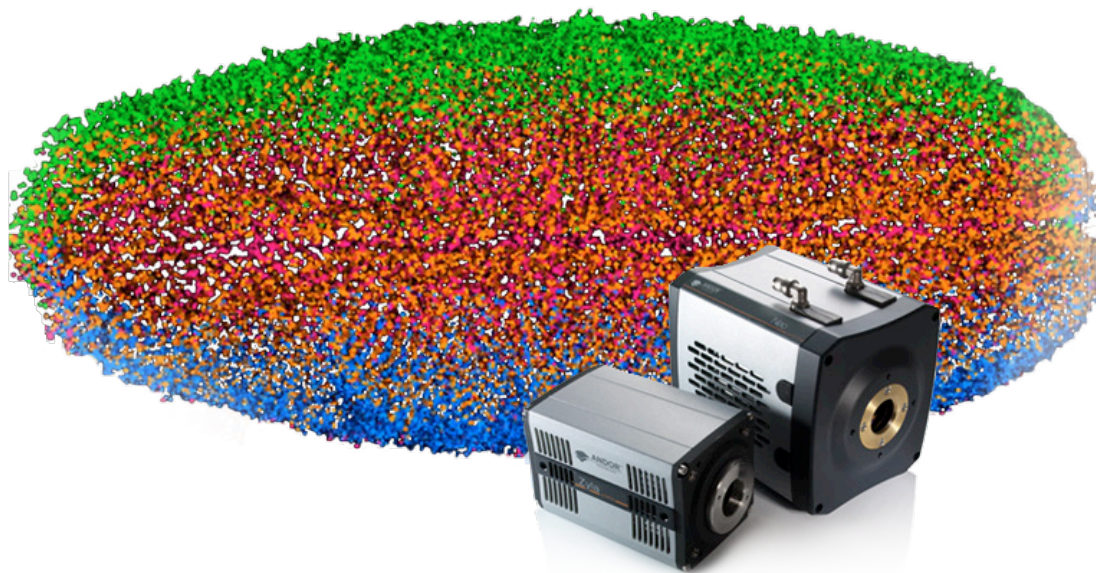


cellSens Dimension Software Guide

Version 1.1 rev 18 May 2014



for Andor sCMOS



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INTRODUCTION

This document explains how to install and setup Olympus cellSens Dimension for use with the Andor sCMOS cameras (Neo 5.5, Zyla 5.5 and Zyla 4.2).

IMPORTANT INFORMATION ABOUT USING CELLSENS DIMENSION

cellSens Dimension 1.11 is compatible with Windows 7 and 8, 32 and 64-bit operating systems.

The sCMOS cameras from Andor Technology require 'High End Camera Solution' from Olympus in order to work with cellSens Dimension software. Please contact your local Olympus representative for more information. This is a separate module to the cellSens Dimension license.

TRADEMARKS AND PATENT INFORMATION

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

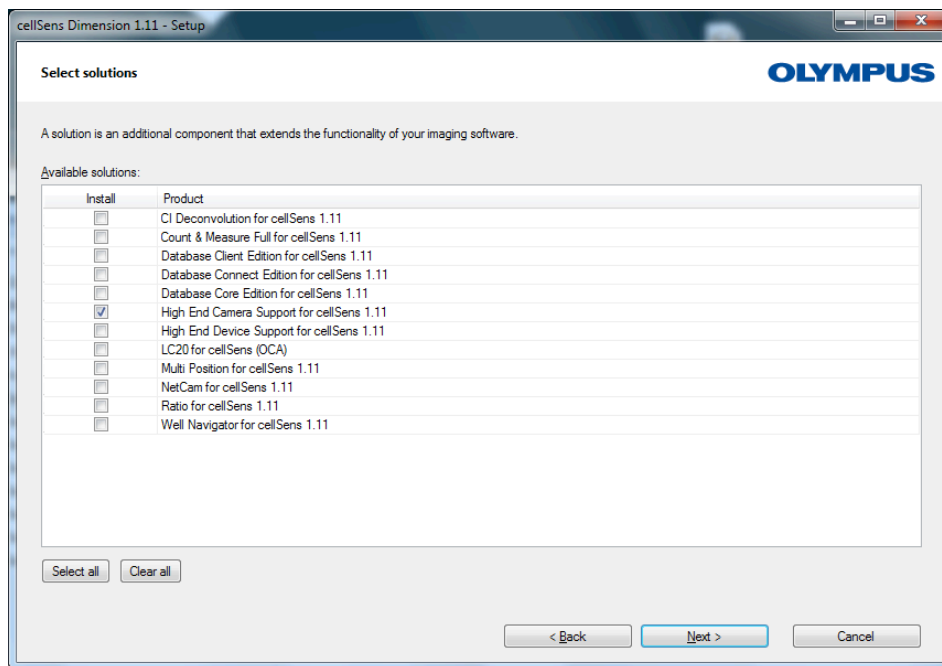
REVISION HISTORY

Version	Released	Description
1.0	22 Aug 2014	Initial Release
1.1	18 May 2015	Updated to cover all Andor sCMOS models (all sections)

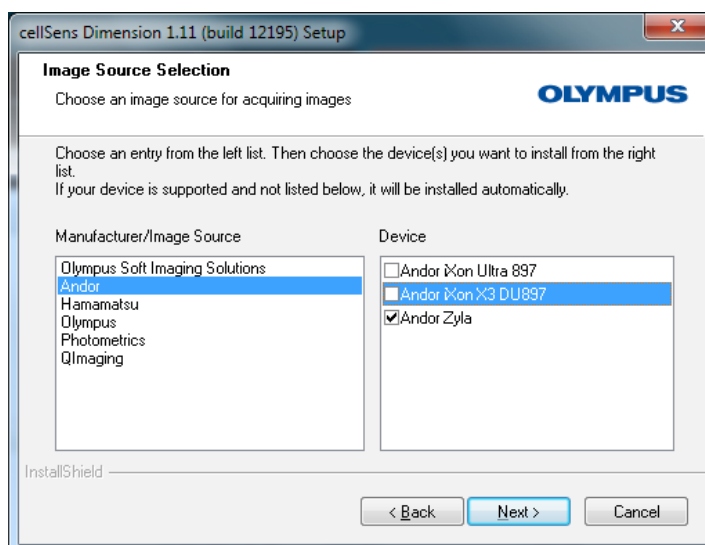
SECTION 1: INSTALLATION OF CELLSSENS DIMENSION

1.1 INSTALLING CELLSSENS DIMENSION TO RUN YOUR ANDOR sCMOS CAMERA FOR THE FIRST TIME

1. Install cellSens Dimension following the steps in the installer.
2. Ensure 'High End Camera Support for cellSens 1.11' is selected*



