

# Geoinformatic Systems and Technologies (GAT) and Information on the Use of GPS Accessories in Integrated Demographic Process

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**Abstract**— The scientific significance of the research results in this article is based on the fact that the demographic data base of the southern region has been developed using the latest methods and technologies, and visualized maps have been developed using ArcGIS QGIS, Mapinfo, ArcGIS QGIS, Mapinfo, demographic process data acquisition and systematic mapping are explained. The practical significance of the research results is primarily to the use of scientific conclusions and recommendations made on the dissertation, as well as the use of targeted government programs and practical measures to regulate demographic processes from the theme and projection card.

**Keywords**— Cartographic, aerospace, statistical, GIS technologies ArcGis, QGIS, Mapinfo, survey questionnaires, regional analysis, mathematical modeling.

## I. INTRODUCTION

Today, the development of modern card-based methods directly relates to Geoinformation systems and technologies. Studying the effects of urban demographic processes on urbanization growth dynamics has attracted many experts today. It is noteworthy that the role of the cards created on the basis of modern methods and technologies is crucial to continuing such processes.

Gathering, storing, digitizing, analyzing, processing, registering, evaluating and predicting geographical information on the globe through the use of modern methods and technologies of space surfacing, space-based modeling and visualization are of particular importance. These processes attach great importance to the use of modern methods and technologies in creating demographic process cards in regions of the country, including the southern region.

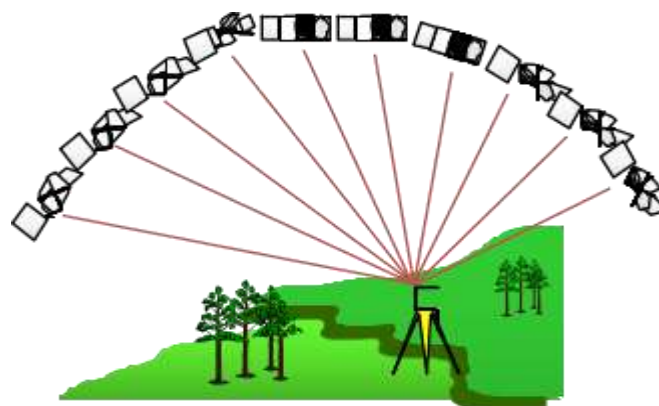
Targeted research has shown that GATs in demographic processes need to be collected in order to collect demographic information and form their database in the region. In the demographic process, the GAT is the address, the coordinates, the data, and the economic parameters of the object.

Modern GIS technology is an effective approach to building demographic processes and performing specific tasks and analyzing problems. demographic processes, mapping of cartographic layers, and forecasting on topographical basis on data coordinates, and providing a single cadastre system over the coordinates of each object in the presentation.

In the demographic process, GAT is a cartographic algorithm for mapping them, and the development of the card algorithm is focused on the cardboard models and systems of communication objects.

### The Main Part

Manufacturers of leading geodetic instruments in the world are producing modern optical electronic devices, as well as electronic digital guides. (Figure 1).



Picture 1. Satellite and GPS receivers

Pryomniks are traded mainly for geodesy, cartography and navigation purposes. To date, several generations of GPS receivers

(ProMark, Ashtech, Leica, Sokia and Trimble) have been used by state-run enterprises and private commercial enterprises in geodesy and cartography. Nowadays, the GPS grips used in the agricultural sector are mostly one-and two-frequency, since the accuracy of centimeters is in units of measurement, and it is necessary to link the state geodetic points to further enhance the accuracy.

