



Introduction to NCU Optical Coherence Tomography Instruments

Nicolaus Copernicus University Toruń, Poland

Toruń, 2013



Faculty of Physics, Astronomy and Informatics

Centre for Astronomy

Inst. of Physics

Dept. of Informatics

School of Engin.

Department of Biophysics and Medical Physics

+7

Optical Biomedical
Imaging Group

Laboratory for Optical
Structural Research

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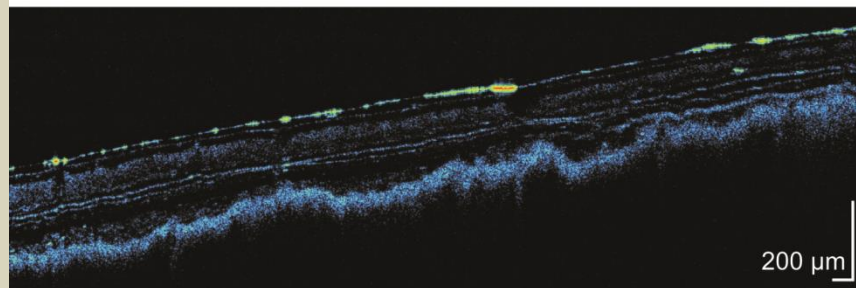
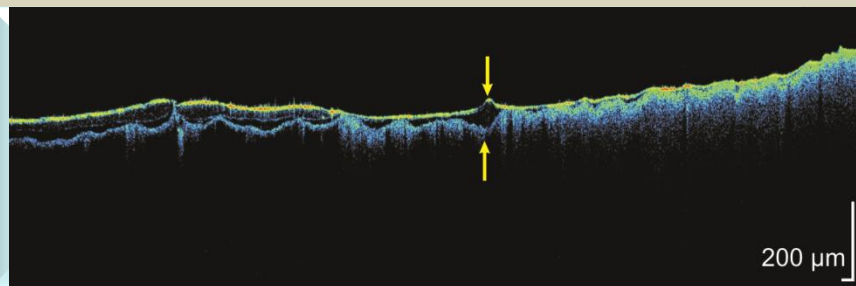
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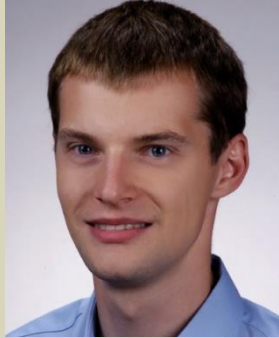
Laboratory for Optical
Structural Research



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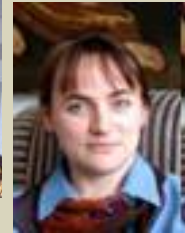
P. Targowski PhD

In permanent co-operation with:



**Institute for the Study, Restoration and Conservation of Cultural Heritage,
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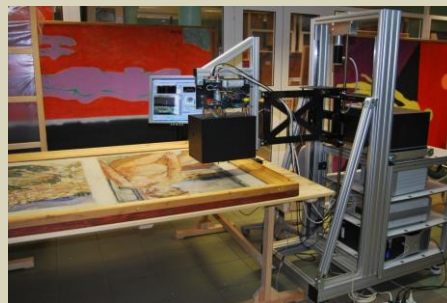


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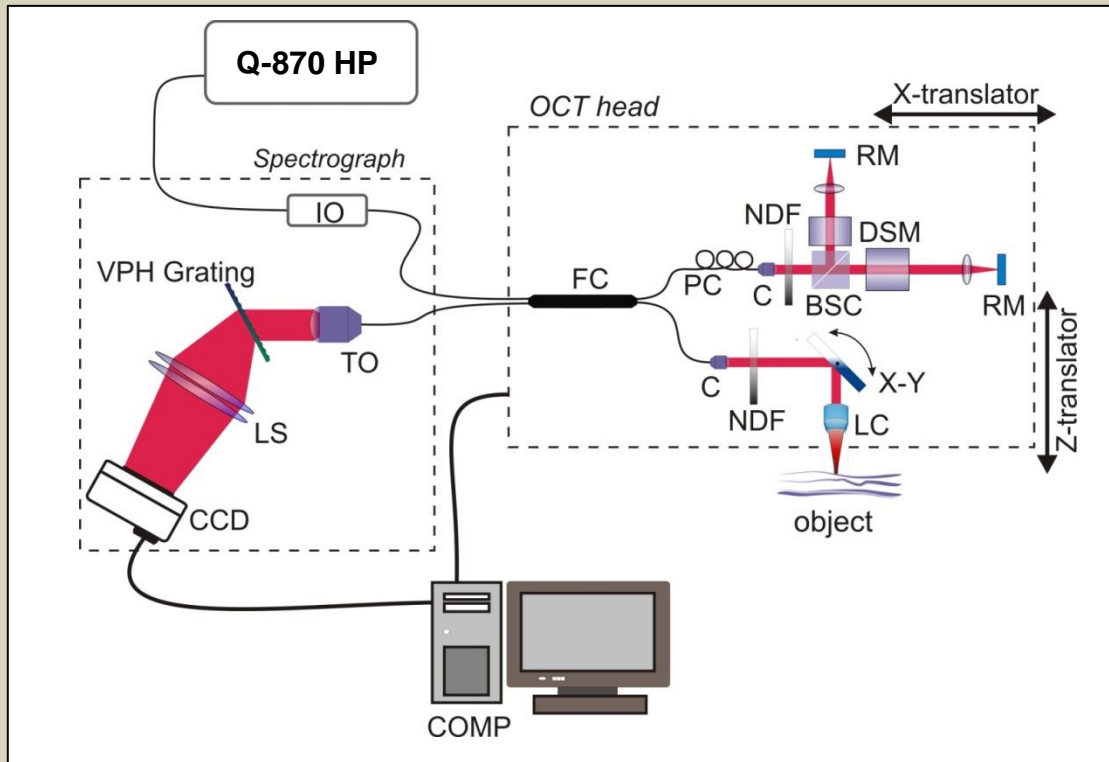
Characteristics of the instruments

