New Nikon AXR High-Definition Resonant Scanning Confocal System

Nikon's brand new AXR confocal microscope features an industry-leading **25mm field of view** (FOV), in both resonant and galvano mode, to enable 2x the amount of data captured in every frame, compared to a conventional confocal system. Achieve ultra-high speed imaging up to **720fps** (at 512x16) in resonant mode and stunning **8K** high-definition images in galvano mode. The AXR features a unique hexagonal pinhole to optimize confocality with minimal light loss, and an exclusive **Denoise.ai** algorithm which leverages deep learning to remove Poisson shot noise from resonant images. **Enhanced Resolution** (ER) mode enables resolution improvement beyond that of a conventional confocal system.

Eclipse Ti2-E Microscope
- Ultra-wide 25mm field of view
- Fully motorized and intelligent
- 4th generation Perfect Focus System for real-time drift correction
- CAM-based, encoded Z-motor for ultra-stable, higher-precision imaging
- Compatible with multiple imaging modalities including widefield, TIRF, super-resolution, field scanning and point scanning confocal, as well as simultaneous imaging and photo-stimulation / FRAP

Scanners
- Hybrid scanning system: high-resolution galvo and high-speed resonant scanners for imaging up to 30 frames per second (fps) at full frame (25mm field of view) and 720 fps in band scan mode (2,048x16)
- High speed resonant scanner can be combined with revolutionary Denoise.ai technology for low-noise data at high acquisition speeds
- Industry-leading 25mm field of view captures an incredible amount of data in every frame to double your data acquisition speed. Achieve automated large image stitching/tiling applications faster. Large FOV enables utilization of higher magnification (and resolution) objectives without sacrificing throughput
- High Definition galvo scanner images up to 8,192 x 8,192 pixels with 1-1,000x scan zoom for proper Nyquist sampling with any objective.

Lasers
- 4-line permanently aligned solid-sate diode laser launch
- 405, 440, 488, 514, 532, 561, 640, and 730nm laser line options, each with >15mW output power at excitation fiber tip
- No-alignment, drift-free design due to patented monolithic, optical crystal combiner

Detectors
- DUX-VB: Variable emission spectral detector with 5nm spectral resolution;
- Includes 4 GaAsP detectors for image collection
  - 2 Tunable GaAsP detectors
  - 2 Filter based GaAsP detectors
- **Transmitted Light Detector:** brightfield / DIC transmitted light imaging

Additional Optional Capabilities
- **FLIM:** Fully integrated Becker & Hickl FLIM module
- **DUX-ST:** 2- or 4-channel detection with GaAsP and/or high sensitivity PMTs for filter based imaging
- **TIRF:** Total Internal Reflection Fluorescence Microscopy is available to achieve high resolution images near the coverslip
- **SIM/STED/SoRa/STORM:** A variety of super resolution techniques is available to improve lateral and axial resolution in live or fixed samples
- **Spinning Disk Confocal:** Spinning Disk Confocal options are available for use in tandem with the Nikon AX confocal
- **Widefield:** Traditional widefield can be added to any AX confocal system

NIS-Elements Software
NIS-Elements C Confocal Package includes:
- Multi-dimensional image capture and display
- AutoSignal.ai for easy to use confocal parameter setup
- 5D image viewer
- Image analysis in up to six dimensions
- Automated object counting, object tracking, intensity measurement over time, image tiling and stitching
- Denoise.ai: Utilizes deep learning to remove Poisson shot noise from resonant scanned images
- Peripheral and 3rd party device control
- Total acquisition-to-analysis solution for high-content imaging applications

Additional software modules
- 2D/3D deconvolution & Clarify.ai
- Custom acquisition and analysis routines, including real-time analysis and intelligent, analysis-based, conditional acquisition

