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CONSERVATION THROUGH DOCUMENTATION – WHAT DOCUMENTS?

KONSERWACJA PRZEZ DOKUMENTACJĘ – JAKIE DOKUMENTY?

Abstract

To be able to appreciate and understand the significance and the quality, often ignored, of the existing heritage – from the single monument to the urban fabric and all the way up to the territory; all themes which are embedded in the concept of identity of their own landscape – the exact geometrical documentation of the state of the object is not sufficient (even if visually significant); an additional step in comprehension is required, backed by surveys and filtered with the appropriate interpretation and comparison keys about the observed organism, looking further beyond its image. Communicating the knowledge of architecture and manmade contexts (appropriate and multidisciplinary investigation methods with up-to-date technology, integrated surveys and scientific experience of the architectural heritage at all scales, the memory of the motivations and planning, philosophical and Social premises, both material and immaterial) is the realm of connoisseurs, and of those with the fortune and the ability to use this documentation for decoding content at multiple levels.

Keywords: knowledge, integrated survey, documentation

Streszczenie

Aby docenić i zrozumieć znaczenie jakości, często ignorowanej, istniejącego dziedzictwa – od pojedynczego zabytku do tkanki miejskiej i w górę (skali wielkości), ku terytorium; wszystkim tematom, które osadzone są w koncepcji tożsamości ich własnego krajobrazu – nie jest wystarczająca dokładna dokumentacja geometryczna stanu obiektu (nawet jeśli wizualnie jest znacząca); wymagany jest dodatkowy krok w zrozumieniu, wsparty o inwentaryzacje i pomiary i przefiltrowany przez stosowną interpretację i klucze porównawcze dotyczące obserwowanego organizmu, sięgające poza jego obraz. Komunikowanie wiedzy o architekturze i kontekstach stworzonych przez człowieka (stosowne i multidyscyplinarne metody badawcze z najnowszą technologią, zintegrowane inwentaryzacje i doświadczenie naukowe w dziedzinie dziedzictwa architektonicznego we wszystkich skalach, pamięć motywacji i planowania, warunków filozoficznych i społecznych, zarówno materialnych, jak i niematerialnych) jest domeną koneserów i tych, którzy mają szczęście i zdolności, by użyć tej dokumentacji do odkodowania treści na jej licznych poziomach.

Słowa kluczowe: wiedza, zintegrowana inwentaryzacja, dokumentacja

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1. Conservation through Documentation – What documents?

If we need to understand how to preserve, to continue to discern we must learn how to understand and preserve the records and signs of our identity involved in heritage.

Building the adequate database for knowledge is a complex yet necessary operation in order to safeguard cultural heritage, and it requires a suitable and correct awareness in the process of data collection. It has been widely demonstrated that a solid “knowledge” base cannot be sufficiently accomplished by filling in mere lists on sheets or indications not argued with reliable and objective “technical” charts.

Before a man-made “artefact”, observers who are interested not only in the aesthetic features but also in the intellectual and operative aspects, are stimulated to explore the keys to a series of questions regarding the causes and the resolutions of a given object.

In architecture the usual questions concern the meaning of established choices: Why that form, why that chosen style, where is the link between the Society and the built object, and furthermore a deeper investigation into the issues between architecture and man, why the position, which are the spiritual intentions, the philosophical approach, the math and the geometric logic behind the observed shapes and then moreover what is the message of identity and “knowledge”.

The necessary analysis to obtain an established response must go beyond the shallow or preconceived level of comprehension of a culturally valid, yet generic, observation, and should be supported by extensive, verified and transmissible documentation.

2. Integrated Surveying

The work of the specialists over many decades, resulting in the so-called process of *integrated surveying*, has not always been adequately acknowledged among scholars in the institutions and papers of the theory of conservation. Yet, integrated surveying effectively responds to the above mentioned knowledge necessities via strict processes, and also to the subsequent issues in critical analysis, obtaining information from the data and that, with the use of appropriate methods, that can respond to difficulties of not directly verifiable design content (in the case of geometry, operating practices, knowledge of astronomical and military building practices etc.).

The evolution of the concept of **integrated survey**, just like the historical protocols, is now a recognized field of interest in the international scientific community. The communication throughout the rigorous and technical languages is furthermore a sign of a relationship, often non-exclusive between information and reality.

