



**The mosaic of the Virgin Mary in the Monastery of Gelati, Georgia.  
Conservation Program – Phase 1**

Documentation, Diagnostics, Study and Executive Conservation Plan

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November 9<sup>th</sup>, 2023



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This document defines the process necessary to document the actual state of conservation, to study and to produce the executive conservation plan of the mosaic of the Virgin Mary in Gelati Monastery, Georgia. It is based on a preliminary survey carried out by Roberto Nardi and Andreina Costanzi Cobau during their visit on July 14 and 15, 2023, days when the Gelati Rehabilitation International Committee met in situ. It refers to the apse of the Church of the Nativity of the Virgin, both the mosaic part and the part reconstructed in painting, as framed in the picture here following.



Objective of the conservation plan will be conserve the mosaic by removing the source of the actual deterioration problems and restoring materials and structures.

This intervention is planned on the basis of an omni comprehensive study capable of answering some fundamental questions:

- on the nature of the mosaic;
- on construction techniques;
- on historical events;
- on past and ongoing processes of degradation;
- on the structural and environmental context within which mosaic, church and monastery are located.

The proposed program (Phase 1) has the objective of collecting all information required to create a “point zero” where the actual status of the mosaic in which the current state of the surfaces and structures are recorder and crystallized in an intelligible and sharable form for the use of specialists, with multiple purposes, from the fundamental record for future memory for scholars and researchers, to the design of the executive conservation program.

It is probably useful to point out that the mosaic surfaces show obvious signs of severe deterioration. These suggest that, in addition to the obvious damage found on the tessellate, there are also serious structural damage. Nevertheless, we did not see any signs of immediate alarm for the survival of the mosaic. This encourages us to proceed according to standard procedures that take into account the natural course of the seasons and the relative better working conditions, foreseeing in March 2024 the beginning of the study.

This phase 1 is structured in stages, which we can summarize as follows:

- a. Preparation of the survey instruments and eventual micro safety interventions;
- b. Documentation and Diagnostics
- c. Study;
- d. Editing of the Executive Conservation Plan.

## **A. Preparation of survey tools.**

In order to proceed with the documentation and study process, it is necessary to produce tools that will allow to record data in a logical and topographical format, acting at the same time as data base and management tool. For this, it is deemed necessary to proceed preliminarily with instrumental survey campaigns that, once the final drawings are produced, will allow for action in both two and three-dimensional surface dimensions.

We plan to proceed with the realization of:

### *A.1. Terrestrial laser scanner acquisition.*

Terrestrial laser scanner acquisition, to be carried out at very high resolution with 3mm\10m scanning pitch and with dense stations so as to capture as much of the geometry of the object as possible. The stations will be built in such a way as to avoid the shaded areas of the scaffolding and will return a point cloud model that will provide a 3D overview of the surveyed surface.

Instrument: *Leica RTC 360*

### *A.2. Ultra-high resolution photogrammetric survey.*

The detail photogrammetric survey will be done with calibrated reflex camera and fixed lens. Photograms will be acquired downstream of setting up a lighting set with cool LED lights and known color temperature. In support, shots will be taken with flash ring integral with the lens, so as to minimize colorimetric differences on the sensed object.

SLR cameras and related optics: *Nikon D850 with 35mm\50mm\60 and 105 macro*

*Sony A7r V with 60 macro.*

None of the technologies mentioned could provide the basis we need on their own. This is because each of the procedures has physical limitations that prevent the completion of the work at the required resolution and accuracy. For this, the on-site survey campaigns will be followed by a post-edition process that will serve to unite the results obtained and return the unified synthetic basis needed to proceed with documentation. The post-edition of 3D scanning images will allow the processing of the reflectance data, i.e., the response of the material to the laser beam, in order to produce descriptive and selective image processing.

Any other instrumentation will be fielded if scenarios not evident today are identified during the course of the study.

At this stage of preparing the survey tools, it is also useful to envisage some modifications to the scaffolding, at least for the apse area. These modifications will be according to the needs of the instrumentation that will be used but above all to respond to some safety rules that we did not encounter during the July visit. In particular, we suggest the installation of safety netting to be applied below the work platforms (sub-bridge nets) and the improvement of the side protection rails. A specific list of corrective actions to the scaffolding will be provided in person when the project on site will start.

During the preliminary phase, decisions will be taken about eventual urgent temporary work needed to secure the mosaic. At this stage the only thing that can be said is that it would be desirable to avoid intervening on the mosaic before the documentation and study are completed. But this may not necessarily be possible. Only an acquired knowledge of the state of preservation and the confidence that conservators will develop with the mosaic during the preliminary study and documentation will tell.

