

# Exploring the Application of UAV Remote Sensing Technology in Geological Hazard Survey

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**Abstract:** Under the background of large science and technology, UAV remote sensing technology, as an emerging technology, has been widely applied in many fields and has improved the overall quality of geological disaster prevention and control. Therefore, surveying and mapping departments need to pay attention to the application of UAV remote sensing technology in geological disaster investigation.

**Keywords:** UAV remote sensing technology; Geological hazard survey; Application

**Citation:** Lili Chen, 2020. Exploring the Application of UAV Remote Sensing Technology in Geological Hazard Survey. *International Journal of Geology*, 5(1): 4-6. <http://doi.org/10.26789/IJG.2020.01.002>

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## 1. Introduction

In the process of modern geological disaster monitoring, UAV remote sensing technology plays an important role, and it has been effectively applied in many industries, highlighting the importance of UAV remote sensing technology, especially its application in geological disaster monitoring. It has made greater contributions to the production and life of the country, helping to prevent and analyze geological disasters, and provide guarantees for the safety of people's lives and property. In the future geological disaster monitoring work, UAV remote sensing technology will be developed rapidly. Based on this, the article analyzes the application of UAV remote sensing technology in geological disaster survey, and analyzes the application strategy of UAV remote sensing technology in geological disaster survey.

## 2. Application of UAV Remote Sensing Technology in Geological Disaster Investigation

### 2.1 Engineering Examples

A canyon project is located in a scenic area in the mountainous area of southern Anhui. The terrain is complex, the surface structure is broken, and it is located in a low-latitude and high-altitude area. The altitude of the

scenic spot is generally 1350m to 1650m, the top of the canyon is 1416m, and the lowest altitude is 1130m. The relative height difference is 286m, and the vegetation coverage rate inside the scenic area is relatively good, reaching 50%. In the elevation of the dangerous rock mass distribution, the rock and soil vegetation stratification is formed with a spacing of 10m to 30m.

### 2.2 Application Practice

#### 2.2.1 Rapid Surveying and Mapping

In the process of geological surveying and mapping, UAV remote sensing technology can be applied at any time and any place. This technology is not restricted by various factors. Relevant technicians can use UAV remote sensing technology to complete monitoring and monitoring in earthquake-prone areas. Surveying and mapping work<sup>[1]</sup>. Surveying and mapping technicians use UAV remote sensing technology to accurately predict, photograph and analyze functions, conduct round-the-clock monitoring of geological disaster-prone areas, analyze the stability of the geological layer in the disaster area, and make prevention and preparations for upcoming and unoccurring events Work. The application of UAV remote sensing technology in the process of geological disaster monitoring helps the staff to control the changes in a timely

manner, avoid the problem of not being able to reach the event area in time, and improve the overall efficiency and quality of geological surveying and mapping. In addition, the shooting function of UAV remote sensing technology is relatively clear. In the case of geological disasters in certain areas, it will not adversely affect the real-time analysis and monitoring of geological disasters by UAV remote sensing technology. When an abnormal situation is found, the terminal remote-controlled drone can be used to shoot at different levels in the same area, and the actual situation at each level can be analyzed in depth to grasp the information of the geological disaster area in a timely and accurate manner, and make effective adjustments to it. Rescue the disaster area.

### 2.2.2 Investigation and Evaluation

UAV remote sensing technology can take multi-angle shooting for the same area at different levels, and do a good job of data analysis of the photos taken to obtain a comprehensive and accurate situation of the incident. UAV remote sensing technology can also analyze the geological situation a second time. When geological disasters occur, UAV remote sensing technology can predict the next disaster, check the injured in time, reasonably divide unstable areas, and provide assistance for the smooth development of rescue work. In addition, in areas where geological disasters have not occurred, when drone remote sensing technology detects dangerous problems and analyzes unstable crustal movement, it is necessary to adjust the actual situation in this area in time. When geological disasters cannot be avoided, timely adjustment is required. Evacuate people to minimize disaster loss and damage.

