

**Position paper of Geodesy Cartography and Cadastre Authority  
of the Slovak Republic about the issues examined in Priority No. 2  
“From Cadastre 2014 to Cadastre 2034”**

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**Abstract**

*Assessment of the achieved level of the cadastral system in Slovakia from the perspective of the ‘Cadastre 2014’ document. A vision of the future cadastral system in Slovakia until 2034. A concept of the real estate cadastre development as an important element of the harmonious progress in this sector. The necessity of continuous updating of the already adopted concept. The vision of the future cadastral system is analysed from two perspectives: a Pan-European perspective, integrative, expecting cross-border completion of all tasks and services of the cadastral systems of the European Union Member States and a national perspective, taking into account specific, particular, traditional, material, financial, legislative, personal, organizational, and other national conditions.*

**1. Assessment of the achieved level of the cadastral system in Slovakia from the perspective of the ‘Cadastre 2014’ document.**

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‘Cadastre 2014 – a vision for the future cadastral system’ is a remarkable, often discussed and cited document of the past 20 years. This document attracted considerable attention, initiated and provoked wide discussions. This document was also particularly important for several new EU member states in Central and Eastern Europe in the stage of arguing, selecting and deciding in favour of one cadastral system, which in these countries followed the stage of centrally controlled economy and its transition to a market economy. At present it is also an impulse for the creation of a new vision for the next 20 years.

At a district level cadastral authorities in Slovakia with their 72 departments administer 3559 cadastral districts. As of 10.1.2014 there were 7,111,951 parcels registered as C-register parcels in the real

estate cadastre, of which 5,494,638 (78.71%) with ownership relation entered in the ownership document. 1,617,313 of the remaining parcels are mainly merged agricultural or forest lands or parcels with another configuration than were the original real estates. These parcels are within the ROEP compilation examined and rights relations are established (so-called E-register parcels). As of 10.1.2014 there were 8,081,043 such E-register parcels with established ownership relations that are administered on the ownership documents in the real estate cadastre.

Quantification of the achieved level of real estate cadastre (hereinafter the "Cadastre"), administration to a specific date is best expressed by the combination of assessment of technical condition level of the core component of the cadastral documentation - the cadastral map (more correctly, the whole cadastral geodetic data file) to the date of the examination and evaluation of contemporary levels of functionality of the cadastral authorities. Ensuring of individual types of a specific type of administrative procedure – the cadastral proceeding, which have their procedural deadlines set at a level of generally legally binding regulations.

Assortment of composition of cadastral maps to 1.1.2014:

- a) cadastral maps in imperial scales (Hungarian coordinate systems) 33.9% of the territory
- b) cadastral maps in metric scales (horizontal datum of unified trigonometric cadastral network S-JTSK) 66.1% of the territory. [3]

In practice it represents an administration of 4,149 files of vector cadastral maps (hereinafter the "VKM") in the following segmentation:

- 1,796 files of numerical vector cadastral maps (hereinafter the "VKMč"),
- 1,894 files of transformed non-numerical vector cadastral maps (hereinafter the "VKMt") with the synchronic administration of adopted measurement files (hereinafter "SPM"),
- 459 files of non-numerical vector cadastral maps with implemented numerical results (hereinafter the "VKMi").

The number of individual vector map files and their classification may change due to further gradual registration of other land consolidation projects (hereinafter "PPU"), possibly as a result of the reclassification of map updating methods.

Proceedings under the Act no. 180/1995 Coll. on some measures for land ownership arrangements (creation and entry into the registers of renewed land evidence - ROEP) are in the nationwide scope just before their end. To 1.3.2014 there are 233 registers to be finished.

Proceedings under the Act no. 330/1991 Coll. on land consolidation, ownership right arrangement, land offices, land resources and land communities - creation and registration of PPU in the cadastre is a long term continuous task. To 1.1.2014 land consolidation projects of 260 cadastral districts (full or partial) as well as simple land consolidation projects of 36 cadastral districts were entered in the cadastre.

From the perspective of the functionality of the Cadastre the most important achievement is a sustained target status which is the functioning of local government authorities in the area of the cadastre - and thus achieving and guaranteeing of countrywide long term comprehensive functionality of all 72 cadastral authorities in all the various tasks stipulated by generally legally binding regulations and sanctioned by procedural deadlines arising from the following acts and regulations:

- The Act no. 162/1995 Coll. on the real estate cadastre and entering of ownership and other rights to real estates (hereinafter the "Cadastral Act"), as amended,
- The Act no. 215/1995 Coll. on geodesy and cartography (hereinafter the "Act on GaK"), as amended,
- The Regulation of Geodesy, Cartography and Cadastre Authority of the Slovak Republic (hereinafter the "UGKK SR") no. 461/2009 Coll., implementing the Act on the real estate cadastre and entering of ownership and other rights to real estates, as amended (hereinafter the "Regulation on the KN")
- The Regulation of the UGKK SR no. 300/2009 Coll., implementing the Act on geodesy and cartography (hereinafter the "Regulation on the GaK"),
- The Regulation of the UGKK SR no. 157/1996 Coll., implementing the Act on some measures for land ownership arrangements, as amended,
- The Regulation of the UGKK SR no. 22/2010 Coll., issuing the Administration of regulation for cadastral offices and cadastral registries.

