

From Analog to Digital

Modernizing Slovakia's Cadastral Information System

CLRKEN Plenary and Joint PCC/EuroGeographics workshop

Rīga, 21st November 2024

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OVERVIEW

- Introduction
- Historical Evolution of Cadastre
- Access to Services
- Information System of Buildings
- Developments and Innovations
- Conclusion



INTRODUCTION

BASIC FACTS



8 Regions



79 Districts



2 927 Municipalities



3 559 Cadastral Districts

STATE ADMINISTRATION STRUCTURE



CENTRAL
STATE ADMINISTRATION

LOCAL
STATE ADMINISTRATION
(72 DISTRICT OFFICES)



GOVERNMENT



Central State
Administration Bodies
(10)

Ministries
(15)



Statistical Office

**Geodesy, Cartography
and Cadastre Authority**

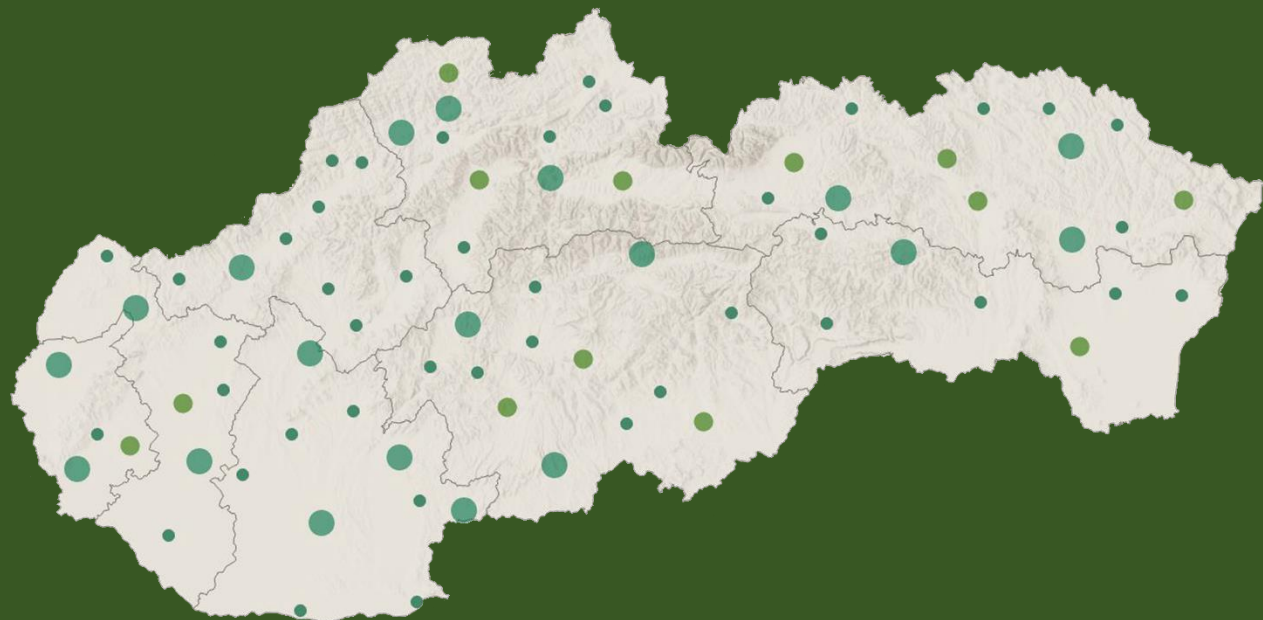
Nuclear Regulatory Authority

The Industrial Property Office

Telecommunications Office

etc.

ORGANISATIONAL STRUCTURE



GEODESY, CARTOGRAPHY AND CADASTRE AUTHORITY

↳ Geodetic and Cartographic
Institute Bratislava

↳ Research Institute of Geodesy
and Cartography in Bratislava

MINISTRY OF INTERIOR

↳ 75 Cadastral Offices

ORGANISATIONAL STRUCTURE

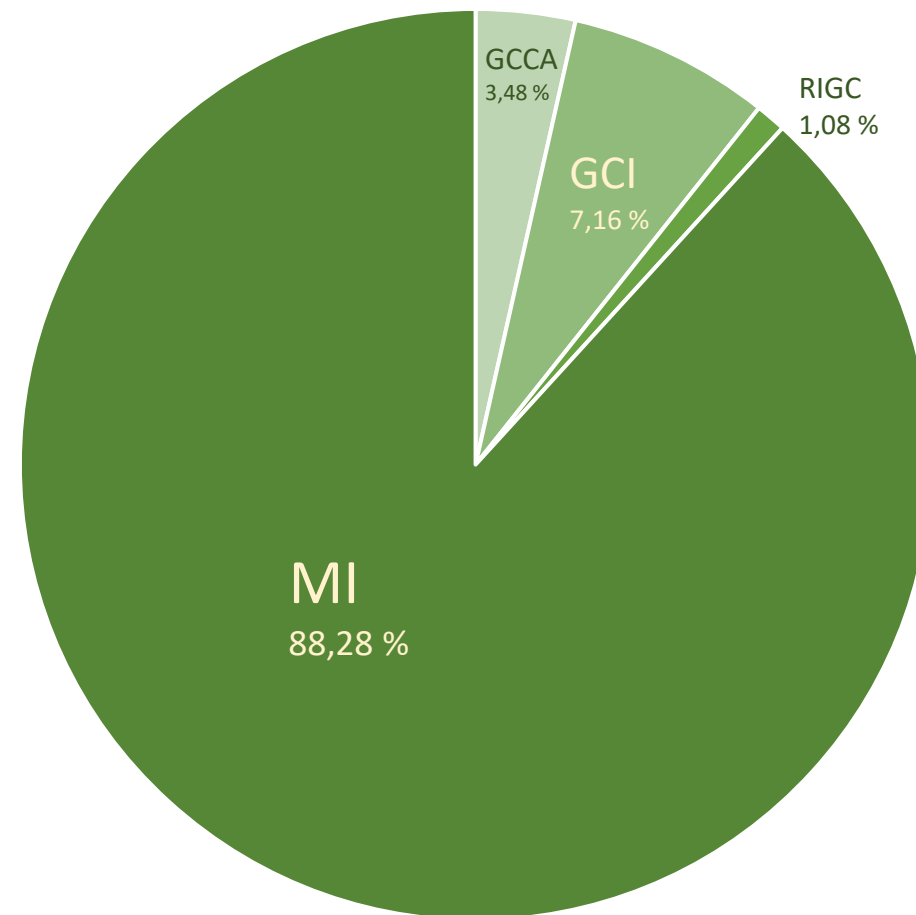
Ca **2039** employees all over the country

