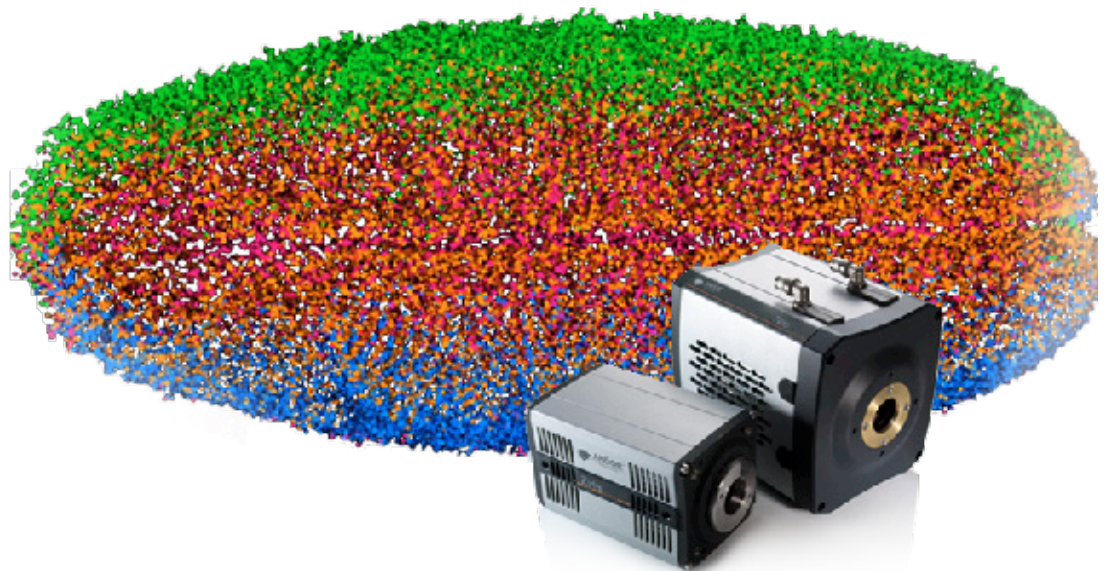


NIS-Elements Software Guide

Version 1.10 rev 28 Jul 2017



for Andor sCMOS



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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”.
2. 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

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

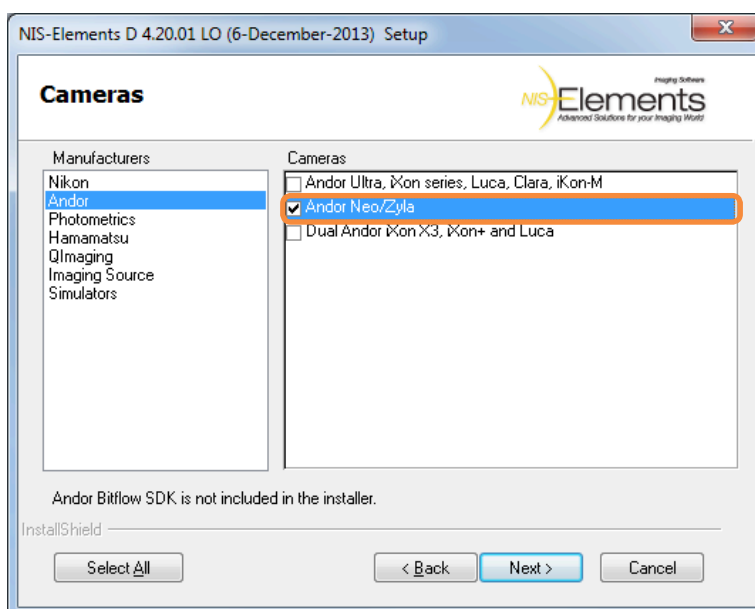
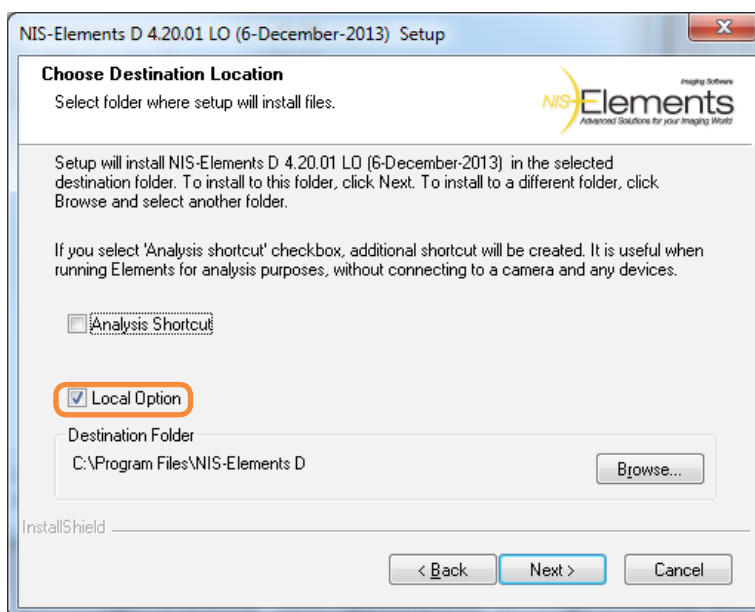
REVISION HISTORY

