

# **COOPERATION BETWEEN PUBLIC AND PRIVATE SECTOR - PROJECT OF DIGITALIZATION OF THE CADASTRAL MAPS IN THE CZECH REPUBLIC**

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**Keywords:** Cadastre of Real Estate, Czech Office for Surveying, Mapping and Cadastre (COSMC), Digitalization, The private sector, File of Geodetic Information (FGI)

## **SUMMARY**

In 2009 in the Czech Republic the private sector has been invited to take part in the digitalization of cadastral maps in the form of public tenders for selected activities. Public tenders were launched as open proceeding for so called framework agreement followed by implementing agreements for single localities. To define range and contract prices the catalogue pages (catalogue sheets) for four basic renewal types were used.

## **INTRODUCTION**

### **Cadastral of Real Estate**

State administrative bodies of the Cadastre of Real Estate managed by the Czech Office for Surveying, Mapping and Cadastre (ČÚZK) provide state administration in the area of registration of land parcels represented by the Cadastre of Real Estate

The Cadastre of Real Estate of the Czech Republic is a set of data about real Estate in the Czech Republic, including their inventory and description and their geometric specification and position. Parts of it are records of property and other material rights and other legally stipulated rights to this real Estate.

### **Administration of the Cadastre of Real Estates**

First records concerning the land inventory were collected for tax purposes. The effort for unified tax policy was tangible even in 1022, when the Czech prince Oldřich from the family of Přemyslovci set up the hide tax. Despite the area of the estate taking for the tax basis was not accurate, we can consider it as the first step towards to the development of the cadastre of real estate (real estate records) as a fiscal tool.

The nobility started to secure private rights to property by recording in Land records at the start of the 14th century. That was the start of the recording of rights to real estate here. Later other records of real estate and cadastral maps were set up, serving predominantly for more effective and fair tax collection.

The foundations of today's modern Cadastre of Real Estate were laid by issuing a supreme patent of the Austrian Emperor Franz I on 23. 12. 1817, about land tax and land surveying. Its basis was a precise inventory and geodetic measurement of all land, a so-called Stable Cadastre. Most cadastral maps of the territory of the Czech Republic are today still derived from the survey documentation of the Stable Cadastre. Such cadastral maps (usually at a scale of 1:2 880) are available for about 48 % of the territory of today's state.

Current Czech Cadastre of Real estate was established in 1993 and integrates the function of Land Registry Book (registration of rights) and former Cadastre of Lands (records of real Estate) into one tool.

Cadastral of Real Estate in the Czech Republic is administered with help of the information system. The Information System of the Cadastre of Real Estate – ISKN is an integrated information support system for state administration of the Cadastre of Real Estate and for providing user services of the cadastre. It was implemented in 2001. The new system increases the data quality, their accessibility and reliability and offers the option of connecting to other basic registers of state administration.

Data are administered in local databases and replicated in roughly 2-hour intervals in the central database by means of the WAN department network. Thanks to this functionality it is possible to search up-to-date data of the cadastre throughout the whole Czech Republic by means of the Internet service „Remote Access to the Cadastre of Real Estate“.

Since September 2001 all historical data of descriptive and spatial data were stored, so it is possible to assemble data into required outputs on historical data (time development). Since June 2006 are the electronic outputs signed by the electronic mark and have the same significance as the public documents issued by cadastral workplaces.

### **Main Tasks of Cadastral Offices**

The main task of cadastral offices is recording of proprietary and other rights to real estate and other data by means of entry or registration and record of notations. Contractual transactions or setting up of material rights to real estate are completed by the constitutional entry of right into the cadastre of real estate, whilst the records or deletions of material rights arising or extinct by the decision of the public authority organ, by law a. o. are performed in a simpler procedural way, by means of so called registration. Similar procedure is used for record of some other data, in particular for record of notations, which should inform the users of cadastral data on important facts regarding the real estate.

