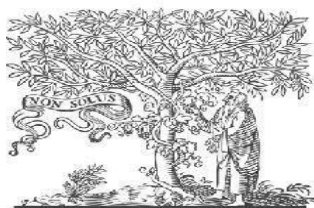




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## Creation of Layers of Land and Buildings on the Digital Cadastral Map

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**Abstract:** After the state registration of property rights to real estate objects, land plots, buildings and structures, creating a digital (duty) map of the territory based on this information.

**Keywords:** Map Info, Arc GIS Arc Info Geographic information system programs for updating digital cadastral maps.

### Introduction

After the state registration of property rights to real estate objects, including land plots, buildings and structures, it is an important issue to create a digital (duty) map of the territory based on this information. The created digital map must reflect the following information and have the required capabilities:

First, legal, economic, technical and geographical information about the land plot and buildings;

Secondly, it reflects the location of the land plot and buildings on the digital map of the area;

Third, it should be different from the digital map of Denmark, Finland and Sweden in the analysis of foreign experience in creating cadastral maps.

After creating such a system, the goal is to increase the operational efficiency of territories, data flow processing, management of production and economic processes, and, accordingly, to ensure the direct quality and operational efficiency of decisions made in various areas of the economy.

Topography is the basis of such a system. Also, plans and textual cadastral maps of different scales, which are used for various purposes and created on their basis, are also the basis. The use of computer technologies in management and cartography makes it possible to create

such maps and plans.

Map Info, Arc GIS Arc Info Geographic Information System programs have the ability to update digital cadastral maps and integrate graphic data and retrieve information about real estate objects in the Geographic Information System database.

Three types of materials are used as distributed sources of information composed of cartographic objects depicted on digital maps:

- traditional forms of existing cartographic materials;
- the results of the field tacheometric survey;
- aerial photography materials.

Existing cartographic materials in the traditional form (maps, plans, orthophotoplans) are often unavailable, so their use is limited, and even if they are available, they are used only if they are not outdated to the point of losing their practical value. Based on the use of existing cartographic materials, the process of data collection is completed with their scanning and vectorization.

Currently, tacheometric measurement is carried out using electronic tacheometers. The measurement results are automatically recorded in the memory computing device. Therefore, its results appear in digital form, namely in the form of a vector model of the contours of objects. Of course, the vector model of the contours of these objects is not a direct result of the drawing. It is formed using special software tools. Tacheometric surveying is more commonly used to create large-scale maps of smaller areas.

Aerial photography materials are considered the main source of input data during aerial phototopographic surveying, with the help of which maps of larger areas are created.

Aerial phototopographic surveying can be divided into two separate forms:

- aerophototopographical survey in which contours of objects are vectorized with stereoscopic pairs;
- aerophototopographic survey, where contours of objects are vectorized in the orthophoto plane.

New modern tools and software are needed to create electronic cards. Including Arc GIS 9.3, which is currently in production, is very useful for creating new digital maps. Working with cards created using this program further expands the user's capabilities.

Arc GIS 9.3 was developed by the ESRI company, which provides the ability to work together with geographic data and attribute data, so this process can be represented by the following scheme.

Arc GIS 9.3 is very convenient to collect and store the database. To create electronic maps in Arc GIS 9.3, we need to do the following.

- The Arc View version of the Arc GIS 9.3 program is installed on the computer base;
- the location is photographed from the air using a digital camera;
- a photo plan or a photo scheme of the place is created from the transformed photos;
- take a photo plan and go to the place and decipher it;
- we download the pictures to the Arc GIS program according to scale;

–based on the decoded photoplan or photoschema, an electronic card is drawn in the Arc GIS program, and the data is also entered into the computer.

