



VirtualArch

Visualize to Valorise – For a better utilisation of hidden archaeological heritage in Central Europe

O.T1.3. Regional strategy for the pilot region 3 – Ljubljansko barje, Carniola (SI)



Project

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LJUBLJANSKO BARJE – DEVELOPMENT AND FUTURE PERSPECTIVES

Ljubljansko barje is a large wetland in the centre of Slovenia that has a series of important functions. It works as a water reservoir and a natural purifying plant for a large amount of drinking water consumed in Ljubljana. The massive quantities of green moss produced here also provide oxygen. Ljubljansko barje is also a cradle of biodiversity, as 61 % of endangered species and 78 % of endangered habitats are dependent of wetlands.

It is the largest unforested area in Slovenia. 80 % of the Corn Crake population in Slovenia, a globally endangered species, nests at Ljubljansko barje. Although the Ljubljansko barje covers only around 1% of the Slovenian surface, it is home to over 20 % of the grassland bird species found here. It is also inhabited by 45 different mammal species.

In the past, the Ljubljansko barje was a complex and dynamic mosaic of different environments, including the lake, floodplain, and wetlands. The Ljubljansko barje and its archaeological heritage should, therefore, be understood as a whole, as a result of long-term interactions of people with a specific and dynamic environment. The result is a unique archaeological heritage, with an excellent preservation of organic cultural material and paleoenvironmental data.

The main aim of our project was to make long-term landscape heritage more tangible and visible to different stakeholders. This included visualization of the extent of the still present buried heritage, the scope of the landscape change, the extent to which the landscape has been modified in the past, the fact that the whole landscape is an artefact of human intervention and every intervention could have a long-lasting effect on heritage and landscape itself.

Aims and objectives

In order to achieve the project aims a visualisation of Ljubljansko barje nad its heritage was prepared. The visualisation would allow the user to understand the Ljubljansko barje landscape changes and the fact that the modern landscape is a result of long-term processes and developments. It shows the landscape changes from the end of the Pleistocene until modern times with focus on the lake dynamics, development of the river network, the emergence of the peat bog and the peat growth itself.

Looking to depict long-term changes, we opted for a more stylised approach with abstract visualisations based on the infographics visual language. This visualisation was also intended to be a basis for several other products, for instance, the landscape change film, the web-app and, of course, the main AR application.

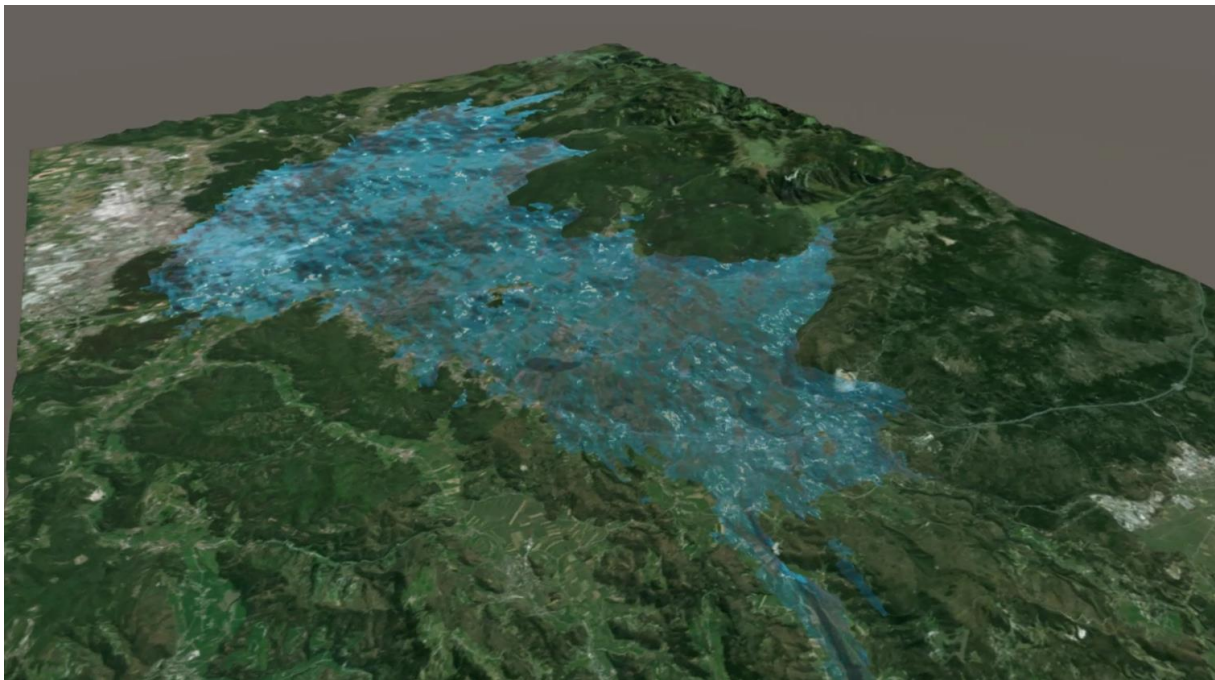
We focused on two well-known pile-dwelling groups that are enlisted on the UNESCO World Heritage List, namely Maharski prekop and Gornje mostišče. The main purpose of this visualisation is to provide the user with an idea of the spatial extent, the distribution and the size of individual pile-dwellings, based on the available evidence. During the digitalisation phase a series of geophysical surveys was performed that enabled visualising



