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Application of 3D City Model in Spatial Planning of the City of Zagreb

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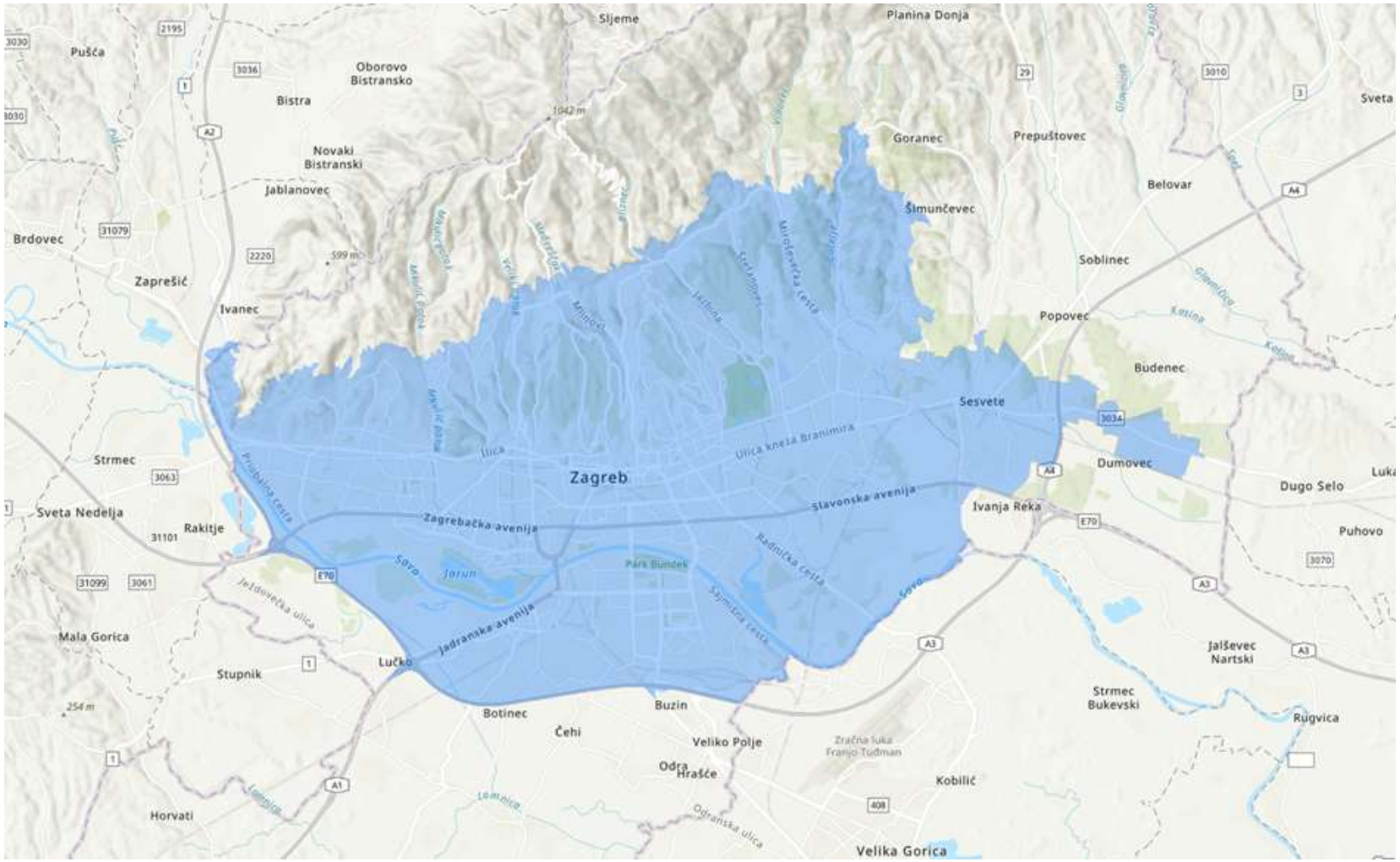
Location of Zagreb and Croatia in the European network of cities

Overview

- City of Zagreb has been developing 3D city model for spatial planning since 2008
- Web App ZG3D (http://zagreb.gdi.net/zg3d/) for browsing, viewing and using 3D data was produced and presented in 2016
- 3D city model is used in spatial planning and many other applications
- City of Zagreb aims to upgrade the existing 3D city model towards the digital city twin

