

## Long-Term Plan for Basic Surveys

*MLIT Notification No. 608*

*Based on the regulations of Article 12, the Survey Act (Act No. 188 of 1949), a Long-Term Plan for Basic Surveys was established. Related documents are available for inspection at the Geographical Survey Institute\* of the MLIT (1, Kitasato, Tsukuba city, Ibaraki prefecture).*

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### 1. Introduction

The Long-Term Plan for Basic Surveys (hereinafter referred to as "Long-Term Plan") is a plan on the Basic Surveys, which is conducted by the Geographical Survey Institute (hereinafter referred to as "the GSI") as the survey that serves as the basis for all other surveys, and Long-Term Plan shall be stipulated by the Minister of MLIT based on Article 12 of the Survey Act.

Long-Term Plan shall be established in order to achieve the purpose of the Survey Act, which is to avoid redundancy in surveys and to assure survey accuracy by publicly announcing the target and scale of the Basic Surveys in advance.

According to the Basic Act on the Advancement of Utilizing Geospatial Information (Act No. 63 of 2007 - hereinafter referred to as the "NSDI Act") enacted in 2007, information that represents the position of specific point or extent in geospace and its associated information are defined as geospatial information, and it is considered extremely important to promote its advanced utilization for creating an economic society in which people can live their lives security and abundantly.

This revision of Long-Term Plan aims to clarify the policies, for which GSI should take initiative in implementing, in order to realize an advanced geospatial information utilization society in which geospatial information including survey results will be used more effectively based on the newly enacted NSDI Act in addition to the Survey Act.

### 2. Background of the Revision of Long-Term Plan

Long-Term Plan has been established approximately every ten years since the first Long-Term Plan had established in 1953.

The last plan was established in June 2004 to cover until FY 2013, aiming to establish an environment in which all geographic information will be easily accessible to anybody, anytime and anywhere. Toward this end, targets were set up based on the following three points: (1) promotion of the development and utilization of the Geo-Referencing Infrastructure (GRI), (2) promotion of the development and utilization of the "Digital Japan" fundamental information, and (3) promotion of the development and utilization of geographic information for disaster prevention and mitigation, and the policies and projects to be implemented with priority were specified.

Afterwards, the Survey Act was revised in 2007 to specify the electronic distribution of survey results and the promotion of one-stop-service for approving the reproduction and use of survey results. Also, the NSDI Act enacted in the same year establishes the FGD as a positional reference for digital maps - that is, as data that plays an important role in associating various geospatial information including survey results in terms of positions. The act also seeks comprehensive and systematic implementation of the following: promotion of the utilization of the Geographic Information System (GIS), satellite positioning, and other technologies; human resource development; and strengthening the cooperation among related agencies such as national and local governments. In addition, the act seeks the establishment

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\*The official English appellation of the GSI was changed to "Geospatial Information Authority of Japan" from "Geographical Survey Institute" on April 1, 2010.

of an environment that enables the advanced use of geospatial information through the combination of the GIS-related policies and the policies on satellite positioning.

Also, the Basic Plan for the Advancement of Utilizing Geospatial Information (hereinafter referred to as "NSDI Plan"), which the Cabinet decided on in April 2008, aims at smooth development of FGD, improvement of people's safety and security as well as their convenience, efficient administration, and creation and development of new industries and services by utilizing geospatial information.

In addition, the Basic Space Law, which was enacted in May 2008 (Act No. 43 of 2008), stipulates that the national government shall promote the establishment of a positioning-related information system and take other related policies.

Considering the above-mentioned social background, a new Long-Term Plan shall be established with the basic idea of forming the foundation for development, distribution, and utilization of geospatial information.

In promoting this plan, full consideration shall be made on securing consistency with related policies, such as the NSDI Plan, the National Spatial Plan, and the Priority Plan for Social Infrastructure Development, as well as their synergetic effects.

### 3. Period and Composition of Plan

#### (1) Period of Plan

For public and various other surveys to be conducted accurately and efficiently based on the result of the Basic Surveys, the plan about the Basic Surveys needs to be implemented continually for a certain period. Time for diffusion into the society is also needed to evaluate the effect of the policies. For these reasons, the term of this plan shall be ten years from FY 2009 to FY 2018.

#### (2) Composition of this Long-Term Plan

In order to direct the survey administration in the future, it is necessary to start with anticipating the ideal image of the future society in Japan. Therefore, the

prospect of the new society to be realized by utilizing geospatial information is specified in Chapter 4 based on the future image of the society shown in the NSDI Plan, etc.

Furthermore, the basic directionality to realize this new society is specified in Chapter 5 and specific policies to be taken based on the directionality are specified from Chapter 6 to 8. In addition, the targets of the policies and projects in this plan are organized in the appendix.

