LIFE SCIENCE

SLIDEVIEW VS200

The Power to See More

EVIDENT

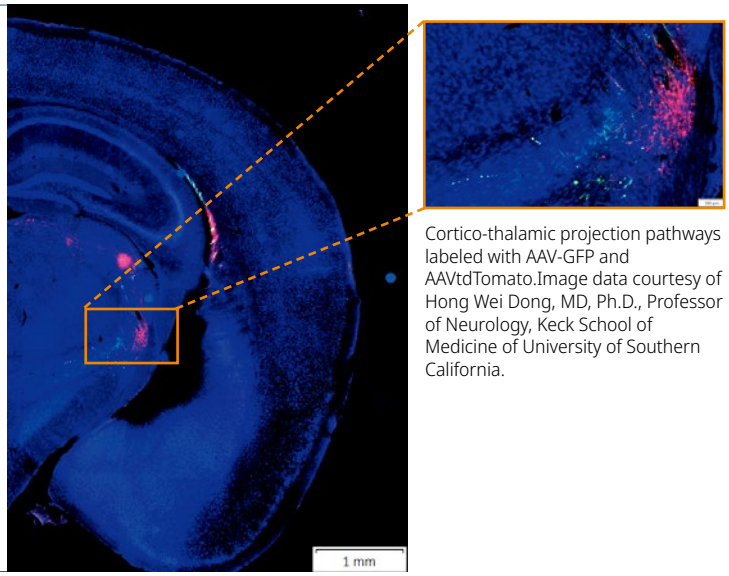
Not for clinical diagnostic use.

Reliable Data for Many Applications

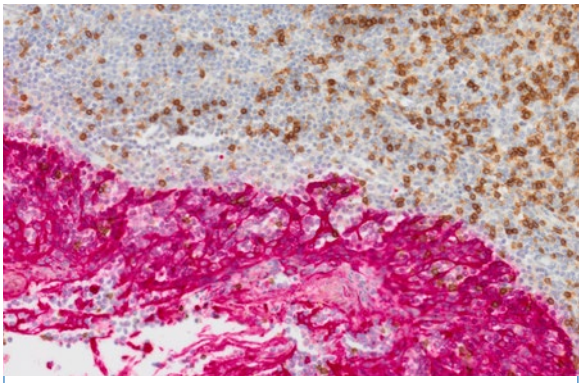
Digitizing slide data makes it easy to analyze, share, and archive your results. The SLIDEVIEW VS200 research slide scanner enables you to capture high-resolution images of your slides for quantitative analysis, so you can make the most of the information your slides have to offer. The optical system is optimized for scanning slides, enabling you to digitize slides for brain, cancer, and stem cell research, as well as drug discovery.

Brain Research

Brain and neuroscience researchers need to observe various samples in detail—from single cells to entire tissue, or organs, such as the brain. The VS200 slide scanner can combine high-resolution images from an entire brain into one digital file instead of multiple snapshots. In addition, since a large glass slide holder is available, bigger samples that previously had to be divided into multiple slides, such as monkey brains, can now be digitized in a single scan.



Cortico-thalamic projection pathways labeled with AAV-GFP and AAVtdTomato.Image data courtesy of Hong Wei Dong, MD, Ph.D., Professor of Neurology, Keck School of Medicine of University of Southern California.



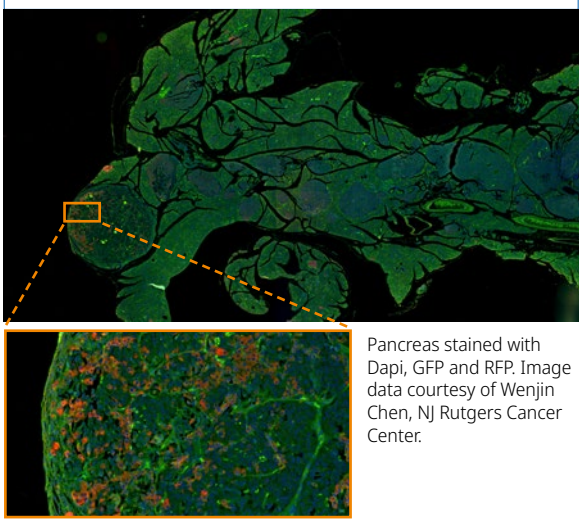
Cancer and Stem Cell Research

In cancer and stem cell research, it is critical to be able to evaluate tissue composition and morphology along with the morphology of individual cells and have the ability to resolve two objects close together or on top of each other (localization). The system's optics offer broad chromatic aberration correction and improved flatness, making these target molecules easier to resolve and significantly reducing distortion.

Tonsil CD3 (rm), ImmPRESS Reagent (HRP) Anti-Mouse IgG Immpact DAB (brown), AE1/AE3(m) ImmPRESS (AP) (HRP) Anti-Rabbit IgG Immpact Vector Red (red). Counterstained with Hematoxylin QS (blue). Image data courtesy of Vector Labs.

Drug Discovery

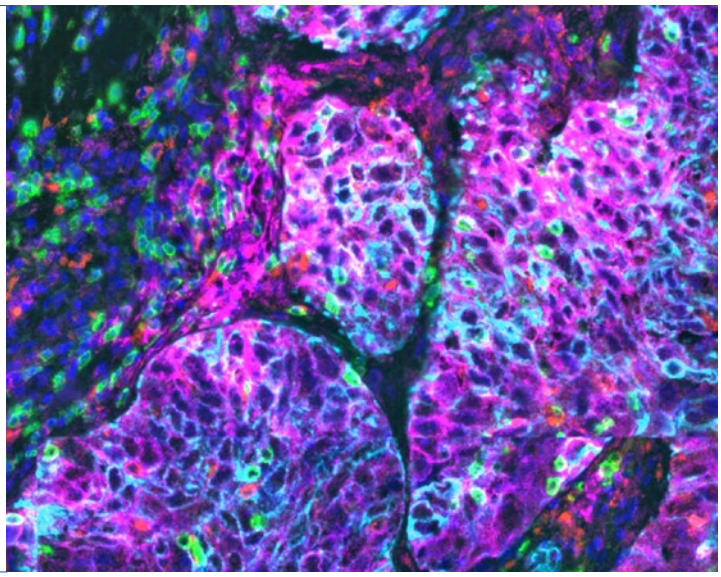
In drug discovery research, it is possible to increase understanding of target molecule interactions by detecting the localization of multiple molecules at one time. Image quality is crucial when acquiring quantitative data from whole slide images, and this is where the VS200 slide scanner excels. By comprehensively scanning positional information of multiple target molecules in a wide range at one time, the interaction between molecules can be evaluated efficiently.



