UDC 349.414(477):528:378

OVERCOMING THE SOVIET LEGACY IN LAND SURVEYING AND TOPOGRAPHIC-GEODETIC ACTIVITIES IN UKRAINE: TERMINOLOGICAL UNIFICATION, REFRAMING OF SCOPE AND INSTITUTIONAL INTEGRATION

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Abstract. *The article develops an integrated framework for overcoming post-Soviet inertia in the interaction between land management and topographic–geodetic activities in Ukraine. It demonstrates that the Soviet educational–professional tradition narrowed geodesy to measurement-centric engineering practices while marginalizing the European understanding of land management as a project- and law-driven activity that designs boundaries and regimes of land use with direct legal consequences. Drawing on international frameworks (FIG, CLGE, INSPIRE, LADM), current Ukrainian legislation, and the author's long-term observation of professional debates on social media, the study substantiates: (1) the need for terminological unification (surveyor as a generic term, with clear distinctions between land/cadastral surveyor and engineering/topographic surveyor; geodesist is not a synonym for surveyor); (2) a reframing of functional roles whereby topographic–geodetic work is an infrastructural instrument enabling value creation across other sectors, whereas land management directly creates new real-estate objects and planning structures and governs asset value through RRR (rights–restrictions–responsibilities) approaches; and (3) institutional integration of data and processes based on INSPIRE/LADM semantic models. The paper identifies*

structural drivers of the perceived "crisis" after 1991—namely, the sharp decline of state demand for "centralized geodesy" and the technological automation of measurements (GNSS, satellite and aerial imagery, UAVs, GIS). It proposes the modernization of higher education under specialty G18 ("Geodesy and Land Management") via interdisciplinary curricula (geodesy × land management × cadastre × spatial planning × real-estate valuation), the adoption of semantic data models and ethics with procedures ensuring public trust in boundaries, and sustained professional communication as a mechanism to eliminate legacy, Soviet-rooted conflicts between communities.

Keywords: *land management; geodesy; topographic-geodetic activities; cadastre; boundaries; RRR (rights-restrictions-responsibilities); INSPIRE; LADM; terminology harmonization; professional qualifications; NSDI; institutional integration; spatial planning; real-estate valuation.*

Introduction

The formation and interaction of two related yet methodologically distinct fields—land surveying and topographic–geodetic activities—in Ukraine unfolded under the decisive influence of the Russian imperial and Soviet educational–professional tradition. This legacy produced a long-standing institutional and conceptual disconnect between the fields which, under European integration and the modernization of state spatial data, generates both practical and terminological contradictions. Paradoxically, within a segment of the engineer–geodetic "old school" there persists a tendency to look down on land surveyors (zemlevporiadnyky) and to ascribe to them "blame" for systemic problems of the geodetic sector. Such a reductionist view of land surveying as an "auxiliary" or "simplified" variety of measurements reflects not only professional stereotypes but also a deeper epistemic divergence: engineering geodesy is oriented predominantly toward measurements and construction tasks, whereas land surveying is primarily a project-driven activity concerned with the creation and regulation of boundaries—

foremost the boundaries of in-rem rights to land, but also the boundaries of administrative, functional, ecological, and other zones.

A key precondition for conflict has been the artificial narrowing of the historical–theoretical foundation of land surveying in Soviet and Russian higher education: systematically ignoring the European tradition of land surveying (traced at least to the Roman agrimensores), curricula focused on a limited repertoire of practices formed within the Russian Empire and the USSR. As a result, a false thesis emerged regarding the "Soviet" origin of land surveying and its alleged absence in "Western" models, whereas in the international context precisely the institutions of land-use planning, the cadastre, and boundary design constitute the core of the professional activity of many practitioners whom the English-language literature subsumes under the term "surveyor."[1] Unfortunately, the gap between European–global approaches and local traditions distorted by the Soviet legacy has led many engineer–geodesists (inzhenery-heodezysty) to remain unintegrated into the legal, economic, and project contexts of land surveying, restricting their understanding of the latter to measurement procedures alone..

A separate terminological issue requires resolution. In Ukrainian professional usage, "surveyor" is often mechanically rendered as heodezyst, which is methodologically incorrect. Surveyor is a generic term for a broad class of professionals in surveying and spatial regulation; its practical use requires specification by functional specialization. In particular, land surveyor and cadastral surveyor in most cases correspond to the Ukrainian zemlevporiadnyk (a specialist who designs and legally formalizes boundaries, ensures cadastral data capture, and reconciles spatial decisions), whereas engineering roles such as engineering surveyor

