



Czech Office for Surveying,
Mapping and Cadastre

The Czech Cadastre and Its Role in 3D GIS

The role of the Cadastre in a Future 3D,
Interdisciplinary, and Integrated Public GIS

Conference „Geomatika 2026“

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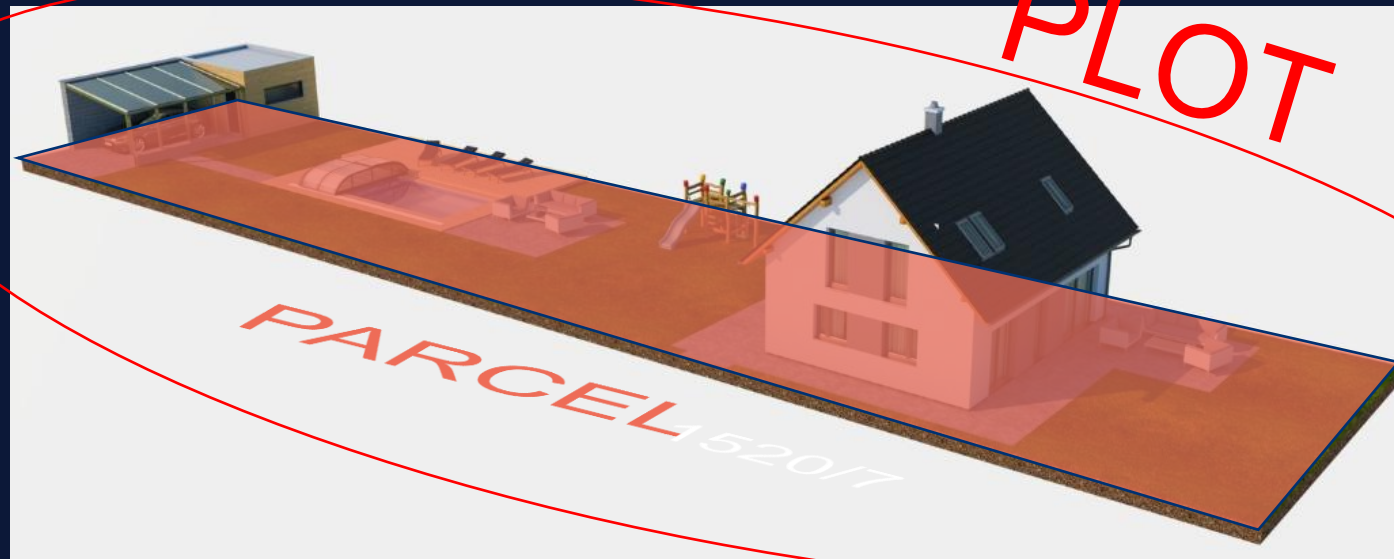
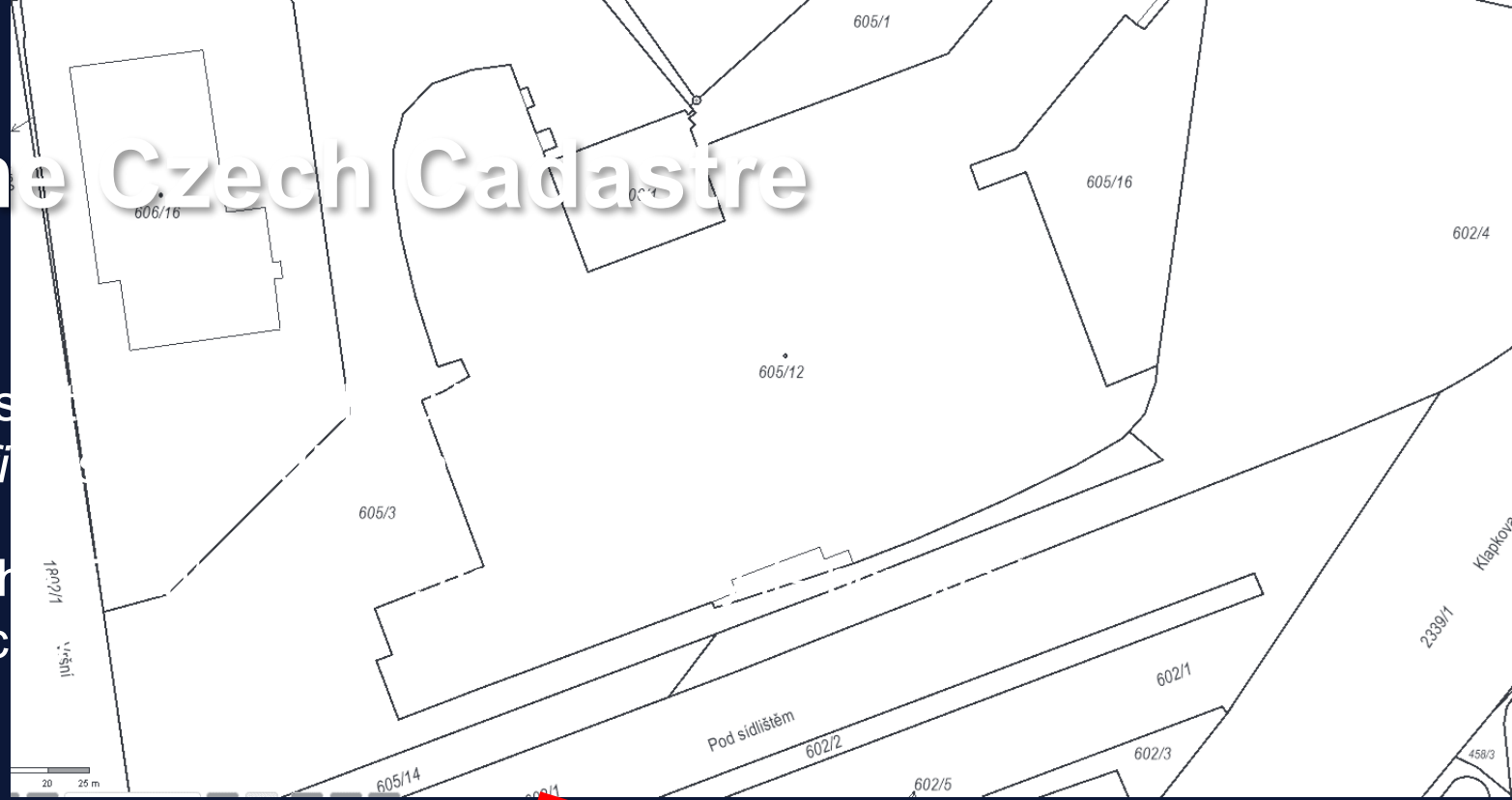