A survey is defined integrated because it answers to two procedural aspects.

- A. In order to survey (with either direct or indirect methods), a technical and scientific process is necessary, making use of the available resources and advanced tools appropriate to the observed objects. In this operational scheme the size and complexity of the data to be collected and examined is crucial to select the right strategic approach and choice of surveying techniques.

B. To verify and complete the data a coordinated integration of the different disciplines is required, with the attendance of a team able to provide figures and information on several fundamental aspects for the full knowledge of the object in consideration.

This complex acquirement system has been in place for several years due to the implementation of *surveying*, *representation* and *data-management* procedures characterized by a high technological content, the support of multidisciplinary know-how and practises scientifically suited to the objective of a complete documented basis.

The surveyor and the workgroup should be able to handle a planned *protocol of research* consistent with the whole circle of knowledge, from the direct approach to the final output, in the preferred approach and methods (III. 2).

3. The complexity in integrated survey

Surveying complexity, i.e. the understanding of a material complexity, is today a well-defined process, reinforced by technical systems and indirect data-acquisition methods strongly different from each other, originating from numerous disciplines. The survey grows on content as well as on its own image and must be able to convey its heterogeneous, yet scientific, message in a correct form.

The concept of a *system*, conveyed via mathematical abstractions to the Kantian philosophy, articulates the ability to represent the unity of diverse sources of knowledge and to collect them under one single idea.

For the common knowledge to become *information*, with a significant amount of collected data and specific content resulting from a basic *analysis*, the process should be led in a scientific way, thus ensuring its validity. This is a concept that can easily refer to the current problem of transition from data collection to its possible output.

The concept of *cultural heritage* expanded to *environmental heritage* up to the institution of the *idea of landscape* is related to the unambiguous choice of the size and scale of the areas, or parts of the territory, which are being researched, in order to choose and form effective *tools* for an integrated knowledge: from data collection to their final management.

In this scientific field, in my opinion, *representation* takes on its very own *strategic* key role, to be addressed. From the mapping to the elements of analysis of the *Forma Urbis*, *figuration* must immediately and accurately lead to the identification of the state of the art in the right dimension, and efficiently represent it, while highlighting the *key constitutive elements*, recognizable in the proper use of the drawing device.

Developing further more into the issue, every “*survey*” procedure now pairs up with an adequate and proper representation, yet these are the outcome of different methodologies and often make use of technically non-combinable methods. The result features many diverse outcomes that need to be compared, adapted and made compatible in order to become the *representation* of a *particular architecture*, *its relative environment*, *landscape* or whatever needs to be understood.

In so-called integrated survey, the two chief foundations of measuring are mixed: analogical and digital means, following two processing philosophies and methods of output which are painfully becoming compatible with one another throughout a mixture based on the digital representation (*vector and raster*), whereas their processing is often accomplished

by specialized subjects. When understanding the information, the sequence of steps and techniques is essential in the process of development and implementation through protocols and programming pointed at an objective. In any representation (mathematical, numerical and geometric) technical features following the content must be compatible and contribute to describe them in their *controllability*, *repeatability* and *verifiability* in the results.

Therefore, now more than ever before, representation is linked to the programming of knowledge that requires a new communicative integrated language (III. 3).

4. The control of measurement

A strict control of the exact form through the identification of its geometrical logic, from visual observation to sketching measurements, is perfectly capable to deliver highly valuable documented results backed with the strategic take of fixed points of the “object” under analysis in order to precisely measure it.

However, *measurement* control, which is the result of an apparently oblivious and unambiguous operation – collection of measures – in reality proves to be a strongly debated step in the process of acquisition of a built reality’s material elements and a real nest of ambiguities, regardless of the number of test checks. The ambiguity of the numeric datum doesn’t rise from the shortcomings inherent in the instrumentation and its applications, or at least is hardly related to it, but rather from the attitude, more or less scientifically aware, of the surveyor.