General description: Spectral domain OCT utilising diffraction grating spectrometer with linear CDD detector (2048 px)

parameter	Instrument I	Instrument II
light source	D855 Broadlighter	Q-870-HP Broadlighter
spectral range	780 – 920 nm	770 – 970 nm
power at object	600 – 1500 μ W	800 μ W
axial resolution	4.5 μ m (in varnish)	2.2 μ m (in varnish)
transverse resolution	~15 μ m	12 μ m
sensitivity	~ 100 dB	~ 100 dB
distance to object	65 mm	43 mm
max. field of view	20 x 20 mm	17 x 17 mm

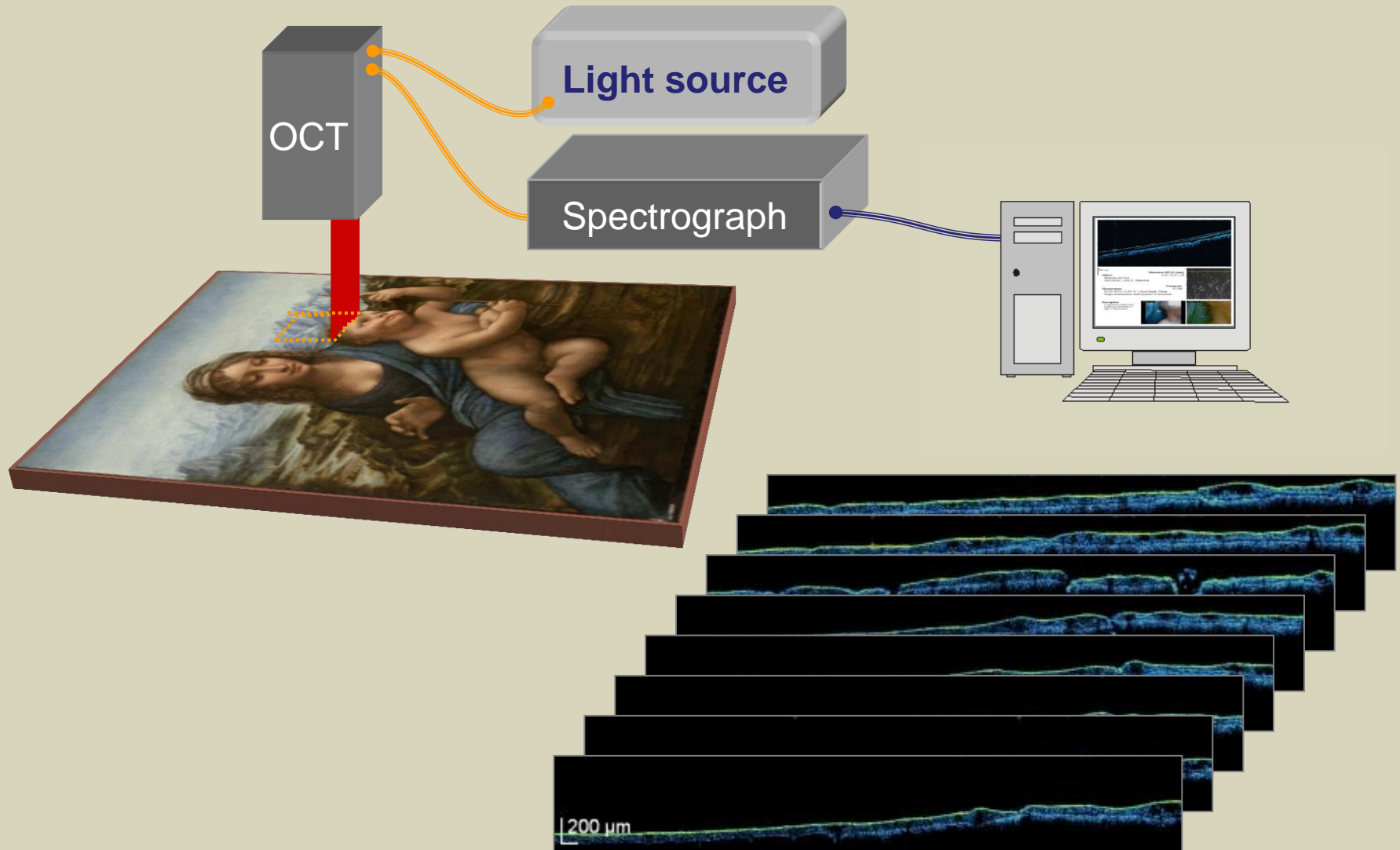


The new system, built for CHARISMA



objective	LSM 04	LSM 02
Lateral resolution	12.4 μm	6.2 μm
Distance to object	43 mm	7.5 mm
