

Bridging Monuments through Digital Repository and Graphic Reconstruction Methodologies

The Digital Enhancement Project of Argolid, Arcadia and Corinthia Castles, Greece

Demetrios Athanasoulis
Cyclades Ephorate of Antiquities
dathanasoulis@gmail.com
Athens, Greece

Antonios Georgiou, Xeni Simou, Anna Sfika, Vasiliki Klotsa, Theodora Ziropianni, Chrysostomos Theodoropoulos, Eleni-Olga Deligianni
ag3006@hotmail.com, xeni.simou@gmail.com, anna.sfika@gmail.com, vklotsa@arch.uoa.gr, t.ziropianni@gmail.com, chrysostomost@gmail.com, el.deligianni.arch@gmail.com
Argolid Ephorate of Antiquities
Nafplion, Greece

Abstract The former 25th Ephorate of Byzantine Antiquities in Greece has long been engaged in the research of medieval fortified architecture and in tailoring of restoration and promotion projects for particular monuments. "Digital Enhancement of Argolid, Arcadia and Corinthia castles" is an ongoing project, currently carried out under the jurisdiction of the newly established Argolid Ephorate of Antiquities. It concerns the creation of an archaeological-centered web-platform and smart-phone application for researchers and public, containing 105 sites of castles, fortified locations and individual towers, scattered within the geographical borders of the aforementioned prefectures.

The current essay examines how the documentation methodology leads the visitor to extract comparative scientific data concerning the archaeological sites and fortified architecture in general by presenting what is the platform's contribution to visualizing archaeological space.

Index terms fortified architecture, virtual archaeology, digital reconstruction

I. INTRODUCTION

Digital inventories of monument entities, either used by institutional bodies or by researchers, definitely serve as documentation tools and repository of easily retrieved data for analysis and restoration purposes. When shared to the public, they become powerful means of spreading archaeological knowledge and therefore turning vice versa people's attention to cultural assets.

Architecture and in particular defensive architecture as being connected with material culture and everyday life gives us a splendid icon of the culture that has been developed through centuries in a small region, Peloponnese that is characterized by the forced coexistence of populations of different language, different creed and different sociopolitical

institutions. The project of "Digital enhancement of Argolid, Arcadia and Corinthia castles, Greece" creates an open web-database for the medieval fortified architecture in northeast central Peloponnese. Beyond the obvious links to regional and chronological entities, the project intends to make the links necessary for one to perceive the integrity of fortified architecture by visual juxtaposing of case studies of different military types. Interpretation of historical archives, measured surveying, digitization, 3-D reconstruction, mapping, geo-referencing, educational activities etc. compose the methodology followed to create a digital platform accessible to all. The project will be available in the following links ecastra.culture.gr and ecastles.culture.gr after its completion.



Fig. 1. Website's preview Digital Enhancement of Argolid, Arcadia & Corinthia Castles

The establishment of international consensus on the principles and best practices of digital heritage visualization through international Conventions (London charter for the computer-based visualization of cultural heritage, and the complementary International Principles of Virtual Archaeology of the Seville Charter) was at the same time an inspiration and a benchmark for the whole project. With respect to these disciplines a multidisciplinary team of archaeologists, architects, surveyors, web-developers, graphic designers worked on the project.

II. THE PROJECT

More precisely, the platform presents all the necessary introductory information (historic frame, medieval geographical locations, typology, architectural elements, fortified architecture evolution, vocabulary etc.) and displays one by one the castles. Each castle is supported by multimedia in different scale of elaboration, text, documents, photos, survey plans, and plans of graphic reconstruction, panorama tours and 3D virtual tours. Supplementary information about experiencing and visiting castles as well as educational activities is provided.

