Documenting Syrian Built Heritage to Increase Awareness in the Public Conscience

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Abstract: The Laboratory of Geomatics for the Environment and Conservation of the Cultural Heritage (GeCo Lab) has been involved in two projects in the past that led us to work in Syria. Both of them were funded by the European Union: 'Coupoles et habitats. Une tradition constructive entre Orient et Occident', in 2007 and 'Mare Nostrum. A heritage trail along the Phoenician maritime routes and historic port-cities of the Mediterranean Sea', in 2009. As geomatics experts, we contributed by collecting spatial data and preparing graphical output aimed, through a multi-scale approach, at documenting construction details, buildings and parts of cities that today are probably severely damaged, if they still exist at all. Different approaches were followed in the projects: in the first one, a top-down approach, the core goal of the project being to analyse the construction system of earthen buildings in villages in the north of the Syria, which was carried out by an interdisciplinary and international team of experts; in the second one, a bottom-up approach, the Mare Nostrum project aiming to provide a sustainable mechanism for the protection and management of cultural heritage resources, leading to an awareness of cultural heritage in the public conscience. The project involved experts from universities, local public authorities, guides and tour operators, teachers and students, with the aim of boosting public interest and pride in the Syrian people's cultural identity.

Keywords: 3D metric survey; digital heritage; cultural mapping; laser scanning; geomatics; Syrian heritage; European projects

Introduction

Between 2007 and 2011, with the Geomatics for the Environment and Conservation of the Cultural Heritage Laboratory, we had the chance to work in Syria, participating in two projects funded by the European Union. We travelled there several times before the onset of the troubles that have overturned the Syrian people's lives. At the time, we did not think that we were appointing ourselves to a bigger challenge: war means the sudden destruction of people, buildings, traditions, social identity and so on. The projects we are presenting here became more important than they were expected to be: they are not only an interesting opportunity to increase knowledge and become more conscious of the tangible and intangible heritage of a fascinating country, but we can now consider them as the opportunity to rebuild villages and a way of life, to save and transmit knowledge and proficiencies to the next generation.

The first project ('Coupoles et habitats'[3]) was about earthen domes and habitats in the northern region of Syria and it started in 2007. Since earth is the world's most accessible building material, earthen buildings vary in form, style and technology, and they contain an intangible tradition that has, in many cases, been continued through the generations. But earth is fragile and requires

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[3] 'Coupoles et habitats. Une tradition constructive entre Orient et Occident' (Contract no. 2007-1134/001-001 CTU COHANT) is a Culture 2000 project funded by the EACEA of the European Commission. Project Leader: University of Florence, INN-LINK-S Research Center on Local and Indigenous Knowledge Systems and Innovation. Head and coordinator of the project: Prof. Saverio Mecca.

proper and regular maintenance. Recording traditional and local typologies and their decorations was intended as the first step in saving important know-how, still common in the small villages we visited but increasingly at risk. The aim of the project was to respond to the urgency to record and document this information, their 'language' as John Hurd, then president of the ICOMOS Committee for Earthen Architecture said.[4]

'Mare Nostrum. A heritage trail along the Phoenician routes and historic port-cities of the Mediterranean Sea' is the second project, and it started in 2009. As geomatics experts, we contributed by collecting spatial data and preparing graphical output aimed, through a multi-scale approach, at documenting construction details, buildings and parts of cities that today are probably severely damaged, if they still exist at all.

Project Approaches

Different approaches were followed in the projects: in the first one, a top-down approach, as the core goal of the project was to analyse the constructional system of earthen buildings in villages in northern Syria, carried out by a multidisciplinary and international team of experts; in the second one, a bottom-up approach, as the Mare Nostrum project aimed to provide a sustainable mechanism for the protection and management of cultural heritage resources, leading to an awareness of cultural heritage in the public conscience. Beside the team of technical experts, local public authorities, guides and tour operators, teachers and students were also involved, with the aim of boosting public interest and pride in their own cultural identity.