## **DIGITALISATION OG THE CADASTRE**

### **Digitalization of the Cadastre of Real Estate**

Digitalization of the real estate registry is a vital step for effective operation and administration of the Cadastre of Real Estate. Cadastral maps in digital form are fundamental databases for administration and decision-making about the area. They are strategically important as a reference basis for creation of further maps, information systems and applications relating to the territory as for instance digital technical maps, spatial plans, price maps, monitoring and development of technical and traffic infrastructure, environment and others.

Digitalization of the file of descriptive information of the cadastre of real estate was realized in years 1993 – 1998, in the frame of which the cadastral database was completed with missing data on land parcels consolidated into large agricultural and forest areas, information on titles, some information on owners and data on agricultural land quality. In the course of this process almost 40 million entries were added to the database and its volume thus doubled. Digitalization of the file of descriptive information of the cadastre created basic conditions for the transition to a higher version of the information system equipped with remote access to data in the central database of the cadastre.

Digitalization of cadastral maps started in connection with the completion of digitalization of descriptive information of the cadastre. The capacities that cadastral offices could give to map digitalization were very limited in view of the growth of volume of other activities. Therefore only 2 to 3 % of the total cadastral territories in the Czech Republic were transformed into digital form yearly by the end of 2008.

### **Development of Digitalization of the File of Geodetic Information of the Cadastre (FGI): 2002–2010**

In 2009 the reversal occurred thanks to the provisions for acceleration of the digitalization, accepted by the government. The rate of digitalization reached nearly 6 % of the territory yearly. This growth in rate of digitalization went on even in 2010, when the increase of the number of cadastral districts covered by the digitized cadastral map reached 8.5 % from the total number of them. Attention was still focused on cadastral maps of cities and larger municipalities, where higher quality documentation is usually available and where more transactions on the property market and development objectives are realized.

Table 1: Development of Digitalization of the File of Geodetic Information of the Cadastre (FGI): 2002–2010

Year	Until	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Digital. Completed cadastral districts		440	453	543	383	314	279	263	313	763	1 106
Total in Digital Form cadastral districts		2 428	2 881	3 424	3 807	4 121	4 400	4 663	4 976	5 739	6 845
Yearly Growth from the Total of 13 027 cadastral districts		3,4 %	3,5 %	4,2 %	2,9 %	2,4 %	2,1 %	2,0 %	2,4 %	5,9 %	8,5 %
% from the Total Number		18,6%	22,1%	26,3%	29,2%	31,6%	33,8%	35,8%	38,2%	44,1%	52,5%

### **Results of Digitalization in 2009**

On 31<sup>st</sup> December, 2009 the cadastral map was available in digital form in 5,739 cadastral districts, which represents 44 % of the total number of 13,027 cadastral districts of the Czech Republic. Revision of cadastral documentation was completed based on the results of land consolidation projects, by new mapping and by adaptation of the set of geodetic information, which means digitalization of existing cadastral maps included transformation into the S-JTSK (System of Unified Czech /Slovak Trigonometrical Cadastral Net) coordinate system to DCM in 763 cadastral districts.

In comparison to the year 2008 the digitalization speeded up nearly 2.5 times. Cadastral offices were reinforced by 300 employees in 2009 in comparison to 2008, which were trained

in 2009 and afterwards participated in digitalization of cadastral maps. Their productivity could not fully occur in 2009 according to their step-by-step employee orientation, which resulted together with significant shortfall in completing land consolidation into lower number of digitized cadastral districts than planned 955 in 2009.

The private sector has been invited to take part in the digitalization of cadastral maps in the form of public tenders for selected activities. Public tenders were launched as open proceeding for so called framework agreement followed by implementing agreements for single localities. To define range and contract prices the catalogue pages (catalogue sheets) for four basic renewal types are used. Cadastral offices made 75 implementing agreements for digitalization of cadastral maps with 40 land survey companies and by 31<sup>st</sup> December, 2009 they took over the results in the amount of 77.4 million CZK, e.g. 3.10 million EUR (1 EUR equals nearly 25 CZK).