[1] Etymologically, surveyor derives from Anglo-Norman surveiour (sur "over, above" + veoir/voir "to see"; Latin supervidēre), and thus literally denotes "one who oversees/inspects from above," i.e., a specialist in inspection, examination, and field investigations. The closest literal Ukrainian counterpart is "vyshukuvach" (фахівець із вишукувань — "fakhivets iz vyshukuvan"), which aligns with the established term "inzhenerni vyshukuvannia" ("engineering investigations"). At the same time, surveyor is a generic designation for a broad cluster of professions and is not identical to "heodezyst" (геодезист — a specialist in geodesy as the science of the figure of the Earth, reference systems, and precise measurements). Therefore, correct translation requires functional specification: land/cadastral surveyor → "zemlevporiadnyk/kadastrovyı inzhener"; engineering surveyor → "inzhener-heodezyst (na budivnytstvi)"; topographic surveyor → "topohraf." By contrast, non-geodetic meanings—building surveyor (інспектор з будівельних обстежень — "inspektor z budivelnykh obstezhen") and quantity surveyor (фахівець з кошторисів — "fakhivets z koshtorysiv")—do not pertain to geodesy at all. Accordingly, the "literal" rendering "vyshukuvach" is acceptable only as a generic label; in practice, the profile should be specified each time to avoid semantic distortion.

or specializations in topography and construction are appropriately rendered as inzhener-heodezyst and topohraf, etc. Mistranslations lead to errors in standards, curricula, and regulation, complicating cross-sector communication and reducing the compatibility of Ukrainian practice with European norms.

The essence of the problem lies in the persistence of terminological and educational matrices that reproduce Soviet-era conceptions and separate the land-surveying and topographic–geodetic spheres instead of integrating them in a complementary manner. Practical consequences include competence conflicts, low interoperability between cadastral and topographic datasets, fragmentation of standards and duplication of functions, as well as sluggish updates of educational programs in line with European frameworks. Accordingly, the problem has both theoretical and applied dimensions, and its solution presupposes a combination of historical–conceptual analysis with proposals on terminology, standardization, and the renewal of educational practice.

Review of Recent Research and Publications

The state of scientific and normative thought in the field of land surveying and topographic–geodetic activities is determined, on the one hand, by international professional bodies of knowledge (FIG, CLGE, UNECE, FAO, ISO, European Commission/INSPIRE) and, on the other, by Ukraine's national law and educational standards. Foundational FIG documents fix a broad, interdisciplinary understanding of the profession: "surveyors" are not confined to engineering geodesy, but encompass the cadastre, land-resource management, GIS, real-estate valuation, planning, and territorial administration [1; 4–7]. This stands in direct contrast to the common narrowing, in post-Soviet practice, of the geodesist's role to construction-oriented surveying.

The European dimension is specified by CLGE documents, which clarify the professional functions of the "European Geodetic Surveyor," ethical foundations, and requirements for cadastral practice. They show that in European jurisdictions a substantial share of surveyors' activity is, in Ukrainian terms, land surveying and cadastral work (demarcation/restoration of boundaries, rights, and restrictions, and

ensuring public trust in the results) [2; 3; 8]. This reinforces the thesis that mechanically translating “surveyor” as “heodezyst” without contextual specification (e.g., land/cadastral surveyor) is methodologically incorrect.

At the fundamental–conceptual level, the research framework is shaped by FIG initiatives on modernizing cadastral and land-administration systems: the FIG Statement on the Cadastre (1995), the visionary Cadastre 2014 and its analytical continuation Cadastre 2014 and Beyond, as well as the Fit-for-Purpose Land Administration approach jointly developed by FIG and the World Bank. These works demonstrate a transition from a carto-centric paradigm to one oriented toward rights and geodata (the RRR model of rights–restrictions–responsibilities, the role of public-law restrictions, gradual enhancement of accuracy, etc.) [4–7].

International guidelines by the UN/UNECE and FAO form the socio-legal context: the Land Administration Guidelines emphasize the role of land-administration systems as infrastructure for the land market, taxation, planning, and rights protection, while the Voluntary Guidelines on the Responsible Governance of Tenure enshrine rights to ownership/use as an element of human rights and food security [8–9]. These frameworks underpin leading reforms and constitute the point of departure for adapting terminology and practice in Ukraine to European and global standards.

The EU systematically harmonizes cadastral data via INSPIRE. The Technical Guidelines for the “Cadastral Parcels” theme set common requirements for data models and access services—crucial for aligning Ukraine’s national spatial data infrastructure (NSDI) with European specifications and for correctly mapping the concepts of “cadastral parcel,” “boundary,” “identifier,” etc. [10]. Complementarily, ISO 19152-1:2024 (LADM, 2nd ed., Part 1) provides a universal conceptual model (parties, RRRs, spatial units) that ensures semantic compatibility and interoperability between registry/cadastral and topographic data [11].

Ukraine’s legal framework institutionalizes the differentiation between the domains: the Law of Ukraine “On Land Surveying” defines the project-and-law nature of land surveying (primarily boundary design and territorial organization),

whereas the Law “On Topographic, Geodetic and Cartographic Activities” regulates surveying, the creation of geodetic networks, cartography, etc. The Law “On the National Infrastructure of Geospatial Data” implements the European logic of harmonizing datasets and services, creating a bridge to INSPIRE and LADM [12–14]. Taken together, this confirms that within Ukraine’s national system land surveying and topographic–geodetic activities are related but not identical fields; conflicts often arise from terminological and role misunderstandings rather than from any “hierarchy” of professions.

