

Architectural Heritage Conservation: a Methodology to 3d Laser Scanning and Digital Photogrammetry Documentation

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With this paper it is intended to present the current state of the art of an investigation and research project entitled “Architectural Heritage Conservation: a Methodology to 3d Laser Scanning and Digital Photogrammetry Documentation”.

This is a multi disciplinary funded research project that involves three Portuguese universities, Faculty of Architecture – Technical University of Lisbon (FAUTL), Coimbra University (UC) and the Archaeology Center of Minho University (UM), as well as the Portuguese public institute responsible for architectural and archaeological heritage management (IGESPAR). The Photogrammetry Laboratory of University of Valladolid is a consultant.

Its duration is from October 2007 to September 2010.

With this investigation project it's under development the systematization of survey methods and processes supported in low cost digital photogrammetry and 3D laserscanning creating the bases for a minimum system of survey and documentation of Architectural Heritage that allows defining reference frames of work both in the context of Architectural Conservation, to the analysis and diagnosis, and in the Archaeology of Architecture, to the architectural stratigraphy.

A web based Information System is also under development. This will allow the management of qualitative and geometric data (plans, sections, elevations, models) to support Conservation and Rehabilitation tasks besides supporting the spreading and study of Architectural Heritage, as well as complementing other existing information systems, exploring possibilities that can be found in between traditional scientific areas.

Important discussion about the way to represent a 3D building in a database and to access to its features is being carried out.

The study cases are being chosen according to the criteria that they should have a high cultural value and that safeguard actions are being planned. Within this context the generated data will be applied to real situations. At the first phase of the project three case studies are considered: St. Frutuoso Medieval Chapel in Braga, the Renaissance Valflores Palace in Loures, and the uptown of Coimbra. These also represent different scale problems.

Surveying works are being developed in St. Frutuoso.

In this case several surveying techniques and strategies are being carried out.

First a topographic survey of control points was accomplished. Data generated defines a reference frame that is the basis for the evaluation of metric quality and accuracy of the other survey methods applied.

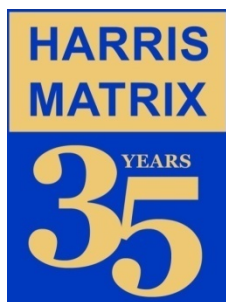
Then several restitutions are being done: classical manual drawing, convergence photogrammetry with Photomodeler, drawing rectification with Autocad superimposed to the topographic survey, and 3D laserscanning.

For drawing rectification several computational routines were developed.

The results obtained with the several surveying methods are compared in terms of geometric accuracy, time consuming, costs and applicability to the archaeological studies to perform.

This first study case will also be the test case for the Information System.

The results and conclusions obtained with this first case will be extrapolated and applied to the following cases in order to consistently and systematically establish frameworks in this area.



35th Anniversary of the Harris Matrix

International Conference on Archaeological Stratigraphy

17.-19. September 2008

Austrian Academy of Science, Vienna (A)

www.harrismatrix.com

The conference to be held at the Austrian Academy of Science on behalf of the 35th anniversary of the Harris Matrix examines the state of the art and the scientific presentation of the stratigraphic method as initially defined by E.C. Harris. The planned scientific sessions will focus on the impact of the matrix and the future development of stratigraphic theory and practice, ethical aspects, digital documentation of stratigraphic excavation and latest software developments for the composing of a Harris Matrix and 4D documentation of archaeological excavations.

