

VISUALIZATION OF A DEVELOPMENT-LED EXCAVATION

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Abstract:

A development-led excavation was undertaken when building an overpass at the road R 35 from Sedlice to Opatovice. The construction site lay less than 500 m to the southeast from the edge of the municipality Opatovice nad Labem (District of Pardubice). The excavations were conducted from 13 April to 18 June 2011; in total 61 features were examined containing ceramic inventory of the Lusatian and Platěnice-Silesian cultures, and from the middle Ages. In this paper, modern visualization and presentation method is discussed and presented with aim to virtual museums and virtual visualization of excavations.

1. INTRODUCTION

Archaeological researches expose many historical objects and the ruins of buildings. One way how to reconstruct these buildings is the visualization. This modern method shows us approximate shapes and appearance of these objects.

This project was worked out in cooperation of CTU in Prague (Department of Mapping and Cartography), ENVIOM PRO s.r.o. and East Bohemian Museum of Pardubice.

2. EARLY IRON AGE HOUSE IN EAST BOHEMIA RECONSTRUCTION

A development-led excavation was undertaken when building an overpass at the road R 35 from Sedlice to Opatovice (Figure 1). This text was funded by the Czech Science Foundation grant GA CR GD404/09/H020, Moravian-Silesian School of Archaeological Doctoral Studies. The construction site stretched over the plots No. 2489, 2494, 2495, 2477, 2493, 2613, 2612, 2611,

2496, 2608, 2497, 2498, 2499, 2607, which lay less than 500 m to the southeast from the edge of the municipality Opatovice nad Labem (District of Pardubice) (Figure 2).



Figure 1: Opatovice nad Labem. Location of the municipality.

The excavations were conducted from 13 April to 18 June 2011; in total 61 features were examined containing ceramic inventory of the Lusatian and Platenice-Silesian cultures, and from the Middle Ages.

2.1 Geology of the locality

From the point of view of geology the locality is situated in the eastern part of the Bohemian Cretaceous Basin. The half-rocky ground at the depth of several metres is composed of limy claystones of the Březno Series. The substratum is overlaid with sandy gravels of a low Elbe terrace of Würmian age. At the locality we can identify alluvial deposits of the river Elbe, represented by reddish-brown floodplain soils of Holocene age (after Ing. J. Šura). Old arms of the river Elbe are still identifiable with numerous sand dunes on their banks, on which archaeological sites are situated. The area of interest was already partially exposed and reclaimed again when building a power station, so that the basic character of ground and superimposed layers became altered.



Figure 2: Opatovice nad Labem. A) Excavation area (Source: www.mapy.cz)

2.2 Description of the examined site

A larger extension of the area was done where archaeological contexts were accumulated. Three sectors arose way in the Figure 3. In the first of them above all Late Bronze Age features were documented (Figure 3:A). Worth mentioning in sector two is a 13th century pit dwelling, strongly disturbed by ploughing (Figure 3:C). The topsoil layer in the third sector was already moved away when building the power station, so that the inventory from features which were not recognised at that time was secondarily relocated and in one case even pressed into the bottom of the feature by heavy machines (Figure 3:D). In this sector an accumulation of ceramic fragments of the Platěnice-Silesian culture was detected, but also finds from the later Period of Strongholds and from the Middle Ages (13th century). Individual features were drawn on graph paper and described in special forms. Measurements with a total station and the complete digitalisation were carried out by the company Michal Kotek.

In the first sector on the right bank of the already abandoned western arm of the river Elbe the eastern half of a Late Bronze Age homestead was examined (Figure 4). The documented deserted river was situated only 55 m to the SE (Figure 3:B). We can try to reconstruct the examined homestead. It was enclosed by an arch-shaped fence marked out by postholes No. 10, 11, 12, 23, 25, 29, 30, 34, 35, 36, 37, 48, 49, 50, 51 and interrupted by an entrance turned inside in the NE (postholes No. 12, 14, 27, 28, 33) (Figure 4:C). In the eastern section a post-and-beam structure was identified, maybe a house making use of the enclosure, sized about 13 x 6.5 m (postholes No. 13, 15, 17, 18, 19, 20, 21, 44, 46, 47) (Figure 4:A). Inside the enclosure there was another row of

postholes (Nos. 40-45), which maybe indicate some other utilitarian feature. Several posts were distinctly charred (postholes No. 49, 32), so that we can assume that the settlement complex was probably destroyed by fire. Inside the enclosure another postholes No. 4, 6-9 were detected and four of them, if not part of the medieval feature 56, may have marked out the base of a granary (Figure 4:B). According to ceramic fragments found in the postholes we can assign this homestead to stage I of the Platěnice-Silesian culture (HB1-2), after V. Vokolek (Jiráň a kol. 2008, 157).

