

NIS-Elements Software Guide

Version 1.10 rev 28 Jul 2017





for Andor sCMOS

andor.com

Andor Technology 2017





TABLE OF CONTENTS

INTR	ODUCTION
SECT	ION 1: INSTALLATION OF NIS-ELEMENTS4
SECT	TION 2: USING NIS-ELEMENTS TO CONTROL YOUR SCMOS CAMERA
2.1	SETTING THE ACQUISITION PARAMETERS
2.2	CONTINUOUS LIVE VIEW AND SNAPSHOT
2.3	OBTAINING THE FASTEST ACQUISITION SPEEDS
2.4	SETTING UP A KINETIC SERIES
2.5	SETTING A CUSTOM ROI IN NIS-ELEMENTS9
2.6	HOW TO SET-UP TWO ZYLA SCMOS CAMERAS IN NIS-ELEMENTS10
2.7	SUSTAINED FRAME RATES FOR THE NEO AND ZYLA IN NIS-ELEMENTS
2.8	NEO & ZYLA FEATURE MATRIX IN NIS-ELEMENTS





INTRODUCTION

This document explains how to install and setup NIS-Elements for use with the Neo 5.5, Zyla 5.5 and Zyla 4.2 sCMOS cameras.

IMPORTANT INFORMATION ABOUT USING NIS-ELEMENTS

- 1. NIS-Elements upgrade period after September 1, 2011. This can be confirmed from "HASP Info".
- Supported Operating System Windows 7 Professional SP1 (English/Japanese). Since NIS-Elements Version 4.00.00, Windows XP and Windows Vista are not supported.

Trademarks and Patent Information

Andor[®], the Andor logo, Neo, Zyla and Solis are trademarks of Andor Technology. Andor is an Oxford Instruments company. NIS-Elements is a trademark of Laboratory Imaging Ltd. All other marks are property of their owners.

Front page image courtesy of Philipp Keller, Howard Hughes Medical Institute, Janelia Farm Research Campus

REVISION HISTORY

Version	Released	Description	
1.0	20 Oct 2012	Initial Release of Neo NIS-Elements Software Guide	
1.1	02 Jul 2013	General updates to improve presentation and procedures throughout. Combined both Neo and Zyla information. Updated Neo frame rates data.	
1.2	26 Aug 2013	Updated Bitflow driver link (Section 1)	
1.3	14 Oct 2013	Updated to show reference to Andor 5.5 sCMOS models	
1.4	24 Jan 2014	Updates to match latest software release (Elements Build 982) and updates to frame rates (all Sections)	
1.5	06 Feb 2014	Updates to match latest device update (Elements Build 984) which supports Zyla 4.2	
1.6	21 Mar 2014	Updates for release 1.4.16	
1.7	28 Apr 2014	Added Feature Matrix (Section 2.8) Updated document template to enhance presentation	
1.8	13 Jan 2015	Frame rate information added for USB 3.0 models.	
1.9	16 Jul 2015	New section added to cover dual Zyla and multi-camera modes (Section 2.6)	
1.10	28 Jul 2017	Removed Bitflow drivers manual install section (no longer required) (Section 1).	



SECTION 1: INSTALLATION OF NIS-ELEMENTS

This section outlines how to install NIS-Elements on your PC for use with the Neo 5.5, Zyla 5.5 and Zyla 4.2 sCMOS cameras.

1. Run the NIS-Elements D hot-fix installation, selecting the Andor Neo/Zyla driver from the Local Option (We used the D version of NIS-elements to write this guide).

NIS-Elements D 4.20.01 LO (6-December-2013) Setup	
Choose Destination Location Select folder where setup will install files.	NIS-Elements
Setup will install NIS-Elements D 4.20.01 LO (6-December-2013) in 1 destination folder. To install to this folder, click Next. To install to a di Browse and select another folder.	the selected ifferent folder, click
If you select 'Analysis shortcut' checkbox, additional shortcut will be running Elements for analysis purposes, without connecting to a cam	created. It is useful when hera and any devices.
Analysis Shortcut	
V Local Option	
Destination Folder	
C:\Program Files\NIS-Elements D	Browse
InstallShield	
< Back	Next > Cancel

NIS-Elements D 4.20.01 LO (6-December-2013) Setup					
Cameras					
Manufacturers Nikon Andor Photometrics Hamamatsu QImaging Imaging Source Simulators	Cameras ☐ Andor Ultra, Kon series, Luca, Clara, iKon-M ✓ Andor Neo/Zyla ☐ Dual Andor Kon X3, Kon+ and Luca				
Andor Bitflow SDK is not included in the installer.					
InstallShield Select <u>All</u> Cancel					



2. Once installed, start the NIS-Elements application with the Neo/Zyla driver.

NIS-Elements D 4.20.01 (Build 982) 64bit - Driver selection						
✓ ANDOR Neo/Zyła						
Enable Multi Camera OK Cancel						
	4					



SECTION 2: USING NIS-ELEMENTS TO CONTROL YOUR SCMOS CAMERA

2.1 Setting the Acquisition Parameters

- 1. The NIS-Elements application will have been opened with the Neo/Zyla driver as shown in **Section 1:** Installation.
- To access camera settings and set up acquisition parameters, open the Acquire menu item and select 'Camera Settings', or open the View menu item and select 'Acquisition Controls', then 'Zyla Settings'. The Camera settings will then automatically appear docked on the right hand side of the main window.



