

# USE OF UNMANNED AERIAL VEHICLES IN LAND MANAGEMENT, CADASTRE AND URBAN DEVELOPMENT

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## ANNOTATION

This article discusses the advantages of using drones over traditional surveying methods in cadastre, land surveying, and urban planning, as well as areas of application for drones.

**Key words:** unmanned aerial vehicles, cadaster, dron, urban planning, urban development.

## Аннотация

В данной статье рассматриваются преимущества использования дронов перед традиционными геодезическими методами в кадастре, землеустройстве и градостроительстве, а также области применения дронов.

**Ключевые слова:** беспилотные летательные аппараты, кадастр, дрон, градостроительство.

## Annotatsiya

Ushbu maqolada kadastr, yer o'lchash va shaharsozlikda dronlardan foydalanishning an'anaviy o'lchash usullariga nisbatan afzalliklari hamda dronlarni qo'llash sohalari haqida so'z yuritilgan

**Kalit so'zlar:** uchuvchisiz uchish apparatlari, kadastr, dрон, shaharsozlik.

Progress in the modern world does not stand still. Twenty years ago it was impossible to imagine that almost everyone would have access to a computer, TV or smartphone with Internet access. Land surveyors of those times carried out measurements with measuring tapes, theodolites using rails, made calculations of measurements manually, and drew plans in ink.

Currently, one of the most popular methods for determining coordinates during cadastral work is the method of satellite measurements. Despite the backward regulatory framework governing the use of this method for determining the coordinates of real estate objects, cadastral engineers actively use it, since it is the least labor-intensive, fairly accurate and very convenient with a small amount of geodetic work.

Along with traditional methods of aerial photography, shooting with the help of unmanned aerial vehicles (UAVs) is becoming more and more popular. This process has manifested itself especially in recent years - against the backdrop of an exponential growth in the popularity of ultra-light aircraft UAVs (the common name for these UAVs abroad is drones) and helicopter types.

Unmanned aerial vehicles are developing at an amazing speed in our time, it is advisable to use unmanned aerial vehicles in almost all areas of activity. The method of remote mapping using UAVs is becoming an increasingly promising way to obtain a geodetic basis in urban planning and cadastral work, primarily for creating digital actual large-scale maps.

For the purposes of land management, cadastre and urban planning, satellite imagery data are most often used in our time. But the main disadvantage of space photography is the insufficient accuracy of the coordinates of the images. The error can be from one to ten meters, which does not allow you to perform a number of tasks that require higher accuracy. Climatic, seasonal and other factors also influence information perception, interpretation of terrain objects.

With the existing disadvantages, such as the high price of hardware and software, UAVs have a number of advantages over other methods of collecting information. This is a high resolution on the ground, achieved due to the low flight altitude, even small details of the relief are visible, low cost compared to traditional methods of aerial photography, efficiency, because the whole process from leaving the site to obtaining data takes several hours, environmental safety, since electric engine, the ability to choose the time of day and weather conditions is also important.

In addition, these technologies, based on the achievements of science, scientists' research and experiments, allow accurate and thorough implementation of the processes from tillage to the finished product without excessive labor and costs, using advanced techniques and digitized equipment. As a result, the scope of introduction of digital information systems on agricultural lands in our country is expanding. For example, the specialists of the Tashkent State University of Economics, Tashkent State Agrarian University and the Cadastre Agency "Geoinnovation Center" under the Tax Committee, working within the scientific-practical project of digitalization of agricultural activities based on modern drone technologies, have also started to achieve preliminary results in this direction. . The project is implemented on the basis of the Decree of the President of February 3, 2021 "On the further development of the system of knowledge and innovation in agriculture and the provision of modern services" and other relevant decisions. In March of those year, the first experimental work was successfully conducted on 10 hectares of grain area, 4 hectares of vineyard area and 5 hectares of plowed land in Qibray district of Tashkent region. One self-flying drone device used in the process completed surveillance work in designated areas in just 6 minutes.

For urban planning purposes, aerial photography is necessary, first of all, to create three-dimensional models of entire cities, because now many urban planning plans are outdated and lose their relevance every year. Of course, various surveys are carried out to create maps and plans, but basically, these plans are created for small areas when planning construction, and a situation often occurs when planned objects, such as power lines, underground utilities, are shifted due to various factors and errors, but on city planning plans, these changes are not made. Particular attention should be paid to underground utilities, the exact location underground, coordinates, because the slightest mistake in them will lead to disastrous results. The use of a drone at all stages of construction will help create accurate schemes and plans for territories,

residential complexes and entire cities. Also, the use of UAVs can be used to detect illegal buildings and objects of construction in progress.

In conclusion, we can present the prospects and opportunities for the use of UAVs for the purposes of cadastre and land management. The obvious advantage of using this type of survey is the creation and updating of digital maps and plans of those territories for which there is no practical possibility or economic feasibility of a detailed study of the terrain and determination of numerical characteristics using satellite images or traditional aerial photography materials, and the photorealistic and high-precision 3D view of the processed data is even more expands areas of use.

The scope of unmanned aerial vehicles is truly limitless. At present, the use of UAVs in relation to agricultural lands, hard-to-reach lands, forest and water fund lands will be especially relevant.

Possible improvements from the use of unmanned aerial vehicles:

- Efficiency;
  - Increasing the accuracy of topographic and geodetic data;
  - Creation and updating of various digital maps and plans;
  - Creation of 3D terrain models;
  - Control over the state of agricultural land;
  - Timely detection of illegal logging and control of the forest fire situation;
  - Monitoring and inventory of land;
  - Identification of illegal construction sites.
- Factors hindering the development of the market:
- lack of a regulatory framework that ensures the performance of topographic and geodetic works for the integration of UAVs into a single airspace;
  - issues of certification, registration, technical requirements and operating conditions of the equipment are not regulated.

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