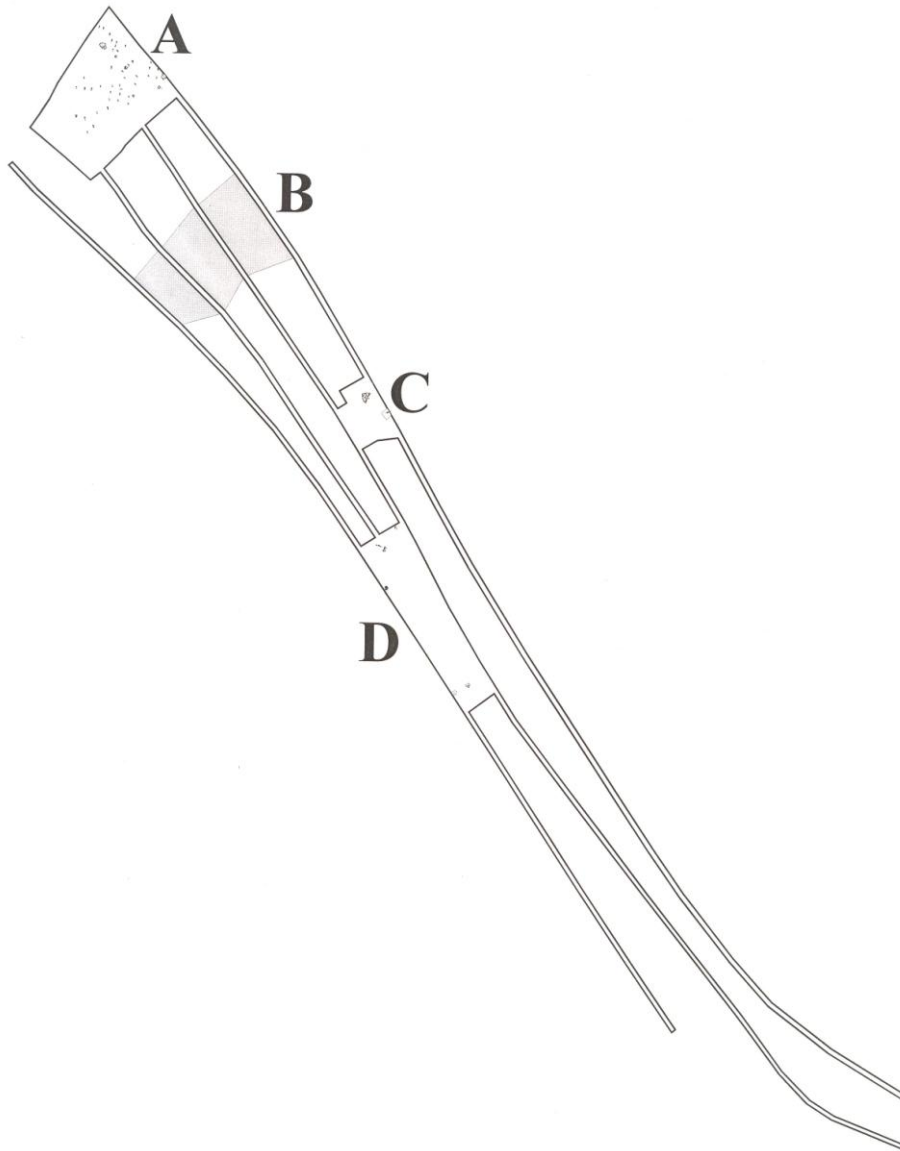


Figure 3: Opatovice nad Labem. Overall plan of the examined site. A) Sector 1; B) Abandoned arm of the river Labe; C) Sector 2; D) Sector 3 (Digitalisation: M. Kotek)