Periodic evaluation of this functionality allows monitoring the functionality development on the time axis and to compare the functionality of individual cadastral authorities among each other in the Slovak Republic, so that it will be possible to adopt the necessary correctives according to the assessment periods (in the field of personnel building, instrument building, technological and methodological guidance and in other fields as well) to achieve sustained target status. The common denominator of selected core tasks is to support building up of a legally consistent state, increasing the legal confidence of owners and other authorized persons and development of the real estate market as an integral part of the market economy.

### **1.1 Commentary to the selected points of the "Cadastre 2014 - a vision for the future cadastral system " document from the Slovak perspective**

This document was designed on the basis of a coherent questionnaire dispatched to cadastral authorities. Thorough analyses of 31 responses of the cadastral authorities from around the world allowed precise defining of the initial state of the investigated aspects of cadastral systems up to the middle of nineties of the last century. Here is presented a set of selected most interesting questions with related answers and comments of the Slovak cadastral authorities.

- **basic elements of the cadastral system:** registration is based on title – contribution of right into cadastre; a unit of the cadastre is a lot/parcel; legal basis is civil law in conjunction with administrative law; registration of property rights is compulsory for all transfers of ownership rights and other tenure (creation, modification and termination of rights) implemented under a contract – treaty; registration is based on adjudication process of the cadastral authority;
- **basic legal aspects of the cadastral system:** legal force of registration has negative effect (unregistered rights are assumed to be non-existent) - the property right, in addition to the contribution of right to the cadastre, may be created, modified or terminated by the so- called recording of right, which itself has legal effects and in this case the entry of right into the

cadastre has register nature only (e.g. by law, court decision, etc.); legal force of registration has positive effect (registered rights are assumed to be correct) - information on the property rights and selected technical data on properties are for each bona fide participant plausible and binding, unless proven otherwise (e.g. a court decision); one who knew about errors or other inaccuracies in cadastral data cannot rely on these data; protection of individual rights by registration is secured by legal status of authenticity and binding force of cadastral data whilst protecting the personal data of the owner and other authorized person in the cadastre; state liability for damage caused by incorrect registration in the cadastre is guaranteed by law; the cadastre among other things, includes land registration and potential new cadastral mapping as well; cadastral maps are part of the cadastral documentation, they form a core component of geodetic data files and cover the whole territory of Slovakia; a subject of registration rights in the cadastre is also other tenure (an easement, encumbrance, a lien, right of refusal if it has effects of tenure); a legal value of boundaries (boundary break points) depends on the numerical determination of break points coordinates and in the case of non-numerical determination on cadastral maps.

- **a link to topographic mapping and completeness of the cadastre:** in Slovakia there is a technical, legal and organizational link between cadastral and topographical mapping; the cadastre covers the whole territory of jurisdiction; the cadastre is of complete character, i.e. the lots – parcels are introduced in the cadastre in a systematic way.
- **responsibility for planning and control in the cadastral system:** strategic planning and management control for registration of rights to lots (in wider sense to real estates) and also for cadastral mapping were concentrated until 30.9.2013 in one public institution (Geodesy, Cartography and Cadastre Authority of the Slovak Republic - central state administration body). Since 1.10.2013, on the basis of the Act no. 180/2013 Coll. on organization of the local government, the competence of cadastral registries was moved to the district office cadastral departments, which are not directly subordinated to the Geodesy, Cartography and Cadastre Authority of the Slovak Republic in the organizational structure. The competence of the district office in the area of real estate cadastre is prescribed by the Act no. 180/2013 Coll. on organization of the local government and the Cadastral Act. The county district office carries out state administration of the second stage in the matters in which the administrative proceedings are decided in the first stage by the district office, which is located within the territorial jurisdiction of a county; if in the first stage it is the county district office itself which decides, in the second stage state the administration is carried out by the county district office. State administration in the field of cadastre that is carried out by district offices is managed and controlled to the extent provided by special laws by the Geodesy, Cartography and Cadastre Authority of the Slovak Republic. Advantages, disadvantages and complex functionality of this new organizational structure in the field of cadastre is closely monitored and evaluated.
- **responsibility for managing and control of the cadastral system:** strategic planning, management control and operational control of the real estate registration and cadastral mapping have been in the competence of one state administrative organization, despite the fact that personal and economic aspects of the management, since the adoption of the Act no. 180/2013, have been separated and thus complicated; this new state has been closely monitored and its advantages and disadvantages are being evaluated.

