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A PLACE OF FAITH AND DEVOTION AND ITS CONTEMPORARY RE-READING, THE DIGITAL SURVEY AND INTERPRETATION OF THE SAN VIVALDO “JERUSALEM” AREA NEAR FLORENCE

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Abstract – Out of Florence, in a peaceful area on hill, it is possible to meet the “Holy mount” of San Vivaldo, a rich complex made by a sequence of small chapels and churches. The digital survey operated in 2009 and 2011, created the basis for a detailed reading of all the architectonic apparatus, allowing the creation of the most accurate 2D and 3D representation this complex has never had, but also an “in depth” understanding of the historical and architectonic relationship working in this specific religious settlement.

INTRODUCTION

On May 1497 the local authorities of the town of Montaione, near Florence, offered the old nearby hermitage entitled to San Vivaldo to the Provincial Chapter of the Tuscan Observant Franciscans. After the formal settlement of 24 March 1500, the friars took possession of the site and start building a convent and a church. Within the walled enclosure close to the convent, a group of small oratories and chapels was built over the century, each one making a reference to a Holy Place in Jerusalem..

THE PLACE AND ITS ARCHITECTONIC APPARATUS

The San Vivaldo settlement is a Renaissance monument and a thematic park of faith as well. It collects the architectonic idea of a far away place, while giving the space a powerful sense of a Middle Eastern image: In fact, the group of chapels is modeled as a transposition of Jerusalem as the faithful visitors might easily recall.

The Jerusalem of San Vivaldo, despite a first impression of randomness, is a place developed according to a precise iconographic program. Just as giving a hint of the places of the earthly Jerusalem choosing to represent them just through plants. Sometimes not only peculiarities of access had been repeated, but also some measure cited.

THE DIGITAL SURVEY OF THE AREA

The whole survey was done in two separated campaigns (operated in April 2009 and December 2011 by the Department of Architecture in Florence and the collaboration of AREA3D S.r.l., Livorno) using a phase shift 3D laser scanner. The small size of the architectures and the good accuracy of this tool allowed to produce a very detailed model with high readable details in a quite short time. The whole survey took just two days to be completed, with the full coverage of every parts in and out the building. The whole set of scans was referenced to a system of targets, some of them materialized using flat or spherical specific elements, and other localized over meaningful details all around the architectures. The logic of the survey was quite simple, taking the whole outside, entering, taking the whole inside, making an evaluation about possible “in depth” extra scans to enhance some details and then passing to the following building. Each building of the whole settlement is quite near

to the other and this facilitated a lot the sequence of operations. As told, for some specific chapel some special operations were done. In example, for the Saint Sepulcher a special set of scans was taken: this chapel presents the demolition of the original roof and is covered by the newer roof. This change in the aspect of the building has caused the original top opening to get lost. But some remains are still in place, under the new structure.



Fig. 1, 2, 3, 4 - Views from the first 3D laser scanner survey campaign, aligned pointclouds.

So for first the building was at first surveyed in his contemporary condition, then, with the help of a scaffolding and of some operators from the municipality, a part of the new roof was removed, leaving visible the original base of the opening. At this point all the scans covering the upper part were replied, creating a “double” version of the same building, and creating the possibility to study the shape of the original opening from a very detailed and accurate survey.

POST PROCESSING OF THE DATA

After a first alignment of the pointclouds describing each building, a specific editable version of the whole dataset was created. Starting from this one the choice felt on a first classical 2D reconstruction, with a particular attention to an accurate vector drawing of all the statue and ceramic elements. The graphic rendering, through plans, elevations and sections was aimed to produce a detail scale equal to 1:20 of the seven chapels covered by the two measurement campaigns. The process of the data was quite simple, working with snapshots from Leica Geosystem Cyclone, choosing classical section planes and preparing the image to be suitable for the further treatment in the CAD software. Bringing the whole set of bitmap based representations inside Autodesk Autocad, a very involving work of redrawing was operated, taking care to respect at the best the details from the screenshots. It is worth to say that the set of screenshots, for each section or plan was not based on a single solution. To enhance the readability of the drawing, for each representation at least three different visualization styles were chosen: a “color from scanner” version (with the reflective value in generic color scale); a “gray scale” version, and a “silhouette” style to enhance the borders and the planarities of each architecture. In specific cases, one more screenshot was prepared, the “elevation map” one, done introducing a variations in the colors according to the “elevation” in a single direction of the whole pointcloud. In this way the possibility to better read differences in a section or in a front view were greatly enhanced with an automatic