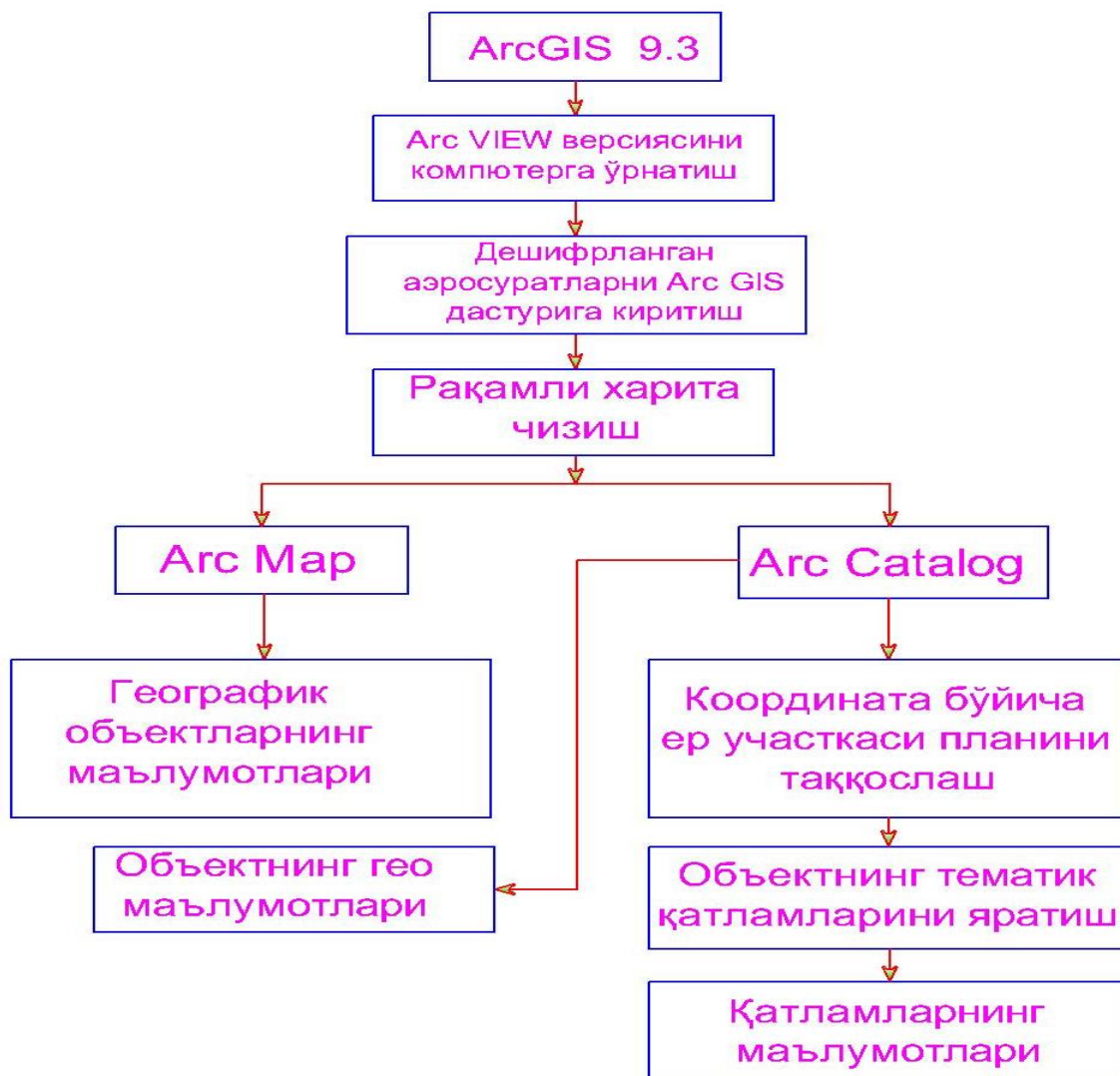


Figure 1. Block diagram of digital cadastral map creation technology in Arc GIS 9.3 program

Arc GIS software consists of two main parts.

1. Arc Map
2. Arc Catalog

Section 1 Arc Map-Geographic objects are used in working with attribute data.

Arc Map from the working window, i.e., to start the program, it is brought to the working state by clicking the left mouse button on the Arc Map from the working window (Fig. 2).