- **purposes served by the cadastre:** the cadastre in Slovakia serves mainly the legal purposes such as the protection of rights to real estate, tax purposes, fee purposes, valuation of properties - parcels in particular, protection of agricultural land resources and forest land resources, formation and protection of the environment, protection of mineral resources, protection of national cultural heritage and other cultural sites as well as protected areas and natural formations and for building-up other information systems on real estates. In principle, the cadastral data base represented in particular by the geodetic data file and the descriptive data file is publicly available (apart from exceptions defined by law) and serves either directly a large number of targets or indirectly as a basis for creation of other territorially-oriented information systems.
- **strengths and weaknesses:** to the strengths of the cadastral system in Slovakia belong: state guarantee of the “title” (contribution of ownership right and other tenure in the cadastre) and legal security in the case when it’s proven the wrongdoing or misconduct of cadastral authority; quick service to the client; complete coverage of the national territory by cadastral documentation; complexity, responsibility and safety of the system; automated electronic management of the system; digital data; the system also serves other purposes e.g. as a base for other information systems on territories, the possibility of integration with other systems; land registration and cadastral mapping in a single organization; a legal basis of system activity; a good foundation for new cadastral mapping and thematic mapping of the relevant scale; a sufficiently decentralized system; a structured system; a system involving private sector; a system suited to the economy; a system with centralized management. The weaknesses of the cadastral system in Slovakia can include: a low budget; differentiated (as well as low) accuracy of maps; inflexible system in adapting to the market; since 1.10.2013 an impaired pyramidal organizational structure and hence a liability structure.
- **reform objectives:** recently, the following implemented cadastral reforms in Slovakia can be described as very important: client service improvement; improving the data quality in terms of their updates and in terms of their reliability/accuracy; opening up to possibilities of multipurpose cadastre; considering the economic aspect of the cadastre, greater private sector involvement.
- **technical trends:** development of the cadastre in Slovakia was significantly affected by the following technical trends: system automation, scanning, digitizing, networking, the application of global navigation satellite systems (GNSS) in geodetic measurements.
- **legal trends:** recently, in the cadastral conditions in Slovakia new legislation, a new financial model and increased involvement of the private sector have been applied.

## **1.2 Commentary to the achieved level of statements adopted in the "Cadastre 2014 - a vision for a future cadastral system" document from the Slovak perspective**

In this document the working group by consensus defined (on the basis of contemporary analysis and studies of existing cadastral systems, on the basis of society needs estimation in each country and based on the expected technology development) six statements by means of which characterized an

expected development of the cadastre over the next 20 years. Here is presented a comment to the reached level of fulfilment of these statements in Slovakia.

**Statement 1 on Cadastre 2014** “Mission and Content of Cadastre 2014”: Cadastre 2014 will show the complete legal situation of land, including public rights and restrictions. This statement is based on the knowledge that the safe management of lots in the property market will necessarily involve inclusion of such information in the future cadastral system.

**Situation in Slovakia 2014:** In Slovakia, to the time horizon 2014, the statement 1 has been partly fulfilled and will be prospectively fulfilled only in a modified form. The cadastral system in Slovakia contains mainly a basic information layer of ownership rights equally to all owners - individual and juridical persons, including public legal entities. It contains directly lien on the real estate, easements on the real estate, the right of refusal if it is to have any effects of tenure, the rental right to the real estate if it lasts or will last for at least five years and other selected restrictions:

- protected parts of nature and their protective zones (a protected landscape area, a national park, protected areas, a nature reservation, a national nature reservation, a natural monument, a national natural monument, a protected landscape element, a protective zone of protected area, bird protection areas, a protected tree and its protective zone, a site of European importance),
- cultural monuments (an immovable cultural monument; an immovable national cultural monument; a monument reservation; an historic zone; a protective zone of an immovable cultural monument, a historical reservation or conservation area; UNESCO World Heritage Sites),
- a spa area, a natural healing source or a natural source of mineral table water, a protective zone of the spa area, a protective zone of natural healing source or a natural source of mineral table water (I - III. grade),
- protected deposit area,
- a protected water management area, a protective zone of water resources (I. - III. grade), a protective zone of water construction,
- a protected survey point mark, a protective zone of survey point,
- a protective zone of an airport and aviation ground facilities,
- optional only, on the basis of a person’s proposal who has a legal interest: protective zone of underground and overhead lines, extra high voltage lines, high voltage lines, low-current lines, oil pipeline, water supply, sewerage, other services.

The cadastral system does not contain building restrictions - a division of an urban area into housing zone differentiated by maximum number of floors, an industrial zone, a recreation zone, an administrative zone etc.

Administrators of individual objects and territories, to whom are related legally defined constraints, including administrators of underground and overhead lines, have been managing their own information system, regardless of whether the cadastral system contains their objects of interest or not. Currently, there is no interconnected way for administrators to browse electronically managed information systems of limitation with the cadastral information system. The formal responsibility for binding nature, timeliness and completeness of information about public restrictions in the cadastral information system is not optimally solved. Discussions on a possible content extension of the cadastre are ongoing.