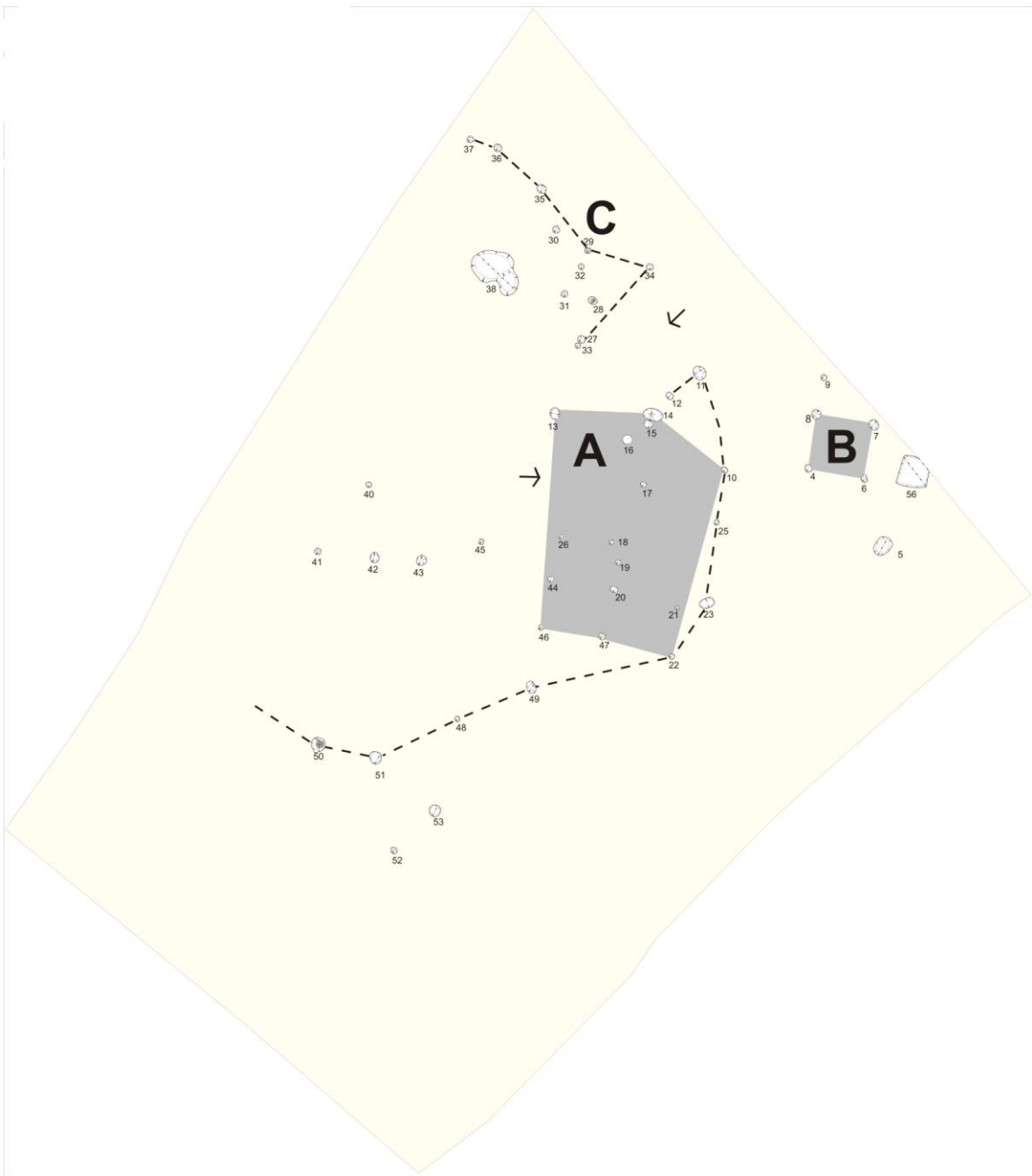


Figure 4: Opatovice nad Labem. Reconstruction of settlement features in Sector 1 after V.Vokolek. Legend: A – aboveground house; B – granary; C – fence (Digitalisation: M. Kotek and K. Cebová)

3. VISUALIZATION

Visual reconstruction of early Iron Age house in East Bohemia was created by ENVIOM PRO Company. Based on information from the archaeological research ENVIOM started to develop basic map. Always developing such project it means quite lot of questions connected with vegetation. Eg. in one of previous projects random vegetation (Birch) was used. When

communicated with Museum we learn that this particular species start to spread in Central Europe hundreds years after. The resulting visualization is shown in the Figure 5.



Figure 5: Visual reconstruction of early Iron Age house in East Bohemia

One of the bases provided to ENVIOM was the digital terrain model created in the software Geomagic Studio. The point cloud from airborne laser scanning was modified in this software. First, the required area was selected. Then the roads and the ponds were removed from the model because they did not exist at that time. In the figure below there is a sample of the DTM.



Figure 6: DTM of the selected area

4. CONCLUSION

The reconstruction of early Iron Age house in East Bohemia is the result of this project. This visualization will become a part of the exhibition in the East Bohemian Museum of Pardubice which will be held in autumn this year.

5. REFERENCES

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