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).

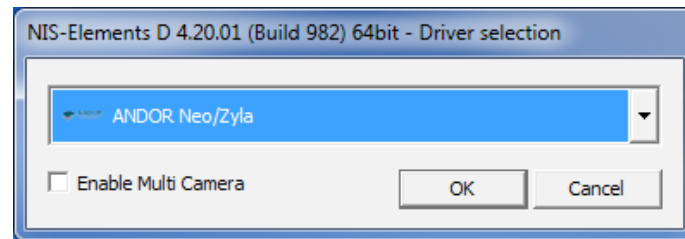
SECTION 1: INSTALLATION OF NIS-ELEMENTS

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).



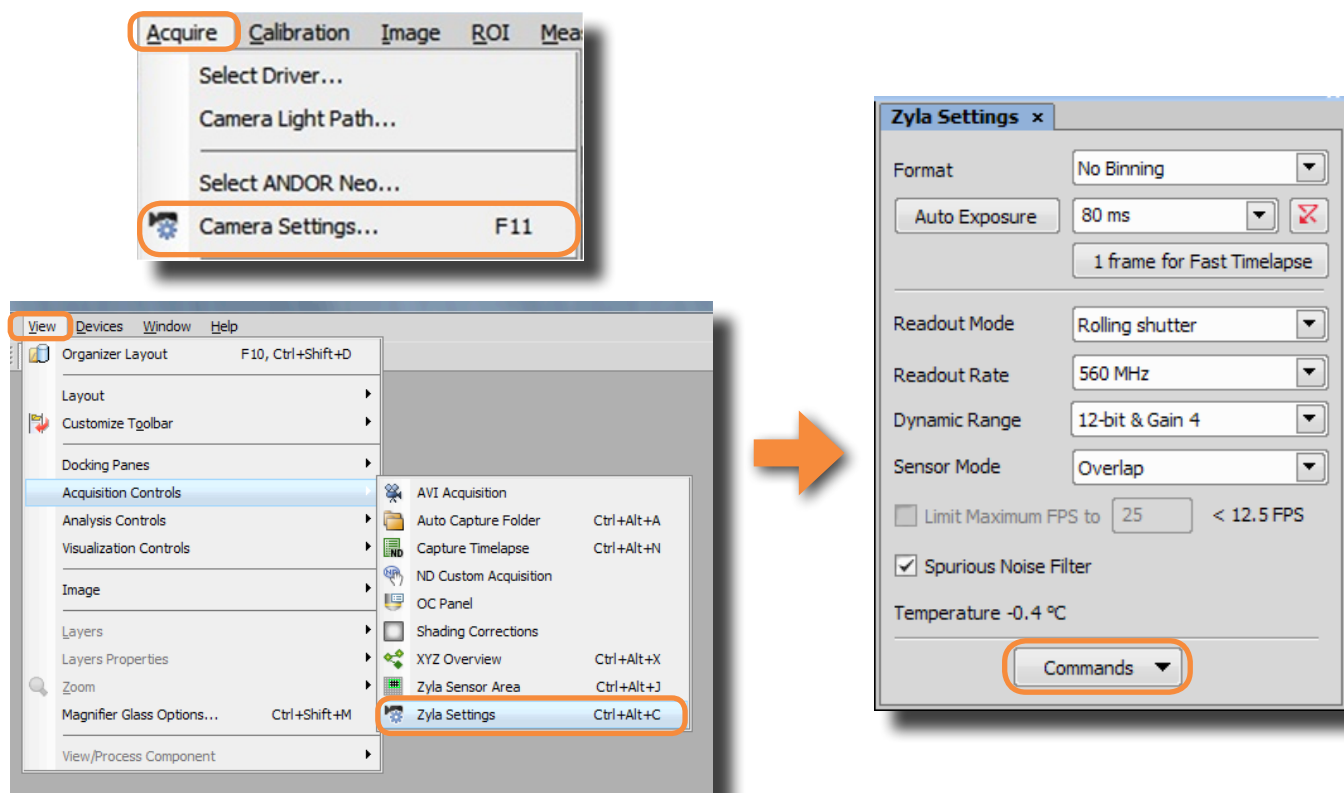
2. Once installed, start the NIS-Elements application with the Neo/Zyla driver.