**Statement 2 on Cadastre 2014** “Organization of Cadastre 2014”: the cadastral systems will have to have a flexible organizational structure to match the future requirements of individuals and societies. In Cadastre 2014 the borderline between the technical side of the cadastre - "maps" and decision making on creation, modification and termination of the property right - "registers", i.e. land register, will be abolished. Distribution of responsibilities between surveyors and lawyers/notaries will be fundamentally changed. Disadvantages of organizational solutions of the cadastre in those countries where two separate organizations exist (a cadastre managed by surveyors and registration of the real estate and land registers managed by lawyers) are as follows:

- The system is laborious, tiresome. Participants in the land market have to address two different authorities for land transactions.
- Administered information is partly redundant which creates the risk of inconsistencies.
- Every organizational unit has its own fees which at least partly recover the cost of maintenance of the system.

**Situation in Slovakia 2014:** In Slovakia since 1993 the geodetic side of the cadastral system as well as the decision making about creation, modification and termination of the property right has been integrated in one institution; this aspect of the statement 2 is accepted.

**Statement 3 on Cadastre 2014** “The Changing Role of Maps in Cadastre 2014”: Cadastral mapping is dead! Long live modelling! Modern technology allows the creation of maps of different scales and registers in different forms from the same data model.

If cadastral systems should fulfil future requirements, the function of maps must be redefined. In the future, maps will simply serve as a representation of the information derived from the data stored in databases. The new possibilities of information technology will change the work of surveyors significantly. One of the most important things was the craft to represent measured objects in a comprehensible map. With the utilization of information technologies, the process substantially changes. The determination of object co-ordinates becomes easier with GPS and remote sensing methods, and the direct drafting of objects on a map is superseded by the creation of objects in an information system. Maps are created out of this model by using representation functions operating plotters and drafting machines. The distribution of information increasingly takes place with the help of data transfer possibilities. Geographic information is sent over the data highways.

**Situation in Slovakia 2014:** In Slovakia to the time horizon 2014 the statement 3 is entirely applicable. The cadastral map fund in Slovakia is practically entirely in the form of vector cadastral maps that respect modern geomatic technologies and allow modelling in multiple scales and then their printing. In accordance with updating technology of vector cadastral maps valid from 1.5.2013, vector map files are split into three groups according to their updating method thus, that each new and older measurements of lot boundaries carried out correctly in the national reference system for positional determination could be implemented by specified technology without local "after-transformation" into the appropriate vector cadastral map:

1,796 files of numerical vector cadastral maps - a set of maps with suitable accuracy for the cadastre made especially after 1971 (they present accurately about 3.4 million parcels in the national reference positioning system).

459 files of non-numerical vector cadastral maps with implemented numerical measurement results (these are the maps that respect the current method of their updating while their precision allows

integration of new most accurate measurements and the current map content adapts to these measurements during the map updating).

1,894 files of non-numerical transformed vector cadastral maps, the content of which does not allow the integration of new measurements, as in the previous group of files, but each such map is updated with so called adopted measurements file with inserted accurate measurements without unwanted distortion. The second and third group of files together display about 3.7 million parcels. Precision of non-numerical vector cadastral maps is not sufficient for the cadastral needs, or it has not yet been reviewed.

**Statement 4 on Cadastre 2014** “Information Technology in Cadastre 2014”: so-called geomatics technology will become an obvious tool for cadastral work. A modern cadastre has to provide the basic data model. Surveyors must be able to think in models and to apply modern technology to handle such models. Spatial components of objects in object oriented models are nothing more than attributes defining the location and shape of this object.

**Situation in Slovakia 2014:** In Slovakia to the time horizon 2014 statement 4 is being gradually applied. The land recording procedures, property rights registration or handling of spatial data are being increasingly computerized. The cadastre, including property rights registration has never been and never will be itself an effective instrument, but it has always been a state instrument fulfilling functions defined in laws. Definition of these functions is always a political judgment of the parliament, which is connected to the development of society, legislation status (in particular the Civil Code, Code of Civil Procedure), outputs of courts’ activities and public authorities, material and financial security of population and government bodies etc. Until the use of paper and pencil is prohibited by law there will always be a part of cadastral clients who would prefer working with paper and pencil.

**Statement 5 on Cadastre 2014** “Privatization in Cadastre 2014”: The Cadastre 2014 will be highly privatized! The public and private sector will be working closely together! Free economies demand flexibility in land markets, land planning and land utilization. Flexibility may be better provided by private institutions. However, for necessary security public involvement is indispensable. The private sector will gain in importance. The public sector will concentrate on supervision and control. This can be achieved by strict and permanently applied computer-assisted control procedures.

**Situation in Slovakia 2014:** In Slovakia to the time horizon 2014 statement 5 has been realized to a considerable extent. The survey sketch making (about 60,000 per year), creation of land consolidation, compiling of registers of renewed land evidence and new cadastral mapping is entirely entrusted into the private sphere. The public sector has only retained the stewardship of the cadastral information system, in which the results of geodetic-cartographic work of private entities are transposed. This sector is also a proprietor of responsibility for the level of legal and current state of the cadastral information system and its compliance with the law.

