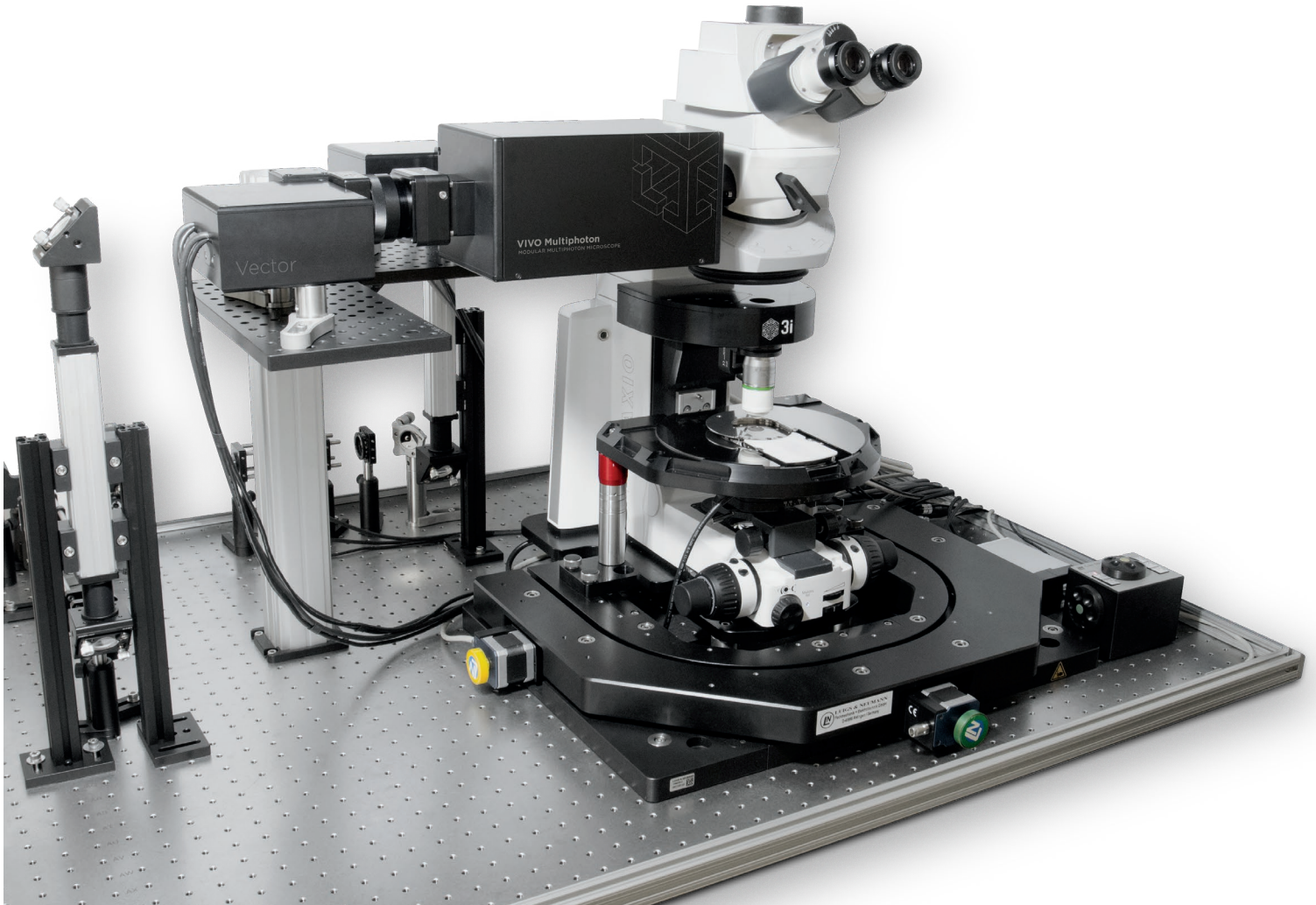




VIVO MULTIPHOTON



Modular multiphoton microscope series

The VIVO Multiphoton™ series merges speed, resolution, and photostimulation in a customizable and expandable system. Available in three modular configurations, each system is designed for optimal optical performance with incredible flexibility to meet a wide array of imaging needs. Complete software and hardware integration through SlideBook™ allows for custom-scripted experimental protocols and integration of external components from electrophysiology to computer-generated holography.