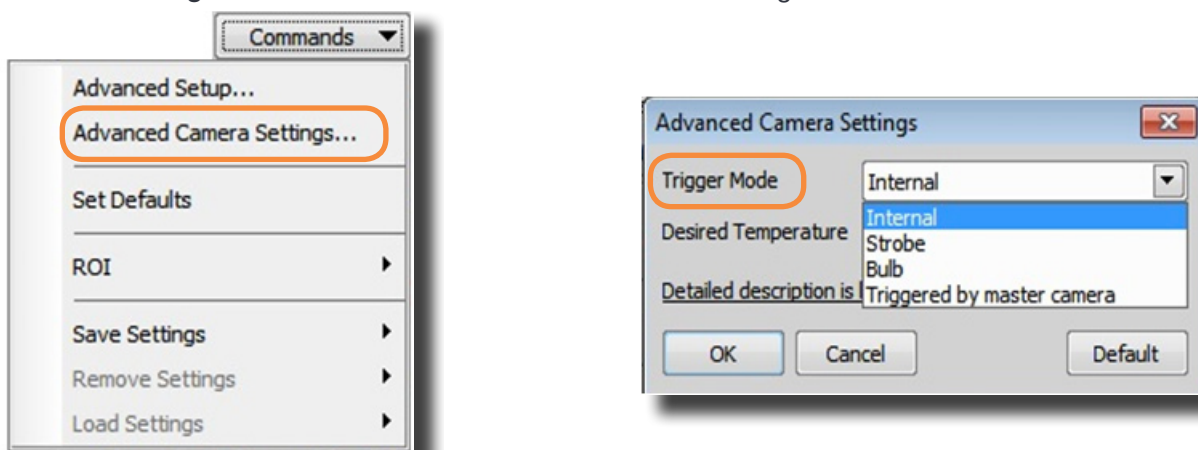
SECTION 2: USING NIS-ELEMENTS TO CONTROL YOUR SCMOS CAMERA

2.1 SETTING THE ACQUISITION PARAMETERS

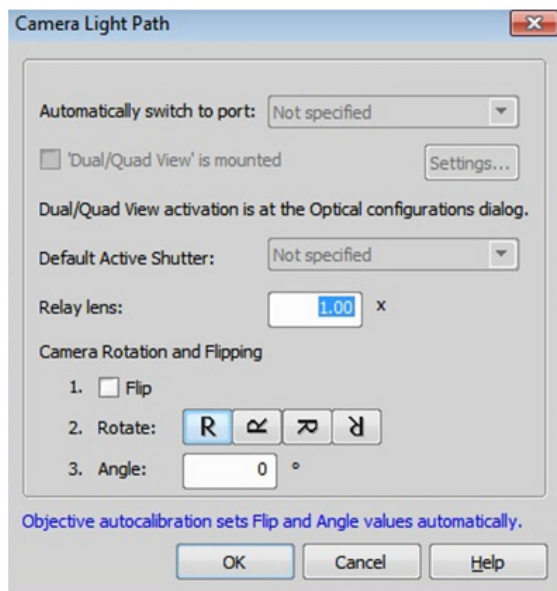
1. The NIS-Elements application will have been opened with the Neo/Zyla driver as shown in **Section 1: Installation**.
2. To access camera settings and set up acquisition parameters, open the **Acquire** menu item and select 'Camera Settings', or open the **View** menu item and select 'Acquisition Controls', 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'.