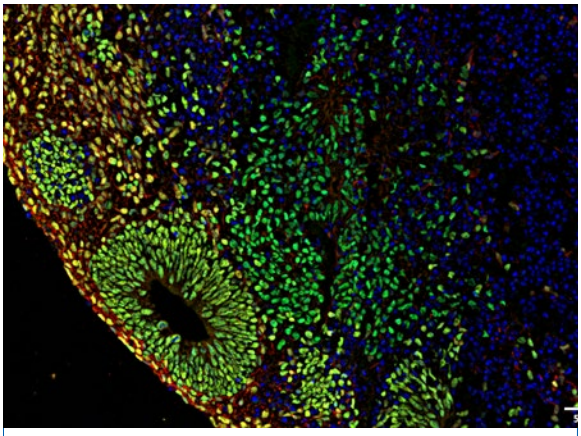
Pancreas stained with Dapi, GFP and RFP. Image data courtesy of Wenjin Chen, NJ Rutgers Cancer Center.

Multiplex Scan Mode

When tissue samples are limited, it is critical to gather the most data possible from each tissue section. Multiplexing immunofluorescence allows for greater understanding of co-expression and the spatial composition of multiple targets within a single sample. The multiplexing scan mode helps optimize the utility of these select samples by aligning multiple fluorescent channels with a reference channel.



Lung tissue imaged on a VS200 at 20x stained with an Ultivue PD-L1 kit multiplex kit; Dapi: Nuclear Counterstain, FITC: CD8, TRITC: CD68, Cy5: PD-L1, Cy7: panCK. Image data courtesy of Ultivue Inc.



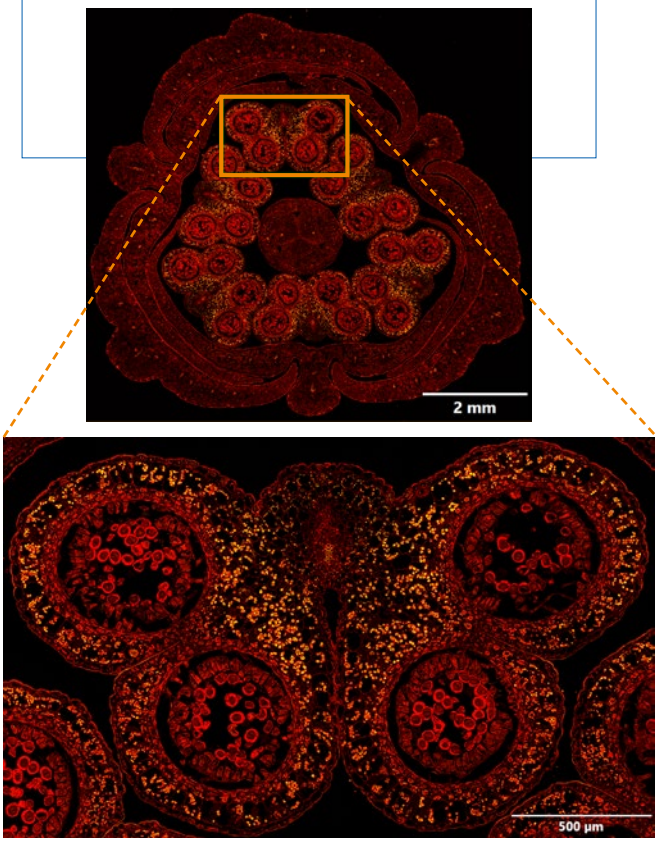
Organoids

3D structures that mimic real organs, organoids are important tools in stem cell research. The SILA optical sectioning device aids organoid research by enabling users to image most sample types, including cleared and fixed cells and tissues thicker than 100 microns as well as any magnification.

Speckle illumination acquisition (SILA, see page 7) image of an organoid sample acquired at 20x. A Z-series of 20um thickness is acquired and processed with extended focal imaging (EFI). The organoid was imaged with 405 nm, 488 nm, 561 nm, and 638 nm excitation. Samples provided by a customer in Europe.

Botany and Plant Research

Plant research is fundamental to get insights into the science behind agriculture and environmental protection. Using the VS200 scanner's batch mode, researchers can quickly screen for mutant phenotypes.

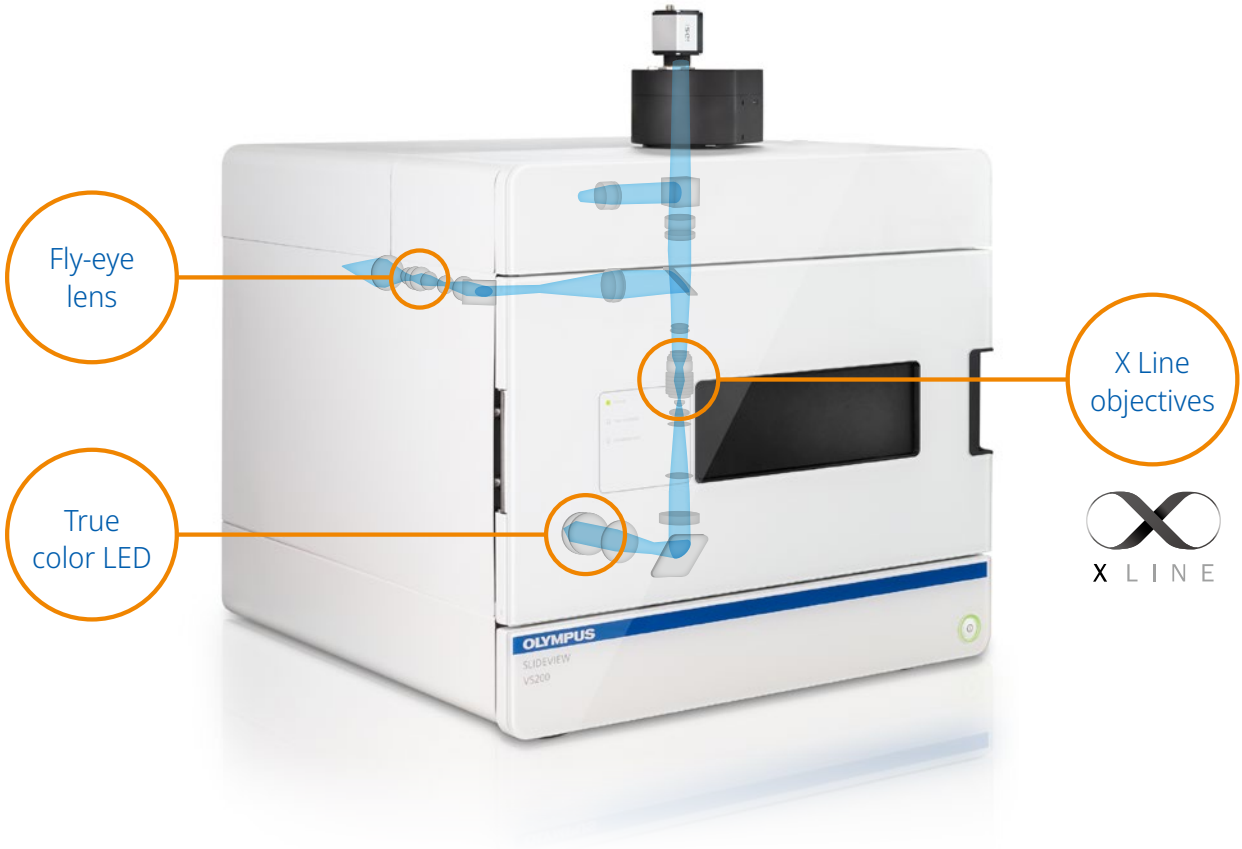


SILA extended focal image (EFI) of a 12 µm lily flower bud acquired at 20x, showing both the whole and enlarged view. Yellow and red: autofluorescence signal at 561 nm and 638 nm excitation.