Introduction - History

- **Spatial cadastral data (the cadastral map)**
 - complement the legal component of the cadastre
 - subject to the principles of rights registration (they show the legal status)
 - not always up to date in terms of reflecting the situation on the ground
- **The Cadastre of Real Estate**
 - originally had a broad technical application
 - now has specialised in legal matters
 - its original technical role has been gradually taken over by other registers, often administrated by the Czech Office for Surveying, Mapping and Cadastre (ČÚZK), and edited by the state administration bodies responsible for making decisions about specific facts and situations. In some cases, the cadastre takes over data from them

Current State of the Czech Cadastre

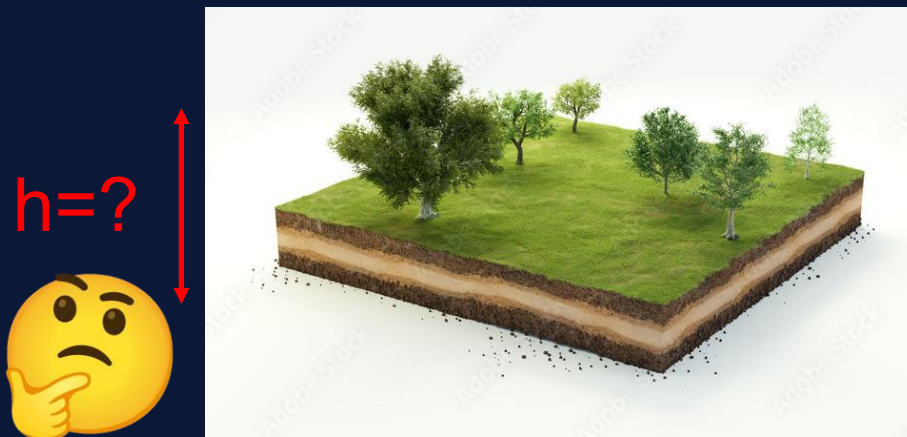
- the primary component of real estate is the land plot, which is considered part of it (the “superficie”)
- a land plot is defined as part of the land, which is a two-dimensional object (a parcel)





