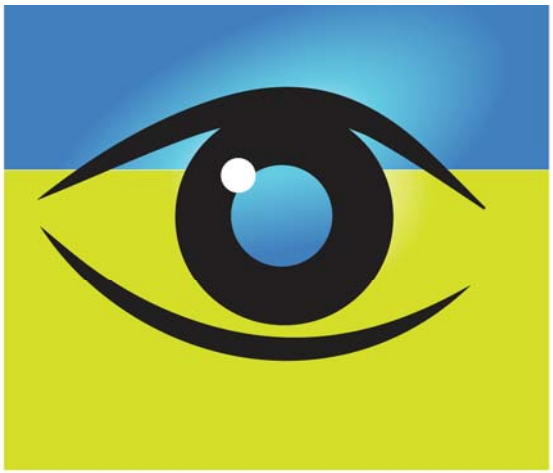


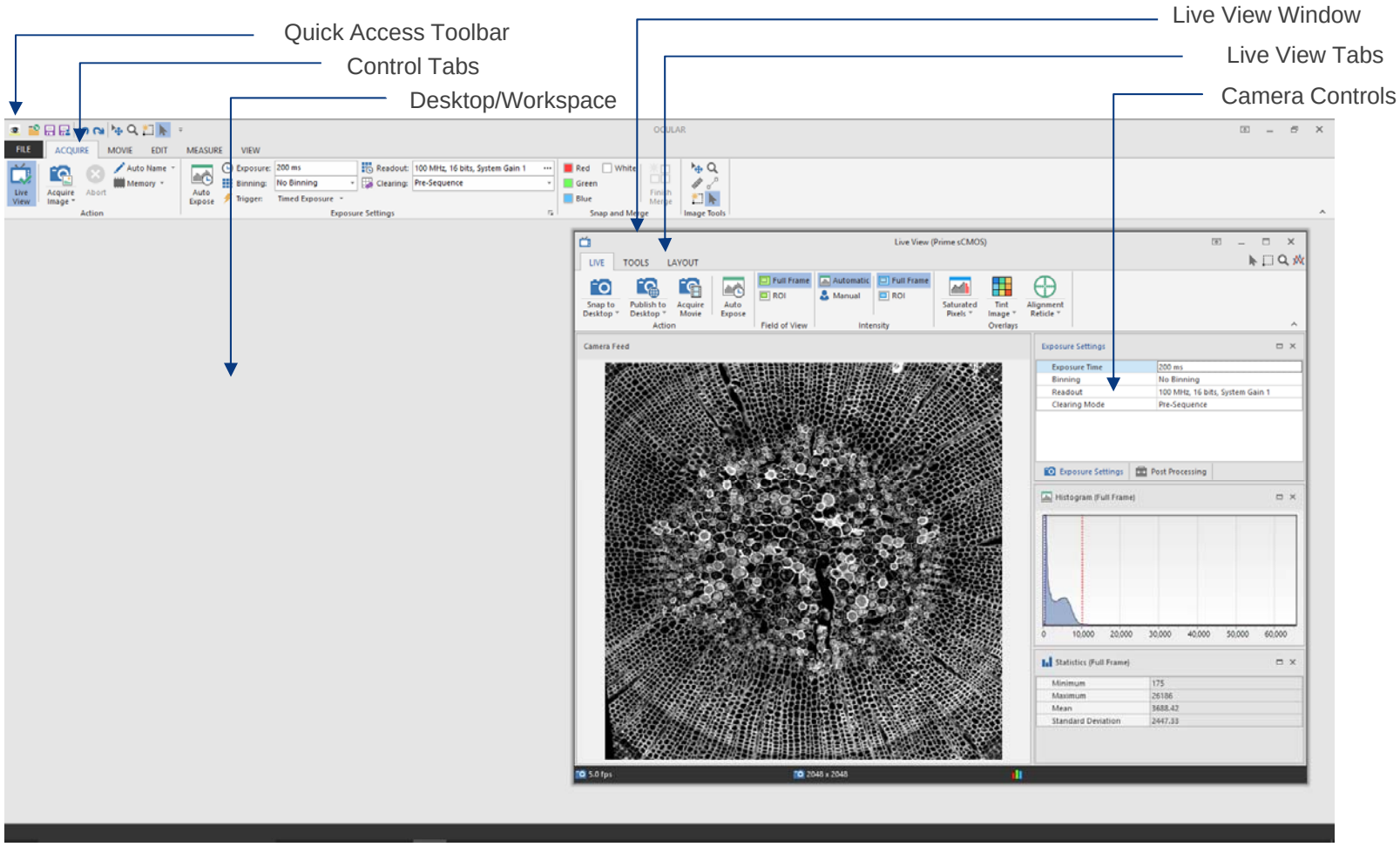
OCULAR®

Scientific Image Acquisition Software

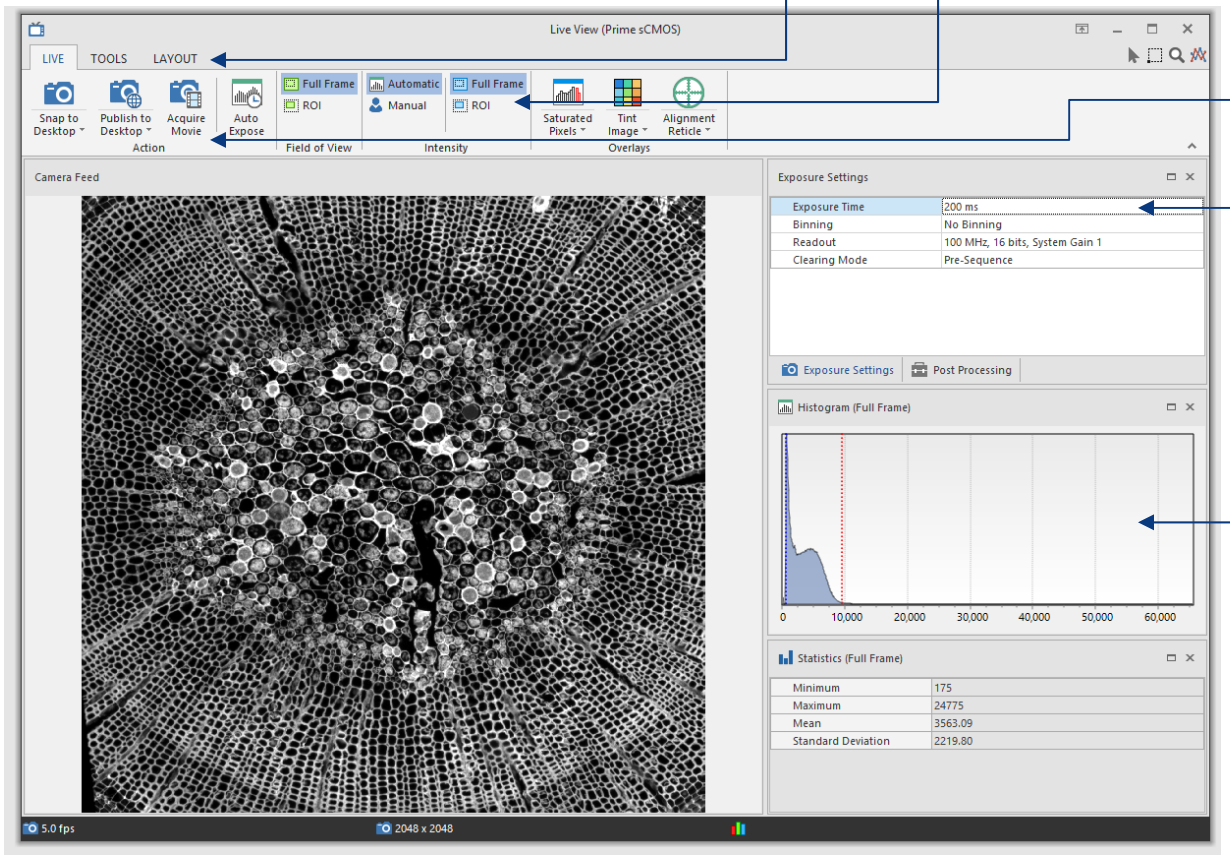
2.0 Quick Start Guide

Contents

Ocular Interface



Live View Window



Live View Tabs

Intensity/Image Scale Tools

Snap/Publish/Movie Tools

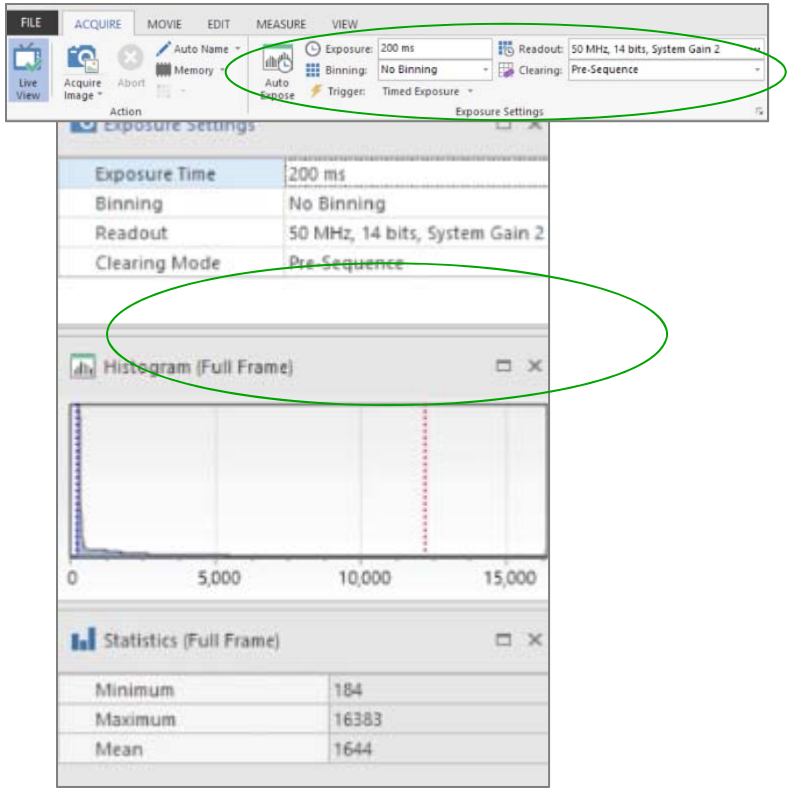
Exposure Control

Histogram Display

Frame Rate and Frame Size

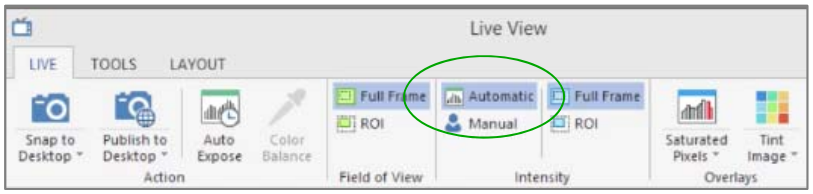
Exposure Settings

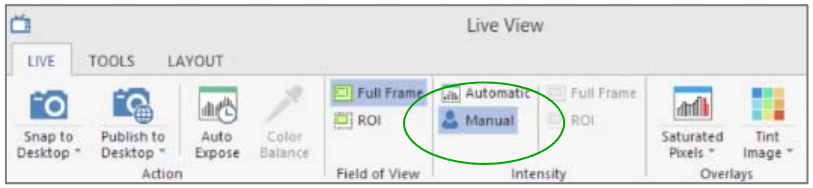
- **Exposure Time, Binning, Readout and Clearing Mode** can be set on either the **Acquire** or **Movie** tabs or directly from the **Live View** window.
- Parameters dynamically link between tabs and the **Live View**.
- **Ocular** sets **Binning** and **Readout** to the selected cameras default values.
- **Clearing Mode** is set to **Clear Pre-Sequence** by default, allowing for maximum frame rates.
- **Auto Exposure** exists as an option in both the **Live View** window and **Acquire/Movie** tabs.
- **Auto Exposure** is ideal for brightfield images but is not recommended for low light fluorescence studies.

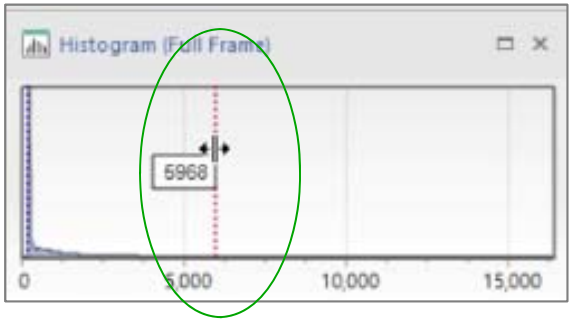


Intensity/Histogram Scale Settings

- Ocular sets the display scale to **”Best Fit”** to ensure the signal being recorded by the camera is scaled for the user to observe it.