Outstanding Image Quality for Quantification

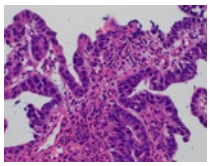
Better Resolution and Flatness

To produce high-quality virtual slide images, the VS200 system uses X Line high-performance objectives, which offer simultaneously improved numerical aperture, chromatic aberration correction, and flatness. The result is flatter images with a wider field of view and negligible intensity fall off near the periphery. To further enhance the image quality, the system's light path is optimized to work with X Line objectives, providing more homogenous illumination. These enhancements allow for excellent image quality so that quantification techniques like particle counting, mensuration, or colocalization are as accurate as possible.

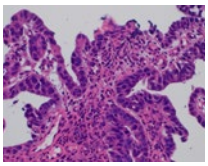


Bright LED with Accurate Color Reproduction

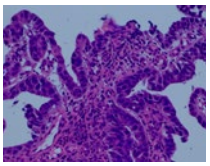
The system's true color LED for transmitted illumination has the same spectral characteristics and power as a halogen lamp, so purple, cyan, and pink stains are correctly represented, imaged, and rendered.



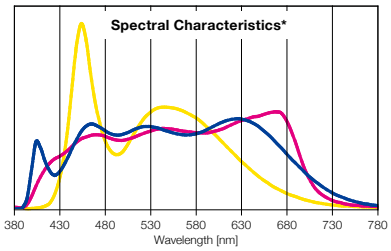
VS200 LED



Halogen lamp + Daylight filter



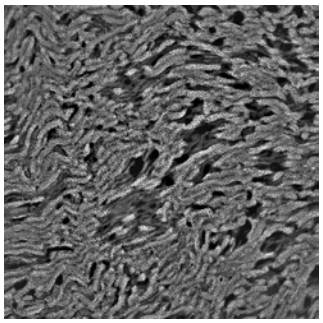
Commercially available white LED



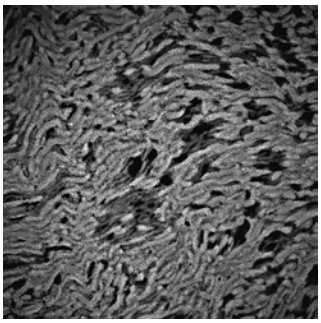
* This graph shows the spectral characteristics of each light source normalized with the luminosity curve. It does not compare the strength of light for each light source.

Uniform Fluorescence Illumination

The fluorescence illuminator with its fly-eye lens uniformly distributes light across the entire field of view for bright, evenly illuminated images.



With fly-eye lens system

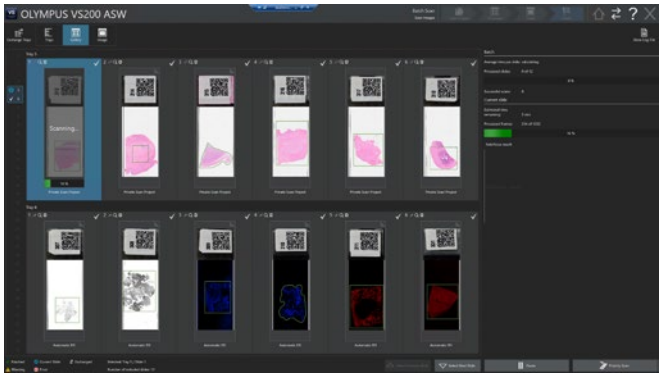


Without fly-eye lens system

Achieve More in Less Time

High Throughput

The loader holds up to 210 26 × 76 mm (1 × 3 in.) slides in 35 slide trays. The robotics in the loader move the trays and not the individual slides, helping your slides remain safe and intact. The type of slide trays, number of slides, and the size of the slides are immediately detected, while the integrated barcode reader automatically captures and records the slide information.



Higher Productivity

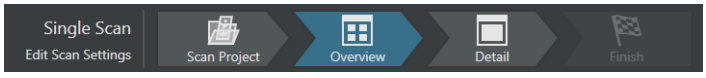
Work on scan parameter settings for some slides while other slides are being acquired. The convenient software gives you the flexibility to control all of your scan settings.

- Identical Settings mode automatically assigns scan settings to all the slides
- Individual Settings mode enables you to change specific settings for each slide or all the slides in a single tray
- Flexible Batch Scan mode enables you to designate a different observation method such as FL, BF, POL, DF, and PH for each slide contained in the batch
- Priority Scan function enables you to interrupt a continuous operation to scan a slide and then resume what you were scanning

The VS200 slide scanner also has hot-swap functionality, so additional trays can be added to the loader before all the trays of a given project have been scanned.

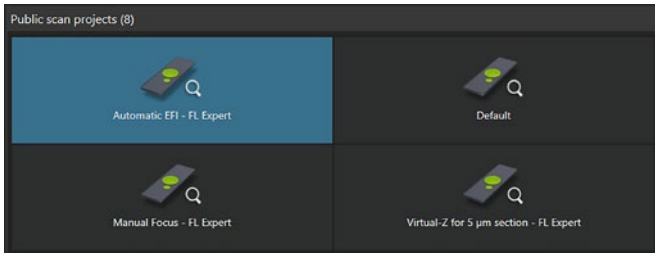
Simple User Interface for Reproducible Results

Depending on the level of control required, you can switch from expert mode, which enables you to customize system settings, to quick mode where the software optimizes the settings for you. Using quick mode, you can complete scanning a slide in as few as two clicks.



