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The utilization of 3D computer reconstruction visualizations in archaeology

Abstract of dissertation thesis

The visual presentation is in the field of archaeology one of the main communication media for conveying information and interpreting it. The recent introduction of digital technologies has brought a whole new dimension to archaeological visualisations. As a result of this development, they become three-dimensional, virtual, multifunctional and interactive. Technological development moreover has not only influenced the way how to retrieve and process the data, but greatly expanded as well the ability to simulate and visualize their different aspects in virtual environment. Since the beginning the virtual archaeology has been taken as direction that would bring new groundbreaking knowledge into the archaeology. However, the current situation is that 3D computer visualizations are just popular conference theme than a standard tool of archaeology as a science, and most works on virtual archaeology still needs to advocate the benefits of 3D visualizations.

Therefore, the dissertation thesis try to deal with theoretical issues of preparation, organisation and analysis of input data in the process of creation of 3D reconstruction computer models, then with possible solutions of visualization of uncertainty of data and the credibility of the models and with form of their results and presentations, including the use of virtual and augmented reality. All these aspects are demonstrated on 3D computer reconstructions made by author and based on different type of input data, such as on historical sources (the town Slaný in 1602), non-destructive archaeological survey (fortified site Libice nad Cidlinou), classical archaeological field documentation (oppidum Závist u Zbraslavi) or on the laser scanning data (medieval mine in Dippoldiswalde).

The dissertation thesis proposes for solving the issue of data uncertainty greater use and direct incorporation of digital documentation methods such as multi-image photogrammetry or laser scanning into the process of creating computer reconstructions. However, it is essential to make full use of visual communication techniques, where the author proposes to design the outputs from 3D reconstruction computer models as a more complex set of more exact data presentation mediated in graphic form. Choosing of a graphical way of expression can speed up the interpretation process, makes it easier, more illustrative and concise when communicating the possibilities of 3D computer models both within archaeology and towards to public.