

NIS-Elements Supported Devices (ver. 3.22 or later)

Nikon Cameras

CCU: DS-U1/L1*²
 (for camera head DS-2Mv/2MBW/2MBWc/5M/5Mc)
 CCU: DS-U2/L2
 (for camera head DS-2Mv/Vi1/2MBW/2MBWc/5M/5Mc/Fi1/Fi1c/Qi1/Ri1)
 CCU: DS-U3/L3*³(for camera head DS-Vi1/Fi1/Fi1c/Qi1/Ri1/Fi2)
 DQC-FS*²

Third-party Cameras

Photometrics
 Evolve
 QuantEM
 CoolSNAP HQ2
 CoolSNAP ES*²
 Cascade 128+*²
 Cascade II 512*²
 Cascade 1K*²

Andor Technology
 Luca S, Luca R
 iXon+ 897, 888, 885
 iXon X3
 iXon Ultra
 iXon-M
 Clara
 Neo sCMOS

QImaging
 Retiga EXi Aqua/Blue
 Retiga 2000R - Mono/Color
 Retiga SRV + RGB-HM-S Slide
 Rolera EMC2
 QIClick
 QICAM

Hamamatsu
 magEM C9100-13
 Imagem-1K
 ORCA-R2
 ORCA-Flash 2.8
 ORCA-Flash 4.0
 ORCA-D2
 ORCA (DCAM)
 C9100-02, C9100-12

Imaging Source
 Converter DFG/1394

Others
 TWAIN Device*³

Nikon Microscope Devices

Biological Microscope TE2000 (Perfect Focus System), Ti (HUB-A/B)
 Biological Microscope 90i (ND filter, Stage), 80i, DIH-E/M, C-Box,
 Biological Microscopes Ni-E/Ni-U, Ci-E
 Fixed-stage Microscope FN1 + DIH
 Multizoom Microscope AZ100M
 Industrial Microscope LV Series
 Measuring Microscope MM-400/800*²
 Metallographic Microscope MA200
 Inspection Microscopes L200N/L300N
 Fiber Illuminator Intensilight
 Laser Module LU4A, Shutter Unit LUSU, AOM Unit
 LV NCNT Nosepiece controller
 D-FL-E
 LUSU
 AOM
 LU4A
 Ni-SH-CON

Third-party Devices

Prior Scientific
 ProScan III (H31)
 ProScan II (H30)
 Prior PCI II
 OptiScan II ES10
 NZ100, nanoStageZ
 Prior ES10ZE
 Prior NIKRFK

Ludl Electronic Products
 MAC5000, MAC6000

Märzhäuser Wetzlar
 TANGO Desktop, Tango PCI
 LSTEP, ECO-STEP

Vincent Associates (Uniblitz)
 VCM-D1

Sutter Instrument
 Lambda 10-2, 10-3, SC, 10-B, XL

Physical Instrument
 PI E-662, 665 (RS232)

Photometrics
 Dual View

EXFO
 EXFO XCite120

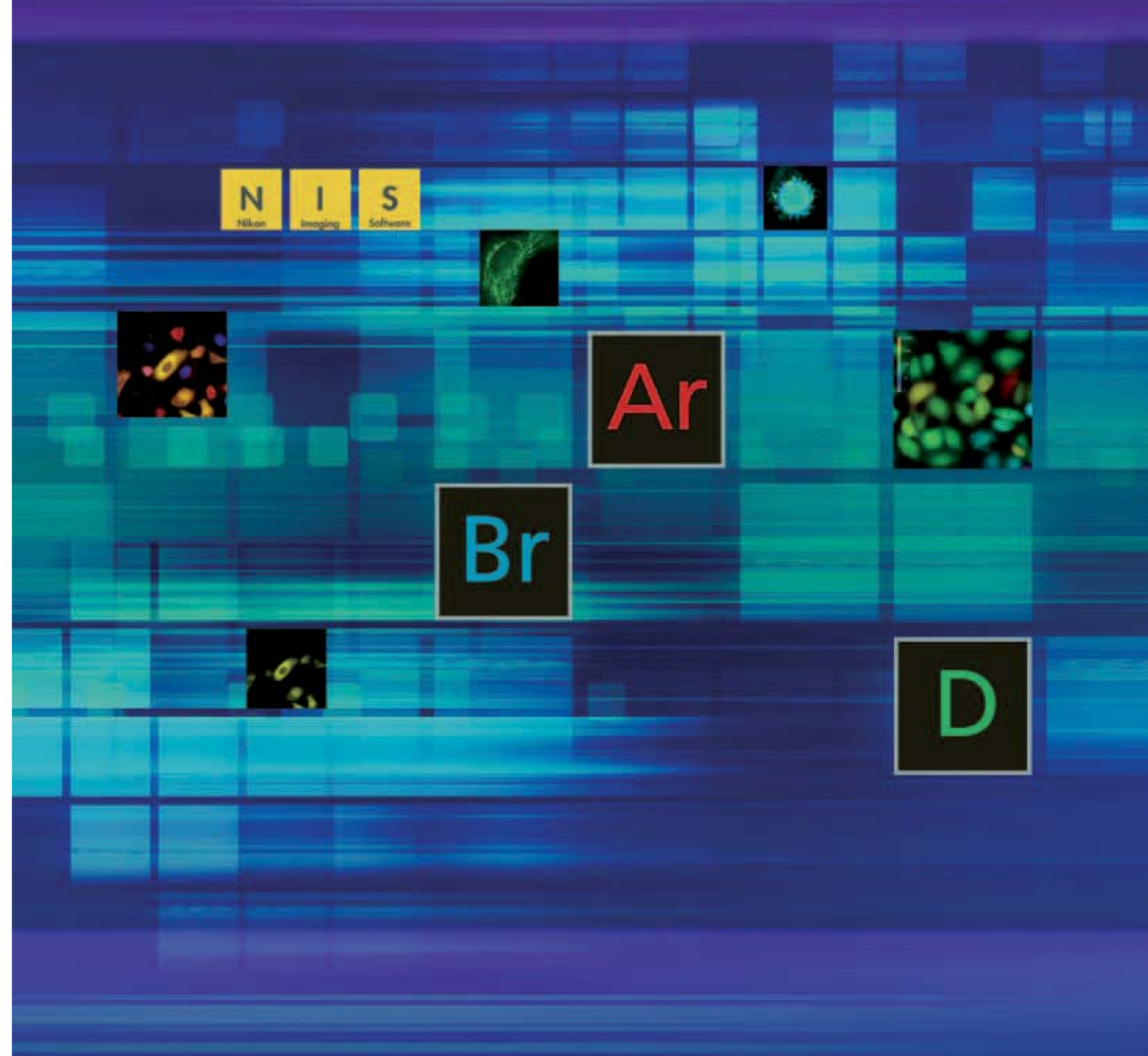
ASI (Applied Scientific Instrumentation)
 MS-2000
 FW-1000
 SC-2000

National Instruments
 TTL Input/Output (NI Card)

Supported Operation System

Windows 7 Professional (32/64 bit Version)
 Windows Vista Business SP2 (32/64 bit up to Version 3.22)
 Windows XP Professional SP3 (32 bit up to Version 3.22)

NIS-Elements is compatible with all common file formats, such as JP2, JPG, TIFF, BMP, GIF, PNG, ND2, JFF, JTF, AVI, ICS/IDS. ND2 is a special format for NIS-Elements. ND2 allows storing sequences of images acquired during nD experiments. It contains information about the hardware settings and the experiment conditions and settings.



