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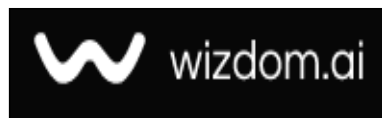How to submit to this journal (link)

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Importance of Remote Sensing Data in The Study of Land Resources

SH.Y.Sattorov

Assistant of the Department of Land use and land management
Tashkent Institute of Irrigation and Agricultural Mechanization Engineers
National Research University Bukhara Institute of Natural Resources
Management, Bukhara, 200100, Uzbekistan

A.M.Abdulloyev

Assistant of the Department of Land use and land management
Tashkent Institute of Irrigation and Agricultural Mechanization Engineers
National Research University Bukhara Institute of Natural Resources
Management, Bukhara, 200100, Uzbekistan

A.B.Ochilov

Master of the Tashkent Institute of Irrigation and Agricultural Mechanization
Engineers National Research University Bukhara Institute of Natural Resources
Management, Bukhara, 200100,Uzbekistan
E-mail: shsattorov1993@mail.ru

A.B.To'xtamishov

Master of the Tashkent Institute of Irrigation and Agricultural Mechanization
Engineers National Research University Bukhara Institute of Natural Resources
Management, Bukhara, 200100,Uzbekistan
E-mail: shsattorov1993@mail.ru

Abstract. This article discusses the importance of remote sensing data in the study of land resources, through which the current production process is carried out directly.

Keywords Earth, information, object, model, technique, application, geodesy, space, aerial photography, image .

Introduction

Currently, the creation of plans and maps is carried out in two ways: as a result of geodetic work on the ground and as a result of deciphering (reading) a remote image of the place. Such images consist of semi-toned (color-like) or black-and-white space and aerial photographs taken from various satellites of the Earth, i.e., spacecraft, aircraft, and helicopters.

In this diagram, several major systems are distinguished, for example:

- *photogrammetric system* . Inserting black-and-white and color photographs into computer memory, converting them to digital form and processing them to a certain extent, and then creating orthophotoplans (in the orthogonal projection of the plot image) or barcode cadastral plans;

- *orthophotoplan and card numbering system* - using this system, plans and cards are converted to digital view (vector state);

- *System of processing, storage and mapping of cartographic data* - creation of their digital model by rasterization of the place or area, conversion into vector view, creation of thematic layers, creation of a special database of data and electronic maps, storage of finished products, color land cadastre and other create cards.

The technological process of complex mapping of land resources is shown in Figure 1 .
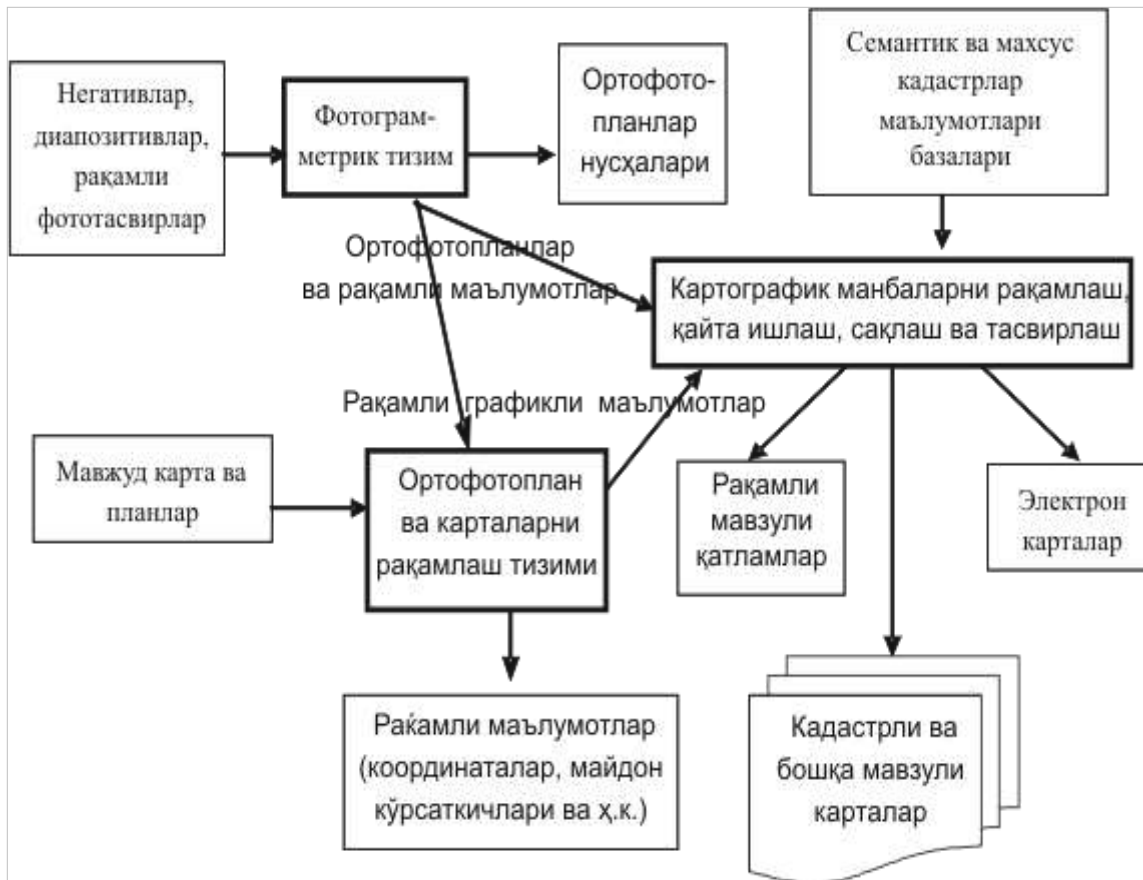
Figure 1 Block diagram of land resource map creation

