

Digital Pathology Solutions by Hamamatsu

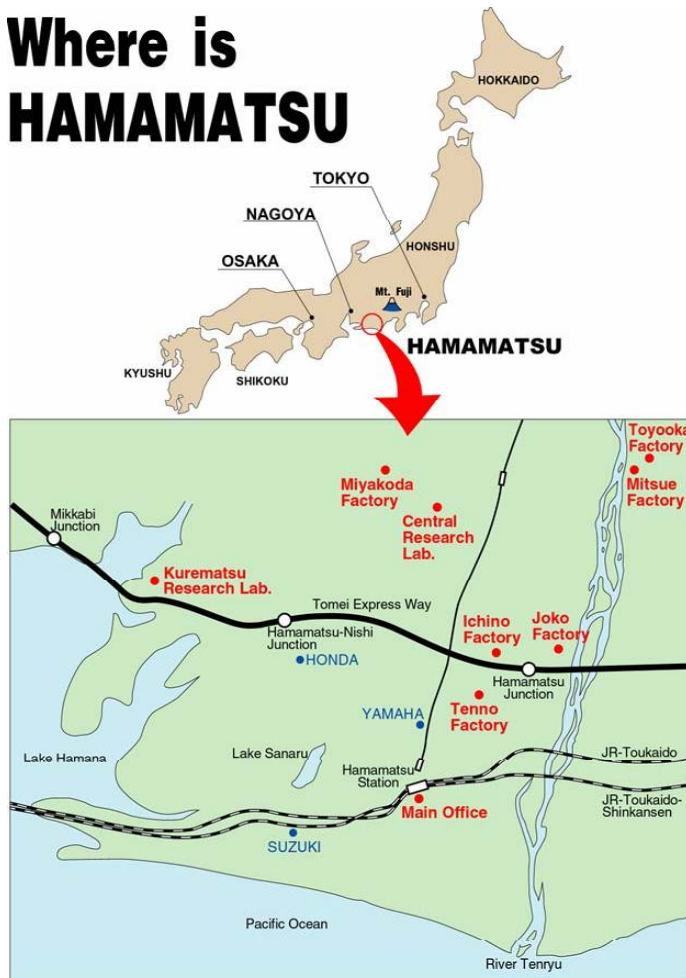


Presentación para el Congreso Telepatología en Jerez. Noviembre 2014

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Manager Spain-Portugal

Who is Hamamatsu?

Where is HAMAMATSU



- Founded in 1953 in Hamamatsu City
- Hamamatsu creates, develops, produces and distributes a wide range of opto-electronic components and systems
- Revenue of approx. 1 billion \$ per year
- 3,200+ employees worldwide
- 4 divisions + CRL: Central Research Laboratory
- >10% of revenue for Research and Development

Products and Key Technologies



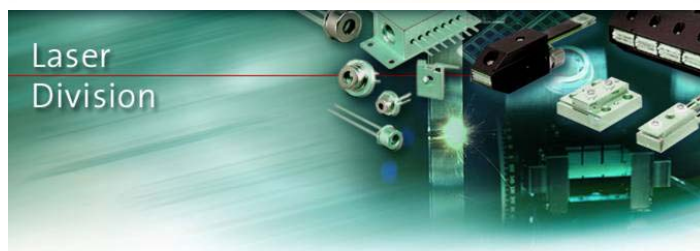
Photomultiplier Tubes, Light Sources, Fiber Optics Plates, Image Sensors, X-ray products, etc.



Photodiodes, Image Sensors, Infrared Sensors, X-ray Sensors, Solid State Emitters, etc.

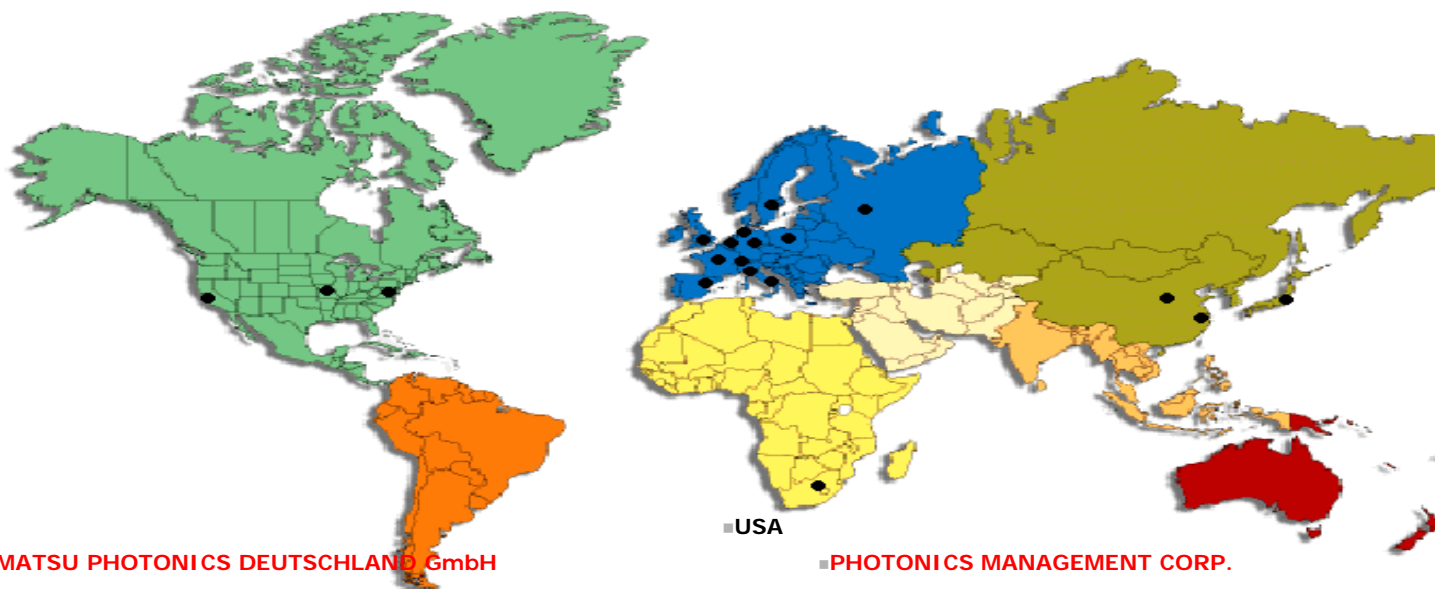


Imaging & Measurement Instruments in the diverse fields such as biological/medical/pharmaceutical fields, semiconductor, spectroscopy and industry



High Power LD, CW LD, etc.