### **Results of Digitalization in 2010**

On 31<sup>st</sup> December, 2010 the cadastral map was available in digital form in 6,845 cadastral districts, which represents 52.5 % of the total number of 13,027 cadastral districts of the Czech Republic. Revision of cadastral documentation was completed based on the results of land consolidation projects, by new mapping and by adaptation of the set of geodetic information, which means digitalization of existing cadastral maps included transformation into the S-JTSK (System of Unified Czech /Slovak Trigonometric Cadastral Net) coordinate system to DCM in 1,106 cadastral districts.

The private sector remained active in the digitalization of cadastral maps in the form of public tenders for selected activities. Public tenders were launched as open proceeding for so called framework agreement followed by implementing agreements for single localities. To define range and contract prices again the catalogue pages (catalogue sheets) for four basic renewal types are used. Cadastral offices supply in this way particularly the land surveying works in the field, because the private sector is very well equipped not only with the instruments but also with the knowledge for it. In 2010 the financing of digitalization of cadastral maps was successfully provided without significant cost reduction despite the governmental economy measures included public tenders.

### **Results of Digitalization in 2011**

Results from 2011 have not been published yet, the official publication of this data is expected in May 2012 and they might be revealed in the Presentation of this Paper on Monday 7<sup>th</sup>, 2012, at FIG Working Week in Rome.

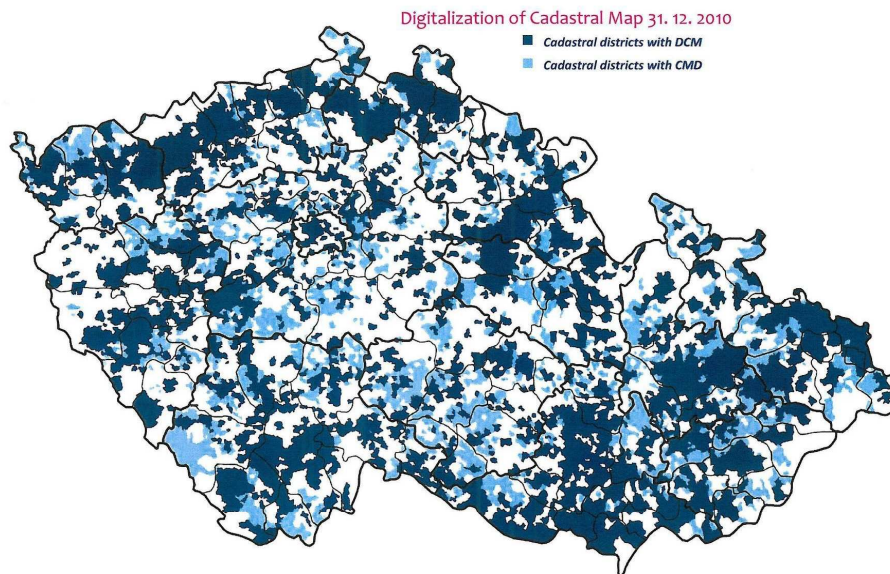


Figure 1: Digitalization of Cadastral Map on 31<sup>st</sup> December, 2010

### Plan of Digitalization of Cadastral Maps in Further Years

Significant governmental economic measures were included into the approved state budget for 2011 and 2012.

Under these circumstances it was impossible to devote initially planned capacity to the digitalization of cadastral maps and even the financial resources prepared for this task had to be lowered. Nevertheless it is impossible to reach further growth in the rate of digitalization to 10 % of the territory yearly. Therefore the real target was set to keep present rate of digitalization in the approximate amount of 8.5 % of the territory yearly with existing capacity and financial resources. This change will be projected into the frame schedule of the digitalization of cadastral maps so as the deadline for completion of the digitalization will be postponed by 1.5 year, thus from 2015 to the first half of 2017.

