THE XpeCAM® SOLUTION

GRAPHICAL DOCUMENTS

What if you …

… could see more?

… could see the invisible?

… were able to have access to hidden information?

… could learn more with extra information?

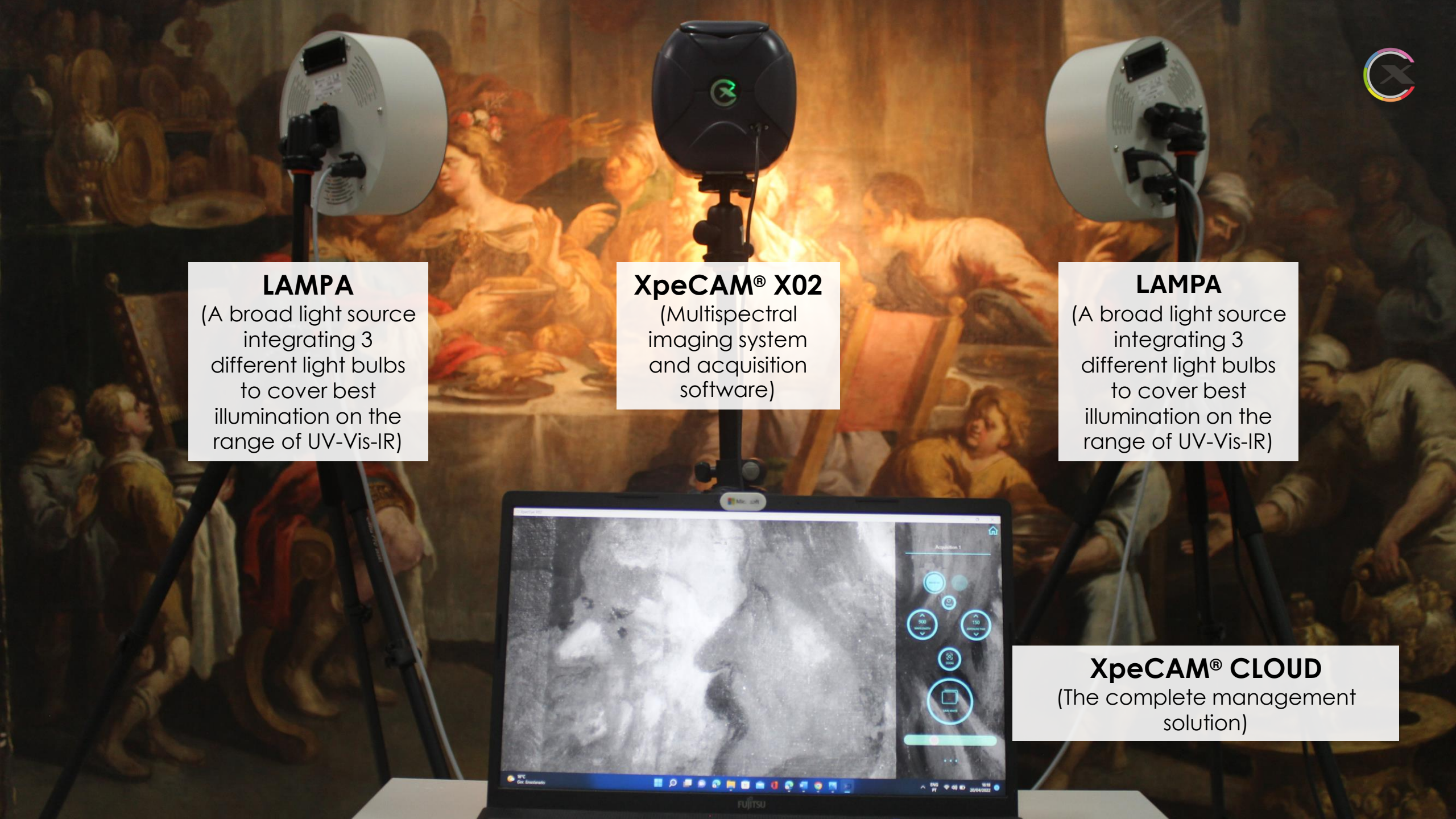
The XpeCAM® Solution

This is what XpectralTEK does.

We provide you with imaging solutions that allows seeing beyond the human eye and learning from it.

