

# **MetaMorph Software Guide**

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# for Andor sCMOS

andor.com

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### **INTRODUCTION**

This Software Guide explains how to install and setup MetaMorph for use with the Neo 5.5, Zyla 5.5 and Zyla 4.2 Camera Link and USB 3.0 camera models.

#### 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 Sep 2012	Initial Release of Neo MetaMorph Software Guide
1.1	02 Jul 2013	General updates to improve presentation and procedures throughout. Combined both Neo and Zyla information. Updated frame rate data.
1.2	02 Oct 2013	Revised SDK3 installation procedure Updates to enable access to additional Neo and Zyla functionality through MetaMorph.
1.3	02 Oct 2013	Corrected Andor Driver Pack version to 3.6.30008 (Section 1.3)
1.4	14 Oct 2013	Updated to show reference to Andor 5.5 sCMOS models
1.5	18 Feb 2014	Added updates for support of Zyla 4.2 model.
1.6	11 Apr 2014	Added updates for centralised regions of interest (Section 3.2)
1.7	14 Apr 2014	Added further content to show both pre-defined and user defined regions of interest (Section 3.2)
1.8	28 Apr 2014	Added Feature Matrix (Section 3.4) Updated document template to enhance presentation
1.9	09 Oct 2014	Updated to show support applies to Zyla 4.2 USB 3.0 model.
1.10	13 Jan 2015	Added Frame rate data for USB 3.0 models (Section 3.3)
1.11	08 Sep 2015	SDK3 driver install added (Section 1.3)
1.12	19 Nov 2015	SDK driver install steps updated (Section 1.3)



## **SECTION 1: INSTALLATION STEPS**

This section outlines how to install MetaMorph on your PC for use with the Neo 5.5, Zyla 5.5 and Zyla 4.2 Camera Link and USB 3.0 camera models.

#### 1.1 INSTALLING METAMORPH FOR THE FIRST TIME

Updates available from <a href="http://www.meta.moleculardevices.com/updates/">http://www.meta.moleculardevices.com/updates/</a>

- 1. Install the latest full version of MetaMorph (MetaMorph 7.8.4) from the installation CD.
- 2. Download the latest update (MM 7.8.8 for Zyla 4.2 USB 3.0 support) and save the zip file to the desktop.
- 3. In order to update the full release of MetaMorph, go to the Meta Imaging Series 7.8.4 folder which contains the Updater program. Select the Updater and browse for the MetaMorph zip file you have just downloaded.

irganize • I Op	en New folder				8== •	
Favorites	Name	Date modified	Туре	Size		
Desktop	Documentation Files on Installation Disk	27/07/2012 10:28	Shortcut	1 KB		
Downloads	Meta Imaging Series Administrator	31/07/2012 16:44	Shortcut	1 KB		
E Recent Places	A Meta Imaging Series Updater	31/07/2012 16:44	Shortcut	1 KB		
	MetaFluor Offline	31/07/2012 16:44	Shortcut	2 KB		
Libraries	MetaFluor	31/07/2012 16:44	Shortcut	2 KB		
Documents	MataMarah Offling	21/07/2012 16:44	Shortest	2 KB		
J Music	Meta Imaging Series Updater		*	2 KB		
Videos	Select Patch File Select the patch file for this update			2 KB		
Computer	Patch File					
Local Disk (C:)	C:\Users\Andor\Desktop\mm778_x64_2012-04-22.zip	,				
SSD RAID (E:)						
Meta Imagi Shortcut						

4. Follow the steps in the Updater menu until all the files are extracted and the application files are configured.

	en Newrolder				8== 👻 🛄
Favorites	Name	Date modified	Туре	Size	
E Desktop	Documentation Files on Installation Disk	27/07/2012 10:28	Shortcut	1 KB	
Downloads	Meta Imaging Series Administrator	31/07/2012 16:44	Shortcut	1 KB	
Recent Places	Meta Imaging Series Updater	31/07/2012 16:44	Shortcut	1 KB	
	MetaFluor Offline	31/07/2012 16:44	Shortcut	2 KB	
Libraries	MetaFluor	31/07/2012 16:44	Shortcut	2 KB	
Documents	Bri MatsMamb Offling	21/07/2012 16:44	Chartert	2 KB	
Music	Meta Imaging Series Updater		×	2 KB	
Videos	Operation Progress The application files are now being configured			2 KB	
Computer	Extracting Files				
💒 Local Disk (C:)					
SSD RAID (E:)					
	c:\MM\uic d variapec1020.dl				
Network					