Scanned area	17 x 17 mm	5 x 5 mm
DOF	250 μm	55 μm

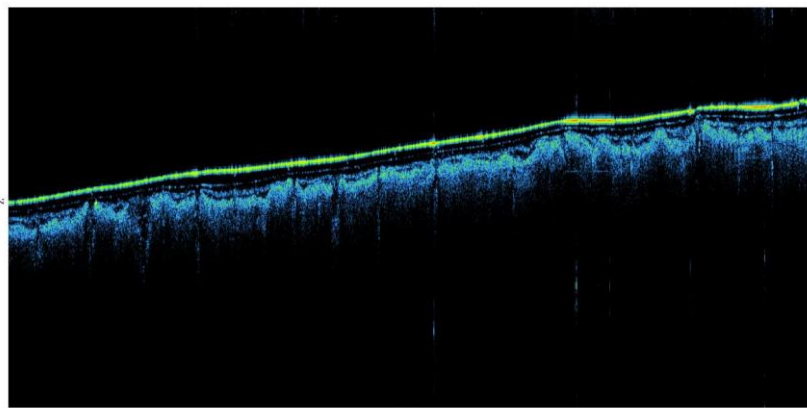
Data collection modes



Output data formats - default



Output data formats - default



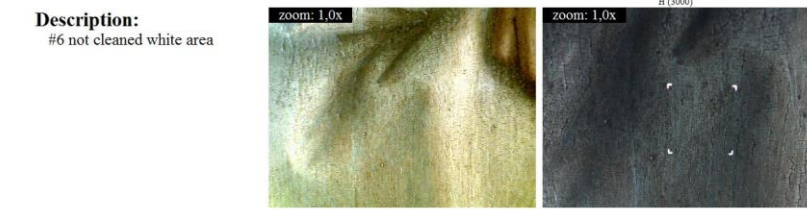
200 um

Object:
City view
2013-02-27_153707_3000x100
(X: 19,8 cm / Y: 149,2 cm)

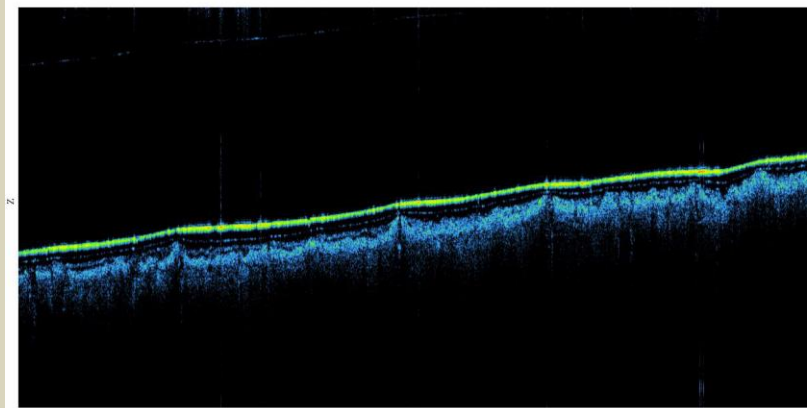
Dimension (H|V|Z) [mm]:
10,0 | 10,0 | 1,09

Tomogram:
50/100

Measurement:
27-02-2013 (15:37:07), focal length: 54mm
Single measurement, head position: 0, horizontal
Rotated from object orientation "90 right" to "straight"



.jpg



200 um

Object:
City view
2013-02-27_153707_3000x100
(X: 19,8 cm / Y: 149,2 cm)

