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Application of Geo-Spatial Data in China

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# **Application of Geo-spatial Data in China**

**Presented by**

**State Bureau of Surveying and Mapping**

**The People's Republic of China**

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The State Bureau of Surveying and Mapping of China (SBSM) and its provincial and local branches have made great efforts in developing multi-scale geo-spatial databases in recent years. The 1:250,000 National Fundamental Geographic Information Database, the 1:10,000 digital elevation model database for the 340,000 km<sup>2</sup> flood-control area along seven major rivers, 1:500 or 1:1,000 fundamental geographic information databases in some cities have been established and the 1:50,000 National Fundamental Geographic Information Database is currently under construction. These multi-scale fundamental geographic databases have come to significant applications in the national economic construction and social development, by providing governments of all levels and professional institutions with unified spatial platform for their space-referenced systems for planning and administration or systems in support of decision making.

## **Applications in Government Administration**

In order to get timely information on the spatial distribution of the national economic construction and social development, governments of all levels have set up various types of space-referenced systems to support decision making. These systems incorporate enormous economic and social information to the vehicle of fundamental spatial data provided by surveying and mapping agencies.

- Based on the 1:1 million and 1:250,000 fundamental geographic data, the General Administration Office of the State Council, in cooperation with SBSM, developed the National Comprehensive GIS for the State Council. The system has been playing an important role in macro analysis and decision making, as a sub-system under the National System Supporting Government Administration. In the process of flood-control campaigns during 1997-1999, the system, as the spatial vehicle for the real time information on flood and weather, provided timely support for the leading group to learn about and direct the fight against the flood. Presently, the governments of about 20 provinces and municipalities are setting up or using the comprehensive GIS of similar types.

raster graphic and digital line graphic is an important fundamental information source for hazard mitigation. At the present, more than 10 provincial governments are constructing their flood control information systems using geo-spatial data. For example, the Henan Provincial flood control information system, established with the help of Henan Surveying and Mapping Bureau, is now operating on the provincial government's automated administration network. Concerned personnel and departments can make inquiries on their terminal computers. The real-time data of rainfall, water levels at large reservoirs and hydrographic stations along the Yellow River is daily transmitted and automatically added to the flood control information system of the General Administration Department of the Provincial Government from the Provincial Meteorological Bureau and the Provincial Water Resources Bureau.

### **Applications in Scientific Research**

Among the 62 priority projects of China's Agenda 21, about 40 need to establish or apply GIS. Fundamental geo-spatial data is essential for research projects such as Three-Gorges Landslide Monitoring, Moving South Waters to the North, Crops Yield Assessment, Sustainable Development of County-level Agriculture in Huanghuaihai Region, Remote Sensing Monitoring of the Vulnerable Ecological Environment in Shanxi-Shaanxi-Nei Monggol Region. For example, to find out the distribution of cultivated lands with a slope over 25 degrees, we overlay the 1:250,000 DEM on the land cover data and analyze it comprehensively. We also use the 1:250,000 database to investigate on the optimal central and western routes for moving the south waters to the north.

### **Public applications**

In recent years, electronic cartographic products facing the public are constantly emerging. China Cartographic Publishing House has presented the National General Atlas of China, the History of China's Anti-Japanese War, Electronic Map of Beijing 2000, Tourist Attractions of Beijing on CD-ROMs. At the same time, on-line services based on electronic maps have also appeared. For instance, the Getting around on Maps provides the public with the latest information about cities, by opening such columns as transportation, tourism, shopping, dining, real estate, recreation, finance, education and training on the electronic maps of 34 large cities. The To Know about Beijing on Line provides information in both picture and text of about 3,400 place names, 1,400 blocks, 300 tourist attractions, 10,000 organizations, 1,000 real estate projects, and 400 bus lines of Beijing.

To improve the services for the public, some cities have established their emergency response systems or bus navigation systems on the basis of digital maps.

- With the help of SBSM, the Ministry of Foreign Affairs established the Sino-Vietnam Land Boundary Database, which integrates fundamental geographic information with delimitation records, historical maps and relative treaties and laws on the concerned boundary. The negotiation process was greatly sped up thanks to the technical support of the system.
- Making use of the 1:250,000 National Fundamental Geographic Information Database, SBSM computed the average elevation of provincial highways over sea level and the distance regulation coefficient for road transportation, for the Ministry of Finance to collect reasonable taxes on automobile fuel and to regulate the distribution of relevant financial subsidy.
- The State Development Planning Commission, the State Personnel Quota Commission, the State Bureau of Statistics are also using the fundamental geo-spatial data in their administration.

### **Applications in Professional Organizations**

Many professional organizations engaged in city planning, land management, water conservancy, environment protection, agriculture and mobile telecommunications have actively taken advantage of the fundamental geo-spatial information for urban construction, natural resources management, hazard mitigation and ecological protection.

Quite a number of cities have established their urban geographic information system, based on large-scale digital maps. For instance, Guangzhou Municipal Bureau of Planning includes in its information system 1:500 digital topographic maps covering its 700km<sup>2</sup> developing area, 1:500 digital maps of underground pipelines covering its built-up area, 1:2000 digital topographic maps, digital orthophoto maps and 1:10,000 digital topographic maps covering the whole city of 1,400km<sup>2</sup>. They added some functions for planning and management to these digital data and developed their own professional operation systems. Tianjin Surveying and Mapping Institute contributes to the mass reformation of dilapidated areas of the city and its urban road widening projects with large-scale digital maps and digital orthophotos. Shanghai has established its information systems for land and real estate tenure management and land use planning. Shenzhen and Changzhou Municipal Planning and Land Bureaus have set up their administrative information system incorporating GIS and other automated administration solutions, which provides functions of documentation, inquiry, statistics, analysis, and making graphics and maps through the computer network, and has achieved remarkable social and economic benefits.

Geo-spatial data such as digital orthophoto map, digital elevation model, digital

With the development of high resolution digital maps, three-dimensional digital landscape imagery and etc., geo-spatial data will undoubtedly gain wider and wider applications in the future.