### 4. New Society to Be Realized by Utilizing Geospatial Information (Prospect of the Future)

Geospatial information such as survey results plays an important role in appropriate national land management such as prompt response to disasters, including an earthquake, storm and flood, as well as the conservation of a favorable environment.

In recent years, opportunities for national and local governments, private companies and individuals, etc., to utilize and present a variety of geospatial information have been increasing, accompanying the diffusion of the Internet. As a result, it is now possible to envision a new society to be realized by using a variety of geospatial information that has not been accessible before.

In addition, by expanding the environment capable of utilizing geospatial information around the world, it is possible to find the directionality of solutions of various problems in the world including global-scale issues.

Shown here is the vision of a new society (advanced geospatial information utilization society) to be realized through the advanced utilization of geospatial information, as well as the view of the stability and sustainable development of the world through the utilization of geospatial information.

#### (1) New society to be realized by utilizing geospatial information

##### (1-1) Safe and secure society

(a) Safe society prepared for disasters, accidents and crimes through cooperation among related

organizations

Policies for disasters, accidents and crimes are studied while a variety of information is put together on the map, and formation of a society resistant against disasters, etc., progresses through wide dissemination of information.

(b) Society in which information necessary for avoiding risks is accessible to anybody in real time

In the event of a disaster or an accident, effective support by the government becomes possible through real-time sharing of information on the constantly changing situation of the afflicted area among administrative staff, victims, etc. Even when victims cannot gain government support, it becomes possible for each individual on the actual site to judge the situation and respond appropriately.

(c) Prompt recovery and rehabilitation from disaster

Speedy administrative procedures for victims and prompt recovery and rehabilitation from disaster can be realized through organizing and visualizing data on the affected houses, facilities, etc., by GIS using the information that indicates the before and after situations of the affected area as well as place name data.

(1-2) Society in which people can live a prosperous and comfortable life

(a) Society that is kind to everyone, in which people can move easily and live comfortably

As positioning technologies such as GPS get widely diffused, it becomes possible to easily determine one's own position, the direction and distance to the destination, etc. As a result, people's activity range and living space expand.

(b) Formation of new communication opportunities

A variety of information, such as on regional situations and current events, can be visualized on the computer network based on a map. As a result, various communication opportunities beyond different fields are provided.

(1-3) Society that maintains the national land environment well

(a) Conservation of a favorable environment and sustainable development

By understanding changes in the environment, efficient and sustainable economic activities with reduced environmental load can be promoted.

(b) Conservation of good national land through effective facility development

By understanding changes in the national land, regions that require conservation can be specified, leading to effective facility development and conservation of favorable national land.

(1-4) Society in which regions are self-reliant and energetic

(a) Promotion of regions and local residents' participation in administration

Use of GIS enables effective planning on use and development of regions as well as tourism, resulting in promotion of the regions.

Collecting and visualizing, by using GIS, various information managed by government makes public administration more efficient, deepens local residents' understanding of the administration, and realizes an environment that enables them to more easily participate in the administration.

(b) Formation of regions with diversity based on topography and history

Understanding differences in topography and history among regions promotes the formation of regions with diversity that makes the best use of respective characteristics.

(1-5) Energetic society in which new businesses are created

(a) Activation of industries by developing usage of geospatial information

Combining widely ranging information with positions as the key and having various perspectives can activate industries, including distribution of

characteristic contents, creation of new businesses and improvement of existing businesses.

(b) Realization of new businesses by locating the positions of people and things

Finding positions and movements of people and things in detail and visualizing them can lead to discovery of new demands and progress of existing business models.

(2) Securing stability and sustainable development of the world through the utilization of geospatial information

Utilization of geospatial information contributes to stability and sustainable development of the world, and it is an important factor in promoting the realization of a new society in Japan.

Japan's efforts regarding the utilization of geospatial information and the effects on the world are expected to help preparation of appropriate development plans, etc., on respective national and regional levels, and contribute to stability and sustainable development of respective countries and regions.

Also, applying Japan's knowledge and know-how about the utilization of geospatial information to overseas cases can lead to the possibility of obtaining important information, etc., in smoothly promoting the realization of a new society in Japan.

These efforts need to be promoted while emphasizing that they contribute to further promotion of international activities with Japan's initiative.

**5. Progress of the Administration that Promotes the Utilization of Geospatial Information**

In order to realize a society as indicated in Chapter 4, accurate policies based on geospatial information that represents the situations of national land and regions need to be implemented in various fields.

First, full use of geospatial information requires stable development and updating of geospatial information as an infrastructure. Moreover, it is

necessary to efficiently organize various geospatial information and establish an environment that makes the information easily accessible and usable to anyone. Also important are promotion of the use of geospatial information through collaboration among the national and local governments, private companies, academic circles, etc., and promotion of the development and use of geospatial information in the world through international cooperation. It is also necessary to promote research and development that will contribute to the utilization of geospatial information.