Save and Recall Acquisition Settings Speed Up Your Work

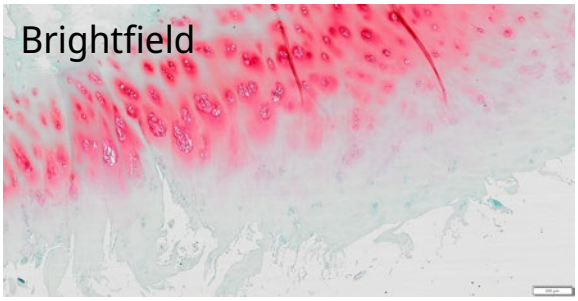
For repetitive workflows, you can save, recall, and share your predefined acquisition setting projects, speeding up your work and helping standardize operations. These projects can also be shared between users for even greater flexibility.

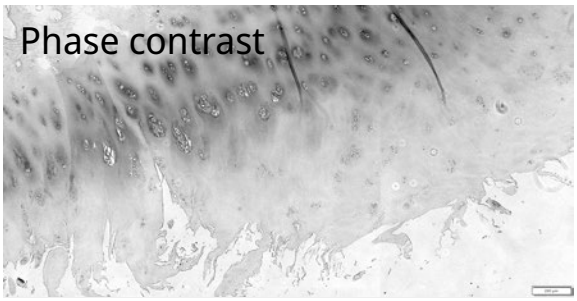


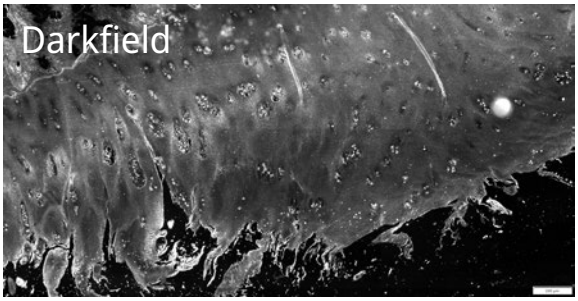
Flexible for Many Applications

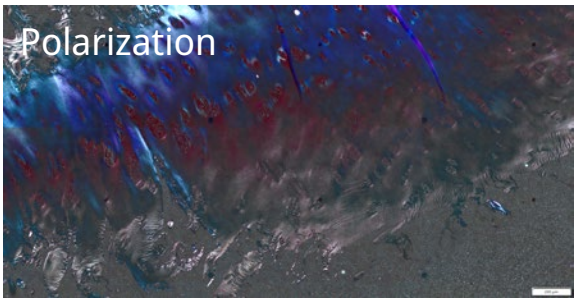
Five Observation Methods in One System

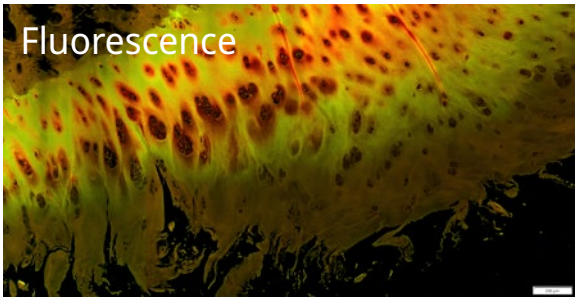
The VS200 slide scanner can be used for brightfield, fluorescence, darkfield, phase contrast, and simple polarization. This flexibility allows you to combine different observation methods to view structures that are only visible under certain conditions. For example, darkfield helps to get a proper overview image of a fluorescence sample unstained in the visible spectrum and provides the best contrast scaling between the overview signal and focused fluorescence signal.



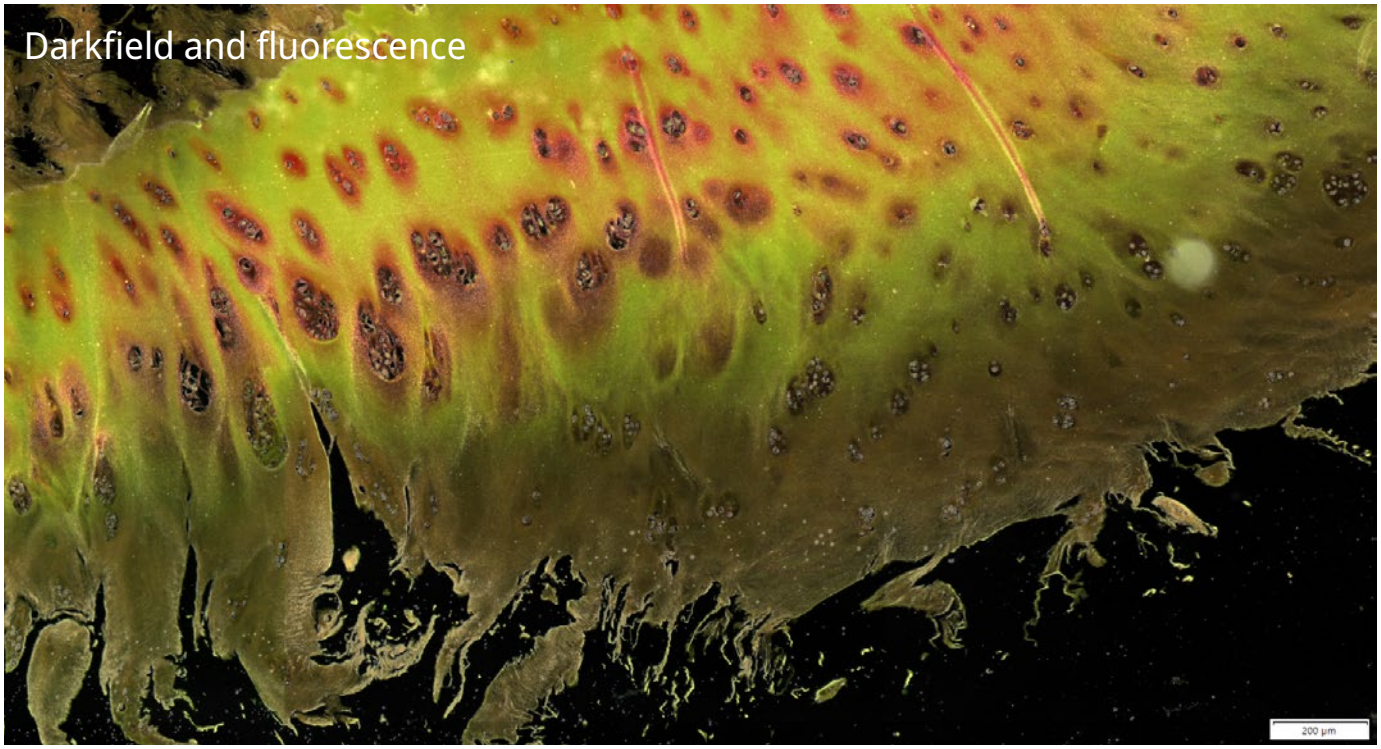








Human cartilage captured with X Line UPLXAPO10X objective.