The ultimate all-optical workstation

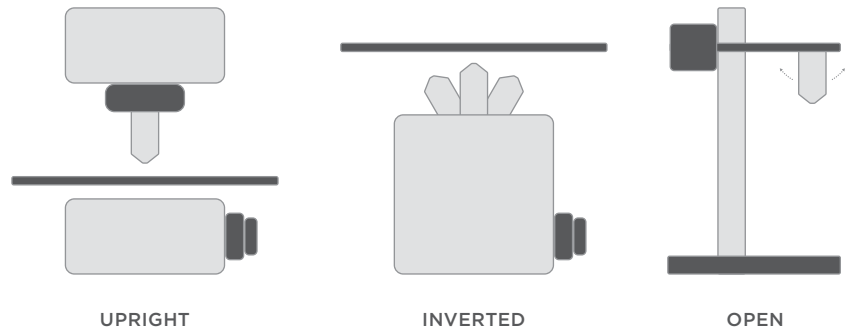
CHOOSE FROM THREE CONFIGURATIONS

Available in upright, inverted, and open (movable objective) configurations, VIVO Multiphoton is highly flexible and can be customized to specific imaging needs.

UPRIGHT - Slice electrophysiology, zebrafish, *Drosophila*

INVERTED - Coverslip-mounted specimens, full environmental control

OPEN - In vivo, virtual reality



FLEXIBILITY

mBEAM™ - Software-controlled beam expander adjusts beam diameter to fill variable objective back aperture sizes.

TTL SYNCHRONIZATION - Integration of electrophysiology and virtual reality hardware.

FAST-GATED PMTs - Sub-millisecond switching between imaging and photostimulation.

SIDEPORT™ - Adds 2 telecentric inputs for photostimulation and ablation on the upright configuration.

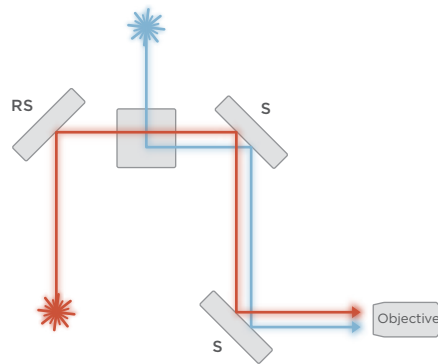




SCANNING + PHOTOSTIMULATION

Vector™ RS+ hybrid scanner combines the speed of resonant scanning with the flexibility of dual galvanometers.

