

Recent Progress in China's NSDI Development

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1. Introduction

China's Spatial Data Infrastructure (SDI) consists of vertically and horizontally integrated geo-spatial databases and communication networks, as well as necessary institutional arrangements for effective flow and exchange of geo-spatial information. State Bureau of Surveying and Mapping (SBSM) plays an important role in the planning and implementation of National Spatial Data Infrastructure (NSDI) in China. Recent efforts include the development of larger-scale fundamental data sets, setting up network-based geo-spatial information distribution system, establishment of provincial geomatics centers, and formulation of new standards and data policies.

2. Fundamental Datasets Development

China's 1:1million-scale and 1:250,000-scale topographic databases were completed by SBSM respectively in 1994 and 1998. The 1:250,000-scale database is composed of topographic datasets, geographic name datasets and DEM datasets. There are 816 map sheets and 14 feature layers in the topographic datasets. The geographic name dataset consists of 805,431 place names. The DEM datasets have two grid sizes, one is 100 meter by 100 meter and the other is 3 second by 3 second.

Since 1999, SBSM started its 1:50,000 database development. Among the seven datasets of the 1:50,000 database, the DRG dataset was completed in 2000. The 25 meter by 25 meter DEM data has been generated and the DEM database management system is under development now. The Landsat 7 and SPOT images covering the mainland were collected and used for producing 1:50,000-scale DOMs. Geographic names at 1:50,000-scale are under field investigation or collection since the beginning of this year. A pilot study has been conducted for designing the DLG dataset, land cover dataset and metadata. The DLG dataset is composed of topography (contours, elevation points, and etc.), boundary, transportation, residential area, and hydrographic elements. The implementation of the 1:50,000-scale datasets and its database management is one of the key tasks of SBSM in the next few years.

Many provincial and municipality surveying and mapping authorities continued or started their 1:10,000-scale database development. More than 35439 map sheets have been updated and 21340 map sheets have been digitized. Larger scale digital datasets have also been produced in municipalities. For instance, besides the 322 map sheets of 1:10,000-scale dataset, Shanghai municipality has produced 7511 digital map sheets of 1:2,000-scale covering the whole municipality, 5060 digital map sheets at 1:1,000-scale for the urban fringe area, 7758 digital map sheets at 1:500-scale for downtown area, and 2463 sheet DOM at 1: 2,000-scale.

There are several projects related to the development of national spatial reference framework. One project is the National 2000 Basic Gravity Network for re-establishing national basic gravity network. It was jointly initiated by SBSM, Military and National Bureau of Seismology in 1999. It consists of 137 points, including 18 fiducial points and 119 basic points. The field work has been completed by the end of 2000 and the data processing is under way. The other one is the Crustal Movement Monitoring Network. 1,200 GPS points with high positioning accuracy were set up mainly along the tectonic belts in China. Moreover, 25 permanent GPS stations have been established in china by the end of 2000. These stations serve to maintain national geocentric reference frame, to provide GPS-related products, to support the study in geodynamics, to promote the application of local area differential GPS as well as wide area differential GPS.

3. Network-based geo-spatial information services

A website for National Fundamental GIS (<http://nfgis.nsdi.gov.cn>) has been set up and in operational use since 2000. Users can get information about the available fundamental data sets from the website by browsing the data catalogs. The 1:4,000,000 vector data can be read and downloaded partly. The catalogue information of map sheets at the scale from 1:50,000 to 1:1,000,000 can be retrieved. The information about aerial photos can also be accessed from the website. The 1:1,000,000 data will be put on the website in the very near future. A dynamic national atlas program has been initiated and its major purpose is to provide more geo-spatial information to public access. The website is linked with the PCGIAP website now.

The SBSM began to implement a National Surveying and Mapping Infrastructure project since 1999. Its main objective is to improve the ability of geo-spatial information acquisition, processing, storage, management, distribution and utilization. A large number of remote sensed data processing and GIS software packages have been installed in NGCC, four SBSM production bases and some provincial production units. The LAN bandwidth has been augmented to 1000 Mbps in these organizations, and the network nodes has increased two to five times since 1999. New hardware and equipment, such as sun enterprise server 5500, have been installed. A storage area network was installed in NGCC, including STK tape library, FC switch and FC disk-array. It has solved the bottleneck problem between the storage systems and

servers. A wide-area network is under construction, which will connect NGCC and main data production bases as well as provincial geomatics centers.

4. Institutional framework development

A geomatics center is considered as the official geo-spatial data custodian and one key element of SDI institutional framework in China. After the foundation of National Geomatics Center (NGCC) in the end of 1995, SBSM called on provincial and municipal surveying and mapping authorities to set up their own geomatics centers. Up to 2000, twenty-four provincial geomatics centers have been established. These centers are in charge of quality control, database maintaining and revising, product generation, data dissemination and information services of fundamental geographic information.

As a key member of National Committee for Geo-spatial Information Coordination, SBSM has been actively involved in the national strategic planning and inter-ministry cooperation. The development of geo-spatial framework (or platform) of digital china was proposed by SBSM as one of its new strategic directions in the coming five years. More and more collaborative work or projects have been done or initiated by SBSM jointly with other ministries, such as the National Agency of Environmental Protection.

5. Development of Geomatic Standards and policies

As a P-member of ISO/TC211, China has been actively involved in the activities of its working groups and some Chinese experts have taken part in the formulation of international geomatic standards. The national technical committee for geographic information standardization (CSBTS/TC230) founded in 1997 continues to organize the formulation and revision of national geographic information standards, to coordinate, examine and approve geomatic standards, to promote the activities related with geomatic standards, and to give publicity to geomatic standards. In the past two years, some technical standards for geomatic data sharing have been worked out or studied, such as the Classification systems of Geographic Information, the Geographic Information metadata, data quality control, Digital Topographic Product models and etc.

In order to provide timely geo-spatial data resources, efforts have been devoted to establish an updating and budgeting mechanism for fundamental geographical information in China. In 1997, the central government listed fundamental surveying and mapping into the State Economic and Social Development Plan of China. The government also determined to set up special budget for fundamental surveying and mapping and to largely increase the amount of the funds. During the period of the Tenth Five-year Plan of China, it is planned that first, to determine the updating cycle for fundamental geographical information and to strengthen a stable government budgeting mechanism both at the state and the provincial level; Second, to improve the capability of acquiring spatial data and to promote launching China's own high

resolution mapping satellite; Third, to further rationalize the distribution of and to build up; Forth, to speed up carrying out the program for updating fundamental geographical information.

An Administrative Regulations on Licenses for Using National Fundamental Geographic Data was formulated and promulgated by SBSM in the end of 1999. According to this regulation, the users are divided into three categories. As the first category users, central government agencies and provincial governments can get the national fundamental geographic data free of charge for purposes of decision-making and social welfare. Non-commercial organizations or individuals are the second category users, and they get the data with favorite prices for internal or individual uses in education, academic research, planning and management, or for them to provide academic results to central government agencies and provincial governments for macro decision making and social welfare; Commercial users or non-commercial organization using the data for commercial purposes, profits or construction engineering projects get the data at market prices. Up to now, SBSM has provided 13 ministries and 14 provincial governments with newly created geo-spatial data, such as the 1:250,000-scale dataset, the 1:10,000-scale DEM and DOM data for the 340,000km² key flood control area covering seven major river valleys. This has promoted the social services of national fundamental geographic information and the geo-spatial data sharing process in China.

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