### 2.2.3 Emergency Treatment of Geological Disasters

For areas prone to geological disasters and areas where geological disasters have occurred, drones can comprehensively analyze the geological disasters in these areas. For example, areas suitable for avoidance can easily cause secondary damage, and can even measure weather conditions in geological disaster areas. Atmospheric conditions. Unmanned aerial vehicle remote sensing technology is not affected by the limitations of time, space and other conditions. It analyzes and processes photos of geological disaster areas from multiple angles and omni-directionally. Through data sorting, they are transmitted to terminal equipment and become geological disaster areas. The medium of contact with the outside world. In addition, rescue work is generally not completed during the day. For example, geological disasters damage the line and cause a great impact on the normal electricity use in the disaster area,

and rescue work is difficult to carry out at night. However, the application of UAV remote sensing technology will not be affected by all kinds of bad weather. UAV remote sensing technology will also transmit accurate data to terminal equipment, which will be transmitted by surveying and mapping personnel to rescue personnel to provide rescue work at night. It is very convenient.

### 2.2.4 Get Data

In the process of field survey and review, surveying and mapping technicians preliminarily determined that the deformation modulus of the weak interlayer is continuously reduced under the action of atmospheric rainfall, temperature and other weathering forces, forming continuous structural joints and weathering unloading cracks. The deformation modulus of the structural surface of the rock mass is decreasing day by day, peeling off layer by layer, forming a dangerous rock mass with layers and interlayers as the bottom boundary in the slope surface, and then a dump-caving instability mode appears. UAV remote sensing technology is small in size, light in weight, and visualized on the ground. It can avoid the drawbacks of traditional methods, so it can obtain more refined, accurate, and informatized image data. In the process of UAV aerial photogrammetry data collection, surveying and mapping technicians mainly rely on the Map Matrix all-digital photogrammetry system to obtain more accurate data and provide guarantee for the stability of the evaluation of collapsed dangerous rock masses. This system has a high degree of automation and can effectively guarantee the accuracy of data compilation and processing. The core of this process is to construct a three-dimensional model, complete digital line drawing and orthophoto, to meet the basic requirements of geological disaster investigation.

## 3. Application Strategy of UAV Remote Sensing Technology in Geological Disaster Survey

### 3.1 Increasing Research Efforts on UAV Remote Sensing Technology

Compared with traditional aerial photography technology, UAV remote sensing technology has great advantages in accuracy, flexibility and stability in the process of geological disaster monitoring. In the development of modern society, relevant personnel need to increase the research efforts of drone remote sensing technology, further increase the overall frequency of drone shooting, so that it can improve the overall accuracy of surveying and mapping during the process of bad weather surveying and mapping, and expand the remote sensing of drones. Space for technological development. In addition, relevant de-

partments need to optimize the hardware equipment of the drone host, introduce lightweight drone host, carry more high-tech equipment, and vigorously create new functions of practical significance. In the rapid development of the new era, my country's UAV remote sensing technology is still in its infancy stage of development, especially the protection of data information is not perfect. In the development of UAV remote sensing technology, it is very easy to cause data theft and threaten everything. The emergence of human-machine sensor signal events. In addition, software development can also be directed towards anti-jamming capabilities and data encryption to ensure the security of data transmitted by drones.

### 3.2 Train High-quality Surveying and Mapping Personnel

In the development of the surveying and mapping industry in the new era, the implementation of surveying and mapping work requires the support of advanced technology, which not only puts forward higher requirements on the drone itself, but also requires drone operation technicians to improve their comprehensive quality. In order to cultivate more compound talents, the surveying and mapping department needs to strengthen the training and education of surveying and mapping technicians, so that they can understand the actual situation of the geological disaster site in real time and master the relevant knowledge of the geological disaster, so that the drone operators can better understand the data Processing and remote sensing technology related content. In addition, surveying and mapping enterprises need to establish a high-quality surveying and mapping team, and operating technicians need to accurately judge various emergencies and implement scientific and reasonable response measures<sup>[3]</sup>.

Therefore, in the development of modern society, drone operation technicians need to learn more about drones, pay attention to the cultivation of their own qualities, and further enrich their own knowledge.

### 4. Conclusions

To sum up, in the new era of social development, UAV remote sensing is in the period of exploration and development, and needs to invest more equipment costs as support, which puts forward higher requirements for the professional ability of operation and data processing. However, UAV remote sensing technology is rare in geological disaster exploration, especially in steep areas. At the same time, in the process of geological hazard survey, UAV remote sensing technology encountered many problems, such as high technical threshold, imperfect laws, regulations and technical standards. Relevant departments need to pay attention to these problems and implement corresponding measures and policies to optimize them.

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