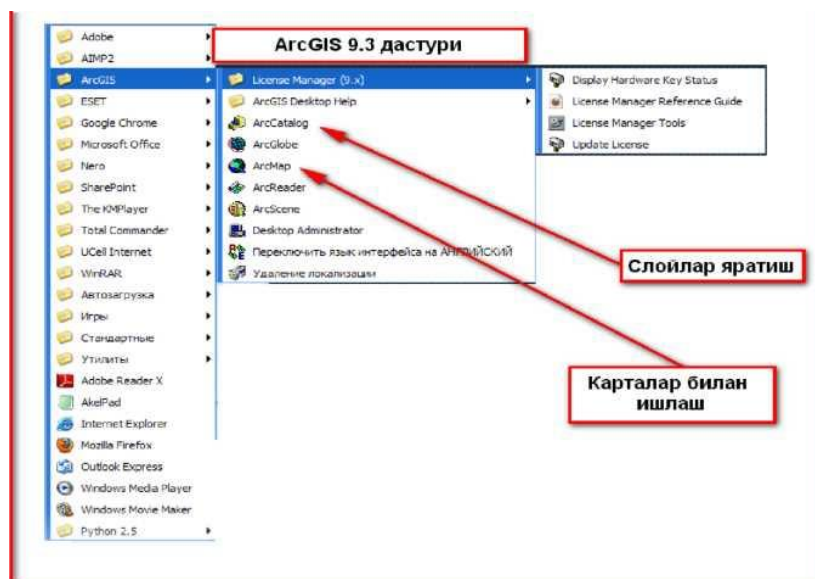


Figure 1. Run Arc GIS and create layers.  
Section 2 Arc Catalog is data management (Figure 3).

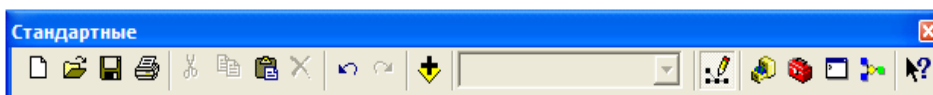
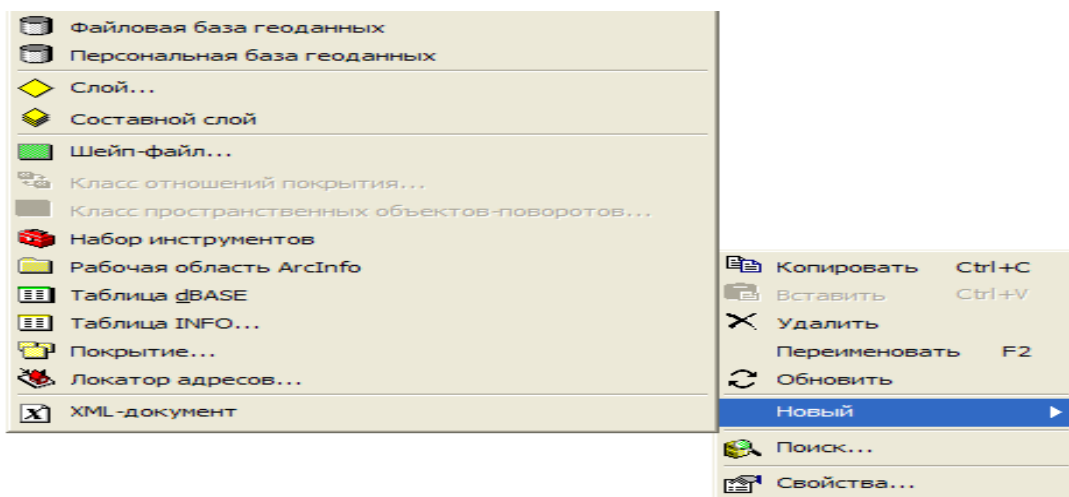


Figure 3. Data management in Arc Catalog



The Arc Catalog window opens Персональная база is created.  
We enter the required balloon symbols and objects into the Personalnaya base.  
Each conditional sign is made in accordance with the state standard (Fig. 4).