Hamamatsu Photonics worldwide



■ Europe

- **HAMAMATSU PHOTONICS DEUTSCHLAND GmbH**
 - Northwest Office
 - Danish Office
 - Netherlands Office
 - Poland Office
- **HAMAMATSU PHOTONICS FRANCE S.A.R.L.**
 - Swiss Office
 - Belgian Office
 - Spanish Office
- **HAMAMATSU PHOTONICS NORDEN AB**
 - Russian Office
- **HAMAMATSU PHOTONICS ITALIA S.R.L.**
 - Rome Office
- **HAMAMATSU PHOTONICS UK Limited**
 - South Africa office

■ USA

- **PHOTONICS MANAGEMENT CORP.**
 - HAMAMATSU CORPORATION
 - Factory
 - Western office (Sales)
 - Chicago office (Sales)
 - Sunnyvale office (Sales)
 - INSPEX, INC
 - UNIVERSAL SPECTRUM CORPORATION
 - PHOTONICS RESEARCH CORP.
 - Compix Inc., Imaging systems

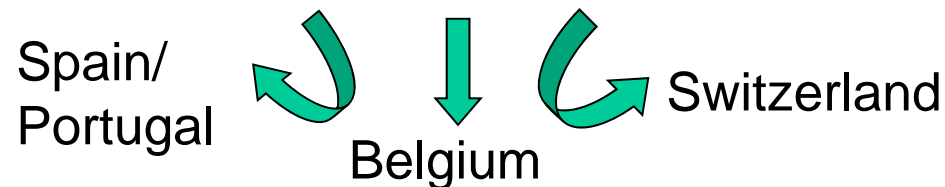
■ Asia

- **HAMAMATSU PHOTONICS K.K.**
 - Beijing Sales Office
 - Shanghai Sales Office
- **Beijing Hamamatsu Photon Technologies Ltd.**

Hamamatsu Photonics in France

HPF = Subsidiary of Hamamatsu Photonics K.K.

- Based in Paris suburbs since 1985
- Structure of 60+ employees, with local sales offices



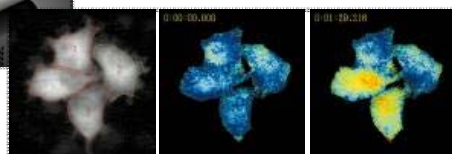
- Mainly Sales Team
- And a Technical Support team of 6 Engineers



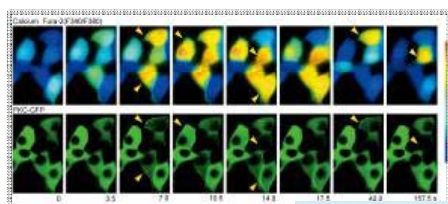
Life Science Systems...