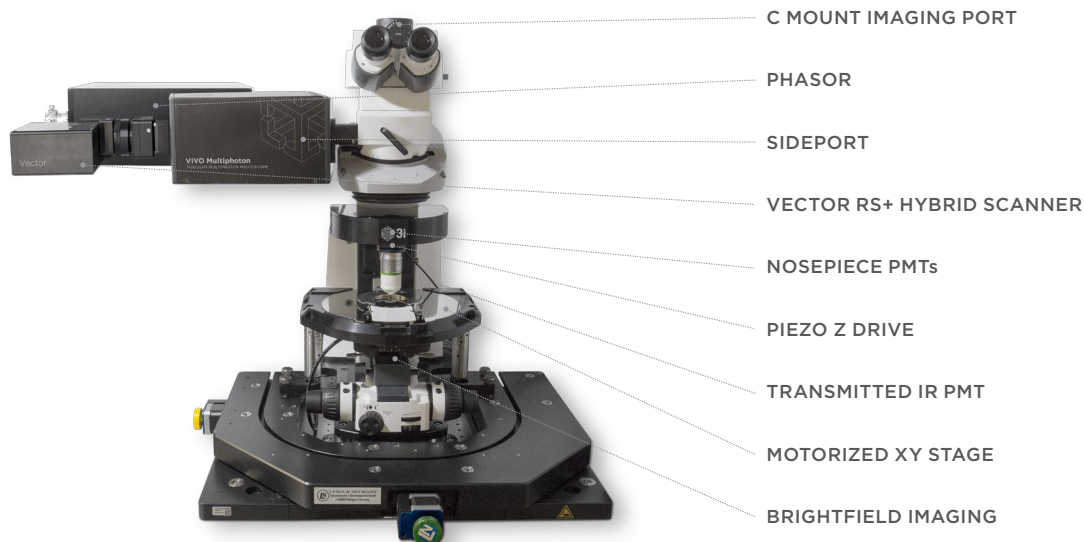
Rapid switching between 30 fps full-frame resonant scanning and spiral or spot photostimulation.

Pulse-triggered digitization ensures maximum signal collection by syncing acquisition to laser output.



-  **Imaging** - tunable NIR laser
-  **Photostimulation** - visible laser or fixed-wavelength NIR laser
- RS** Resonant scanning galvo
- S** Scanning galvo

CORE COMPONENTS



Computer generated holography with Phasor™

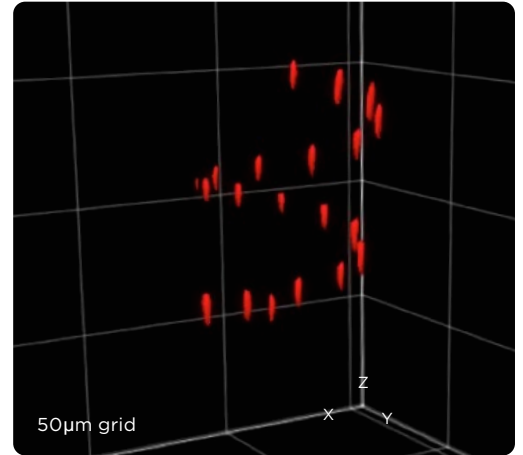
Optogenetic photostimulation and uncaging with the highest available temporal resolution and simultaneous illumination of non-adjacent regions.

Spatial light modulator (SLM) creates a holographic illumination pattern via shapes, hand-drawn regions, and diffraction-limited spots.

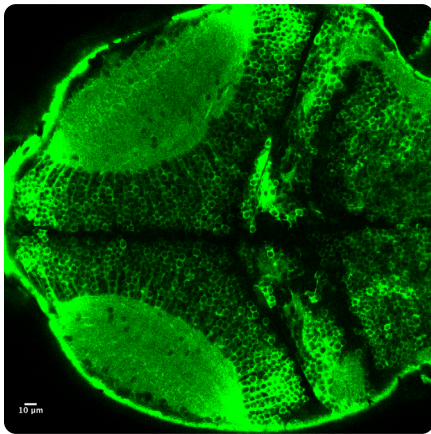
Capable of simultaneous stimulation in multiple 3D locations above and below the plane of focus.

Choose from a combination of up to 7 visible wavelengths or a high power fixed-wavelength femtosecond laser for near-IR stimulation and uncaging.

Optional Temporal Focusing for Phasor 2-Photon confines the axial thickness of large illumination regions to $<20\mu\text{m}$.



RAPID 4D IMAGING



Dynamic, continuous beam diameter and laser power adjustments for optimal signal collection.

Piezo objective collar eliminates delay between frames with continuous, synchronized Z movement.

SlideBook algorithms track the sample in X, Y and Z to maintain focus and alignment.

