Governance and Management of the Holy Edicule Rehabilitation Project

Antonia Moropoulou[1] and Nikolaos Moropoulos[2(✉)]

[1] School of Chemical Engineering, NTUA, Athens, Greece
[2] Athens, Greece
nikolaos.moropoulos@gmail.com

Abstract. This paper presents the key aspects of Governance and Management of the project that rehabilitated, reinforced and conserved the Holy Edicule in the Holy Church of the Resurrection in Jerusalem. The overall approach was based on the continuous communication and collaboration with the three Christian communities who share the principal responsibility for the Church of the Holy Sepulchre. This was combined with full transparency on all aspects of the project and intense publicity and external communication so that the progress of the work would be shared and publicized to the media of the world at large. The Church of the Holy Sepulchre and the Holy Edicule have been monuments of ecumenical love and devotion throughout the centuries and we wanted to accentuate this by making the project available to the world. The coordination of the scientific and the managerial team was founded on frequent meetings where all key people would participate and contribute to the resolution of the issues and sound decision making. The quality of the work and the decision making was made possible by the analysis and storage of all emergent data with the full deployment of scientific equipment and digital technologies. The high level of uncertainty in the first four months of the project made it necessary to adopt an agile approach to decision making and management. The stakeholders and the project teams should be ready and able to respond quickly to emergent data about the monument and its features, by making the necessary adjustments to the project plan, schedule and budget, and ensuring that we would put the knowledge gained to good use. The project was successfully completed on time and with a small increase of total expenditure compared to the original budget.

Keywords: Governance · Management · Project · Holy · Edicule · Rehabilitation

1 Introduction

"Wednesday, March 22, 2017, was an historic day in the long history of the Basilica of the Holy Sepulchre in Jerusalem. That morning, an ecumenical celebration marked the end of the restoration work on the Edicule that encloses the remains of the tomb of the Risen Jesus." The Holy Land Review [1]

The Church of the Holy Resurrection in Jerusalem was originally constructed in the fourth century over a tomb that is universally accepted as the burial place of Christ.

A. Moropoulou et al. (Eds.): TMM_CH 2018, CCIS 961, pp. 78–102, 2019.
https://doi.org/10.1007/978-3-030-12957-6_6

The rock-cut tomb is enclosed in an Edicule (small edifice), which lies inside the Rotunda of the church. The current Edicule is the fourth structure to have covered the tomb since the construction of the church in the fourth century. The present Edicule was built by a Greek architect, Nikolaos Komnenos (1770–1821) in 1808–10, following a fire. Under his supervision, a local workforce carried out extensive repairs of the damaged church and rebuilt the Edicule from its foundations. The structure, like previous ones, encloses two spaces: The Tomb Chamber, to the west, to which access is gained through the Chapel of the Angel, to the east. The Tomb Chamber is surmounted by a cupola. Komnenos' work extended to the interior of the Chapel of the Angel and the vaulting over the Tomb Chamber, but it did not include the marble cladding inside the Tomb Chamber, which had survived the fire intact.

In 2015, the extensive deformations of the monument and the steel cage put around it by the British in 1947 to support it, led the Israeli police to shut it down as it was considered to be unsafe for the pilgrims. Following this incident, the Greek Orthodox Patriarch Theophilos III, invited the National Technical University of Athens to perform a study to document the Edicule, diagnose the conditions affecting its preservation, and propose an appropriate course of action for its future. A relevant framework agreement was signed, and the study was completed in January 2016.

The project's scope was defined as the implementation of the 2016 NTUA study, and it became possible following the common agreement between the three principal churches which act as custodians of the Church of the Holy Sepulchre. This is a historic agreement as it is the first time for more than 200 years that the three custodians have agreed to perform significant interventions on the monument.

After the necessary preparations, the project started in June 2016 and ended successfully in March 2017.

The second section of the paper (after the introduction) highlights project governance, the third section presents the scientific and managerial roles, whereas the fourth section focuses on the construction site team and its structure.

The fifth section presents some of the project's constraints, and the sixth outlines the key attributes of the management approach. The seventh section deals with structuring and scheduling of the work, and the eighth on key project processes.

The penultimate section presents key aspects of the project's publicity and external communications, followed by the results. The conclusions wrap up the paper.

2 Project Governance

The common agreement of the three principal Churches acting as custodians of the Church of the Holy Sepulchre provided the framework for the governance of the project, outlining the formation and operation of the Project Owners' Committee and the Steering Committee.

2.1 The Stakeholders

The three principal stakeholders of the project were the three Christian Churches which act as custodians of the Church of the Holy Sepulchre: the Greek Orthodox Patriarchate

of Jerusalem, the Franciscan Order, and the Armenian Patriarchate of Jerusalem. The three churches will be called for brevity "the status quo communities", in reference to the first official declaration freezing the rights of worship and possession of the religious denominations within the church of the Holy Sepulchre, which was issued in 1852 by Sultan Abdul Mejid, in a decree known as the Status Quo.

They formed the Project Owners' Committee, the highest authority of the project, which is presented in a section below.

Continuous communication with the status quo communities and quick resolution of emerging issues was a critical success factor for the project. The project had a tight deadline and we could not afford any delays in the decision-making process. We tackled this challenge successfully on most occasions, but failed in some, and the relevant issue dragged on. Regardless of that, we were able to contain the delays and there was no overall negative impact on the project.

World Monuments Fund (WMF), a private, international, not-for-profit organization, supported the restoration project. Financial support through WMF, thanks to two individual donors, made the organization a key stakeholder, represented in the project Steering Committee. Funds were released to the project in installments, based on a timeline, and contingent on the progress of the project. Progress was satisfactory throughout, and all installments were released on time. While the project was ongoing, WMF was able to secure additional funds and increase its initial contribution to the project. In addition to lead financial support, WMF provided an additional layer of technical oversight for the project.

National Geographic Society, a global non-profit organization, was the project stakeholder engaged in the project's external communication and publicity.

2.2 The Common Agreement

In March 2016 all three principal custodians of the Church of the Holy Sepulchre: The Greek Orthodox Patriarchate of Jerusalem, the Franciscan Order in the Holy Land, and the Armenian Patriarchate in Jerusalem approved of the project as per their "**Common Agreement**" dated 22nd March 2016 [2].

The common agreement was signed by the at the time heads of the three "status quo communities":

- the Patriarch of Jerusalem, His Beatitude, Theophilos III,
- the Custos of the Holy Land, His Paternity, Most. Rev. Fr Pierbattista Pizzaballa, and
- the Armenian Patriarch in Jerusalem, His Beatitude, Archbishop Nourhan Manougian

On the 24th June 2016, Fr. Pierbattista Pizzaballa, was appointed titular Archbishop of Verbe, and Apostolic Administrator of Jerusalem. He was replaced by Fr. Francesco Patton.

We will quote the common agreement in various sections of this paper as it provided the basic framework for the governance of the project.

2.3 Project Owners' Committee

The Project's highest authority was the Project Owners' Committee (POC). According to the "Common Agreement":

> *"2.1 The meeting of the Heads of the three major Communities performing as "project owners' committee" (POC) will undertake the responsibility for all strategic decision making."*

The heads of the three "status quo communities" were the POC members:

- the Patriarch of Jerusalem, His Beatitude, Theophilos III,
- the Custos of the Holy Land, His Paternity, Most. Rev. Fr Francesco Patton, and
- the Armenian Patriarch in Jerusalem, His Beatitude, Archbishop Nourhan Manougian

The chairman of the committee, His Beatitude Theophilos III, Patriarch of Jerusalem, was also the chairman of the project steering committee.

