

InsightART

— We measure the DNA of your art



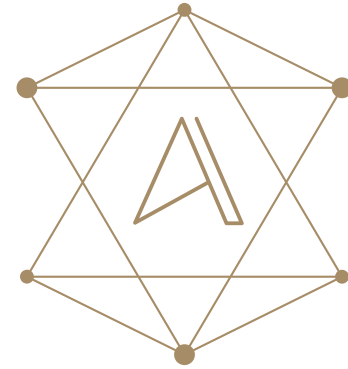
InsightART
Cutting-edge X-ray imaging
technology meets the world of art

U Pergamenky 1145/12
170 00, Praha 7
Czech Republic

info@insightart.eu
www.insightart.eu

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InsightART is revolutionising the art world with next-generation X-ray imaging technology

"InsightART strives to safeguard the world's artistic heritage. We've developed a state-of-the-art platform, RToo, designed to assist art restoration experts and to unmask forgeries. InsightART makes the lives of art professionals easier by saving time and boosting results."



Josef Uher
(founder & CTO |
particle physicist)





RToo robotic platform for ART analyses

The basic principle is the standard X-ray imaging:

- X-rays from an X-ray tube pass through the sample.
- The imaging device measures shadow cast by the sample.

The major differences between RToo and similar technologies:

1. RToo also measures wavelength of X-rays, i.e. "colours" in the shadow. The "colours" of the shadow tell us about composition of materials in the sample.
2. All is fully digital and controlled from PC.
3. The X-ray tube and detector is operated by robotic arms. This makes the imaging very capable and allows even 3D views (CT).
4. Robots provide an exchange of imaging tools - combination of X-rays with other images (visible, UV, IR, etc.).

Application of the method in the field of restoration, conservation and art history research

1. Creation of permanent technological documentation of an artwork.
2. Perfect mapping of the technical condition for the needs of restoration and conservation of the artwork.
3. Full-area material mapping of the artwork.
4. Detection of the author's changes and non-original interventions such as overpainting and later repairs.
5. Standardised monitoring of the artwork over time.
6. Standardised input data for comparative research.

Cutting-edge technology for art professionals



Reasons to choose InsightART

1. Our detectors are based on CERN technology and are used by NASA researchers.
2. From art specialists to art specialists – we automate the art imaging process.
3. Our technology automates and standardises the image post-production process.
4. RToo provides pseudo-colour X-ray scans, revealing differences in material composition.
5. The possibility of both 2D and 3D imaging of scanned objects.

Featured by:



Forbes

NASA



business incubation centre
Prague



Showcase

From B&W to colour

The common X-ray is able to reveal a hidden painting. However, even based on a perfect (yet still B&W) image, it is hard to judge where to focus other techniques or take samples for testing in the next phases of painting research. The colour image shows differences in materials of the overpainted layer and provides better guidance for what part of the painting to focus on using other techniques (XRF, electron microscopy, etc.).

Women on the Bridge,
Daylight photography, Edvard Munch, 1902



"Women on the Bridge"
Common X-ray image



"Women on the Bridge"
"Colour" X-ray image

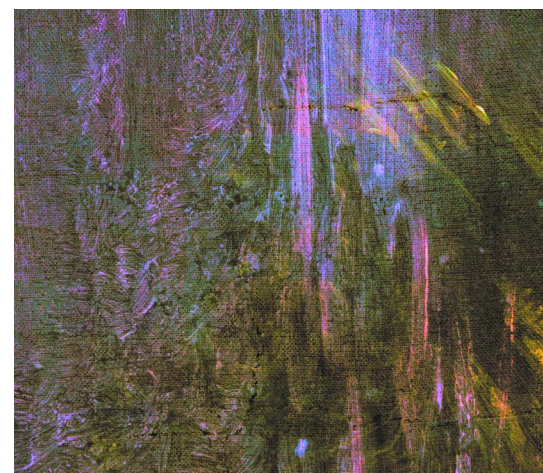


Details of brush strokes

X-ray detail of the original painting
"Women on the Bridge"



Hidden strokes are revealed in the painting, yet are those of the same pigment?



The spectral ("colour") X-ray imaging helps us recognise different pigments. This X-ray image guides further localised examination such as XRF or electron microscopy.

