



USE OF HISTORICAL IMAGES FOR THE DOCUMENTATION AND THE METRICAL STUDY OF CULTURAL HERITAGE BY MEANS OF DIGITAL PHOTOGRAMMETRIC TECHNIQUES

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Digital photogrammetry for recording and documentation of archaeological sites, historical structures and objects, offers nowadays a wide range of possibilities in terms of data acquisition (semi-metric or consumer digital cameras, digital stereo-camera systems...), data processing (monoscopic or stereoscopic plotting, 3D model reconstruction...) and data representation (orthophotos, photo-textured 3D models...). By means of photogrammetry is in fact possible not only an accurate geometric reconstruction, but also the collection of other important data for the knowledge of Cultural Heritage objects and structures (colors, texture and materials, damage state...), useful also to support conservation and restoration activities.

On the other hand, restoration activities have been in some cases carried out in the past without leaving appropriate documentation, and changing some object aspects: in these cases the availability of historical images is often the only way to study and reconstruct the past. Together with the simple qualitative analysis of some object characteristics, like for example the changes and the decay in the used material or in the decorations, the powerful tools today offered by the digital photogrammetric systems permit in fact the metric reconstruction of the object state also in past epochs, using historical imagery like digitized old photos and illustrations from books. Obviously the key phase in this process is the calibration of these images, often critical because of many problems: the low quality of the available pictures in terms of resolution and radiometry, the lack of informations about the images (acquisition period and method, camera information), the difficulty in finding accurate data like constraints or control points considered valid also in the epoch of interest, the difficulty of modeling all the distortions or deformations suffered by the images in the time course.

The poster shows the study conducted about the *Lararium* from the House of the Skeleton in Ercolano. This object is interesting for this kind of research because it presents some static problems and it has suffered during the excavations many interventions and changes, until the complete disassembly and successive replacement in situ. Three images of the 1927-1928 periods were chosen with the aim of creating a historical 3D model of the object, comparable with the actual model, derived by the photogrammetric survey conducted in the 2006 campaign.

After an experimentation phase necessary to define the most suitable methods to perform the images calibration (single or multi photo, with the use of geometric constraints or also with the use of control points), a valid set of parameters was found and a complete model of the object was reconstructed, representative of the metric and qualitative conditions in this epoch.

The dimensional comparison between the two temporal situations (historical and actual) permitted qualitative and quantitative considerations about the differences, offering an important tool for the evaluation of the past restorations and useful also to plan all the future interventions.