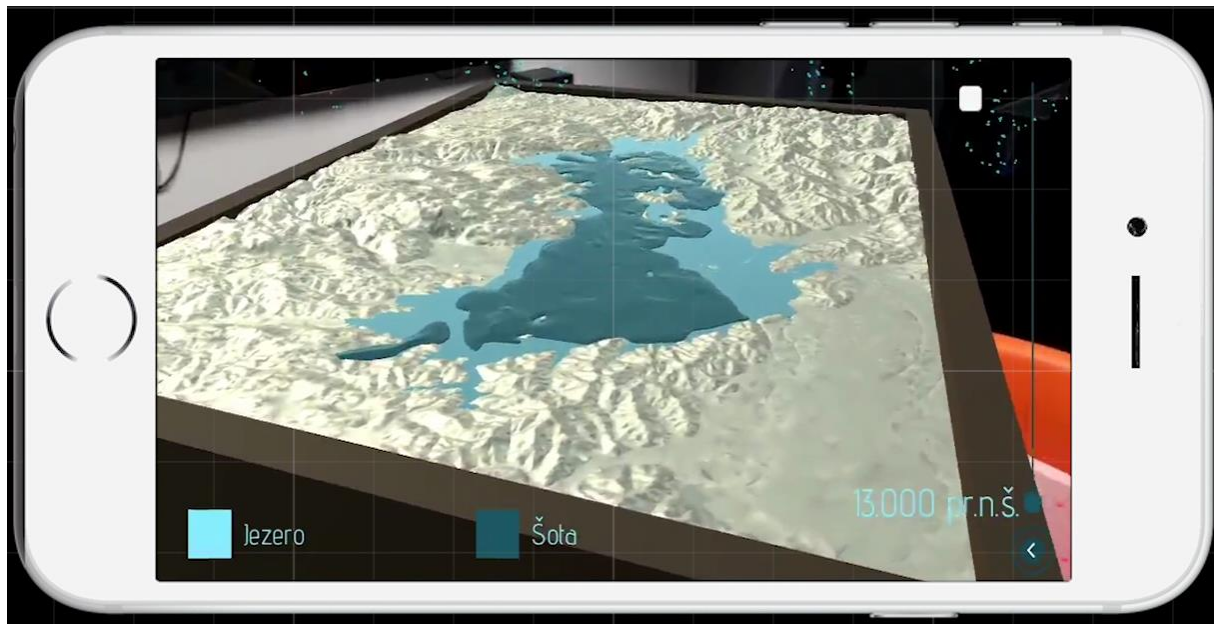
the pile-dwellings as settlements located in a dynamic landscape. Again, the intention was to use more stylised, abstract visualisations, based on the infographics visual language.

The main rationale was to focus on the most important and known aspect of prehistoric settlements - the positions and sizes of individual houses and their relationships. The visualization thus enables the user to see the organization and size of the village.

The visualisation covers an area of around 20.000 km² and spans over 12.000 years. We managed to incorporate the data from historical and archival sources compiled during the data-gathering period. It is also the first visualization of the Ljubljansko barje landscape that is freely available. The app provides a very plastic and tangible exploration of the prehistoric pile-dwelling village in its original position and allows comparison with the modern landscape features. Field tests with users and stakeholders were very encouraging, as they described the experience as an “eye-opening”, allowing for the first tangible and visible experience of the hidden prehistoric settlement.



Lake change visualisation. Still from a video.