That is why in 2011 the number of cadastral districts covered with digitized cadastral map is planned to be 1,045 of the total number of all cadastral districts in the Czech Republic. The same increment of digitalization at the level of 8 % from the total number of all cadastral

districts should be reached both in years 2012 and 2013, in further years the number of completed cadastral districts should be wound down together with winding down of devoted capacities.

### **Schedule of Digitalization of File of Geodetic Information (FGI) in 2011 – 2017**

The actual course of adaptation of cadastral maps into digital form is negatively affected on the one hand by the necessity of completing cadastral maps of parcels consolidated in the course of collectivisation into large land blocks, today registered in a simplified manner using the historical map fund of former registrations, and on the other hand by the very urgent need of resolving the consequences of unfinished allotment and consolidation proceedings arisen after the second world war.

Whilst the removal of parcels registered in a simplified manner is a technical problem, resolution of the consequences of unfinished allotment and consolidation proceedings is a problem with serious legal aspects. Land consolidation, which is the most effective tool for the solution of relations in the area as a whole, because it provides digital cadastral map together with resolution of ownership relations i.a., proceeds however very slowly due to insufficient financial support.

To fulfil the above stated plan it is necessary to receive reasonable financing of this task. At the same time it is necessary to carry on the land consolidation to clarify the reconstruction of allotments and completing of redistribution step-by-step in the cadastral districts with uncompleted allotment and redistribution proceedings.

Until the digital cadastral map is for disposal in all cadastral districts, users' needs are covered by the raster data obtained by precise scanning of cadastral maps and maps of former land registries. Raster data of cadastral maps with current content are being collected continuously upon the stated requests.

Currently these maps are for disposal on the whole territory of the Czech Republic via applications Remote Access into the Cadastre of Real Estate, Consultation of the CRE and Web Map Services of the CRE.

Table 2: Schedule of Digitalization of FGI: 2011 – 2017

<b>Year</b>	<b>1997 – 2010</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>	<b>2017</b>
Proposal of the number of cadastral districts for map digitalization	-	1 045	1 045	1 045	998	879	760	410
Total number of cadastral districts with cadastral map in digital form	6 845	7 890	8 935	9 980	10 978	11 857	12 617	13 027
Yearly growth in % out of total number	-	8.0 %	8.0 %	8.0 %	7.8 %	6.8 %	5.8 %	3.1 %
% out of total number	52.5%	60.5%	68.5%	76.5%	84.3%	91.1%	96.9%	100%

# **DIGITALIZATION OF THE CADASTRE – COOPERATION BETWEEN PUBLIC AND PRIVATE SECTOR**

## **Start of the Public Tender**

In the first half of year 2008 six cadastral districts were prepared for the six pilot projects. Each of them was with the different quality of base data and with the different stage of digitalization of cadastral map or even with just an analogue cadastral map. Every chosen case needed the different approach to the Renewal.

It was mentioned to find the right way in the cooperation between Private Sector and State Authority in the Cadastre, to develop a proper methodology for the work and to develop the checking tools as well. The main Private companies were invited into the small tenders to win and make these pilot projects. There were prepared the presentations at every Region with the presenting the results, good achievements and mistakes in cooperation at the end of 2008.

## **The First Step of the Public Tender**

In 2009 the first round of the Public tender was launched to the market. The area of the Czech Republic is divided into 14 regions and The Czech Office for Surveying, Mapping and Cadastre Czech is divided into 14 Regional Cadastral Offices, every for each region. Central Office for Cadastre prepared bidding documentation and conditions, Agreement Suggestion, Technical Instructions and Methodology

That is why the whole Call for Tender was divided into 14 smaller regional tenders to ensure the best Private Companies for every Region. The whole tender included four types of Catalogue Pages (Catalogue Sheets – CS). Each CS was prepared for different kind of input analogue or graphic data and maps and for different type of Renewal of File of Geodetic Information (FGI):