ImagEX2

High-End Scientific
Cameras

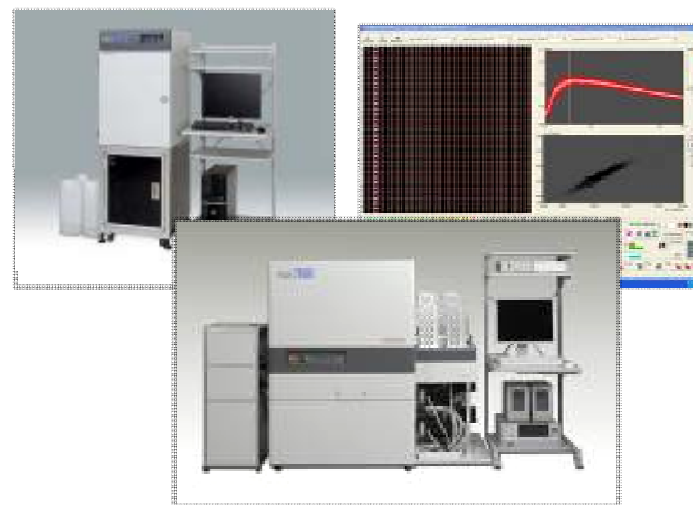


FRET imaging of protein interaction

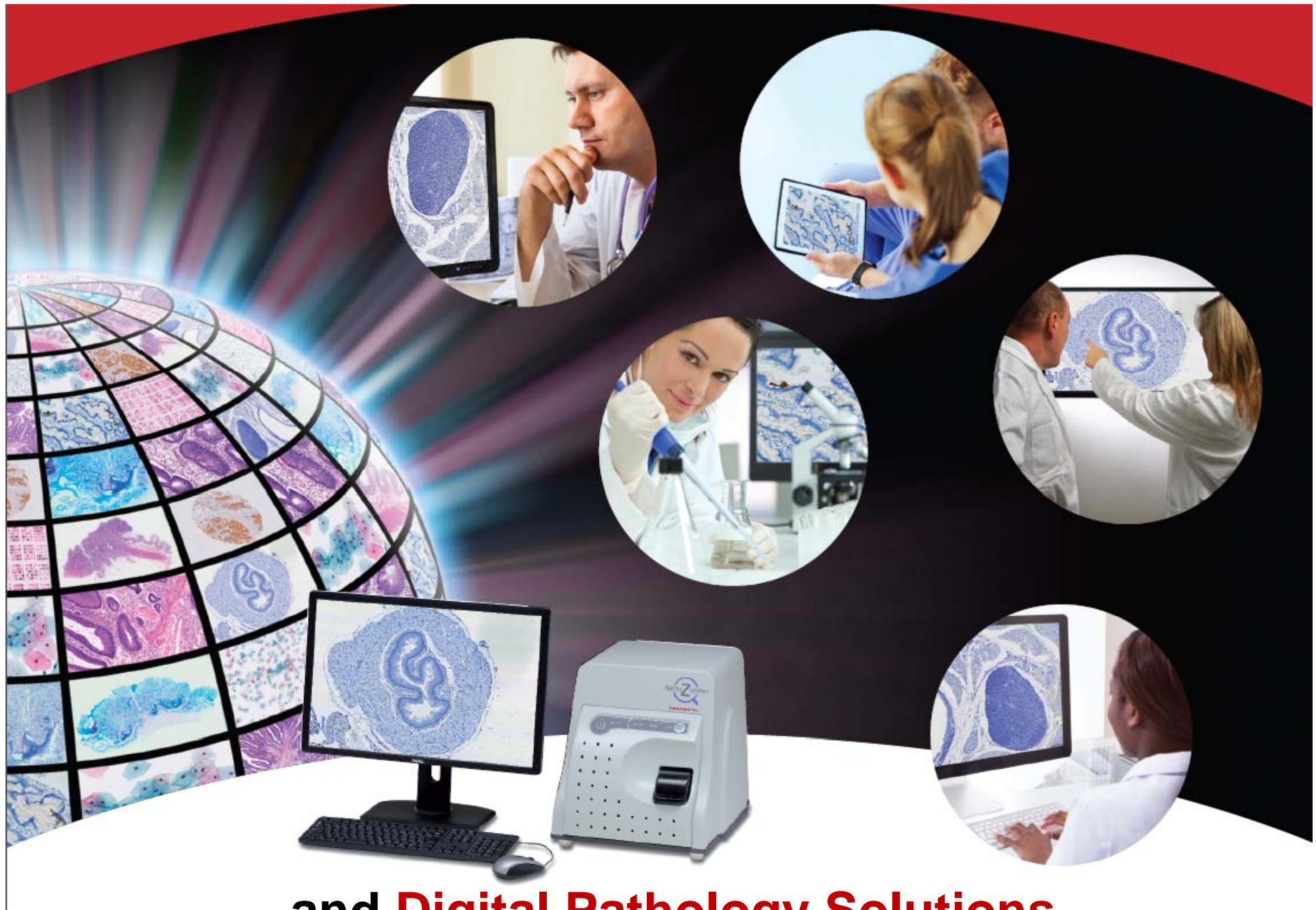


DIGITAL CAMERA
ORCA[®]Flash4.0LT

CCD, EM-CCD,
sCMOS cameras

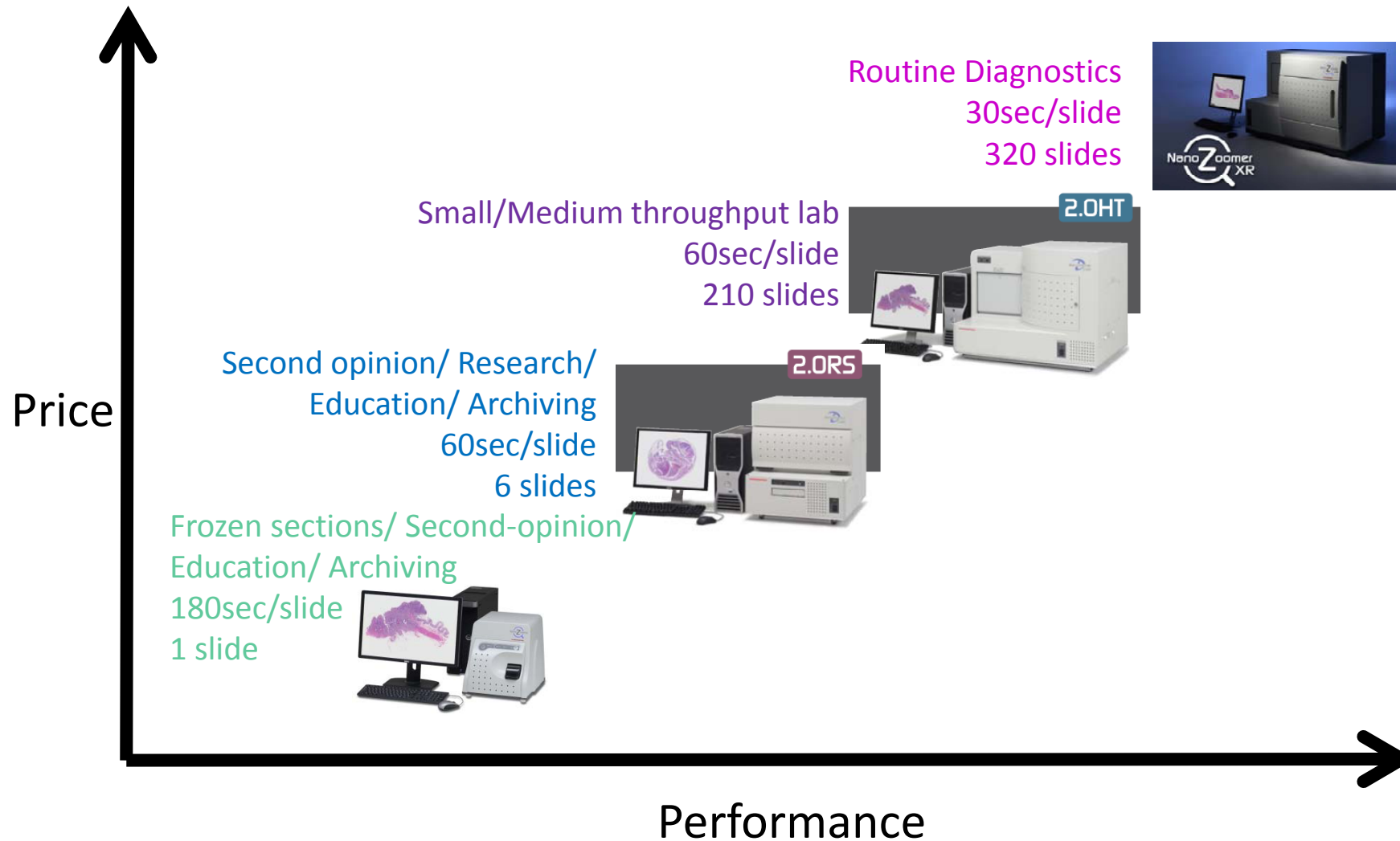


Cell-Based Screening Systems
(high, medium throughput)



... and **Digital Pathology Solutions**

Slide Scanning Solutions: NanoZoomer series



Slide Scanning Solutions: NanoZoomer 2.0

NanoZoomer
2.0RS



NanoZoomer
2.0HT



Since 2006

Proposed by Hamamatsu...

