THE ROMAN THEATER OF CORDOBA: MULTIMEDIA WORKS USING THE SCANOMETRY OF THE REMAINS. NEW PROCEDURES OF VIRTUAL ARCHAEOLOGY AND THE SEVILLA CHARTER.

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Key words: *scanometry, Sevilla charter, animation, virtual archaeology, anastylosis.*

Abstract
The remains of the Roman Theater in Córdoba are located in the basement of the Archaeological Museum. We have scanned the remains in order to use them to explain the visitors the features of the theatre. With this scanned 3D information we have made videos and images across the path for visitors to perform visual information for them.
Using technical graphic information we ensure that the work is according with the Sevilla chater.

Figure 1: A part of the remains of the Roman theatre in Córdoba, located at the underground of the museum.

The Sevilla charter consists in a theoretical foundation to create strong criteria for the community of people working about Virtual Archaeology. The language of virtual infography is in construction. Many people in the world are adding new graphic procedures to serve Archaeology. In the case of the Roman Theater in Córdoba we introduce the novelty, as far as We know, of working on the 3D scanometry of the remains (Figure 2).
One of the main concepts of the Sevilla charter is to gather a multidisciplinary team in order to have a panoramic view of the subject. In our case, the team was formed by the archaeologists of the theater, technicians of the Ministry of Culture, the curators of the Museum, an architect expert in 3D scanning, the interior designers experts in museology and our company Balawat working in virtual multimedia design. We think it was a very complete team.

1. SCANOMETRY

Scanometry is now a popular tool to register the Archaeological heritage, but it provides millions of points; a big amount of topographic data which is very difficult to be assumed by archaeologists. But from the point of view of 3D design scanometry is a very good opportunity to work with a detailed reproduction of the real archaeological settlement.

Figure 2: *Point cloud of the remains scanned using a Riegl Scanner*

The remains of the Roman theater in Cordoba appeared next to the archaeological Museum of this city. The Museum has been expanded and now the public can visit the remains inside it.
Balawat was ordered to make the multimedia information to explain the ruins. There is a gateway going through the structures of the theater. The curators asked us not to make a virtual reconstruction because the remains are only a part of the foundations of the cavea. Only with these data is impossible to define the whole building.
So, the solution was to make a scanometry of the remains and export the results to a mesh available in our modeling program. Then, we started to construct on the mesh only the well-known elements of the ancient building.
The mesh is a translation of the point cloud obtained with the scanner, so it is very important to notice that we are working in the real x, y, z coordinates. It means that the virtual reconstructions made in place on this mesh work as if they were on the real world.

The first audiovisual projected is about the Vitruvius theaters theory (Figure 3). We reproduce an animation in which an equilateral triangle is the generator of the plant of an ideal Roman theatre. This way we can explain to the visitors what is a Roman theater, its construction system (Figure 5) and functions (Figure 4).

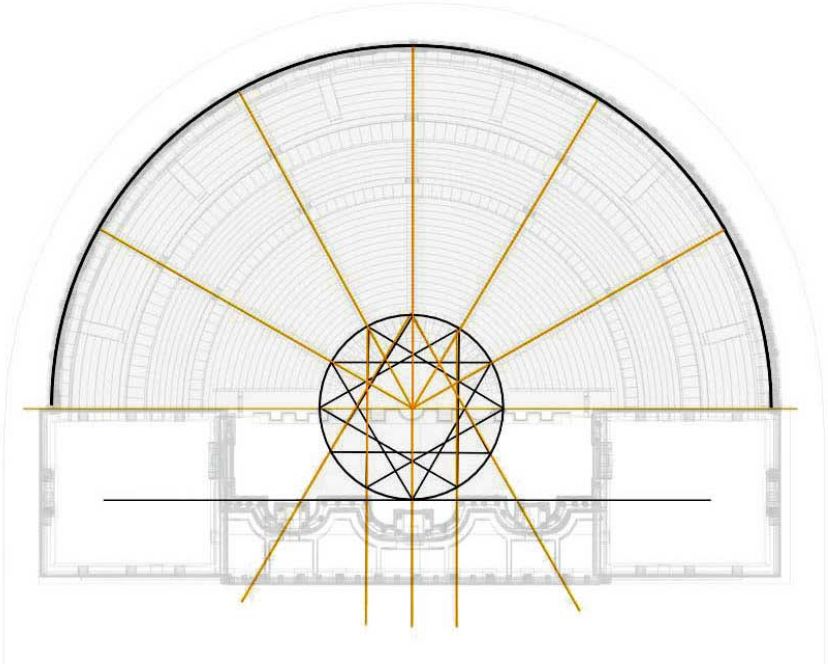

Figure 3: The theory of Vitruvius: frame of the animation reproducing the construction of an ideal theatre generated by an equilateral triangle.

Figure 4: Animation representing a show at an ideal theater: the scenery, mechanical machines and actors.

