G R O M A

documenting archaeology | dept. of history and cultures, university of bologna

Open-Access E-Journal about methodology applied to archaeology
http://groma.unibo.it

Annalisa Pietrobelli,

Review of: Fabio Remondino and Stefano Campana. eds. 2014. "3D Recording and Modelling in Archaeology and Cultural Heritage: Theory and best practices". BAR International Series 2598. Oxford: BAR

Volume 2-2017
ISSN: 1825-411X
pp. 1-II
Publisher: BraDypUS [http://books.bradypus.net]
Publication date: 03/11/2017

Section: Book review

ANNALISA PIETROBELLI

Review of: Fabio Remondino and Stefano Campana. eds. 2014. "3D Recording and Modelling in Archaeology and Cultural Heritage: Theory and best practices". BAR International Series 2598. Oxford: BAR

Fabio Remondino and Stefano Campana. eds. 2014. *3D Recording and Modelling in Archaeology and Cultural Heritage: Theory and best practices*. BAR International Series 2598. Oxford: BAR.

«La nature n'est pas en surface; elle est en profondeur». As S. Campana, one of the curators of this text, quotes the maxim stated by the French painter Paul Cézanne at the beginning of the book, it also appears well suited to describe the latest developments occurring in the use of 3D in the field of Archaeology and Cultural Heritage during recent years. Out of the curator's consideration, the necessity to propose an ensemble of new "best practices" arises, in order to include these technologies in the current methodologies applied to Archaeology.

The present volume is made up of scientific articles on theory and case studies, written by several authors with expertise in lecturing and tutoring on 3D applications in documenting cultural heritage and archaeological practice, who aim to introduce the application of 3D recording and modeling as a standard in the realm of archaeological recording and interpretation.

Interpretation is also the key word of Chapter 1, a general premise on the needs of Archaeology and Geomatics through the lens of the transition to three-dimensionality. At the core of this shift there must be the awareness of the context in which the object of 3D documentation is embedded. As the author stresses in one of his examples, the underlying purpose of a 3D model of a building is "to read" through its different phases in time, according to the interpretation proposed, and not just to present a sequence of measurements.

Chapters 2 and 3 respectively examine the use of laser scanning (terrestrial and aerial) and digital photogrammetry. Taking into account that the adoption of laser scanning for archaeological purposes requires knowledge of the best techniques to enhance specific results, this section provides technical background, analyzing how airborne laser scanning data are collected and processed and how the workflow of terrestrial optical active sensors is executed, with the underpinning of theory principles. The section dedicated to digital photogrammetry also includes both basic principles for image-based 3D modelling techniques, from camera calibration and image orientation, point clouds and polygonal model generation to texture mapping and visualization, and a range of case studies. A separate part is dedicated to UAV (Unmanned Aerial Vehicle) platforms, from data acquisition to processing, with a specific focus on their archaeological application through detailed examples.

Chapter 4 deals with remote sensing and consists of a single contribution on satellite imagery used to reconstruct archaeological landscapes. Once given an excursus of the existing available satellite images,

the paper provides a description of each stage of the workflow, from pre-processing, image rectification and resampling on a base map to interpretation.

Chapter 5 analyzes the use of geographical information systems (GIS) to represent two- or three-dimensional geographic features. A general description of the management of data such as attributes, geometries and topologic relations is provided, following a brief list of examples of GIS functions for spatial analysis and map generation. Specific attention is given to Web-based geo-data publication in 3D and its performance through the most commonly used protocol, the diffusion of which is carried out by web mapping applications with some 3D GIS capability. The author also states the need to implement this practice with the integration of more support for 3D queries and advanced 3D analysis.

Chapter 6 then investigates the use of virtual reality in Archaeology, and the newly coined term of "cyber-archaeology": not only authentic but static models from digital products, but also models embedded in interactive environments, with accurate documentation for reconstruction which is necessary for archaeological interpretation. The interactive presence of the user plays a key-role in this shift from virtual to cyber. This consideration is in fact the premise for "Teleimmersive Archaeology (TeleArch)", a research project conducted by M. Forte, author of this contribution, its affiliates UC Merced and UC Berkeley, aimed at creating an immersive and collaborative environment for research and education in Archaeology, described in this chapter: an advanced evolution of 3D visualization and simulation during excavation, with real-time interaction. The author also provides the example of the "3D Archaeology in Catalhuyuk" project, where the entire archaeological process of excavation is virtually reconstructed using 3D technologies. Moreover, the use of virtual reality in Archaeology is also described in its application to communication in museums, such as in the Scrovegni Chapel in Padua and the APA project in the City Museum in Bologna.

Chapter 7 is dedicated exclusively to case studies: it contains examples of 3D modelling of sculptures from acquisition to publication, the use of 3D models for intra-site investigation in archaeology, a 3D GIS specifically designed for Cultural Heritage (the QueryArch3D prototype), and the use of airborne laser scanning for archaeological prospection in the Salisbury Plain Wiltshire (UK).

This volume offers its readers (ideally, graduate students) a deep insight into both theory and practice in the cutting-edge archaeological application of three-dimensionality, thoroughly exploring its range of utility. The curators' effort to bring together different expertise and experiences is reflected in the fact that every scale is taken into account, that is, from detailed (i.e., 3D models of single objects) to large-scale analysis (i.e., 3D GIS), with a solid connection to the theory that underlies each applied technique.

Despite the presence of some misprints, this work is surely accurate and complete in terms of contents. The curators' aim of proposing this volume as an ensemble of guidelines and procedures for the application of new technologies in the field of Archaeology has to be considered accomplished, given that those who are likely to read this work can approach it as a real manual, complete with a CD and questions and answers for self-evaluation.