

MODERN METHODS OF CARTOGRAPHIC AND GEODETIC RESEARCH AND THEIR ENGINEERING AND GRAPHIC SUPPORT IN LAND MANAGEMENT

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Land management is one of the most important branches of modern geodesy and cartography. Land management is a complex process that includes collection, processing and analysis of geodetic and cartographic data to solve various tasks related to land use.

Various technologies and devices are used in modern methods of cartographic and geodetic research in land management. For example, global navigation satellite systems (GNSS) allow you to determine the coordinates of points with high accuracy. These systems can be used to collect data during land management, road design and other engineering projects. [1]

Other modern methods of cartographic and geodetic research used in land management include:

- **Laser scanning:** this is a technology that allows to quickly and accurately scan surfaces with high accuracy and detail. Laser scanning can be used to collect data on the topography of an area and compare this data with previously collected data.
- **Photogrammetry:** this technology uses images taken from the air to determine the coordinates of points and the dimensions of objects on the ground. Photogrammetry is an important technology for collecting data about land plots and their configuration.
- **Ground-penetrating radar:** this technology is used to detect underground objects and structures such as pipelines, cables, archaeological artefacts, and

others. Ground-penetrating radar uses radio waves to penetrate deep into the earth and obtain information about the structure of underground objects. [2]

Engineering and graphic support in land management also uses various software tools for data processing and analysis. For example, programs for processing GNSS data allow you to accurately determine the coordinates of points on the ground. Mapping applications such as ArcGIS, QGIS and AutoCAD Map 3D allow you to create and edit digital maps and other geodetic data. [3]

One of the current trends in land management is the use of artificial intelligence (AI) and machine learning (ML) technologies to automate geodetic data collection and processing. For example, machine learning algorithms can be used to automatically determine the boundaries of land plots based on collected data.

Summing up, modern methods of cartographic and geodetic research and their engineering and graphic support in land management are very diverse and include the use of various technologies and devices, as well as software tools for processing and analysing geodetic data. New technologies such as AI and ML are opening up new possibilities for automating data collection and processing procedures in land management and facilitating various tasks related to land use.

References.

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