3. At the Image Source Selection, ensure the correct camera is selected e.g. **Andor Zyla** as shown below.



* sCMOS cameras from Andor Technology require 'High End Camera Solution' from Olympus in order to work with cellSens Dimension software. Please contact your local Olympus representative for more information' This is a separate module to the cellSens Dimension license.

4. Click '**Next**'.
5. Follow the steps to complete the installation.
6. After the cellSens installer has completed - it places a HTML file on the Windows Desktop called '**Driver Information.html**'. Open this file and follow the instructions to install the device drivers for your sCMOS camera.
7. As an example we have outlined below how to install the driver for Zyla 4.2. The same steps are required for Neo 5.5 and Zyla 5.5:

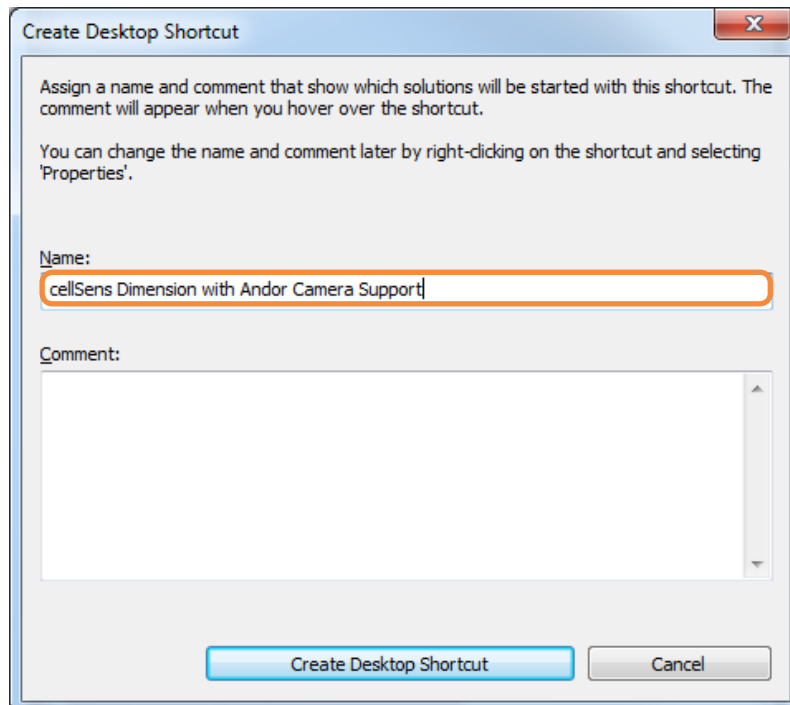
For the Andor Zyla 4.2 camera:

1. Execute the file '**setup.exe**'.
2. On the welcome page click '**Next**'.
3. On the **Select Destination Location** page accept the default location and click '**Next**'
4. On the **Ready to Install** page click '**Install**'
5. On the **Completing the Andor SDK 3.7.30101 Setup Wizard** page accept the default '**Yes, restart the computer now**' and click '**Finish**'.
6. Now connect your Zyla 4.2 camera to your computer and switch it on.
7. Windows will now install the driver for the camera (This will take a while).
8. Now the camera is ready for use.

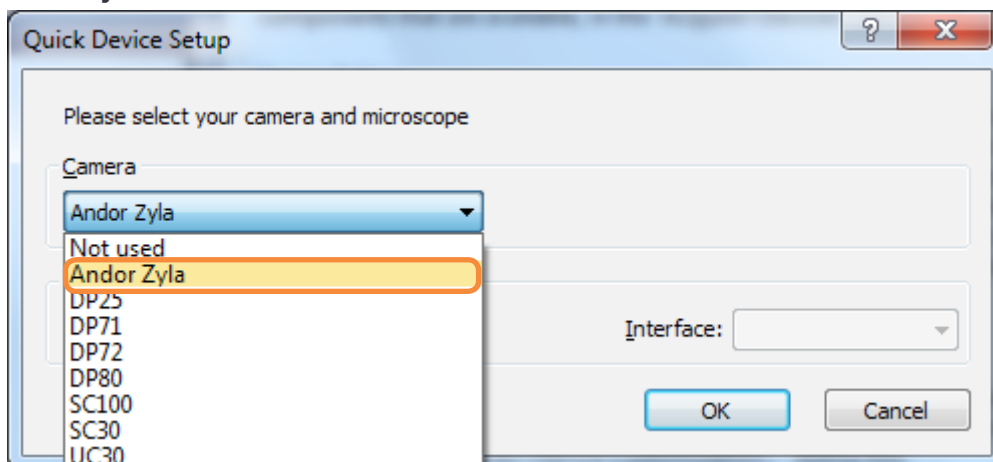
SECTION 2: USING CELLSSENS DIMENSION TO CONTROL YOUR sCMOS CAMERA

2.1 RUNNING YOUR ANDOR sCMOS CAMERA FOR THE FIRST TIME IN CELLSSENS DIMENSION

1. Open the cellSens application, using Desktop Shortcut or from **Start>All Programs>cellSens Dimension>cellSens Dimension**.
2. Select '**High End Camera Support for cellSens 1.11**'.
3. Click **Create Desktop Shortcut**, this ensures that the Andor cameras are always available.
4. Create a name and enter a comment for the Shortcut so you will always know what solution/camera will start with this shortcut.



