ARCHITECTURE. LANDSCAPE ARCHITECTURE.

ECONOMY. ECONOMIC SCIENCE. OTHER BRANCHES OF THE ECONOMY.

ORGANIZATION AND MANAGEMENT.

POWER ENGINEERING, ELECTRICAL ENGINEERING, AUTOMATICS.

INTEGRATION OF INFORMATION IN THE CREATION OF ELECTRONIC DEMOGRAPHIC MAPS INTO A DATABASE

Rajapboyev M.K, Teshaev N.N - "Tashkent Institute of Irrigation and Agricultural Mechanization Engineers" National Research University

Abstract

Today, works such as the creation of thematic maps and plans, their processing, the formation of databases, integration and visualization have been considered one of the main objectives of GIS technology. Collection of information in the creation of electronic demographic maps, the formation of database, in accordance with them is carried out on the basis ArcGis, MapInfo, Panorama, GeoDraw, GeoGraph, Atlas Gis, Win Gis, ArchInfo and other programs. Analysis was carried out to improve the accuracy of the data on the maps, as well as in the creation of maps to observe demographic processes and predict demographic processes. This article provides comments on the collection and use of modern methods of creating electronic maps, visualization, integration of spatial data, as well as to create socio-economic maps.

Keywords: *electronic map, visualization, integration, statistical information, cartographic product, multimedia, demography, population, cartographic source, plan*

Introduction. As human consciousness and thinking develops, so do his needs. It is natural that we will not find our place in life if we do not keep up with the term "Times Now", if we cannot learn and absorb the news in time. In recent years, great research and studies have been carried out in all sciences and fields, and unprecedented results have been achieved. In particular, it is no secret that cartography and geoinformatics are developing as a science, technology and production field. The penetration of geographic information systems (GIS) into science has led to the rapid development of the photography industry. [6].

Purpose and tasks of work. Today, 1:5000-scale digital maps of territories are created in programs belonging to the GIS software family (ArcGIS, QGIS, Mapinfo) and are used in production organizations. By summarizing these maps with demographic processes, it is possible to form an expanded database of all cities, towns and villages. When innovative technologies are introduced, the statistical data related to the population is obtained online from local organizations based on new information, and integration with the geoinformatics database allows for continuous monitoring of the population dynamics in our country.

The main part. Integration is a very broad concept. Today, people understand better the essence of the integration process. What is integration? - "Integration" is derived from the Latin word "integratio", which means "to restore", "to unite"; integration means interdependent development, integration into a whole, making it whole. Integration is the process of combining different parts and elements into a whole. Integration processes can be in organized systems - in this case, they increase the level of integrity and organizational level of the system.

With the help of modern GPS receivers, it is required to carry out scientific and research work by experts in the field in order to compile or update regional data. From the beginning of the research work, an electronic digital map created and formatted in the ArcGIS application is uploaded to the GPS receivers.

The downloaded electronic digital map will be activated in the GPS receiver. An order is made to connect the GPS receiver with satellites to make it work. When connecting with satellites, it is required to fill at least 4 channels, and the accuracy indicator when connecting should not exceed 5. This value describes how many satellites are evenly distributed across the sky. The more satellites are directly above you and the fewer on the horizon, the lower the PDOP (Position Dilution of Precision) value. On average, 10 to 12 satellites can be connected in the territory of the Republic of Uzbekistan. From 4 to 8 satellites in the areas of foothills and mountain slopes provide the possibility of communication in areas with a high magnetic field. In carrying out the research process, such as creating demographic electronic maps of the places, the following information about the area is studied:

- total population; Women; men; children; disabled; the luminaries; Nations; death (reduction); birth (growth); labor resources; population employment, such information is studied on the basis of reliable sources and entered into the GPS receiver. The table was compiled by the author based on the data of the Statistical Office of the Republic of Uzbekistan.

An electronic digital map created in the ArcGIS program is loaded on the computer. The data received and the data collected are imported into an electronic digital map loaded using a GPS receiver. Imported points are automatically linked to the region based on their geographic location according to the country's spatial coordinate system. The data fills in the corresponding data table. Based on the data in the related data table, conditional symbols are formed based on all indicators. Conditional symbols appear in the form of several diagrams.

It is known that initially GAT technologies were used for the purpose of accurate visualization. What do we mean by a visual approach to the development of demographic process maps and what do we mean by their practical application? Maps can be viewed visually (by eye) or through a computer, digitally, by a human. When visually compared by humans, various differences or similarities can be found based on human perception [1]. Also, with the help of GAT technologies, there are possibilities of visualization in various forms, which are depicted not only in the form of a map, but also in tables, diagrams and other forms of interaction with the user.