In-application visualisation of a landscape change.



Augmented reality visualisation of Maharski prekop pile-dwelling on the original location. Houses are indicated in grey.

Since the pile-dwelling villages were visualized using stylized visual language, indicating only the size, precise position and the orientation of houses on the site, users and stakeholders complained that when they approach the pile-dwelling from close distances, houses appear “too blocky” and asked for a more realistic rendition of the prehistoric pile-dwelling houses. For this reason, we decided to provide a less abstract visualisation of a single, generic, pile-dwelling house, based on available evidence. This visualization now allows the user to gain basic ideas about the prehistoric house - its architecture, materials, specifics etc.



Visualisation of a pile-dwelling house.

In the data-gathering phase, we acquired and gathered a large database about the history of research on the Ljubljansko barje. Curated and annotated gallery of historic photographs, plans and diagrams is available as an addendum and it allows users to dig deeper into the history of research and evidence and explore how pile-dwellings emerged during the excavation, what kind of evidence was encountered and used for visualization. This way the public could have a deeper insight into the complex archaeological process, from the excavation and landscape studies to the interpretation of the past based on a variety of data acquired.



Historical photographs from the excavation of the Parte pile dwelling.



Guided field trip in the test phase.

Sustainability

One of the aims of the international co-operation in general is also a sustainability of the project's outcomes after the official end of the project. In this respect, potential partners and stakeholders were identified.

Landscape Park Ljubljansko barje

The Landscape park Ljubljansko barje (Javni zavod Krajinski park Ljubljansko barje) was recognized as one of the essential partners since the area of the Ljubljansko barje pile-dwellings is managed by them.

The main objective of the park is the protection of nature, carrying out the following tasks:

- the preparation of the park's work and management plan,
- cooperation with the local communities,
- the monitoring of local biodiversity,
- exercising control over the protection of nature in the park,
- cooperation with the landowners, tenant farmers and other land users and their advisement,
- participation in the international projects,
- raising an awareness of the heritage and the education of the general public,
- guiding visitors around the park.



The park is a part of the EU's "Natura 2000" project. Its main purpose is to protect the areas inhabited by animal and plant species that are of international concern. The Natura 2000 sites are protected areas as stipulated by the Directive on the conservation of natural habitats of wild fauna and flora (92/43/EEC) and by the EU Directive on the conservation of wild birds (79/409/EEC). On the basis of expert criteria the entire Ljubljansko barje has been designated as a protected area for birds.

The parks long-term management plan mostly focuses on preserving the parks natural biodiversity and archaeological heritage. They are involved in multiple cooperation projects, including, but not limited to, PoLJUBA, LIFE NATURAVIVA, Sava TIES, Na-kolih, LIFE AMPHICON etc. This gives a perfect opportunity to incorporate our project, specifically our VirtualArch app, in the parks long-term management plan, to offer a valuable enrichment to their already existing programme.

An important part of the parks function is the education of landowners and tenant farmers in the area. It is crucial to preserve the Ljubljansko barje itself but at the same time, it is also important to preserve the quality of life and the economy of the local residents. It is necessary to attain agricultural and economic development. The parks strives to develop an attitude towards the high quality environment that would not burden the locals. They wish to accomplish this by educating the local population, especially the landowners, tenant farmers and other land users in the area. The park sees an opportunity in promoting ecologically friendly production. They also plan to revive traditional and alternative activities in the area. But most importantly, their focus is on preventing any activities that could destroy the environmental balance of the area.

The possible solution lies in the promotion of grazing, grass growing on deep organic soil, promotion of agriculture on the fringes of the area and the hillocks, as well as on mineral and shallow organic soils. Reducing the share of maize and increasing crop rotation in the fields on Ljubljansko barje as well as moderating the intensity of fertilization are planned.

Long-term we find the VirtualArch project outcomes as an additional factor in educating the stakeholders, especially the local landowners, to understand and embody the archaeological potential of the Ljubljansko barje area.

Moreover, the potential of the Ljubljansko barje goes beyond the local interest. The Landscape Park is a site manager of the UNESCO World Heritage site. The area of nine pile-dwellings around Ig was declared in 2011 as part of the transnational serial World Heritage Site "Prehistoric Pile-dwellings around the Alps". The entire monument area comprises of more than hundred pile-dwellings in six Alpine countries and is protected with the highest level of protection. In Slovenia, it is protected by the Decree on the proclamation of Pile dwellings on Ig as a monument of national importance (Official Gazette of the Republic of Slovenia, No. 2/14, hereinafter: the Decree).