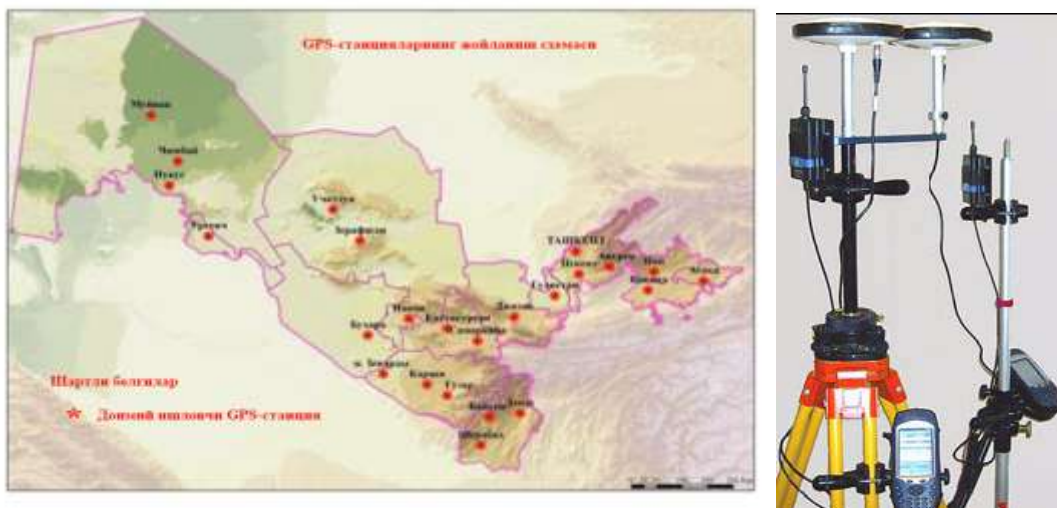
Geodetic point is the point where geodetic methods are used to determine the position of coordinates. Geodetic point coordinates (position) are used to determine where the coordinates are at the high point. The coordinates of the geodetic point are determined primarily by "Triangulation" methods. For long-term use of geodetic points, their location on the surface of the surface is determined by a special concrete cast (monolith), called the geodetic center. In addition, a pyramidal tower (geodetic signal) is constructed at the geodetic point. Geodesic point sets are called geodetic base stations. They are divided into state geodetic, local geodetic and planing points. Geodetic base stations are the basis for topographic plans, but also serve as a basis for addressing geodetic and engineering-technical issues of the national economy and the state.

Geodetic network is a network based on triangulation, trilateral and polygonometric surfaces. It can be divided into 4 levels, its width can range from 20 to 25 meters to several hundred meters. They are mainly constructed in the form of a triangle, that is, the interconnection of several geodetic points forms the geodesic network.

The corners of the geodesic points are determined by the exact theodolites. The accuracy of the accuracy can be from 0.7 to 2, and in some cases, the accuracy can be higher than the coordinates of the geodetic point points by geodetic and astronomical measurements, and the altitudes are determined by the method of leveling to the sea level taken as the starting point.

Sectors and their points are established by the project created by the Department of Geodesy and Cartography of the Land Resources, Geodesy, Cartography and State Cadastre of the Republic of Uzbekistan. Earth's satellites have been able to link geodetic continents and establish world geodetic networks through land observation.

The total density of points 1, 2, 3 and 4 of the state satellite geodetic network is at least one point per 50 km<sup>2</sup>. The geodetic coordinate system (SR42), which is currently in force in 1942, operates on the territory of the Republic of Uzbekistan. At the same time, Uzbekistan has a geodetic network of satellite geodetic networks and is based on the principle of their development. State satellite radio navigation systems The state satellite geodetic networks to be built using NAVSTAR (USA) and GLONASS (Russia) and other space-based geodesy systems include: Reference system geodetic points; 0 class satellite geodetic network; 1st class satellite geodetic network. State satellite geodetic network locations are identified in two coordinate systems - public and referencing systems. The connection between the two systems is interconnected from the connection settings. We believe that the creation of geodetic networks in our country should be based on the state geodetic points and lines. As you know, the permanent base station consists of satellite geodesy and antennae. This base station is fixed in a reliable location and operates with a source of uninterrupted power supply. The data receiver receives satellite signals itself. The received signals are processed and transmitted to other devices at the same time, ensuring the operation of the device. The requirements for accuracy, density and stability of geodetic networks are varied.

