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RESEARCH ON POSITIONING AND FRAMEWORK DESIGN OF INFORMATION MAPPING SYSTEM

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Abstract

With the rapid economic development of the current society, the continuous progress of science and technology, and the combination of information technology and science and technology brings us fast, convenient and accurate information transmission, so in the process of the construction and development of the surveying and mapping system, we must improve the information surveying and mapping system, realize the practical requirements of the combination with modern technology, and integrate information. In order to establish an effective frame structure and promote the application of modern information system in surveying and mapping, the scientific positioning of Surveying and mapping system should be carried out. The information-based surveying and mapping makes our country's surveying and mapping mode realize a new development stage from traditional surveying and mapping to digital surveying and mapping after transforming to information surveying and mapping, and also realizes the mode combining with network technology service.

Key words: Informationalization; Mapping system; Positioning.

INTRODUCTION

With the progress of our country's economy and society, my scientific and technological level has been developed rapidly, and superb science and technology has been widely used in various fields. For example, in the field of construction, the surveying and mapping system has gradually moved towards informatization. This kind of Surveying and mapping system based on the level of informatization is of great significance to promote the promotion of Surveying and mapping technology in China and the strategic development prospect of the industry in the future. In order to further play the role of information mapping system, people need to accurately position it, and make a comprehensive study and analysis of its framework. With the continuous development of China's surveying and mapping industry, the industry has new requirements for various technologies in the project. The development of Surveying and mapping technology towards informatization has become an inevitable trend of development. At the same time, the construction of Informatization Surveying and mapping system has become a hot topic in China. The construction of information-based surveying and mapping system is mainly reflected in technology and service. In addition, the surveying and mapping technology has become more and more important. Therefore, we must pay attention to the quality of Surveying and mapping and related technologies to further promote the construction of information-based surveying and mapping system.

A SIMPLE EXPLANATION OF INFORMATION MAPPING SYSTEM

Concept of Information System

From the perspective of technology, information-based surveying and mapping technology can be said to be formed after the integration and intersection of multiple disciplines. It takes the digital surveying and mapping system as the prototype, effectively realizes the ability of network distribution, network production, function, processing and updating of geospatial information resources, realizes the value-added service, perfect intersection and integration of resources, and makes surveying and mapping technology and The surveying and mapping information is gradually deepened and socialized, providing the whole society with perfect services in various forms, all-round and multi-scale. Generally speaking, the Informatization Surveying and mapping technology specifically covers virtual reality technology, computer network technology, information highway technology, geographic information system technology, aerospace remote sensing technology, satellite altimetry hormone sum, satellite positioning and navigation technology, and satellite gravity. Force detection technology, etc.[1]

In the face of the urgent needs of all walks of life in

our country and the massive data information related to geography at the terabyte level, the transmission of data information brings us difficulties that are difficult to surmount. On the one hand, the information required by users is not able to answer the questions put forward by users at the first time; on the other hand, the data information is large and cannot be processed in a large area in time. Therefore, the real-time, intelligent and automatic requirements for geospatial data processing and processing are put forward, the digital function of Surveying and mapping technology is improved, and the current complex and contradictory situation is broken down. With the needs of the current situation, the concept of global information grid enters the field of information technology, and people will realize accurate and effective grid computing using the 4G Internet. That is to say, it can not only use the resources on the network to calculate at any time, but also retrieve and query GIS and relevant time data.

In this context, the current omega-s data and related technologies in China are faced with four major obstacles: different data storage formats, different semantic descriptions, different spatial data benchmarks and different real-time dynamics of spatial data. Therefore, it is an urgent need for the development of the times and grid computing to build a unified spatial information grid in the world. For this reason, the concept of multilevel grid of spatial information has been put forward. This concept is mainly based on the user's needs, using the coarse and fine grid with geoscience coding to unify the situation of different real-time spatial dynamics and storage methods. The theoretical point of view is: Taking geographical coordinates as the general structure, according to the current social development trend, it is divided into grid of different thickness, taking global geocentric coordinate system coordinates or grid center point longitude and latitude coordinates as the main reference object, storing the attribute characteristics and features of each grid. The above storage method is also applicable to the analysis and statistics of social and economic data in China. In the field of work. If the transformation of different scale spatial database and multi-level grid of spatial information can be realized, the information-based mapping system will step into a new stage of development. Not only that, spatial data mining technology can also be widely used, making the auxiliary decision-making and spatial analysis enter a new stage of development, but also clarifying the direction and core objectives of the information-based mapping system.[2] (**Figure 1**)

