

EuroMed2010

# Digital Heritage

3<sup>rd</sup> International Conference dedicated on  
Digital Heritage

Short Papers



*Before July, 1974...*



*After July, 1974...*

The Katholikon of the Monastery of Antiphonitis in Kalogrea, Cyprus (16<sup>th</sup> century)

**DON'T MISS THE *Hi-tech*-STORY...**

8<sup>th</sup>–13<sup>th</sup> of November 2010  
Limassol, Cyprus

Edited by

M. Ioannides, D. Fellner, A. Georgopoulos, D. Hadjimitsis

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***Front and Back Cover Images:***

Christ *Antifonitis* near *Kalogrea* in the Kyrenia district in Cyprus is another church, which was built and decorated with wall paintings in approximately 1200 AD. In the early 16<sup>th</sup> century, the north and south wall of the church proper and the northwestern squinch were decorated with wall paintings from the life of the Virgin, the Stem of Jesse, the Last Judgment and the standing saints, while the cupola was decorated with Christ Pantocrator, the Deesis-Supplication, the Apostles seated on thrones and the Prophets. Unfortunately, after the Turkish invasion in 1974 and the occupation of the area by the Turkish army, the systematic destruction and removal of the wall paintings from the monument began. The faces of Archangels Michael and Gabriel in the conch of the apse were barbarically destroyed, while the wall painting of the Birth of Christ was removed. These wall paintings are dated from the end of the 12<sup>th</sup> or early in the 13<sup>th</sup> century. The great wall paintings of the Stem of Jesse and the Last Judgment (early 16<sup>th</sup> century) were fragmented into small pieces and removed from the south and the north wall on which they were painted. Several *fragments from the wall paintings (in yellow outlined)*, which had been exported by Turkish smugglers to Germany from where they were repatriated, are on display on the second hall of the Byzantine-Museum (BM.321-356) in Nicosia, Cyprus. Others are in Germany and it is hoped they will be returned to Cyprus. When all the pieces which have been found are gathered, an effort will be made to restore these two large wall paintings using different modern applications from the area of Digital Heritage.

Photos: Eliades Ioannis, Curator, Byzantine Museum in Nicosia, Cyprus

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ISBN 978-963-9911-16-1

Published by ARCHAEOLINGUA  
Printed in Hungary by PRIMERATE  
Budapest 2010



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# 3<sup>rd</sup> International Conference EuroMed2010

## dedicated on

# Digital Heritage

LIMASSOL, CYPRUS

November 8<sup>th</sup> – 13<sup>th</sup> 2010

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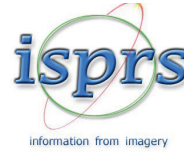
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## **Acknowledgement and Disclaimer**

The EuroMed 2010 Conference has been supported by CIPA, ISPRS, ICOMOS and the European Union Projects ATHENA, EuropeanaLocal, Carrare, Michael+ and Minerva+.

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# Foreword

We would like to take this opportunity to welcome you all to the 3<sup>rd</sup> International Euro-Mediterranean Conference (EuroMed 2010) on the historical island of Cyprus.

This volume contains the so-called “short” papers presented at the EuroMed 2010 International Conference held in Limassol, Cyprus, on 8<sup>th</sup> – 13<sup>th</sup> of November 2010. The Conference is an effort of several organizations and continues the successful series of EuroMed Conferences, which started in Nicosia, Cyprus in 2006. Since 2006 the EuroMed conference is organized in cooperation with CIPA, which is one of the oldest International Scientific Committees of ICOMOS (The International Council for Monuments and Sites) and was founded in 1968 jointly with ISPRS (International Society for Photogrammetry and Remote Sensing) to facilitate the transfer of technology from measurement sciences into heritage documentation and recording disciplines. CIPA originally stood for the Comité International de Photogrammétrie Architecturale (<http://cipa.icomos.org>). However, this old and well known name no longer describes the full scope of CIPA activities, therefore CIPA Heritage Documentation was established, which is now an organization that endeavours to transfer technology from measurement and visualisation sciences to the disciplines of Cultural Heritage recording, conservation and documentation. CIPA holds an International Symposium every two years. Accompanying these Symposia, frequent specialist workshops are held, which deal with specific topics.

