

# **Strengths and Weaknesses of the Czech Cadastral System: An Analysis of Present System**

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**Key words:** Czech Republic, Cadastre, Historical Turnovers, Analysis of Development

## **SUMMARY**

The existing Czech Cadastre has its roots in the Austro-Hungarian cadastral system created in the first half of the 19th century. The development is similar as in many Central European countries like Austria, Hungary, Slovakia, Slovenia, Croatia, Northern Italy, etc. Indirectly the Napoleonic Cadastre influenced the system. Since the creation of independent Czechoslovakia the Cadastre was formed namely by following important events:

- in 1927 Cadastral Law with maps based on modern co-ordinate system and cartographic projection,
- with the start of collectivisation of the agricultural land after 1951 the registration of titles was reduced and entries into Land Books were stopped,
- in 1992 New Cadastral Law put again the stress on ownership registration and unifies the land Book data with the Cadastre into one system,
- in 2001 the Information System of Cadastre of real Estates was put into operation using Internet Technology
- since 2004 free Internet access to basic cadastre data is possible.

This complicated development of the Czech cadastral system especially after the 2nd World War and the interruption of its continuity in the period of planned economy. Limited possibility to transform the socialist system for requirements of a market economy resulted in a new Czech Cadastral System based on modern solutions and technologies.

The paper discusses strengths and weaknesses of the present system, opportunities and threats in external environment and analyses legal principles, organisation, human resources, culture, activities and funding of the system. In the conclusion the contribution tries to show the possible future development in the frame of expected development in Europe.

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## **1. HISTORICAL DEVELOPMENT OF CADASTRES AND LAND REGISTERS IN THE CZECH LANDS**

### **1.1 Introduction**

The cadastre of real estates has a long tradition in the Czech lands. A cadastre is a very complex, extensive and expensive work that has been created as in other European countries over several centuries and continually has followed up with previous results. Its due administration and development is conditioned by the long-term political and economic stability of the state, and for its reliability it is exceptionally important to preserve the continuity of its development. The erosion of this continuity has had very grave consequences, which are difficult to eliminate. The contemporary cadastral system in the Czech Republic has been impacted by historical evolution much more significantly than land registers in countries where democratic development has not been interrupted.

Cadastral systems and public land books count among the largest information systems, on which special demands are made as for the precision and the reliability of the data. As opposed to other information systems, demands are made on the reliable administration not only of the current status but of the whole previous process as well. Thanks to a more than 150-year-old tradition, the cadastral systems of many countries have been among the most reliable and the trustworthy information systems. However, knowledge of the historical evolution and formerly valid legal regulations is the precondition for a deeper understanding of the mutual historical context and it is necessary for working with the documentation of the previous records.

The Czech Cadastre of Real Estates is a unified technical and legal instrument instituted by Act 344/92 Code (Cadastral law), which integrates the two most important components of historical land registers. These components were, firstly, the Land Cadastre as a geometric projection, a list and a description of every land in the territory of the state and, secondly, the Land Registry (land books), in which important legal relations concerning the lands were registered.

### **1.2 Stable Cadastre (1817 – 1869)**

The land registry was founded on the territory of the present Czech Republic at the beginning of 19th century (as one of the first countries in Europe and in the world to found registry on a nation-wide extent). This registry was founded on a new surveying basis of large-scale maps.

Cadastral documentation was based on extensive precise measuring and was gradually founded in the 1st half of 19th century according to the Highest Land Tax Patent of The

TS 28.6 – Business of Land Administration

2/14

Jiri Rydval, Vaclav Slaboch and Libor Tomandl

TS28.6 Strengths and Weaknesses of the Czech Cadastral System: An Analysis of Present System

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Emperor Franz I, from the year 1817. This registry became the fundamental tool for meeting the fiscal policy of the state and beginning in 1874 was utilised as a technical foundation for filing the new Land Books of the Czech Lands, as it guaranteed unmistakable and simple individualisation of land as an object of the law.