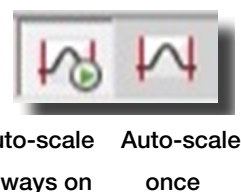
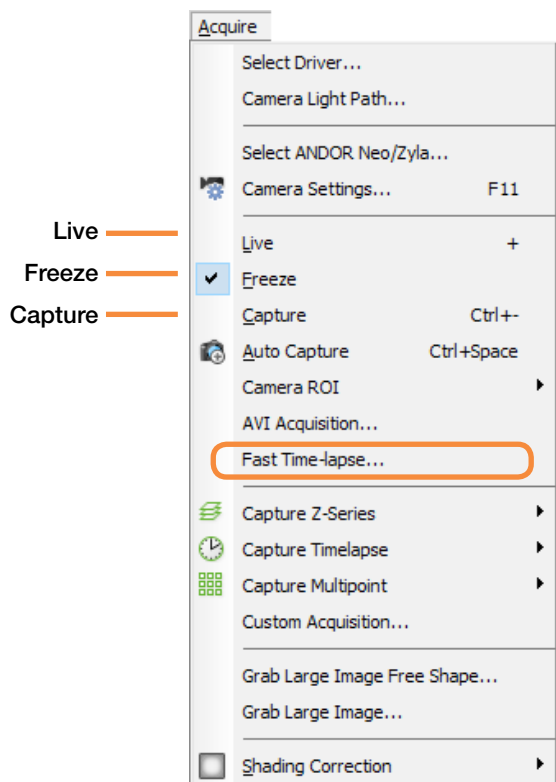


- If you need to rotate or flip the image (e.g. multi-wavelength imaging), go to the **Acquire** tab and select 'Camera Light Path'.
- Then select the required option.



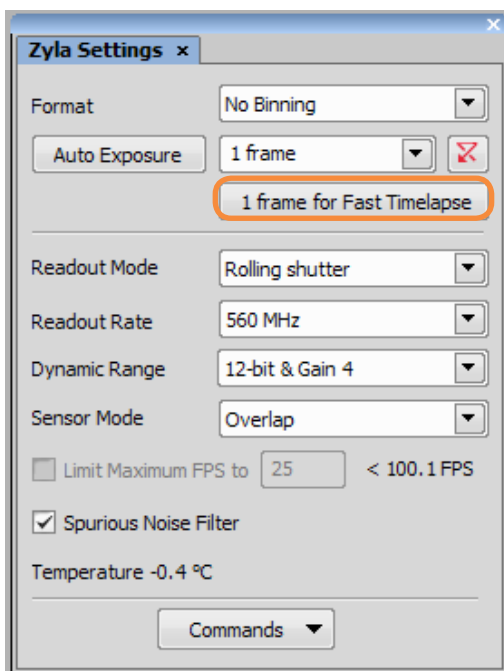
2.2 CONTINUOUS LIVE VIEW AND SNAPSHOT

- 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.



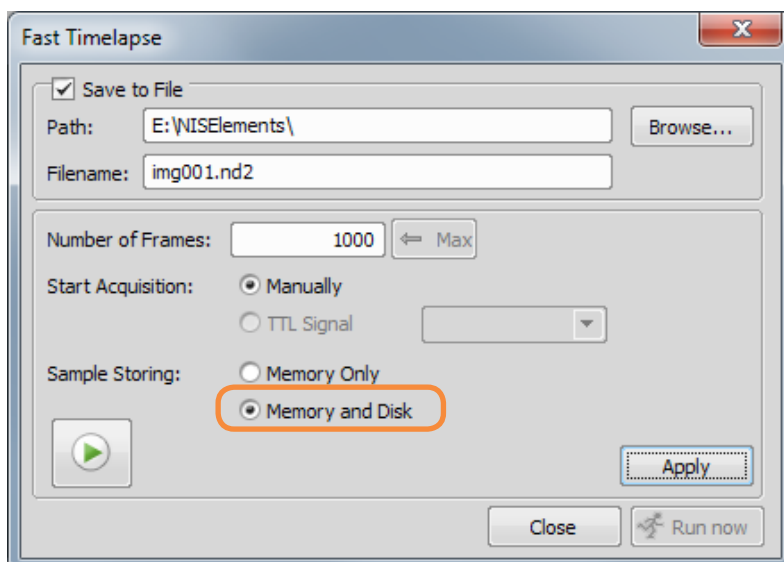
2.3 OBTAINING THE FASTEST ACQUISITION SPEEDS

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.