Historically significant international declarations—the Bogor (1996) and Bathurst (1999) Declarations—consolidated the link between the cadastre, land administration, and sustainable development, formulated principles of reform, and moved the discussion beyond “accuracy and maps” toward the broader public value of the cadastre [15]. This likewise argues for function-specific translation of “surveyor”: in most European practice, a land/cadastral surveyor is primarily a specialist in land surveying/the cadastre, whereas an engineering/topographic surveyor represents other segments of the profession [1–3; 10–11; 15].

The objective of the study is the analytical identification and description of substantive, institutional, and terminological distortions in the interaction between land surveying and topographic–geodetic activities as consequences of Soviet educational and professional inertia artificially severed from the European and global context. The central tasks are: (1) to conceptually delimit the subject fields and delineate zones of their objective commonality; (2) to undertake a critical review of terminology with an emphasis on functionally correct Ukrainian equivalents of the English notions (surveyor, land/cadastral surveyor, engineering/topographic surveyor); (3) to identify educational and regulatory “points of shift” that sustain conflictual practices; and (4) to formulate the foundations for terminological unification and interdisciplinary integration necessary to improve the quality of spatial data, the effectiveness of land governance, and harmonization with European standards.

Materials and Methods

The material base comprises a corpus of international professional and normative documents and standards (FIG, CLGE, INSPIRE, ISO 19152-1 LADM, UN/UNECE and FAO guidelines) [1–11, 15–16], as well as current Ukrainian legislation in the domains of land surveying, topographic–geodetic and cartographic activities, and the national spatial data infrastructure (NSDI) [12–14], together with the historiography of professional practices in Europe and North America. An additional empirical layer consists of the author's extended non-reactive observations of public professional debates on social media, within which typical perceptions of the roles of the zemlevporiadnyk ("land surveyor/cadastral engineer") and the heodezyst ("geodesist") are reproduced. Taken together, these sources provide both a conceptual and a normative basis for comparative analysis.

Methodologically, the study combines: (a) documentary textual analysis (desk research) of international frameworks and technical specifications; (b) comparative-legal analysis of Ukrainian laws regarding subject matter, outputs, and zones of responsibility in land surveying and topographic–geodetic activities; (c) a historical–institutional approach to reconstruct divergences between European and Soviet traditions; and (d) political–institutional analysis to identify mechanisms for institutional integration of data and processes. All statements about post-1991 sectoral transformation are grounded in a juxtaposition of the content of normative acts and international approaches with fixed technological trends reflected in professional standards and publications.

A dedicated methodological block is devoted to terminological alignment. The key English concepts (surveyor; land/cadastral/engineering/topographic surveyor; geodesist) are operationalized via four criteria: the target product (geometry vs. legally effective boundaries), legal status and responsibility (RRR components), typical application context (cadastre/planning/construction), and technical means/accuracy regimes.

The study's limitations stem from its analytical–conceptual character: no quantitative surveys or experiments were conducted; the conclusions concerning the

post-1991 “crisis” follow from documentary comparison and observations of public debates and do not claim representativeness for all market sub-sectors. At the same time, reliance on standardized international frameworks (FIG, INSPIRE, LADM) and validation against national legislation minimizes interpretive bias and ensures the reproducibility of the analytical logic.

Results and discussion

Up to the eighteenth century, the territories of the Russian Empire did not develop a mature school of geodesy and cartography, which is explained by the absence of sustained demand for precise measurements and maps in civilian use. The European trajectory was different: the combination of a mathematical toolkit, military needs, and legally protected private property continuously reproduced demand for the establishment and restoration of boundaries, the fixation of land rights, and the creation of topographic bases for territorial governance. In medieval and early modern Europe, the plurality of jurisdictions and the judicial protection of property rights formed a market for professional services in measuring fields, roads, fortifications, and front lines; by inheritance from antiquity, trigonometric instruments—originating in astronomical applications—were integrated into terrestrial tasks of boundary delineation.

Within the imperial Russian context, for a prolonged period a model of weakly institutionalized private land rights prevailed, dominated by large state and landed-estate ownership. In the absence of legally protected smallholdings and a developed system of civilian boundary disputes, day-to-day demand for precise measurements was limited; this did not foster a stable civilian market for cadastral and land-surveying work. In the military sphere, strategies likewise prevailed for a long time that did not incentivize the development of a detailed topographic–geodetic infrastructure. A characteristic element of later Russian myth-making is the appeal to the “Tmutarakan Stone” and the attribution of early measurements to Prince Hlib (eleventh century); however, this reference lacks any continuous methodological or institutional connection with the formation of geodetic science in the Muscovite state, and its use as the “origin of Russian geodesy” is illustrative rather than evidentiary.

The institutional development of geodesy in the Russian Empire was in fact initiated largely through the “import” of specialists and knowledge from Western Europe and through the incorporation of scholarly cadres from annexed territories. A significant share of the earliest schools and practices was shaped by German, Dutch, and French specialists serving the needs of the military engineering corps. Illustrative are the biographies of leading figures—including Friedrich Georg Wilhelm Struve—as well as the involvement of Delisle, Knorre, Schubert, and others whose training and methods derived from the European scientific milieu. After the annexation of the Baltic, Poland, and Finland, imperial institutions acquired local scientific schools; some of their representatives entered imperial service, preserving professional standards and practices.