2pFLIM

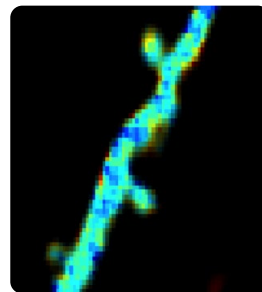
2P Time Correlated Single Photon Counting (TCSPC)
Fluorescence Lifetime Imaging Microscopy (FLIM)
SlideBook module.

Utilizes standard GaAsP detectors or optional hybrid
PMT/APD detectors.

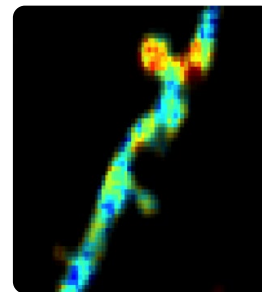
PM-ER interaction in dendritic spines imaged with 2pFLIM

MBL Neurobiology, 2015

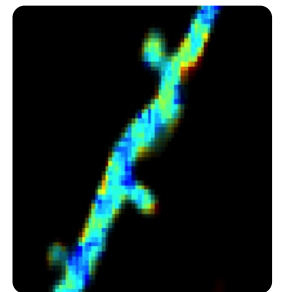
UNCAGING
↓



BEFORE



1 MIN



2 MIN



SlideBook 6

Full hardware control and integrated image acquisition

Powerful built-in analysis tools

Custom scripting, MATLAB and electrophysiology software integration

Software modules include ratiometric imaging, stereology,
photostimulation, ablation, FRAP and FLIM

Specifications

BASE OPTIONS

Upright, inverted, or open (movable objective)

SCANNER

Vector RS+ hybrid scanner:

- Merges the speed of resonant scanning with the flexibility of dual galvanometers
- Fast scanning can be paused for sub-millisecond switching to spiral or spot photostimulation

Vector dual galvanometer scanner:

- Up to 4 frames per second with bidirectional scanning at 512 x 512, maximum frame size 4096 x 4096
- Up to 1500 lines per second (unidirectional)
- Frame, line, and curve scanning patterns
- Point or spiral photostimulation

Vector RS resonant scanner:

- Up to 30 frames per second at 512 x 512, maximum frame size 2048 x 2048

DETECTORS

Two GaAsP PMTs mounted in custom nosepiece for close proximity to the back aperture

One or 2 substage GaAsP detectors for additional signal collection

Up to 4 multialkali or GaAsP (with optional cooling) detectors in a custom c-mount array

Red-shifted multialkali PMT for transmitted IR imaging

PHOTOSTIMULATION

Computer-generated holography:

- Phasor or Phasor 2-Photon
- Simultaneous illumination of multiple arbitrary regions
- 2-Photon uses high-powered fixed-wavelength NIR laser or fixed line of dual-line NIR laser
- Temporal Focusing for Phasor 2-Photon confines z illumination to <20µm for holograms with diameter 20-100µm

Scanning:

- Vector for point or spiral stimulation

OPTICS

Custom-designed SidePort for combining multiple inputs

Automated beam expansion (0.25x-3.9x) to accommodate multiple objectives

Compatible with a variety of high-NA, long-working distance (up to 3mm) objectives

Available DIC, Dodt contrast or phase contrast

STAGE

Fully-integrated, software-controlled XY stage

Range of stages with available motorization, linear-encoding, interchangeable bridges, and integrated micromanipulators

LASER

Full integration and software control of tunable NIR lasers including Coherent and Spectra-Physics

Power modulation and blanking controlled by electro-optic modulator



BUILT BY SCIENTISTS FOR SCIENTISTS. Intelligent Imaging Innovations (3i) designs and manufactures cutting edge live cell and intravital microscopy imaging platforms driven by 64-bit SlideBook software. 3i was established in 1995 by a group of scientists whose wide range of research activities includes cell biology, immunology, neuroscience and computer science. Our collective aim is to provide advanced multi-dimensional microscopy platforms that are intuitive to use, modular in design, and meet the evolving needs of investigators in the biological research community.

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