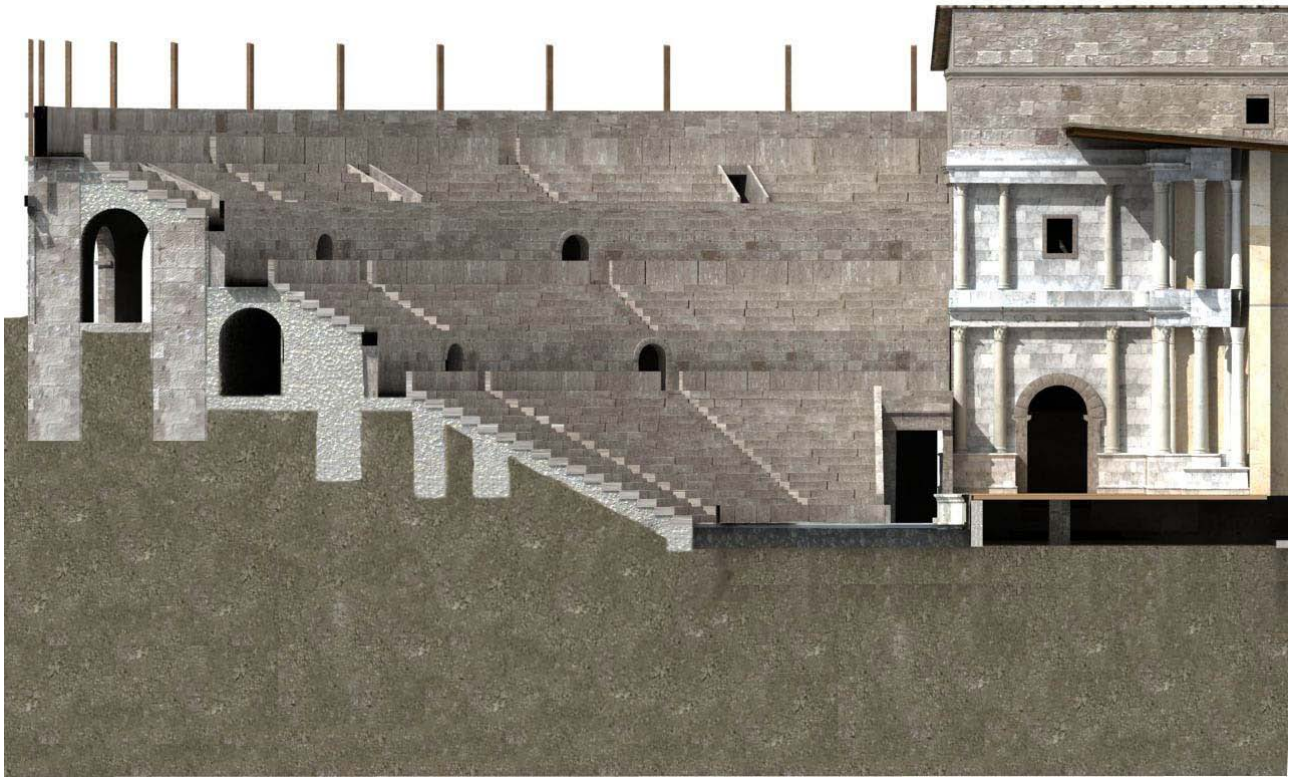

Figure 5: Section of the ideal theatre. In this case the bleachers are located on a slope in order to explain the visitors the remains they have in front of their eyes.

Then we use the point cloud to show the well-known elements of the Roman theater in Cordoba on it; the corridor for public, the basements of the cavea, a vomitorium, the canals to carry water to a disappeared fountain.....Visitors are watching not only "artistic" virtual reconstructions but technical ones and the way that archaeologists follow to study the remains. (Figure 6).

The third audiovisual is about a big fallen piece of concrete which belonged to the bleachers. We isolated the scanned piece so we could move it and take it to the original place in the virtual scene, on a corridor over the remains (Figure 7).

We are sure that this kind of studies are going to develop in the next future. So, it is possible to attempt anastyilosis without affecting the ruins which are the unique real remains able to transmit us the spiritual energy from the past.

¿What is the relationship between the Sevilla charter and the investigation about new tools in virtual Archaeology? The answer is that we need a model of behavior in order to do useful works for the development of Archaeological Culture.