process. The main intention was to provide a very traditional graphic representation, the most detailed possible, this is the reason why the choice of the 1:20 scale. The aims are to encourage the subsequent analysis and specific studies on individual chapels offering a high quality set of drawings made in a style that appears like a sort of “tribute” to the tradition of architecture survey and architecture representation.

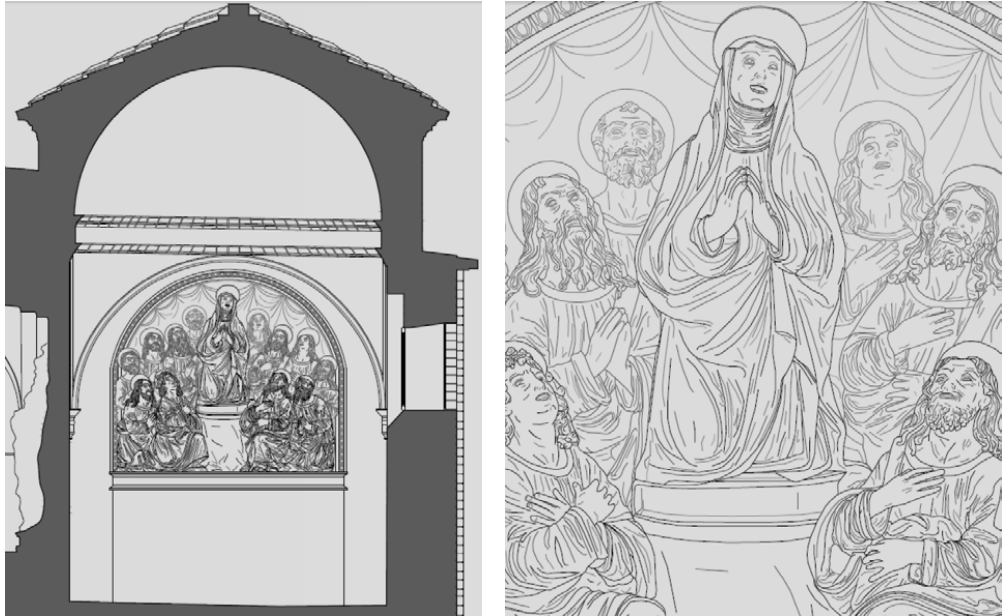


Fig. 5, 6 - Views of a section from the Pentecoste chapel in San Vivaldo

GEOMETRY OF THE ARCHITECTURES

The system of small churches and chapels all around the hill are at the same time a sort of selection of architectonic elements and design solution from their age. The high precision of the survey allows to describe in detail and trace with accuracy the grids and the proportions between each part of the buildings. The geometrical analysis based on the ancient measurement units allows to develop important considerations on building purposes and to advance hypotheses on geometric series used in the design phase, searching proportions and relationships in the use of multiples and submultiples.

It comes out clear that the whole asset is based on the “braccio fiorentino” measurement system, a typical solution of that time, but not an obvious find in this area.

The use of the extracted and treated 2D drawings allows to enhance and put in evidence the combination of geometry and architecture, showing a clear, simple but rigorous criteria that put in robust proportions each building. The dimensioning is oriented to create a very “human” and “easy to catch in a single sight” condition, but all the parts have sober proportions, empathizing the sculptures and the ceramic elements which became the real inhabitants of each church and chapel.

VIRTUAL RECONSTRUCTION: THE HOLY SEPULCHER

One of the most interesting dilemma about the original layout of the San Vivaldo Jerusalem is the previous design of the Holy Sepulcher.

This meaningful building, with his altered roof is worth of an accurate study, while it can give more than one indication about the way the people working on this settlement intended

architecture and the “model” they were representing here. A study based on the geometrical analysis has helped in this direction, but it is not that easy to define a digital reconstruction of the missing parts of this chapel.