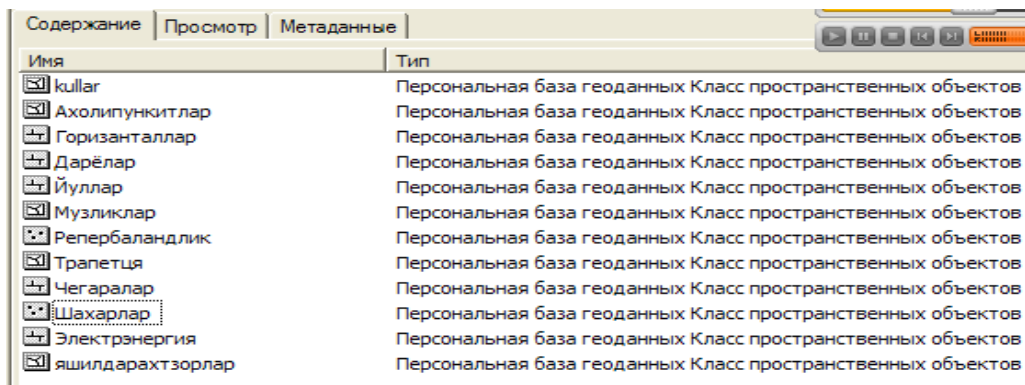
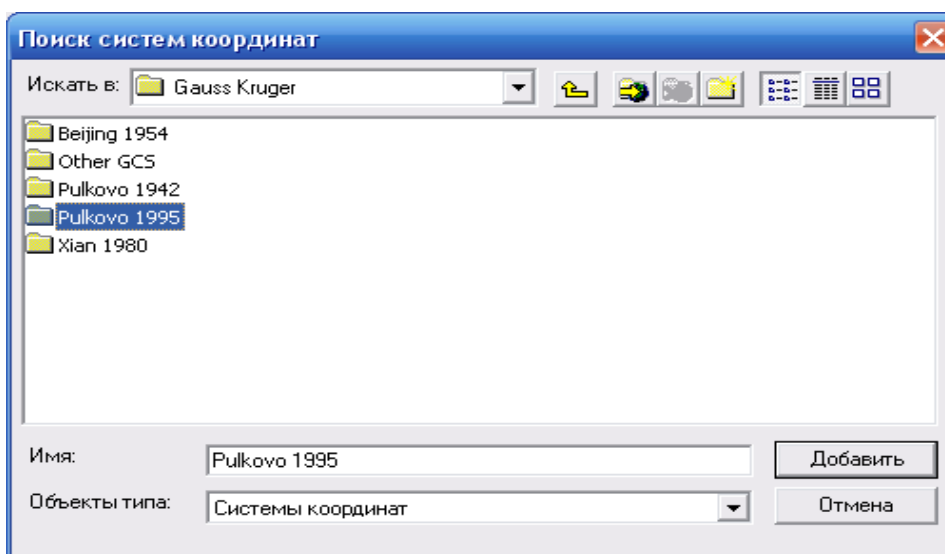


Figure 4. Creating conditional symbols in the Arc GIS program

We enter a coordinate system suitable for our conditions from the coordinate system to each conditional symbol created. In our republic, the Gauss Kruger coordinate system is mostly used. All topographical and visual-topographical maps are made in equiangular cross-cylindrical projection. The German scientist K. F. Gauss (1777-1855) theoretically based this projection, while another German scientist L. Krueger (1857-1923) developed formulas for its calculation. That is why it is called the Gauss-Kruger projection. In this projection, the angles of the shape on the surface of the ellipsoid are depicted in a plane exactly like themselves, so it is called an equiangular or conformal (similar) projection.

The Gauss-Kruger rectangular cross-cylindrical projection allows to connect geodetic coordinates of points on the ellipsoid surface with rectangular coordinates in the plane corresponding to this point.

From the working window to start this system **Новый набор классов объектов** turns on, from it **Gauss Kruger** coordinates are opened from this system **Pulkovo 1942** is selected. The Pulkov coordinate system of 1942 is divided into regions. The one that suits the area where we live **Pulkovo 1942 GK Zone 12N** is a coordinate system (picture 5).



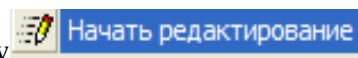
5 - picture. Transfer to the Pulkov 1942 coordinate system

The Arc Catalog window closes.

Introduction of electronic cards to the Arc GIS program.

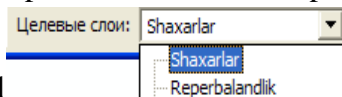
– The Arc Map window will open:

– The editor panel is opened from the Arc Map window

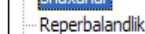


enabled:

– A new object will be opened from the editor panel:



– from the editor panel



the layer we need is selected and the

desired layer is selected:

– from the editor panel database is created using these symbols:

– We enter the necessary information into the database.

The required information is entered into the linear objects. For example, we can take roads, hydrography, borders, horizontals, power lines, gas pipelines and other linear objects.

Creating layers of land and buildings in geographic information systems, dividing objects into layers on the basis of a digital map of the border of the land plot and surface objects created by connecting geodetic base points, geographic information personalwe can make bases (Fig. 6).

