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Budapest 3D underground map

Katalin Zsoldi
PhD student

Eötvös Loránd University Budapest, Hungary
Why to create Budapest underground map?

- Budapest is a beautiful city with a lot of attractions
- The underground world is also varied (metro lines, caves, bunkers, tunnels, mines, wells, hospital)
- Exciting to be a detective or a historian -> search and find the 50-100 years old objects
- The most exciting to create the map

zskata@map.elte.hu

Eötvös University, Budapest
How to create the map?

- Goal: create a MAP and stay a cartographer
- NOT to create a blueprint or an engineering model
- Define: scale, projection, legend, generalise

zskata@map.elte.hu

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Why to create a 3D map?

- Objects in underground: multi-level, overlappings, different depth, height
- Can you imagine how the metro line cross each other?
- Orienteering is easy on the streets, see the objects outside: buildings, trees, city furnitures...
- Orienteering is not so easy: in a tunnel or in a metro car: can’t imagine their real position
- => 3D visualization needed

zskata@map.elte.hu

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Scale, projection, generalisation

- 3D surface of Budapest
- Texture: 1:10 000 topographic map
- Projection: EOV (Unified Hungarian Projection)

zskata@map.elte.hu

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Scale, projection, generalisation

- 3D objects scale: 1:10 000-1:5 000
- Generalization: not to be too detailed, not an engineering model
- 3x elevation distort, but keep the segment original

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Data

- Become aware of an underground object
- Visit experts, talk people (some expert doesn’t want to share his knowledge, they are confidential)
- Find the architectural blueprints in archives
- If it needed: georeferate the blueprint into topo map
- Modeling the object
Kőbánya, limestone quarry

- 180 000 m², 32-33 km long
- The mining stopped in the 20th century
- Many buildings in Budapest were built from this stone
- Now used for: beer, wine stocking, mushrooms growing

zskata@map.elte.hu

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Kőbánya, limestone quarry

- Each path has different depth and height

zskata@map.elte.hu

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Metro 4
• Under construction (starts operating in summer 2014)

zskata@map.elte.hu
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Historical aspect

- Cellars of houses were strengthened and functioned as bunkers in World War II.
- Metro line 2 and 3 functioned also bunkers in WW II.
- After WW II Soviet troops came to Hungary and the communist dictatorship began.
- The enemies of communists, or anyone who didn’t agree with the communist principles were tortured, killed or put to jail in underground objects.
Historical aspect

- Cellars were used as jails
- Lot of people disappeared in underground objects (tunnels, cellars)
- Almost all the evidence destroyed in 1990 at the end of communist regime
- Only eyewitnesses, no paper documents or blueprints

zskata@map.elte.hu

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Gellért (well) tunnel

- Tunnel connects 3 baths on Buda side
- Thermal wells belongs to baths

zskata@map.elte.hu

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Sewage channel

- First channels are 150 years old
- Height and width can reach 4.5 meters

zskata@map.elte.hu

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Display

- Runtime application
- Completely interactive, fly underground
- Turn on/off objects
- Real stereoscopic 3D in Visualization Center

zskata@map.elte.hu  
Eötvös University, Budapest
Summary

• Challenge to collect all the data
• 3D underground map is needed all kind of underground construction
• Hydrological analysis
• Continue the work: metro lines, quarry in Budafok (3 stories), Buda Castle (4-5 stories cave system), water pipelines, caves in Buda Hill, find the truth of urban legends

zskata@map.elte.hu

Eötvös University, Budapest
Thank you for your attention

Zsoldi Katalin: zskata@map.elte.hu  Eötvös University, Budapest