Coupoles et Habitats

This project responds to an increasingly important need: the growing necessity to learn from vernacular architecture, the techniques and materials, not only to register this information as historical knowledge and archival documentation, and to protect this patrimony, but also to design and construct new sustainable buildings using what is natural and local. The project was based on interdisciplinary scientific research linking an in-depth study of local architecture, the representation of architectural knowledge, and theoretical and experimental scientific analysis and interpretation.

Who

The project was developed through a close cooperation and partnership between the Syrian authorities in charge of culture and heritage and a group of specialised European institutions with complementary profiles and competencies (universities, research, promotion and training centres in the field of cultural heritage). The profiles of the researchers and technical experts complemented each other in terms of archaeology, architecture, building technology, geomatics and mechanics.

The project leader was the University of Florence (Italy), and Prof. Saverio Mecca was the head and coordinator of the project. The other partners were:

- Directorate General of Antiquities and Museums, Syria;
- Hellenic Society, Greece;
- University of Liège, Belgium;
- Polytechnic University of Valencia, Spain;
- École d'Avignon, France;
- CNR – ICVBC, Italy;
- Culture Lab, Belgium.

[4] Hurd 2009.

What

The core goals of the project were:

- to document this unique landscape, the expression of the complex relationship between the environment, people and architecture over thousands of years;
- to examine the common roots between East and West demonstrated by the astonishing diffusion of corbelled architecture all over Europe and the Mediterranean;
- to experiment with and test an interdisciplinary approach to the analysis and valorisation of knowledge systems known as Vernacular Architectural Heritage.

The final goal of the project was, therefore, to increase the perception and consciousness of the value of this local earthen architectural heritage in an effort directed towards the sustainable development of this region.

Where

The interdisciplinary research started with the in-depth study of local architecture during an on-site mission in May – June 2008, where all the experts worked on different aspects of the architectural heritage.

The fieldwork focused on the analysis of three geographic areas of northern Syria:

- the west region of Lake Jabboul,
- the west region of Lake Al Assad,
- and the east region of Hama.

How

The tools used in this first approach were:

- technical sheets for the identification, documentation and analysis of the urban and architectural morphology of villages, architectural morphology of houses, building technologies, building elements, building pathologies and causes, lifestyles;
- metric survey: manual methods, topographic methods, laser scanning, photogrammetry;
- mechanical testing;
- sampling of materials;
- interviews with builders and inhabitants.

The fieldwork produced a large set of data and qualitative and quantitative information, which provided the basis for more traditional scientific analysis and interpretation through the collaboration and integration of different scientific approaches to the urban, architectural, technical, archaeometrical, structural, geographical and environmental dimensions. The different scientific activities were organised so that all of the partners collaborated in a multi-directional way, by sharing data, information and knowledge, all converging at the project goal: to analyse and model the vernacular architecture knowledge system.

The Role of Geomatics

The geomatics teams were required both to collect primary data, complying with the requirements of other experts, and to define the data recording and management tools.

In multi-disciplinary teams, geomatic techniques can be used, first of all, to construct a reference base that enables all members to meaningfully participate in both investigative procedures and project development and application.

Fig. 1 The adopted solution for closing the top of the vault (inner view), the arrangement of the brick can be read easily in the 3D model (© Geomatics for Environment and Conservation of Cultural Heritage Laboratory)

The regions were studied at several scales of investigation in order to obtain a complete analysis. The need to provide documentation at different scales highlights the usefulness of integrating various levels of detail in the same project.[5]

Metric Documentation

Metric documentation of the cultural heritage requires a thorough understanding and careful observation of the site, and suitable graphic output using the data collected, as well as dimensional quantification with appropriate instruments.

In the belief that complexity is an inspiring challenge and that contingent difficulties constitute an effective stimulus to finding better solutions, here is a list of some of the factors that we had to take into account:

- preliminary knowledge of the investigated villages was limited, so a certain flexibility was required when setting up the on-site survey operations;
- instrument use was constrained by environmental and climatic conditions;
- the presence of experts from diverse fields highlighted the existence of different requirements for spatial data collection.