Imaging Workstation
- HP Z4 High Performance PC featuring Intel Xeon 3.7 GHz processor, 64GB RAM, 512GB Turbo SSD drive for Operating System and Program Files, 1TB Turbo SSD data drive, 12TB data storage, Windows 10 64-bit Professional.
- 3-Year warranty for parts, labor, and service.
- Leverage the powerful NVIDIA RTX5000 16GB GPU for faster image analysis and processing within NIS-Elements software
- 32" HP 4K UHD Display Monitor

ECLIPSE *Ti2*

A New Vision for Inverted Microscopes

Nikon's Eclipse Ti2 sets a new standard for inverted microscope platforms. The ground-breaking 25mm field of view enables 2X more data capture in every image compared to previous technology. With its expandable stratum structure and modular illumination system, the Ti2 provides a flexible, future-proof platform that evolves with your research.

Ultra-Wide 25mm Field of View (FOV)
- Large FOV provides incredibly flat images from edge-to-edge, enabling more quantitative data to be extracted from each field
- Faster, seamless image stitching with reduced acquisition and post-processing time
- Use higher magnification, higher resolution objectives without sacrificing FOV
- Two 25mm side-ports for multiple imaging detectors
- Redesigned optics and filter cubes to achieve 25mm FOV
- Fly eye lens for even illumination across the expanded FOV

Fully Motorized and Intelligent
- Fully motorized for advanced imaging applications
- Intelligent components for software recognition and verification

Hardware Triggering
- Unique hardware triggering capabilities removes the need for software-callbacks during acquisition routines to maximize imaging speed
- The detector communicates directly with motorized devices to synchronize and initiate their movement
- Triggering also minimizes the amount of time specimens are exposed to light, thereby extending long-term imaging

Accessible Back Aperture
- Easily view and image the back aperture for TIRF alignment without laser safety concerns

Perfect Drift Correction
- 4th generation Perfect Focus System (PFS) for real-time drift correction
- Utilizes a linear encoder and high-speed feedback mechanism to correct focus drift caused by temperature changes and mechanical vibrations
- The detector portion is separated from the nosepiece to reduce burden on the Z-drive and eliminate heat output to provide an incredibly stable imaging environment
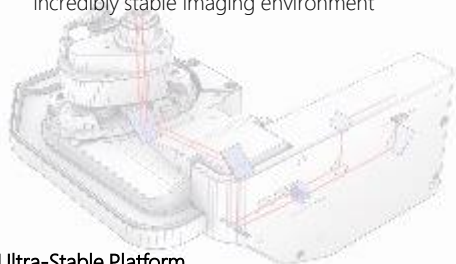
Ultra-Stable Platform
- The cam-based Z focusing mechanism minimizes XY drift to provide an ultra-stable platform for demanding applications such as super-resolution and single-molecule imaging
- The Z-drive is detached from the main body of the microscope in order to maintain a close distance between the actuator and the objective lens even in expanded (staged-up) configurations
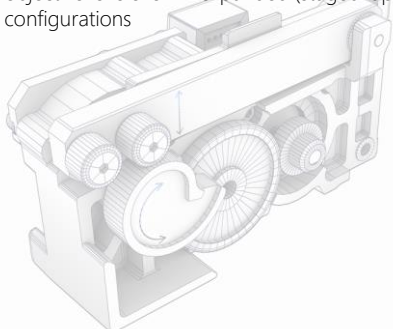
Flexible and Future-Proof
- In its standard configuration, the Ti2 can accommodate up to three different illumination devices, enabling you to easily incorporate FRAP or photo-stimulation with a variety of imaging applications such as confocal or TIRF.
- In its expanded (staged-up) configuration, the Ti2 can accommodate two optical layers and up to five different illumination devices for unsurpassed flexibility in experiment design.
- This flexibility also ensures the system can be easily modified to accommodate future needs.