Conference program:

Wednesday 17th September 2008

8.00 – 10.00 Registration
Coffee & tea served

10.00 Opening of the conference

**10.30 - 12.00 Session 1:
Stratigraphic Theory**
Chair: E.C. Harris

10.30 – 11.00 Beyond the Surface - An update on stratigraphic theory
Wolfgang Neubauer, VIAS - University of Vienna (A)

11.00 - 11.30 The Harris Matrix in the UK – context of development and some unexploited potentials
Steve Roskams, University of York (GB)

11.30 – 12.00 Man-made stratigraphy - A discussion on architectural archaeology
Medri Maura, University of Genova (I)

12.00 - 14.00 Lunch break

**14.00 - 16.00 Session 2:
Improvements in Stratigraphic Recording**
Chair: Wolfgang Neubauer

14.00 – 14.30 Architectural Heritage Conservation - A Methodology to 3D Laser Scanning and Digital Photogrammetry Documentation
Sónia Filipe, Coimbra University of Lisboa (P)

14.30 – 15.00 Digital recording of stratigraphic excavations
Michael Doneus, University of Vienna (A)

15.00 – 15.30 The Harris Matrix Composer - A new tool to manage archaeological stratigraphy
Christoph Traxler, Vienna Univ. of Technology (A)

15.30 – 16.00 New functions for the Harris Matrix diagram in digital 3D GIS model building
Undine Lieberwirth, Free University Berlin (D)

16.00 – 16.30 Coffee break

**16.30 – 18.00 Session 3:
Theory and Practice in Archaeological Stratigraphy I**
Chair: Klaus Löcker

16.30 – 17.00 Archaeological Stratigraphy - Theory and practices in Tula Hidalgo, México
Oswaldo José Sterpone, INAH Hidalgo (MEX)

17.00 – 17.30 Soils as material culture - The relations among sedimentary remains, methods and theory
Roderick Salisbury, University at Buffalo (USA)

17.30 – 18.00 The importance of stratigraphy for forensic applications
Ian Hanson, Bournemouth University (GB)

18.00 – 18.30 Coffee, wine and beer break

**18.30 Honorary talk by E.C. Harris on
35 years of the Harris Matrix**

Followed by a honorary ceremony and a reception

Thursday 18th September 2008

10.00 - 12.00 Session 4: Theory and Practice in Archaeological Stratigraphy II

Chair: Steve Roskams

10.00 – 10.30 The cat in the pit- A philosophical approach to excavation processes
Matthias Kucera & Klaus Löcker, VIAS-University of Vienna (A)

10.30 - 11.00 Soil Phosphate Analysis on Neolithic Catalhöyük Sediments in Anatolia
Ali Akin Akyol, Ankara University (TR)

11.00 – 11.30 Coffee break

11.30 – 12.00 Archaeological stratigraphy and painted surfaces

José Manuel Barros García, Polytechnical University of Valencia (E)

12.00 – 12.30 3D-recording of the stratigraphic excavation at Steinabrunn, Austria

Petra Schneidhofer, VIAS – University of Vienna (A)

12.30 – 13.00 From stratification to stratigraphy – A transformation process

Martin Fera, VIAS-University of Vienna (A)

13.00 – 15.00 Lunch break

15.00 – 23.00 Evening excursion to Heldenberg: Museum and archaeological park on the oldest European Monuments (4800-4500 BC) followed by a Stone Age reception in the reconstructed buildings

Friday 19th September 2008

8.30 – 22.00 Full day excursion to

The Archaeological Park Schwarzenbach: Late Iron Age hillfort with ongoing interdisciplinary stratigraphic excavation, reconstructed Celtic buildings and rampart

The Archaeological Park Carnuntum: Roman Town in the centre of the largest archaeological landscape of Austria with reconstructed Roman buildings and restored excavations.

Saturday 20th & Sunday 21st September 2008

Excursion to the prehistoric salt mines of Hallstatt, registration closed

Hiking tour passing the prehistoric cemetery and through the mines visiting the actual excavation sites guided by the excavators from the Natural History Museum of Vienna (ca. 3-4 hours)

For registration, hotel booking and detailed information please refer to www.harrismatrix.com

The international conference on Archaeological Stratigraphy is organized by the Austrian Academy of Science, VIAS-Vienna Institute for Archaeological Science, University of Vienna and the Bermuda Maritime Museum.