Based on this idea, the survey administration needs to start anew and make progress as the administration that aims at stable development and effective use of geospatial information, in other words the "administration that promotes the utilization of geospatial information". In order to achieve this purpose, the following policies shall be implemented with priority.

(1) Development of geospatial information as an infrastructure

For effective use of geospatial information, it is important to develop geospatial information to be shared widely, for example, as the positional reference, or the mapping reference to represent the national land.

Concretely, first the coordinate system shall be managed to provide a proper positional reference so that an accurate survey can be performed. Also, efforts shall be made to develop FGD that associates a variety of geospatial information.

In addition, geospatial information to be shared for organizing different geospatial information shall be developed as the mapping reference to represent the national land.

Also, efforts shall be made to develop geospatial information needed for national and local governments, etc., to share a common knowledge on the conditions of national land and regions for the purpose of appropriately implementing national land management, including disaster prevention.

(2) Establishment of an environment for geospatial

information utilization

For the purpose of efficient development and widely ranging use of geospatial information, the following shall be promoted: establishment of rules and standards regarding development, distribution and use of geospatial information; establishment of a mechanism for distribution and use of geospatial information; human resource development; and literacy improvement.

(3) Promotion of cooperation and research and development, to promote the utilization of geospatial information

Aiming to promote cooperation among related ministries, local governments, private companies, and academic circles, a system for opinion exchange and information exchange shall be built. Furthermore, efforts shall be made to promote international joint observation and the development of geospatial information to be shared all over the world, for the purpose of promoting the development and utilization of geospatial information through international cooperation.

Furthermore, research and development needed for the administration that promotes the utilization of the geospatial information shall be promoted.

**6. Development of Geospatial Information as an infrastructure**

(1) Development of information as positioning reference

(1-1) Establishment of Geo-Referencing Infrastructure (GRI)

In connecting the actual land and geospatial information, control points, such as GPS-Based Control Stations (hereinafter referred to as "GPS Stations") and triangulation points, and their survey results, play an especially important role. On the other hand, surveys using satellite positioning have enabled the measurement of land position and its gradual movement and transformation resulting from crustal activities. Aiming to perform efficient surveys using diversified technologies including satellite positioning, and to effectively utilize the results, a new GRI that enables integrated use of results of surveys of different periods and methods shall be established.

Furthermore, next-generation satellite positioning technology, etc., shall be actively used to advance the maintenance and management of GRI.

(a) Continuous observation of crustal activities using GPS Stations and development of reference information for positioning

To maintain the positional reference for surveys, continuous observation of crustal activities using GPS Stations shall be conducted throughout Japan, including solitary islands. Also, high-precision three-dimensional surveys, advanced regional control-point surveys, tidal station surveys and gravity surveys shall be performed. Maintenance of GPS Stations, and equipment renewal and upgrading needed for continuous observation shall be steadily executed.

Intelligent control points (control points attached with an IC tag) shall be established, and a system for their effective use shall be constructed. Also, aiming to secure consistency of results of surveys on changing national land, survey results shall be managed according to survey periods and a semi-dynamic correction system shall be introduced, which corrects the influence of crustal deformation between the different periods.

(b) Maintenance of the reference coordinate system and correspondence with various coordinate systems

Aiming to connect geospatial information to actual positions on land, the reference coordinate system shall be maintained and managed via VLBI survey, GPS Stations survey, etc. Also, efforts shall be made to connect elevations and geomagnetic northerly directions of various places to this coordinate system via geoid survey and geomagnetism survey.

(c) Utilization of the next-generation Global Navigation Satellite System (GNSS)

Anticipating a future increase in the types of positioning satellites, such as the Quasi-Zenith Satellites and the Galileo, and considering its influence on GPS Station users such as positioning information service providers, as well as on the stability and accuracy of the crustal activity observation, GPS Stations shall be

improved to accommodate the next-generation GNSS, as needed. Also, aiming to expand the range of the surveys that can utilize the GPS receivers and advance the utilization of GNSS in surveys, information on ionospheric delay and tropospheric delay generated based on the survey results of GPS Stations data shall be delivered.

(1-2) Development and updating of the Fundamental Geospatial Data (FGD) (continuous accuracy improvement)

In the NSDI Act, FGD is defined as positional information that provides positional reference for geospatial information on a digital map, and the FGD shall be virtually completed by FY 2011 according to the NSDI Plan. Clause 2, Article 16 of the NSDI Act stipulates that national and local governments shall take necessary policies including timely updating of the FGD. As such, development, updating, and continuous accuracy improvement of the FGD shall be done while maintaining its "uniqueness" as positioning reference.