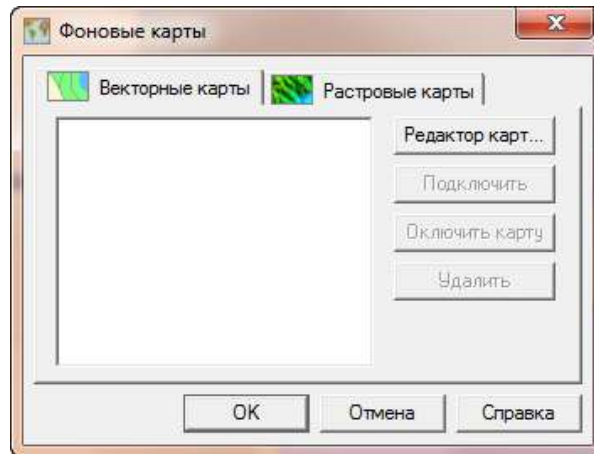


Picture 2. GPS stations in Uzbekistan and Magellan GPS receiver

There are a number of prerequisites for working in satellite geodetic networks, which are the products of such major companies as Stonex, Leica, Trimble, and Magellan.

Magellan, one of the aforementioned companies, uses GPS (Picture 2), a company known as Ashtech (French), to be a precursor to digital cameras and navigation guides.

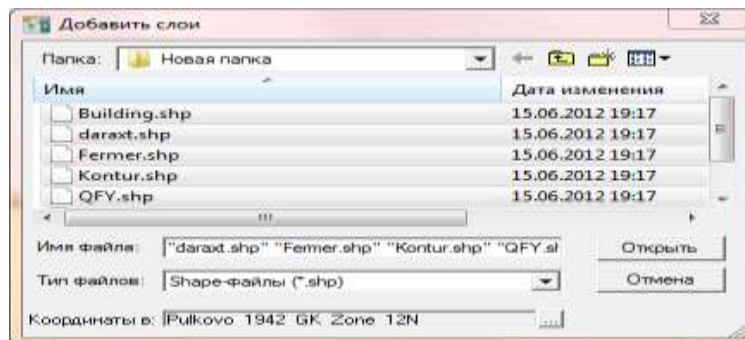
For download of any digital card of agricultural objects to a GPS navigator, it is necessary to bring the layers of the digital card into the \*.shp format. The Navigator's Mobile Mapper Office program opens and the "Fonoviye karti" button is pressed.



Picture 3. Download vector cards (mabila mapper office software)

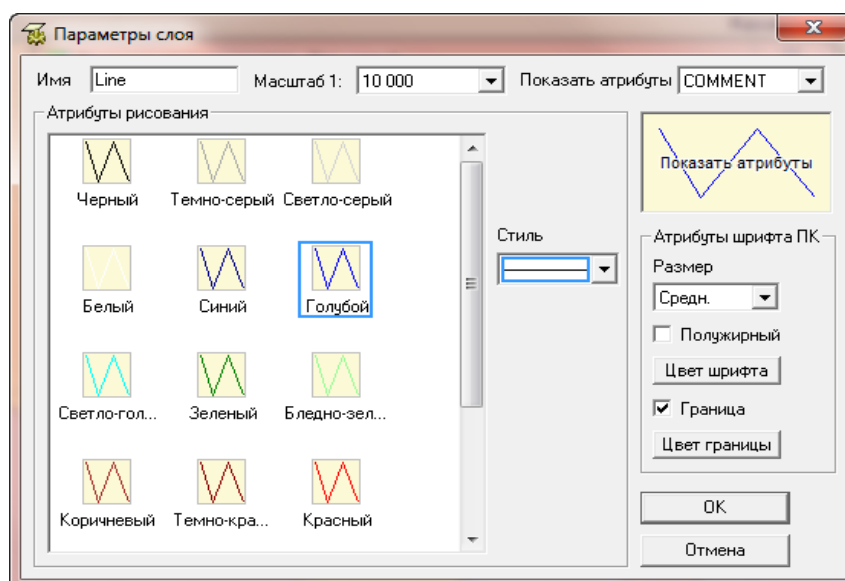
Opens a window called "Fonovie Card" (Figure 3). In this box, press the cardholder card button.

