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New NSDI and National Mapping Policy of Japan*

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1. Introduction

“Basic Act on the Advancement of Utilizing Geospatial Information” (NSDI Act of Japan) came into effect in 2007, and Geographical Survey Institute (the GSI) faces phase of major change as a national organization in charge of survey and geospatial information.

This paper introduces two kinds of new geospatial information which the GSI manages, “Fundamental Geospatial Data” (hereinafter “FGD”) and “Digital Japan Basic Map”. Also this paper explains the policy for development and updating of them.

2. NSDI Act and FGD

On May 2007, NSDI Act of Japan was enacted. The purpose of this act is to urge the national government agencies, local governments, and private sectors to take measures to promote the utilization of geospatial information, which is vital to construct a sound and prosperous society. The measures include production and distribution of data as well as human resource development.

Likewise, this act defines FGD which is Japanese NSDI. FGD includes framework geospatial information such as geodetic control points, administrative boundaries, roads and railways. FGD is defined as the positional reference to which various kinds of geospatial information are related and expected to promote sharing of geospatial information because geospatial information which is maintained with FGD keeps proper relative position and can be easily overlaid each other (Fig.1).

National government and local governments are required to develop and utilize FGD conforming to the specification regulated by Ordinance of the Ministry of Land, Infrastructure and Transport (MLIT). The GSI is due to develop seamless FGD by the end of Japanese fiscal year 2011 on a scale of 1:2500 in urban area (1/4 of Japan in area) and on a scale of 1:25000 in other area. The GSI will develop 1:2500 scale of FGD by integrating large-scale map digital data provided by the national and local governments. Japanese particular situation enables this method, as follows.

- 1) Local governments are required by the law to develop and update large-scale map called “city planning map” across urban area (“city planning area” defined by the City Planning Act).
- 2) Survey Act requires national and local governments to formulate specifications of survey which define procedures and accuracy of survey conducted by them. Also this Act requires them to gain approval of the Minister of Land, Infrastructure, Transport and Tourism for their specifications.
- 3) Survey Act requires national and local governments to submit their survey results to The GSI. The GSI examines those results.

The situation 1) above ensures large-scale maps be developed and updated in urban area. 2) and 3) authenticate accuracy of large-scale maps created by national and local governments.

As of August 31, 2009, the GSI completed all of the 1:25000 scaled FGD, and 53% of the 1:2500 scaled FGD. Prepared FGD can be browsed on the Internet and downloaded from the Internet for free of charge.

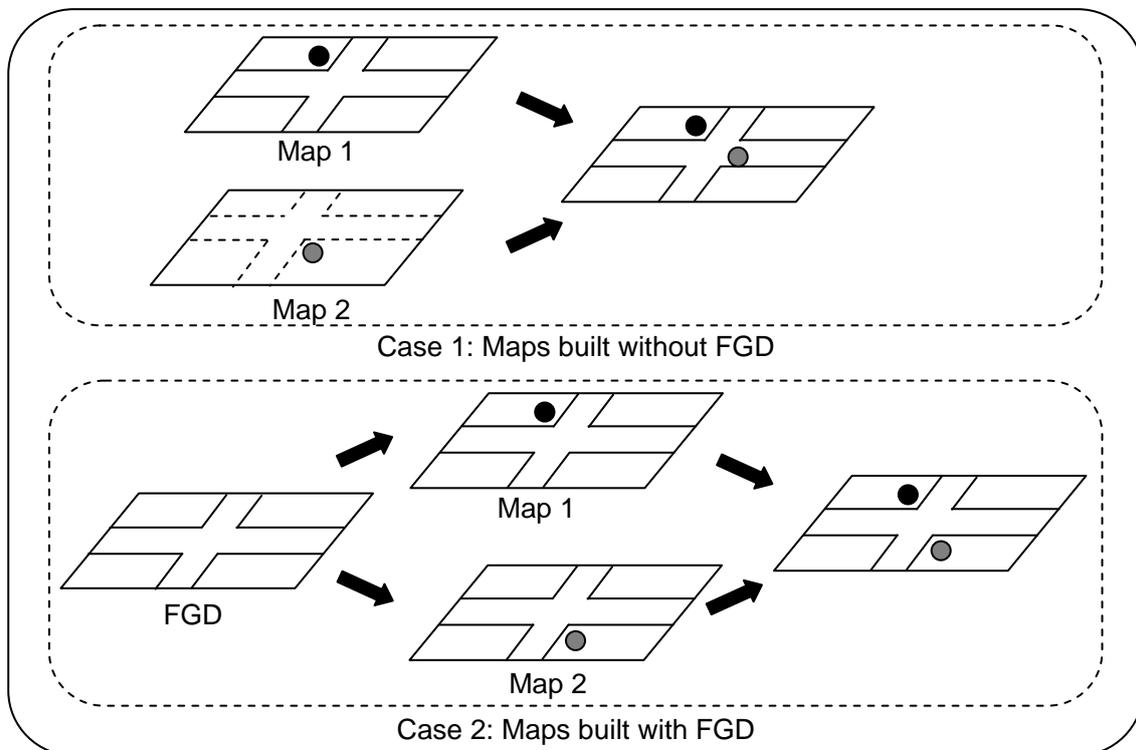


Fig.1 Advantage of FGD in sharing geospatial information

3. Grand Design of FGD

On July 2009, the GSI released “Grand Design of Fundamental Geospatial Data (hereinafter, “Grand Design”). Grand Design clarified ideal model of FGD, and settled the role of the GSI and stakeholders such as national government agencies and local governments when they develop or update FGD. It also states ideal cooperation between the GSI and stakeholders.