Concretely, the FGD shall be virtually completed for city planning areas throughout Japan at an accuracy of 2500-scale level or higher, by using the results of surveys such as the Digital Japan Basic Map (hereinafter referred to as "DJ Base"), the airborne laser survey, public surveys, etc., by FY 2011. Regarding the areas outside the city planning areas among the plains and solitary islands that are important for national land and regional management (hereinafter referred to as "Plain Area"), the FGD shall be virtually completed at an accuracy of 5000-scale level or higher by FY 2013.

The FGD shall be updated and improved in accuracy by using the survey results of the DJ Base and public surveys, based on the GRI. Updating shall be performed promptly using the method that achieves the highest accuracy for each geospatial information item, and quality information at the time of updating as well as the FGD shall be managed.

Cooperation with local governments, etc., shall be further promoted, aiming at smooth development of the FGD using the results of public surveys, etc. Toward this end, support necessary for the development and

updating of the FGD shall be provided to local governments, etc.

(2) Development of information as mapping reference for representing the national land

If place names on maps, and definitions and acquisition specifications of geospatial information are different among parties that develop information, users of the information concerned will be confused. As such, DJ Base shall be developed as geospatial information as an infrastructure that serves as mapping reference for representing the national land. Such geospatial information shall be developed basically as digital data to secure diversification of usage, accuracy, and efficient updating.

(2-1) Development and updating of the Digital Japan Basic Map (DJ Base)

DJ Base, which is composed of Map Information (hereinafter referred to as "DJ Map"), Orthophoto Imagery (hereinafter referred to as "DJ Ortho") and Place Name Information (hereinafter referred to as "DJ Name"), shall be developed as reference for representing the national land using a digital map, and also as geospatial information of digital data shared for widely ranging purposes. DJ Map is geospatial information that conforms to the FGD with the same content as a topographic map, and DJ Ortho is digital imagery of orthogonally projected aerial photographs.

(a) Map Information (DJ Map)

DJ Map for the entire country shall be virtually completed by FY 2012. Completed DJ Map shall include geospatial information that represents topography and land situations necessary for national land management and disaster prevention. When key geospatial information items do not represent the current situation, the items concerned shall be updated within three months by using the results of public surveys, and results of basic information surveys for national organizations, local governments etc. The other items shall be efficiently updated in association with the development and updating of the FGD and DJ Ortho. DJ Map of the

areas for which DJ Ortho is not updated, updating shall be performed at appropriate intervals using aerial photographs from public surveys, etc.

(b) Orthophoto Imagery (DJ Ortho)

DJ Ortho on Plain Area shall be developed by FY 2013 and updated every five years, aiming to understand the current situations and changes in the national land and regions. Additionally, efforts shall be made to update DJ Ortho within a year in the area where a significant change has taken place.

Considering the prospected future increase in demand of orthophoto imagery, Imagery Control Points, which are useful for speedily and accurately preparing orthophoto imagery from aerial photographs, shall be prepared by FY 2013. Also, Imagery Control Points shall be continually updated in association with updating of DJ Ortho, thus contributing to efficiency improvement of preparation of orthophoto imagery in public surveys, etc.

(c) Place Name Information (DJ Name)

DJ Name is a key in searching positions in utilizing geospatial information. As such, DJ Name shall be developed and updated nationwide, by using the results of public surveys and the results of basic information surveys for local governments.

(2-2) Development and updating of topographical maps and regional maps

In stipulating the position and shape of the national land and presenting them domestically and abroad, and also appropriately managing the areas according to widths and characteristics of the national land and regions, the print maps play an important role as mapping reference. Therefore, print maps including 1/25,000 topographic maps, 1/200,000 regional maps, 1/500,000 district maps, 1/1,000,000 Japan maps, 1/5,000,000 maps of Japan and its surroundings, lake charts and digital elevation topographic maps shall be continually developed and updated for the foreseeable future, and their digital maps shall also be developed and updated.

In the development of these print maps and digital maps, efforts shall be made to secure cooperation with related administrative organizations.

The Global Map of Japan shall be developed and updated as part of the Global Mapping project.

Additionally, information about the areas of local governments' administrative districts, etc., shall be developed and updated.

(3) Development of information shared for national land management including disaster prevention

In order for parties related to national land management, such as national and local governments, and local residents, to understand and recognize the current situations and changes of the regions and conduct appropriate national land management according to the regions' characteristics, necessary geospatial information shall be developed and updated. Also, in the event of a disaster, necessary geospatial information related to disaster damage, etc., shall be prepared, aiming to quickly understand the national land situation. In these processes, cooperation with related regional organizations such as local governments shall be strengthened, aiming to quickly respond to administrative demands.

(3-1) Development and updating of basic information for disaster prevention

High-accuracy elevation data needed for national land management such as disaster prevention and city planning shall be developed by airborne LIDAR surveys.