The XpeCAM® Solution

(A THREE-COMPONENT PACK)


LAMPA
(A broad light source integrating 3 different light bulbs to cover best illumination on the range of UV-Vis-IR)
XpeCAM® X02
(Multispectral imaging system and acquisition software)
LAMPA
(A broad light source integrating 3 different light bulbs to cover best illumination on the range of UV-Vis-IR)
XpeCAM® CLOUD
(The complete management solution)

The MSI system

XpeCAM X02 – Multispectral Imaging System

- State-of-the-Art (it incorporates the latest technological developments)
- Broad Sensitivity Range (350 – 1200 nm)
- 30 band-pass interference filters
- 6.4 MP monochrome array sensor
- Autofocus (unique achromaticity correction)
- XpecEye control and acquisition software

The MSI system

The Acquisition Area:

- Standard:
  - Till A4 format (35 mm C-Mount exchangeable lens)

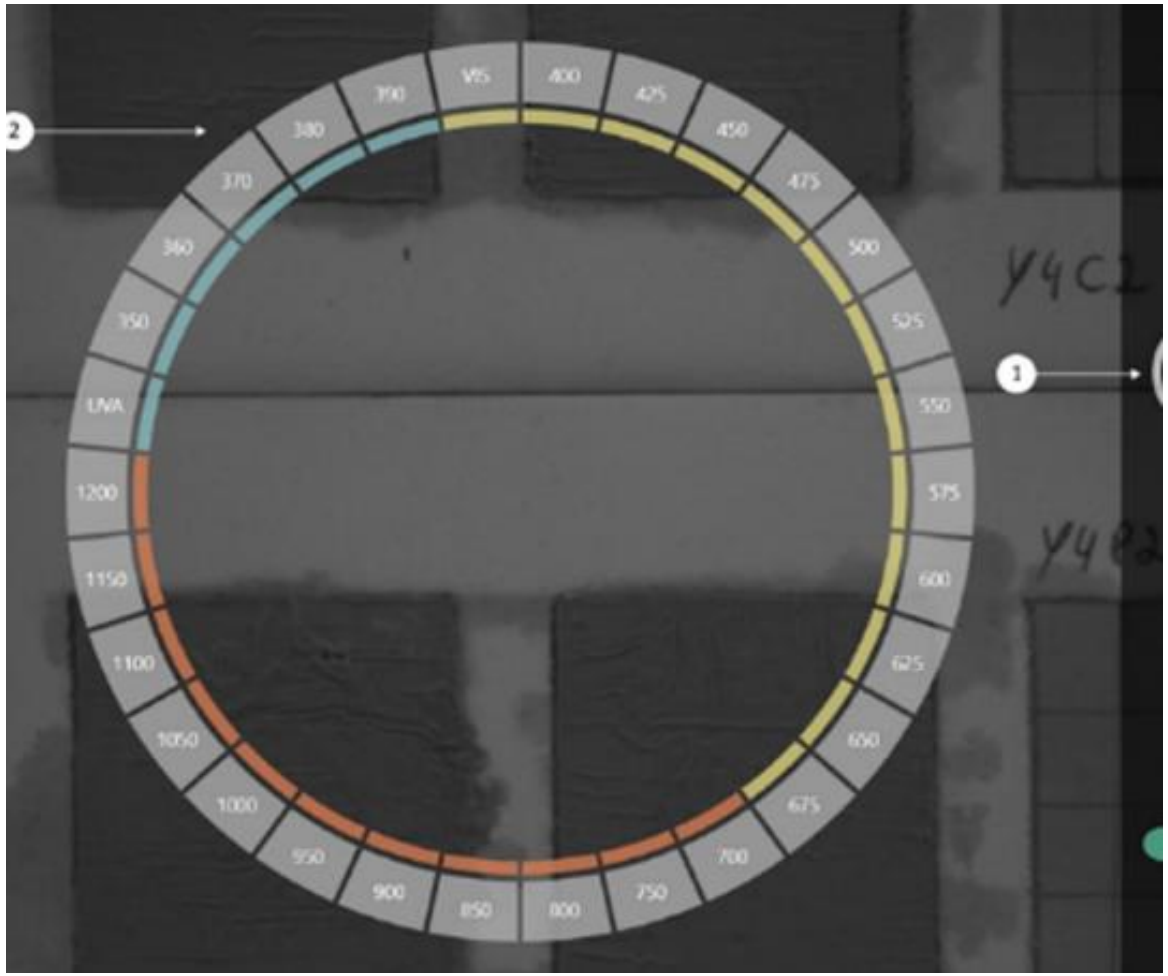
- Optional:

  Till A3 format (25 mm C-Mount exchangeable lens)

- Coming Soon:
  - A2 format

The XpecEYE

THE XpeCAM® X02 CONTROL AND ACQUISITION SOFTWARE



Available:

- Automatic (Fast) Acquisition Mode:
  400 nm to 1000 nm
- Manual Acquisition Mode:
  350 nm to 1200 nm

Note: Possible to merge data acquired in automatic mode with data acquired in manual mode (and vice-versa)

LAMPA

THE COMPLETE ILLUMINATION SYSTEM FOR ART ANALYSIS

The LAMPA

THE COMPLETE ILLUMINATION SYSTEM FOR ART ANALYSIS

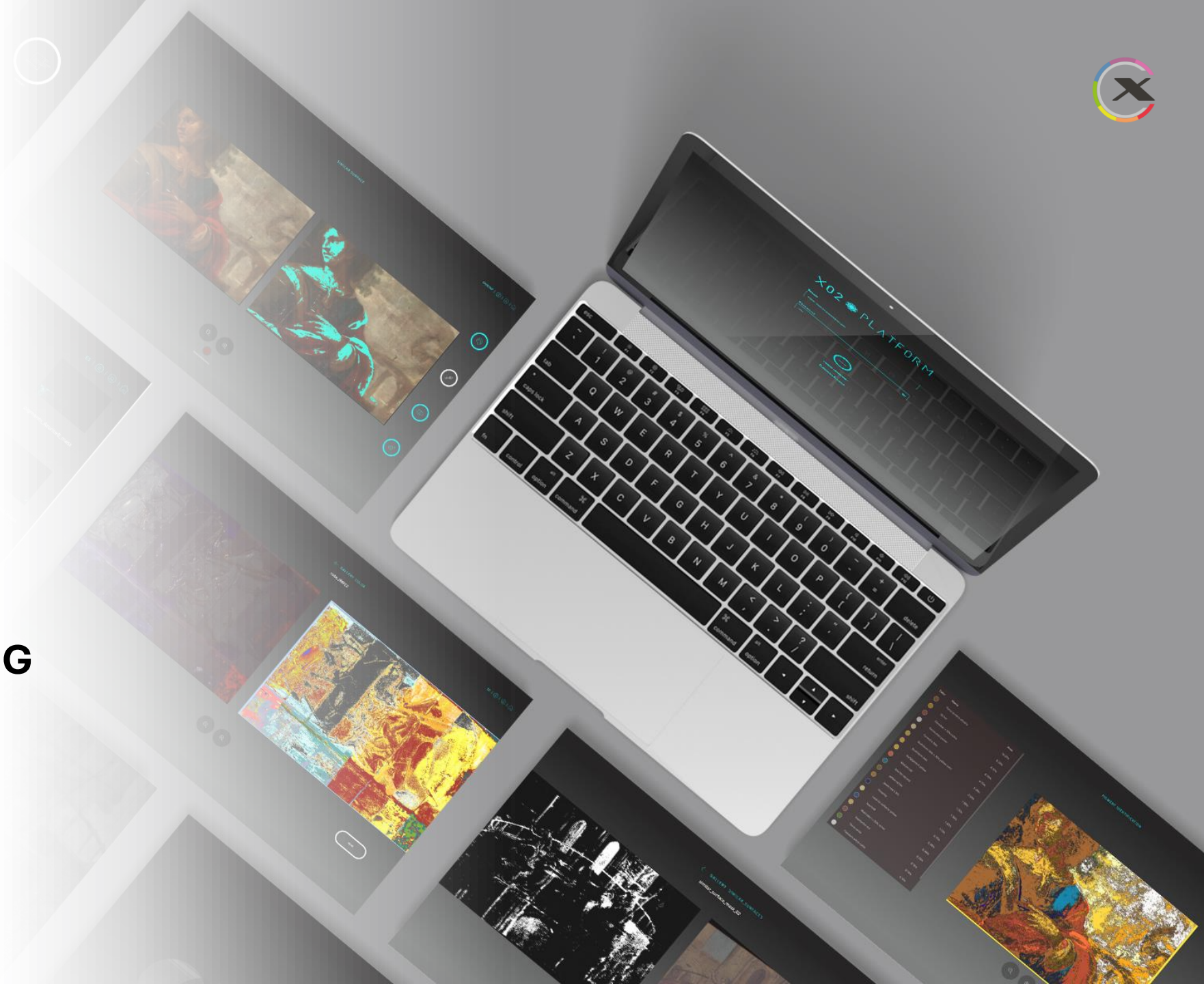
LAMPA is an all-in-one UV-VIS-IR illumination system dedicated to Art Conservation needs.