Visual communication is of great importance to create a virtual-real system of GAT technologies, in which all GAT technology images are used. Visual communication is divided into the functions of orientation and navigation, selection, control and analysis. If the user is in a 3D environment, these functions should be reflected in the 3D environment as much as possible. This can be done by using the virtual world itself [3; page 123].

In this regard, we can see the information-rich work of visualization, the creation of new structures of structured and unstructured data. For example, Tree Maps, Cone Trees, Perspective Walls, Star Field displays, Hyperbolic trees,

DOITrees for data managers), Space Trees and others can be cited as an example [5; page 2].

Based on the characteristics of maps in the process of visualization, their tasks related to space processing are a graph of a spatial data source in the form of a graphic database or cartographic work. An experienced professional in the production of visual products requires the creation of high-resolution graphic and spatial databases to enable visualization.

Visualization is still evolving in every field today. Creating a visual image on the basis of modern GAT technologies can be the basis for many achievements in the creation of population maps, as in every industry. For this, a modern visual equivalent is created using visualization. Data sources are related to information graphics, information visualization, research data analysis, and statistical graphics. This, in turn, stimulates the search for information in visual perception, while improving the perfection of self-research work.

We found that spatial demographic data has the following advantages in layered organization:

- the ability to change the appearance of layers in the visualization of the demographic map;
- the ability to change the order of layers in the visualization of the demographic map;
- the ability to independently adjust the visualization parameters of each available layer when drawing maps;
- the possibility of independent spatial analysis in layers of geographical maps;
- the ability to create maps from different levels of details and resulting layers based on software tools is an advantage.

This requires the visualization of spatial demographic data in map form and the emergence of 3D visualization features.

A key trick to spatial data visualization on the go is the use of spatial data layering. In this, one type of data is grouped into layers. Here, it can be understood that a data type has the same semantics as a DE, or objects with the same size or topological structure [2].

Once the link is established by implementing the Theisgis software and the receivers, further studies will automatically enter the data into the database. It is done by visualizing the database based on new data.

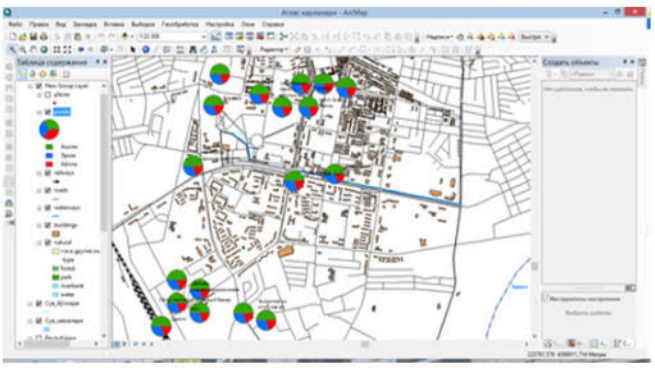

Figure 1. Receive data from regions and update online.

We can see the superiority of GAT technologies in the representation of spatial information based on cartographic images. As a result, it became clear that the use of existing paper maps as a basis for creating digital and electronic maps of some regions did not give the expected result.

Therefore, first of all, it is necessary to create a cartographic basis. To represent the processes on maps, we created a cartographic framework from remote sensing materials. Landsat spacecraft images were initially used to create a new cartographic framework. In the sequence of methods and technology of electronic and digital maps, the formation of new principle steps in the process of preparing original maps and copying them is directly related to software belonging to the family of geographic information systems.

When creating maps based on the technology of creating electronic demographic maps, paper and electronic digital maps and related tables, text and other data are collected in the computer memory.

In the data verification system, all collected data is checked and systematized. For example, in a data warehousing system, the above structured data is stored in a central database server based on a specific order.

All data collected in the queue analysis system will be analyzed by topic and transferred to the requested organizations and other government bodies to provide interactive services.

At the next stage, interactive service organizations provide information to the requested address.

At the final stage, in the analytical and statistical analysis of dynamic changes, forecasting actions are carried out based on the data collected by the researcher during forecasting work on various topics. If necessary, develops their maps.

We can see that remote sensing techniques provide good opportunities for supporting remote sensing techniques, reviewing analytical studies, monitoring and analyzing processes, and creating maps based on the collected results.

Analytical work was carried out to increase the accuracy of the information on the maps, as well as to create maps for monitoring demographic processes and forecasting demographic processes. For this, space photos ArcGIS software was downloaded and exported through the Earth Explorer geoportal, and NDVI analysis was carried out in the following sequence.