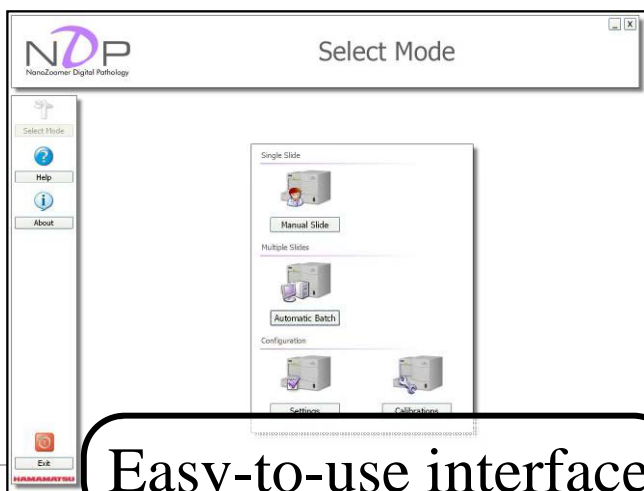
NanoZoomer 2.0 HT



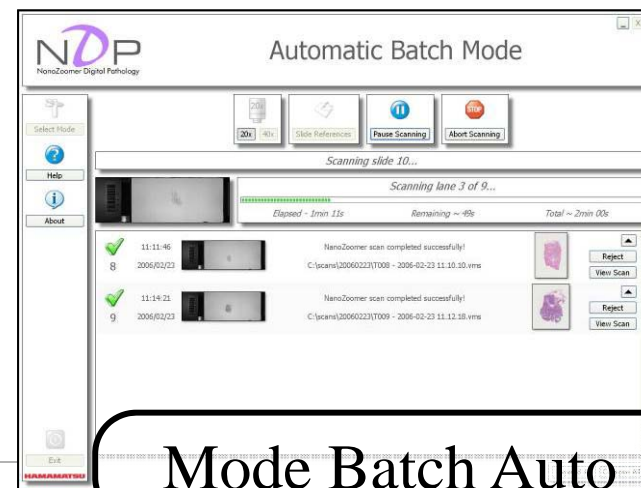
30 slides per rack



Up to 7 racks

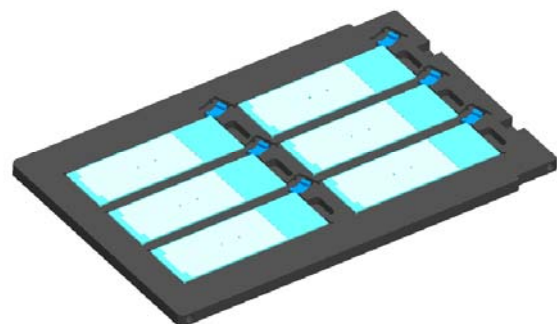


Easy-to-use interface

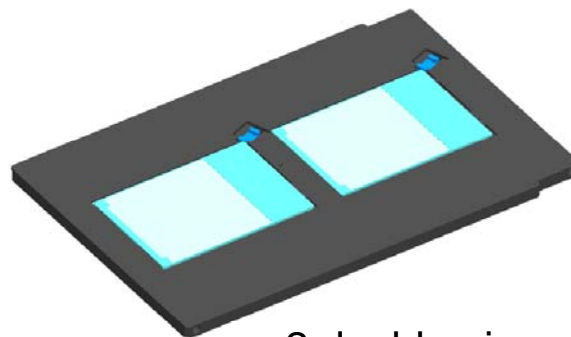


Mode Batch Auto

NanoZoomer 2.0 RS



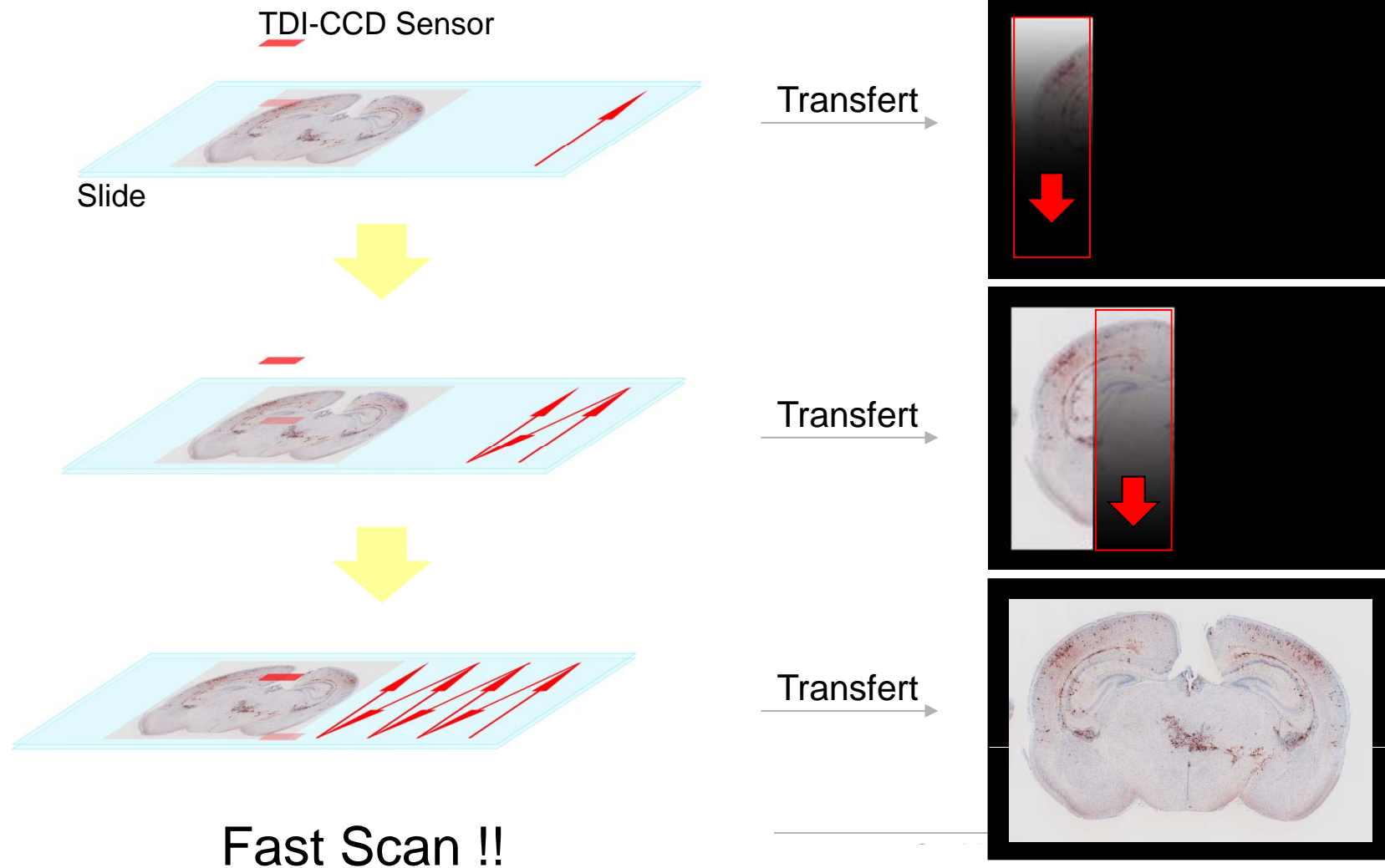
6 standard slides



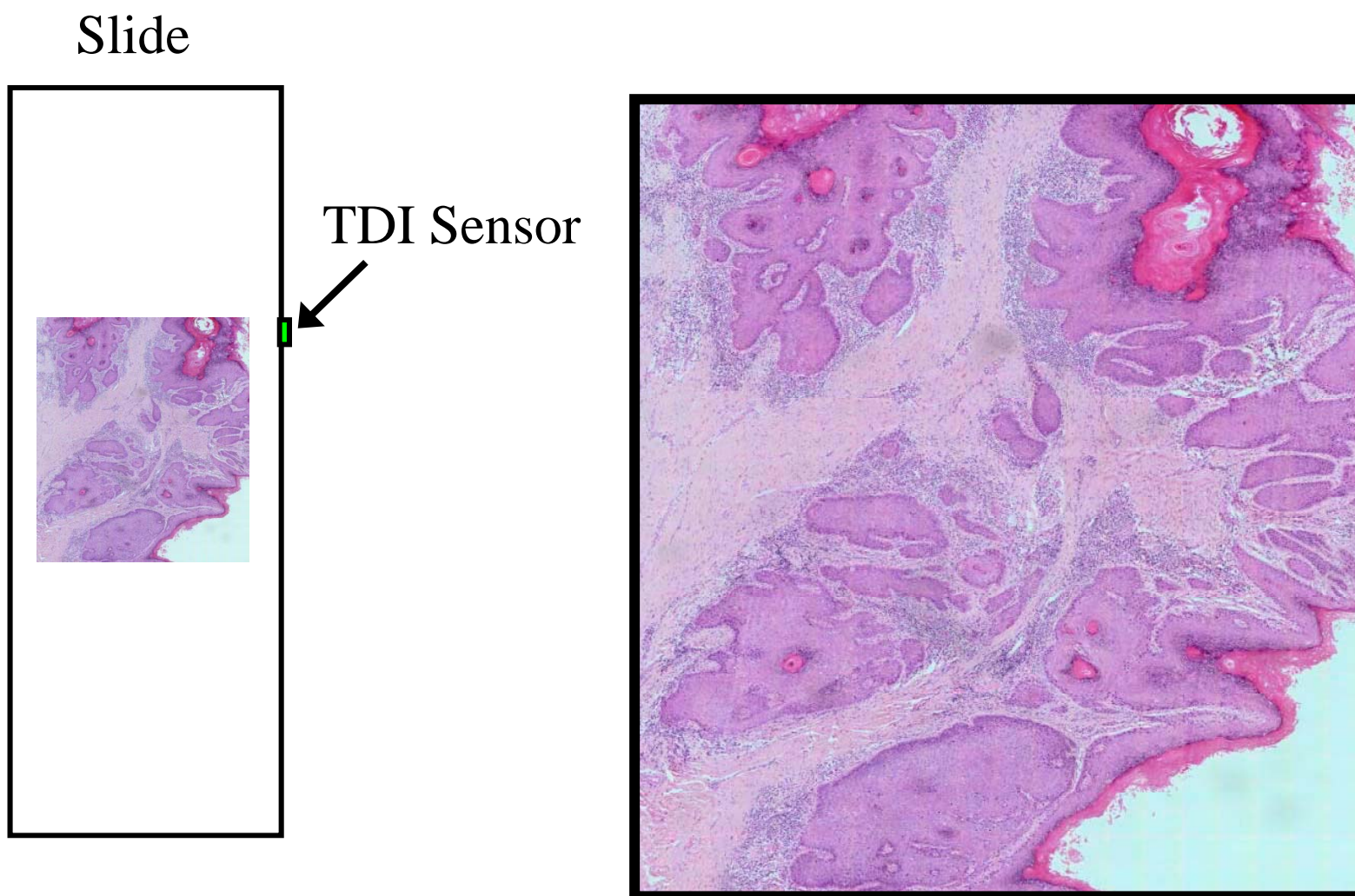