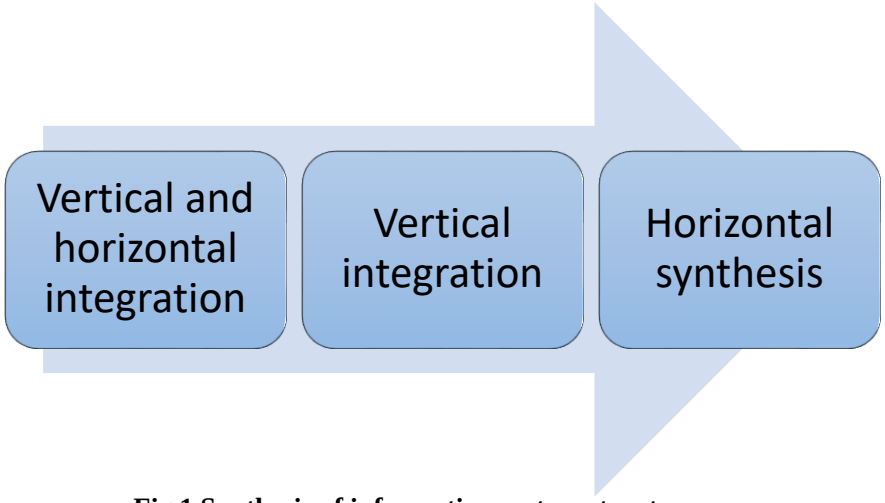

Fig 1 Synthesis of information system structure

Development of Information Mapping System

The development of Surveying and mapping technology has gone through a long time, and the early surveying and mapping technology has appeared from ancient Egypt. At that time, the method of land measurement was used for engineering surveying and mapping. Through continuous development, it has been developed to remote sensing surveying and mapping. The traditional manual surveying and mapping technology has been gradually replaced by modern surveying and mapping technology. In the 20th century, the main symbol of Surveying and mapping technology is optical machinery, but this kind of machinery is very large. In order to obtain the required surveying and mapping data, the surveying and mapping personnel often need to hold huge surveying and mapping equipment, and the accuracy of Surveying and mapping is far from the current technology. In addition, manual mechanical drawing method is used in the early production of line mapping map, which is not only time-consuming and laborious, but also the quality of drawing is not very high. After the emergence of digital surveying and mapping system, the quality of Surveying and mapping has changed a lot. The acquisition, processing, processing and application of data have realized digitization. The form of products has also changed from traditional paper model to 4D model, realizing a revolution of Surveying and mapping technology. The new surveying and mapping system takes 3S technology and spatial data resources as the core, and combines the more developed digital means such as network and storage. It develops from GIS to

Web GIS, then to Open GIS, then to the mutual operation of spatial data, and then to clearinghouse; database also develops from basic geographic information database to spatial data technology facility, and then to spatial information infrastructure.[3] (**Figure 2**)

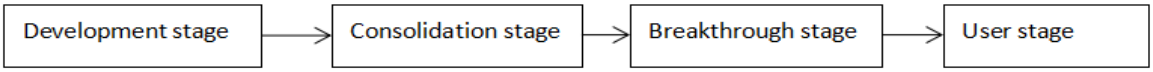

Fig 2 Development of information cartography system

POSITIONING OF INFORMATION MAPPING SYSTEM

On the basis of the digital mapping system, we can understand the information mapping system, that is, the automation of mapping technology, the digitization of mapping results, and the socialization of mapping products based on the network of mapping services.

Surveying and Mapping Production Automation

Because the traditional analog mapping production technology system has realized the transformation to the digital mapping production technology system, and the mapping instrument has realized the digitization, which makes the control survey change from the original triangulation and distance survey to the satellite positioning survey: the field mapping changes from the paper mapping of the flat panel instrument to the field mapping system of digital automation; the photogrammetry changes from the analog aerial photogrammetry to the landless. The transformation of all digital aerospace remote sensing data acquisition and processing system based on area control; the transformation of cartography from traditional manual cartography to digital map design and production system; the transformation of mapping products from paper form to geographic information database and geographic information digital products, etc. Therefore, the whole process of Surveying and mapping production from geographic information acquisition, processing to service has realized digitization and speediness. Especially when the demand of 3D data acquisition and geographic information real-time update collection is growing, the automation of its corresponding process in technology makes it inevitable for further development. [4]That is to say, information-based surveying and mapping is bound to establish a surveying and mapping production technology system characterized by intelligent and automatic geographic information data processing, which includes widely realizing automation in the process of geographic information collection, processing, management, update and application, which is a major change in the development of Surveying and Mapping Technology from digitalization to informatization.

