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Information system for preserving culture heritage in areas affected by heavy industry and mining

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The natural development of the Ústí region (North-West Bohemia, the Czech Republic) has been affected by the human activity during the past hundred years. The heavy industrialization and the brown coal mining have completely changed the land-use in the region. The open-pit coal mines are completely destroying the surrounding landscape, including settlement, communications, hydrological network and the over-all natural development of the region. The other factor affecting the natural development of the landscape, land-use and settlement was the political situation in 1945 (end of the 2nd World War) when the borderland was depopulated. All these factors caused vanishing of more than two hundreds of colonies, villages and towns during this period of time.

The task of this project is to prepare and offer for public use a comprehensive information system preserving the cultural heritage in the form of processed old maps, aerial imagery, land-use and georelief reconstructions, local studies, text and photo documents covering the extinct landscape and settlement. Wide range of various maps was used for this area – Müller's map of Bohemia (ca. 1720) followed by the 1st, 2nd and 3rd Military survey of Habsburg empire (1792, 1894, 1938), maps of Stabile cadaster (ca. 1840) and State map derived in the scale 1:5000 (1953, 1972, 1981). All the maps were processed, georeferenced, hand digitized and are further used as base layers for visualization and analysis. The historical aerial imagery was processed in standard ways of photogrammetry and is covering the year 1938, 1953 and the current state.

The other important task covered by this project is the georelief reconstruction. We use the old maps and aerial imagery to reconstruct the complete time-line of the georelief development. This time-line is covering the period since 1938 until now. The derived digital terrain models and further on analyzed and printed on a 3D printer. Other reconstruction task are performed using the processed old maps – here we are studying the land-use change, settlement development and the industrialization and brown coal mining effect on the hydrological network structure.

The processed data (old maps, aerial photographs, land-use and georelief reconstructions) are published as a web-mapping application built using the ArcGIS API for Flex technology. The application is offering visualization and overlay tools so the user can perform basic landscape and land-use development analyses. The resulting information system will consist of three parts – the web-mapping application, database containing the text and photo information about the vanished towns and villages (spatially linked to the web-mapping application) and other local studies performed on single sites in the region. The local studies are focused on application of data collection methods as UAV (Unmanned Aerial Vehicle), KAP (Kite Aerial Photography) and LIDAR.