Dimension (H|V|Z) [mm]:
10,0 | 10,0 | 1,09

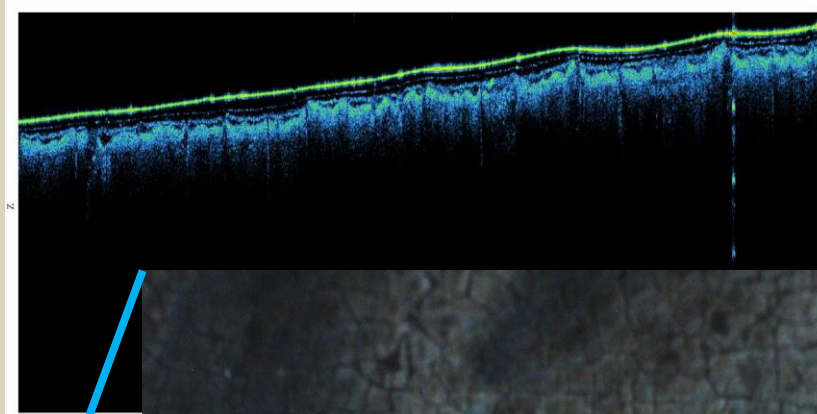
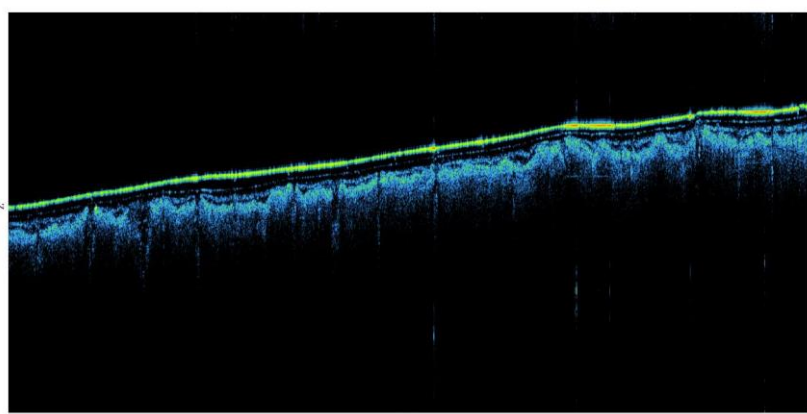
Tomogram:
1/100

Measurement:
27-02-2013 (15:37:07), focal length: 54mm
Single measurement, head position: 0, horizontal
Rotated from object orientation "90 right" to "straight"



.avi

Output data formats - default



200 um



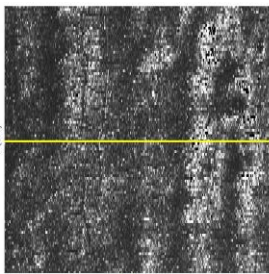
Object:
City view
2013-02-27_153707_3000x100
(X: 19,8 cm / Y: 149,2 cm)

Dimension (H|V|Z) [mm]:
10,0 | 10,0 | 1,09

Tomogram:
50/100

Measurement:
27-02-2013 (15:37:07), focal length: 54mm
Single measurement, head position: 0, horizontal
Rotated from object orientation "90 right" to "straight"

Description:
#6 not cleaned white area



200 um

Object:
City view
2013-02-27_153707_3000x100
(X: 19,8 cm / Y: 149,2 cm)

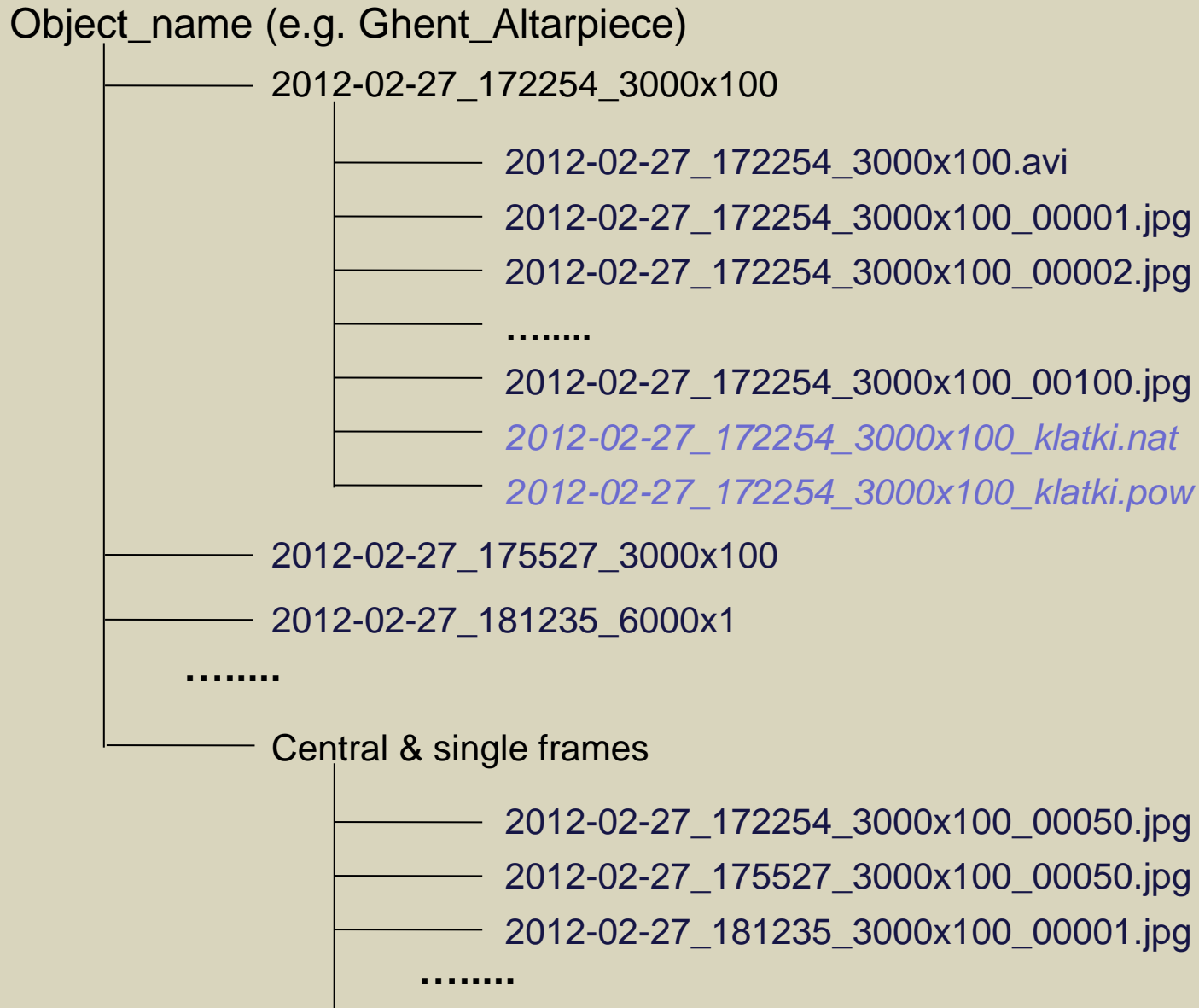
Measurement:
27-02-2013 (15:37:07), focal length: 54mm
Single measurement, head position: 0, horizontal
Rotated from object orientation "90 right" to "straight"