3. In order to access the trigger mode and set the desired temperature of the camera, click on 'Commands' in the **Camera Settings** window and choose 'Advanced Camera Settings'.



Trigger Mode Internal Desired Temperature Internal Strobe Bulb Detailed description is Triggered by master camera OK Cancel Default	Advanced Camera Settings					
Internal Desired Temperature Internal Strobe Bulb Detailed description is Triggered by master camera OK Cancel Default	Trigger Mode	Internal 💌				
OK Cancel Default	Desired Temperature Internal Strobe Bulb Detailed description is Triggered by master camera					
	OK Can	cel Default				



USING NIS-ELEMENTS TO CONTROL YOUR SCMOS CAMERA

NIS-Elements

- 4. If you need to rotate or flip the image (e.g. multi-wavelength imaging), go to the **Acquire** tab and select 'Camera Light Path'.
- 5. Then select the required option.

utomatically switch to por	t: Not specified 💌
Dual/Quad View' is mou	unted Settings
Dual/Quad View activation	is at the Optical configurations dialog.
Default Active Shutter:	Not specified 💌
Relay lens:	1.00 ×
Camera Rotation and Flipp	ing
1. 🗌 Flip	
2. Rotate: R	<u>к</u> 2
3 Apple:	0 •

2.2 Continuous Live View and Snapshot

- For a continuous live view choose 'live' in the **Acquire** tab or press the 'Live' icon on the main toolbar.
- To acquire a snapshot choose 'Capture' in the Acquire tab or press the 'Capture' icon on the main toolbar.
- To stop the live mode choose 'freeze' in the **Acquire** tab or press the 'Freeze' icon on the main toolbar.
- If, when you go live you cannot see an image click on 'auto-scale' to adjust the contrast settings.

Select Driver Camera Light Path			
Camera Light Path			
	Camera Light Path		
Select ANDOR Neo/Zyla			
🐨 Camera Settings F11			
Live +			
Freeze <u>Freeze</u>			
Capture Capture Ctrl+-			
🚯 Auto Capture Ctrl+Space			
Camera ROI			
AVI Acquisition			
Fast Time-lapse			
Gapture Z-Series	•		
Capture Timelapse	•		
Capture Multipoint	•		
Custom Acquisition			
Grab Large Image Free Shape			
Grab Large Image			
Shading Correction	۲		





2.3 Obtaining the Fastest Acquisition Speeds

- 1. To acquire the fastest speeds with the Neo 5.5, Zyla 5.5 and Zyla 4.2, the shortest exposure must be set at every ROI.
- 2. If the ROI is altered, always ensure that '1 Frame for Fast Time-Lapse' is selected in the Neo/Zyla Settings window. This will automatically select the shortest exposure for the ROI defined and therefore the fastest speeds will be acquired.

Zyla Settings ×					
Format	No Binning 💌				
Auto Exposure 1 frame 💌 🔀					
	1 frame for Fast Timelapse				
Readout Mode Rolling shutter					
Readout Rate 560 MHz 💌					
Dynamic Range 12-bit & Gain 4					
Sensor Mode Overlap					
Limit Maximum FPS to 25 < 100.1 FPS					
Spurious Noise Filter					
Temperature -0.4 °C					
Commands 🔻					

2.4 Setting up a Kinetic Series

 To set up a 'burst mode' (Neo 5.5 only) or 'sustained' kinetic series go to the Acquire tab on the main toolbar and choose 'Fast-Time lapse'. Choose this method over the 'AVI Acquisition' to achieve the fastest speeds with the Neo 5.5/Zyla 5.5/Zyla 4.2. This is where you choose to save your kinetic series and input the number of frames/time-points you wish to acquire. Always choose the memory and disk option for sample storing.

Fast Timelap	ise 🗾 🔀	
Path:	o File E:\VISElements\ Browse	
Filename:	img001.nd2	j
Number of	Frames: 1000 🗢 Max	
Start Acqui	isition: Manually TTL Signal	
Sample Sto	oring: Memory Only	
	Apply	
	Close 🕺 Run now	



NIS-Elements

- 2. Press 'Apply' and 'Run Now' to start acquiring images.
- 3. The acquired kinetic series/time lapse experiment automatically opens in the main NIS-Elements window once the acquisition is complete. In order to view the time it took to acquire the series and the maximum frames per second just hold the mouse over the bottom of the movie and a window appears with this information.