The wars of the eighteenth and nineteenth centuries stimulated the deployment of large-scale topographic work; however, in the twentieth century, after the abolition of private property in land, geodesy in the USSR became centralized, oriented toward defense needs, and subordinated to a secrecy regime. Parallel “public” and “military” cartographic products were produced; access to precise data was restricted, which hindered civilian applications. After 1945, “trophy” technologies and equipment removed from Germany played a significant role: the technical solutions of Soviet instruments (for example, the 2T30 universal theodolite) showed kinship with Carl Zeiss Jena T30 models; in constructive logic the Soviet 2T2 was close to the Wild Heerbrugg T2. In the 1960s–1970s, against the backdrop of rapid advances in electronic distance meters (EDMs) and tacheometers/total stations in Japan and the United States (Sokkia, Topcon, Geodimeter, Hewlett-Packard), Soviet models copied or reproduced a number of technical approaches that had already become international standards. In satellite navigation, GLONASS was created in line with the global concept proven by GPS, with engineering solutions closely aligned in design philosophy.

Soviet land surveying (zemleustrii), in turn, took shape within the logic of centralized agrarian policy and collectivization, which eliminated the land market and private incentives for rational land use. Intra-farm land surveying in kolkhozes and

sovkhozes functioned as an instrument for meeting plan targets and structuring production, rather than for the legal organization of ownership and boundaries. Core objectives—maximal expansion of arable land, consolidation of tracts, and priorities of gross output—systematically displaced environmental criteria, manifesting in the ploughing of vulnerable lands, landscape homogenization, and large-scale land-reclamation projects that risked soil degradation and disruption of hydrological regimes. In the absence of private property, the fundamental competencies of land surveying as a project-and-law activity (procedural evidentiary robustness of boundaries; integration of rights and restrictions into public registries) failed to develop adequately, resulting in significant institutional and terminological gaps during the transition to a market economy.

The European and Anglo-American trajectory of surveying emerged at the intersection of private land rights, military needs, and the exact sciences (see Table 1). Roman agrimensores, medieval practices of boundary establishment, the English Enclosure Acts, the later Napoleonic Cadastre, the Prussian and Austro-Hungarian cadastral reforms, and the Public Land Survey System (PLSS) in the United States—all these phenomena formed an institutional demand for a professional who combines measurement–geometric, legal, and project competencies. Within this paradigm, a substantial segment of surveying is, in substance, land surveying (boundary design and the legal formalization of boundaries and rights) rather than merely topographic–geodetic investigations.

Table 1. Comparative historical trajectories and implications for terminology

Period / Space	Europe / North America	Russian Empire / USSR	Terminological implication
Antiquity – Early Modern	Agrimensores; emergence of private rights; litigation over boundaries	Weak role of private rights; fiscal–military enumerations	“Surveyor” = boundaries + rights + measurement
18th–19th c.	Napoleonic cadastre; enclosure; professionalization of the cadastre	Centralized military–engineering surveys; state secrecy	“Surveyor” closer to “land surveyor (zemlevporiadnyk)”
20th c.	Urban cadastre; RRR models; valuation; planning	Abolition of private property; dominance of military tasks	“Geodesist (heodezyst)” narrows to engineering surveys
Late 20th –	INSPIRE, LADM; service-	Slow adaptation; inertia	Need for unification of

21st c.	oriented cadastral infrastructures	of the “geodesist/land surveyor” dichotomy	translations and roles

Note: the author’s own development.

By contrast, the Russian Empire and the USSR developed geodesy predominantly as a military–engineering instrument of the centralized state, with minimal role for private land rights. The abolition of private landownership in the USSR, the secrecy regime, and the dominance of military and construction tasks produced a different “genetics” of the profession: higher education focused on engineering geodesy (heodeziia), topography, and production technologies, while the historical and legal context of land surveying (zemleustrii), cadastral boundary design, and public-law restrictions was either marginalized or reduced. This structural divergence partly explains today’s terminological and role collisions.

These observations resonate with conclusions of the European professional community, notably the decisions of the Brussels (2005)[2] international conference on European professional qualifications in land surveying (zemleustrii) organized by FIG and CLGE, which recorded that “the surveying profession throughout Europe is changing from a main focus on surveying and measurement science to spatial science and land management dealing with the management of rights, restrictions and responsibilities in land, where the property systems and the legal issues are the core element.” It is hard to disagree: even in the near term, graduates of Ukrainian programs will face tasks such as designing consolidation projects for agricultural land, preparing comprehensive spatial development plans for municipalities, large-scale formation of public-law restrictions, cross-cadastre data integration, and professional servicing of the real-estate market. These are not “extended measurements,” but first and foremost the design of boundaries and use regimes with legal consequences that require public trust.