- Catalogue Sheet 1 – Renewal of FGI with a new mapping
- Catalogue Sheet 2 – Renewal of FGI with conversion the analogue (“paper”) cadastral maps into the Digital Cadastral Maps (DCM)
- Catalogue Sheet 3 – Renewal of FGI with remaking the analogue (“numbered”) cadastral map in State Coordinate System into the Digital Cadastral Map (DCM)
- Catalogue Sheet 4 – Renewal of FGI with conversion the analogue cadastral map into the Cadastral Map Digitised (CMD)

Each Catalogue Page (Catalogue Sheet) includes a wide scope of activities which leads to the proper delivery of demanded results (Digitized Cadastral Map – DCM, or Cadastral Map Digitised – CMD) and it was mentioned, that every part of every Catalogue Page (Catalogue Sheet) could be done separately.



The Results of the first round were the Frame Agreements with five best Bidders from the sub tender as Contractors for each Catalogue Page (sheet). Every Frame Agreement includes Catalogue Pages (Catalogue Sheets) of all successful Contractors in the official Enclosure. Frame agreements are signed for the period of four years (2009 to 2012).

Every contractor knows the prices of the others and knows that he can win only in the case he offers lower prices than the lowest Bidder. The lowest bidder can still submit lower prices as well.

## **The Second Step of the Public Tender**

In the second half of 2009 and at the beginning of 2010 and 2011 there were prepared small tenders for every Region and for chosen Catalogue Sheet. The Contracting Parties were Regional Cadastral Offices and the successful Bidders from the frame tender. As a renewal unit was chosen the cadastral district.

If the Contractors wanted to win the sub tender and get the Implementation Agreement (to renew the cadastral district) they had to beat the lowest price from all known Catalogue Pages (enclosure to the every frame agreement). They had to submit an offer with the price below the lowest one.

At least the Contractors had to submit the bid with the prices from their Catalogue Sheet and so to take part in these sub tenders; otherwise they were charged with a penalty 5% from the price of subcontract. The penalty is charged by Employer also in the case the contractor submits the bid with the mistakes and causes it to be no acceptable.

There were some tries not to take part in the tender and after some negotiations to pay the penalty and let the other contractor with better price to win the tender. Then you get the penalty back from the winner and sometimes participate in the contract as a subcontractor but in better prices.

There is an institution of the “special affair to be considered” in the some disadvantageous conditions for the Employer that can help him to revoke the invitation to the tender and organize the new one.

## **Conclusion**

Although there were some disputes between Private and Public Sector, the digitalization of the Cadastral Map became quicker and there are still two years of agreed cooperation (Frame Agreement) between contracting parties. Everybody hopes the amount of money from the state budget will be sufficient to cover this kind of digitalization.

The project of cooperation between Public and Private in the digitalisation cadastral (or other maps or data) could be transferred into the other countries, only the methodology and

instructions have to be adapted to the local law. I can add some more official documentations and concrete examples and numbers with the cooperation of COSMC.

## **CZECH OFFICE FOR SURVEYING, MAPPING AND CADASTRE (COSMC)**

### **Role and position of the organisation**

- Complete administration of the Cadastre (including legal relations to real estate property),
- Maintenance and modernisation of horizontal, vertical and gravity control in the Czech Republic,
- Large-scale mapping (cadastral maps, derived 1:5.000 State map),
- Medium-scale mapping (Base map of the Czech Republic 1:10 000, 1:25 000, 1:50 000, 1:100 000, 1:200 000),
- Small-scale mapping of the Czech Republic (1:500 000, 1:1 000 000),
- Creation of the Fundamental Base of Geographic Data (ZABAGED),
- Geodetic surveys and documentation of state boundaries,
- Development and maintenance of the Information System of Surveying, Mapping and Cadastre in the Czech Republic,
- Standardisation of geographical names,
- Coordination of research and international cooperation in geodesy, cartography and cadastre.