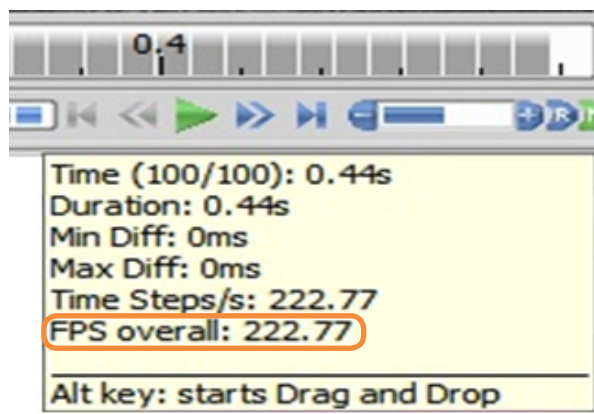


2.4 SETTING UP A KINETIC SERIES

1. 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.



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.

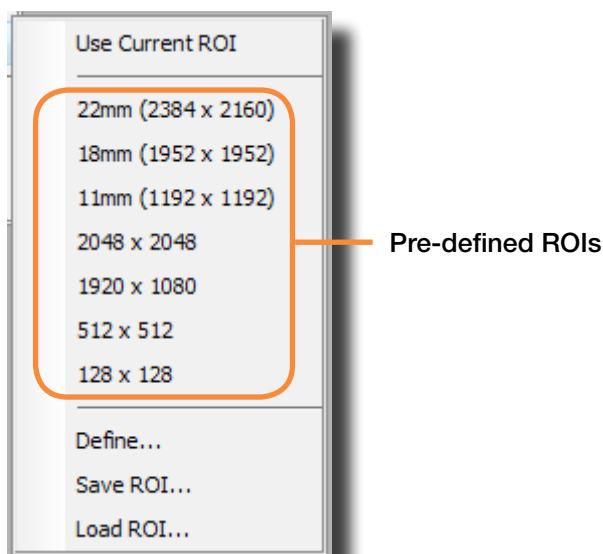


2.5 SETTING A CUSTOM ROI IN NIS-ELEMENTS

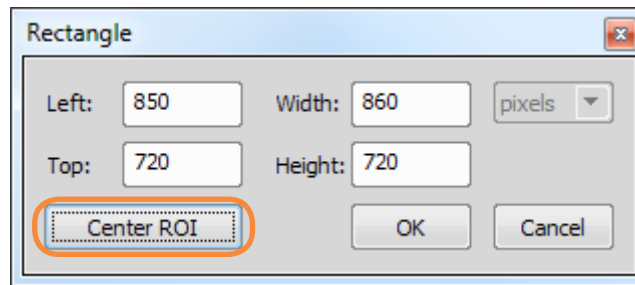
In order to achieve the fastest frame rates at any Region of Interest (ROI) in NIS-Elements the ROI selected must be centred on the sensor.

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.



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.

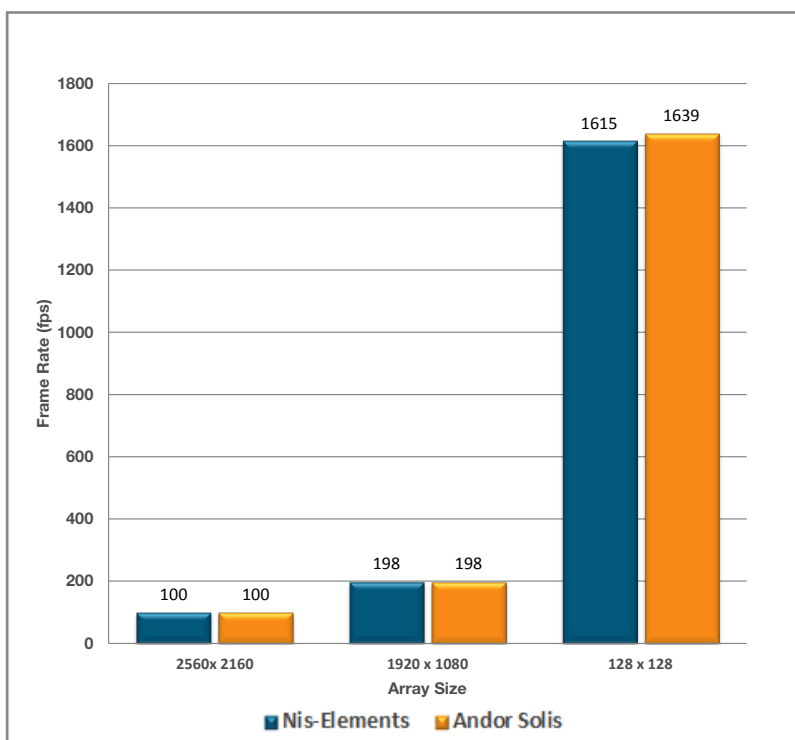
There are two options for connecting the cameras to the trigger source, either connect both to the trigger source or connect the master camera to the trigger source and the slave camera to the master camera's fire output. We would recommend the latter as the cameras will still work if they are switched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

