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IMAGE-BASED AND RANGE-BASED 3D MODELLING OF ARCHAEOLOGICAL CULTURAL HERITAGE: THE TELAMON OF THE TEMPLE OF OLYMPIAN ZEUS IN AGRIGENTO (ITALY)

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Abstract. The Temple of Olympian Zeus in Agrigento (Italy) was one of the largest temple and at the same time one of the most original of all the Greek architecture. We don ' t know exactly how it was because the temple is now almost completely destroyed but it is very well-known for the presence of the Telamons. The Telamons were giant statues (about 8 meters high) probably located outside the temple to fill the interval between the columns. In accordance with the theory most accredited by archaeologists the Telamons were a decorative element and also a support for the structure. However, this hypothesis has never been scientifically proven. One Telamon has been reassembled and is shown at the Archaeological Museum of Agrigento.

In 2009 a group of researchers at the University of Palermo has begun a study to test the hypothesis that the Telamons support the weight of the upper part of the temple. The study consists of a 3D survey of the Telamon, to reconstruct a detailed 3D digital model, and of a structural analysis with the Finite Element Method (FEM) to test the possibility that the Telamon could to support the weight of the upper portion of the temple. In this work the authors describe the 3D survey of Telamon carry out with Range-Based Modelling (RBM) and Image-Based Modeling (IBM). The RBM was performed with a TOF laser scanner while the IBM with the ZScan system of Menci Software and Image Master of Topcon. Several tests were conducted to analyze the accuracy of the different 3D models and to evaluate the difference between laser scanning and photogrammetric data. Moreover, an appropriate data reduction to generate a 3D model suitable for FEM analysis was tested.

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