*1 Only compatible with Windows XP
 *2 Not compatible with 64 bit version OS
 *3 Not compatible with Windows Vista

N.B. Export of the products* in this catalog is controlled under the Japanese Foreign Exchange and Foreign Trade Law. Appropriate export procedure shall be required in case of export from Japan.
 *Products: Hardware and its technical information (including software)
 Monitor images are simulated.
 Company names and product names appearing in this brochure are their registered trademarks or trademarks.

Specifications and equipment are subject to change without any notice or obligation on the part of the manufacturer. March 2013 ©2006-13 NIKON CORPORATION

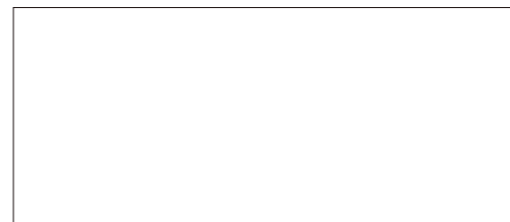


WARNING TO ENSURE CORRECT USAGE, READ THE CORRESPONDING MANUALS CAREFULLY BEFORE USING YOUR EQUIPMENT.



ryf ag

 Ryf AG
 Bettlachstrasse 2
 2540 Grenchen
 tel 032 654 21 00
 fax 032 654 21 09
 www.ryfag.ch



This brochure is printed on recycled paper made from 40% used material.

Nikon offers total software solution covering image capture, archiving, and analysis

NIS-Elements is an integrated software imaging platform developed by Nikon which delivers comprehensive microscope control, image capture, documentation, image analysis and data management. NIS-Elements handles multidimensional imaging tasks flawlessly with support for capture, display, peripheral device control, and analysis & data management of images of up to six dimensions. The system also contributes to experiment efficiency with an intuitive image analysis feature set and database building capabilities developed to handle archiving and management of large numbers of multidimensional image files. Unified control of the entire imaging system offers significant benefits to microscopists for cutting-edge research, such as live cell imaging



The NIS-Elements suite is available in three packages scaled to address specific application requirements.

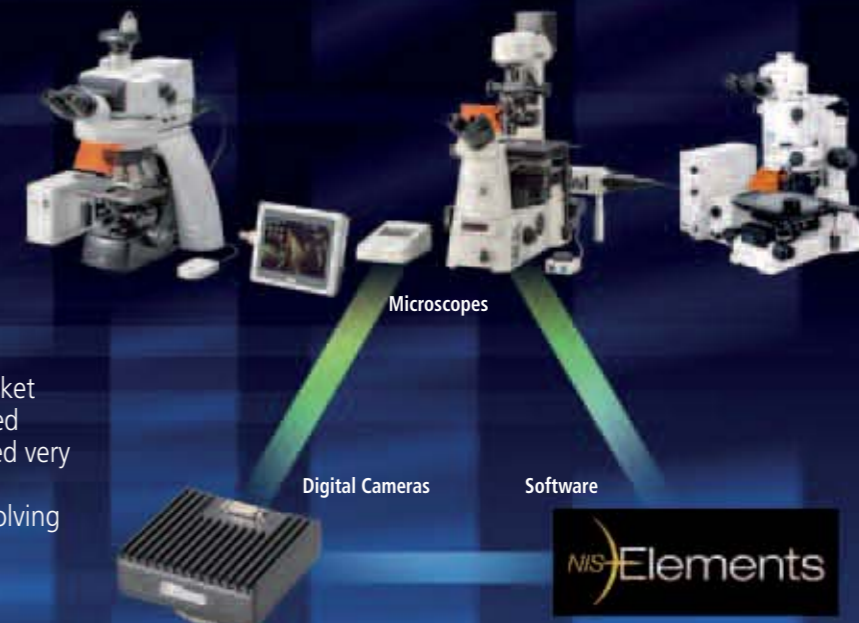
Ar NIS-Elements AR is optimized for advanced research applications, featuring fully automated acquisition and device control through full 6D (X, Y, Z, Lambda (Wavelength), Time, Multipoint) image acquisition and a wide range of image analysis.

Br NIS-Elements BR is suited for standard research applications, photodocumentation of fluorescent samples and image analysis including intensity and counting measurements. It features acquisition and device control through 4D (up to four dimensions can be selected from X, Y, Z, Lambda (Wavelength), Time, Multipoint) acquisition.

D NIS-Elements D supports color documentation requirements in bioresearch, clinical and industrial applications, with basic measuring and reporting capabilities.

Why NIS-Elements?

As a leading microscope manufacturer, Nikon realizes the importance of providing its customers with system-based solutions to free them to focus on their projects and research and not on the complexities of the microscope. Never before has a software package offered such comprehensive control of microscope systems, image acquisition, image analysis and data management.



Total Imaging Solution

In designing and bringing to market the most technologically advanced optical systems, Nikon has worked very hard to provide a "total imaging solution" that meets the ever-evolving demands of the microscope user.

•Highest Quality Optical Performance

The world-renowned Nikon CFI60 infinity optical system effectively set a new standard for optical quality by providing longer working distances, higher numerical apertures, and the widest magnification range and documentation field sizes. As a leader in digital imaging technology, Nikon recognized the importance of adapting its optics to optimize the digital image. Nikon's new objectives and accessories are specifically engineered for digital imaging. Because what you see depends greatly on the quality of your microscope, we strive to power our microscope systems with optical technologies that are nothing but state-of-the-art.

•Diverse Line of Powerful Digital Cameras

Image capture has become a high priority in microscopy and the demand for products that deliver high quality and versatile functionality has grown considerably in recent years. In accordance, Nikon offers a full line of digital cameras, addressing the varied needs of microscopists in multiple disciplines. Each Nikon digital camera is designed to work seamlessly with Nikon microscopes, peripherals, and software. With Nikon Digital Sight (DS) series cameras, even novice users can take beautiful and accurate microscopic images. For the advanced researcher, hiresolution image capture and versatile camera control is fast and simple. Together with Nikon's new software solutions, image processing and analysis have reached new levels of ease-of-use and sophistication.

•Intelligent Software Solutions

Designed to serve the needs of advanced bioresearch, clinical, industrial and documentation professionals, NIS-Elements provides a totally integrated solution for users of Nikon and other manufacturers' accessories by delivering automated intelligence to microscopes, cameras, and peripheral components. The software optimizes the imaging process and workflow and provides the critical element of information management for system based microscopy.

Multi-layer Document Structure

NIS-Elements uses a sophisticated image documentation structure making it possible to achieve non-destructive archiving of image data including annotation (arrows, lines, text notes), measurement data, binary data for storing results of threshold or classification processes, and meta-data information for recording acquisition and device conditions at the time of image acquisition.