5. The software is now updated to the latest release.



#### 1.2 MetaMorph already installed

- 1. If MetaMorph is installed already, ensure that the latest version is installed.
- 2. The latest version can be downloaded from <u>http://www.meta.moleculardevices.com/updates/</u>. Use the Updater program as described in **Section 1.1 Installing MetaMorph for the first time.**

#### 1.3 INSTALLING THE ANDOR DRIVER PACK

1. Download and install the latest Andor Driver Pack for sCMOS from the following link: <u>http://www.andor.com/</u> <u>downloads?src=drivers</u>

Setup - Andor Driver Pack 3	
	Welcome to the Andor Driver Pack 3 Setup Wizard
	This will install Andor Driver Pack 3 v3.8.30007.0 on your computer.
	It is recommended that you close all other applications before continuing.
	Click Next to continue, or Cancel to exit Setup.
	Next > Cancel

2. Complete the installation steps and click Finish.



### **SECTION 2: CONFIGURING METAMORPH**

- 1. Power on your Neo 5.5, Zyla 5.5 or Zyla 4.2 camera.
- 2. Run the Meta Imaging Series Administrator to set up the configuration for acquisition.
- 3. Select MetaMorph-Default, then click 'Configure Hardware'.
- 4. Click 'Create New Setting', to create a new setting, and call this setting 'Neo 5.5', 'Zyla 5.5' or 'Zyla 4.2' as required.

Nota Imaging Series Ad	Iministrator: Single User Configuration		M Meta Imaging Series Administrator: Single User Configuration
List of Groups			List of Grou Configure Hardware
Group Name	Hardware Setting File Association	Select a Group and Press a Button to Customize:	Group Na
MetaFluor MetaFluor Offline	Default Offline	Assign Hardware	MetaFluo MetaFluo
MetaMorph MetaMorph Offline	Default Offline Default	Drop-ins/Toolbars	MetaMori MetaMori Configure Devices Toolbars
Metavue	Derault	Clear Settings	Metavue Rename Setting ettings
<	• • • • • • • • • • • • • • • • • • •	Edit Defaults	Delete Setting
Pressing Set File Association be launched when .stk and (marked by *)	n will set the default group and the group to .tif images are double-clicked in Explorer	Set File Association	Pressing St be launche (marked by
Enter Multi-User Mode	Configure Hardware		Enter Mu
Set Administrator Password	Create Icons	ОК	Set Administrator Password Create Icons OK

Click 'Create New Setting' first

Click 'Configure Acquisition' after the new setting has been created

- 5. Click 'Configure Acquisition'.
- 6. Select the AndorSdk3 driver from the list of Available Drivers.

Group Na Hardware	Settinas		up and Press Justomize:	
MetaFlug Configu	re Acquisition	Continent to see the	a. (pres.)	
MetaMon	Available Drivers		Installed Drivers	
Metal/ue CRI N Metal/ue CRI N Pressing Stole lounche PCO C (marked by PCO C Enter Mu Prince Sensiti	uance Antration Stration How Stration How Stration How Strategy St	Add>>> VAnd << Remove Configure Help Cancel OK	orSdk3	
Driver	Configuration:		*Default Driver	
Andor	6dk3 Camera			

- 7. Click 'Add >>'.
- 8. Then click 'Configure...'.



 Check that the 'Flip Vertically' checkbox is checked. If this is unchecked, MetaMorph will process the image data during the acquisition and cause unnecessary slowdown. In addition, ensure the "Generate Debug output" is off i.e. not checked.

	AndorSdk3 Camera Driver       Camera     Advanced     Defect Correction     Version       Camera     Information (Channel 1)     Camera Information (Channel 1)       Name:     Andor 20/LAX4 (2:CL10     Reset       Serial Number:     VSC-00870     Flip Horizontally       Camera Modet     ZYLA-4.2:CL10     Flip Vertically	Ensure that the Flip Vertically checkbox is checked
Ensure that the Generate Debug Output is not checked	Camera information (Channel 2) ND CAMERA Hide all camera error messages Generate Debug Output (affects all cameras) OK Cancel Apply	

10. Adjust the Internal Frame Buffer Size to approximately half of the computer RAM. Also, ensure the "Enable software binning" is off.

