3D Visualization in Historical Geography

The case of Ancient Agora of Athens

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3D visualization of historical environments in the recent past had the form of axonometric and sketches. Generalization of the digital technology provided the user with the opportunity of virtual perception through the production of 3D models. The production of a model in historic time has several peculiarities during the collection of information, 3D modeling and visualization. The example that we used to examine this issue is the construction of the virtual model of the Ancient Agora of Athens.

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Visualization in the third dimension of historical buildings, complexes, and cities in the recent past had the form of axonometric and sketches. Generalization of the digital technology provided the user with the opportunity of virtual perception through the production of 3D models. The production of a model in historic time has several peculiarities during the collection of information, 3D modeling and visualization. The example that we used to examine this issue is the construction of the virtual model of the Ancient Agora of Athens.

The basic drawings of the buildings mainly come from publications of the American Archaeological School (main excavator) (Camp, 2004). We
used common software tools: autoCAD for the basic design, ArcView for the creation of the digital terrain and 3D StudioMax for animation. The result was the production of the model of the Ancient Agora during the Roman Period (Figure 1). At that time the agora reached its maximum morphological peak, since it was the period with the greatest number of buildings.

We have selected the urban planning construction scale because we believed that it was the more suitable one, since it is more oriented towards the site and not exclusively towards the buildings (Figure 2). The objective of the visualization was the general picture of the morphology of the site and the buildings.

The creation of the terrain was a particularly crucial point. Present-day recording is completely different from the one in the Roman Period. It is the result of geomorphological changes that resulted from the successive construction activity or its abandonment. Its construction started with the creation of a present-day model and was shaped with the addition or removal of material, depending on the archaeological and historic data. Plateau levels (the buildings extrude by base high) were created and were incorporated in the terrain, at the location where the monuments should “stand” (figure 3).

The buildings were chosen from various versions of published suggestions. The basic material (ground plans, faces, cross sections) for the construction was difficult, but accessible. The most significant problem had to do with their adaptation both to the
terrain model and to the other building complexes or isolated buildings.

This effort brought to light a series of questions and problems. First of all the creation of 3D building models that have to do with historic time, presents essential peculiarities in relation to a modern building. Particularly important is not finding data relevant to the third dimension, since the buildings are destroyed. Information (z) is indirect and comes mainly from texts. It is based mainly on the accuracy and possibility for documentation. It results from various interpretations and hypotheses. The “processing” limits of the 3D model are delicate and require careful study. The slightest deviation from a non-documented view is immediately destructive and could lead to a serious degradation of the historic site.

An important stage in the effort of visualization is the creation of the digital terrain model (DTM). Its construction is a combination that results from the hypsometry of the buildings (excavation and texts) and the survey of the present day relief. To these we should add the technical requirements of modeling.

The combination of all these above allows the reconstruction of a “historic” geomorphological status. A direct addition to this image is land cover, green. However, we have very little information about it in history. These cannot help us complete the continuous space (espace continu) (George, 1970) of the geographical representation. Frequently the reconstruction on this level is the result of chance or in the best case, a copy of the present day image. The creation of the agora has been dealt with as part of a wider project about historic Athens. (Figure 4).

The last but not least question has to do with “life” in the image. From the moment we decide to use the virtual form of representation, which is mainly an experiential representation, the question is: should image be still or animated (Kraak M. J. - Brown A. 2000,)? However, the creation of animated images is perhaps premature for the average user (creation of faces, animation) and at the same time new requirements are added that have to do with the documentation of new fields (for example costumes), but also adding numerous other items that make the picture ultra real (Sidiropoulos, Vasilakos, 2006).

The image should be oriented towards ultra real visualization, while we can determine the degree of convenience of the technique that seems to contribute to the establishment of “versions”, something
that makes us move towards a new image with script and animation or should we remain on the strict provision of the image as a tool for analysis?

In any case, the production of a 3D model means the simultaneous adaptation of the historic object in a potential “virtual actor”.

The reconstruction of the Agora of Athens (figure 5) uses 3D visualization to familiarize spectators with an historical environment of a distant past. The principal approach is that someone can learn best when it becomes an active participant and the 3D visualization is the technique that offers that. The combination of historical geography with modern visualization techniques results in a powerful meaning.

The question raised is whether the 3D visualization is the appropriate way to show a historical complex, how was the reconstruction made, were expert sources consulted, and finally is the role of the 3D visualization to analyze or to show the importance of a historic civilization?

The paper does not provide definite answers but merely attempts to pose the questions in the 3D virtual visualization of the historical geography.

References