

# Role of Basic Surveying and Mapping Production In Urban Management

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**Abstract.** Since the traditional urban management style has been unable to cope with contemporary challenges of the growing number of urban problems, the implementation of urban information management and urban meticulous management are important measure to improve the performance of urban management, and it is an effective way for the city to improve the production and living environment and the urban quality. Exploring of the role of basic surveying and mapping production in urban management is helpful to improve the city's planning, construction, management and service levels. This paper summarizes the uses of basic surveying and mapping production in the management of city.

## Introduction

China's rapid economic growth, market's rapid development, the rapid expansion of the city size, substantial floating population transfer, complicated public security situation, all those factors make the urban management more and more difficult. The rough urban management philosophy, Methods and means have been lagging behind the requirements of modern management. In order to do better the urban management, we should change the traditional rough urban management method, introduce the concept of urban informationize and meticulous management, to improve the city's administrative structure, and to improve the management level to a new stage.

In recent years, with the rapid development of mapping technology, basic surveying and mapping production have been widely used in the social aspects of disaster prevention, flood, sudden emergency, land resources, environmental resources and mineral resources survey, it guarantees that the resources of the ground clear, and it provides a wealth of information and data for urban management.

## Basic Surveying and Mapping Production

Formed in the process of basic surveying and mapping, basic surveying and mapping production contains graphics and data by various information carriers. Basic surveying and mapping production reflects that the fundamental geographic information is dynamically. Basic surveying and mapping product system is a very complex system that includes mapping the benchmarks and graphic in aspect of basic surveying and mapping's meaning. while in aspect of the form of a map products, Basic surveying and mapping product system includes analog maps and digital map products. From the graph type, it includes topographic maps, cadastral maps, image maps, and administrative zoning map. Those maps have different scale such as 1:500, 1:1000, 1:2000, 1:5000, 1:10000, 1:50000, 1:250000, 1:1000000. Under normal circumstances, 1:500, 1:1000, 1:2000 three kinds of scale products are urban infrastructure mapping map products, and those maps are produced and updated by country mapping departments. Under normal circumstances, digital products contain Digital Line Graphic (DLG), Digital Raster Graphic (DRG), Digital Orthophoto Maps (DOM), and Digital Elevation Model (DEM).High-resolution remote sensing images. All the films (or photos) record electromagnetic value of various features, are known as remote sensing images, which mainly include aerial photographs and satellite photographs in remote sensing. Compared with the traditional low-resolution satellite imagery, high-resolution remote sensing

images have the advantages of the amount of information increased significantly, imaging spectral band narrowing, more prominent feature geometry and texture information, two-dimensional to three-dimensional information, and high temporal resolution, etc. CORS system is a product of the global positioning navigation system technology development, it can solve the positioning, navigation, weather-related issues. Continuous Operational Reference System(CORS) can be defined as a network, consisting of modern computers, data communication, Internet (LAN / WAN) technology and several fixed continuously operating GNSS reference station.



Figure 1 large-scale topographic map



Figure 2 cadastral map

### **The Application of Basic Surveying and Mapping Production In Urban Management.**

Under the impetus of the science and technology of surveying and mapping progress, basic surveying and mapping productions began to show its characteristics, such as digitized production forms、networked production services、visual production applications and so on. With the advent of the era of informationalized surveying and mapping, basic surveying and mapping productions will happen more profound changes in some respects, such as production type、production process、carrying content、manifestation、service mode、application of space and so on. And it will also play a more and more important role in urban management.

#### **A. Largescale map's application**

1) Safeguard the Legitimate Rights of Citizens. In the implementation of urban master planning and urban detailed planning, the topographic map of the listed building, a central area of Square, tourist attractions in the area, and construction in progress are needed to safeguard the supervision of dynamic management of urban planning. A precision real-time topographic map can provide a legal basis and technical support for urban construction management department to guarantee legitimate rights and interests of citizens are not violated.

2) Orderly Management of the Urban Infrastructure. In fact, Some elements of the topographic map are not full expression. Urban management departments hope the topographic map performance all city facilities components, such as traffic lights, servicing silos, street lights, in order to facilitate management and maintenances.

3) Provide Technical Support for the Implementation of Rural Planning. In investigating and punishing the illegal construction in the urban construction department (such as exceed area, ultra-high or constructing not according to the planning of examination and approval, adjusting planning at will etc.), large scale map can provide accurate data and legal basis, and remit urban regulatory violation engineering in time, which enables the urban master planning to implement rationally, orderly and steadily.

#### **4) Dealing with the City Emergencies and Natural Disasters**

Once urban infrastructure (such as natural gas pipelines, water supply and drainage pipelines, electric power communication cable and so on) broken, or emergencies in urban areas, the large scale topographic map which detailed show the tube well, control site, hospital and police station will play a vital role, it is convenient for policy maker to deploy related departments quickly. By using the large scale topographic map, the situation can be effectively controlled, in order to reduce unnecessary losses.