Post-processing

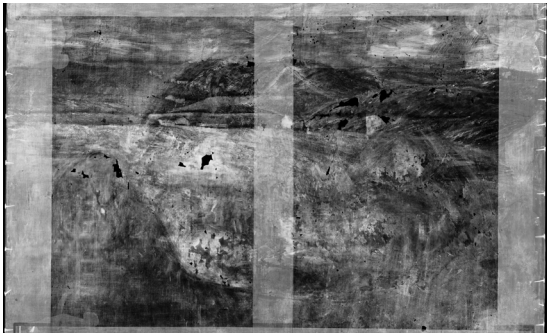


BEFORE RESTORATION

Vincent van Gogh

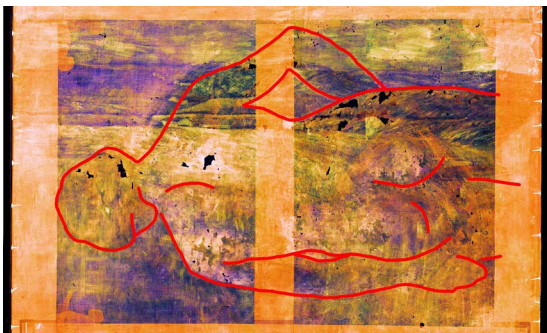
"La Crau with Montmajour in the Background"

1888



B&W HIGH-RESOLUTION X-RAY RADIOGRAPHY

Indicates that there could be another painting underneath.



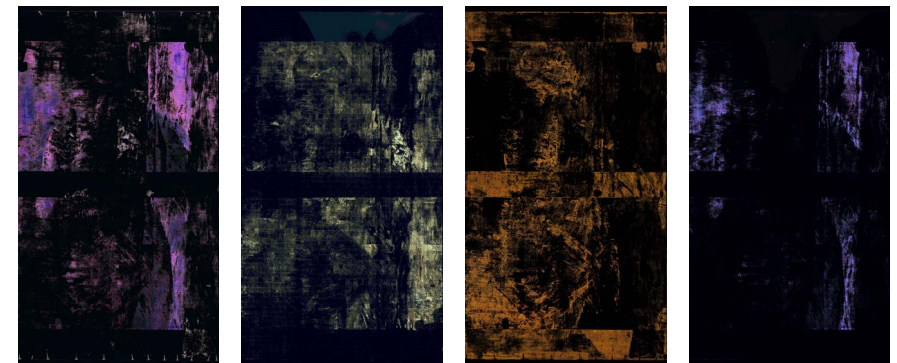
SPECTRAL X-RAY RADIOGRAPHY

Colour X-ray better indicates a silhouette of a female nude.

Advanced post-processing tools

allow to further analyse the spectral image by extracting only a certain type of pigment.

A group of pigments that were used to paint the original female nude is now clearly visible.



The advanced post-processing can be used to extract and view other pigments based on their composition.

Multimodality

Modular scanning system and standardisation of analysis

Possibility of implementation of additional modules for the exploration of painting with a wide range of imaging modalities:

- Macro-photography
- IR reflectography (spectral)
- UV fluorescence imaging
- 3D photogrammetry visualisation
- Hyper-spectral imaging
- XRF imaging
- X-ray diffraction
- Air-coupled ultrasound



Raphael Santi

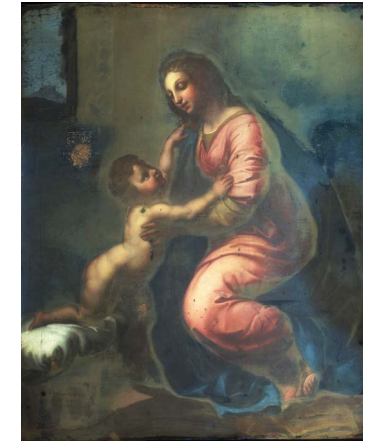
"Madonna with Child"

1517, Rome

Daylight photography



Infrared



Ultraviolet

Examples of other imaging modalities



X-ray



Multispectral X-ray

Computed tomography

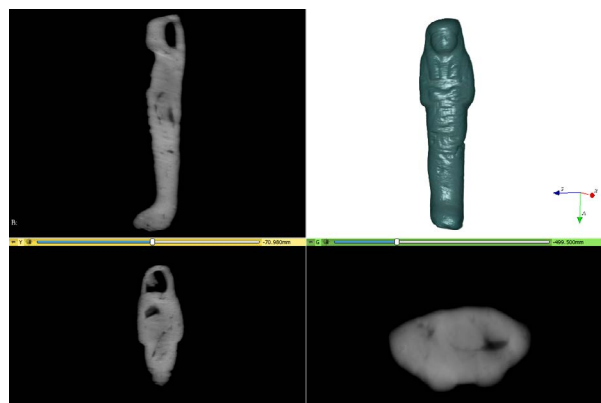


X-ray radiography in which a three-dimensional image of an object structure is constructed by computer from a series of X-ray images taken from a variety of angles.