Current State of the Czech Cadastre

- Property rights to land include the space above and below the Earth's surface, subject to socio-economic limits on land use
- It is impossible to determine clear boundary in the third dimension for all plots



Law No. 89/2012 Coll (the **Civil Code** of the Czech Republic):

- Component parts of a tract of land include the space above and below the surface, structures erected on the tract of land and other facilities (hereinafter a “structure”), except for temporary structures, including what is sunk into the tract of land and attached to walls.
- If an underground structure is not an immovable thing, it is a component part of the tract of land even if it extends under another tract of land.

- The cadastral map is a 2D map showing parcel boundaries in the viewing plane. If necessary, adding a third dimension to the boundaries using data from the digital terrain model (vertical accuracy ~0.18 m) is easy to implement



Current State of the Czech Cadastre

- **Buildings**
 - recorded in a limited way
 - usually only as an „envelope“ for the purpose of registering any residential and non-residential units defined within the building





Current State of the Czech Cadastre

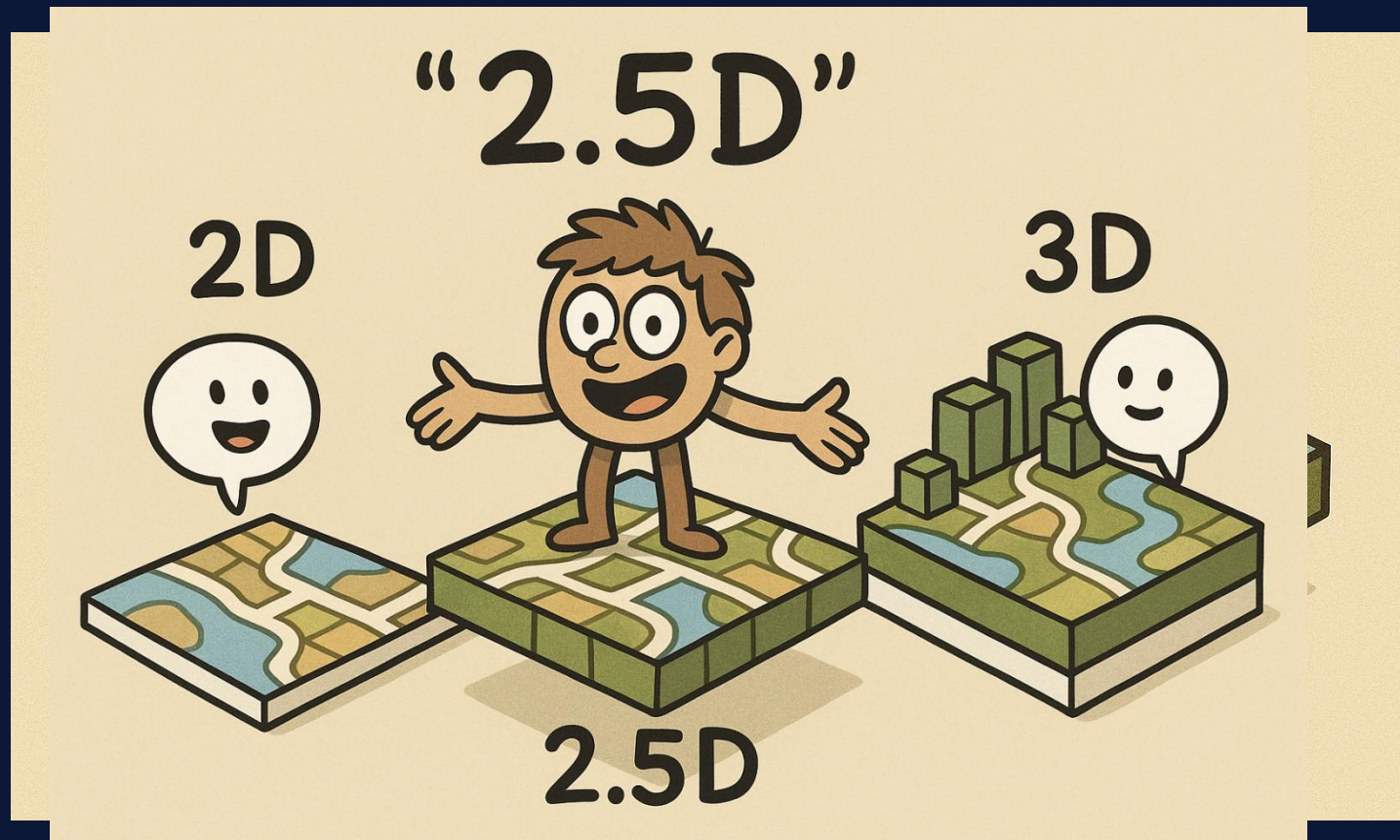
- if a building is divided into individual units, these units are considered immovable property and are subject to registration in the cadastre
- in other cases (e.g. cooperative ownership), flats and non-residential premises are not registered in the cadastre