## **B. Documentation.**

The goals of documentation are many and well-known. Perhaps it is useful to point out some of them, just because they will apply to Gelati.

The first, obvious one, is to crystallize the current state of the surfaces and structure of the mosaic in order to set "a zero point" that will serve as a reference for what will be done in the future and possibly interpret what happened in the past.

Another objective is to identify the distinctive elements present on the surfaces and within the mosaic in order to break down and classify what today seems to be a set of problems that are more or less difficult to understand.

A further possible goal of this operation is to bring out anomalies that may prove useful in identifying unexpected or new information.

In the case of Gelati, the documentation will have to be twofold: it will be done manually, on a digital basis, by conservators with experience in this specific field, because a professional's ability to analyze and synthesize is not replicable instrumentally nor automatically. Contextually, it will be necessary to resort to instrumental means both to reach all the information not visible to the naked eye and to collect as much information as possible with an objective system, independent of the operator's critical judgment.

For the documentation entrusted to the conservators, it is planned to use the graphic and photographic bases produced during the preparation phase, working on a 1:1 scale, noting all the features that will be identified on the surfaces and in the structure of the mosaic. A list of items will be produced during the preparation phase of the survey instruments and will still be dynamic, open and editable throughout the survey phase.

For the instrumental component, it is envisaged for the time being to perform:

### *B.1. Georadar survey*

Radar acquisition will be carried out by means of very high-frequency instrumentation with centimeter detection pitch. The produced papers, with anomalies highlighted and interpreted, will be returned in 2d or 3d. Instrument: *Proceq GP 8800*

### *B.2. Surface survey by Thermo-vision*

Thermographic analysis will be done with high-sensitivity thermal delta instrument. The images produced will have a thermal resolution of 240 × 180 (43,200 pixels) and an accuracy ±2%. Instrument: *FLIR E6 Wifi*

The documentation will be the combination of the various methods applied working symbiotically: this will produce the final result we need to deepen our understanding of the mosaic.



### **C. Study.**

The current state of the mosaic suggests extreme caution in proceeding with conservation intervention: at least until its nature, history, and state of preservation are known, it would be advisable not to proceed with direct interventions on the mosaic surface and structure. It will be the direct analysis of the mosaic surfaces and the study of the documentation, together with the confidence that conservators will gradually acquire, that will open the way for us to plan the conservation intervention in detail.

What we want to acquire with the study are all the answers that we do not have today to such substantive questions as:

- the nature of the mosaic, that is, how and with what materials it was made;
- its history, from the time of its creation to the events that have occurred up to the present day, including past catastrophic events and restorations;
- the interrelationship between the nature of the mosaic, historical events, the environment and their consequences;
- the current state and ongoing processes of deterioration.

An important role in the study phase will be played by the part devoted to the analysis of materials, archival research (photos, drawings, documents and whatnot) and the collection of bibliographic documentation.

The analysis of materials will consist of the collection and analysis of "original" materials (mortars), salt samples, restoration materials, coloring, and whatever else may become apparent during the documentation and study of the surfaces. These analyses will help conservators in the process of studying the original execution techniques, in identifying and understanding the mechanisms of degradation, in reconstructing the history of the restorations that over time have been superimposed on and within the mosaic surfaces and possibly on the colorings and additions or reconstructions.

Archival and bibliographical research will be used to gather historical photos, drawings, documents, articles, publications, and whatever else can provide information that we will not be able to gather in the course of the analysis of the surfaces but that will help us to answer precisely those questions that the study of the surfaces will confront us with.

For scientific analysis we will rely on specialized laboratories; for archival and bibliographic research we will rely on Georgian archives and libraries.

In addition to all this, the study will provide us with possible questions we do not have today and hopefully further answers. All information collected and elaborated in this phase will serve as bases for the work final report.

#### **D. Executive Conservation Plan.**

The definition of an executive conservation plan must come to terms with some questions that at the present state of our knowledge have not yet been answered. These questions are related to the surrounding environment of the church, its architectural structure, the origin of the aggressors, the state of the mosaic, and the historical events that have changed its nature.