The Project Owners' Committee had complete authority over the project and its decisions were irrevocable. The committee convened at the start of the project, its middle, and at the end of the project.

Following each Steering Committee meeting, His Beatitude briefed the project owners' committee on the proceedings and the decisions. All Steering Committee decisions were sanctioned by the project owners' committee.

There have been regular and ad hoc POC meetings.

The regular meetings took place immediately after the Steering Committee meetings, as on the 20th July 2016.

Ad hoc meetings took place to address and resolve issues. Examples are the meetings of the 26th May 2016 (project working hours and community religious services) and 18th October 2016 (three-day closure of the Holy Edicule - see also the "Project Constraints" section.)

2.4 Steering Committee

According to the "Common Agreement":

> *"2.7 The (POC) project owners' Committee authorizes the Steering Committee (SC) to cope with the current problems of integrated project governance with the participation of the CSS (Chief Scientific Supervisor), the CSM (Construction Site Manager) and the PM (Project Manager). The Patriarch of Jerusalem or His Deputy is chairing the SC with the obligation to inform the project owners Committee."*

The Steering Committee (SC) of the Project had the highest governing authority. It convened regularly to review progress, identify and address project issues and make decisions.

The Committee was chaired by His Beatitude Theophilos III, Patriarch of the Holy City of Jerusalem and All Palestine. The SC had the following seven members in total:

- His Beatitude, Patriarch of Jerusalem, Theophilos III, Chairman
- Archbishop Aristarchos of Constantina, Deputy Chairman
- Archbishop Isidoros of Hierapolis, substitute Deputy Chairman

- Prof. A. Moropoulou, Chief Supervising Scientist, Member
- Dr. Th. Mitropoulos, Construction Site Manager, Member
- Prof. Harris Mouzakis, Deputy Construction Site Manager, Member
- Nikolaos Moropoulos, Project Manager, Member

Depending on the agenda of the SC meeting, the Chairman invited representatives of the religious communities, donor representatives, Government officials, as well as project team members to participate in the relevant proceedings.

The first meeting of the Steering Committee was also the Project's Kick Off meeting and it took place on the 20th May 2016.

The five SC meetings that followed had two parts: in the first part Professor Antonia Moropoulou, the chief scientific supervisor of the project, presented the scientific report of the relevant period; in the second part Mr. Nikolaos Moropoulos, the project manager, presented the relevant progress report.

There have been six Steering Committee meetings in the period from May 2016 to March 2017 as follows:

- Final Meeting – 22 March 2017
- Fifth Meeting – 21 February 2017
- Fourth Meeting – 16 December 2016
- Third Meeting – 7 October 2016
- Second Meeting – 21 July 2016
- First Meeting – 20 May 2016

2.5 World Monuments Fund (WMF)

In addition to the three Status Quo communities, World Monuments Fund was the main donor to the project and a key project stakeholder. An agreement to that effect was signed between the Greek Orthodox Patriarchate of Jerusalem and WMF in July 2016.

Support from WMF was made possible thanks to a contribution from Mica Ertegun, a longtime donor and member of the Board of Trustees of the organization. The project received USD 1,100,000 from Mica Ertegun through WMF, a contribution which formed the basis of the July 2016 agreement. Additional funding of USD 150,000 was provided by Jack Shear, another longtime donor and Trustee, in December 2016.

Yiannis Avramides, Program Manager, was responsible for reviewing all progress reports and liaising with the Project Manager on behalf of WMF.

In addition to WMF, copies of all Regular Progress Reports were sent by the Project Manager to Mrs. Linda Wachner of New York and to Fr. Alex Karloutsos, a Protopresbyter of the Ecumenical Patriarchate and a member of the staff of the Greek Orthodox Archdiocese of America with responsibility for Public Affairs.

According to the agreement between the Greek Orthodox Patriarchate of Jerusalem and WMF, disbursement of funds was contingent upon timely submission of reports, according to a mutually agreed-upon schedule, and review and approval of project reports by WMF staff.

In the course of the project all reports were issued on time, and were approved by WMF staff, and as a result the disbursement of funds throughout the project proceeded according to schedule.

In addition, WMF representatives were invited and participated in all Steering Committee meetings, with the exception of the first meeting on May 20, 2016, which took place prior to the signing of the agreement.

Mrs. Ertegun, Mr. Shear, Mrs. Wachner, Fr. Karloutsos, Mrs. Bonnie Burnham (President Emerita of World Monuments Fund), and Mr. Avramides all attended the project closure and completion ceremonies on March 22, 2017 in Jerusalem.

3 Scientific and Management Roles

The project engaged scientists, conservators, restorers and masons. Coordinating the teams was a major challenge. It was successfully undertaken by the Chief Scientific Supervisor and the Project Manager. The scientific team prepared, analyzed and made available all the necessary data provided by the scientific equipment in place and the construction site work as it progressed. The key scientific and management project officials were then able to make relevant decisions. The decisions were made on a timely fashion and no delays were observed in this respect.

3.1 Scientific Roles

The scientific supervision of the project was one of the key success factors. According to the Common Agreement:

> *"2.5 The Scientific Supervision will be performed by the interdisciplinary NTUA Study Team, headed by Professor A. Moropoulou (CSS). She has the overall responsibility for the scientific monitoring of the work and is the director of the interdisciplinary scientific monitoring laboratory which will be set up in the construction site. In collaboration with the interdisciplinary NTUA scientific team, the Project Manager (PM) and the CSM she will monitor and control the work."*

The key roles in the project from a scientific perspective were the following:

- Chief Supervising Scientist (CSci), NTUA Professor A. Moropoulou. She had the overall responsibility for the scientific monitoring of the work and was the director of the interdisciplinary scientific monitoring laboratory which was set up in the construction site. In collaboration with the interdisciplinary NTUA scientific team, the Project Manager (PM) and the CSM and his deputy she monitored and controlled the work, to ensure it was progressing and completed according to the scientific specifications set by the design study, contributed to the regular progress report and recommended, when necessary, adjustments to the design guidelines and directives, the project's schedule and the budget. When necessary she escalated the issues and/or risks to the Project Manager. She was responsible to communicate the scientific project progress to the International Community, to disseminate innovation aspects, and promote on-site training and education. The role of K. Labropoulos, E. Delegou, M. Apostolopoulou, Emm. Alexakis from the Scientific team CSS Office to the technical editing of the scientific reports, as well as, the executive role of A. Lampropoulou at the dissemination and education plan and documentation were highly appreciated.

- CSS was acting as well as director of materials, repair, reinforcement and conservation interventions (DMC). Professor A. Moropoulou. She had the overall responsibility for the materials and conservation interventions, as well as the measurement of the impact and assessment of the work done. She addressed relevant issues and risks.
- Director of rehabilitation (DRH). Professor Emm. Korres. He had the overall responsibility for the rehabilitation work and addressed relevant issues and risks. When necessary, he escalated the issues and/or risks to the Chief Supervising Scientist.
- Director of structural assessment (DSA). Professor C. Spyrakos. He had the overall responsibility for the reinforcement work and addressed relevant issues and risks. When necessary, he escalated the issues and/or risks to the Chief Supervising Scientist.
- Director of geometric documentation (DGD). Professor Georgopoulos. He had the overall responsibility for the geometric documentation of the work done and addressed relevant issues and risks. When necessary, he escalated the issues and/or risks to the Chief Supervising Scientist.