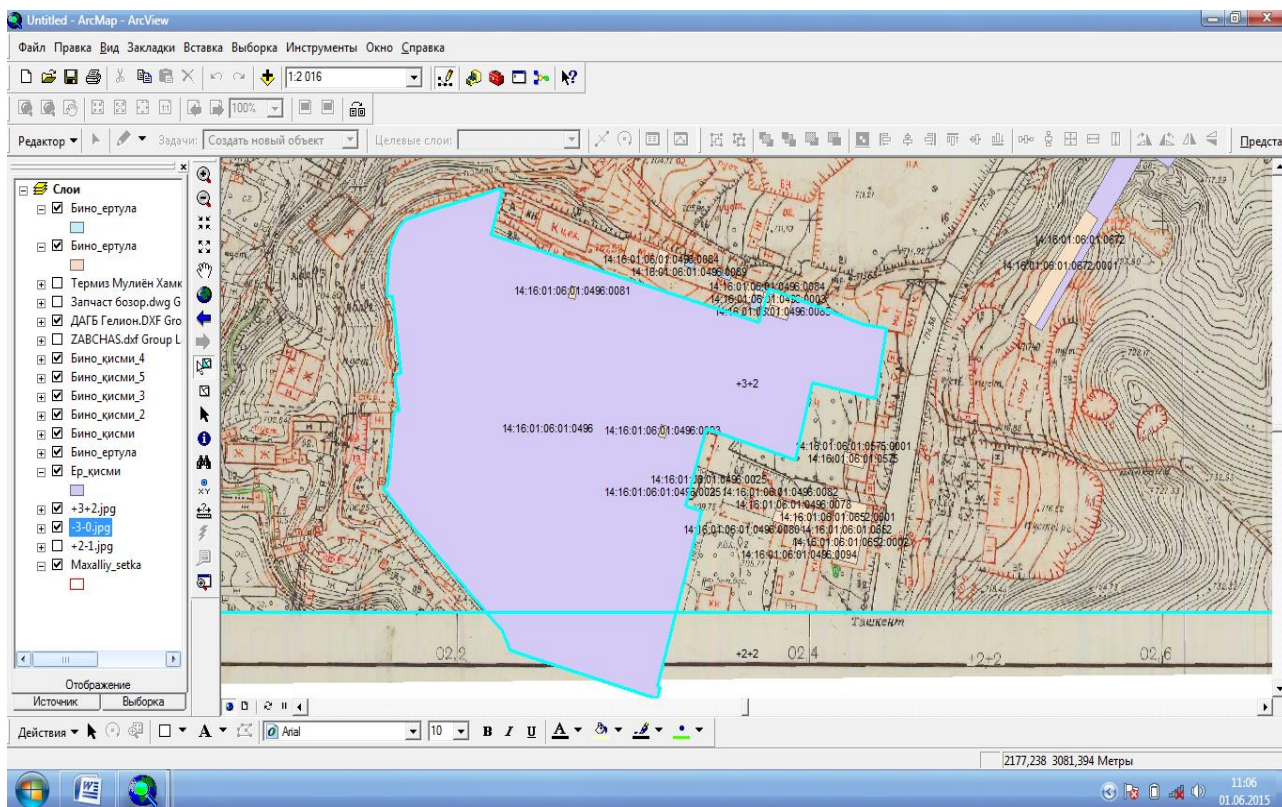


Figure 6. Comparison of object boundary coordinates on the map of the area.

In the creation and maintenance of geographic information systems on the digital (duty) map of the area being created, geodetic reference points are connected, tacheometric surveying

of surface objects is performed using high-precision geodetic tools and software, data on each object is collected and connected to a single system.

In the personal database, the text data of the classes of objects are systematized as field lines, the cadastral number of the plot of land, address, legal owner, name of the object, land category, type of right, document determining the right, the date of state registration, occupied area, for what purpose it is allocated, rights to the plot of land We create easements and restrictions, disputed issues, credit score, value and tax zone.

The object recorded in the cadastral survey is prepared in accordance with the local coordinate system in the Auto Cad family program format and processed in the Arc Map main component of the Arc Gis program by attaching textual information to the conditional view of the object.

During the processing of the image, we use decoded topographical plans on a scale of 1:2000 to check the coordinates of the boundary turning angles of each separate object.

4 sides of these topographic maps are connected by coordinates and they serve only for orientation.

Each cadastral object is carefully checked to ensure that it does not cross the border of another land plot, and that it is in a single coordinate system, because after the state registration, conflicts do not arise and the immovable property is protected by the state (Fig. 7).