The resulting virtual computer model representing the scanned sample visualises inner structure of the object in three dimensions.



3D CT model allows inspecting cross sections, i.e. virtual "cuts" through the object or 3D visualisation of the sample



Major benefits

Our platform scans and delivers a full-scale, fully digital high-resolution image with unprecedented contrast range and no need for further adjustments. Simply place the artwork in the robotic scanner, choose your settings from the easy-to-use interface, and let the technology work for you.



The best X-ray image quality on the market



"Color" X-ray imaging able to distinguish materials (new functionality of common X-ray imaging)



Automatic scanning (no chemical development, scanning stitching in Photoshop)



Fully digital output



"Two-in-one": automatic 2D scanner and computed tomography



Platform: extendable by other imaging modalities

Our product

InsightART's main product is the RToo scanner—your “Swiss knife” for art inspection.

	RToo	X-ray tube + film scanner	X-ray tube + Imaging plate scanner
Material composition differentiation (“colour X-rays”)	✓	-	-
Large area 2D X-ray images	✓	✓	✓
2D image size in single exposure	60x120 cm	30x40 cm	35x43 cm
Number of grey levels digitised	16,777,216	65,536	65,536
Dynamic range [dB]	144	96	96
CT (3D computed tomography)	✓ 10x10x10 cm ³	- N/A	- N/A
CT scan of region-of-interest	✓	N/A	N/A
Detector resolution [µm]	55	40	50
Online images	✓	-	-
Chemical processing	-	✓	-
Digital data readout	✓	-	✓
Offline digitisation required	-	✓	✓
Extension by other imaging modalities	✓	-	-
Laser surface scanning	✓	-	-
Macro-photography IR reflectography (spectral) UV fluorescence imaging 3D photogrammetry visualisation Hyper-spectral imaging XRF imaging X-ray diffraction Air-coupled ultrasound	extension under development	-	-

X-ray tube + Flat panel	Spectral Medical CT	Industrial CT	XRD
-	✓	-	-
Custom mechanics required	-	-	-
12x7 cm	-	41x41 cm	1.4x1.4 cm
3,547	N/A	10,000	11,810
71	N/A	80	81
- N/A	✓ 210x70x70 cm ³	✓ 50x50x100 cm ³	- N/A
N/A	-	-	N/A
74.8	500	100	55
✓	-	✓	-
-	-	-	-
✓	✓	✓	✓
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

Robotic Scanner RToo!

Your "Swiss knife" for art inspection

Our multimodal RToo scanner is equipped with specially designed robotic arms that allow for unprecedented FLEXIBILITY, enabling RToo to **scan not only 2D but also 3D objects** including statues, sculptures and antiques.