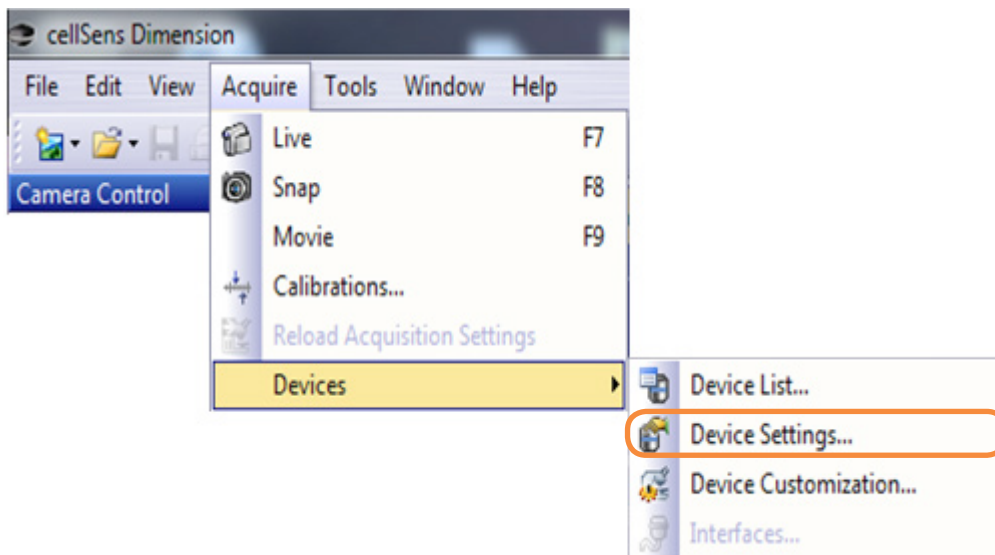
5. On first run Quick Device Setup will automatically appear, select your Andor sCMOS camera model, for example **Andor Zyla**:



6. Your sCMOS camera is now ready to use in cellSens Dimension.

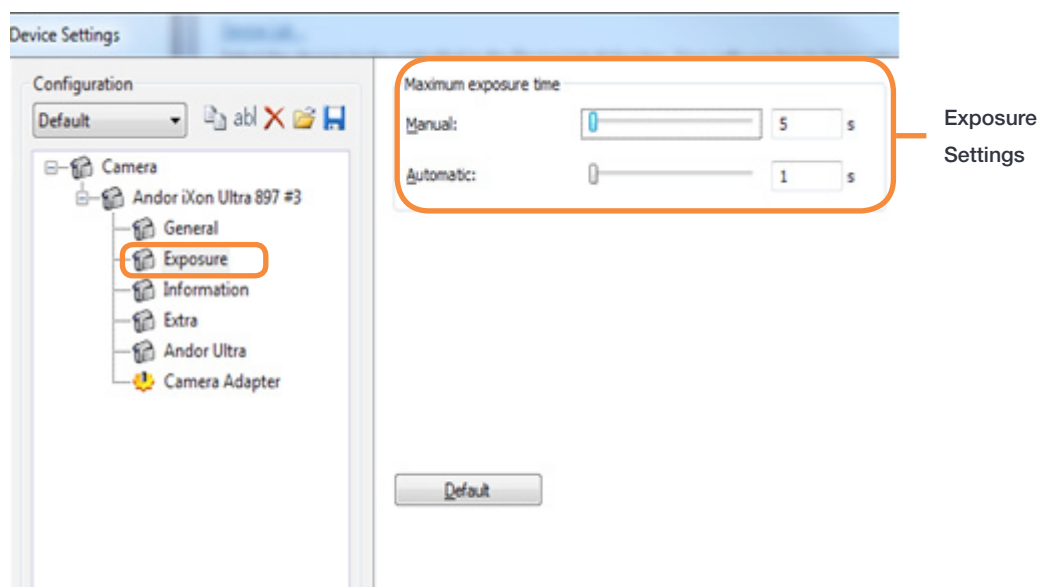
2.2 SETTING THE ACQUISITION PARAMETERS

1. To access camera settings and set up acquisition parameters, open the **Acquire** tab on the main toolbar.
2. Click on **Devices > Device Settings**.

