

OUTPUT T3.5

Pilot Action (P13)

Iža Kelemantia (Slovakia)

Title Increasing the Visibility of the
Roman Danube Limes

Final version
02/2022

Author(s) Slovak University of Technology in Bratislava-STUBA

Project ID DTP3-359-2.2

Contents

1. Introduction.....	2
2. General Information on the Pilot Site.....	2
3. Documentation of Selected Visibility Measure(s) Implemented On-Site	3
4. Visibility Workshop.....	4
5. Virtual Reality Reconstruction and 3D Models.....	5
6. Interplay between the 3D Models and Physical Visibility Measure.....	5
7. Further Project Initiatives and Activities Fostering the Visibility of the Pilot Site.....	5
8. (Future) Initiatives at the Pilot Site Triggered Through <i>Living Danube Limes</i>	5
9. Existing Synergies Capitalised and New Synergies Generated.....	6
10. Feedback of Participants.....	6

1. Introduction

This paper attempts to bring together the efforts and experiences that have been recorded and developed on the platform of Living Danube Limes project to increase their visibility and transmission. It focuses on the pilot sites that were defined as part of the project and form the framework for further activities: (listed downstream of the Danube): Gunzenhausen (Germany), Comagena/Tulln in collaboration with Cannabiaca/Zeiselmauer (Austria), Iža (Slovakia), Matrica/Százhalombatta (Hungary), Ad Labores/Kopačevo (Croatia), Lederata/Ram (Serbia), Bononia/Vidin in collaboration with Sinagovtsi (Bulgaria) and Sacidava (Romania).

2. General Information on the Pilot Site

The remains of the Roman fort are located east of the city of Komárno, approximately 2.2 km southwest of the centre of the municipality of Iža, in location called Leányvár, on the left bank of the Danube, at an elevation of approximately 108-111 meters above sea level. Its area appears slightly above the surrounding flat plain terrain as a square-shaped low ridge accentuated in the western, northern and eastern part by the residues of ramparts and ditches. The surface is grass covered, lined with a row of trees in the west and east. The area is determined from the south by a high protective embankment of the Danube River, in the north is surrounded by a dirt road and drainage canals. On the west is an archaeological base station and on the east a shooting training ground. The first excavations were done by J. Tóth-Kurucz at the beginning of the 20th century. Systematic research is currently underway since 1978 under the leadership of the Archaeological Institute of SAS. In 2021, the archaeological site was added to the UNESCO list, which expanded the number of Roman monuments on this list.

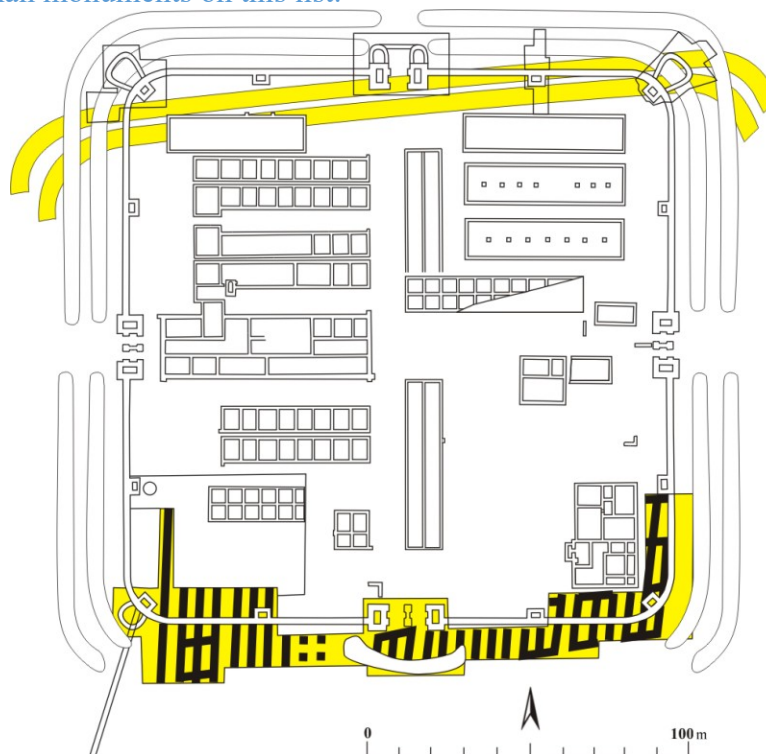


Figure 1 floor plan of development stages the Roman fort source: Archaeological Institute of SAS.



3. Documentation of Selected Visibility Measure(s) Implemented On-Site

The site of the archaeological camp is located in a romantic landscape relatively far from the village of Iža and the town of Komárno. The biggest influx of tourists is currently ensured by the international cycle route, which is in close proximity. Its character is rural, the majority part is archaeologically undiscovered and has a protective layer from the past. The entire set of buildings has two dominant elements, which are presented by masonry, namely the southern defensive wall and the northern entrance gate. In a smaller part of the area, there are indicative presentations of masonry and a well. The site is currently difficult to read for the general public and the massiveness of the entire complex remains unread.

Vegetation: The long-term care of the site proved to be a big challenge, which overburdens the administrator of the site. Therefore, part of the visibility measure attempt focused on this seemingly banal problem and tried to use it for the benefit of the presentation.