Digitization and Diversification of Surveying and Mapping Results

Compared with the paper form of traditional surveying and mapping results, the digitization of Surveying and mapping results is mainly manifested in the following aspects: ① the information content of Surveying and mapping results is more abundant. Because the digital results do not have the limitations of the simulation results on the content representation, in addition to the physical geographical elements or the shape, size, spatial location and attributes of the surface artificial facilities represented on the traditional map, the future mapping results will also contain a lot of other attribute information. ② the current situation of Surveying and mapping results. The information society has the characteristics of rapid change, so the surveying and mapping results must accurately reflect the current geographic information, and digitalization will ensure the realization of this requirement. ③ diversification of Surveying and mapping products. On the basis of digitalization of Surveying and mapping results, a variety of Surveying and mapping products can be derived, such as digital maps to meet various needs, various geographic information data products, various functional geographic information systems, decision support systems, etc. ④ standardization of Surveying and mapping products. In the information society, information is required to be circulating, which undoubtedly requires that surveying and mapping products must be standard.[5]

Mapping Service Networking

The traditional service mode of Surveying and mapping and the service mode of digital surveying and mapping are basically based on providing, that is to say, the service of information surveying and mapping is really based on service.[6] Therefore, the service mode must change to the buyer's market, that is, the demand market mode. With the rapid development of information technology and the rapid popularization of Internet in the world, the space of human society has been gradually reduced in the concept of information, and the way of Surveying and mapping services has changed fundamentally. Surveying and mapping results can be stored in various places in a distributed way, and an integrated geographic information portal website can be established by establishing a one-stop service system

of geographic information. Users only need to visit the website and query interface to search, visit and browse the geographic information distributed in different places, so that anyone can enjoy the geographic information service in any place and at any time.

Socialization of Surveying and Mapping Products

The socialization of information application of Surveying and mapping information service is based on the integration of information resources and the convenience of information service, and needs to produce public and open surveying and mapping products first. Its ultimate goal is to make geographic information and surveying and mapping products penetrate into ordinary people's homes, and make surveying and mapping and geographic information become the common needs of the whole society. Only when the information resources are extremely rich, the access to information is smooth and convenient, and the public products of geographic information are complete, can a wide range of user groups be formed and the socialization of application be realized. Informatization Surveying and mapping reflects the changes of Surveying and mapping demand structure in economic society and people's life, and reflects the characteristics of the development of information society, which is a new surveying and mapping development idea proposed to achieve the goal of national economy and social informatization development.[7]

By making full use of space technology and computer technology, surveying and mapping has realized the transformation from traditional surveying and mapping technology system to digital map production technology system, and digital surveying and mapping products have been widely used.[8] The establishment of digital surveying and mapping technology system has injected new connotation into Surveying and mapping in the information age, and surveying and mapping has entered the information age. It is the basic requirement of the information society for the development of Surveying and mapping and the only way for the sustainable development of Surveying and mapping in China to take the road of information-based surveying and mapping development and accelerate the construction of information-based surveying and mapping system. In the new century, China's surveying and mapping must realize the historical transformation from digital map production to information-based surveying and mapping services. On the premise of ensuring map confidentiality, we should try our best to develop various spatial information services, such as lbs / MLS, its, urban grid information services, precision agriculture and logistics distribution.[9] (**Figure 3**)

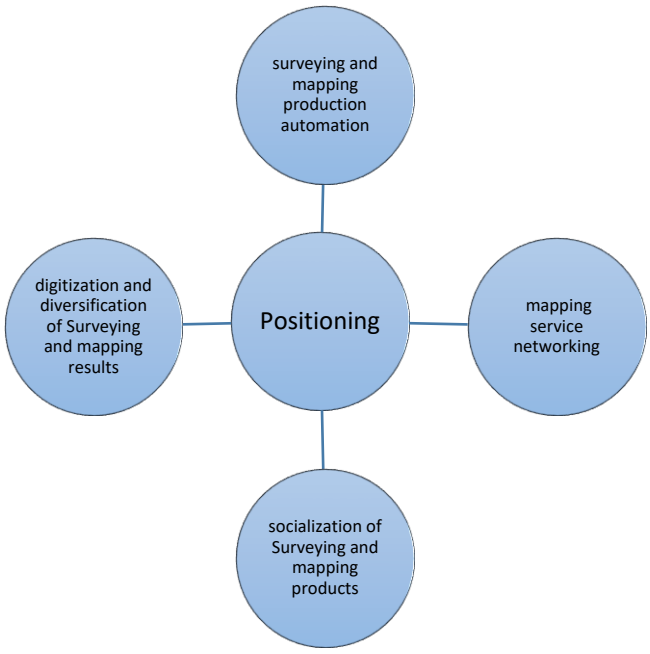

Fig 3 Positioning of information mapping system

FRAMEWORK OF INFORMATION MAPPING SYSTEM

The hierarchical structure of information surveying and mapping system is mainly composed of five levels of technology data layer, management layer, service layer and application layer, and four systems of technology innovation, support and guarantee system, data acquisition, database building and update system, information integration and navigation system, industrialization and social information application service system. The wide application of the full socialization of spatial information is the concrete embodiment of the whole process of the information mapping system, which serves the economic construction and social development in many directions and fields, such as the spatial benchmark framework service system, the spatial data processing service system and the basic spatial database service system. [10]Based on the