- Best Fit Image display is on by default as indicated by the highlighted option **Automatic**.
- By left clicking on the histogram, the slider can be manually adjusted. This intervention automatically sets the Intensity measurement to **Manual**.
- To return to automatic intensity scaling simply reselect **Automatic**.

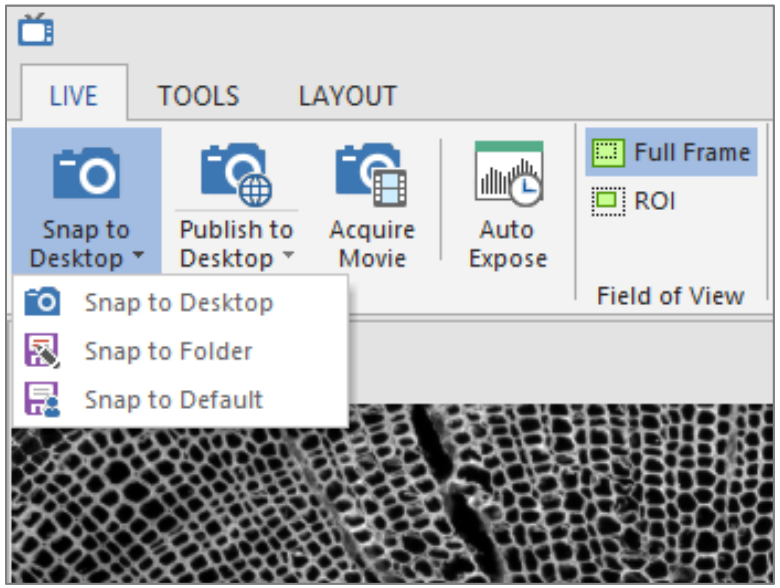






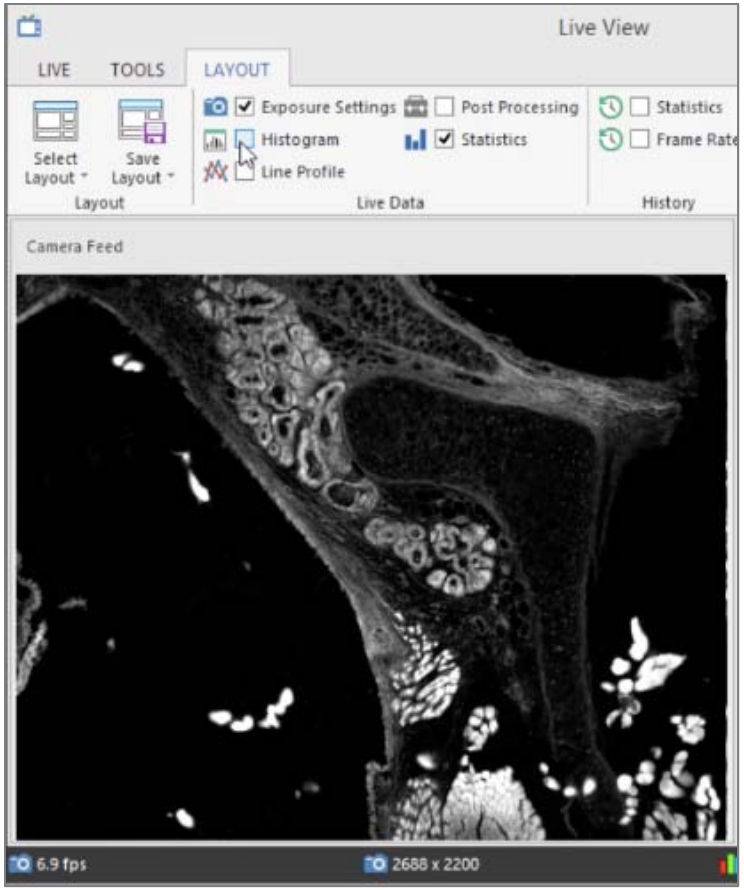
Snap or Publish

- **Snap** acquires a full bit depth image with the intensity scale set for display only.
- **Publish** acquires the image as a 24-bit image with the intensity scale set to reproduce the current display settings.
- Published images can be saved as compressed formats such as .JPEG.
- Users can **Snap** or **Publish** images to the Desktop or be prompted to save to a specific or default folder.



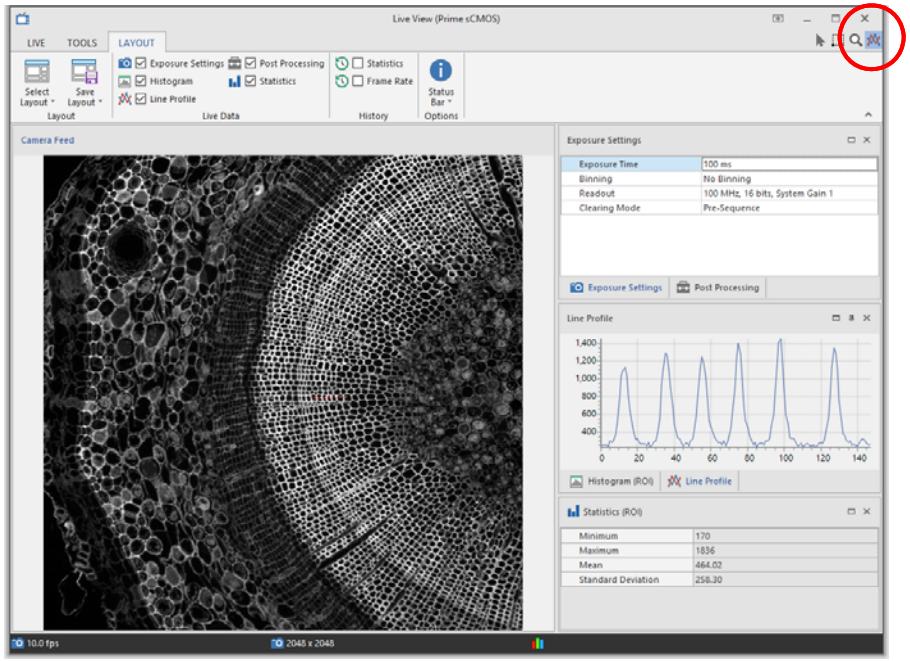
Customize Live View

- The location and view of all elements of the **Live View** window can be arranged or hidden as needed.
- Under the Layout tab users have the option to select and deselect components, such as histogram and statistics. This allows an increased area for the camera feed.
- Users can select and drag to alter the arrangements of the components.
- **Save Layout** and **Select Layout** saves and loads user preferences.
- At any stage the **Live View** window can be scaled to a user-defined size.



