# Danube´s Archaeological eLandscapes. Virtual archaeological landscapes of the Danube region

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*Type of best practice*
Cooperation between Museums and Heritage sites

*Keywords*
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*"A collaboration between various research and public institutions, with stakeholders from ten countries, aiming to raise the visibility of the archaeological sites and museums in the broader Danube region, raising their profile at the regional, national and international level, and thus increasing their attractiveness and forms of sustainable tourism. The project achieved its aims using new digital technologies like virtual and augmented reality. In this way, museums overcome the issues of visibility and disunity, because they encourage their visitors to experience the archaeological heritage in its original landscape. The project therefore brings researchers and audiences together, drawing on new technologies to share and foster engagement with our archaeological past.*

## Organisation in charge of best practice
Universalmuseum Joanneum (Graz)

## Location
Austria, Slovenia, Romania, Czech Republic, Germany, Croatia, Bulgaria, Slovakia, Hungary, Serbia

## Dates
01.07.2020 - 31.12.2022

## Description
The Danube region has a rich and culturally diverse archaeological heritage, which is a testimony of cultural and social development, as well as a source of information about our past. This archaeological heritage also has an important role in promoting and encouraging cultural tourism. If it is presented in an attractive way, it can become a sustainable cultural resource. However, the potential of the Danube's archaeological heritage is difficult to exploit, due to scarce visibility and a disunity of the sites.

There are, of course, common issues in archaeological heritage, and not only isolated issues of the Danube's region. Usually, archaeological heritage is largely hidden underground. Even where there are some archaeological remains above the surface (e.g. in the form of ramparts, burial mounds or stone monuments) these sites are often covered by vegetation, so they are not fully accessible. In addition, it is difficult for the common visitor to imagine how the remains we witness today belonged to buildings and settlements in the past. Besides this lack of visibility, archaeological heritage also finds challenges because of a disunity: archaeological finds are usually located in museums, far from their find spots. Under these circumstances, it is challenging for visitors to understand the archaeological context and the history of these remains and the artefacts displayed at a distance from their original place. Furthermore, sites are not isolated places in space, but are integrated into archaeological landscapes.

With all these considerations in mind, the project's aim was to make the archaeological landscapes of the Danube region more visible at the regional, national and international level, and thus more attractive supporting the development of sustainable cultural heritage tourism. Indeed, museums as heritage preservers, interpreters and hotspots of cultural tourism have the power to contribute to a sustainable development of archaeological landscapes.

Museums and landscapes are strongly interdependent, more than it is perceivable at the first glance. On one hand, museums are interpreters of history and transmitters of knowledge, and so they can promote landscapes in order to increase visitors to those places. On the other hand, landscapes give museums the possibility to contextualise objects and enable people to better understand and value heritage. A successful connection between sustainable tourism, heritage research and interpretation appears to be the future of heritage and landscape preservation.

The EU INTERREG project "Danube's Archaeological eLandscapes" was implemented by a collaboration of various institutions, researchers, public and stakeholders from ten countries of the regions: Austria, Bulgaria, Croatia, Czech Republic, Hungary, Germany, Romania, Slovakia, Slovenia and Serbia. In particular, there are 10 project partners and 12 associated strategic partner institutions, led by the archaeology team of the Universalmuseum Joanneum (Austria).

The partners divided themselves in three international working groups in order to focus on different parts of the projects, and then they combined their research in three international studies, in particular: archaeological, technical and social aspects of the project. The aims of the archaeology's group were to support partners in the development of state-of-the-art digital visualisations of archaeological landscapes, sites or objects, based on scientific data. The second group evaluated the costs and benefits of technological solutions for the development and presentation of archaeological visualisations and their promotion across the partner institutions, considering in particular virtual and augmented reality applications. The third group, focused on public archaeology aspects, analysing the social aspects of archaeological heritage, like accessibility, digital visibility, etc. These studies defined the basis for the implementation of digital technologies in the promotion of archaeological heritage in the Danube region.

In order to offer visitors the possibility to understand the context of archaeological heritage, the project drew on new digital technologies like virtual and augmented reality with the aim to enable their visitors to experience virtually the archaeological artefacts in their original landscapes. At each participant organisation, visitors had the opportunity to explore not only the archaeological landscapes of their own country, but also those of the partner countries - through a combination of touch screens, apps, and augmented and virtual reality stations. In doing so, the project is thus creating Danube's Archaeological eLandscapes bringing researchers and audiences from across the geographic and institutional landscapes together, to share and enjoy the knowledge about the region's archaeological past.

The project was planned considering the goals stated above, and it included - as mentioned - working groups covering interdisciplinary aspects of the virtual visualization of cultural heritage (interpretation; technology; audiences). It is common to think about virtual visualizations of cultural heritage sites as simply presenting virtual 3D models. However, when dealing with virtual visualizations, it is necessary to take a more interdisciplinary approach, so to consider the sources and content of the visualisation (based on the archaeological sources and the interpretation needed by the target groups), the possibilities and limitation of the technologies (including costs, technical development, and sustainability), and the audience's responses to different technological approach and to online communication by archaeological museums and researchers.