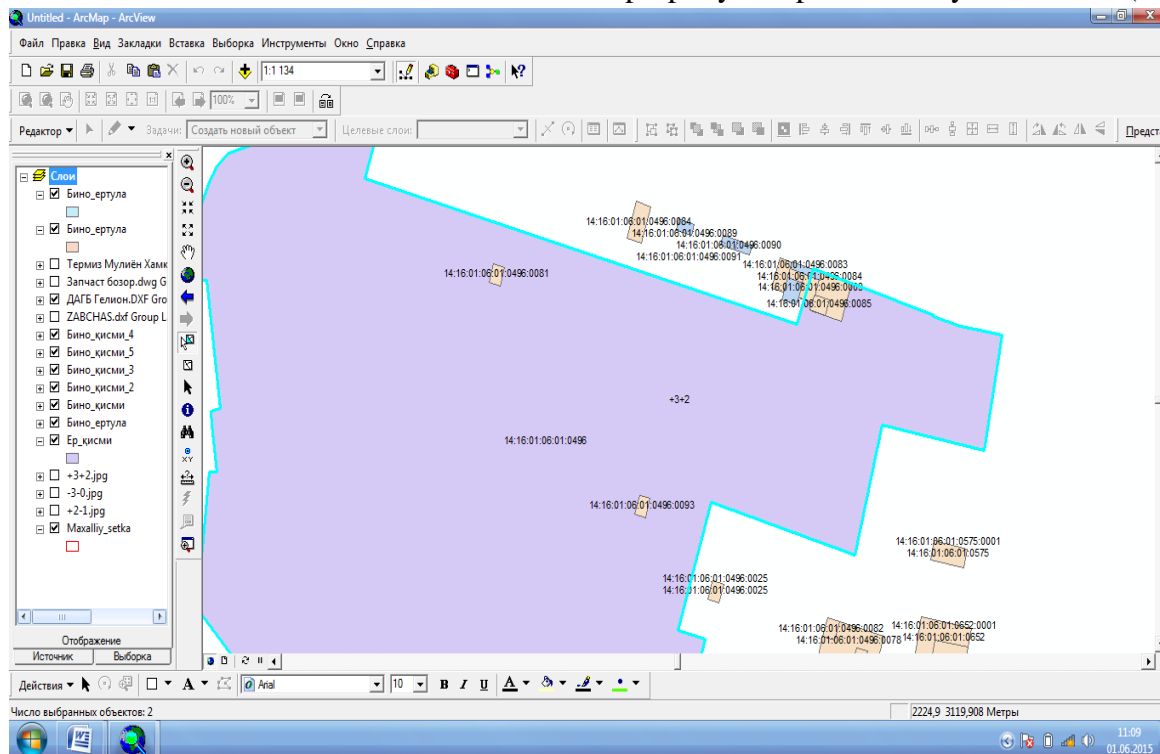


Figure 7. Map of state-registered real estate.

Creation of personal geo data in Arc Catalog auxiliary component of Arc Gis program attributive database of geographical information systems (Fig. 8)



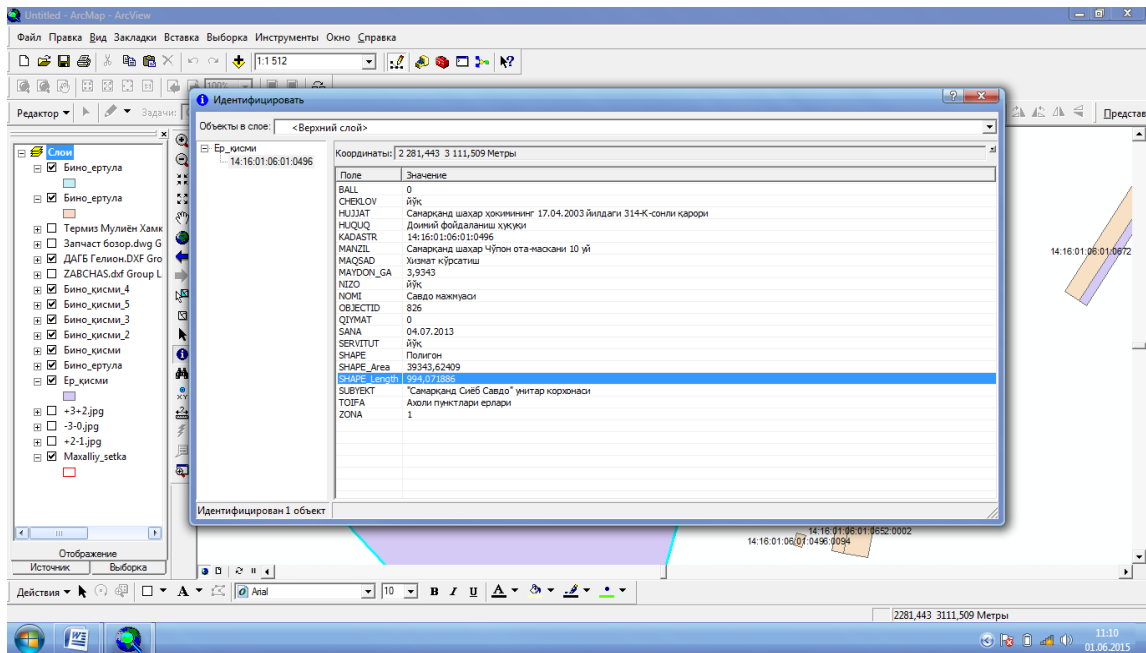


Figure 8. An attributive database in the Arc Catalog utility component of Arc Gis.