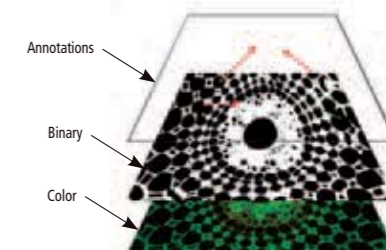


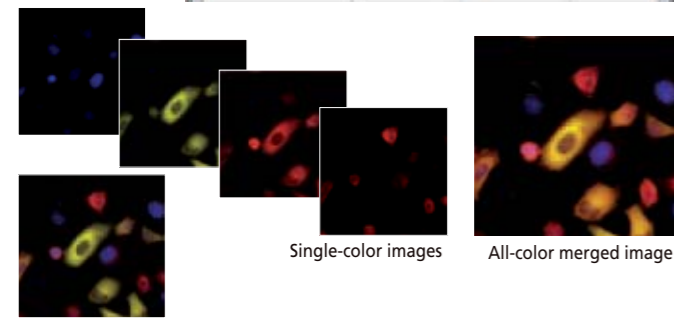
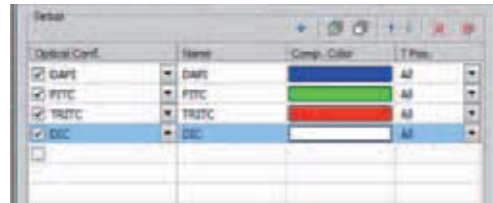
Image Acquisition

NIS-Elements offers the most suitable image acquisition for various applications with the integrated control of the camera, motorized microscope and peripheral devices.

Multichannel (multi color)



NIS-Elements can acquire full bit depth multi-color images, combining multiple fluorescence wavelengths and different illumination methods (DIC, phase contrast etc.), while offering independently scalable channels.



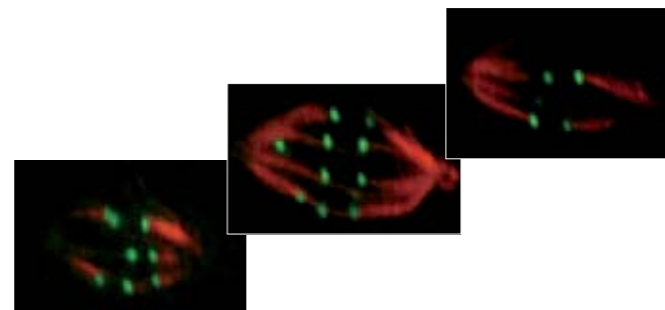
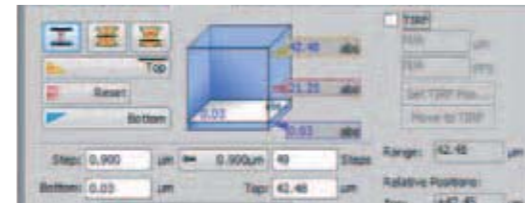
Single-color images All-color merged image

Specified-color merged image

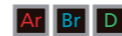
Z-series



Through motorized focus control, NIS-Elements reconstructs and renders 3D images from multiple Z-axis planes.

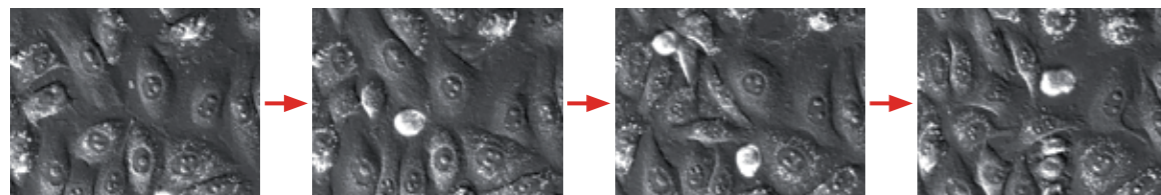
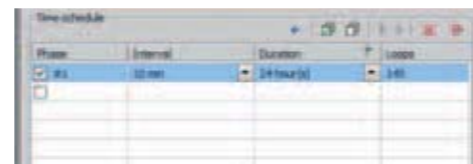


Time Lapse

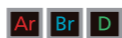


Time lapse imaging in NIS-Elements is easily configurable simply by setting the time interval and duration of capture.

The Perfect Focus System of the motorized inverted microscope Ti-E enables high-accuracy image capture without focus drifting even during extended time time-lapse experiments.



Multipoint Experiments



NIS-Elements' motorized stage control offers automated travel to multiple stage points of the sample of a multi-well plate or dish. Stage points are memorized and can be saved and loaded for future imaging sessions.

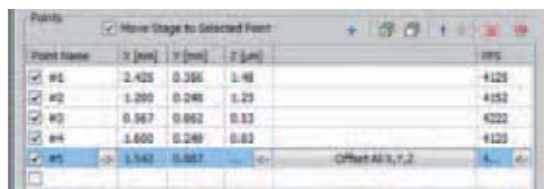
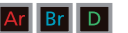
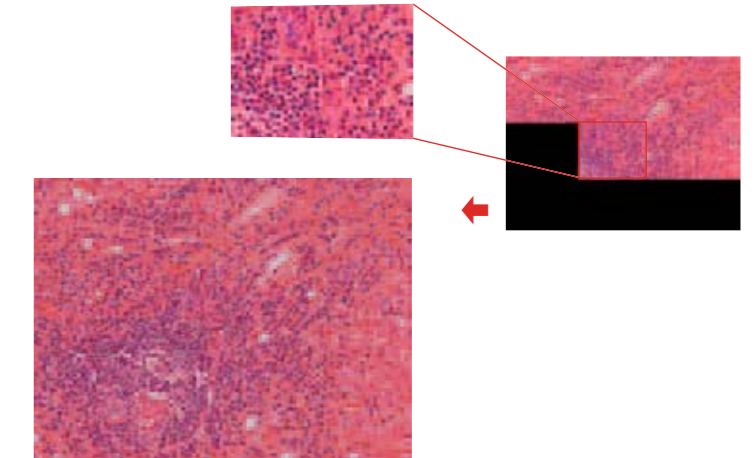
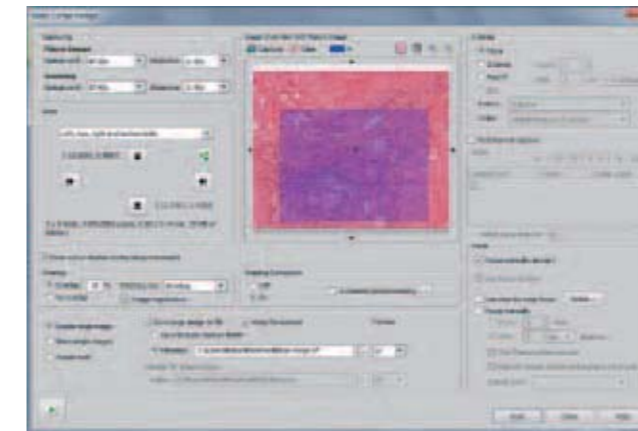


Image Stitching (Large image)



Large Image Acquisition generates a single high-magnification wide field-of-view image by automatically stitching multiple adjacent frames from a multipoint acquisition using a motorized stage or from multiple single images captured from a previous session. Users can easily select image acquisition ranges and areas from low magnification images.