"Dobavit danniy" button is pressed from the next window. As a result, the "Dobavit sloj" window opens and the existing layers in \*.shp format are highlighted and the button is pressed. (Figure 4).



Picture 4. Vector Layer Download Windo

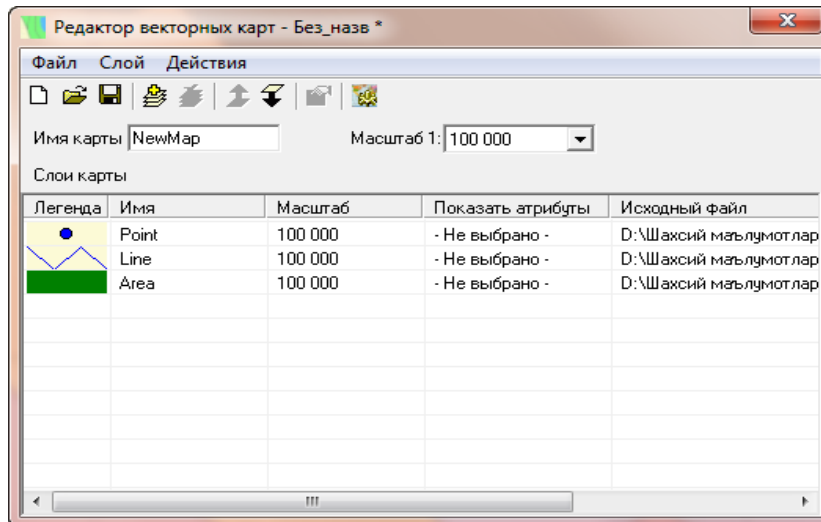
Then there is a situation in the window shown in the second picture, and we will look at the layers, the conditional character, and the process of writing. When you press the left mouse button 2 times over any desired layer, a window opens with the name "Parameter Type" (Pic. 5).



Picture 5. Conditional character window for vector layers

Type of the conditional character, size, name, color, maximum range and classification of the auxiliary window items is clicked and the "OK" button is pressed.

After each sequence has been replicated with this sequence, the "Sakhranit Project" button is pressed and a name for the project (project) will be pressed once again, then press the "CARD" button and the card we want to print will be saved into the workstation and press the release button (Pic. 5).



Picture 6. layers spreadsheet

Return to the window, and then click again to display the layers in the worksheet (Figure 6). Mobile Mapper office software window

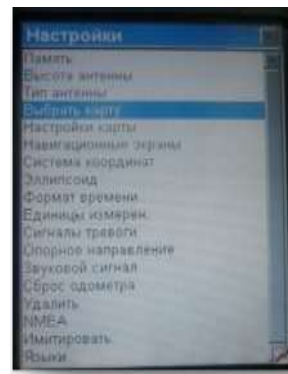
Next, the GPS navigator software is loaded and the drive type is entered in the Mobile Mapper column and then the USB port connects to the computer.

The computer is selected by the Mobile Mapper office and the "Vogue Phone" button is selected for the "Fonovie Card".

The window opens on the working glass under the name "Parameter GPS" and will automatically wait until it is connected to the navigator.



Picture 7. Navigator main menu



Picture 8. Navigator correction menu

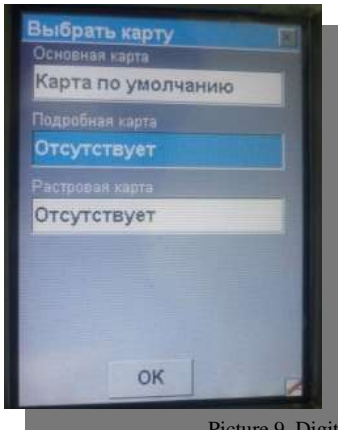
When you find the navigator, the white button is pressed and the layers in the navigator will start to float in the background.