Description:
#6 not cleaned white area



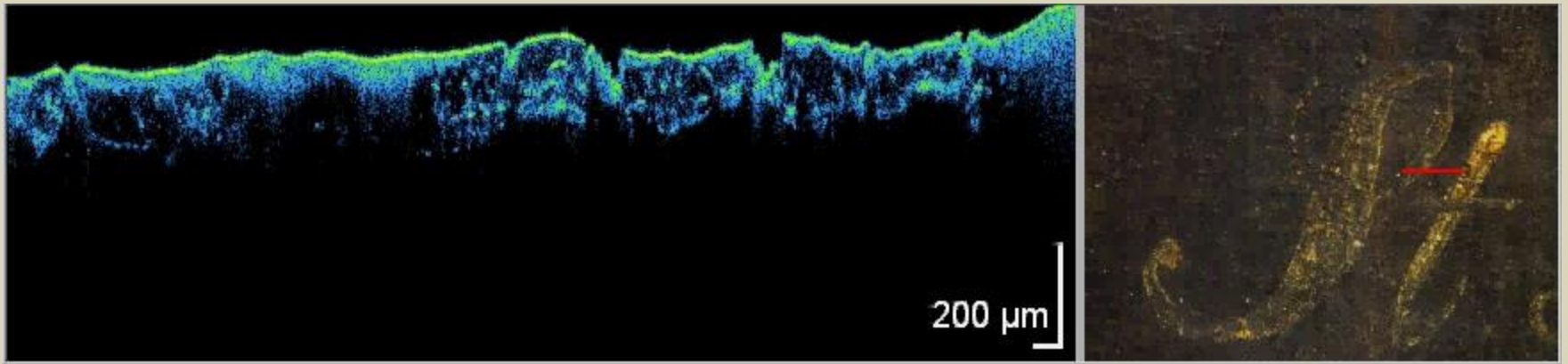
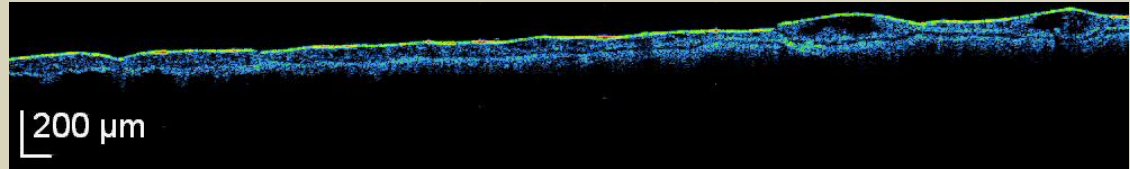
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Catalogue structure