The combination of the LAMPA MASTER and the LAMPA Satellite increases the illuminated area and improves illumination homogeneity.

- Covering from 360 nm to 1200 nm with 2 lamps for the UV region, 1 lamp for the VIS region and 1 lamp for the IR region, fully remote (automatic) connection with the XpeCAM® X02, commuting the lamps ON/OFF when moving through wavelength range.

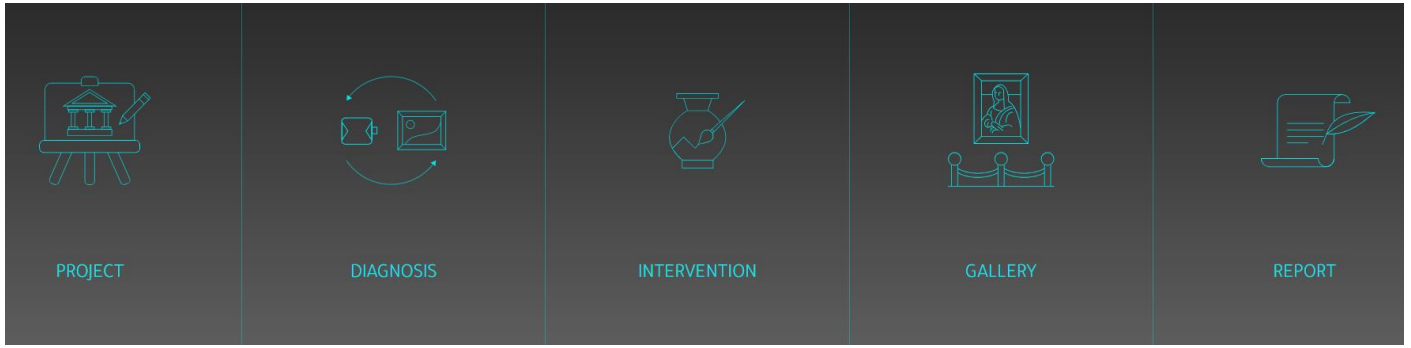
XpeCAM® CLOUD

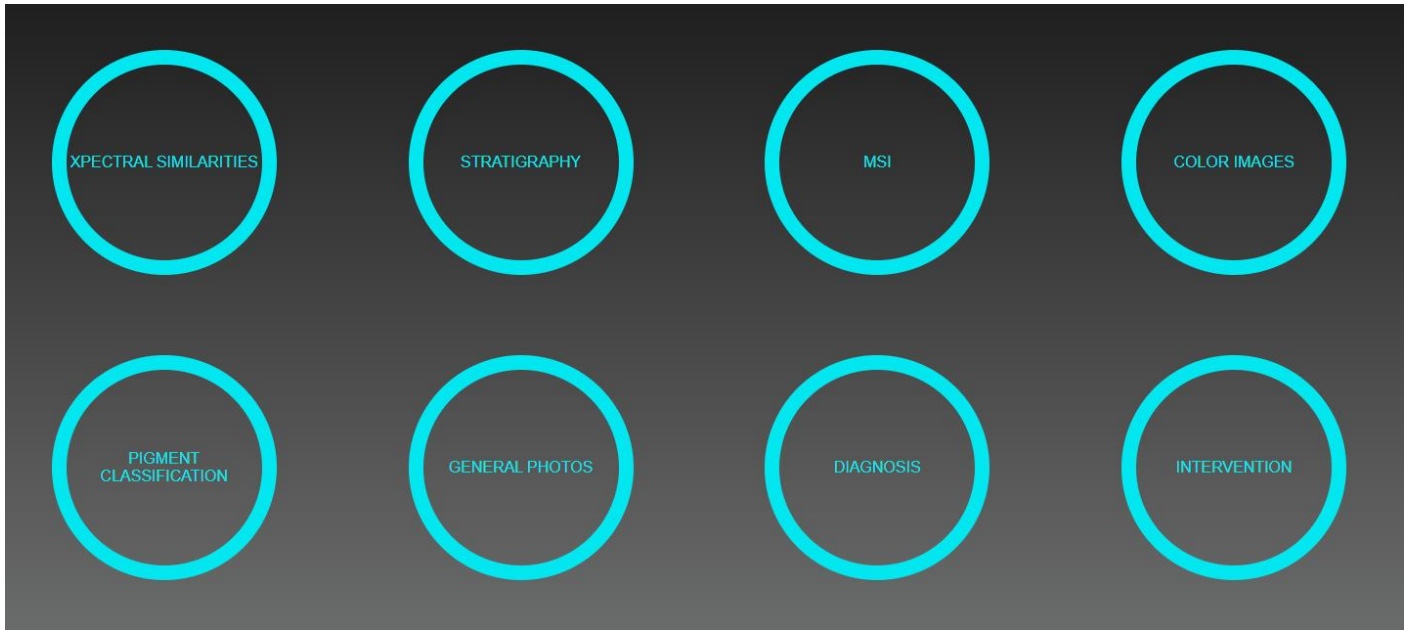
FOR DATA PROCESSING AND ANALYSIS



XpeCAM® CLOUD

FOR DATA PROCESSING AND ANALYSIS





Some of the features:

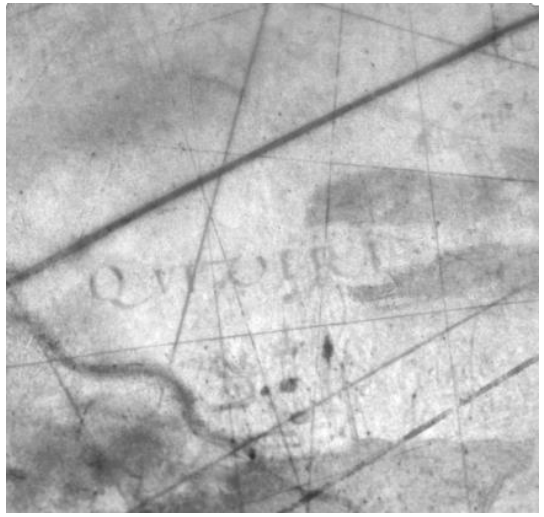
- Project (analysis) management
- Automated data processing and analysis
- Automated pigments classification(in-built pigments database)
- Spectral similarities
- Underlying image tool
- Automated reporting
- Multilanguage (EN, PT, SP, FR, KR),
- Save data storing
- and much more!

SOME EXAMPLES OF GRAPHICAL DOCUMENTS ANALYSIS

BY THE XPECAM® SOLUTION

A nautic chart

By analyzing this map with the XpeCAM® Solution, **the customer by changing from the visible wavelength range (the same wavelength range of the human eye) to the ultraviolet wavelengths range, was able to see more clearly information that was not so clear and new information/details that was not possible to see by the human eye.**