### **1.3 Revision of the Stable Cadastre (1869 – 1882)**

The Cadastre was not reliably updated with changes (the cadastral map above all) and the Land books failed to meet the new requirements. This situation led to the issuing of a law about the revision of the cadastre (1869). The function of the revision was chiefly a one-off addition to the real estate registry survey and written documentation of all the changes which had come since the original surveying and also the new segmentation and valuation of lands. During these revision works a demand was made to stabilise triangulation points, to repair and to fill in their location sketches and to plot these points on the cadastral maps. The revision itself was completed in 11 years. The huge pressure for a timely completion led to a substantial devaluation a large part of the maps of the Stable Cadastre.

### **1.4 Land Cadastre (1927 – 1964)**

The level of the land register was gradually improved by new technological development that allowed more precise surveying of land boundaries with the assistance of new instruments and new methods, particularly after the establishment of the independent Czechoslovak state. Radical changes were however not made until 1928, when a new law about the Land Cadastre and its administration (The Cadastral Law) was passed. The cadastre was to serve as the foundation for the assessing of taxes, and furthermore for filing, restoring and filling the public land books and their maps. It was also to be a base for the securing ownership and for the assigning real estate. In addition it was to serve as a tool for technical, economic and scientific purposes.

Cadastral surveying offices were entrusted with an administration of the cadastre. New detailed directives for the component departments of the cadastral service were passed (The Instruction A from 1932 and The Instruction B from 1933). Many of the regulations from these directives are in essence still used today. The Cadastral Law introduced a new obligatory projection system for all surveying works – The Uniform trigonometric cadastral network (JTŠK). A result of the new mapping was numerical maps primarily in the scales 1:1000 and 1:2000.

After World War II, the quality and reliability of The Land Cadastre and The Land Registry, was markedly weakened by the pressure of realising the coming proprietary changes in the fastest possible and cheapest manner. A consequence of this strain was the deviation of the well-tried constitutive principle of the records in land books. A consequence of the political circumstances of the fifties was a total breaking of the continuity both of the land books administration (in 1951) and of the Land Cadastre (1956), which in effect meant destroying of content and other grave repercussions. Some of these repercussions we have not been able to eliminate even to this day.

## 1.5 Land Inventory (1964 – 1992)

In the Act 22/1964 Code, dealing with the Land Inventory, can be seen the effort to correct before-mentioned incompetent interventions. The systematic foundation of a new legal-relations registry however took almost a quarter of the century to complete. The functionality of the Land Inventory was markedly limited by the imperfect principles, on which it was based. The Land Inventory was based solely on a notification principle whose reliability is very problematic. Rights of use were originally registered and the legal code explicitly specified that agricultural and forest lands in a individual's possession, which were used by a socialist organisation, would not be registered according to parcel numbers and would not be plotted on to the land maps. In spite of these restrictions the Land Inventory laid the foundations of the present Cadastre of Real Estates and allowed a realisation of the restitution and privatisation processes at the beginning the nineties.

## 2. ANALYSIS OF THE CONTEMPORARY CZECH CADASTRAL SYSTEM

### 2.1 Organisational and Personnel Structure, Core Activities of the Sector

The contemporary Czech cadastral system was created in 1993. State administration of the cadastre, surveying and mapping in the Czech Republic was entrusted to an autonomous supreme body - **the Czech Office for Surveying, Mapping and Cadastre** in Prague (CUZK). This authority is responsible for development, legislation, methodological, personnel and financial management, technology, standards, quality, fulfilling tasks of the sector and international co-operation. It administers the central database of the cadastre. The president of CUZK is subordinated to the Prime Minister of the Czech government.

Administration of the Cadastre is secured by the CUZK through 14 subordinated **Cadastral Offices** in regions that have 111 **Cadastral Workplaces** in larger towns since 2004. These bodies decide in cadastral proceedings, administer and update the real estate cadastre, participate on cadastral mapping, authenticate legal surveys of private sector related to the cadastre, administer cadastral documentation and provide cadastral information.