2 double-size slides

Creation of virtual slides: TDI Technology

3-CCD-TDI Camera + Optimized Optics + Motorized stage

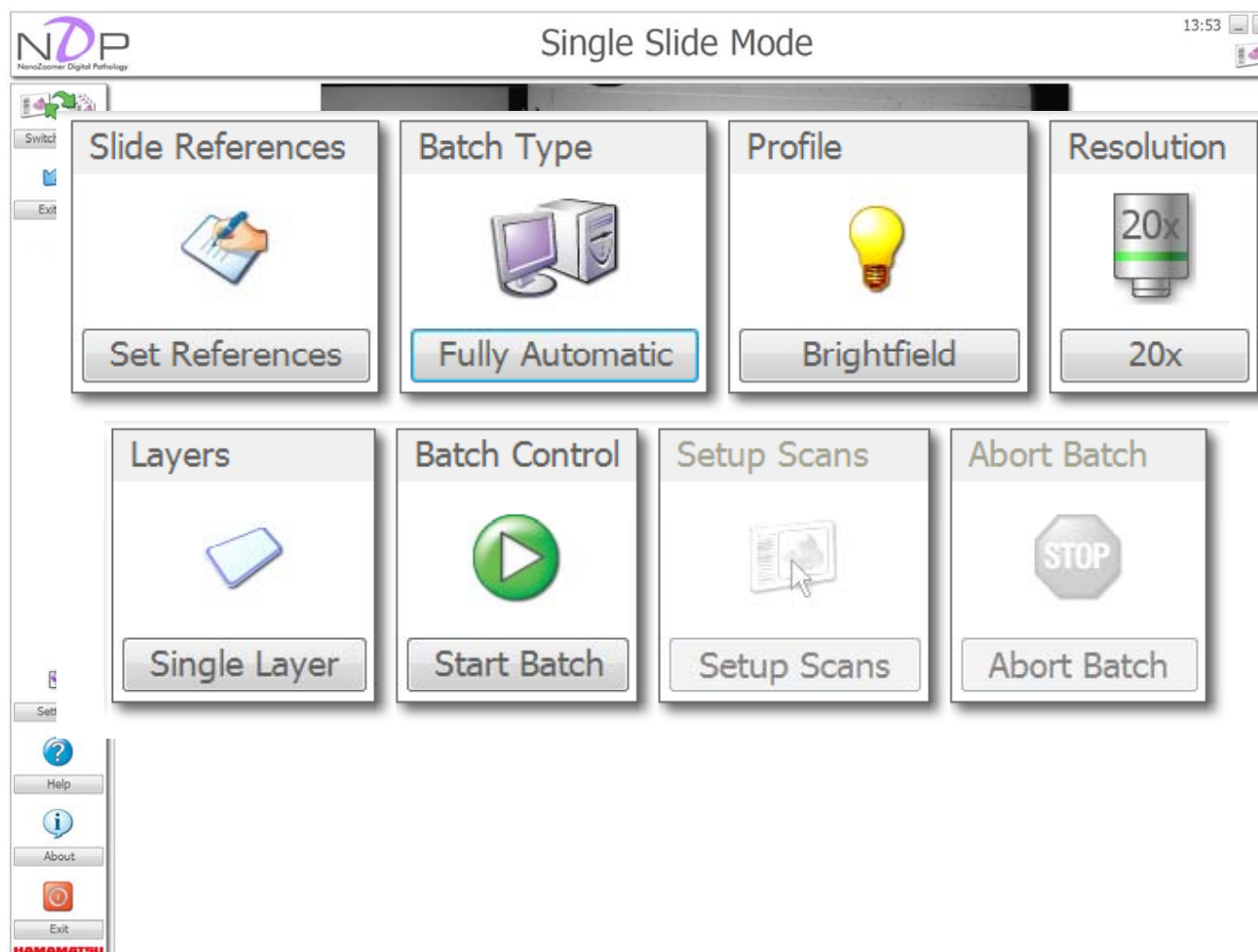


TDI Technology



A user-friendly interface

NDP.Scan software to drive NanoZoomers



- Fully comprehensive icons
- Single slide mode, Batch Fully or Semi-auto



Batch of Slides

- In only a couple of clicks, scan a lot of slides!

