3D RECORDING OF MONUMENTS

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Extended abstract

For the preservation of our cultural heritage it is necessary to perform its recording first. New technologies and the use of special software programs developed during the last decade have helped significantly to record reliably and systematically our cultural heritage and create either architectural drawings at a scale sufficient to render all the details and features of the monuments, but also to provide 3D photorealistic models which are the most appropriate and complete products for their documentation (Tsioukas, V., 2009).

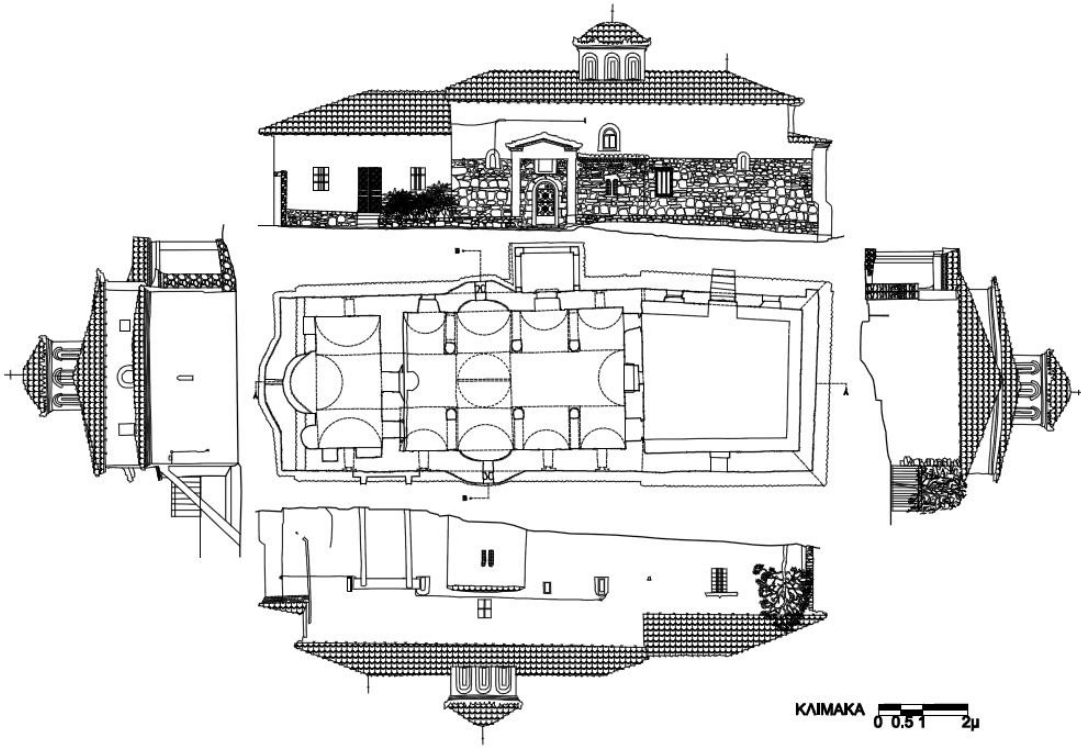

Fig. 1. Overview of the produced drawings

This paper presents the most important innovative technologies and techniques for the 3D surveying of monuments and aims to inform scientists (Archeologists, Architects) about the use of these techniques and their relevant products (drawings and 3D models) for a systematic monument documentation. Special reference is made on the use of terrestrial 3D laser scanners and photogrammetric techniques to create mapping products for the 2D and 3D recording of monuments, in an appropriate scale, that can render all the architectural details accurately. Additionally, it will be presented the