The National Technical University of Athens deployed a large team of scientists to work under the leadership of the five directors. The complete is shown in Appendix 1.

3.2 Management Roles

This section presents the project's management roles. According to the Common Agreement:

> *"2.6 The project management will implement the project charter, report on the work progress according to the schedule and budget and coordinate the construction and the scientific supervision teams in order to complete the work successfully and on time and to manage risks on regular basis."*

The key roles in the project from a project management perspective were the following:

- Construction Site Manager (CSM), Dr. Th. Mitropoulos, Chief Engineer of the Holy Sepulchre Common Technical Bureau. The CTB (Common Technical Bureau of the Church of the Holy Sepulchre), staffed by three Architects by the three Communities, was responsible for overseeing the execution of the project so that it followed the scientific studies and directives set by the National Technical University of Athens.
- The CSM had the overall responsibility for the construction site's operation within the health and safety directives set forward by the relevant authorities. He has been working closely with the especially appointed "Safety Advisor", in implementing all local regulations and guidelines, while adhering to the laws of the country of Israel. He was supported in his work by the Deputy CSM.
- Deputy Construction Site Manager (dCSM), Professor H. Mouzakis. He had the overall responsibility for the implementation of the project's engineering design and the correct use of all the facilities and equipment in the construction site. He also

assumed the role of the Superintendent of all construction work. He worked closely with the authorized construction site manager and the team leader of the conservation team to whom he delegated tasks and responsibilities as the needs of the project dictated.

- Project Manager (PM), Mr. Nikolaos Moropoulos. He had the responsibility to coordinate the construction and the scientific supervision teams to successfully complete the work. The project manager, working with the Chief Supervising Scientist, the Construction Site Manager, his deputy and the other project officers maintained the project schedule, cash flow and budget and prepared the regular progress reports. He coordinated the teams in identifying and addressing the project issues and risks on a regular basis and ensured that the project standards and procedures were adhered to.

3.3 Project Management Office

The Project Manager was supported in his work by the Greek Orthodox Patriarchate's (GOP) Secretariat which maintained the project archive and processed all documents in the purchasing cycle. This support was invaluable, especially if one considers that the project workload was carried by the Secretariat in addition to its regular work load, which is considerable.

The Secretariat organized all Steering Committee and Financial Committee meetings, the transfers of team members to/from the Tel Aviv airport, the relevant hotel reservations, as well as the Monument's Inauguration events of March 2017.

The indefatigable Archbishop Aristarchos of Constantina, Elder Secretary-General of the Greek Orthodox Patriarchate, led and continuously supported the effort of the Secretariat team.

Equally valuable was the support of the Greek Orthodox Patriarchate's Financial Committee who was managing the donations to the project.

In addition to the above resources of the Greek Orthodox Patriarchate, a major contribution to the Project Management Office was made by the Athens Greece based NTUA team of the Chief Scientific Supervisor (CSS). The team compiled all technical specifications for the equipment and materials that were to be acquired in cooperation – as needed - with the Construction Site Management Team and conducted the necessary market research to identify reliable suppliers who would then be invited by the GOP Secretariat to submit a quotation in the context of the purchasing cycle (see also the section on supplier management).

CSS's team also handled the planning of the project team's travel to/from Jerusalem. They compiled and maintained a weekly schedule and liaised with the GOP Secretariat and Aegean Airlines, the air transportation sponsor of the project in order to make the air travel bookings and issue the relevant tickets. The efforts of the CSS relevant administrator Mrs. Georgia Skoulaki and her deputy Ms. Katerina Kolaiti are greatly appreciated.

3.4 Common Technical Bureau

"2.4 The CTB (Common Technical Bureau of the Church of the Holy Sepulcher), staffed by three Architects by the three Communities, will be responsible for the correct execution of the project according to the scientific studies and directives realized by the National Technical University of Athens. The representative of the Common Technical Bureau of the Church of the Holy Sepulcher (Dr. Theodosios Mitropoulos), as Construction Site Manager (CSM), will be responsible for the construction site's operation within the directives set forward by the relevant authorities." (The Common Agreement)

The members of the Common Technical Bureau who have been involved and made contribution to the project are:

- Dr. Theodosios Mitropoulos, Architect, representing the Greek Orthodox Patriarchate of Jerusalem
- Mr. Osama Hamdan, Architect, representing the Custody
- Ms. Carla Benelli, Art Historian, representing the Custody, and
- Irene Badalian, Architect, representing the Armenian Patriarchate

The Chief Scientific Supervisor, Prof. A. Moropoulou, met regularly with the Common Technical Bureau and consulted with them regarding the materials used and the relevant interventions in the Edicule. She also cooperated with them in addressing the problem that emerged regarding "Pavement preservation and rehabilitation" (see section on "Additional Problems".)

The Governance and Management structure of the project is shown in Fig. 1.

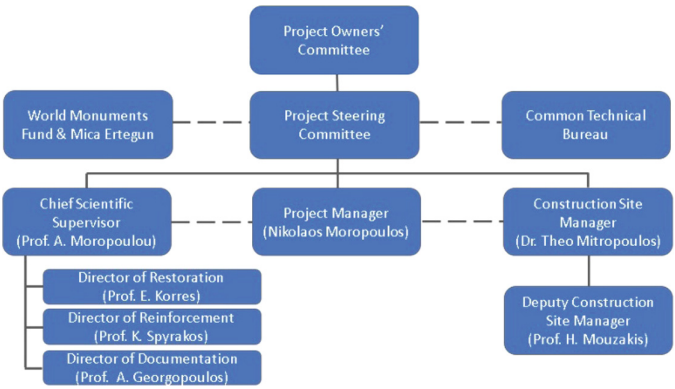

Fig. 1. Project governance and organisation

4 The Construction Site Team

The construction site team comprised the restorers and masons' team, the conservators' team, and the safety advisor of the project. The team was fully deployed in the second week of June 2016. As the project progressed, some restructuring and strengthening was necessary.

4.1 Restorers and Masons Team

V. Zafeiris, Civil Engineer, Team Leader, Authorised Construction Site Manager
G. Anastasiadis, Senior Marble Mason
G. Palamaris, Marble Mason
I. Andritsopoulos, restorer
C. Theodorakis, restorer
A. Karydis, restorer
P. Chaloftis, restorer

Team Restructuring (26 November 2016)
There have been some occasions where the construction site team had to be restructured to address critical project requirements. An example is the restructuring that was implemented at the end of November 2016 to meet the deadlines of a critical path activity, the reinstalling of the external stones. This was a show-stopper activity. Missing the deadline for its completion would mean that the project would miss the 22nd March 2017 project completion deadline.