The Ukrainian context adds several essential emphases to this European frame. After the collapse of the USSR, demand for “centralized geodesy”—that which had lived primarily on state defense and construction–infrastructure tasks—declined sharply. Budgetary expenditures on cartography (historically oriented toward military

[2] https://www.fig.net/news/archive/news_2006/clge_december_2005.asp

needs) contracted, and with them the volume of work for state geodetic and cartographic enterprises. The sector, accustomed to “absorbing” funds under the logic of planned financing, proved unprepared for the signals of a market economy: where there is solvent demand, there is work; where there is no demand, no amount of “proper” technical argumentation will persuade policymakers. This is the first—macroeconomic—layer of causality behind the contemporary “crisis” as perceived by some practitioners.

The second layer is technological. GNSS and network positioning services, satellite and aerial imaging, unmanned platforms, laser scanning, modern cartographic software, and GIS have made the measurement and processing of geodata faster, more accurate, and cheaper. What yesterday required an entire surveying institute with hundreds of employees for a season is today performed by a small company in a few weeks. Moreover, a significant share of routine geodetic operations can now be correctly carried out by specialists from adjacent fields—construction, forestry, environmental protection, geology—without necessarily having a “classical” geodetic education. Consequently, the purely measurement component has lost its monopoly on uniqueness, and the principal added value has shifted to the design, interpretation, and legal validation of spatial decisions.

Against this backdrop, over the last three decades a land reform unfolded that multiplied the demand precisely for land-surveying (zemleustrii) work: the design and legal formalization of boundaries, populating the cadastre, reconciling rights, restrictions, and servitudes, and supporting transactions on the real-estate market. For a portion of engineer–geodesists (inzhenery-heodezysty) this created a cognitive dissonance: they saw that “something akin to geodetic surveys” was being performed by land surveyors (zemlevporiadnyky) and that there was plenty of work there, while classical topographic–geodetic tasks had contracted. Hence emerged the irrational claim that “land surveyors harmed geodesy.” In reality, these are different end products: the engineer–geodesist supplies high-quality geometry, whereas the land surveyor creates a legally effective boundary as an element of the public

infrastructure of rights (with appropriate procedures of reconciliation, evidentiary robustness, and provenance metadata).

A separate object of "critique" involves different accuracy tolerances: where engineering surveying in construction requires centimeter-level accuracy, in most land-surveying situations a meter-level error was often entirely acceptable—especially in the first decade of land reform—given the manner of actual parcel use and the economics of procedures. A field is not operated to centimeter precision; a tractor does not "see" the difference between 0.02 and 0.50 m, whereas the owner and the community clearly "see" the legal boundary and the absence of dispute—yet for a geodesist this is "unacceptable."

The root of the misunderstanding lies in Soviet educational inertia. For decades, technical universities cultivated a narrow engineering context—networks, surveying, construction, deformation monitoring—whereas the history of European land surveying (zemleustrii), property law, public-law restrictions, methods of boundary design, and the proving of boundaries in court remained marginal or were presented through the prism of imperial–Soviet experience. It is unsurprising that geodesists (heodezysty), immersed in the "fight for the millimeter," instinctively devalue the project-based nature of land surveying as "less precise" or "secondary." Yet the difference here is not one of the "quality" or "prestige" of work, but of their target logic: geodesy supplies the geometric foundation, while land surveying supplies the legal validity and social legitimacy of boundaries.

The terminological dimension is a key driver of professional disorientation. In Ukrainian usage, surveyor is often mechanically translated as heodezyst, whereas in most European jurisdictions surveying has, historically and functionally, encompassed not only measurement-engineering work but also what in Ukraine is designated land surveying (zemleustrii): the establishment and restoration of boundaries, work with rights, restrictions, and encumbrances, cadastral administration, and integration with registries and market services. The correct approach is functional differentiation: land/cadastral surveyor corresponds to the Ukrainian zemlevporiadnyk (or kadastrovyi inzhener, depending on the regulatory

context); engineering surveyor corresponds to inzhener-heodezyst (na budivnytstvi); topographic surveyor corresponds to topohraf; whereas heodezyst is a scientific–technical specialty in geodesy (the figure and dimensions of the Earth, reference systems) and is not a synonym for surveyor. Such clarification restores the professional meanings of the terms and removes artificial oppositions.

The terms land management and land governance require separate clarification, as they are often confused with land surveying (zemleustrii) or with "state administration in the sphere of land relations." Land management (управління земельними ресурсами) is the operational–applied level of organizing land use and protection: land-use planning, land surveying as boundary and regime design, cadastre maintenance, real-estate valuation, land reallocation and consolidation, data integration into the national spatial data infrastructure (NSDI; NIGD), and the support of transactions. Land governance (земельне врядування) is the broader institutional–political frame that encompasses the rules, institutions, procedures, and participation mechanisms through which decisions regarding access to land, the allocation of rights and responsibilities, dispute resolution, and accountability are made and implemented. Thus, land governance sets the "rules of the game" and guarantees public trust, while land management implements these rules through the instruments of planning, the cadastre, and boundary design.

