

# Research on Application of Wireless Communication Technology in Surveying and Mapping Engineering

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**Abstract:** With the rapid development of science and the continuous progress of society, a new technology, wireless communication technology, has been born. This technology has played a vital role in the development of the national economy. The scope and fields to which it is applied It is also quite extensive, such as surveying and mapping engineering operations, remote control, and 5G networks. This article discusses and studies how wireless communication technology is applied in surveying and mapping engineering and hopes to provide reference for the application of communication technology in surveying and mapping engineering in China through the research in this paper.

## 1. Introduction

At present, 5G has been formally commercialized, and various industries in the society have also developed towards digital information technology. In terms of surveying and mapping engineering, traditional surveying and mapping methods can no longer meet the needs of the industry. Therefore, it is necessary to attach great importance to wireless communication technology Application research to maintain the accuracy and effectiveness of surveying and mapping work in order to solve communication problems in surveying and mapping work.

## 2. Overview of Wireless Communication Technology

Wireless communication is a communication method that uses the characteristics of electromagnetic wave signals to propagate in free space to exchange information. In recent years, in the field of information communication, the most widely used and rapidly developed technology is wireless communication technology. Through the working principle of its technology, we can see that its main function is to serve as a means of communication. In the work of surveying and engineering drawing, it basically consists of two important devices, the base station and the mobile station. The server is part of a base station.<sup>[1]</sup> A necessary supplement in use, it can maintain a relatively safe and stable operating state for the system, and then provide an important guarantee for providing an efficient information transmission rate.

## 3. Composition of Wireless Communication System

### 3.1 Hardware of Wireless Communication System

Wireless communication equipment consists of antennas, single-chip computers, power supplies and other parts. The single-chip computer is the central axis of the hardware part. The single-chip microcomputer is an integrated circuit chip. Its quality directly determines the information transmission rate in surveying and mapping. Therefore, when choosing a suitable microcontroller MAPPING wireless communication system that works in practice, you can consider The stability,

accuracy, and long-distance transmission of the controller can be consumed. Under the action of the microcontroller, to ensure that the mapping information can be effectively and transparently transmitted, to achieve the efficiency of information transmission and the stability of the machine. Another important piece of hardware is the antenna, a device used to transmit or receive electromagnetic waves in the radio. In the process of using wireless communication technology, it should also focus on its RF antenna and feeder. The selection of the antenna should meet the basic requirements of wireless communication technology. For example, the length of the antenna can be selected according to the actual situation.<sup>[2]</sup> For its high portability, a spiral antenna is often selected. In order to improve the efficiency during installation, an antenna with a short thread is often selected. And mobile stations and secondary stations often choose directional antennas, and have the characteristics of large parameters and strong radiation. The diameter of the feeder should also be increased to avoid the situation where the signal is unstable due to the antenna's energy being converted into a medium or thermal energy being absorbed during transmission. It is also necessary to consider the stability of the power supply and the shoulder microphone to ensure that the system is in a high-speed and efficient working mode, which is an important guarantee in the operation of the system.

### **3.2 Software for Wireless Communication Systems**

In wireless communication systems, not only hardware support but also software support is needed. Raw data is transmitted to the computer's service terminal through the hardware facilities of the wireless communication system. Next, the software must be used to process and process these raw data for mapping. The staff should prepare for the calculation and drawing later. Geographic Information System (GIS) plays a big role in the wireless communication software of modern surveying and mapping engineering, and it can bring great convenience to the work of surveying and mapping staff. According to the working conditions of various professional surveying and mapping instruments in surveying and mapping engineering, it can be seen that when the raw data obtained under the functions of these instruments is transmitted to the system server terminal, it needs to use the functions of the software part to effectively process the raw data. The software part is mainly responsible for completing the data transmission, analysis and processing.<sup>[3]</sup> Software such as GPS and GIS occupy an important leading position in surveying and mapping engineering. Geographic Information System (GIS) can bring great convenience to the work of surveying and mapping staff. Compared with the traditional static positioning method, GPS wireless communication technology has made unprecedented great progress. In the traditional measurement mode, a reference station needs to be established in the area to be mapped, which will greatly reduce the efficiency of information reception, and the development of social urbanization is urgent, so we should adopt new wireless communication technology. Only data can be used to transform and transmit information between different regions. The transmission medium is divided into wireless and wired communication technologies. All can use transmission channels to link computers and data to achieve real-time sharing of data resources. Among them, software writing occupies an important position. Currently, Active X mode is generally adopted to upgrade the original software to achieve interactive purposes. In order to ensure the rationality of the system software modules, a reasonable development mode should be selected during the programming process to effectively reduce the workload of the operator. At the same time, it should be combined with the actual needs of the wireless communication system to select the right to develop the software modules. The framework enhances the portability of the software and expands the scope of real-time mapping of the system.