As stated in the Construction Site Management Meeting Minutes of the 26th November 2016:

> *"Effective immediately, Mr. G. Palamaris and Mr. Th. Carydis will work as a team with Mr. G. Anastassiadis. As soon as the work on the staircases by the entrance of the Edicule is complete and the titanium mesh is placed in its vertical position, the team will be enhanced by the addition of Mr. Ch. Theodorakis and Mr. P. Chaloftis. This restructuring will remain in effect until the 7th February or thereafter."*

This change was necessary to support the 'Preparation for reinstalling the external stones' task. As stated in the same meeting's minutes:

> *"All the stones of zones Delta, Epsilon and Zeta will be placed by the relevant panel, and then they will be positioned to their final panel position, marked accordingly, and prepared for anchoring as needed. Once this "mock" reinstalling is done, each stone will be returned to the area by the panel. This task will be done from the 1st to the 10th December. The team of the task comprises G. Anastassiadis, G. Palamaris, and Th. Carydis. Ch. Theodorakis and P. Chaloftis will join the team once they finish their other assignments."*

4.2 Conservators Team

Th. Mavridis, M.Sc., Conservator, Greek Ministry of Culture, Team Leader
M. Troullinos, Senior Conservator (joined in early January 2017)
K. Karathanou, M.Sc. Archaeol.- Cons., Greek Ministry of Culture
Am. Troullinou, Conservator (joined in early January 2017)
Ar. Troullinou, Conservator (joined in early January 2017)

Team Strengthening
In early January 2017 the conservation workload exceeded the significantly capacity of the conservators' team. To address the workload peak, three experienced conservators (M. Troullinos, Am. Troullinou, Ar. Troullinou) joined the team. This resulted in the successful and timely completion of the conservation tasks prior to the 22nd March deadline.

4.3 Safety Advisor

In early June 2016, the project engaged Mr. Uri Agame as safety advisor. The first working permit for the project was issued by Mr. Agame on the 14th June 2016.

Mr. Agame did an excellent job and ensured that the safety of the construction site was properly maintained and provided for throughout the project. There have been no safety incidents.

The construction site team structure is shown in Fig. 2.

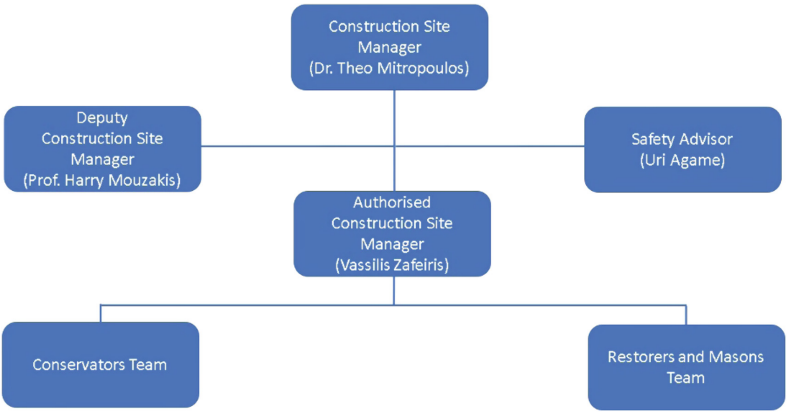

Fig. 2. Construction site team

5 Project Constraints

> *"2.3 b. The works, which will be completed in approximately eight months to one year, will not prevent the religious services in the Holy Sepulcher or, more specifically, in the Edicule, nor prevent the access of pilgrims into these places." (The Common Agreement)*

The project was implemented under a set of constraints, the most important of which was the completion deadline. The Holy Edicule had to be delivered to the status quo communities on the 22nd March 2017 so that the Easter ceremonies would go ahead as always. The deadline was met. The restored and conserved Edicule was delivered to the status quo communities on the 22nd March 2017, ten months after the start of the project.

Another important constraint was the one stated in the common agreement. The project should be implemented in a way that the religious services would proceed as normal and the pilgrims would be able to access and visit the Holy Edicule.

The religious services constraint was met but there were some difficulties, especially at the beginning, due to inadequate communication. As mentioned in the Construction Site Meeting Minutes (27th May 2016), the following incident took place on the 26th May 2016:

"Apparently, members of the Franciscan Order in the Church of the Holy Sepulchre were not aware of the work schedule that has been approved by the Steering Committee of the 20th May 2016, and repeatedly stopped the work of moving the construction site equipment in the Church designated areas."

His Beatitude Theophilos III, Patriarch of Jerusalem, was notified and he instructed Archbishop Isidoros, the Greek Orthodox Superior of the Holy Sepulchre Church, to organize a meeting with the status quo communities in the Church of the Holy Sepulchre, to explain to them the work schedule and ask for their cooperation.

The pilgrims' access constraint was also met. Work on the Edicule took place during the night, from 7pm to 6am every day. The only period the Edicule was closed to the public was from 1800 h of the 26th October 2016 to 0600 h of the 29th October 2016. This was necessary to make necessary interventions in the Holy Tomb and the Holy Rock.

To ensure the full support of the status quo communities, the Chief Scientific Supervisor, Prof. Moropoulou, met with their leaders in Jerusalem on Tuesday 18th October 2016, in the presence of the Chief Secretary of the Greek Orthodox Patriarchate of Jerusalem, Archbishop Aristarchus of Constantia.

Another set of constraints is relevant to space. To operate a construction site, we needed storage space for the equipment and materials. The space available inside the Church of the Holy Sepulchre was not big enough, so most of the stones that were used in the restoration had to be left in the piazza outside the Church. Moving these heavy stones in an area without the relevant infrastructure was time consuming and required to hire laborers to do the job, as the construction site team was not set up for this type of task. In addition, extra care had to be taken to avoid accidents.

The location of the Church posed another set of constraints to the project. Equipment and materials would be delivered to Jaffa Gate (see Fig. 3) and would have to be transported to the Church of the Holy sepulcher using small vehicles that can negotiate the bumpy narrow passages of Jerusalem's Old Town.

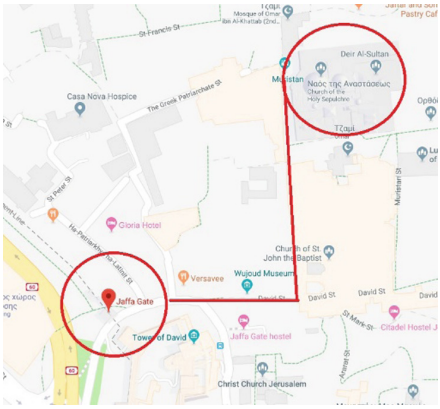

Fig. 3. From Jaffa Gate to the Holy Sepulchre

Another critical constraint was the existence of the Copts' chapel in the western side of the monument. To proceed with the project work, the chapel had to be repositioned. This entailed communication of His Beatitude Theophilos III, Patriarch of Jerusalem with the Patriarch of the Copts to explain the necessity of the move and ensure that the tentative site where the chapel would be removed, on the southern side of the monument, would function equally well as the original. A tentative structure was put in place and the chapel was successfully repositioned on the 18th July 2016.

6 Management Approach

The approach we followed in project management had the following attributes:

Transparency. All project information was available to all stakeholders continuously during the project. Key scientific, managerial, and financial data were presented and shared during the steering committee meetings. All the relevant project documents were released on time to the status quo communities.