on the basis→in the personal database, the name of the class of objects is given and the coordinate system is selected→in the personal database, thematic layers such as plot of land, ground floor of a building, 1st floor of a building, 2nd floor of a building, etc. are created in the personal database (Fig. 9).

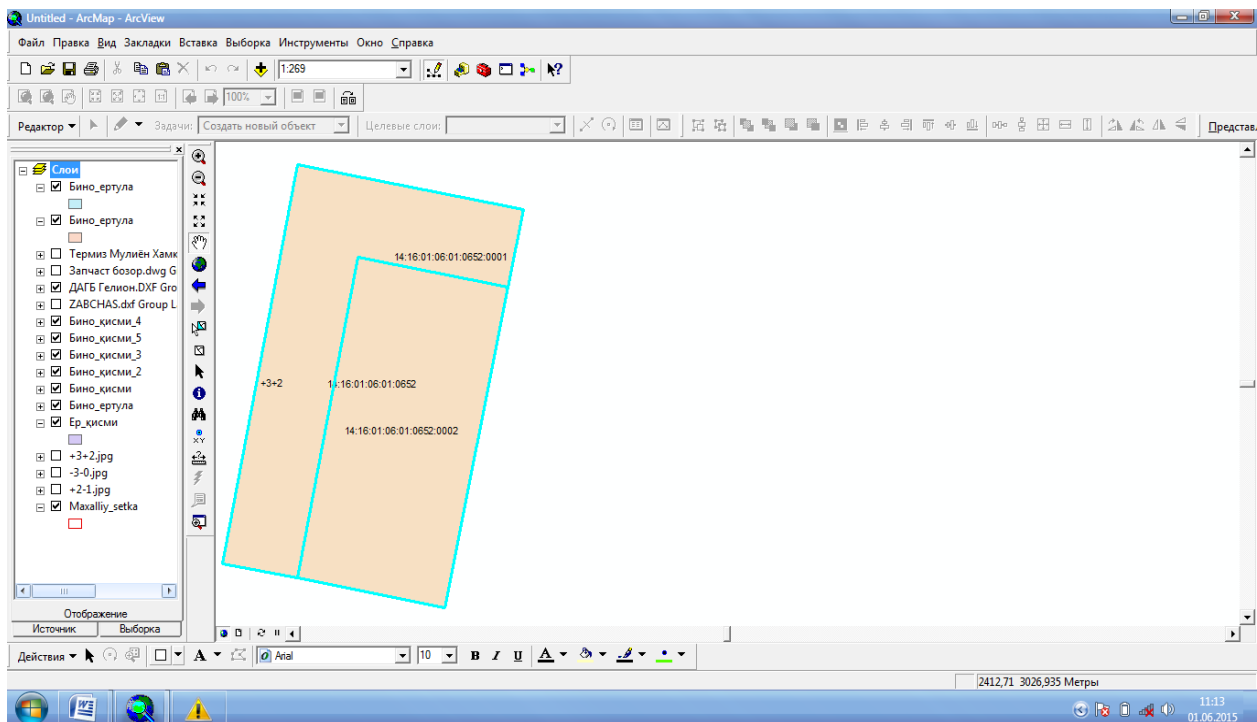


Figure 9. Creation of thematic layers of the plot of land and the building. In this case, we can get the following information (Figure 10)