The focal point of this Conference is Digital Heritage, which all of us involved in the documentation of Cultural Heritage continually strive to implement. The excellent selection of papers published in the Proceedings reflect in the best possible way the benefits of exploiting modern technological advances for the restoration, preservation and e-documentation of any kind of Cultural Heritage. Above all, we should always bear in mind that what we do now may be used by people in another century to repair, rebuild or conserve the buildings, monuments, artefacts and landscapes that seem important. Recent events like earthquakes, tsunamis, volcanic eruptions, fires and insurrection show that we can never be too prepared for damage to, and loss of, the physical and non-tangible elements of our past and in general the Cultural Heritage. To reach this ambitious goal the topics covered include experiences in the use of innovative recording technologies & methods and how to take best advantage of the results obtained to build up new instruments and improved methodologies for documenting in multimedia form, archiving in Digital Libraries and managing the Cultural Heritage.

Technological advances are very often reported in detail in specialised fora. This volume of proceedings establishes bridges of communication and channels of cooperation between the various disciplines involved in Cultural Heritage. Furthermore, the contributions presented in this conference and included herein can assist all experts involved in the Cultural Heritage area in restoring, renovating, protecting, documenting, archiving, monitoring of the history of humanity in order to secure this information for the years to come. It is evident and clear that a worldwide collaboration in this area will help make our “Hi-tech-Story” accessible to the present and the future.

This important event and the proceedings you are holding in your hands contribute decisively to providing a forum for scientists and professionals to share ideas, experiences, needs and problems.

The papers contained here are shorter in length, but not lower in quality. Authors have chosen to contribute preliminary results of work-in-progress in a shorter form, while mature research is presented in the “full” papers volume in the LNCS Proceeding from Springer Verlag. “Short” papers have been peer-reviewed and due to the great number of submissions, only a small part of them could be accepted and published.

We gratefully acknowledge that this task would not be possible without the support from our paper reviewers, collaborators and sponsors.

*Marinos Ioannides, Dieter Fellner, Andreas Georgopoulos and Diofantos Hadjimitsis  
November, 2010 – Cyprus*





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## DIGITAL SURVEY FOR THE STUDY OF INTANGIBLE “TABARKINIAN” TRACES: THE CASE OF CARLOFORTE IN SARDINIA

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**KEY WORDS:** Tabarka, Digital Survey, Urban Survey, Carloforte, Sardinia, Architecture, Laserscan, Nueva Tabarka, Pegli

### ABSTRACT:

In the Mediterranean area the richness of the relationship between people, art, architecture and urban settlements is articulated in an incredible mosaic. In this research the focus is set on the people who named themselves “Tabarkini” and on their settlements, especially on the “sense of place” produced by their towns on the observer. Visiting the town of Carloforte it comes out quite clear the impression to be in a town from the northern coast of Liguria more than on an island in front of the Sardinia Island. An articulated story has brought this population from Pegli (Liguria) to Tabarka (Tunisia) and to from there to Sardinia and on the small island of Nueva Tabarca in Spain. Behind the story of this people it’s possible to read a story of urban settlements: which has preserved certain characteristics everywhere in the Mediterranean area, so that it is easy to feel the mood and the suggestions from each of the places touched by this migration, but it is difficult to identify the elements producing these sensations. A confrontation about the house typologies and of the urban pattern is still missing. To put in evidence which are the constants and the variables in these settlements and what makes these places what they are; this project has chosen to operate starting from a detailed survey and documentation campaign. The contemporary technologies based on laserscan and digital imaging have been used to develop a rich archive of information and to start the analysis about these Mediterranean settlements.

### 1. HISTORICAL BACKGROUND

In the mid 15th Century the Genoese had the control of the North Africa coast, they had obtained from the Tunisian Bey the privilege for fishing and for trading the coral along the coast of Ras Ajebel. This situation brought the creation of a more stable situation in that area, with the raise of a spontaneous settlement where it was possible to distinguish houses around a church, warehouses and a small walled city with a tower defending the colony from the pirates.

