The Land surveyor and the GPS in the context of systematic land registrations

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DOI: https://doi.org/10.62343/cjss.2024.252

ABSTRACT

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

Keywords: *systematic registration, property rights, surveyors' institute, legal framework, surveying activities, cadastral data*

INTRODUCTION

The Institution of Surveyors has played a crucial role in the process of land privatization and the operation of an entire regime of property rights over land in Georgia since the country gained independence and continues to do so today. In recent decades, the importance of this profession has grown significantly with the introduction of systematic registrations of rights to real estate. The Surveyor Institute is instrumental in determining accurate cadastral data. It should be noted that surveyors primarily operate as subjects of private law, and a comprehensive definition of their rights and duties is unfortunately absent from the current legislative framework in Georgia.

This paper provides insights into how the Surveyor Institute and GPS systems address legal challenges in the systematic land registration process. It reviews the role of the Surveyor Institute and the existing legal situation in Georgia, aiming to establish the need for a regulatory framework governing surveying activities. The article highlights aspects of the Surveyor 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 3,000 years and is 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. 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, 1994, p. 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; and Job 24:2 (Holy Bible, 2nd ed.).

In Europe, in the 18th century, a survey method known as "triangulation," which relied on measuring angles, was used to network various communications (ICSM, n.d.). During the early days of the colonization of Australia and New Zealand, different methods were employed to determine geographical data, including the measuring wheel, Gunter's chain, and compass. Surveyors performed this task, numbering the country's perimeter (Hallmann, 1994). However, over time, outdated methods such as the so-called "Bafta" and others have been replaced by GPS systems (e.g., 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 registering rights to real estate, one of the important aspects is the land survey, which takes into account the interests of both the buyer and the seller. For example, from the 20th century to the present day, the functional role of the surveyor's activity in the USA has not changed: determining the boundaries of the land-land survey-which establishes the geographical boundaries of the property. This process is necessary to avoid future neighborhood disputes due to overlapping borders. Through advanced technology and methodology, a land 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, 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 creating a topographic map, an essential component of construction permit documentation (U.S. Department of the Interior, 1973, pp. 144–222). Moreover, land surveyors have an essential function in the resolution of land disputes by providing expert results and 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 (McNeil, 1992). Land surveyors are responsible for bringing the document establishing the ownership right into harmony with the actual circumstances (Pylaeva, 2020). A land information system can be created with cadastral programs and digital maps collected in geoinformation systems (GIS; Tanawijaya, 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, 2008, p. 31). The government of Georgia carries out systematic registration of rights to land plots free of charge (Roland, 2015, p. 35). 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 (Article 2 of the Law of Georgia on the Method of Systematic and Sporadic Registration of Rights to Land Plots and Perfection of Cadastral Data, 2020).

With the establishment of the National Public Registry Agency, the legal importance of systematic registrations has increased, especially in geographical areas where there is an overlapping situation in the registered data, which becomes the

cause of legal disputes between owners. In this process, the land surveyor and advanced GPS technologies play a decisive role. The Surveyor's Institute provides the field digitization of agricultural land as an object, the preparation of documents necessary to register ownership rights, and the specification of geographical boundaries (Navratil, 2004, pp. 471–486). Systematic registration is also a legal mechanism for obtaining ownership rights for legitimate owners (Article 4 of the Law of Georgia on the Method of Systematic and Sporadic Registration of Rights to Land Plots and Perfection of Cadastral Data, 2020). Within the framework of systematic registration, a social context is provided for citizens, which implies a registration fee subsidy. Surveyors and GPS technologies play an advanced role in effectively implementing systematic registration, protecting and realizing the rights of the true owner (Article 2 of the Law of Georgia on Public Registry, 2020).

Measure challenges in Georgian legal reality

There is no separate legal framework for surveying activities in Georgia. The surveyor's rights and duties are not sufficiently regulated at the normative level. Instead, they are scattered across various provisions in orders or separate normative acts. For example, Order No. 1-1/410 of the Minister of Economy and Sustainable Development of Georgia, dated August 3, 2016, specifies that the surveyor, acting based on a written contract with the interested party, is responsible for preparing the cadastral survey drawing. However, this alone is insufficient to establish a comprehensive legal order for the rights and duties of surveyors. In foreign countries, separate normative materials and legal frameworks are dedicated to regulating this profession and defining surveyors' rights and duties.

For example, there is a special law regarding land surveying and cadastre production in Germany. The normative content stipulates that a national land survey must be conducted to ensure that, for example, the registration object requested by a private owner aligns with state interests. Land cadastre production is also carried out in the context of conducting property surveys, where determining the time and boundaries of buying and selling is mandatory. These processes are managed using geoinformation systems (VermG, 2004). In contrast, Georgian legislation does not require the surveyor to be involved in the agreement process between parties or to verify such agreements. However, in the Netherlands, like France, the surveyor has the right to verify and record the parties' agreement after conducting a field survey and adjusting the geometric relationships in office conditions using geoinformation systems (GIS) (Wakker, 2003).

GPS in surveying cadastral boundaries and updating maps

In the Netherlands, to effectively process information about the rights of owners and land plots, the cadastral and land registry agencies are separate institutions (Wakker, 2003). They divide the registration process into cartographic and administrative activities, ultimately serving one purpose. The administrative database contains essential legal and administrative information about any land plot. At the same time, the cadastre ensures the alignment of geo-information systems and cadastral survey drawings of the plot with administrative data. There is no separate legal framework for the cadastre. Since the introduction of the land register and cadastre in the Netherlands in 1832, all changes to the cadastral map have been preserved in the geoinformation system of the land plot (Gurung, 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, 2022). At the beginning of the 19th century, one of the tools used by surveyors was a chainsaw; today, this has been replaced by GPS devices, which are managed by RTK-kinematic servers, enabling real-time coordinate digitization. The RTK method ensures the accuracy of GPS measurements. According to registered digital cadastral data, the location of objects is determined by coordinates (Amerisurv, 2021). The surveyor can determine the actual coordinates with a GPS device (Safrei, 2018). GPS technologies are integrated into many digital devices; however, 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, 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 as an advanced tool for collecting, verifying, and updating spatial data. The legislation of Georgia does not explicitly require that only licensed persons can carry out surveying activities. This is evident from the archive records of the National Agency of Public Registry, where several registration documents and cadastral survey drawings are stored, having been created by unlicensed persons using improper tools (e.g.).

CONCLUSION

Systematic registration of rights to immovable objects is an essential process for securing property rights and ensuring the social function of the land. A historical review of the Surveyors' Institute has highlighted the relevance of this profession from the earliest times.

GPS systems play a crucial role in determining land boundaries and collecting accurate cadastral data. Therefore, it is essential to implement GPS and RTK land surveying methods in all surveying activities.

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