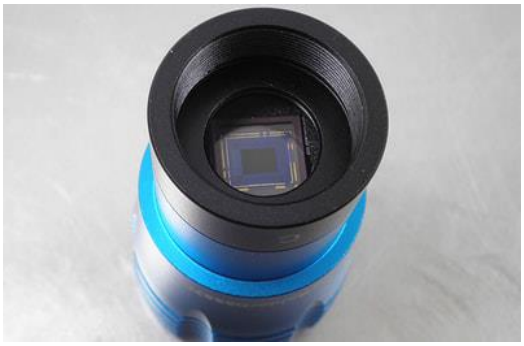
[Version 3.4]
Michael Burns
Rock Mallin



Revision History

[SkyRaider DS287 User Manual]

This document will quickly introduce you to the wonders of the MallinCam SkyRaider DS287 Camera. It will include instructions on how to install the Software and Drivers and how connect the SkyRaider to your computer along with explanations of the camera's major settings. The purpose of this guide is to quickly get you up and running with the SkyRaider Camera so that you can image.

Version	Date	Revision Description
3.4	08/18/2018	Template Creation

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1. Introduction

MallinCam bring you a new addition to the SkyRaider Video Camera series.

There are few things in life where one must "see it to believe it". The New MallinCam DS287 is one of them. Never has an astronomical camera had so much sensitivity that instant, live views could be achieved. MallinCam designed and is producing an astronomical camera that achieves this goal. The new Sony IMX287, industrial CMOS sensor has been introduced by them to dominate the market of high sensitivity low noise, high signal to noise ration sensors. The camera has been designed around this sensor to offer unmatched sensitivity at a reasonable price.

The New MallinCam SkyRaider DS287c/m is perfect for outreach programs at schools, colleges, universities, planetariums, museums, astronomy clubs or for the ultimate in live, personal observing. The camera comes with MallincamSky software, which allows live stacking (either averaged or additive), dark field and flat field application, gain adjustment and much more for fine tuning the image seen on the computer screen. This allows the camera to perform with stunning sensitivity with very short exposures. The results are hard to believe until seen live on the screen.

The MallinCam SkyRaider DS287 is the most sensitive guider camera ever created. All components are industrial Grade 1 throughout the circuitry and the IMX287 CMOS Industrial sensor is also Class 1. Included with the camera are a 1.25" eyepiece adapter, 2-meter (78") guiding cable, and a premium 5 meters (16.4') USB3 heavy duty cable. Frame rate is 525+/- FPS (frames per seconds), making the SkyRaider DS287 the ultimate Planetary, Lunar, Solar (with proper solar filtration) and deep sky camera available. Be ready to be impressed - it's a MallinCam, the pioneer in live video astronomy.

A great galaxy hunting camera - ideal for super nova search!

The MallinCam SkyRaider DS287c comes full equipped with a 5-meter (15 feet) USB3 high grade cable, 1.25" eyepiece c-mount, guiding cable. Software is available to download from the MallinCam website.

Special thanks to **Jack Huerkamp** and **Rock Mallin** whose expertise and experience are way beyond my capabilities.

So, thank you for your purchase, and let the adventure begin.

The Contents of the SkyRaider-DS287 Package

Specifications:

- PC Win XP, Win7, Win 8, Win 10. Mac.
- Support and includes Full Trigger Mode
- Aircraft aluminum construction
- Stainless steel hardware
- Heavy Duty Heat sink for effective heat dissipation
- Cold finger contact to the rear of the sensor to the heat sink
- Latest Technology throughout
- C mount
- Industrial Sony CMOS sensor, IMX287 Series, class 1
- 0.4 MP
- 6.9 x 6.9 micron pixel size
- 1/3" (4.97 x 3.73)
- 720 x 540 resolution
- QE 95%+ (tested at 96.2%)
- 525+ FPS (frame per seconds @ 0.100ms exposure, USB3.0 connectivity)
- Noise figure: 1.2e
- Adjustable gain
- Digital Binning , 1x1, 2x2, 3x3 , 4x4
- Live stacking, averaged, or additive, selectable
- Frame alignment on the fly - ideal for ALT-AZ mounted motorized telescopes
- Live Histogram adjustment
- Built-in temperature monitor of the CMOS sensor
- Sharpness feature
- 4584mv @ 1/30s for the color model DS287c
- 7469mv @ 1/30s for the mono model DS287m
- Exposure from 0.100ms to 16 minutes 40 seconds.
- And a whole lot more

System Requirements:

- Equal to Intel Core2 2.8GHz or Higher
- Memory: 4GB or More
- USB port: USB 3.0 Port (will operate on USB 2.0, but a slower through-put)
- Display: 15" or Larger Recommended

In the Box

The SkyRaider DS287 includes the following standard equipment:

- MALLINCAM SkyRaider-DS287 Camera
- 5 meters (15 feet) premium Heavy Duty USB3.0 cable
- Threaded 1.25" eyepiece adapter
- C mount
- 2 meters (6.5 feet) Telescope Guiding Cable

Note

Software and **Drivers** can be down-loaded at the **Software Downloads** Window located in the **Support Tab** at **www.mallincam.net**

2. Installing Driver and Software

System Requirements

PC running either Windows ® (32-bit & 64-bit) XP, Vista, 7, 8, 8.1, 10, Mac, Linux

Performance is not guaranteed if the following specification cannot be reached.

- DirectX 9.0 or later installed
- 2.8GHz processor (Recommend dual core 2.8GHz or more)
- USB 3.0 Port
- 2GB RAM (Recommend 4GB or more)
- 200MB Free HDD

Installing the Software

Step 1

Visit the Software Downloads Page in the Support Tab located on the website: www.mallincam.net

Step 2

Select the Blue **Click Here** Button to download the Drivers and MallincamSky Software for a Windows PC (there is a **Click Here** that contains a non-stacking version along with ASCOM drivers).

Note

If you have a Mac, or Linux computer, just choose the appropriate download form the download page. The following instruction will represent a Windows Computer.

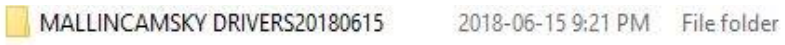
Note

Make sure that the SkyRaider DS287 is **not plugged** into the computer.

Step 3

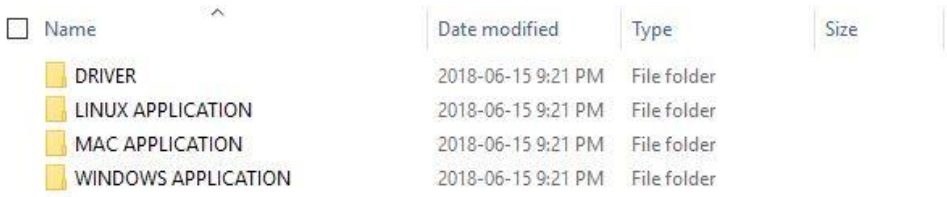
Place your mouse on the zipped file, **Right-Click** to pop-up an **Action Window**, and choose **Extract All …**

Just **Click** on the **Extract** button, when the next Window pops-up. Windows should now open up the actual folder that contains the software to install.



Step 4

Un-Zip the folder, then **Double-Click** on it to open it up, revealing the 4 programs it contains (or 1 program if just downloading MallincamSky).



The **DRIVER** folder contains the **ASCOM** and **Direct Show Drivers** for the camera
The **WINDOWS APPLICATION** folder contains the camera control software.

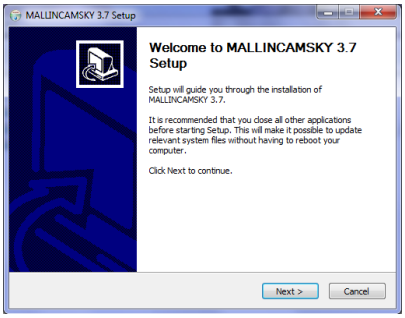
Step 5

Double-Click on the **WINDOWS APPLICATION** folder to open it up, and then **Double-Click** on the **MALLINCAMSKYSetup** file and then follow the instructions to install the **MallincamSKy** software and drivers onto your computer:

Note

You may need to give your Windows computer permission to run the installation programs.

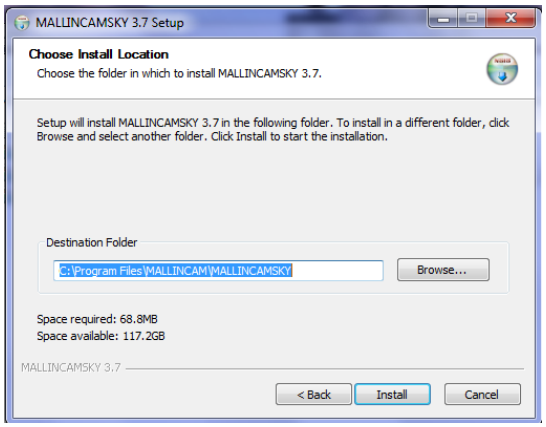
The following **MallincamSky Setup Screen** will then appear:



Step 6

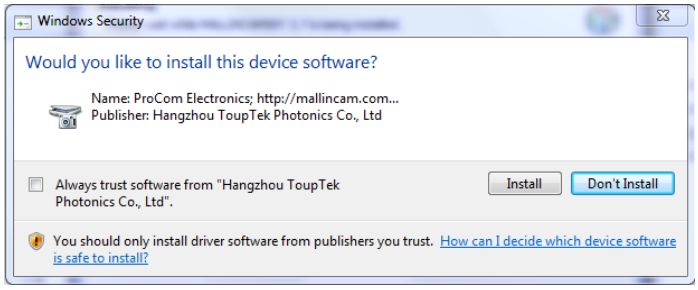
Click on **Next** to start the installation process.

The installation program now wants to know where you would like to install the software. Either choose your own location or select the **default**.



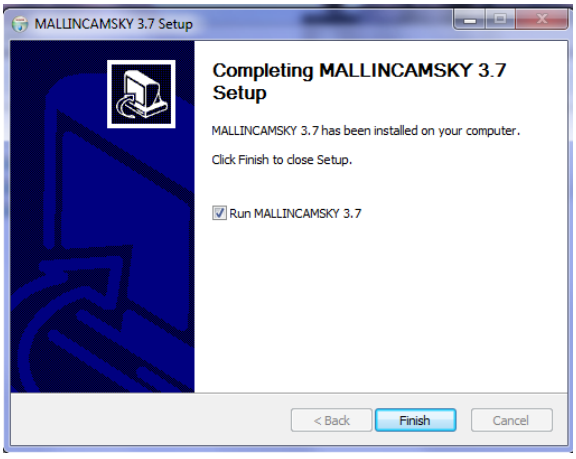
Step 7 Click on **Install** to proceed.

Windows **may again** ask for permission to install the device software.



Step 8 Click on **Install** to accept.

The **MallincamSky Software** will take about a minute to be installed. When completed, the following screen will appear:

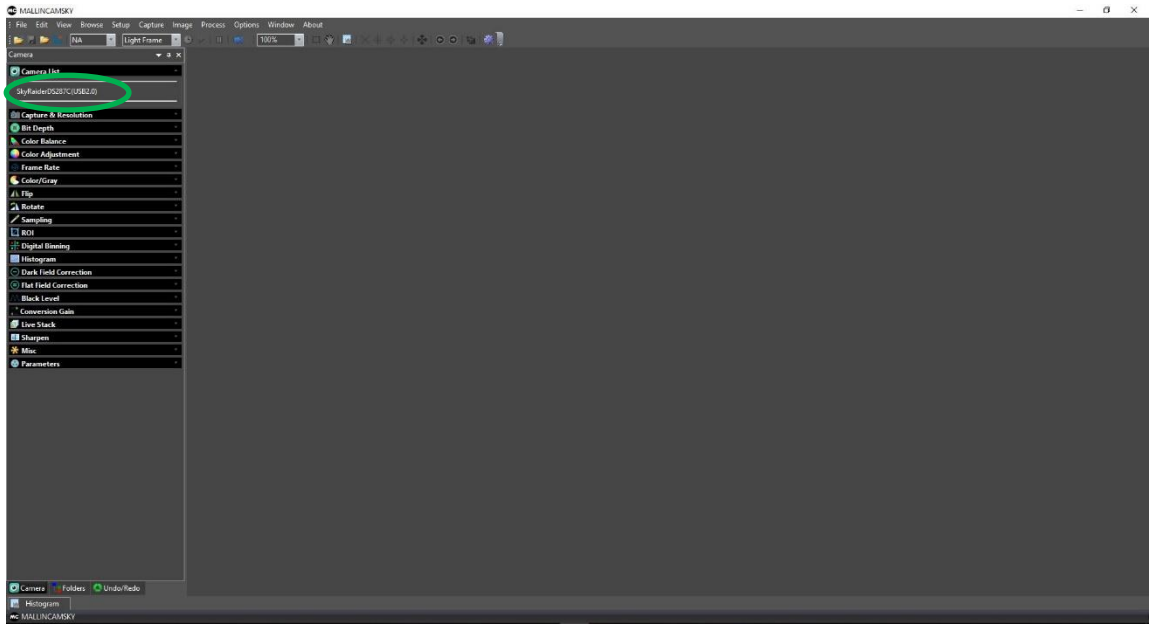


Step 9 Click on **Finish**, and the **MallincamSky** will start and will appear on your screen.

Now you can plug in the SkyRaider DS287 into your computer (see the next Chapter called "***Connecting the SkyRaider***" for more details). It will take a moment for **Windows** to attach the drivers to the port, then you are ready to start imaging.

Hint

You can determine if MallincamSky recognizes the camera (and thus the drivers) by noticing the **SkyRaiderDS287C** name in the **Camera List** Tab (see **Chapter 3** for detailed instructions). If by chance you are running the SkyRaiderDS287 on a USB 2.0 cable, you will see the name as: **SkyRaiderDS287C (2.0).**



Step 10

Optionally (see **Installing the ASCOM Driver** in **Section 7** for more in-depth details), **Double-Click** on **ASCOM DRIVER** folder, then **Double-Click** on the **ASCOMMallincamSetup** and **ASCOMMallinST4Setup** programs and follow instructions to install the ASCOM driver.

Step 11

Optionally, (see **Installing the DIRECTSHOW Driver** in **Section 7**for more in-depth details), **Double-Click** on the **DIRECTSHOW DRIVER** Folder to open it up, then **Double-Click** on the **MALLINCAMDshowSetup** program and follow instruction to install the **Directshow** drivers onto your computer.

Windows may display a warning asking for permission to run the program, if it does, select **YES.**

3. Connecting the SkyRaider

Connecting the SkyRaider-DS287 to your Computer

Remove the rubber dust cover from the front of the SkyRaider-DS287 camera (place it back in the box for safe keeping).

Screw in the 2" adapter to the front of the SkyRaider-DS287.

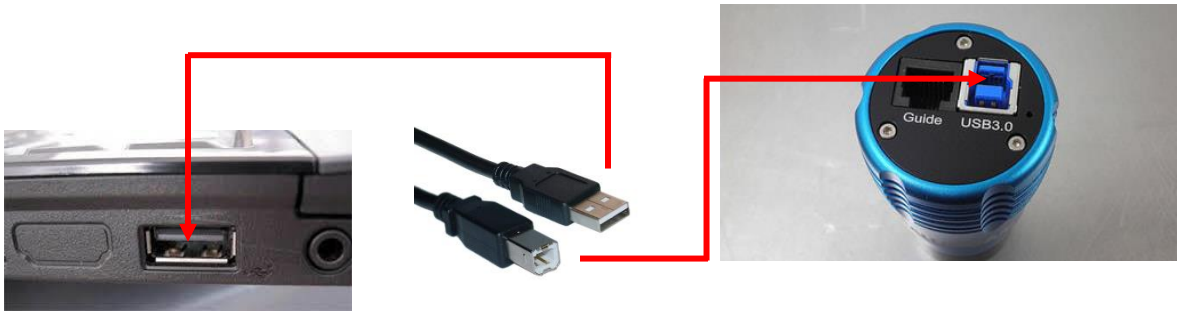
Insert the SkyRaider-DS287 (with 2" Adapter attached) into a 2" eyepiece adapter on your Telescope.

Depending upon the telescope, you may need extenders so that you can reach focus with your telescope. It is recommended that you set this up in the daytime, so you can see what you are doing (plus can aim at an easy to find tree or telephone pole).

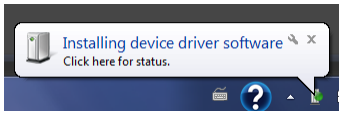
Attach the 5 metre USB 3.0 Cable from the back of the SkyRaider DS287 to a free USB 3.0 (or USB 2.0) port on your computer.

Hint

The SkyRaider DS287 has some strict power and thru-put requirements, and not all computers are created equal. If you find you are having difficulties with the following steps, it maybe the USB 3.0 port on your computer. If that is the case, one option to try is; connected a Powered USB 3.0 Hub to your USB 3.0 port on your computer. This simple step can improve, both thru-put, power and distance between your computer and the SkyRaider DS287 camera.



Windows will then automatically load the correct **SkyRaider Camera Driver** onto your computer.



Once the driver has been successfully loaded, you will see the name of the **SkyRaiderDS287 Camera** in the **MallincamSky Camera List** on the upper left of the Window. You can install more than one SkyRaider Camera to your computer, but the software can only control one SkyRaider Camera at a time.

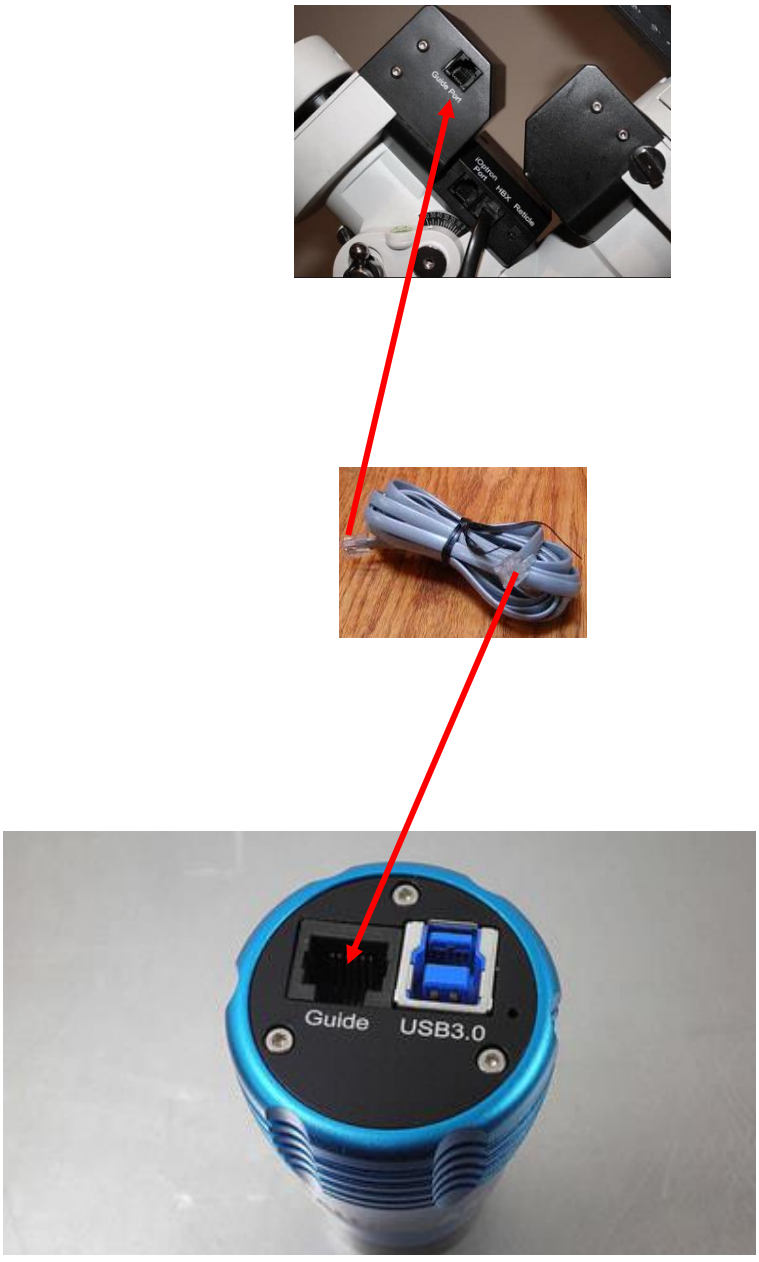
Note

If you notice that the **SkyRaiderDS287** has a **(USB2.0)** behind it, then you are either using a USB 2.0 port, or the distance is too great for the USB 3.0 cable, and the system has entered USB 2.0 speeds.

Connecting AutoGuider Cable to the SkyRaider-DS287

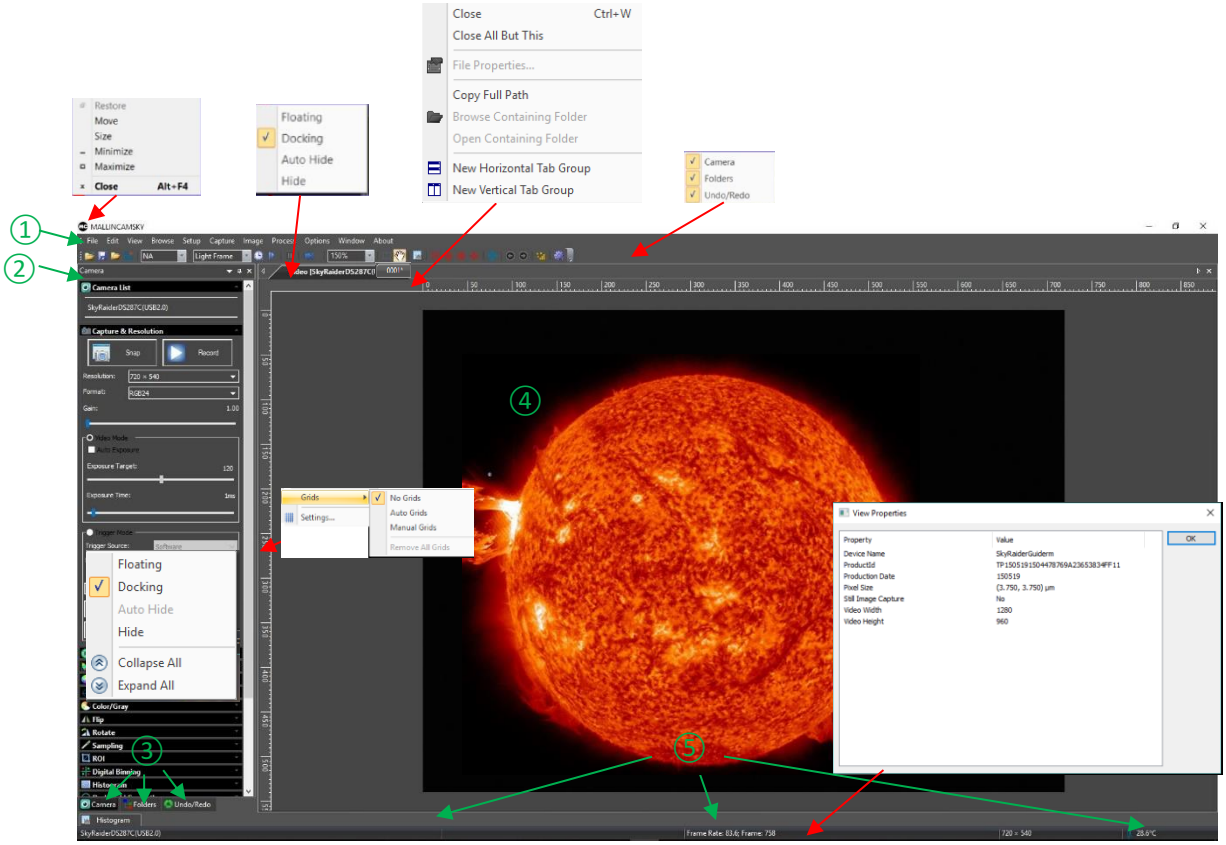
If you are going to use your SkyRaider DS287 as an Autoguider, then you will need to attach the provided ST4 cable.

Attach one end of the **ST4** cable into the **ST4** slot on the back of the **SkyRaider-DS287**, and the other end into the **ST4** port on your Telescope Mount.



4. Using MallincamSky Software

The MallincamSky Window



The **MallincamSky Software Window** is segmented into a few regions to make viewing and adjusting the SkyRaider camera easy and intuitive.

① The **Top Menu Line** provides dropdown menus and icons to allow you to make major settings of the software

② The **MallincamSky Left SideBar** provides the simple click activation and selection capabilities to control all aspects of the image and camera.

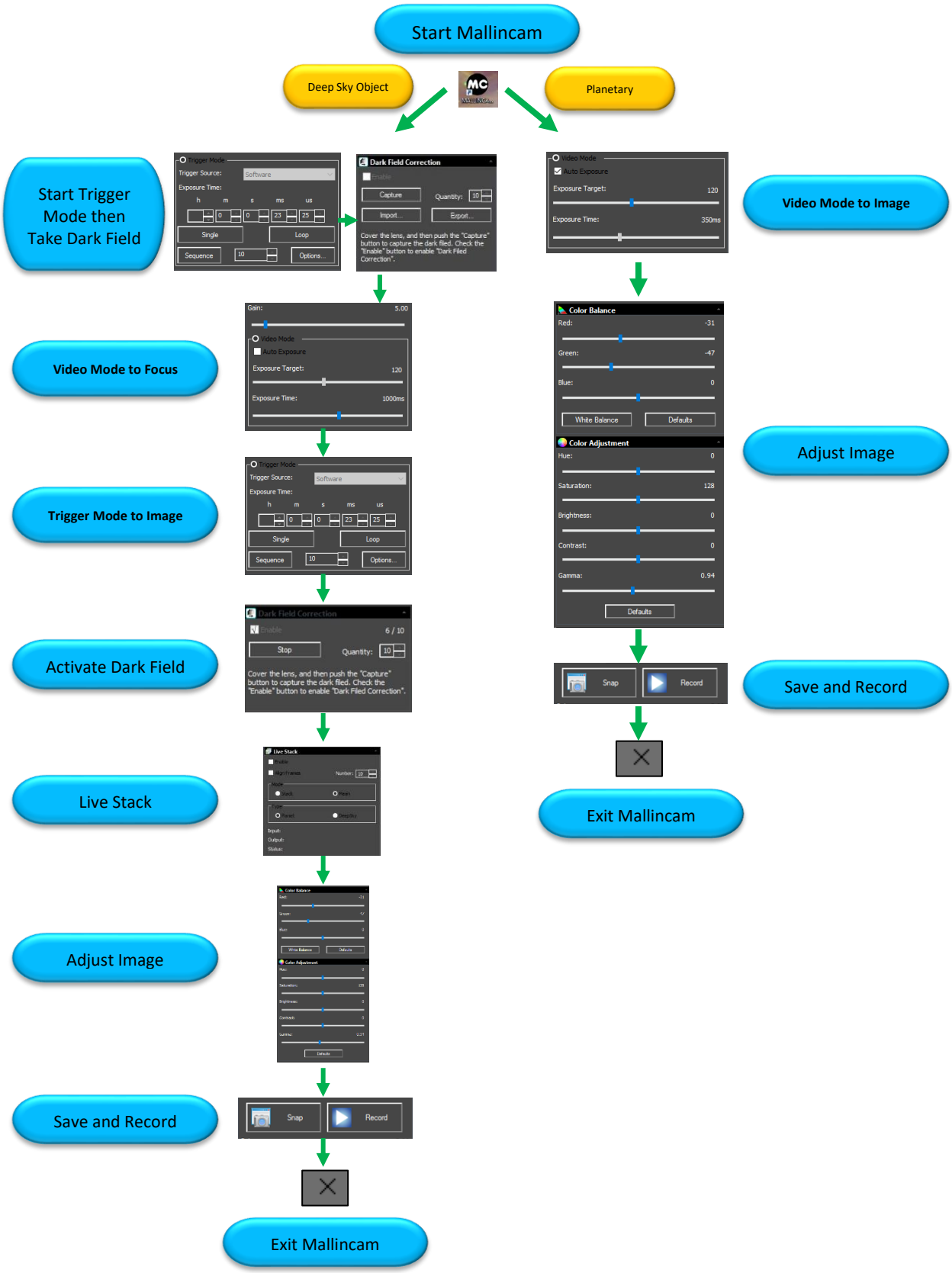
③ The **Left SideBar Base** provides selection options for **Camera**, **Folders**, or **Undo**. **Left Clicking** on the selection choice will fill the **Left SideBar** with its options.

④ The **Video Window** will contain the display image from the **SkyRaider Camera**. It is here that you will see the live video, or images.

⑤ The **Information Line** will indicate the current camera, current frame rate, number of frames displayed, resolution, information about captures, etc.

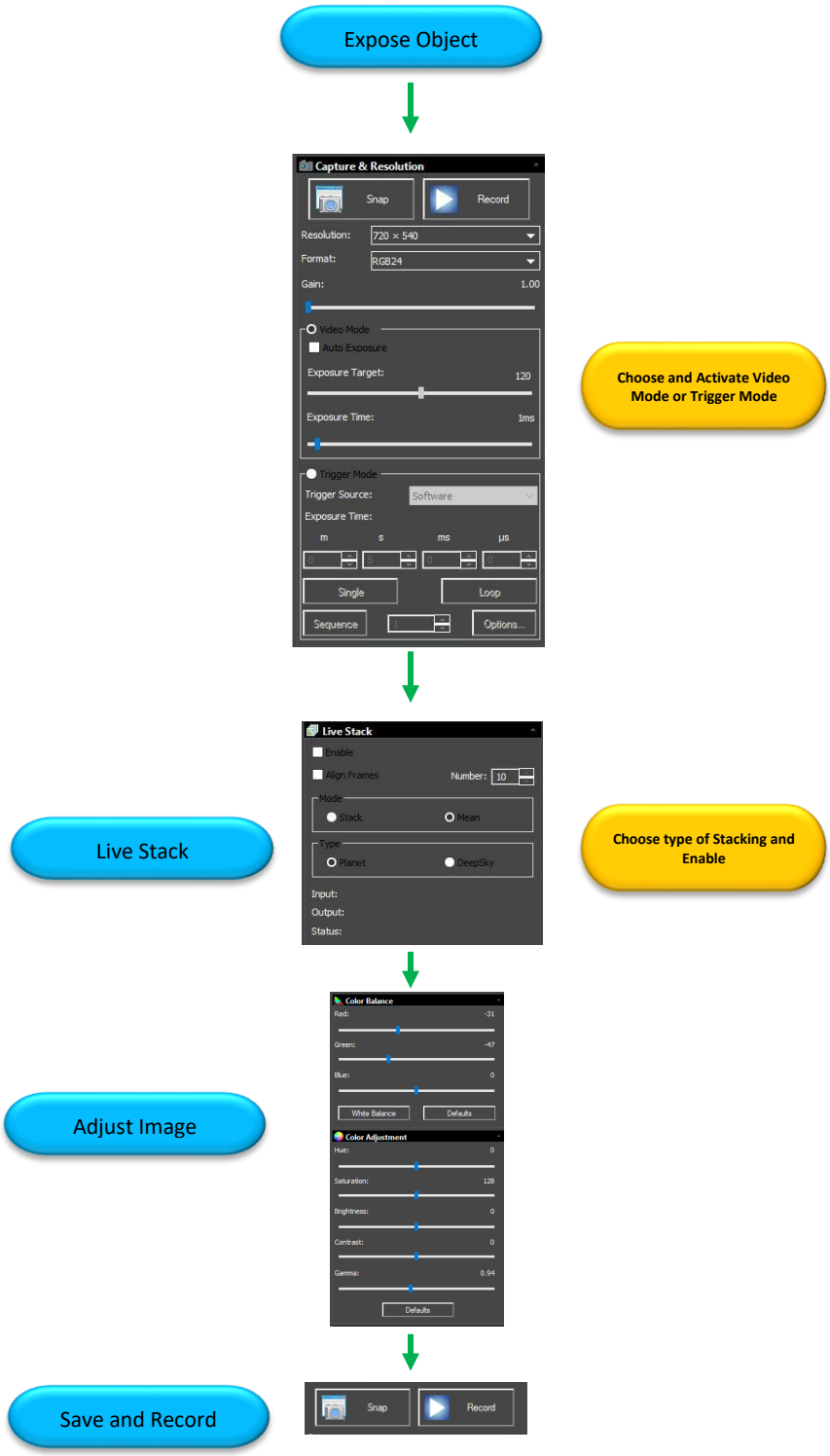
SkyRaider Quick Setup and Pictorial Work-Flow

A typical workflow when using the **SkyRaider DS287** with **MallincamSky**.



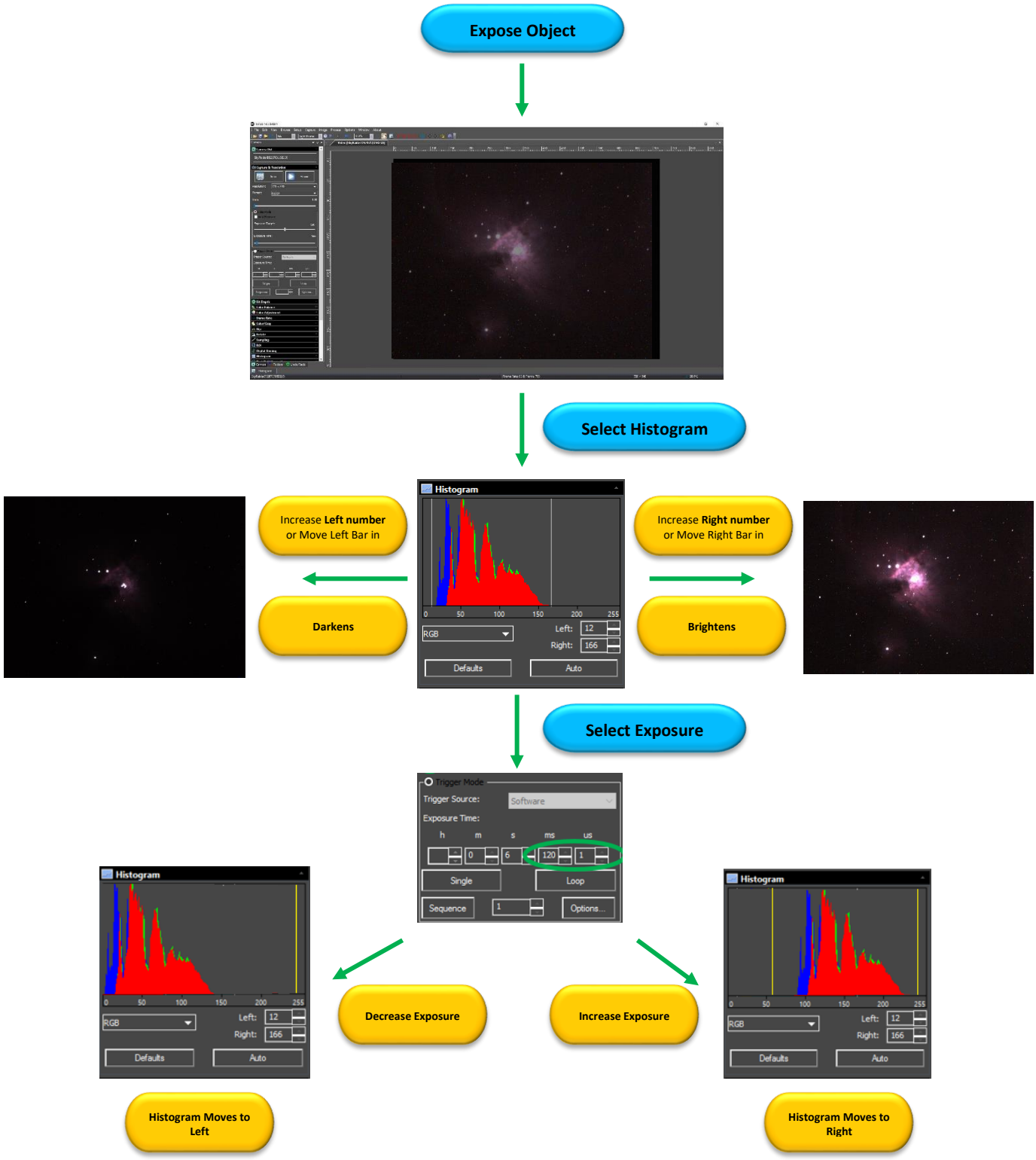
Live Stack Pictorial Work-Flow

A typical workflow when Live-Stacking with **MallincamSky**.