2.5 SETTING A CUSTOM ROI IN NIS-ELEMENTS

In order to achieve the fastest frame rates at any Region of Interest (ROI) in NIS-Elements the ROI selected must be centred on the sensor.

To define a custom ROI follow the instructions below:

- 1. Go Live to see the full field of view and acquire an image.
- 2. To define the ROI go to 'Commands' in the Camera Settings window and select 'ROI'. Here, you can choose from a list of predefined ROI's or you can define your own custom ROI. If you choose to define your own custom ROI a new window will appear where you can set the height and width and also centre the region on the sensor. It is very important to centre each ROI you define to ensure the max frame rates are achieved.





3. When you have selected the width & height click 'Center ROI' to centre the ROI.

Rectangle					
Left:	850	Width: 8	60	pixels 🔻	
Top:	720	Height: 7	20		
Ce	nter ROI		ОК	Cancel	

4. Press OK and the window will update to the size of the ROI that has been selected.

2.6 How to set-up two Zyla sCMOS cameras in NIS-Elements

There are two acquisition modes which can be chosen at the start-up of NIS-Elements:

- 1. Dual Zyla will pair two cameras at the same time and synchronize them tightly.
- 2. Multi-camera mode allows two cameras to run but they will not be synchronised.

There are multiple options for triggering cameras in NIS-Elements:

- Internal
- Strobe (External)
- Bulb (External Exposure)
- Triggered by master camera (used when running multiple instances of NIS Elements)

The dual Zyla driver pairs the two cameras into one virtual camera with two channels. There is only one triggering option to configure here for both cameras. So select 'Strobe' or 'Bulb' depending on whether you want external trigger or external exposure trigger.

There are two options for connecting the cameras to the trigger source, either connect both to the trigger source or connect the master camera to the trigger source and the slave camera to the master camera's fire output. We would recommend the latter as the cameras will still work if they are switched to a software/internal mode for focussing etc.

10 🛑



2.7 Sustained Frame Rates for the Neo and Zyla in NIS-Elements

The sustained frame rates for the Neo 5.5, Zyla 5.5 and Zyla 4.2 in NIS-Elements are compared with Solis at different ROI sizes in the following figures.

The PC used to test sustained frame rates in NIS-Elements is the following: HP Z420, 32 GB RAM, 64-Bit OS. This PC is recommended by Nikon in order to achieve the fastest sustained frame rates with Andor's range of sCMOS cameras.

Zyla 5.5 10-tap



Zyla 5.5 USB 3.0





Neo 5.5

NIS-Elements USING NIS-ELEMENTS TO CONTROL

YOUR SCMOS CAMERA



Zyla 4.2 10-tap



••• 12

-



NIS-Elements USING NIS-ELEMENTS TO CONTROL

YOUR SCMOS CAMERA



Zyla 4.2 USB 3.0



USING NIS-ELEMENTS TO CONTROL YOUR SCMOS CAMERA

2.8 Neo & Zyla Feature Matrix in Nis-Elements

	Neo 5.5	Zyla 5.5	Zyla 4.2
Trigger Modes			
Internal	\checkmark	\checkmark	\checkmark
External	\checkmark	\checkmark	\checkmark
Software	×	×	×
External Start	×	×	×
External Exposure	\checkmark	\checkmark	\checkmark
Acquisition Modes			
Fixed length - specify the number of images required	\checkmark	\checkmark	\checkmark
Continuous - camera acquires until aborted.	\checkmark	\checkmark	\checkmark
Frame Rate Control	\checkmark	\checkmark	\checkmark
Software Accumulation - specify number of images to accumulate	x	×	×
Readout Modes		•	
Imaging - Full Image Readout from Sensor	\checkmark	\checkmark	\checkmark
Fixed ROI support (centred) - 2048x2048, 1920x1080, 512x512, 128x128	\checkmark	\checkmark	\checkmark
ROI - Single Arbitrary Region of Interest Selection on sensor	\checkmark	\checkmark	\checkmark
Camera Binning - 1x1, 2x2, 3x3, 4x4, 8x8	\checkmark	\checkmark	\checkmark
Metadata		•	
Timestamp	\checkmark	\checkmark	\checkmark
On-Camera Correction			
Spurious Noise Filter	\checkmark	\checkmark	\checkmark
Fan Speed Control			
On, Off	\checkmark	\checkmark	\checkmark
High, Low	\checkmark	×	×
Operating System Support			
Windows 7 - 32-bit	\checkmark	\checkmark	\checkmark
Windows 7 - 64-bit	\checkmark	\checkmark	\checkmark
Recommended Application Features		·	·
Easy Vertical Centering of ROI for fastest acquisition	\checkmark	\checkmark	\checkmark