2.7 SUSTAINED FRAME RATES FOR THE NEO AND ZYLA IN NIS-ELEMENTS

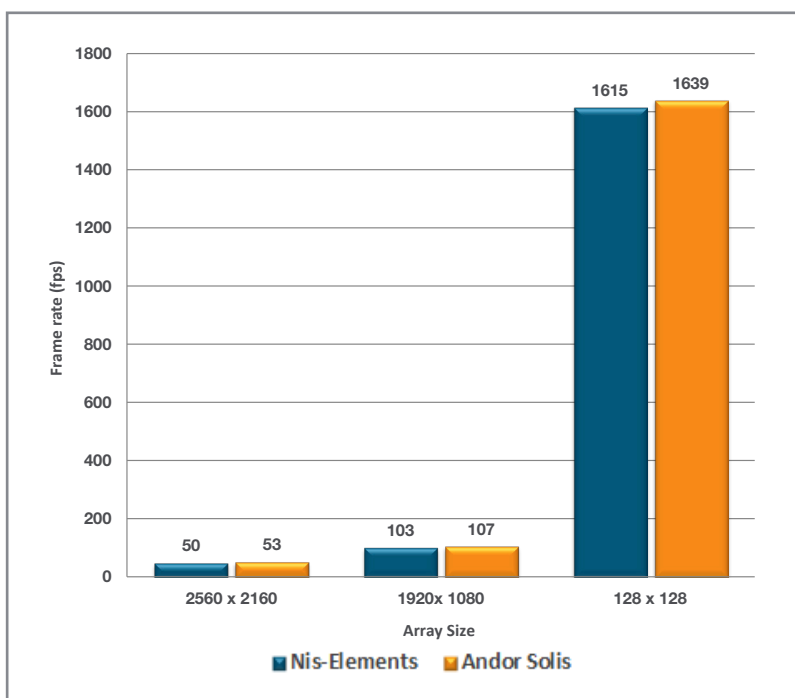
The sustained frame rates for the Neo 5.5, Zyla 5.5 and Zyla 4.2 in NIS-Elements are compared with Solis at different ROI sizes in the following figures.

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.