It follows that equating land management with land surveying (zemleustrii) is a reductionism. Land surveying is a key but not the only component of land management; it is responsible for boundary design and the legal validation of spatial decisions. Likewise, rendering land governance as "state administration" is incorrect: governance is not reducible to the activity of state bodies, but includes the interaction of all stakeholders (owners, communities, business, professional communities), procedures for transparency, appeal, and mediation, and standards of ethics and accountability. In Ukrainian terminology it is advisable to preserve the distinctions: "zemelne vriaduvannia" (land governance), "upravlinnia zemelnymy resursamy" (land management), "zemelne administruvannia" (land administration), and "zemleustrii" as a project-and-law instrument (see Table 2).

Table 2. English–Ukrainian equivalents and domains of correct usage

English term	Recommended Ukrainian equivalent (with transliteration)	Brief meaning	Usage caveats
Surveying	Вишукування / просторово-кадастрові вишукування (Vyshukuvannia / prostorovo-kadastrovi vyshukuvannia)	"Umbrella" field: measurement, boundary design, cadastre, cartography, GIS, incl. applied inspections and assessments	In technical contexts—"інженерні вишукування" (inzhenerni vyshukuvannia); in broader contexts—"вишукування (surveying)" with specification of the domain
Surveyor	Вишукувач (із уточненням профілю) (Vyshukuvach, iz utochnenniam profiliu)	Generic designation for a professional in surveying	Avoid the mechanical "геодезист" (heodezyst); functional specification is mandatory
Land surveyor	Землевпорядник / інженер-землевпорядник (Zemlevporiadnyk / inzhener-zemlevporiadnyk)	Boundary design and legal formalization; cadastral work	In most European practice corresponds to "zemlevporiadnyk"
Cadastral surveyor	Кадастровий інженер / землевпорядник (Kadastrovyi inzhener / zemlevporiadnyk)	Demarcation/restoration of boundaries; maintenance of cadastral data; RRR	Pronounced legal component and responsibility
Engineering surveyor	Інженер-геодезист (на будівництві) (Inzhener-heodezyst, na budivnytstvi)	Geodetic support to construction; deformation monitoring	Measurement-engineering profile; different accuracy objectives
Topographic surveyor	Топограф / інженер-геодезист (топографія) (Topohraf / inzhener-heodezyst, topohrafiia)	Topographic surveys; cartography	Predominantly measurement activity
Geodesist	Геодезист (Heodezyst)	Scientific–technical specialty (figure and size of the Earth; reference systems)	Not a synonym for surveyor
Chartered surveyor (RICS)	Сертифікований сюрвейєр (із галузевим уточненням) (Sertyfikovanyi siurveiier, iz haluzevym utochnenniam)	Broad field: from real estate to planning	Requires functional rendering by specialty
Boundary surveyor	Фахівець зі встановлення меж (землевпорядник/кадастровий інженер) (Fakhivets zi	Boundary design, restoration, and reconciliation	High requirements for public trust in results

	vstanovlennia mezh (zemlevporiadnyk/kadastrovyi inzhener))		
Land management	Управління земельними ресурсами (Upravlinnia zemelnymy resursamy)	Operational implementation of policies: land-use planning, land surveying as boundary/regime design, cadastre, valuation, consolidation, NSDI/NIGD	Not identical to “land surveying”; the latter is a component of land management
Land governance	Земельне врядування (Zemelne vriaduvannia)	Institutions, rules, procedures, and stakeholder participation; accountability and transparency	Do not reduce to “state administration”; broader than land administration

Note: the author’s own development.

The history of the profession’s development in the West further explains why this is so. Where private rights to land were a social norm and the courts protected boundaries, there was a constant demand for a professional capable of combining measurement precision with legal evidentiary robustness and project thinking. In the Soviet model, by contrast, private ownership was abolished, cadastral logic was replaced by administrative–command logic, and spatial data became restricted and “classified.” Geodesy naturally fused with the military–engineering complex and construction rather than with the cadastre and law. We are now reaping the consequences of this divergence: when markets and communities require boundaries as legal facts, an appeal solely to “high measurement accuracy” is insufficient—procedures of reconciliation, standards of proof, the semantics of rights and restrictions, and data models that integrate geodata, economics, law, and social aspects are needed.

Within the geodetic community, this is often emotionally reflected as a “loss of status” or a “betrayal of tradition.” It is easier to find a personal “culprit”—a land surveyor (zemlevporiadnyk) or a lawyer—than to acknowledge that structural conditions have changed: the economics of public finance, the structure of demand, the technological base, and societal expectations. In reality, what is at issue is a redistribution of roles within a shared spatial infrastructure. What Ukrainian practice needs is not a “war of professions,” but a clear division of responsibility and mutual

reinforcement: the engineer–geodesist (inzhener-heodezyst) ensures geodetic quality and the reliability of geometry; the land surveyor (zemlevporiadnyk) ensures the legal validity and social legitimacy of boundaries. Where these roles meet—in shared data and procedures—interoperability emerges, upon which modern cadastres, planning, and the real-estate market rest (see Table 3).