Crustal deformation information and ground movement information that are closely related to earthquakes or volcanic activities shall be developed and updated through continuous observation of crustal activities and high-accuracy ground movement surveys, etc.

In addition, efforts shall be made to identify the areas with a high risk of occurrence of natural disasters, such as earthquakes, volcanic activities and flooding, so that disaster can be quickly responded. Collected information on these areas shall be developed and updated as active fault belt information, volcano disaster

basic information and flood disaster basic information.

(3-2) Development of land use information

Detailed land use information, etc., shall be developed on the urban areas of complicated land use and the surroundings of lakes and marshes that are fragile to environmental changes.

(3-3) Prompt understanding of the national land situation in the event of a disaster

In order to quickly understand the approximate condition of crustal deformation in the event of an earthquake or volcanic activity, mobile observation, urgent analysis of GPS Station data, and crustal deformation monitoring by interferometric Synthetic Aperture Radar (SAR) shall be performed, and measures shall be taken for the appropriate use results of control points as needed.

Also, in order to quickly understand changes in the situations of national land and regions in the event of a disaster, urgent aerial photographing shall be conducted. In addition, disaster overview maps, etc., shall be prepared, aiming to share disaster information with related organizations in the event of a disaster such as an earthquake.

Additionally, a business continuity plan to surely execute a necessary business in the event of a disaster shall be thoroughly penetrated and improved continuously.

## 7. Establishment of an Environment for Geospatial Information Utilization

(1) Promotion of the utilization of satellite positioning, etc.

An environment to fully utilize GNSS shall be established, such as by establishing efficient survey techniques using GNSS and popularizing them through education.

Also, in order to establish an environment to enable indoor positioning continuously from outdoors, installation procedure standards of positioning supplementation devices, barcodes, and IC tags as indoor positioning reference shall be provided, and standard

techniques for indoor positioning shall be stipulated.

(2) Establishment of an environment to promote the development and utilization of the FGD

In order to efficiently prepare maps that are developed as legal books (hereinafter referred to as "Legal Map"), etc., by using the FGD, technical support shall be provided for the development of Legal Maps, and a liaison conference on the FGD shall be set up to strengthen cooperation with related ministries. In addition, Legal Maps and other various data prepared through collaboration with related organizations shall be collected and used to update the FGD. Because referring to various public survey results is effective to enhance the accuracy of the FGD, submitting copies of results of public surveys based on the Survey Act shall be promoted.

Also, in order to secure accuracy and consistency of positions of geospatial information developed by various parties, an easy and efficient method to prepare geospatial information by using the FGD shall be standardized and diffused.

(3) Promotion of the efficient development and sharing of geospatial information

To secure accuracy of public surveys, administrative and technical support, adjustment, etc., shall be conducted and development of accurate geospatial information shall be promoted.

Also, the development of orthophoto imagery, as well as the construction of a system to share them shall be promoted.

In addition, a mechanism and standards to utilize characters and codes (geographic identifiers) that can correspond to positional coordinates such as place names, facility names and postal codes shall be studied.

(3-1) Diffusion of the operation rules and geographic information standards

To secure accuracy of public surveys and promote the utilization of survey results, diffusion of the operation rules of public surveys, geographic information standards, and the procedure of electric delivery of

survey results shall be promoted. The procedure needed for public survey implementation shall be made known, and a system to facilitate the procedure shall be studied. In addition, necessary guidance, diffusion and educational activities, etc., shall be continually conducted, aiming to promote the development of accurate hazard maps based on public surveys and the transition of the existing public survey results to the world geodetic system.

Additionally, efforts shall be made to promote the development, distribution and utilization of geospatial information in the private sector, through association with policies regarding the survey business.

Also, association with policies on marine information shall be strengthened so that geospatial information on sea and land can be used together.

#### (3-2) Formulation of a mechanism for the development and sharing of orthophoto imagery

Aiming to realize the development, updating, and supply of seamless orthophoto imagery for all national land, a system to develop and share orthophoto imagery shall be constructed through cooperation among national organizations, local governments, etc.

#### (3-3) A mechanism and standardization for the utilization of geographic identifiers

Regarding the geographic identifiers necessary for construction of a mechanism for GIS to manage geospatial information consisting of differently expressed maps and characters, a mechanism and standards for their promotion, including their course of development shall be studied. Development that has to be done by the national government shall begin, aiming at completion and continual updating.

#### (4) Promotion of the smooth distribution and utilization of geospatial information

To contribute to the smooth distribution and active utilization of geospatial information, standards and rules on the handling of geospatial information shall be established, and a mechanism for one-stop service, etc., shall be built.

#### (4-1) Establishment of a mechanism to promote the distribution and utilization of geospatial information

By utilizing Digital Japan Web System (DJ Web), which enables the distribution and use of geospatial information on the Internet without any special software, a Web-version National Atlas equipped with the base map to display thematic information shall be developed.