Timeliness. All members of the joint scientific and management team had an acute sense of urgency and strived to perform their tasks in a timely fashion. Estimating was particularly difficult especially in the first half of the project, where we had no hard data of the team's performance on which we could base our estimates. To counter this uncertainty, we inserted time buffers in the project schedule and monitored planned versus actual on a continuous basis. More often than not, critical factors for the completion of tasks were related to the availability of the required materials and equipment.

Effectiveness. The teams were given all the required resources in order to get the job done. They had to ensure good enough execution of their tasks in spite of the inherent uncertainties. This implies that the team members had to exercise their initiative and adjust on the spot, if they assessed that this was the right thing to do. The teams were empowered to do so.

Participation. The key team members participated in the construction site management meeting where all project issues were discussed and decided upon.

Collaboration. For the project to meet its deadlines it was necessary for the teams to collaborate as per the project needs. Although the construction site team was properly structured, there were times when this structure was modified in order to allow for tackling key tasks and activities.

Ownership and Accountability. Team members were accountable for the tasks they owned.

Agility. Due to the high level of uncertainty in the first half of the project, it was essential that we were prepared to swiftly adjust our work plan, schedule and effort estimates as new data became available. This continuous learning and adjustment were essential to the project's success. The integrated interdisciplinary decision making we deployed was critical in enabling agility [7].

7 Structuring and Scheduling the Work

Determining the elements and components of the monument and the relevant interventions, was the basis of the project's work breakdown structure. Scheduling of the work was iterative and continuously considered the new data that emerged as work progressed.

7.1 Work Breakdown Structure

The project work breakdown structure was primarily defined based as a set of interventions on elements and components of the monument defined using the plan shown on Fig. 4 and the façade shown on Fig. 5.

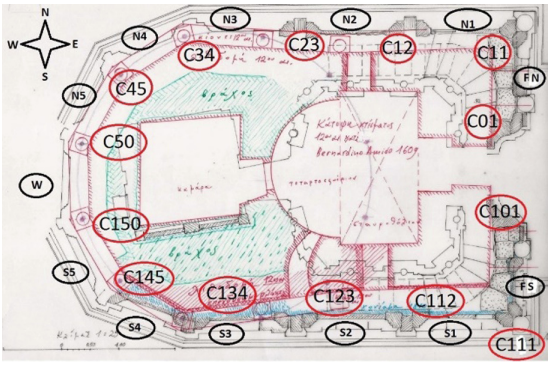

Fig. 4. Holy Edicule plan. Based on Prof. Korres's drawing [8]. (Color figure online)

In terms of vertical elements, the monument comprises 13 vertical panels (bays) (marked in black ellipses), 2 staircases and 14 columns (marked in red ellipses).

In terms of horizontal layers, the monument comprises 15 layers, denoted by the Greek letters from Alpha to Omicron, as shown on the left of Fig. 5. These layers were grouped into three zones, starting from the ground up.

The following components of the monument were also included in the project work breakdown structure:

- Additional lateral support
- Retaining structure to support the western side
- The British Steel Cage
- Holy Tomb Chamber
- Myrrh bearers wall-painting in the Holy Tomb Chamber
- Onion Dome
- Chapel of the Angel

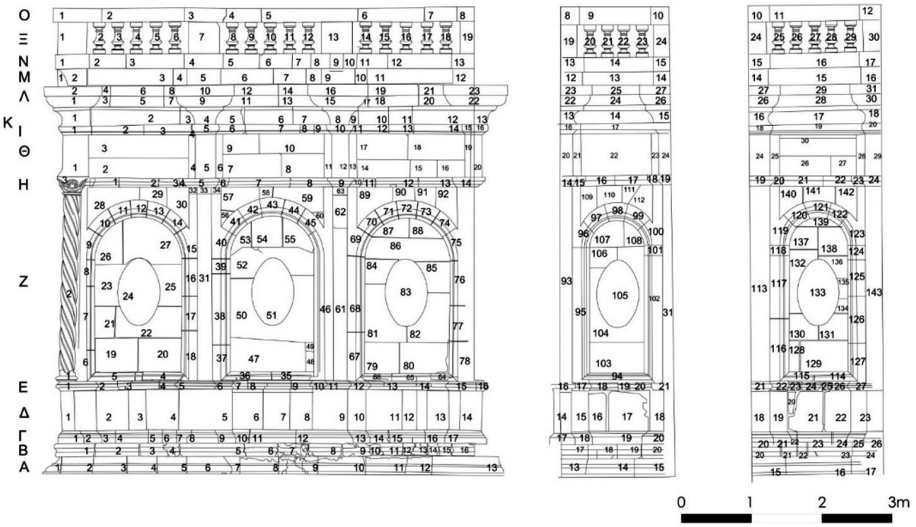

Fig. 5. Facade of the north side. See Giannakopoulos [6]

7.2 Scheduling

A preliminary schedule was drafted at the start of the project based on the technical studies and the information supplied by the non-destructive methods.

However, this was tentative, and all members of the team were aware of this, as we knew from experience that only when we remove the external stones we would have a clear picture of the tasks in hand.

The first major additional activity that was added to the project was the installation of additional lateral support, as the existing steel grid was severely deformed and might not hold the monument once we removed the external stones.

Following that, when we removed the stones from the panels N2 and N3 it became clear that after removing the loose mortar and cleaning the masonry, we would only need to repair the masonry.

A different picture emerged from panels N4, N5, W, S5 and S4, where the masonry was in such a bad state that it had to be completely rebuilt. The rebuilt in turn required that we had to design and install a retaining structure that would hold the upper part of the monument while the restorers rebuilt the masonry of the lower part.

The project schedule was therefore continuously adjusted, to account for the new findings and the relevant additional and/or modified tasks.

In the period from May 2016 to December 2016 the granularity of the schedule was medium. The activities were defined in such a way that they could be assigned to a team (e.g. restorers and masons) and it was the team that would then develop a detailed day by day schedule for implementing the activity.

The granularity changed to fine in December 2016, when we only had three months to complete the project and the level of uncertainty has been reduced substantially. Working with the scientific and the construction teams, we were able to prepare a detailed list of tasks, allocate team members to each, and estimate the time for each task's completion.

To properly update the schedule to include the daily progress of the work, a "Daily Activity Report" would be prepared by the Authorized Construction Site Manager, including the active tasks, the effort extended to each by each assigned team member, and any issues that were relevant. The Project manager would review the Daily Activity Report and update the project schedule to reflect the progress. All relevant issues were either addressed on the spot, if they were simple, or discussed and resolved in the Construction Site Meeting.

8 Project Processes

Supplier management was one of the project's critical processes as the timely supply of equipment and materials was linked to the project milestones. The regular construction site management meeting developed into a key project process for issue identification and resolution. Scientific and progress reporting was a standard feature of all steering committee meetings. Equally important were financial reports and meetings of the project's financial committee.

8.1 Supplier Management

There were multiple issues with the suppliers of the project. The first issue had to do with a monopoly.

In the transport of materials and equipment from Jaffa Gate to the Church of the Holy Sepulchre, we did not have a choice, as there is only one operator in Jerusalem's Old Town. It was necessary to spend time to explain to the supplier the procedure to be followed every time we used them. They key issue is that upon completion of the transport, we had to receive from the supplier a signed statement of the work effort and transport cost, and approve it on the spot, or reject it, asking the mover to make changes. This was new to the mover, who until then only issued an invoice without a document that stated the services received and the relevant quantification.