Fluorescence module (optional)



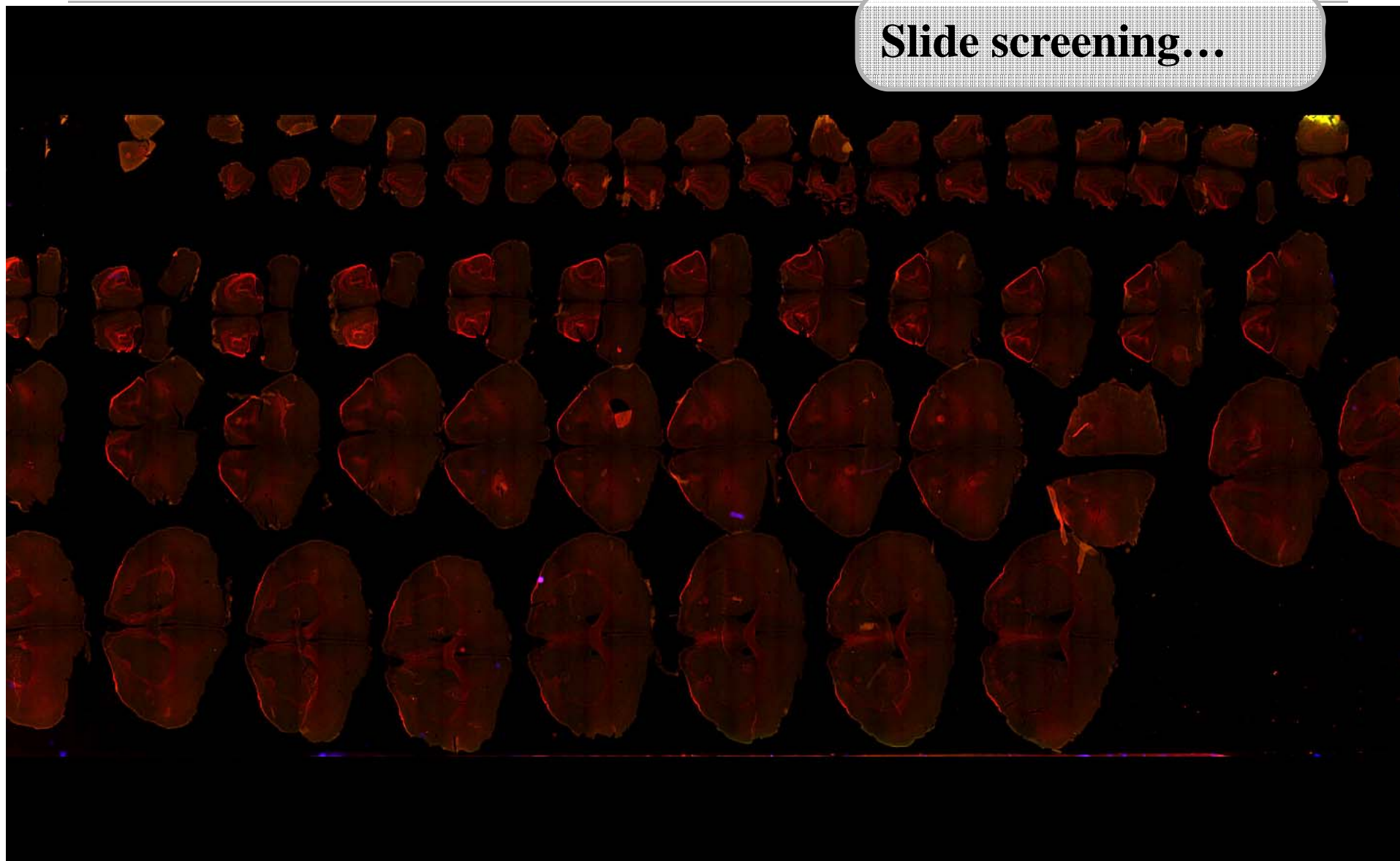
- Can be added to any system
- At any time

No need to change
or add camera!



Fluorescence Module

Slide screening...



NanoZoomer XR: the fastest scanner



Since 2013

Proposed by Hamamatsu...



NanoZoomer XR

Basic specification	NanoZoomer XR	NanoZoomer 2.0 HT
Compatible glass slide	76mm x 26mm, thickness 0.9mm to 1.2 mm	
Slide loader	Automatic. Max. 320 slides (40 slides cassette X 8)	Automatic. Max 210 slides (30 slide cassettes x7)
Z-Stack scan	Enabled	
Scanning range	25mm x70mm	25mm x 52mm
Objective lens	20X NA 0.75	
Scanning resolution	0.46 um/pixel (20x standard mode), 0.23 um/pixel (40x high resolution mode)	
Scanning method	TDI (time delay integration) with 3 chip TDI sensor	
Image format	Compressed data (JPEG), Un-compression (8bit, 12bit)	
Scanning mode	Full automatic batch scan, Semiautomatic batch scan with manually defined scanning parameters, Single scan	
Focusing method	Dynamic focus / Focus map	Focus map
Macro slide image	Color	B&W

Bright field scan	NanoZoomer XR	NanoZoomer 2.0 HT
Scan speed (15mm x15mm)	20X mode: 30sec, 40X mode: 35sec	20X mode: 60sec, 40X mode: 150sec
Throughput (15mm x15mm)	20X mode: less than 57sec 40X mode: less than 62sec	20X mode: 110sec 40X mode: 200sec

NanoZoomer SQ: small footprint, great scans

- A single-slide scanner
- Desktop & compact in size
- A simple access to networking and telepathology



Officially Released in September 2014

NanoZoomer SQ: dedicated to Frozen sections

Clinical
(Telepathology)

Plug-and-Play system
(network setup), easy
to use, low cost.



Telepathology Ile-de-France Project:

- Started end 2012
- A global project for Telepathology (Frozen sections and Tele-Expertise)
- 17 organizations involved (11 AP-HP Pathology labs already equipped with a scanner + 5 additional structures: General Hospitals & private)

Specs required:

- Scanning time (and throughput) < 5 min
- Good image quality
- Possibility to scan at 20X and 40X
- Possibility to scan in Z-stack

⇒ ***The project finally started beginning 2014 with Hamamatsu & Tribvn solution and is now running***