Aiming to enhance the efficiency of the procedure to utilize survey results and to promote the distribution and utilization of survey results, one-stop service to apply for an approval for reproduction and use of survey results on the GSI Web page shall be realized by the end of FY 2009. Also, as part of the one-stop service, the clearinghouse that can retrieve the whereabouts of geospatial information shall be advanced and diffused. In addition, all geospatial information publicly announced by GSI shall be made wholly accessible on the Internet.

#### (4-2) Preparation of guidelines on the handling of geospatial information

Aiming to promote the utilization of geospatial information, specific handling of personal information and intellectual property rights shall be organized into guidelines through cooperation with related organizations. Also for the handling of geospatial information related to national security, collaboration with the government's undertakings shall be promoted.

#### (4-3) Prompt distribution of geospatial information

A variety of geospatial information developed by GSI shall be widely diffused to the general public via the Internet, publications, etc. In the event of a disaster, necessary geospatial information shall be promptly provided to related organizations, victims, etc.

#### (5) Human resource development and literacy improvement

In order to promote the diffusion of technologies related to survey and GIS and the utilization of geospatial information, personnel who can plan the development, utilization, etc., of geospatial information shall be fostered, through holding of seminars, lectures,

and delivery courses. Especially for local governments, undertakings such as technical support shall be strengthened, aiming to further promote the utilization of geospatial information.

Regarding the qualification of surveyors, etc., the system shall be revised as needed so that the abilities required for the qualification will include the ability to utilize geospatial information.

## **8. Promotion of Cooperation and Research and Development to Promote the Utilization of Geospatial Information**

### (1) Promotion of cooperation among industry, academia and government

Aiming to smoothly advance the development and utilization of geospatial information, there shall be government conferences for geospatial information utilization and nationwide conferences for cooperation among industry, academia and government about geospatial information. In addition, opportunities for industry, academia and government to exchange opinions and information shall be provided in respective regions, thus strengthening cooperation among related ministries, local governments, private companies and academic circles.

### (2) Promotion of international cooperation

In order to contribute to the understanding of crustal deformations and environmental changes on a global scale, development of geospatial information in an international frame shall be promoted through cooperation with various countries. Collaboration and cooperation related to international joint observation and the establishment of international standards shall also be aggressively pursued.

#### (2-1) Promotion of international development of geospatial information by the Global Mapping project

The Global Mapping project, aimed to develop geospatial information necessary for the study of global environmental issues, etc., shall be promoted through

international cooperation. Also, collaboration and cooperation with various countries at the Permanent Committee on GIS Infrastructure for Asia and the Pacific (PCGIAP) shall be aggressively promoted.

#### (2-2) Promotion of international joint observation, such as the International VLBI Service

Observation through international collaboration such as the International VLBI Service (IVS) and the International GNSS Service (IGS) shall contribute to enhancing the accuracy of satellite positioning throughout the world. In addition, in order to respond to earthquakes that have frequently occurred in the Asian region in recent years, crustal deformations, etc., shall be observed through international cooperation such as in the Asia Pacific Regional Geodetic Project (APRGP).

#### (2-3) International adjustment of opinions about place names and geographic information standards

Aiming to promote sharing of geospatial information, opinions shall be adjusted by geospatial information-related technical committees at the United Nations Conferences on the Standardization of Geographical Names and the International Organization for Standardization (ISO). Additionally, international geographic information standards shall be appropriately reflected in Japanese standards.

### (3) Promotion of research and development

For steady promotion of the Long-Term Plan, the research and development needed for the administration that promotes the utilization of geospatial information shall be promoted through cooperation with related organizations, while responding to changes in social circumstances and technological trends.

## **9. Evaluation and Readjustment**

The effects of respective policies and projects shall be properly evaluated when they are implemented, and the Plan concerned shall be readjusted as needed to be highly effective and respond to constantly changing social circumstances.