Current State of the Czech Cadastre

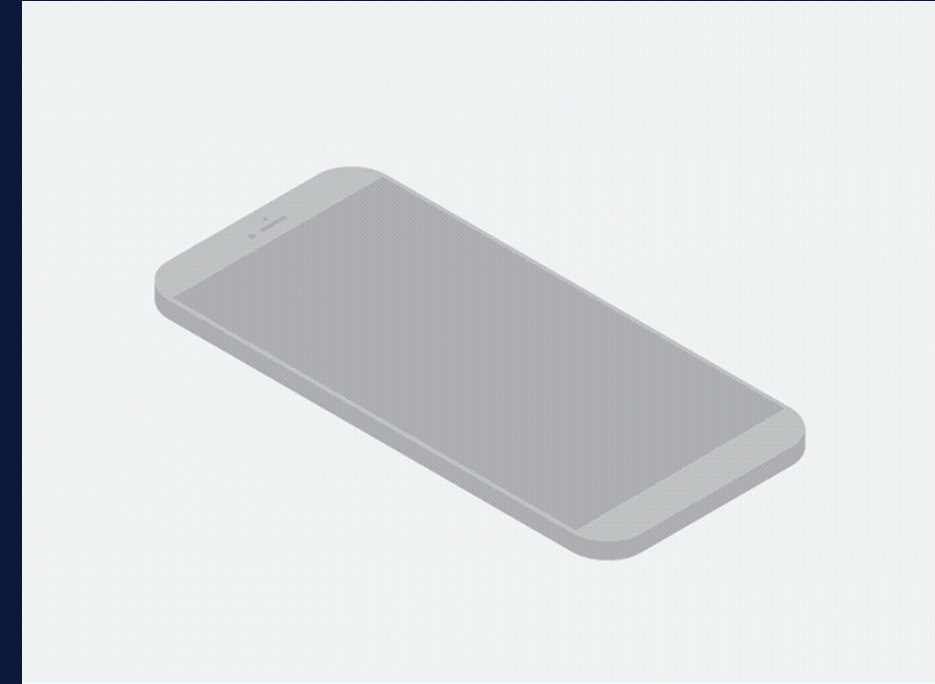
- If we were to classify the Czech cadastre in terms of dimensionality, it would most likely be considered a 2.5D GIS.





Other Public Sector GIS Systems

- Registry of Territorial Identification, Addresses and Real Estates
- ZABAGED®
- Digital Technical Map (DTM)
- Basic Model of the Built Environment (incl. BIM)
- Other GIS (geology, environment protection, ...)





