

Tourist Booklets collecting the experiences derived from the implementation of the pilot sites

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Abstract

The Booklets are aimed at resuming key elements of innovation of the HISTORIC Project for the purpose of a broader dissemination. Thanks to their formats and the used language it can be used a printable material or a short presentation to be attached as a digital document.

The Booklets are four and covers the main scientific area of experimentation investigated during the project. Their title are the following:

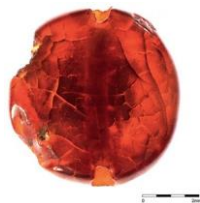
- Amber Routes during Protohistory
- A GIS for the Roman roads of Venetia et Histria
- VR and AR for cultural heritage
- Level of Details for 3D Modelling.

Amber routes through protohistory.

This booklet describes the digital database and a GIS system which collect all the amber evidence known, to date, in Veneto region and on the Croatian coast. In the GIS system, modern cycle routes and maritime communication routes between the two Adriatic coasts were then identified and included, as well as the main Museums where the most famous objects found along the “amber routes” could be found. Using these tools, visitors will be able to construct an itinerary, archaeological but also naturalistic, that will remind them of the routes travelled by the ancient inhabitants of these areas during their trade journeys.

“Amber Routes” in Bronze and Iron Age of high Adriatic coast

The amber is fossilized tree resin produced by coniferous trees, characterised by a bright orange or red, translucent colour, particularly diffuse throughout the Baltic Sea coasts. The use and diffusion of this material has a long history, since the very beginning of the Neolithic period, in the whole Europe. For the Greek, amber was known with the word “ēlektron” and was linked to the myth of Phaeton, who, falling from his sun chariot, died in the river Eridanus; his sisters, the Eliads, hopeless, turned into poplar trees, weeping tears of resin, of amber.



Amber beads from the fortified site of Fondo Paviani (Verona). Recent Bronze Age.

During the ancient times, especially between the Bronze and Iron Age, amber represented a luxury good, prerogative of the ruling élites, the aristocracy, and was generally used to make parts of ornaments or objects of high symbolic value.

Both in the form of raw materials and finished manufactures, amber circulated throughout Europe using the communication and exchange networks established by communities that, from the earliest Bronze Age onwards, strengthen close relations. This network was fundamental to the economic and territorial development of a system of circulation of raw materials, artefacts, but, above all, ideas and people.

Fundamental to the exchange of amber, which usually come from the shores of the Baltic Sea, is the use of **routes**, by land and by river, to allow trade. The amber spread between the Upper Adriatic coast of Veneto region and the opposite Croatian coast found many parallels and possible connecting nodes. In some important site of Veneto and Croatia are diffused, during the final phases of Bronze Age, particular types of amber beads, known as “Allumiere” and “Tirinto” beads. In Veneto region these beads are very common in the centre of Frattesina (Rovigo) and Grignano Polesine (Rovigo), where the direct production of “Allumiere” beads is attested. This type of beads are parts of particularly prestigious necklaces that become fashionable objects and symbols of prestige throughout the Adriatic coast.



Allumiere and Tirinto beads from Frattesina (Rovigo). Final Bronze Age



Allumiere and Tirinto beads from Kompolje cemetery (Croatia). Final Bronze Age

Ornamental objects decorated with amber components, such as fibulae and pins used to fasten clothing, are also widespread, especially during the Iron Age. In particular, sites like Prozor (settlement) and Kompolje (cemetery) have provided a very high number of attestations.



Fibulae with amber components from Prozor and Hrvatsko (Croatia). Early Iron Age

An important goal of the research was to create a digital database and a GIS system that would collect all the evidence known, to date, in Veneto region and on the Croatian coast. Observation of the collected data made possible to visualise the main concentrations of amber manufactures and the possible routes of exchange and network walked during the ancient times.

An “amber route” was certainly active during the Early Bronze Age, running along the Brenner pass and down through the Adige Valley to the pile-dwelling sites on Garda Lake.