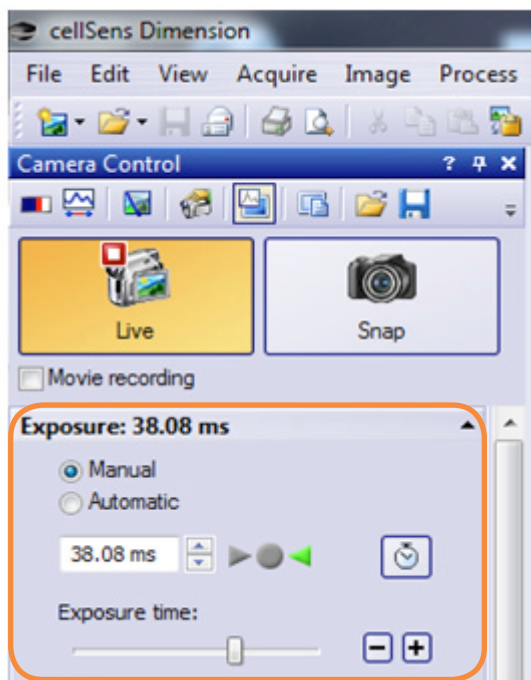


2.2.1 SETTING THE EXPOSURE

3. Choose '**Exposure**' which will allow the maximum exposure to be set.

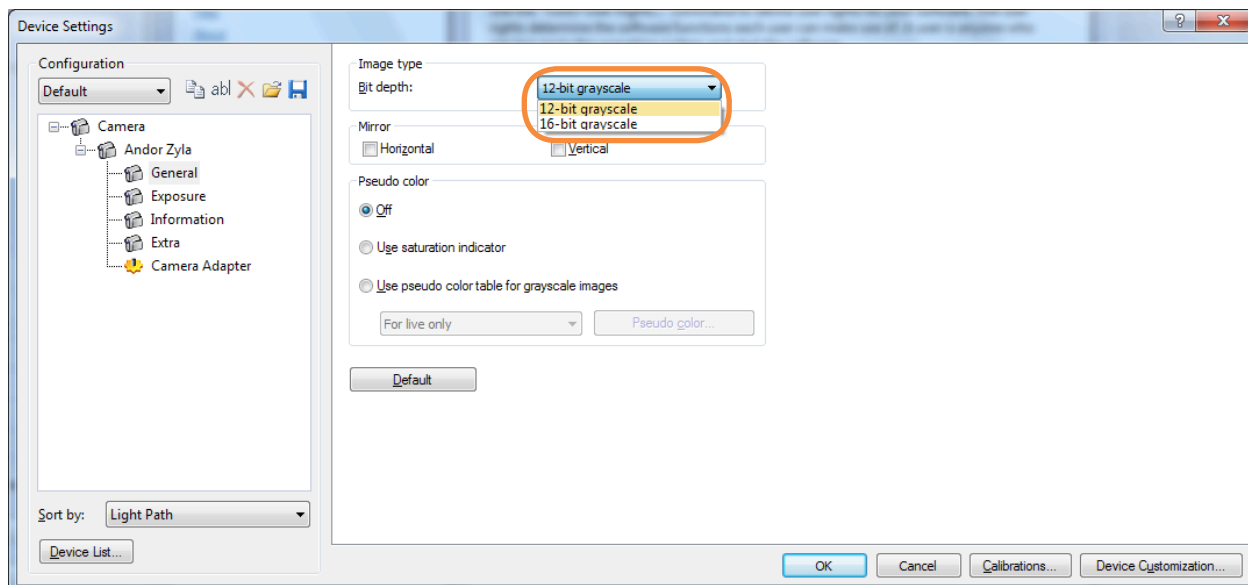


For shorter exposures use the **Exposure** control in the **Camera Control** window.

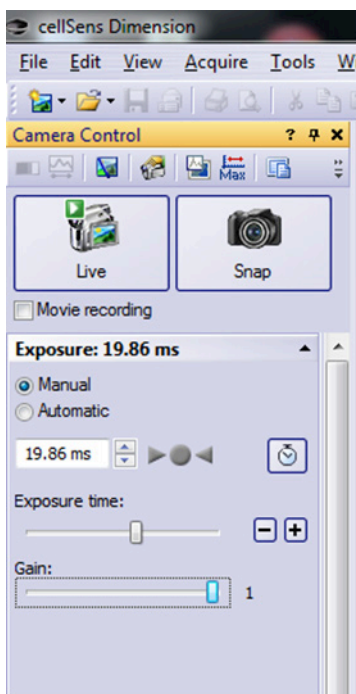


2.2.2 SETTING THE DYNAMIC RANGE/BIT-DEPTH

1. To set the dynamic range/bit depth on your sCMOS camera select 'General' under Device Settings.



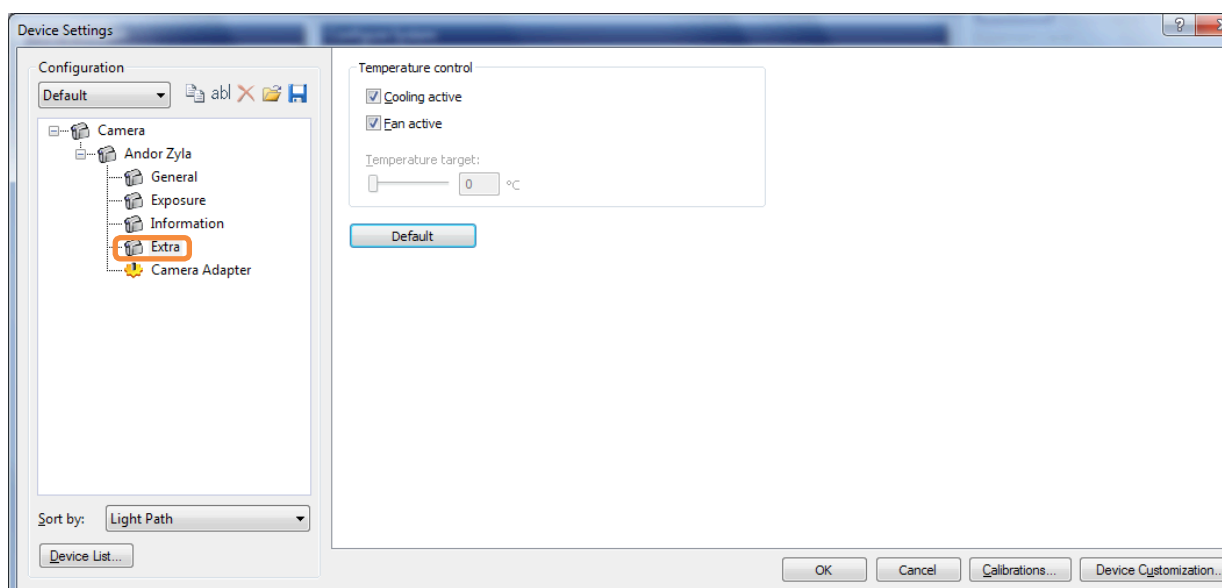
2. Selecting 12-bit grayscale provides the user with 2 Gain options on a slider in the Camera Control window:
 - 0 is 'High Well Capacity' 12-bit mode
 - 1 is 'Low Noise' 12-bit mode



A Gain of 1 will provide the best image quality for low light samples at 12-bit. Only use Gain 0 if the sample being investigated emits a lot of photons, i.e. has a high fluorescent signal. Selecting 16-bit grayscale provides 1 Gain option in the Camera Control Window (Dual amplifier mode, 'Low Noise & High Well Capacity' 16-bit mode).