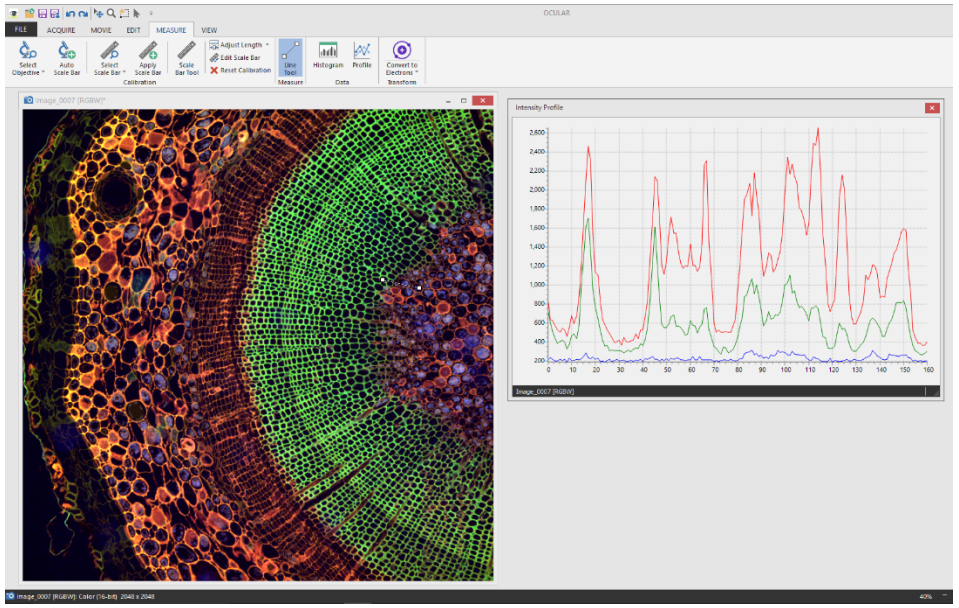
Live Line Profile

- Users can view a live line profile by making sure **Line Profile is** activated in the **Live Data** section of the **Layout** tab.
- Then a line can be drawn with the line tool in the top right corner of the Live View window.
- The line can be removed by clicking once anywhere on the image with the line tool.



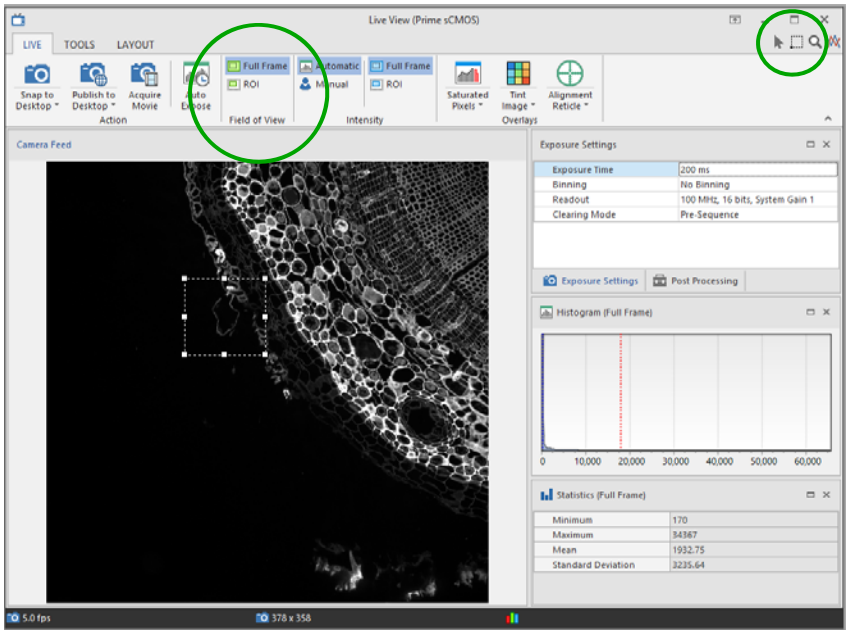
Post-Acquisition Line Profile

- On the Ocular desktop, a line profile can be drawn by selecting the **Line Tool** from the **Measure** tab.
- A line can now be drown on the image. (The distance measurement label can be removed by holding Ctrl and clicking the center of the label.)
- Next, select **Profile**.
- Multiple lines can be drawn by selecting the desired lines to display with the mouse pointer tool.



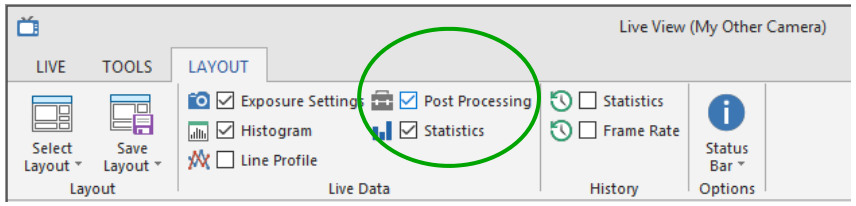
Region of Interest (ROI) Control

- ROI's can be selected from top right of the **Live View** window.
- Users can left click and drag a selected region onto the image.
- The image with the ROI can be viewed in place or by zooming in by selecting **Full Frame** or **ROI** from the **Field of View** options of the **Live View** window.
- The **ROI** can be deleted by highlighting it and selecting the **Delete** option on the keyboard.

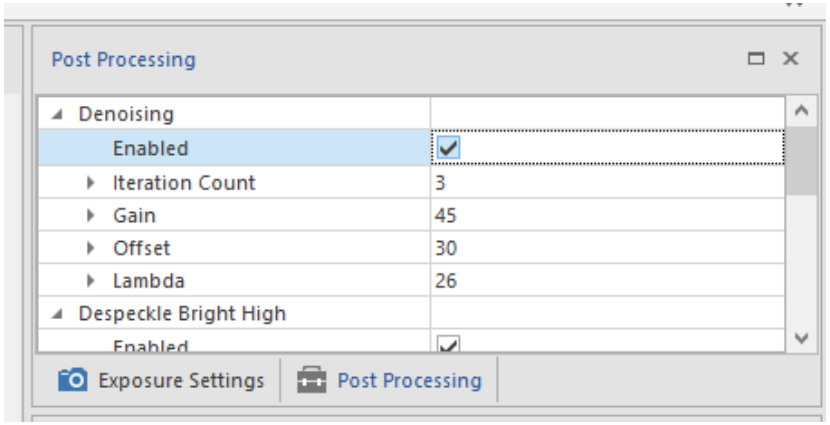


PrimeEnhance Denoising

- The **PrimeEnhance** denoising algorithm can be activated for compatible cameras by first activating the **Post Processing** options tab, via the Layout tab within the **Live View**.

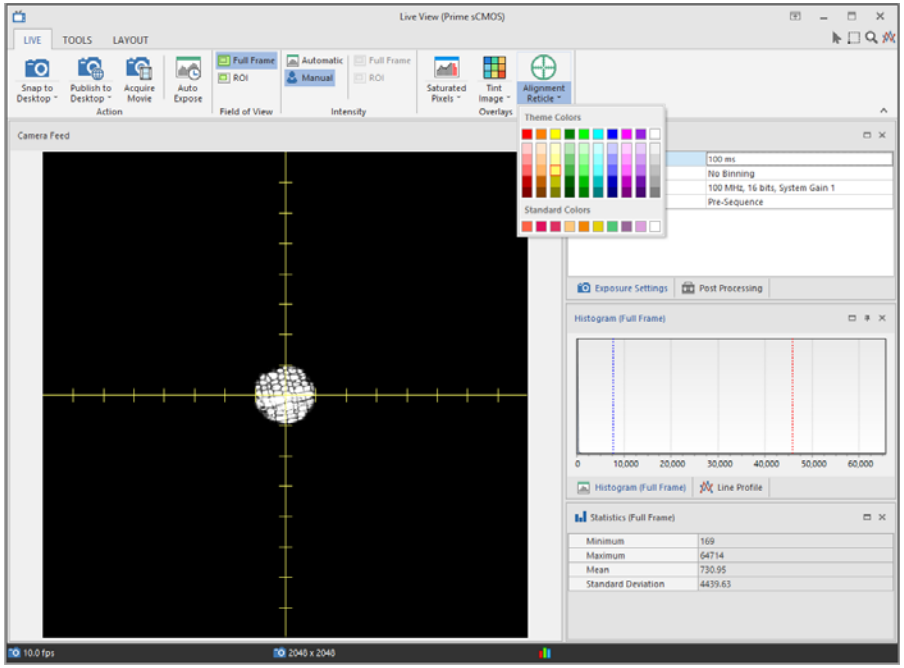


- Within the Post Processing Tab, Find Denoising → Enabled, and check the box.