Eventually the mover agreed to follow the procedure, but 'negotiating' the numbers on the 'services received' document was always an issue. The help and support of Archbishop Isidoros, the Greek Orthodox Superior of the Holy Sepulchre Church, in achieving this was decisive.

The second issue had to do with the timing of the works of the major local supplier of construction services. We had trouble in communicating to the supplier the deadlines of the project. A typical example was the installation of additional lateral support. We experienced a deadline creep and had to summon the representative of the supplier to a meeting with His Beatitude, Theophilos III, Patriarch of Jerusalem. The issue was eventually resolved, but by then we had suffered a delay. Fortunately, this occurred early in the project and we were able to catch up and absorb the delay.

Another problem we experienced with the major supplier was the quality of the invoices. Some of them were obscure and we could not easily match them to our purchase orders and the relevant deliveries. As a result, payment was withheld and the Project Manager, the Construction Site Manager, his Deputy and the Authorized Construction Site Manager had to spend considerable time cross checking and proofing

the invoices. Eventually we held a meeting in early January 2017 to clear the backlog of pending invoices and ensure that all the documents were in order.

Another type of issue we experienced with local suppliers was that the materials and/or equipment we required were not available and had to be ordered or we had to order another item. In addition to the inconvenience, this complication resulted in loss of time and potentially additional cost.

The following excerpt from the minutes of a construction site meeting is indicative.

> *"Assuming that DS Construction deliver the steel beams and the Bedec and Hilti tools and equipment are also delivered by the 18th August, we will be in a position to start the rebuilding work on the 21st August." (Minutes of the Construction Site Management Meeting of the 10th August 2016.)*

The timely delivery of materials purchased from suppliers abroad and shipped to Jerusalem was also an issue. The following excerpt from the minutes of a construction site meeting is indicative.

> *"The crucial milestone for the continuation of the project is the delivery of the titanium bars and anchors by the 15th November 2016, so that the anchoring of the external columns can begin on the 16th November 2016. This is on the project critical path." (Minutes of the Construction Site Management Meeting of the 30th October 2016.)*

8.2 Construction Site Management Meeting

A key project process has been the Construction Site Management meeting. The meeting took place on average once every two weeks and resolved all pending issues or referred them to the scientific committee and/or the Chairman of the Steering Committee, as appropriate. A total of 28 meetings took place during the project.

The weekly meeting had the following standard agenda:

- Review of progress
- Review of issues
- Any other business
- Next meeting

The Construction Site Management meeting participants were the following:

- Prof. Antonia Moropoulou, Chief Supervising Scientist
- Dr. Th. Mitropoulos, Construction Site Manager
- Prof. Harry Mouzakis, Deputy Construction Site Manager
- Mr. Vassileios Zafeiris, Authorized Construction Site Manager
- Mr. Theodore Mavridis, Conservators Team Leader
- Mr. George Anastassiadis, Senior Stonemason
- Mr. Michail Troullinos, Senior Conservator (since January 2017)
- Mr. Nikolaos Moropoulos, Project Manager

The Construction Site Meeting was the key coordination and communication process in the project. It enabled the scientific and the construction site team to create a common ground, identify and effectively address the project's issues. It also functioned in a way

that facilitated decision making and avoided delays due to internal miscommunication and misunderstandings.

The smooth and effective functioning of the Construction Site Meeting did not happen overnight. The first couple of months were trying and challenging, as each participant in the meeting came to it with different experiences and daily practice routines.

It was the sharing of a common vision and aspiration, to deliver the project on time and within the required quality, that brought all these different parties together and helped forge a common ground.

The leadership provided by His Beatitude, Theophilos III, Patriarch of Jerusalem, focused our minds on the task in hand and away from separate and divisive agendas.

To maximize the quality of the process, we invited to the meeting the senior stone mason, Mr. Anastassiadis, who was a key member of the team and made a significant contribution to each meeting. We did the same with the senior conservator Mr. Troullinos, when he joined the team in January 2017.

8.3 Regular Progress Reporting

Regular Progress Reports contained the following information:

I. Project Status

- Key achievements of the reporting period
- Improvement opportunities
- Status of tasks due
- Summary of project expenditures

II. Risks and Issues

- Issues
- Risks

III. Area Reports

- Report by the Chief Supervising Scientist
- Report by the Directors of Rehabilitation, Reinforcement, Materials and Conservation Interventions, and Geometric Documentation
- Report by the Construction Site Manager

IV. Decisions

Decision recommendations to be considered by the Steering Committee.

Regular progress reports were prepared and distributed on the following dates:

- 20 May 2016
- 15 July 2016
- 6 October 2016
- 15 December 2016
- 21 February 2017
- 19 March 2017 – Closure Report: Financing and Expenditures

All regular progress reports have been presented during the relevant Steering Committee Meeting (except the last one, because there has not been a relevant meeting) and distributed to the three status quo communities and the WMF.

8.4 Scientific Reporting

A total of four scientific reports have been compiled and delivered to the Steering Committee and the Project Owners' Committee as follows, starting with the second steering committee meeting and then continuing for each steering committee meeting until the completion of the project [3].

- 20th July 2016
- 6th October 2016
- 15th December 2016
- 22nd February 2017

The directors of the scientific team made a presentation of the project results in the context of the project closing meetings of the 22nd March 2017 [4].

In addition to the published reports above, the interdisciplinary team has produced numerous interim reports as the project progressed. An example is the technical report of the 8th of July 2016, regarding the findings following the removal of the first stone slabs. The report was compiled by Prof. M. Korres, Director of Rehabilitation and H. Mouzakis, Deputy Construction Site Manager, and was discussed at a meeting of the scientific team in the presence of the project manager. Decisions were made based on the report's findings.

8.5 Project Funding and Cash Flow

The project was funded by private donors and the status quo communities. At the end of the project the funds were more than adequate for the project needs. Total funding amounted to approximately 3.7 million Euros.

However, the timing of the funds' availability was a parameter that had to be carefully and closely monitored and managed. In its lifecycle, the project was always liquid. There have been a few occasions where cash was tight, but scheduled installments of already secured donations and/or new donations relieved the pressure.

At the beginning of the project the secured funds where approximately one third of the budgeted expenditure. At the end of the first three months of the project the secured funds were approximately half of the project expenditure. The solid progress of the project and the successful intervention in the Holy Tomb and the Holy Rock in October 2016 generated a new momentum in the funding of the project. By January 2017, the secured funds were approaching the full project expenditure.

The Project Manager prepared and maintained the project's cash flow, incorporating the actuals and projecting future inflows and outflows. The cash flow was a topic in all Steering Committee meetings.

8.6 Project Expenditure

Project expenditure was kept under continuous monitoring and control and all relevant information was shared with the stakeholders on a regular base and included in the regular project reports. Ad hoc requests for relevant information were answered in less than one week's time.

Under normal circumstances, the purchasing cycle started with a request for quotation by the Secretariat of the Greek Orthodox Patriarchate. The quotation was reviewed and, if it was considered reasonable, it would be approved by the project manager and the Secretariat would proceed to place a relevant order. On occasions, clarifications and modifications were requested from the supplier.