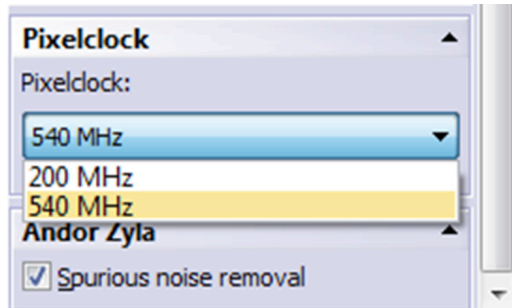
2.2.3 ADJUSTING COOLING TEMPERATURE AND FAN SPEED

1. To control the cooling temperature and the fan operation choose 'Extra' in Device Settings
2. Adjust the settings as required.



2.2.4 SETTING THE READOUT RATE

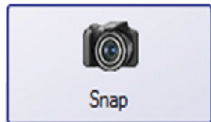
1. The readout rate can be set in the **Camera Control** window:



2.3 CONTINUOUS LIVE VIEW AND SNAPSHOT



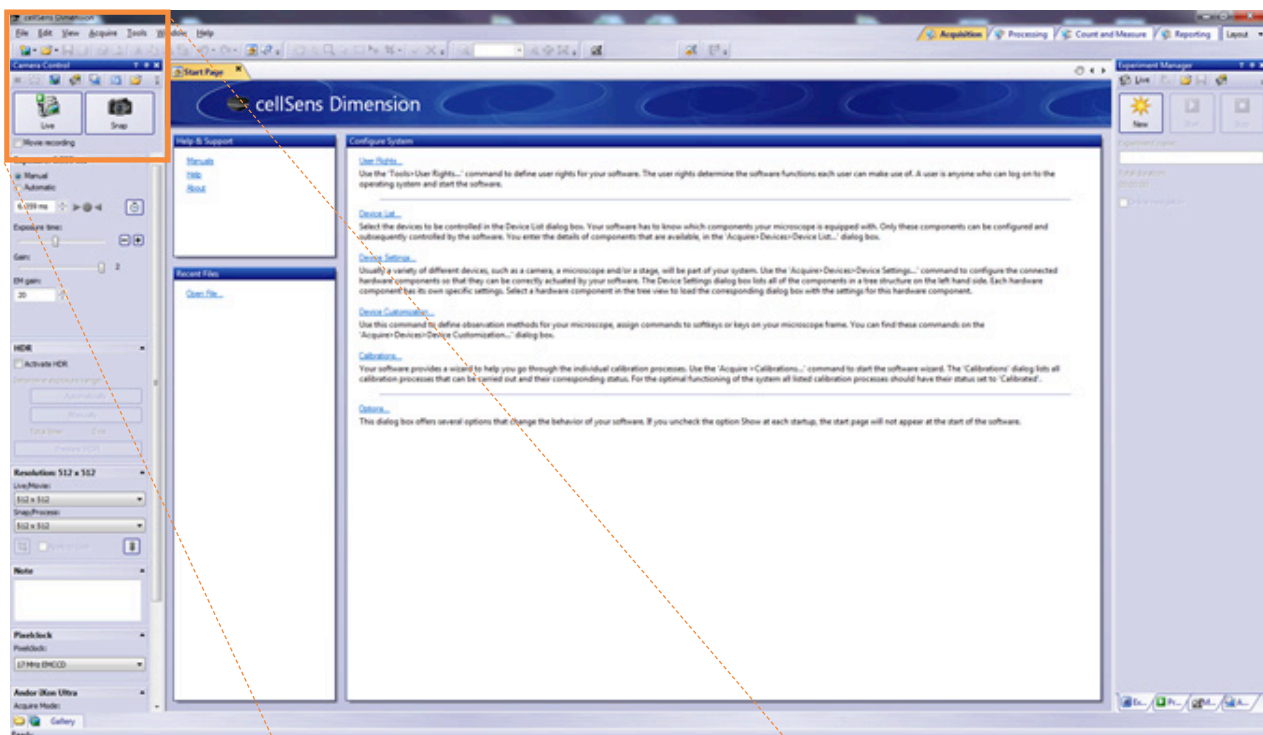
For a continuous live view press the 'Live' icon in the **Camera Control** window or go to the **Acquire** tab and choose 'Live'.



To acquire a snapshot press the 'Snap' icon in the **Camera Control** window or go to the **Acquire** tab and choose 'Snap'.

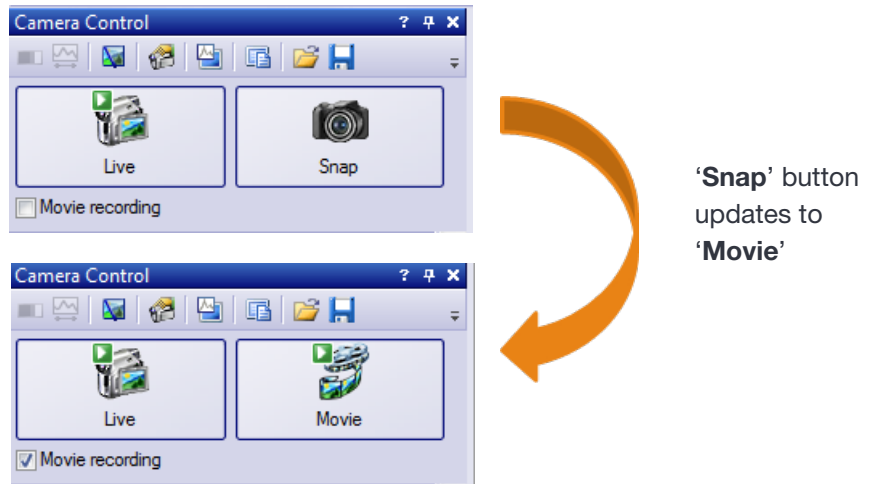
2.4 SETTING UP A KINETIC SERIES IN CELLSENS

1. Configure acquisition settings using the **Camera Control** tab or go to the **Acquire** tab and choose 'Snap'.



2. Select 'Movie recording' which is located under the 'Live' button.

- Once you select **'Movie recording'**, the **'Snap'** button updates to **'Movie'**.