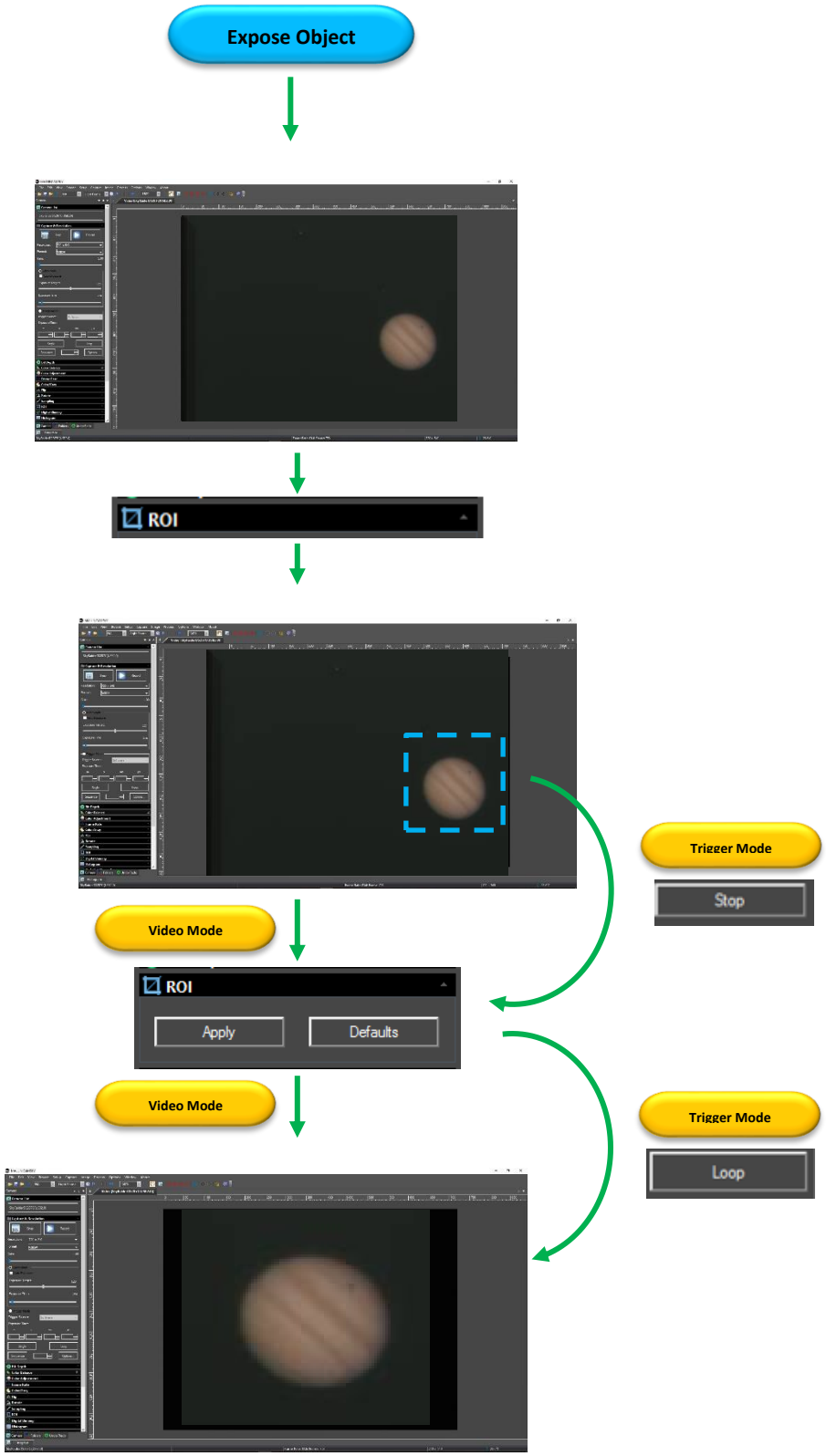
Histogram Pictorial Work-Flow

A typical workflow when using the **Histogram Command** with **MallincamSky**.



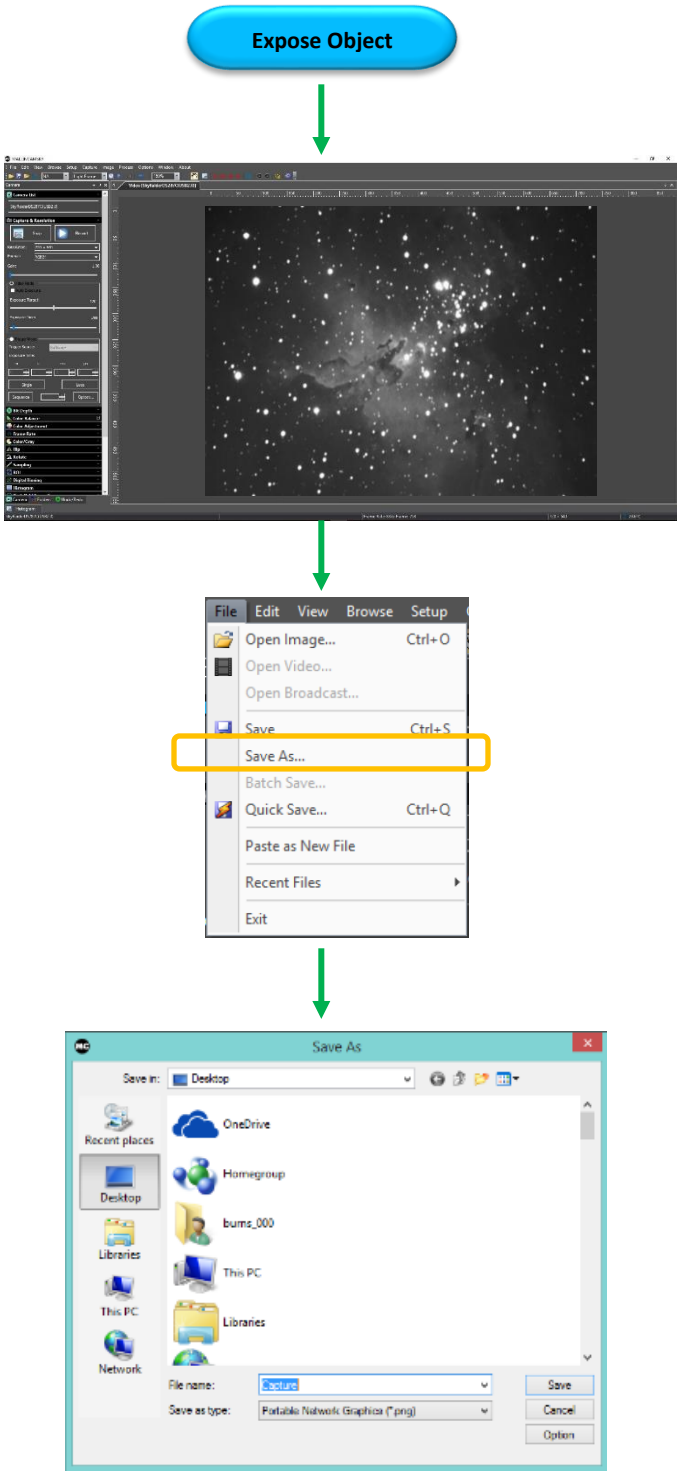
ROI Pictorial Work-Flow

A typical workflow when using the **ROI Command** with **MallincamSky**.



Save Image Pictorial Work-Flow

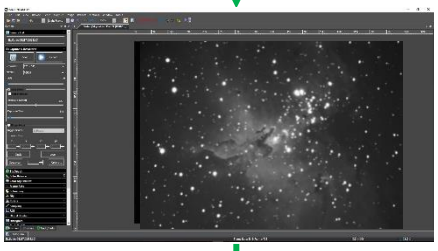
A typical workflow on how to Save an Image with **MallincamSky**.

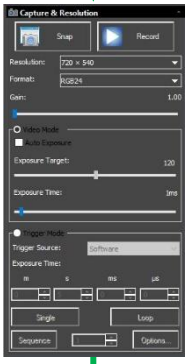


Record Video Pictorial Work-Flow

A typical workflow on how Record a Video with **MallincamSky**.

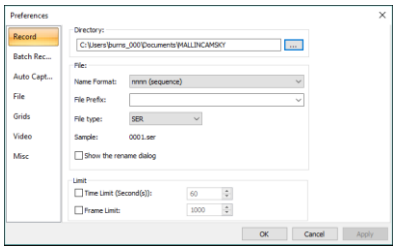
Expose Object



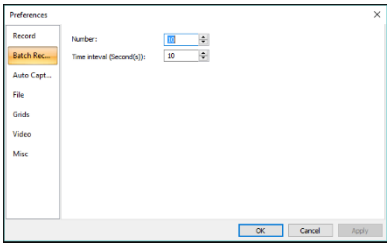


Video Mode to Image

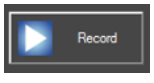
Options->Preferences...



Enter File Location, Format, Prefix, Type, Number of Seconds



Number of Videos, Time between each Video

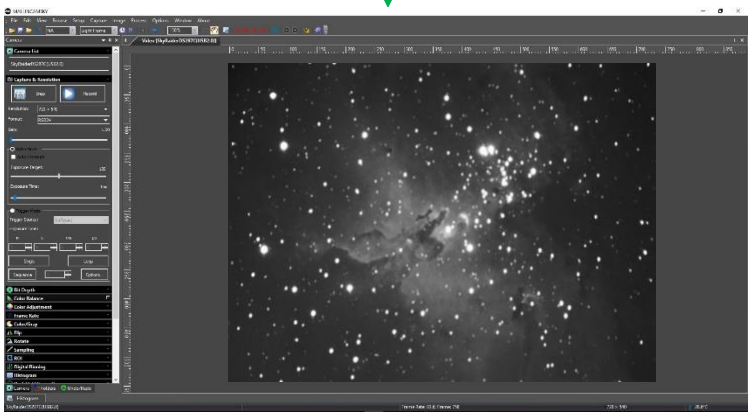


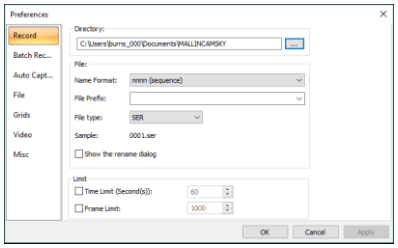
If No Time Limit Set

Batch Record Pictorial Work-Flow

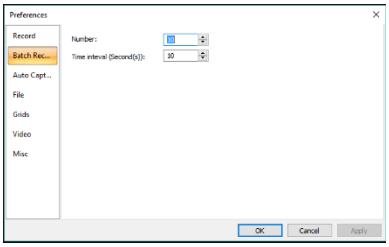
A typical workflow on how to **Batch Record** a series of **Videos** with a single **Click**.

Expose Object





Enter File Location, Format, Prefix, Type, Number of Seconds

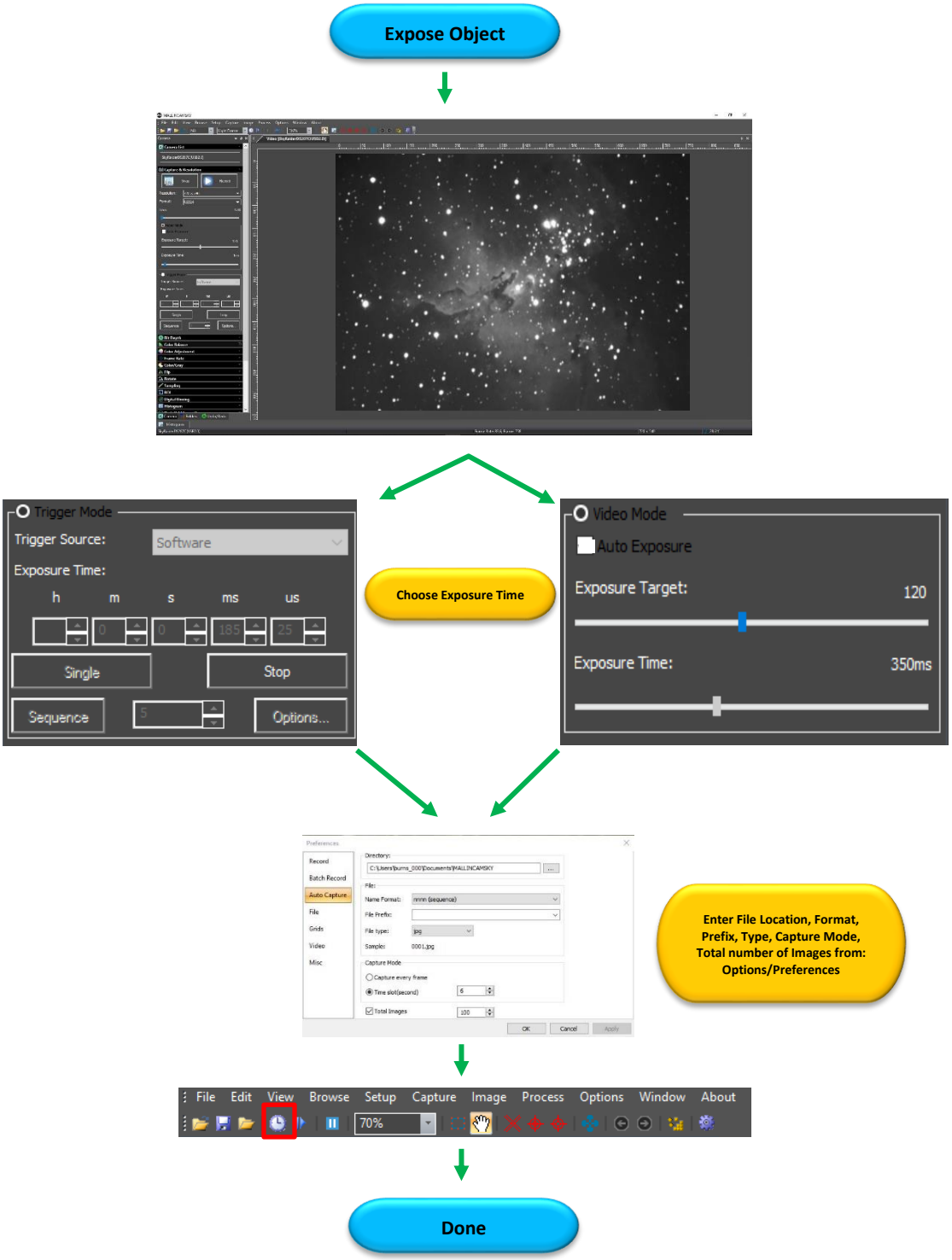


Number of Videos, Time between each Video

Done

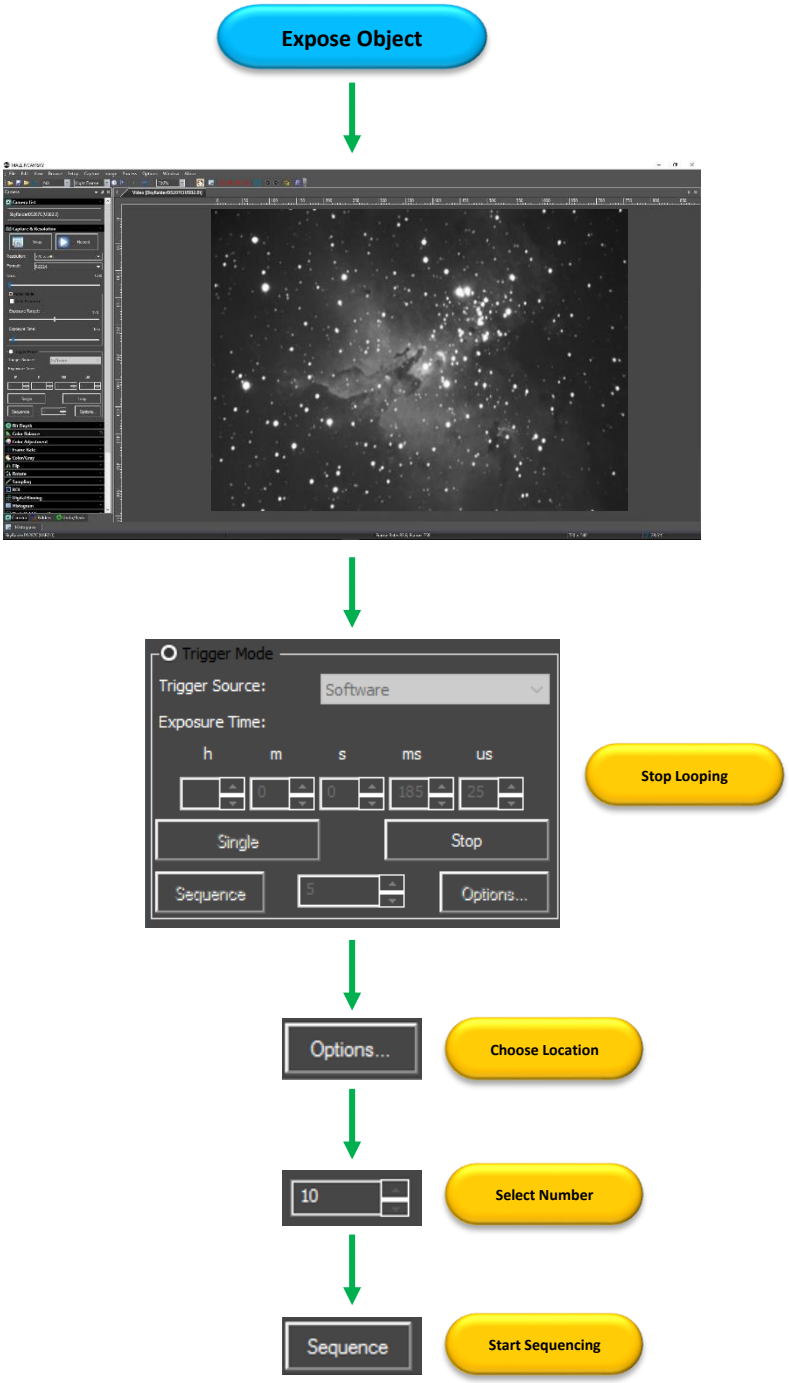
Auto Capture Pictorial Work-Flow

A typical workflow on how to **Auto Capture** a series of **Images** with a single **Click**.



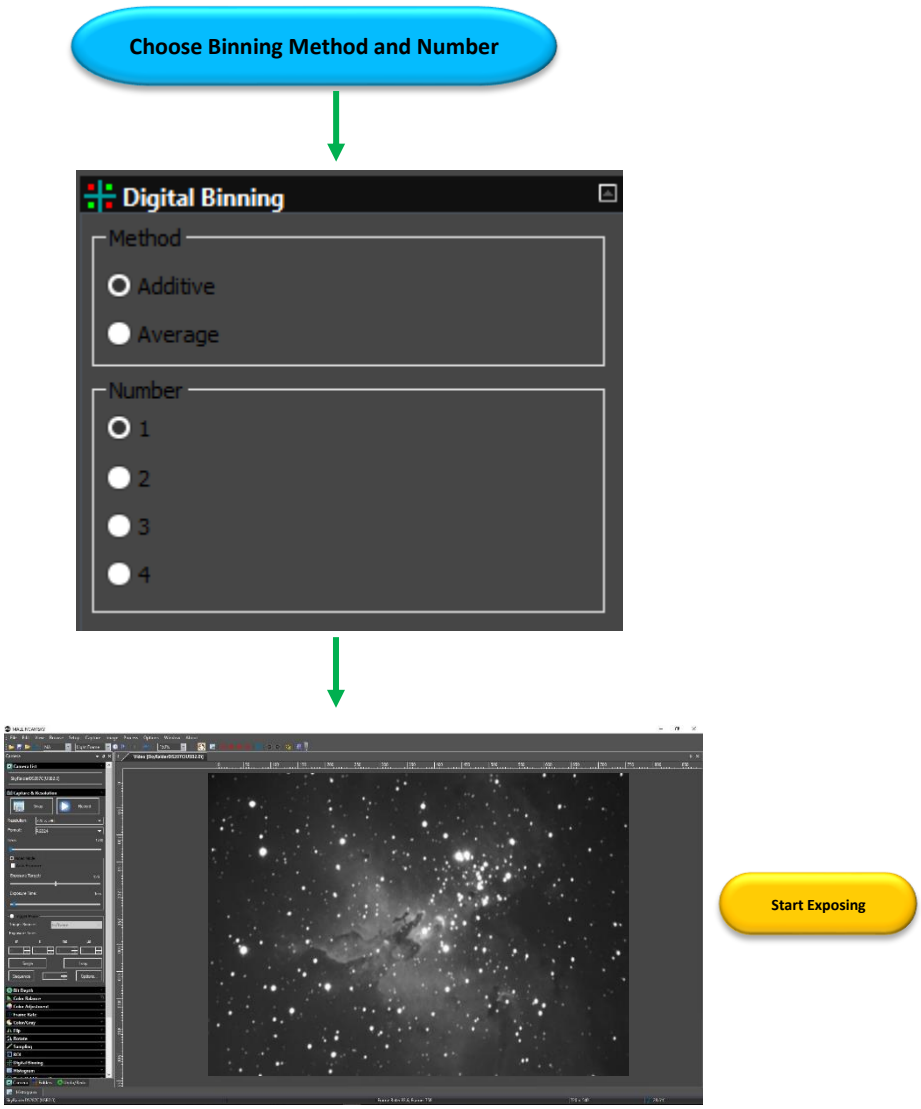
Save Sequence of Images Pictorial Work-Flow (Trigger Mode)

A typical workflow on an alternative method to Save a Sequence of Images with the **Sequence Command** in **Trigger Mode** with **MallincamSky**.



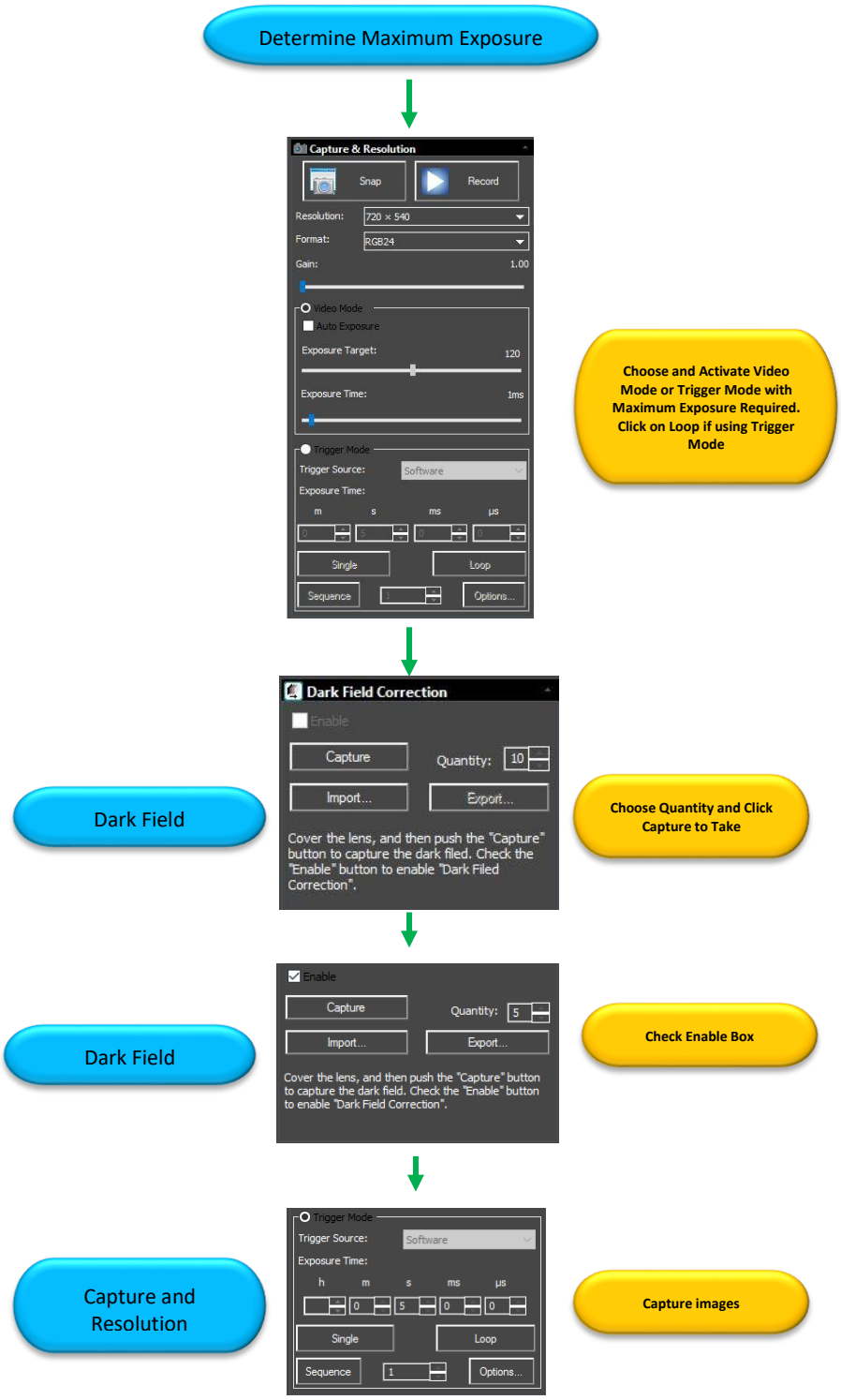
Digital Binning

A typical workflow on applying **Digital Binning**. Choose a **Method** (usually **Additive**), now select a **Binning Number** from **1** (default) to **4**. Notice the video window will decrease in size, so you may need to increase the **Zoom** factor.

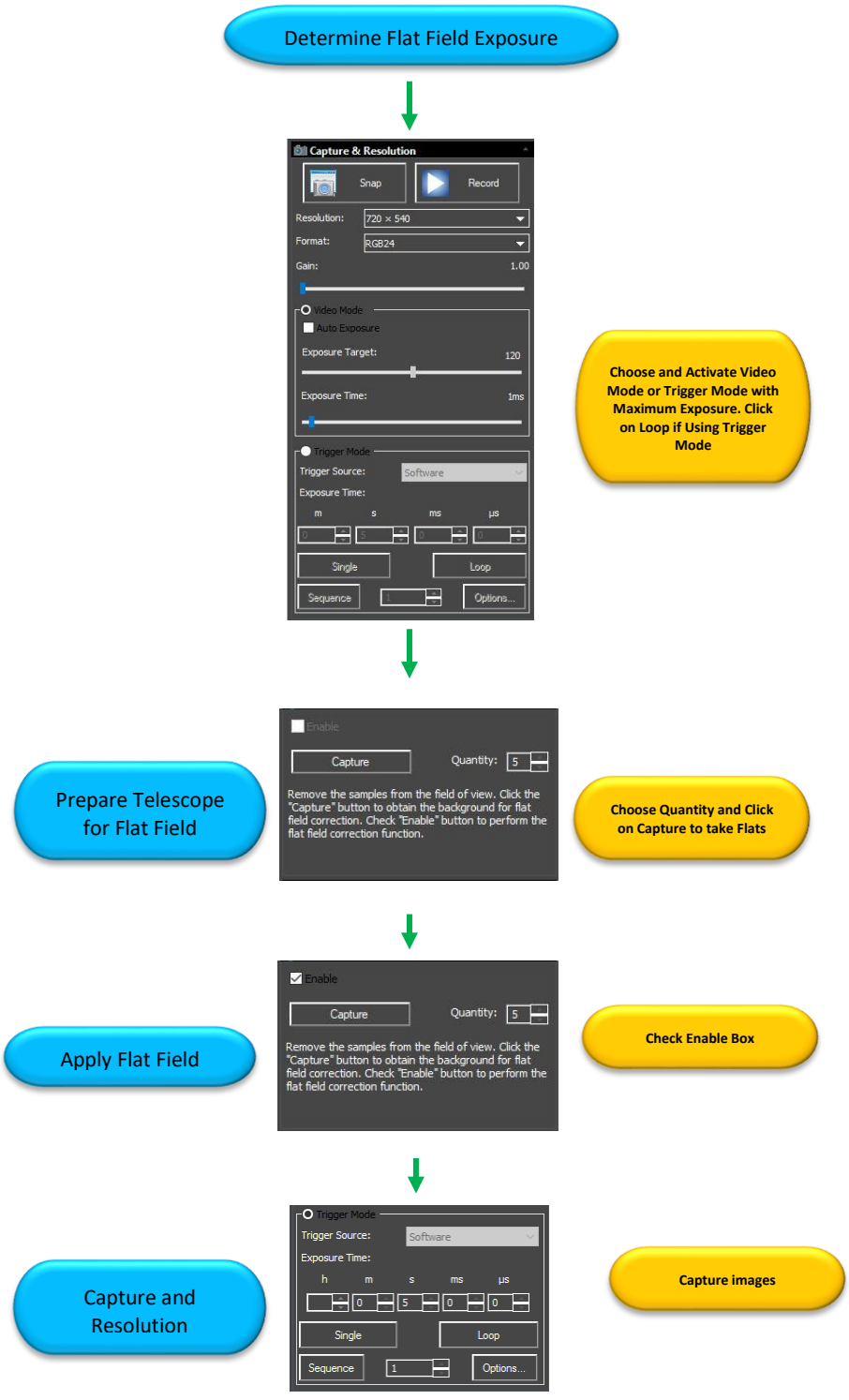


Dark Field Pictorial Work-Flow

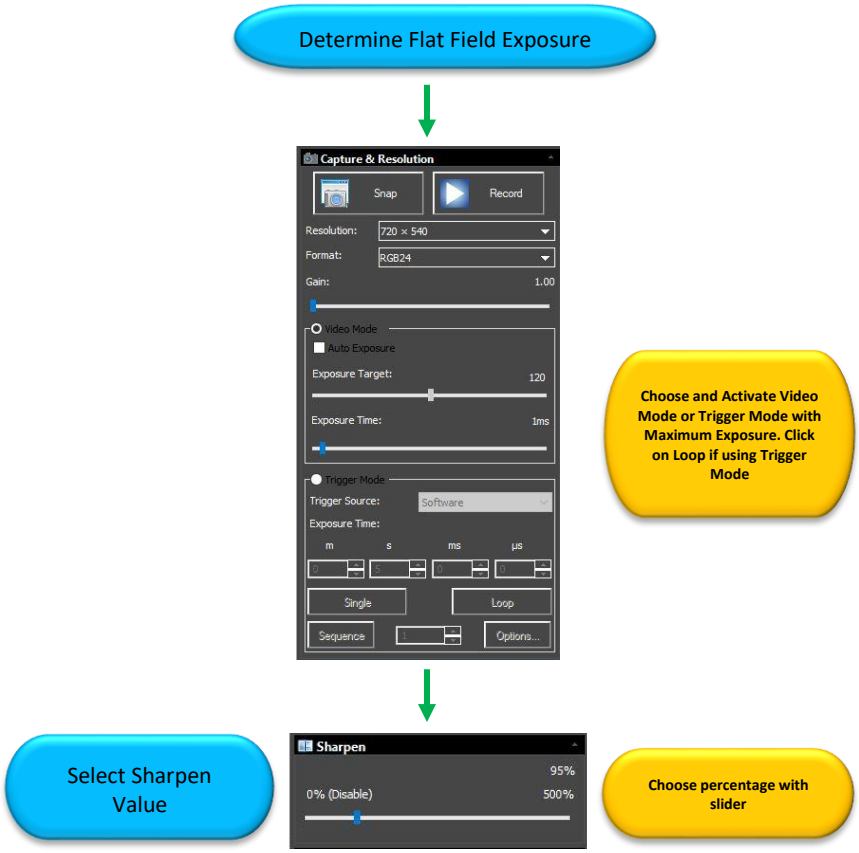
A typical workflow when taking a Dark Field with **MallincamSky**.



Flat Field Pictorial Work-Flow



Sharpen Pictorial Work-Flow



More Detailed Work-Flow Procedure

Quick Workflow for MallincamSky

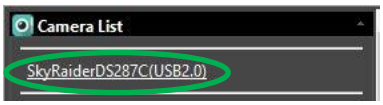
So, you don't like to read manuals, and you just want to just jump right into imaging. Then this section gives you a **Quick and Dirty** method to get going. Then, I follow this section with an even more detailed section on **Planetary Imaging Workflow**, and finally a more detailed section on **Workflow on Imaging Deep Sky Objects**.

The **Mallincam SkyRaider DS287 Cameras** provide a processing technique called **Dark Field Correction** (see the Section **Dark Field Explanation** in the **Appendix** for a complete description of **Dark Field Correction**).

Step 1 **Double Click** on the **MallincamSky Icon** to start the program.

Step 2 Select the **SkyRaiderDS287** from the **Camera List** in the **Camera Tab.**

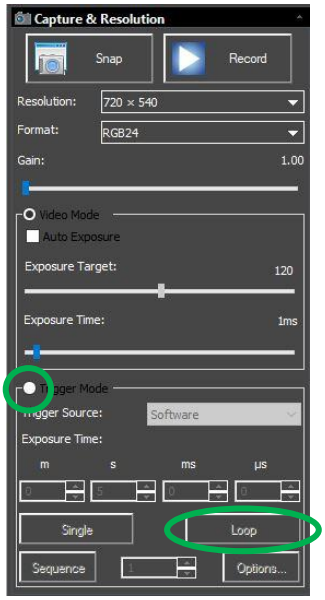
With the **Camera Tab** selected on the **Left SideBar**, **Left-Click** on the **SkyRaiderDS287** (between lines in **Camera Heading**). Once the SkyRaider is selected, a black rectangle (with **SkyRaider Camera** name) will appear in the **Video Window** of the **MallincamSky** Software along with the **Horizontal** and **Vertical Rulers**.



Note If you are imaging planetary objects or don't require **Darks,** then jump to **Step 5**.

Step 3 **Select an Exposure Time for Dark Field Correction**

With the **Camera Tab** selected on the **Left SideBar**, **Left-Click** on the **Capture & Resolution.** The **Exposure & Gain Window** will expand select the exposure time for the Dark Field.



Note You must determine what you believe will be the maximum exposure for this session. As, you will create Dark Field's with this time (or close to it).

If you are taking a maximum exposure under 5s, then select **Video Mode**, but since most Deep Sky Objects will require an exposure of over 5s, choose **Trigger Mode**.

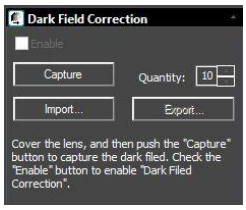
Either **enter in the time** into the appropriate boxes or use the **up** and **down** arrows beside the chosen Exposure time unit to set your maximum time.

To start the SkyRaider DS287 taking continuous exposures in **Trigger Mode**, **Left-Click** on the **Loop** button.

Step 4

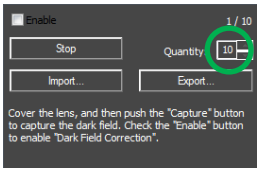
Take Dark Field Correction

Ensure that the **Lens Cover** is either on the **SkyRaider Camera** or the Telescope itself is Covered (Cap is on), then **Left-Click** on the **Dark Field Correction Tab**.



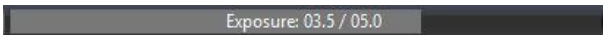
The **Dark Field Correction Box** will open allowing you to select the **Quantity** of **Dark Fields** and the option to start the **Dark Field Capture** process.

Select up to **99** for the **Quantity** (Start with **5** exposures to get a feel of the process). Then **Left-Click** on the **Capture Button**. The Software will display its progress above the selected **Quantity**. Remember, it is beneficial to set the Dark Field exposure time greater than the longest time you will be imaging at.



Note

As the Dark Fields are being exposed, you can watch the **exposure counter** in the **Dark Field Correction Tab** go up, and on the bottom of the MallincamSky window, you will see a counter letting you know the exposure progress.

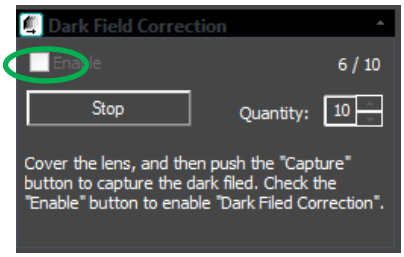


Note

Once the **Dark Fields** have been taken, you have the option of saving (so you can use then again on another night) them with the **Export button** in the **Dark Field Correction** Tab.

You can import previously saved **Dark Fields** by using the **Import Button**.

Now, **Left-Click** in the **Enable check box** in the Dark Field Correction's box to have **Dark Fields** applied in real time to your images.



Step 5

Reduce Exposure Time to Align Telescope

As you will most likely use the camera to align and focus your Telescope, now is the time to reduce the **Exposure Time** to **1** or **2** seconds, and if not already attached to the Telescope, **remove the lens cap** from the **SkyRaider Camera** and insert the **c-mount** on front end of the camera and slide camera into eyepiece holder of telescope. The shorter exposure will make it easier for you to align and focus your telescope.

Left-Click on the **STOP** button in the **Trigger Mode** screen, and now select **Video Mode**. Move the slider (or enter the time) to some value less than 5 seconds (note that the units are in milliseconds, so 1 second = 1000 ms), and align and focus your telescope. In Video Mode, images are continuously taken.

Step 6

Increase Exposure Time to Image

Now is the time to expose some **Deep Sky Objects** or **Planetary Objects**. So, go back into **Trigger Mode** (if you are imaging **Deep Sky Objects**, else remain in **Video Mode** if imaging **Planetary Objects**) and adjust the **Exposure Time** to match the current target and the equipment you are using.

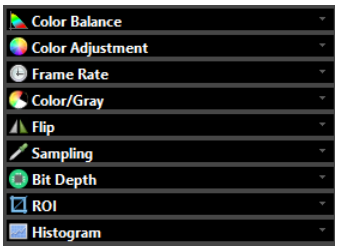
Note

If you have enabled the **Dark Field Corrections** for this session (**Dark Fields** are stored directly in the **SkyRaider Camera** and will be deleted when the camera is turned off), the **SkyRaider** will automatically apply the best **Dark Field Correction** to your image when **Dark Field Correction** is **enabled**.

Step 7

Adjust the Parameters

Choose a parameter from the **Camera Tab** on the **Left SideBar** and see what you can adjust, and how it affects your image.



Note

You will have to wait until the next image is exposed to see how your adjustments look (keep an eye at the bottom of the screen to see when the next adjusted image will appear).

