

New Technologies of Measurement and Role of Field Sketches

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Key words: technologies of measurement, output documentation, field sketches, digital sketches, digital map.

SUMMARY

The history of cadastral mapping and the role of field sketches in the Czech Republic start already in 11th century when the Premysl dynasty ruled on the Czech area. After the velvet revolution and finishing of communist rule the Czech Parliament adopted new Cadastral Law no. 344/1992 and following regulations coming into power since 1 January 1993. From the historical point of view the field sketches contained always survey and non-survey information and have complemented the map original. VUGTK has developed new technology for cadastral mapping and software for creation of field sketches. Drawing of field sketch is automatically edited on the base of change in position - points set by measurement. From the "inaccurate" position in the sketch into "accurate" one is the point moved on the base of change of co-ordinates in the database. The change of point's positions automatically causes change in drawing of digital sketch. If another point number was used during survey, individual hand editing of drawing is needed after point visualisation. Sketches (individual files) are pieced together into one file of measured locality and attributes of map elements are assigned into form and structure standard of digital cadastral map.

RESUME

L'histoire du levé du sol sur le territoire de la République Tchèque actuelle, comme un outil fiscal qui permettrait d'imposer équitablement les citoyens aux contributions foncières et des relations juridiques, commence au 11ème siècle. Après „la Révolution de Velours“ et la chute des Communistes en 1989, le Parlement tchèque a donné en 1993 sa sanction à la nouvelle loi cadastrale. En général, les documents cadastraux sont constitués par les fichiers des informations géodésiques (c'est surtout une carte cadastrale) et la documentation littérale (parcelles, propriétaires, nature de culture, valeur du sol ...), des relations juridiques et le livre foncier y compris et des archives (contrats de vente, plans géométriques, testaments, des croquis de vérification des limites de parcelles et des croquis de levé ...).

Pour le cadastre Tchèque notre institut (VÚGTK) a déployé la nouvelle technologie de levé et logiciel pour la création de croquis de levé digitale. Le dessin des croquis on ajuste automatiquement en égard au changement des points approximatifs par les point mesurés, placés dans la base de données. Changement automatique des positions des points engendre aussi de changement de dessin des croquis digitaux. En cas d'utilisations d'autres méthode, il est nécessaire tout d'abord afficher des points sur l'écran (d'après la mesure sur le terrain) et éditer manuellement des dessins des croquis.

L'achèvement du travail nécessite l'assemblage des croquis dans un fichier de levé et incorporer les attributs des éléments de la carte dans la forme et les structures du standard national.

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1. SHORT HISTORICAL BACKGROUND

The history of cadastral mapping and the role of field sketches in the Czech Republic start already in 11th century when the Premysls' ruled on the Czech area. The tradition of field sketches creation as a part of output documentation of the mapping persists till present.

From the historical point of view the field sketches every time contained survey and non-survey information and have complemented the map original. We can divide the field sketches by the manner of survey on the field sketches created by:

- table method of mapping
- numerical method of measurement
- digital method of measurement.

2. FIELD SKETCHES IN PRESENT

After the velvet revolution and finishing of communist rule was in the Parliament adopted new cadastral law no. 344/1992 and following regulations with virtue since 1/1/1993.

Field sketches remain as an obligatory document for recognition of the location of borders of plots, detailed planimetric survey and for sketches, which are parts of survey sketches and setting-out of plots.

Field sketches for recognition of the location of borders of plots are created on the basis of existing cadastral map. The extension of the sketch is chosen so that it contains integral blocks of parcels of the same owners who will be asked to take part in the local-on-the ground examination on the concrete day.

The list of real estates is created of each sketch that the owners sign as an agreement with the found reality. From the sketch of detection of plot border localisation, where changes are graphically marked, survey sketch is created. In it are written numbers of detailed survey points and measured values.

3. NEW TECHNOLOGY OF CREATION OF FIELD SKETCHES

VUGTK has developed new technology for cadastral mapping and software for creation of field sketches. It consists of:

- fast (approximate) vectorization of original map
- filling of numbers of owner's folio from the database of file of descriptive information
- division of the locality into blocks of sketches in individual *.dgn files

- editing of digital sketch on the base of outputs of recognition of borders location and use of these numbers during detailed survey
- computed co-ordinates of detailed survey points (from the total station) are loaded into database of points with the same numbers as inaccurate graphical file
- drawing of field sketch is automatically edited on the base of change in position - points set by measurement. From the "inaccurate" position in the sketch into "accurate" one is the point moved on the base of change of co-ordinates in the database. The co-ordinates of the point in the sketch are replaced by co-ordinates from the survey in field, which are saved in relation database assigned by the same point number and the point changes its location. The change of point's positions automatically causes change in drawing of digital sketch. If another point number was used during survey, individual hand editing of drawing is needed after point visualisation.
- sketches (individual files) are pieced together into one file of measured locality and attributes of map elements are assigned into form and structure of digital cadastral map according to the state standard.

4. CONCLUSION

Digital maps can fully overtake the role of field sketches with use of modern equipment by survey crews. The data then can be saved into a unified database (graphical and non-graphical). Users can get documents in past created by traditional manner from the unified database.

Creation of digital sketches saves processing time even with average skills of the observer and once gained digital information remains in this form (without paper) for the whole mapping process and following upkeep.

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BIOGRAPHICAL NOTES

Milan Kocáb, graduated in geodesy and cartography at the Technical University of Brno head of department of GIS and cadastre of Research Institute of geodesy, topography and cartography (VUGTK) in Prague, Czech Republic;

1974 – 1978 – the experience in cadastral offices with mapping

1983 – 1987 – the experience in Algerian – expert of topography

1989 – 1993 – the experience in Morocco – teacher of cartography

1993 – head of department GIS and cadastre – main projects:

- System of automatic information of geodesy and cartography (1993 – 1996)
- Digitalization of cadastral maps in Czech Republic (1996- 1998)
- Inclusion of historical map series to DIKAT-P systém for specification of detailed localization of real estate culture(1998 – 2000)
- System of arrangement in river basin to decrease harmful inundation effects – development of GIS application (2001 – 2003)
- Creation of state maps in scale 1 : 5000 (2001 – 2003)
- Development of technologies of measuring in large scale of cadastre. (1999 – 2003).

CONTACTS

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