Macrophotography of Wide Area Works of Art:  
the Paliotto of St. Filippo Neri Church in Torino by P. Piffetti

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INTRODUCTION

In the 18th century, Pietro Piffetti was an unrivalled cabinet maker at European level. He worked at the court of the king Carlo Emanuele III di Savoia in Turin as Royal Cabinet-Maker. Born from a modest family, received an education probably from a father of the St. Filippo Neri Oratory in Turin. His studies covered music, poetry, literature and painting. After an apprenticeship period in Rome he was called back to Turin where he worked till his death.

Various examples of his art can be found in Turin at the Palazzo Reale, Palazzo Madama and Galleria Accorsi and in Rome at the Quirinale [1,2].

Masterpiece of Piffetti is the Paliotto (church altar front) of the St. Filippo Neri church in Turin [3] currently visible at the Museo Internazionale delle Arti Applicate Oggi (MIAAO) of Turin. Piffetti made also a second Paliotto for the Pope, now in the private furnishing of Cappella Sistina in Vatican.

As for the first one, such a valuable work of art was never submitted to a scientific diagnosis on the materials used. Moreover, little photographic documentation was present of the Turin Paliotto and almost none about the roman one.

For this reason a scientific analysis program was planned in collaboration with the MIAAO Direction and with the Congregazione dell’Oratorio owner of the masterpiece.

In the framework of this program an exhaustive photographic documentation was planned in collaboration with Varianti Srl, a company with great expertise in digital photography and image processing.

The photographic work is reported in this paper, while the non-destructive analysis on the materials of the Paliotto is described elsewhere in this Annual Report.

TECHNIQUE AND INSTRUMENTATION

A macrophotography approach was chosen to obtain an accurate documentation of the artwork and of its conservation status. This technique consists in taking pictures at short distance, using special macro lenses. In this way the image on the focal plane of the camera has dimensions comparable with those of the original. The picture field of view is reduced but a notable magnification effect is obtained. Moreover, since the picture field of view is reduced, the illumination of the subject can be done homogeneously using low power light sources. In this way possible injuries to the artwork due to powerful lamps are avoided.

Dealing with digital pictures, another technique can be applied the so called “picture stitching” i.e. the merging of pictures taken in sequence with an overlap region of the subject. Originally developed to create 360° panoramic views, this technique can be used with large area works of art at the cost of taking a larger number of pictures all in the same conditions. A portable mechanical structure, to move both the camera and the artwork keeping the necessary parallelism, was developed in the Mechanical Workshop of LNL, as described elsewhere in this Annual Report.

The camera was an optical bench from Sinar mounted on a Manfrotto head with a high resolution lens Sinaron Digital 120macro HR. The distance of the lens from the Paliotto was 50 cm.

The adopted back was the Sinarback 75H with a 48.0 × 36.0 mm CCD sensor having a resolution of 6668 × 4992 pixels, (33 Mp) 16 bits per color channel. The CCD sensor was also equipped with piezoelectric micro-scanning and with Peltier cooling with ventilator.

The light up of the subject was obtained using two flashlight Elinchrom Range Quadra with a honeycomb structure diffuser for homogeneous illumination.

THE PHOTOGRAPHIC SESSION

The photographic session was performed on-site at the MIAAO in Turin. The mechanical structure was easily reassembled together with the camera and the illumination system. The camera was computer controlled by means of a MacPro Intel dual-core with 8GB ram using the Capture shop V6.01 code both for setup and picture download. In Fig. 1 a backstage picture of the complete setup is shown.

The Paliotto (5.20 × 3.60 m) is subdivided in four detachable parts: mensa front cover, left and right wings and a central part covering the altar tabernacle plus an ivory crucifix. All the parts were photo-scanned with an overlapping region of about ¼ of the image in the four directions.

The total number of picture of the session was 350 plus
some extra shots. Each picture takes about 290 MB of disk storage.
Two full days were necessary to complete the session.

![Backstage picture of the assembled photographic system.](image)

**PICTURES ELABORATION**

The stitching of individual pictures was done in semi-automatic mode using Photoshop CS5-Extended code. The first piece of the Paliotto to be elaborated was the mensa cover. The final picture is $79700 \times 30000$ pixels (about 2.4 Gpixel) occupying some 7 GB of disc storage.

A highly reduced version is presented in figure 2 while a small particular is presented in figure 3 at its full resolution.

![Global view of the mensa cover which is the largest piece of the Paliotto (279 × 105 cm).](image)

The elaboration of the other parts is still undergoing. Due to the shape of the wings, still larger images will be obtained.

**WEB PUBLISHING**

Another aim of the present work was to spread the documentation collected to the wide community of art historians and restorers. For this purpose, it was decided to create a dedicated web site in collaboration with Bitstream company.

The main problem encountered was the dimension of the pictures of the order of magnitude of some GB. The download time for this amount of data is, in the best conditions, of the order of some hours. Moreover, a powerful computer, both in CPU and in memory, is necessary to display such pictures even if they are stored on local disk.

To cope with these limitations an image pyramid scheme was adopted. In this scheme, the original picture in full size lays at level 0 but it is subdivided in small files that can be downloaded easily. At level 1 the same is done for a picture resized to one half of the original. The same procedure is repeated up the pyramid till a single global picture is obtained. It can be easily seen that the disk space needed is more or less the double of the original picture, but can be organized in a hierarchy directories, subdirectories and small files. In the present case the total number of files obtained is more than 50000 including directories. A software package [4], embedded in the webpage, traverse the image tree up or down giving the impression to zoom in or out of the picture from maximum resolution up to a global view and vice versa.

Another gain in space, and consequently in bandwidth, can be obtained converting the original TIFF image format to a more compressed JPEG format at the cost of a little less definition. In any case, one can go back to the original picture, if necessary.

The final web site www.paliottopiffetti.org is still under construction and will be ready in the second half of 2011.

At the moment a very preliminary edition is present at www.lnl.infn.it/~art/art2 for test purposes.

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