Purchases from suppliers who enjoyed a position of monopoly, e.g. the Old Town transportation firm, and/or requiring small amounts would be ordered and acquired without following the complete procedure, provided that a project official, e.g. the construction site manager would authorize it. In case of time and materials purchases, the ordering official would secure a document signed by himself and the supplier, detailing the hours worked and other units relevant to the provided service.

All purchases were supported by the relevant invoice. Invoices received were reviewed, matched to the purchased product/service and either approved, or put on hold so that the supplier would provide additional information and/or make changes.

The full documentation of project purchases is today included in the project archive.

Total project expenditure slightly exceeded 3.5 million Euros, an increase of approximately 16% of the initial project budget.

8.7 Financial Reporting and Meetings

The finances of the project were regularly reviewed by a committee coordinated by the Project Manager, comprising representatives of all three status quo communities.

- Brother Dobromir Jasztal, representing the Custody
- Brother David Grenier, representing the Custody
- Brother Athanasius Macora, representing the Custody
- Father Samuel Aghoyan, representing the Armenian Patriarchate
- Father Hovnan Baghdasaryan, representing the Armenian Patriarchate
- Nikolaos Moropoulos, Project Manager

The Project Manager prepared the following financial reports on the respective dates.

- 10 June 2016 – Budget, Cash Flow, Materials, Equipment and Infrastructure Expenditure Memorandum
- 20 July 2016 – Financial Review (PowerPoint Presentation)
- 21 July 2016 – Funding Memorandum
- 30 August 2016 – Funding Memorandum
- 8 September 2016 – Funding Apportioning Approach (PowerPoint Presentation)
- 2 February 2017 – Project Expenditures (prepared following a 31st January 2017 request by the WMF)

The following meetings of the finance committee took place on the respective dates. The relevant finance report(s) were presented and discussed in the meetings.

- Fourth Meeting – 13 February 2017
- Third Meeting – 8 September 2016
- Second Meeting – 20 July 2016
- First Meeting – 20 June 2016

The meetings and/or reports were triggered either by regular reporting and/or specific queries by the communities or the WMF.

As an example, the meeting of the 8th September was triggered by the following query submitted by the Armenian Patriarchate's accounting department.

"The Accounting Department of the Armenians has the below inquiry:

1. The name of the donors and whether all the donations are for restoration of the Church or private to Our Patriarchate. If the donations are for the restoration, they need the total amount so that they calculate how much is the remaining amount until they pay their 1/3.
2. If any of the 3 communities have paid the agreed amount of 350,000 euros discussed in the latest (July) financial meeting. If they have to pay, they need bills of companies so that they transfer the amount."

(email sent by the Secretariat to the Project Manager, 24th August 2016).

The report of 2nd February 2017 was prepared following a request by the WMF Program Manager, Mr. Yiannis Avramides. The report was to detail the project expenditures so that Mrs. Mica Ertegun and the WMF officials would be able to conduct a project review.

The report was well received by the WMF and was subsequently shared with the status quo communities.

9 Publicity and External Communication

The importance of publicity and external communication was clear right from the start of the project. The Church of the Holy Sepulchre has been and continues to be a monument that belongs to humanity regardless of religion, nationality, race. The millions of visitors every year are the living proof of this. Its location in the heart of the Old City of Jerusalem, makes it a monument that unites people and projects the ability of human beings to coexist and share, rather than fight and split.

We experienced the aura of peace and love that cuts through barriers from the first day we were engaged in the project and we felt that it was our obligation to honor the legacy of the monument and make the project transparent to all, providing the necessary publicity and external communication.

We shared this view with the status quo communities and WMF and we received a positive response to the wide and comprehensive publicity and comprehensive communication approach.

This aspect of the project was significantly strengthened when National Geographic Society, a global non-profit organization joined us as our publicity strategic partner and

stakeholder. Gary E. Knell, President and CEO, and Jean Case, Chairman of the Board of Trustees, gave their wholehearted support to the project and committed all the necessary resources so that our project would become the project of the world.

The first major contribution of National Geographic Society (NGS) to the project materialized in October 2016, when the interventions in the Holy Tomb and the Holy Rock took place. NG immortalized the relevant activities with photographs and videos that were publicized with minimal delay.

With their experience in the field and top quality of professionals, led by Fredrik Hiebert, PhD, Archaeologist-in-Residence, NG have given the project worldwide exposure. The articles of Kristin Romey, NG editor and writer, are indicative of the quality and the depth of this coverage.

The NG contribution did not end with the completion of the project. Under the leadership of Kathryn Keane, Vice President of Exhibitions, and in close cooperation with the National Technical University of Athens, the NG team put together a digital exhibition "The Tomb of Christ" in Washington DC. The exhibition is curated by Fredrik Hiebert and is on show until January 2019.

10 Results

The project was successfully completed on time and with a small increase of total expenditure compared to the original budget [5]. In the course of the project we identified some additional problems that were outside its scope but need to be tackled by the status quo communities as they may adversely impact the Holy Edicule and the Church of the Holy Sepulchre at large.

More specifically, studies were carried out by the National Technical University of Athens to prospect and document the underground structures, tunnels, canals, cisterns and cavities in the Rotunda and the Church.

These studies highlighted the need for:

- Foundation Interventions for the underpinning, reinforcement, water and humidity control of the Holy Edicule
- Control of the rising damp and installation of proper sewage and water drainage system
- Pavement preservation and rehabilitation

Additional studies put forward proposals for addressing these areas of concern. All the studies have been presented and submitted to the status quo communities which now have all the information needed to make the relevant decisions.

11 Conclusions

The leadership and continuous support provided to the team by His Beatitude Theophilos III, Patriarch of Jerusalem, and the other Status Quo Communities enabled the governance and management approach we followed. The successful delivery of the

rehabilitated Holy Edicule is largely due the following features of the governance and management approach.

- Continuous communication and collaboration with the three Christian communities who share the principal responsibility for the Church of the Holy Sepulchre
- Full transparency on all aspects of the project
- Intense publicity and external communication so that the progress of the work would be shared and publicized to the media of the world at large
- Coordination of the scientific and the managerial team, founded on frequent meetings where all key people would participate and contribute to the resolution of the issues and sound decision making
- Analysis of all emergent data with the full deployment of scientific equipment and digital technologies
- Adoption of an agile approach to decision making and management, so that the stakeholders and the project teams would be ready and able to respond quickly to emergent data about the monument and its features, by making the necessary adjustments to the project plan, schedule and budget, and ensuring that we would put the knowledge gained to good use.

Acknowledgements. The study and the rehabilitation project of the Holy Edicule became possible and were executed under the governance of His Beatitude, the Patriarch of Jerusalem Theophilos III. The Common Agreement of the Status Quo Christian Communities provided the statutory framework for the execution of the project; His Paternity the Custos of the Holy Land, Archbishop Pierbattista Pizzaballa (until May 2016 – now the Apostolic Administrator of the Latin Patriarchate of Jerusalem), Fr. Francesco Patton (from June 2016), and His Beatitude the Armenian Patriarch of Jerusalem, Nourhan Manougian, authorized His Beatitude the Patriarch of Jerusalem, Theophilos III, and NTUA to perform the research study and implement the project.

The project's funding was secured by donations from all over the world. Worth noting due to their size and/or timing are the donations (through WMF) by Mica Ertegun and Jack Shear and Aegean Airlines who donated the air transportation tickets from Greece to Israel.