What we see in the visible range

What we see in the UV range

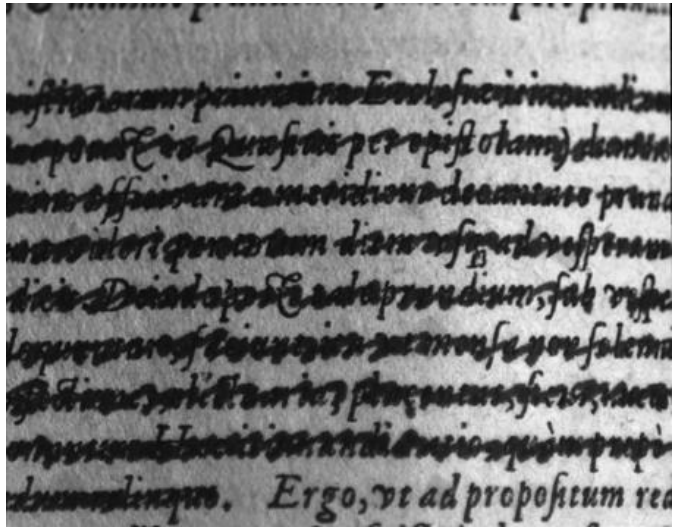
Censored image in a book

What we see in the visible range

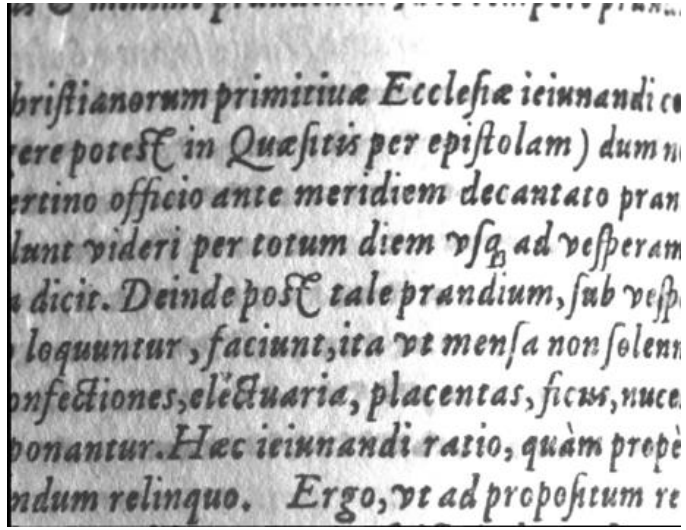
What we see in the IR range

By analyzing this censored image in a book with the XpeCAM® Solution, **the customer from 700 nm ahead (in this case analyzed it till 1100 nm) starts to see in the infrared range what was/is behind the dark ink used to censored the image.** This is possible because the dark ink is different from the remaining ink used to write and draw in the book (different spectral "signatures" of the inks at the infrared wavelengths range). By curiosity, the image was censored because was shown the Pope at the time as an evil image (like a wolf).

Censored text in a book



What we see in the visible range



What we see in the IR range

By analyzing this censored text in a book with the XpeCAM® Solution between the UV and the IR, **the customer was able to see in the infrared range what was/is behind the ink used to censored the text**. This is possible because the ink used to censor is different from the remaining ink used to write in the book (different spectral "signatures" of the inks at the infrared wavelengths range).

Historic document

This slide and the next 4 slides will show (very briefly) different data analysis of the same "sample" after data processing.

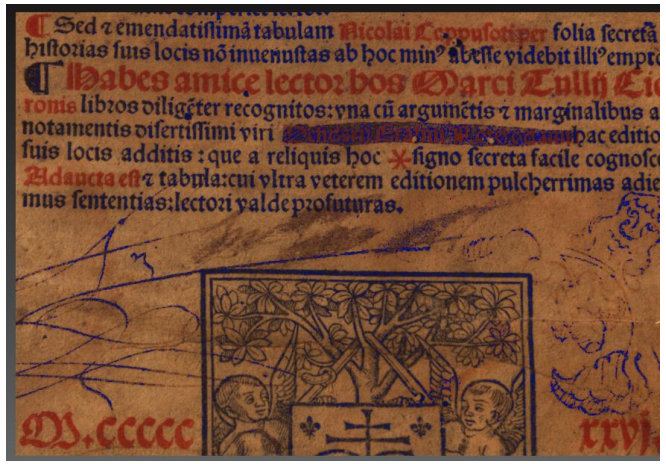
Hereunder we've the **RGB reconstruction** of the historic document. Its **a close representation of the visible photography of the original document** (applies to any "sample" measured and analyzed by the XpeCAM® Solution).

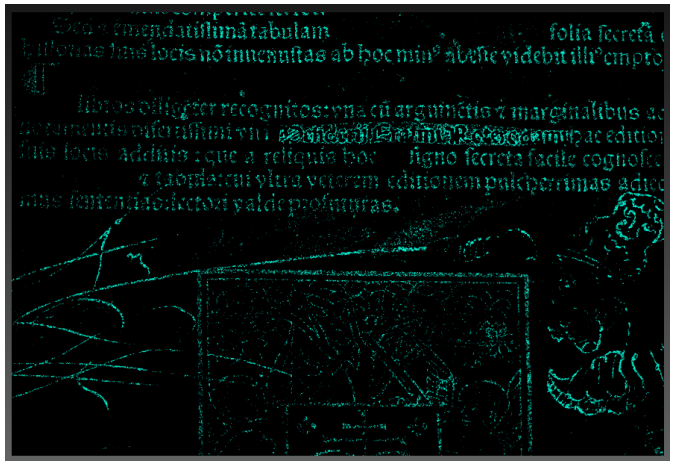
Historic document

This slide shows the **Automated Pigments Classification** done of the analyzed document. **Different colors are representing the distribution of the different pigments shown in the generated table by common international name, formula (when applies) and percentage of area**. It shows also the diversity of inks used in this document and we can also see that the high percentage of lead white on it indicates that it was used as powder to protect the book from biological attacks and/or bugs attacks.