Scope of work of land surveyors and engineer–geodesists

Category	Land surveyor (land/cadastral surveyor; zemlevporiadnyk)	Engineer–geodesist (engineering/topographic; inzhener-heodezyst)	Points of intersection
Subject matter	Design/legal formalization of boundaries; establishment of rights, restrictions, and servitudes; territorial organization	Measurements, construction of geodetic networks, topographic survey, setting-out (staking-out), deformation monitoring	Field measurements and data exchange
Result	Cadastral–legal outcome (boundaries with legal attributes, RRR); land-surveying (zemleustrii) projects	Geometrically precise outcome (coordinates, terrain models, plans, maps)	Boundary markers, coordinate catalogs, topographic base for projects
Norms and models	Cadastral/land law, INSPIRE CP, LADM (RRR, parties, spatial units)	Technical standards of surveying, reference systems, accuracy, metadata	Interoperable data models
Instruments	GNSS, legal and cadastral procedures, owner reconciliation, public cadastres and registries, real-estate valuation	GNSS, tacheometry/total stations, leveling, photogrammetry, laser scanning	Shared quality and control schemes
Responsibility	Public trust in boundaries and rights; minimization of legal-dispute risk	Responsibility for measurement accuracy and geometry	Harmonized validation protocols

Thus, what is presented in debates as a “crisis of geodesy” is in fact a dual transformation: economic (a change in sources and the structure of demand) and technological (automation and the staffing of adjacent competencies), compounded by the need for terminological and educational rethinking. And the sooner we abandon Soviet narratives and mythology, the more easily we will integrate into

European practice, where surveying is above all the ordering of rights and boundaries, while precise measurements are its indispensable instrument.

Conclusions

The essence of the problem under examination is not a “war of professions,” but a systemic mismatch of roles and terms. In the Soviet period there was a deliberate narrowing of geodesy to engineering-measurement work and, at the same time, a separation of land surveying (zemleustrii) from its European “core”—work with land rights, boundaries, and public-law restrictions. This generated false “hierarchies” and conflicts.

Modern topographic–geodetic activity is an infrastructural instrument. By themselves, surveys, network construction, and deformation monitoring do not generate added value as an end product; rather, they enable its creation in adjacent sectors—construction, engineering, agriculture, environmental protection, transport, defense, and spatial planning. The quicker this instrumental nature is accepted, the easier it will be for the sector to position itself in the market. Land surveying (zemleustrii), for its part, is a project-based activity that forms assets and manages the value of land and territories. Precisely through design—including spatial planning—and the legal formalization of boundaries, the establishment of use regimes, and integration with registries, land surveying creates new real-estate objects and planning structures and manages asset value and transactional trust in markets.

The “crisis of geodesy” has structural, not personal causes. After the collapse of the USSR, the principal client for “centralized geodesy” disappeared, and technological progress radically reduced the labor intensity of measurement work. In parallel, land reform multiplied demand for land surveying (zemleustrii). Therefore, the post-Soviet “imbalance” is objectively explained by changes in demand and technology, not by the “errors” of land surveyors or lawyers.

The success of today’s graduates is determined by interdisciplinarity. Measurement alone is insufficient: the labor market best rewards combinations of geodesy with land surveying, cadastres, spatial planning, real-estate valuation, GIS/data, and legal competencies. Such curricula are the most in demand. The key to

resolving the problem is the modernization of higher education under specialty G18 “Geodesy and Land Surveying (Heodeziia ta zemleustrii)” and sustained professional communication. Without updating educational content and without ongoing dialogue between communities (shared standards, terminology, quality practices, ethics), conflicts will reproduce themselves.

The worst legacy to pass on to the young is imaginary conflicts rooted in the Soviet–Russian past. They demotivate, blur professional identities, and push students away from the productive collaboration that the modern spatial-data economy requires.

References

1. Council of European Geodetic Surveyors (CLGE). (2006). Definition of a geodetic surveyor. Availabte at: https://www.clge.eu/wp-content/uploads/2007/10/definition_of_geodetic_surveyor.pdf

2. Council of European Geodetic Surveyors (CLGE). (2009). Code of conduct for European surveyors. Availabte at: https://www.clge.eu/wp-content/uploads/2019/03/CLGE-GE-Code-of-Conduct-for-European-Surveyors.pdf

3. Enemark, S., Bell, K. C., Lemmen, C., & McLaren, R. (2014). Fit-for-purpose land administration (FIG Publication No. 60). International Federation of Surveyors (FIG) & World Bank. Availabte at: https://www.fig.net/pub/figpub/pub60/Figpub60.pdf

4. European Commission, INSPIRE Maintenance and Implementation Group (MIG). (2024, July 31). INSPIRE data specification on cadastral parcels: Technical guidelines. Availabte at: https://knowledge-base.inspire.ec.europa.eu/publications/inspire-data-specification-cadastral-parcels-technical-guidelines_en

5. Food and Agriculture Organization of the United Nations (FAO). (2012). Voluntary guidelines on the responsible governance of tenure of land, fisheries and forests in the context of national food security. Availabte at: https://www.fao.org/4/i2801e/i2801e.pdf

6. International Federation of Surveyors (FIG), Commission 7. (1995). FIG statement on the cadastre. Availabte at: https://www.fig.net/resources/publications/figpub/pub11/FIG%20Statement%20on%20the%20Cadastre.pdf