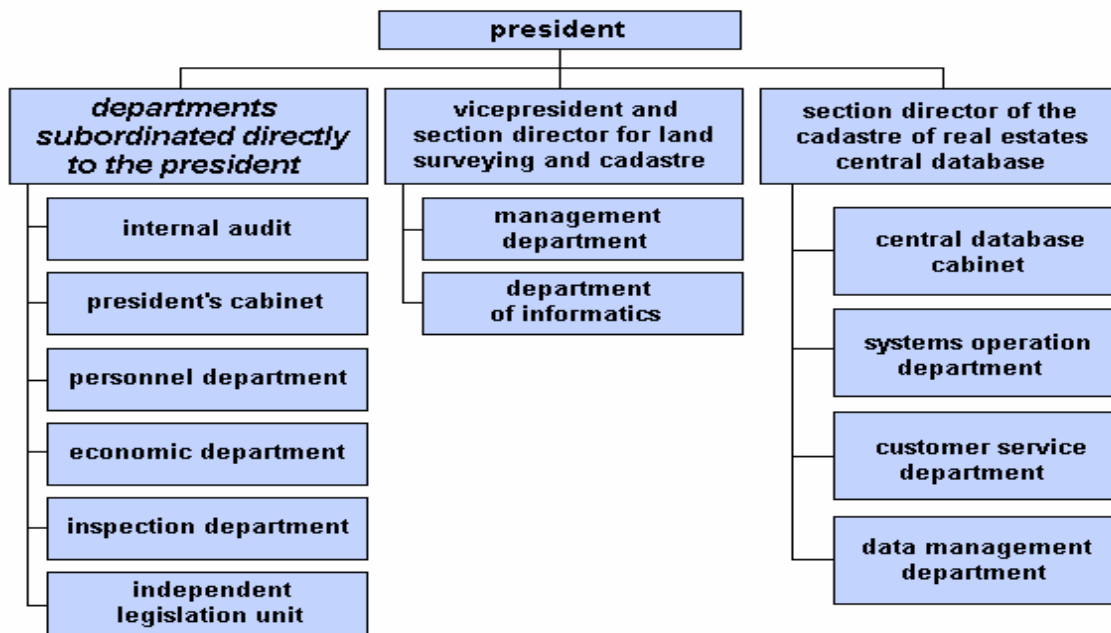
Supervision of cadastral and surveying activities of state and private sector in public interests is performed by 7 **Survey and Cadastral Inspectorates** in regions.

**The Land Survey Office** in Prague carries out maintenance, and modernisation of fundamental geodetic control, medium and small-scale state mapping, creation, maintenance of the Fundamental Base of Geographic Data (ZABAGED), provision of data and maps and archival activities.

**The Research Institute of Geodesy, Topography and Cartography** secures basic and applied research in these branches, scientific co-operation, development and testing of new techniques and software.