Step 8

Have Fun and Experiment

You can now spend some time to become more comfortable with the **MallincamSky** Software. The **SkyRaider DS287 User Manual** will go into more detail about all of the options and adjustment you can perform with the **SkyRaide**r series of cameras. But, don't be afraid to experiment.

Detailed Workflow of Video Imaging Planetary Objects

The following instructions will guide you in setting up your SkyRaider camera for imaging Solar, Lunar, or Planetary Objects.

For planetary objects, the exposure setting will be very small (as the objects themselves are usually very bright). It is recommended that you start imaging objects, such as the Moon and planets, as it will allow you to become comfortable with all the adjustments that MallincamSky provides for you. With planetary objects, you want as much resolution and data as possible, so choose the highest resolution your SkyRaider provides (which is easy as that is set for you).

Note

Since the exposure rate is so short, you may find that you do not need to take any **Dark Fields** preparation shots before imaging. But, if you do notice warm pixels and would like to eliminate them. Then follow the step-by-step instructions located in the section called: **Dark Field Correction** later in the manual.

The following instructions are used as a guide to assist you in doing planetary video imaging. Don't forget, when finished with a particular step that uses a particular feature Tab, you can close the Tab (This will remove, the green and blue boxes which may be displayed over your image) by **Clicking** on the little **up- arrow** in the right corner of that Tab.

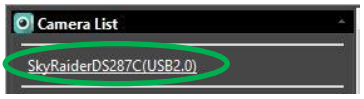
Step 1

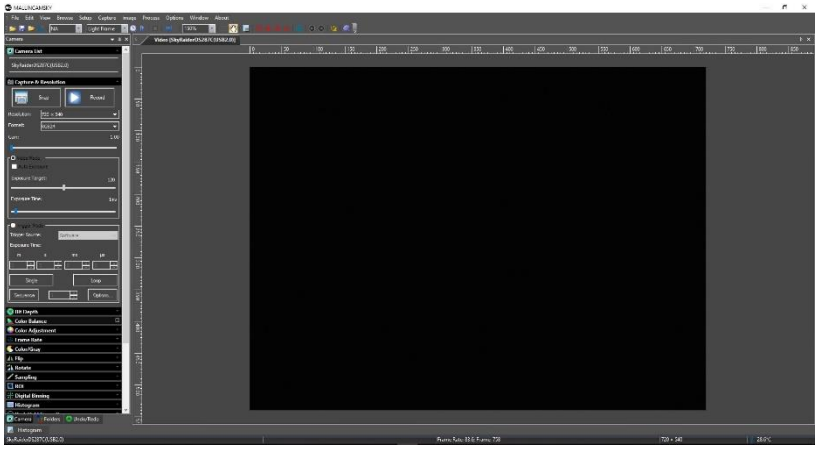
If not started, **Double Click** on the **MallincamSky Icon** on your **Desktop** to start the program.

Step 2

Select the **SkyRaiderDS287** from the **Camera List** in the **Camera Tab.**

With the **Camera Tab** selected on the **Left SideBar**, **Left-Click** on the **SkyRaiderDS287** (between lines in **Camera Heading**). Once the SkyRaider is selected, a black rectangle (with **SkyRaider Camera** name) will appear in the **Video Window** of the **MallincamSky** Software along with the **Horizontal** and **Vertical Rulers.**





Step 3

Have your telescope pointed to the Planetary Object of interest, and it is recommended that you use a **Barlow Lens** attached to your Telescope to provide a "Larger (Longer Focal Length)" image.

Note

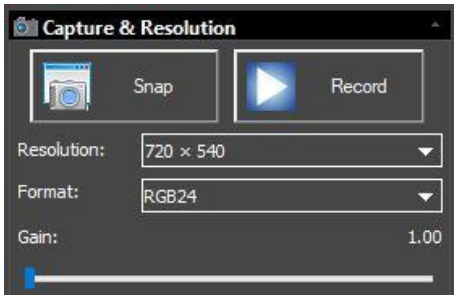
Since you will want to "**push**" the capabilities of the SkyRaider in displaying the Planetary object, you will require the **highest resolution** that your particular SkyRaider can produce, along with the largest **bits of data** (for color or shades of Back and White) for each pixel that the SkyRaider is able to produce. This will provide enough data for external stacking programs to pull out the finest detail from your video images.

Step 4

From the **Capture and Resolution Tab** on the **MallincamSky ToolBar**, select the **Largest** resolution values that your SkyRaider is capable of.

Note

The SkyRaiderDS287 is capable of 1 resolution: 720 x 540.



Step 5

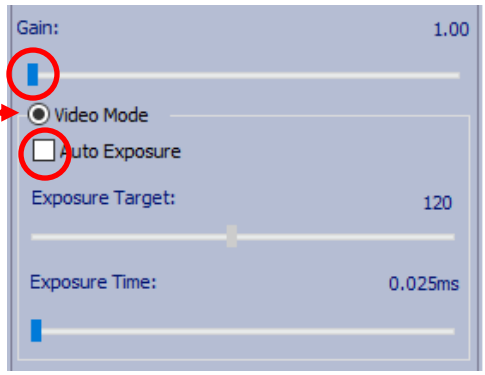
If you are going to be saving and processing images taken with the SkyRaider, you may want to increase the Bit depth to the highest value your particular SkyRaider camera supports.

Note

Since you have chosen a **High Resolution** and a **Large Bit Count**, this will slow down the **Frames per Second** rate at which the MallincamSky can process the images (huge amounts of data moving through the system). We will make an adjustment in a later step that will increase the **Frames per Second** rate.

Step 6

With MallincamSky running, **Left-Click** on the **Capture and Resolution Tab** to expand the exposure window.



- **Click** in the **Video Mode Selector** to choose **Video Mode**.
- Move the **Gain** Slider all the way to the Left.
- Make sure that the **Auto Exposure CheckBox** is **unchecked.**

Note

The SkyRaider DS287 has two exposure modes:

- **Video Mode**
- **Trigger Mode**

Since we are imaging planetary objects, our exposure should not exceed **5 seconds**. Therefore, we will be using **Video Mode** exclusively for setting our exposure times. **Video Mode** will continuously take and display images at the duration you set in the Exposure time.

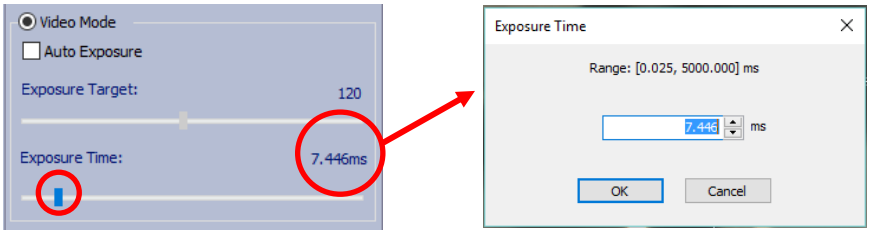
Note

If the **Green Exposure Rectangle** (it is visible **only** when you have selected the **Auto Exposure** checkbox) annoys you, you can **Left-Click Hold and Drag** corners of the rectangle to resize it to either cover the whole image window, or even to be a zero-size box at one of the corners of your image window. This way you can always have the **Capture and Resolution** Tab open without the annoying green rectangle in the middle of your image.

So, let's get started:

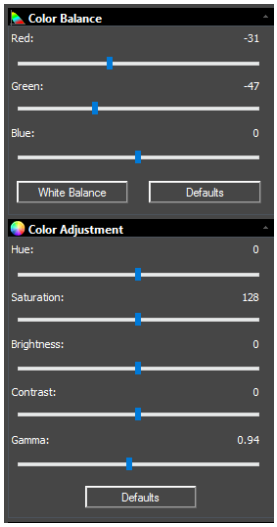
- Set your exposure to a small value, say **10ms** as a starting point (we are using a small time, but the actual exposure amount depends upon the f/ratio, size of telescope, filters, seeing conditions, ...). You can adjust the exposure using one of the three methods below:
  - You can either use the **mouse button** and **Left-Click-Hold and Drag** the **Slider Marker** (This method is best for making large movements).
  - You can also **Click** on the **Slider Marker**, then use the **Left** and **Right** arrows keys on your keyboard to precisely move the **Exposure Marker** (this method provides the most accurate tiny adjustments to the exposure times).

- You can **Click** on the **Exposure Time's** current setting and a pop-up window will appear that allows you to enter the required exposure time in milliseconds (This allows you to be very precise in the exposure time you require, **5000 ms = 5 seconds**).



You should be able to see the Planetary object of interest on your screen. So now adjust the **Exposure Time** to make the object bright enough match your viewing requirements. You can also adjust the **Gain** to the **Right** to brighten your image.

Step 7 Now is the time to adjust the **Color Balance** and **Color Adjustment** (Contrast, Gamma, …) to your required preferences.



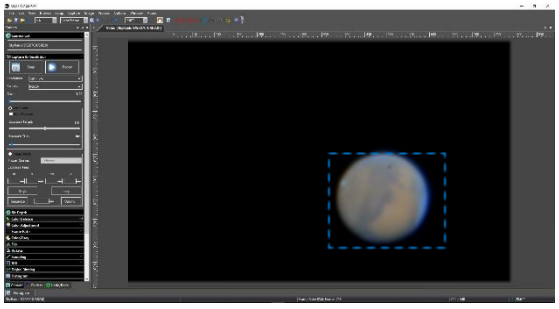
Hint Read the appropriate section in the **User Manual** (it is great reading, if I do say so myself) to obtain more information what each particular setting does in the **Color Balance** and **Color Adjustment** Tabs in MallincamSky. There is no precise value for every user, as we all use different equipment. This is a great time to '***play***' with the settings to see what value work best for you. Just have fun.

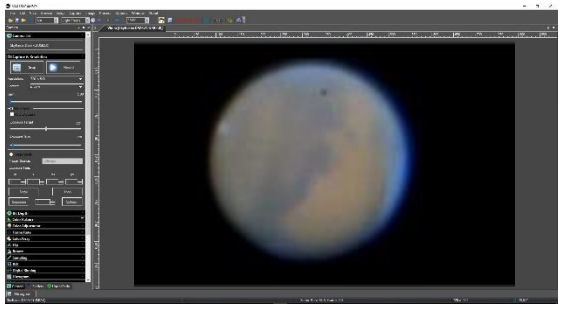
Step 8

To improve the Though-put (**Frames per Second**) or if you want to isolate the planetary object, choose a **Region of Interest** (**ROI**) that just includes the image of the planetary object.

You select the **ROI** by using **Left-Click-Hold and Drag** the handles of the **Blue Rectangle** that will appear over your **Image Window** when you selected the **ROI Tab**. Once you have framed the **Blue ROI Rectangle** over your image, then **Click** on the **Apply** button in the **ROI Tab** to accept it.

This will make the Video Screen contain just the object that was enclosed by the **ROI's Blue Rectangle**. To return back to **Full Video Mode**, just **Click** on the **Defaults Button** on the ROI Open Tab.



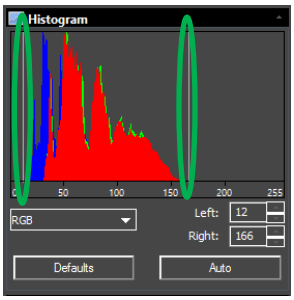


Hint

Using the **Scroll Wheel** on your **mouse**, when the mouse is over the **Image Window**, will enlarge and reduce the image size in the **Image Window**.

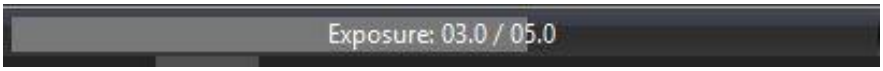
Step 9

To finely adjust the image characteristics, open up the **Histogram Tab**, and either enter in the **Left** and **Right** values, or **Left Click, Hold and Drag** the two **Vertical Bars** so that you are not clipping data, on either side of the window. These adjustments will help improve the image on the screen. The **Histogram Tab** will take a bit of practice to become comfortable with it (read section in the User Manual covering the **Histogram Command**). Set the exposure so that the peak of the histogram is someplace between **50** and **100**.



Hint

For any Exposure over **3 seconds** (3000 ms), you can determine how long your camera's exposure time has left by looking at the bottom of the MallincamSky's Window, near the middle. It will provide a real-time indicator that informs you of the time used of the exposure time that you had previously set.



The example above is telling us that we have used **3 seconds** of our **5 second (5000ms)** exposure.

Note

If you have created **Dark Field Corrections** for this session (**Dark Fields** are stored directly in the **SkyRaider Camera** and will be deleted when the camera is turned off, so ensure that you save them after creating them), then when you enable the Dark Field corrections, the **SkyRaider** will automatically apply the best **Dark Field Correction** to your image.

Remember to enable **Dark Field Correction** by checking the **Check the Enable Button** in the **Dark Field Tab**, to disable **Dark Field Correction**, just **un-check** the **Enable Button** in the **Dark Field Tab**.

Again, for most planetary imaging, **Dark Fields** will not be necessary.

Note

If you have created **Flat Field Corrections** for this session (**Flat Fields** are stored directly in the **SkyRaider Camera** and will be deleted when the camera is turned off), then when you **enable** the Flat Field corrections, the **SkyRaider** will automatically apply the **Flat Field Correction** to your image.

Hint

Try different values of **sharpen** to see what details you can pull out of your planetary image.

Hint

If you are imaging the Sun in the daytime, then select **Options** from the **Top Menu Line**, then choose **Preferences**. It is here that you can set options for the **MallincamSky**. If you go into **Misc.,** you can change the Color Style of the **MallincamSky** software. If you select another **Color Style**, **Apply**, then **Left-Click** on **OK**. Choose the **Color Style** which works for you. (Use a bright **Color Style** if using computer in Daylight).

Detailed Workflow of Video Imaging Deep Sky Objects

The following instruction will guide you in setting up your SkyRaider DS287 camera for imaging **D**eep **S**ky **O**bjects (**DSO**).

For Deep Sky Objects, the exposure setting will be very large (as the objects themselves are usually very dim). It is recommended that practice imaging objects, such as the these, will allow you to become comfortable with all of the adjustments that MallincamSky provides for you. With Deep Sky Objects, you want as much resolution and data as possible, so choose the highest resolution your SkyRaider provides.

Note

Since the exposure rate can be very long, you will need to prepare your system by taking **Dark Fields** and a **Flat Field**. If this is the first-time imaging DSO's, you may not have saved previous **Dark Fields**, so this Walk-Through will take you through the **Dark Field** preparation step.

Remember complete explanations of each of the processes and controls are provided later in the User Manual.

The following instructions are used as a guide to assist you in doing Deep Sky imaging. Don't forget, when finished with a particular step that uses a particular feature tab, you can close the Tab by clicking on the **little arrow** in the corner of a Tab (This will remove the green and blue boxes which may be displayed over your image).

Have your SkyRaider connected to your telescope, and since you are video imaging Deep Sky Objects, you should have a **Focal Reducer** attached. This will provide you two benefits: first you will be presented with a larger field of view (see more of the object), and second, you will have a faster telescope (shorter exposure times).

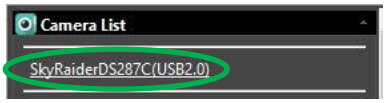
Step 1

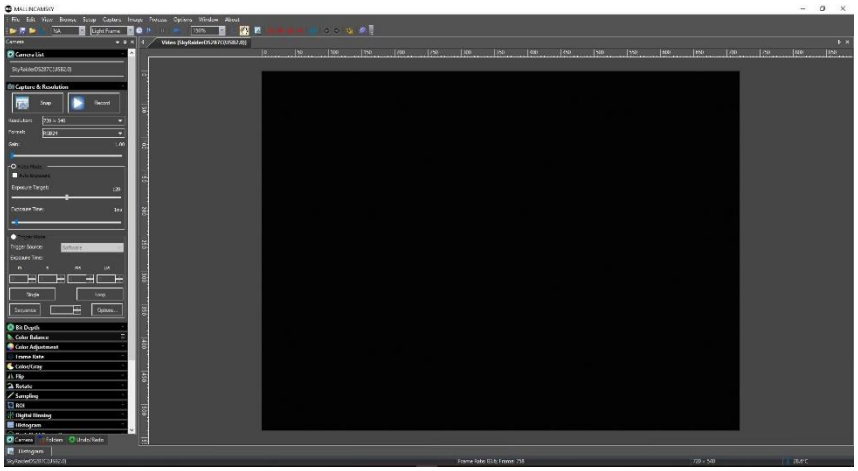
If not Started, **Double Click** on the **MallincamSky Icon** on your Desktop to start the program.

Step 2

Select the **SkyRaiderDS287** from the **Camera List** in the **Camera Tab.**

With the **Camera Tab** selected on the **Left SideBar**, **Left-Click** on the **SkyRaiderDS287** (between lines in **Camera Heading**). Once the SkyRaider is selected, a black rectangle (with **SkyRaider Camera** name) will appear in the **Video Window** of the **MallincamSky** Software along with the **Horizontal** and **Vertical Rulers.**





Note

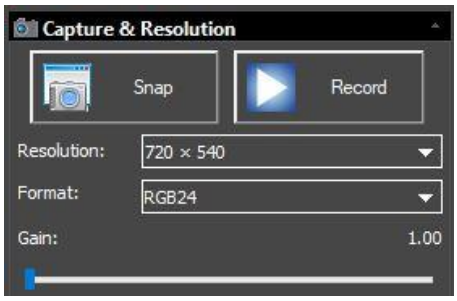
Since you will want to "**push**" the capabilities of the SkyRaider in displaying the Deep Sky Object, you will require the **highest resolution** that your particular SkyRaider can produce, along with the largest **bits of data** (for color or shades of Back and White) for each pixel that the SkyRaider is able to produce. This will provide enough data for external stacking programs to pull out the finest detail from your video images.

Step 3

From the **Capture and Resolution Tab** on the **MallincamSky ToolBar**, select the **Largest** resolution values that your SkyRaider is capable of.

Note

The SkyRaiderDS287 is capable of 1 resolution: 720 x 540.



Step 4

If you are going to be saving and processing images taken with the SkyRaider, you may want to increase the Bit depth to the highest value your particular SkyRaider camera supports.

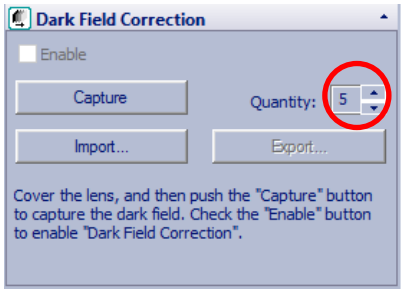
Due to the Large Exposure times, you will be using in imaging Deep Sky Objects, the SkyRaider (in fact every camera no matter what the cost) will sometimes display noise such as, warm pixels and amp glow. The longer the exposure the more noise that can appear on your image. The MallincamSky software can remove this noise, by applying pre-prepared **Dark Fields** to your images, effectively removing the noise.

Step 5

Either place the Lens cap over your Telescope or place the dust cover cap over your SkyRaider DS287 camera to block any light from hitting the sensor of the camera.

Step 6

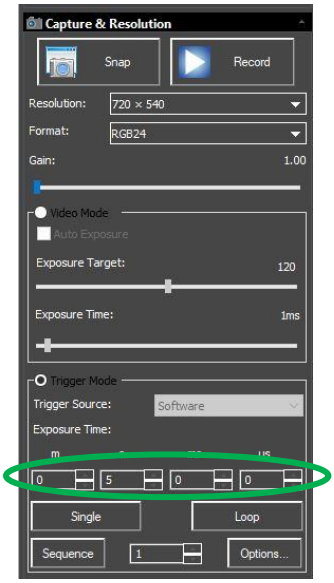
Open up the **Dark Field Correction Tab** on the **Left SideBar** of MallincamSky. You will normally determine the maximum exposure time that you will be using for the evening, but to get started for the first time, we will choose **5** exposures of **30** seconds. Adjust the **Quantity** to **5**.



Step 7

Select an Exposure Time for Dark Field Correction

With the **Camera Tab** selected on the **Left SideBar**, **Left-Click** on the **Capture & Resolution** (if you are in **Video Mode**, a **Green Rectangle** with the word **Exposure** will appear in your **Video Window**).



Note

You must determine what you believe will be the maximum exposure for this session. As, you will create Dark Field's with this time (or close to it). In this example, we will choose **30 seconds**.

In the **Capture & Resolution** Tab; **Click** on the **Trigger Mode Radial Button** (Trigger Mode is used to select any exposure time over 5 seconds).

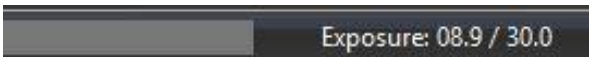
Move the **Gain Slider** to about **5.0**.

Either enter the time into the appropriate exposure **time unit boxes** or use the **up** and **down** arrows beside the chosen Exposure time unit to set your maximum time. For us, set the seconds (**s**) time unit to **30** for 30 seconds.

To start the SkyRaider DS287 taking continuous exposures, **Left-Click** on the **Loop** button.

Note

Since we have chosen **30 seconds**, you will notice, on the bottom of the Main Window of MallincamSky, the **Exposure indicator**. This shows you the current set exposure time used in the exposure.

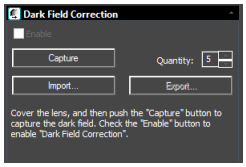


The example on the left is telling us that we have used **8.9 seconds** of our **30 second** exposure.

Step 8

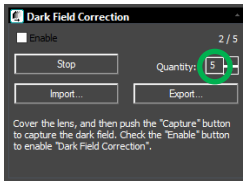
Take Dark Field Correction

Ensure that the cover is either on the **SkyRaider Camera** or the Telescope itself is covered, then **Left-Click** on the **Dark Field Correction Line**.



The **Dark Field Correction Line** will open up allowing you to select the **Quantity** of **Dark Fields** and the option to start the **Dark Field Capture** process.

Select **5** for the **Quantity**, then **Left-Click** on the **Capture Button** (which will change its name to **Stop**, in case you need to abort the Dark Field capture). The Software will display its progress above the selected **Quantity**. Remember, it is beneficial to set the Dark Field exposure time greater than the longest time you will be imaging at.



Note

As the Dark Fields are being exposed, you can watch the **exposure counter** in the **Dark Field Correction Tab** go up to let you know how many Dark Fields have been taken (**2** out of **5** in the above example).

Note

Once the **Dark Fields** have been taken, you have the option of saving them by **Clicking** on the **Export button** and saving them in a folder of your choice. This way you can use then again on another night.

You can also import previously saved **Dark Fields** by using the **Import Button**.

Now is the time to get busy with actually imaging our Deep Sky Object since the preliminary work is done. So, remove the Len Cap from the Telescope, or Len Cover from the SkyRaider.

Hopefully, your telescope is mostly polar aligned, and you are ready to visit your first DSO, and produce an image to impress one friends, neighbors, and spouse (so you can justify spending all of your hard-earned money on those extra pieces of equipment that you just had to have for imaging).

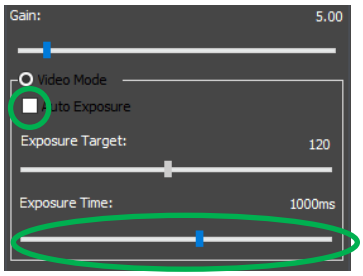
The first thing we need to align and verify focus of our Telescope. To do that we only need a short duration exposure (under 5 seconds), so we will use **Video Mode**.

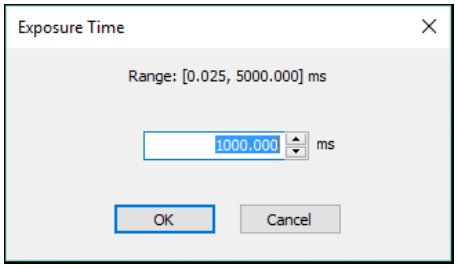
Step 9

Open up the **Capture and Resolution Tab**, and ensure that the **Auto Exposure** box is **unchecked**. Move the **Gain** slider to about the same value you set in the **Dark Field**, say **5.**

Step 10

Now Select the **Video Mode** Radial indicator button, then either use the slider or **Click** on the **Current Exposure Time Value** to open up the **Exposure Time Window**. Enter in **1 second (1000 ms)** in this window and **Click** the **OK** button to accept.





Note

We will use a small exposure, so we can verify that the object is someplace in the field of view (if in using **1 second** the star or object is too dim, increase exposure to **2 seconds**). This is a great time to check your focus as the images will be updated very quickly. You can use the **Crosshair's Button** at the top of the MallincamSky Window to assist in centering you object (or focus a star). **Click** on the Crosshair to activate, and again **Click** on the Crosshair to deactivate it.

If the image is too dim, try increasing the **Gain**.

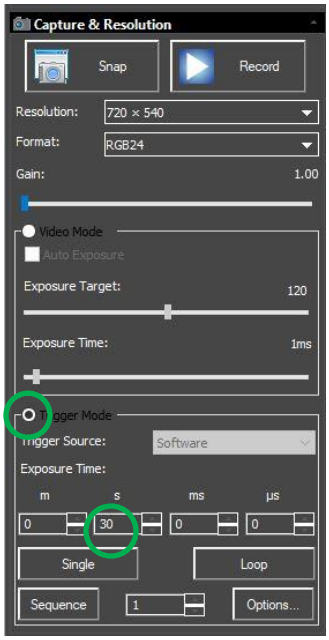
Now, you have your Deep Sky Object (or a least a dim version of it, centered in your screen. It is time to crank-up-volume. Well, for us, time to increase the exposure time.

Step 11

If the **Capture and Resolution Tab** is not open, then **Click** on it to expand its Window.

When imaging Deep Sky Objects, we will need to use an exposure over **5** seconds (**5000ms**), this is where the **Trigger Mode** comes in, on the SkyRaider DS287.

- **Click** on the **Trigger Mode Radial** selection button to activate **Trigger Mode**.



- Set your exposure to a large value, say 30s as a starting point (we are using **30 seconds**, but the actual exposure amount depends upon the f/ratio, size of telescope, filters, seeing conditions, ...). You can adjust the exposure using one of the two methods below:
  - You can **Click** in the **Time Unit Box** and enter in an amount (**30 seconds**) using your Keyboard.
  - You can **Click** on the **up** or **down** arrow in the **Time Unit Box** of choice to move the exposure time to your required value (**30** seconds).

- **Click** on the **Single Button** to a take a single exposure to see if the image of the object is close to the brightness you need.
- If you are satisfied with the single image, then **Click** on the **Loop Button** to have the SkyRaider DS287 continuously take images (at 30 seconds in our example.

Note

Since we have chosen **30 seconds**, MallincamSky will continuously display the **exposure time** and the **current amount of time captured** in the exposure info box located on the Bottom of the MallincamSky Window (MallincamSky does this automatically for any exposure over 3 seconds).

The example on the left is telling us that we have exposed **24 seconds** of our **30 second** exposure.

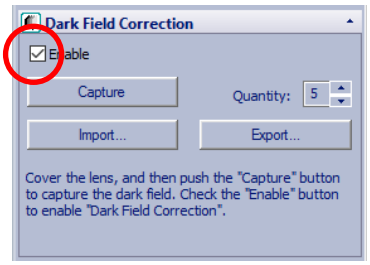
Note

Now, we are heading into the "Art" of video imaging. You can **decrease** the **Exposure Time**, as long as you **increase** the **Gain**. But, by increasing the **Gain**, you also **increase any noise** that is present. Use your own judgment in what you are willing to accept on your image.

Now, that we have an image that we are happy with, it is time to enable **Dark Field** subtraction (if you took Dark Field Images).

Step 12

Click on the **Enable CheckBox** in the **Dark Field Correction** Tab. Dark Fields will automatically be applied during the next image refresh, so in our example you may have to wait up to 30 seconds before the Dark fields are applied.



M57, 20 Seconds exposure, VRC 6", F/4.5 with MallinCam 0.5X focal reducer, NO Dark Field Correction. No processing, as seen live on monitor. Single frame.

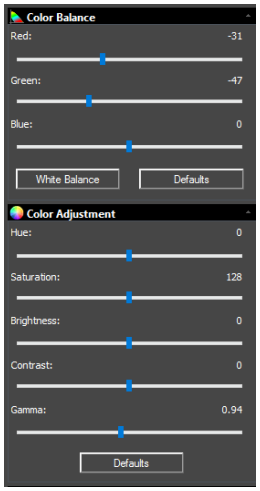
M57, 20 Seconds exposure, VRC 6", F/4.5 with MallinCam 0.5X focal reducer, One Single DARK FIELD CORRECTION APPLIED LIVE, no processing, as seen live on monitor, Single frame.

Obtaining an Image of our First Deep Sky Object is enough for most to start the celebration process (again most of us will call for our spouse to have a look at the amazing image we have just produced, again trying to justify the money used in buying those extra pieces of hardware).

Next, we want to fine tune our image to perfection (at least that is what you will tell yourself), but this is a great time to get familiar with some of the adjustment options available in MallincamSky.

Step 13

Click on the **Color Balance Tab** and the **Color Adjustment Tab** to open them up and have access to the **Color Balance** and **Color Adjustment** (Contrast, Gamma, …) settings to tweak your image.

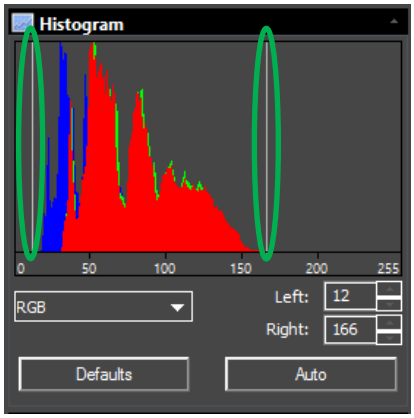


Hint

Read the appropriate section in the **User Manual** (it is great reading, if I do say so myself) to obtain more information what each particular setting does in the **Color Balance** and **Color Adjustment** Tabs in MallincamSky. There is no precise value for every user, as we all use different equipment. This is a great time to '***play***' with the settings to see what value work best for you. Just have fun. The best part is if the mess up, there is always the **Defaults Button** to bring your image back.

Step 14

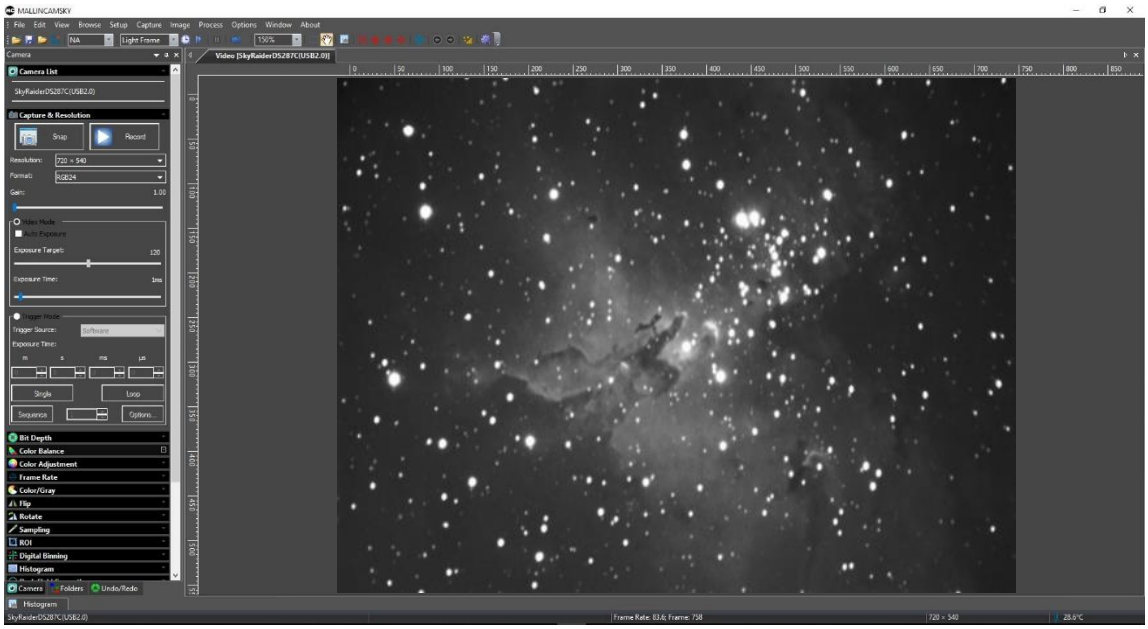
To finely adjust the image characteristics, open up the **Histogram Tab**, and either enter in the **Left** and **Right** values, or **Left-Click-Hold and Drag** the two **Vertical Bars** so that you are not clipping data, on either side of the window. These adjustments will help improve the image on the screen. The **Histogram Tab** will take a bit of practice to become comfortable with it. For more detailed information on how to use the **Histogram Tab**, locate that section in the User Manual. Set the exposure so that the peak of the Histogram is someplace between **50** and **100**.



Note

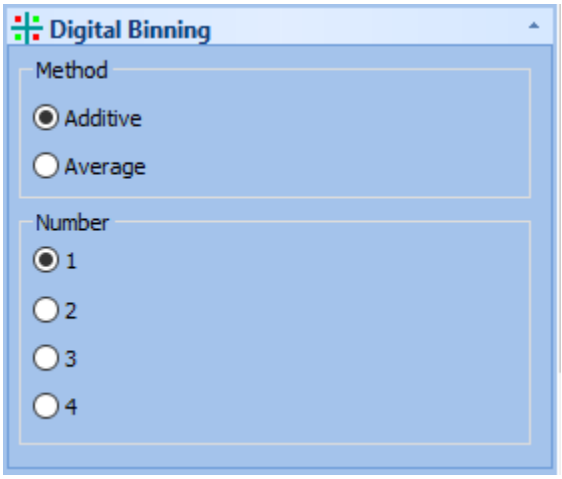
Remember, every adjustment in MallincamSky such as **Exposure**, **Gain**, **Gamma**, **Brightness**, **Contrast**, … will not appear on the Video Window until the SkyRaider has done its next refresh (which depends upon the current exposure time).

This is where you should take over, as each telescope, night-sky, seeing conditions are different from user to user. So, have fun and experiment with the settings and see how they affect your image. Remember, these are your images and you decide what is best for you.



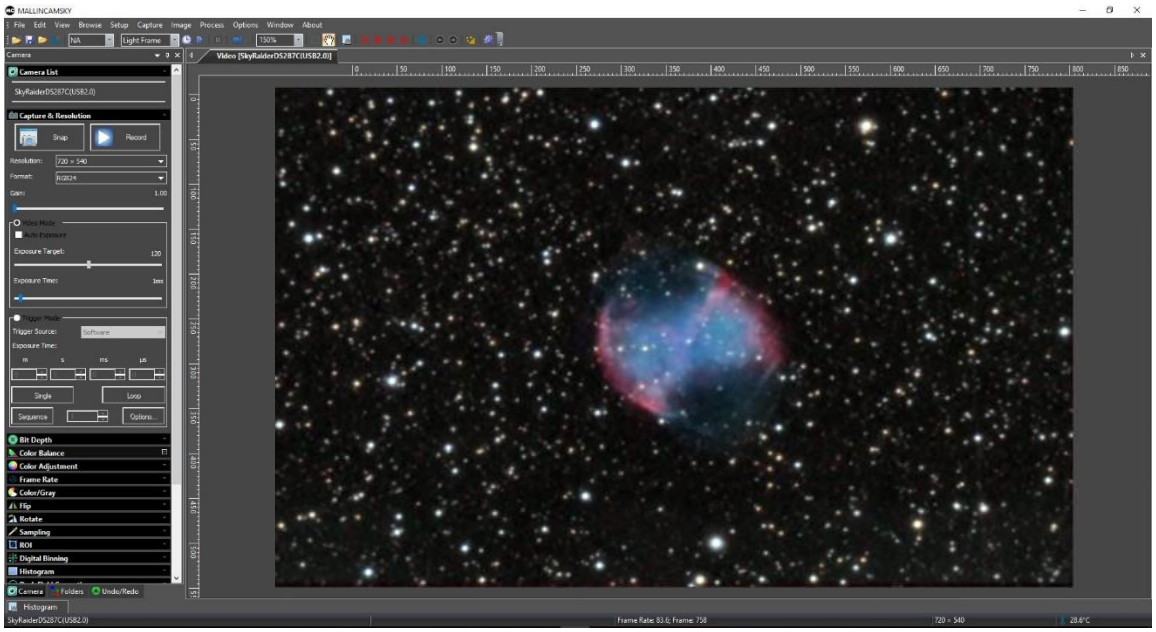
Step 15

To shorten the exposure (also reduces the resolution), you have the option of selecting **Digital Binning**. You can choose no Binning (1) all the way to **4 x 4 Binning**. Note, you will need to re-adjust appropriate histograms, contract, … after choosing a binning number. You will also notice the **Video Screen** image size is reduced to match the "digital resolution" of the Mallincam Camera when the **Digital Binning** is applied. You need only increase the **Zoom** factor to increase the size of the window.



5. The SkyRaider Software Controls

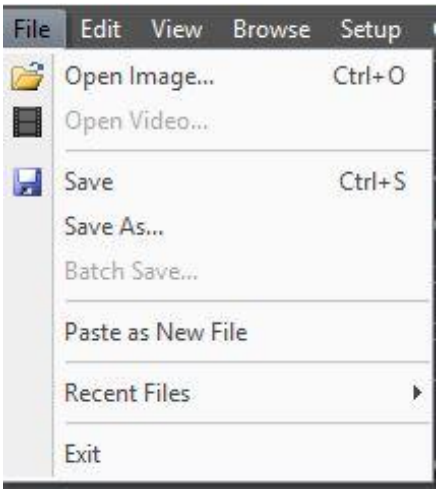
This Chapter of the User Manual will describe in exact detail what each control on both the **Top Line Menu** and the **Icon Toolbar** does. This Chapter is best read on a rainy day or can be used to jump to the specific section that describes how to use a particular control.