At the end of the work, the Navigator's menu button is pressed and entered in the "Nastroyka" line in the menu (Chapters 7 and 8).

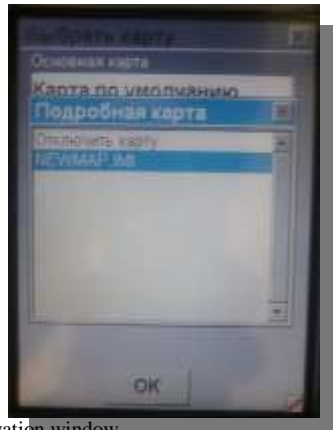
As a result, auxiliary functions of the "Nastroyka" will be created, the "Vibrat kartu" (Figure 9) function will be selected from the card of the card, and the "OK" key will be pressed (Figure 9).

The layers in the \*.shp format are loaded into the working window, depending on the region's coordinates (Figure 10).

Navigators with this capability, having enough experience and experience through performing the above sequence, can also be tested and tested for this feature.



Picture 9. Digital card activation window



Picture 10. Applying Navigator Clipboard

Integration of information into database creation when creating demographic cards

With the help of GPS receivers it is required to carry out research by experts in the field to collect or update regional data. Before carrying out the research, GPS receivers are loaded with an electronic digital card created and developed by ArcGIS on the basis of the above series. (Figure 11)



Figure 11. An electronic digital card created by ArcGIS

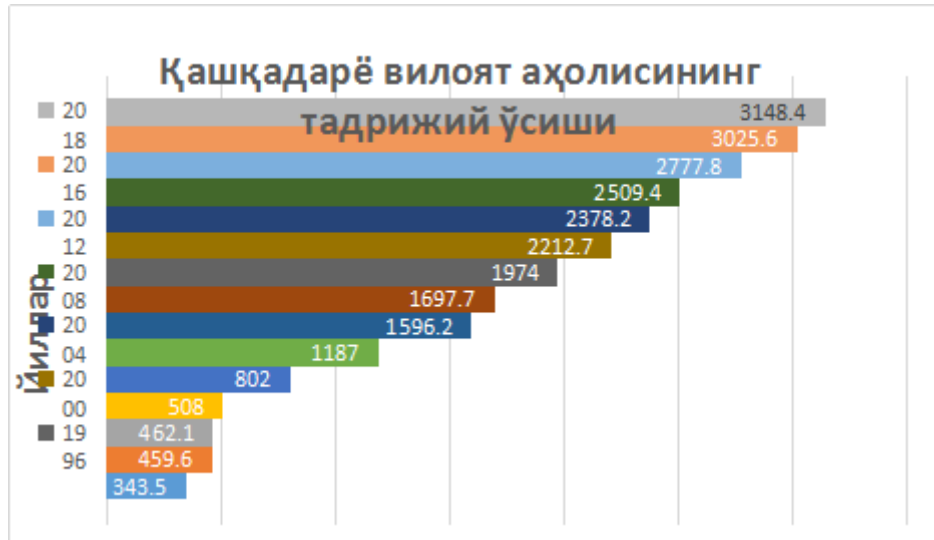
The downloaded electronic digital card is activated on the GPS receiver. The GPS receiver is commanded to connect with satellites to work. Connecting to satellites requires at least 4 channels to be filled, and PDOP error corrections should not exceed 5. On the territory of the Republic of Uzbekistan there are about 10 to 12 satellite connections. There are 4 to 8 satellites in areas with high mountains, mountains and magnetic fields. The following demographic information will be studied in the area during the survey:

- total population;	- nations;
- women;	- deaths (decrease);
-men;	- Birth (growth);
- children;	- labor resources;
- persons with disabilities;	- population employment.
- loneliness;	- other demographic information

This information is learned from reliable sources and is included in the GPS receiver. (Picture 12)

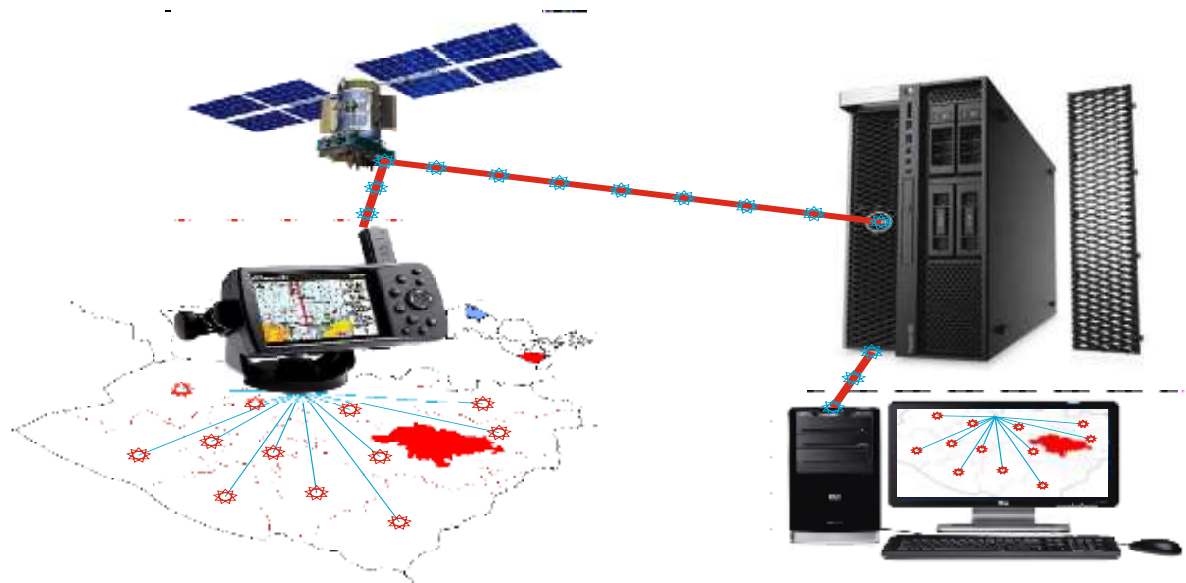
Years	Of value
1926	343,5
1936	459,6
1950	462,1
1959	508
1970	802
1979	1187
1989	1596,2
1991	1697,7
1996	1974
2000	2212,7
2004	2378,2
2008	2509,4
2012	2777,8
2016	3025,6
2018	3148,4