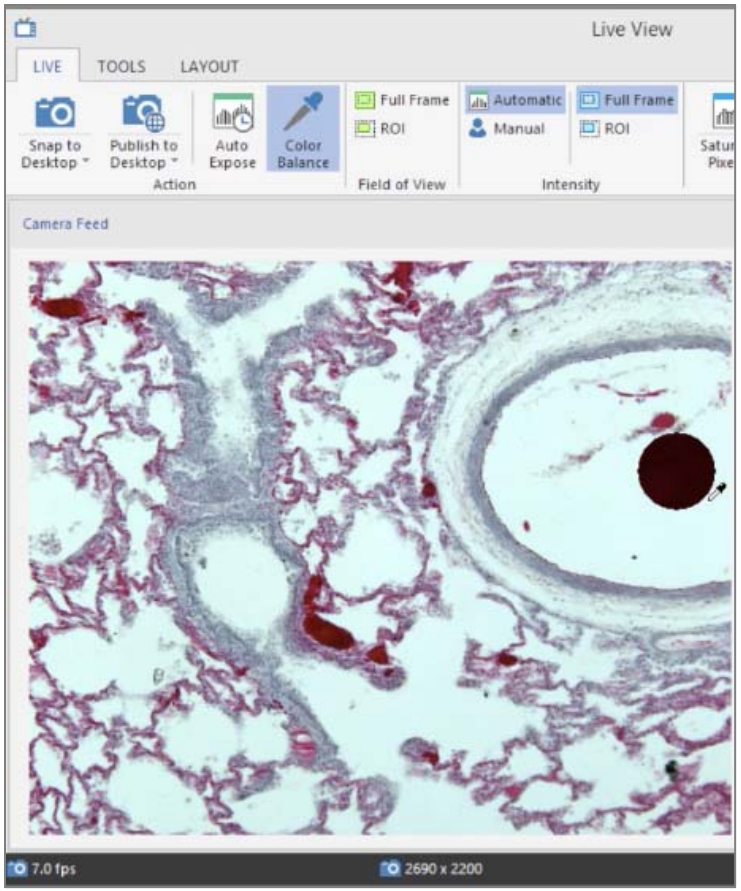
Alignment Reticle

- For some applications an alignment reticle can be very useful. For example this can aid alignment of apertures for Kohler illumination.
- This can be activated by choosing **Alignment Reticle** from the Live View window.
- Then, a color can be selected by clicking the drop-down arrow.



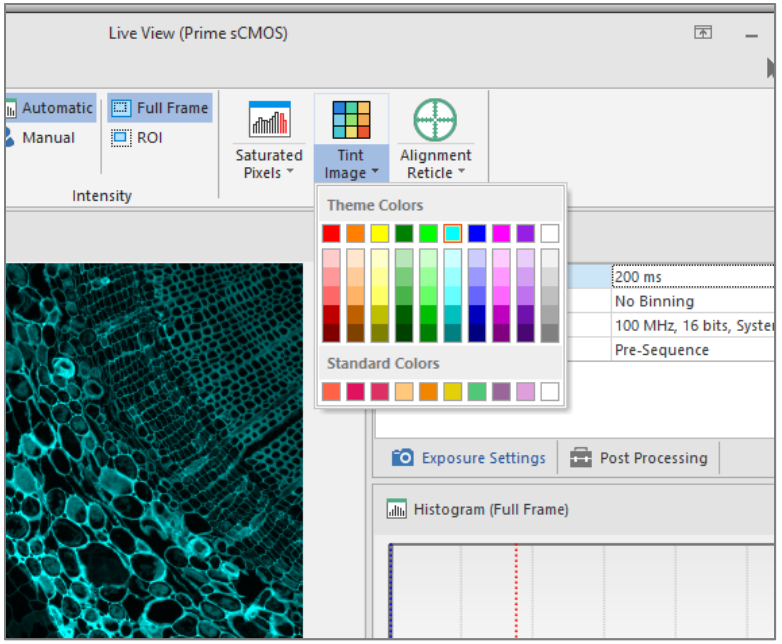
Color and White Balance

- The best color images can be captured by setting up the microscopes correctly for the user's eye.
- Selecting **Auto Exposure** ensures the camera is using it's bit-depth.
- Then **Color Balance** can be selected by left clicking and dragging over to the white area.
- Releasing the left click automatically white balances the image.



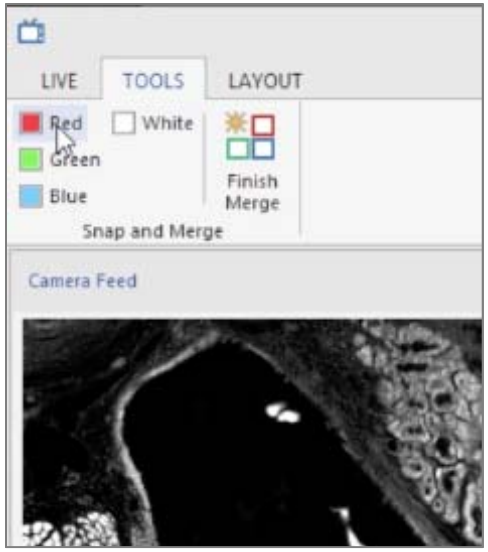
Live Tint

- Images can be matched with colors that are seen down the eye piece by selecting **Tint Image** from the **Live View** window.
- Select the color of choice from the palette.
- The image will now display live in the selected color and **Snap** or **Publish** can be used with the same color scheme.
- **NOTE:** The tint will only be visible outside Ocular if **Publish** is selected.



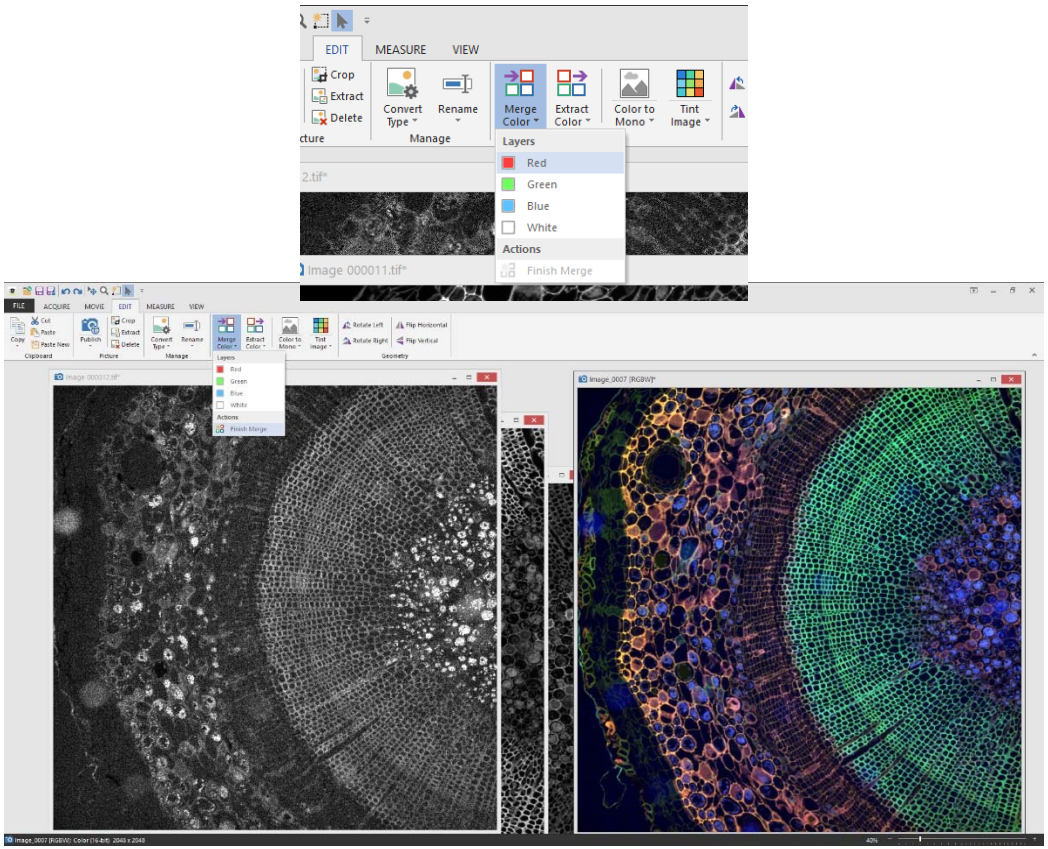
Tint and Merge

- The **Snap and Merge** tools are accessible from both the **Acquire** Tab and the **Live View** window in the **Tools** tab.
- Users can acquire an image into the workspace with the corresponding tint by selecting a color.
- The image is captured with the current histogram settings.
- Clicking a different color merges the new color into the initial image.
- Clicking on the same color updates the channel in the initial image.
- Selecting **Finish Merge** moves to the next acquisition.



