

Implementation of digital maps and documentation of the site based on geographic information system for the selected regions of oil trail

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GIS is a well-organized database, which allows storing information about objects and phenomena that includes both Earth and its surface. Nowadays, rapid technological development can be observed. Databases (geodatabase) are designed to enable presentation of the world, as well as to allow multi-dimensional analysis of the collected information regarding a space (Chrobak 2009, Gotlib 2009). This solution creates a kind of object-oriented map, which includes spatial and numerical data collected from various sources and combined together, such that these form a coherent representation of geospatial (Bac-Bronowicz 2010, Dorożyński 2010, Gotlib et al. 2005). This provides a rich source of comprehensive information with possible multiple access, both in the form of simultaneous read and work (Dorożyński 2010, Lupa & Piórkowski 2012).

Members of the “KIWON” Scientific Society at the Faculty of Geology, Geophysics and Environmental Protection AGH proposed the idea of creating a full documentation of selected areas of the Podkarpacki Region, which was studied thoroughly by them in the last several years. The first stage of the project includes creating a three-dimensional model of the terrain surface based on data from the scanning of air (LiDAR). The modeled area will cover selected areas of the Oil Trail, especially around the Bóbrka and Ustrzyki Dolne.

Szlak Naftowy is a cross-border route connecting the places related to the birth and history of the oil industry. The main axis of the route goes through Jasło – Krosno – Sanok – Lesko – Ustrzyki Dolne, and the further part is located in the Ukrainian side. The latter area is not a matter of our study.

The main aim of the project is developing digital maps of selected regions of Szlak Naftowy based on Geographic Information System. Maps will provide integrated information on topographical, geological and environmental occurrence of the selected areas of oil and gas from the Krosno area to the Polish-Ukrainian border. The purpose of this study is to create a detailed three-dimensional map of two areas, (1) the Bóbrka area and (2) Ustrzyki Dolne (Polana deposit). The map will present ground surface and ground three-dimensional model, developed on the basis of borehole data. These models will be developed in two independent systems, enabling the creation of three-dimensional models of the substrate (ArcScene and Petrel). Additionally, a comparative analysis will be carried out on both output models. Point clouds acquired by laser scanning LIDAR method will be used in creating a digital model of the terrain surface. A complementary NMT based on satellite data (InSAR method) will be created as well. The planned result of this work is a digital, interactive map that

will provide opportunity of analyzing individual layers to oil and gas in the studied area and the creation of visualization ground, consideration natural and anthropogenic objects.

To summarize, a database containing the coordinates of the waypoints and the localized geological and environmental information will be formed through reconnaissance vehicle that includes updating and verifying the locations of the pits and natural leakage of oil and natural gas along the trail of Szlak Naftowy, as well as photographic documentation.

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