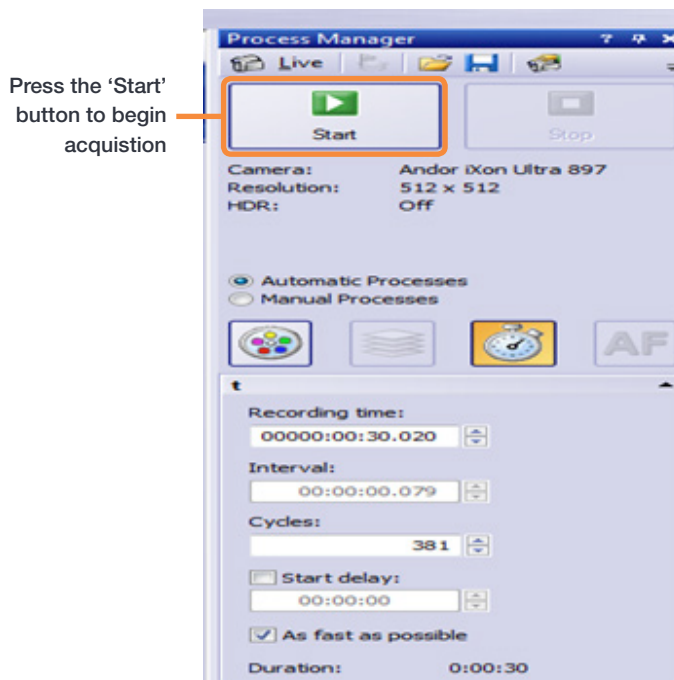
- Click **'Movie'** to begin the acquisition.

Note: The Movie button  updates to  to show that an acquisition sequence is being recorded.

2.4.1 SETTING UP A TIMELAPSE IN CELLSSENS DIMENSION

Use the **'Process Manager'** on the right hand side of the main cellSens window to define the number of frames you wish to acquire and to set an interval between frames. In addition, you can set a delay at the start of an acquisition. This is important, if for example, photoactivation of a sample is required before acquisition.

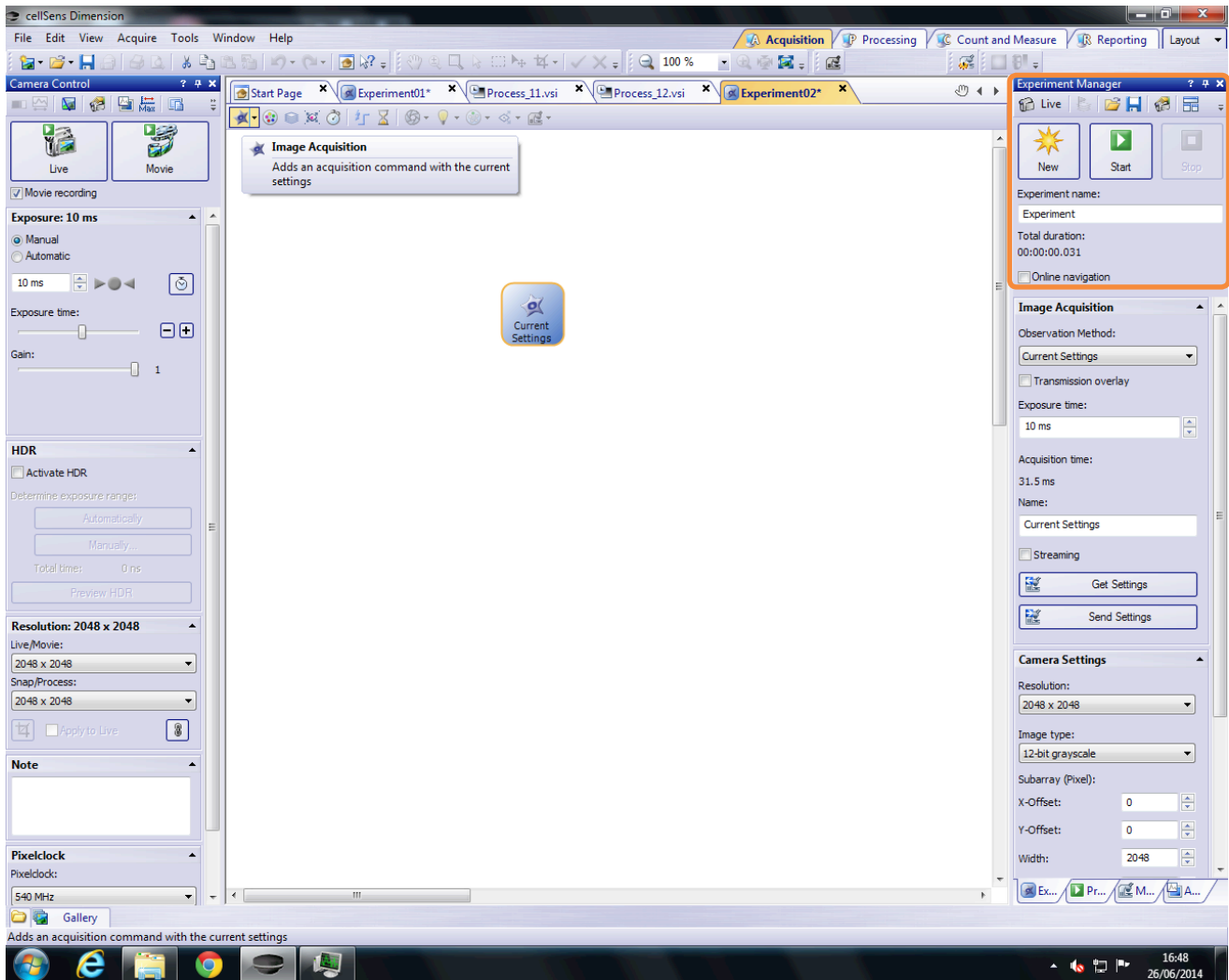
When all experimental parameters have been set press the **'Start'** button to begin acquisition