Appendix  
Targets of policies and projects

## 1: Development of geospatial information as an infrastructure

(1) Development of information as positioning reference	
(1-1) Establishment of Geo-Referencing Infrastructure (GRI)	
(a) Continuous observation of crustal deformations at GPS Stations and development of reference information for positioning	<ul style="list-style-type: none"> <li>* GPS Station survey (1,240 stations [continuously])</li> <li>* Tidal station survey (25 stations [continuously])</li> <li>* High-precision three-dimensional survey (areas under intensified measures against earthquake disaster: approx. 1,200km [from quarter-year to 2-year cycle]; areas of high-priority observation and survey: approx. 1,350km [1-year or 2-year cycles]; other areas: approx. 17,500km [8-year cycle])</li> <li>* Advanced regional control-point survey (10km interval [5-year or 10-year cycle])</li> <li>* Gravity survey (37 zones [within 10-year cycle])</li> <li>* Semi-dynamic correction (updating and diffusion of crustal deformation parameters [once a year])</li> </ul>
(b) Maintenance of the reference coordinate system and correspondence with various coordinate systems	<ul style="list-style-type: none"> <li>* International VLBI Service (international observation whose main purpose is to maintain the International Terrestrial Reference Frame (ITRF) [approx. 50 times a year], observation of earth rotation: [approx. 150 times a year])</li> <li>* VLBI-GPS collocation observation (Tsukuba Station [3-year cycle], Shin-Totsukawa, Chichi-jima and Aira Stations [5-year cycle])</li> <li>* Geoid survey (27 zones)</li> <li>* Geomagnetism survey (continuous geomagnetic observation: 11 points, continuous wideband magnetotelluric observation: 2 points, first order geomagnetic survey: 20 points [2-year cycle])</li> </ul>
(c) Utilization of the next-generation Global Navigation Satellite System (GNSS)	<ul style="list-style-type: none"> <li>* Updating GPS Stations (updating and advancement of GPS Stations that accommodate the next-generation GNSS)</li> <li>* Delivery of information on ionospheric delay and tropospheric delay</li> </ul>
(1-2) Development and updating of the Fundamental Geospatial Data (FGD) (continuous accuracy improvement)	
	<ul style="list-style-type: none"> <li>* Development of the FGD (accuracy at 2500-scale level or higher: 100,000km<sup>2</sup> in city planning areas [to be virtually completed by FY 2011], accuracy at 5000-scale level or higher: 90,000km<sup>2</sup> in the Plain Area outside city planning areas: [to be virtually completed by FY 2013])</li> <li>* Updating of the FGD (updating with accuracy improvement)</li> </ul>
(2) Development of information as mapping reference for representing the national land	
(2-1) Development and updating of the Digital Japan Basic Map (DJ Base)	
(a) Map Information (DJ Map)	<ul style="list-style-type: none"> <li>* Development of DJ Map (to be virtually completed nationally [by FY 2012])</li> <li>* Updating of DJ Map (main items [within 3 months], other items [appropriate cycle in association with the updating of FGD and DJ Ortho])</li> </ul>

	(b) Orthophoto Imagery (DJ Ortho)
	<ul style="list-style-type: none"> <li>* Development of DJ Ortho (190,000km<sup>2</sup> in Plain Area [by FY 2013])</li> <li>* Updating of DJ Ortho (190,000km<sup>2</sup> in Plain Area [updating by aerial photographing at 5-year cycle and within one year in case of a significant change])</li> <li>* Development and updating of Imagery Control Points (190,000km<sup>2</sup> in Plain Area [in association with development and updating of DJ Ortho])</li> </ul>
	(c) Place Name Information (DJ Name)
	* Development and updating of DJ Name
	(2-2) Development and updating of topographical maps and regional maps
	<ul style="list-style-type: none"> <li>* Updating of print maps and digital maps (updating of 1/25,000 topographic maps, 1/200,000 regional maps, 1/500,000 district maps, 1/1,000,000 Japan maps, 1/5,000,000 maps of Japan and its surroundings, and their digital maps [updating respectively based on the DJ Base])</li> <li>* Development and updating of lake charts (50km<sup>2</sup>)</li> <li>* Development of digital elevation topographic maps (5,700km<sup>2</sup>)</li> <li>* Development and updating of Global Map of Japan [5-year cycle]</li> <li>* Development and updating of administrative area information (development and updating of the information about administrative areas of local governments [every year])</li> <li>* Digitalization of existing print maps and aerial photographs</li> </ul>
	(3) Development of information to be shared for national land management including disaster prevention
	(3-1) Development and updating of basic disaster prevention information
	<ul style="list-style-type: none"> <li>* Airborne LIDAR survey (5,700km<sup>2</sup>)</li> <li>* Continuous observation of crustal activities (monitoring of crustal deformation by strainmeter, tiltmeter, GPS observation, etc.)</li> <li>* Highly accurate survey of ground movement (monitoring of crustal deformation and ground movement by interferometric SAR (twice a year))</li> <li>* Survey of landform change (monitoring of crustal deformations in the active fault belts by an electronic distance meter, etc.: 42 zones [from 1-year to 5-year cycle])</li> <li>* Survey of ground movements in volcanic areas (15 volcanoes [5-year cycle])</li> <li>* Development of active fault information (20 belts)</li> <li>* Development of volcanic disaster basic information (development: 1,000km<sup>2</sup>, updating: areas with significant changes)</li> <li>* Development of flood disaster basic information (development: 18,000km<sup>2</sup>, updating: 10,000km<sup>2</sup> of urban areas)</li> </ul>
	(3-2) Development of land use information
	* Development of land use information (14,000km <sup>2</sup> in large cities [5-year cycle], 1,000km <sup>2</sup> in surroundings of lakes and marshes, nationwide environmental monitoring)
	(3-3) Prompt understanding of the national land situation in the event of a disaster
	<ul style="list-style-type: none"> <li>* Mobile observation (flexible implementation of GPS survey, distance measurement, leveling, etc. [after occurrence of a disaster or when there is a possibility of a disaster])</li> <li>* Urgent analysis of GPS Stations data [within 3 hours after occurrence of a disaster such as an earthquake]</li> <li>* Measurement of crustal deformation by interferometric SAR [within 46 days after the occurrence of a disaster such as an earthquake]</li> </ul>