Administration of Cadastre of Real Estate is performed by 14 cadastral offices in regions and 114 subordinated offices, 80% of all activities in the sector of the Czech Office for Surveying, Mapping and Cadastre - COSMC). Since 1993 cadastral offices have been given the power to make decisions about entries of proprietary and other rights in relation to real estate into the cadastre.

Maintenance and modernisation of fundamental geodetic control, medium- and small-scale official mapping, creation of the Fundamental Base of Geographic Data (ZABAGED) and geodetic surveys and documentation of state boundaries are mostly carried out by the Land Survey Office in Prague (380 employees).

7 Survey and Cadastral Inspectorates (90 employees) supervise the performance of cadastral offices and those activities of private companies and licensed surveyors performed for the state administration.

The Czech Office for Surveying, Mapping and Cadastre is an autonomous supreme body of the state administration of surveying, mapping and cadastre in the Czech Republic. The president of COSMC is subordinated only to the prime minister of the Government. The Office has its own account in the State budget of the Czech Republic.

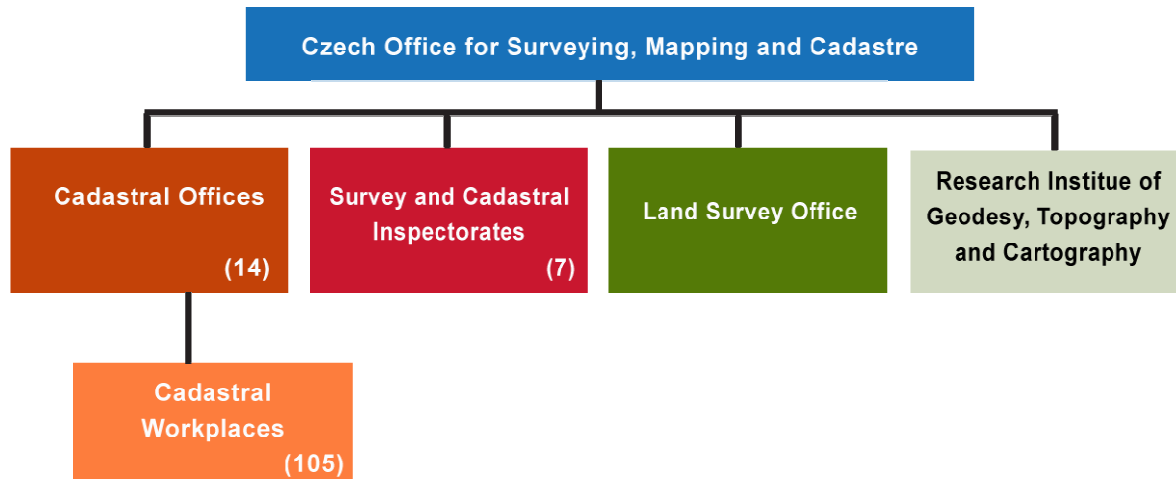


Figure 2: Organizational chart of the COSMC Sector

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## Biographical notes:

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Cooperation Between Public And Private Sector - Project Of Digitalization Of The Cadastral Maps In The Czech Republic

FIG Working Week 2012

Knowing to manage the territory, protect the environment, evaluate the cultural heritage

Rome, Italy, 6-10 May 2012

Czech technical University in Prague, Faculty of Construction, Geodesy and Cartography, MSc. Degree, 1988

Current Position:

Co-owner and Vice Chairman of the Board of Directors, GEFOS a.s. (since 1995: GEFOS a.s., Czech Joint Stock Company: Project Manager, Head of Data and Map Services Department, Commercial Director, Director of South Bohemian Region, CEO GEFOS a.s.)

Since 2010: Lector at the University of Technology and Economics Ceske Budejovice (VSTE CB), Department of Engineering and Applied Sciences, Department of Geodesy

The FIG General Assembly elected at its meeting in Sydney, Australia in April 2010 Robert Sinkner as FIG Commission 10 Chair for a four-year term of office 1.1.2011 – 31.12.2014.

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