Endless Possibilities with LAPP Illumination System
- The Ti2 offers a modular series of illumination devices for laser and LED-based applications, called LAPPs
- LAPP system includes modules for epi-fluorescence, TIRF, FRAP, DMD, and super-resolution
- Modules can be mixed and matched and further combined with confocal to accommodate the most demanding imaging applications
- The flexibility of the Ti2-LAPP system ensures your system is future-proof and easily upgraded to meet your evolving research

NIS-Elements

Unified Software Solution for All Systems
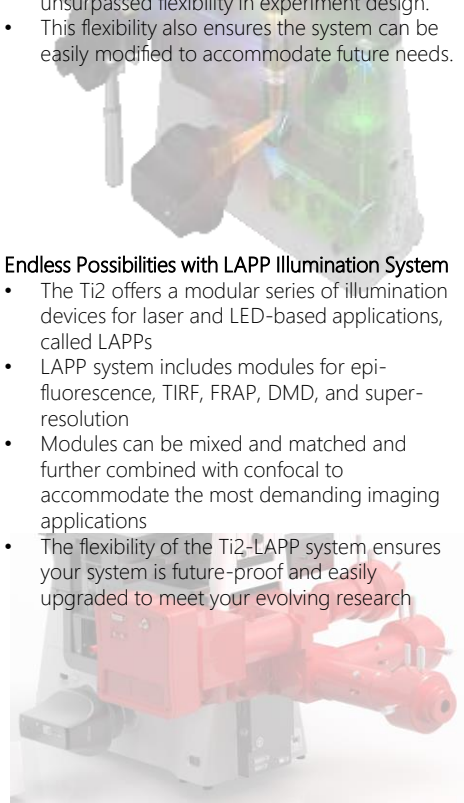
Nikon's universal software platform, NIS-Elements, combines powerful image acquisition, analysis, visualization, and data sharing tools. With fully customizable user interfaces and software modules, NIS-Elements can serve as an uncomplicated interface for photo-documentation and scale up to powerful, complex workflows with automated imaging and analysis. NIS-Elements can be adapted to each individual user's skill level to provide accessible and effective tools for scientific inquiry for the most complex experimental design.

Unified Software Platform for All Nikon Systems
- NIS-Elements software package spans the full spectrum of imaging platforms, from basic photo-documentation to super-resolution and confocal systems
- A consistent user experience ensures a smooth transition across all Nikon imaging platforms and reduces training time
- The software is always transforming with the demands of research and will grow with your system over time as experimental needs evolve

Software Tailored to Fit Individual Research Needs
- NIS-Elements allows you to tailor all aspects of the system to your specific experimental needs – from user interface, to individual hardware selection and optimization, and fine tuning acquisition routines and custom multi-channel binary analysis
- Capture only the data you need, exactly how you need it, using conditional/intelligent acquisition workflows. Using the JOBS experiment wizard, customized experiments with embedded analysis tasks and branches based on analysis results can be created, allowing for higher throughput and more targeted acquisitions
- Integrate automated data sharing with custom lab programs to leverage other components of your research routines

Hardware Triggering to Maximize Speed and Specimen Viability
- Leverage the power of National Instruments DAQ to use hardware-triggering functionality through I/O voltage-mediated connections to quickly drive devices, such as light sources, Z-positioning, and external pumps/valves. With no requirement for software checks and callbacks, latency is greatly reduced and exposure of cells to light is minimized.
- When combined with JOBS and General Analysis, hardware triggering maximizes collecting meaningful data quickly. Users can let the results dictate the acquisition parameters with conditional workflows.

High Content with a Single Click
- NIS-Elements HC package provides streamlined high-speed, automated well-plate acquisition, data review, analysis and data management
- Streamline high content acquisition using customizable wizards to define well-plate configuration, plate handling, autofocusing, filter switching, and detector options
- High repeatability with consistent settings across large scale experimental designs

Leverage Deep Learning
- Artificial Intelligence (AI) and deep learning methods make seemingly impossible tasks, typically tackled with challenging acquisition parameters or manual segmentation, not only possible but readily attainable
- The NIS.ai module employs convolutional neural networks (CNNs) to learn from labeled training data and recognize patterns. The resulting training recipe can then be applied repeatedly and reliably to similar samples to process or analyze huge volumes of data at significantly faster speed than traditional techniques.

