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CREATION OF A SATELLITE GEODESIC BASE ON THE TERRITORY OF THE REPUBLIC OF UZBEKISTAN.

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Abstract: The rapid development of science and technology in recent decades has made it possible to create a fundamentally new method for determining the coordinates and increments of coordinates-satellite. In this method, instead of the fixed points of the geodetic network with the known coordinates, the mobile satellites are used, the coordinates of which can be calculated for any moment of time that is of interest to the geodesist.

Keywords: . GNSS, reconnaissance, triangulation, geodetic coordinates.

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INTRODUCTION.

Until the 10th year of the end of the 20th century, geodetic surveying was carried out using mechanical and then optical equipment. With the development of radio technology, light and radio dynamometers were created.

In the 21st century, based on scientific and technical achievements, geodetic equipment has been created, which is significantly different from the traditional method, which has high measurement accuracy and requires less time for measurement. An example of this is GPS, digital level, and electronic laser equipment. Most of these devices are based on light and radio frequency measurement methods. This dataset contains information on new surveying equipment from various sites, magazines and articles.

Nowadays, we often come across the term GPS, this concept is widely used not only in the field of geodesy, but also in mobile phones. This word stands for Global Positioning System. This system consists of a system of satellites that continuously transmit electromagnetic signals to the earth [1-3].

There are also special receivers and devices on the ground to receive such signals. The advantage of such devices is that the distance from the satellite to the object on the earth is measured with high accuracy (from several 10 km to several mm), and as a result, the coordinate or location of the object taken from books with such accuracy is also measured with high accuracy. The idea of creating a global positioning system appeared in the 50s of the last century, and the idea of putting it into practice was used by Johns Hopkins University. GPS was developed in 1969 based on the order of the US Department of Defense. At the initial stage, this

system consists of 24 satellites 22.5 km above sea level, at an inclination of 55 degrees, orbiting 6 times, and a system of special ground stations designed for observation on the surface of the earth and continuously monitoring the movement of the satellites, providing in-orbit direction errors if necessary was (Fig. 1). Satellites send weak signals to Earth, but this is enough to determine the coordinates of the location of the object [4-9]. This antiquated system cost the US government $12 billion.

Figure 1. Schematic location of GPS satellites in orbit.

THE MAIN PART

Each modern satellite is equipped with a number of high-tech devices on board, including:

- four atomic clocks;
- three cadmium nickel batteries;
- two solar batteries with a capacity of 1136 W;
- short-wave range antenna for satellite control;
- 12-element long-wave antenna for user communication.

If the size of the GPS devices developed at the beginning was the size of a soccer ball or larger, the size of today's GPS devices is the same as a mobile phone, and these devices, in addition to information such as the height of the location of the object, the location of the object in the city, transport highways and along with many other objects can also be displayed on a card on a small screen [10-15].

Fig. 2. GPS device (with additional devices).

In addition to determining three coordinates (longitude, latitude, and altitude above sea level), GPS also performs the following functions:

- determining the components of the object's speed;
- measure the exact time with an accuracy of 0.1 s;
- calculation of the actual road slope of the object;

Figure 3. Communication of satellite system and GPS receiver.

At the moment, there are five large control stations on the ground that maintain constant communication and monitoring with GPS receivers. The control center is located in the US state of Colorado, and the rest of the centers are located around the world: Hawaii (Pacific Ocean), Weozneseniya Island (Atlantic Ocean), Diego Garcia Island (Indian Ocean), Kwajalein Island (Pacific Ocean).

GPS was originally designed for military purposes, with the help of which it was used to accurately place squads in places, to find the shortest distance to an object, and similar goals. By the 80s of the last century, GPS began to be used for civilian purposes. Now every citizen can appreciate the functionality of GPS.

GPS is used not only on land, but also in sea and air navigation. GPS can be used anywhere, but cannot be used in places where GPS signals cannot be received (basements, mines, caves). GPS has a wide range of applications. Such areas include the navigation of impressive vehicles such as private cars, military and domestic vehicles, ships and aircraft [16-20]. GPS used in the fields of land surveying and cartography consists not only of receivers, but also of additional computer devices and programs to determine the coordinates of the earth's surface, because this field requires more accurate data and maps.

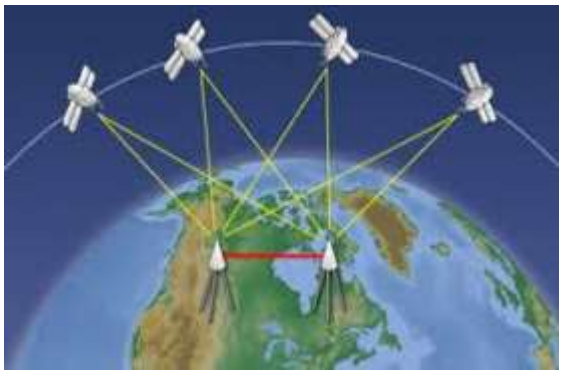

Figure 4. Application of GPS in navigation.

Currently, the fields of application of GPS are expanding year by year.

Below is a clear example of the use of GPS for the civil work of cargo transport navigation. This system is based on the Axiom Logistics system [21-24]. The main functions are:

• Operational information about the location of each vehicle and cargo;

• Access to the coordinate map with the routes of vehicles through the web interface of the Axiom-Logistics system;

• Controlling the accuracy of the route and schedule;

• Establishing an emergency connection with the vehicle;

• Entering information about customers, freight carriers, vehicles and loaders into the database of the Axiom-Logistics system;

• Automating the process of registration of transport and customs documents in Axiom-Logistics;

• Increase the reliability of the system through the better functioning of GPS and GSM technologies;

• Less effort for devices (standard equipment is used);

• Less effort for data exchange. (cheap SMS – traffic + special tariff is used);

• Secure access to Axiom –Logistics data;

• Comprehensive web solution;

• GPS/GSM – the device must be present in the vehicle;

• Operator center and processing of SMS-messages in movement along Axiom-Logistics route;

• Data visualization and analysis server (SMS — messages) [25-28].

CONCLUSION

In short, determining the coordinates with the help of GPS ensures finding the absolute position of a point anywhere on the earth's surface with the same accuracy in the implementation of the fundamental goal of geodesy. Using traditional geodetic and topographical methods, we find the location of the point with an accuracy that depends on the distances to these points relative to the starting

points. Therefore, GPS has a great advantage over conventional methods. Geodesy, on the other hand, is the basis for GPS, and vice versa, GPS has become the main tool for geodesy. These words are confirmed to be true if we remember the main goals of geodesy:

Construction and maintenance of national and global spatial geodetic reference networks on the Earth's surface, taking into account the fact that their points shift over time.

Determination of measurement and description of geodetic phenomena (movement of the earth's poles, displacement of the earth's crust, etc.).

Determination of the Earth's gravitational field, along with its periodic changes.

Although most GPS users will not encounter the above tasks, those who work with these devices must have an understanding of geodesy.

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