- Photos downloaded from Earth Explorer through Geoportal Space.
- Initially opens https://earthexplorer.usgs.gov/;
- Enter the Geoportal and get your personal login and password;
- The required field is selected or searched by coordinates.

The period specified in the measurement, the image of the selected area is shown in it, and the time at which it is needed is entered. After determining the desired zone, the space photo system at the base was selected.

The next step will be a number of additional feature requirements. In this row, the pictures are covered with clouds, the number of the orbit, the name of the photo and other indicators are entered. Then the result will be searched and pictures of the area will be displayed.

More information about the space photo is available in the Metadata. The resulting images are exported to ArcGIS software and can be analyzed.

We consider aspects of the link to demographic processes in NDVI analysis. When performing NDVI analysis, we need the red and infrared spectrum of the image. In it, through the toolbox (toolbox), the Map Al panel is set to the Spatial Analyst tool (Spatial Analyst tool), and then to the Raster calculator.

NDVI = (IR-R)/ (IR+R) is calculated according to the formula

In this case, the IR-infrared spectrum image of the image
R-red spectrum image

Usually, the value of the index results obtained as a result of the analysis varies from 1.0 to -1.0. Corresponding values of population points were observed in the range of about 0.6

to 0.22.

In the processing of remote sensing materials, the photos taken are initially transformed into a trapezoid in the form of a photo frame. [8; p. 106-110] Then separate vector layers of general geographical elements were formed. Topographical maps were prepared as a basis for drawing up the first demographic maps of the southern region. Then the quality and topology of the electronic database of the map were checked.

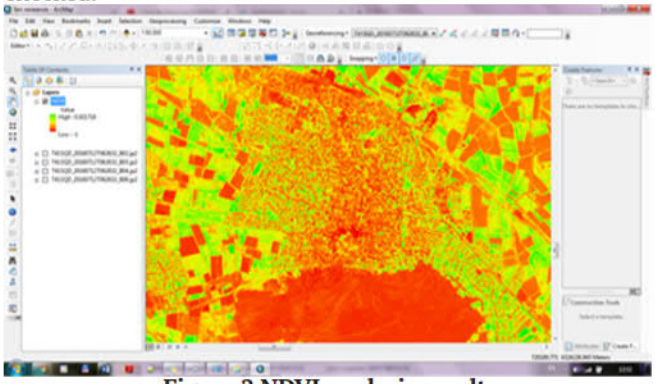

Figure 2 NDVI analysis result.

The next step is vector layers *.sxf. ArcGIS file extension *. shp format. ArcGIS, general geography, geography, population points, roads, boundaries, relays, industrial and social objects were formed in separate layers and files.

The result of the above works on the new cartographic basis created in the program, that is, the statistical data collected in the central database using the geolocation method, are interrelated.

Conclusion. The analysis of the theoretical foundations of the mapping of demographic processes using geoinformation technologies showed that the interdependence of GAT and maps is constantly complementing each other. Traditional, statistical, cartographic, aero and space materials are used to describe processes or objects in nature and society. A new approach using modern computer techniques and data processing methods, GAT, serves as a perspective in collecting and processing information about objects, processes and events. Thus, in many cases, geoinformatics and cartography should pay attention to their interdependence, and in general, the two sides: the geoinformation supply of cartography, on the other hand, the cartographic supply of geoinformatics, from the point of view of interdependence it was concluded that cartography and geoinformatics complement each other.

References:

1. RV. Gavin, N.G. Markov. Geoinformation systems. Tomsk 2008. 69 p.
2. Huisman O, Ralf A. de By, "Principles of Geographic Information Systems". The Netherlands - 2009. [453 p.]
3. Kang-Tsung Chang. Introduction to Geographic Information Systems. Worth publishing. - McGraw Hill Education (India) 2008. - 450 p.
4 Abdurakhmanov S. N. Development of information on creating maps of demographic processes in the system of geographic information technologies / / XXI International Scientific and Practical Conference Advances in Science and Technology. RUSSIA in June 2019.
5. Abdurahmanov S.N. Geoinformatics systems and technologies (GAT) and data on the use of GPS accessories in the integrated demographic process // International journal of multidisciplinary research and publications ISSN: 2581-6187. 2019
6. Raklov V.P., Safarov E. No, it is not., Abdurahimov K.A. Geographic information systems. - T.: Science, 2007. - 140 B.
7. Sh. Shokirov, I. Musaev. Remote sensing T-2015. 195 p.
8. Tajiyeva.Z. Population of Uzbekistan: growth and settlement. Monograph. - T:. Science technology, 2010.- 113b