Organisational chart of the CUZK

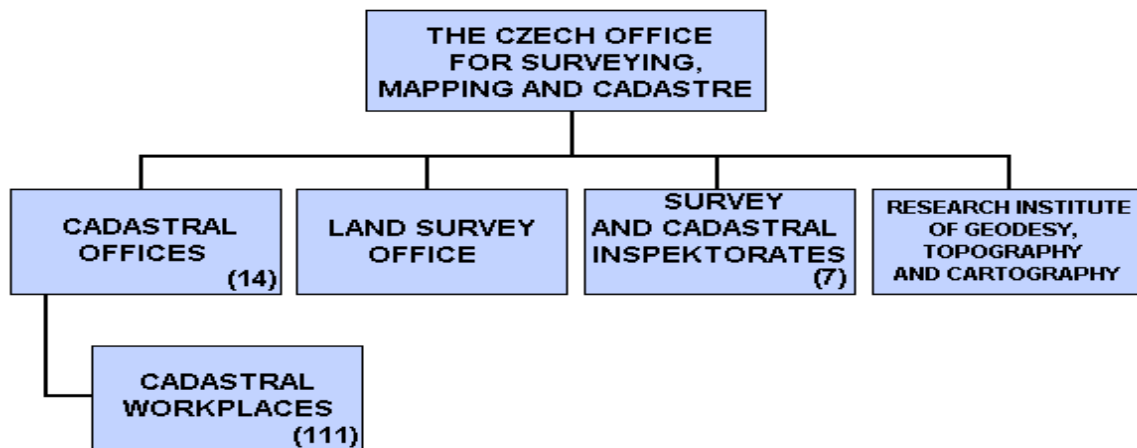
Figure 2.1.1



Source: <http://www.cuzk.cz/>

Organisational chart of the CUZK sector

Figure 2.1.2



Source: <http://www.cuzk.cz/>

## Number of employees in the sector

Table 2.1.1

Year	CUZK	Land Survey Office	Cadastral Inspectorates	Cadastral Offices	Research Institute	Total
1993	52	362	80	4354	50	4898
1996	64	375	85	5363	50	5937
2000	66	385	90	5167	49	5757
2002	70	407	92	5107	50	5726
2003	70	410	93	5103	49	5725

Source: CUZK /2/

**The professional structure of employees** is as follows (2003): graduate surveyors and cartographers 12%, graduate lawyers 6%, other university education 6%, secondary school - surveying 27%, other secondary school 46%, elementary education 2%. Nearly 74% of employees in the sector are females, 25% of personnel are at the age 41-50, 30% are older than 50 years. The staff is trained in accordance with the adopted conception of vocational education and training. The central and regional authorities, Research Institute and the Czech Union of Surveyors and Cartographers secure professional training.

### 2.2 Budget of the Sector

The CUZK has its own account in the State budget of the Czech Republic. The government bill of the State budget is every year passed by the Czech Parliament. The central body then carries out annual allocation of financial resources to lower organisational units.

Annual total budget expenditures of the sector in 2003 were 85,5 million USD (Cadastral Offices 67,2 mill. USD), earnings only 45,9 mill. USD (40,5 mill. USD). Annual total budget income in 2003 was 7,3 mill. USD.

Eighty per cent of all activities of the CUZK sector relate to administration of the cadastre, which is the topic of this paper.

### 2.3 The Czech Real Estate Cadastre

The present Czech Cadastre jointly registers **technical information and legal interests of owners and other legally recognised subjects concerning real estate**. It is designed as a multipurpose cadastre (especially for protection of material rights to real estate, tax and charge purposes, land evaluation, protection of land, forest and natural resources, providing base data for building other IS).

The cadastre covers systematically the whole Czech territory with the area of 78.867 sq. km and the population of 10, 2 million inhabitants. It comprises 21, 7 million parcels and data about 5, 8 million owners on 5, 0 million owner's folios arranged in 13.027 technical units called cadastral areas (2003).

**The objects** registered in the Czech Cadastre are cadastral areas, land parcels, buildings, private flats and non-flat rooms. **The subjects of the cadastre** are owners, joint owners and persons competent from legal relations to real property. The Czech cadastre records also **material rights** to real estate: ownership rights, mortgages, easements and pre-emption rights.

There are four principal parts of **the cadastral documentation**:

- The geodetic /survey/ information file - /cadastral maps in analogue form on plastic foils, partly with registers of co-ordinates and digital vector cadastral maps (2004-26% CR)/
- The descriptive information file /fully digitised cadastral register in the form of database files/
- Surveying and measuring documentation
- Collection of deeds

## 2.4 Information System of the Cadastre

Rapid progress of ICT and digitisation of cadastral information enabled a new solution. In 2000 LANs of Cadastral Offices were interconnected with the centre by WAN and in the following year **the Enhanced Information System of the Cadastre of Real Estates** with advanced architecture and technology was implemented.

This solution supports:

- The whole administrative process in Cadastral Offices including accounting and effective supervision of the process
- High security of the system
- Sufficient capacity for data storage
- Full integration of descriptive and graphical data stored in a database environment
- On-line access to up-to-date cadastral information from the whole Czech territory and Internet access to this information for the public
- Possibility of mutual data exchange with other IS

Development, technological infrastructure and implementation of the Enhanced Information System of the Cadastre of Real Estates was fully covered from the state budget and cost about 1, 3 billion Czech crowns (50 million \$).