In the first half of the 16th Century the Spanish Crown began a military campaign in this area in order to hold back the Muslims. Tabarka, placed in a location highly considered for its richness in coral, has become the "center" of the Christian-Muslim rivalry. Here Spain wanted to establish there a strategic "border". In 1547 the first contract was signed between the Spanish monarch and the Genoese families of the Lomellini and of the Grimaldi. In 1560 is dated the renewing of the exclusive agreement with the Lomellini di Tabarka. The agreement allowed them to settle in the island with a presence legally defined by a concession about fishing and coral trading. In change they had to pay to the Spanish Crown the tax of a "fifth". They had the right to appoint a Governor of the island, who had to swear allegiance to the Catholic King and to rule according to the laws of Castile. Then a fortress dedicated to St. George was built on top of the island. So it began a two Centuries period of Spanish government, someone (like the Ligurian Society of History) has defined it as a "community-garrison of fishermen, craftsmen, soldiers and religious".

During the 17th Century, following the economic operations of the Lomellini Family, a large part of the people living in Pegli, near Genoa, migrated to the Tabarka Island. They were sent there to work as coral fishers and they colonized fully the small island. In the following century Tabarka became overpopulated while the coral reefs decreased. Moreover the population began

to have trouble with the pirate incursions and with the local Governor. In the middle of the 18th Century, King Carlo Emanuele III di Savoia decided to offer to the population the opportunity to migrate to the southern part of Sardinia, to continue their work in a new completely uninhabited land, called San Pietro. There were two reasons for this offer: on one side it was an attempt to support the repopulation of the Sardinia Island, where people were reduced at that time to almost 300.000 units. On the other side it was the opportunity to block the pirate’s presence in the San Pietro bays.

The colonization of San Pietro was done in few years, and the new town, named Carloforte, was built according to plan of engineer La Vallée.

A complex history of kidnapping and of slavery followed, in which a large part of the population from Carloforte and Tabarka were taken by pirates and sold as slaves on the Tunisian market.

The town of Tabarka was completely destroyed. Part of the kidnapped people were set free by the efforts of various European countries, and between the end of the 18th Century and the beginning of the 19th Century, they all came back from their slavery.



Figure 1: An ancient picture of the Carloforte waterfront

They partially went back to Carloforte, partially to Calasetta (on the opposite side of the gulf, in front of San Pietro Island) and partially to a new founded town, Nueva Tabarka, an island in front of the Spanish coast.

Up to now, the studies brought on have underlined the continuity in historical, linguistic, economic, sociological and cultural development of the settlements of Carloforte, Calasetta, Pegli and Nueva Tabarca; this proves the sense of affiliation of their inhabitants to a unique community.

Therefore it is presumable that this heritage has expressed itself also in the shapes of housing, in particular in the formal, constructive and typological characters of the residences and of the fortifications. All the centers of new edification, in fact, were realized on the urban design made by military engineers and subsequently edified by the colonists with constructions belonging to their traditions. This aspect isn't secondary inside the general dynamics that have interested the new-built settlements following the so-called "tabarkinian diaspora", but it hasn't been sufficiently investigated yet. The research project developed in partnership with the Spanish team, aims to recognize the fundamental characters of the tabarkinian architecture, its constants and variables.

## 2. THE PROJECT

### 2.1 Tabarkinian traces: from intangible to tangible

The historians define the so-called "tabarkinian house" as a building made of stone, with square plan, one floor, covered by a single pitched roof. But there is a lacking of confirmation on the Tabarka Island, from which the name of this building typology takes origin; thus it is possible to find some examples (commonly called "baracca") in the rural environment on the Islands of San Pietro and Sant'Antioco in Sardinia. It is moreover presumable that these small buildings were the house-type in the urban environment.