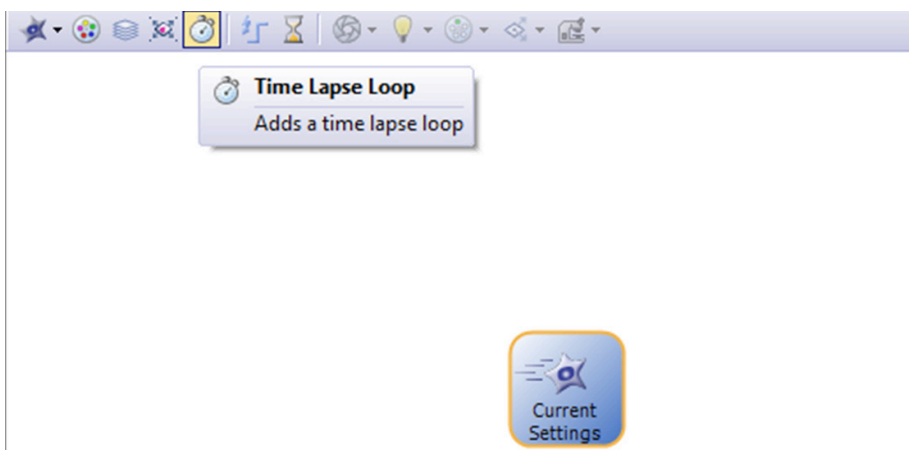
* It is important to note that 'Process Manager' uses the software trigger by default. This means that the fastest frame rates cannot be achieved in this mode with your sCMOS camera. Using the 'Movie' option above or 'Live Mode' provide the fastest frame rates using your sCMOS camera. These two options use internal trigger instead of software trigger.

2.4.2 SETTING UP AN EXPERIMENT IN CELLSSENS

1. To define an experiment you need to use the advanced experiment manager (right hand side of main window), this is the only way to define an experiment with internal trigger. This will allow you to get the best frame rates from your sCMOS camera in a defined acquisition mode.



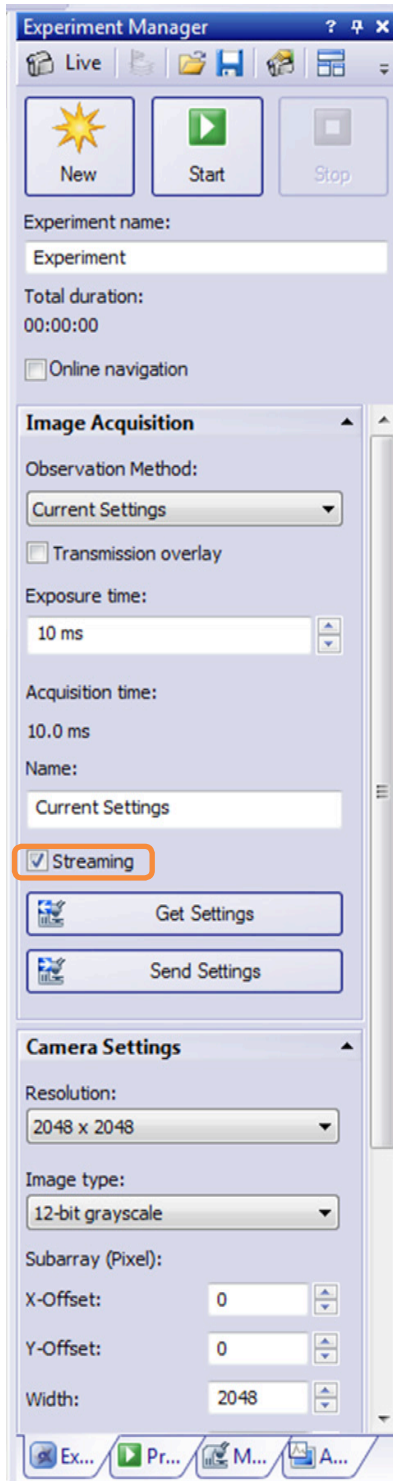
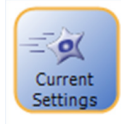
2. Create a new experiment, add an acquisition (appears as 'Current Settings' icon) and draw a timelapse loop around it.