	<ul style="list-style-type: none"> <li>* Urgent aerial photographing [within one day after the occurrence of a disaster]</li> <li>* Mapping of disaster overview [within 3 hours after the occurrence of a disaster]</li> </ul>
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## 2: Establishment of an environment for geospatial information utilization

(1) Promotion of the utilization of satellite positioning, etc.	
	<ul style="list-style-type: none"> <li>* Establishment of an efficient survey technique using GNSS</li> <li>* System development to deliver information on ionospheric delay and tropospheric delay and establishment of a delivery format</li> <li>* Standardization of correction information forms for entry in a single-frequency GPS receiver, establishment of a quality check method and formulation of a check mechanism</li> <li>* Standardization of survey techniques to locate a point as indoor positioning reference</li> </ul>
(2) Establishment of an environment to promote the development and utilization of the FGD	
	<ul style="list-style-type: none"> <li>* Technical support to develop Legal Map</li> <li>* Establishment of a liaison conference on the FGD (nationwide)</li> <li>* Cooperation with local governments, etc., about development and utilization of the FGD</li> <li>* Promotion of the submission of copies of public survey results</li> <li>* Establishment of an easy and efficient method to prepare geospatial information by using the FGD</li> </ul>
(3) Promotion of the efficient development and sharing of geospatial information	
(3-1) Diffusion of the operation rules, geographic information standards, etc.	
	<ul style="list-style-type: none"> <li>* Promotion of electric delivery of public survey results (electric delivery of all results)</li> <li>* Implementation of diffusion and educational activities for local governments, private companies, etc.</li> </ul>
(3-2) Formulation of a mechanism for the development and sharing of orthophoto imagery	
	<ul style="list-style-type: none"> <li>* Formulation of a mechanism for developing and sharing orthophoto imagery through cooperation with national organizations, local governments, etc.</li> </ul>
(3-3) A mechanism and standardization for the utilization of geographic identifiers	
	<ul style="list-style-type: none"> <li>* Development of necessary standards</li> </ul>
(4) Promotion of the smooth distribution and utilization of geospatial information	
(4-1) Establishment of a mechanism to promote the distribution and utilization of geospatial information	
	<ul style="list-style-type: none"> <li>* Development of Web-version National Atlas</li> <li>* Promotion of the sharing of geospatial information by Digital Japan Web System (DJ Web)</li> </ul>
(4-2) Preparation of guidelines on handling of geospatial information	
	<ul style="list-style-type: none"> <li>* Preparation of guidelines on personal information protection and intellectual property rights</li> </ul>
(4-3) Prompt distribution of geospatial information	
	<ul style="list-style-type: none"> <li>* Distribution of geospatial information developed by the GSI via the Internet and publications</li> <li>* Distribution of geospatial information to related organizations in the event of a disaster</li> </ul>
(5) Human resources development and literacy improvement	
	<ul style="list-style-type: none"> <li>* Holding of seminars, lectures, etc.</li> <li>* Technical support for advanced utilization of geospatial information to local governments, etc.</li> <li>* Revision of the surveyor qualification system</li> </ul>

## 3: Promotion of cooperation, and research and development, to promote the utilization of geospatial information

(1) Promotion of cooperation among industry, academia and government	
	* Establishment of a regional conference of cooperation among industry, academia and government (tentative name)
(2) Promotion of international cooperation	
(2-1) Promotion of the international development of geospatial information by the Global Mapping project	
	* Development and updating of the Global Map [5-year cycle]
(2-2) Promotion of international joint observation such as the International VLBI Service	
	* International VLBI Service (international observation whose main purpose is to maintain the International Terrestrial Reference Frame (ITRF) [approx. 50 times a year], observation of earth rotation: [approx. 150 times a year]) {republished}
	* International GNSS Service (7 stations [continuously])
	* Asia Pacific Crustal Monitoring Project (6 stations [continuously])
(2-3) International opinion adjustment about place names and geographic information standards	
	* Adjustment of opinions in the United Nations Conferences on the Standardization of Geographical Names, etc.
(3) Promotion of research and development	
	* Implementation of research and development needed for the administration that promotes the utilization of geospatial information