During the Late Bronze Age and especially the Final Bronze Age, the Polesine pole was absolutely the crucial: here raw amber was worked and then redirected to the Adriatic coast, to cross it and reach the Croatian shores.

It is also possible that the Croatian area also drew amber from a second, internal, “continental” route, following the course of the Rhine.

During the Iron Age the Polesine pole lose its leading position in favour of the Adige Valley routes and the international routes of Rhine and Danube Valley.

In our GIS system, modern cycle routes and maritime communication routes between the two Adriatic coasts were then identified and included, as well as the main Museums where the most famous objects found along the “amber routes” could be found.

Using these tools, visitors will be able to construct an itinerary, archaeological but also naturalistic, that will remind them of the routes travelled by the ancient inhabitants of these areas during their trade journeys.



A GIS for the Roman roads of Venetia ed Histria.

This booklet describes the GIS project created to map and enhance the ancient road network of the Adriatic Gulf. The data-set comprised archaeological and topographic vector data, WMS layers related to 1984-1989 orthophotos, satellite images (BingMaps, google earth, Landsat), historical cartography, cadastral and modern cartography. The management of data through GIS has allowed to realize a thematic digital cartography, composed mainly of two layers: one punctual, with which the distribution of ancient settlements has been mapped, and one linear, which records, instead, the routes and roads of the Venetia et Histria region. This latter layer, in particular, has been useful for the HISTORIC project, since it has been imported into the Trip Planner Web Application, which allows to manage tourism products and social route tracking, ensuring at all levels of tourism users the opportunity to explore the territory and its cultural potentialities.

From points to lines

Within the framework of Historic, the territories that have been the subject of the research have been mainly the coastal areas of the Adriatic Gulf, where the pilot areas are located.

If these places could represent the ‘points of interest’ of the entire area which the project has focussed on, an effective enhancement of these landscapes could not be separated from the creation (or the reactivation, historically reliable) of a link between those same sites. It was, in fact, essential to switch from ‘points’ to ‘lines’.



Precisely because of the vocation of that territory as an osmotic area of passage and transit, those lines have been easily identified with the routes and roads which, from pre-Roman times and especially from the Roman period, had to innervate the coastal fringes of the Adriatic Gulf, both horizontally (through maritime routes and an earthy and coastal road network) and vertically (along the rivers and the roads which allowed to move inland).

From lines to network

Already from the late Bronze Age (XIII-XII century BC), the Polesine area and, in particular, the sites of Frattesina and Campestrin are well known for their activities of importing, processing and exporting amber from the Baltic Sea to the Adriatic and, from there, to the Aegean Sea and the Mycenaean world. Even during the Roman period that region continued to be a key area, along the Amber Road, due to commercial, but also (and above all) political and military interests which, between the end of the 1st century BC and the beginning of the 1st century AD, Rome began to show towards the Baltic territories.

Sometimes before, this tradition of contacts and exchanges had found a valid vector of development in the Via Annia, which in 153 BC was planned as the shortest connection between Rome and Aquileia. In 148 BC the same Aquileia became the eastern terminus of the Via Postumia, which, from Genoa, crossed longitudinally all northern Italy passing through Tortona, Piacenza, Cremona, Verona, Vicenza and Oderzo.

Shortly after, in 132 BC to the Annia/Postumia system a coastal road was added, the via Popillia, which had to reasonably remain in the immediate vicinity of the coast and put in communication Rimini with Adria and Altino.

The coastal arch of the Adriatic was later completed by the Via Flavia, which from Trieste, in turn connected to Aquileia, led to Pula, in Istria, and by the coastal route of Dalmatia, stretched from Rijeka to Split.

Also within this geographical context, the Romans should be acknowledged the merit to have understood that an efficient road network was the basis of a functional and effective state organization. The Roman road network represented the backbone of every activities linked to the administration of a territory, which in this way was gradually integrated into the Roman state. The roads were the main factors of unification of the Roman world, not only in military or political-economic terms, but also (and above all) from a cultural and social perspective.