Nowadays in Tabarka only the fortress of San Giorgio and the residue of some minor buildings remain to testify the presence of a town. The original documents about the settlement are not descriptive enough to give a clear image of the place and to allow developing any direct reconstruction hypothesis. With the exception of the castle, planned by military engineers of the Crown, the structure inherited traces of the settlement and existing buildings, where houses were built by the settlers themselves. The used type of housing should meet the logical constraints of simplicity, economy and functionality, using a models coming from the rural origin in a traditional way with a choice of easy self-construction to realize the "baracche".

While in Nueva Tabarca the "baracche" actually form the urban structure, in Carloforte a different economic situation and a very close tie-up with the "motherland" have induced the transformation of the original model according to the example of the Genoese building trade. At the same time, in Carloforte, It is easy to find practical and aesthetic solutions in arts, architectonic and urban solutions coming from the same heritage. The first step approaching this research is to gather the existing studies and start an articulated survey campaign to develop a clear and solid base of knowledge.

### 2.2 Project development

Planning an investigation about urban and architectural features, the towns of Pegli, Tabarka, Carloforte, Nueva Tabarca and Calasetta show very different conditions:

- Pegli has been transformed after it has been blended inside Genoa's urban pattern.
- Tabarka shows only poor remains of the town, while the fortress is still standing and considered a military area.



Figure 2: The overall scheme of the research approach

- Carloforte shows a very interesting town asset with two different urban patterns: one in the planar part of the town on the waterfront and another used where the buildings have grown over the relief in the northern part. The transformations of the original housing typology are often heavy, but it is still possible to find well preserved or partially preserved samples.
- In Nueva Tabarca and Calasetta the typology used for the agrarian settlements is applied to develop the original structure of the town, with simple but still well readable solutions.



The target of this project is to find constants and variables in the architectonic and urban environment. This is to be done according to an articulated development process, where the entire urban context will be analyzed. The investigation will take care of some "relevant" elements, like the environmental sections, the overall structure of the town plan, the study of the cartography and of the previous investigations done. Then it will be necessary to move to the interpretation of the characterizing details, the chromatic features and the visual "noise" caused by disturbing elements.

To operate this investigation the tools will be the photographic survey, with a further image analysis to focus and to extract specific trademarks, and the three dimensional survey operated with laserscan technology, so to produce a complete detailed three dimensional image of the whole town, with all its meaningful features. Starting from these data, a simple and complete database will be developed, useful also to organize the base information for the research group. This database will be also the base for any further study and analysis.

### 3. APPROACHING TO THE THEME: CARLOFORTE

#### 3.1 Digital survey

After a first extended phase dedicated to inspection and sources gathering, a survey campaign in Carloforte has been done in June 2010, basing the whole work on laserscan technology. A classic survey scheme was adopted, using a Phase Shift Scanner, a Cam2 Faro Photon 8080, supported by a specific topographical network. This kind of scanner works very fast, with a very good accuracy even on the long distance and it is well suitable to perform urban survey in a small town center like Carloforte.



Figure 3: The laserscan at work in the town centre of Carloforte



Figure 4: A plan of the surveyed areas in Carloforte taken from the survey sketchbook.

The topographical network, working as connection for each single scan is a fundamental step to allow quicker procedures and to fully benefit the laserscan characteristics. The laserscan campaign has covered the whole town center between the "via XX Settembre" at the South, the Civic Museum at the North,

the sea at the East and the church of the town at the West. This has produced a good coverage of all the main aspects of the town, comprehending both the regular and the non regular urban patterns, from the entire building to the architectural details. It has been created a complete three dimensional image of the town, with all its qualities and its pathologies and level of decay.



Figure 5: One of the houses from the “Le Tanche” settlement



Figure 6: The laserscan at work in the “Le Tanche” settlement

The survey campaign takes care of both the town pattern and the interesting rural settlement named “Le Tanche”. Infact here some good samples of rural and original housing can still be found. An articulated campaign of inspections is planned for the towns of Pegli, Tabarka, Nueva Tabarka and Calasetta, where a generous photographic survey was done and a lot of suggestions and impressions were gathered. A selected set of cartography, books, old pictures, various multimedia materials have been collected and composed in an accessible archive to work as common information base for the whole research group. The further project development will see the selection of specific themes, trying to focus on the meaningful common characteristics. To enhance the interpretation of the urban patterns, it is to say that all these towns are “new towns” and they have the specific characteristics of these kinds of settlements.