VR and AR: another exquisite means has been the possibility of new technologies that has allowed reaching a wide range of visitors, which has been realized within the project *LDL app*. *It provides an overall overview of the monumentality of the locality.*

Information boards: *in addition to basic information, they offer the possibility of closer localization of the LDL app for users.*



Figure 2 green presentation source: STUBA

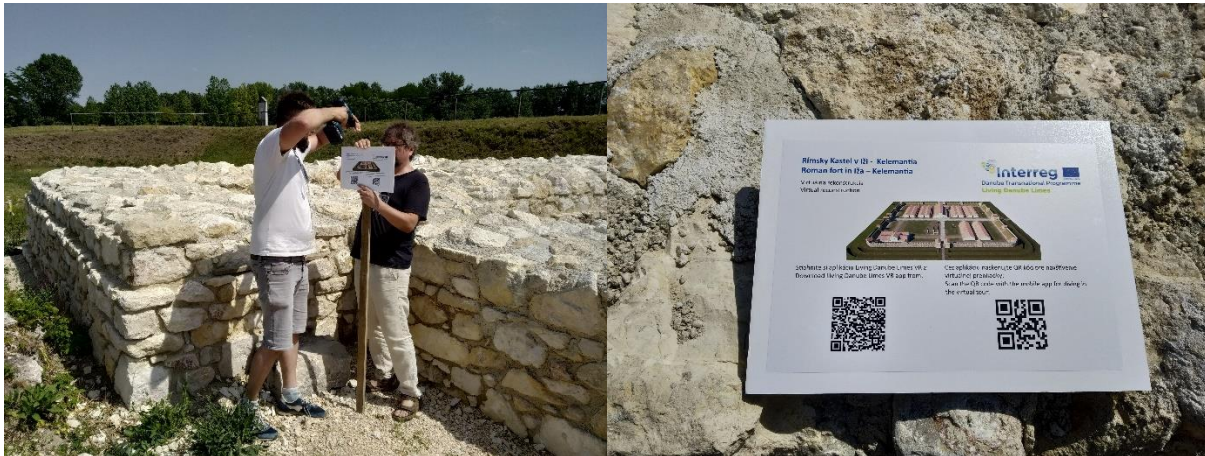


Figure 3 Installation of the information boards on the several spots on the site. Source: STUBA

4. Visibility Workshop

For the workshop, we chose to test all the presentation options that the course of the project and its basic theses allowed us.

The technique of presentation through mowing required the long-term participation of the parties involved, especially the SAV Nitra, and was basically created from spring to summer. In the first steps, it was necessary to analyze the research by J. Tóth-Kurucz, which was improved by the verification georadar research that had been created thanks to the LDL project. It was necessary to create a network based on GPS and geodetic knowledge and technology. They defined the contours of underground military facilities. Subsequently, they were marked with stakes so that it was possible to guide the workers. For a better understanding of visitor behavior, two approaches were chosen: one defined only the total area and the other also defined interior rooms. Due to the fact that the archaeological site is not guarded or fenced, we also monitored the possible phenomenon of vandalism, which could damage the presentation. At the workshop itself, we analyzed the state of the presentation and the visitors' reactions in the debate.

The phenomenon of ecological benefit was also supportive. In the grassland, which was left without maintenance for the whole season, a favorable environment for the life of insects was created. As for the phenomenon of global warming, the load of soil overheating has decreased and the amount of retained rainwater has increased, which is beneficial for this temperature extreme environment in summer. Vegetation has grown and created the clear contours of Roman architecture.

VR and AR reconstruction through the mobile LDL app turned out to be a great option. Workshop aimed at checking it directly on the spot so that possible deficiencies could be improved in the next stages. During the workshop, the generational possibilities of individual participants as well as the usual technological possibilities of mobile technology were checked. Due to the fact that there is currently no WIFI connection at the site, visitors are forced to use the services of commercial mobile providers. Due to the proximity of the border with Hungary, access was questionable, as there could have been a connection to the Hungarian mobile network. This negative phenomenon did not materialize and it was possible to use the local mobile network at all points. The 3D models themselves were functional, but we found a problematic point in their visibility on cell phones. In strong sunlight, the presentation was not sufficient, but another attempt with cardboard VR was

more than satisfactory. The idea of a ticket to existing museums was born, which would be printed on VR cardboard.

Boards: for better understanding and navigation of tourists, they were analyzed and a Hungarian language mutation was added to them.



Figure 4 VR reconstruction source: STUBA

5. Virtual Reality Reconstruction and 3D Models

Virtual reality was applied in full thanks to scientific knowledge gained from the site by SAV Nitra. The individual scenarios were fine-tuned directly on the spot so that they were placed on the natural route of tourists, with an emphasis on the international cycle route, which is currently the most used path for visiting the archaeological site. In order to strengthen hiking tourism, places that attract visitors have been selected.

6. Interplay between the 3D Models and Physical Visibility Measure

The 3D model was used to create a better idea of the site for visitors. The data remain available to partners for possible use. It is not appropriate to create a printed model on the site itself. A detailed model was created in the nearby museum in Iža, which is more than sufficient for the presentation of the archaeological site.

7. Further Project Initiatives and Activities Fostering the Visibility of the Pilot Site

For better presentation and protection, a new UNESCO Management Plan is being prepared, which will define the further development of the archaeological site. The municipality of Iža together with the Danube Region Museum plans to continue taking care of the site and its development. *It is planned to minimize the form of indicative reconstruction in favor of the natural character of the site. If there are enough funds, the plan is to repeat the form of presentation by mowing.*

8. Existing Synergies Capitalised and New Synergies Generated

The goal of the workshop was a review of the available options for the presentation of cultural heritage and the possibility of the participation of experts in the field of monument care with the administrators of the site. A critical platform was created, which contributed to the fine-tuning of outputs from various points of view. We believe that even through our efforts, we will be able to continue the appropriate presentation of the site in the years to come.

9. Feedback of Participants

The workshop participants appreciated the possibility of debate and critical evaluation of the presentation on the spot. They got an idea of the possibilities and limits of the archaeological site with an overlap of VR and AR. The mayor of the village together with the participants appreciated the quality of the outputs and the contribution to their community.