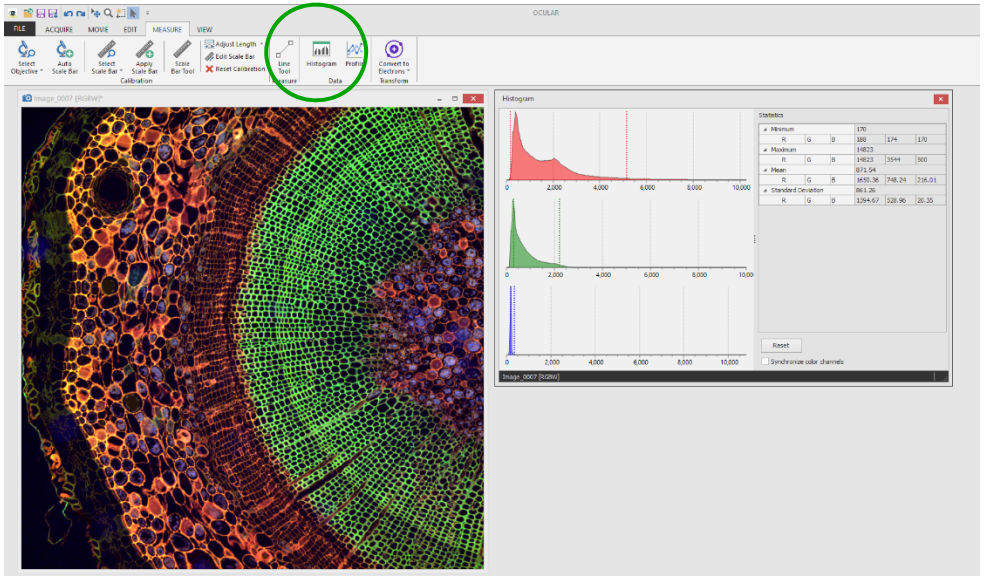
Post-Acquisition Tint and Merge

- The **Merge** tool for acquired images is available in the **Edit** tab of the Ocular desktop.
- For each channel of the multi-channel image, first select the monochrome image,
- Then select Merge Color → Red / Green / Blue / White.
- Once all desired channels have been added to the image, choose **Finish Merge**.



Histograms – Acquired Images

- View the histogram of an acquired image by selecting Measure, Histogram from the Ocular desktop.
- Adjust the display scaling for the image and view image statistics.
- If the image is color, histograms will be displayed for each color channel separately.
- These can be adjusted independently, by choosing ‘Synchronize color channels’ to adjust all three simultaneously.

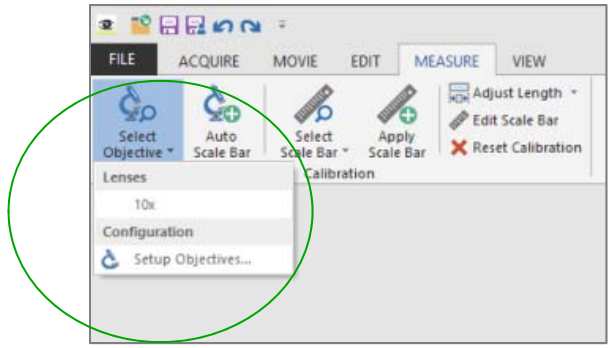


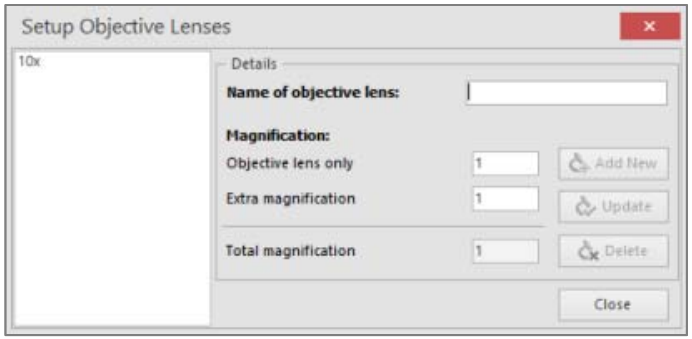
Calibrations – Set Up

- Before using marker bars, the **Setup Objectives** under the **Select Objectives** option on the **Measure** tab must be completed.

  1. Name the Objective
  2. Select the Magnification of the Objective
  3. Extra magnification refers to any other optics such as a c-mount coupler
  4. Select **Add New** to add it to the List

- Once completed, the Objective will appear in the list of Objectives on the left of this dialog and in the **Lens List** under the **Select Objectives**.



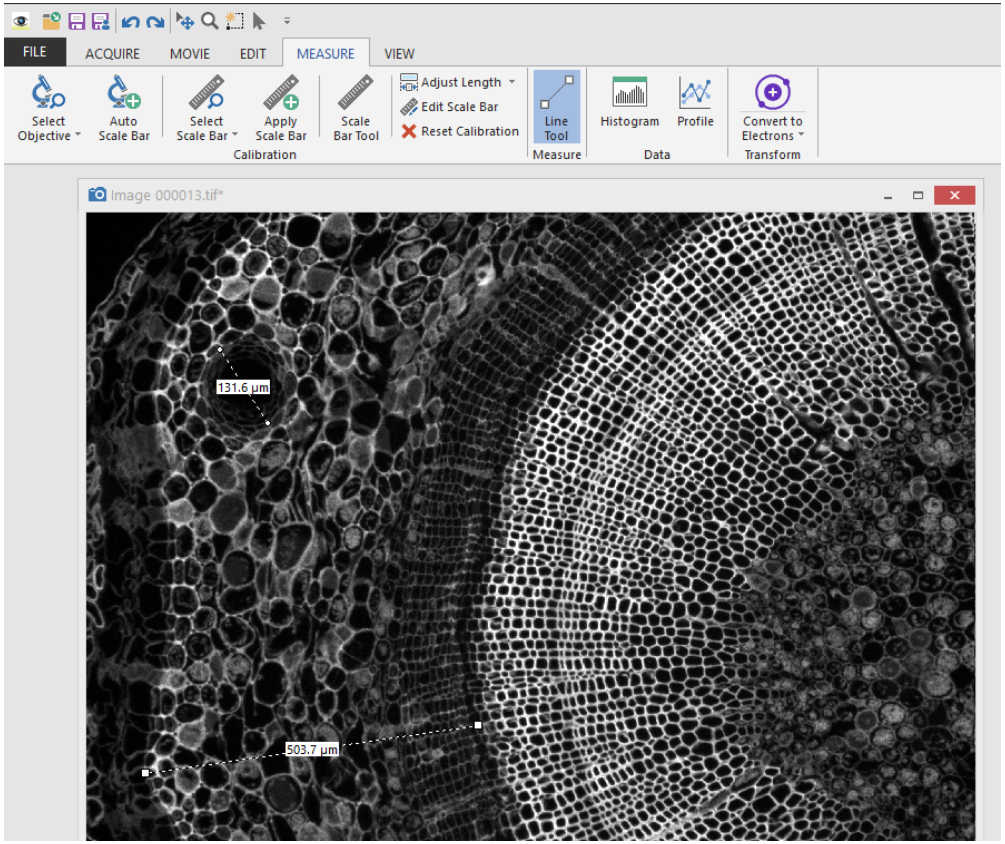


Calibrations – Auto Scale Bar

- Add an **Auto Scale Bar** by simply selecting the objective from **Select Objective** and the selecting Add **Auto Scale Bar**.
- This loads a scale bar to the bottom portion of the image.
- The scale bar will be 15% of the field of view in x.
- Length can be adjusted by selecting **Adjust Length** and entering a number.
- The image can be saved with the calibration by selecting the **Publish** option on the **Edit** Tab.