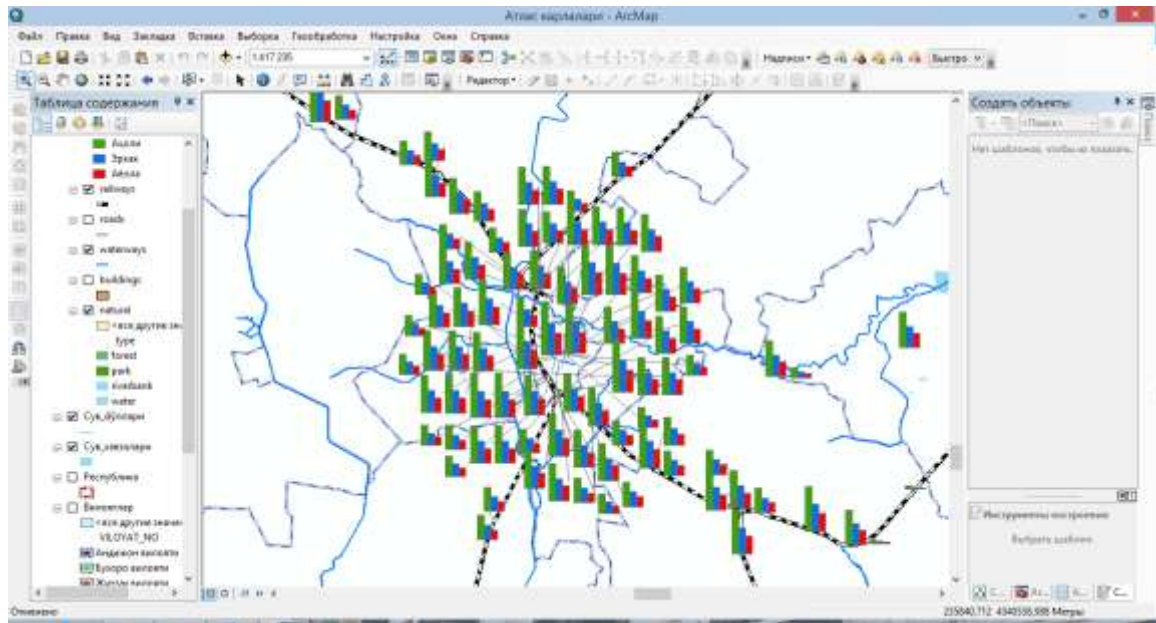
Picture 12. Demographics information

Before entering data into the gps receiver, the coordinates are obtained from the dotted area, depending on the geographical location of the area. the aggregated information will be included in the table of attributes of the coordinates taken. the information included in the database is integrated into the online server for integration with the software. the backup data is automatically backed up on the server for emergency situations. then, the information is automatically retrieved to the memory of the working computer. (Picture 13)



Picture 13. Integration Structure

An electronic digital card created by ArcGIS on the computer is loaded. imported points and data collected using the GPS receiver are imported into the downloaded electronic digital card. Imported points are coordinated automatically in accordance with the geographic location of the state coordinate system. The information fills in the spreadsheet. Based on the data in the index of the index, the conditional signs are formed based on all indicators. Conditional characters are visualized in the form of several diagrams. (Figure 14)



Picture 14. Visualization of conditional characters in diagrams

After completing ArcGIS software and GPS receiver interoperability, in subsequent studies, data is automatically retrieved to the database. Database is based on ArcGIS database and worksheet "Obnovit" for database visualization based on new information. (Figure 15)

Indicators of the level of quality and quantitative scales of quantitative and qualitative assessments of the degree of necessity of introduction of aero-space photography in the process of GIS maintenance in demographic processes were developed. Cards were created in GIS technologies used to improve cartographic and geodetic support for creating demographic cards based on GIS technologies.



Picture 15. Receive and update online information from regions

### Summary

GPS receivers and data retrieval systems, the world's leading geodetic instruments manufacturers have developed modern optical electronic devices and electronic digital navigation nodes, with the ability to follow the business process steps of a typical GPS object, add the attribute and the picture in the final step more is given. As a result of the above mentioned sequences, topographic geodetic surveys are carried out using GPS in the region.

At present, many state-owned enterprises and businesses use agricultural land in their control, monitoring and planting crops. The Stonex S-3 Series receiver features a wide range of GPS and GNSS handling and panels.

The process of data base formation and integration into the GPS receiver is also detailed.

At the same time, the structure of the geodetic network in the country is defined and its development is based on the principle

of transition. State satellite geodetic network locations are identified in two coordinate systems - public and referencing systems. The connection between the two systems is interconnected from the connection settings. The analysis of the necessity of state geodetic stations and networks in the creation of satellite geodetic networks was analyzed and process of integration of demographic cards into database was developed. Consolidated data will be automatically copied on the server and the information will be automatically retrieved on the computer's hard disk drive.

After completing ArcGIS software and GPS receiver interoperability, in subsequent studies, data is automatically retrieved to the database. The database is visualized on the basis of new information. The process of creating and updating the created cards in a short time is provided in detail.

