



AUGMENTED ARCHAEOLOGY.

AMBIENTI VIRTUALI INTERATTIVI E BENI ARCHEOLOGICI

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Different applications developed in field of virtual archaeology at the CINECA VISIT (Visual Information Technology) lab <http://3d.cineca.it/> during the last decade will be presented.

Such applications have been designed not only taking into account flexibility from the usability point of view, but also portability, hence enabling the application to run on many different visualization platforms available today.

In order to make such virtual archaeological environments more user-friendly, it is necessary to improve access to and understanding of contents by providing both researchers and the general public with new paradigms for access and use.

Virtual Reality applications and interaction via palmtops will grant a better surfing experience inside the reconstructed environment. Different communication forms, such as the Internet, streaming videos, virtual worlds within Virtual Sets will most likely increasingly integrate. It is necessary to understand the specific features of each medium while foreseeing possible synergies between such new communication modes within the specific framework of Virtual Environments.

The creation of virtual scenarios for research and communication purposes implies a new organization of work. For example, within the framework of Virtual Cultural Heritage, the creation of real-time applications based on 3D digital models develops within a multidisciplinary environment where computer experts, architects, archaeologists, data bases experts, scriptwriters work to bring about Virtual Reality applications.

The development of a VR product relies on a working method that makes use of different professional skills and foresees constant feedbacks between technical, computer-oriented and liberal arts experts. Moreover the usage of a framework based on an open source software, can be considered an important added value for a real "open heritage".

The use of open source tools is changing the approach to Virtual Reality applications in the heritage sector, leading to the creation of personalized spatial tools useful to link/connect all the data acquired during survey campaigns; keep the same geographical projection used in GIS projects; maintain the same GIS data formats; generate quality pagged and tiled terrains of the area from GIS data; maintain the same modeling formats of three-dimensional monuments and sites reconstructed with photo-modeling or scanner-laser techniques and processed with external software; create libraries of 3d models and vegetation typical of the area and of the period; connect directly inside the three-dimensional geographical space the models and the vectorial themes; work dynamically at the reconstruction of the visible archaeological landscape, testing hypothesis, using the same data even for complex VR applications, useful for example for museums with a story-telling approach; and finally publish the results of surveys over the Web, updating them at each new campaigns through web plug-in.

The ability to use open source technology allows the dissemination of content without additional cost and the customization of applications so VisMan, our VE visualization component, has been developed using OpenSceneGraph (open source) foundation library and allowing connections to multimedia databases.

This activity allow us to have a scalable presentation architecture, from high end VR installations to low end, plug in based web fruition.



Anyway, we believe that due to enhancement in both network bandwidth and spread of 3D client graphics performance, the ability to produce web-accessible content and application is a key issue in 3D content production pipeline.

Moreover the correct use of the product will then be guaranteed by communication experts who will coordinate all the project components. It is usually necessary to involve several institutions to bring together such well-structured teams, and this is exactly our experience in the Vesuvius' scenario reconstruction.

Our experience somehow highlighted how the concept of *media morphosis* can also apply to a medium such as VR. The latter will necessarily involve more media and maybe it will force other media to change – the same happened when TV ushered in the transformation of the radio.

Today Virtual environments – just like early cinema – are new media that still goes through an “amazement effect” stage, but VR will soon need to devise its own language and its own specialized genres. VR curators must be able to interact with different disciplines and to exploit the potential of computer science in order to accompany users as they surf complex scenarios. The scientific results of the Exploris project <http://exploris.pi.ingv.it/> have produced a new research project with archaeological purposes.

Starting from the reconstruction of the Roman time Vesuvius' topography based on geological data and historical sources, a new simulation of the past is going hopefully to be run.