Registry of Territorial Identification, Addresses and Real Estates (RÚIAN)

- one of the four Basic Registers of the Czech Republic and the only one that contains spatial data
- the spatial data are derived from the cadastral map and other 2D sources
- in the long term, it is anticipated that a register of individual flats could be incorporated
- the need for 3D spatial data will likely increase
- <https://vdp.cuzk.gov.cz/vdp/ruian>



ZABAGED®

- **ZÁkladní BÁze GEografických Dat**

= The Fundamental Base of Geographic Data of the Czech Republic

- digital vector geographic model of the territory of the Czech Republic
- a seamless database
- 2D information and descriptive information on settlements, communications, utility networks and pipelines, hydrology, administrative units and protected areas, vegetation and surface, terrain relief +

Altimetry data → terrain model and surface model

Filtered laser altimetry
4th and 5th gen

Incl. vegetation and
buildings

- <https://ags.cuzk.gov.cz/geoprohlizec/?p=22575>

ZABAGED 3D





Digital Technical Map

- DTM is focused on data related to technical and utility infrastructure – in 3D
- The nationwide technical map, compiled from regional technical maps
- ČÚZK is administrator, operators of the respective utility network are editors
- <https://dmvs.cuzk.gov.cz/mapovy-portal/mapa>





Digital Technical Map

- DTM serves as a legally binding basis for urban planning and construction
- the developer is able to obtain information regarding the existence of utility networks and protective zones at the construction site via a centralised access point
- the utility network operator is responsible for the completeness of the data; the developer is not obligated to contact the operator regarding any missing data

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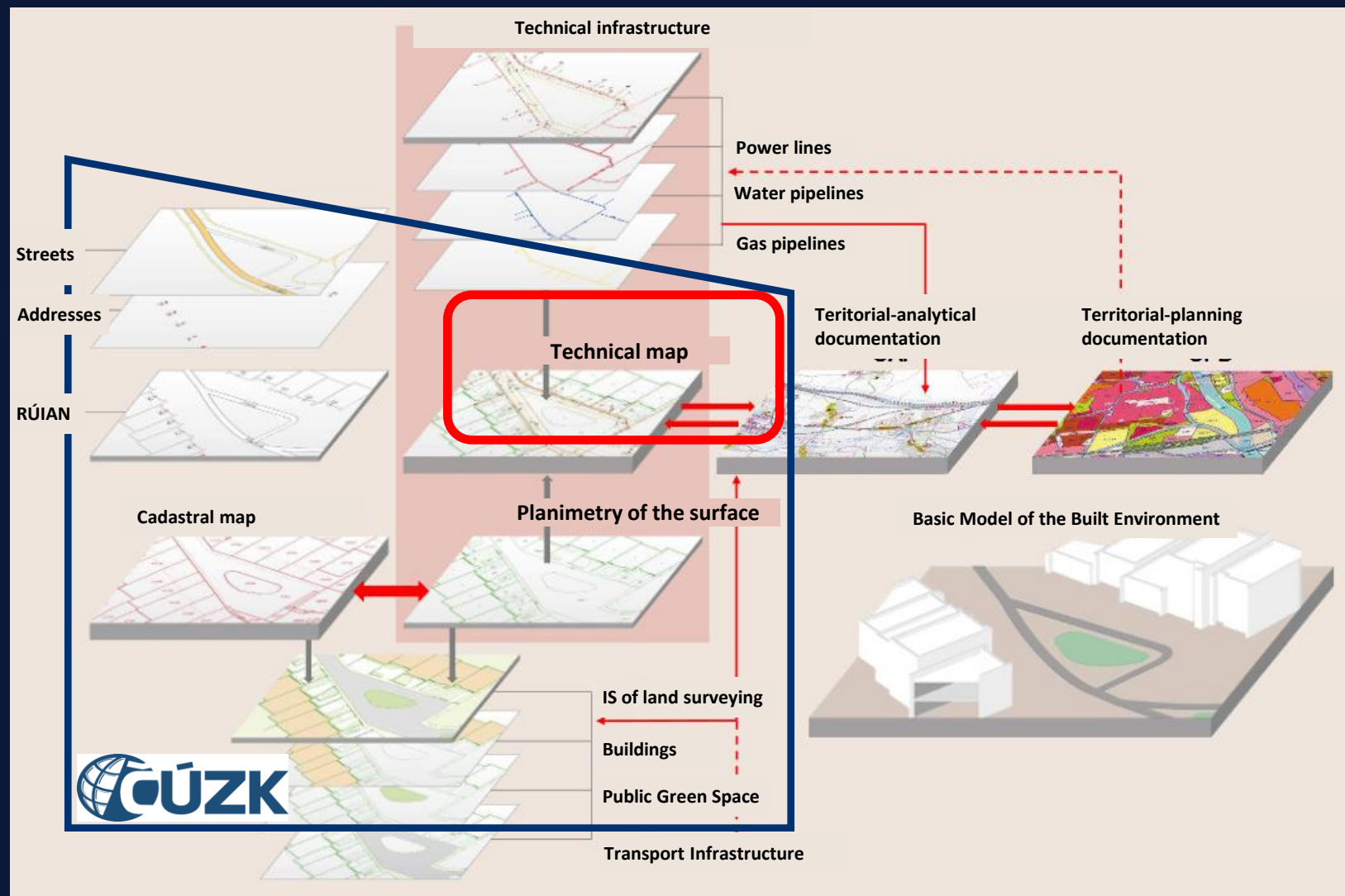
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[Pokračovat](#)



