Application of Computer UAV Remote Sensing Technology in Building Engineering Surveying and Mapping

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Abstract. UAV remote sensing systems are widely used in environmental investigations. It is mainly used to classify land resources and monitor environmental land in urban areas to fully grasp urban land resource information. At present, some government departments in China have tried to use unmanned aerial vehicle remote sensing systems for environmental investigations. Using high-definition digital cameras equipped with unmanned aerial vehicles to carry out environmental surveys in rural and urban land resources. The unmanned aerial vehicle remote sensing system obtains a remote sensing map to provide a basis for the measurement of land use rights, reduces the investment in traditional land measurement manpower and material resources, greatly improves the measurement efficiency and meets the precise requirements of government departments for environmental monitoring. This article analyzes and explores the application of UAV remote sensing technology in surveying and mapping.

Keywords: UAV remote sensing technology; engineering surveying and mapping; application

1. Introduction

Using remote sensing technology, through the investigation of target object data and image restoration and the use of image processing technology and object recognition technology to extract target object information and then achieve real-time monitoring feedback and finally complete the measurement work. Applying this technology to cadastral surveying, translating and processing aerial photographs with the aid of a stereo mapping instrument and then processing to generate image files and data analysis of target objects Handling has greatly promoted the improvement of work efficiency.

2. UAV remote sensing technology analysis
2.1. Classification of remote sensing monitoring platform

The UAV remote sensing monitoring system is classified according to different remote sensing monitoring platforms. At present, there are three remote sensing monitoring platforms at home and abroad: unmanned helicopter platforms, unmanned fixed-wing aircraft platforms and unmanned airship platforms. Among them, unmanned airship platforms and unmanned fixed-wing aircraft are highly controllable and suitable for many occasions and are mostly used for land surveys in a small area. Unmanned helicopter platforms have the advantages of flexibility and portability and are used in emergency situations[1].

2.2. The main components of the remote sensing monitoring system

UAV remote sensing monitoring system is mainly composed of three major parts: UAV platform, data ground processing system and airborne system. Unmanned aerial vehicle is a flying platform, it serves as a carrier for remote sensing monitoring. It mainly includes three platforms: unmanned fixed wing, unmanned airship, unmanned helicopter. The airborne system includes two parts: airborne control system and airborne instrument. Airborne instruments include two major parts: imaging equipment and monitoring instruments. There are three types of airborne control systems: data acquisition system, signal control system and data transmission system. The operation of the airborne instrument is affected by the signal control system. The collection and transmission of the measurement data of the airborne instrument are completed by the data acquisition system and the data transmission system, respectively. The data ground processing system includes two parts: a data processing system and an image and monitoring data receiving system. It receives and processes data from groundborne instruments. As far as monitoring instruments are concerned, they are widely used in the environmental field. The following pollutants can be monitored, such as particulate matter, sulfur dioxide, ozone, temperature, nitrogen oxides, humidity and other meteorological indicators[2].

3. Surveying and mapping analysis of building engineering

Engineering surveying and mapping is the core content of buildings, focusing on all-round engineering surveying and mapping of soil erosion during the construction of building projects. In this process, the application of UAV remote sensing can further improve the quality and efficiency of engineering surveying and mapping and save engineering surveying and mapping costs. Improve the utilization rate of engineering surveying and mapping resources. For example, during the construction of water conservancy projects, the application of unmanned remote sensing can target the construction project area to obtain the water and soil erosion situation in the construction project area and realize the construction amount, disturbance area and soil erosion intensity in different construction stages And other information extraction. At the same time, through comparative analysis of multi-stage image data obtained by drones, it is possible to grasp the prevention and control effects of buildings, including the effects of disturbance land remediation, forest and grass coverage and restored rates, to meet the needs of building engineering surveying and mapping.

3.1. "Governance Design" of UAV Remote Sensing Application

In the construction of buildings, when carrying out comprehensive treatment for the problem of soil erosion, relevant staff shall conduct investigation and analysis of the treatment area according to the
relevant regulations and on this basis, carry out comprehensive treatment design. In this process, traditional building investigation and analysis methods are susceptible to various factors such as space environment, personnel operation behavior, engineering disturbance, etc., increasing the difficulty of investigation and research and affecting the comprehensive prevention and control design quality and prevention process. The application of UAV remote sensing can quickly and accurately obtain the required information, enrich the basic design data, ensure the accuracy and scientificity of the measures and methods applied and improve the overall quality effect. The remote sensing signal mapping is shown as figure 1.