The structure of the web-platform itself is being developed following up to date principles of web-architecture. The portal intends to provide interoperability of metadata following the Europeana Semantic Elements standards and significant attention is paid to the open-source data. The content derived by the database is being accessible through a publishing subsystem using W3 international standards of accessibility and more precisely WAI/WCAG. Portal's data can be manipulated from the authorized users of the Ministry of Culture through a content management subsystem. The overall infrastructure is made in order to be compliant to the future cloud computing system of the Ministry. The virtualization techniques applied in the digitization process, are selected between various contemporary virtual methods in order to better fulfill the criteria of historical context and to accomplish at the same time the web-navigation standards.

III. HISTORICAL CONTEXT

Peloponnese, with its strategic geographical position in the Eastern Mediterranean, underwent constant social and political changes through the centuries. Many invaders tried and occasionally achieved to capture it. This resulted in the prolific creation of various defensive structures.

With starting point the turbulent Protobyzantine era (4th-7th c.), imperial defensive projects are realized all around the late Eastern Roman Empire. In the Peloponnese, a unique linear defensive structure, the *Hexamilion Wall*, is erected in order to secure its only land access, while some of its major cities are being fortified. During the "Transitional" period (7th – 9th c.) and the Middle Byzantine Period (9th-12th c.) new enemies threaten the Byzantine Empire. New fortifications and existing ones serve as refuge for the locals. All provincial cities, the so called *Kastra*, obtain a more rural character and they are mainly limited inside their enclosure.

At the beginning of 13th c., after the 4th Crusade, Peloponnese is occupied by Franks and Venetians. The number of fortresses increases considerably, while the new dominants import and transplant their own elements of defensive structures. Although, as they settle over a territory with rich mason tradition, they also exploit local knowledge and patterns, creating, thus a local idiom. From 15th century onwards, while Ottomans and Venetians alternate their dominance over the Peloponnese, innovative defensive architectural elements are applied over existing and new castles, imposed by the evolution of war technology.

The current project gives an opportunity, by means of interdisciplinary approach, to perceive the castle making procedure and evolution in a specific geographical area over the centuries and under different cultures.

IV. INTELLECTUAL CONNECTIONS

Basic concern of the scientific group was to create a database that can demonstrate in an appropriate manner the intellectual and material aspects of fortified archaeology. Thus, the web page designed focuses on the interrelation of the castles in several different ways. By choosing filters of the construction period, the typology and the location, thematic maps are created so that the guest will be able to understand the simultaneous building activities, and to recognize phases, construction elements and techniques of each era. At the end the guest will be capable of making comparisons, identifying entities, and visualizing in general the historic information about the civilization dominions and society conformations.

The webpage's structure itself is designed to serve as a digital tool for comparative study while fortified architecture construction cannot be considered as an individual or random fact. It can only be perceived as a web of fortified edifices. It's about control and communication channels between a complex net of topographically significant locations. The web visitor is invited to deal with the most essential issues of fortified architecture problems through the complexity of the digital database.

V. DIGITAL SURVEYS

Within the frame of Digitization project, surface excavations were executed in several fortified positions in order to reveal the borders of the fortification edifices, which state of conservation, may differ from a castle to another. The method, techniques and the level of detail of the surveys that followed, were imposed by the condition, the significance and the special requirements of each fortified position. For the surveys there was used a combination of technology starting by hand measurements and sketches to 3d-scanning technology, total station, georeferencing with geodetical GPS system, different photogrammetric methods such as aerial photography, rectified images, point cloud through 3d stereoscopic couple of pictures, panoramas etc.