71 employees
Geodesy, Cartography and Cadastre Authority (GCCA)

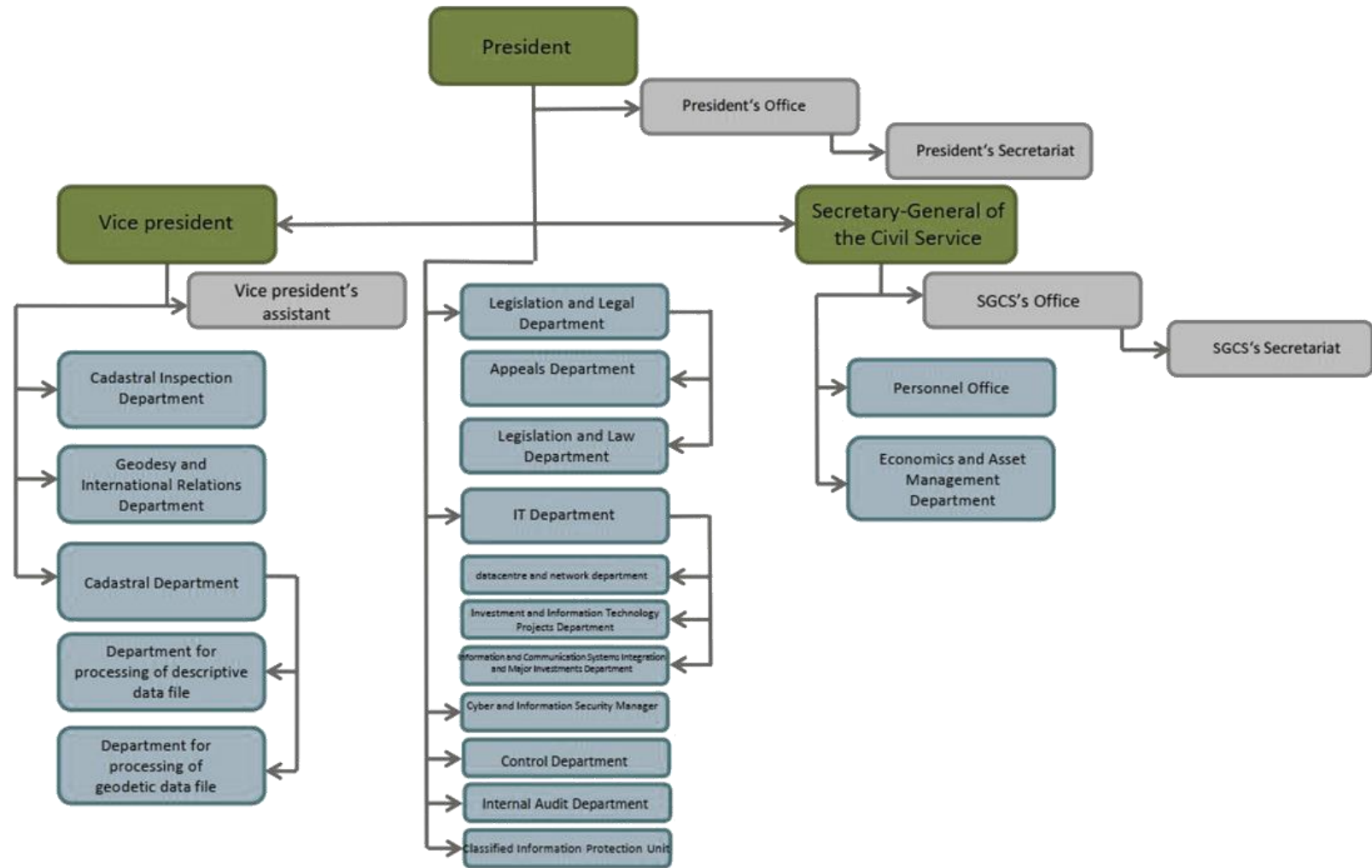
146 employees
Geodetic and Cartographic Institute Bratislava (GCI)

22 employees
Research Institute of Geodesy and Cartography in Bratislava (RIGC)

ca **1800** employees
Ministry of Interior (MI)



AUTHORITY STRUCTURE



LEGISLATION

ACT ON GEODESY AND CARTOGRAPHY

ACT ON REAL ESTATE AND CADASTRE

ACT ON THE CHAMBER OF SURVEYORS

Act on NSDI

Act on certain measures for the organization of land ownership

Act on Information Technologies in Public Administration

Act on eGovernment

Act on Free Access to Information (Transportation of Directive 2019/1024 – Open Data Directive)

MAIN ACTIVITIES

Public administration and professional supervision in the field of geodesy and real estate cadastre.



Reference Systems,
Geodetic Control,
Metrology



Real Estate
Cadastre

ZBGIS[®]

Topographical
Database



State Maps

MAIN ACTIVITIES



Orthoimagery



Airborne Laser
Scanning
(Classified
Point Cloud,
DTM and DSM)

GN

Standardization
of Geographical
Names



Central
Map
Archive

REAL ESTATE CADASTRE



CADASTRE

one Office, one DB

LAND REGISTRY

3559 Cadastral Districts
(17 military areas)

13,8 km² Average area of the
Cadastral District

2000 Average number of Parcels
per Cadastral District

Consists of cadastral documentation organized by cadastral districts. The cadastral documentation contains the following parts:

- Geodetic data file (i.e. cadastral maps)
- Descriptive data file
- Collection of documents
- Data on the land fund
- Land register and railway register

HISTORICAL EVOLUTION OF CADASTRE

1945 – 1964

- Two type of evidence – Land Registry and Land Registry Book
- After II. World War – most of the data lost or destroyed
- Evidence to the Land Registry Book on the basis of first and last name only – exchange of persons
- 1950 – aquisition of ownership by deed

- 1.4.1964 – Law of Real Estate Registration
- State IS of Real Estate – the new evidence was realised in 2 phases
 - Evidence on the basis of deeds
 - Evidence of ownership that were not registere during the 1. phase, using public registers and investigations in the municipalities
- Priority:
 - Efficient management of resources (agricultural production, forestry, investment construction)
- Ensuring certainty of real estate ownership, fairness of taxation were subdued.

