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Article

The Land Surveyor and the GPS in the Context of Systematic Land Registrations

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Abstract: The article covers the Surveyor Institute's historical context and its role in the legal order of land rights registration. It highlights the importance of GPS technologies in ensuring the accuracy of registering rights to real estate. The article reviews the role of systematic registrations in clarifying overlapping cadastral data and preventing neighborhood disputes. Additionally, it underscores the challenges related to surveying activities in Georgia and emphasizes the importance of establishing a legal framework for this profession.

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Introduction

The Institute of Surveyors has played a decisive role in the process of land privatization in Georgia since independence and continues to do so today. In recent decades, the importance of this profession has increased significantly with the introduction of systematic registrations of rights to real estate. The Surveyor's Institute plays an important role in determining accurate cadastral data. It should be noted that surveyors are mostly subjects of private law, and a comprehensive definition of their rights and duties, unfortunately, cannot be found in the current legislative material in Georgia.

This paper provides insights into how the Surveyors' Institute and GPS systems are addressing legal challenges in the systematic land registration process. It reviews the Surveyor's Institute and the existing legal situation in Georgia, aiming to determine the need for establishing a regulatory framework for surveying activities. The article highlights aspects of the Surveyor's Institute and GPS systems that are significant to the law.

Historical Context of Surveying Activities

Surveying activity dates back to ancient times. The land register recorded in Egypt dates back 3000 years, related to the process of restoring the boundaries of agricultural farms damaged by the Nile flood and the construction of the Great Pyramid of Giza (2). Sources of Roman law indicate that surveyors established the basic surveying tools through which the geographical units of the Roman Empire were defined. A tax register of the conquered lands existed from 300 AD, with administrative data about the land processed by the surveyors (Hopkins K., 116.) The borders of the land and landmarks can also be read in biblical concepts, for example, in Deuteronomy 19:14 and 27:17; Proverbs 22:28 and 23:10; Job 24:2 (3).

In Europe, in the 18th century, a survey method known as "triangulation," which relied on measuring angles, was used to network various communications (4). During the early days of the colonization of Australia and New Zealand, different methods were employed to determine geographical data: measuring wheel, Gunter's chain, and compass. Surveyors performed this task, numbering the perimeter of the country (Hallmann F., 1994). However, over time, outdated methods such as the so-called "Bafta" and others have been replaced by GPS systems (GNSS Rover, Total Station). These devices allow surveyors to measure a geographic object with maximum accuracy.

Surveyor as a Land Surveyor at the Time of Registration

In the process of registration of rights to real estate, the most important thing is the land survey, taking into account the interests of the buyer and the seller. For example, from the 20th century to the present day, the functional meaning of the surveyor's activity in the USA has not changed: determining the boundaries of the land - land survey, which determines the geographical boundaries of the property object. This process is necessary to avoid future neighborhood disputes due to overlapping borders. Through advanced technology and methodology, a land surveyor/surveyor provides legal data-based geoinformatics data processing. In the context of limited commercial rights, such as easements and essential roads, the surveyor specifies the geographic location of the easement and accurately reflects it in the documentation (Wilson R.C., 2006). During zoning, land surveyors assess whether a property complies with municipal zoning ordinances, providing critical information to the buyer, including the seller. Land surveyors play an important role in the process of creating a topographic map, which is an essential component of construction permit documentation (7, 1973). Moreover, land surveyors have an important function in the resolution of land disputes, expert results, and providing evidence, for example, in connection with the demarcation of country borders, they create maps of property and land in general with high accuracy, which is a necessary basis in the process of real estate registration and obtaining ownership rights (8). The land surveyors are responsible for bringing the document establishing the ownership right into harmony with the actual circumstances (Pylaeva, A.V., 2020). A land information system can be created with cadastral programs and digital maps, which are collected in geoinformation systems (GIS) (Tanawijaya H., Velisia, M., 2022). Surveying activity is of such great importance, both in legal and other sciences, that in many developed countries the profession of surveyor requires legal education (Ronald, L., Williams, SR/WA). The government of Georgia carries out systematic registration of rights to land plots free of charge (12). The process of registration of ownership rights and changes in registered data on plots of land located in different geographical areas or within the scope of a project of special state and public importance is ongoing on a proactive basis (13, Article 2). Along with the establishment of the National Public Registry Agency, the legal importance of systematic registrations has increased, especially in such geographical units where there is an overlapping situation in the registered data, which becomes the basis of legal disputes between the owners, and in this process, the land surveyor and advanced GPS technologies play a decisive role. It is the Surveyor's Institute that provides the field digitization of agricultural land as an object, the preparation of documents necessary for the registration of ownership rights, and the specification of geographical boundaries (Navratil G., Frank U.A., 2004). Systematic registration is also a legal mechanism for obtaining ownership rights for legitimate owners (15, Article 4). Within the framework of systematic registration, a social context is provided for citizens, which implies a subsidy of the registration fee. Surveyor and GPS technologies have an advanced role in the process of effective implementation of systematic registration, protection, and realization of the rights of the true owner and owner (16, Article 2).