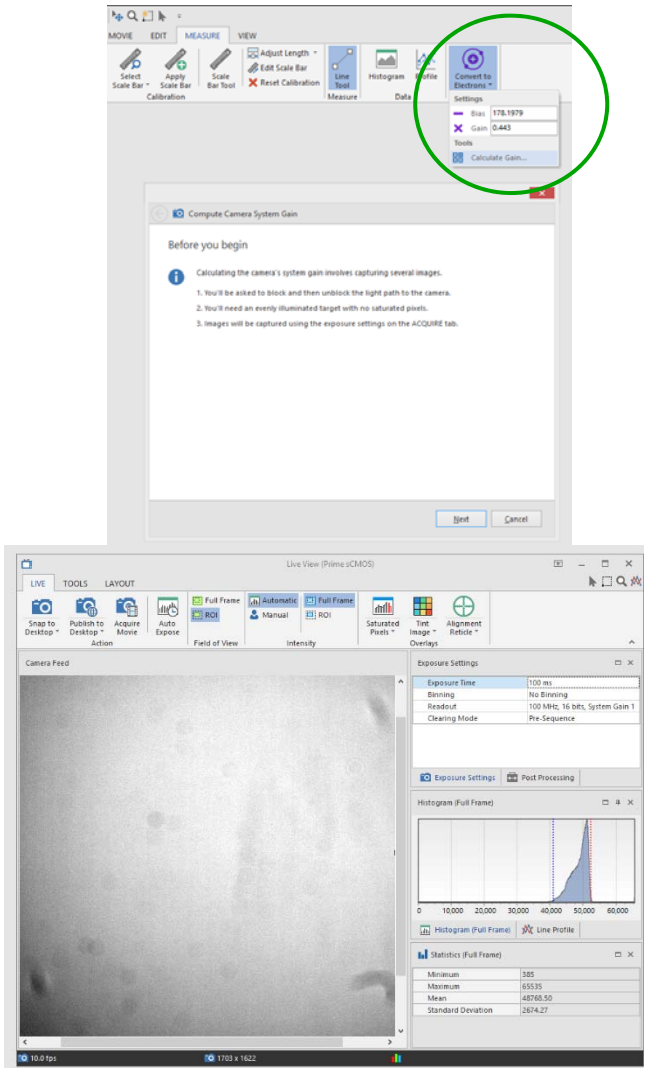
Measuring Distances

- A line can be drawn by selecting the **Line Tool** from the **Measure** tab.
- For a calibrated image, these distances will be displayed in the chosen units.
- If the image is not yet calibrated, distances will be measured in pixels.
- Drawn lines and measurements can be included in a published image by choosing Edit → Publish, or right clicking the image and choose 'Publish Image'.



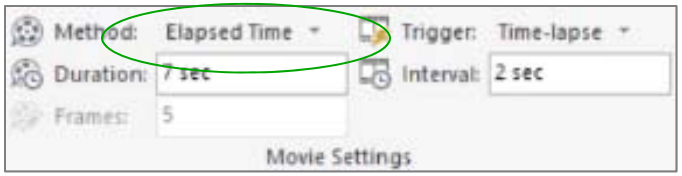
Conversion to Electron Units

- In many circumstances (such as calculating signal to noise) it can make sense to convert the display units from greyscales to photoelectrons.
- From the Ocular desktop, choose **Convert to Electrons** from the Measure tab.
- If you the camera Bias and Gain settings (such as from a supplied Certificate of Performance), these should be inserted.
- Running the **Calculate Gain Wizard** enables the ability to calculate bias and gain and provides further instructions.
- Note: At one stage, the users will be asked to take flatly illuminated image. A flatter image will yield a better result. An out-of-focus Brightfield illumination of a blank slide is recommended.



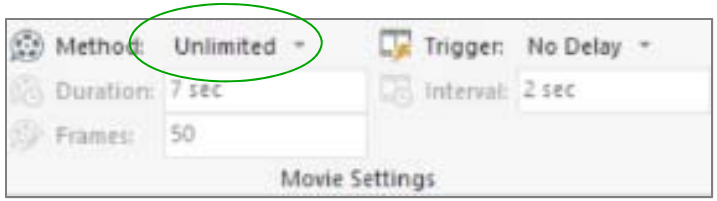
Movie Capture – Time-Lapse or No Delay

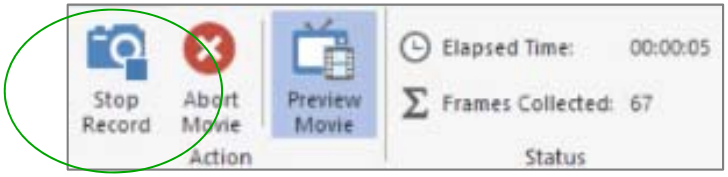
- Ocular allow users to quickly capture Time-lapse or No Delay (Streamed data) Movies.
- From the **Movie Menu** select the **"Trigger"** (time-lapse or no delay).
- From **Method** Select either **Elapsed Time** or **Frame Count.**
- For **Elapsed Time** enter a desired **Duration**.
- For **No Delay** enter a value for **Frames**.
- Movies can then be reviewed using simple re-play tools.



Start Stop Movies

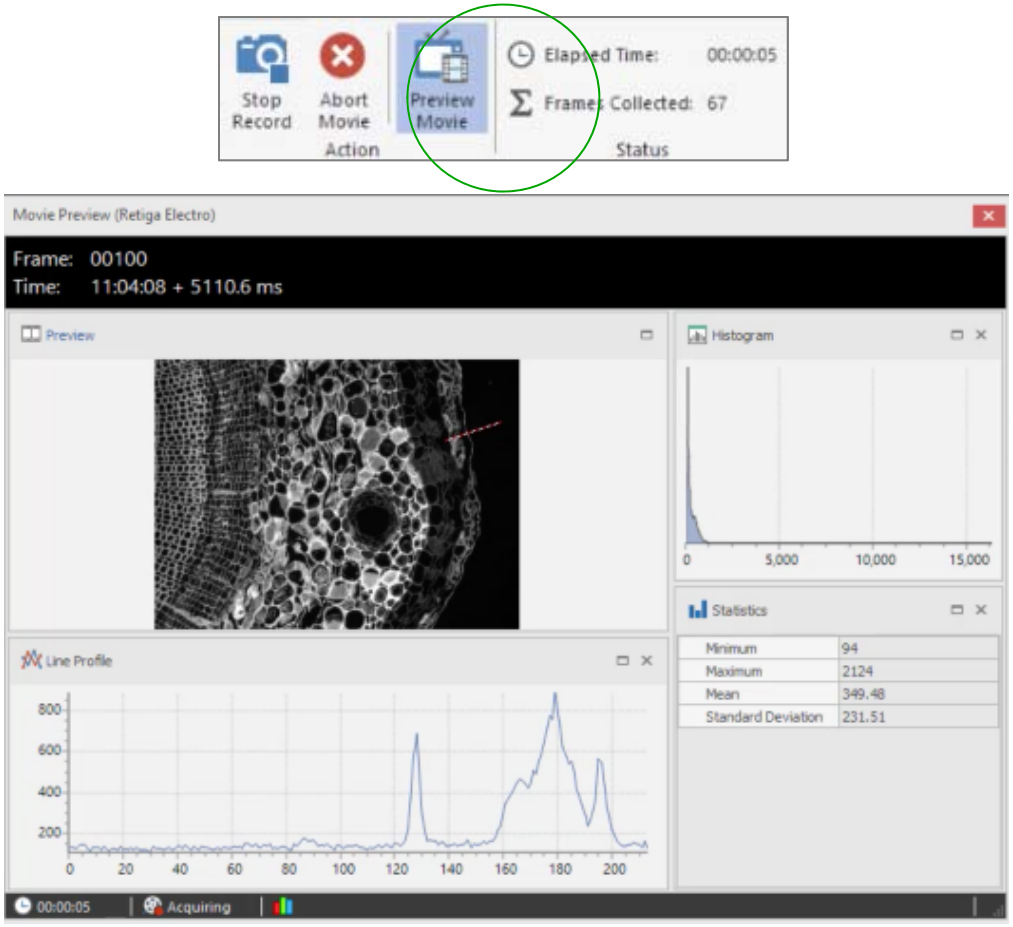
- If **Duration** or **Frames** of experiment is unknown, select **Unlimited** from **Method**.
- This allows the user to **Start Recording** and **Stop Recording** as needed.
- Both the **Elapsed Time** and **Frames Collected** are displayed in the Movies Menu during acquisition.





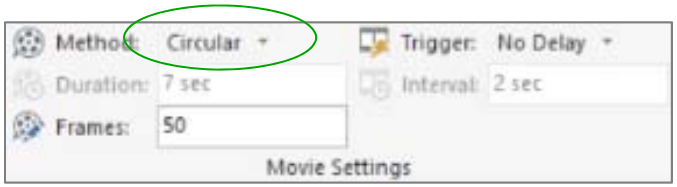
Movie Preview Window

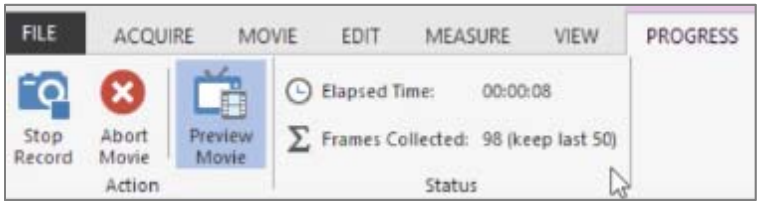
- To monitor experiments during a movie acquisition, the **Preview Mode** can be activated.
- **Preview Mode** can be selected once acquisition is started and will remain on until deactivated.
- **Preview Mode** initiates a second image display monitor which can be positioned as needed.
- New for 2.0: **Line profiles**, **statistics** and image **histograms** are also displayed.
- Note: Ocular's **Preview Mode** does not affect recording performance.