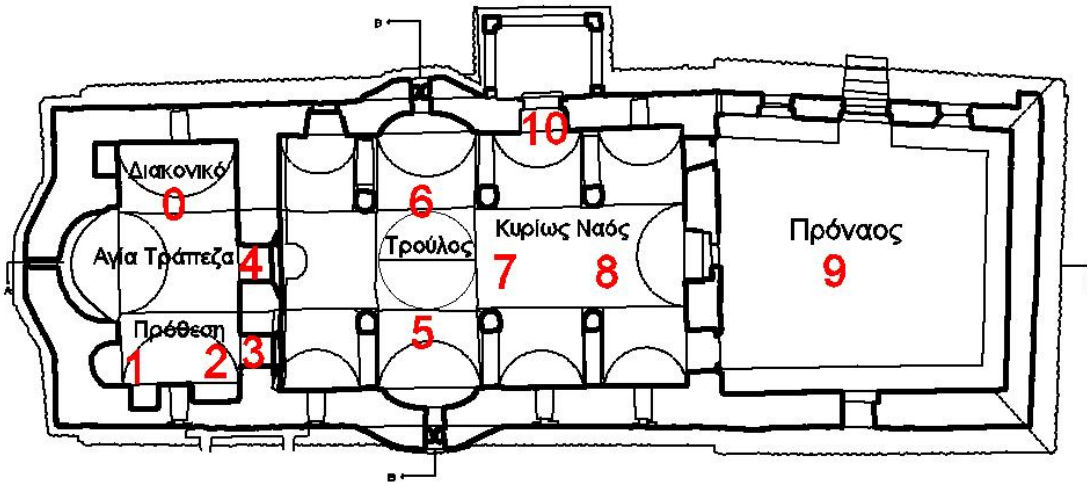

Fig. 2. Laser positions of the internal scans

recent 3D recording of the church of Profitis Ilias of Tyrnavo in Larissa, implemented during the diploma thesis of the student Elpida-Michaela Karakassi in the School of Rural and Surveying Engineering in the Aristotle University of Thessaloniki (Karakasi E.-M., 2013).

The recording was realized with the use of the terrestrial laser scanner Faro Focus 3D and top view, bottom view, section and facade drawings were produced (Figure 1). Several scans from different locations in the internal and external area of the church were realized and special software was used for the connection of point clouds derived from a total of 20 scanning positions, 10 in the inside (Figure 2) and 10 outside of the church (Figure 3) with the high accuracy of about 3mm (maximum error 6mm). The architectural details of the church were recorded in the top view,

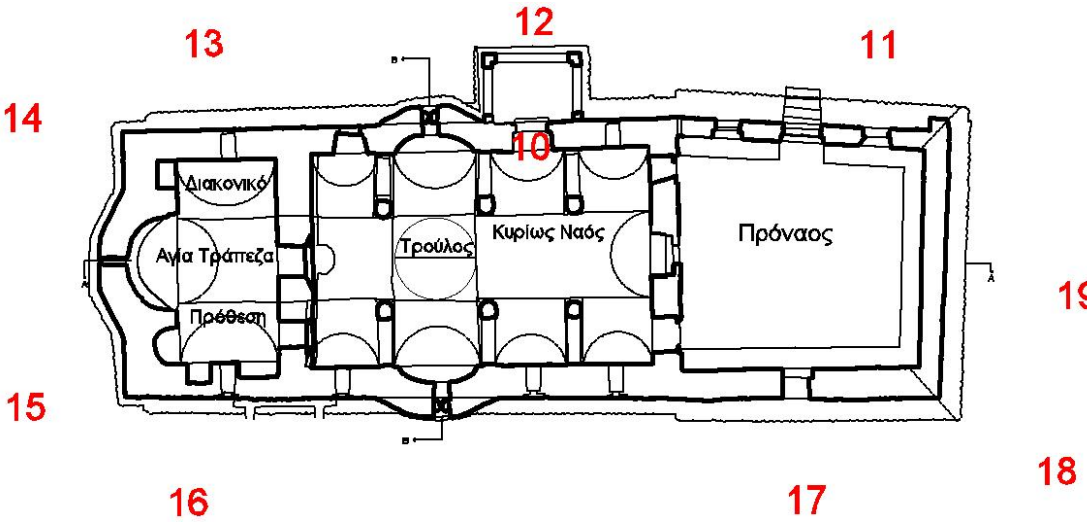

Fig. 3. Laser positions of the external scans

bottom view and sections with the help of AutoCAD software recognized on the unified 3D model of the 20 scans, while the recording of the projected details on the facades and sections were collected on orthoimages generated (Figure 4) by other special software.

In total 8 drawings in 1:50 scale were created but also animation video of the virtual navigation inside and outside of the church was produced. Finally, 3D anaglyph images were captured using a common stereoscopic camera (Fujufilm Real 3D W1)

that gives the ability to see the pseudo 3D of the imaged areas on either the monitor display of a PC or on red-blue printouts using special glasses (Figure 6).

References

Karakassi, E.-M., 2013, 3D recording of the church of Profitis Ilias of Tyrnavos in Larisa, Diploma Thesis, School of Rural and Surveying Engineering, Aristotle University of Thessaloniki.

Tsioukas, V., 2009, Χρήση Νέων τεχνολογιών για την τρισδιάστατη αποτύπωση μνημείων και χώρων, Notes for the seminar of Hellenic Technical Chamber, e-μηχανικοι

Fig. 4. Orthoimage of the north facade

Fig. 5. Orthoimage of the longitudinal section (A-A').

Fig. 6. Anaglyph stereo image.