Chapter 19

“Discretizzazione” and Data Analysis at the Time of “Total Survey”

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ABSTRACT

The chapter contains considerations and methods of analysis of data acquired using modern surveying technologies, applied to cultural heritage. Three case studies are carried out. They are different in type of monuments, aim of survey and survey techniques used. The large amount of data acquired through innovative techniques of photographic survey and laser scanning requires an adequate process of “discretizzazione”. It will change an uncritical “total survey” into a selective and effective analysis and communication process. An excess of information could distract from the actual purpose of survey, and it could provide the illusion of a comprehensive understanding of the monument. Actually, the real knowledge does not come from the amount of data acquired but from the ability to analyze them, to relate and communicate to potential users.

INTRODUCTION

Modern surveying technologies and related computer applications introduce innovative technical instruments that force the processes of architectural and urban survey to carry out an epoch-making mutation. It is not just the mechanical instrument what defines the relationship between surveyor and objective referent. The results and the type of raw data that these tools provide are the main factors that influence the processes of interpretation that every survey operation requires. Whatever the survey instrument adopted, the “mechanical” measurement action is a simple operation of data collection that requires or urges a process of discretization. It, however, is not yet the fulfilment of the survey but only its premise.

The modern instruments of expeditious survey - photo straightening; photogrammetry; photomodeling; laser scanner - can help to reduce the time of the operations carried out in the field and produce a “total survey” of the monument, without any selection of data. The result that comes out is made up of
photographic images or point clouds that gather the whole geometric, metric, volumetric, qualitative, chromatic complexity. The subjectivity of the surveyor is entrusted exclusively to a preliminary draft of shooting – photographic or laser – which will enable an optimal data acquisition. At this stage, the surveyor’s subjectivity is only limited to the choice of the shooting points and the direction of the optical axis. There is no selection of metric data acquired. The complex operation of discretization, which with the traditional methods of survey is accomplished since the survey operations in the field, is now postponed. It is performed at a later stage of processing and interpretation of the data, in the absence of the surveyed object.

It is clear that it radically transforms the cognitive-interpretative approach of the surveyor and produces consequent graphic elaboration. Most assessments will not be carried out in the field, through direct contact with an objective referent, but they will take place on a digital model that will be a mimetic replica of the real model. The spatial complexity is transformed into algorithmic sequence. The phase of understanding and critical interpretation of the artefact can therefore use an amount of oversized data compared to the actual needs. It provides an undeniable operational advantage for the assessment and analysis of the artefact but, at the same time, requires adequate ability for selection, analysis and discretization of acquired data. It leads to the construction of an interpretative model, coming from the survey, without redundant data, that can highlight the metric, volumetric and qualitative features depending on the purpose of the survey.

**BACKGROUND**

This chapter develops on three different levels: historical and iconographic analysis; semiotics and graphics; technical and operative experimentation.

From an historical point of view, the Castellion in St. Niceto and the Cattolica in Stilo belong to the time of Byzantine domination in Calabria (554-1060). The subject has been treated by many scholars cited in references (Bozzoni, Minuto, Venditti, Venoso and others, about the Byzantine religious architecture; Martorano, about *Castellion* in St. Niceto). However, these studies are largely historical and with little attention to the survey, the representation and graphic-morphological analysis. The representations of these monuments, available in the scientific literature, show traditional surveys and drawings, often summary.

The Church of Piedigrotta in Pizzo Calabro has a more recent history, while being culturally linked to a hypogeous tradition, which is common in the region since the Byzantine era. The few historical information are taken from the publications listed in bibliography (Costa, Malferà). The bibliographic sources generally have no drawings and are rich of photographic illustrations. In 1989, a private company specialized in instrumental survey realized a photogrammetric survey integrated with total station. Other drawings, dating back to the years 1996 and 2007, illustrate surveys conducted with traditional methods, in the occasion of two redevelopment projects of the site.

The laser scanner survey proposed in this chapter is the first realized on the monument with advanced instruments and it is the most accurate representation currently available.

The second aspect investigated is intertwined with graphical representation theories and studies about semiotics. The theme is related to interpretation, organization and representation of the data emerging from the survey. The new digital instruments put the theme of the relation between mimetic image and analytical representation. A theme with ancient roots that the potentialities of mimetic replication made available by the modern techniques of survey make it even more actual today.
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