Circular Movies

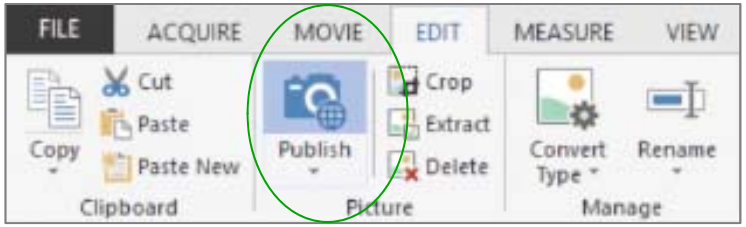
- **Circular Movies** allows users to capture a set number of frames before selecting **Stop Record**, enabling the ability to see the previous *X* number of frames.
- **Circular Movies** can be used by selecting it from the **Method** drop down menu.
- Select the number of frames to record – *X*.
- Start Recording and conduct the experiment by monitoring in the **Preview Movie Window**.
- When ready, select Stop Record and the resulting movie will be the last *X* frames.

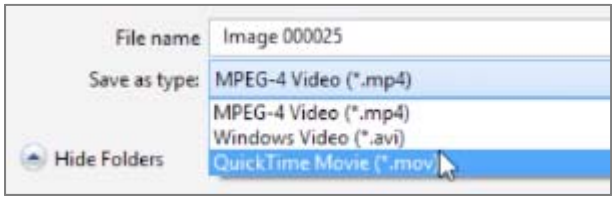




Saving Movies

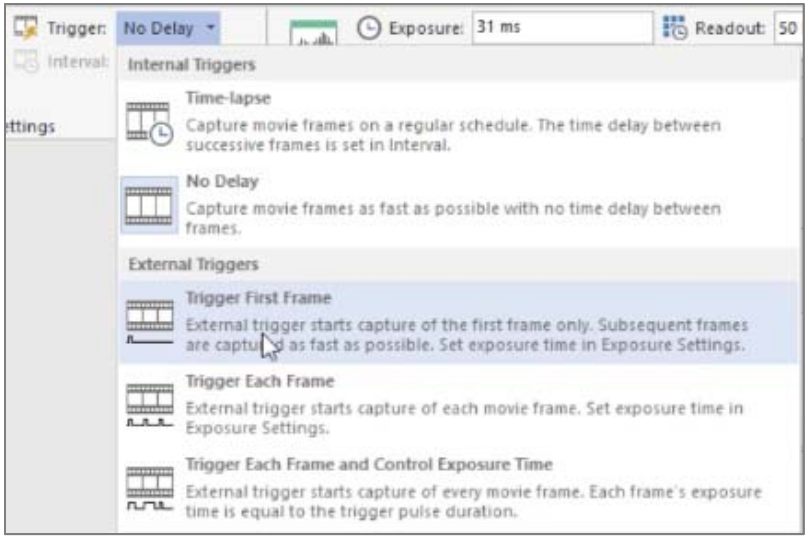
- Movies can be saved for analysis by selecting the **File Menu** or folder icon.
- Acquired movies can be saved in convenient formats such as MP4, AVI or MOV by selecting **Publish** from the **Edit File Menu**.
- Once selected the file is converted to a 24-bit color image, the user will be prompted to save the file in a user-defined format.





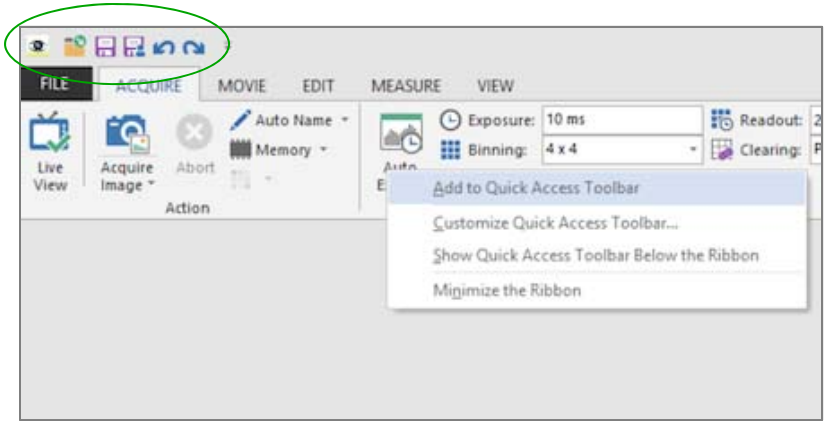
Triggered Movies

- **Triggers** refers to the initiator of an acquisition.
- **Internal Triggers** refers to software triggers that are sent to the camera to acquire a single image from a **Time-lapse** or by starting a **No Delay** movie.
- **External Triggers** refers to the triggers that are sent to the camera via the camera's trigger in-put.
- The software can be set to expect the triggers to start an acquisition of the **First Frame**, for **Each Frame** or to control the exposure through the input Trigger width.



Quick Access Toolbar

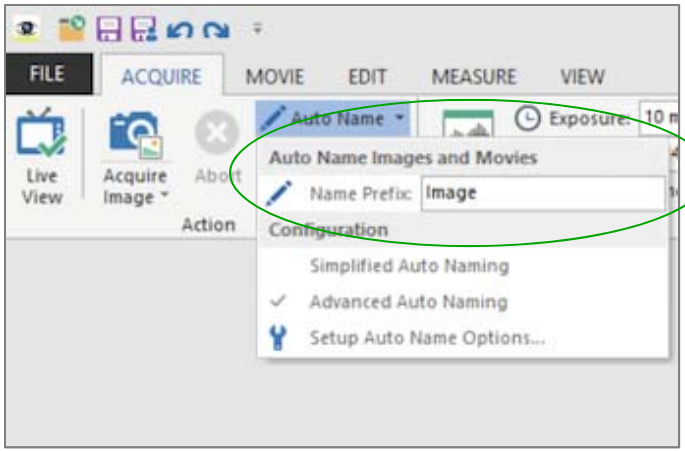
- To add workflow, tools can be added to the **Quick Access Toolbar** (highlighted).
- Tools can be added by right clicking on the tool and selecting **Add to Quick Access Toolbar**.
- Items can be removed from the **Quick Access Toolbar** by right clicking and selecting **Remove from Quick Access Toolbar**.



Auto Naming - Basic

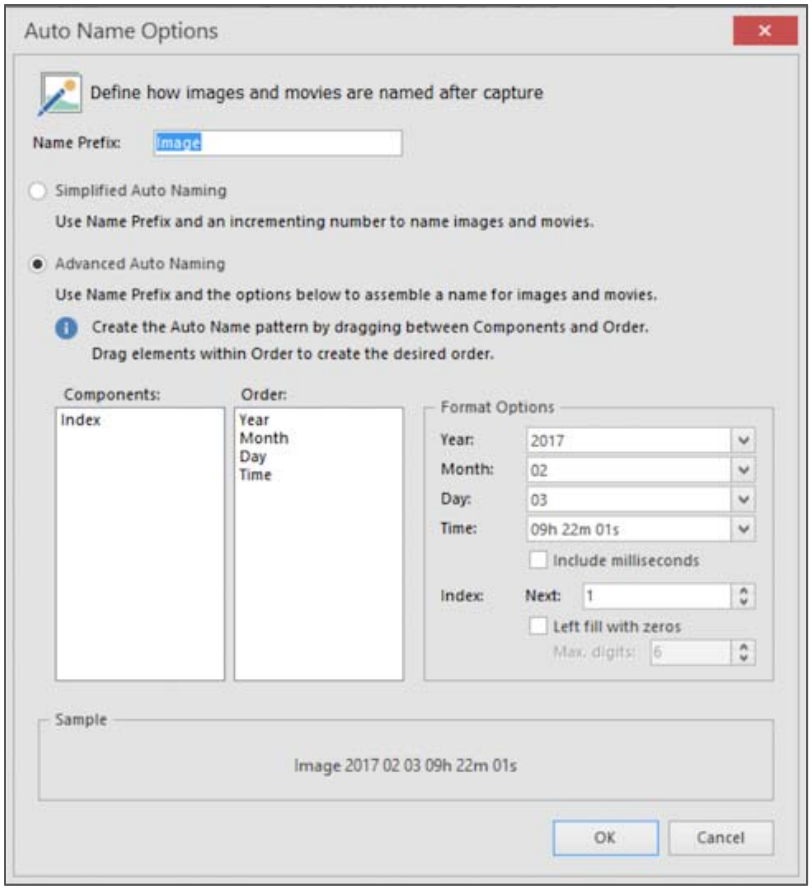
- **Ocular** uses a naming convention of “Imaging0000”. As images are acquired, they are given the name Image0000 which incrementally increases as more images are taken.

- By selecting **Auto Name** from the **Acquire** or **Movie** tab, users can enter a user-defined **Name Prefix**.