**Statement 6 on Cadastre 2014** “Cost Recovery in Cadastre 2014”: Cadastre 2014 will be cost recovering! Cadastral systems need considerable investment. But the land documented and secured by the cadastre represents a multiple of the investment. The investment and operation costs have to be paid back at least partially by those who profit. Cost/benefit analysis will be a very important aspect of cadastre reforms and implementation. Surveyors and lawyers will have to deal more with economic questions in the future.



**Situation in Slovakia 2014:** In Slovakia to the time horizon 2014 statement 6 has not been accepted. The reason is a fundamental conflict between the financial return principle of the cadastral information system and the principles recommended by the European Union to provide information from the state information system and hence from the cadastral information system for free. The amount of revenue (payments and administrative fees) for the administrative procedures of public authorities and for information they provide from the state information system and their direction (revenue of specific budget headings or revenue of general treasury administration) is always a political judgment of the Slovak parliament. Those activities carried out by the private sector in the cadastre are of course financially recoverable.

## **2. Vision concretization of the cadastral system in Slovakia in the time horizon till 2034**

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During discourse about direction of the real estate cadastre and its tasks which can be fulfilled by the cadastral information system, we are inevitably moving in a certain conceptual framework.

The word concept generally means a set of main objectives, important steps, definition of qualified estimate, thought-out idea, a set of principles, main ideas, not an outline of operational nature but ready for the medium term future, for example 5, 10, 15 years. If the period for which that set of main objectives is modelled represents a longer period (e.g. 20 years or more) and therefore cannot be accompanied by an elaboration of detailed nature supplemented of operational steps, as it is in the case of a concept, we are talking about a strategy eventually about a vision.

In any comprehensive system of regulated human activity it is appropriate and necessary for certain time periods to periodically draw up development concepts as well as development strategies – visions, to evaluate and update them continually. Otherwise, the danger increases of development spontaneity in the field of question, its slowdown or stagnation with all the negative consequences. Likewise, the processing of development concepts in the cadastre in Slovakia has certain tradition. Individual concepts traditionally contain some elements of a longer-term vision. The currently effective concept was adopted in 2011: Concept of real estate cadastre development for the years 2011 to 2015, UGGK SR PP-8801/2011-1156. [1].

Cadastral functions clearly belong among the basic functions and exclusive tasks of the state. Cadastre is an integral part of state registration and particularly provides protection of the rights and freedoms of citizens.

The cadastre is unified for all urban settlement sizes and has a pyramidal interconnected structure. Management of activities of the real estate cadastre (including decision making about the creation, modification and termination of ownership rights and other tenure to real estates) at the central level (nationwide) and at the level of local government authorities was until 30.9.2013 included in one public institution (Geodesy, Cartography and Cadastre Authority of the Slovak Republic) in the pyramidal hierarchical organizational structure. Since 1.10.2013, on the basis of the Act no. 180/2013 Coll. on organization of the local government, the competence of cadastral registries was moved to the district office cadastral departments, which are not directly subordinated to the Geodesy, Cartography and Cadastre Authority of the Slovak Republic in the organizational structure. In this context, mainly due to some elements of current division of responsibilities between various central state administration authorities, a question arises, of whether in the current organizational structure

autonomy, synergy of central governance and independence of this specific type of administrative procedure of cadastral authorities is sufficiently guaranteed. The answer to this question is currently maturing and crystallising.

The vision of the future cadastral system is analysed from two perspectives:

- pan-European view,
- national view.

## **2.1 Pan-European view**

The pan-European view is an integration view, expecting in the distant time horizon a cross-border interconnectivity of the cadastral information systems and fulfilling of all tasks and services of these cadastral systems of the EU Member States.

While accepting the pan-European perspective the following important premise of the cadastre development vision cannot be ignored. This premise demands being aware of a degree of uncertainty in modelling of the future given by

- a) the fact, that the cadastre as a branch of human activity in a civilized society has not served and will never serve itself, but it will always be an information system and a registry tool that serves society, and thus is formed and operated in certain socio-political and therefore financial, legislative, organizational and technological contemporary conditions,
- b) the fact, that in the next modelling period the technological development in the field of information technology can be relatively accurately estimated, which largely limits the development of the cadastre management itself, but it is more difficult to predict what technological innovation offered in future periods will be available on the market that would at the same time be financially manageable for a cadastral information system administrator (to purchase them and to manage them throughout their estimated service life),
- c) the fact that a subject of the cadastre content shouldn't be all that, what the cadastre in the future period could administer and offer to public. Rather it should be all, what is possible in terms of expected legislation development, organizational structures, staffing and financing facilities to realistically achieve.

As proof of that, some requirements for expanding the cadastral content in Slovakia must be permanently filtered out, some initiatives to register the most diverse facts and phenomena that cadastre in Slovakia has faced in the last decade can be mentioned. Under these initiatives the cadastre should be registering:

hunting grounds, land prices, building prices, prices of apartments and business premises, fishing grounds, technical and economical parameters and use of housing stock, the number of persons permanently residing in an apartment, the number of self-managed households in an apartment, a way of flat creation (new construction, extensions, additions, conversion of non-residential premises, reconstruction), beginning of construction, completion of construction - the age of the building, building acquisition costs, building expiration, house as a listed building, apartment occupancy, legal reason for use of dwelling, number of rooms, technical equipment of the apartment, heating method etc.