Top Menu Line

File

This **Drop-Down Menu** will allow you to **Load** and **Save** images, play video files.



Open Image

The **Open Image** command is used to open an existing image file. This command can also be used to preview an image in small size, or to view its statistics and information without actually opening the image itself. You can use this command to quickly locate a particular image on your computer. **MallincamSky** supports and can open a variety of image formats. These are identified in the **Files of type** list box.

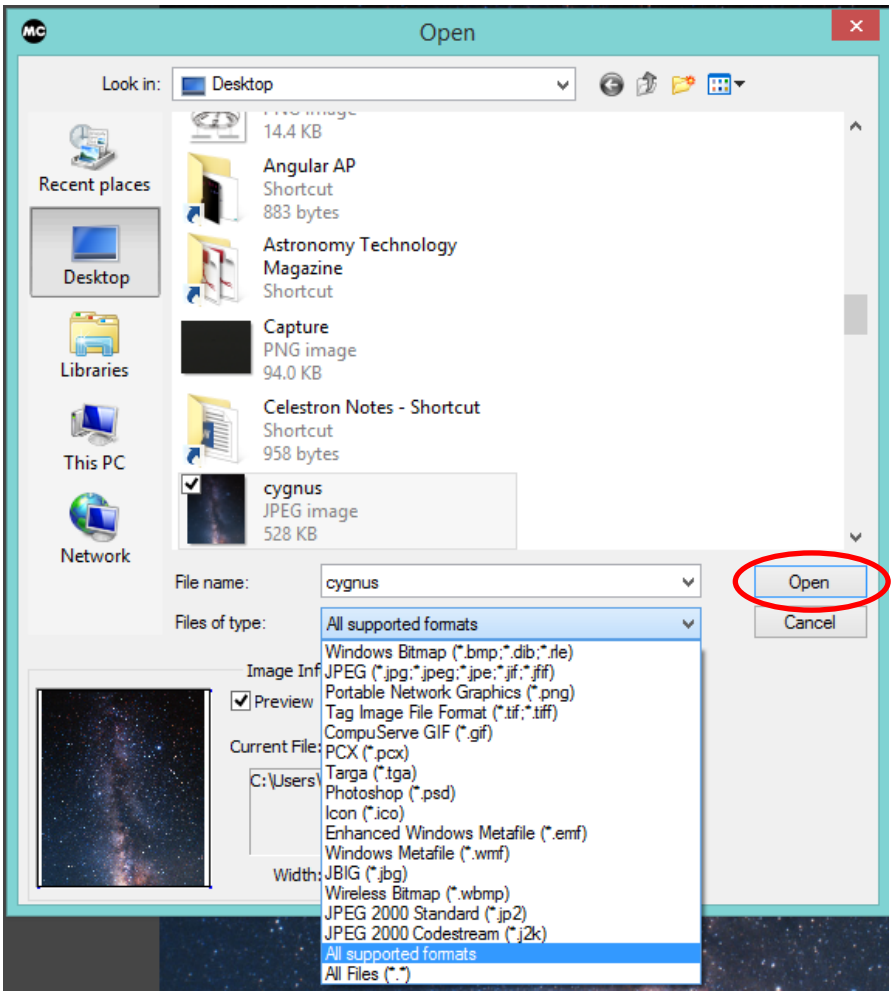
MallincamSky can open more than one image simultaneously by:

- **Ctrl + Left Mouse Click** on each required File, then **Left-Click** on **Open**
- **Shift + Left Mouse Click** method to highlight the files to be opened, then **Left-Click** on **Open**

When an image is opened, **MallincamSky** places it into a new image window and it then becomes the active image.

Note

MallincamSky maintains, at the **File>Recent Files** submenu, a list of the last opened files.

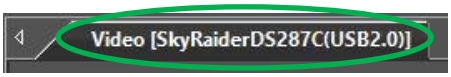


Open Video

Use the **Open Video Command** to open an existing video on your computer. The **Open Video** command is only enabled when no **SkyRaider** Camera is present when **MallincamSky** is started. Only a single video can be opened at a time. If the SkyRaider DS287 is active, then this **Open Video** command will be disabled.

Hint

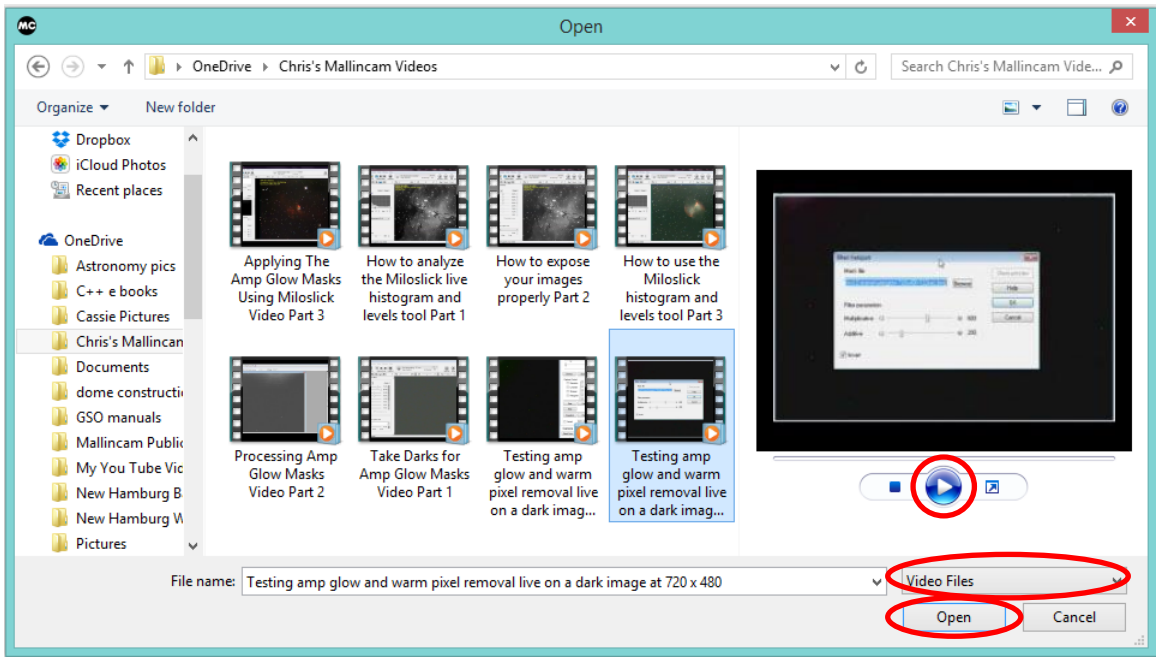
Right-Click on **Video [SkyRaiderDS287] Title** in **Video Window**, then choose **Close**. This will shut-down the video stream and allow you use the **File>Open Video** command.



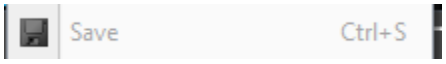
Select the name of the file you want to open. If the file does not appear, select the option for showing all files from the **Video Files Drop-Down Button**. The video file type can be **wmv**, **asf**, or **avi** format.

You can preview the Video by **Left-Clicking** on the **Play Button** on the **Preview Window** on the right side of the **Open Window**.

Click on the **Open** Button to open a video file, this will create a New Video Window and begin to start playing the video stream. The video window will be associated a name called "Video [XXX.XXX]" (i.e., its title bar will display "Video [XXX.XXX]", here, XXX.XXX is the video file name). **No sound will be heard** when playing the video stream.



Save



The **Save** command allows you to save the updated **image** (not live Video) onto your computer. The command immediately stores the current window image to its filename (the filename is listed on the window's title bar) while leaving the image still active in its window.

If the image is untitled or titled with a digit, **MallincamSky** will issue the **File>Save As** dialog automatically. The default "**Save as type**" will be "Window Bitmap (*.bmp,*.dib,*.rle)".

The **File>Save** command can be used to save the most recent changes to disk. It is often performed as a precautionary measure during lengthy or involved processes to reduce the amount of reprocessing that might be required in the event of a system failure or operational error.

When an image is being closed (**Right-Click** on Image title) and you have chosen **not to save its changes** from the Popup Window, **MallincamSky** discards all changes made since the last **File>Save** operation.

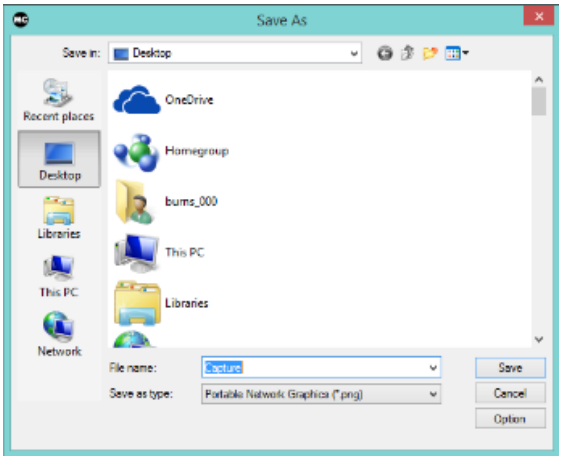
Note

The **File>Save** command saves the contents of the entire window, unless if there was an **ROI** (Region of Interest) defined on it, in which case it will save the **ROI** contents. The **File>Save** command will be disabled if the file is not changed or the changes have been saved.

Save As …

The **Save As** command allows you to save an image onto your computer with a specified file format. At the end of a **File>Save As •••** operation, the image window will be associated with the new file and the new format (i.e., its title bar will display the new file name). **MallincamSky** supports the following file formats:

- Window Bitmap (*.bmp,*.dib,*.rle)
- JPEG (*.jpg,*.jpeg,*.jpe,*.jif,*.jfif)
- Portable Network Graphics (*.png)
- Tag Image File Format (*.tif, *.tiff)
- PCX(*.pcx)
- Targa (*.tga)
- JPEG 2000 Standard (*.jp2)
- JPEG 2000 Codestream (*.j2k)
- MallincamSky File Type (*.tft)
- FITS (*.fit, *.fits)



The **Save As** command has several important uses beyond simply storing an image to a new file name. **Left-Click** on the **Option** button to select the different parameters to encode the file (based on selected **Save as Type**).

JPEG

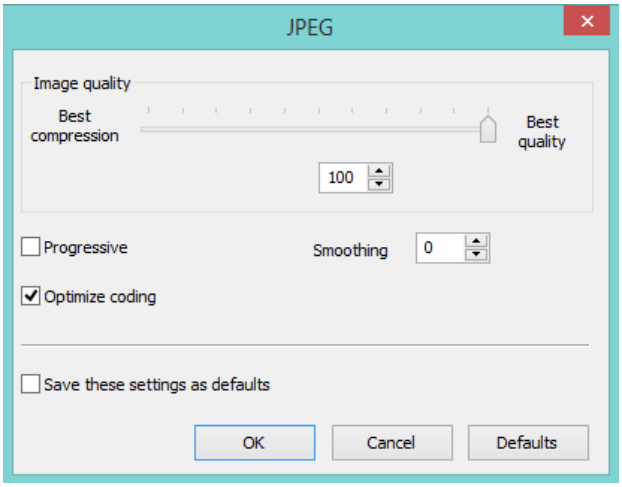
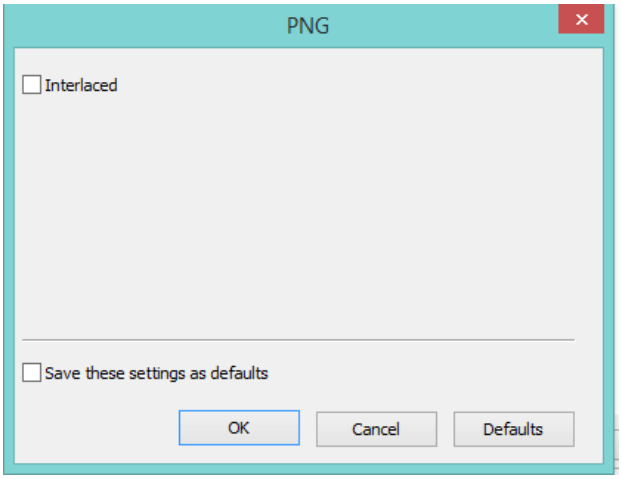


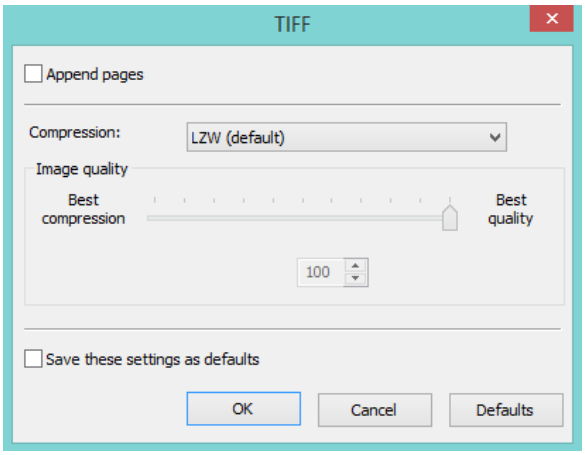
Image quality	If you save an image in JPEG format (*.jpg), you may adjust image quality in the edit box. The values range from 0 to 100. Default value is 75.
Progressive	The default is unchecked.
Optimize Huffman codes	The default is unchecked.
Smoothing	The values range between 0 and 100. The default value is 0.
Save these setting as defaults	When saving a file, the current settings will be saved as defaults for the next file save operation.

PNG



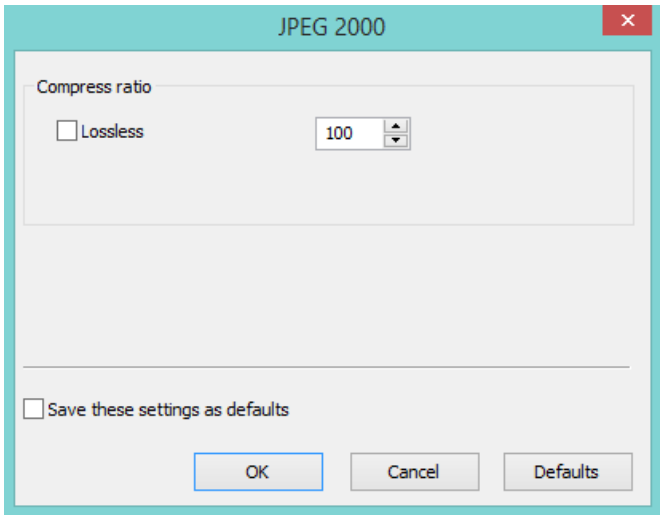
Interlaced	The default is unchecked.
Save these setting as defaults	When saving a file, the current settings will be saved as defaults for the next file save operation.

TIFF



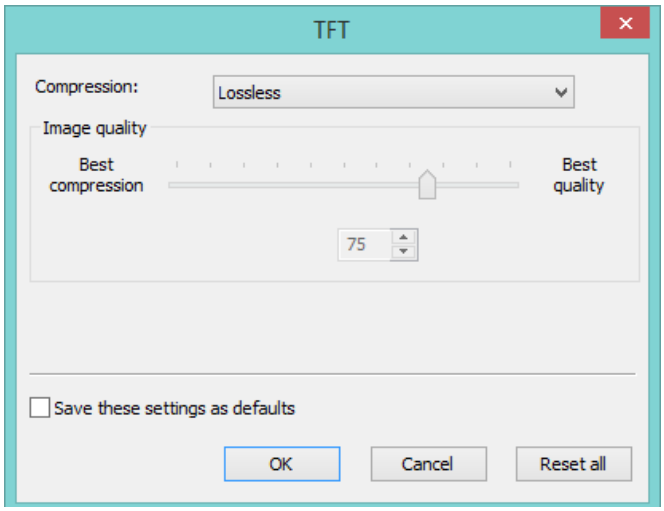
Appended Pages	Determine whether the current image will be saved in multiple pages' style or not.
Compression	Specifies a method for compressing the composite image data. For saving a 32-bit TIFF file, one can specify that the file be saved with predictor compression.
Image Quality	If choosing Compressions as "JPEG", the Image quality can be adjusted by the slider bar. The values range between 0 and 100. The Default value is 75.
Save these setting as defaults	When saving a file, the current settings will be saved as defaults for the next file save operation.

JPEG 2000



Compress Ratio	If choosing Compressions as "JPEG 2000", the Image quality can be adjusted by the slider bar. The values range between 0 and 100. The Default value is 0.
Save these setting as defaults	When saving a file, the current settings will be saved as defaults for the next file save operation.

TFT



Compression	Choose Lossless or JPG (Lossy)
Image Quality	If choosing Compressions as "JPEG", the Image quality can be adjusted by the slider bar. The values range between 0 and 100. The Default value is 75.
Save these setting as defaults	When saving a file, the current settings will be saved as defaults for the next file save operation.

Note For Bitmap (*.bmp), PCX (*.pcx), Targa (*.tga); There is no **Option choices**.

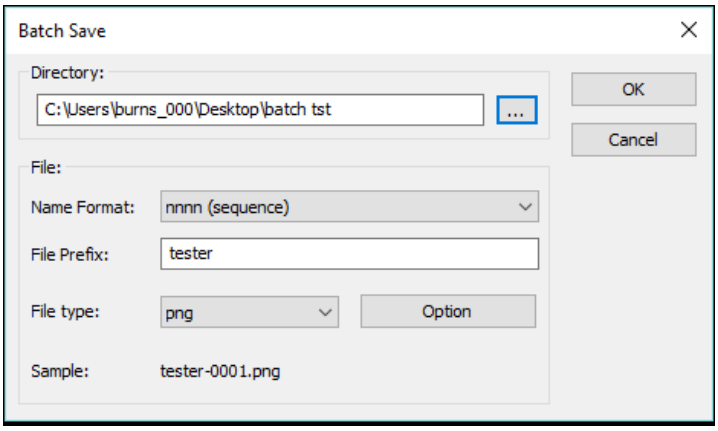
Batch Save…

The **File>Batch Save•••** command will be enabled when:

a) An image is opened.
b) An image is captured from the camera using **Snap**.
c) An image window is created by choosing the **File>Paste as New File** command.
d) An image window is created copied from the **Undo/Redo** Sidebar.

To start the **File>Batch Save•••**command, you have to:

1. Choose the **File>Batch Save •••** command which will bring up a Batch Save dialog:



Directory: Enter the name of the drive and directory where your captured images will be saved. You may either type the path information or use the Browse button to locate it from a standard Browse Folder dialog.

Name Format: The year, month, date, hour, minute and second or a number **nnnn** (sequence) are used as part of the filename. If more files are saved within a second when using a time format, a (xx) suffix is attached to the end of Name Format to avoid the possible name conflict. For the **nnnn** (sequence) "Name Format", no suffix is needed.

File Prefix: Enter a file name prefix for Batch Save when generating files names for a series of images. This prefix will be combined with Name Format to form a final file name naming paradigm.

File Type: In this combo box, select the format in which you want the image to be saved (can be BMP, JPG, PNG, TIF). Click the **Option Button** to set the different parameters for encoding the file (For BMP format, the Option will be disabled. See **File>Save As •••** command about the details of the format encoding methods).

Sample: The final file name is shown at the right of the Sample label for quick reference to see if you like it.

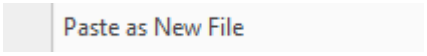
2. Once the settings are made, **Left-Click** the **OK** button to begin the file batch save process or **Cancel** to cancel the **File>Batch Save •••** command and return to the application.

Note

When the **File>Batch Save•••** command has finished, the **Title** on the **Image Tab** or **Image Window** will be modified with the file name formed in the **Batch Save dialog**.

The **File>Batch Save•••** will perform no saving operation if the file is not modified.

Paste as New File



The **File>Paste as New File** command will be enabled when there is valid image data on the clipboard first (see the **Edit>Copy** command). If there is no image data on the clipboard, the **File>Paste as New File** command will be disabled.

Choose the **File>Paste as New File** command to place the contents of the clipboard image into a new image window, which becomes the active image. The new image type will be the same as that of the original image.

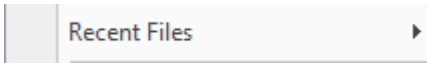
This is useful for bringing in a previously saved image (that you have selected via the operating systems **copy command**) into the **MallincamSky Image Window**. You can modify the image properties via the **Image Menu** choice (see **Image** section in user Manual).

MallincamSky will accept image data from other applications via the clipboard as long as it is in Windows Bitmap (DIB) format.

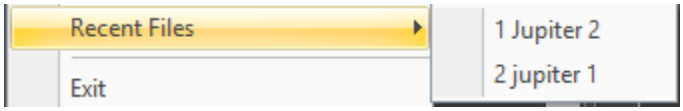
Note

MallincamSky will assign a digit to the **Paste as New File** command in the created image window **Title Bar**.

Recent Files

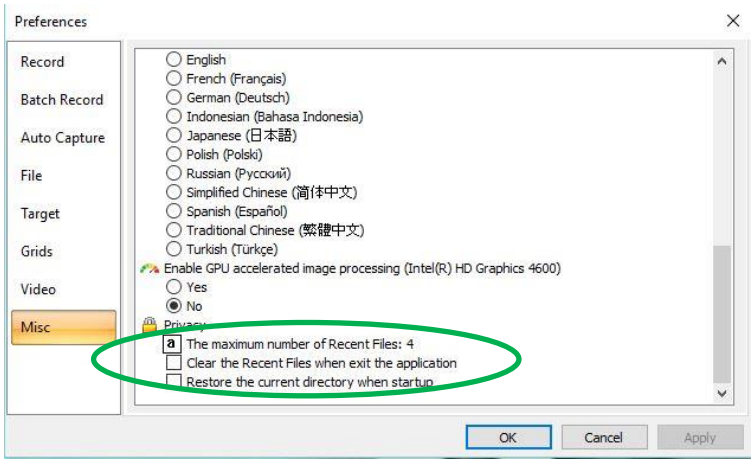


MallincamSky maintains 4 (default) of the most recently opened document files under the **Recent Files** command. Choosing one of these submenus will reopen that file immediately.

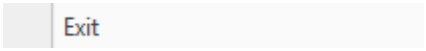


Note

- The maximum number of **Recent Files** can be modified by choosing the **Options>Preferences•••** command and clicking the **Misc** selection. Here, clicking the **4** (default) edit box will allow you to enter the number of the Recent Files Submenu that you want. The value ranges from **0** to **8**, the default is **4**;
- One can also check the **Clear the Recent Files when exit the application** to clear the Recent Files after exiting the **MallincamSky** application.



Exit



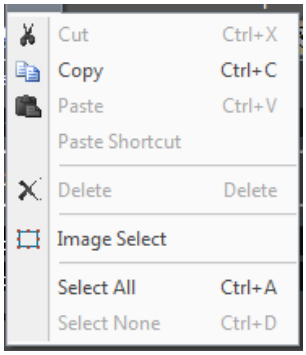
Choosing the **File>Exit** command will close video, all of the image windows and Browse window and remove their windows from the screen. After all of the windows are closed, MallincamSky will end itself.

Note

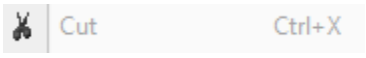
If an image has been modified before attempting to **Exit**, **MallincamSky** will issue a warning to ask if user wants to save the images or not.

Edit

This **Drop-Down Menu** will allow you to **Cut**, **Copy** and **Paste Layers** over your images. From the **Edit Menu** you can also select a **Region of Interest** (**ROI**) from your **image** and copy it to the **Windows Clipboard**, or even **de-select** the **ROI** if you have changed your mind.

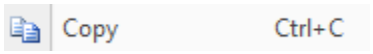


Cut



This command is or future implementation (I cannot find a use for this command).

Copy

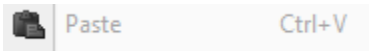


This **Edit>Copy** command can be used to copy a selected part of your image (see **Select Image** command) to the **Windows Clipboard**. Then you can use another software's **Paste Command** to place this selected image inside that software, or **File>Paste as New File** to paste into a new MallincamSky Window.

Hint

Using the Select Image command, you can select a region of your currently live image (using the **Left-click Hold and Drag technique**) then choose **Edit>Copy** (or **Ctrl+C**). Now you can **Paste** that selected image into another document (such as **Microsoft Word,** or **Microsoft Paint**) for later use.

Paste

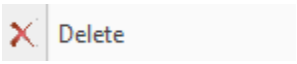


This control allows you to place a **Copied File** (you have previously selected the **File** and then used **Edit>Copy**) into your currently selected folder. Remember to use **File>Paste as New File** to paste image into a new MallincamSky Window.

Paste Shortcut

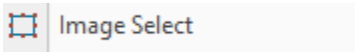
This control allows you to place a **copied File Shortcut** (you have previously selected the **File** and then have used **Edit>Copy**) into your currently selected folder.

Delete



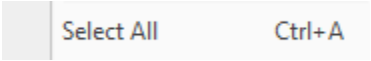
This control allows you to **delete** a selected file from your currently selected folder.

Image Select



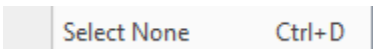
You can select a **Region of Interest** on your **Image Tab** (live or static) by using the **Left-Click Hold and Drag** technique. Once selected then you can **Copy** (**Ctrl+C**) the selected region and then **Paste** it into another software program.

Select All

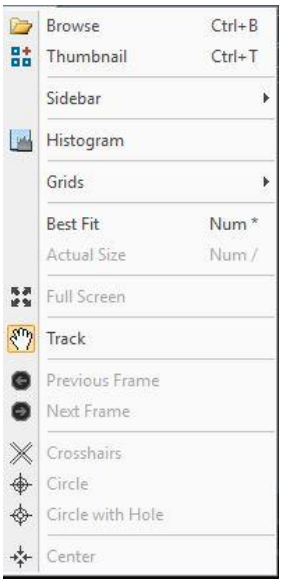


You use this command to select the **Whole Video Image Window** (live or static). Once selected, then you can **Copy** (**Ctrl+C**) the selected region and then **Paste** it into another software program or **File>Paste as New File** to paste image into a new MallincamSky Window.

Select None



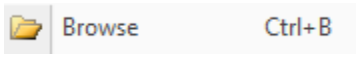
This command can be used to **De-Select** the image that was selected using either the **Image Select** or the **Select All** commands.



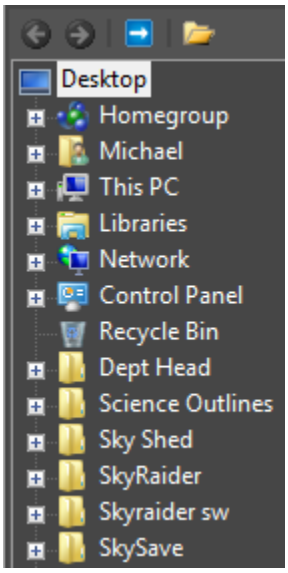
View

This **Drop-Down Menu** will allow you to **Browse** folders, **Display** or **Remove Tabs** from the **Sidebar**, **Activate Grids** or **Reticles** on the **Video Window**, Change the **Video Window Size** to match your computer real-estate, and Allow you to **move** the image around in your **Video Window**.

Browse



The **View>Browse** command from the **View Menu** (or the **Browse Icon** on the **Icon Tool Bar**) is used to browse images under the specified directory in the **Folders Sidebar**.



The **Browse Window** resembles the **Windows Explorer**. **Left-Clicking** on the **+** will expand a folder so that you can examine its contents.

You can **Right-Click** on a **Folder** (or file) and the actual Windows controls will pop as in **Windows Explorer**.

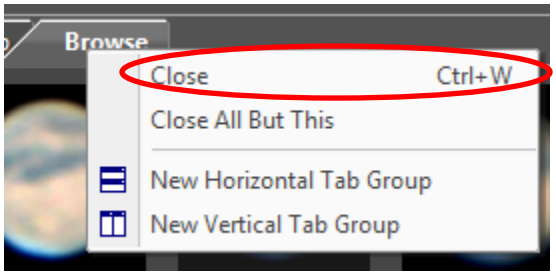
As you get deeper into the **Browse Window**, you can **Back-Out** or Move Deeper via the **Green Left** or **Right Arrow in** the **Browse Window**.

The **Blue Right Arrow** will take you to your computer's **Root Directory**.

Left-Double Clicking on a **Folder** will open up a **Window Tab** in the **Video Window** (this **Window** will be labeled **Browse**). This T**ab** will display all of the graphic files inside that Folder. If you **Left-Double Click** on a **Graphics File** inside the **Video Window**, it will open up that **Graphics File** in a new **Tab** in the **Video Window**.

Hint

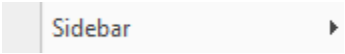
You can close the **Browse Tab** in the **Video Window** by **Right-Clicking** on the **Tab's Title** (**Browse**), then choosing **Close**.



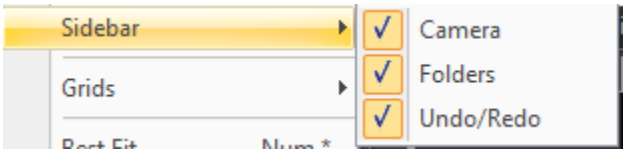
Thumbnail

The **Thumbnail control** opens an image tab and displays small (thumbnail) images of all of your current loaded or snapshotted images you have taken during this session.

Sidebar



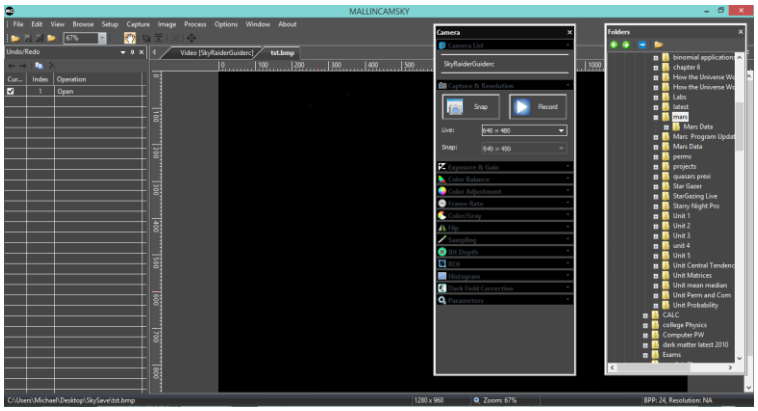
The **SideBar** can contain **3** different Tabs: **Camera**, **Folders**, and **Undo/Redo**.



Left-Click on the **SideBar** control to expand it. You will see the **3** choices (each with a **check-mark** beside it), **Left-Click** on the **check-mark** to **Select** or **De-Select** which ones of the **3** you would like to see displayed in the **SideBar**.

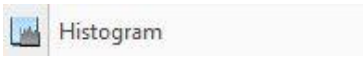
Note

The **Tabs** on the **SideBa**r can remain docked to the **SideBar** or can be free floating. Just use the **Left-Click Hold and Drag** technique to move the **Tab** to another location on your **Desktop Window**.



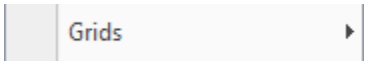
To **Dock** the **Floating Tab** back to the **SideBa**r, just **Left-Double Click** on its **Name**.

Histogram

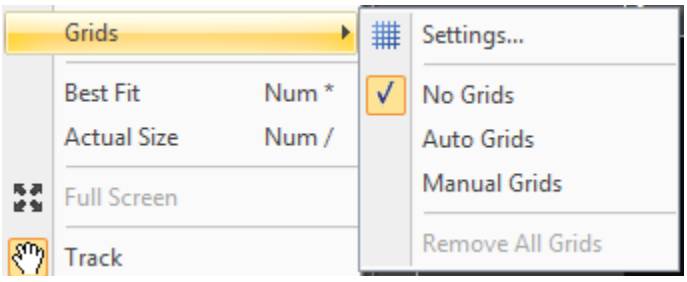


Selecting the **Histogram Control** splits the image screen with your live image on the top half and a live Histogram on the bottom half. You have an option to view the Histogram data as linear or logarithmic. **Clicking** on the **Histogram Control** again, closed the Histogram window.

Grids



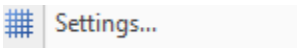
The **View>Grids** control has the ability to display a grid overlay on top of your **Video Window**. You can use the **Auto Grid** style of create your own grid format.



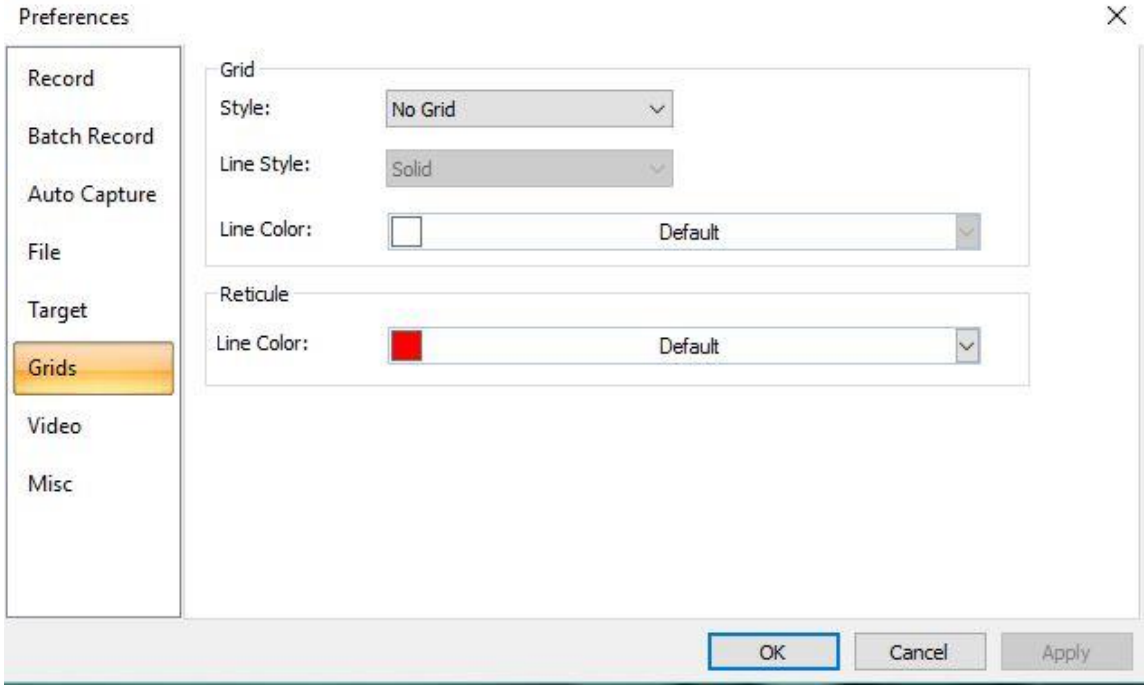
Left-Click on the choice you require (No Grids, Auto Grids, or Manual Grids) to activate.

Auto Grids

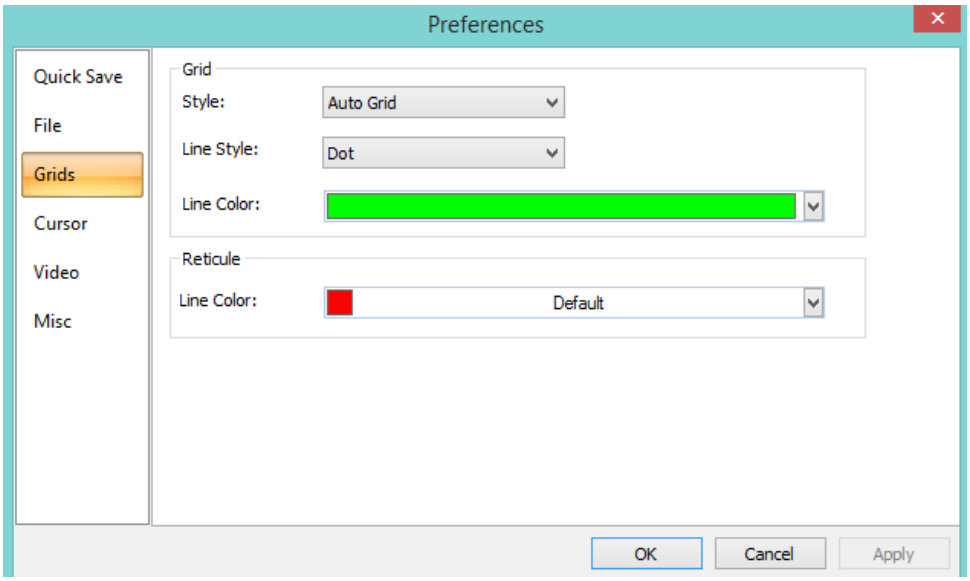
Auto Grids can be set in the **View>Grids>Settings** control.



This command will pop-up the **Preferences Window**.



Left-Click on the **Grids** option on the left of the **Preferences Window** and adjust the **Style** (No Grid, Auto Grid, and Manual Grid), **Line Style** (Solid, Dash, Dot, or DashDot), and **Color** that you are interested in.