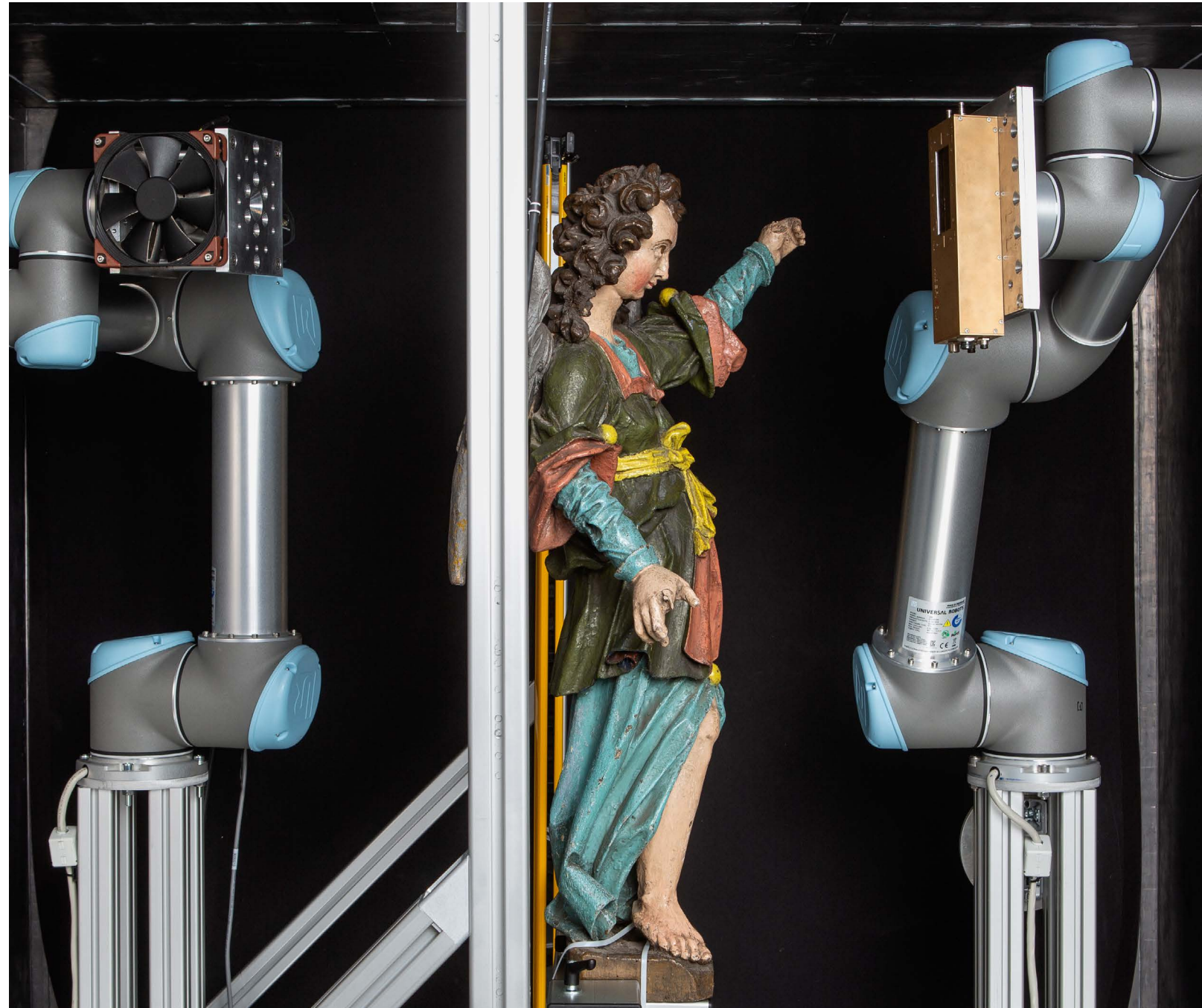
Statues



Sculptures

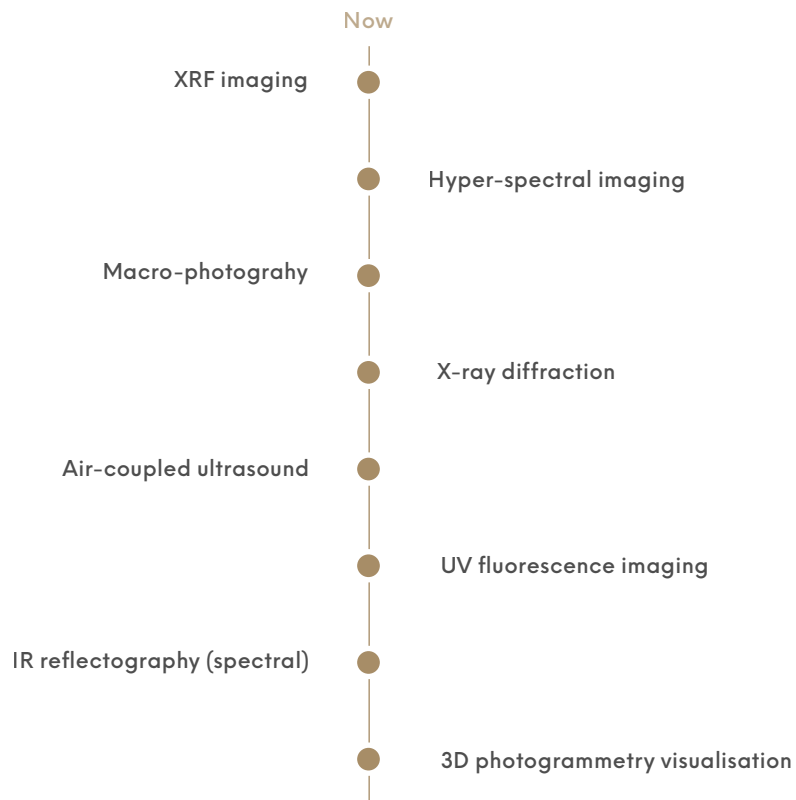


Antiques



COMING SOON

Our experts are working on the next steps of RToo's evolution to further enhance its position as the all-in-one "Swiss knife" for art inspection. Simply add new modules to make your RToo more powerful, rather than purchasing a brand-new, expensive machine.