1964

HISTORICAL EVOLUTION OF CADASTRE

1964 – 1980

- Mandatory data in the IS Real Estate:
 - Parcel Number
 - Number of Cadastral Area
 - Area of the Parcel
 - Type of Land
 - Area of Agricultural Plant
 - Area of the Sector
 - Area of Republic, Regions, Districts and Municipalities
 - The Real Estate Register consisted of geodetic information and descriptive information (as nowadays)
- 1980 's
- Priority of efficient management of resources (agricultural production, forestry, investment construction) continued
 - Private property protection still absent
 - The Law of Real Estate Registration from 1964 no longer meet the needs of social relation.
 - Its shortcomings became more visible after 1989 – shift in the understanding of property in relation to commercial activity

HISTORICAL EVOLUTION OF CADASTRE

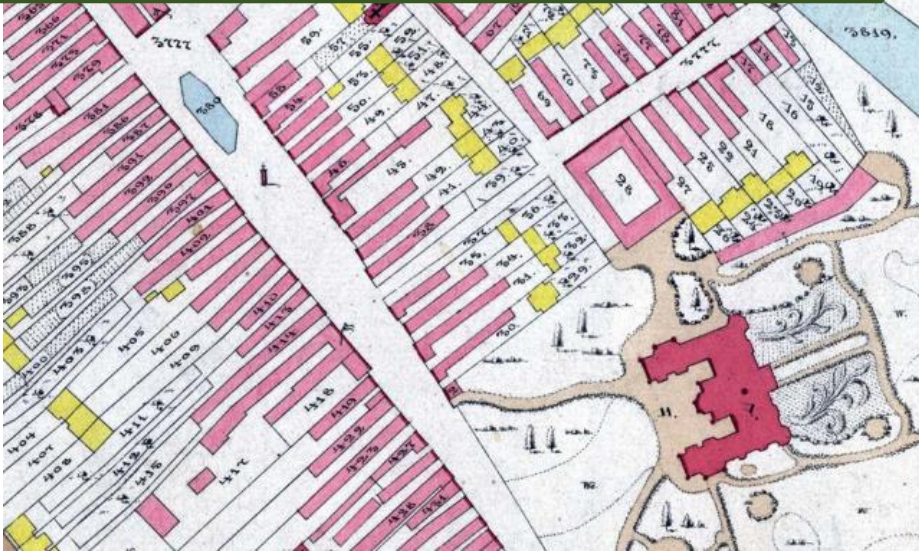
1990 's

- The Law of Real Estate Registration from 1964 was replaced on 1.1.1993
- The turbulent social and economical changes required an elaboration of a new Cadastral Law
- New Cadastral Law (1.1.1996) brought significant changes:
 - Protection of rights (to real estate)
 - Shaping the condition for trade in real estate, business activities
 - Protection of land fund an environment, cultural monuments and constructions
 - Data for tax and fee purposes

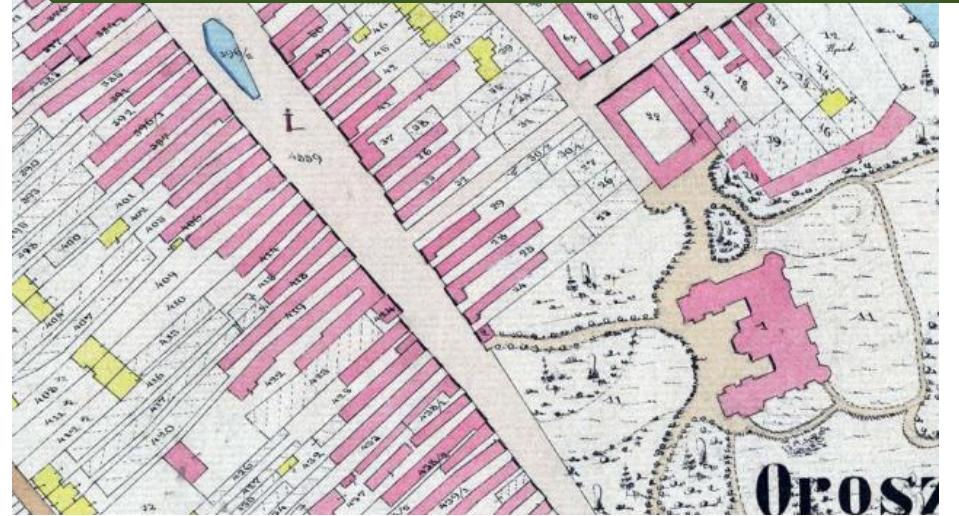
2000 's

- Several changes in the Cadastral Law had led to greater efficiency, improved functionality and enhanced the expertise required in approval processes
- Faster services for the public
- 2013 – organisational changes – cadastral offices operate under the administration of Ministry of Interior
- 2018 – realisation of the project – Electronic Services of the Real Estate Cadastre
- Integration to another reference registries (Physical and Legal Persons, Addresses)
- Tracking changes in the cadastre