#### **B. Application of DEM**

In the urban planning terrain analysis, the elevation is an important influencing factors. The ups

and downs of the terrain, the trend of mountains and rivers, slope and aspect, all those factors directly impact on planar structure and spatial arrangement forms in urban expansion. In traditional elevation analyze methods, people use different color to draw different elevation zone according to the changes of the contours. Drawing surface plan in this way is lack of intuition and integrity, and it cannot accurately express the structure and detailed features of the terrain, such as ridgelines, bottom line, fault lines, gullies, scarps, etc. Using the DEM to analysis is using shade or color to express 3D terrain surface elevation changes and detailed features of the terrain structure, to visually express the overall characteristics of the terrain, and to provide intuitive judgments basis for determining the urban planning area development direction and spatial arrangement forms. Taking full account of topographical factors' impact of urban construction and constraints, DEM can improve the rationality and scientificity of urban planning.

#### C.Application of the high-resolution remote sensing

The high-resolution remote sensing with high spatial resolution, high temporal resolution and high spectral resolution, focus on the monitoring of "objects" in the various elements of the urban management. With high spatial resolution features, we can make all kinds of urban management object more clear and legible, to implement refined management for the city with providing the high spatial resolution geospatial information elements, including buildings, bridges, roads, living areas, green areas, water bodies and so on. With high temporal resolution characteristics, we can obtain historical snapshots of the urban area of the main building with a higher frequency, to grasp the evolution and timing of the development of urban construction, to reflect changes in the type of urban management in the various elements of the distribution and amount of change, and to determine the type of ground before and after the change, boundaries and trend, etc.

##### 1) Meticulous management of urban-rural planning

Remote sensing data as a comprehensive, rapid, periodic spatial information access, can be applied in the preparation and review of urban planning, urban land Survey and tracking, dynamic monitoring of urban planning, which helps to improve the level of decision-making and management of urban and rural planning, and comprehensive benefits of the urban and rural planning in environment, economy and society . Based on planning dynamic monitoring of remote sensing, the main content of this work includes the direction of urban development, land size, the protection of Green Line, Blue Line, Purple Line, Yellow Line, and all kinds of urban construction land changes. It implements the oversight mechanisms for rapid detection and timely treatment on breach of the urban and rural planning, curbs illegal signs preliminary and maintains the seriousness and authority of the overall urban planning.

##### 2) Protection of urban drinking water safety

Monitoring the quality and quantity of drinking water sources in urban areas by scores of remote sensing image provides the scientific basis for the construction of security for urban drinking water source. Parameters that affect water quality include suspended solids, algae, chemicals, dissolved organic matter, heat emissions, pathogens and oil substances. There both qualitative and quantitative methods to monitor source water quality, using hyper spectral remote sensing data. The qualitative method is to establish the tones between the water environmental chemical phenomena and remote sensing image through image interpretation signs. Quantitative method is to calibrate quantitative mathematical model on the basis of the qualitative method. In order to eliminate the influence of random factors, we usually need to obtain measured data synchronized on remote sensing image.

##### 3) Meticulous management of urban emission reduction

Urban emission reduction monitoring and evaluation include the monitoring and evaluation of urban waste disposal and urban sewage treatment status quo. Based on high resolution remote sensing data we can automatically extract the data of piling up waste, which has area greater than 100 m<sup>2</sup> or more like construction waste, industrial waste, mixed garbage and solid waste. The characteristics of solid waste on high spatial and hyper spectral remote sensing image can help us to classify solid waste press of its kind, area and stacked form so to decide the best way for garbage transportation and reasonable layout of waste disposal facilities .It provides practical and reliable

scientific data for the development of the recent methods of waste disposal and long-term waste comprehensive treatment planning.

#### D. Application of CORS

Compared to past technical methods, the CORS system has strong advantages in urban management and operation. It can help management personnel solve many technical problems and bottleneck in management. The CORS system is bound to bring a new round of institutional change.

1) high-precision positioning and navigation. Most of current real-time precision navigation and positioning services can only be provided by the meters, 10 meters or less, can't achieve real-time cm-level, which is influenced by the United States, Russia and other navigation satellite property policies, navigation satellite is not made public release high precision navigation and positioning information data, especially in the period of military tensions, real-time navigation and positioning accuracy are lower, sometimes even can't positioning and navigation. The CORS system can improve the efficiency and quality of urban management, and also can promote people to change the way of life.

2) Earthquakes and Crustal Deformation Monitoring. Using CORS system builds on the bedrock of base stations in crustal deformation monitoring network, using observation data of base station, crustal deformation accumulation area, provide experimental data for urban earthquake forecast. CORS system will be an important part of seismic and geological disaster forecasting, crustal deformation monitoring, providing measurement benchmarks for the Crustal deformation monitoring, the fault zone monitoring, landslide monitoring, land subsidence monitoring of the city.

### Conclusion

In the environment of the implementation of the strategy of China's Digital Earth, the result of basic surveying and mapping has played a more and more important role and its status continued to elevate. The result of basic surveying and mapping provides spatial data base for city management. It is the accuracy and reliability of the result of basic surveying and mapping that makes it become common positioning system of the general spatial correlation information. We can promote the sustainable development of the city and improve the city information management level through reasonably application of basic surveying and mapping results in the management of the city.

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