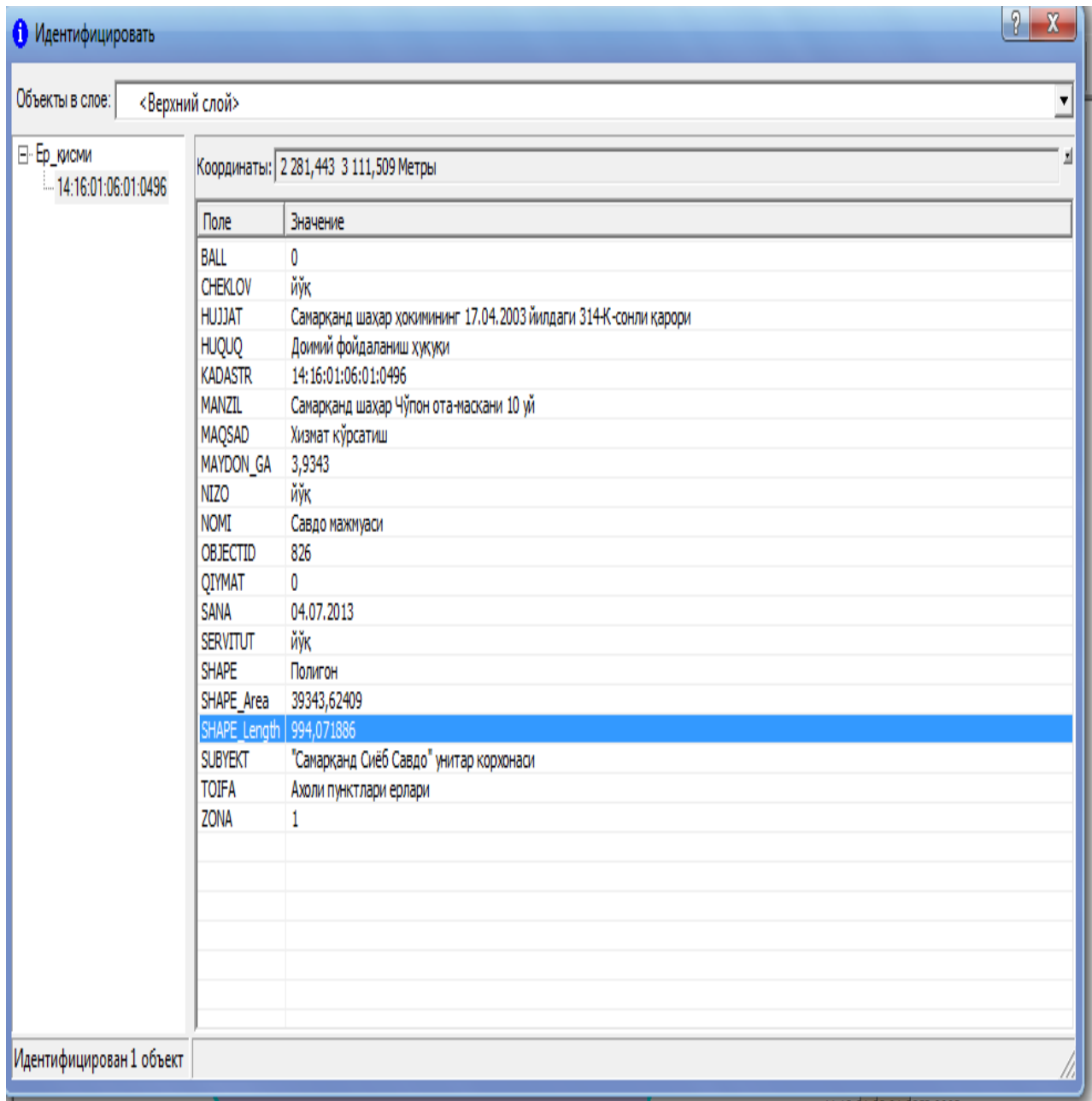


Figure 10. Land plot and building attributive database.

Above is a digital cadastral map of the area located on our chosen street using Ars GIS 9.3 software. In this card, we can get legal, economic, technical and geographical information about the land and building structures of our chosen street registered with the state. For this, as soon as we click the left mouse button on the cadastral number, information about the street we have chosen will appear on the screen (Fig. 10).

## Literature:

1. Mirzaliev T. Cartography.-Tashkent., University, 2006.
2. Mirzaliev T., Karaboev J. Designing and making cards.-Tashkent., "Talqin", 2007.
3. Mirzaliev T., Musaev I. M., Safarov E. Yu. Socio-economic cartography.-Tashkent.: New generation, 2009.
4. Safarov e., Musaev I., Abdurakhimov N. Geoinformation system and technologies. T.: TIMI, 2008., 160 p.
5. Safarov E.Yu. Geographic information systems.-Tashkent., University, 2010.
6. [mailto: site@tikhvin. org](mailto:site@tikhvin.org)
7. [www.gov.uz/Ergeodezkadastr](http://www.gov.uz/Ergeodezkadastr)- State Committee of Land Resources, Geodesy, Cartography and State Cadastre of the Republic of Uzbekistan