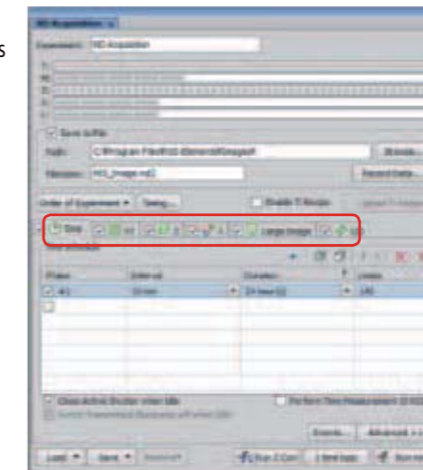


Multidimensional imaging

* Available dimensions vary depending on the package.

ND Acquisition

NIS-Elements captures images in a combination of multiple dimensions such as Time-Lapse, Multichannel, Z-series, and Multipoint. It is also possible to create and manage the acquisition of a multi-dimensional dataset with a thirty-minute time lapse of two wavelengths and a Z series across each well of a multi-well plate.



Option (Ar Br)

ND Stimulation

NIS-Elements controls photo stimulation and image acquisition.

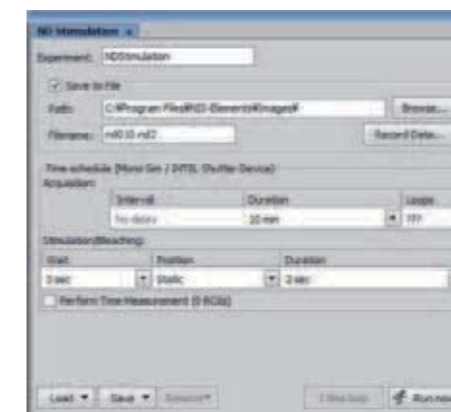
Option (Ar)



ND Simultaneous Stimulation

NIS-Elements enables image acquisition during photo stimulation.

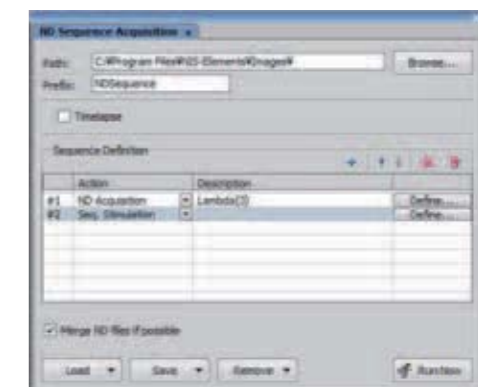
Option (Ar)



ND Sequential Acquisition

NIS-Elements allows various sequential imaging experiments to be combined with other functions, such as simultaneous photo stimulation and imaging, or multidimensional acquisition.

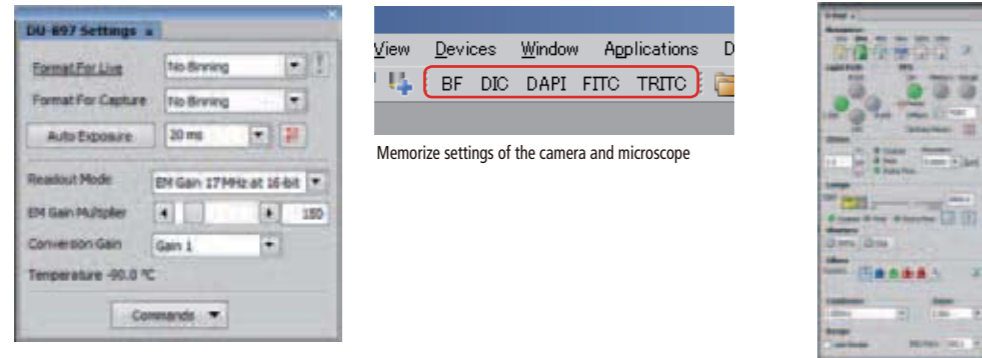
Option (Ar)



Optical Configuration

Ar Br D

Presets or 'Optical Configurations' can be saved for each observation method such as FITC fluorescence and DIC imaging, memorizing the settings of the microscope, camera and peripheral devices. The optical configurations are created through a one click set up and are displayed as icons in the tool bar for easy access and use.



Memorize settings of the camera and microscope

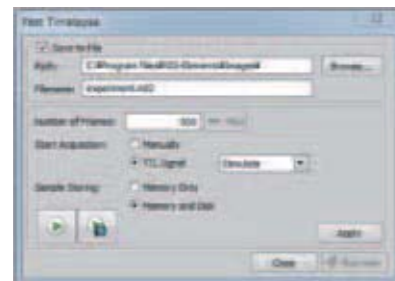
Movie Capture, Fast Image Capture

NIS-Elements has several options to observe and capture a sample's change and fast movement.

Fast Time Lapse

Ar

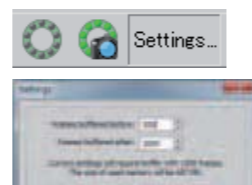
Fast Time Lapse is designed for ultra high-speed cameras. The hard disk drive can be used together with PC memory to enable a longer acquisition time.



RAM Capture

Ar

RAM Capture allows for acquisition at the fastest possible rate of the camera. A RAM buffer is utilized to enable capture and retrieve a high speed time lapse, which aids in the capture of fleeting events such as calcium sparks, motility and translocation.



AVI Live-Stream Capture

Ar Br D

AVI Acquisition automatically captures live data into an easily exportable and viewable AVI format.



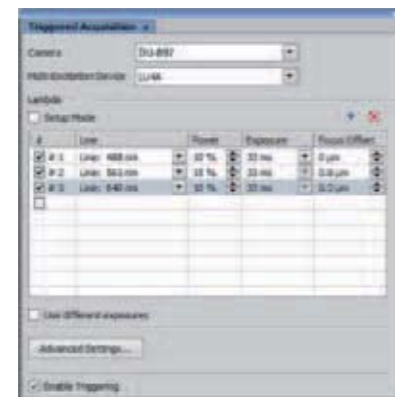
Time Saving Acquisition by Hardware Collaboration

Ar Br

Nikon's original technology optimizes image acquisition speeds by synchronizing the camera with the microscope and peripheral devices.