The management of the UNESCO site is focused in particular on monitoring and preserving the condition of the pile-dwellings and their outstanding universal value, valorisation of the heritage as well as on its presentation. As a UNESCO destination it offers a great potential for touristic use, therefore the archaeological area is being managed to encourage cultural tourism, promotion, raising public awareness and education.

In this regard, Krajinski Park Ljubljansko barje agreed on using the existing infrastructure around the UNESCO pile-dwellings to promote VirtualArch app on the information boards, to which the QR codes were added to direct the user to the Google Play store where they can download the app and further explore the area. The location of these boards is also marked within the application itself and they serve as orienteering points for the exploration of Ljubljansko barje using the VirtualArch application.



QR code with the VirtualArch application information on the existing information board.

In 2020, Krajinski park Ljubljansko barje is going to organise field trips as part of the LIFE NATURAVIVA project. We want to offer them the opportunity to use our app on these field trips and to provide our project members to carry out some of the field trips if needed.



The park also plans to organise workshops for local landowners to educate them on the importance of the area. The app could offer a new, interesting perspective to help them understand the history and significance of the area they live in.

Additionally, the park has been actively working with schools around the Ljubljansko barje area. We want to offer our app to the students included in this project as well.

As part of the project “Na-kolih”, the Park is planning to build an interpretation centre that will serve as a way to show the cultural and archaeological heritage of the area. They are planning to host several exhibitions in the centre. During the project, we produced several virtual visualisations of the pile-dwellings and the area. Besides the 3D reconstruction of the pile-dwellings themselves and other visualisations would be interesting for the general public. The hidden heritage of the area with the support of the LiDAR technology and geophysical surveys that we carried out can be presented.

The interpretation centre will be the origin point of a learning trail that takes the visitor to the pile-dwellings. The plan is to include our app in the learning path. The path takes the visitor to the Gornje mostišče and Maharski prekop pile-dwellings. On their journey the visitors would get to know the history of the landscape using the app. It also removes the necessity of a guided tour for individuals or groups that want to explore the area by themselves as the app is a guide by itself in a way.

Other partners and stakeholders

Within the project we also approached the Centre for the Architecture of Slovenia (CAS), which works in the field of architectural education and design. Their main aim is raising awareness of the spatial literacy of children and adults throughout Slovenia and promoting the rich Slovene cultural and architectural heritage, including the architectural heritage of prehistoric pile-dwellings. They are interested in the VirtualArch application and see it as a valuable tool in visualising prehistoric-pile dwellings (especially as it brings new and fresh data and interpretation on the organization, size and extent of pile-dwellings).

Together with CAS we developed a pile-dwelling exploration package. They contributed their architectural knowledge and we offered an archaeological viewpoint on it. The result is a unique experience that combines two different disciplines and offers a new type of Ljubljansko barje pile-dwelling exploration experience. We are going continue our cooperation with the Centre for the Architecture of Slovenia in the years to come.

The curriculum for primary schools in Slovenia includes a subjects focused on prehistory and subsequently also the Ljubljansko barje pile-dwellings. We developed a package specifically for primary schools where we offer guided tours and presentations on Ljubljansko barje using the VirtualArch application. Unquestionably, the incorporation of such an app is beneficial for the pupils as it offers them a new viewpoint and the AR approach sparks interest in young students. This work package is something we plan on working on in the coming years and organising for more primary schools that are interested in the subject.



We also contacted the Tourist Information Center of Ljubljana, the main hub for tourism-related issues in Ljubljana. They expressed limited interest in the VirtualArch application and field trips but were supportive in providing information about the project and VirtualArch application. They agreed to distribute an information brochure about the project and application, available at the Tourist Information Center offices in Ljubljana. This brochure will also be available at the museum shop in the City Museum of Ljubljana.

Moreover, we are also in touch with the Tourist society "Bober" from Ig, the closest village to the UNSECO pile-dwellings who are much more interested in the VirtualArch project. We agreed that we would present the results of the project and the application at the "Pile-dwelling days" that they plan to organize in 2020. They are going to distribute the VirtualArch information leaflet and information about application and filled trips, organized within the project.

All these stakeholders and partners coming from different fields and working with heterogenous public (tourists, local community, schools etc.) are to ensure the sustainability of the project outcomes even after the VirtualArch project finishes.