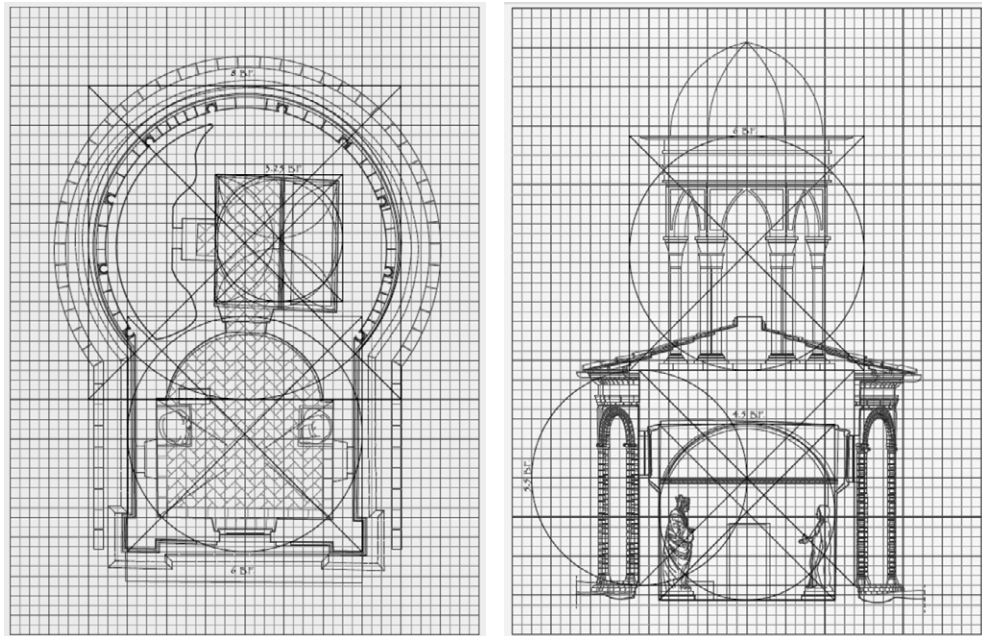


Fig. 7, 8 - Grid Analysis on the virtual reconstruction study for the Holy Sepulcher chapel

First of all the remains and the reference to the “theoric” model of the sepulcher can give a clear indication about the presence of a lantern over the roof, but to make further assumptions about its possible size some accurate reflections are needed. To hypothesize the dimensioning of this element it was chose to follow its graphical traces to extend them into lines and creating a reference pattern to compose the architectural parts. The first passage was doubling the square located on the main front by six Florentine arms, then developing a proportional grid starting primarily by the proportioning of the classical orders, in the specific case using the typical Tuscan order, but this first try was not successful. So the further try started taking into account the possibility of columns without entasis, obviating the failure result of the initial proportions (the stem determined in that way was disproportionate, rather short and stout) and trying to live up to the remains of the base of the columns, which was founded during the past restorations. In addition, the reconstruction and sizing plant has been possible thanks to the results of the survey carried out using the 3D laser scanner, which revealed the hexagonal base of the lantern (two of the six sides, others were built accordingly to a geometrical reconstruction). In this way, following a step by step analysis of the possible design grid, a first and meaningful working grid came out. In the choices made in the reconstruction a very strategic rule was played by the observation of the equivalent monument in Görlitz, Germany, an interesting parallel, which was studied and surveyed using a photogrammetric solution, based on the use of Agisoft Photoscan, one of the most well diffused and better working SFM (Structure From Motion) software. The SFM reconstruction was tested at first with a previous version of Photoscan, the 0.9, then with the use of the new release, the 1.0 the results came out in a more complete and usable way. The testing and the experimentation using Photoscan were operated in collaboration with arch. Mirco Pucci.

The reading of the germanic example gave an interesting contribution in imaging the original aspect of the Holy Sepulcher. From this reading it came out clear how the specific

architectonic solutions are a very “elastic” language for these buildings, where the only rigorous element is the size of the Jesus’s sepulcher, it is the element of faith to be respected, all the other elements adapt themselves to the environment conditions and architectural preferences.