The last two systems will be discussed in detail in the following sections of this manual, where we will briefly discuss the individual processes that make up a photogrammetric system. These include:

1. Aero- and space photography of the place.
2. Geodetic works on planned and elevated connection of base points.
3. Data includes photogrammetric processing.

1. Aero- and space photographs of the Earth's surface are taken with the help of aerial cameras, then slide photocopies are made of negatives on paper or non-deformable films by contact or projection methods. In recent years, digital aerial photography has been used in photography .

They can be used to take a digital image of a region or a place and then enter it directly into a computer , bypassing not only the chemical processing of images, but also the process of digitizing the image during the scanning phase. They work like ordinary cameras, but they use f -sensitive elements that convert the photo into electrical signals .

At present, the input of photographs into computer memory is mainly done by scanning the photographic material. Negatives, slides and roll aerofilms are used as photo materials.

Scanners used to digitize aerial photographs and space images are very expensive. Such scanners have very high requirements: the allowable sharpness is up to 10 microns, the degree of accuracy is 2-3 microns (0.02-0.03mm), the scan format is 24x24 cm. When doing this, it should also be noted that the horizontal and vertical viewing clarity of some scanners are different. Therefore, sufficiently reliable data can be obtained if common Hewlet Packard scanners are used. An example of a cheap scanner is a scanner manufactured by Nustek .

Geodetic works are carried out in order to determine the planned and elevated coordinates of individual points (landmarks) on the Earth, to connect all the photographic materials taken in the area with the ground, to photogrammetrically process them.

It is at this stage that the defined plan and elevation coordinates of the points are used to select the coordinate system and cartographic projections needed to create the next plan and maps. Currently, the method of using the Earth's satellites - GPS - is widely used to determine geodetic coordinates.

As a result of using this method, geodetic work is carried out with great precision, which greatly facilitated the work of determining the coordinates using previous geodetic instruments (theodolite, taximeter, tape) and methods.

Photogrammetric processing includes the following processes:

- analytical phototriangulation, ie a method of determining the coordinates of other points of the location relative to the coordinates of existing reference points by photogrammetric methods. As a result of this work, not only the coordinates of other points of the place, but also the external orientation elements of the model, which represent the spatial location of the place stereomodel at the time of planning, are determined. In recent years, this work is carried out directly using GPS-receivers;

- Numbering (vectorization) of objects - the creation of a stereomodel of the place, simultaneous decoding (reading) of objects and their representation in the accepted symbols;

- to create a digital model of relief and create color or black-and-white orthophotoplans based on it.

The above-mentioned processes - technology of remote sensing and creation of orthophotoplans on the basis of these materials, technical means of photogrammetric and cartographic software, are one of the technologies currently widely used in all production units (enterprises) of ERGEODEZKADASTR .

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