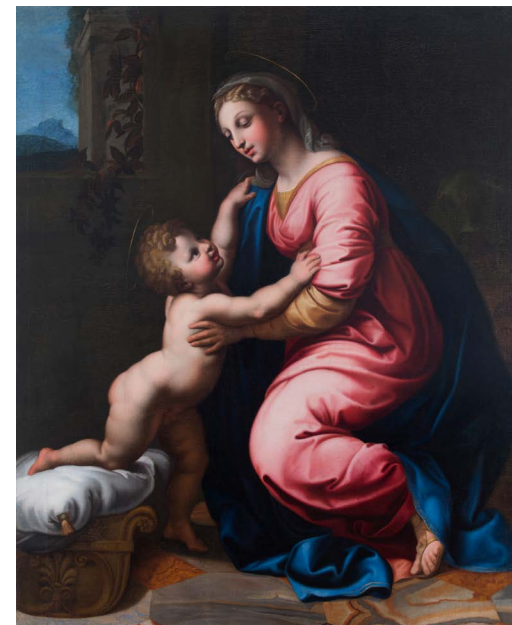


If you purchase your RToo now, you get **50% discount** on all **additional modules** we develop in the future.

References



A/ Landscape attributed to Vincent van Gogh
The X-ray image reveals a painting of a female nude strikingly similar to van Gogh's nudes from the same period, which provides strong evidence for the painting's authenticity.



B/ Raphael Santi – "Madonna and Child"
X-ray showing the micro-structure of the work, which helps in subsequent art restoration.

1. Services

Artworks scanning service



Superior quality full-scale and fully digital X-ray images of art objects in unprecedented contrast and detail.

InsightART offers the service of X-raying artworks – **paintings, statues or antiques.**

We currently operate a full-service laboratory in **Prague.**

Deliverables:

- a full-area high-resolution black & white scan
- a full-area high-resolution colourised scan showing material composition
- report describing the performed measurement and technology

2. Hardware

RToo – modular robotic X-ray imaging system with broad expandability



The robotic RToo X-ray scanner system includes:

- Photon-counting X-ray imaging detector **Widepix 1x5 MPX3**, resolution of 55 μm
- Collaborative robotic arms Universal Robots **UR-5**
- X-ray tube **Oxford Instruments Apogee**
- Mechanics for robot support
- **X-ray shielded cabinet**
- **Laser Curtain**
- Control PC or Mac
- Scanner control and **data processing software**

Delivery:

6 months from the date on which we receive your order

Advisory board

As part of our ongoing efforts to find the best solutions for art analysis, we are excited to cooperate with leading experts in the fields of art authentication and scientific research.



MAURIZIO SERACINI

Since the mid-1970s Maurizio Seracini has pioneered the use of multi-spectral diagnostic imaging, analytical diagnostics and other advanced technologies to study art and architecture.



OTTO M. URBAN

Otto M. Urban is an art historian specialising in modern and contemporary European art. In 2017, he became curator of the 19th Century Art Collection at the National Gallery in Prague.



MONSIGNOR TIMOTHY VERDON

Monsignor Timothy Verdon is Director of the Opera del Duomo Museum in Florence, Italy. He has served as Consultant to the Vatican Cultural Heritage Commission and is a Fellow at the Harvard University Center for Italian Renaissance Studies.



JIŘÍ FAJT

Jiří Fajt is an art historian specialising in the medieval and early modern art of Central and Eastern Europe. He is the author of numerous publications on art history and has curated many international exhibitions.

Our partners

Advacam

Our parent company, the developer of photon-counting detectors based on next-generation imaging technology.

Radalytica

Our sister company, which provides us with robotic systems. They focus on the implementation of technologies in non-destructive testing (NDT), medicine and other specialised areas.

Air Ventures

A CEE-based Venture capital group with extensive experience investing in successful innovative high-tech start-ups.

ESA BIC

InsightART is one of the few companies in Central Europe cooperating with ESA BIC.



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