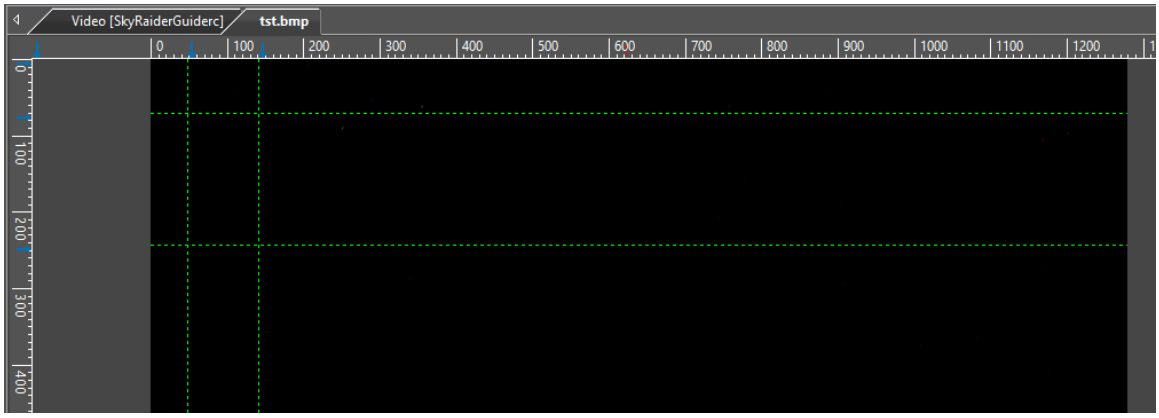
Left-Click on the **Apply** button to display the **Grid**, then **Left-Click** on **OK** to accept.

Manual Grids

Choosing this control will display two small **Blue Right Arrow** and **Down Arrows** overlaid on the top of the **Vertical Ruler** and on the left of the **Horizontal Ruler** as shown below:

Use the **Left-Click Hold and Drag** technique to move the **Blue Down Arrow** along the **Horizontal Ruler** to where ever you want. When it is dragging over the video/image, there will be a **Vertical Line** (in the **Color** and **Style** chosen by you) aiding you in judging where to release this line on the video/image. You can drag as many lines as you require to overlay them on the video/image.

Similarly, you can drag down as many **Vertical Lines** as you like to create **Vertical Grids**.



Hint

You can at any time, grab and move the **Blue Arrows** to adjust the locations of the **Horizontal** and **Vertical Grid Lines**.

No Grids

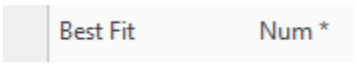
The **No Grids** control can be used to **temporarily remove** the grid overlay from the **video/Image**.

If you re-select **Manual Grids**, your previous designed **Grid Lines** will re-appear.

Remove All Grids

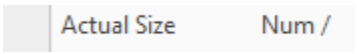
This will **remove** the **Grid Overlay** from your **video/image**. It will also **delete** your **Manual Grid Lines** settings (thus allowing you to create a new set of **Manual Grid Lines**).

Best Fit



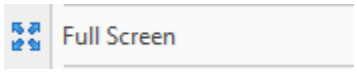
Select the control **View>Best Fit** to automatically resize the **image/video** to fit inside the **Video Window Tab**.

Actual Size



Select the control **View>Actual Size** to **reset the Zoom** to 100% (**Actual Size** will be disabled if the **View** is already set to 100%) and place the **image/video** inside the **Video Window Tab**.

Full Screen



Selecting the **View>Full Screen** control will display the video window in full screen mode. You will not see any commands or controls while in this mode.

Pressing the **Esc** key on your keyboard will return MallincamSky to the **Default Video Window**.

Track

If the **video/image's** actual size is larger than the **video/image Window**, then this control will allow you to position the actual **video/image** within in the **video/image Window**. This control is activated automatically when necessary.

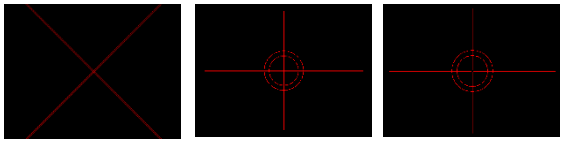
Its function is similar to the scroll bars. It is an alternative to using the arrows on the scroll bars for positioning the **video/image** within the window. Position the mouse

(make sure to choose a location outside a **Region of Interest** rectangle. You may need to close the **ROI** rectangle if necessary) on the actual **video/image**.

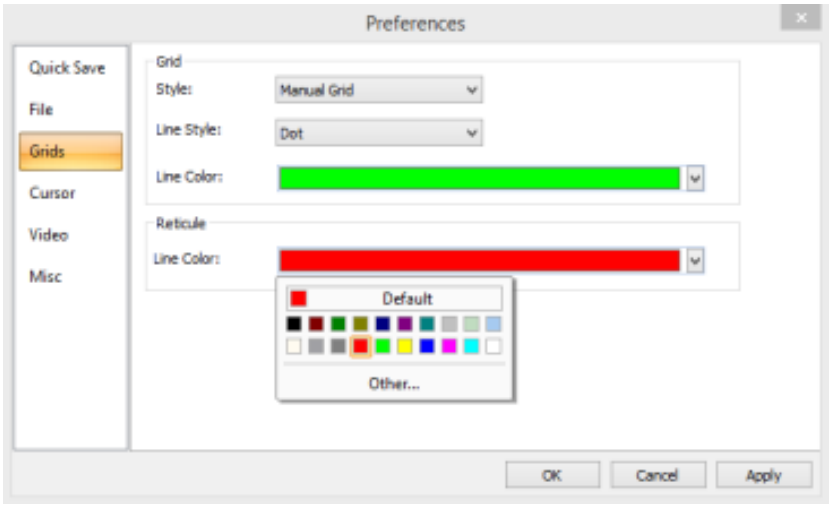
Left-Click and Hold (the **Open Hand** will change to a **Closed Hand**). Now drag the image around inside the video/image Window

If the **video/image** size is smaller than the **video/image Window** size, then the track operation will be disabled.

Reticles



MallincamSky provides three Reticles (or cross-hairs) styles to aid in aligning your telescope to a star (or another stellar object). You can change the **color** of the Reticle via the **Option>Preferences** control in the **Top Menu Line**.



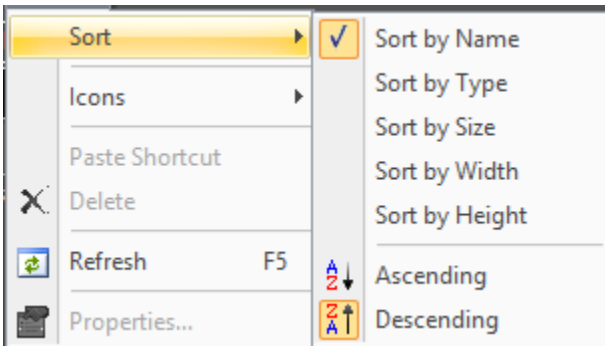
Left-Click on Reticle icon to Activate and **Left-Click** again on Reticle icon to **De-Activate**.

Browse

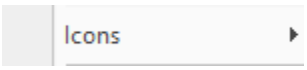
This command is used to determine how **MallincamSky** should display the graphic files when you are **viewing the Folders**. This command will allow you to change the size of the image icons, determine how to sort the files, add shortcuts to the folders, delete files, refresh the folders, and even determine the properties of the image file all without having to perform these tasks thru **the Windows Environment.**

Sort

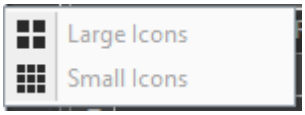
This control allows you the option of rearranging the image files via a variety of choices (**Name**, **Type**, **size**, **Width**, and **Height**. All in either **Ascending** or **Descending** order.). Just **Left-Click** on the choice that best suits your needs and **MallincamSky** will automatically rearrange the files.



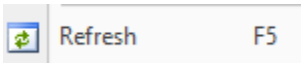
Icons



This control allows you to display the **Graphic Files** as either **Large** or **Small** Icons. Simply **Left-Click** to make your Selection.

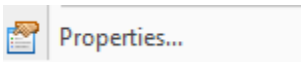


Refresh



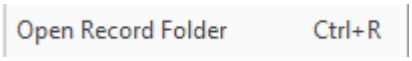
This control allows you to **refresh** the contents of the currently selected folder.

Properties



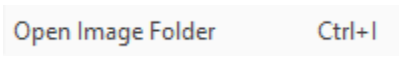
This control will display the current File **properties** for the **Graphics File** that you have selected (This is identical to **Right Clicking** on a File while using **Windows Explorer**).

Open Record Folder



This control will display the current **Video Record Folder** (the default Video Record Folder is selected thru the **Options->Preference** Command).

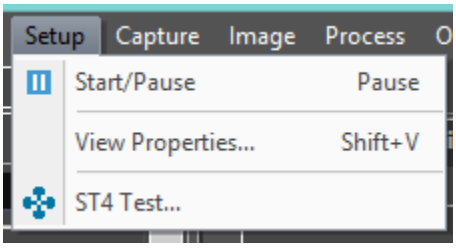
Open Image Folder



This control will display the current **Image Folder** (the default Image Folder is chosen by using the **Options->Preference** Command).

Setup

This **Top Menu Line Command** is used to provide you information about the SkyRaider **DS287 Camera** activated thru **MallincamSky**, as well as test the ST4 port on the camera. You can also pause the Video image on the Video Window from here.

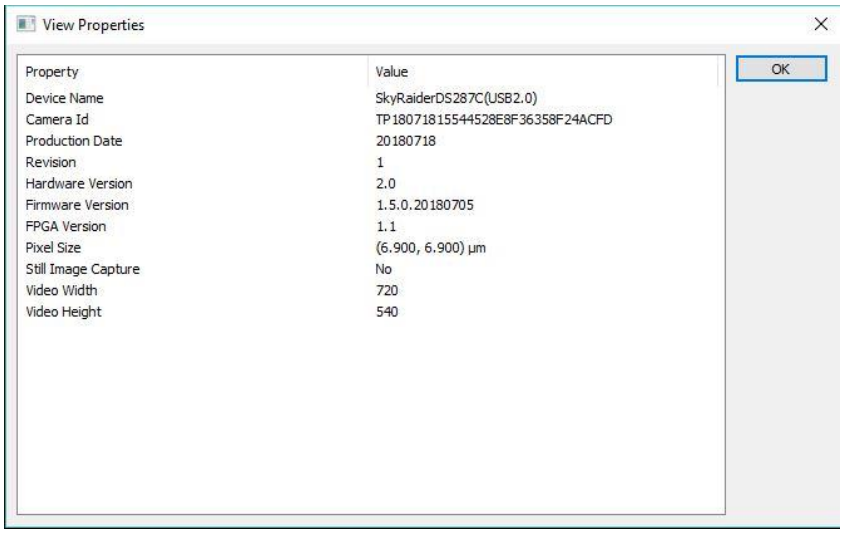


Start/Pause

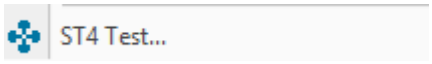
Left-Clicking on this control will **Pause** the **SkyRaider Camera's** live display. **Left-Clicking** on this control again will activate the live display.

View Properties…

Left-Clicking on this control will pop-up the **View Properties Window** that contains information about the currently activated SkyRaider **DS287 Camera**.

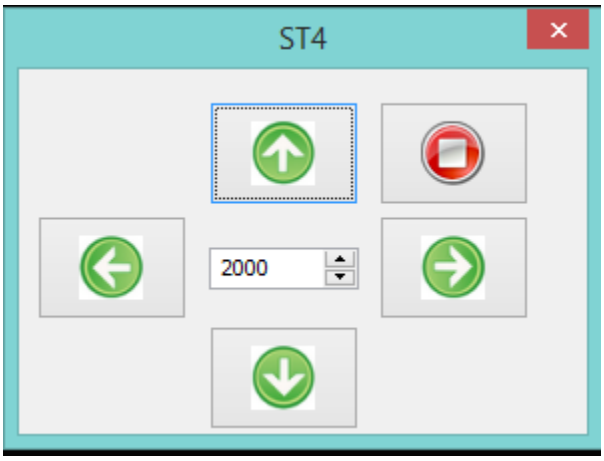


ST4 Test…



The **SkyRaider DS287 series** of cameras have a **ST4** port, so it can be used to **AutoGuide** your telescope mount.

This control is used to check if the camera can correctly communicate with the **Telescope Mount.**



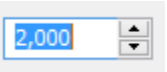
Connect the **ST4 cable** provided with the **SkyRaider DS287 Camera** to the **ST4 Port** on your **Telescope Mount**. Turn on the **Telescope Mount** to ensure that it is ready to be tested.

Left-Click on this control and the **ST4 Popup Window** will appear.

The **ST4 Window** will contain 4 **Green Arrow** keys that when pressed will send a specific direction command thru the **ST4 cable**. Press each **Green Arrow** and note if the **Telescope Mount** moves in a specific direction.

Due to the various orientations of the **SkyRaider Camera** once inserted inside the telescope, the **Green Directions Arrows** will not necessarily match the direction of **Mount** movement. Don't worry, all **guiding software** will automatically orient itself with the movements.

You can abort the movement by **Left-Clicking** on the **Red Stop button** in the **ST4 Popup Window**.

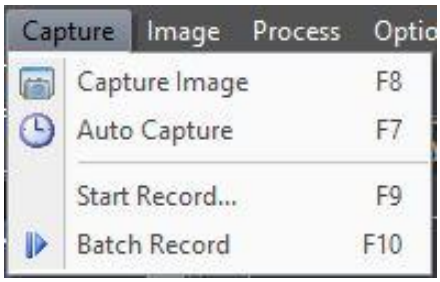


The **number box** located in the middle of the **4 Green direction Buttons** can be **increased** or **decreased** to affect the distance the **Telescope Mount** moves when a **Green Direction Button** is pressed. You can directly enter a number into the **number box**, or **Left-Click** on the **up** and **down** arrows to scroll up or down the value in the **number box**.

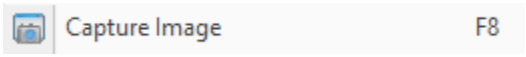
Attempt to orientate the **SkyRaider Camera** in the eye piece holder of the telescope in such a manner as to match the **Green Directions Buttons** movement of the stars in the video display.

Capture

This **Top Menu Line** command allows you a more in-depth capture routine of either a **still image** or a **video stream**. This command will offer connection to **Night Skies Network** (**NSN**) in future releases.



Capture Image



During the **video preview**, you can always choose the **Capture>Image Capture** command to capture the video image. After the image is captured, the captured image (**still image**) will be placed the current active window with an automated title (0001*).

The **Capture>Capture Image** menu now be disabled (as you are now viewing a still image). If you wish to capture another image again, **Left-Click** the active video window (**Video [SkyRaiderDS287]**) title to activate the **Video Window** and the **Capture>Capture Image** menu will be enabled again.

Hint

The **Snap Button** on the **Camera SideBar** can continuously shoot the image even if the video window is not activated. **Left-Click** this **Snap** button on the **Camera Sidebar** to a capture image quickly

Note

Only when the **video** window is active, the **Capture>Capture Image** menu will be enabled. If the **Live** and **Snap** resolutions are different, then **MallincamSky** needs to switch the resolution from **Live** to **Snap** in the background to capture an image with **Snap resolution**. After the **Snap** is finished, then **MallincamSky** will switch back to the **Live resolution** to continue the video stream process. Therefore, it will take more time to capture a still image.

Auto Capture

This function can capture a sequence of pictures when using either **Video Mode** or **Trigger Mode**.

Note

First you must set up the location, File Format, Prefix, number of exposures required in the **Options>Preferences Tab** (see **OPTIONS Tab** for more detail).

To start the capturing process, just **Click** on this tab or press the **F7** Function key.

Note: Tab name will change to **Stop Capture**, so **Click** on it to stop the process.

You will see a counter on the bottom left of the screen indicating the capture process i.e. **05/20** (this says taking the 5th image of the required 20).

Start Record…

Note

First you must set up the location, File Format, Prefix, and duration required for the video in the **Options>Preferences Tab** (see **OPTIONS Tab** for more detail).

To start the capturing process, just **Click** on this Tab or press the **F9** Function key.

Note: The Tab name will change to **Stop Capture**, so **Click** on it to stop the process.

Hint

Follow instructions in **User Manual** on using the **Record Button** on **Left Side Panel**, to record video in **Trigger Mode** as this command is identical.

Note

The only way to view Videos (must be saved in **ser** format) using **MallincamSky** is to **Right-Click** on **Video Tab** to **Close** that Video Window, then you will be able open a video using the **File>Open Video** command.

Note

When capturing; the resolution is chosen from the **Capture & Resolution** settings in the left window pane. You will also notice that the **Blue Arrow Record** icon now change to a **Red Stop** icon. Clicking on this Button will stop the capture process.

Hint

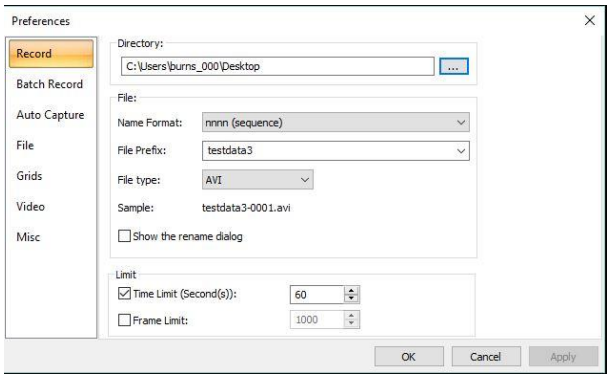
Use **Windows Explorer** to View your saved videos.

Batch Record

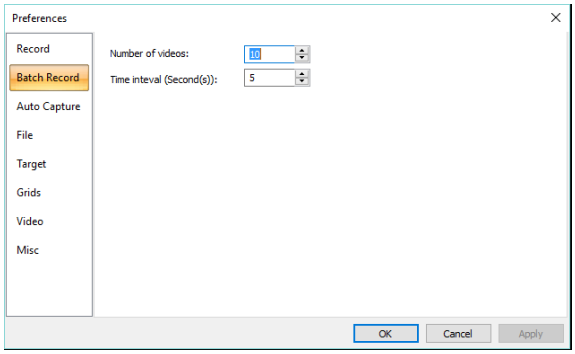
This command will allow you to save a sequence of video onto your computer. You will need to have already chosen the location, number and duration of the videos in the **Option->Preferences…** tab.

See **Options->Preferences…** Tab for more detailed information on setting up the parameters for Batch Record, but below is a quick walk-through

In the **Record Tab** in **Options->Preferences…**, choose the location and file type and duration for recorded Video Files



In the **Batch Record Tab** in **Options->Preferences…**, chose the number of Videos to be recorded, plus the time interval between each Video.



Once these have been set, all you need to do is **Click** on the **Batch Record Tab** (**F10**) in the **Capture Tab**.

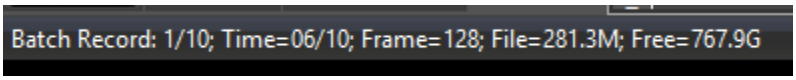
MallincamSky will automatically start the recording process (notice how the **Batch Record Tab** has changed (and the **Record Button** on **Main Window** turns to a **Red STOP** symbol), it remains highlighted).

By **Clicking** on the **Batch Record Tab** again, MallincamSky will then abort the whole capturing process.

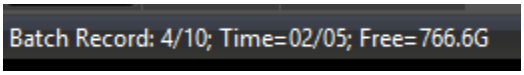
By **Clicking** on the **Red STOP** symbol, MallincamSky will only abort the current Video, but will continue with the next sequence.

MallincamSky will also provide you in a status on how the recording are going by displaying a Status Information line on the bottom of its window.

It will provide you the current status of the Recording process

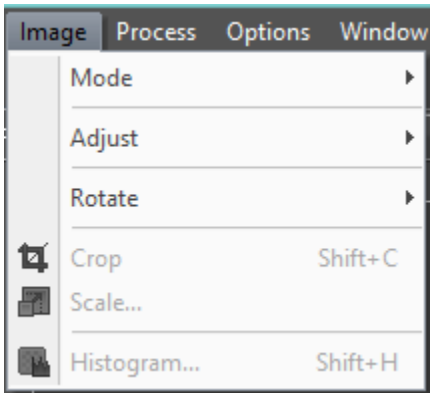


And the current status of the pause between each Recording.



Image

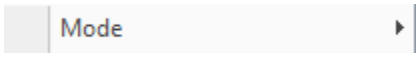
The Image menu will allow you to adjust the properties or any **captured image** in an active Image Tab in MallincamSky video/image window.



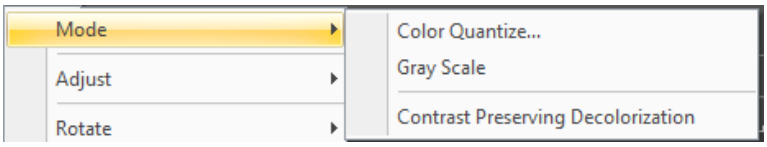
Hint

You can use the **SideBar's Undo/Redo Tab** to revert any correction back to a previous state.

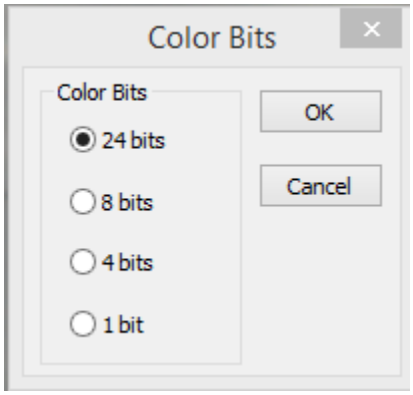
Mode



The Mode Control will give you the ability **Color Quantize**, **Gray Scale**, and **Decolorize** the selected **still image**.



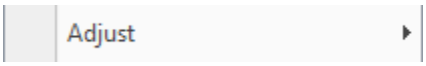
The **Color Quantize•••** command is widely used to change the image bit. **MallincamSky** supports the mutual changes among 24-bit, 8-bit, 4-bit or 1 bit images. When the **Colour Bits** dialog is opened, the default checked color bit is the current image's color bit. Check the desired bit and click **OK** to end the command. The image will be converted to the selected color bits in the image window.



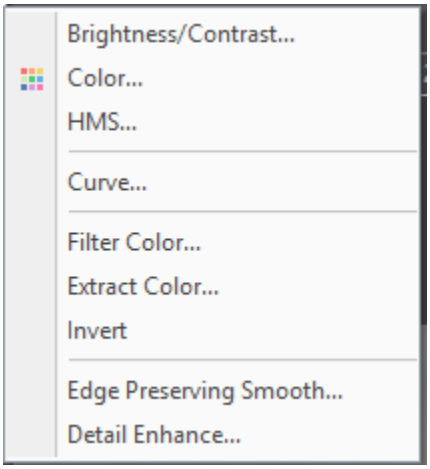
The **Gray Scale command** to convert a color image (true color image or index color image) to a gray scale image. If the original image is 24 bit, the new image is 8 bit. Otherwise the bit of the image will not be modified.

The **Contrast Preserving Decolorization** command to convert a color image (true color image or index color image) to a gray scale image with a unique algorithm to preserved as much of the color contrast for each channel into Monochrome image. If the original image is 24 bit, the new image is 8 bit. Otherwise the bit of the image will not be modified.

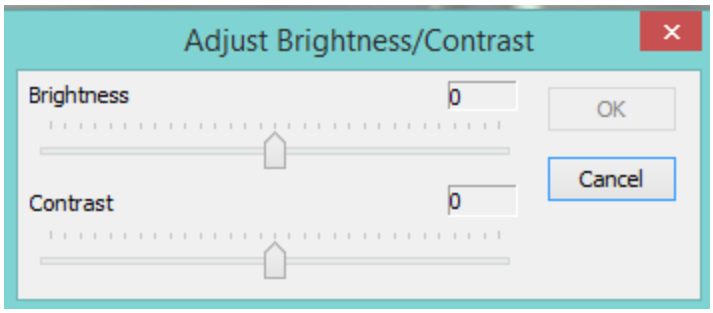
Adjust



The Adjust menu will allow you to adjust the Brightness and Contrast of the image. You will be able to modify the RGB Color balance, as well as the **High Lights**, **MidTones** and **Shadows** values. Color Curves and Filtering algorithms are also in the menu control. You will have the ability to Invert the image as well as perform some Detail Enhancement procedures on the image.



Adjust Brightness/Contrast



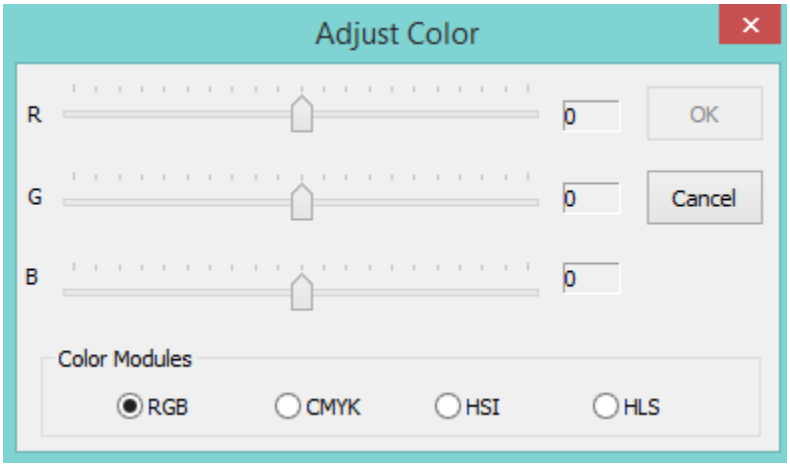
The **Image>Adjust>Brightness/Contrast•••** command offers simple adjustments to the tonal range of an image. This command makes the same adjustment to every pixel in the image. The **Brightness/Contrast** command does not work with individual channels and is not recommended for high-end output because it can result in the loss of details about the image.

Brightness: Dragging the slider bar to the left decreases the level and dragging it to the right increases the level. The numbers on the right of the slider bar displays the Brightness value. Values can range from **-150** to **+150**. The **Default** value is **0**.

Contrast: Dragging the slider bar to the left decreases the level and dragging it to the right increases the level. The numbers on the right of the slider bar displays the Contrast value. Values can range from **-150** to **+150**. The Default value is **0**.

Make your adjustments to the **Brightness** and **Contrast values** and **Left-Click** on **OK** to accept.

Color



Choose the **Image>Adjust>Color•••** command to modify the overall mixture of the colors in an image.

There are **four** color modules that are supported by **MallincamSky**:

RGB

MallincamSky uses the **RGB** model. It assigns an intensity value to each pixel ranging from 0 (black) to 255 (white) for each of the **RGB** components in a color image.

For example, a bright red color might have an **R** value of 246, a **G** value of 20, and a **B** value of 50. When the values of all three components are equal, the result is a shade of neutral gray. When the value of all components is 255, the result is pure white; when the value is 0, pure black.

RGB images use three channels to reproduce up to 16.7 million colors on-screen. In addition to being the default mode for new Mallincam images, the **RGB** mode is used by computer monitors to display colors. This means that when working in color modes other than **RGB**, such as **CMYK**, **MallincamSky** uses **RGB** mode for display on-screen.

Although **RGB i**s a standard color mode, the exact range of colors represented can vary, depending on the application or display device.

CMYK

The **CMYK** mode is based on the light-absorbing quality of ink printed on papers. As white light strikes translucent inks, certain visible wavelengths are absorbed while others are reflected back to the eyes.

In theory, pure cyan (**C**), magenta (**M**), and yellow (**Y**) pigments should combine to absorb all light and produce black. For this reason, these colors are called subtractive colors. Because all printing inks contain some impurities, these three inks actually produce a muddy brown and must be combined with black (**K**) ink to produce a true black. (**K** is used instead of **B** to avoid confusion with blue.) Combining these inks to reproduce color is called four-color process printing.

The subtractive (**CMY**) and additive (**RGB**) colors are complementary colors. Each pair of subtractive colors creates an additive color, and vice versa.

HSI

Based on the human perception of color, the **HIS** model describes three fundamental characteristics of colors:

Hue is the color reflected from or transmitted through an object. It is measured as a location on the standard color wheel, expressed as a degree between 0° and 360°. In common use, Hue is identified by the name of the color such as red, orange, or green.

Saturation, sometimes called Chroma, is the strength or purity of the color. Saturation represents the amount of gray in proportion to the hue, measured as a percentage from 0% (gray) to 100% (fully saturated). On the standard color wheel, Saturation increases from the center to the edge.

Intensity is the relative lightness or darkness of the color, usually measured as a percentage from 0% (black) to 100% (white).

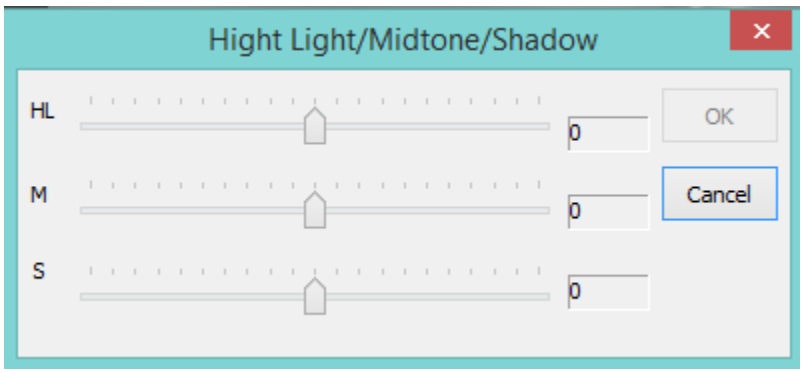
HLS

The **HLS** model is very similar to the **HSI** color model. The main difference between them is the calculation used to produce the brightness value. In the HLS model, a pixel's brightness (**L**) is derived from its three (R, G and B) color values. That is, a pixel's brightness (**L**) is determined by the minimum and maximum values of its three-color values.

The values beside the slider bar show the color changes in various color channels.

- The **RGB** channel values can range from -100 to +100. The Default values are 0.
- The **CMYK** channel values, they can range from -100 to +100. The Default values are 0.
- In the **HSI** channel, the **H** value can range from -180 to 180, the **S** value can range from -275 to 275, and the **I** value can range from -442 to 442. The Default value are 0.
- In the **HLS** channel values, the **H** value can range from -180 to 180, the **L** value can range from -100 to 100, and the **S** value can range from -100 to 100. The Default values are 0.

HMS

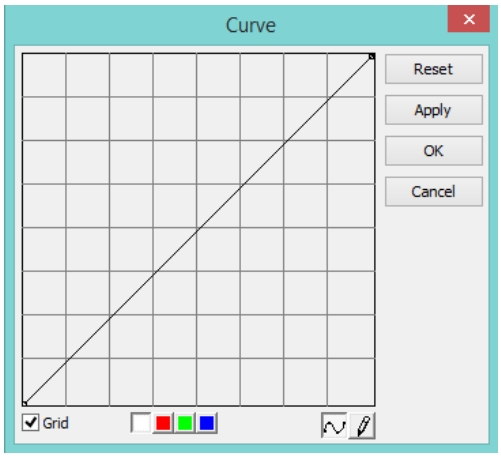


Select the Image>Adjust>HMS••• command to adjust the **HL** (Highlight), **M** (Midtone), and **S** (Shadow) parts of the image.

Each part's value ranges from -100 to 100. This command is only available for 24-bit true color image.

Curve

Sometimes you may desire more precise control, or more unusual, nonlinear effects. The Curves tool in MallincamSky provides more arbitrary remapping of the color channels; it is the color-correction tool of choice among many print and photographic professionals.



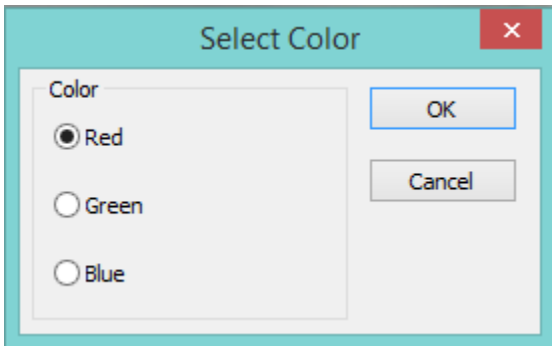
Using Curves, the input-output mapping of color channels can be defined by an arbitrary cubic spline or can be drawn freehand. This flexibility provides extreme generality.

It is worth the effort to review how color curves work in such graphics programs such as Photoshop (tons of information about curves on the internet).

Filter Color…

Select the **Image>Adjust>Filter Color** command to filter out a special color channel from a color image. Check either **Red**, **Green**, or **Blue** color to filter.

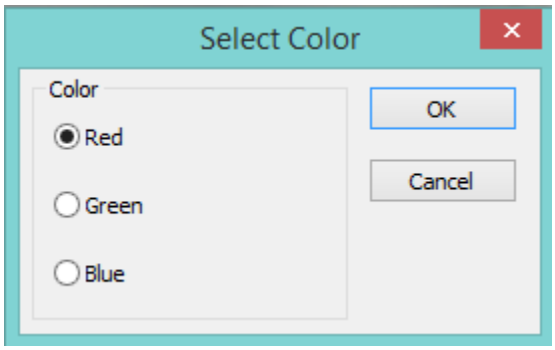
For Example, if **Red** color is checked, then only information about the **Red** channel will be discarded. The **Green** and **Blue** information will remain there.



Extract Color…

Select the **Image>Adjust>Filter Color** command to retain a special color channel from a color image. Check either **Red**, **Green**, or **Blue** color to filter.

For Example, if **Red** color is checked, then only information about the **Red** channel will be retained. The **Green** and **Blue** information will be discarded.

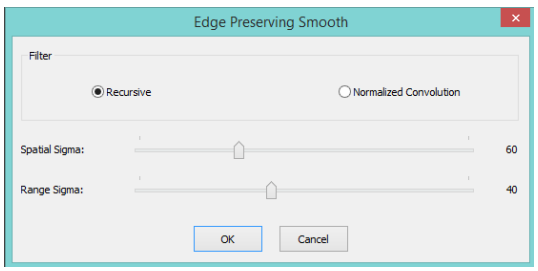


Invert

Select the **Image>Adjust>Invert** command to reverse the pixel values of the active image.

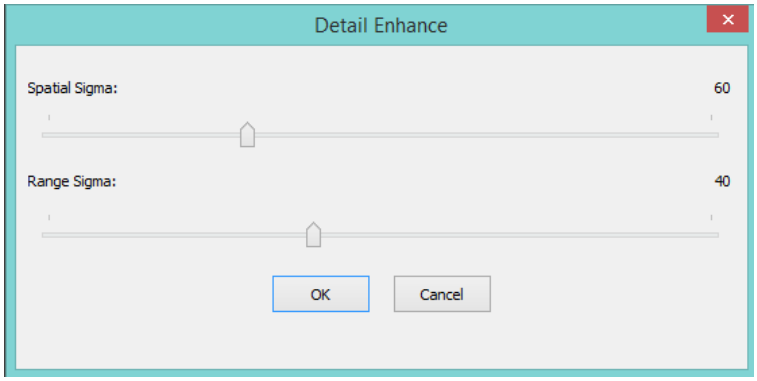
Edge Preserving Smooth

This control looks for the most homogeneous neighborhood area around each point in a picture, and then gives each point the average gray level of the selected neighborhood area. It removes noise in a flat region without blurring sharp edges, nor destroying the details of the boundary of a region. This smoothing also has the ability to sharpen blurred edges.



Choose either a **Recursive** or the **Normalized Convolution**. By adjusting the **Spatial Sigma** (like the domain) and the **Range Sigma**, you can affect how many pixels the algorithm uses when applying the smoothing.

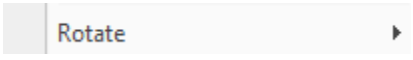
Detail Enhance



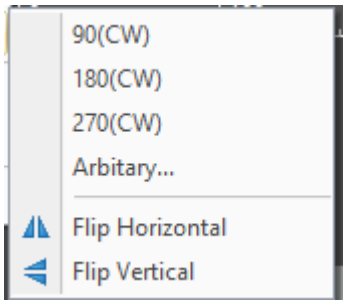
This filter works by identifying sharp edge boundaries in the image, such as the edge between a subject and a background of a contrasting color and increasing the image contrast in the area immediately around the edge. This has the effect of creating subtle bright and dark highlights on either side of any edges in the image, called overshoot and undershoot, leading the edge to look more defined when viewed from a typical viewing distance.

Choose either a **Recursive** or the **Normalized Convolution**. By adjusting the **Spatial Sigma** (like the domain) and the **Range Sigma**, you can affect how many pixels the algorithm uses when applying the smoothing.

Rotate

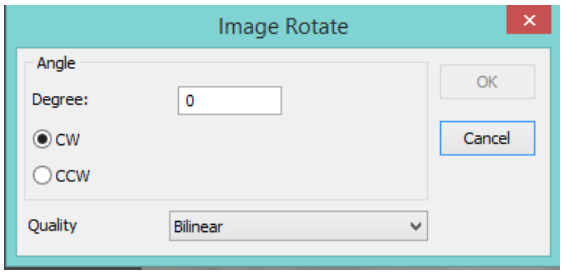


This control allows you to rotate and or flip your image across an axis.



Your options include:

- Rotate the image90 degrees Clockwise (CW)
- Rotate the image 180 degrees Clockwise (CW)
- Rotate the image 270 degrees Clockwise (CW)
- Rotate the image an Arbitrary amount



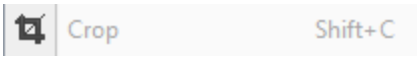
To **Rotate** the image a specified amount (in **degrees**) in a chosen direction (**clockwise** or **counter clockwise**), **Left-Click** on the **Arbitrary** control. When this option is selected, the **Image Rotate Window** will popup, where you can enter in the required values. You also have two redrawing algorithm choice for it to use when rotating the image (**Bilinea**r or **Bicubic**). **Bicubic** seems to be better for images, but it is your choice that counts.