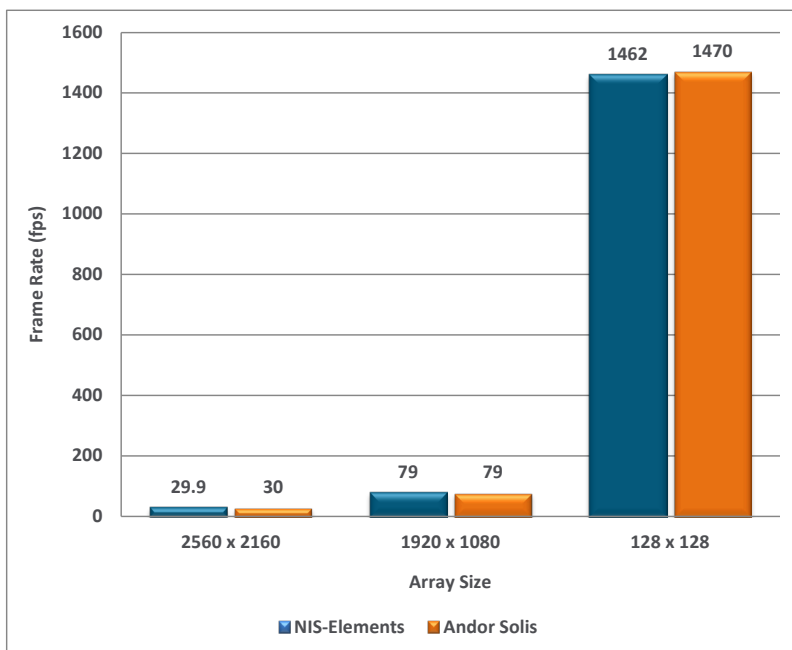
Zyla 5.5 10-tap



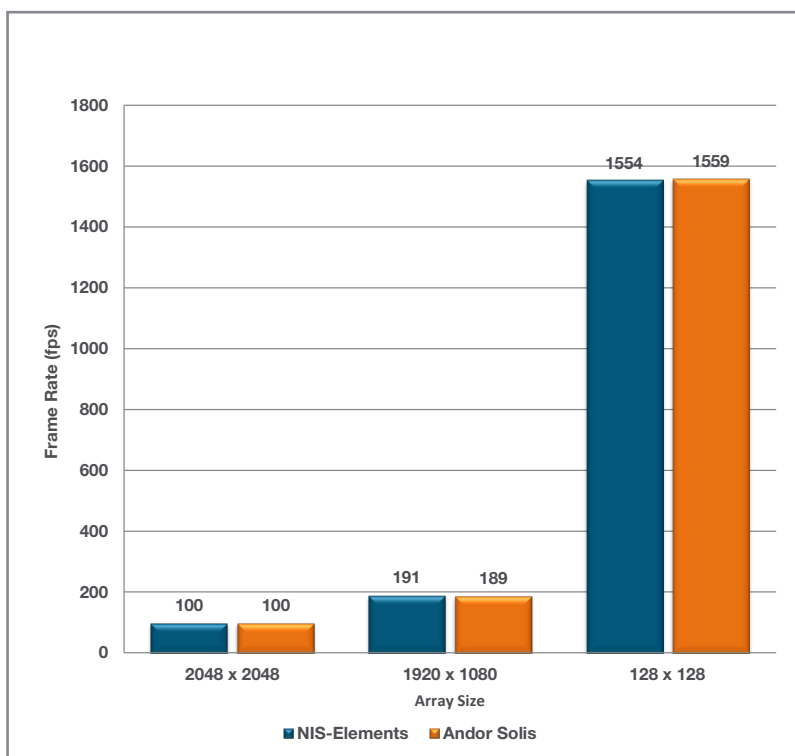
Zyla 5.5 USB 3.0



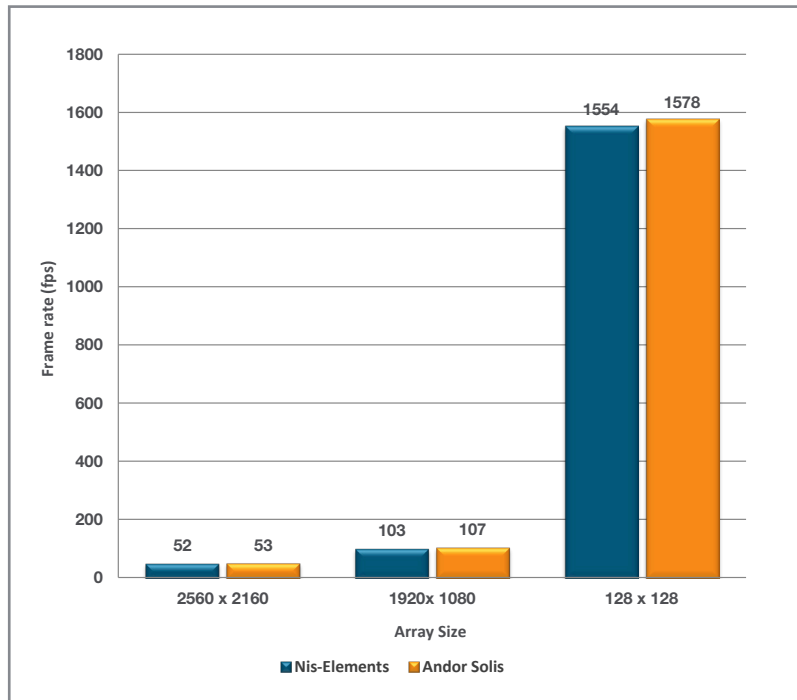
Neo 5.5



Zyla 4.2 10-tap



Zyla 4.2 USB 3.0



2.8 NEO & ZYLA FEATURE MATRIX IN NIS-ELEMENTS

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