Measuring Challenges in Georgian Legal Reality

There is no separate legal order for surveying activities in Georgia. The surveyor's rights and duties are not sufficiently regulated at the normative level but are scattered in various articles in orders or separate normative acts, for example, order #1-1/410 of the Minister of Economy and Sustainable Development of Georgia dated August 3, 2016, where it is determined that the surveyor is signed in writing with the interested person. The person acting based on the contract, who is responsible for the preparation of the cadastral survey drawing. Of course, the above will not be enough to establish the legal order of rights and duties of the surveyor's institute. Foreign countries dedicate separate normative material and legal frameworks to the order of this institution and define the rights and duties of surveyors. For example, in Germany, there is a special law about land surveying and land cadastre production, the normative content defines that a national land survey must be carried out, which means whether, for example, the registration object requested by a private owner corresponds to the state interests, land cadastre production is also carried out in the context of

conducting property surveys Determining the time and boundaries of buying and selling is mandatory, and the processes are produced in geoinformation systems (17, 2004). The legislation of Georgia does not require the surveyor to be involved in the process of the agreement of the parties or to verify such an agreement, however, in the Netherlands, like France, the surveyor has the right after the field survey when the object is measured and then the geometric relationship is adjusted in office conditions through geoinformation systems (GIS), the decision of the parties will be verified and recorded by the surveyor even (Wakker J.W., Van der Molder P., Lemmen C., 2003).

GPS in Surveying Cadastral Boundaries and Updating Maps

In Holland To effectively process information about the rights of the owners and the plot, the cadastral and land registry agencies are separate institutions (Wakker J.W., Van der Molder P., Lemmen C., 2003), that is, they divide the registration process into cartographic and administrative activities, which ultimately serve one purpose. The administrative database contains the essential legal and administrative information of any land plot, and the cadastre ensures the alignment of geoinformation systems and cadastral survey drawings of the plot with administrative data (20). There is no separate legal framework for cadastre. Since the introduction of the land register and cadastre in Holland in 1832, all changes to the cadastral map have been preserved in the geoinformation system of the land plot (Gurung P., Kafle R., Khadgi P., Adhikari S., 2021). Map updating is related, for example, to the agreement of the parties on the location of new boundaries, when the surveyor measures new boundaries establishes the coordinates of new boundaries brings them into correspondence with topographic objects, and determines objects located on the ground (Hagemans, Unger, Soffers, Wortel, 2022). At the beginning of the 19th century, one of the tools used by surveyors was a chainsaw, and today the latter has been replaced by GPS devices, which are managed by RTK-kinematic servers, which means real-time coordinate digitization. The RTK method works to ensure the accuracy of the GPS. The location of objects is determined by coordinates (23), according to already registered digital cadastral data The surveyor can determine the actual (coordinates) with a GPS device (Safrei, Nugroho, Qudas, 2018). GPS technologies are integrated into any digital device, but in surveying activities, positioning is done through at least two satellite GPS receivers, one for measuring the baseline and the other for measuring the actual distance and location of the position (Meng Fanjing, 2020).

Resolving land use conflicts is a complex process, during disputes it is necessary to analyze spatial data, which is carried out through GIS, however, to ensure the accuracy and reliability of GIS data, GPS technology is necessary, which is an advanced tool for collecting, verifying and updating spatial data. The legislation of Georgia does not provide a clear record that only licensed persons can carry out surveying activities because, in the archive records of the National Agency of Public Registry, there are several registration documents and cadastral surveying drawings, which are stored by an unlicensed person, improperly (mobile phone or so-called handheld GPS) is made with a measuring tool.

Conclusions

Systematic registration of rights to immovable objects is an important process for securing property rights, which ensures the social function of the land. A historical review of the surveyor's institute highlighted the relevance of this profession from the earliest times.

The article outlined the need to develop a legal framework for surveying activity in Georgia, which defines the surveyor's rights and duties and licensing rules.

GPS systems play a crucial role in determining land boundaries and in the context of collecting accurate cadastral data, so it is important to use GPS and RTK land surveying methods in all surveying activities.

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