ABOUT DIGITAL FIELD DOCUMENTATION

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An important application of 3D computer graphics in the world of archaeology is in documenting the excavated features. Since archaeological excavations constitute removal of deposits from the site, the need to document in a comprehensive and detailed way each feature removed during the excavation requires methods of graphic and photographic documentation that can support traditional 3D modelling. This technique can be used both for recording of individual finds and also for features included in a GIS system in which the 3D data are functionally integrated. From this point of view, the combination of GIS systems in archaeology and the development of 3D laser scanning and image-based 3D modelling techniques resulted in the emergence of experimental systems of 3D GIS. This system is able to visualize 3D data within the geographic information system, such as point clouds from laser scanners.

At the landscape scale, digital 3D modelling and data analysis allow archaeologists to integrate different archaeological features into a physical context in order to better document the investigated area. At the monument/site scale, 3D techniques can provide accurate measurements and objective documentation, as well as a new aspect or a different point of view at the recorded features. At the artefact scale, 3D modelling allows the reproduction of accurate digital/physical replicas of every artefact.

3D modelling can also be extremely useful for the identification, monitoring, conservation, restoration, and promotion of archaeological findings. Archaeological heritage is under constant threat and danger. Architectural structures and cultural and natural heritage sites are exposed to pollution, tourists, and wars as well as environmental disasters such as earthquakes, floods, and climatic changes. Hidden aspects of our cultural heritage are also affected by agriculture, changes in agricultural regimes due

to economic progress, mining, gravel extraction, construction of infrastructure, and expansion of industrial areas. In this context, 3D computer graphics can support archaeology and the politics of preservation of cultural heritage by offering scholars a "sixth sense" for understanding traces of the past, whilst at the same time allow us to experience it.

Each product of human intentional or unintentional actions, such as artefacts, structures and cultural landscapes, has a 3D constitution and so it is possible to describe it using three spatial dimensions. The shape of artefacts, expressible in 3D, suit the artefacts' purposes from the perspective of function, social or symbolic meaning. These objects have long dwelled in their 3D space, not always the one in which they were deposited by their owners, but a different one, dictated by various taphonomical processes. Nevertheless, the position of artefacts and their spatial context offer archaeologists many clues for deciphering their usage and meaning. The context and the taphonomy are extremely important because they often allow archaeologists to interpret the purpose of otherwise static and enigmatic archaeological finds.

Understanding space and its importance for contextualization of structures and artefacts was always inherent in archaeological method. The dimension of space is closely related to the basic archaeological methods: analysis of typology of the materials and the sites' stratigraphy.

Digital 3D documentation allows iterative research of archaeological context after the excavation. Unlike traditional 2D technology, 3D recording of deposits allows archaeologists to develop more detailed understanding and different analyses of the complex deposits and artefacts they excavate.

ArchaeoPackPro! a software for digital field documentation

3D recording methods have always been dependent on the contemporary technological possibilities. In accordance with the practices of other disciplines, three-dimensional space has routinely been reduced to only two dimensions, which can be expressed on paper. Archaeological sites have been transformed into sets of plans and trench section views, finds have been transformed into drawings and photographs. This tendency to simplify archaeological reality persists even today, even though the tools have been developed that provide a more realistic and visually more effective documentation (Tasić & Jevremović 2003).

Within the CONPRA project, a software (ArcheoPackPro!) designed and used at the Department of Archaeology in Belgrade and in archaeological excavations at the site of Vinča near Belgrade was implemented. This is a software conceived to equip archaeological teams with a comprehensive data management for archaeological fieldwork. With numerous possibilities that modern computer systems nowadays offer, ArcheoPackPro! was designed with the aim to replace the old-fashioned procedure of data input and thus help speed up the fieldwork, as well as to improve the quality of collated documentation and introduce new methods of data processing and analysis.

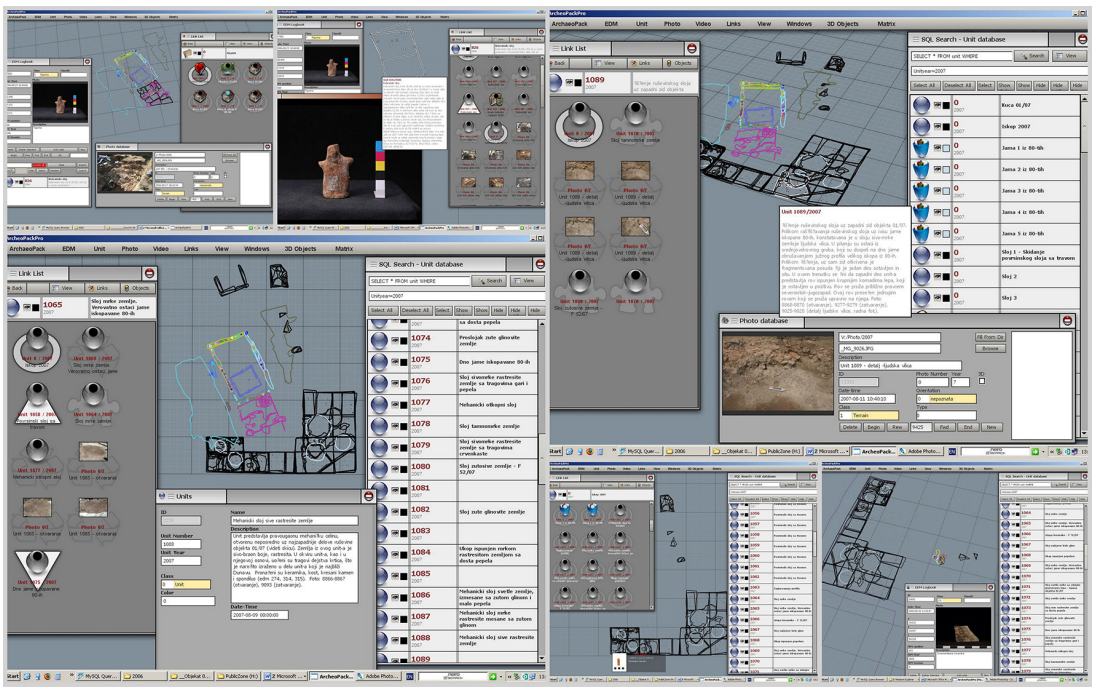

Figure 4. Screens from ArchaeoPackPro! software for 3D field documentation management.

The software package is based on a modular system and access. Every element of the system communicates and exchanges the data with other elements, but is at the same time independent. An approach like this enables constant upgrading and introduction of new options and possibilities into an ArcheoPackPro!.

ArcheoPackPro! was designed to be used in three separate processes of archaeological research:

- Fieldwork data recording and storage.
- The analysis and interpretation of archaeological materials.
- Archiving old field documentation.

Since detailed, accurate and precise field documentation represents a key premise for archaeological interpretation and for a professional approach in explaining archaeological finds, it is easy to understand that the threes aspects are of essential importance for archaeological fieldwork.