This control also allows you to flip your image **Horizontally** or **Vertically**.

Flip Horizontal reverses the image in the application area so that the top right corner of the original image is now the top left, and the top left corner of the original image is now the top right corner.

Flip Vertical reverses the image in the application area so that the top right corner of the original image is now the bottom right corner, and the top left corner of the original image is now the bottom left corner.

Crop

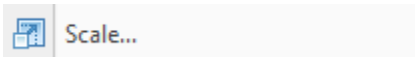


Choose the **Image>Crop** command to remove the portions of an image that does not want so that the focus is on the part of the image that is left.

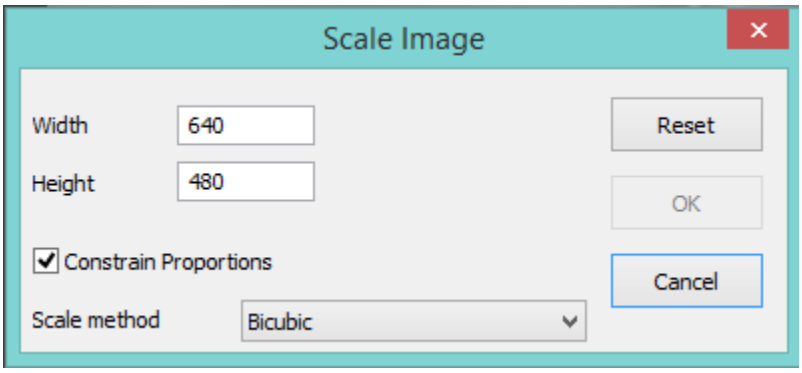
First select **Edit>Image Select** (the mouse cursor will change into cross hairs) from the **Top Menu Line**. Next use the **Left-Click Hold and Drag** technique to draw a rectangle around the portion of the image you would like to keep. Finally select **Image>Crop** and your **image window** will now only contain the portion of the original image that was inside the **Image Select's Rectangle**.

When you create an **Image Select Rectangle**, you can **Left-Click Hold and Drag** the rectangle around your full image to move it to a different location.

You can also resize the **Image Select Rectangle** by grabbing one of the little boxes around the rectangle and dragging the mouse to increase, decrease, or change dimensions of the rectangle.

Scale… 

Select the **Image>Scale•••** command to change the image to a specified size. This process actually changes spatial resolution by adding (replicating) or removing (decimating) pixels to achieve the specified dimensions.



Width and Height: When choosing the **Image Scale** command; the dialog box displays the dimensions of the original image in pixels. The **Width** and the **Height** can be set on the new image by adding or removing pixels. If **Constrain Proportions** is checked, the **Width** and **Height** will stay proportionate to each other. If the **Constrain Proportions** is unchecked, the **Width** and the **Height** can be set independently, but this will distort the image.

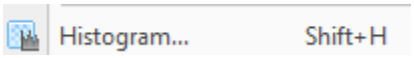
Reset: Resets the image's **Width** and **Height** to the original settings.

Constrain Proportions: To maintain the current proportions of pixel Width and Height, **check** Constrain Proportions. This option automatically updates the **Width** as the **Height** is modified, and vice versa. Otherwise, **uncheck** the Constrain Proportions button.

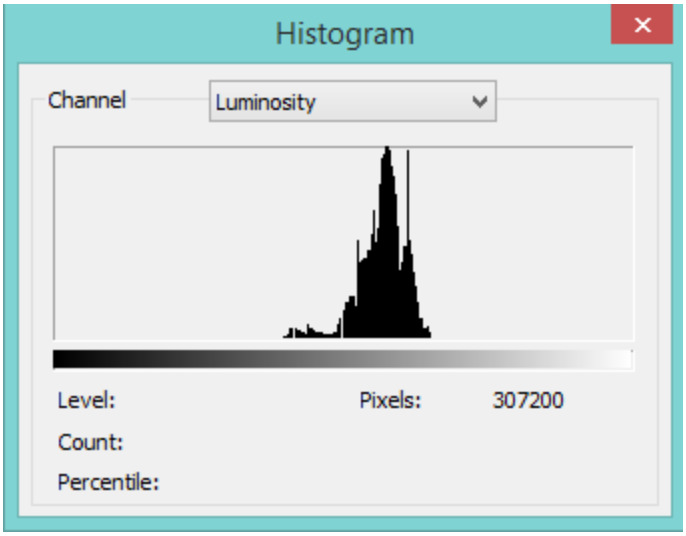
Scale method: There are 2 options for the algorithm that the **Scale method** uses to resize the image. They are: **Bilinear**, and **Bicubic**. The default scaling method is **Bilinear**.

Once you have selected your parameters, **Left-Click** on **OK** to make the new **Image Scale** final.

Histogram



A **Histogram** illustrates how pixels in an image are distributed by graphing the number of pixels at each color intensity level. The **Histogram** shows detail in the shadows (shown in the left part of the histogram), mid-tones (shown in the middle), and highlights (shown in the right part).



A **Histogram** can help you determine whether an image has enough detail to make a good correction.

A histogram is a mathematical graph that shows you the current **tonal range** of an **image**. This way you can evaluate it and, if necessary, correct it.

Tonal range refers to the range of brightness levels in the image. A histogram shows us how much of the image is currently pure black, how much is currently pure white, and how much of it falls somewhere in between.

It is very important to note that even though we're talking about brightness levels, we're *not* just talking about black and white (grayscale) images, but Histograms work equally well, and are just as important, with full color images.

This is because, even though we don't always think of color as being anything but color; yet every color in your image has its own brightness level.

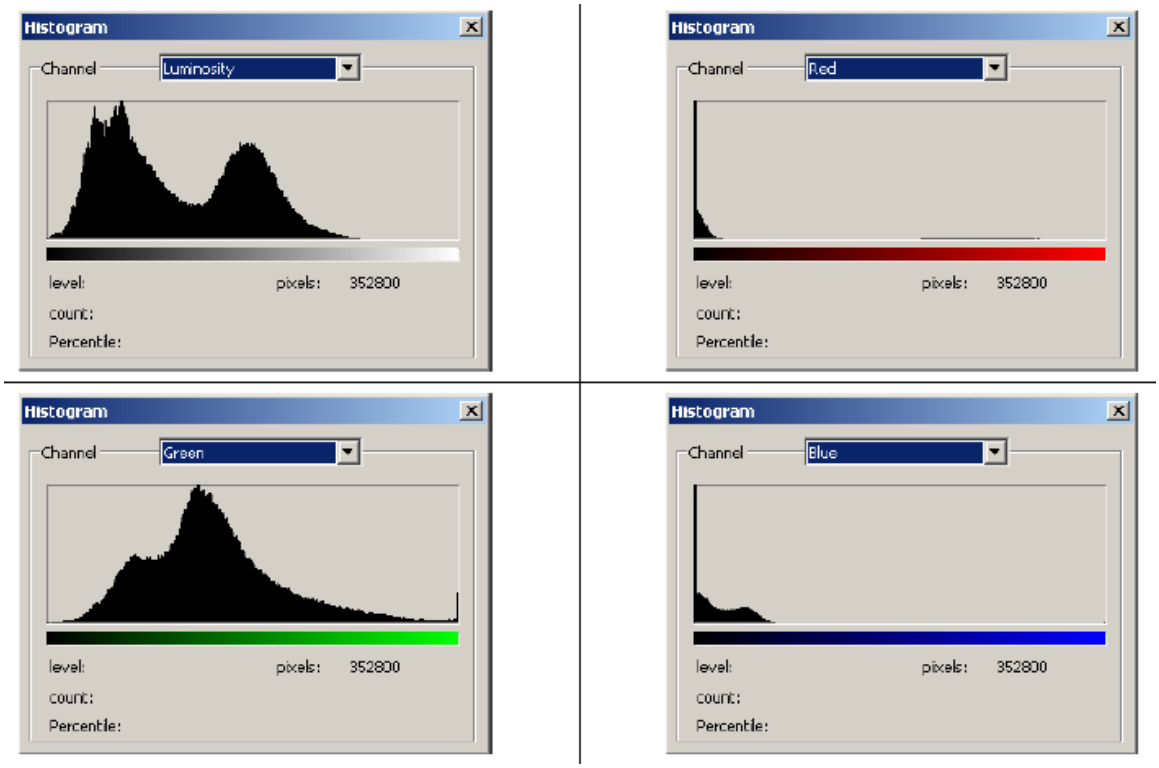
Orange, for example, are typically very light; while blues and reds are much darker. These differences in brightness values mean that color can have a huge impact on the tonal range of your image.

Do a Google Search on **How to Read and Understand Image Histograms in Photoshop** to find out more information on how to use Histograms to improve your images.

Choose the **Image>Histogram•••** command to open the **Histogram Window**. Depending on the image's color mode, choose **R**, **G** and **B**, or **Luminosity** to view a composite Histogram of all the channels.

If the image is **RGB true color**, choose **Luminosity** to display a Histogram representing the luminance or intensity values of the composite channel.

If the image is **RGB true color**, choose **R**, **G** and **B** to display a composite Histogram of the individual color channels in color.



Do one of the following:

- To view information about a specific pixel value, **place the mouse pointer in the Histogram.**
- To view information about a range of values, click down **the Left-Click hold and Drag** the mouse into the Histogram to **highlight the range**.

The Histogram Window displays the following statistical information below the Histogram:

Pixels: Represents the total number of pixels used to calculate the Histogram.

Level: Displays the intensity level of the area underneath the pointer.

Count: Shows the total number of pixels corresponding to the intensity level underneath the pointer.

Percentile: Displays the cumulative number of pixels at or below the level underneath the pointer. This value is expressed as a percentage of all of the pixels in the image, from 0% at the far left to 100% at the far right.

Note

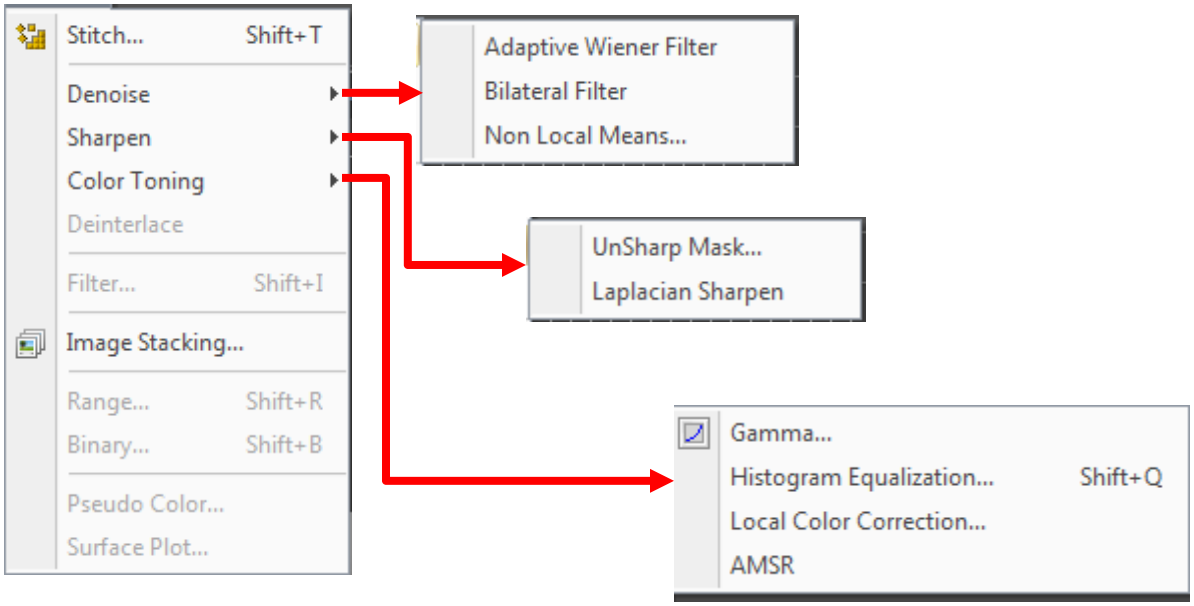
The Histogram from **Image>Histogram** (still images) provides different information about the video/image window than the **SideBar's Histogram** (live video capture).

Process

MallincamSky provides some very advance image processing tools. You can apply these tools to your **captured image** to tweak the final output. It would take a novel to explain each of these standard graphical enhancement tools. So, I will leave it up to you to Google Search the enhancement type to see if it is something you could use.

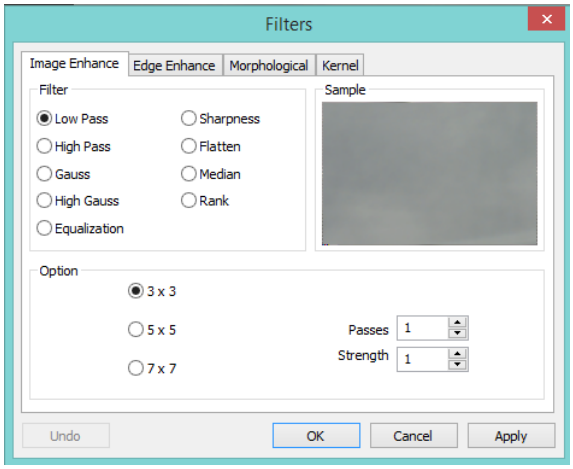
Hint

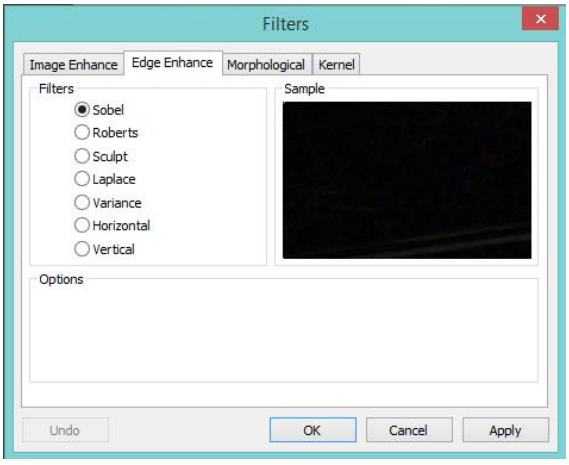
You can use the **SideBar's Undo/Redo Tab** to revert any correction back to a previous state.

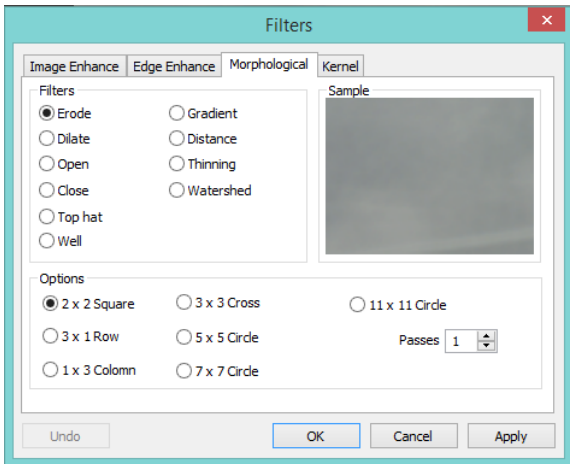


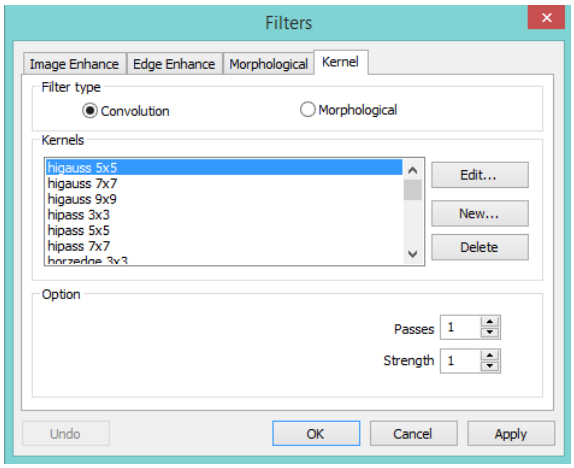
Stitch: See Stitch section later in the manual

You can find **Enhancement Filters** inside the **Process** command to sharpen your image.

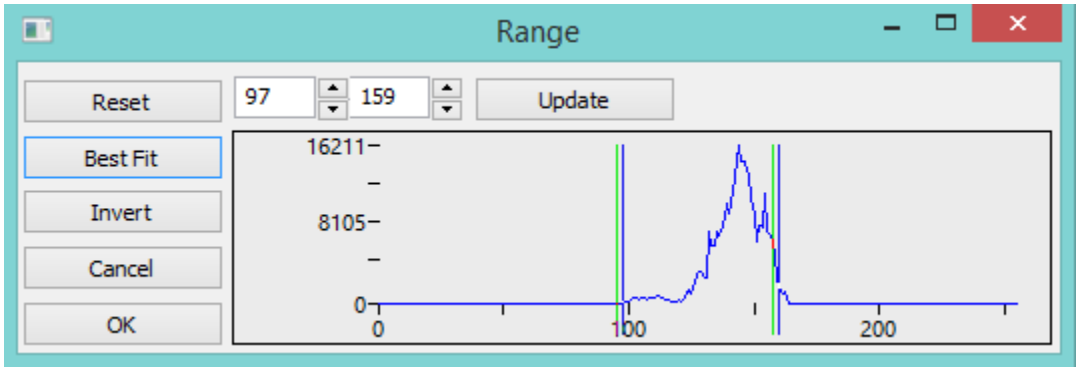




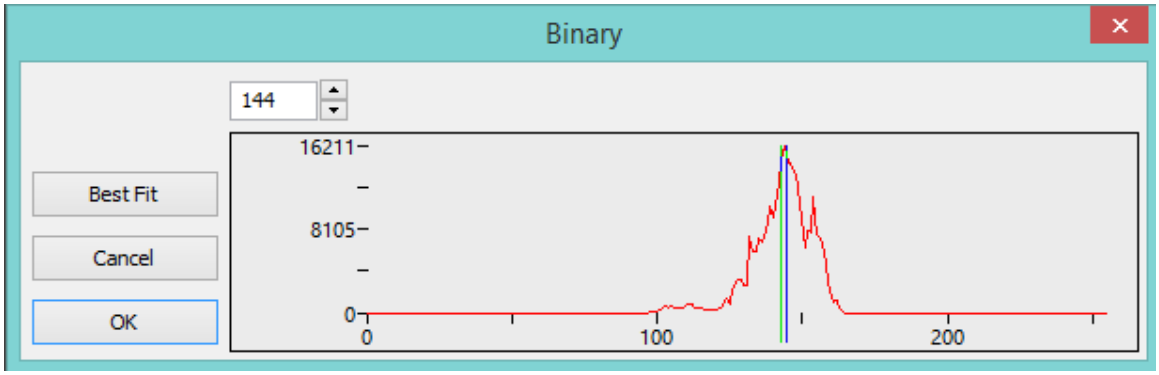




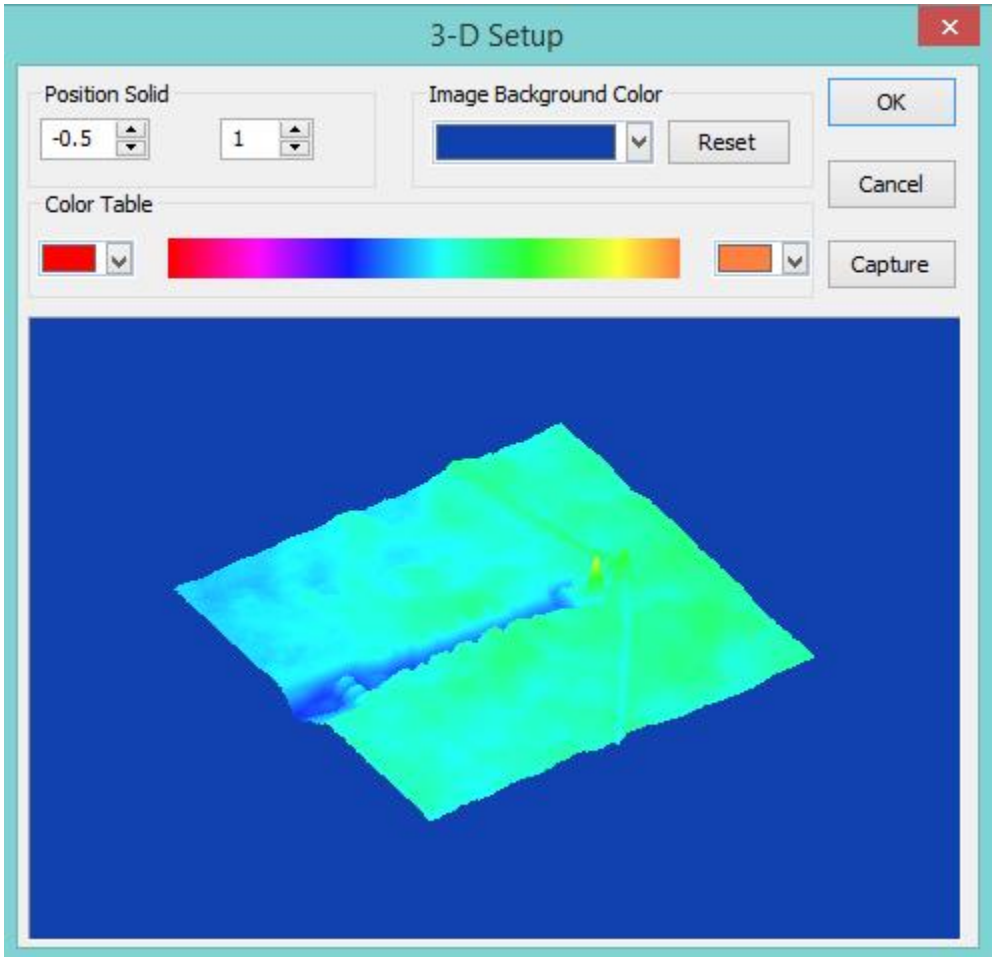
You can modify the color effectiveness range with the **Range** control to color sharpen your image.



You can modify the image the **pixel/no pixel** count with the **Binary** control



You can examine the image as a 3-D color contour map with the **3-D setup** control



You can apply the **Pseudo Color** application tools to turn a Black and White image into color tones.

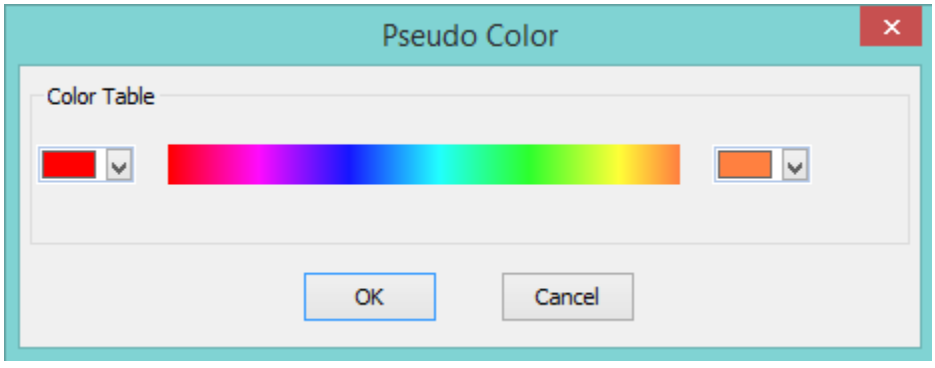


Image Stacking

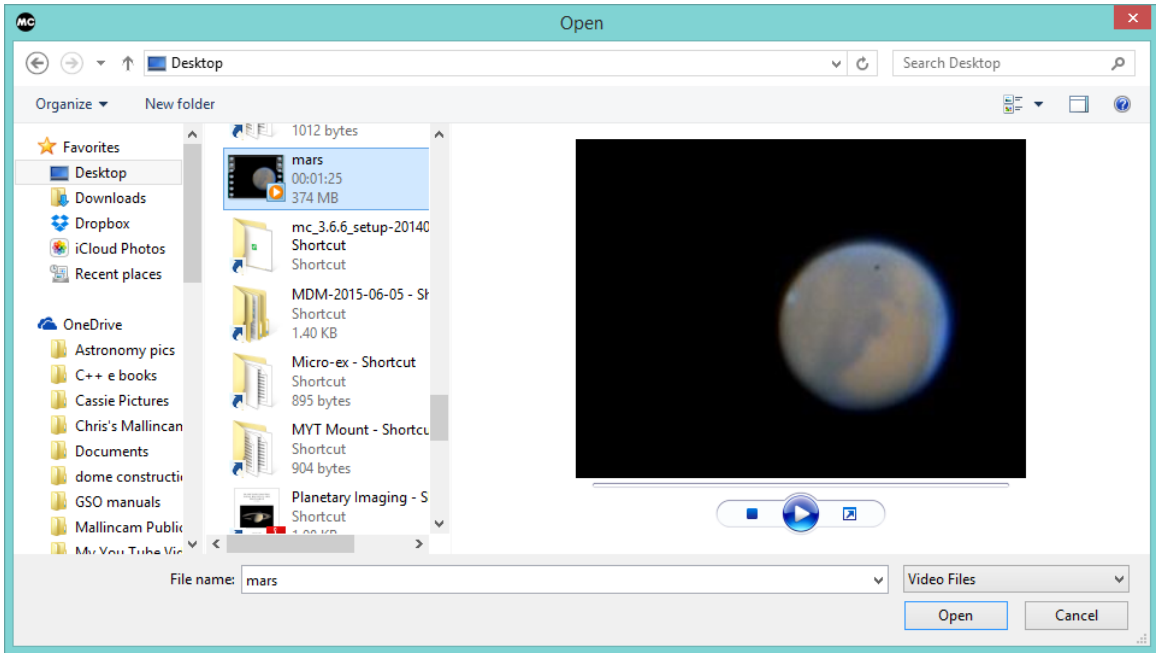
Image Stacking control will allow you to select a saved video file, then it will do an elementary stacking process on the file.

In the Image Stacking process, **MallincamSky** takes the first frame as the reference image, this means the first frame is very important and should be assure the first frame to be the right image scene and the subsequent frames have a greater overlap region with the first frame.

The stacked image signal to noise ratio is greatly improved. The stacked image may have had some black edges, this is because the images in the video has moved and in the stacking process, **MallincamSky** will added black to the image area that has no corresponding pixel in the reference image.

This Image Stacking process will not align the video images, so may be better suited for Deep Sky than for planets.

Left-Click on the control and **MallincamSky** will open up a **Dialog Window**.

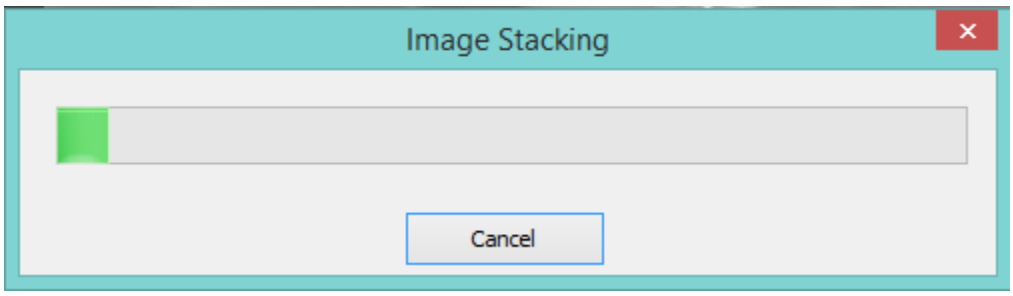


Using the **Open Dialog Window** move to the directory and **Left-Click** on the File you would like to apply the Stacking process to, then **Left-Click** on Open.

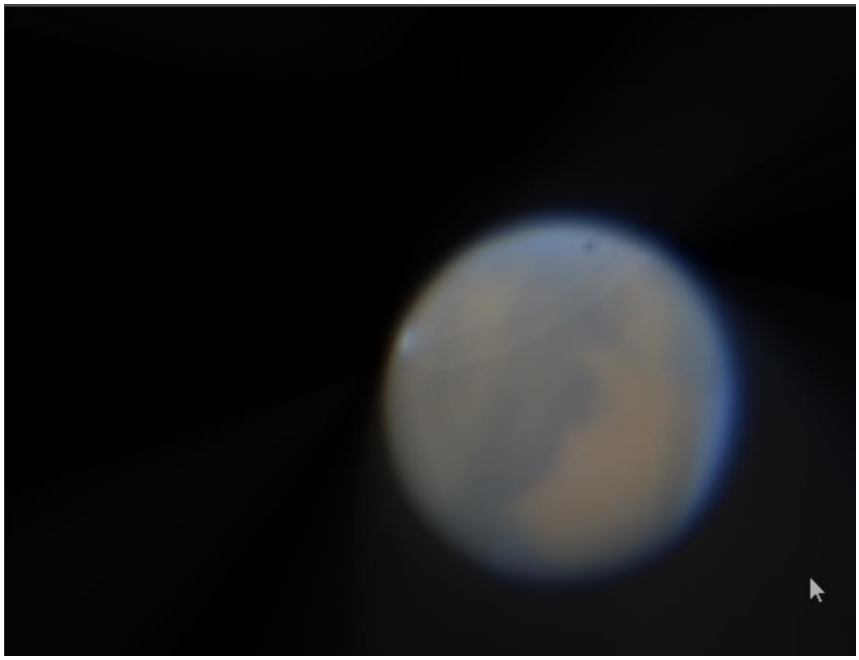
Note

MallincamSky supports the following video formats for the **Image Stacking** process: wmv , asf , avi , mp4 , m4v , 3gp , 3g2 , 3gp2 , 3gpp , mov , mkv , flv , rm , and rmvb.

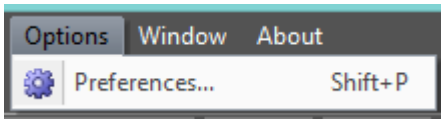
MallincamSky will Open an Image **Stacking Progress Bar** to inform you of the process.



Once completed, the stacked image will appear in the Video/Image window. You can now apply other processing techniques to this image which has a large signal to noise ratio.



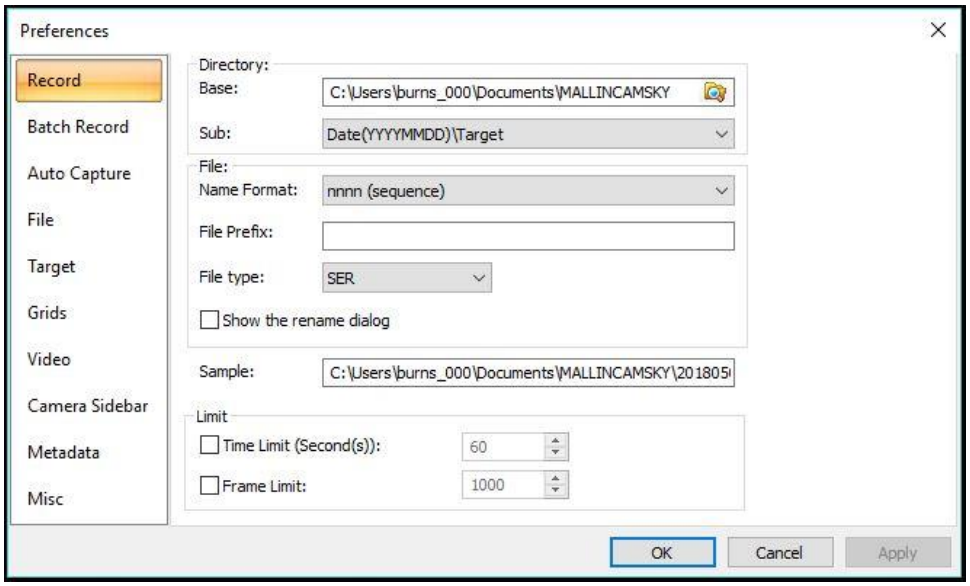
Options



The **Options** Menu provides 7 Tabs in the **Preference Window**. They are: **Record**, **Batch record**, **Auto Capture**, **File**, **Grids**, **Video**, and **Misc**.

Record

The **Options/Preference/Record** tab will allow you to set the location, File Format, File Prefix, File Type, duration or Frame Limit for the Video recording of the current SkyRaider camera.



Directory:

The file **Directory** can be select by **Left- Clicking** the **Browse** button (**…**).

File:

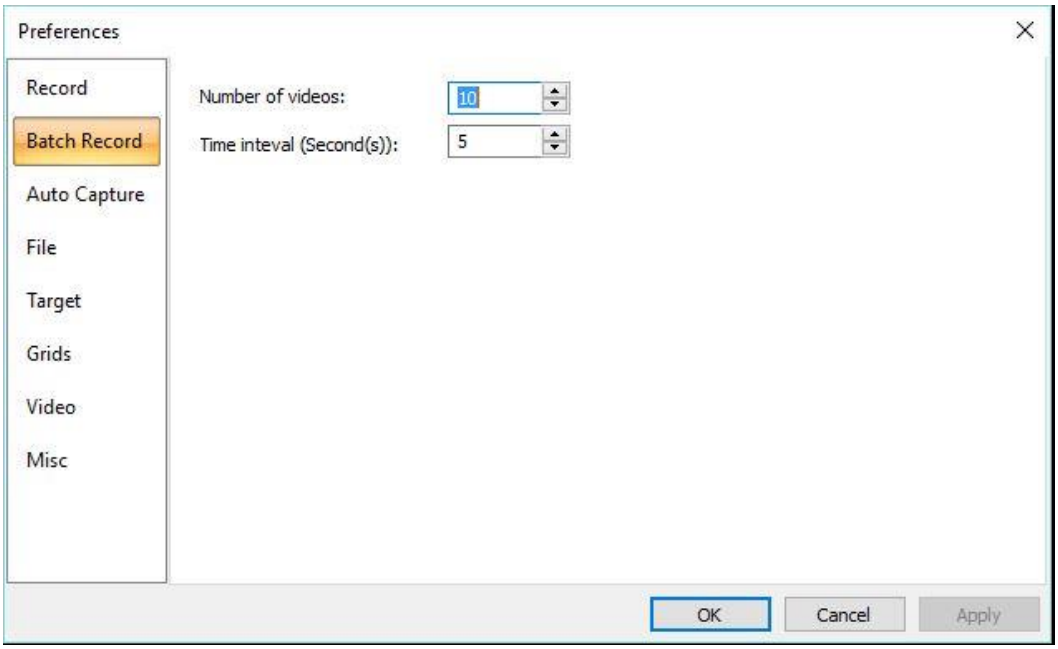
The **File Name**; This can be a combination of **Name of Format**, **File Prefix**, and **File Type** (**avi** or **ser** format) as shown in the **Sample**.

Limit:

You can either choose to capture a **specific number of seconds** (from **0** seconds to **36,000** seconds) or a **specific number of frames** (from **1** frame to **1,000,000** frames). Just **Check** the box under limit and enter the required amount. If none is checked, **MallincamSky** will record until you Stop the recording by **Clicking** on the Red **Stop Recording** button on the Left of the Screen.

Batch Record

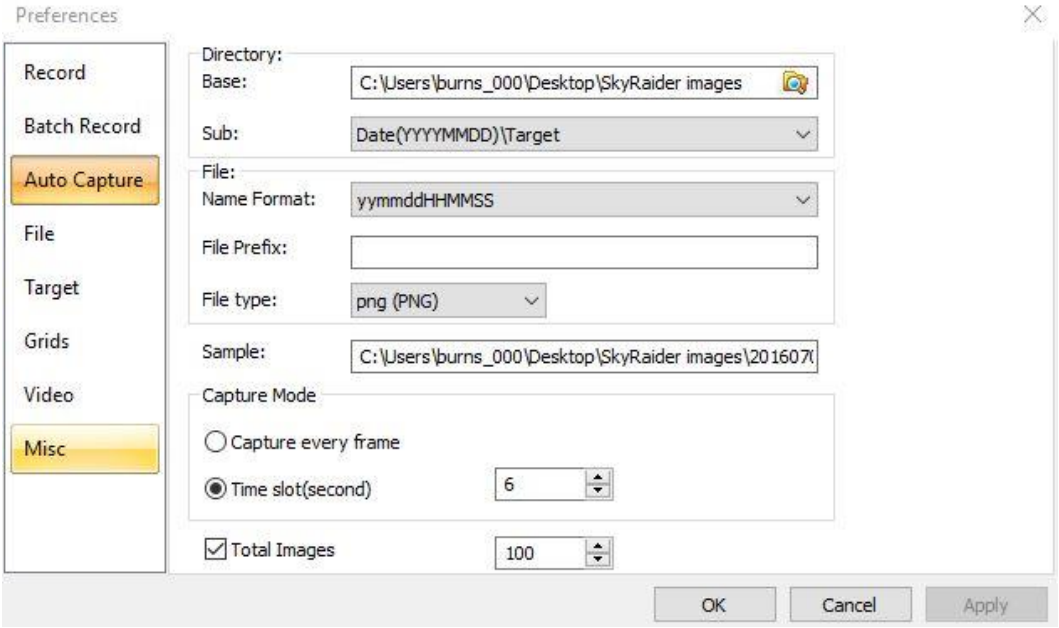
The **Options->Preferences…->Batch Record** tab will allow you to set the number of Video recordings in the batch, plus the time interval between each separate recording.