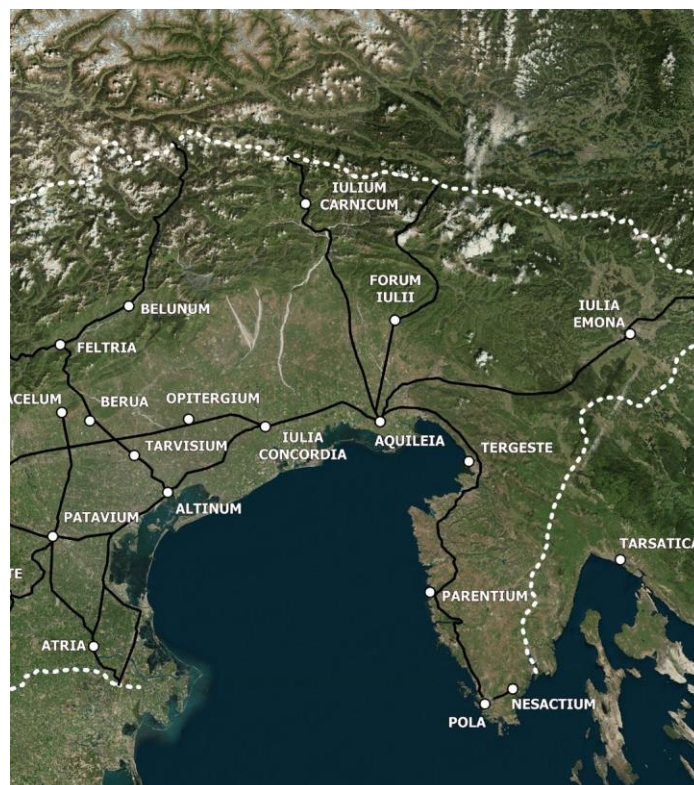


But there is more. The Roman roads were planned first of all to respond to specific military and strategic needs, and their irradiation from Rome is strongly integrated within the stages of the territorial expansion, which to some extent is anticipated precisely by the creation of these routes, which are planned in the present, but already preparing a future reality.

From network to GIS

To manage the data-set useful for the creation of the layout of the ancient road network of the Adriatic Gulf, a targeted GIS platform was created by means of the open source software QGIS. The data-set comprised archaeological and topographic vector data, WMS layers related to 1984-1989 orthophotos, satellite images (BingMaps, google earth, Landsat), historical cartography, cadastral and modern cartography.

The management of data through GIS has allowed to realize a thematic digital cartography, composed mainly of two layers: one punctual, with which the distribution of ancient settlements has been mapped, and one linear, which records, instead, the routes and roads of the Venetia et Histria region. This latter layer, in particular, has been useful for the HISTORIC project, since it has been imported into the Trip Planner Web Application, which allows to manage tourism products and social route tracking, ensuring at all levels of tourism users the opportunity to explore the territory and its cultural potentialities.



VR and AR for Cultural Heritage.

This booklet describes the use of VR and AR to improve the interaction between the final user and the 2D - 3D information. The use of digital technologies in Cultural Heritage, can intervene on two levels: on the 'form' of the object with virtual reproductions or on the knowledge associated with it with augmented reality. These interventions "digitally" change objects and contexts of fruition by modifying the specific subject-object interaction, both from a perceptual and an intellectual point of view. New technologies have demonstrated the communicative potential of a new generation of devices, which can 'talk' directly and differentially to users, involving them by creating interactive and/or immersive experiences.

Virtual Archaeology

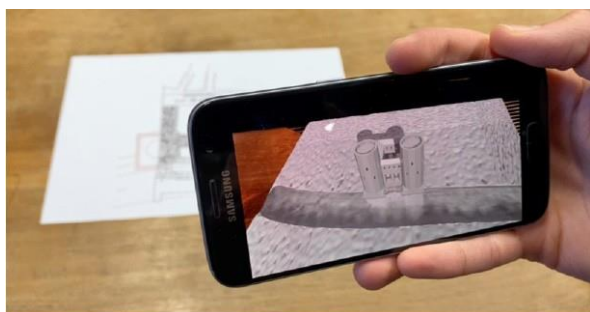
From the use of virtual reality in archaeology a specific field of Virtual Cultural Heritage was born: Virtual Archaeology (VA). With Virtual Archaeology it is not only possible to reconstruct entire sites, but also ancient artefacts according to methodologies that guarantee their scientific accuracy.