1856



1881



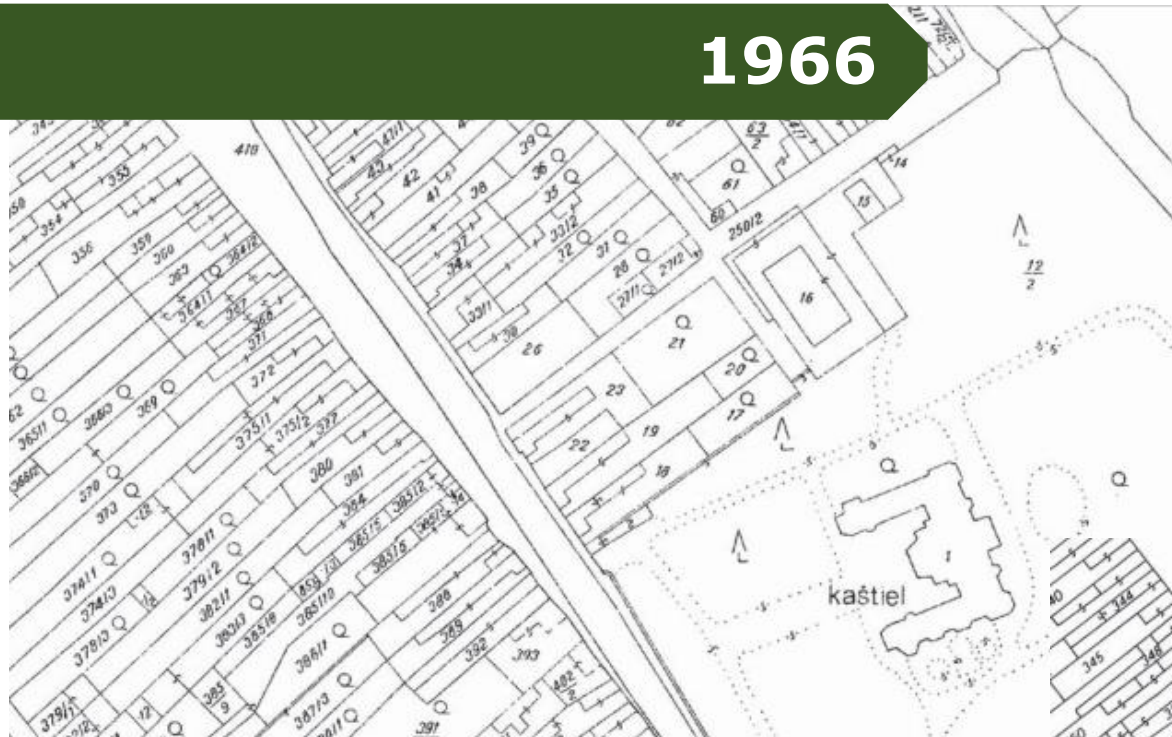
1902



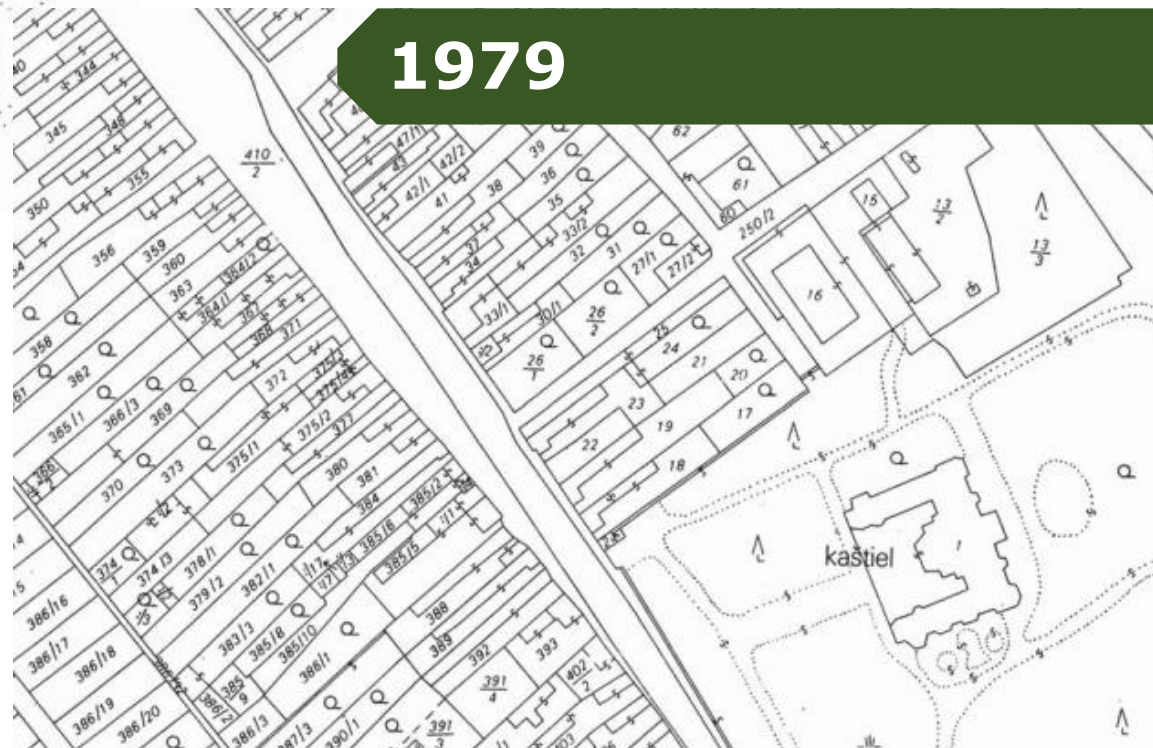
1950



1966



1979



2024



2024

Úrad geodézie, kartografie a katastra Slovenskej republiky VÝPIS Z KATASTRA NEHNUTEĽNOSTÍ

Okres : 105 Bratislava V Dátum vyhotovenia : 11.11.2024
 Obec : 529494 Bratislava-Rusovce Čas vyhotovenia : 16:53:55
 Katastrálne územie : 853771 Rusovce Údaje platné k : 8.11.2024 18:00:00