#### REFERENCES

- [1] Zeyler M. Modelirovaniye nashego mira (rukovodstvo ESRI po proyektirovaniyu bazo' geodannox). - M.: MGU, 2001. - 255 s.
- [2] Qayumov. A.A., Yakubov O'.Sh., Rayimjonov Z.H. Aholi geografiyasi va demografiya asoslari Toshkent 2008 y-26.b.
- [3] M.R. Bo'riyeva Demografiya asoslari. Toshkent 2001y 10-b.
- [4] Q.X.Abduraxmonov X.X. Abdiramanov. "Demografiya" T.2010y 22-127-b
- [5] Chislennost naseleniya Respubliki Uzbekistan 1998. - Tashkent, 1999. s-12
- [6] Pakazateli sotsialno-ekonomicheskogo razvitiya. Respubliki Karakalpakistan, oblastey i g. Tashkenta.-Tashkent, 2000. - S-8.
- [7] Qayumov. A.A., Yakubov O'.Sh., Rayimjonov Z.H. Aholi geografiyasi va demografiya asoslari T. 2008 y. 94-b
- [8] "Demograficheskiy ensiklopedicheskiy slovar" Moskva 1985.
- [9] Abduraxmonov Q. Abduramanov X. "Demografiya" 127 b. Toshkent 2010y.
- [10] Abduraxmonov Q. Abduramanov X. "Demografiya" 157 b. Toshkent 2010y.
- [11] A.A.Qayumov. O'.Sh.Yakubov Z.H.Rayimjonov "Aholi geografiyasi va demografiya asoslari" Toshkent-2018
- [12] Tojiyeva.Z. O'zbekiston aholisi: o'sishi va joydanishi. Monografiya. - T.: Fan texnologiya, 2010.- 113b.
- [13] Berlyant A.M. Kartografiya: Uchebnik dlya vuzov. - M.: Aspekt Press, 2002, -162 s.
- [14] Sabitova N.I. Tematicheskoye karta na osnove metoda plastiki relefa v natsionalnom atlase Uzbekistana G'G' Nauchno-metodicheskiye osnova sozdaniya natsionalnogo atlasa Uzbekistana, -Tashkent, 2009. -S. 38-40.
- [15] B. Mirzaev, F.M. Mamatov, The nature of the interaction of flat blade cutters with cutting materials, «Water management-state and prospects of development» Collected articles of young scientists, Part 1, RIVNE, 2010. 77-79 pages
- [16] B. Mirzaev, I. Avazov, Sh. Mardonov, Perspective directions of development of new soil cultivation machines against soil erosion printed «Water management-state and prospects of development» collected articles of young scientists, part 1, rivne, 2010. 18-20 pages
- [17] B. Mirzaev, F.M. Mamatov, Soil protection and moisture saving technologies and tools for tillage, European Applied Sciences. 2013, -№9. -P.115-117.
- [18] DURMANOV, Akmal Shaimardanovich; TILLAEV, Alisher Xasanovich; ISMAYILOVA, Suluxan Sarsenbayevna; DJAMALOVA, Xulkar Sayorovna & MURODOV, Sherzodbek Murod o'gli. (2019) Economic-mathematical modeling of optimal level costs in the greenhouse vegetables in Uzbekistan. Revista ESPACIOS. 40 (N° 10), (20) <http://www.revistaespacios.com/a19v40n10/19401020.html>
- [19] <http://www.ESRI.com>
- [20] <http://gis-lab.info>
- [21] <http://www.geospatialworld.net>
- [22] <http://www.gisig.it/best-gis/Guides/main.tm>
- [23] <http://www.gisinfo.ru>
- [24] <http://tp:lex.uz>
- [25] <http://www.dataplus.ru/>
- [26] <http://www.cadacademy.ru/>
- [27] <http://www.gis.nnov.ru>
- [28] <http://www.sasgis.org>
- [29] <http://www.stat.uz>