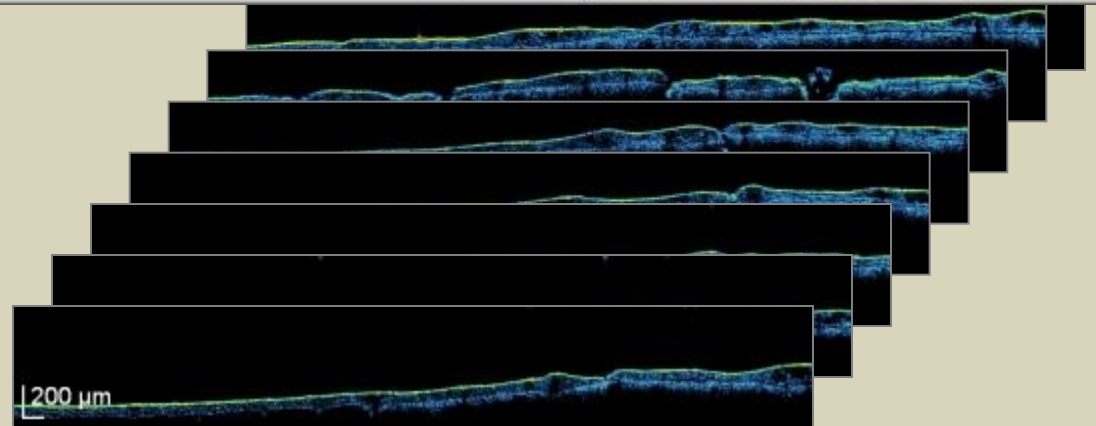


Output data formats

Cropped AVI

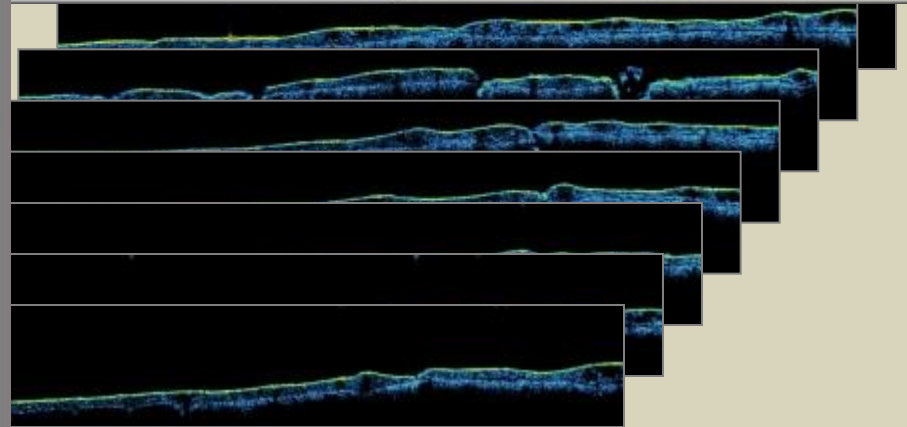
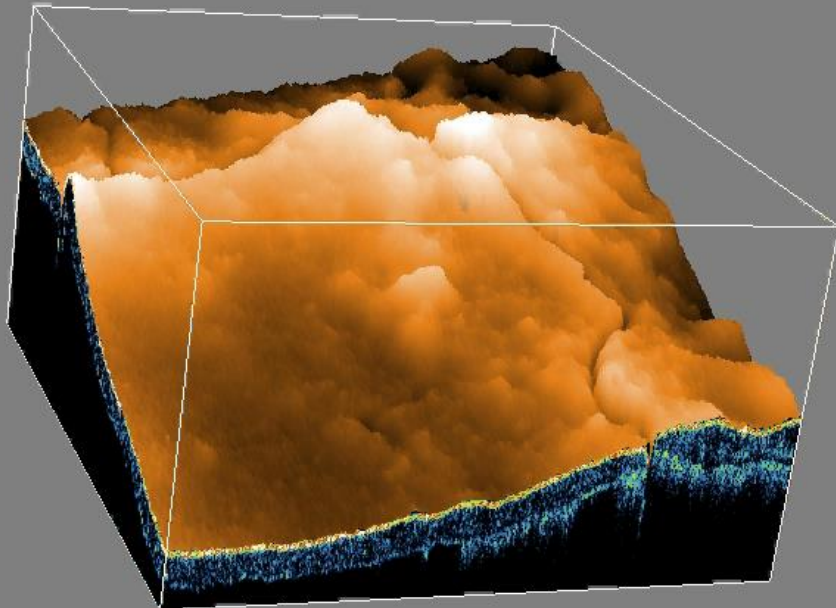
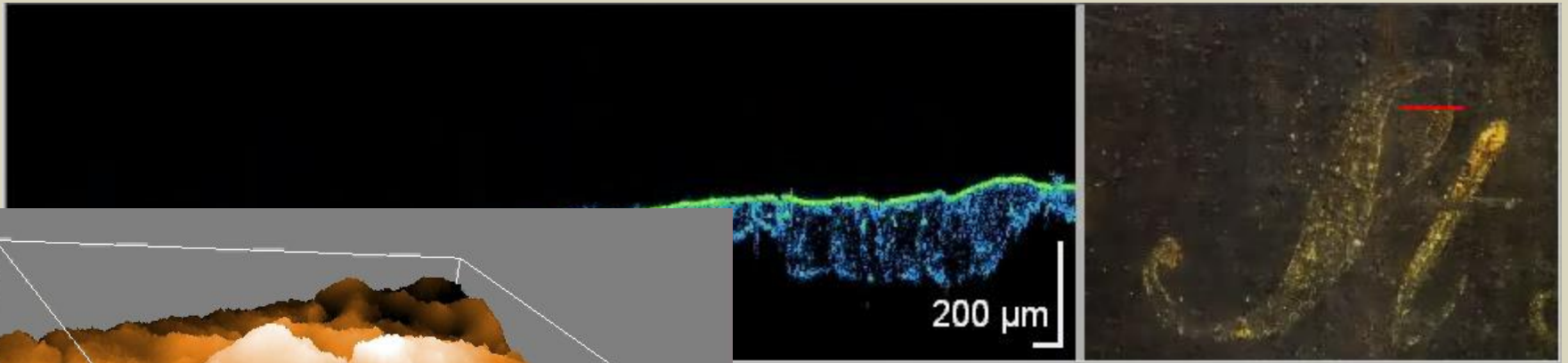
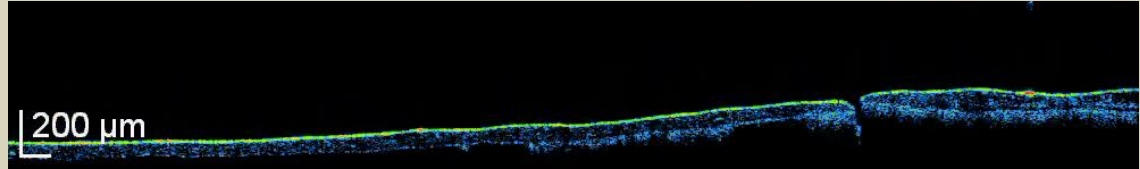