It follows that the *scientific value* of an entire surveying campaign and its final outputs is fully carried out in the verified output of its representation, consisting firstly in the determination of a **geometric model (two dimensional or three dimensional)**. Such a document must result unquestionable at all scales of representation. Digital illustration, if it toughens the work of the operators as it requires an exact 1/1 recording of each measured point, acts as a support in the determination at all scales of the geometrical references, the so called “static lines”, which are always present in the form and structure of a piece of architecture.

“Geometric models” have always substituted the real object, both for a mere three-dimensional render of the measured object, or for an operational management of the conservation project or moreover still of whatever reconstruction or monitoring operation, either for a subsequent reading or for scholarly management based on appropriately verified theoretical assumptions.

In surveying, the systems of codifying the image have, throughout the history, directed clarity in an exquisitely technical area of interaction, controlled by the surveyor alone within the rigorous application of his knowledge of the geometrical and formal symbols. The present situation has resolutely geared towards advanced technology in its multiple aspects and potentials. The control of the systems has extensively been converted into indirect approaches and the field of application has vastly amplified. “Tools” are now the only intermediary between who aims to attain the knowledge and the object of knowledge itself. The ever more sophisticated options offered by technology, widespread in the operations of acquisition and production of data, and the necessary control of the surveying campaigns at all scales, create a technical and operational ground which cannot be ignored by the sector’s operators, and requires an adequate training.

It is a well-known fact that the initial operational difference to be dealt with does not consist in the simple difficulty of understanding and adequately utilising these new “machines”, but in finding a place in this system, which somehow communicates and runs the operations in a different process from the one that has been customary up to now. Indirect means of measurement have upgraded the method of topographic acquirement of data, attended visually by a controller. The reference is, in particular, to the possible “takes” with *laser scanner* where, with only the mere choice of a setting spot the operator can proceed to the shots generating a complete 3d visualisation of the Point Cloud.

The mass of points forming the Point Cloud represent referenced geometric elements (edges, corners, points and more) of the examined object, but as they are they are still undifferentiated without any sort of hierarchy (Ill. 4). The actual “discretisation”, either three or two-dimensional, is only a posterior reorganisation phase and is run with software that is compatible with the measuring equipment used for the data collection in the previous phase (Ill. 5).

5. Critical reading of data

A central element to understand the artefact is the *artefact* itself, which has always the importance and the function of a stable and secure document to be analysed and compared with historical evidence from the archives.

Understanding the size of a historical architectural entity, defined in its appropriate measure units, with the understanding and comprehension of the intents of who has designed or built that one entity, means going well beyond the numeric datum: it means entering the architecture. The form contains a structural, geometric and functional rationality inherently, which is related to a dimensional choice that can be defined “unit” of that building. The choice of such unit expands its application from the single building to the city scale and regional planning.

The idea that measuring is one of the key controls to verify an object is not the outcome of one single operation, instead it reveals the understanding of the relative society. The comparison is between science and technology, science and art, a relatively complex field to decipher critically in specific applications.

Critical observation of architecture by the surveyor raises the fundamental question of his personal capacity of refined analysis, based on solid historical awareness.

In case of a project for knowledge related to the recovery of an object, the ability of applied research to comprehend, confront and retrace the project is essential. Recognising not only the structural and material parameters, but also the qualitative and morphological ones are necessary to understand the present status of an artefact and to focus its typology and formal identity. In architecture, *quality* in relation to *quantity* is an essential component of comparison. Thus, the very concept of survey expands throughout specialised competences to the fields of design, theming and diagnostics towards which it must deliver secure, compatible and homogenous information in an efficient and multidisciplinary cooperation.

Communicating the necessary knowledge for architecture and manmade contexts (the appropriate multidisciplinary methods of investigation with the modern technologies, integrated surveys, the scientific knowledge of the architectural heritage at all scales, the

memory of the planning, philosophic, social motivations and assumptions behind a project) is a prerogative of the experts, with the possibility and ability of who is in need of such communication of decoding it at the highest levels.

6. Documentation for the protection of architectural heritage

Theoretical and methodological treatises over the application of what has been summarised so far cannot be focused and made operational anywhere on the territory if the authority of laws or regulations of intervention and administration is lacking.