## 2.5 Administration of the Cadastre

Administration of the Cadastre is secured predominantly on the level of Cadastral Workplaces. They have responsibility for land registration. **Land registration** in the Czech Cadastre has three forms:

- **Entry** in a case, when changes of legal relations in the Cadastre are based on a contract. These rights originate, change or extinct by entry into the cadastre based on decision of a territorially competent Cadastral Office (Cadastral Workplace).
- **Record** - changes in the Cadastre based on decisions issued mainly by state administration and Courts.

- **Annotation** - recording informative facts,
- and their **deletions**.

Further important tasks of Cadastral Workplaces are:

- gradual **digitisation of** analogue and numeric **cadastral maps**,
- participation in **cadastral mapping** and **land consolidation** utilised for renewal of cadastral documentation,
- **checking and certification of legal surveys** of licensed private surveyors,
- **maintenance** of digital and analogue **cadastral maps**,
- **corrections of errors** in cadastral documentation,
- **providing information** from the cadastral documentation,
- **local database management**

### Core activities of Cadastral Offices in the Czech Republic

Table 2.5.1

Y e a r	Unit	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
Entries into the Cadastre	thousand entries	215	262	266	313	379	416	438	411	369	482	498	572
Records in the Cadastre	thousand records	378	390	394	393	365	401	418	398	416	443	485	588
Requests for cadastral information	thousand requests	690	719	794	918	1013	1074	1172	1268	1292	1519	1569	1761
Certified legal surveys	thousand plans	84	135	112	107	118	127	116	118	111	139	127	140
Digitisation of descriptive information	cadastral area	0	1114	2279	3304	3459	2881	38	0	0	0	0	0
Cadastral maps converted into digital form	cadastral area	0	0	57	195	185	169	360	1045	440	473	571	357

Source: CUZK /2/



**Assessment of Time Consumption in Core Activities of Cadastral Offices** Table 2.5.2  
(Cadastral Workplace Blansko in per cent of total disponible working hours)

Activity	2000	2003	2004
Digitalization of cadastral maps	12,4	9,0	4,7
Registration of titles	9,3	6,6	6,5
Updating the file of descriptive information	18,0	24,6	30,4
Updating the file of geodetic information	4,2	5,7	6,3
Providing information from the Cadastre	8,8	8,4	9,6
Certification of legal surveys (geometric plans)	2,7	3,2	2,4

Source: Cadastral Workplace Blansko-Statistical Reports 2000, 2003, 2004

Cadastral offices reduce activities concerning renewal and digitisation of cadastral maps and re-deploy their employees to meet growing demands on land registration simultaneously with prescribed reduction of number of employees (2 % yearly).

## 2.6 Paid and Free Customer Services

Cadastral authorities purvey these basic paid and free products and cadastral services for the public:

- Land registration
- Certification of legal surveys
- Cadastral information
- Results of surveying activities

Cadastral information is provided to the public in several forms:

- verbal form,
- public deeds (copies of deeds, owner's folios, cadastral maps, identification of parcels),
- outputs from cadastral documentation with informational character only:
  - printed form (textual and graphic information),
  - electronic form (textual and graphic computer files),
  - Internet access :
    - remote access
    - free access to selected data

**Price list of selected cadastral products and services (2005)**

Table 2.6.1

Price in Czech Crowns/(USD) per unit

Product, service	Unit	Price (charge)	Administrative Fee
Land registration-entry	case (deed)		500/(20)
record, annotation	case (deed)		0
Public deed – owner's folio	folio-20 parcels		100/(4)
copy of cadastral map	page-format A4		50/(2)
Certification of legal surveys	geometric plan-20 parcels		100/(4)
Verbal information		0	
Cadastral map	printed map sheet	250/(10)	
Electronic form - computer file	parcel + owner's folio	0,30-2/	
textual information		(0,01-0,08)	
graphic information	point	0,30-1,30/	
		(0,01-0,05)	
Internet access – information on parcels, owners, owner's folios, maps	page-format A4	50/(2)	

Source: Czech legal regulations

Public deeds for state administration and outputs from cadastral documentation and Internet access for municipalities and regional governments are provided free of charge.