### 3.2 Constants: typological studies

The typology used in the first houses built in Carloforte was chosen by the settlers themselves. Today there are hardly any traces of them, although - as you can see in the photographic documentation of the mid XIX Century - we can say that it was the same type that still populates the rural area of the island, the so called “baracca”. This is a simple construction, a square of 5 x 6 meters with single internal space. The main façade has a single opening of access to housing, and is topped horizontally at about 3.5 meters in height above the level of access. The interior is a single space, covered by a single pitched roof and split in 2 parts by a small wooden slab forming a loft. Entering from the front door on the street there is at first the kitchen with fire and fireplace on one side, and the steps to access the attic. The remaining space is occupied by the sitting-room, while upstairs the bedroom is located, ventilated by a window on the rear façade. The typology is completed by a cistern located under the terrace outside the entrance, which receives the rainwater collected on the roof through a system of gutters and downspouts. A small “Butron” was placed next to the entrance, evacuating the sewage directly overboard. The walls were built with masonry and floors with stout wood girders: board in the attic, while slats, reeds and tiles are used for the roof. This typology, although particularly suited to the site, is similar to other rural types that can be found in areas of the Mediterranean. However it is interesting to consider its way of aggregation to form villages. Under this glance it could be particularly enlightening to analyze the laws of aggregation of the village “Le Tanche”, for it consists in a set of huts clustered along a road.

### 3.3 Variables: urban system and fortification

Unlike the houses, edified directly by the settlers, the urban plan and the fortification systems -although used by the settlers- were designed by military engineers chosen by the state apparatus.



Figure 7: One of the gates in the Carloforte town centre



This fact induced project choices reflecting, in some precise details, the language style coming from each of the designer origin towns and do not put in evidence the typical tabarkinian character.

#### 4. CONCLUSIONS

The research is actually under development. The gathering data phase is almost completed, so we can say that the overall mosaic of traces shows some ideas useful for the next steps of this study. A very important aspect is the evolution of the settlement: now it appears quite clear how the "typical" rural housing is the first step of all these towns, with a construction of the town starting from a simple group of housing, made to define a continuous façade and to allow an easy subdivision of the properties. Later, with the growing of the population and with the rising of the needs, the original houses started to be reconstructed and replaced by larger and more comfortable and enhanced buildings. To better understand and to present efficiently this urban story there will be soon the development of some versatile three dimensional models, aimed to show correctly the main phases of the towns from the Pegli migration. The state of advancement of the whole work is in itself a good and useful document, while a solid and complete image of a large part of the town is archived with a high level of details in its aspect in June 2010. The following treatments will produce the first accurate documentation about the state of the town since its foundation.

#### ACKNOWLEDGEMENTS

The research unit of the Dipartimento di Architettura: Disegno - Storia - Progetto, Florence (Italy), is composed by: Emma Mandelli, Alessandro Merlo, Giorgio Verdiani, Filippo Fantini, Stefania Iurilli, Gaia Lavoratti, Uliva Velo.

The research unit of the Escuela Técnica Superior de Arquitectura de Valencia (Spain) is composed by: Francisco Juan Vidal, Salvador Lara Ortega, Pablo Rodriguez Navarro, Juan Carlos Navarro Fajardo.

The project has been supported by the Italian Ministero dell'Università e della Ricerca in the "Azioni Integrate Italia-Spagna" framework (2009). The project is named "The italo-spanish 'frontier': the new founded towns edified between the 16th and the 18th Century in the mutual insular properties in the Mediterranean sea", coordinated by Emma Mandelli and Francisco Juan Vidal.

Survey campaigns: - laserscan surveys were done in collaboration with Area3D s.r.l. Livorno, laserscan operator: Alessandro Peruzzi; - topographic surveys were done in collaboration with arch. Francesco Tioli.

A special thank to Antonio Cipollina, Battista Boccone and the Municipality of Carloforte for the support to this research.

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