Výpis je nepoužiteľný na právne úkony VÝPIS Z LISTU VLASTNÍCTVA č. 577

ČASŤ A: MAJETKOVÁ PODSTATA

Parcely registra „C“ evidované na katastrálnej mape

Počet parcelí: 11

| Parcelné číslo | Výmera v m ² | Druh pozemku | Spôsob využívania pozemku | Druh chránenej nehnuteľnosti | Spoločná nehnuteľnosť | Umiestnenie pozemku | Druh právneho vzťahu |
|-----------------------|-------------------------|-----------------------------|---------------------------|------------------------------|-----------------------|---------------------|----------------------|
| 1 | 2478 | Zastavaná plocha a nádvorie | 17 | 201 | 1 | 1 | |
| Iné údaje: Bez zápisu | | | | | | | |
| 2 | 201 | Zastavaná plocha a nádvorie | 17 | | 1 | 1 | |
| Iné údaje: Bez zápisu | | | | | | | |
| 4/5 | 1337 | Zastavaná plocha a nádvorie | 18 | | 1 | 1 | |
| Iné údaje: Bez zápisu | | | | | | | |
| 4/7 | 727 | Zastavaná plocha a nádvorie | 18 | | 1 | 1 | |
| Iné údaje: Bez zápisu | | | | | | | |
| 5/1 | 99469 | Ostatná plocha | 37 | | 1 | 1 | |
| Iné údaje: Bez zápisu | | | | | | | |
| 5/10 | 31410 | Ostatná plocha | 37 | | 1 | 1 | |
| Iné údaje: Bez zápisu | | | | | | | |
| 5/12 | 1337 | Ostatná plocha | 37 | | 1 | 1 | |
| Iné údaje: Bez zápisu | | | | | | | |
| 6 | 5073 | Zastavaná plocha a nádvorie | 16 | | 1 | 1 | |
| Iné údaje: Bez zápisu | | | | | | | |
| 8 | 37 | Zastavaná plocha a nádvorie | 17 | | 1 | 1 | |
| Iné údaje: Bez zápisu | | | | | | | |
| 1057 | 2685 | Zastavaná plocha a nádvorie | 16 | | 1 | 1 | |
| Iné údaje: Bez zápisu | | | | | | | |
| 1058 | 4435 | Zastavaná plocha a nádvorie | 18 | | 1 | 1 | |
| Iné údaje: Bez zápisu | | | | | | | |

Legenda

Spôsob využívania pozemku

- 16 Pozemok, na ktorom je postavená nebytová budova označená súpisným číslom
- 17 Pozemok, na ktorom je postavená budova bez označenia súpisným číslom
- 18 Pozemok, na ktorom je dvor

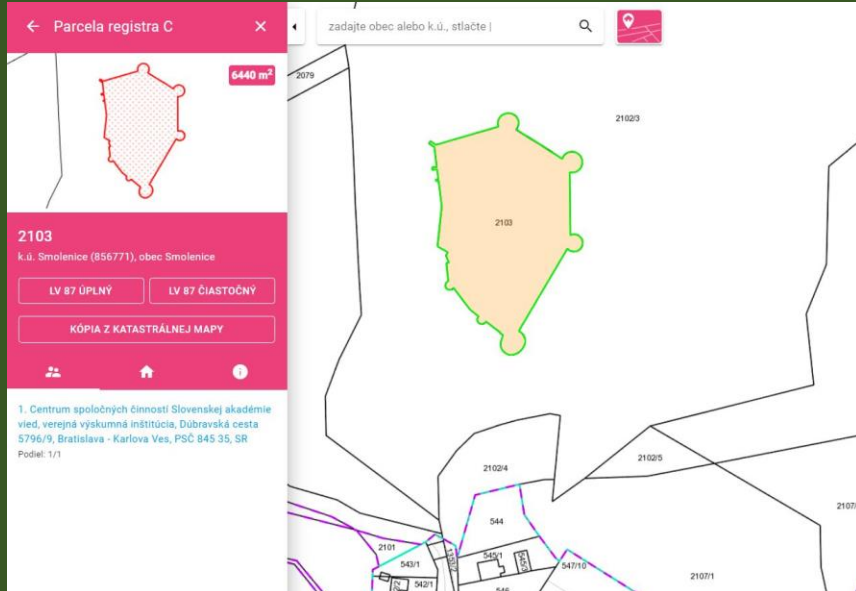
40. územie B./ Vlastníctvo: Mestský Úrad Bratislava číslo: Bratislava

B) Tulajdoni lap.

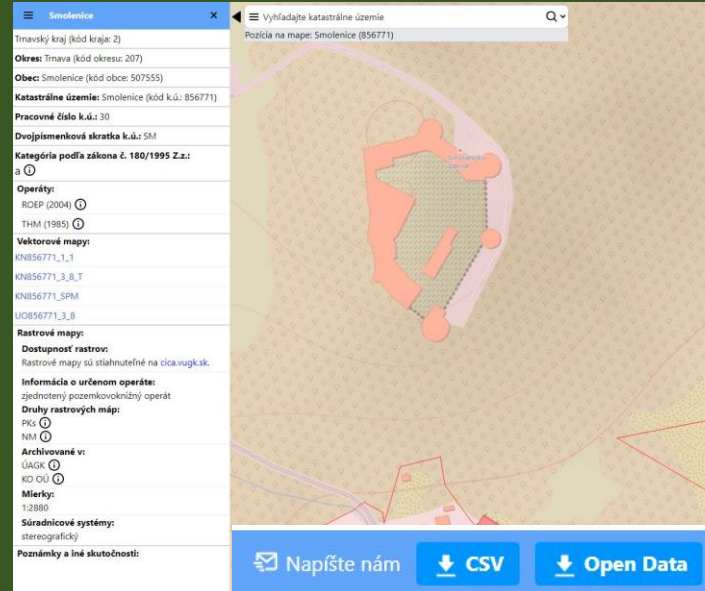
| Parcelné číslo | Popis pozemku | Uzemný katalóg | Prílohy |
|----------------|---|----------------|---------|
| 1 | Číslo 1929 angustina 20. júna 1829 o.s. | | |
| 2 | Číslo 1929 angustina 20. júna 1829 o.s. | | |
| 3 | Číslo 1929 angustina 20. júna 1829 o.s. | | |
| 4 | Číslo 1929 angustina 20. júna 1829 o.s. | | |
| 5 | Číslo 1929 angustina 20. júna 1829 o.s. | | |

(Handwritten notes and signatures are present in the original document, including a large green arrow pointing to parcel 5/10.)