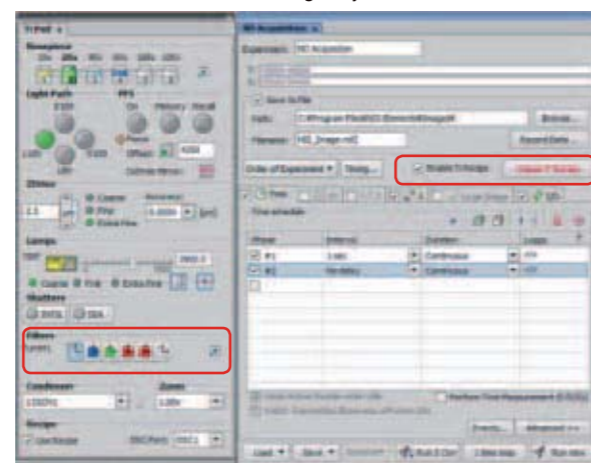
Trigger Acquisition

Triggering external devices directly from the camera enables synchronized control of various devices such as the laser unit without passing through the PC. This allows for the fastest performance of the system components for multi-wavelength excitation in TIRF observation.



Ti-recipe

This function enables the HUB-A controller of the motorized inverted microscope Ti-E to control both image acquisition and change of fluorescent filter, motorized stage and fluorescent shutter by directly connecting the camera and a HUB-A controller without passing through a PC. As a result of optimizing the communication times of all connected devices, acquisition times for multi-dimensional datasets are greatly reduced.



* Some cameras are not compatible with this function. For more information, please contact Nikon or its authorized representative.

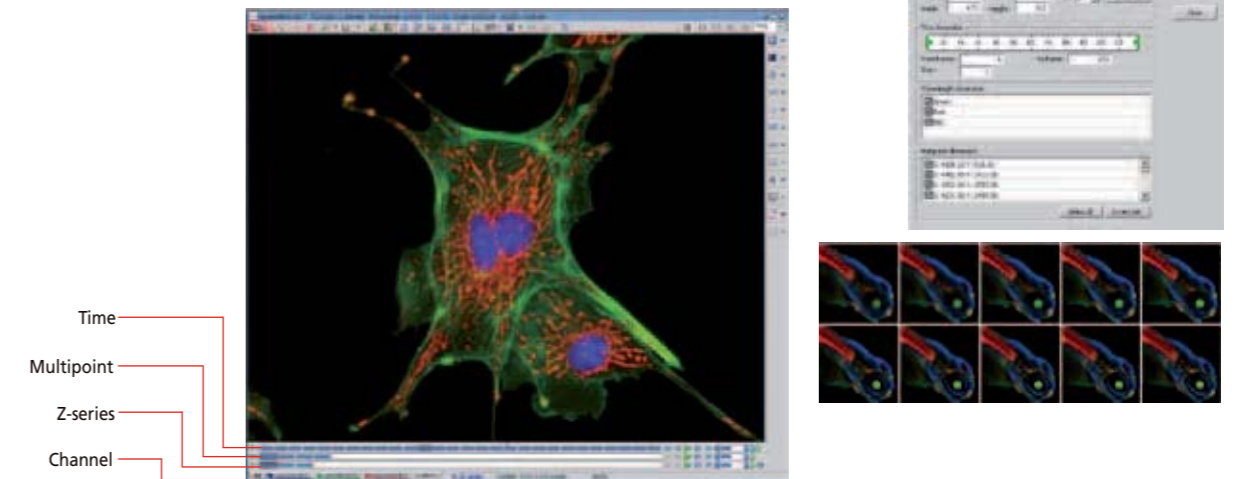
Display and Data Processing

Various methods are available for displaying and processing captured images and datasets.

Multi-dimensional Image Display

Ar Br

NIS-Elements displays time lapse, multi-channel, multiple X, Y, Z positions in an intuitive layout, which allows for automatic playback and the ability to select subsections of the data to be saved as a new file.



Merge Channels

Ar Br D

Multiple single channel images (ex., two from three-channel acquisition images) can be merged together to create an overlay of full depth separately scalable images. With AR and BR, images can be merged by simply dragging the tab of one image onto another image. With D, images are merged by selecting each image for red, blue, green and brightfield channels.

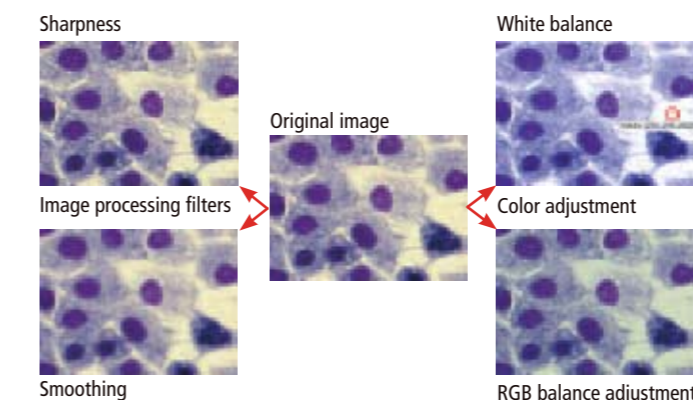


Image Processing

Image Filtering, Color Adjustment

Ar Br D

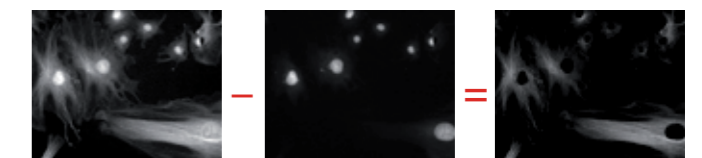
* Usable functions vary depending on the package. With NIS-Elements image processing tools, it is possible to modify image display and feature extraction using various filters for, for example, sharpness, smoothing and detection. White balance and RGB/HIS balance adjustment are additional available options.



Arithmetic operation (Image arithmetic)

Ar Br Option (D)

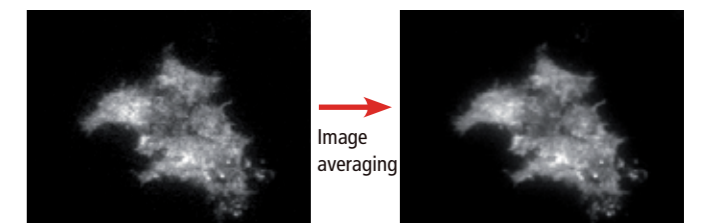
NIS-Elements enables arithmetic operations such as addition, subtraction, multiplication and division on an image or between multiple images. Arithmetic operation between multiple images is also possible.