![Remote sensing signal mapping](image)

**Figure 1.** Remote sensing signal mapping

3.2. "Acceptance assessment" of UAV remote sensing application

The acceptance assessment of construction projects is one of the important contents in the construction work. Through the acceptance assessment, we can timely understand the quality of construction projects and ensure that the construction projects meet the standards for building prevention. In this process, the application of UAV remote sensing can carry out targeted and purposeful inspections on construction projects\(^3\). For example, spoil grounds and waste dumps of water conservancy hubs, temporary roads and highways, medium and long tunnels, borrow pits, ash storage yards, etc. In addition, based on the results of engineering surveying and mapping, the actual situation of the construction project can be understood and the objective evaluation of the prevention and control effect of the project in water body maintenance can be realized to improve the accuracy and reliability of the acceptance assessment.

4. Application of UAV remote sensing technology in building surveying and mapping

4.1. Data collection

Engineering construction is inseparable from accurate data. Only when the surveying and mapping accuracy meets the requirements can high-quality project products be built. Then, the collection of engineering surveying and mapping data is very important. Good data support is an important basis for
engineering decision-making. Through data analysis, comprehensive planning and design of the project are completed. In various engineering surveying and mapping work, drone remote sensing technology has been widely used to help engineering personnel collect various useful data. At the same time, it can also perform timely summary analysis to increase the speed of data collection and increase the accuracy. In the actual operation process, relevant operators are required to input instructions to the computer, divide the area of surveying and mapping, reasonably design the drone route and let the drone execute the designed instructions under reasonable environmental conditions during the flight process. No need to operate, as long as the safety of the drone is guaranteed, relevant data can be obtained and the engineering surveying and mapping work can be successfully completed. At present, with the continuous innovation of technology, the UAV has realized the function of precise positioning by means of the positioning system and according to the corresponding coordinate system, to ensure the ability of a certain range of surveying and mapping operations. For the various data obtained, it is necessary to do a review and inspection to ensure the accuracy of the data and then make a second flight to supplement the required data and comprehensively improve the accuracy of the data. The data acquisition fit is shown in the figure 2.

![Figure 2. Data acquisition fit](image)

### 4.2. Image acquisition

In addition to collecting data, engineering surveying and mapping also needs to collect and organize various images to fully meet the needs of cartography. Image collection is an indispensable content. Through the use of drone technology, the information in the surveying and mapping area can be collected to form an image shooting. In addition, the three-dimensional modeling can be used to further process the shooting screen, providing effective guidance for the mapping work. Unmanned surveying and mapping is more intelligent and it can automatically process images that do not meet the requirements. The system can process the images. The digital camera will automatically zoom on the overlapping images to achieve effective and rapid adjustment of image parameters, effectively
ensuring the collected images Clearer.

4.3. Working at low altitude

The use of drones greatly guarantees safety. Especially for some engineering surveying and mapping projects, clear images and accurate data must be provided. When operating in some poor environments, low-altitude drones are more flexible and free from Under the influence of external conditions, the surveying and mapping task can be completed. The UAV can adapt to the flight in a complex environment and complete various instructions safely and quickly on the premise of ensuring its own safety[6]. With the continuous improvement of technology, the remote sensing technology of UAV low-altitude operations is also continuously upgraded, effectively improving the rapid response ability of the UAV and improving the overall effect and quality of surveying and mapping.

5. Conclusion

At present, with the continuous improvement of China's scientific and technological level, it has greatly promoted the improvement and progress of remote sensing technology and the effective integration of remote sensing technology and conventional technology has realized more convenient access to information. Through an in-depth analysis of traditional resources, we find that in the subsequent development process, the fusion of technology and method is an inevitable trend in the development of remote sensing technology and it can further improve the efficiency and quality of secondary information acquisition. However, what we need to point out here is that we still need to actively improve the limitations that exist in it. Only by organically integrating remote sensing technology and traditional information extraction methods can we automatically obtain land use information.

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