	AndorSdk3 Camera [	Driver	? ×				
	Camera Advanced	•					
	Temperature Control						
	Enable cool	er during camera initializatior	]				
	Fan Mode:	On	<b>-</b>				
	Temperature:	0 C (-50 to 24)					
	Stream Acquisitio	on Buffer Size: 10480	МВ				
Ensure that the Enable	IO Pin Inversion Fire 1 Arm Fire N and 1	Fire N	Aux Out 1				
software binning is not	Enable software	e binning	Reset				
checked		ОК	Cancel Apply				

 Once the configuration is complete, click 'OK' to leave the Meta Series Administrator and go to the MetaMorph Application (be sure to select your newly created Neo 5.5, Zyla 5.5 or Zyla 4.2 setting by selecting "Assign Hardware" before leaving the Administrator).

		le Association	a Button to Customize:
MetaFluor MetaFluor Offline	Default Offline		Assign Hardware
MetaMorph MetaMorph Offline	Default Offline		Drop-ins/Toolbars
MetaVue	Default		Clear Settings
•		۰.	Edit Defaults
ressing Set File Association re launched when .stk and .t marked by *)	will set the default group a if images are double-clicke	and the group to ed in Explorer	Set File Association



## SECTION 3: USING METAMORPH TO CONTROL YOUR SCMOS CAMERA

#### 3.1 Setting Processing Preferences and Acquisition Parameters

- 1. Open the MetaMorph application.
- 2. Go to Edit Preferences and select Processing to open the 'Processing Preferences' menu.
- 3. Check the 'Enable CPU usage compatibility mode' checkbox.

Processing Preferences
Region Labels         Stack Buffering           Windows         Processing         Open         Save         Measure Objects         Journals
<ul> <li>Enable automatic annotations</li> <li>Redraw during iterations</li> <li>Interpolate when Duplicating with Zoom</li> </ul>
Movie Preference: Plays movies slower but uses less memory Plays movies faster but uses more memory
Color Model used to display pixel values:
Enable CPU usage compatibility mode
Auto Threshold algorithm:
OK Cancel

4. To access camera settings and set up the acquisition parameters, open the '**Acquire**' window which is accessed via the **Acquire** menu or the Acquire icon.

M	N	letaMo	orph										
Fi	le	Edit	Regions	Stack	Acquire	Devices	Display	Process	Log	Measure	Journal	Apps	Windov
111	um:	[None]	]	-	🛞 Ma	g: [None]		-	<b>q</b> 4	5.5	no stage-		
	3	8	) a X		🗯 🐴 🖬	1 🗳 🕺	i   🛱 🖣	TO M		- 🔂 🕯	L 😤 🔁	-	🗟 🕾

Aco	quire Devices	Display	Process	Log
	Acquire			
	Capture Live Im	ages	F1	1
	Stop Focusing		F	2



5. Set the Readout Speed, Gain setting, Shutter and Trigger parameters in the '**Special**' tab of the '**Acquire**' menu.

Acquire		
Acquire	Image: 📑 Acquired	
Save 'Acquired-2'	Save to: C:\MM\\Acquir	red001.bf Set Save
Save w/Sequence	Display Acquire Corre	ct   Deconvolution   Annotate Special   Live Replay
Exposure Time:	Digitizer:	560 MHz - fastest readout
1.5 🔶 sec 💌	Gain:	16-bit (ow noise & high well capacity)
AutoExpose	Bectronic Shutter:	12-bit (high well capacity) 12-bit (low noise)
Binning: 1 💠	Info	16-bit (ow noise & high well capacity)
Camera Area:	Cooler On	
-> Full Chip	Trigger Mode:	Normal (TIMED)
Center Quad.	TTL Output:	FireRow1
Use Active Region	Noise Filter	
Show Live	Show Focus Indicator	Baseline Clamo
Live Bin: 1 🖨	Frames To Avg:	1
Temp: -0.44 c		
Setting Modified)		
w		
Close Less (c)	Setting: Load	Sava Sava Ar

6. For a continuous live view press 'Show Live' in the 'Acquire' window or the 'Live' icon on the toolbar. To acquire a snapshot press the 'Acquire' button on the 'Acquire' window.



Acquire a Snapshot Image

Continuous Live View

#### 3.1.1 SETTING UP A KINETIC SERIES

To set up a kinetic series go to the **Acquire** option on the main MetaMorph toolbar and choose 'Stream Acquisition...'. In the Stream Acquisition menu the number of frames/time-points to be acquired can be selected as well as where the data will be streamed to i.e. the RAM/Hard Disk location.