Composed AVI



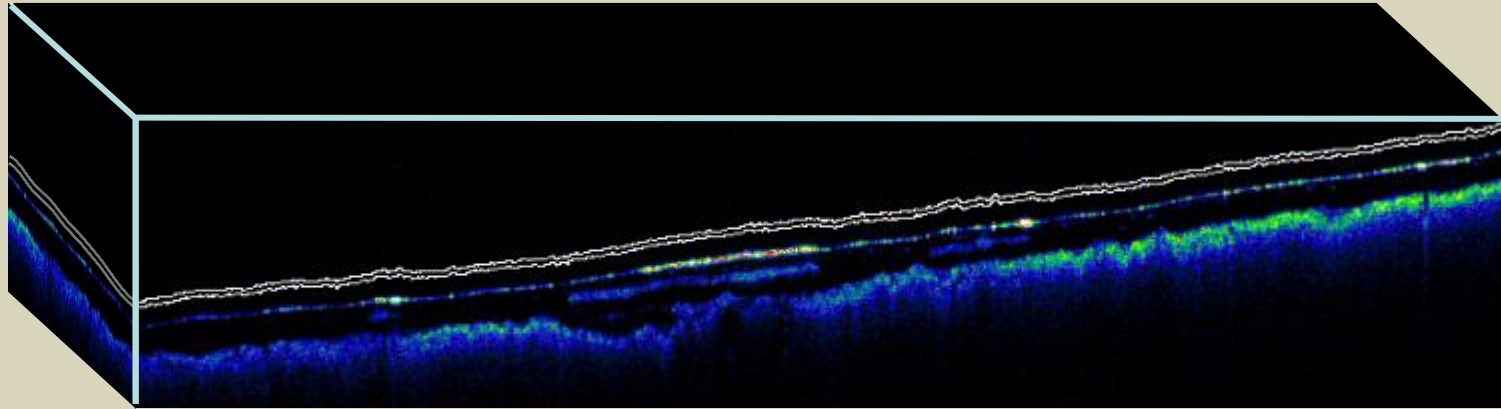
Output data formats

Cropped AVI

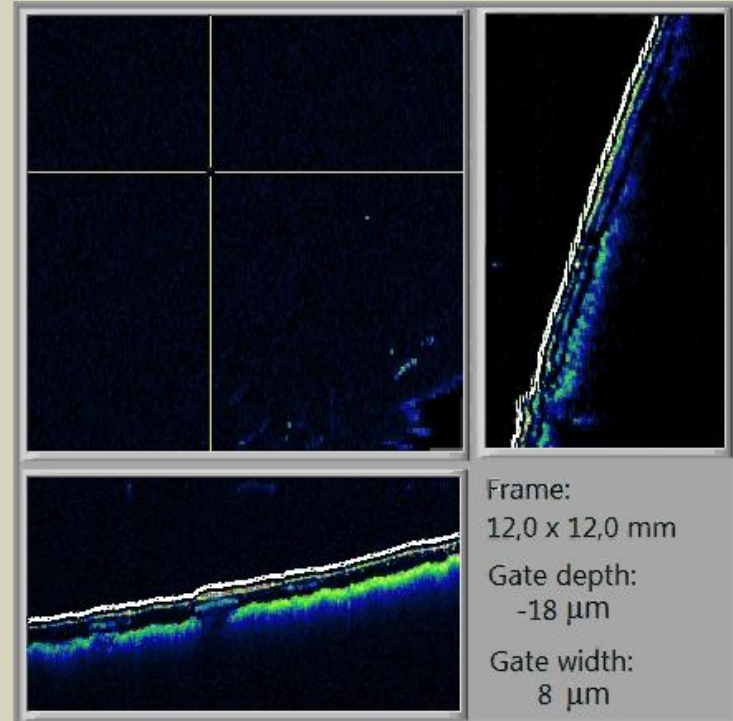
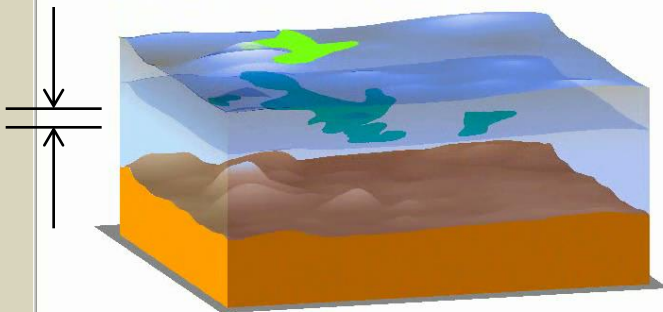


