The landscape recomposition of the of Festung Krakau – a new approach based on Airborne Laser Scanning point cloud processing and GIS spatial analyses

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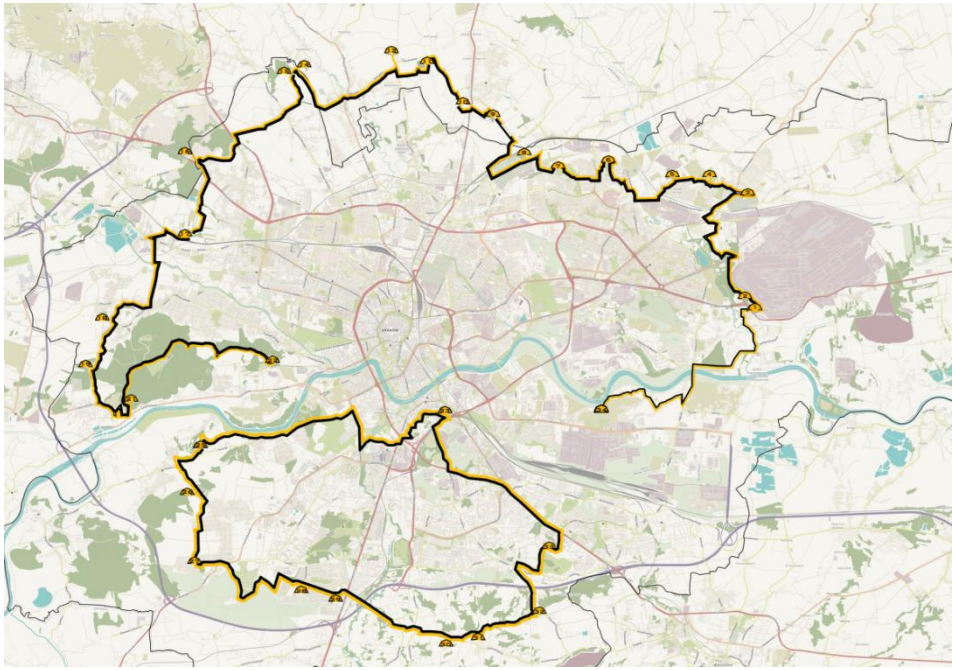
Aim

With Airborne Laser Scanning (ALS) data this study identifies forms of fortifications, visualisation data and analyzes visibility to project recomposition landscapes of historic fortress.

Research area

Permanent fortifications in the area around Krakow are called “Festung Krakau”. They are a system of defensive structures built of the Austro-Hungarian Empire.



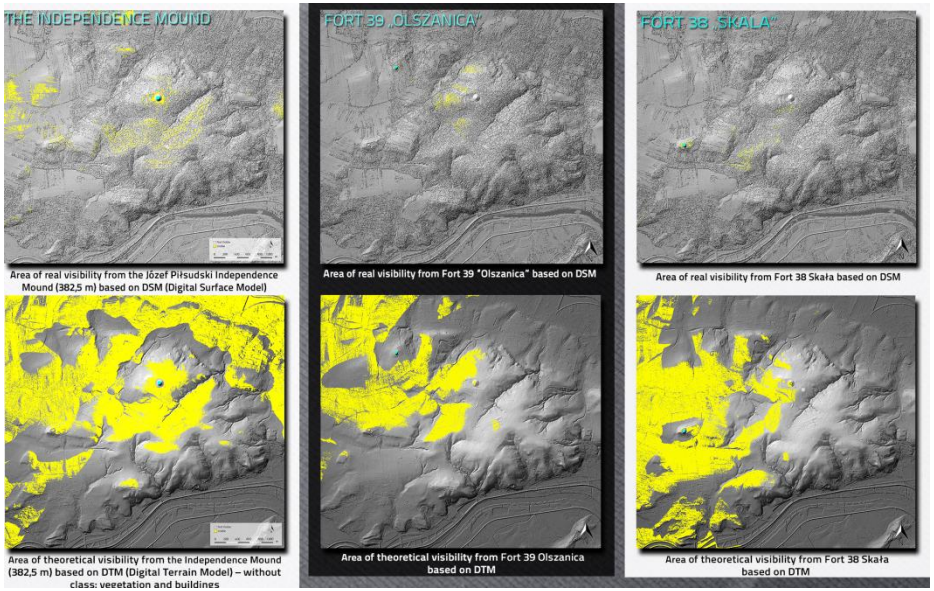
Touristic Festung Krakau Trail

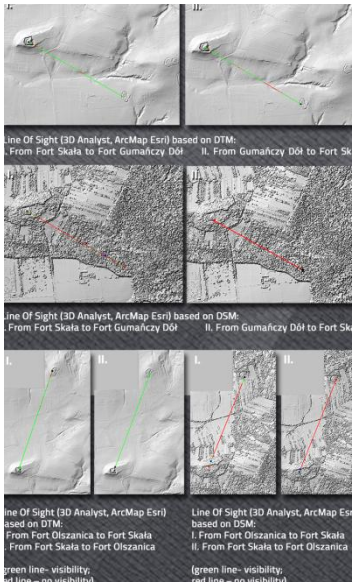
Buildings on the Festung Krakau Trail

ALS inventory

Identification and visualization buildings of Festung Krakau in 2,5D without vegetation, ISOK

Methods





Panorama from the Jozef Pilsudski Mound to Krakow

Panorama from the Fort Krępak

Panorama from the Fort Olszanica

The proposed method based on Digital Terrain Model (DTM), Digital Surface Model (DSM) and ALS point clouds, as input for the analyzes. Areas of visibility specified by algorithm - Observer Point (3D Analyst, ArcMap). An observer point placed to the human eye position - 1.70. In order to check the scope of visibility by using a line of sight from one point to another used algorithm Line Of Sight (3D Analyst, ArcMap)

Results

- The GIS Spatial Analyses showed high usefulness to identify fortification, visualization of these objects and performance analysis visibility to recomposition landscape,
- ALS data are the new quality of geospatial data. They offer an opportunity to develop a new, faster technology used in the restoration, preservation and inventory of architecture militaris.
- The Digital Terrain Model showed that 3D models enable analysis architectural objects which are fortification – especially vizualization 2,5D without vegetation