3. Then click on the acquisition ("Current Settings") to edit its properties.

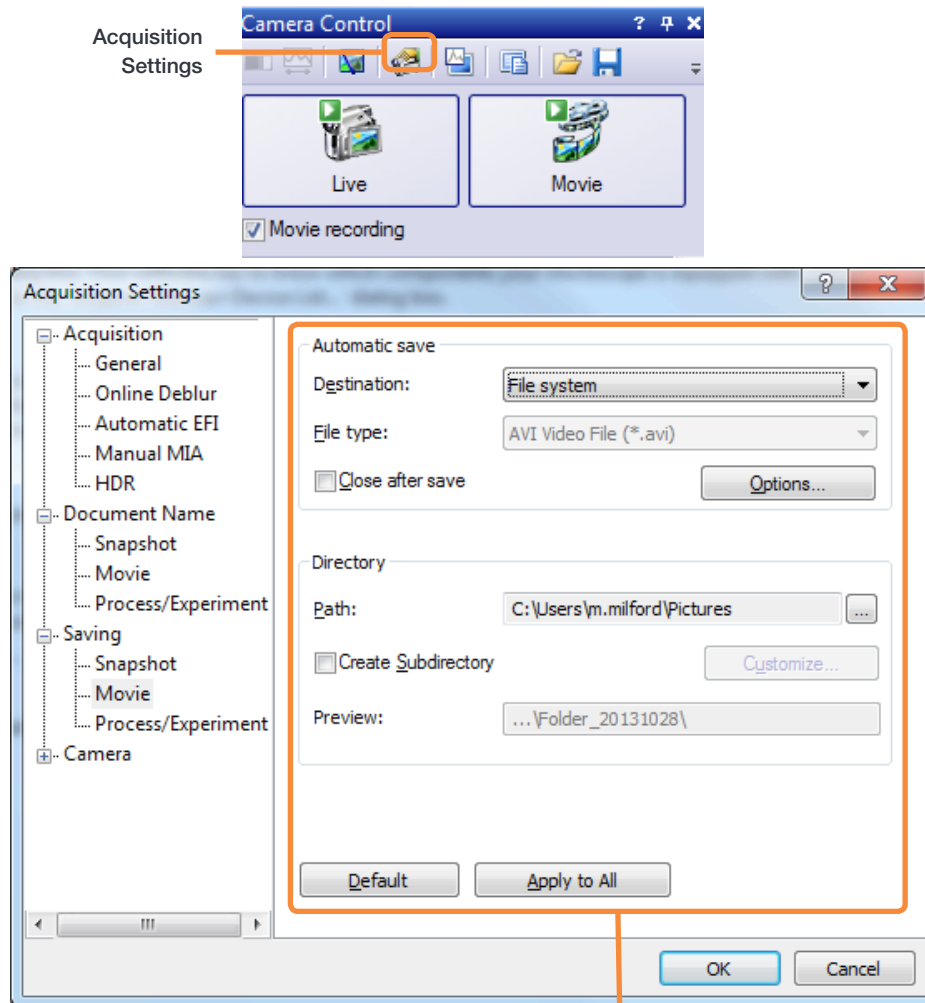
For the fastest frame rates, ensure that the streaming option is selected under the **Experiment Manager** and Exposure time is set to the minimum.

The acquisition settings icon updates:



2.4.3 SAVING A KINETIC SERIES

cellSens Dimension automatically saves the image acquisition files in avi format directly to disk in the **My Pictures** folder. The default save options can be modified in **Acquisition settings > Saving > Movie** if required.

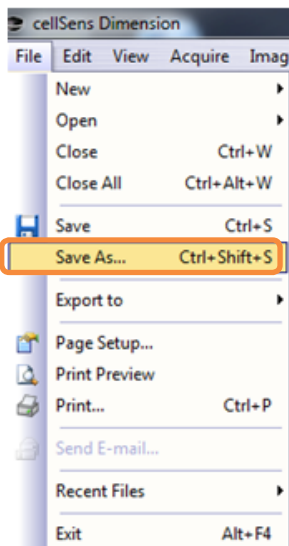


Adjust the save settings as required

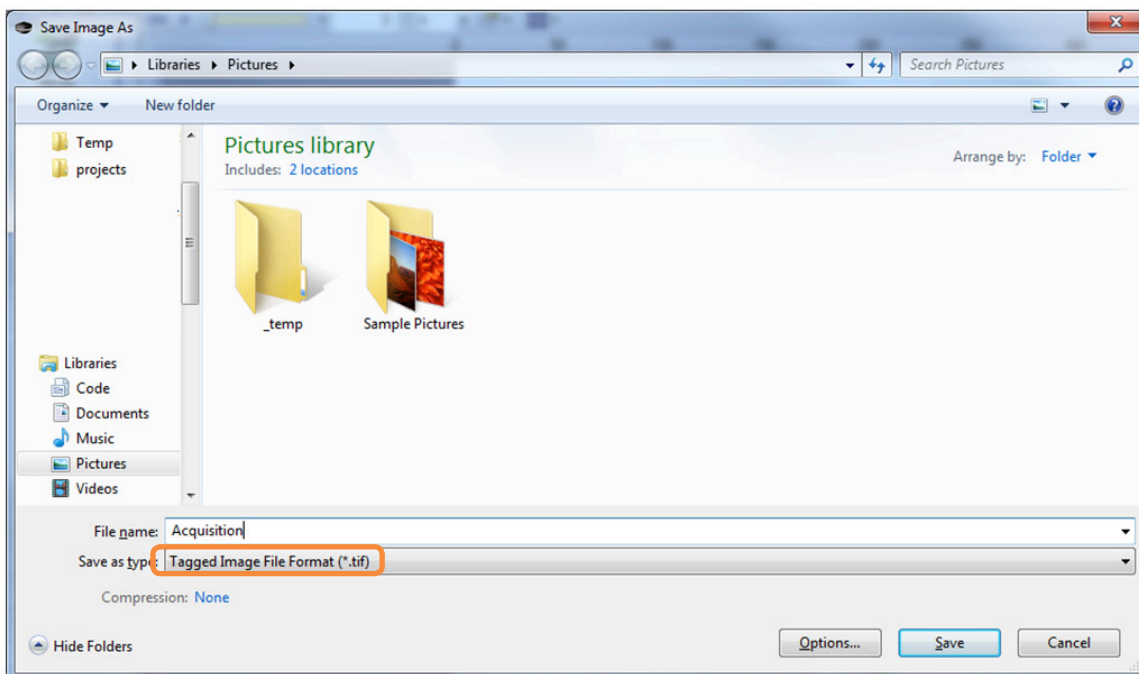
2.4.4 SAVING A KINETIC SERIES AS A MULTI-PAGE TIFF FILE

The kinetic series can also be saved as a multi-page tiff file after acquisition if required. To do this follow the steps below:

1. Select **'File' > 'Save as'**.



2. Choose the location to save your image files to and choose **.tif** as the file type.



3. Click **'Save'**.

2.5 SETTING A REGION OF INTEREST (ROI) IN CELLSSENS DIMENSION

To define a ROI follow the instructions below:

1. Start live mode to see the full field of view.
2. To define the ROI go to the '**Resolution**' part of the camera control window. Click on the '**Toggle sub-array**' button.



3. The dimensions of the ROI can be adjusted in the live window.

FIGURE 1:

2.6 sCMOS FEATURE MATRIX FOR CELLSSENS DIMENSION

	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	✗	✗	✗