Introduction

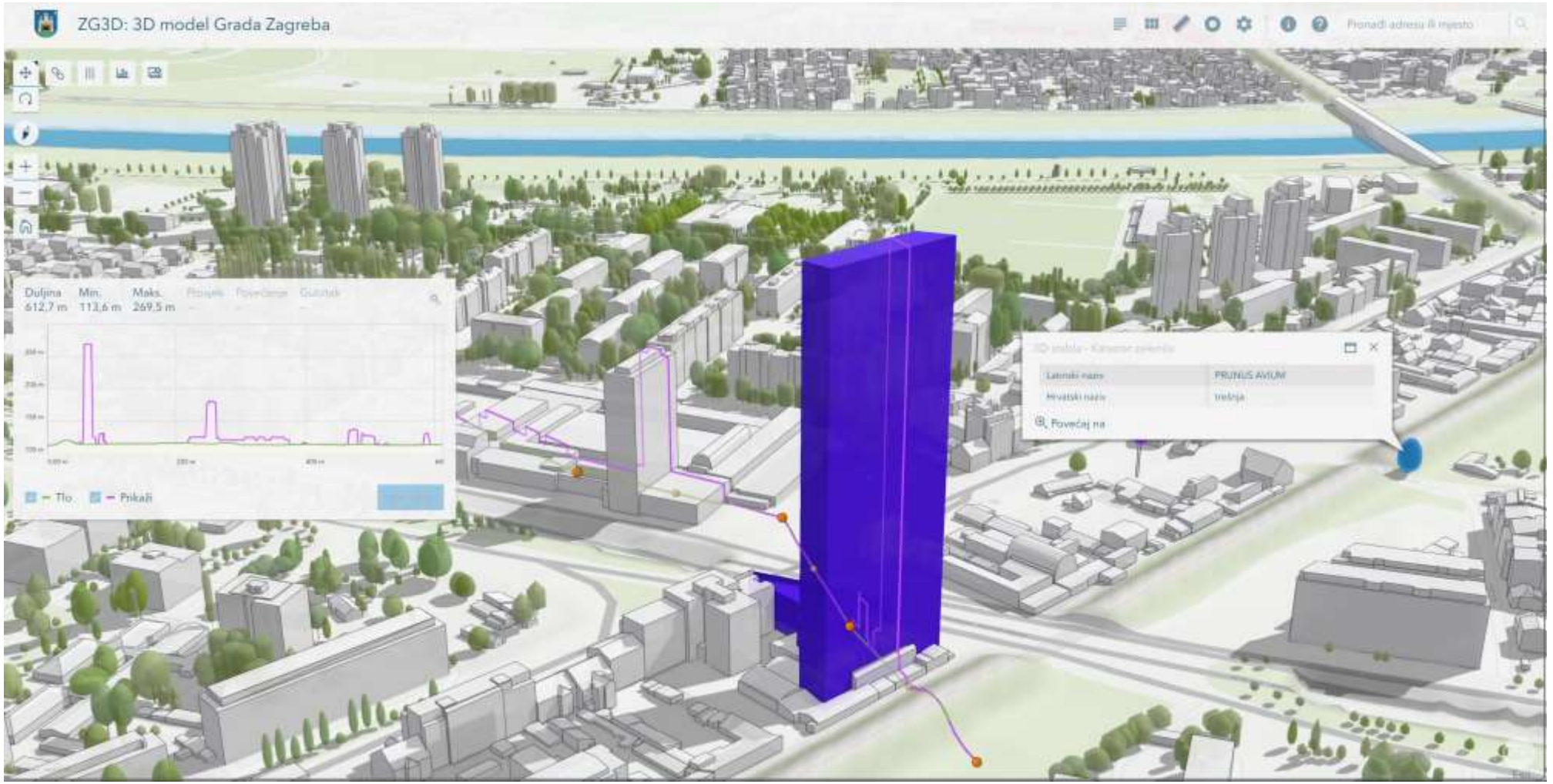
- The main driver for production of Zagreb 3D city model was need for better city planning and development
- In detailed planning, especially planning of already built areas, knowledge of 3D data on existing buildings became a crucial tool for efficient city planning and protection
- The model development started in 2008 by photogrammetric mapping with Level of Detail (LoD) 2, for city urban territory of about 240 km² (Figure 1)



Zagreb urban area - borders of master (general) urban plans (240 km²)

3D model development

- Initial aerial photo survey in September 2008, initiative of private company
- Virtual model (LoD 2) was made using photogrammetric mapping of rooflines, together with DTM, aerial photography and true orthophotos
- Study on application of 3D model in city management, University of Zagreb 2013
- Evaluation of 3D model data was made in 2015
- Web App “ZG3D” for browsing, viewing and using 3D data in 2016, based on ESRI technology



ZG 3D App https://zagreb.gdi.net/zg3d/

3D model in city planning

Application of 3D city model in spatial planning of the City of Zagreb so far may be classified as:

1. 3D overlay in master land use planning
2. 3D building zoning in detailed land use planning
3. 3D modelling of new buildings during architectural competitions
4. 3D modelling of building interpolations in protected city core
5. 3D visualization post-earthquake reconstruction process

Application of 3D city model in spatial planning – examples (1-5)

3D model in other areas:

- Control of geodetic documentation
- Creation of development strategies
- Implementation of urban-architectural competitions
- Creation of urban plans and detailed landscaping plans
- Traffic design
- Construction permits
- Records of protected monuments of cultural heritage
- Assessment of agricultural and forest resources
- Noise maps
- Solar potential cadastre
- Planning of utility lines
- Emergency simulations
- Tourist promotion
- Informing citizens

Challenges and opportunities

- Sporadic model updating, on project level (2012, 2019, 2020)
- Overall model update planned for 2023, using official (SGA) LiDAR and aerial photo data
- Mid term plans for yearly model updating (initiative of new mayor)
- Application of 3D model in numerous city projects and activities
- Integration, sensors, IoT, digital twin

Thank you!

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