

SURVEYING, MAPPING AND CADASTRE IN THE CZECH LANDS — HISTORY, PRESENT STATE AND PERSPECTIVES

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1. HISTORY

Beginning of surveying and land registration in the Czech Lands may be found around 1270 during the reign of the king Premysl Otakar II. He introduced the institution of authorised surveyors who took substantial part on building towns, castles, ponds, roads and settlements in waste lands. In the same century the measure of length was defined to be used to survey of lots and domesday books registering the property of nobles, free towns and church were established.

Years between 1348 and 1620 are considered today as an epoch of important grow of science and art in the Czech Lands — among them also of surveying and cartography. Excellent surveyors and astronomers were active in Prague, e.g., Tycho Brahe and Johannes Kepler. The first textbook for surveyors was edited in Prague in 1617. The oldest maps of the Czech Lands are dated 1518 (map of Bohemia), 1561 (map of Silesia) and 1569 (map of Moravia).

After 1620 the Czech Lands became for 300 years a part of the Austrian (and later Austro-Hungarian) Empire. Development of surveying and beginning of cadastre were common to a group of other lands forming this Empire, e.g. to Austria, Hungary, Slovakia, Croatia, Slovenia and two North-Italian provinces.

In 1718 the first School of Engineering with lessons in surveying was established in Prague. In 1720 Johann Christoph Müller created his map of Bohemia at approximate scale of 1 : 132,000 based on astronomical determination of position of larger towns and length measuring between settlements by a survey coach.

At the end of the 18th century the first military topographic mapping took place. Cadastre of Lands was established by the Emperor Joseph II as so called „Stable“ cadastre in the whole Austrian Empire based on triangulation and detailed survey during 1817 - 1861. Cadastral maps were compiled at scales 1 : 2,880 and 1 : 1,440. An important part of cadastre was its descriptive and evaluating documentation which served to the taxation of lands.

In 1912 the Society of Czech Surveyors has traced out three basic goals: to concentrate all organisations of surveying and mapping in one, to prolong university studies of surveying to four

years and to gain equal position of surveyors in public services with other graduates from technical universities.

In 1918 the Czech Lands became part of the Czechoslovak Republic. In twenties and thirties the national geodetic reference system as well as a national cartographic projection were formed by Josef Krovák. In 1927 Czechoslovakia became member of the International Federation of Surveyors (FIG). In the same year the Act on the Cadastre of Lands came in force. Together with detailed technical instructions it gave start to dispatched forming of a modern cadastre.

During the World War II the Czech Lands became a part of Great German Empire as its Protectorate. This epoch has contributed to concentration of state surveying in the Land Survey Office except for the cadastre which still remained in the sphere of the Ministry of Finances.

Results of the World War II led to incorporation of Czechoslovakia into the East Block of Socialist Countries bringing some positive and some negative consequences. A boon may be seen in fulfilment of the three basic goals of Czech surveyors from 1912, in the first line by establishing the Central Authority of Geodesy and Cartography in 1954 as a budget organisation with own chapter in the state budget. The president has been nominated by the government and also directly responsible to it. Other positive features of this epoch were the integration of fundamental trigonometric, levelling and gravimetric networks and unification of medium and small-scale map series in all former socialist countries. On the contrary, this epoch brought a suppression of the Cadastre of Real Estates that originally registered proprietary relations to lands, its replacement by the Land Registry recording user relations to lands only, as well as forcible influencing the content, form and distribution of maps caused by secrecy mania. During forty years of communist rule the private sector of surveying and mapping became completely extinct.

2. PRESENT STATE

Czechoslovakia was splitted peacefully on the 1st January 1993 and the Czech Lands (Bohemia, Moravia and Silesia) became the Czech Republic. At the same time a central body of state administration was established — the Czech Office for Surveying, Mapping and Cadastre which supervises activities of

- 77 Cadastral Offices in districts,
- 7 Survey and Cadastral Inspectorates in regions,
- Land Survey Office with nation-wide field of activity and the
- Research Institute of Geodesy, Topography and Cartography.

Activities of state administration bodies are strictly regulated by law. Capacity of 80% of 5,700 employees is dedicated to administrative and technical activities in the Cadastre of Real Estates. The Czech Republic belongs to few European countries where the cadastral offices decide about entries of ownership and other material rights to real estates and also register such rights together with technical parameters of lots, buildings and flats.

Other important tasks of state administration are:

- care of fundamental geodetic networks (trigonometric, levelling and gravimetric ones) and their upkeeping and modernisation,
- creation and updating of Basic Maps of the Czech Republic at medium and small scales,
- establishing and maintenance of the Information System of Surveying, Mapping and Cadastre,
- managing the Central Archives of Surveying, Mapping and Cadastre,
- care of geographical names and their gazetteer.

Other survey and cartographic activities are carried out exclusively by private firms (about 500 enterprises) and by licensed surveyors (about 1800), e.g., laying-out and delimitation of lots, production of survey sketches (more than 120 thousand annually), surveying for building construction (engineering geodesy) and creation of thematic maps, charts and atlases.

In 1994 two basic concepts of long-time activities were defined:

- digitising of the Cadastre of Real Estates (1994 - 2006),
- creation of the Fundamental Base of Geographic Data (ZABAGED) as a topologic-vectorial basic layer to GIS and computer created medium and small scale map series.

Till the end of 1999 a considerable part of these goals was fulfilled: the File of Descriptive Information of the Cadastre of Real Estates was fully digitised and ZABAGED covered more than 80% of the national territory. The fundamental horizontal control was integrated into the European frame (EUREF) thanks to several international GPS campaigns during 1991 - 1994. In the large-scale densification campaign DOPNUL the ETRF-89 coordinates of 176 stations were determined. The DOPNUL stations are regularly distributed over the entire territory with the spacing 20 - 25 km. The Czech Republic is a NATO member and the Military Topographic Service of the Army of the Czech Republic co-operates effectively on creating of unified map series in digital form (V-map). NATO standards are accepted, especially the World Geocentric System WGS84 in its more precise version, and the Universal Transverse Mercator Projection for creation of military maps.

3. PERSPECTIVES

The main task of the state administration of surveying, mapping and cadastre in the Czech Republic at the beginning of the coming millenium will be implementation of the so-called Enhanced Information System of the Cadastre enabling integration of descriptive and geodetic data of the cadastre, their maintenance in local area networks (LAN), the replication in the Central Data Base by the wide area network (WAN) and remote access of end users by means of the Internet. The Fundamental Base of Geographic Data (ZABAGED) will be updated in four-years-intervals. Since 2005 it will also represent the exclusive source of data for computer created medium and small scale maps. In the same period close relation between civil and military geographic data bases will be achieved. Transformation of basic horizontal ground control into

ETRS-89 geocentric system in the nineties represents the end of the era of classical geodesy in the Czech Republic. The new technology does not require dense network of horizontal control stations any more. Therefore the future maintenance of fundamental horizontal control will be focused to approximately one third of existing trigonometric stations. Creation of a network of active permanent GPS reference stations in the frame of activities of Czech private firms is discussed.

After vectorising of all cadastral maps (2006) the Enhanced National Geodetic Reference System (S-JTSK/95) will be implemented into cadastre and large-scale mapping eliminating local distortions of existing horizontal ground control caused during its creation in twenties by joining heterogeneous historical observations without new determination of scale by base measurement and astronomical orientation of the network.

Concept of development of national geoinformation infrastructure will be started in 2000. Its goal is to form legislative, standardised, organisational and technological environment suitable to acquisition, processing and distributing geographical information required by public administration and private sector.

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