#### 3.1.1.1 Burst Mode Kinetic Series (Neo 5.5 only)

For **Burst Mode** kinetic series i.e. those that are equal to or less than 4GB (the Neo 5.5 on-head memory) choose to **'Stream to RAM'** as this will allow the fastest acquisition speeds.

Ac	quire	Devices	Display	Process	Log		
	Acq	uire					
	Cap	ture Live I	F11				
	Stop	p Focusing	F	2			
C	Stream Acquisition						
	Acq	juire Time	apse				

An example of a typical good set-up for 'burst mode' for the

Neo 5.5



Acquire       Camera Parameters         Acquisition Mode:       Stream to RAM         Number of frames:       100         Image: Command Stream to RAM       Brows         Filename:       Enmissive osustained full frame overlapped.mpf         Image: Command Stream S	
Acquisition Mode: Stream to RAM Number of frames: 100 😨 Browse Filename: E:Vnm3VNeo sustained full frame overlapped.mpf ③ Save during acquisition Acquisition Information: Your current acquisition region is: 2560x2160 Each pixel will use: 2 bytes Each frame will use: 10.55 MB Total number of frames: 100 Amount of memory stream will use: 791.38 MB Amount of memory stack will use: 1.03 GB Amount of memory variable: 6.00 GB Readout time per frame: 10.12 ms Acquisition time for stream: 1.01 to 1.01 sec Initial Illum: None 🔹	
Number of frames:       100       Browsa         Filename:       E:\mm3\Neo sustained full frame overlapped.mpf       Save during acquisition         Acquisition Information:       Your current acquisition region is:       2560x2160         Each pixel will use:       2 bytes         Each frame will use:       10.55 MB         Total number of frames:       100         Amount of memory stecan will use:       1.93 GB         Amount of memory stecan will use:       1.03 GB         Amount of memory available:       6.00 GB         Readout time per frame:       10.12 ms         Acquisition time for stream:       1.01 to 1.01 sec         Initial Illum:       [None]         The Nun user programs       NOTE: Device streaming not supported by the camera	-
Filename: E:\mm3\Neo sustained full frame overlapped.mpf	e )
✓ Save during acquisition         Acquisition Information:         Your current acquisition region is:       2560x2160         Each pixel will use:       2 bytes         Each frame will use:       10.55 MB         Total number of frames:       100         Amount of memory stream will use:       103 GB         Amount of memory required (total):       1.80 GB         Amount of memory available:       6.00 GB         Readout time per frame:       10.12 ms         Acquisition time for stream:       1.01 to 1.01 sec         Initial Illum:       [None]           MOTE: Device streaming not supported by the camera           Katue:: Configure OK	
Acquisition Information: Your current acquisition region is: 2560x2160 Each pixel will use: 2 bytes Each frame will use: 10.55 MB Total number of frames: 100 Amount of memory stream will use: 791.38 MB Amount of memory stack will use: 1.03 GB Amount of memory required (total): 1.80 GB Amount of memory available: 6.00 GB Readout time per frame: 10.12 ms Acquisition time for stream: 1.01 to 1.01 sec Initial Illum: [None] - Run user programs NOTE: Device streaming not supported by the camera	
Your current acquisition region is: 2560x2160 Each pixel will use: 2 bytes Each frame will use: 10.55 MB Total number of frames: 100 Amount of memory stock will use: 791.38 MB Amount of memory stack will use: 1.03 GB Amount of memory available: 6.00 GB Readout time per frame: 10.12 ms Acquisition time for stream: 1.01 to 1.01 sec Initial Illum: [None] • NOTE: Device streaming not supported by the camera	
Each pixel wil use: 2 bytes Each frame will use: 10.55 MB Total number of frames: 100 Amount of memory stream will use: 791.38 MB Amount of memory stack will use: 1.03 GB Amount of memory equired (total): 1.80 GB Amount of memory available: 6.00 GB Readout time per frame: 10.12 ms Acquisition time for stream: 1.01 to 1.01 sec Initial Illum: [None] - Run user programs NOTE: Device streaming not supported by the camera atus:: Configure OK	
Each frame will use: 10.55 MB Total number of frames: 100 Amount of memory stream will use: 791.38 MB Amount of memory stack will use: 1.03 GB Amount of memory available: 6.00 GB Readout time per frame: 10.12 ms Acquisition time for stream: 1.01 to 1.01 sec Initial Illum: [None] - Run user programs NOTE: Device streaming not supported by the camera atus: Configure OK	
Total number of frames:       100         Amount of memory stream will use:       791.38 MB         Amount of memory stack will use:       1.03 GB         Amount of memory required (total):       1.80 GB         Amount of memory available:       6.00 GB         Readout time per frame:       10.12 ms         Acquisition time for stream:       1.01 to 1.01 sec         Initial Illum:       [None]         Run user programs         NOTE: Device streaming not supported by the camera         tatus:       Configure OK	
Amount of memory stream will use: 791.38 MB Amount of memory stack will use: 1.03 GB Amount of memory required (kotal): 1.80 GB Amount of memory available: 6.00 GB Readout time per frame: 10.12 ms Acquisition time for stream: 1.01 to 1.01 sec Initial Illum: [None] • Run user programs NOTE: Device streaming not supported by the camera tatus: Configure OK	
Amount of memory stack will use: 1.03 GB Amount of memory required (total): 1.80 GB Amount of memory available: 6.00 GB Readout time per frame: 10.12 ms Acquisition time for stream: 1.01 to 1.01 sec Initial Illum: [None] • Run user programs NOTE: Device streaming not supported by the camera tatus: Configure OK	
Amount of memory required (total): (1.80 GB Amount of memory available: 6.00 GB Readout time per frame: 10.12 ms Acquisition time for stream: (1.01 to 1.01 sec Initial Illum: [None] • Run user programs NOTE: Device streaming not supported by the camera tatus: Configure OK	
Amount of memory available: 6.00 GB Readout time per frame: 10.12 ms Acquisition time for stream: 1.01 to 1.01 sec Initial Illum: [None] • Run user programs NOTE: Device streaming not supported by the camera atus: Configure OK	
Readout time per frame: 10.12 ms Acquisition time for stream: 1.01 to 1.01 sec Initial Illum: [None] • Run user programs NOTE: Device streaming not supported by the camera tatus: Configure OK	
Acquisition time for stream: 1.01 to 1.01 sec Initial Illum: [None]  Run user programs NOTE: Device streaming not supported by the camera tatus: Configure OK	
Initial Illum: [None]  Run user programs NOTE: Device streaming not supported by the camera tatus: Configure OK	
Run user programs NOTE: Device streaming not supported by the camera	
NOTE: Device streaming not supported by the camera	
NOTE: Device streaming not supported by the camera	
NOTE: Device streaming not supported by the camera	
NOTE: Device streaming not supported by the camera	
tatus: Configure OK	
tatus: Configure OK	
aus. Conigure or	
A	cquire