Clicking on **OK** accepts the settings.

Auto Capture

The **Options->Preferences…->Auto Capture** tab will allow you to set the location, file format, type, interval and number or required images for the **Auto Capture** (**F7**) function of MallincamSky.



Directory:

The file **Directory** can be select by **Left- Clicking** the **Browse** button (**…**). You can also set a subfolder as a specific name such as the **Target** name.

File:

The **File Name**; This can be a combination of **Name of Format**, **File Prefix**, and **File Type** as shown in the Sample. The File Type can be **bmp**, **png**, **jpg**, **tiff** or **fits**.

Capture every frame:

You can either choose **capture every frame** or select a **Time slot**. If Capture every frame is chosen, then **MallincamSky** will capture the number of images indicated by the **Total Images** count (**do not leave unchecked**).

Time Slot:

This Time slot (in Seconds from **2s** to **3600s**) is the time that **MallincamSky** waits before capturing another image (**5s** would indicate waiting another **5** seconds before capturing another image).

Total Images:

Checking **Total Images** will enable its edit box. You can enter the Total Images (from **1** to **9999**) to be captured. **MallincamSky** will stop the **Time-lapse capture** process automatically when the **Total Images** are reached.

If **Total Images** is **unchecked**, **MallincamSky** will capture the images continuously until you choose the **Capture>Stop Auto capture** command again to stop the **Time-Lapse capture**.

Left-Click OK to begin the Time-lapse capture, or **Cancel** to cancel the **Start Time-Lapse (Auto Capture)•••** command.

Clicking on the **OK Button** accepts the capturing settings. To active the Capturing process use **Capture->Auto Capture (F7).**

After the Time-lapse capture is started, the **Capture>Start Auto Capture•••** menu will be changed to the **Capture>Stop Auto capture** menu. Choosing this command will stop the Time-lapse capture.

Note

There are a variety of image formats available (they are **bmp, jpg**, **png**, and **tif**) to save the captured image. For example, when choosing the **jpg** format, you can set the parameters of **Option** to adjust its compression quality or encoding method. Please check the **File>Save As••• menu** for more details.

File

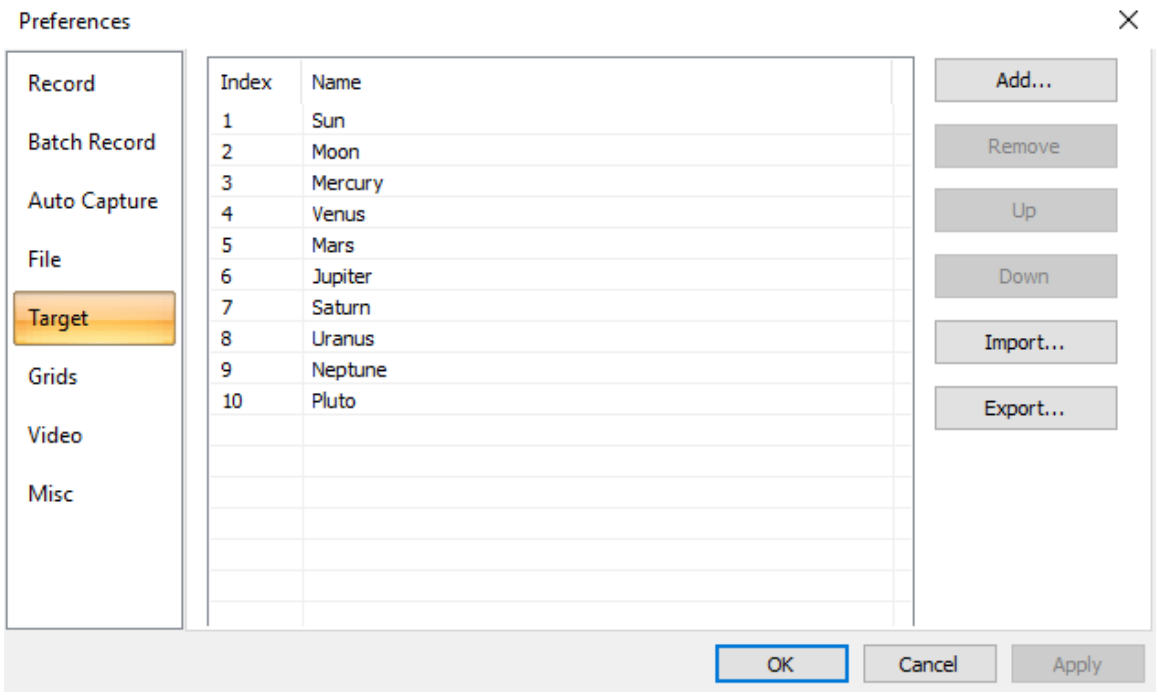
One can check a **File** Extension for the specified file Format and its Abbr. (abbreviation), to determine whether or not it will be displayed in the **Browse** window or not (The checked Format can be displayed in the Browse window).

Extension	Format	Abbr.	Browse
bmp	Windows Bitmap	BMP	☑
dib	Windows Bitmap	BMP	☑
rle	Windows Bitmap	BMP	☑
jpg	JPEG	JPEG	☑
jpeg	JPEG	JPEG	☑
jpe	JPEG	JPEG	☑
jif	JPEG	JPEG	☑
jfif	JPEG	JPEG	☑
png	Portable Network Graphics	PNG	☑
tif	Tag Image File Format	TIFF	☑
tiff	Tag Image File Format	TIFF	☑
gif	CompuServe GIF	GIF	☑
pcx	PCX	PCX	☑
tga	Targa	TGA	☑

Target

The Target Tab allows you to label the target that you are currently shooting. The 10 solar system objects are set as the defaults, but you may change the names of the objects, add new objects, export or import list from others from this Tab.

The target list appears in the drop down list available on the **Top Line** icons.



Grids

The **Grids** Tab allows you to determine if you would like a **Grid** displayed, and if so how should it be draw. Grids can also be used to define the color of the **Reticle** that can be drawn over the image.

Grid Style: The Grid Style can be **No Grid**, **Auto Grid** or **Manual Grid**. Default is **No Grid**.

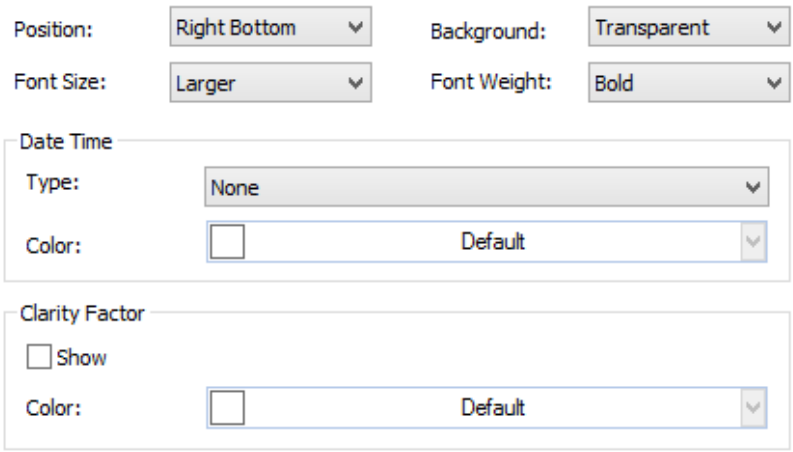
Grid Line Style: The Line Style for the grid can be Solid, Dash, Dot or DashDot. The Default is Solid.

Grid Line Color: The color of the grid line. The Default color is Red (255,0, 0).

Reticle Color: The color of the **Reticle**. The Default color is Red (255,0, 0)

Video

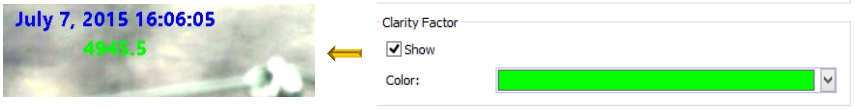
You can overlay the Date and Time on the **Video Window** (With a location and color of your choice). You can also have **MallincamSky** display the **Clarity Factor** (can assist in focusing) on the image. These overlays are updated in Real-time.



For Example:

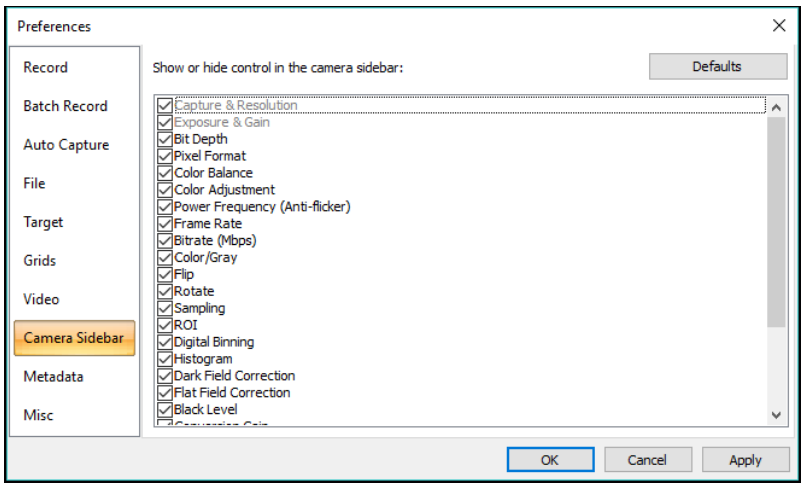
The settings on the Right will overlay the video stream with

Will produce the overlay in the top left corner.



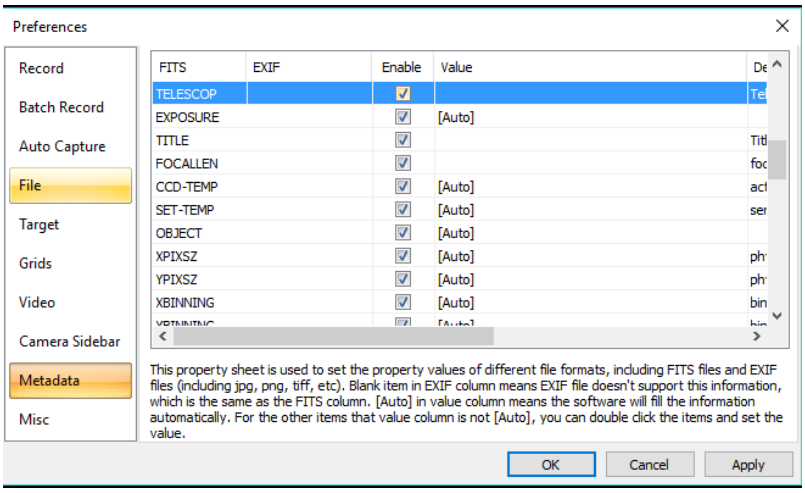
Camera Sidebar

The **Camera Sidebar** allows you to choose what options you would like displayed on the left side of the MallincamSky Control Tab. Just you the check boxes to select what you would like to see or, uncheck the box to hide that control from the Sidebar. This allows you to customize the MallincamSky window to your liking.



Metadata

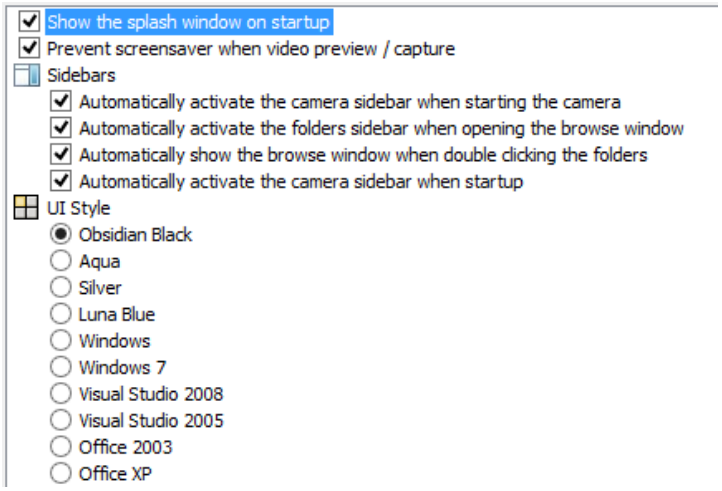
This control allows you to determine what metadata is embedded inside the **FITS** and **EXIF** files when they are saved. File views that read **FITS** or **EXIF** images can then display details about how that image was taken, equipment and telescope used.



Misc

The **Misc** page is mainly used for the control of the MallincamSky's User Interface. It mainly includes:

1. MallincamSky's special file format warning information.
2. Sidebars.
3. User Interface Style;
4. Language.
5. Graphics accelerator
6. Privacy.



Just **Left-Click** in a **checkbox** to choose your required Option.

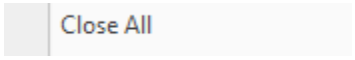
Window

The menu control will close all open windows (Tabs), and it can reset the lays back to its default settings.

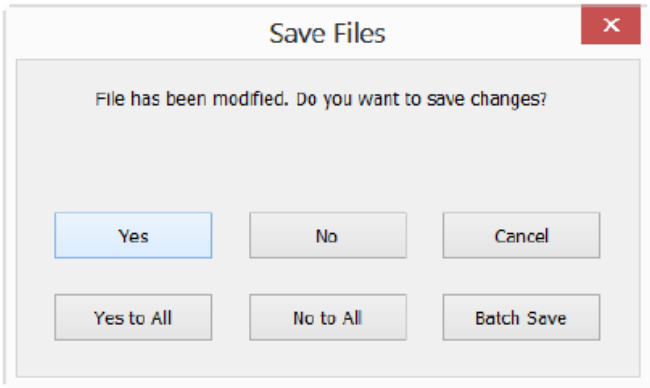
Activate Video Window

Ensures that the real time video window is what is currently displayed in the video window.

Close All



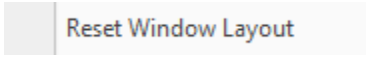
Selecting the **Closes All** command will close all of the pictures opened or captured inside **MallincamSky's** frame. If you have made any modifications to the pictures or if you have captured some pictures from the camera, choosing the **Close All** will let you finish the saving operations quickly.



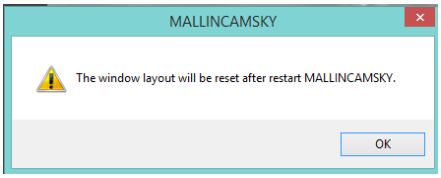
Hint

The **Close All** will actually close down the live **Video Stream** window. You can now use the **File>Open Video** to view a saved video. **Left-Click** on camera will again open the **Video Stream** window.

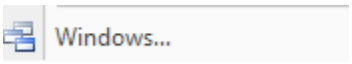
Reset Window Layout



Choosing this command will **reset** the **MallincamSky** window layout to the original one. The reset will be effective after restart.



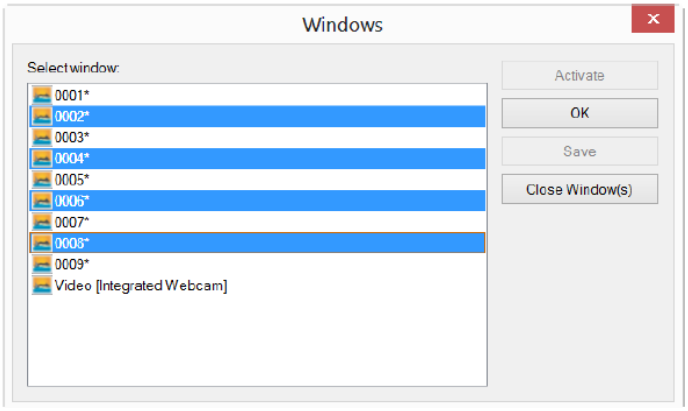
Windows…



Choosing the **Windows>Windows•••** control will open a dialog box that lets you manage the currently opened windows.

The dialog allows you to manage large lists of open windows by assigning them into groups. Let us say you have eight windows open but want to close four of them scattered through the list.

1. Choose the **Windows>Windows•••** control.
2. Select the windows you want to close. Hold **Ctrl** or **Shift key** to select more than one at a time. Here, 4 windows are selected.



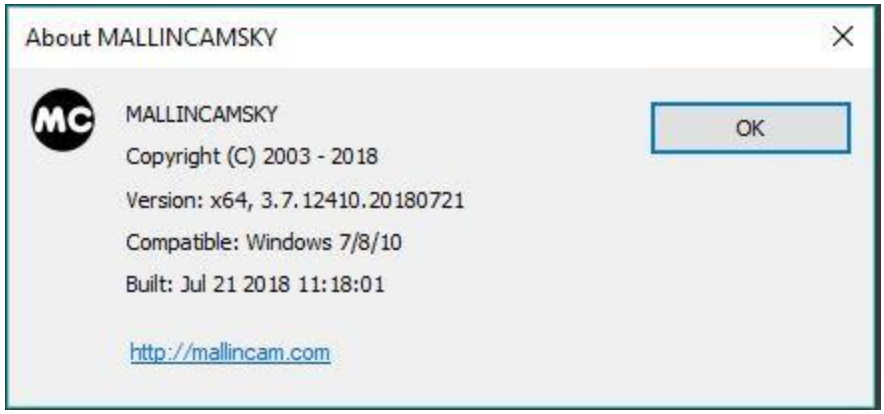
3. Click **Close Window(s)** button, those four selected windows will be closed, leaving the other files or captures available for editing.

You can use this command to switch to a required window on a list by hitting **Activate**.

About

This control will pop-up a window that informs you of the version number and built date of this version of **MallincamSky**.

Left-Click on **OK** to Close.



MallincamSky Toolbar

Open

The **Open Image** command is used to open an existing image file. This command can also be used to preview an image in small size, or to view its statistics and information without actually opening the image itself. You can use this command to quickly locate a particular image. **MallincamSky** supports and can open a variety of image formats. These are identified in the **Files of type** list box.

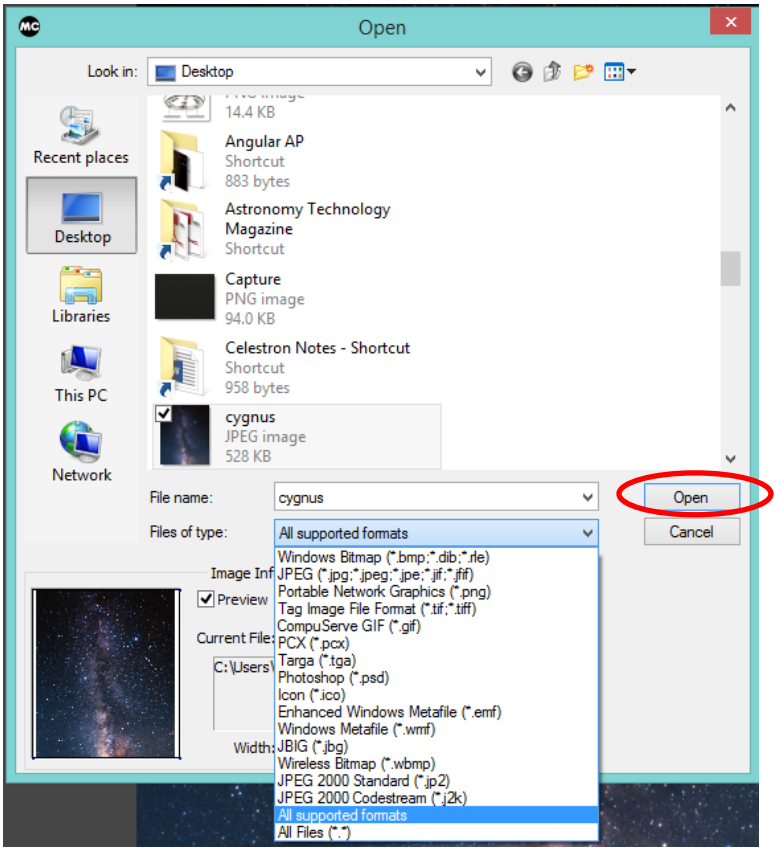
MallincamSky can open more than one image simultaneously by:

- **Ctrl + Left Mouse Click** on each required file then **Left-Click** on **Open**
- **Shift + Left Mouse Click** method to highlight the files to be opened, then **Left-Click** on **Open**

When an image is opened, **MallincamSky** places it into a new image window. It then becomes the active image.

Note

MallincamSky maintains, at the **File>Recent Files** submenu, a list of the last opened files.



Save

The **Save Icon** allows you to save an image onto your computer. The command immediately stores the current window image to its file (the filename is listed on the window's title bar) while leaving the image still active in its window.

If the image is untitled or titled with a digit, **MallincamSky** will issue the **File>Save As** dialog automatically. The default "**Save as type**" will be "Window Bitmap (*.bmp,*.dib,*.rle)".

The **Save Icon** can be used to save the most recent changes to disk. It is often performed as a precautionary measure during lengthy or involved processes to reduce the amount of reprocessing that might be required in the event of a system failure or operational error.

When an image is closed and not to save its changes is chosen, **MallincamSky** discards all changes made since the last **Save** operation.

Note

The **Save Icon** always saves the contents of the entire window, even if there is an **AOI** (Area of Interest) defined on it;

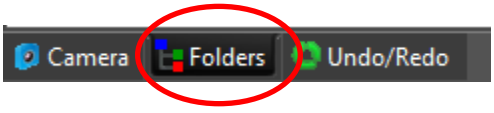
Hint

The **Save Icon** can be used to save a **Snap Shot** to the default File folder of an active **Video Stream** (it will ask you for a **File Name**).

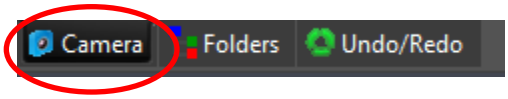
Browse

The **Browse Icon** from the **MallincamSky Tool Bar** is used to browse images under the specified directory in the **Folders Sidebar**.

This command is identical to hitting the **Folder's Tab** at the bottom of the screen.



To return back to the **Camera Bar**, just **Click** on the **Camera Tab** located at the bottom of the screen.



The **Browse Window** resembles the **Windows Explorer**. **Left-Clicking** on the **+** will expand a folder so that you can examine its contents.

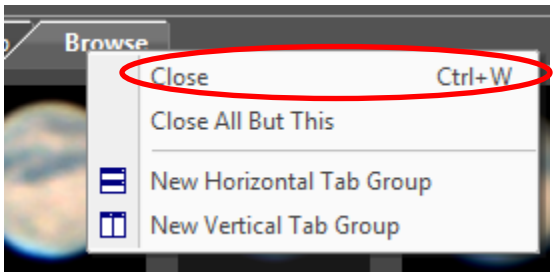
You can **Right-Click** on a **Folder** (or file) and the actual Windows controls will pop as in **Windows Explorer**.

As you get deeper into the **Browse Window**, you can **Back-Out** or Move Deeper into the File Folders via the **Green Left** or **Right Arrow in** the **Browse Window**.

The **Blue Right Arrow** will take you to your computer's **Root Directory**.

Left-Double Clicking on a **Folder** will open up a **Window Tab** in the **Video Window** (this **Window** will be labeled **Browse**). This T**ab** will display all of the graphic files inside that Folder. If you **Left-Double Click** on a **Graphics File** inside the **Video Window,** it will open up that **Graphics File** in a new **Tab** in the **Video Window**.

You can close the **Tab** in the **Video Window** by **Right-Clicking** on the **Tab's Title** (**Browse**), then choosing **Close**.



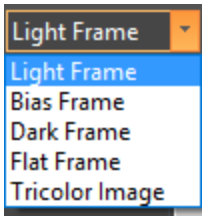
Thumbnail

This icon creates an image window that contains snapshots of your current sessions images. You need only click on that image to have it display its contents in its own Window.

Target

This icon allows you to give a name to the current Target that you are imaging. You can add or change names in the **Options->Preferences…->Target** Tab. The Target name can automatically be used as a **suffix** for a file folder name when saving images or video captures.

Image Type



This icon allows you to designate the type of image you are saving. This is only for your reference. Just select an image type from the drop-down list.

Auto Capture

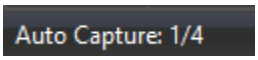
This icon activates the **Auto Capture** routine in MallincamSky.

You must have previously chosen the **File location**, **File Type**, /**Number** of required images, and the **Time Interval** between each captured image from the **Options->Preferences…-> Auto Capture** Tab (see **Options** for more information).

Hint

The **Auto Capture** Icon will remain highlighted until the capture process is completed. You can **Abort** the capture process at any time by again **Clicking** on the **Auto Capture** icon.

MallincamSky will indicate the status of the Auto **Capture** process on the lower left of the MallincamSky window.



Batch Record

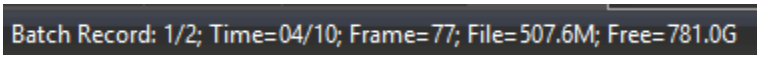
This icon activates the **Batch Record** routine in MallincamSky.

You must have previously chosen the **File location**, **File Type**, /**Number** of required Videos, and the **Time Interval** between each captured video from the **Options->Preferences…-> Batch Record** Tab (see **Options** for more information).

Hint

The **Batch Record** Icon will remain highlighted until the capture process is completed. You can **Abort** the capture process at any time by again **Clicking** on the **Batch Record** icon.

MallincamSky will indicate the status of the **Batch Record** process on the lower left of the MallincamSky window.

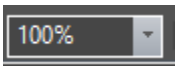


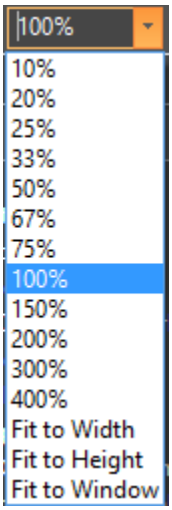
Pause Video Capture

This icon Pauses the **Batch Record** routine in MallincamSky. If will highlight when you are able to pause a video capture.

Open Video Folder

This icon will allow you to open up and view either the default **Record** or the default **Image** folder. This way you can examine the results of the recording.

Zoom 



The Zoom Icon allows you to Zoom-In or Zoom-Out while viewing a Video/image window. The Drop-Down list will off you the zoom options. Just highlight the zoom option with your mouse and release the mouse button.

Hint

You can change the **Zoom** by rolling your **Mouse Wheel**, if your mouse has one.

Image Select

You can select a **Region of Interest** on your **Image Tab** (live or static) by using the **Left-Click Hold and Drag** technique. Once selected then you can **Copy** (**Ctrl+C**) the selected region and then **Paste** it into another software program.

Note

Once a **Region of Interest Rectangle** is on the screen, you can **drag** it around, or grab one of its handles and **resize** it.

Note

Left-Clicking on the **Image Select Icon** again will remove the Region of Interest Rectangle from the screen.

Track

If the **video/image's** actual size is larger than the **video/image Window**, then this control will allow you to position the actual **video/image** within in the **video/image Window**. This control is activated automatically when necessary.

Its function is similar to the scroll bars. It is an alternative to using the arrows on the scroll bars for positioning the **video/image** within the window. Position the mouse

(make sure to choose a location outside a **Region of Interest** rectangle. You may need to close the **ROI** rectangle if necessary) on the actual **video/image**.

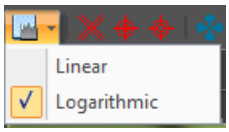
Left-Click and Hold (the **Open Hand** will change to a **Closed Hand**). Now drag the image around inside the **video/image Window**

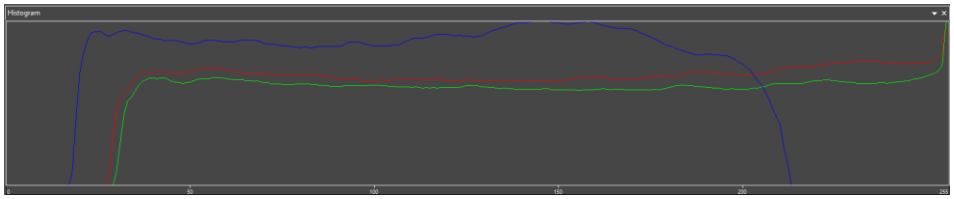
If the **video/image** size is smaller than the **video/image Window** size, then the track operation will be disabled.

Histogram

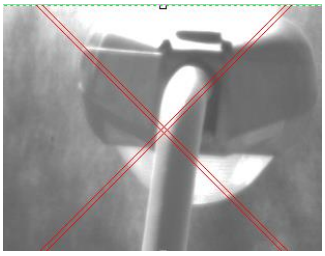
This icon will display a real-time **Histogram** (for information purposes) beneath the Video window being displayed. **Clicking** on the icon again will remove the **Histogram**.

The icon has a **pull-down** tab where you can choose to display the real-time **Histogram** in either a **Linear** or a **Logarithmic** scale. **Clicking** beside the scale name will immediately make the change in the **Histogram**.





Reticle



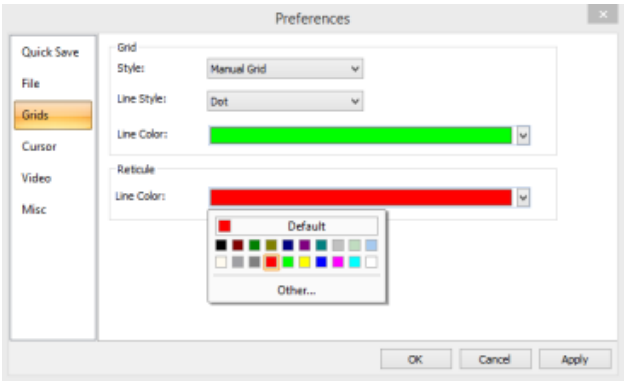
MallincamSky provides four **Reticles** (or cross-hairs) to aid in aligning your telescope to a star (or another stellar object).

Left-Click on a Reticle Icon to activate it and **Left-Click** again to **De-Activate**.

You can **Left-Click and Drag** the location of the Reticle around the screen to center it on an object of interest.

Note

The **Reticle-Icon** will automatically re-center the Reticle on your image.



You can change the **color** of the Reticle via the **Option>Preferences** control in the **Top Menu Line**.

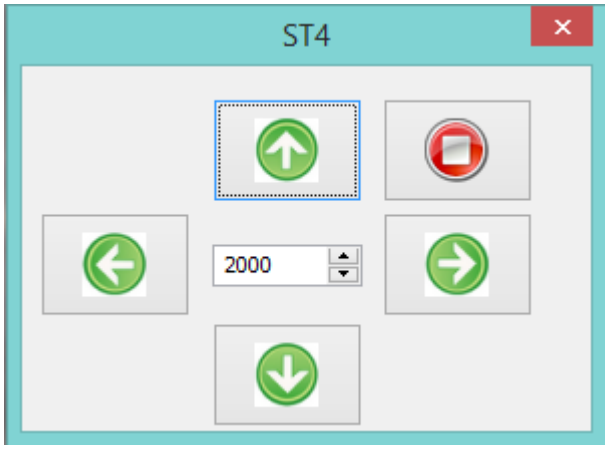
ST4 Test

If your **SkyRaider** camera (such as the **SkyRaiderDS287**) has a **ST4** port, then it can be used to **AutoGuide** your telescope mount.

This control is used to check if the camera can correctly communicate with the **Telescope Mount.**

Connect the **ST4 cable** provided with the **SkyRaider Camera** to the **ST4 Port** on your **Telescope Mount**. Turn on the **Telescope Mount** to ensure that it is ready to be tested.

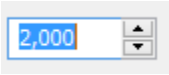
Left-Click on this control and the **ST4 Popup Window** will appear.



The **ST4 Window** will contain 4 **Green Arrow** keys that when pressed will send a specific direction command thru the **ST4 cable**. Press each **Green Arrow** and note if the **Telescope Mount** moves in a specific direction.

Due to the various orientations of the **SkyRaider Camera** once inserted inside the telescope, the **Green Directions Arrows** will not necessarily match the direction of **Mount** movement. Don't worry; all **guiding software** will automatically orient itself with the movements.

You can abort the movement by **Left-Clicking** on the **Red Stop button i**n the **ST4 Popup Window**.



The **number box** located in the middle of the **4 Green direction Buttons** can be **increase** or **decrease** to affect the distance the **Telescope Mount** moves when a **Green Direction Button** is pressed. You can directly enter a number into the **number box** or **Left-Click** on the **up** and **down** arrows to scroll up or down the value in the **number box**.

Attempt to orientate the **SkyRaider Camera** in the eye piece holder of the telescope in such a manner as to match the **Green Directions Buttons** movement of the stars in the video display.

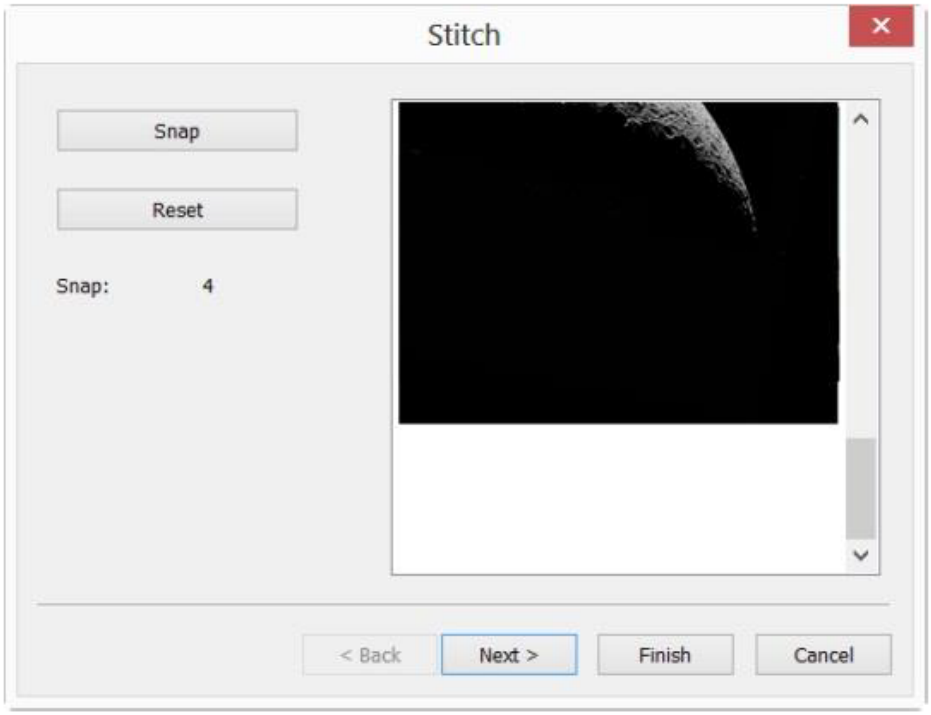
Advance/Reverse

These icons allow you to advance or reverse the current frame when viewing a Video in the **ser** format.

Recall: to load a video for examination and viewing first close down the live camera window (this stops the camera). Then choose **File->Open Video** and select the **ser** format video to view. The icons will now become active. You can now restart the Mallincam camera if required.

Stitch

When the Video Window is active, choosing the **Stitch** Icon will invoke the video Stitch dialog window as below:



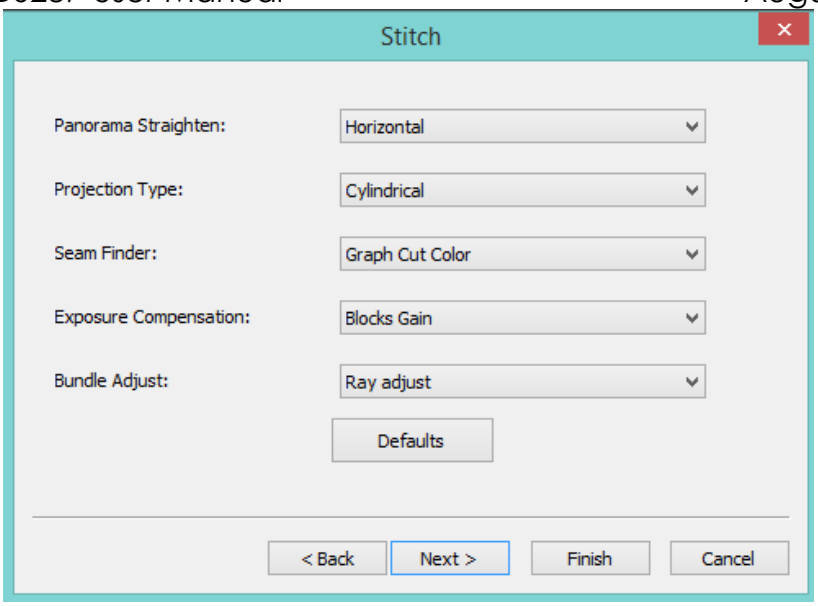
The purpose on this control is to stich (glue) together images to create a panoramic view (image) so plan ahead with this control; are you going to create a horizontal panoramic image, or a vertical panoramic image.

- Have the camera viewing a specific location (or object), Now **Left-Click** on the **Snap** button. This will place a snapshot in the viewing box.

- Move the telescope so that you have some overlap in the image and **Left-Click** on the **Snap** button again.

- Repeat as needed.

- When you are completed taking the snaps, **Left-Click** on **Next** to bring up the next **Stich Window**.



- Examine the options in this window and make the appropriate decisions on how you would like **MallincamSky** to Stich the snapped images together (this is where the pre-planning comes in handy). You will still be experimenting with your decisions.

Panorama Straighten: The image stitching direction can be **Horizontal**, **Vertical**, or **None**.

