IESL FORTH
Institute of Electronic Structure and Laser

SERVICES & PRODUCTS in
•DIAGNOSTICS
•ANALYSIS and
•LASER CLEANING

IRIS-II Spectral Imaging

IRIS-II is a complete, flexible instrument for imaging the compositional and structural information of layered surfaces. It is fully portable and independent enabling the examination of objects *in situ* (museums, conservation laboratories, archaeological areas).

Features:

✓High spatial resolution (5MPixel)

✓High spectral resolution (28 spectral regions)

✓High spectral sensitivity (350nm-1200nm)

✓Portable - two parts system a) Head, b) Laptop

✓Mobile
Operates up to 2h with a 12V battery

✓Dedicated user friendly software

✓Non destructive – Non contact technique

Applications:

✓Art Conservation (under-drawings, over-paintings, varnishes)

✓Archaeology (marbles, ceramics)

✓Food (quality characterization)

✓Industry (analysis, quality control)

✓Medicine (optical biopsy)

IRIS$_{2010}$ (*infrared imaging system*) provides detailed information related to the chemical composition of materials, based on reflection and fluorescence spectroscopy.

Spectral Imaging in Art and Archaeology

SELECTED EXAMPLES

Reflectance – Fluorescence Imaging

Through Reflectance and Fluorescence Imaging it is possible to differentiate between the original and the over-painted areas of a painting, based on the different chemical composition of pigments. In the shown example the original white layer is lead white, while the over-painting was found to be titanium white. Given that titanium white was commercially available after 1920 the era of the conservation interventions is estimated to be the beginning of the 20th C.
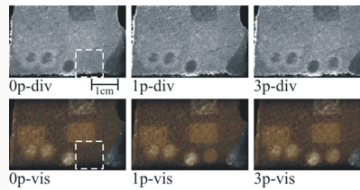
Visible Reflectance

Fluorescence

Monitoring of cleaning interventions

Spectral Imaging allows monitoring on-line, non-destructively and in situ the cleaning level of pollution encrustation on stonework. The developed methodology is based on the optical properties of monochromatic light penetration in matter. The calculated differences of images, obtained at two different spectral bands, can reliably map the depth of cleaning.

0p-div   1cm   1p-div   3p-div

0p-vis   1p-vis   3p-vis

Pigment Identification

Spectral Imaging provides combined analytical information from the reflectance or fluorescence spectra related to the chemical composition of the pigments along with high spatial resolution. In the shown example it is shown that in every pixel a full spectrum can be acquired, in order to differentiate and/or identify pigments of similar hue.

Black paint of the eye

Black paint of the nose

Reflected Light

Wavelength nm
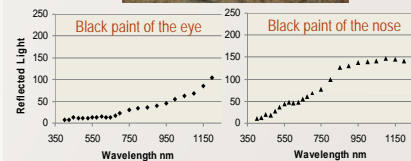
IRIS -I

IRIS-I is a mobile Spectral Imaging System with 2MPixel color CCD sensor, 15 interference filters covering the detectors sensitivity range from 380nm-950nm.

Technical data

Sensor: Color CCD

Spectral Sensitivity: 380-950nm

Spectral Bands: 15

CCD resolution: 1600*1200 pixels

Sensor lens: C-Mount type (exchangeable)

Dimensions (LXWXH)

Laptop: 15.4 Inch

Head: 23X16X8.5 cm (overall)

IRIS-II

IRISI-II is a mobile Spectral Imaging System with 5MPixel Monochrome CMOS sensor, 28 interference filters covering the detectors sensitivity range from 350nm-1200nm.

Technical data

Sensor: Monochrome CMOS

Spectral Sensitivity: 350-1200nm

Spectral Bands: 28

CCD resolution: 2560*1920 pixels

Sensor lens: C-Mount type (exchangeable)

Dimensions (LXWXH)

Laptop: 15.4 Inch

Head: 21X16X6.5 cm (overall)

Contact: Vassilis Papadakis, IESL – FORTH, PO Box 1527 – 71110 Heraklion Greece, e-mail: billyp@iesl.forth.gr, tel.: +30 2810 391267 Website: www.iesl.forth.gr