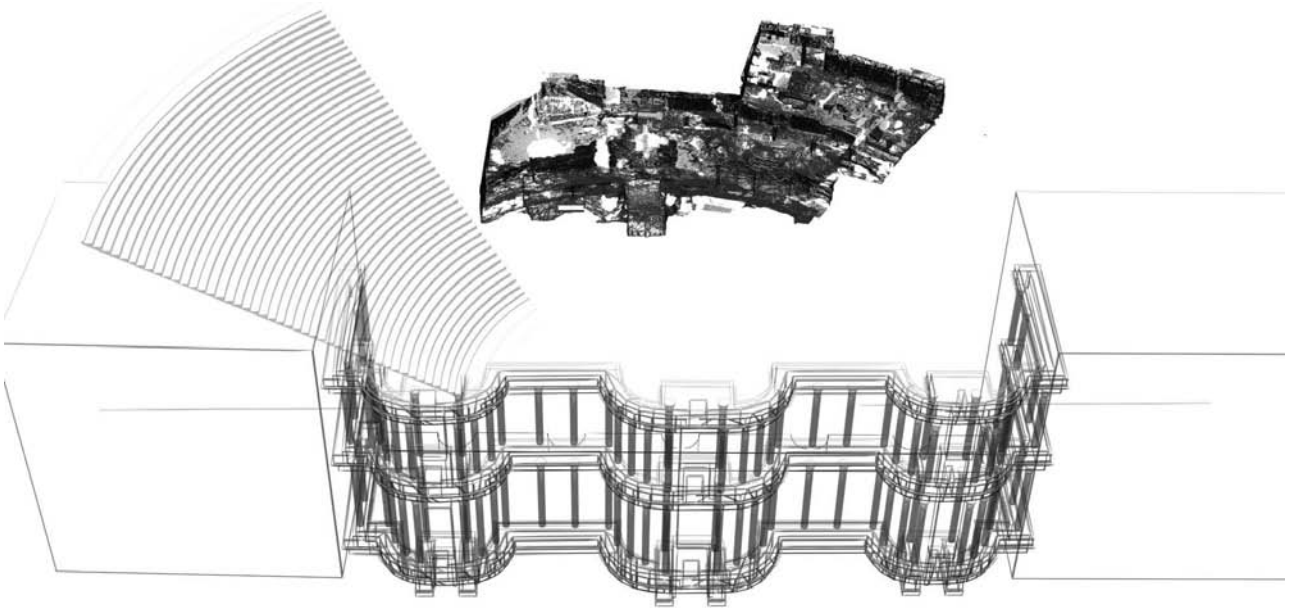

Figure 6: Frame of the audiovisual using the scanometry (above, dark) and its position in relation to the unexcavated frons scaenae.

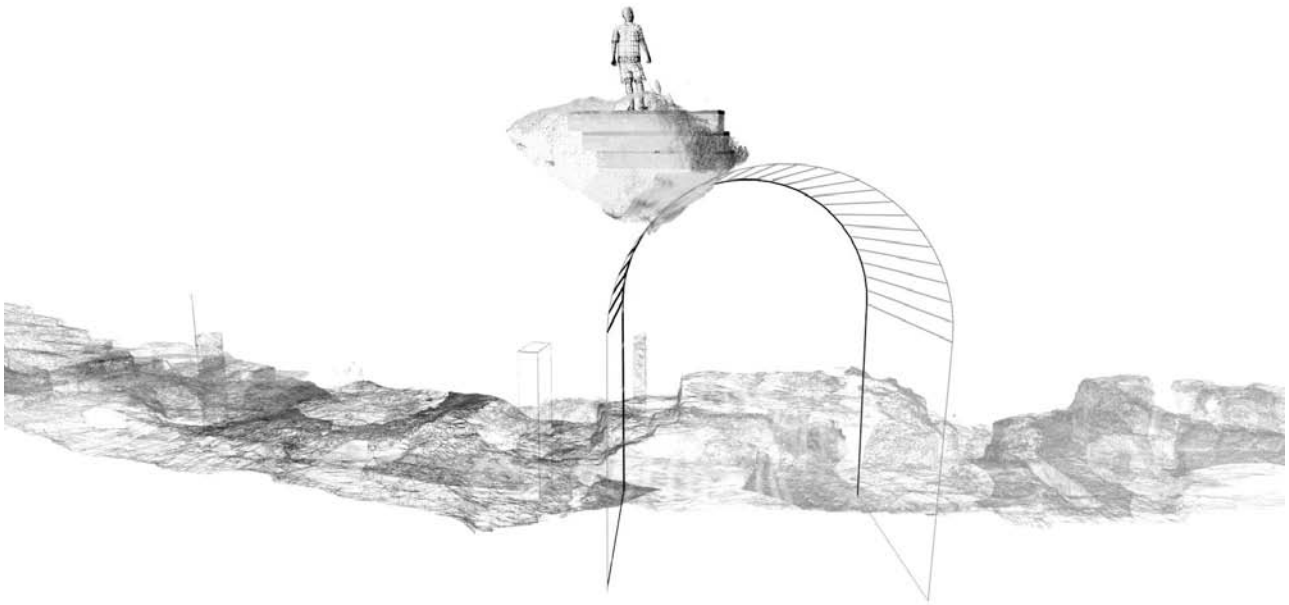

Figure 7: Frame of the animation of the piece of concrete now in its original position on a vault.