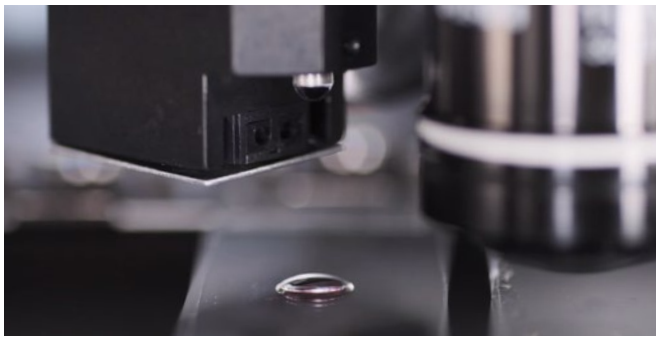


Supports Glass Slides and Plates

The simple-to-use slide tray supports 26 × 76 mm (1 × 3 in.), 52 × 76 mm (2 × 3 in.), 76 × 102 mm (3 × 4 in.), and 102 × 127 mm (4 × 5 in.) slides. The system enables you to manage different slide sizes at the same time in the same batch scan.

Flexibility to Use Dry, Silicone Oil, or Oil Objectives

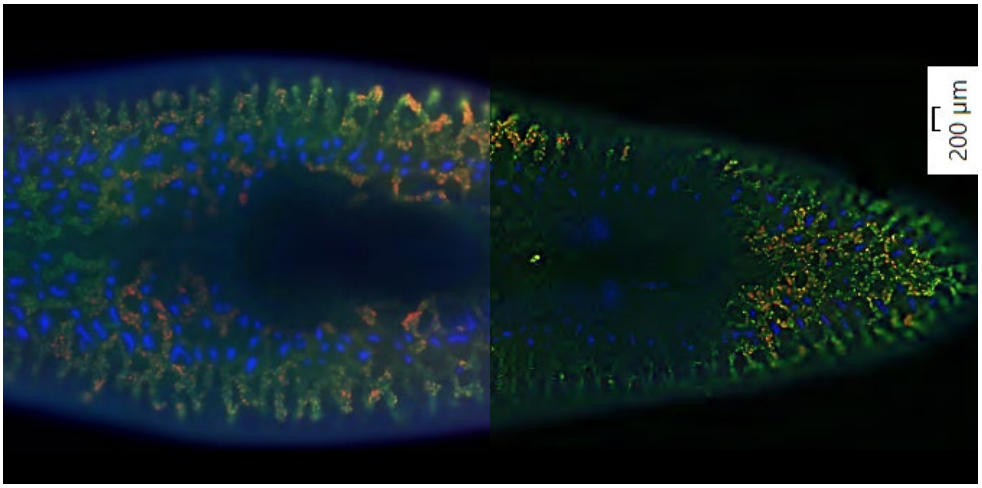
Unlike many slide scanners that do not offer high-magnification capabilities, the VS200 system's automatic oil dispenser enables you to use high-magnification, oil, or silicone oil immersion objectives for batch scanning without having to frequently stop to oil the lens.



Online Fluorescence Deblurring

TruSight Live deblurring reduces diffused light from above and below the focal plane of a thick sample.
The image data is then recalculated using a special 2D deconvolution algorithm, making the images sharper and clearer.

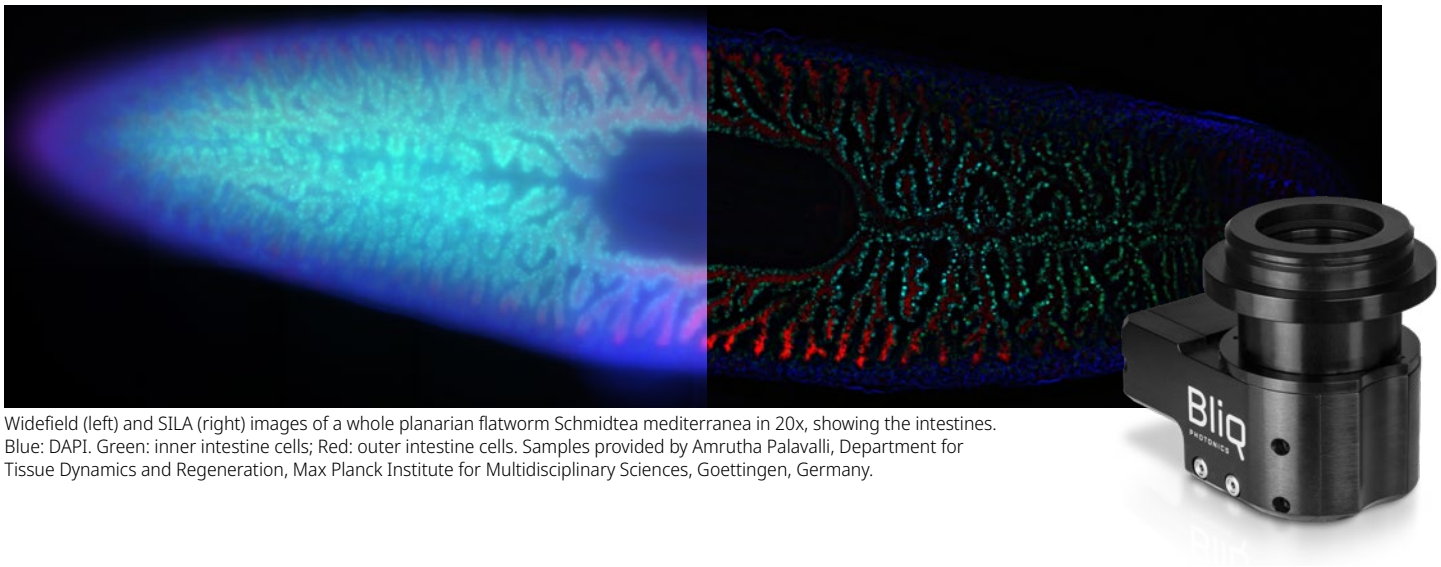
TRU SIGHT



S. mediterranea stained with double fluorescent (red and green) in situ hybridization,counterstained with DAPI, and scanned at 10X magnification. Sample provided by Miquel Vila-Farré, Max Planck Institute of Molecular Cell Biology and Genetics.

High-Contrast Optical Sectioning of Whole Slide Scans

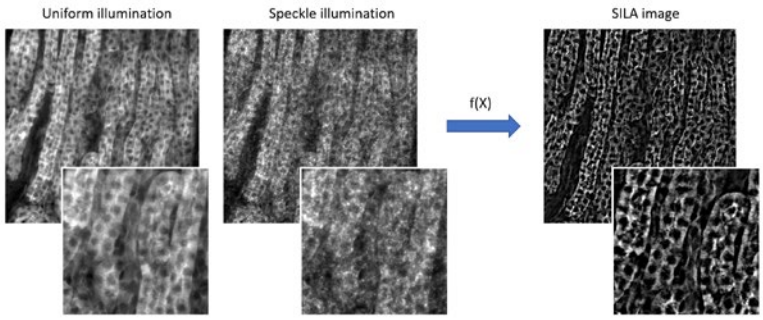
The Speckle Illumination Acquisition (SILA) optical sectioning device uses laser speckles to obtain high-contrast images by removing out-of-focus light. The HiLo microscope technology used by the device—developed by Bliq Photonics—offers many benefits and can easily be added to existing VS200 slide scanners.