The need to provide documentation at different scales highlights the usefulness of integrating various levels of detail in the same project.

The most basic form of documentation is inventories. They require a low level of detailed analysis and produce ‘identification’: in our case every village first had to be identified, then georeferenced and stored. By contrast, a high level of detailed analysis provides highly detailed 3D models, where the resolution is such that even the texture of the constituent materials is described (Fig. 1). The level of detail of the various investigations performed in the Syrian villages was often in the middle range, consisting of:

[5] Tucci et al. 2009.

Fig. 2 Record of the structure of the buildings that make up the village. The buildings can be considered modular. This approach highlights only the most relevant dimensional differences of the cells (graphics elaborated on the basis of aerial images by Vegas et al. 2009)

Fig. 3 Considering the laser scanning survey of a single dwelling, it is instead possible to distinguish larger and smaller modules (the first are generally used for dwellings or as stores, the second as kitchens, ovens or secondary rooms), to identify the open areas associated with the modules, ascertain the position of the mastaba and indicate the presence of external dividing walls (plan and elevation of the dwelling studied in Joub Maadi village, graphics elaborated on the basis of a laser scanning survey) (© Geomatics for Environment and Conservation of Cultural Heritage Laboratory)

- positioning the various villages in the territory;
- documenting the arrangement of the settlements, i.e. the spatial relations between the residential units which, despite being quite autonomous, share 'pseudo-urban' spaces (Figs. 2–3);
- surveying single dwellings, including the rooms used for living, the central court and the accessory structures (oven, stores, animal shelters) (Fig. 4);
- documenting the technological and structural characteristics of a typical cell (Fig. 5–6).

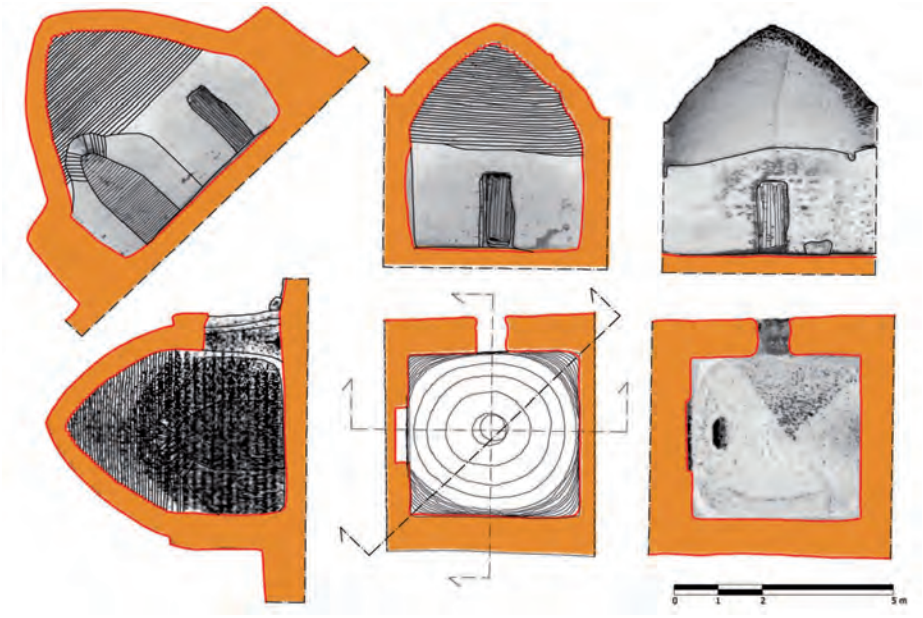

Fig. 4 Large-scale drawings of a single residential unit in the Oum Aamoud Seghir village. The horizontally laying bed dome is made of superimposed, progressively jutting rings of sun-dried bricks and raw earth mortar, making the construction process self-supporting (Paglini et al. 2009a)