In Italy the issue has been legally tackled in 2004 with Legislative Decree Dlgs 22/01/2004, no. 42 (s.i.m.) subtitled *Code of Cultural Heritage and Landscape*. The text contains the definition of *Cultural Heritage*, of *Landscape* and of *Environment*, building onto definitions and perceptive tools of study, equally inferred yet cohesive, then introduced into the subsequent Dlgs 03/04/2006, No. 152.

Reference to this law here is a precise reference to the possibility of access to knowledge, documentation and direct maintenance, which cannot be avoided and that is clearly and operably indicated, especially under the light of aperture to the idea of Landscape occurred in 2000. The hands in the sector of Cultural Heritage unfortunately, have very often neglected this law.

It so happens that this really is *Code with the power to define, enumerate, regulate and sanction* with all the strength of a law.

Andrzej Tomaszewski, who had been invited to the Conference of my academic field, at the end of 2009, responded with a detailed paper, exhorting specialists of the subject to approve the correct *modus operandi* in “documentation” in order to protect the cultural heritage. “... And so we get to the issues of surveying the monuments of architecture. We do it with ever more perfection from the ground and from the sky. We process the attained data with electronic devices and we allow the monuments to live in a virtual reality, towards which we have wider access. The methods of surveying are based on ever more perfected measuring techniques. Nevertheless its end and its task are part of the theory of the tutelage of cultural heritage. For these reason it is the subject of interest of our Committee. In the conservationists’ international arena the concept of “conservation through documentation” is gaining an increasingly wider space for itself...”

The words of Andrzej Tomaszewski while accrediting the work over many decades of the specialists in the field of *integrated surveying*, on the one hand; on the other, was carefully requesting a proper and opportune carefulness towards the issue of documentation, which, as it has been argued, cannot act with sufficient strength throughout the edition of mere sheets or indications, which lack the support of reliable and objective “technical” diagrams.

Natural disasters, earthquakes (Assisi, L’Aquila, in Italy) or widespread war damage have raised this very issue. The situation has been declared: “survey emergency”. Existing documentation has been considered unable to react to this partial or total destruction and needed a historical memory, as well as descriptions, photos, supported by surveying papers, drawings and supervision, in order to securely utilise the fullness of the documentation.

This aspect, advocating for the tutelage and safeguard of the architectural heritage is a praised theoretical concept of Emiliani, which, together with the lucid implementation of

scientific surveys, defined by Sanpaolesi in the far Sixties, formulates the theory of the vast field of real “knowledge” of the built manufactures.

Current technologies with their methods and languages have become a constant source of assistance for higher precision and completeness of the results; yet, also the actual difficulties of compatibility, when combining the attained data, have to be recalled. 3D representation, allowing for interactivity, derived from the data re-elaboration, for example from the Total Station or a laser scanner Point Cloud, involves technological abilities and cultural understanding by the operators.

Multidisciplinary actors participating together, when building up an analysis able to respond to all different necessities of the documentation (geometric, structural, material, geological, historical, archaeological etc) which should set up a virtual “model” of the examined object, inherently leads to the necessity of scientific integration.

Thus, the formation of a digital model, should be guided by the preliminary understanding of the purposes of the research, so that the model can be of use to all the different necessities of the operators and involved scholars. The 3D model can even be enclosed in a multi-scale “container” where ample interactions between the objects can be initiated.

The data obtained has to be integrated in order to develop into the **information, which** is going to be requested.

The references, stated at the beginning of this script, display clearly the pressing methodological requirements to form a unification of the results, languages and processing, shared by all the parts involved to formulate a clear list of the proper documentation, as a result of the criteria and of the assumed protocols. **It is in fact necessary to etquette the type of analysis and necessary synthesis.** Documentation has to be guided by requests, which respond to the necessity of supervision and protection, and by the scientific choice of the experts’ replies and management.

This, in my opinion, is the first answer to the question of this conference: implementing and stabilising proper “knowledge” for present and future safeguarding of cultural heritage in their form or structure and the intangible content of their identity¹.

I wish to conclude with the explicit words closing Andrzej Tomaszewski communication: “... ‘Conservation through documentation’ must lead methods of ‘preventive conservation’, which is becoming increasingly important, not just in the field of protection of pieces of ancient art in museums, but also of architecture’s masterpieces. (...) We should support such a program as the main vocation of architectural conservation, which requires the financial commitment of the European Union... We should not forget that our fundamental role as architects-conservationists is that of documenting our cultural heritage for science and for the future generations. Nobody is going to do it in our stead, and nobody is going to excuse our shortcomings for not doing it”.