Widefield (left) and SILA (right) images of a whole planarian flatworm Schmidtea mediterranea in 20x, showing the intestines. Blue: DAPI. Green: inner intestine cells; Red: outer intestine cells. Samples provided by Amrutha Palavalli, Department for Tissue Dynamics and Regeneration, Max Planck Institute for Multidisciplinary Sciences, Goettingen, Germany.

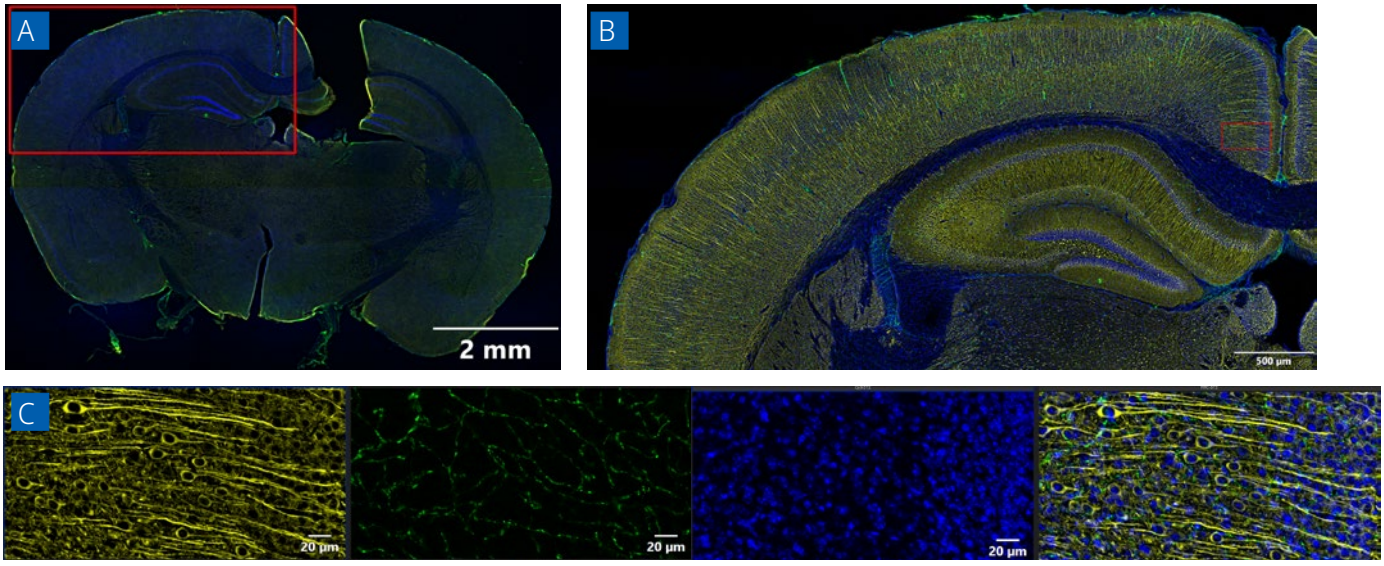
Fast and Easy to Use

SILA is fast—it rapidly removes out-of-focus light using only two illuminated images that are mathematically processed—and simple for anyone to use as it requires no special calibrations. The only parameter that needs to be set is the sectioning thickness.



Precise 3D Imaging with High Penetration Depth

The laser speckles remain sharp at depth, so SILA device retains the same capabilities as you image deeper in the sample. This enables you to image thick samples well beyond the limit of a regular widefield microscope.



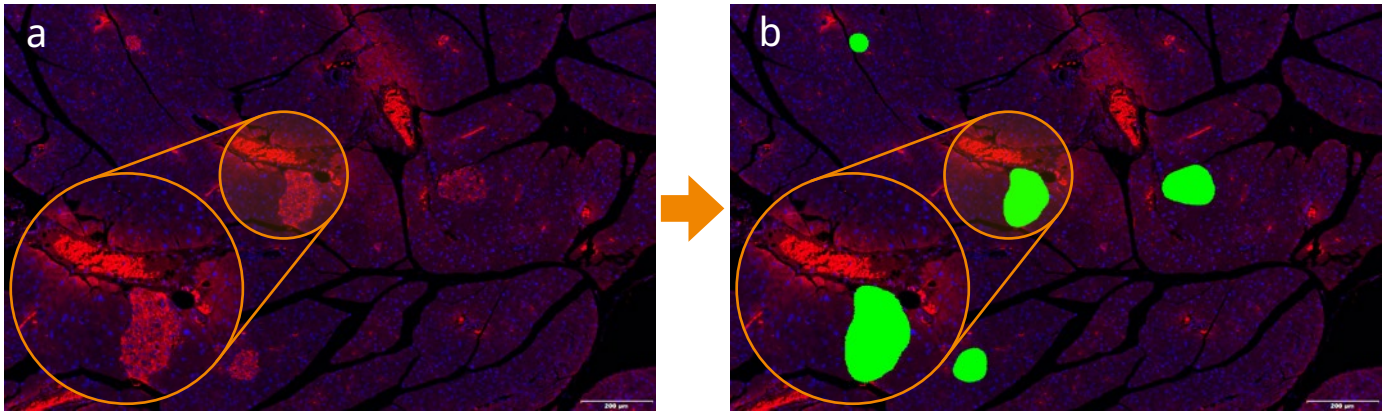
SILA image of a 200 µm mouse brain section: (A) Overview acquired at 4x. (B) Detailed scan is an extended focal image (EFI) of a 47 µm Z series acquired at 20x. (C) Enlarged tile view shows individual cellular structures as well as merged view. Blue: DAPI, Green: MAP2 (neurons), Yellow: GFAP (glia).

Easy to Install

The SILA device is compact and easily attaches to the VS200 system's fluorescent illuminator. It can be added to any existing VS200 system, including those with a loader, or purchased together with a new system.

Deep Learning for Deeper Insights

TruAI technology uses deep learning to simplify workflows and rapidly deliver more accurate results. Conventional thresholding methods often have difficulty identifying morphologic features on a sample and can miss critical targets. With a trained neural network, for example, on pancreatic samples, TruAI technology can accurately segment pancreatic islets and differentiate them from similar looking clusters of erythrocytes, enabling the number and size of the islets to be counted and measured automatically.