Reconstructing an artefact means describing the evidence, demonstrating the relationships between the existing and the reconstructed, and trying to make the reconstructive hypothesis clearly identifiable.

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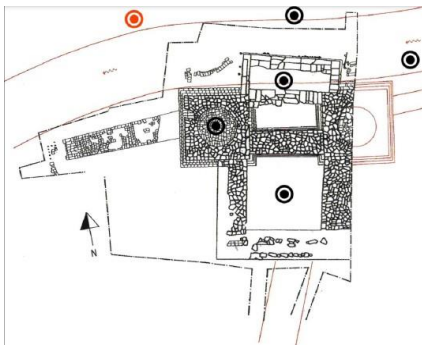
If properly thought through, developed, and tested, they can become the way in which the research is transmitted from institutions to users, in an effective and persistent manner.



Augmented Reality

To improve the interaction between the final user and the 2D - 3D information, an Augmented Reality application was realized with Unity 2019.4. This app allows to frame with a device the edited planimetry and to extrude the virtual model. In the pilot areas the installation of AR application could enrich the tourist offer creating a recognizable attraction.

In terms of tourism-specific functionality, the application offers interface elements for keyword search and browse through available information. Exploration of the immediate visible surroundings of the user is probably the most obvious advantage that AR mobile applications could provide to tourists. AR applications display one specific layer or spatially relevant information. This approach enables the user to explore available content without having specific background knowledge.



Virtual Reality

The monumental aspect, due to the size and visual impact of the city gate, could play a role that went beyond the simple purpose of a port of call and access to the city.

To emphasise this component, an immersive reality environment is used, in which the user stands at the centre of the model and its context, perceiving it in its real dimensions, both geometric and landscape.

Regarding the landscape context, palaeoenvironmental studies and remote sensing research have provided useful information for the planimetric reconstruction of the surrounding urban and environmental aspect.

In the implementation of the virtual tour, the dissemination approach is also supported and emphasised by the possibility of placing textual hotspots on specific elements of the reconstruction to promote the semanticisation of what is presented and thus provide a greater understanding of the model.



Level of Details for 3D modelling.

This booklet describes the modelling of the city gate of Altino carried out in the Blender 2.83.10 environment, a multi-platform open source software. The geometry of the elevation was realised using the concept of Levels Of Detail, which allow not only the visualisation of different levels of detail, but also the scanning of the interpretative evolution.

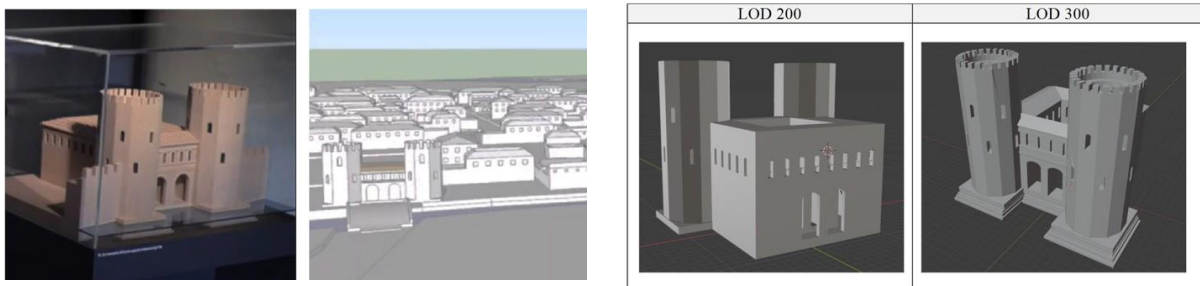
Digital Cultural Heritage

Digital Cultural Heritage (DCH) describes a type of intangible cultural heritage which, due to its intangible nature, may be studied at a distance, circulated freely and, at the same time, be subjected to processes of virtual anastylosis in order to see it as it used to be and to be communicated in museums with new communication tools for different classes of users.