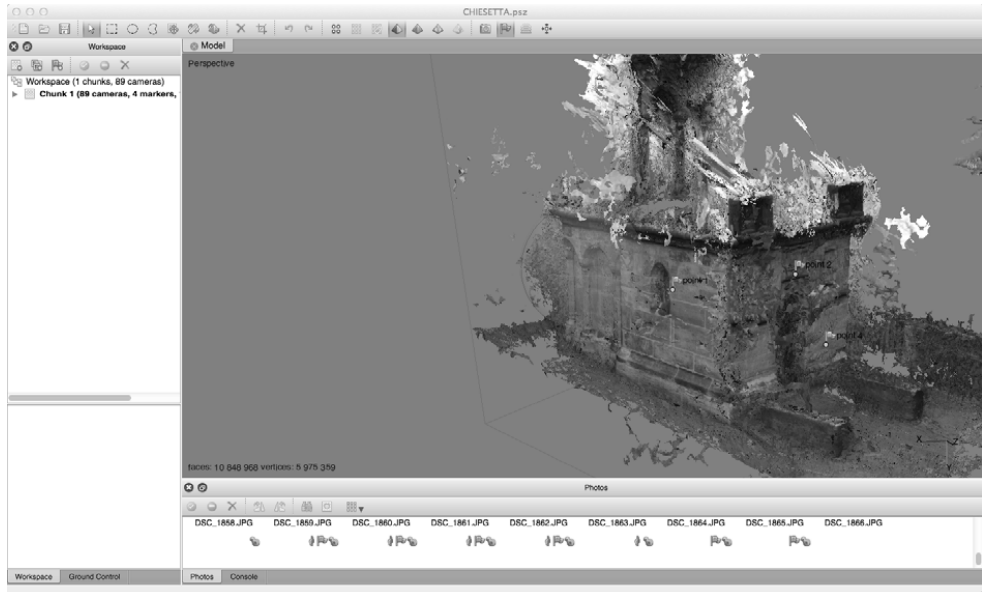


Fig. 9 - 3D modeling from photos of the Görlitz “Holy Sepulcher” using Agisoft Photoscan.

SOMETHING MORE DIGITAL

The developing of an app for San Vivaldo is one of the advanced challenge in this research, it looks more to the tourist and to the curious than to the scholar, but it can be helpful to enhance a right interpretation of the value of this architecture. The development has been carried on in collaboration with arch. Francesco Sani and the APP was initially thought for the use with an Apple Ipad, but it is possible to imagine an easy translation into a Google Android operative system. Inside the APP it has been outlined visit to the chapels, especially trying to create a path as much as possible linear and following as much as possible the timeline of the “episodes” of the life of Jesus represented at San Vivaldo.

The proposed visit to the area starts from the parking area, and provides a passage across the trees leading to the church and to the convent of San Vivaldo and then proceed according to a progression starting from the Chapel of the Samaritan, passing by the Mount Sion chapel, crossing one after the other all the other 13 chapel to focus on the Holy Sepulcher and then closing with the remaining 5 chapels.

The intention is to go beyond the traditional visit based on the use of an audio guide or information boards, reducing the impact of signs all around the "The Jerusalem of San Vivaldo" and giving more attention to the original asset of the place. The APP can be used on site, exploiting a local net or as a home application, it will allow to move through the site information (events, sightseeing, how to get there, touristic information), history and the map which will help to complete the real visit. The application, ready for the visit, will show a map of the site where the various points of interest, the individual chapels are located, specific markers will help in the identification of each element. An arrow indicates the direction to follow in the path led through the activation of a GPS positioning system, the latter will drive both the planned visit of the site. During the visit, an alert tone will signal the proximity of a point of interest. Only those points of interest which have correspondence both with

Jerusalem and Görlitz will present in its form, and automatical procedure will propose the connection with one and/or another website containing appropriate information.

CONCLUSIONS

The “Jerusalem” in San Vivaldo shows its particularities and create the occasion for thinking and reflecting about the historical architecture and the way ancient architects approaches themselves to the logic of building and how they were used to communicate the faith of their age. The articulated subjects create the conditions for more than one challenge, where digital solutions, documentation, representation and new technologies are called to research side by side with the historical and artistic value of a meaningful place.

