Advances in multiband IR imaging of masterpieces of Italian Renaissance art

Part I – Technique
Luca Pezzati, Gruppo Beni Culturali, Istituto Nazionale di Ottica, INO – CNR

Scanning multi-spectral infrared reflectography (SMIRR), developed at INO – CNR in the framework of the FP6 EU-Artech project, has been one of the key mobile techniques in the FP7 EU research infrastructure project CHARISMA (www.charismaproject.eu). This infrared (IR) spectral imaging technique can reveal details of paintings which have remained obstinately hidden even to the most up-to-date infrared imaging techniques. It is part of the mobile laboratory (MOLAB) of CHARISMA and as such it is engaged in several measurement campaigns all over Europe. The instrument is transportable, even if a bit bulky, having to accommodate scanning mechanics more than one meter wide.

In SMIRR’s current implementation it produces thirteen IR images ranging from 800 to 2300nm, each with an on-target spatial resolution of 4 pixel/mm. Four million spectra are obtained per square meter, in about three hours of scanning measurement. However, the major contribution of SMIRR to computer-aided study of an old master’s painting technique is in revealing more and more details of the paint layers structure (underdrawing, retouches, pentimenti) by the use of many separate narrow-band IR channels. Separating the images indeed results in an increased visibility with respect to wide-band IR reflectography. The use of this technique is yet in an early phase. A new model of the instrument with extended capabilities, combining 16 visible bands from 400 to 800nm and 16 IR bands up to 2400nm, has just started experimental work this year, and new surprises are expected to come.

Part II – Applications
Cecilia Frosinini, Opificio delle Pietre Dure e Laboratori di Restauro

The application of SMIRR has recently given significant contributions to solve old dilemmas of art history, such as the presence of the underdrawing in Caravaggio’s paintings, and to discover new details in masterpieces that already underwent extensive diagnostic campaigns, like SMIRR reflectograms obtained on some Leonardo’s paintings are clearly showing.

Following a preliminary survey on the importance of incorporating infrared reflectography into a typical art historical method of studying paintings in relationship to their preparatory drawings on paper, the paper will present three case studies that illustrate in depth their statement, in chronological order. The first case study examines Giotto and traces the inclusive use of templates in his artistic production, not only on mural paintings (as already known), but also on panel paintings. The second case study examines the careful and scrupulous use of a cartoon by Sebastiano dal Piombo, in the underdrawing phase of his masterpiece, the Pietà in Viterbo. According to Vasari’s account, Michelangelo passed a cartoon that he himself drew to Sebastiano. The IR reflectography proves the existence of a cartoon, but also shows an exact correspondence to some sketches by Michelangelo, obviously enlarged for use on the panel. The third case pertains to a more modern artist, Francesco Hayez (1791–1882), the leading painter of Romanticism in mid-19th-century Italy. A consistent group of sketches, preliminary to a painting representing Samson and the Lion, were grouped, studied in sequence, then compared to a display-cartoon and finally to the IR reflectography of the painting.