Fig. 5 Views of 3D laser scanning models: the interiors of the residences have no fixed furniture and objects are usually placed in niches. There are some very small cavities, arranged in a sequence (left), some the size of a window, or niches that rise from the floor to the height of 1–1.50m (© Geomatics for Environment and Conservation of Cultural Heritage Laboratory)

Fig. 6 Different 3D solid models were realised for different purposes: on the left, an earthen scale model building used for analytical and numeric assessment of the static performance of the devices based on specific hypotheses (Paglini et al. 2009b); on the right a small-scale 3D model printed using a coloured filament, made for communication purposes (didactic, exhibitions, support for disabled people, etc.) (© Geomatics for Environment and Conservation of Cultural Heritage Laboratory)

Mare Nostrum

The ‘Mare Nostrum. A heritage trail along the Phoenician maritime routes and through the historic port-cities’ project was a large European Union project on cultural heritage and urban regeneration, which aimed to bolster the sites involved by promoting and supporting sustainable tourism.

Site-specific sets of actions were developed in order to make both the tangible and intangible heritage more meaningful to the local communities and to make places more accessible for locals and tourists.

Who

Six Mediterranean countries participated in the Mare Nostrum project: Greece, Italy, Lebanon, Syria, Malta and Tunisia. The cities in the Mare Nostrum network have a common Phoenician origin that can still be seen nowadays in their historical heritage, and all of them have a strong relationship with the Mediterranean Sea (Figs. 7–8).

What

The goal of this project was to valorise the cultural heritage of the sites involved by promoting and supporting sustainable tourism. The multi-disciplinary team approached the issue from different

Fig. 7 An international meeting during the ‘Mare Nostrum’ project
(© Geomatics for Environment and Conservation of Cultural Heritage Laboratory)

Fig. 8 Training the local team during a participatory photographic workshop
(© Geomatics for Environment and Conservation of Cultural Heritage Laboratory)

points of view, but with common aims: to contribute to raising public awareness of the preservation and promotion of the Mediterranean port city and archaeological sites along the Phoenician ring-thread routes in a past-present continuum; to promote initiatives for community participation in decision-making to design culturally, physically and visually accessible Mediterranean port city sites by re-interpreting the spaces as new places of life; to promote the rediscovery and, in a historical past-into-present overview, the re-shaping of the local tangible and intangible heritage through different means of awareness-raising, in view of connecting Mediterranean port city sites along the Phoenician ring-thread routes; to trace specific educational paths along the historical role of the cities involved in the project in Mediterranean culture; to strengthen and address the actions of the local authorities/governments to preserve and regenerate the tangible and intangible heritage of their areas, through shared and integrated sustainable tourism plans for new tourist itineraries; to suggest new port city site designs – that show their past-present continuum – integrated with the urban fabric and archaeological sites; to promote Mediterranean handicrafts and safeguard their design and production.

Where

One case study was chosen for each country and some activities were carried out only on selected sites. The project was divided into different 'work packages'. The fourth, which was the responsibility of the University of Florence, aimed to design and analyse the port-city site 'heritage trail' at the local and Mediterranean levels, with regard to socio-physical elements in particular. Information and material were selected with regard to safeguarding and regenerating archaeological sites. The geomatics team's work in Syria concentrated on the port city of Tartous (including the nearby Arwad Island, which is already on the World Heritage Tentative List) as a pilot site. Tartous is the second most important city on the Syrian coast and before the conflict it was the main centre of a network of important points of interest for culture and tourism. Tartous and nearby Arwad Island have the distinction of being the last Crusader strongholds in the Middle East; however, not much remains of the Phoenician Antaradus (Anti-Aradus – the town facing Arwad), the mainland settlement that was linked to the more important and larger town on Syria's only offshore island, Arwad. The few Phoenician ruins that remain on the mainland are at the nearby site of Amrit. Today, within the citadel, the urban structure is constituted by the vertical overlay of various stone structures – remains of galleries, fortifications, the hall and the chapel of the crusader fort, and new housing built on the ruins of the medieval city.

