NEW TECHNICAL ACHIEVEMENT FOR 3 DIMENSIONAL SCANNERS

DIGITIZATION OF THE EAST PEDIMENT OF THE TEMPLE OF ZEUS AT OLYMPIA

ZSÓFIA VÉGVÁRI – CEO- RESEARCH LEADER TONDO SP1 KFT- COMPLEX ENGINEERING SERVICES- MISKOLC, HUNGARY VEGVARI@TONDO.HU WWW.TONDO.HU
A. PATAY-HORVÁTH- INSTITUTE FOR ANCIENT HISTORY, UNIVERSITY EÖTVÖS LORÁND, BUDAPEST, HUNGARY PATHORV@GMAIL.COM

norway grants
OTKA

Figure 1. Background of the poster Breuckmann smartSCAN 3D at work in Olympia- Tondo SP1 Ltd

INTRODUCTION

Topometrical HighDefinition 3D-surface scanners, optimized for the requirements of arts and cultural heritage, allow the 3-dimensional digitization of art objects with highest resolution and accuracy. Moreover, the texture and/or colour of the object can be recorded, offering a one-to-one correspondence of 3D coordinate and colour information.
Due to the high flexibility and mobility of these systems they are suitable to be used in museums and in- the-field

3D SCANNING OF THE SCULPTURAL DECORATION IN THE MUSEUM OF OLYMPIA

The temple of Zeus at Olympia has been built in the first half of the 5th century B.C. Its sculptural decoration consists of two pediments and twelve metopes. Given the large size of the building itself, the sculptures were all well over life-size.
The arrangement of the five central figures of the east pediment has been the subject of scholarly debates since the discovery of the fragments more than a century ago. The basic problem is that the fragments themselves can be arranged in four substantially different ways and there are no obvious clues for choosing the most probable one.

THE PROBLEM OF SCANNING

The difficult task of scanning the marble fragments was carried out in the Museum of Olympia from 23.08 to 03.09. 2009 by two experienced technicians of Tondo SP1 Ltd. (Budapest, Hungary) under the supervision of the project coordinator. The difficulties encountered during the data capture can be summarized as follows:

- monumental scale of the fragments, upper parts are accessible only with a special equipment
- absolutely unmovable pieces: mounted to the wall with iron bars, alignment close to the wall, rear sides difficult to reach with the scanner
- world-famous pieces, highlights of the museum: restricted working hours at night.

The solution for 3D scanners is a new equipment. It is a special “scaffold”, a kind of film camera- crane to make the 3D scanning job easier. Based on the knowledge of film-shooting, the crane was redesigned for 3D scanners by Tondo SP1 Ltd. The first prototype of the crane was used for the project of Olympia.

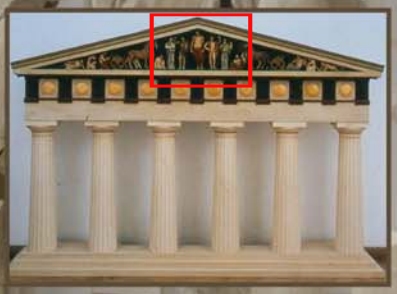

Figure 2. Reconstructed model (approx. scale 1:10) of the east front of the temple of Zeus at Olympia. Munich, Museum für Agbüsse klassischer Bildwerke. Photo: author. The central part of the pediment (marked in red)

Figure 3.. The central group of the east pediment. 3D models of the fragments (from left to right: K, I, H, G, F).

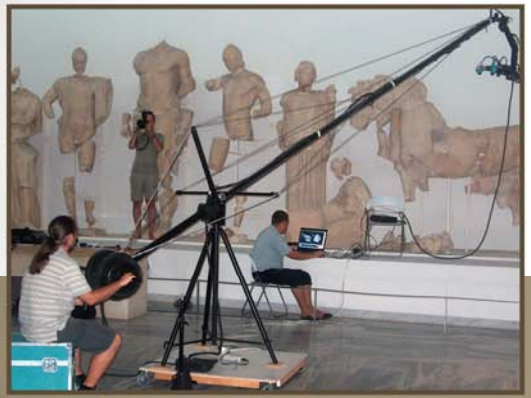

Figure 4. scanning with the help of the special crane, a jimmy jib type. The crane made by a Hungarian company

THE MAIN ADVANTAGES OF THE MODIFIED CAMERA- CRANE:

- 3 OR 6 METER LONG ARM , (UP TO THE CABLE OF THE SCANNER)
- THE HEAD IS MOVABLE IN 3+2 AXES; ROTATABLE IN 360 DEGREE (PAN HEAD)
- EASY TO OPERATE AND EASY TO ASSEMBLE
- ANTI-VIBRATION & ANTI-SHAKE HEAD, EASY TO MOVE THE SCANNER INTO THE POSITION FOR THE SCANNING JOB
- EASY TO TRANSPORT- (ASSEMBLED IN SMALL PARTS)
- NEVER EVER NEED ANY SCAFFOLD OR LADDER ON THE FUTURE

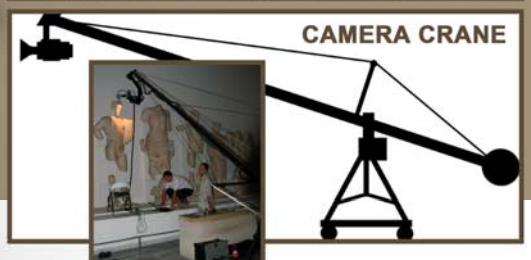

Figure 5. scanning with the help of the special crane, a jimmy jib type.

THE RESULT

The difficulties were overcome in most cases very successfully and all the figures of the pediment (13 human figures and two four-horse chariot teams) have been scanned during 10 days with the help of the new technical achievement.