Surface + cross-sections

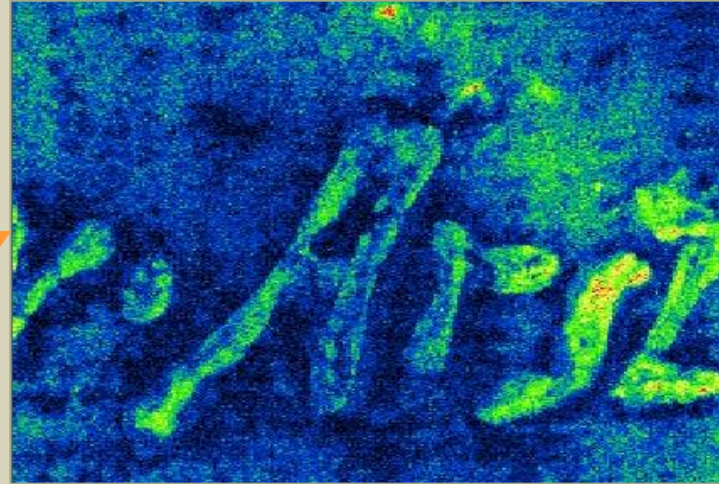
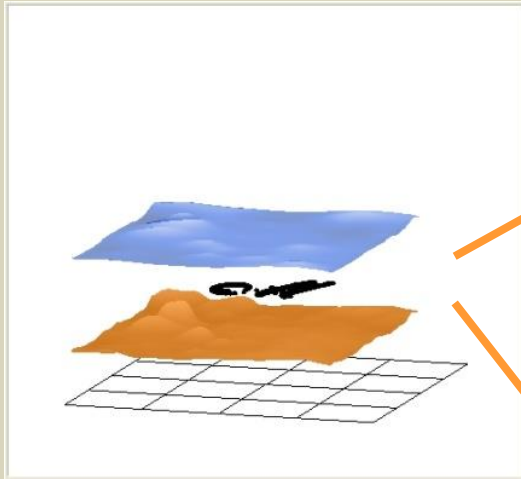
Output data formats



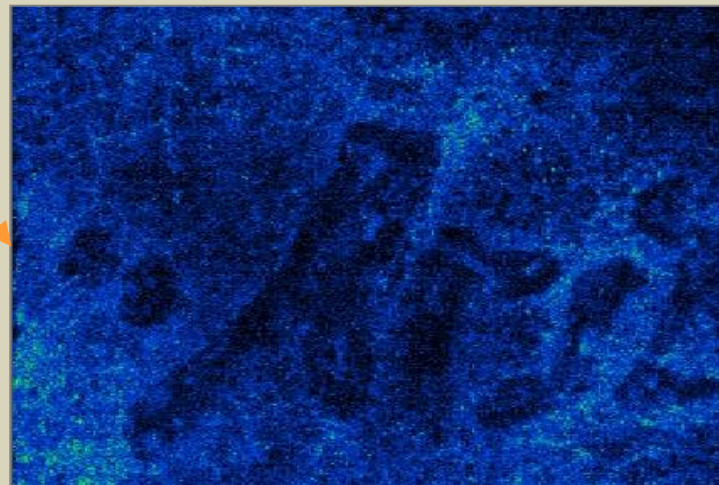
Coherence gate



Inscription between two varnish layers



50÷90 μm



90÷160 μm

- structure examination:

- ✓ sequence and thickness of varnish and glaze layers
- ✓ absolute LIBS stratigraphy
- ✓ destruction processes of historic glass
- ✓ structure of objects with glass support
- ✓ structure and surface morphology of glazed ceramics
- ✓ volume rendering – 3D maps and profilometry

- real-time monitoring:

- ✓ monitoring of cleaning procedures, inc. monitoring of laser ablation of varnish
- ✓ tracking of deformations under environmental stress

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INNOVATIVE ECONOMY
NATIONAL COHESION STRATEGY



ZPORR
Zintegrowany Program
Operacyjny
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