Digital Technical Map of the Czech Republic





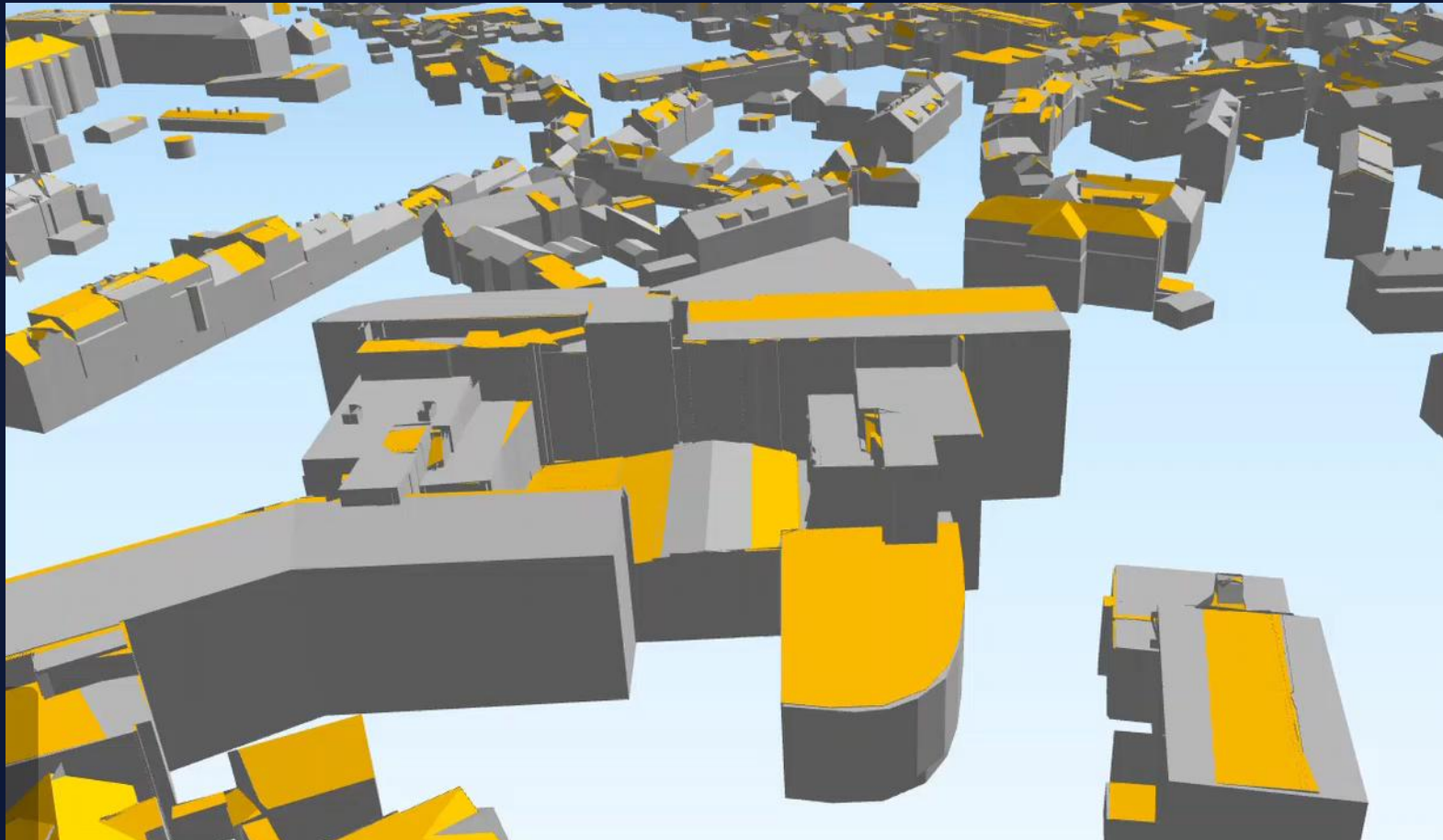
Building Information Modeling (BIM) and Model of the Built Environment