If you have set the number of frames too high for 'Stream to RAM' a warning will appear at the bottom of the window as shown in the figure below. If this happens, reduce the number of frames, or switch to 'Stream to Hard Disk' to resolve the issue.

	Stream Acquisition	
	Acquire Camera Parameters	
	Acquisition Mode: Stream to RAM	•
	Number of frames: 1000	Browse
	Filename: E:\mm3\Neo sustained full frame overlapped.mpf	
	Save during acquisition	
	Acquisition Information:	
	Your current acquisition region is: 2560x2160	
	Each pixel will use: 2 bytes	
	Each frame will use: 10.55 MB	
	Amount of memory stream will use: 773 GB	
	Amount of memory stack will use: 10.30 GB	
	Amount of memory required (total): 18.03 GB	
	Amount of memory available: 6.00 GB	
	Readout time per frame: 10.12 ms	
	Acquisition time for stream: 10.12 to 10.13 sec	
	Initial Illum: [None]	-
	Run user programs	
Insufficient	NOTE: Device streaming not supported by the camera	
memory	Stature Met anough moment	
warning	Status: Not enough memory	
warning		Acquire
message	Record Configuration State	Close



#### 3.1.1.2 Sustained Kinetic Series

For **sustained** kinetic series, choose to '**Stream to Hard Disk**' and ensure there is a large storage device available to Stream the data to e.g. a 1TB SSD. Acquisition information is supplied in this window relating to the amount of memory your data will require and the length of time for the acquisition.