ACCESS TO CADASTRAL DATA



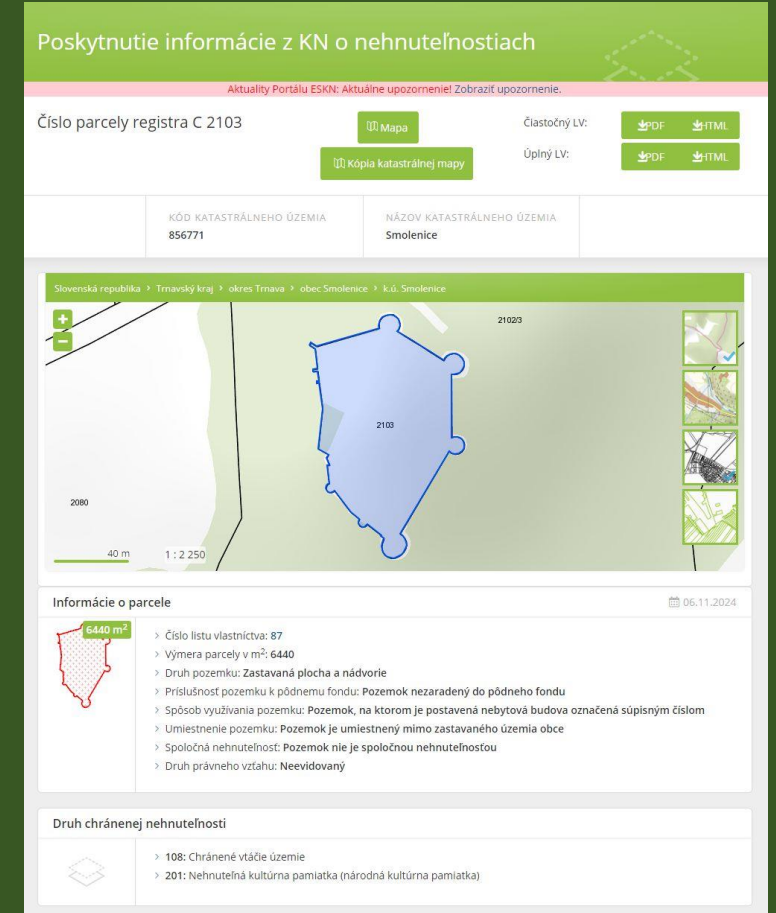
MAPKA



AKO



PORTALS



ESKN

66



ELECTRONIC SERVICES

- Provision of information from the Cadastre on owners and other entitled persons
- Provision of information from Cadastre on real estate
- Provision of information from the Cadastre on rights to real estate
- Filing a proposal for registration in the Cadastre – selling, buying, donating, exchanging, recording an easement on real estate etc.
- Filing a proposal for recordation in the Cadastre – registration of inheritance, registration of a building in the Cadastre, deleting of a building etc.
- Filing a request for the provision of data from the Land Registry Book
- *and much more...*

INFORMATION SYSTEM OF BUILDINGS



UP-TO-DATE DATA AT ALL TIMES

DATA FROM THE REAL ESTATE CADASTRE, REGISTER OF ADDRESSES AND ZBGIS®

DETAILED INFORMATION ABOUT THE BUILDING

FLOORS

No. OF ROOMS

CONSTRUCTION

DATE OF APPROVAL

ACCESS TO DATA – ONLY AUTHORISED PERSONS

FOR PUBLIC – AVAILABLE WMS SERVICE

INFORMATION SYSTEM OF BUILDINGS



Pop-up
Zobrazovacia služba WMS - zoznam stavieb - Zobrazovacia služba WMS - zoznam stavieb

FeatureInfoCollection - layer name: '0'

| Interný identifikátor stavby | Číslo listu vlastníctva | Popis stavby | Umiestnenie stavby | Druh stavby | Druh chránenej nehnuteľnosti | Kód katastrálneho územia | Názov katastrálneho územia | Kód obce | Názov obce | Dátum platnosti údajov KN | Celková úžitková |
|------------------------------|-------------------------|--------------|---|---|------------------------------|--------------------------|----------------------------|----------|------------|---------------------------|------------------|
| 1586788 | 87 | zámok | 1 - Stavba postavená na zemskom povrchu | 11 - Budova pre školstvo, na vzdelávanie a výskum | 0 - | 856771 | Smolenice | 507555 | Smolenice | 05.11.2024 18:00:00 | Null |

Benefits

- Harmonization of data between municipalities and the Cadastre of Real Estate
- Easier access to information for the administrative workers
- Data from the IS are used for the enumeration of population, houses and dwellings
- Data are useful for the summary information on buildings made by the Ministry of Transport and Construction
- Data also used by the National Bank of Slovakia to analyze property price growth