- future 3D GIS will contain property ownership data in some form; the role of the cadastre as a source of relevant reference data is essential
- geographic spatial data is by no means outside the scope of ČÚZK – in fact, it is of growing importance
- new opportunities came with the implementation of BIM
 - currently, we are preparing a basic 3D model of the Built Environment
 - the target year is approximately 2030



3D Model of Prague

The Prague Institute of Planning and Development





3D Model of Prague

<https://app.iprpraha.cz/apl/app/model3d/>

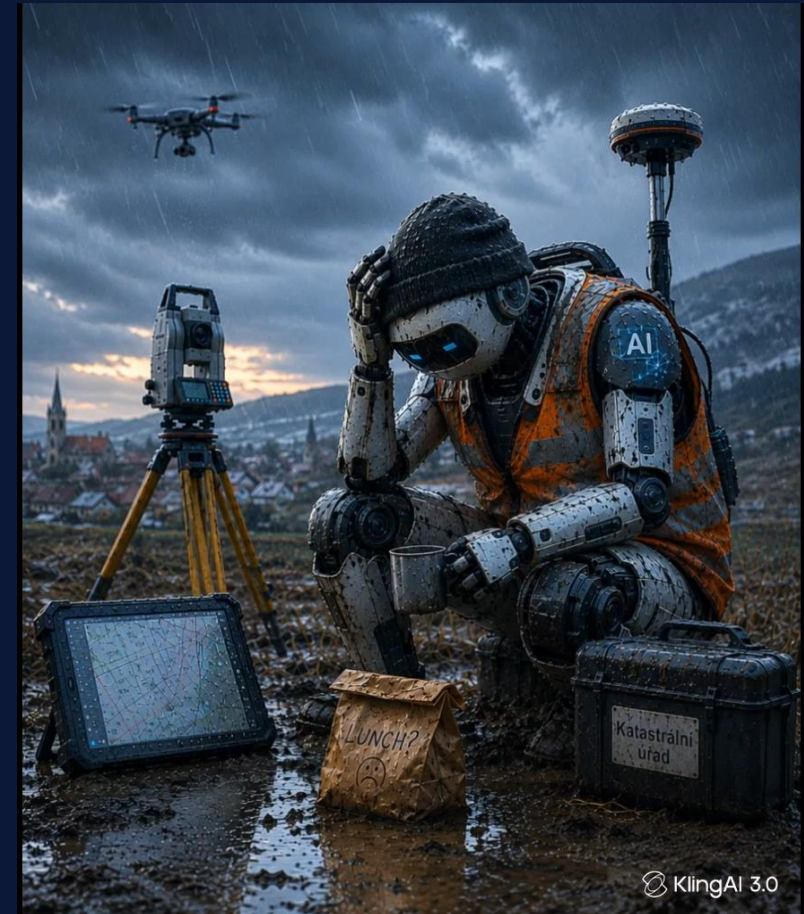
The Prague Institute of Planning and Development





Conclusion and Future Perspective

- in the context of our country, the real estate cadastre will continue to focus on the registration of property rights
- it is anticipated that the scope of technical data on properties will be progressively confined to the boundaries of individual parcels
- other technical attributes will be gradually eliminated
- due to the interconnected nature of public data systems, such information will no longer be imported from other systems either (in line with the “once only” principle)
- is it feasible, in the context of the Czech Republic, to define legal space within BIM and register property rights to it?





Thank you for your attention

Questions?