Arithmetic operation (Image averaging)

Ar

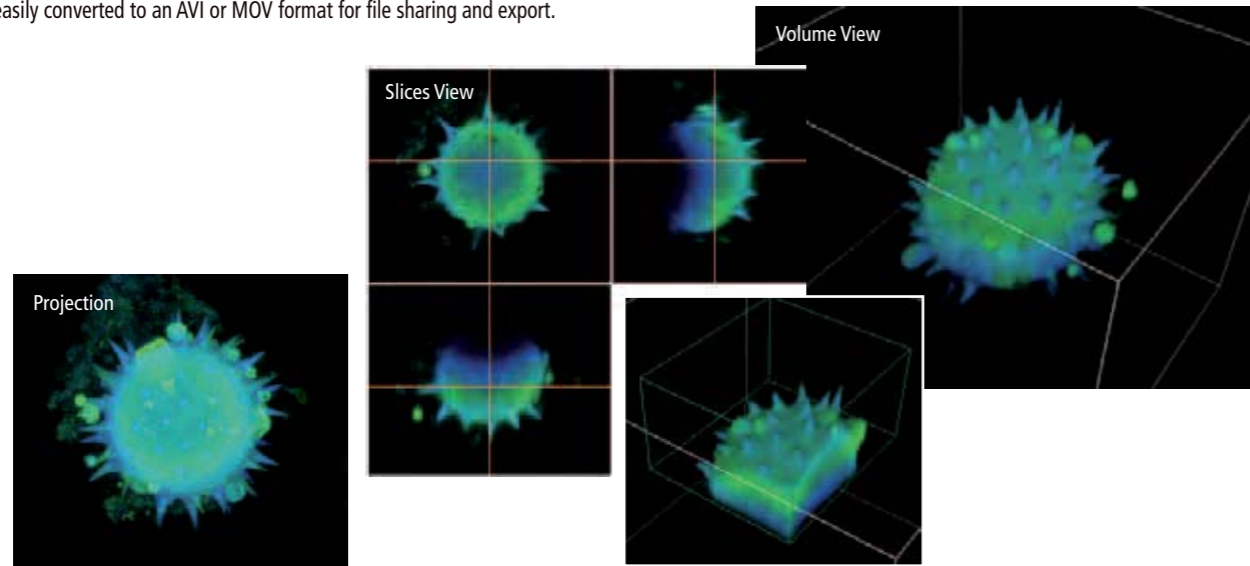
NIS-Elements reduces the noise of an image by averaging multiple sequential images such as time-lapse images. Rolling averaging that does not reduce frame rate is available as well.



Z-Series Image Display

* Volume view and slice view are only possible with AR and BR. **Ar Br D**

Z-series images can be displayed in various formats such as max. and min. projections, X-Z axis and Y-Z axis cross-sectional slice view and 3D volume view. Rotatable 3D volume rendered views from 3D datasets are easily converted to an AVI or MOV format for file sharing and export.

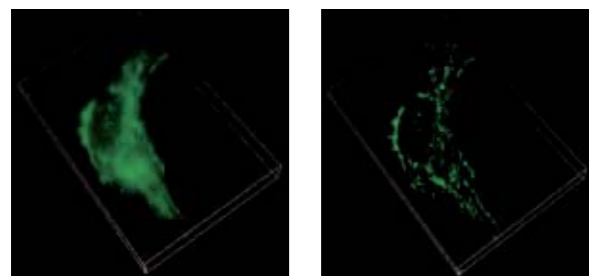


Deconvolution

Option (Ar)

3D Deconvolution

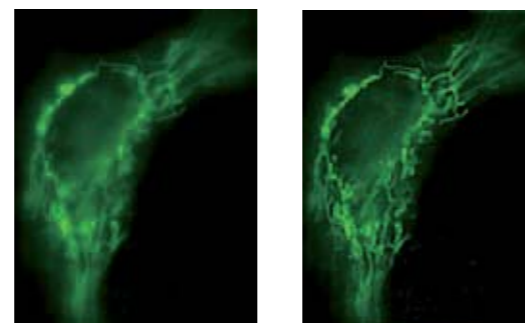
Haze and blur of the acquired fluorescence image can be eliminated. By reassigning out-of-focus intensities back to the spatial locations to where they originated, the intensity of the image is kept and allows for quantitative analysis. Algorithms for wide-field fluorescence, point-scanning confocal and spinning-disk confocal images are available.



Before deconvolution After deconvolution

2D Deconvolution

The 2D deconvolution module can be applied to a live image or an already acquired dataset. The module also allows the elimination of out-of-focus blur from live images and multidimensional images.



Before deconvolution After deconvolution

Extended Depth of Focus (EDF)

Option (Ar Br D)

NIS-Elements EDF function selects the in-focus area from multiple Z-stack images, and produces one all-in-focus image. The composite image can be viewed and rotated as a virtual 3D image, as it contains Z-axis information.



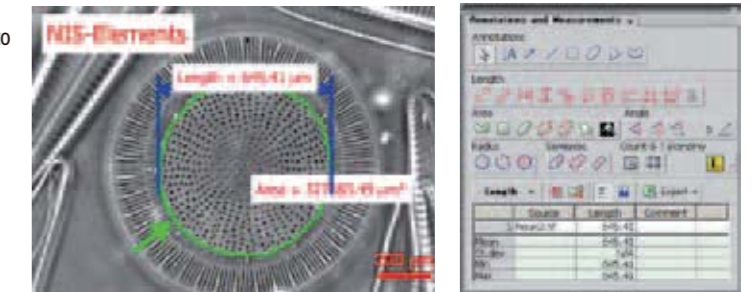
Selects the in-focus area and produces one all-in-focus image.

Measurement and Analysis

Manual Measurement (Interactive Measurement) and Image Annotation

Ar Br D

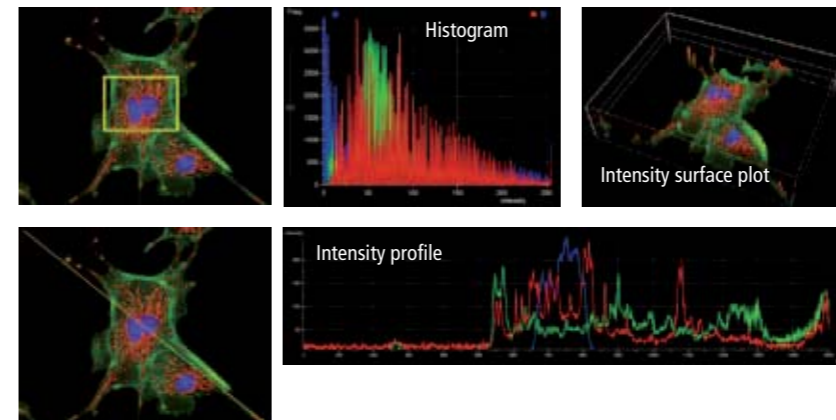
Interactive Measurement allows easy measurement of length and area by drawing lines or an object directly on the image. The results can be attached to the image, and also exported as text or to an Excel spreadsheet. Annotations such as arrows, circles, squares, text are also available display options.



Histogram/Intensity Line Profile/Intensity Surface Plot

Ar Br D

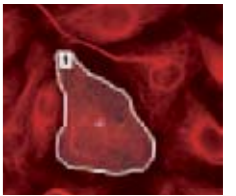
Histogram measurement measures the intensity distribution of pixels across the whole image or a defined region. An intensity line profile measurement shows the intensity distribution on a defined line. The Intensity Surface plot shows the intensity distribution of an image with the height of the z-axis line.



ROI Statistics

Ar Br

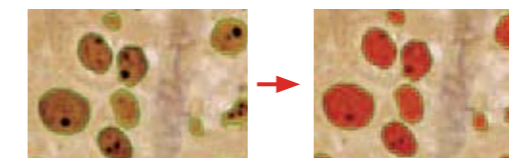
* Usable functions vary depending on the package. Common pixel measurements such as area, maximum or minimum intensity are possible with the user defined ROI (Region Of Interest). ROI or multiple ROIs statistic results for a single image or a multi-dimensional dataset are displayed and easily exported as text or an excel file.