DEVELOPMENTS AND INNOVATIONS



cadastral mapping

PHOTOGRAMMETRY AND
LASER SCANNING



state boundaries



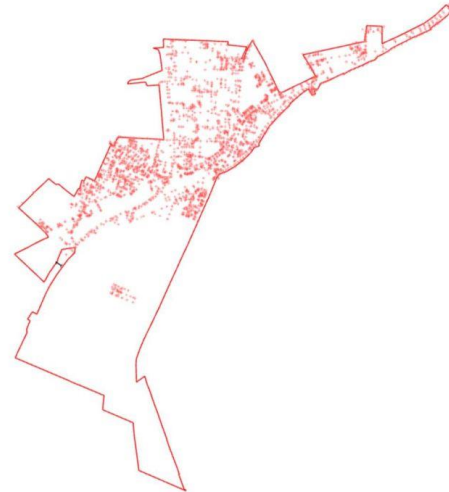
geodetic controls

DEVELOPMENTS AND INNOVATIONS



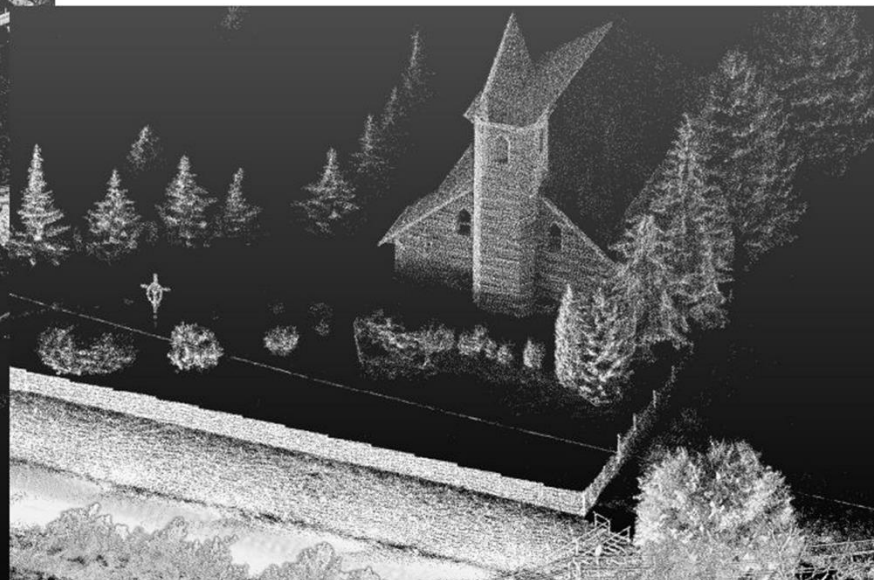
Kalinovo

Pilot Area

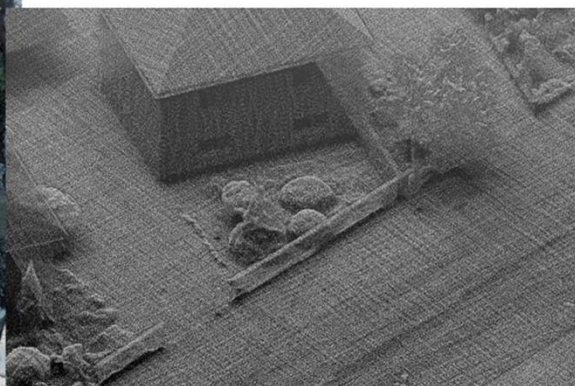
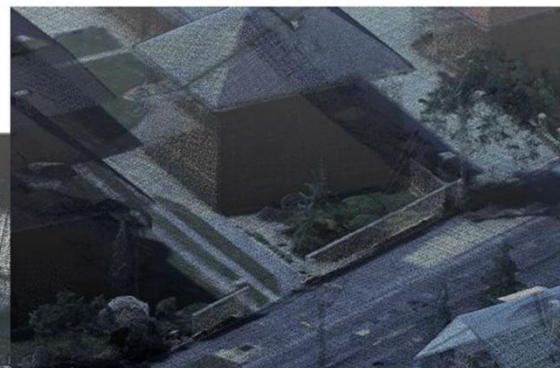


- Measurements realised in 2 phases
 - Phase 1 – 55 ha
 - Phase 2 – 104 ha
- Laser scanning
- Photogrammetric scanning
- Scanning with SLAM technology
- Terrestrial measurements with universal total station technology using GNSS connection

Emesent Hovermap ST-X

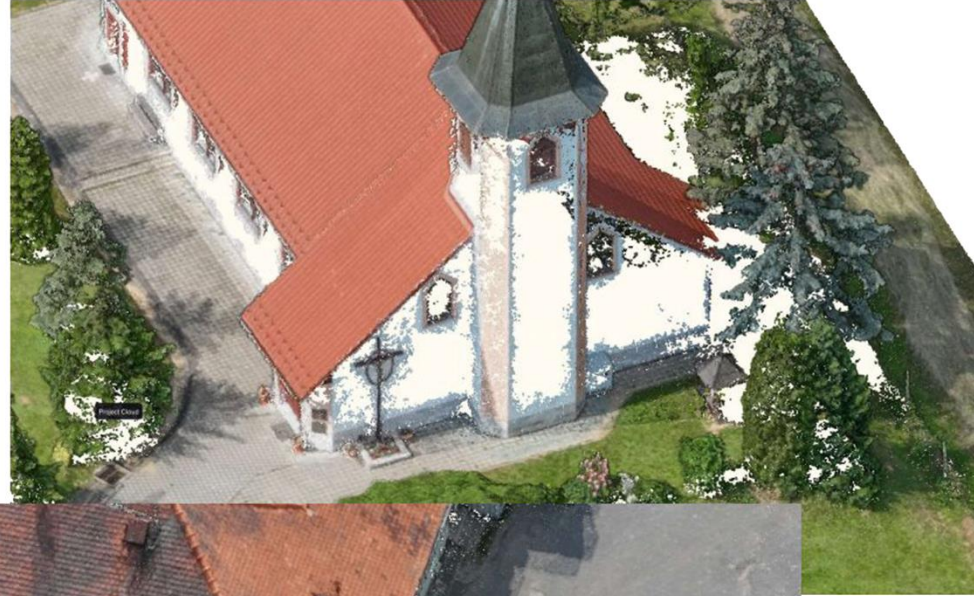


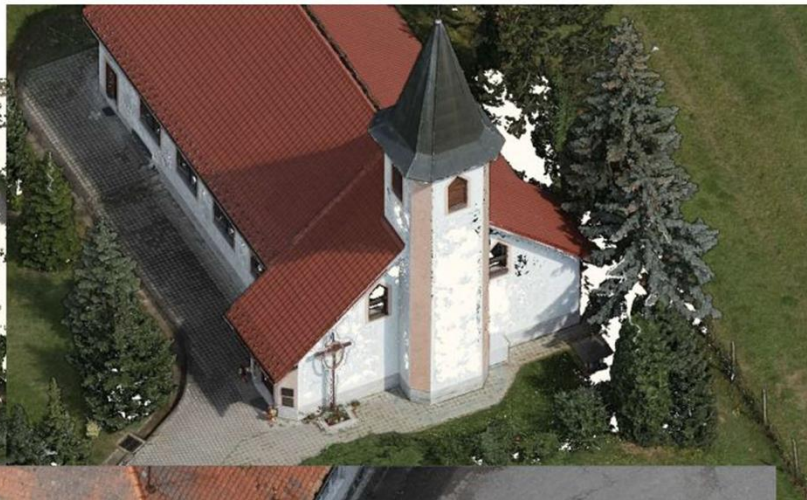
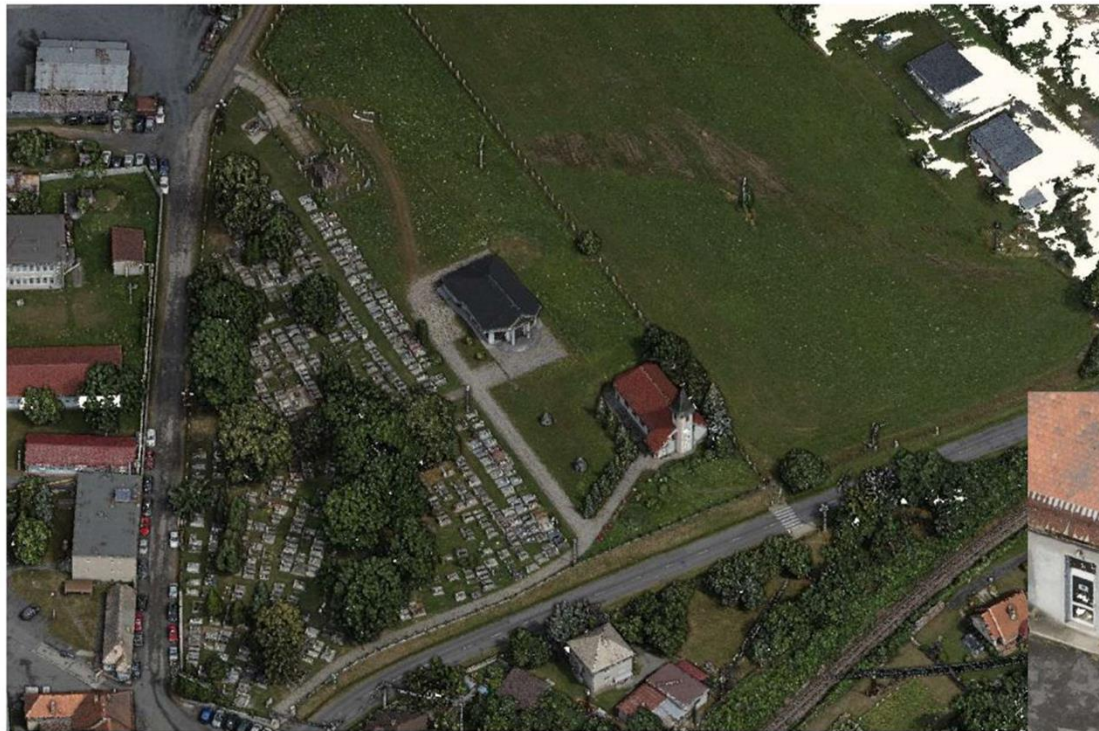
Lidaretto