⇒ Proposed with Macro by Tribvn & CaloPix software

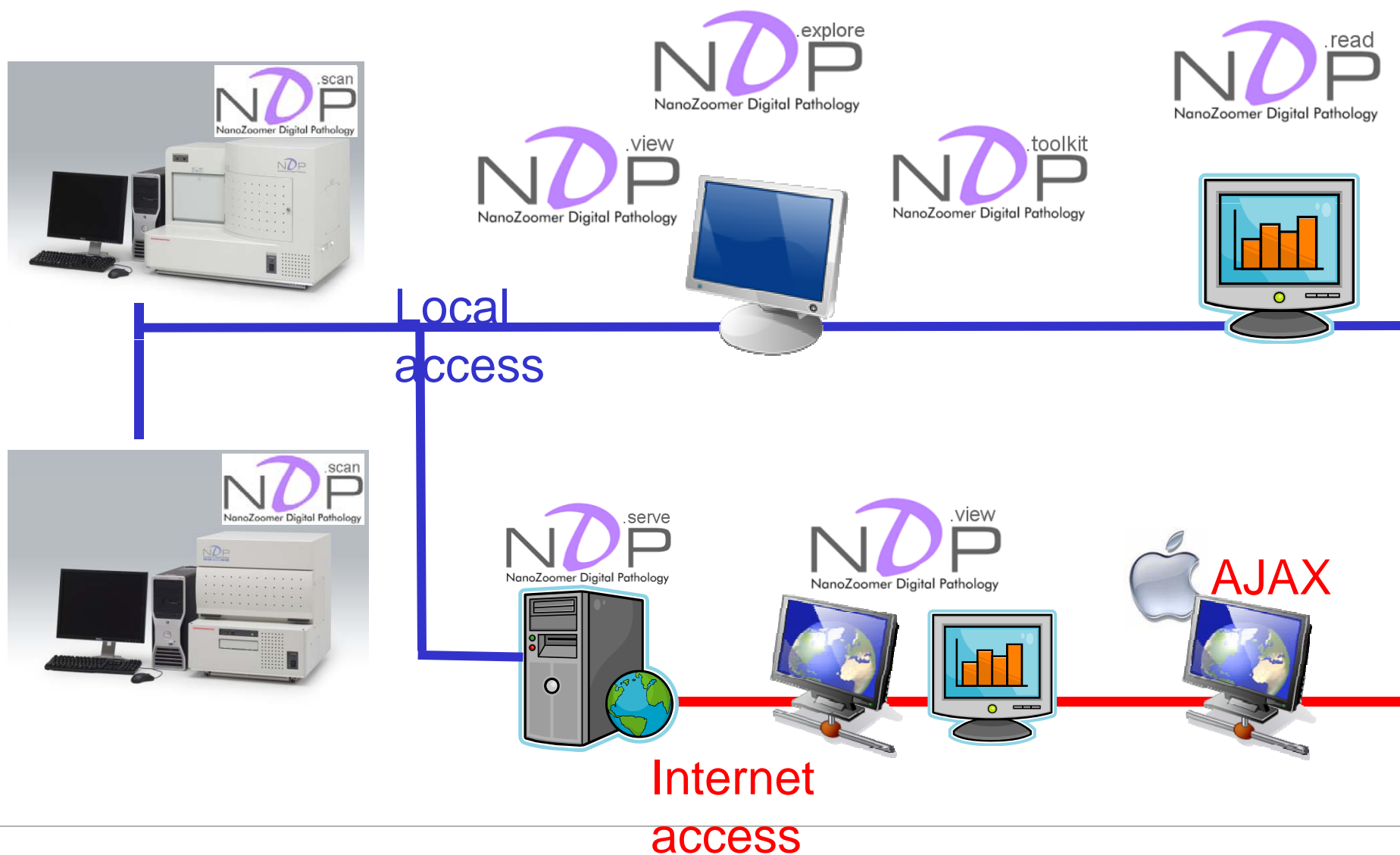


MACRO
by TRIBVN

CALOPiX



Slide sharing and Telepathology



Integration in the Lab workflow

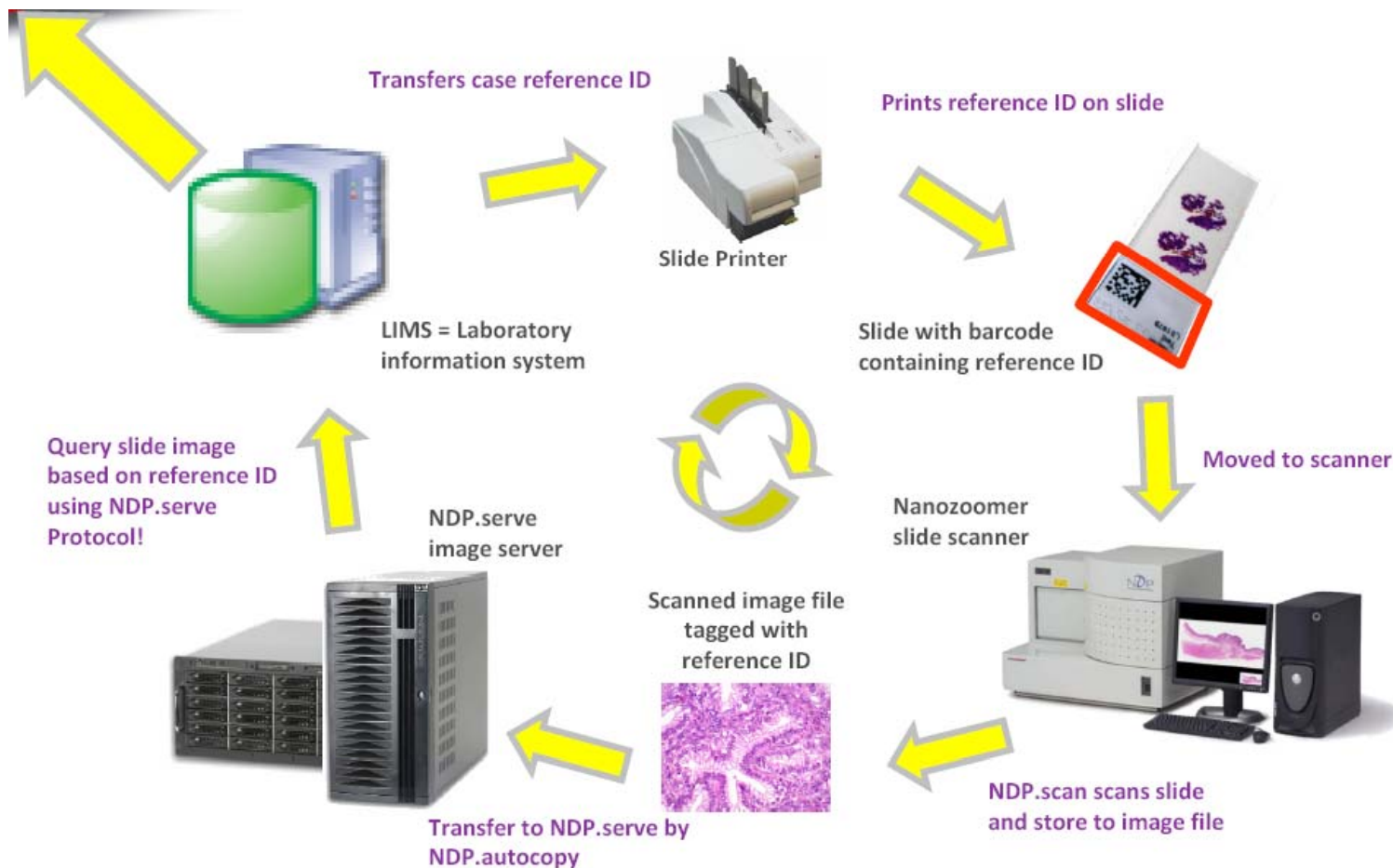


Image Analysis: NDP.Analyze & APPs

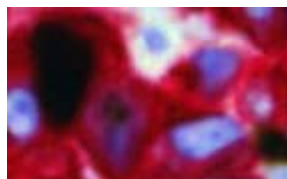


Image
analysis
quantification
steps

Step											
Image pre processing											
Pixel classification											
Image post processing											
Output calculation	<table border="1"> <thead> <tr> <th>Result</th> <th>Value</th> </tr> </thead> <tbody> <tr> <td>NUC POS</td> <td>110</td> </tr> <tr> <td>NUC TOTAL</td> <td>480</td> </tr> <tr> <td>POS RATIO (N)</td> <td>0,229166666666667</td> </tr> <tr> <td>POS RATIO (A)</td> <td>0,221077285411415</td> </tr> </tbody> </table>	Result	Value	NUC POS	110	NUC TOTAL	480	POS RATIO (N)	0,229166666666667	POS RATIO (A)	0,221077285411415
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Analyse d'images: NDP.Analyze & APPs

The screenshot displays the Hamamatsu NDP.analyze software interface. The main window shows a histology image with a yellow box highlighting a region of interest. The 'APP Control' window is open on the right, showing the following details:

APP Control [General Cell APPs/NUCLEI *]

NUCLEI

Detection of Nuclei