If we want to talk about pan-European perspective on the status and perspective development of cadastral systems in EU countries, we should take into account the main EU bodies. It would be good, if the EU would abandon its present non-committal position under which international treaties (that countries willing to join the European Union are bounded by) are not directly related to the cadastral area and property rights registration. International treaties only establish general principles which indirectly affect the cadastral administration. For example the Article 17 of Universal Declaration of Human Rights enshrines: the right to own property, the equal right of all kinds of ownership, especially equalization of ownership rights of citizens, legal persons and the state and provides equivalent protection to that law, guarantees of equal legal content and protection of ownership rights of all owners and provision of guarantees of inheritance. The same right of ownership acquisition for all persons and retention of this ownership right is directly linked to it. Similarly, the Article 1 of the Supplementary Protocol to the European Convention on Human Rights and Fundamental Freedoms [18] states that 'Any individual or legal person is entitled to peaceful usage of property in their possession. No one shall be deprived of his/her property except in cases of public interest and under the conditions laid down by law and general principles of the international law'. Similarly, in a general way in international treaties there is declared the need to protect other rights for example the access right to information, the right to economic development it means the right to run business, the right to form associations, the right to protect privacy, the right to free choice of profession etc. From this relationship among rights is clear that on one hand the ownership guarantee, which is the right to freedom is complete only with other aforementioned freedoms, while on the other hand other rights (freedoms) need to be supplemented by the ownership guarantee, especially real estate ownership. The legislative situation in the Slovak Republic in the early nineties began progressively reflecting these general principles and the need of their balanced implementation with an increased emphasis on the ownership protection and protection of acting in good faith.

Similarly, the EU community law did not regulate the process in the real estate administration. Legal regulations in this area have been and still are entirely left to the competence of the EU member states. In this area the EU requires from the member states only functionality of legal regulations when respecting several of the already mentioned general principles.

If we do not make some steps to homogenization of cadastral systems, we can say goodbye to the prospect of cross-border interconnection of information systems. We are currently working with differentiated definitions of the real estate cadastre, registration of ownership; there is no unity in what could be considered property, what is a lot, what is a parcel, what rights in addition to the ownership right the cadastral system should contain, what legal restrictions of ownership rights except encumbrances the cadastral system should contain, what kind of buildings are to be included in it, what care should it take regarding underground properties (subways, underpasses, cellars without buildings above the ground, rail and road tunnels, mining works, engineering structures such as oil and gas pipelines, power lines, sewers, etc.), who should be the responsibility bearer for factual accuracy and timeliness of cadastral data, what should be the restriction on public cadastral data and others. We would have achieved some limited progress if the EU by means of recommendations outbraved these issues; following these recommendations, the countries aspiring to join the EU could modify their legislation in line with these recommendations. In the next stage older Member States could gradually accept in their legislation these recommendations as well. As an absolutely necessary step we recommend preparing a common multilingual terminological dictionary with the interpretation in one (two? three?) EU languages and smaller Member States could on this basis produce a translation of this dictionary into their languages.

## 2.2 National view

The national view is a view reflecting specific, particular, traditional, material, financial, legislative, personnel, organizational and other national conditions. Accepting this national view the following core tasks of cadastral concept- eventually vision- can be defined:

- The cadastral data base completing in its current assortment composition (first stage of the task will be completed by entering of the Registers of renewed land evidence under the Act no. 180/1995 Coll., as amended in the last cadastral district of Slovakia by the scheduled date 31.12.2014); another stage which is a long-term task (40-50 years?) is a continuation of gradual systematic consolidation of ownership relations to properties registered in the E-register and their mass transfer to C-register within the implementation conditions of land consolidations project as well as their transfer in individual cases according to documents.
- Completing and consistent administration of the quality of information contained in the cadastral geodetic data file at the level of information details relative to an individual detail point and ensuring such an updating method of a vector cadastral map in the way that to the position of points with a number in the map corresponded their position in the reference system in the field (this task is gradually being realised).
- Improvement of data security in the cadastral information system; theft protection of the data base; protection against misuse; protection against planned or unplanned collapse of the cadastral information system; which requires a central database solution and a more sophisticated interconnection between descriptive data file and geodetic data file.
- Addressing of unsatisfactory architecture of the cadastral information system, including increasing reliability of the cadastral portal operation and permanent restoration of individual physical components and applications improvement (this task is dependent on the competence of decision-making at higher levels; in formulating our information projects the final say must be given by cadastral experts, otherwise the whole system suffers from faulty analysis of complex processes and procedures and misunderstanding of needs of the cadastral information system).
- Connection to the central public administration portal and other information systems (a natural persons register, a legal persons register, address register and the like.); in connection with this very important task it should be ensured that every administrator of an information layer of territorially-based information system was responsible for correctness, completeness and timeliness of this layer; he should allow an electronic interconnection of that layer with a cadastral information layer by fulfilling this principle; necessary cooperation of individual administrators of information layers is essential which will ensure avoiding potential occurrence of duplicate administered data, respectively layer; the cadastre should also enable the use of information about territories from other sources in a way that best suits the optimal overall development of society and doing so it should always take into account the necessary legislative, organizational, personnel, budgetary and technological background of such link or interconnection of data sources.