The project's work plan consisted of nine key steps:

1. Project Planning: selection of archaeological (cultural heritage), technical, and social strategies;
2. Data Acquisition: gathering of data through active near & remote sensing techniques, passive near & remote sensing techniques, legacy data digitisation, analogies research etc.;
3. First Interpretation: archaeological/cultural heritage interpretation with the focus on virtual digital enhancement;
4. 3D Model Creation: integration of data, virtual reproduction, and virtual reconstruction;
5. Communication Strategy: selection of best communication channels and file formats;
6. Second Interpretation: design of a storyline;
7. 3D Model Adjustment: adjusting of the 3D model according to expert demands and chosen format, and post-processing of the renderings;
8. Dissemination: finished communication formats (and their use);
9. Documentation: documenting para- and metadata.

The project developed a set of applications following the above workflow. It also relied on digital storytelling methods to foster engagement with the presentation. Digital storytelling can help not only to build memories and instil values, but it can also educate about our shared obligation to preserve these memories and our archaeological heritage.

The project included knowledge exchange workshops and mobility actions for the participant organisations, often in parallel to training and discussion events for local museum and heritage professionals. In parallel, exhibitions testing and showcasing the technological solutions were opened at all the museums, and were evaluated through an international visitor survey aiming to investigate the effect of the different applications on their audiences.



**Links**
https://www.interreg-danube.eu/approved-projects/danube-s-archaeological-elandscapes
http://www.dael-routes.eu/
https://www.museum-joanneum.at/en/archaeology-museum-schloss-eggenberg/projects/danubes-archaeological-elandscapes

**Resources needed**
The project was funded with more than 2 million Euro by the EU INTERREG programme. This funding allowed the constitution of the network and supported the work. On the one hand, the project organised a series of events, creative hubs, and conferences - thus requiring organisational support and spaces to host such events. On the other hand, the collection of existing digital data and digitisation of further objects, alongside with the design and development of the applications required substantial resources - both in relation to staff and equipment. In particular, state-of-the-art virtual reality (VR) and/or augmented reality (AR) technologies were acquired by the various museums and adequate spaces for their use were set up.

## Challenges encountered

"The presentation of archaeological data with innovative digital tools was challenged by different levels of digital expertise across the organisations as well as public archaeology expertise. Often, research data are not appropriately documented, with a lack of metadata and paradata. This might then lead to challenges in generating scientifically accurate digital reconstructions of sites. Long-term data management plans for digital models are also often missing, database models are inadequate for this type of resources, and copyright and access policies need to be agreed upon. Current digital archaeology work is aiming to tackle these challenges and this project contributed to raise capability and expertise among the participating organisations. Furthermore, virtual visualisations are difficult to create because they have to be scientifically credible while attracting and engaging their audience: the survey conducted in this project aimed to test reactions to different solutions in order to evaluate the success and limitations of the visualisations. Finally, the digital tools used in museums for exhibition purposes require systematic funding for long-term maintenance and a sustainable infrastructure (like virtual platforms, websites, databases, podcasts, etc.), but long-term funding is usually pretty rare. Thus, a collaborative approach pooling resources and skills - such as in this project - might contribute to address the sustainability challenge.

## Evidence of success

"The series of exhibitions and applications emerging from this project is a witness to its success, as well as the academic and professional events that were organised. The key outcome of the project is the exhibition "Stories of the Past: Digital Journey into Lost Landscapes", which was hosted in 10 different countries and included VR glasses & cardboard VR, touch screens & AR tablets, monitors & projections, mobile phone/app, and a PC app. In parallel, a database presents the sites through an online interactive map. The survey evaluating the impact of these digital tools on visitors received 4667 answers. A series of events (mobility actions, industry forums, conferences, policy makers workshops), hosted e.g. at the National Museum of Slovenia, the Universalmuseum Joanneum, Rousse Regional Museum of History, National History Museum of Romania, Hungarian National Museums, etc. and participation in international conferences raised the profile of the project and disseminated its results within the professional and academic communities.

## Potential for transfer

"The Danube´s Archaeological eLandscapes project was implemented under the Danube Transnational Programme (DTP), funded by the European Regional Development Fund (ERDF) and co-funded by Hungary, Romania and Bulgaria. Given the amount of funding received, its results might be difficult to replicate by organisations with less capabilities. However, the reports and experiences gained in the project (and shared through its deliverables) will support institutions aiming to develop interactive and innovative digital solutions for the interpretation and mediation of archaeological heritage and to connect sites and museum artefacts through digital tools. In particular, the workflows, recommendations for the development of the tools and their curation, as well as the visitor survey - all available through the EU INTERREG web page - have the potential to inform and support further digital public archaeology activities and projects.

**Further Information**

"Different workshops, forums and action plans, where visitors had the possibility to explore the activities of the projects, have been organised. The EU INTERREG webpage and the project's social media (Instagram and Facebook) offer an overview of these activities and present the project deliverables.