7. International Federation of Surveyors (FIG) & United Nations. (1999). The Bathurst Declaration on land administration for sustainable development Availabte at: https://www.fig.net/admin/ga/2000/pdf-files/pub-21.pdf

8. International Federation of Surveyors (FIG). (2004). FIG definition of the functions of the surveyor. Availabte at: https://www.fig.net/about/general/definition/definition.pdf

9. International Organization for Standardization (ISO). (2024). ISO 19152-1:2024 Geographic information — Land Administration Domain Model (LADM) — Part 1: Generic conceptual model. Availabte at: https://www.iso.org/standard/81263.html

10. Kaufmann, J., & Steudler, D. (1998). Cadastre 2014: A vision for a future cadastral system. International Federation of Surveyors (FIG). Availabte at: https://www.fig.net/resources/publications/figpub/cadastre2014/translation/c2014-english.pdf

11. Steudler, D. (Ed.). (2014). Cadastre 2014 and beyond (FIG Publication No. 61). International Federation of Surveyors (FIG). Availabte at: https://www.fig.net/pub/figpub/pub61/figpub61.pdf

12. United Nations Economic Commission for Europe (UNECE). (1996). Land administration guidelines with special reference to countries in transition. Availabte at: https://unece.org/DAM/hlm/documents/Publications/land.administration.guidelines.e.pdf

13. Verkhovna Rada of Ukraine. (1998, December 23). Pro topohrafo-heodezychnu i kartohrafichnu diialnist: Zakon Ukrainy No. 353-XIV [On topographic, geodetic and cartographic activities: Law of Ukraine No. 353-XIV]. Availabte at: https://zakon.rada.gov.ua/go/353-14

14. Verkhovna Rada of Ukraine. (2003, May 22). Pro zemleustrii: Zakon Ukrainy No. 858-IV [On land management: Law of Ukraine No. 858-IV]. Availabte at: https://zakon.rada.gov.ua/go/858-15

15. Verkhovna Rada of Ukraine. (2020, April 13). Pro natsionalnu infrastrukturu heoprostorovykh danykh: Zakon Ukrainy No. 554-IX [On the national infrastructure for geospatial data: Law of Ukraine No. 554-IX]. Availabte at: https://zakon.rada.gov.ua/go/554-20

16. Williamson, I., Enemark, S., & Wallace, J. (2010). Land administration for sustainable development. ESRI Press. Availabte at: https://eng.unimelb.edu.au/__data/assets/pdf_file/0004/3929728/land-admin-for-sustainable-development.pdf

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ПОДОЛАННЯ РАДЯНСЬКОГО СПАДКУ В ЗЕМЛЕУСТРОЇ ТА ТОПОГРАФО-ГЕОДЕЗИЧНІЙ ДІЯЛЬНОСТІ В УКРАЇНІ: ТЕРМІНОЛОГІЧНА УНІФІКАЦІЯ, ПЕРЕОСМИСЛЕННЯ ЗМІСТУ ТА ІНСТИТУЦІЙНА ІНТЕГРАЦІЯ

Анотація. *Стаття пропонує цілісну рамку подолання пострадянської інерції у взаємодії землеустрою та топографо-геодезичної діяльності в Україні. Показано, що радянська освітньо-професійна традиція звузила геодезію до вимірювально-інженерних практик і водночас маргіналізувала європейське розуміння землеустрою як проєктно-правової діяльності з формування меж та режимів користування, що мають юридичні наслідки. На основі аналізу міжнародних рамок (FIG, CLGE, INSPIRE, LADM), чинного українського законодавства та тривалих спостережень автора за професійними дискусіями у соціальних мережах обґрунтовано: (1) необхідність термінологічної уніфікації (surveyor як родове поняття, з розмежуванням land/cadastral surveyor → «землевпорядник», engineering/topographic surveyor → «інженер-геодезист/топограф», «геодезист» — не синонім surveyor); (2)*

переосмислення функціональних ролей: топографо-геодезична діяльність є інфраструктурним інструментом створення доданої вартості в інших секторах, тоді як землеустрій безпосередньо формує нові об'єкти нерухомості, планувальні структури та управляє цінністю майна через RRR-підходи; (3) інституційну інтеграцію даних і процесів на основі моделей INSPIRE/LADM. Визначено структурні причини «кризи» галузі після 1991 р.: різке скорочення державного попиту на «централізовану геодезію» та технологічна автоматизація вимірювань (GNSS, ДЗЗ, БПЛА, ГІС). Запропоновано модернізацію вищої освіти за спеціальністю G18 («Геодезія та землеустрій») через міждисциплінарні навчальні траєкторії (геодезія × землеустрій × кадастр × просторове планування × оцінка), впровадження семантичних моделей даних, етики та процедур публічної довіри до меж, а також розвиток постійних професійних комунікацій як механізму зняття уявних конфліктів між спільнотами.

Ключові слова: *землеустрій; геодезія; топографо-геодезична діяльність; кадастр; межі; RRR (права-обмеження-обтяження); INSPIRE; LADM; термінологічна уніфікація; професійні кваліфікації; НІГД/NSDI; інституційна інтеграція; просторове планування; оцінка нерухомості.*