On the international scene, Information and Communication Technologies (ICTs) have changed the way in which cultural heritage is communicated, generating new languages, multiplying the levels of storytelling, and enabling the adoption of communication strategies based on interaction, choice and sharing.

The choice of the case study, the city gate of Altino, was determined by its particularly significant character, both in terms of its architectural and monumental features, its functional and symbolic value, and finally for the context in which it is placed.

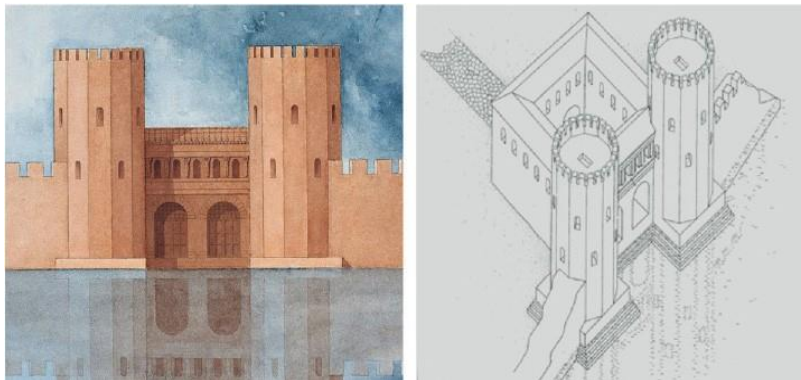
Known as the precursor of Venice, the Roman city of Altino stood on the edge between the alluvial plain and the upper Adriatic lagoon, a place with a delicate environmental balance between river and brackish waters.



Previous reconstruction

The strong monumental connotation of Altino's land gate and the knowledge produced by excavations and the survey of its foundations have prompted reconstructive hypotheses on several occasions. Various solutions have been employed in order to provide these reconstructions and promote the volumetric perception of the archaeological complex.

Different approaches have been taken to the topic of the reconstruction of the gate, sometimes aimed at the most aseptic representation of volumes, sometimes aimed at a greater involvement of the senses. In any case, the theme of water and the relationship between architecture and the natural element have always been central to the representation, as has the search for the monumentality of the building.

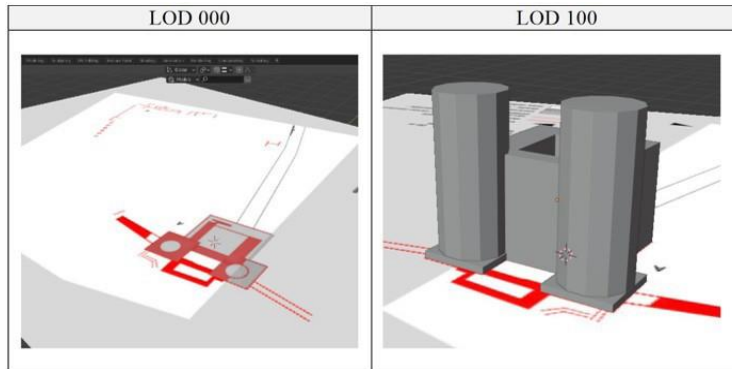


3D modelling and LoD

The modelling of the city gate was carried out in the Blender 2.83.10 environment, a multi- platform open source software.

The geometry of the elevation was realised using the concept of Levels Of Detail, which allow not only the visualisation of different levels of detail, but also the scanning of the interpretative evolution.

Taking the guidelines as a reference, the reconstruction of the city gate develops from LOD 000, which corresponds to the appropriately scaled plan, and reaches subsequent levels of complexity through processes of extrusion of the geometries and the addition of further decorative elements (such as windows, battlements and moldings).



Texturing

From a methodological point of view, the “dressing” of models uses PBR (Physically Based Rendering) textures. This term indicates a rendering technique capable of simulating the characteristics of a material and its response to light in real time. It is based on texture packages that are able to give to the model the main properties of the material attributed to it, such as reflectance or roughness or the colour itself.