Florence, June 2015

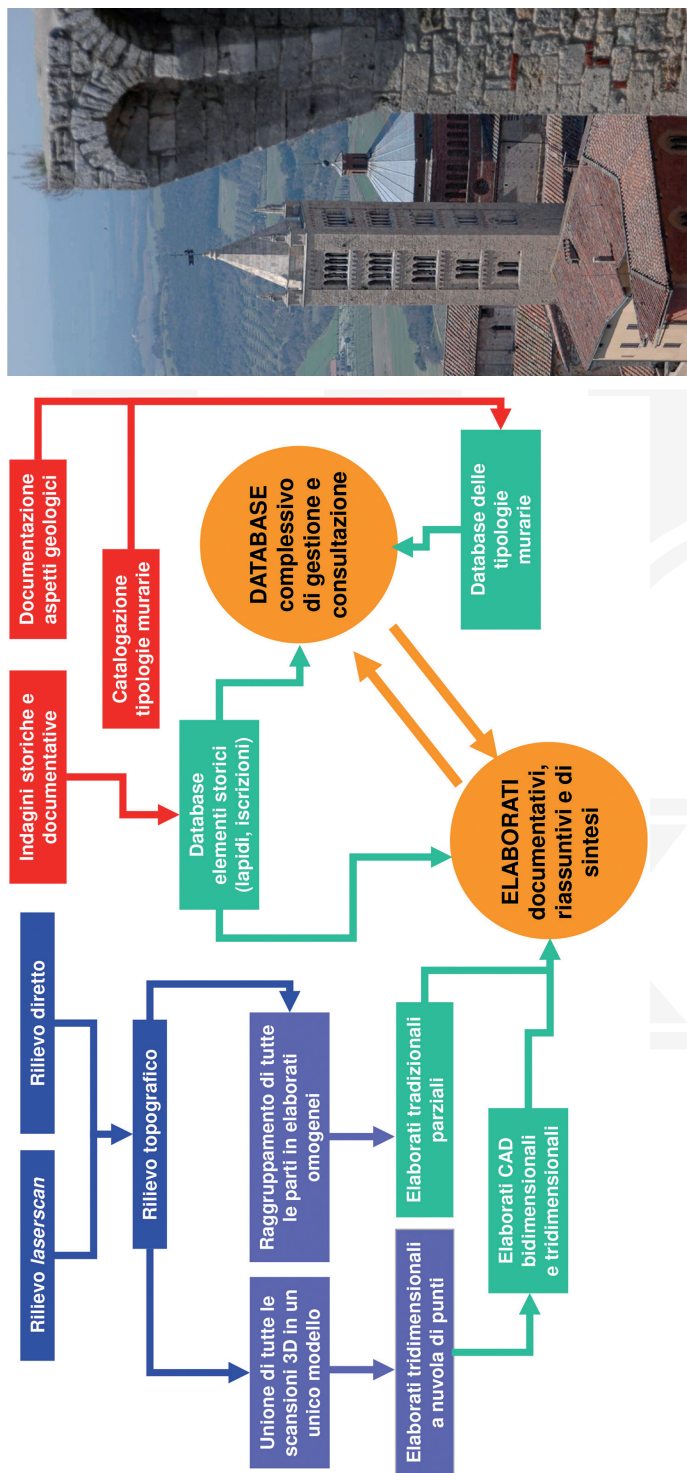
¹ **Images of an example of “knowledge and documentation”.**

E. Mandelli, edited, *The city walls of Massa Marittima, a double fortified citadel*, Vol. pp. 207, Tear 2009, Collana Toscana Cultura I, Pacini Editore, Pisa; Book published for the Tuscan Region, besides offering a vast photographic documentation and a full repertoire of the representations of the carried out surveys, it contains a technical and enlightening report over the work led. The sequence of participants who, over the years of the whole survey campaign (over 5 in total), have taken part in the endeavour with different tasks has been listed. Finally the book contains a vast general bibliography over integrated survey and a fully exhaustive list of publications regarding historical papers of the citadel of Massa Marittima and the landscape of the Maremma (Ill. 1).