DJI Mavic 3 Enterprise

PHOTO-GEO s.r.o.



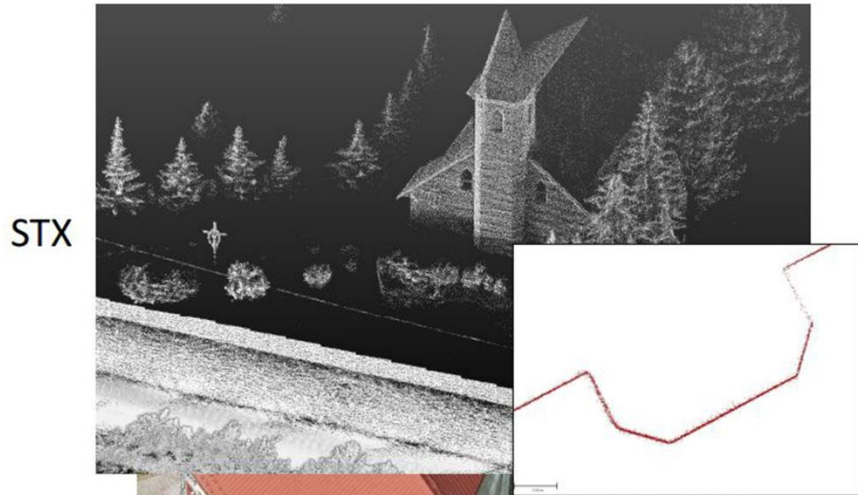


**DJI Matrice 300 RTK
+
DJI Zenmuse P1**

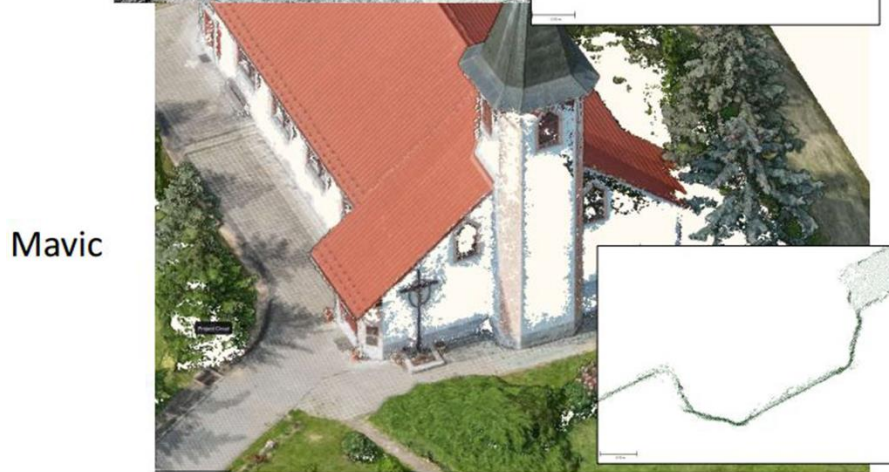


COMPARISON OF RESULTS

UAV
+
Laser scanning



UAV
+
Photogrammetry



COMPARISON OF RESULTS

Cadastral Mapping

| Technology | Amount of Points on Constructions | Achieved Accuracy < 5 cm | Achieved Accuracy < 14 cm |
|--------------------------------------|-----------------------------------|--------------------------|---------------------------|
| DJI Mavic 3 Enterprise | 1 295 | 84 % | 98 % |
| DJI Matrice 300 RTK + DJI Zenmuse P1 | 1 022 | 82 % | 98 % |

CONCLUSION

1 Office and Database

8 Main Activities

3 Portals for Data Access

66 Electronic Services for Public

1 IS of Buildings

1 Project to Improve the Quality of Cadastral Mapping, State Boundaries and Geodetic Controls by Photogrammetry and LiDAR



SPECIAL THANKS TO THE COLLEAGUES:



Matúš Fojtl

Geodesy, Cartography and Cadastre Authority of the Slovak Republic



Ján Bublavý

Geodetic and Cartographic Institute of Bratislava

TAKE A LOOK

MAPKA:

<https://zbgis.skgeodesy.sk/mapka/sk/kataster?pos=48.800000,19.530000,8>

AKO:

<https://ako.vugk.sk/>

ESKN:

<https://kataster.skgeodesy.sk/eskn-portal/>

WMS IS of Buildings:

https://zoznamstavieb.skgeodesy.sk/stavby/services/WMS/zoznam_stavieb_wms/MapServer/WMSServer