spatial reference frame, GPS continuous tracking station and differential reference station can be added for GPS data processing and information dissemination for the whole society, and a GPS integrated service system for real-time positioning and navigation can be built. Based on the geographic information acquisition and processing system, it can give full play to the advantages of technology and equipment, assist the professional departments to establish thematic database or integrate the professional geographic information system to prepare and update the navigation electronic map through data collection, collection and integration, and provide data value-added services for the location-based service (lbs), intelligent transportation system (ITS) and other construction projects. Based on the basic geographic information database system, authoritative and fair static statistics and dynamic analysis can be carried out for the spatial characteristic data such as location, height, length and area of important natural or human geographical entities and the surface resources and environment information concerned by the society, and services such as spatial statistics, monitoring, trend prediction and release can be carried out; spatial data retrieval, query and release can be provided for the public. It provides online mapping and integration services for specific users and data update services for national basic geographic information system. The construction goal is to provide personalized and customized spatial information services - on-demand services "fast, accurate, comprehensive and cheap" for government management and decision-making enterprise operation and public life.[11]

CONCLUDING

The information cartography system is a new stage of the development of the surveying and mapping system. If the information cartography system is analyzed from the technical point of view, it is formed by the intersection, integration and further development of the modern surveying and mapping technology. Relying on the current developed digital information technology, it can quickly obtain spatial geographic information, and integrate the information with technology, accuracy and intelligence. A digital surveying and mapping system that can be managed and networked. Through the analysis and research of the information surveying and mapping system, we find that the development process of Surveying and mapping technology is actually very long, and it develops step by step into today's information surveying and mapping after continuous development and reform. The information-based surveying and mapping system is a new stage of the development of Surveying and mapping technology. People have made a new orientation for it, which is the automation of Surveying and mapping technology, the digitization of Surveying and mapping results, the networking of Surveying and mapping services and the socialization of Surveying and mapping products. It also has a new framework structure, which includes more complete levels and systems, and meets the continuous changes of people's geographic information data. The need of transformation.

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REFERENCE

1 Tang B H , Zhou Z X . The application of equipment positioning system in the based on the distributed of integrated navigation and multi-sensor data fusion[C]// 2017 2nd International Conference on Image, Vision and Computing (ICIVC). IEEE, 2017.

2 Liu Q X , Wang Z H , Long S G , et al. Research on Automatic Positioning System of Ultrasonic Testing of Wind Turbine Blade Flaws[J]. IOP Conference Series: Earth and Environmental Science, 2017, 93:012074.

3 Li X . Research on the Information Management System of Materials of Tobacco Industry in Guizhou Province[J]. Journal of Computational & Theoretical Nanoscience, 2017.

4 Zhang F , Dong L . Design of Farmland Water Conservancy and Irrigation Management System Based on GIS[J]. Asian Agricultural Research, 2017(11).

5 Gao Q , Meng X , Qian W , et al. Research on correction algorithm of laser positioning system based on four quadrant detector[C]// Seminar on Novel Optoelectronic Detection Technology & Application. 2018.

6 Liu K , Jiang J , Ding X , et al. Design and Development of Management Information System for Research Project Process Based on Front-End and Back-End Separation[C]// 2017 International Conference on Computing Intelligence and Information System (CIIS). IEEE Computer Society, 2017.

7 Traxler G , Byerlee D . Crop management research and extension: The products and their impact on productivity.[J]. CIMMYT Economics Paper (CIMMYT). no. 5. 1992.

8 Li S , Yang Z , Xiu J , et al. Research on an intelligent semantic-based information extraction framework[C]// 2016 16th International Symposium on Communications and Information Technologies (ISCIT). IEEE, 2016.

9 Wang S H . Notice of Retraction The Framework Design and Research on Enterprises Group Financial Decision Support System[C]// International Conference on Management & Service Science. IEEE, 2010.

10 Milliron T , Jensen R J , Barzel R , et al. A framework for geometric warps and deformations[J]. ACM Transactions on Graphics, 2002, 21(1):20-51.

11 De Vaujany F X , Lesca N , Fomin V , et al. Community on the Watch: Making Sense of I.S. Research Through the Lens of Espoused Theories of I.S.[J]. Social Science Electronic Publishing.