Stream Acquisition		- • •	
Stream Acquisition           Acquire         Camera Parameters           Acquisition Mode:         Stream to Hard E           Number of frames:         1000           Filename:         E-VMN-Zyta_kinetic_serie           Image:         E-VMN-Zyta_kinetic_serie           Image:         Save during acquisition           Acquisition Information:         Your current acquisition region is:           Each frame will use:         Total number of frames:           Disk space the streak will use:         Disk space the streak will use:           Disk space the streak will use:         Disk space the streak will use:           Disk space required (total):         Disk space the streak will use:	tesk s.smf 2560x2160 2 bytes 10.55 MB 1000 0.00 KB 10.30 GB 10.30 GB 10.30 GB 2 93022 GB	Browse	File memory requirement and acquisition time information
Acquisition time for stream: Initial Illum: [None] Run user programs NOTE: No components which suppo Status: File(s) already exist Record Configuration State	34.01 to 43.98 sec		

#### 3.1.1.3 Obtaining the Fastest Acquisition speeds (Overlapped Mode)

To achieve the fastest speeds with the Neo 5.5, Zyla 5.5 and Zyla 4.2 in MetaMorph set the camera state to **overlapped mode**. Overlapped mode is where the sCMOS sensor is being exposed and readout simultaneously; hence the faster speeds when in this mode. Having overlap on will make a difference to the frame rates when the exposure time is longer than the readout at a specific ROI. The exposure setting when acquiring sustained frame rates is longer than the readout at each ROI and therefore having the overlapped mode on here will increase the frame rates.

Acquire Camera	Parameters	
Acquisition Mod	le:	
Acquire image	ges at frame rate	
Acquire image     Acquire image	ges from each external trigger	
C require may	ges non max excernal trigger	
Digital Camera	Controller Parameters:	
Camera State:	Overlapped	-
Shutter Mode:	Not Available	*
Clear Mode:	Not Available	*
the second	tantes te acquire per coveria.	
Display prev Update preview	iew image during acquisition image every 1 🚖 frames	



#### 3.1.2 Saving your Image Data

When 'Stream to Hard Disk' is selected you have the option to save the images during the acquisition by ticking the 'Save during acquisition' box in the Stream Acquisition window. This should always be ticked as you want to guarantee that all your data will be saved if there is a crash during the acquisition. You can also indicate the file location where you want the files saved to.

- A sustained kinetic series on the Neo 5.5, Zyla 5.5 and Zyla 4.2 will generate a very large amount of data so the storage device and location should be a large SSD (at least 1TB).
- You can also choose a filename at this point. For the file-type choose \*.smf.

nol		•		Þ
niej	Natwork	File name:		Open
	Network	Files of type:	All Image Files 🗸	Cancel
			All MetaMorph (*.tif;*.tif;*.stk;*.nd;*.scan;*.seq;*.inf) ND Sequential File Format(*.seq) Meta Series Single /Multi-alane TIFE(*.tif)	Help
s which support stream	_		Streaming MetaSeries Format(*.smf)	
	Image Size:		MetaMorph TIFF File Format("_tif)	
			Metamorph Stack File Format(".stk) JPEG File Format(".jpg)	A
			BMP File Format(*bmp)	
			ND File Format(".nd;".scan) MetaFluor File Format(* inf)	
tate			Dataset File Format(*.dataset)	
			Bio-Rad MRC500(*.pic)	th.
			leica LIF File Format (* lif)	

Once you are happy with your settings press the 'Acquire' button and acquisition will begin.

#### 3.1.3 Viewing Acquired Image Files/Data Series

To view the acquired kinetic series/time lapse experiment go to File-->Open Special-->Build Stack and choose one of the four options available:

- The 'Quick' option will allow you to select the first file of the series and will automatically open all of the frames sequentially. This can take a significant amount of time if you have a long kinetic series e.g. 30,000 frames with the full chip.
- In **'Numbered Names**' and **'Numbered Extensions**' you can choose what the first and last frame will be and therefore you can limit the size of the series to open.
- In 'User defined' you can select which frames you want to see by selecting them from a list.
- Whatever way you choose to open them you have the option then of exporting/saving as a .avi file.