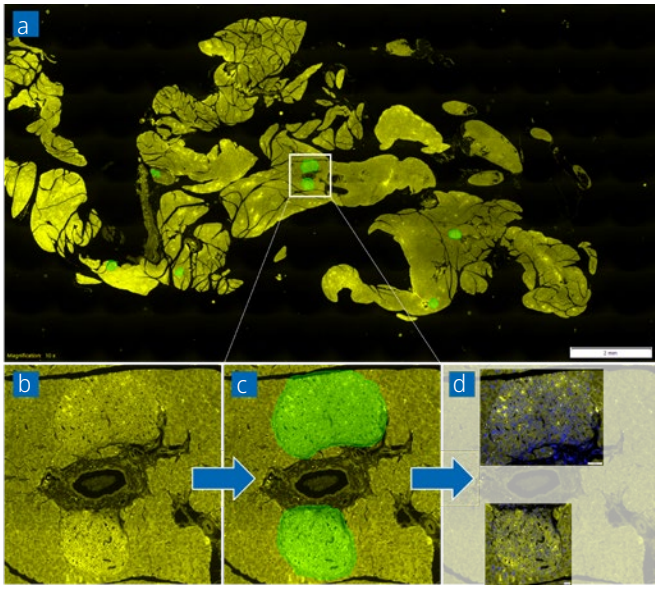
(a) Cy3 fluorescence marked pancreatic islets. Pancreatic islets are stained (red) while erythrocytes are autoflourescing. (b) Probability map detection based on TruAI technology. Only pancreatic islets are accurately detected (green). Image data courtesy of Univ.-Prof. Dr. rer. nat. Simone E. Baltrusch, Institute for Medical Biochemistry and Molecular Biology, Rostock University Medical Center, University of Rostock.

The Power of Deep Learning

For difficult-to-detect objects of interest, you can train your own neural networks and apply them to TruAI with a click of a button. The deep neural network's performance is superior to traditional segmentation techniques, and you can develop your own neural network libraries for different applications and share them with collaborators.

TruAI technology now includes pre-trained neural networks for nuclei and cells, so you can immediately perform instance segmentation for the most common applications without spending time training your own neural network.*

*Pretrained models are general and will not perform perfectly in every instance.

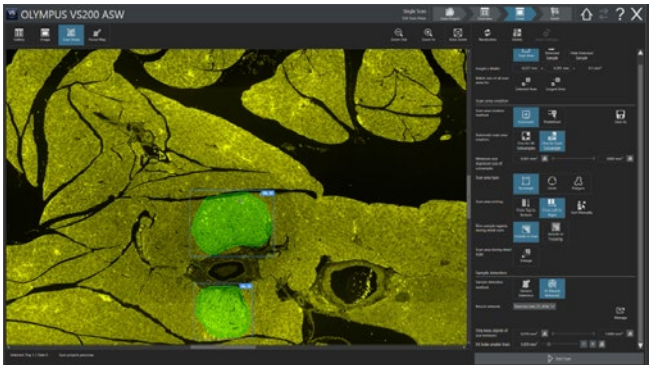


The figure presents an example of selective detection performed using a NN trained to identify pancreatic islets (PI): (a) Overview of a rat pancreas section stained with fluorescent labelling (Alexa 594, in yellow) at ×4 magnification. (b) and (c) are images of two of the PIs at higher magnification. (d) Illustrates the two final scans (DAPI in blue and Alexa 594 in yellow) superimposed on the overview. Only the two regions covering the PIs have been scanned at higher magnification (×40).

Optimize Your Workflow with AI

TruAI technology's straightforward software interface is easy to set up and operate and can increase your efficiency. For example, to reduce the data burden, activate the selective scanning mode, and the system will skip scanning areas that are of no interest to you. This helps optimize data management, including storage, uploading, and sharing images.

On shared scanners, like in a core facility, the reduced scanning times maximize your ROI, enabling more data to be acquired in a shorter time.



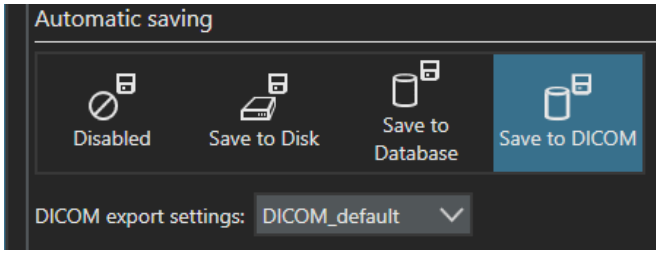
TruAI detection can improve your sample detection accuracy with one click.

Seamless from Scanning to Sharing

Managing the large amount of data generated by your VS200 scanner is easier than ever thanks to compatibility with our NIS-SQL database and OlyVIA web programs. You can automatically upload your images to one or more databases, differentiate between users, and take advantage of offline visualization and annotation tools.

Supports the of DICOM Format

For clinical researchers working in a lab, the VS200 scanner enables you to save images in the DICOM format and upload them directly into your organization's picture archiving and communication system (PACS) and connect to a laboratory information system (LIS) to populate your images with metadata.



Comprehensive Image and Data Management

The optional Net Image Server NIS SQL database allows you to conveniently manage any image. The database software enables users to store images and send image data via the web so that virtual slide images can easily be shared with a broad audience. Access to the image data can be controlled with individual access rights. Virtual slides are easily found by searching for keywords. Simply double-clicking on the corresponding thumbnail image on the result table opens a virtual slide in a new window.

Data management via the Net Image Server

Remote Access with Free Virtual Slide Viewers

OlyVia desktop is a free Olympus software that enables acess to virtual slides through local or network storage. Images that have been saved to the Net Image Server can be viewed over a secure HTTPS internet connection using OlyVIA web. This viewer supports image annotations and allows sharing information with other users.

Colon stained with Masson's Trichrome.

Image data courtesy of Wenjin Chen, NJ Rutgers Cancer Center.