- Optimum fulfilment ratio of cadastral individual functions represented by a guarantee that none of its functions will be absolute in relation to other functions (balanced mix of fulfilling protection of the real estate rights function, functions of the tax property base, functions of the fee purposes base, property valuation, functions of the base to protect agricultural land resources and forest land resources, functions of the base for creation and protection of the environment, functions of the base for building more property information systems and some other functions).
- Cadastre stabilization to the maximum possible extent and preparation for further use of the cadastral information system for production and administration of other thematically oriented information systems as a base of all territorially oriented large-scale detailed information systems (e.g. position recording of thousands of kilometres of utility networks in the vector cadastral maps appears to be quite redundant, since this layer is with much richer and more complete data base electronically administered by individual administrators of utility networks, where there are over 25 of them and the cadastre can never reach their level of information; it is also applied to protected areas, construction zones, and other area information that are created and updated by other departments and organizations and should only act as an autonomous layer above the base layer of the cadastre, with the option of simultaneous display as it is in modern state administration information systems). Each proposal to expand the cadastral content is and must be considered from the perspective of requirement objectification for society, in terms of economical and organizational complexity of creating and administering of such file, and in terms of establishing one responsible - competent authority for administering these data (i.e. collection, updating, protection against misuse and provision of individual data). In the case of a positive decision, deciding between creating another separate information system or extending an already existing information system of desired content will always take place. On the other hand it is certain that no matter how broad the cadastral content will be, the public will never be fully satisfied, and there will always be some more area of information the public would be interested in, but which are not maintained by the cadastre. It is not possible to continually expand the cadastral content. The cadastre should provide in addition to the data administration on ownership rights and other tenure, in particular homogeneous data about the location of individual properties and their basic attributes so, that the cadastral content matches its original purpose for which it was created.
- Optimizing the use of the cadastral information system and the primary database for geographic information systems (ZB GIS) from the viewpoint of mutual usage for the needs of updating, change detection of planimetric content, unauthorized change detection of land nature, buildings without planning permission etc.
- Opening of the debate on a need for creation, administration and updating possibility of 3D cadastre. A legal framework and its definition is of importance as well as the readiness of society to use 3D cadastre. The rights to land are defined differently than the rights to space above or below it. In relation to 3D cadastre there is a whole series of unanswered questions, technical and organizational. We can start with questions of whether a data base of 3D cadastre should be part of the assessment of future prospects of issuance of the building permit at building authorities and finish with the underestimated issue of practical inability, respectively complications associated with surveying of underground structures

by means of GNSS technology with prescribed accuracy. The question of funding, building up and updating of 3D cadastre is equally difficult.

- Preparation, in the long term, for interstate mutual exchange of information administered in the cadastral information system.
- Following on the development and progress in the cadastral key questions in the time horizon to 2034, changes in the organizational structure of local state administration can be expected. With advancing completion of the cadastral data base, computerization of society and linking territorially oriented public registers the reduction of cadastral departments can be assumed (in the first step cancelation of 3 current detached cadastral departments, later on a gradual centralization of cadastral authorities in less frequented district seats into natural centres with a target state of offices in the core administrative centres).

Selected individual specific conceptual tasks of the real estate cadastre in Slovakia include:

- A complete projection of adopted numerical measurement results to the appropriate VKM according to their assortment composition i.e. to the VKMč or to the VKMi or to the SPM. The Regulation no. 87/2013 Coll. has enabled and defined such measurements of parcel boundaries and map administration that all correctly made measurements can get into the appropriate map with the possibility of their unlimited spatial and time field reconstruction even within the lowest accuracy maps which are stored in the cadastre. This task is related to the need to address further improvement and refinement of the geodetic data file and to the need of a more sophisticated definition of error correcting process in the geodetic data file including its legislative framework.
- Correction of incorrect data and missing data in descriptive data file (SPI) and bringing them into line with today's requirements for the cadastral data recording or registering and with the requirements placed by computer technology. Detected incorrect and missing data in the SPI can be divided into four categories:
  1. incorrect data, removal of which is now possible without the assistance of third parties,
  2. incorrect data, removal of which is only possible on the basis of further interaction with owners, other authorized persons or municipalities and public authorities,
  3. incorrect data, removal of which is only possible with additional legislative changes (of the Cadastral Act or other generally binding legal regulation),
  4. incorrect data, which were entered correctly in the cadastre according to historical legislation, which now need to be left in this form until next handling of the real estate; then they can be removed.