New	Ctrl+N	11	🕈 -no stage-		Z: no z motor-	
Open	Ctrl+O	R	। 🛃 🥵 🔁   🏜 🚔 ।	<b>X</b>		
Open Special	•		Open Previous	Ctrl+Left		
Open in 4D Viewer			Open Next	Ctrl+Right		
Close	Ctrl+W		Build Stack	•	Quick	Ctrl+
Close All			Play Images From Disk	•	Numbered Names	
Multi Dimensional Tools			Import		Numbered Extensions	
Image Browser	•				User Denned	

## MetaMorph USING METAMORPH TO CONTROL YOUR SCMOS CAMERA



Look in:	MM 🔒		• G 🦻 🖻 🖽 •			
(Es	Name	*	Date modified	Туре	Size	First file of the
	Zyla_kineti	c_series0001.smf	03/10/2012 08:40	SMF File	8,104 KB	Line Marcada
Recent Places	Zyla_kineti	c_series001.smf	03/10/2012 08:39	SMF File	8,104 KB	kinetic series
	Zyla_kineti	c_series0002.smf	03/10/2012 08:40	SMF File	8,104 KB	
	Zyla_kineti	c_series002.smf	03/10/2012 08:39	SMF File	8,104 KB	
Desktop	Zyla_kineti	c_series0003.smf	03/10/2012 08:40	SMF File	8,104 KB	
	Zyla_kineti	ic_series003.smf	03/10/2012 08:39	SMF File	8,104 KB	
1000 A	Zyla_kineti	c_series0004.smf	03/10/2012 08:40	SMF File	8,104 KB	
Libraries	Zyla_kineti	c_series004.smf	03/10/2012 08:39	SMF File	8,104 KB	
	Zyla_kineti	c_series0005.smf	03/10/2012 08:40	SMF File	8,104 KB	
	Zyla_kineti	c_series005.smf	03/10/2012 08:39	SMF File	8,104 KB	
Computer	Zyla_kineti	c_series0006.smf	03/10/2012 08:40	SMF File	8,104 KB	
	Zyla_kineti	c_series006.smf	03/10/2012 08:39	SMF File	8,104 KB 👻	
Network	File name:	Zyla_kinetic_series0001			▼ Open	
Network	Files of type:	All Image Files			Cancel	
					Help	
(mage Size: 25	60 x 2160 (16-bit)	(mage)				
Acquirea from An Exposure: 34 mse	dorsdk3 Camera				- A	
Binning: 0 X 0						

Information summary for the related kinetic series



#### 3.2 SETTING A CUSTOM REGION OF INTEREST (ROI) IN METAMORPH

In order to achieve the fastest frame rates at any ROI in MetaMorph the ROI selected must be centred on the sensor.

#### 3.2.1 Using Centralised Predefined Regions of Interest (ROI)

- 1. Go Live to see the full field of view and snap an image.
- Download and install the MetaMorph centralised ROI's (sCMOS) installer from MyAndor>Software> Drivers and 3rd Party. This installer file contains the predefined centralised ROI's for the Neo & Zyla 5.5 and the Zyla 4.2.



3. Ensure this is installed to the MM directory folder.

etup - Andor sCMOS Regions ielect Destination Location Where should Andor sCMOS Regions be installed?	Setup - Andor sCMOS Regions  Ready to Install Setup is now ready to begin installing Andor sCMOS Regions on your computer.
Setup needs to install Andor sCMOS Regions into the relevant folder.	Click Install to continue with the installation, or click Back if you want to review or change any settings.
To continue, click Next. If you would like to select a different folder, click Browse.	Destination location:
At least 0.1 MB of free disk space is required.	<u>ح</u>
< <u>B</u> ack <u>N</u> ext > Cancel	< Back Install Cancel



4. To use a predefined ROI go to the main tool bar and select **Regions>Load Regions...** This will open a window where a predefined ROI's can be selected.

h	M Open Region File
gions Stack Acquire Devices Display	C v WM → regions → Neo-Zyla_5.5 v 4 Search Neo-Zyla_5.5
Region Tools	Organize 🔻 New folder 🔠 🖛 🗍 🔞
Load Regions	MM Name Date modified Type
Load Regions	128x128.rgn 25/02/2014 11:25 RGN File
Save Regions	app 512x512.rgn 25/02/2014 11:00 RGN File
	i 1392x1040.rgn 25/02/2014 11:00 RGN File
Create Region	Coefficientse     1920x1080.rgn     25/02/2014 10:56     RGN File
Delete Active Region	Groups
Clear All Regions	Hardware
crear rai regionali	🔒 Help
Shrink Region to Fit	📔 ImageForma
Transfer Regions	📔 images
	📔 kernels
love All Regions	🔒 luts
T I	NDSTATE
Convert Regions To Lines	regions
Resequence Region Labels	Neo-Zyla_5 🕆 🤸 👘
Create Segment Regions	File <u>n</u> ame: 1920x1080.rgn
Create Segment Regions	Help Open Cancel
Create Regions Around Objects	<u>H</u> eip Open Cancer

- 5. Select the ROI of interest (For example, 1920 x 1080 as shown above).
- 6. An outline of the new central region will now be visible on the full resolution of the chip.