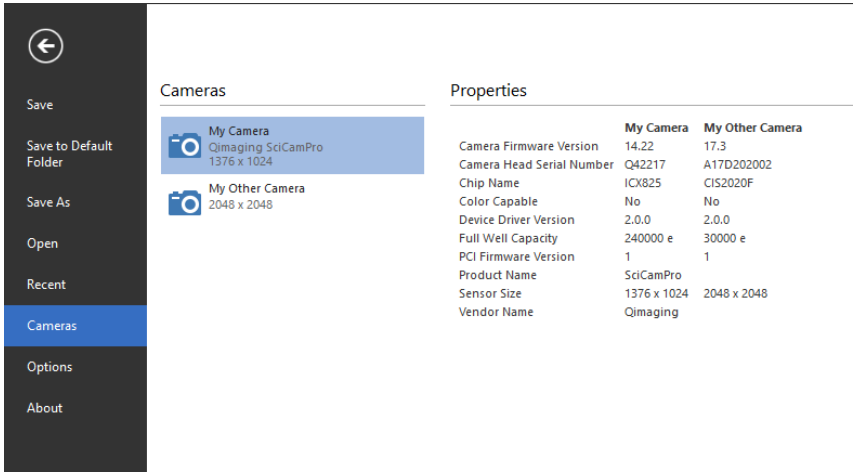
Auto Naming - Advanced

- More advanced auto naming options are available by selecting **Setup Auto Name Options**.
- To aid users who need a more advanced nomenclature, **Ocular** allows users to select parameters such as **Year, Month, Day** and **Time** that are added to the **Name Prefix**.
- Once selected all images will be acquired with the Prefix name, followed by the selected parameters.

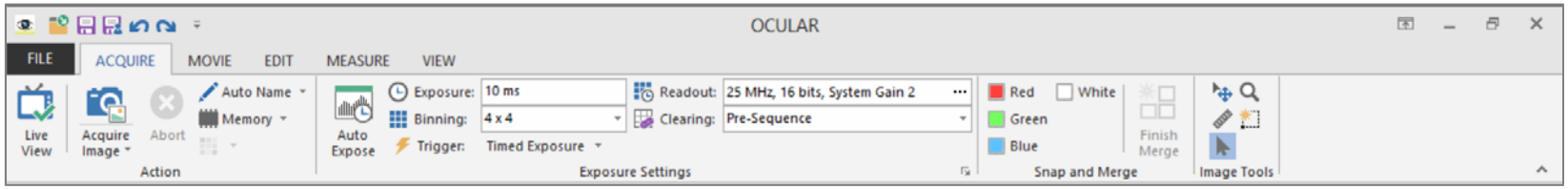


Selecting Between Available Cameras

- If multiple compatible cameras are running, users can choose between them via **File** → **Cameras**.
- All available cameras will be listed alongside some useful properties and information.

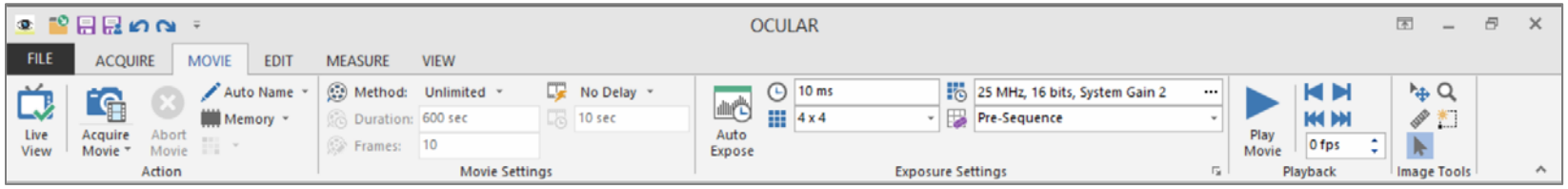


Acquire Tab



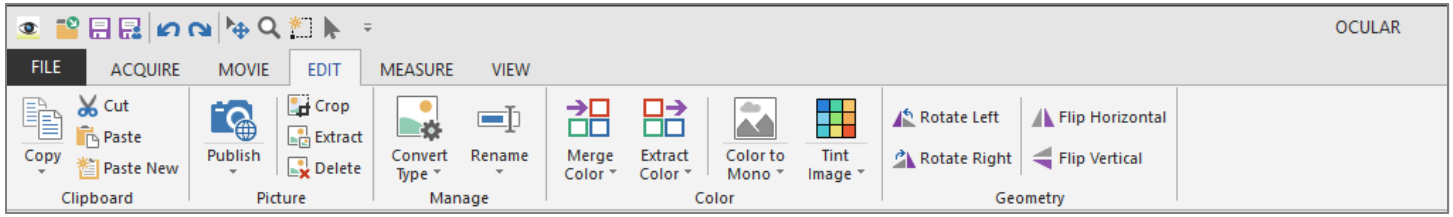
- **Live View** - Re-opens the **Live Window** if closed
- **Acquire Image** – Acquires an image into the workspace
- **Auto Name** – Allows a personalized image naming convention
- **Exposure Settings** – Replicates **Live View** tools
- **Snap and Merge** – Replicates **Live View** tools
- **Image Tools** – Zoom, Region, Scale and Select

Movie Tab



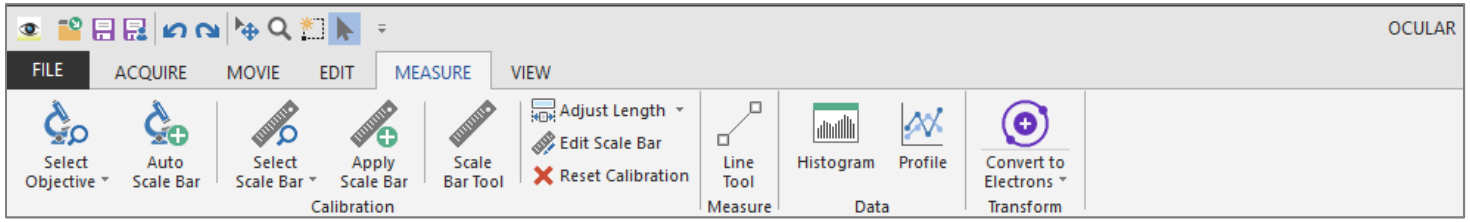
- **Live View** - Re-opens the **Live Window** if closed
- **Acquire Movie** – Acquires a movie into the workspace
- **Abort Movie**– Aborts the movie mid acquisition
- **Auto Name** – Allows a personalized image naming convention
- **Movie Settings** – Controls parameter settings for movie acquisition
- **Exposure Settings** – Replicates **Live View** tools
- **Playback** – Basic navigation tools

Edit Tab



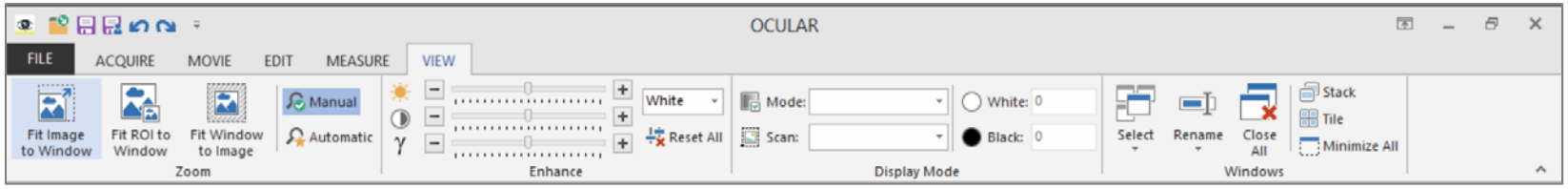
- **Clipboard –** Cut/Copy/Paste images or regions
- **Picture – Publish** – Converts an image to a 24-bit color image
- **Picture – Crop/Extract/Delete** – Basic cropping tools
- **Manage – Convert** – Allows conversion to differing bit-depths
- **Manage – Rename** – Allows image to be re-named pre-save
- **Color – Merge Color** – Merge multiple greyscale images into a single multi-color image
- **Color – Extract Color** – Allows for Red/Green/Blue images to be extracted
- **Colour – Color to Mono –** Converts color images to monochrome
- **Colour – Tint Image –** Replicates **Live View** tools
- **Geometry – Rotate & Flip** – Correct image orientation & mirroring

Measure Tab



- **Select Objective** – Allows users to select preselected Objectives or create new ones
- **Auto Scale Bar** – Places a Toolbar on the image, (20% of the image width) and applies calibration settings.
- **Select Scale Bar** – Allows users to select or setup dedicated Scale Bars width
- **Apply Scale Bar –** Applies to the selected Scale Bar
- **Adjust Length** – Allows users to adjust the length of the **Auto Scale Bar**
- **Edit Scale Bar** – Allows users to **Edit Scale Bar** (length/position etc.)
- **Reset Calibration** – Removes **Calibration** from the image
- **Line Tool** – Draw a line on the image to measure distance or plot a **line profile.**
- **Histogram** – View and adjust the histogram for the image
- **Profile** – Display a line profile for selected line (drawn with the Line Tool)
- **Convert to Electrons –** Display brightness in units of electrons measured in each pixel

View Tab



- **Zoom Fit** – Allows users to select different auto fit/zoom preferences
- **Zoom Manual** – Allows users to zoom as needed with no override
- **Zoom Automatic** – Sets display to one image pixel to one screen pixel
- **Enhance** – Post Acquisition Brightness/Contrast and Gamma tools
- **Display Range** – Allows users to adjust display range of acquired images
- **Windows** – Allows users differing lay-out styles for multiple images in a workspace and **Close All** tool.

Contact Photometrics for Additional Information

OCULAR®
Scientific Image Acquisition Software

www.photometrics.com/ocular
info@photometrics.com