

Quarry Mapping Technology with Unmanned Aerial Vehicles (Drones)

Sh.Sh. Khudaykulov, M.M. Kalandarov , J.U. Ortikov

Teacher, Samarkand State Institute of Architecture and construction, Uzbekistan

Teacher, Samarkand State Institute of Architecture and construction, Uzbekistan

Master's degree student, Samarkand State Institute of Architecture and construction, Uzbekistan

ABSTRACT: This article develops a technology for creating topographic maps using unmanned aerial devices (drones). It can also be used to detect outbreaks of underground caves and sediments, as well as to create drainage maps. Terrain surveys help us to determine the area and area of mapping, as well as to determine the length of the area.

KEYWORDS: plan, map, dron, monitoring, optimization, shooting.

I.INTRODUCTION

Currently, innovations and developments are taking place in all classes, including geodesy and cartography. In the process of processing objects, it is possible to process data online and as soon as possible. This information is widely used by unmanned aerial vehicles (drones). Unmanned aerial drones are used in various areas of the national economy: agricultural, energy, construction and territory protection bodies use drones. The functions of drones are used for research, mapping, monitoring with the integration of the latest technologies for collecting, monitoring, reviewing and optimizing data. For example, you can use a quarry to create a ground map. Design of power transmission line, photography and observation of places during construction of buildings-structures (Figure 1).



Figure 1.

When we process data from drones with drones, we will have a georeferenced 3D point cloud, a digital earth model, an encoded vector map of mines, orthogonal contours and images, topographic maps, contour images. (Figure 2).

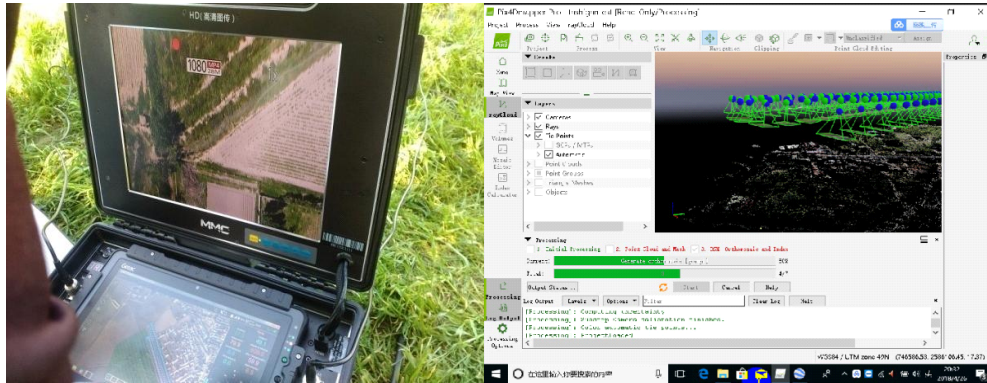


Figure 2.

Drones can also be used to mark underground pits and mines as well as to create maps. Pits are useful for mapping and determining surface area as well as for determining the excavated area. When surveying the area, the drone can be controlled from the station in automatic or manual mode. In automatic mode, put the drone in flight mode and connect and install antennas to the station. By determining the location indicated on the station, we can find the section of the pit to be excavated on the screen. After the waypoints are marked, the data is exported to the drone and the drone whose route is marked starts the automatic shooting process (Figure 3).



Figure 3.

When a drone flies on a specified route, it automatically calculates its return, depending on the size of the station. With manual control of drones, it moves using its own point, i.e. both hands. One hand controls takeoff, landing and steering. The second hand is used to control the movement of the drone during the shooting process, i.e. forward-backward, left-right (figure 4).



Figure 4.

Together with Chinese specialists, one can photograph the location and when processing the received data, while at the station, download data from control technology by connecting the data to a flash drive or directly to a computer. Using new software installed on computer technology, contours and orthogonalized geo-reference images, topographic mapping, contour imaging. When surveying the above-ground part of the pits, a station will be set up to go to the place for photography and data collection, and the place given to the control system will be entered along the route and the drone will be launched. Once the drone is launched, one can stand at the station and zoom in or out on the pictures one take. When the survey of the designated location is complete, we process the data using a computer program. Processed using the Pix4Draper software installed on your computer. The photos taken are published in order. The computer-generated data is displayed on a geo-referenced 3D point cloud, digital model of the earth, coded mine vector mapping, contours and organized organ-referenced images, topographic mapping, contours on the image screen (figure 5).

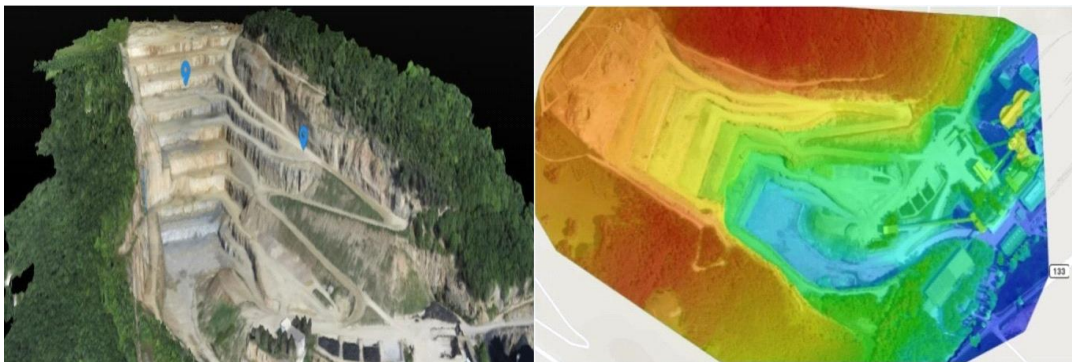
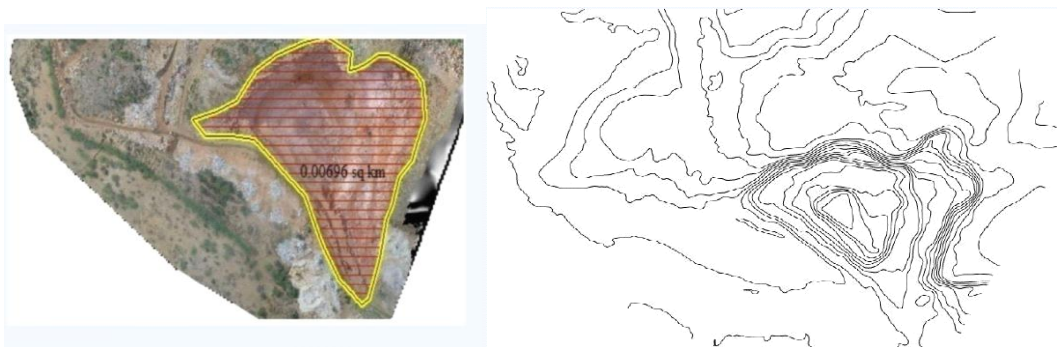


Photo of open pits

Color-based depiction of images.



Boundary of a closed pit.

Using the software pit description.

Figure 5.

Displaying three-dimensional point clouds with georeferencing when processing open-pit mine using computer technology (figure 6).

We also contribute directly to the widespread use of drones in geodetic work.

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