III. 1. Regional layout of the Maremma Toscana

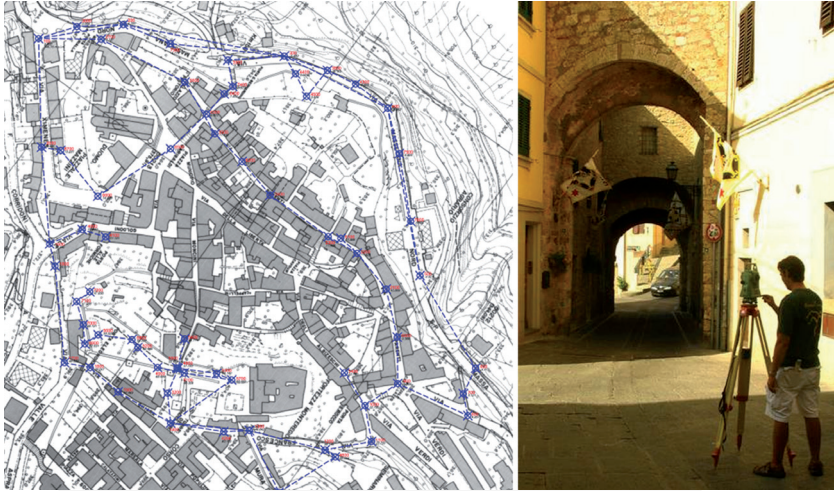
II. 1. Plan regionu Maremma Toscana



III. 2. Scheme of the integrated survey process used in Massa Marittima. View of Massa Marittima (GR)

II. 2. Schemat zintegrowanego procesu inwentaryzacji zastosowanych w Massa Marittima. Widok Massa Marittima (GR)

a)



b)

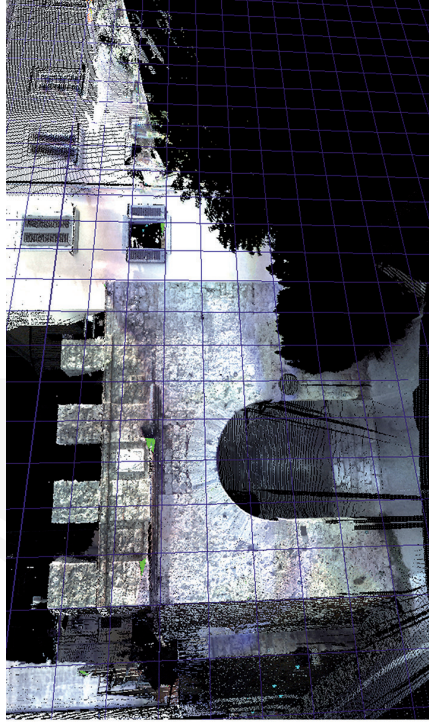


III. 3. a) Topographic campaign carried out with two Total Stations: creation of a principal closed traverse outside the walls hooked to the traversing of the old town and three closed traverses linked to the first one with the graphic output in the proper scale, altimetry and profiles, trilateration of the “targets” positions for the photogrammetric graphic rendering. And also other open traverses where necessary;

b) Plan survey of the strip of land adjacent the city walls with the current layout