A detailed description of the mentioned issues of incorrect and missing data with the way how to solve them is shown in [5].

- Adjusting the current regulation of entering encumbrances and rights resulting from encumbrances and its nationwide projection into the cadastral documentation. Removing the current differentiated entry in the cadastre (especially after parcel renumbering) in order to guarantee legal certainty and clear awareness of cadastral clients. The current

triple approach of cadastral authorities when entering encumbrances into cadastral documentation is related to the absence of uniform detailed regulation. [6] and [7].

- Registration adjustment of engineering structures and ownership rights to them. [7]
- Registration adjustment of underground structures and ownership rights to them.
- Public access to the history of changes on the ownership documents through electronic ownership documents.
- Addressing registering real estate prices. Either incorporation of the real estate prices in the cadastre or creation a new separate information system about the real estate prices and its link to the cadastral information system. However, it is not within the UGKK competence to prevent presenting of cumulative prices into contracts which practically devalues such information or even makes it impossible. The general public mistakenly believes that "market" prices are given in the contracts. The mentioned prices need to be properly called "contractual" prices since they are affected by many other contemporary as well as subjective factors which are unknown to the cadastral information system; they are known only to a transferor and transferee, moreover these prices are not constant on the timeline but are subject to changes. A similar situation would be if we were instructed to incorporate gradually into the cadastral information system "administrative" prices (i.e. determined by expert opinions).

A related professional discussion will undoubtedly contribute to formulation quality and subsequently the way of individual task solving.

### **2.3 A vision of further cadastral development and university education**

In the past two decades we have witnessed a slow and inadequate response of selected universities to the need to change the outdated structure of training cadastral professionals (in the category of technical universities it is essential to improve teaching orientation, in particular the collection of spatial data, their computerized processing, visualization, interpretation and distribution and in the category of law universities it is essential to improve teaching orientation for cadastral proceedings, to strengthen disciplines in favour of the real estate cadastre). In the field of cadastral specialists' education it will be necessary:

- to consider a more appropriate form of organized systematic training in the postgraduate form within universities,
- to tighten requirements and also test procedure to obtain special professional competence for decision making on the proposal for contribution of right into the cadastre and also for verification of selected geodetic activities (the second mentioned begins to implement successfully),
- to prevent district authorities from employing workers in cadastral departments without appropriate education and other qualifications for successful implementation of all cadastral procedures and processes.

## **2.4 Further objectives of cadastral development**

Depending on the development and availability of new technologies, cadastral concepts in general follow the assurance of necessary cadastral goals even with regard to limited financing options. The main emphasis is placed on improving the technical level of the cadastral documentation administration and on continuous improvement of administered data compliance and property rights to them with the real and legal status. The improvement of this technical level of cadastral administration by applying the latest information technologies is a limiting factor in operation of the cadastre as a state information system. From the degree of legal and real status compliance with the status administered in the cadastral information system, depends the level of actual protection of the real estate rights as well as the support of the real estate market.

Similarly till now, in the next period a commercial geodetic sector will play an important and irreplaceable role in fulfilling cadastral tasks. It is assumed that the commercial sector will fully ensure survey sketch making (annually about 60,000 survey sketches with an average price of 300€), setting out break points of disputed and undisputed land boundaries, processing of land consolidation projects under the Act no. 330/1991 Coll. on land consolidation and completing the registers of renewed land inventory according to Act no. 180/1995 Coll.

When defining the cadastral objectives it should be remembered that it is necessary to focus on the cadastre as a whole, that authors of the concept should not be affected by individual details as these ones could cause an inaccurate vision of the entire system. On the other hand the objectives cannot be defined naively without adequate possibility to operatively resolve difficult details which could lead to a collapse of the system.

A fact should be kept in mind that current trends in social and especially economic development can be characterized by systematic increase in demands for performance of cadastral departments while budgetary deficiencies persist, despite the fact that income from cadastral activities is not negligible.

## **3. Conclusion**

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Probably no other comprehensive human activity which is carried out in specialized state administration contains such complicated internal and external linkages as the real estate cadastre. They range from assessing complex legal aspects of decision-making activities on the rights to the real estate through building the oldest nationwide information system that administers alphanumeric and graphical information to each parcel which is located on the Slovak territory and related rights to it, as for example, up to assessing accuracy of measurements made by means of GNSS, including the operation of its own observational service (SK POS), enabling the use of satellite motion of several international satellite networks for accurate positioning. Under these significant societal demands on the cadastre, current complex linkages in methodical, financial and organizational management of cadastral departments generate besides the existing "standard" problems and difficulties some new ones as well. Therefore it will be necessary to double our efforts in overcoming them so the level of task fulfilment will not generate dissatisfaction of society with the cadastral activities.

In the case that individual cadastral authorities of EU Member States will in certain areas of cadastral development come to interesting solutions in particular applications in their own cadastral practice we would be pleased to become familiar with these results, we will study and analyse them and possibly introduce them into our application practice.



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