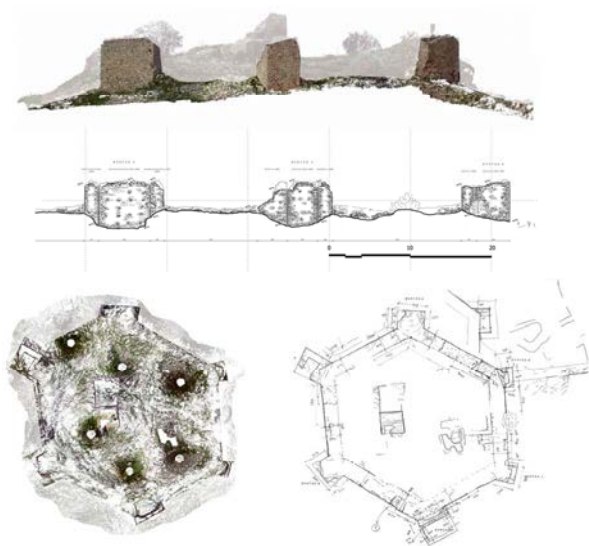


Fig. 2. Kiveri Castle, Argolid, Combination of Hand Measurements and Laser Scanning Survey

The field work of the different cases evinced that there is not an ideal or individual digital method applied for surveying. Visual corrections, recognition of blind areas in the plans and all those design assumptions necessary for representation of the space of the monument cannot be captured and interpreted by the digital mean. On the contrary, sophisticated possibilities and accuracy of digital technology can solve problems in the fields where traditional techniques are problematic and even impossible.

VI. VIRTUAL RECONSTRUCTION

Doubtless, decisive role to the creation of the archaeological experience has played the graphic reconstruction methods followed. While visiting a fortified location, the guest wanders between relics, decumbent stones and fragments without being able to imagine the original fortress. Augmented reality of a virtual tour can now accompany him through his smartphone application. Moreover, inserting the concept of time through presenting superposed phases creates four-dimensional models that empower the visitor to re-connect space and time.

Drafting of a three dimensional tour for the historic reconstruction of selected castles was one of the main pillars of the overall attempt to distribute and secularize archaeological information. For the deepest comprehension of the architectural structure a detailed archaeological documentation preceded. The methodology followed combined architectural evidence in the field, archive information, historical photos, comparisons with other castles of the same typology and period etc.

The result was 3D model representations that can be divided into two wider categories. The first includes castles and monuments built in a certain period of time that kept most of their parts intact, without major historic or modern

alterations, such as Agionori stronghold (Fig.3). Different type of fortified complexes from tower-houses, fortresses and fortified settlements are valuable tools in the comparative study, as they form part of the key chain that can help in recreating the historic evolution of fortification. Instant controlled touring options offer guidance to places of interest, highlighting hotspots and info points with pop up texts, images and 3d constructional sections.

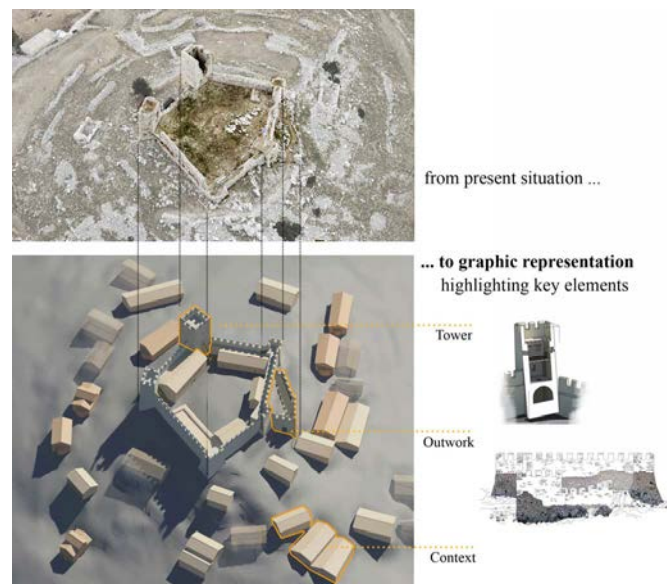


Fig. 3. Three dimensional Graphic Representation of Agionori stronghold, Corinthia, Greece

The second refers to large scale complexes evolved over a wider period of time, usually nested with important national, settlements such as Argos Castle (Fig.4-5). This category presents a prolific juxtaposition of historic phases and the evolution of fortification in southern Greece. The virtual reconstruction aims to give a comprehensive vision of critical historic periods, alterations, expansions and contractions. Strategic key-hotspots provide information about the architectural evolution and comparative analysis; Byzantine towers and Venetian lunettes, arrow-slits and crenellations.

