Monitoring illuminations and gilding characteristics with the RICH Minidome

The Bible of Conrad von Vechta from the Museum Plantin-Moretus in Antwerp, is a superb example of the manuscripts produced in the amb of Wenceslas IV, noted for their inventive borders as much as their miniatures and for their technical refinement, especially evident in the varied uses of gold. The scribe Laurentius dated the second volume in 1402-1403; it is not known when he started writing or at what date the project was abandoned incomplete. The lavishly illuminated manuscript has historiated initials with full borders of acanthus stems enclosing gold patterned roundels with figures, beasts, birds, grotesques and flowers. Such ambitious undertakings were necessarily collaborative.

To document surface characteristics of graphic materials, supports and pictorial layers, the digital imaging device Minidome was developed in 2012-2014 at Leuven University (Belgium). A camera of 28 million pixels is imaging the objects with omni-directional lighting and export the result to 2D+. The technique is based on polygonal texture mapping, also known as Reflectance Transformation Imaging (RTI), a technique of imaging and interactively displaying objects under varying lighting conditions to reveal surface phenomena. The module is a semi-spherical structure with a single downward looking video camera. The object to be captured (maximum 180 to 120 mm) lies in the center and is illuminated from computer-controlled lighting directions, through the subsequent activation of multiple white LEDs (2160). The different angles that illuminate the surface of the artifacts are revealing extreme details.

Examination and identification of the production of scripts, miniatures, gold tooling, embossing, stamps on paper and parchment, gold- and blind tooling on leather book covers. For changes in their structures (ea. cockling, frations, folds, lacunas, retouching, scratches, abrasion) the imaging tool proved to be extremely accurate. Complementary, RICH is useful to monitor the conservation and preservation status of an object before and after treatment, transport or exhibition.

In the Bible of Conrad von Vechta, between fol. 161v-176v, in the part illuminated by the Joshua Master, several miniatures are incomplete, as the illuminator didn’t finish his work when the project was abandoned. These miniatures are illustrating brightly the complex sequences in the creation of medieval miniatures. In the depiction of David and Goliath on folio 167v, the image is drawn, the background complete, silver (?) applied for Goliath’s armour and David’s sword. The raised is tooled in great detail with geometrical and decorative patterns, giving great refinement to the images.

In spring 2014, a new prototype, the Microdome, was developed with a smaller cupula of 30 cm, holding 220 white LEDs. For book conservation reasons, a slice of the Microdome can be removed, allowing the tool to moniter into the gathering of a book (opening at 109°). The Microdome is mounted on a specially adapted conservation book cradle, designed by the university of Graz in Austria. Fragile books with delicate bindings can be monitored through RTI, without risk to stress or damage. Light suction on a bar is flattening gently the paper or parchment folios during the three minutes of imaging. The near future is the development of hard- and software for a third Microdome, with LEDs in different spectra (UV and IR). This will be a challenge for imaging and studying pentimenti and underdrawing in illuminations and on polychrome surfaces.