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THE DEVELOPMENT OF THE REQUIREMENTS FOR COLLECTION AND PROCESSING OF AEROPHOTOGRAPHY DATA FROM DRONES FOR SIMULATION OF GEOSPACE

Technologies do not stand still and develop rapidly. The study of the geosphere does not go beyond this participation. Not all, but most companies have moved away from outdated theodolites. It happens because they are not easy to use and take a long time to know the data and further processing of data. Besides, accuracy is not of the highest quality. Of course, modern tacheometers are more popular in enterprises. Exploring geospatial makes it more comfortable, convenient and accurate. They allow us to take readings over long distances easily and with high accuracy to determine altitude marks, then we can perform the necessary calculations and formulate plans. However, this is not the peak of engineering thought and development in the field of geospatial research. It's about using an unmanned aerial vehicle (UAV) - drones.

Nowadays drones are increasingly used in mining companies. Drones have proven to be a really reliable technology for making maps, plans and other geodatabase products. Shooting or exploring territories and objects is done offline, but under the close control of the operator, this person can skillfully handle a drone. UAVs are capable of performing various aerial photos and video production, mapping products and 3D models, monitoring changes in space and performing various calculations.

The advantages of photogrammetric shooting with the help of the drones:
• More accuracy than with tacheometric shooting;
• less time spent on work;
• large shooting area;
• fast data processing;
• security;

The disadvantages of photogrammetric shooting with the help of the drones:
• dependence on many physical factors (such as wind gusts, weather, etc.);
• low autonomy of work
• expensive equipment (purchase of the drone itself, the Software, and auxiliary tools in the form of a powerful PC that can process information).
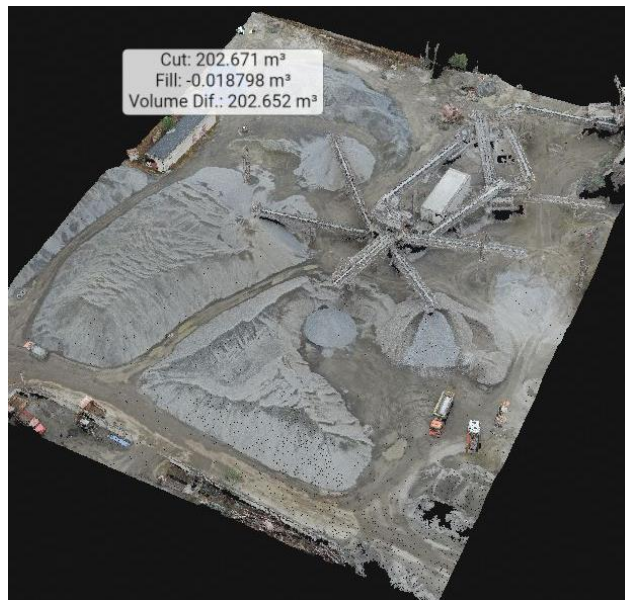
The example of a 3D model obtained from Pix4D

The relevance of the study - today high expectations and prospects are given to the drones in the geosphere. But the requirement for the collection and processing of data to obtain the most accurate and effective values in the development and modeling of geospatial is also very important.

A lot of factors are coming up with a qualitative photogrammetry test which is made with UAVs. For example, even the material of the drone.

In the spring, at one of the seminars, specialists conducted a test flight, testing the drone Skywalker. The offer was budget friendly, but the quality of the drones was not rather good. They had foam bases, so they withstood the gusts of wind badly.

1. So one of the requirements is the material of the drone itself. Practice has shown that the use of plastic frame structures is the most effective in resisting wind gusts and load capacity.

2. Also the quality of the camera on the copter is important because the quality of photogrammetry performance depends on it. After all, as a result of poor shooting, the blocks of still images obtained from the drone may have low photogrammetric quality in terms of standard professional photogrammetric software, which increases the time spent on their camera processing.

3. The autonomy of the drone also plays an important role in modeling. It is important to capture as many of the planned areas and objects as possible with one technique for gain maximum accuracy without distortion.

4. The development of a project of altitude linking guarantees the necessary reliability of the data and the achievement of the requirements of the current instruction and regulations regarding the accuracy of the finished cartographic products.

5. Using the right and appropriate software to handle the camera properly and obtain the necessary materials.

REQUIREMENTS	CHARACTERISTICS	CONFIRMITY
Behavior when work performs in the air	Base material and resistance to external factors during operation (wind gusts, turbulence, etc.)	UAV execution materials should not contain more than 10% of foam
The quality of the shooting device	Camera quality to receive qualitative materials that will be processed in the future	1 pixel, mm - minimum 0.0020 focal length, mm - 20 min light force of action - min 1.8
Autonomy	The amount of time it can spend in the air while performing its UAV work duties without changing his battery	work on a single charge, min - 20 min
Developing of a plan	Developing a plan that allows the implementation of the maximum planned areas and the achievement of instructions and regulations	It is performed while creating topographic maps of scale 1: 500 - 1: 5000 built-up areas
Software	The use of UAV-friendly software that will allow you to obtain and process the maximum amount of necessary and useful information that in the future will allow to form photogrammetry	PIX4D, MicaSenseAtlas

An example of getting 3D Career Models with quality shooting and post-camera processing, including all the requirements

Conclusion

Using the drones and putting them into production, the following can be optimized and improved:

- accurate geo-shooting and subsequent geospatial modeling

- the shape and texture of objects that are not available in the normal shooting method (for example, for safety reasons, but are not physically available for exploration)

- Compliance with all standards

- cost-effectiveness compared to other methods and requirements

- safely and efficiently carry out geological survey work

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