Collected administrative fees and charges are direct income of the State budget. The CUZK sector is involved in the volume of receipts. The budget expenditures of the CUZK are proportionally reduced, in case the sector does not fulfill the planned budget receipts.

**Paid and Free Customer Services in 2003**

Table 2.6.2

mil. Czech Crowns/(mil. USD)

Activity	ADMINISTRATIVE FEE		CHARGES	PRICE	TOTAL
	collected	free			
a	1	2	3	4	5
Land registration- entries	217,4 / (8,7)	16,2 / (0,6)	x	x	16,2 / (0, 6)
Public deeds in the cadastre	235,7 / (9,4)	46,8 / (1,9)	x	x	46,8 / (1,9)
Certification of legal surveys	13,9 / (0,6)	0	x	x	0
Provision of cadastral information	x	x	252,8 / (10,1)	x	252,8 / (10,1)
Providing results of surveying activities	x	x	x	13,7 / (0,5)	13,7 / (0,5)
<b>CUZK total</b>	<b>467,0 / (18,7)</b>	<b>63,0 / (2,5)</b>	<b>252,8 / (10,1)</b>	<b>13,7 / (0,5)</b>	<b>329,5 / (13,1)</b>

Source: CUZK /2/

## Summary of annual budget receipts of the sector in 1998 -2003

Table 2.6.3

mil. Czech Crowns/(mil. USD)

Y e a r	1998	1999	2000	2001	2002	2003
Receipts	64,4 (2,6)	74,0 (3,0)	92,3 (3,7)	162,3 (6,5)	205,2 (8,2)	181,5 (7,3)

Source: CUZK /2/

Total value of paid and free customer services of the sector provided to the public in the year 2003 was 39,1 million USD.

### 3. STRENGTHS AND WEAKNESSES OF THE SYSTEM

#### 3.1 Organisation

From the very beginning of the existence of the Cadastral Offices there was a strong pressure to subordinate the administration of the Cadastre of Real estates to one of the Ministries of the Czech Government. Considered were namely the Ministry of Agriculture, Ministry of Finance, Ministry of Justice and Ministry of Interior. For the time being the independent organisation has some advantage, first of all it gives possibility for independent decisions and relative stability, without sudden changes caused by political decisions.

Present total number of 111 cadastral workplaces in all districts represents a relatively dense network that easily accessible by most of the citizens and organisations. On the other hand this does not enables a most effective exploitation of human resources and information technology.

#### 3.2 Human Resources

The entire CUZK has about 5500 employees. Comparing with other European Countries this number seems to be relatively high, nevertheless it has to be taken into consideration some important facts. First of all the Cadastre Offices have to deal with a lot of activities resulting from privatisation and restitution processes. The tasks that are guaranteed by the CUZK are much wider than those of the majority of other European Cadastres. A very important part of the activities is connected to decisions on entries of legal rights into the Real Estate Cadastre.

The majority of the employees can enjoy advantages of public servants that give relative security of work and salary depending on qualification, experience and seniority. On the other hand this system does not give much space for motivation and higher remuneration of top and young experts. This does not enable flexible and prompt recruitment of necessary work force. This concerns mainly graduated lawyers, surveyors and IT specialists. The young graduated people prefer to start their professional carrier in private sector where they expect higher rewards without waiting to achieve the required seniority as it is the case in the public sector of the CUZK.

The CUZK has to challenge permanent pressure of the Government administrative requirement to lower the number of staff by 2 % each year without consideration of the

required tasks, that are permanently growing.

### **3.3 Technology and software equipment**

The great advantage of the present Czech Cadastre is a complex application of the most recent technological and software tools for data processing and their distribution. The New Enhanced Information System of the Cadastre of Real Estates was implemented in mid of 2001.

The cadastral data are updated in local databases and replicated every 2 hours into the central database. A substantial advantage consists mainly in uniform software and hardware equipment of the central and local work places. System can be administered from one place and was made to measure to satisfy the needs of the Czech Cadastre.

The system enables access to all most recent cadastral data via Internet to all private and public subjects and free of charge access to selected basic information to the general public. This free Internet access has extremely positive influence on the quality of cadastral data as any owner, user or potential buyer can immediately verify the date. The system has also increased the transparency of all cadastral processes.