How

The project goals were achieved by:

- development of a methodology for the definition of a tourism integration plan based on two pilot projects implemented in Rhodes, Greece and Tyre, Lebanon;
- publication of a Vademecum of Participatory Planning in the Mediterranean Sea Areas;
- design and realisation of an awareness-raising campaign and an appropriation process – various competitions with school children and students of architecture and graphic design, exhibition of the results;
- development of cultural trails in the six partner cities – including signage, maps, brochures – and training of guides and promotion of trails with the tourism sector;
- development of an online virtual tour for each city;
- identification and establishment of a network of artisans and craftsmen in the port cities;
- organisation of regional traditional markets and creation of the Melkart label for branding the project's products;
- conservation guidelines, specifically related to the activities of work package 4.

The Role of Geomatics

The contribution of geomatics not only consisted in the application of the latest information technology procedures but also created a new methodological approach within the data acquisition and management process. Graphic, cartographic, iconographic and bibliographic material was gathered for the pilot sites and so, after an inspection, it was possible to define the area in which to concentrate the on-site research: on the one hand, a survey campaign was set up to acquire metric and qualitative data on the structures chosen as samples. This provided the necessary information for the systematic analysis (chronological phases, construction techniques, state of preservation) required for preparing conservation guidelines. On the other hand, an enormous amount of photographic and video documentation was collected: digital images, panoramic images for virtual tours and stereoscopic images (Figs. 9 and 10).

Fig. 9 Spherical panorama of the galleries in Tartous
(© Geomatics for Environment and Conservation of Cultural Heritage Laboratory)

