

Communicating the territory in evolution: an interactive virtual diorama for reconstruction of the land register of the Roman city of Urbs Salvia

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Objectives of the project

The present work concerns the virtual reconstruction of the territory and archaeological landscape of the middle valley of the Fiastra river and of the Roman colony of Urbs Salvia. This is a part of a wider project about the enhancement of cultural heritage promoted by Regione Marche and it was developed from the idea that the archaeological structures are often readable by specialists in the field and, at the same time, difficult to understand for the average visitor.

Among the objectives of the project, was to develop a new method for data collection and archaeological study and elaborating new ways of communication about the archaeological sites through case experimental sample and the use of ICT.

The method identified provides both the traditional preparation of virtual 3D reconstructions of individual monuments, also aimed at the creation of augmented reality, and large portions of ancient landscape related to the Roman city.

The issue of reconstruction of archaeological landscape is very problematic and the cases of systematic application of 3D modeling, in particular of the peri urban and suburban landscape, are very limited still today. This happens especially when the purpose of the enhancement arises as a premise the analysis of the data confirmed both by the archaeology and by the topographic survey.

Scientific premises and ways of operating

One of the objectives of the work was to overcome the potential dichotomy between the needs of the development and the promotion of the territory. This dichotomy may in fact lead to oversimplification and sometimes to a distortion of the contents and of their scientific correctness that is essential for the strengthening of local identity and the overall growth of the area and its potential users, both local and tourists.

The goal has been achieved through the creation and the use of a digital interactive diorama. The 3D Regional Technical Map 1:10.000 and an aerophotogrammetric survey of 2007 allowed to obtain a Detailed DTM and a digital OrthoPhotoMosaic with pixel of 30 cm. A digital interactive diorama of a rectangular area of 9.6 x 10.9 kilometers (10,500 hectares) that represents the current situation was created using the open source SW VTP (Virtual Terrain Project, <http://vterrain.org/>) with this data. To obtain the appearance of the Roman period the DTM has been edited by removing modern anthropogenic changes (fig. 1) and inserting the known elements of the period. The analysis of the ancient riverbed of Chienti and Fiastra rivers (fig. 2) has suggested, for example, to implement a different path of the hydrographic elements (fig. 3). The same method was applied to the OrthoPhotoMosaic.

Upon this model have been rendered the main Roman monuments of the urban area and the different components of the agricultural landscape then placed in the virtual diorama. As for the monuments of the Roman city (fig. 4) focus was therefore on the ones already studied with the objective of integrating the project later, starting from the city walls of the Augustan age (fig. 5).

For what concerns the forum of the colony it was decided, at this stage of the project, to focus on the religious area and on the reconstruction of the temple-criptoporticus complex of tiberian-claudian age (fig. 6). For the theatre, completely excavated and known in the basic articulations of the plant, it was necessary the use of literature comparisons for the integration of the known planimetric data and for the appearance of frons scaenae, the external and the porticus post scaenam (fig. 7).

For the amphitheater, whose the summa cavea has not been preserved, has been elaborated a new survey (figg. 8a,b; 3; 9).

The reconstruction of archaeological peri urban and suburban landscape was very problematic: despite it was being studied for a long time by the University of Macerata, detailed data are only partially known.

Numerous surveys allowed to identify reliably a large quantity of sites that have been documented, georeferenced and inserted into a GIS aimed at the management and at the publishing of the archaeological map of the Provincia di Macerata (CAM). The GIS was the essential scientific basis for the implementation of the work (fig. 3).

The limits of the peritica of Urbs Salvia not yet been defined with certainty. The area involved in the research is certainly within the territory of the colony and it has been chosen trying to insert the different elements of the landscape that make up the land registry. Therefore along with the lands assigned, were considered public ones, in their different meanings administrative and not yet assigned ones.

The project was also an opportunity to continue the study on the centuriations of the city. Thanks to the new method of integration and management of archaeological and geomorphological data through the 3D representation (fig. 10) a new hypothesis has been advanced (fig. 11). On this basis crop diversification and all the evidence that characterized the Roman countryside have been represented (fig. 12).

Within the chosen territory were georeferenced the most common types of settlement that make up the Roman land registry, villae and small rural settlements (farms and small farmhouses e.g.), were georeferenced. These types of settlement have been inserted with scientific accuracy even if, not having certain archaeological data for the reconstruction of individual buildings for the construction of 3D models, reference was made to a model type defined on the basis of the bibliography (fig. 13).

The funerary monuments, concentrated around the necropolis areas and along roads, are largely known but some of these are in ruins and do not allow a certain reconstructive proposal. In this case some types of reference attested and well known at Urbs Salvia have been defined (fig. 14) on the basis of characteristics of the concrete conglomerate of the visible ones.

The reconstruction of the road network was based on the specific search form elaborated within the CAM. This allowed a proposal for the studied area that has been verified by comparison with the terrain model (fig. 15) and rendered on the basis of the survey of a portion known (fig. 16) by laser scanner and integrated with the insertion of bridges (fig. 17).

The 3D Terrain Model can be navigated interactively within the Enviro application of VTP SW suite, allowing to shoot snapshots and videos documenting the landscape and its evolution; other important functionalities are the ability to take measures, generate profiles, sections and visibility analysis (figg. 18, 19).

The realization of this pilot project allowed the application of actual 3D technology to the study of archaeological topography and landscape and to its communication for the enhancement of cultural heritage and tourism promotion and at the same time it permitted to create an open 3D database. This may be enriched by modeling of other eras for this territory in which lies also an ancient Cistercian monastery of the twelfth century, a fourteenth century castle and a medieval fortress rebuilt in the sixteenth century.

In the digital diorama it is possible to represent POI (point of interest) and lines (e.g. horse, bicycle and foot paths, perimeters and other thematic map lines) showing them from each point of view with metric and visibility information offering new support to the tourism.