Auto Measurement (Object Counting)

Ar Br Option (D)

Auto measurement measures the number or area of objects which are extracted from images by the creation of a binary layer through thresholding using RGB/HIS or intensity values. The results can be listed or exported as text or an excel file. It is possible to save and reuse thresholding parameters.



Classifier

Object Classifier

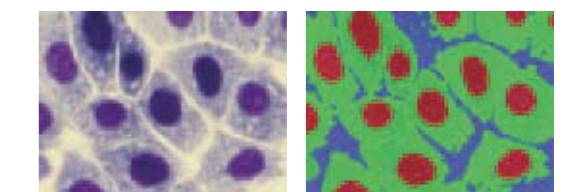
Option (Ar)

Object classifier uses objects identified by thresholding along with additional features such as shape factors, and other statistical methods including nearest neighbor and neural networks for classifying objects into multiple categories. It is also possible to teach the module based on interactive 'picking' of image pixels.

Pixel Classifier

Ar Br Option (D)

This function classifies each pixel in the image with RGB/HIS and intensity across the whole image. Results are reported in percentage and it possible to save and reuse parameters across a large sample of images. Multiple binary layers are also displayed with multiple colors on the image and are available with other analysis tools within the software package.

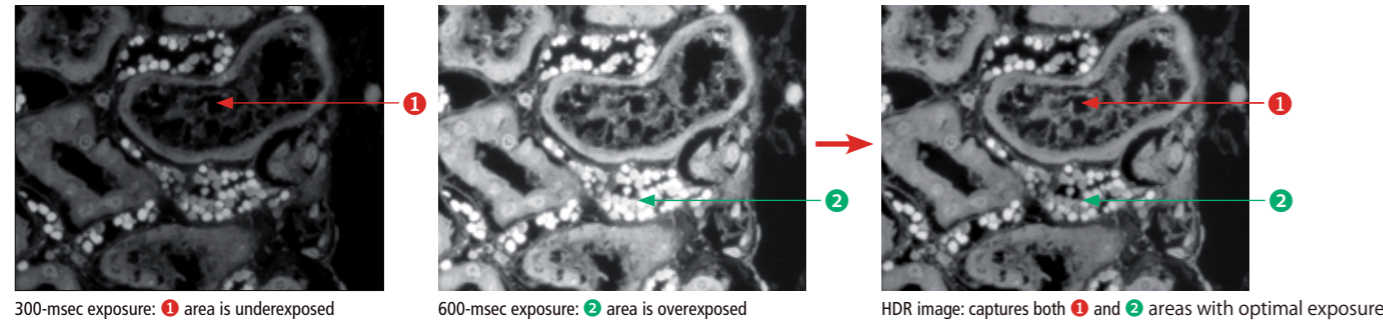


Others

HDR (High Dynamic Range) Image Acquisition

Ar

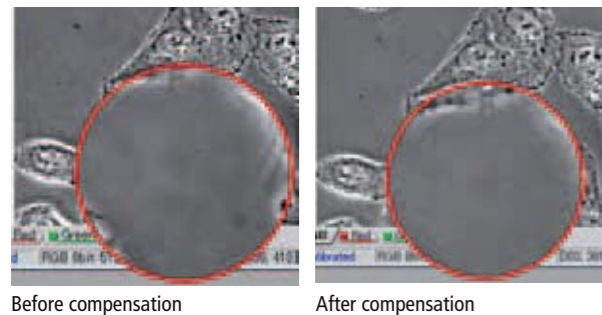
HDR creates an image with appropriate brightness in both the dark and bright regions in a sample by combining multiple images acquired with different exposure settings. It is also possible to create HDR image using multiple captured images.



Background Compensation

Ar Br D

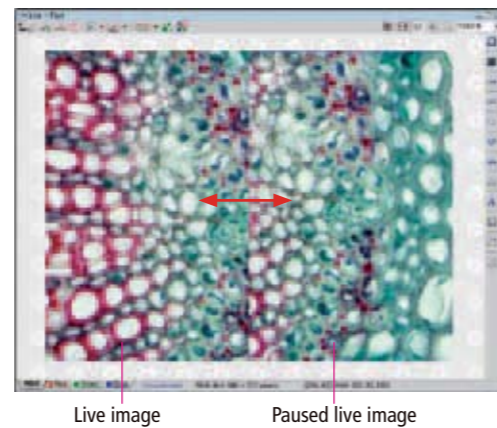
Background correction uses previously captured images to correct uneven background brightness while imaging or of captured images.



Live Image Comparison

Ar Option (Br D)

Live Compare enables easy image comparison between a sample image and a live image. Live observation side by side with a paused live image is also available in split screen mode.



Database

Option (Ar Br D)

Using the organizer function, captured images are displayed in thumbnails for easy retrieval of the desired image. By simply clicking on the thumbnail image in this view, the image is easily opened. Sorting and filtering this database of images and datasets using acquisition details such as objective settings, date and author is an easy method for data management as well.



Report Generation

Ar Br D

Images captured with NIS-Elements have information such as acquisition details and analysis results, allowing export and PDF conversion of the image and the associated image header and data information.



User Control

Ar Br D

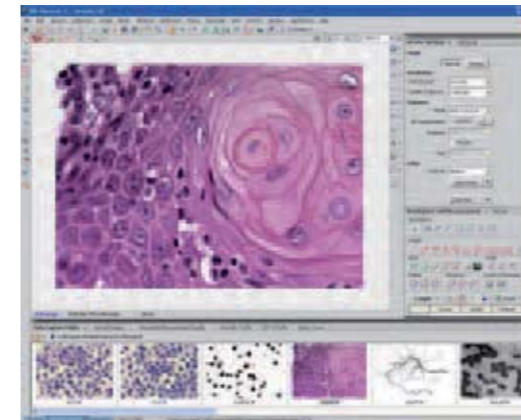
For safe system management, it is possible to individually limit each user authorization using the user account of Windows® (such as the Administrator or Guest). It limits the authorization and modification of the settings of devices (microscopes or other), optical configuration and layout editing.

GUI Option

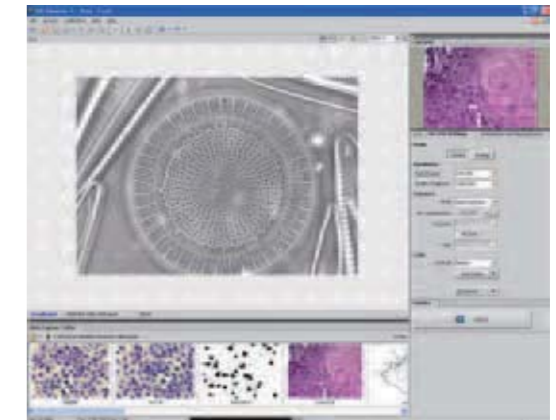
Industrial Simple GUI

D

With D package, the simple GUI mode provides controls for the most common operations such as image capture and simple measurement.