## **4. Application of Wireless Communication Technology in Surveying and Mapping Engineering**

In order to meet the actual needs in the implementation of surveying and mapping engineering operations, the practical application of GPS wireless communication technology in specific surveying and mapping operations should be emphasized. When using this wireless communication

technology for surveying and mapping work, reasonable planning and network layout should be performed. Usually, point or line links are used to draw the synchronized graphics of the Three Exchanges to achieve comprehensive network layout settings.<sup>[4]</sup> Among them, specific conditions should be taken into consideration, such as area, terrain, and network information. In addition, it is necessary to follow the relevant national operating regulations to ensure stable positioning and better observation conditions. Therefore, a reliable GPS RTK system must be established to improve the accuracy of surveying and mapping while giving full play to the actual needs of reference stations and mobile stations in the system. Under the function of the base station system, it can be applied to the measurement host, GPS antenna and the like to achieve the effective measurement accuracy of the coordinates, and calculate the distance between it and the size and correction of the satellite to ensure that the obtained data can be received. The receiver receives and obtains accurate positioning results, ensuring the measurement accuracy and reliability of the mapping mobile station.

GPS RTK technology is also called real-time dynamic monitoring technology, which mainly adopts real-time detection and specific analysis on the detected objects. Use the carrier phase view as a carrier, at least two or more signal receivers. One data base station and several data mobile stations, and at least five satellites are used for monitoring and detection. To achieve continuous and uninterrupted data reception and transmission, and use differential observations to process and analyze the data. In order to ensure the accuracy and accuracy of the measurement results, it is higher in the application of the system and plays the role of the base station to the maximum. Effect.

In the surveying and mapping work, the intermediate base station plays the role of organization, and can give full play to the role of GPS in the best state to achieve accurate and efficient measurement. It ensures that errors can be effectively reduced during the measurement operation, and that the generated data can be accurately obtained. For the entire surveying and mapping project, the use of the base station improves the overall work efficiency and accelerates the progress of the surveying and mapping project watch for.

When wireless communication technology is applied to GPS RTK measurement in surveying and mapping engineering operations, a standardized management system should be constructed, and a good measurement mode should be slowly formed to ensure that the system can provide long-term stable data transmission services during operation. At the same time, it should also be supported by very reliable wireless communication technology to meet the diverse needs of surveying and mapping, expand the mapping of surveying and mapping work, effectively use receivers, base stations and mobile stations, improve the effective use of survey data, and reduce surveying work. To measure the implementation rate of the program.<sup>[5]</sup> To avoid or reduce the occurrence of lost data packets or dropped lines in GPS terminals under effective cost reduction, the transmission data should also be encrypted to ensure the accuracy and security of the data and improve the mapping Efficiency in personnel mapping. Although poor signal reception may occur in some remote areas or in areas with poor signals, with the continuous development of science and technology, GPS wireless communication technology is also developing rapidly and is constantly being improved and improved. From the overall situation, GPS wireless communication technology is easy to use and operate, and it is directly connected by wireless signals, which effectively reduces the cost of surveying and mapping engineering operations. The application of wireless communication technology in surveying and mapping has become the main force in social development.

## 5. Conclusion

During the surveying and mapping project operation, the reliable wireless communication technology ensures the high-speed, safe, and accurate transmission of various information in the surveying and mapping work, which can effectively improve the work efficiency and not only make outdoor communication more real-time, At the same time, many obstacles have been eliminated. For example, the inconvenience caused by the reliance on drawing operations in the traditional

mode for surveying and mapping engineering operations has greatly improved the efficiency of surveying and mapping engineering operations. In addition, it can effectively reduce the time consumption and reduce the manual operation errors, while expanding the actual application range of surveying and mapping projects, while improving the accuracy of surveying and mapping. In short, wireless communication technology has brought broader prospects to the surveying and mapping project, and it has construction significance across the ages. For a surveying and mapping project, how to improve the overall work efficiency and ensure the accuracy, precision and reliability of information and data is the key, and wireless communication technology just solves all the problems in the surveying and mapping project. Provide important technical support and assistance.

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