As for environment and structures we leave the field to our architect and engineer colleagues simply expecting that:

- the roof will be rehabilitated;
- water infiltration be eliminated;
- the original rainwater drainage functions be reestablished from the roof level down to the ground;
- That the underground channels for capturing and disposing of rainwater and groundwater be reopened and restored to their original functions;

Referring instead to the mosaic more specifically, some of the questions still open on the table include:

- the nature of the salts and their origin;
- the consistency of the original materials, from the tiles to the bedding and structural mortars;
- the origin, type and extent of the detachments between the mosaic and the preparation layers;
- severity and extent of salt crystallization damage within the body of the tesserae with particular reference to the condition of the gold and silver tesserae *cartellina*;
- quantification and location of the gypsum-based consolidations whose presence we have visually identified and whose verbal confirmation we have received from the restorer Mr Vladimer (Lado) Gurgenadze;
- the function now performed by the large number of metal restoration pins inserted in the 1990s and before;
- the state of the areas detached and reapplied during previous restorations;
- the state of the restoration additions;
- the state of the lower areas of the apse where the mosaic was replaced with pictorial reproductions.

All of these questions, along with others that will surely come in the course of the study, will have direct consequences for technical operational choices. One example is how new salt contamination can be inhibited; or how and to what extent extractions will have to be performed; or whether different procedures for stabilizing or precipitating salts will have to be identified in parallel.

Continuing always in the series of examples, we have to ask ourselves to what extent it will be appropriate to fill the voids currently generated by the detachments between the preparatory layers since, at the moment, it is precisely these voids that interrupt the migration of salts to the mosaic surface.

Or, what will be the best decision vis-à-vis the numerous metal restoration pins?

Same question for mosaic restored areas that have curvatures that are not compatible with the original.

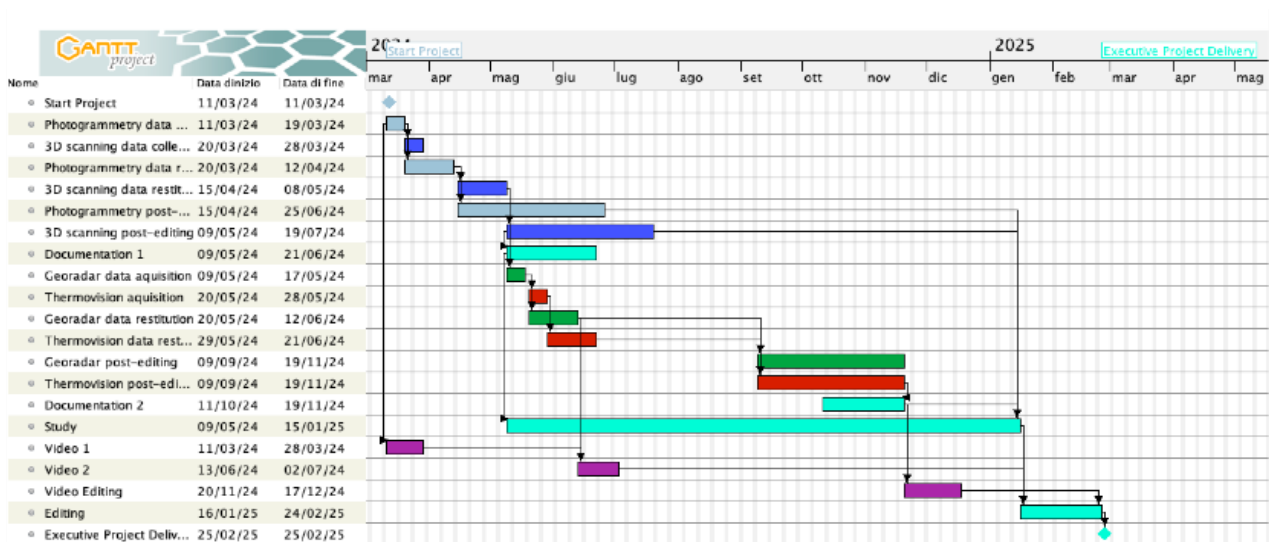
Answers to all the above questions, along with the documentation of the state of surfaces and structures, with the interpretation of study data, together with the newly acquired confidence with the mosaic, the church, the monastery and the sites, will constitute the executive technical plan for the conservation intervention. This will include the technical procedures to be carried out, the topographic specification of where the single operations will be needed, materials and tools, time-tables and costs.

A high resolution video will illustrate the entire process with the double objective to record and document all the steps of the process and to facilitate the dissemination of the efforts that the Gelati Rehabilitation Committee is doing for the safeguard of this important site.

### E. Time and cost

The time needed to complete the above process is 12 months from spring 2024. This estimate includes the final processing of all instrumental data and the production of the conservation study and executive plan.

The sum requested for the implementation of the above program is €\_\_\_\_\_. The figure is intended as a lump sum and includes all requested expense items, including travel, lodging, materials, diagnostics, documentation, and specialists' fees.



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