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INDEX

STRATEGIC ISSUES

“e-Infrastructures and Research Infrastructures for Digital Culture Heritage”	Rossella Caffo	22
“High Quality Archive Project for Polo Museale Fiorentino: Developed Activities”	Cristina Acidini Vito Cappellini Takayuki Morioka Marco Cappellini	23
“Linking a bipolar world: new jobs to bring ICT to Museums”	M. Mazura	25

EC PROJECTS AND RELATED NETWORKS & INITIATIVES

“On Defining the Virtual Museum: a V-Must Research Project”	Susan Hazan Sorin Hermon	30
“Feeding The Digital Humanities: The DM2E and Judaica Europeana Projects”	Dov Winer	36

“Enriching the Web of Data with Artworks: Burckhardtsource.org experience”	Francesca Di Donato Susanne Muller	42
---	---------------------------------------	----

“Hyperspectral imaging for non-invasive diagnostics on polychrome surfaces: the latest advances of research at the IFAC-CNR laboratories”	Costanza Cucci Andrea Casini Marcello Picollo Lorenzo Stefani	43
---	--	----

HDR Images for Cultural Heritage Documentation”	Andrea De Polo	49
--	----------------	----

2D - 3D TECHNOLOGIES & APPLICATIONS

“THz- Arte Project for non-invasive analysis of Cultural Heritage”	K. Fukunaga M. Picollo G.P. Gallerano	56
---	---	----

“Conserving Digital Images Into the 23 rd Century – a New Case Study”	Graham Diprose Mike Seaborne	57
---	---------------------------------	----

A Place of Faith and Devotion and its Contemporary Re-Reading, the Digital Survey and Interpretation of the San Vivaldo “Jerusalem” Area near Florence	C. Mastroberti Pacciani G. Verdiani	62
---	---	----

“Architecture and sculpture: a digital investigation about the Cellini’s Perseo basement from the Loggia dei Lanzi to the Bargello Museum”	Pablo Rodríguez-Navarro	68
---	-------------------------	----

“The baroque altar and the liturgical furnishings in the 3D reconstruction and reframing: suggestion for a new layout of the Museums Diocesani”	A. De Gloria, L. Magnani, V. Fiore, S. Rulli	69
---	---	----

“Super Multiview and Free Navigation by FTV”	Masayuki Tanimoto	75
--	-------------------	----

VIRTUAL GALLERIES – MUSEUMS AND RELATED INITIATIVES

“Image Digitisation in ICARUS”	D. Jeller	82
--------------------------------	-----------	----

“Using a Creative Evolutionary System for Experiencing the Art of Futurism”	Steve Di Paola, Sara Salevati	88
---	----------------------------------	----

“Structuring Wild-Style: Developing a Research Database and Connected Web Archive for Historical Graffiti”	Elisabeth Lindinger	94
--	---------------------	----

“Preservation of Cultural Heritage as Double Historicity: its Substance and the Importance of Existing”	Sara Penco	95
---	------------	----

“A New Cognitive Approach to Art Experience: Priming, EEG-Based Virtual Reality, and Digital Storytelling”	Raffaella Folgieri Annalisa Banzi Diletta Grella	101
--	--	-----

“Investigation of the activity based teaching method in e-learning musical harmony course”	P. Pistone A. Shvets	107
--	-------------------------	-----

ACCESS TO THE CULTURE INFORMATION

“London’s Digital Culture: Artists & Designers, Public Service Media & ‘Livecasting’”	James Hemsley Nick Lambert Lizzie Jackson	114
“Learning is a Way to Access to Treasure of Museums”	Elena Gaevskaya	120
Online Edition EMA – The Letters of Erich and Luise Mendelsohn 1910-1953”	Andreas Bienert	125
“Networked Museum, Concept, Design, Technology and Experiments”	Shinji Shimojo, Masaki Chikama, Kaori Fukunaga, Eiji Kawai, Hisako Hara, Jin Tanaka, Takayuki Morioka	126
“Solution for Cultural Experience in Places of Elective Supermodernity (NeoLuoghi)”	F. Spadoni, R. Rossi, F. Tariffi	131
“Multimedia guides based on augmented reality technologies”	Tatyana Laska, Sergey Golubkov	136