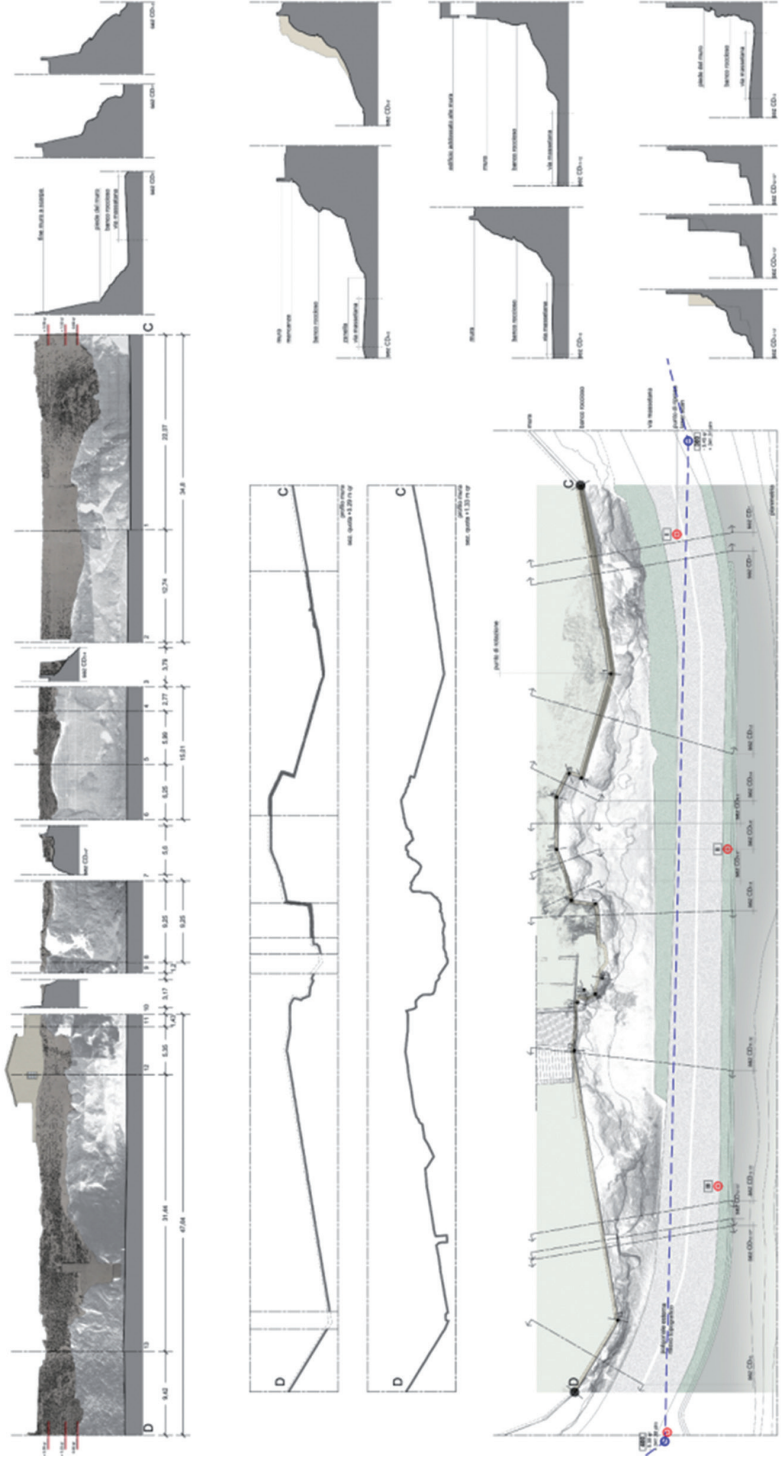
II. 3. a) Topograficzny operat przeprowadzony przy użyciu dwóch urządzeń Total Station: tworzenie na zewnątrz murów obronnych bazowych poligonów zamkniętych, dowiązanych do siatki poligonów pomiarowych starego miasta oraz tworzenie trzech poligonów zamkniętych, dowiązanych do pierwszego poligonu z odniesieniem graficznym do odpowiedniej skali, z uwzględnieniem poziomów i profili, trilateracji pozycji “celów” dla fotogrametrycznego renderingu graficznego. W razie potrzeby możliwe jest zastosowanie poligonów otwartych;

b) Plan pomiaru pasa terenu przylegającego do murów miejskich na bazie obecnego układu



III. 4. Survey campaign using two laser scanners, in the entire accessible perimeter made so eliminating the vegetation (cloud of points a screen shots)

II. 4. Operat pomiarowy wykonany za pomocą dwóch skanerów laserowych, w całym dostępnym perymetrze wykonany z eliminacją roślinności (chmura punktów uzyskanych ze zrzutów ekranu)



III. 5. Detail of the city walls – computerized and graphic render of the data processed via laser scanner shots and topographic and photogrammetric acquisitions

II. 5. Szczegóły murów miejskich – komputerowy i graficzny render na bazie danych przetworzonych za pomocą skanowania laserowego oraz zebranych danych topograficznych i fotograficznych