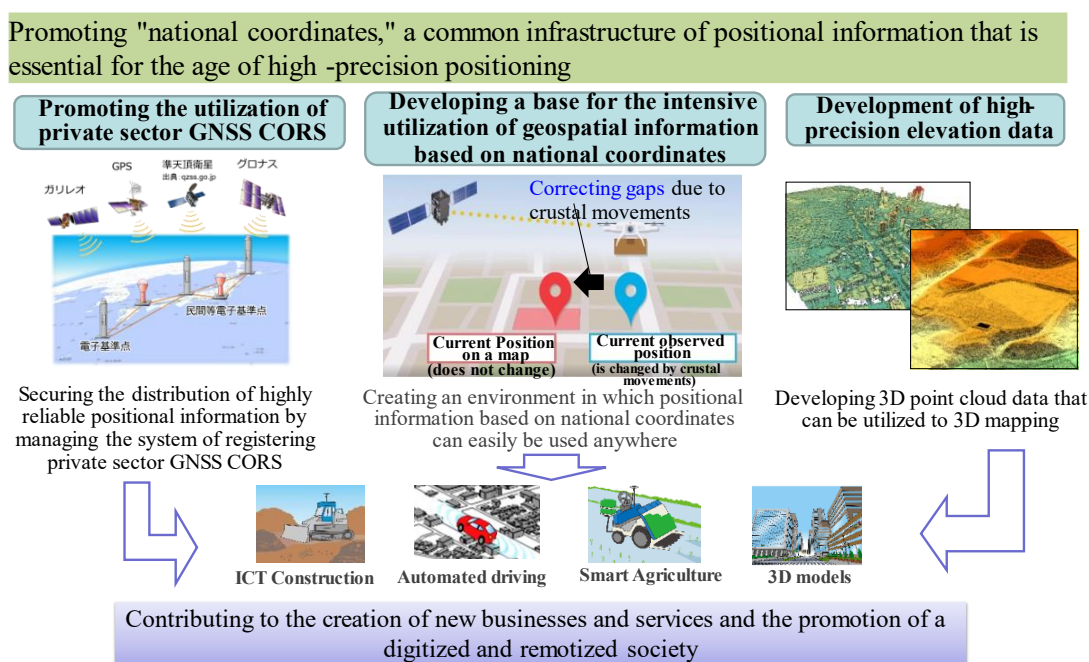
The measures promoted by the GSI regarding "Comprehensive measures to promote the development and utilization of geospatial information" are as follows:

- Hold the Geospatial EXPO composed of seminars on the effectiveness of the use of geospatial information and the latest technological trends, lectures and symposiums that contribute to the creation of new industries and new services, as well as exhibitions of new products and services, etc., together with the Cabinet Secretariat and the Ministry of Land, Infrastructure, Transport and Tourism.
- Support people who are responsible for the utilization of geospatial information in geography-related education and disaster prevention and for education in fields related to geology, by providing contents and materials to support educational activities.

#### 4.6 Symbolic Projects

In Section 6 of Part II, this Basic Plan stipulates 10 measures that should be particularly prioritized as "Symbolic Projects", among the measures to be promoted in Sections 1 to 5. GSI is to implement one of these symbolic projects, "Promotion of 'national coordinates,' a common infrastructure of positional information indispensable in the era of high-precision positioning" (Fig. 5).

etc., and the distribution of highly reliable positional information. In addition, the development of standards and 3D point cloud data, which are indispensable for the realization of the digital twin, is to be promoted as the basis for the creation of 3D maps. By developing these positional information and map information infrastructure, the GSI contributes to the social implementation of projects using G-spatial technology such as i-Construction, smart agriculture, automatic driving, smart cities, etc., and to the realization of a G-spatial Society.



**Fig. 5** Symbolic projects "Promotion of 'national coordinates' a common infrastructure of positional information indispensable in the era of high-precision positioning"

This measure is designed to create an environment in which anyone can easily develop and use 3D and 4D geospatial information that conforms to the common rules for harmonizing positional information as "national coordinates".

For this reason, the GSI is to promote the appropriate operation of GEONET, the widespread use of the registration system for GNSS CORSs in the private sector, improvement of the accuracy of the crustal deformation transformation system and its stable operation, the establishment of new vertical references

#### 5. Concluding remarks

The Fourth Basic Plan focuses on maximizing the potential of geospatial information to resolve social issues and create new services. The GSI will promote measures related to responses to natural disasters, development and provision of basic geospatial information, etc., focusing on the Symbolic Project "Promotion of 'national coordinates' a common infrastructure of positional information indispensable in the era of high-precision positioning" in order to steadily

implement this plan.

In addition, as one of the secretariats of the Committee for AUGI, the GSI plans, formulates, and comprehensively coordinates measures to promote the utilization of geospatial information. The GSI will continue to actively lead the government's work to promote the utilization of geospatial information.

#### **References**

- Basic Act on the Advancement of Utilizing Geospatial Information (Act No. 63 of 2007) .
- Basic Plan for the Advancement of Utilizing Geospatial Information (Cabinet Decision of April 2008) .
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