Currently, the possibility of replacing the local databases by one central database is being considered. This central database would enable direct access to all cadastral workplaces for updating in real time. This system would also enable electronic submission of request for entry or registration of legal rights from any place.

The full use of remote exploitation is still hindered by the fact that the digitisation of the cadastral maps is completed only by 30 %. Only analogue maps that are available also in raster form but not suitable for Internet application cover remaining 70 %.

### **3.4 Legislature**

It can be stated that the Czech Cadastre is in full conformity with the legislative requirements of the European Union. One of the most important changes of the last decades has been delegation of legal decisions on entries into the Cadastre to the cadastre authorities. This decision created “legal cadastre” unifying the traditional technical and legal function of the land registration. After 13 years of experience it can be stated that this has been a step into the right direction.

The process is by far not finished. It is needed to harmonise the cadastral regulations with some other laws and regulations, e.g. Civil Code, Building Law, Law on Protection of Personal data, etc.

### 3.5 Finance

The CUZK has its own chapter in the State budget and thus its cadastral activities are fully covered. It also means that the CUZK depends on the financial situation of the Czech Economy as the whole. This dependency limits the possibility of broader reforms that might be required.

## 4. CONCLUSIONS

The Czech Cadastre had to cope during the last 50 years with many revolutionary political and economical changes. Nevertheless, thanks to its historical roots and traditions it remained compatible with most of the European Systems, namely those of neighbouring countries Austria, Slovakia, Hungary, Germany but also with those of France and Belgium.

The most recent political changes after the “velvet revolution” in November 1989 required prompt solutions corresponding to requirements of the new political and economic situation oriented on protection of private ownership and rapidly growing market with real estates.

The economic development of the country would not be possible without a unique and reliable and secure cadastral system.

The new information technologies enabled to modernise the existing analogue system and to create a modern computerised one. The rapid change of the system has brought many positive results like unification of the legal and technical systems, computerisation, distribution of data by Internet and higher reliability of the Cadastre. To make the system perfect several problems are still to solve: Continuing professional development of personnel, improving quality of data – mainly the digitisation and georeferencing of cadastral maps, financing of future development on Cadastre.

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## **BIOGRAPHICAL NOTES**

### **Jiri RYDVAL**

Born in Prague in 1941, where he graduated from the Czech Technical University, the Faculty of Civil Engineering, branch of study surveying, as surveying engineer (M.Sc.) in 1963. After graduating he was employed in Institutes in Plzen and in Prague, where he carried out cadastral and thematic mapping and geodetic engineering. Presently director of the Cadastral Office Blansko. He is active as expert witness on Cadastre. He is member of the Council of the Czech Union of Surveyors and Cartographers and member of the National Committee for the FIG, where he is an assistant to the national delegate in Commission 7. Author of several contributions at the FIG Congresses and Working Weeks on Czech Cadastre.

### **Václav SLABOCH, PhD.**

Director of Research Institute of Geodesy, Topography and Cartography (VUGTK) in Prague, Vice-Chairman of the Czech Union of Surveyors and Cartographers, member of the FIG Commission Revision Group and delegate to Commission 5. Studied geodetic surveying at the Czech Technical University in Prague, 1968 –1969 employed with Fairey Surveys Ltd., U.K and later at the department of informatics of the VUGTK in Prague and at the Czech Office for Surveying, Mapping and Cadastre. 1979 – 1981 recruited as consultant for UNDP, and 1990 - 1995 by the Government of Malta. Member of the EuroGeographics Expert Group on Quality, teacher of Engineering Surveying at the Czech Technical University in Prague.

### **Libor TOMANDL**

born in Ostrov in 1967, graduated from the Czech Technical University, the Faculty of Civil Engineering, branch of study surveying, as surveying engineer (M.Sc.) in 1989. After graduating he was employed in Cadastral Office in Karlovy Vary Presently director of the Cadastral Office Karlovy Vary. He is member of the Czech Union of Surveyors and Cartographers and member of the National Committee for the FIG, where he is the national delegate to FIG Commission 7.

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