Powerful Analysis Tools – Expand the Platform with Optional Modules
- The General Analysis module enables easy customization of complex analysis or statistical flows such as 3D volume and 4D tracking by simply dragging and dropping analysis templates, ensuring accurate and reliable analyses
- Real-time analysis of live cell dynamics during acquisition, including intensity based measurements and object tracking, means you don't have to wait to see the results
- Data export to Excel, Matlab or any third party or customer software
- The 2D/3D Deconvolution module leverages the power of GPU-acceleration for maximum speed. NIS-Elements incorporates proprietary Nikon optics data for optimal PSF calculation, giving robust and reliable results

Data Visualization and Presentation Tools
- Easily toggle between 2D and 3D views of multi-dimensional data sets
- Unique Extended Depth of Focus (EDF) view for creating beautiful, high-contrast, in-focus 2D projection images from 3D data
- Modern movie maker functionality allows users to easily combine time-lapse data, still images and dynamic graphs to create high impact figures and movies

Control 3rd Party Hardware Devices
- NIS-Elements supports many major 3rd party hardware devices, including confocal, camera, light source, and motorization options, providing Nikon customers with unparalleled choices in system design
- Regular updates ascertain that support for new hardware is constantly being added so you can stay on the cutting edge

Nikon AXR Confocal System

AXR Hybrid Resonant and Galvano Confocal Scanner
- High Speed 2K Resonant Scanner
- Ultra High Definition 8K Galvano Point Scanner
- High Definition Confocal Controller
- Tunable GaAsP Detector System
    - Traditional Bandpass Imaging
    - Spectral Unmixing Capability
    - 4 GaAsP Detectors (2 Tunable)
- Permanently Aligned Laser Launch
    - 405/488/561/640 nm Lasers
- Vibration Isolation Table & Sub-shelf

Nikon Ti2-E Inverted Microscope
- Award-winning ergonomic microscope
- Industry exclusive 25mm field of view
- Fully Motorized and Intelligent
- Encoded Motorized XY-Stage
- Encoded High-Precision Z-Drive
- Perfect Focus Focal Drift Correction System

Epifluorescence
- Full visible spectrum fluorescent LED light engine
- Filter sets for visualizing DAPI, GFP, DsRed, and Cy5 (and other fluorophores with similar Ex/Em spectra)

Objective Lenses
- Plan Apo λ 4X, 0.2NA, 20mm working distance
- Plan Apo λ 10x, 0.45NA, 4mm working distance
- Plan Apo VC 20x, 0.75NA, 1mm working distance
- Plan Apo λ 40x, 0.95NA, 250µm working distance
- Plan Apo VC 60x Water, 1.2NA, 270µm working distance
- Plan Apo VC 100x Oil, 1.4NA, 130µm working distance
- DIC (Nomarski) Optics
- Immersion oil & cleaning supplies

NIS-Elements Software and High-Performance Workstation
- Elements HCA Confocal Software Package
- Multi-dimensional Imaging
- Manual and automated analysis tools
- 5-Dimensional Image Viewer
- Windows 10 Professional Workstation
- Ultra-High Definition Monitor

Software Modules
- GA3 2D/3D Analysis Builder
- 3D Volume Rendering
- JOBS Customized Acquisition Builder
- 2D/3D Deconvolution and Clarify.ai
- 2D/3D Advanced Measurements
- NIS.ai for artificial intelligence and deep learning from customer data

Optional accessories include:
- Environmental Incubation System
- NIS-Elements Offline Analysis Station
- sCMOS monochrome camera for EPI-Fluorescence
- Color Camera