Standard GUI mode: Displays all functions of D package

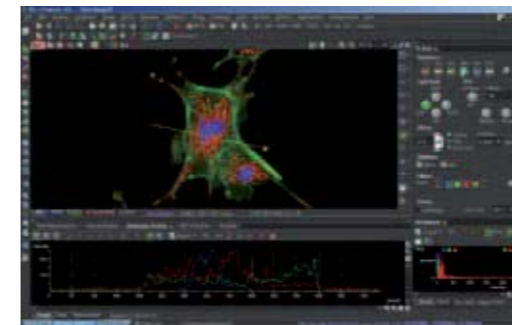


Simple GUI mode: Display only image capturing and measurement

Dark Color Scheme

Ar Br

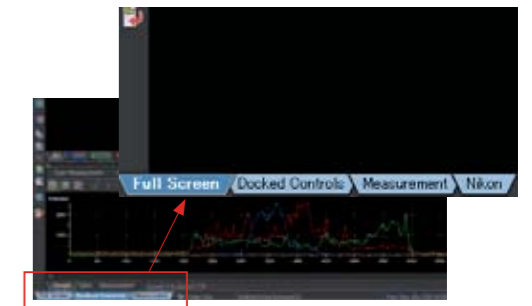
This popular display option mode has a brightness level interface color palette suitable for use in a dark microscopy room.



Layout Manager

Ar Br D

Layout manager enables customizing layouts of controls, toolbars and menus and application (image acquisition or measurement). Saving custom layouts is possible and accessible through one-click tab access.



Compatibility with Third-party Products

NIS-Elements is compatible not only with Nikon products but also with third-party products such as high-sensitivity CCD cameras and peripheral devices. Third party devices and cameras are easy to integrate through the NIS-Elements intuitive install and device manager.

Off-line Package for Analysis

The NIS-Elements off-line software package offers analysis tools such as intensity measurements and object counting of tiff and multi-dimensional format images captured with Nikon's microscopes and third-party software.

Viewer Software

This is free software for image display of single images and datasets captured using NIS-Elements. Possible views include Tile View, Max/Min Projections and 3D Volume View. Saving multi-dimensional files into TIFF format is available as well. The viewer is downloadable from the Nikon website.



Software Upgrade Agreement (SUA) License

NIS-Elements can be upgraded for one year from the date of purchase. The Software Upgrade Agreement (SUA) License, which is purchasable in one-year license segments, extends the access to the latest version of NIS-Elements.



Supporting Broad Microscope Imaging

NIS-Elements is a common software platform for Nikon microscope systems, which allows the comprehensive control of wide range of functions for cameras, confocal imaging systems and super resolution microscopes.

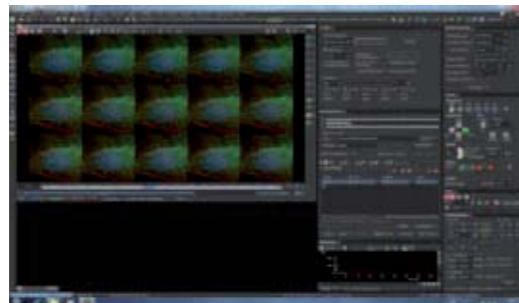
NIS-Elements C

NIS-Elements C is an optimized software package for confocal imaging. It is compatible with high-speed/high-resolution confocal microscope A1+/A1R+, multiphoton confocal microscope A1 MP+/A1R MP+, confocal microscope C2+ and spectral confocal imaging systems.



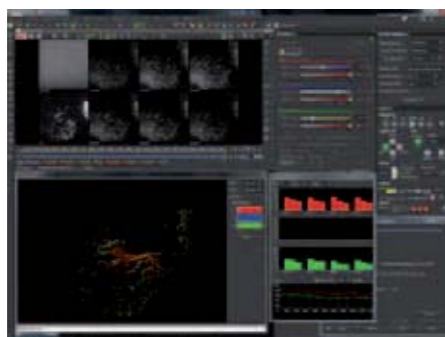
N-SIM Analysis option

N-SIM Analysis option allows control of Nikon Super-Resolution Microscope N-SIM, which can achieve an image resolution of 85nm and temporal resolution of up to 0.6 sec/frame using high frequency Structured Illumination.



N-STORM Analysis option

N-STORM Analysis option enables control of Nikon Super-Resolution Microscope N-STORM, which realizes an incredible image resolution of approx. 20nm by utilizing Stochastic Optical Reconstruction Microscopy (STORM).



Features

	AR	BR	D
Window style	MDI (Multiple Document Interface)	MDI (Multiple Document Interface)	SDI (Single Document Interface)
Dark color scheme	○	○	—
Industrial simple GUI	—	—	○
Camera control	○	○	○
Microscope control	○	○	○
Nikon made peripheral control	○	○	○
Non-Nikon peripheral control	○	○	○
Live image capture	○	○	○
Time-lapse image capturing (T)	○	○	△
Z-series image capturing (Z)	○	○	○
Multichannel image capturing (λ)	○	○	—
Multipoint image capturing (MP)	○	○	○
Multidimensional image capturing	● Up to 6D	● Up to 4D	—
Stimulation experiment	●	—	—
RAM capture	○	—	—
HDR image capture	○	—	—
AVI live-stream capture	○	○	○
Objective calibration	○	○	○
Capturing data savings (Meta-data)	○	○	○
Image filtering	○	△	△
Binary	○	△	▲
LUT (look up table)	○	○	○
Histogram	○	○	○
Manual measurement	○	○	○
Auto measurement	○	○	●
Intensity line profile	○	○	○
Intensity surface plot	○	○	○
Time (intensity) measurement	○	●	—
3D measurement	●	▲	▲
Volume measurement	○	—	—
Database	●	●	●
Macro	○	△	△
Advanced interpreter	○	●	●
Report generator	○	○	○
Live compare	○	●	●
Volume view	○	△	△
EDF (Extended depth of focus)	●	●	●
3D surface view	●	●	●
Ratio view	○	—	—
SD deconvolution	●	—	—
AQ blind deconvolution	●	—	—
2D real time deconvolution	●	—	—
2D deconvolution	●	—	—
3D deconvolution	●	—	—
2D/3D deconvolution	●	—	—
3D blind deconvolution	●	—	—
Wavelength switcher	●	●	●
TTL/analog IO	●	●	●
Object classifier	●	—	—
Object tracking	●	—	—
Calcium & FRET	●	—	—
CQ Cell Proliferation	●	—	—
CQ Wound Healing	●	—	—
CQ Cell Count	●	—	—
CQ Cell Motility	●	—	—
N-SIM analysis	●	—	—
N-SIM offline analysis	●	—	—
N-STORM analysis	●	—	—
N-STORM offline analysis*	●	—	—
Metalogical analysis	—	—	●

○ : Full function △ : Limited function — : Not available ● / ▲ : Option
 * N-STORM analysis is required.