T *Acquired (30%)	
<b>小</b>	Y Acquire
A 8	Acquire Image: 🌁 Acquired
	Save 'Acquired-2' Save to: C:\MM\\Acquired001.tif Set Save
an anna la sain protes desta de propia e se se se la sa	Save w/Sequence Display   Acquire   Correct   Deconvolution   Annotate Special   Live Replay
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	1.5 Gain: 16bt (ow noise & high well capacity)
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the stand of the second second to be a second second second	Camera Area:
	-> Full Chip Trigger Mode: Normal (TIMED)
	Center Quad. TTL Output: FireRow1
and the set of the set	Use Active Region
	Show Live Show Focus Indicator V Baseline Clamp
	Live Bin: 1 🐑 Frames To Avg: 1 💠
	Temp: -0.44 c
	Setting [Modified]:
	Close Less << Setting: Load Save Save As
JCreationTimestamp: Fri Mar 14 10:15:31:697 2014 ms	

7. To select the new region click the '**Use Active Region**' button in the '**Acquire**' window and the new region you have defined will appear in a new window.



#### 3.2.2 DEFINING A CUSTOM REGION OF INTEREST

- 1. Go Live to see the full field of view and snap an image.
- 2. To define the ROI go to the main tool bar and select **Regions>Create Region**. This will open a new window where you can set the height and width and x and y position on the sensor.



3. Select the width, height, x and y position for the ROI (You will see an outline of the new region on the full resolution of the chip).



Preview of the selected region of interest



4. Once you have defined the required region, click 'Create'.

Create	Re		•
Type: Recta	ngle	() Ellip	ise 🔘 Line
Position:	X	585	*
	Y:	561	*
Width:		1392	-
Height:		1040	*
Create			Close

5. To select the new region click the '**Use Active Region**' button in the '**Acquire**' window and the new region you have defined will appear in a new window.

Acquire				×
Acquire	Image: 🌁 Acquired			
Save 'Acquired-2'	Save to: C:\MM\\Acquir	ed001.tif Set Save		
Save w/Sequence	Display Acquire Correct	ct   Deconvolution   Annotate Special   Live Rep	lay	
Exposure Time:	Digitizer:	560 MHz - fastest readout -		
1.5 💠 sec 💌	Gain:	16-bit (low noise & high well capacity)		
AutoExpose	Bectronic Shutter:	12-bit (high well capacity) 12-bit (low noise)		
Binning: 1 🔄	Info	16-bit (low noise & high well capacity)		
Camera Area:	Cooler On			
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Certer Quad.	TTL Output:	FireRow1		
Use Active Region	Voise Filter			
Live Pier 1	Show Focus Indicator	Baseline Clamp		
Temp: -0.44 c	Frames To Avg:	1 💿		
Setting [Modified]				
Close Less <<	Setting: Load	Save Save As		



#### 3.3 SUSTAINED FRAME RATES FOR THE NEO AND ZYLA IN METAMORPH.

The following graphs show the typical sustained frame rates for a number of pre-defined ROIs using MetaMorph and Andor Solis.

#### Neo 5.5



#### ZYLA 5.5 USB 3.0



# USING METAMORPH TO CONTROL YOUR SCMOS CAMERA



#### **Z**YLA 5.5 10-TAP



ZYLA 4.2 10-TAP



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# USING METAMORPH TO CONTROL YOUR SCMOS CAMERA



#### ZYLA 4.2 USB 3.0





### 3.4 Neo & Zyla Feature Matrix in MetaMorph

	Neo 5.5	Zyla 5.5	Zyla 4.2
Trigger Modes			
Internal	$\checkmark$	$\checkmark$	$\checkmark$
External	$\checkmark$	$\checkmark$	$\checkmark$
Software	$\checkmark$	$\checkmark$	$\checkmark$
External Start	$\checkmark$	$\checkmark$	$\checkmark$
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			
Readout Modes			
Imaging - Full Image Readout from Sensor	~	~	$\checkmark$
Fixed ROI support (centred)* - 2048x2048, 1920x1080, 512x512, 128x128	×	×	×
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		l	
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		<u></u>	·
Easy Vertical Centering of ROI for fastest acquisition	×	×	×

\*can be setup with supplied region files