The virtual reconstruction aims to guide both virtual and *in situ* visitors to places of interest. It allows them to re-imagine, re-think and re-envision a palimpsest of history, which is other ways fragmented and remote. It recollects landmarks of our history and presents them in an expandable platform. Additionally, their state of preservation presents us detailed elements, crucial in deducing facts on the context and everyday life of a medieval fortified complex.

VII. EDUCATIONAL ACTIVITIES

The education activities that the project includes aim to get acquainted with a fortified city, its material and ideological context. In order to accomplish the aforementioned objective, ten activities of different levels of interaction have been developed. Three of these games follow a certain educational script that contains general historical and architectural

information. As far as the rest is concerned, they are focused on terminology relevant to defensive architecture, photos, artistic evidence and literary texts concerning existing fortresses. By combining entertainment and knowledge, users cultivate their observation and critical thought, while through visualization; past becomes more attractive and tangible to the user. In consequence, the conscience of protecting their national and at the same time universal cultural heritage is being developed.

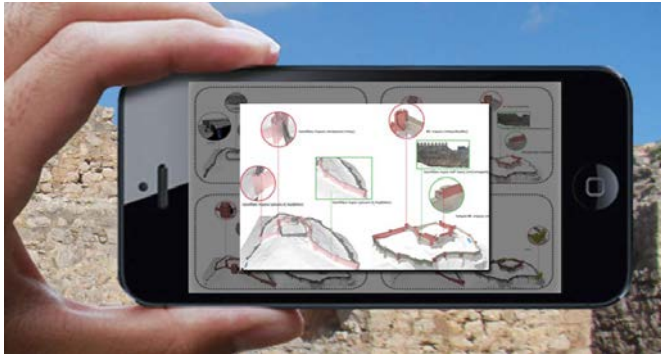


Fig. 4. Virtual navigation in Larisa Castle, Argos, Greece

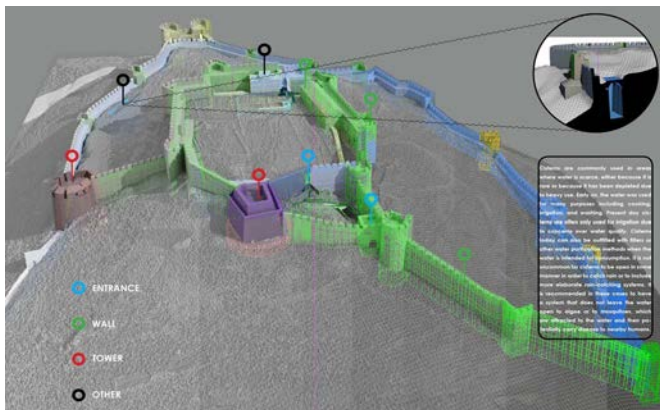


Fig. 5. Three dimensional modeling-Building Phases, Larisa Castle, Argos

VIII. PERSPECTIVES

The expectation of the overall program of "Digital enhancement of castles of Argolid, Arcadia and Corinthia" is of course the educational success in terms of attracting public awareness from the most to the less renowned monuments. By making the processes of fortified architectural production conceivable, the project intends to emphasize the significance of the unique multicultural mosaic that created the topography of medieval Arcadia, Argolid and Corinthia, and to introduce the user to the pursuit of historic information.

Beyond the documentation, the overall outcome of the platform could inspire future conservation and planning implications. Furthermore, in the frame of a covetable dissemination of the project as a whole, the platform could certainly be extended to the greatest span of Peloponnese region. All the gathered experience and information of "Digital Enhancement of Castles" project should be elaborated towards the creation of a unified national geographic information system (GIS) combined with a cultural resource management.

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