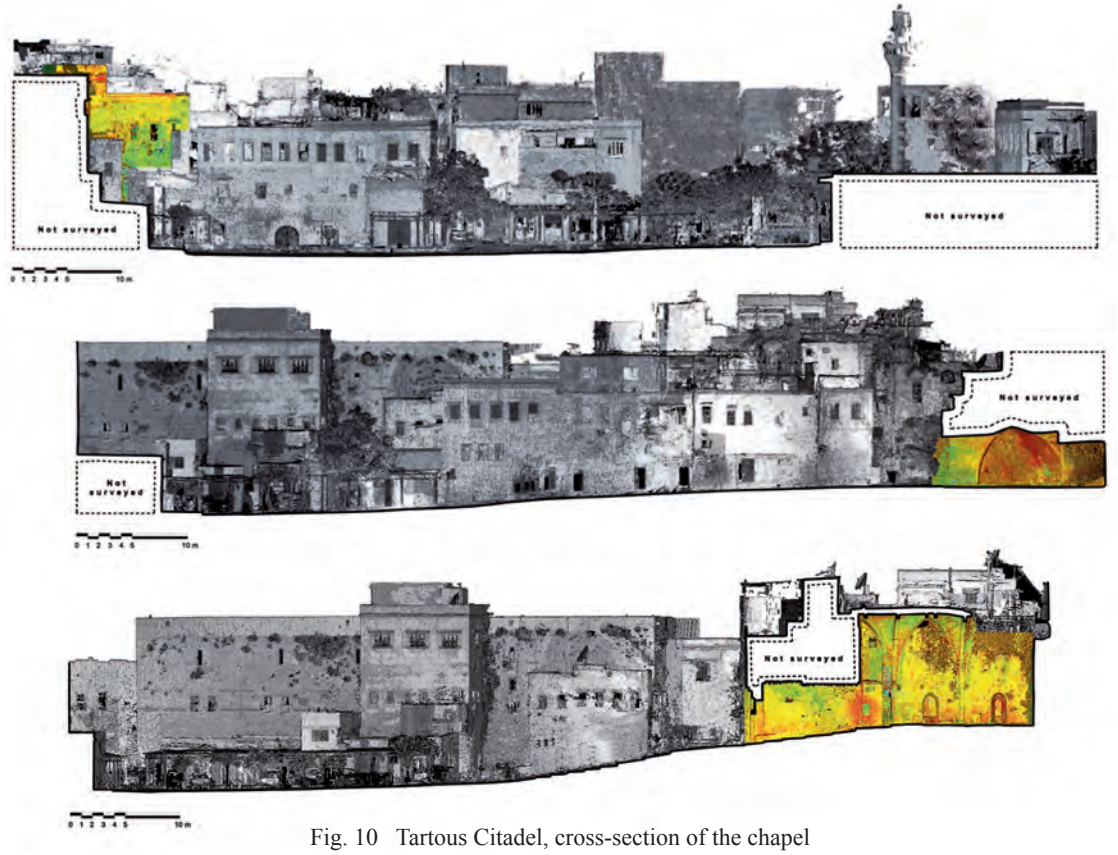

Fig. 10 Tartous Citadel, cross-section of the chapel
(© Geomatics for Environment and Conservation of Cultural Heritage Laboratory)

Metric Documentation

The metric surveys and studies of the materials and construction techniques were mainly carried out in the old city of Tartous. The urban fabric has a complex structure because of its pronounced vertical stratification. The Knights' Chapel and the cross-vaulted galleries, both situated in the inner circle of the city walls, and a part of the wall circle were chosen because at that time they had the best preserved Crusader architecture. Three-dimensional metric surveys were carried out to document that part of the city as well as to detail wall textures (Figs. 11–13).

Non-metric Documentation

The most interesting parts of Tartous, and the surrounding areas (Arwad Island and the archaeological site at Amrit) were photographed. About 60 panoramas were stitched and then

Fig. 11 3D model of the galleries in Tartous
(© Geomatics for Environment and Conservation of Cultural Heritage Laboratory)

Fig. 12 Scanner setting in Tartous
(© Geomatics for Environment and Conservation of Cultural Heritage Laboratory)

Fig. 13 Tartous Citadel, with the main monuments in colour and the urban fabric in grayscale (© Geomatics for Environment and Conservation of Cultural Heritage Laboratory)

linked together in a virtual tour published on the internet. At the same time, stereoscopic images were collected on the main building and some decorative elements (Fig. 14). Digital image recording has a high communication potential, enabling the preparation of virtual tours, integrated video and multimedia products, valuable material for improving the communication capabilities of websites, etc.

Fig. 14 An example of non-metric documentation: a stereoscopic image of a capital (© Geomatics for Environment and Conservation of Cultural Heritage Laboratory)

Shared Cultural Mapping

There has always been a direct relationship between tourism and cartography: maps of travel routes and general information about the areas to visit are used to select the destination and plan travel and stays. Cultural mapping is a process of collecting, analysing and summarising information in order to describe the cultural resources, networks, links and usage patterns in a community.

A cultural mapping project was set up in Tartous, although it was interrupted shortly afterwards due to the conflict. The first stage of the project was to build a mapped catalogue of the most relevant tangible and intangible cultural features of the city. This process aimed more to build knowledge for planning activities than to produce an effect on the population's identity. The knowledge produced by this mapping was mainly built by looking at Tartous's past. This did not mean that the mapping activities would focus exclusively on the historical heritage: contemporary cultural activities and features were also to be mapped, and they would comprise part of the basis for planning the future development of the city. Overall, the main objective was to provide new

value to those cultural features maintaining a connection with the past. Finally, this cultural mapping tactic could be viewed as a way to promote exogenous attention to Tartous's heritage. The city of Tartous today needs to undergo a new and far-reaching regeneration process, and participatory experiences such as those started with the Mare Nostrum project should be helpful.

Conclusions

The goal of the projects presented here was to investigate the sites from a technical point of view and to boost the cultural heritage of the places involved by promoting and supporting sustainable tourism.

At the time the projects were developed, we focused our attention on conservation management planning and on the model for sustainable valorisation. These could be integrated to develop a new model wherein heritage serves as the core of the development process.

Nowadays, with the country at war, new needs arise and the spatial data collected in the past bears witness to parts of cities, villages and monuments, but also construction techniques, ancient materials and lifestyles, that have been destroyed. As a result, they can be considered their digital memories.

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