HDAB - Haematoxylin

Sensitivity: 22,0 %

Size: 5,5 µm

Classification of Nuclei

- Separate Nucleus Type (Inactive)
- Detection of Cytoplasm (Inactive)
- Detection of Membranes (Inactive)
- Detection of Probes (Inactive)

Training completed for detection of: nuclei.

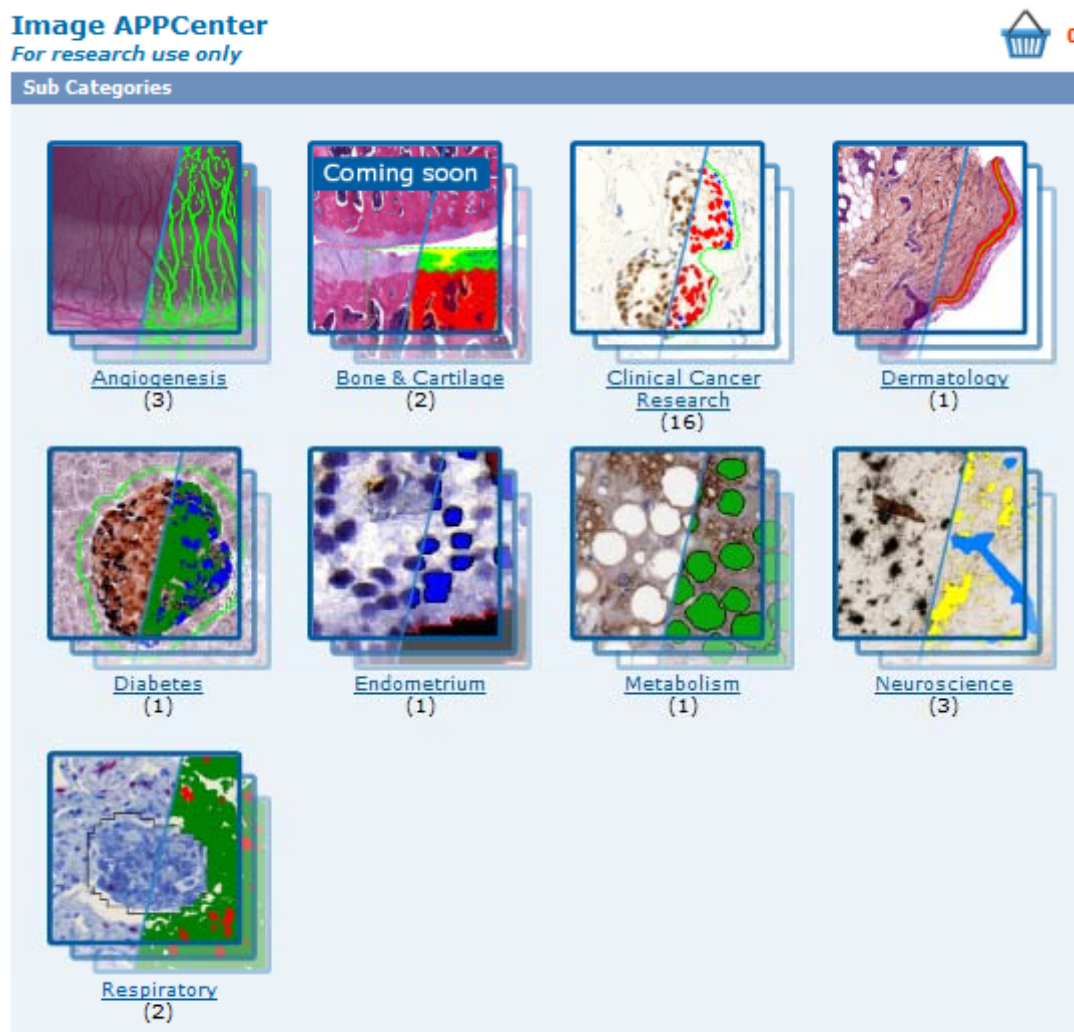
Result	Value	Copy
POSITIVE RATIO	0,146341463414634	
STRONG POS RATIO	0,666666666666667	
WEAK POS RATIO	0,333333333333333	

Mag: 10X Zoom: 50,00 % Frame: 1/1 Mode: Layer Drawing Num 07:48 05/10/2012

Analyse d'images: NDP.Analyze & APPs

Image APPCenter
For research use only

Sub Categories



The screenshot displays a grid of image analysis applications. Each application is represented by a thumbnail image showing a biological or medical sample with overlaid analysis results (e.g., green outlines, red/yellow highlights, blue arrows). Below each thumbnail is a text label and a count in parentheses. A 'Coming soon' label is present over the 'Bone & Cartilage' thumbnail. A shopping cart icon with a '0' is located in the top right corner of the interface.

Sub Category	Count
Angiogenesis	(3)
Coming soon	
Bone & Cartilage	(2)
Clinical Cancer Research	(16)
Dermatology	(1)
Diabetes	(1)
Endometrium	(1)
Metabolism	(1)
Neuroscience	(3)
Respiratory	(2)

www.hamamatsu.com