The interdisciplinary NTUA team for the Protection of Monuments, Emmanouil Korres, Andreas Georgopoulos, Antonia Moropoulou, Costas Spyrakos, and Charis Mouzakis, were responsible for the rehabilitation project.

Appendix 1: The NTUA Scientific Team

The National Technical University of Athens Interdisciplinary Team for the "Protection of Monuments" scientific responsible for the Project:

- Chief Scientific Supervisor of the Project with executive authority: Prof. A. Moropoulou
- Interdisciplinary Team: Prof. Emeritus Emm. Korres (member of the Academy of Athens), Prof. A. Georgopoulos, Prof. A. Moropoulou, Prof. C. Spyrakos, Ass. Prof. Ch. Mouzakis

- NTUA School of Civil Engineering: Prof. C. Spyrakos, Ass. Prof. Ch. Mouzakis, Prof. Emeritus P. Marinos, Assoc. Prof. M. Kavvadas, EDIP S. Asimakopoulos, EDIP Dr. L. Karapitta, Dr. Ch. Maniatakis, PhD Cand. L. Panoutsopoulou
- NTUA School of Architecture: Prof. Emeritus Emm. Korres, Architectural Engineer V. Chasapis
- NTUA School of Chemical Engineering: Prof. A. Moropoulou, Prof. Emeritus G. Batis, Assis. Prof. A. Bakolas, EDIP Dr. E. T. Delegou, EDIP Dr. M. Karoglou, EDIP Dr. K. C. Lampropoulos, EDIP Dr. P. Moundoulas†, Dr. N. Vesic (Father Ambrosius), PhD Cand. Emm. Alexakis, PhD Cand. M. Apostolopoulou, PhD Cand. D. Giannakopoulos, PhD Cand. V. Keramidas, PhD Cand. A. Kolaiti, PhD. Cand. M. Kroustallaki, PhD Cand. I. Ntoutsi, PhD Cand. E. Tsilimantou, Dr. A. Zacharopoulou, Chemical Engineer N. Galanaki, Chemical Engineer M. Kalofonou, Architectural Engineer Z. Karekou. Communication and administrative support, A. C. Lampropoulou. Managerial and administrative support, G. Skoulaki. Technical support, I. Mountrichas.
- School of Rural and Surveying Engineering: Prof. A. Georgopoulos, Prof. Ch. Ioannidis, Prof. G. Pantazis, Assoc. Prof. E. Lambrou, Ass. Prof. A. Doulamis, ETEP S. Soile, ETEP S. Tapinaki, ETEP R. Chliverou, PhD Cand. P. Agrafiotis, PhD Cand. E. Stathopoulou, L. Kotoula, F. Bourexis, A. Papadaki, N. Tsonakas, P. Nikolakakou, M. Skamantzari
- The Interdisciplinary NTUA team cooperated with other Schools, Laboratories and scientific collaborators: Prof. S. Kourkoulis and Dr. E. Passiou from NTUA School of Applied Mathematics and Physical Science, Sector of Mechanics, Dr. A. Menychtas, NTUA School of Electrical and Computer Engineering, Mech. Eng. M. Agapakis, A. Fragkiadoulakis, S. Theocharis and Chem. Eng. I. Agapakis
- NTUA Inter-Departmental Postgraduate Program "Protection of Monuments", Direction "Materials and Conservation Interventions" graduate students Emm. Alexakis, D. Giannakopoulos, A. Zargli, A. Kolaiti, E. Koukouras, M. Kroustallaki have conducted Master Thesis interconnected to the project
- The Interdisciplinary NTUA team cooperated with: University of Pireaus, University of Peloponnese, Agricultural University of Athens, Institute of Geology & Mineral Exploration (I.G.M.E.), Athens Water Supply and Sewerage Company (EYDAP S.A.). Specifically, Assis. Prof. D. Kyriazis (Electrical Engineer) from the University of Pireaus, Assoc. Prof. N. Zacharias from the University of Peloponnese, EDIP Dr. A. Tsagkarakis from the Agricultural University of Athens, Dr. G. Economou, Dr. Ch. Papatrechas from the Institute of Geology & Mineral Exploration (I.G.M.E.) and A. Aggelopoulos, E. Karampelas and D. Tamvakeras from EYDAP S.A., Dr. P. Sotiropoulos and S. Maroulakis from Terra Marine

References

1. The Restored Edicule, The Holy Land Review, 1 June 2017
2. Integrated Diagnostic Research Project and Strategic Planning for Materials, Interventions Conservation and Rehabilitation of the Holy Aedicula of the Church of the Holy Sepulchre in Jerusalem. Scientific Responsible: A. Moropoulou, National Technical University of Athens (2016)
3. Common Agreement of the three Communities, the historic guardians and servants of the Holy Places, for the Restoration of the Sacred Edicule in the Church of the Anastasis. Signed by: Theophilos III, Patriarch of Jerusalem; Pierbattista Pizzaballa, Custos of the Holy Land; Nourhan Manougian, Armenian Patriarch of Jerusalem, Jerusalem, 22 March 2016
4. Scientific Reports on the scientific supervision, monitoring and decision making for the project for the conservation, reinforcement and repair interventions for the rehabilitation of the Holy Edicule of the Holy Sepulchre in the All-Holy Church of Resurrection in Jerusalem: 1st Steering Committee Meeting: Specific implementation studies. Jerusalem Patriarchate, 20.05.2016, 2nd Steering Committee Meeting, 20.07.2016; 3rd Steering Committee Meeting, 06.10. 2016; 4th Steering Committee Meeting, 15.12.2016; 5th Steering Committee Meeting, 22.02.2017 presented by A. Moropoulou, chief scientific supervisor on behalf of the interdisciplinary team em. prof. Emm. Korres, prof. A. Moropoulou, prof. A. Georgopoulos, prof. K. Spryrakos, Ass. Prof. H. Mouzakis
5. Moropoulou, A., Korres, E., Georgopoulos, A., Spyrakos, C., Mouzakis, Ch.: Presentation upon completion of the Holy Sepulchre's Holy Edicule Rehabilitation, National Technical University of Athens, 2017, p. 12. ISBN: 978-618-82196-4-9
6. Moropoulou, A., et al.: Faithful rehabilitation. History, culture, religion, and engineering all intertwined in a recent project in Jerusalem to rehabilitate and strengthen the site believed to be the tomb of Jesus of Nazareth. J. Am. Soc. Civ. Eng. **78**, 54–61 (2017)
7. Giannakopoulos D.: Architect: architectural documentation in interactive relation to the integrated study of protection of the Holy Edicule of the Holy Sepulchre in Jerusalem. M.Sc. thesis, NTUA Interdisciplinary program of postgraduate studies in Protection of Monuments —Direction Materials and Conservation Interventions, Supervisors: Prof. M. Korres, Prof. A. Georgopoulos, Prof. Ch. Ioannidis, Prof. A. Moropoulou, Ass. Prof. H. Mouzakis, February 2017
8. Moropoulou, A., Farmakidi, C.M., Lampropoulos, K., Apostolopoulou, M.: Interdisciplinary planning and scientific support to rehabilitate and preserve the values of the Holy Edicule of the Holy Sepulchre in interrelation with social accessibility. Sociol. Anthropol. **6**(6), 534–546 (2018). https://doi.org/10.13189/sa.2018.060603