Grand Design states ideal model of FGD as follows;

- 1) FGD should be unique data in order to be used as the positional reference to which various kinds of geospatial information are related.
- 2) FGD should be updated promptly, and its positional accuracy should be improved through updating FGD.
- 3) FGD should be provided for free of charge through the internet.

Grand Design defines the task of the GSI as follows;

- 1) The GSI should complete the initial development of seamless FGD by the end of Japanese fiscal year 2011.
- 2) The GSI should improve FGD accuracy from 1:25000 scale to more than 1:5000 scale in plain regions around the city planning area.

Grand Design requires the role of national government agencies (except the GSI) and local governments as follows:

- 1) To develop and update their survey result as digital data.
- 2) To develop and update map data including city planning map and maps for road management as digital data.
- 3) To cooperate with the GSI to update FGD and improve its accuracy.

Grand Design states ideal cooperation between the GSI and stakeholders as follows;

- 1) Local offices of national government (including the GSI) and local governments should establish cooperation in each region in order to define their individual roles, and standardize the specification for developing geospatial information, etc.
- 2) The GSI should support stakeholders to develop and update large-scale maps with lending them aerial photographs and digital ortho images. This assistance helps stakeholders to understand the benefit brought about by FGD (such as cost-cutting for their map development), and makes it easy to get their cooperation for developing and updating FGD.
- 3) The GSI and stakeholders should establish a framework or a conference for cooperation

among industry, governments and academia in order to exchange views and discuss the way to cooperate effectively.

4) The GSI should collaborate with Ministry of Internal Affairs and Communications which administers local administration in order to combine FGD and “Integrated GIS” which is a GIS to integrate various geospatial information developed by various bureaus in local governments (for example, Integrated GIS utilize FGD as its framework geospatial data, and FGD is updated with geospatial information in Integrated GIS).

4. Maintenance of Digital Japan Basic Map

On April 2009, the GSI has started to develop “Digital Japan Basic Map” which is nation’s new basic map and will replace 1:25000-scale topographic maps. Digital Japan Basic Map consists of three components; map information, digital ortho images and geographic names (Fig. 2). Digital Japan Basic Map is expected to be used for various purposes, especially public administration including land management, disaster measures and environment protections.



Fig. 2 Digital Japan Basic Map

1) Map Information

Map information is digital data that integrated additional geospatial information for public administration including information about topography, vegetation and public offices into FGD (Fig. 3). Its horizontal accuracy is higher than 2.5m in urban area, 5.0m in rural area and 25m in forest area. In order to utilize them in emergency situation such as earthquake occurrence, important features for disaster measures including public offices, highways and administrative boundaries are highlighted.

The GSI is due to update map information in three months by information collection from national and local governments and private companies when important features such as highways and railways change. Map information will be provided mainly in a raster format

through the Internet. This policy makes it possible to provide latest geographic information on a constant basis without concerning paper maps stock.

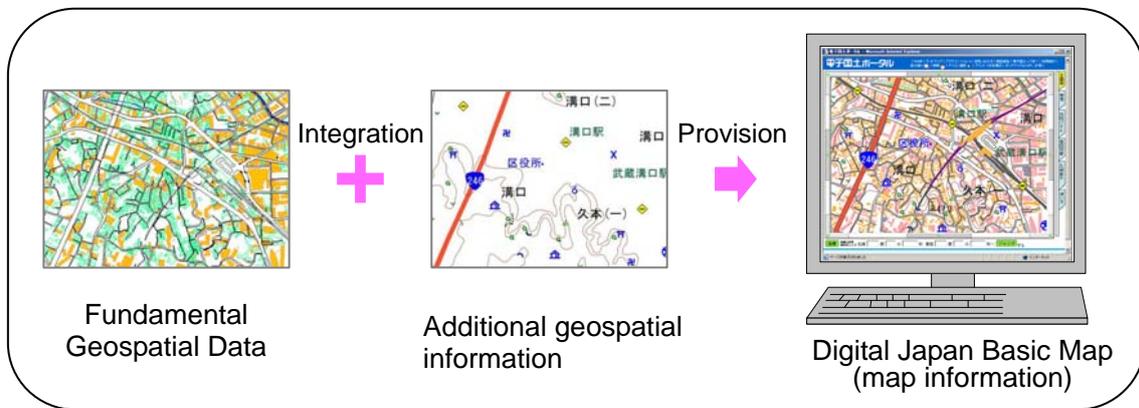


Fig. 3 Composition of Digital Japan Basic Map (Map Information)

Behind this policy, the fact is that:

- i) FGD, the positional reference for mapping digitally various geospatial information, has already developed, thus basic maps have to be consistent with FGD on position.
- ii) Because map use through the Internet is growing rapidly, hence the demand for highly accurate and frequently updated geospatial data is increasing.

2) Digital Ortho Images

The GSI develops digital ortho images from aerial photographs taken by digital aerial camera. Though, heretofore, the GSI had been used areal photographs as only one of reference data for updating 1:25000-scale topographic maps, digital aerial camera, GPS/IMU and digital photogrammetry system makes it amazingly easy to prepare digital ortho images. Also digital ortho images are very effective information sources in order to use for public administration.

The pixel size is 20cm in urban area and 40cm in rural area and forest area. Digital elevation model (DEM) is also produced as a by-product during preparation of digital ortho images, and the GSI provides this DEM separately. The GSI will provide digital ortho images through the Internet. Users can browse and download them for free of charge on the Internet.

3) Geographic Names

The GSI newly improves the geographic name dataset prepared in relation to map updating. New geographic name dataset consists of standard geographic names, alias names,

geographic identifiers with their position or geographic extent. The dataset is expected to be used to identify geographic features both for humans and computers. Additionally, geographic identifiers are to be used for integrating or sharing geospatial information among different geospatial information databases.