Color	Name	Formula	Area
	Lead white	$2\ PbCO_3 \cdot Pb(OH)_2$	12.20%
	Vivianite	$Fe_3(PO_4)_2 \cdot 8H_2O$	10.00%
	Terra sombra oliveira		5.00%
	Phthalo blue	$C_{32}H_{16}N_8$	4.90%
	Vine black	C	4.30%
	Jaune mars leis		4.00%
	Turmeric lake		3.10%
	Azurite natural	$Cu_3(CO_3)_2(OH)_2$	2.80%
	Kremer white		1.70%
	Yellow ochre		1.60%
	Azurite	$Cu_3(CO_3)_2(OH)_2$	1.20%
	Sienna natur brown		0.90%
	Raw umber dark brown	$Fe_2O_3 \cdot nH_2O + Al_2O_3 \cdot MnO_2 + Si$	0.90%

Historic document



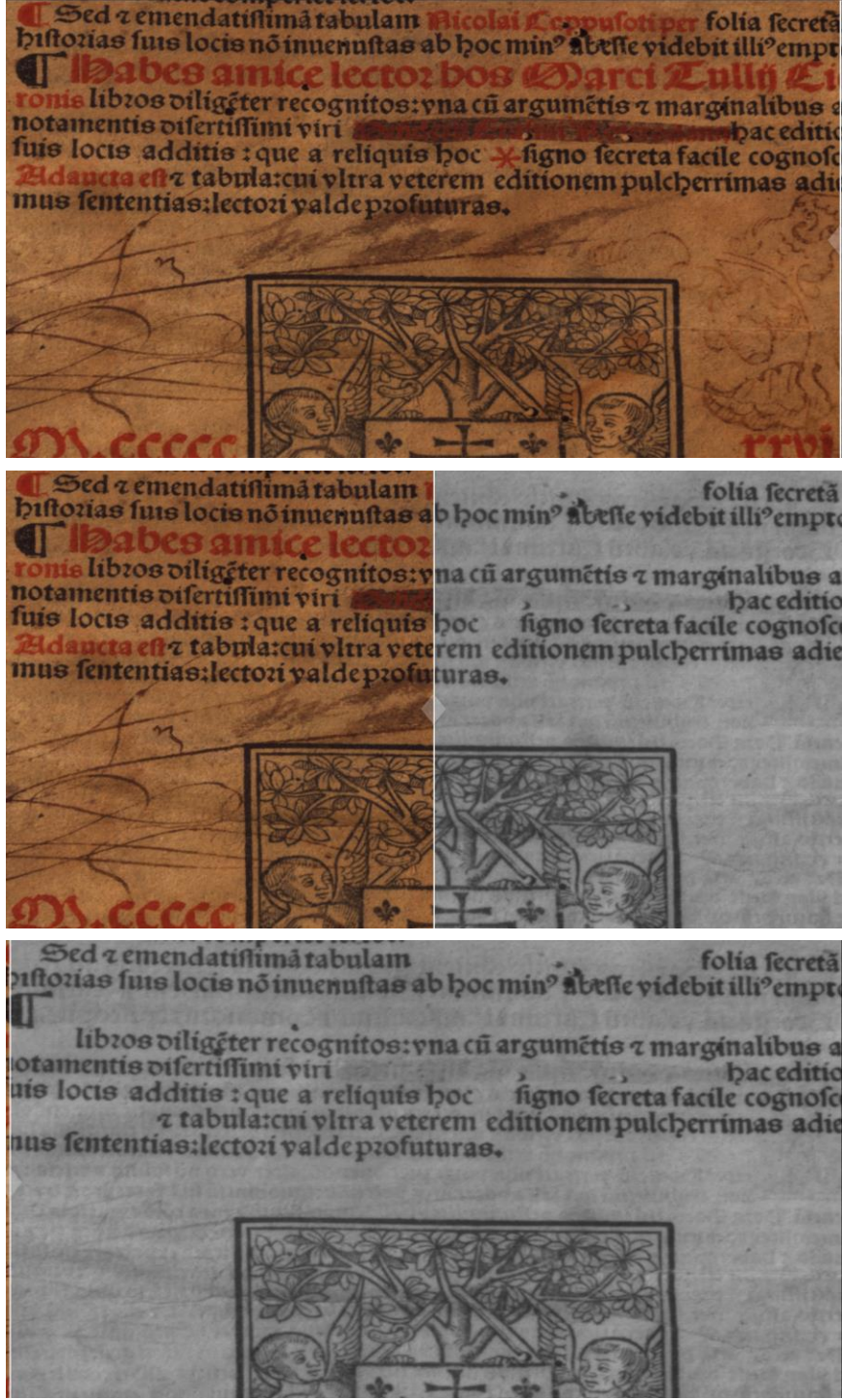


This slide shows **two different pigments distribution on the document using a color enhancing on the RGB (images on the left) and the individual pigment masks (images on the right) to be easier to understand it's distribution**. For documents it's also very useful do check different texts, signatures, drawings, etc., done by different inks.