Specifications

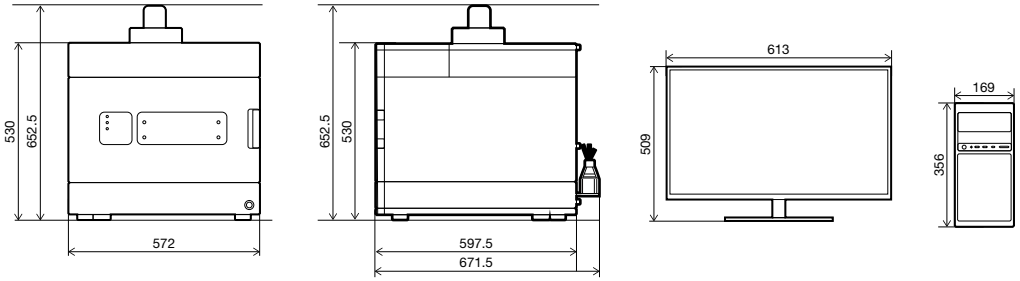
		VS200 Single Tray	VS200 Multiple Tray Loader
Intended Specimen	Observable Specimen	Glass slide with cover glass	
	Size of Glass Slide (W × L × H)	Standard slide tray: 25 mm–26.5 mm × 75 mm–76.5 mm × 0.9 mm–1.2 mm (1 in. × 3 in. × 0.05 in.) (6 slides) Optional trays 1) 51 mm–53 mm × 75 mm–76.5 mm × 0.9 mm–1.2 mm (2 in. × 3 in. × 0.05 in.) (3 slides) 2) 100 mm–102 mm × 75 mm–76.5 mm × 0.9 mm–1.2 mm (4 in. × 3 in. × 0.05 in.) (1 slide) 3)126 mm–128 mm × 75 mm–76.5 mm × 1.1 mm–1.4 mm (5 in. × 3 in. × 0.06 in.) (1 slide)	
	Cover Glass Thickness	0.12 mm –0.17 mm	
	Observation Methods	Brightfield, reflected brightfield (optional[*1]), darkfield, phase contrast (optional[*2]), simple polarization (optional[*3]), fluorescence (optional), fluorescence optical sectioning with speckle illumination (optional SILA module)	
Optical Frame	Illuminator	Built-in Köhler illumination for transmitted light; high intensity and high color rendering LED (up to 50,000 hours)	
	Objectives	Compatible objectives 2x, 4x[*4], 10x[*5], 20x, 40x[*5], 60x[*5], and 100x[*5] 6-position motorized nosepiece (incl. selected oil immersion, silicon oil immersion, and phase contrast objectives)	
	Motorized Stage	XY stage with automatic control	
	Focusing	Motorized focusing with automatic control	
	Color Camera	Integrated 2/3 inch CMOS, 3.45 µm × 3.45 µm pixel size, high sensitivity, high resolution	
Scan Unit	Capacity	1 slide tray, 6 slides maximum; upgradable to a multiple tray loader model	Up to 35 slide trays, 210 slides maximum
	Pixel Resolution (Color Camera)	UPLXAPO20X (NA 0.8): 0.274 µm/pixel Options: UPLXAPO4X (NA 0.16): 1.37 µm/pixel UPLXAPO10X (NA 0.4): 0.548 µm/pixel UPLXAPO40X (NA 0.95): 0.137 µm/pixel UPLXAPO40XO (NA 1.4): 0.137 µm/pixel UPLXAPO60XO (NA 1.42): 0.091 µm/pixel UPLXAPO100XO (NA 1.45): 0.055 µm/pixel	
	Scan Time	Brightfield: approx. 1.5 minutes (20x objective, scan area 15 mm × 15 mm) Fluorescence widefield NOVEM: approx. 6.5 minutes (20x objective, scan area 15 mm × 15 mm, 4 fluorescence channels, 10 ms exposure each)	
	Software	Automatic sample detection (generic and TruAI deep learning), automatic barcode reading, automatic focus mapping, automatic scanning, automatic stitching, pause and resume scanning, Z-stack imaging, extended focus imaging (EFI), image format: vsi, JPEG, TIFF, DICOM, synchronized multi-image display, stepless zooming, zooming while scanning, annotations, screen capture, slide loader control (multiple tray loader only)	
Fluorescence (optional)	Fluorescence Components	UPLFLN4X objective, illuminator with fly-eye lens, motorized mirror turret, motorized filter wheel Widefield light source options: U-LGPS, Excelitas X-Cite XYLIS, X-Cite TURBO, X-Cite Novem SILA: 4-line laser combiner (405 nm, 488 nm, 561 nm, and 638 nm) and scrambler unit	
	Monochrome Camera	Options: VS-304M, 1-inch CMOS, 3.45 µm × 3.45 µm pixel size HAMAMATSU ORCA Flash4.0 V3 HAMAMATSU ORCA Fusion HAMAMATSU ORCA Fusion BT	
Solutions for Scanner Software (optional)	Solution License	Batch image format converter DICOM converter Fluorescence SILA acquisition	
Desktop Software (optional, separate solution for analysis)	Solution License	Batch image format converter DICOM converter Detection and analysis Deep learning 3D deconvolution	
Environment	Weight	Optical frame: 69 kg (152.1 lb) 1 slide tray: 0.6 kg (1.3 lb)	Optical frame and multiple tray loader: 142 kg (313 lb) 35 slide trays: 21 kg (46.3 lb)
		Fluorescence: 8 kg (17.6 lb) PC and monitor: 16 kg (35.3 lb) Camera cover (optional): 9 kg (19.8 lb)	
	Operating Environment	Temperature: 15–28 °C (59–82.4 °F) (including other devices) Humidity: up to 80% (31 °C (87.8 °F))	
	Power Consumption	221 W	
	Power supply [*5]	Input: 100–240 V AC; 50/60 Hz; 4 A Output: 24 V DC, 9.2 A	

*1 Optional light source, illuminator, motorized mirror turret, and mirror unit are required
*2 Optional phase contrast objectives are required
*3 Optional analyzer mirror unit and motorized mirror turret are required
*4 Included in Fluorescence Solution
*5 Sold separately

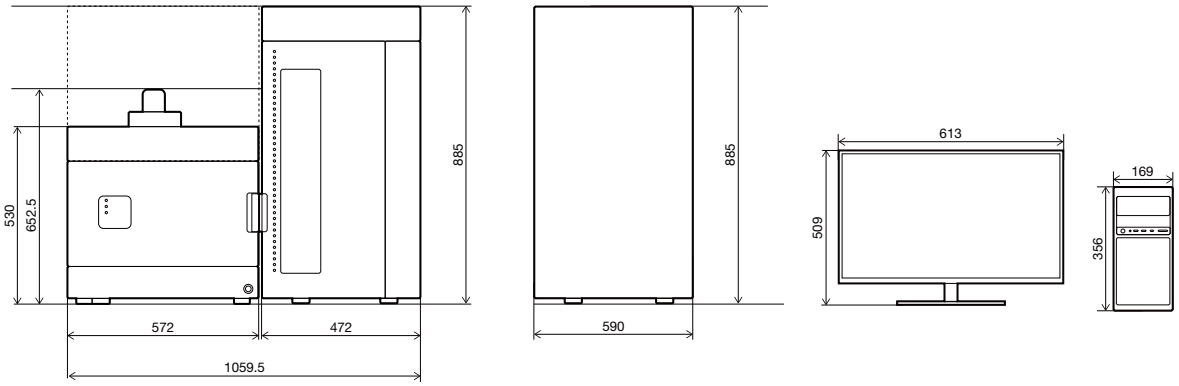
Dimensions

(unit: mm)

Base Unit with Standard Camera



Loader System



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