Digital Layered Models of Architecture and Mural Paintings over Time

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Abstract

The European project Enhancement of Heritage Experiences: The Middle Ages. Digital Layered Models of Architecture and Mural Paintings over Time (EHEM), approved in the call for JPICH Conservation, Protection and Use (0127) in the year 2020, aims to obtain virtual reconstructions of medieval artistic heritage – architecture with mural paintings – that are as close as possible to the original at different times, incorporating historical-artistic knowledge and the diachronic perspective of heritage, as an instrument for researchers, restorers and heritage curators and to improve the visitor's perceptions and experiences.
In the digital models elaborated we intend to develop, as concrete objectives:

1. *The understanding of architectural complexity, which is usually regularized geometrically.*
2. *Solving chromatic problems. The analysis of pigments, the arrangement of the pictorial layers and the successive restorations suffered, with the help of conservation and restoration technicians, will allow us to digitally specify the original colouring of the paintings.*
3. *Raise and propose the resolution of lighting problems. To date, trials have been carried out for the restitution of these problems in digital models based on the analysis of natural lighting, which we intend to improve. We also propose to deal with artificial lighting by chandeliers or oil lamps, which produced effects of painting vibration at the moment when, for liturgical reasons, the images "acted".*
4. *To approach digitally the different perspectives of the medieval building and its paintings according to the categories of users.*

*To this end we have chosen three sites that because of their complexity will serve as case studies: The early medieval church of **Santa Maria Antiqua in Rome (Italy)**, a mural palimpsest, consisting of up to ten layers of overlapping painted plasters, realised during a relatively short period of life (sixth-ninth centuries), which also poses architectural challenges of visual resolution given that it was transformed into a church from the Domitianic entrance hall in the Roman Forum to the imperial Palace on the Palatine hill. The hermitage of **Sant Quirze de Pedret (Spain)**, with its complex architectural genesis from the tenth century, was decorated at the head of the church at two different times by superimposing a layer on the previous one. The discovery of its paintings, their removal and the transfer to two museums took place at two different moments (1921 and 1937) and with very different procedures. At the same time, years later, radical interventions were made to the building, altering the two pictorial phases in its "virtual" presentation. The Engleistra or Place of Seclusion founded by Neophytos (**Agios Neophytos Monastery, Cyprus**) The oratory was excavated in the rock from a natural cave and was decorated, at different times during the Middle Ages, with Byzantine wall paintings. The extreme nature of the site and the irregular nature of the rocky surface that house these cycles, comprising of up to five phases constitute a fundamental challenge for their digital presentation.*