Historic document

This slide shows the use of the **Underlying Image Tool** applied to the document.

The Underlying Image Tool its a visual comparative feature that enables the users to understand the differences between the pigmented layer and any possible underlying information (hidden information). Usually it refers to underdrawings, other paint/ink layers or signatures. Uses the RGB and one of best three IR images acquired.

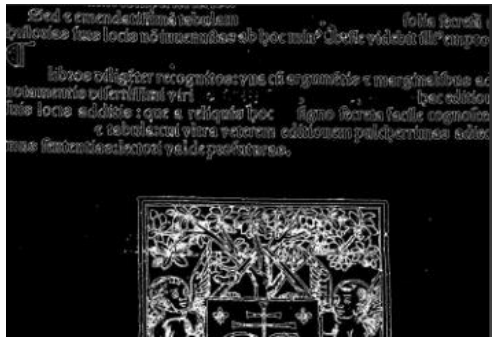


Page from an historic book

Image map of Cluster 01

Image map of Cluster 02

Image map of Cluster 03



Cluster 01 Mask

Cluster 02 Mask

Cluster 03 Mask

This slide shows another tool, the **Spectral Similarities**, where **the user can see the clusters of materials (inks) with similar spectral "signatures"**.

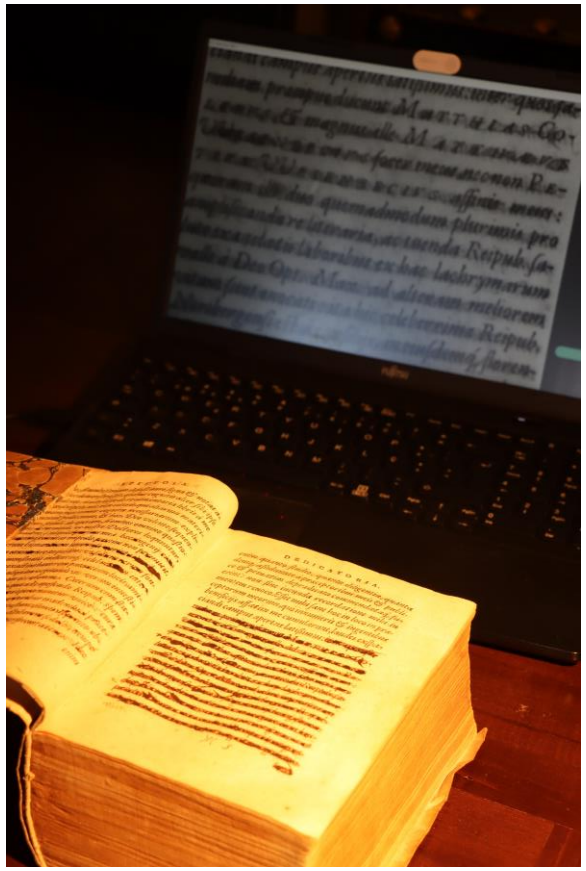
Below it's the example of the clusters and of the correspondent masks for easier visualization, showing that in the document there are few clusters and where they are on it.

WORKING ON THE FIELD RELATED TO GRAPHICAL DOCUMENTS ANALYSIS

BY THE XPECAM® SOLUTION

The XpeCAM® Solution in the field

THE XPECAM® SOLUTION DIGITALLY RESTORING CENSORSHIP TEXTS



The XpeCAM® Solution in the field

THE XPECAM® SOLUTION ANALYZING BOOKS IN A LIBRARY

The XpeCAM® Solution in the field

THE XPECAM® SOLUTION COUPLED TO A RAMAN MICROSCOPE FOR ANALYSIS OF A DOCUMENT

(Note: the XpeCAM® X02, can be coupled to any microscope that has a C-MOUNT adapter)

More information

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TOGETHER WE CAN SEE MORE!

Thank you very much!