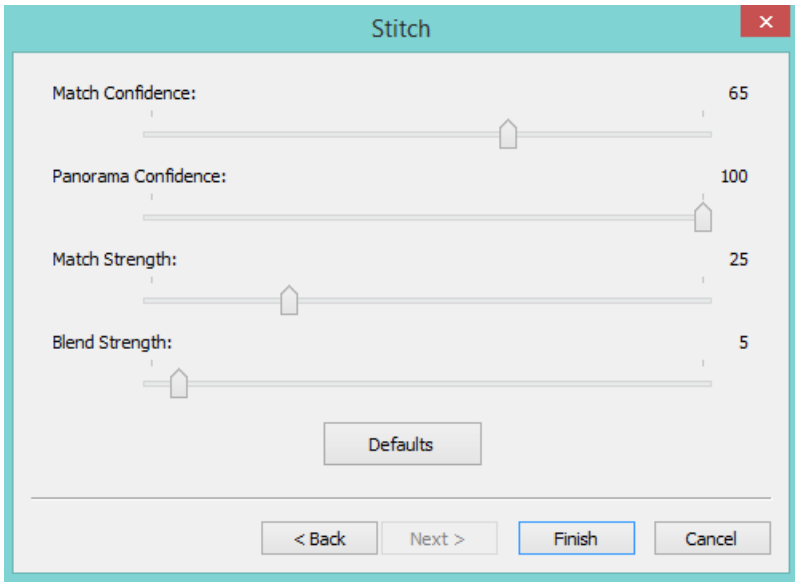
Projection Type: For image pieces that have been taken from the same location, stitched images can be arranged using one of following projection mappings: **Plane**, **Cylindrical**, **Spherical**, **Fisheye**, **Stereographic**, **Mercator** or **Transverse Mercator**.

Seam Finder: MallincamSky provides four Sean Finding algorithms: None, **Voronoi Diagram**, **Graph Cut Color**, or **Graph Cut Color Grad**.

Exposure Compensation: This is used to minimize the exposure differences between the stitched images. Compensation algorithms available are: **None**, **Gain**, and **Blocks Gain**.

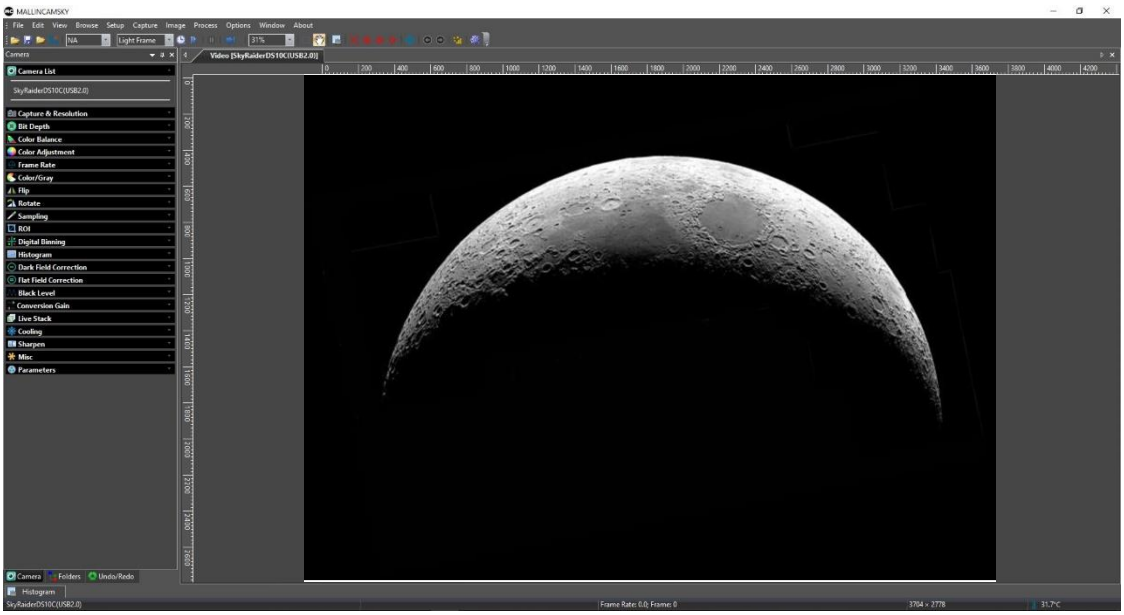
Bundle Adjust: This is the process of simultaneously refining the 3D coordinates that describe the geometry in accounting for the relative motion of the images. Two algorithms are available**: Ray Adjust** and **Reprojection Error**.

- Once completed, **Left-Click** on **Next** to bring up the final **Stich Window**.

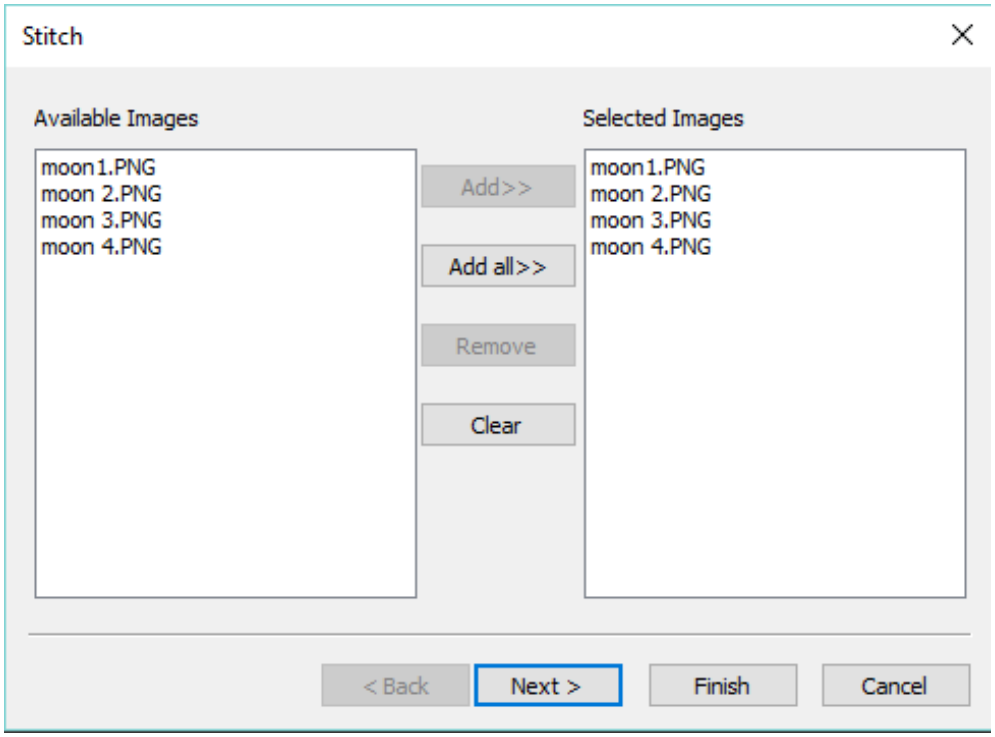


- Again, make some logical guesses with the numbers, and **Left-Click** on the **Finish button** when decisions have been made.

MallincamSky will work thru the **Snaps** (and apply the choices you have made) and will place the final result in an **image window** for your viewing pleasure.

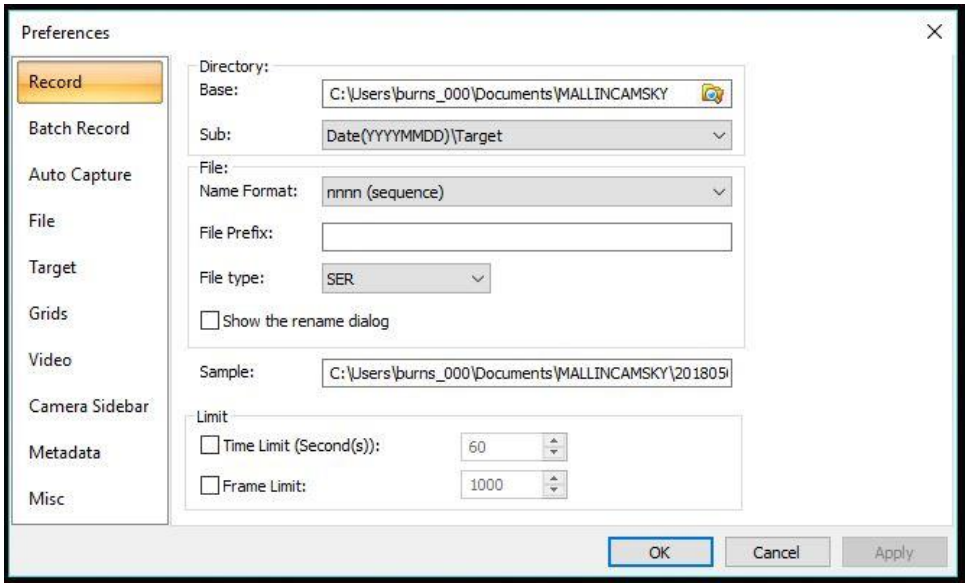


You can try other **Stitching decision** by having the **Stitched imaged** active in your **Video Window** and **Left Clicking** on the **Stitch Icon** again. You will notice that your original snapped image is available for you to play with and combine in other ways.

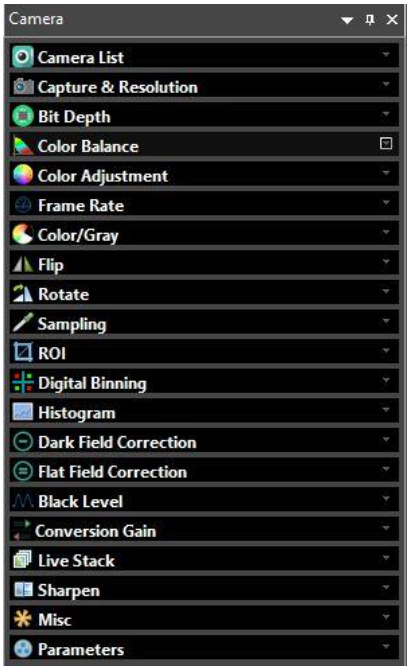


Preferences

This icon opens up the preferences window. This icon is identical to the Main Tab line **Options->Preferences…** . See above in the **Options Tab**.



6. Controlling the SkyRaider



Once you have a connection to the **SkyRaider Camera,** your next task will be to adjust the controls that make it possible to improve the image the **SkyRaide**r is capturing. These controls are located on the **Left SideBar Menu** on **MallincamSky**.

The Controls all have drop-down arrows; **Left-Clicking** on the **Down-Arrow** in the control heading will expand that control. Some controls will also display a coloured rectangular box on the **Video Window** to remind you that that control is in effect. You will be able to collapse the control window by **Left-Clicking** on the **Up-Arrow** on the control heading.

Camera List

The **Camera List** control lists the current **SkyRaider** cameras connected to the computer. **Left-Clicking** on the camera name will start the camera video window. You will see a tabbed frame (with SkyRaider Camera Name) appear in the window after selecting the Camera from the list. If you are only using the SkyRaiderDS287, then this is what you should see. Just **Left-Click** on **SkyRaiderDS287** to activate the camera. You will see a Window open in the Video Window.

Note

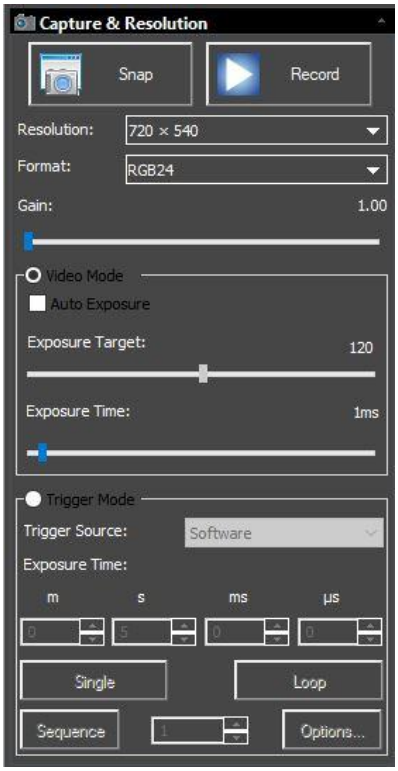
You can only access one **SkyRaider Camera** at a time.

Capture and Resolution

The **Capture and Resolution Tab** allows you to adjust the resolution (the current SkyRaider DS287 has a fixed resolution), modify the **Gain**, and choose the type of **Exposure Mode** that you require for the camera.

Resolution

Located at the top of this control is the **Resolution** Command. This command allows you to adjust both the display and capture resolution of the **SkyRaider Camera** (each model of the **SkyRaider Camera** will have its own resolution settings that will appear in the list). Once the resolution is set, this control will also allow you to either take a snap shot of the image or save a video recording of what is currently being displayed.



Left-Click on the **Drop-Down** list on the **Resolution:** to see all the allowable resolutions available for your **SkyRaider**. The **SkyRaider DS287** has one resolution: 720 x 540.

The **Snap Shot** resolution is automatically adjusted to match the **Live Resolution** and will use the Format is selected by you in the **Format control**.

Snap

Left-Clicking on **Snap** will tell **MallincamSky** to display in a **New Tabbed Window** containing a snap shot of the image that is currently being exposed by **SkyRaider Camera**. The image will appear in the **Video Display Window**, with a name which follows the naming convention **nnnn*** (for example 0001*).

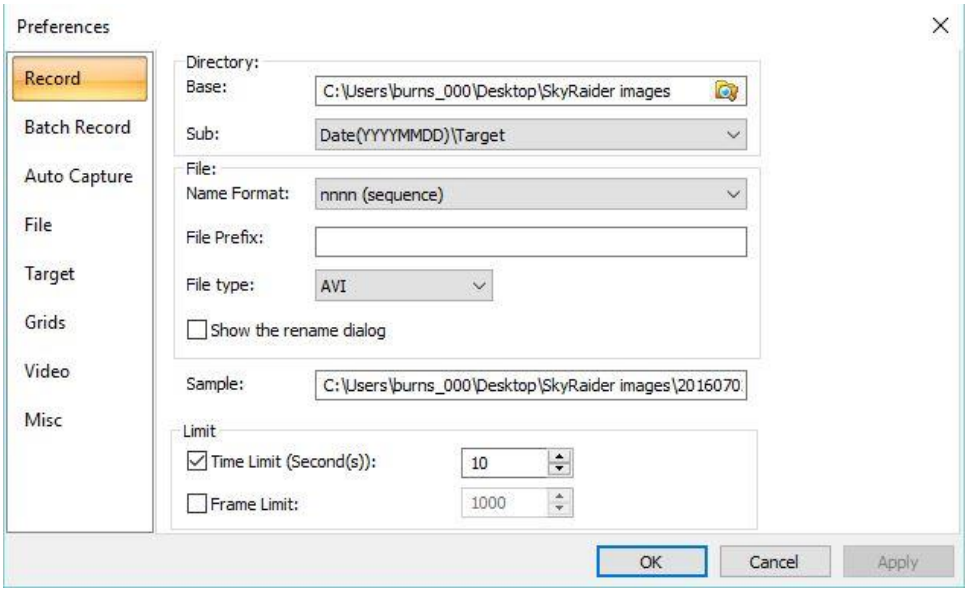
Every time you **Left-Click** on **Snap**, another **tabbed window** with the name number increased will appear in the Window. The image is **only displayed** in the **Video Window**; it is **not saved** on your computer.

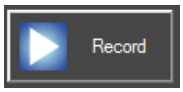
You can save the image (and thus rename it), by using the **Save icon**, or **File>Save As…** command from the **Top Menu Line**.

Record

This command is only available when the Mallincam SkyRaider is in **Video Mode**. See the Top Line **Capture Tab** for details on how to record video when in **Trigger Mode**.

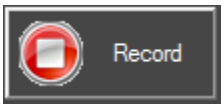
Prior to pressing this icon, you must use the **Options->Preferences…** Tab to choose the **location**, **name**, **format**, and **duration** of the video.





Left-clicking on the **Record Icon** will tell **MallincamSky** to start recording a video of what is currently being captured by the **SkyRaider** (you will now be able to see the image being recorded as the **Record Button** will activate the camera).

When the Mallincam SkyRaider is recording, the Icon will change to a **Red STOP** Symbol. By **Clicking** on the **Stop Icon**, MallincamSky will terminate the Video recording process.



Gain

This control allows you to adjust the gain. **Gain** will brighten up the image (but it can also brighten up the artifacts). The higher the **Gain** value; the shorter the exposure that you will require. All you need to do is find the highest **Gain** value that provides you with the image you are satisfied with.

The **Gain Control Bar** has an indicator to provide you with the current Gain setting on the camera. Gain ranges from a low of 1 to a high of 50.

You can modify the **Gain** in two different ways:

- By **Left-Click-Hold and Drag** the marker bar to the required value.
- If you **Left-Click** on the **Slider Bar** (which selects it), you can use the **Left** and **Right Arrow Keys** of your keyboard to move the slider (this gives you more control).

Hint

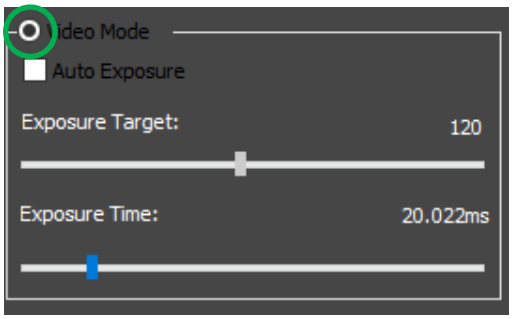
For **Deep Sky Objects**, start the Gain at about **50**. For **Planetary Objects**, start the Gain at about **5**.

Exposures

The Mallincam **SkyRaider DS287** camera provides two different types of exposures. Video Mode, where exposures up to 5 seconds are taken, and Trigger Mode were exposures from 25*us* to 16 minutes and 40 seconds can be taken.

Video Mode

This control allows the **SkyRaider DS287** to have an exposure up to 5 seconds (5000ms), this mode is ideal for focusing the telescope and imaging planetary objects. You can have MallincamSky automatically choose the exposure by checking Auto Exposure check box, or you can set an exposure time yourself.

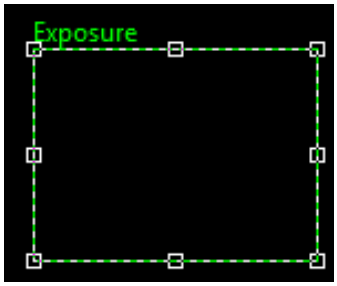


Video Mode is activated by **Left-Clicking** the **Video Mode Radial Button**.

Exposure Target

MallincamSky uses the image contained in the **Green Rectangle** to aid in determining the best method to match the Exposure target. To use **Exposure Target**, **Auto Exposure** must be checked. You can change the Exposure Target by **Left-Click-Hold and Drag** the marker bar to the required value. If you **Left-Click** on the **Slider Bar** (which selects it), you can use the **left** and **right** arrow keys of your keyboard to move the slider (this gives you more control).

When **Video Mode** is selected along with **Auto Exposure** checked, you will see a **Green Rectangle** (labelled **Exposure**) will appear over your **Video Window**. This **Green Rectangle** is a marked region that is a reference region for judging if the image brightness has reached the **Exposure Target Value** (When **Auto Exposure is** selected). Dragging or Resizing **the Green Exposure Rectangle** to a dark area will increase the video brightness and **Dragging** it or **Resizing** it to a bright area will decrease the video brightness.



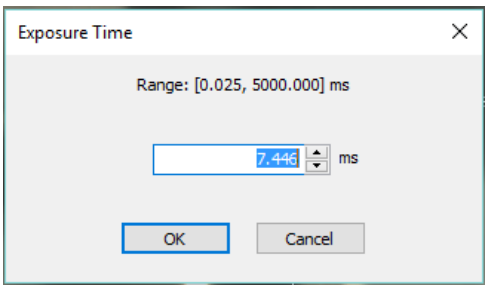
The **Green Exposure Rectangle** will be removed when you uncheck **Auto Exposure**. But if you need **Auto Exposure,** then I recommend that you enlarge the **Green Exposure Rectangle** to the full size of the **Video Window** (**Left-Click Hold and Drag**) or drag and reduce the green rectangle to a corner of the image window.

Exposure Time

The current Exposure time is displayed above the Exposure Time slider. **MallincamSky** will display the exposure time in **ms**, from **0** ms to **5000 ms**.

To use **Exposure Time**, **Auto Exposure** must be **unchecked**. You can modify the **Exposure Time** in three different ways:

- By **Left-Click-Hold and Drag** the marker bar to the required value.
- If you **Left-Click** on the **Slider Bar** (which selects it), you can use the **Left** and **Right Arrow Keys** of your keyboard to move the slider (this gives you more control).
- If you **Left-Click** on the **Current Exposure Time Value**, a window will open up where you can enter in the exact exposure time you require. This window will also provide you the exposure limits the **SkyRaider Camera** can handle.



Don't forget to **Left-Click** on **OK** to have **MallincamSky** accept the entered exposure time.

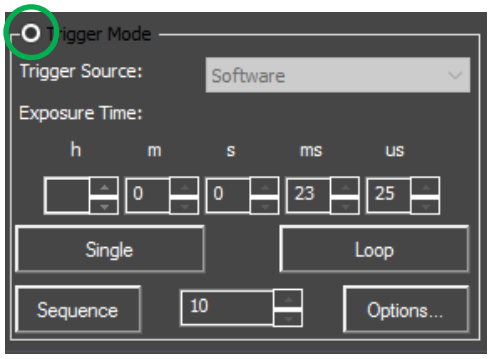
Note

For any exposure **over 5 seconds**, you can determine how long your camera's exposure time has left by looking at the bottom of the MallincamSky's Window. It will indicate to you the current time used of the exposure time that you had previously set.

The **SkyRaider DS287** will use the following format to inform you of the current exposure condition: **Time Used/Exposure Time**

If you have enabled the **Dark Field Corrections** for this session (**Dark Fields** are stored directly in the **SkyRaider Camera** and will be deleted when the camera is turned off), the **SkyRaider** will automatically apply the best **Dark Field Correction** to your image when **Dark Field Correction** is **enabled**.

Trigger Mode

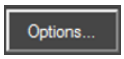


Trigger Mode is used mainly for exposures over 5 seconds (Deep Sky Objects). It is selected by checking the **Trigger Mode Radial Button**. This mode does not require the Green Rectangle for exposure control. But rather allows you to take a **Single** image, or continuously *Loop* images from the **SkyRaider DS287**.

- You have two methods of setting your exposure to a large value:
  - You can **Click** in the **Time Unit Box** of choice and enter in an amount (i.e. **30 seconds**) using your Keyboard.
  - You can **Click** on the **up** or **down** arrow in the **Time Unit Box** of choice to move the exposure time to your required value (**30** seconds).

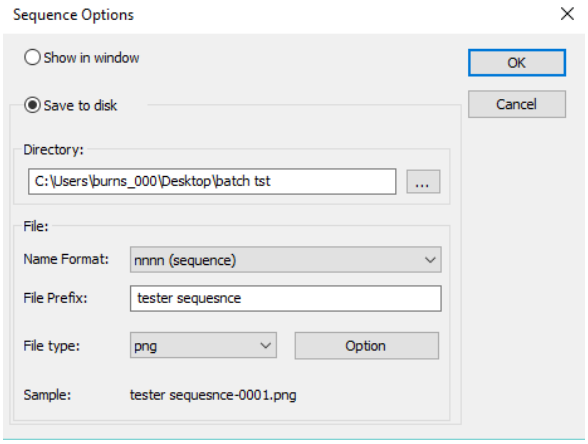
- **Click** on the **Single Button** to a take a single exposure to see if the image of the object is close to the brightness you need.
- If you are satisfied with the single image, then **Click** on the **Loop Button** to have the SkyRaider DS287 continuously take images at the entered exposure value (it will change its name to **Stop**, so you can again **Click** on the button to stop the Looping).

To capture a sequence of images using the Mallincam **SkyRaider DS287**, there is are a series of command controls available for you.



Options

Clicking on this Button opens up the Sequence Options Window.

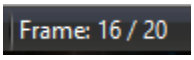


This Window allows you to either display the sequence of automatic captures in a window on MallincamSky (not recommended… too many windows), or Save the sequence images to a file. You have complete control, since you can choose **specific directory**, a **File Prefix**, a **numbering system**, and even a **file format** to match your preferences (this is great for choosing a folder location for AstroToaster).

Number in Sequence

Use this control to enter in the number of images you would like MallincamSky to save to your selected folder (from the **Options Command** above).

You will see the status of the Frame sequence by a counter located on the bottom of the Video window.



Sequence

Clicking on the **Sequence Button** will start the sequence capturing process. Once Sequencing, the **Sequence Button's** name will change to **Stop**. **Clicking** on the **Stop Button** will abort the sequence process.

The camera **cannot be Looping** at the time you **Click** on the **Sequence Button**.

Bit Depth

Pixel Bit Depth relates the number of bits assigned to produce a color (or shade of Gray). The larger the number of bits, the larger the number of assigned colors (or shades of Gray) that the camera can produce.

In an **8-bit** image; for each color channel (Red, Green, Blue), there are 8 bits assigned. That is, there are **256** (2^8) shades of Red, Green, and Blue available.

In a **12-bit** image; for each color channel (Red, Green, Blue), there are 12 bits assigned. That is, there are **4096** (2^{12}) shades of Red, Green, and Blue available.

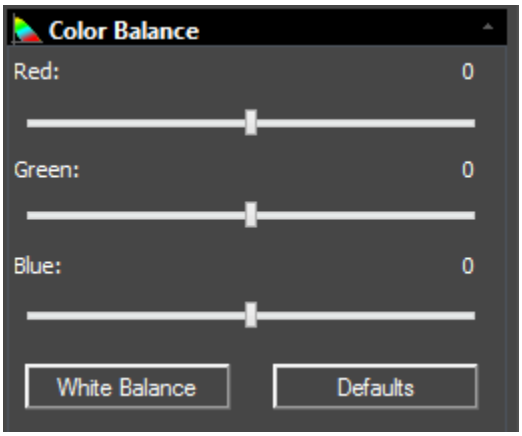
The larger the **Bit Depth**, the larger the data, and the harder the CPU must work to produce image adjustments.

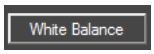
Color Balance

The **Color Balance** control allows you to manually adjust the individual **Red**, **Green**, and **Blue** components of your image to better match your requirements.

To adjust each specific colour use the **Left-Click-Hold** and **Drag** mouse technique.

Once this control is expanded, **MallincamSky** will draw a **Red Region of Interest Rectangle** on your **Video Window**. You can adjust the size and location of this rectangle by using **Left-Click-Hold and Drag** mouse techniques.

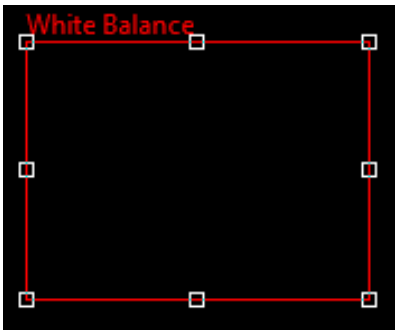




White Balance

Drag or **Resize** the **Red Rectangle** to a pure white area and **Left-Click** on the **White Balance Button** to establish the video **White Balance** for future video streaming process.

To adjust the **Red**, **Green**, or **Blue** components of **Color Balance** use the **Left-Click-Hold and Drag** technique to mode the sliders or **Left-Click** on a slider (to activate it), then use your **Left** and **Right** Keys on your Keyboard to move the sliders.



If you (or the **SkyRaider Camera**) ever get confused with what settings you have entered into the **Color Balance** control, you can reset these values back to their defaults by **Left-Clicking** on the **Default Button**.

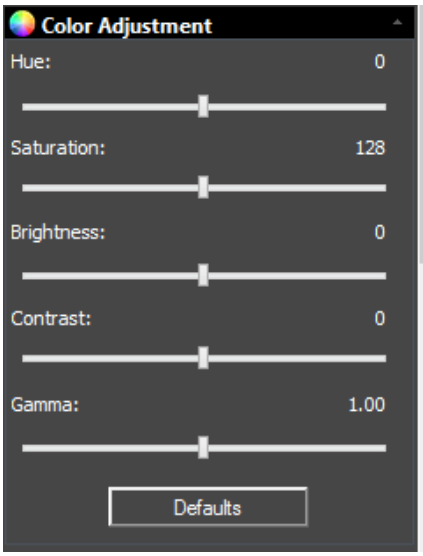
Color Adjustment

The **Color Adjustment** control will allow you to adjust: The **Hue**, The **Saturation**, The **Brightness**, The **Contrast**, and the Gamma of the object that the SkyRaider DS287 is exposing.

Note

Any changes to these commands will only be display after the next camera refresh. (which for Deep Sky Objects can take a while, depending upon the exposure).

It is recommended as you become comfortable with these settings, you will determine what values are the best starting point so make of note of them, so you can quickly get these values to a setting that works for you.



Hue

This command controls the **Hue** of the Video image. **Hue** is one of the main properties of color. By adjusting **Hue**, you are changing the balance of **Red**, **Green**, and **Blue** in the image.

You can either **use the Left-Click-Hold and Drag** technique to move the slider to the left or right, or just **Left-Click** on the **Hue's** slider (this selects it), then use your **Left** and **Right** arrow keys on your Keyboard to adjust the value (small Hue adjustments are easier with this technique). The value of the **Hue** setting will be displayed above the slider.

Saturation

This command controls the **Saturation** of the Video image. **Saturation** increases the separation of colors on a video image. It has the ability to enhance or inhibit the colors on the video image.

You can either **use the Left-Click-Hold and Drag** technique to move the slider to the left or right, or just **Left-Click** on the **Saturation's** slider (this selects it), then use your **Left** and **Right** arrow keys on your Keyboard to adjust the value (small Saturation adjustments are easier with this technique). The value of the **Saturation** setting will be displayed above the slider.

Brightness

This command controls the **Brightness** of the Video image. **Brightness** makes the video image brighter or dimmer. This is a linear adjustment.

You can either **use the Left-Click-Hold and Drag** technique to move the slider to the left or right, or just **Left-Click** on the **Brightness's** slider (this selects it), then use your **Left** and **Right** arrow keys on your Keyboard to adjust the value (small Brightness adjustments are easier with this technique). The value of the **Brightness** setting will be displayed above the slider.

Contrast

This command controls the **Contrast** of the Video image. **Contrast** is defined as the separation between the brightest and darkest areas on the video image. When you adjust the **Contrast**, you increase the separation between bright and dark.

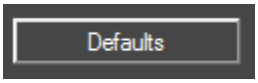
You can either **use the Left-Click-Hold and Drag** technique to move the slider to the left or right, or just **Left-Click** on the **Contrast's** slider (this selects it), then use your **Left** and **Right** arrow keys on your Keyboard to adjust the value (small Contrast adjustments are easier with this technique). The value of the **Contrast** setting will be displayed above the slider.

Gamma

This command controls the **Gamma** of the Video image. **Gamma** adjusts the mid-tones in a non-linear manner. That is, rather than make the image look brighter; it can increase the brightness of the shadows and mid-tones, without affecting the highlights in the image (This control is like adjusting the mid-tone slider on a histogram.

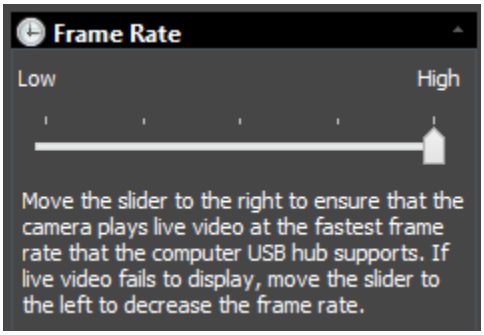
You can either **use the Left-Click-Hold and Drag** technique to move the slider to the left or right, or just **Left-Click** on the **Gamma's** slider (this selects it), then use your **Left** and **Right** arrow keys on your Keyboard to adjust the value (small Gamma adjustments are easier with this technique). The value of the **Gamma** setting will be displayed above the slider.

If you (or the **SkyRaider Camera**) ever get confused with what settings you have entered into, by using the **Color Adjustment** control, you can reset these values back to their defaults by **Left-Clicking** on the **Default Button**.



Frame Rate

The speed of the through-put on the USB 3.0 port on your computer can depend on many parameters that are specific to the processes running on your computer. This through-put can be affected by the current Windows environment, CPU, graphics cards.



Using the **Left-Click-Hold and Drag** technique, move the slider to the highest frame rate that your computer can support.

Note

Start with the **Frame Rate** slider at the highest value, and only adjust lower if video image fails to appear. **Most** will find setting frame Rate towards the **Low** end of the scale better. If MallincamSky seams to freeze, lowering the Frame Rate can sometime resolve the problem.

Color/Gray

This control contains commands allow the SkyRaider DS287 to display its displayed images I color (these colors can be adjusted using the commands seen above) or display the image in shades of grey. Some uses prefer the subtle contrast variations that a grey image provides, especially when imaging the Moon.

If you require the color video to be displayed in **Color**, then **Left-Click** on the **Color** choice.

If you require the color video to be displayed in shades of **Gray**, the **Left-Click** on the **Gray choice**.

Flip

This control allows you to **Flip** the video image, **Horizontally**, **Vertically**, or **Both**. This is a useful command, as it allows you to match the image orientation to that of the orientation of the actual object (which changes with the number of reflecting mirrors in your telescope).

Left-Click to place a **check mark** in the **Horizontal**, **Vertical** boxes to have the image immediately reflect your choices.

Rotate

This control allows you to **rotate** the video image, **0°**, **90°**, 1**80°** or **270°**. Just click on the radial button that matches your desired rotation (**0°** is back to normal).

Sampling

Note

This control contains commands that are only enabled on those **SkyRaider Cameras** that support binning, currently the DS287 does not support Binning.

If you require to **Bin** or **Skip** your video sampling rate from the **SkyRaider Camera**, then this control allows you to select and/or change the current setting.

Bin refers to the method of combining (averaging) pixels of block of neighboring same color pixels to resize the video to a lower resolution (can increase video frames/second).

Skip (also known as decimation) means that a certain number of pixels is not read out but skipped (horizontally, vertically or in both axes). This reduces resolution of the resulting video but introduces subsampling artifacts.

Left-Click on the required button to select the Sampling technique you need.

ROI

ROI or **R**egion **O**f **I**nterest relates to the rectangular portion of the video image that you may be interested in. You will lose you **Dark Field** using this control.

When you are recording video images of planetary objects, the size of the video can grow very quickly. The **ROI** allows you to instruct MallincamSky to only show and save a specific area of the screen (a smaller region that just contains the

image of the planet as indicated by a blue rectangle). This has 2 benefits: smaller files sizes, and as an added bonus, will allow for a faster frame rate.

Note

The **ROI** command only works while the SkyRaider DS287 is in Video Mode but, see below for a work around.

When selected, a **Blue Rectangle** will appear over your **Video Window**. You can adjust it using the **Left-Click-Hold and Drag** technique or **Left-Click-Hold and Drag** to place it over a specific portion of your **Video Window**.

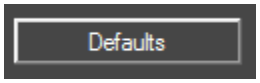
Once you have resized and placed the **Blue ROI Rectangle** on your **Video Window**, **Left-Click** on the **Apply Button** to selection this as the **New Video Window**. Then the **Next Refresh** will fill in the ROI window.

You can then resize the **New Video Window** by either the **Drop-Down Size** command in the **MallincamSky Tool Bar** or by scrolling the wheel on your mouse (if your mouse has a scroll wheel).

This command allows you to **Zoom** in on a specific area of your original Video image.

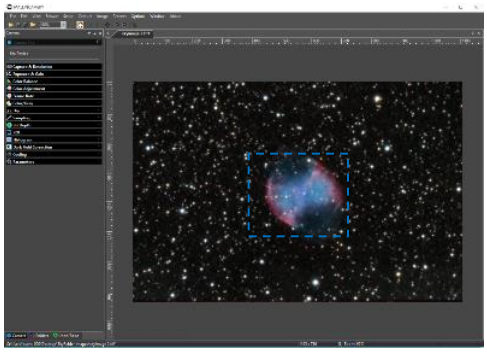
Note

If you (or the **SkyRaider Camera**) ever get confused with what settings you have entered into the **ROI** control, you can reset the **ROI** to its full screen by **Left-Clicking** on the **Default Button**. You may need to set **Fit to Window** in the **Drop-Down Size** command in the **MallincamSky Tool Bar**.

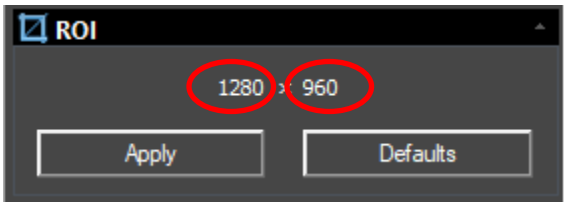


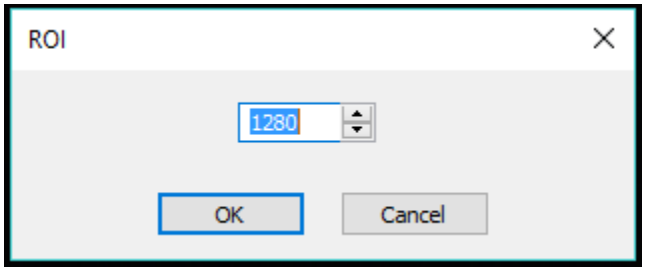
Note

If you are trying to improve the frame rate (frames per second) when viewing planetary objects. By selecting a **Region of Interest** around the planet will allow MallincamSky to only capture that **ROI** portion of the whole image. As a result, the frame rate will dramatically increase.

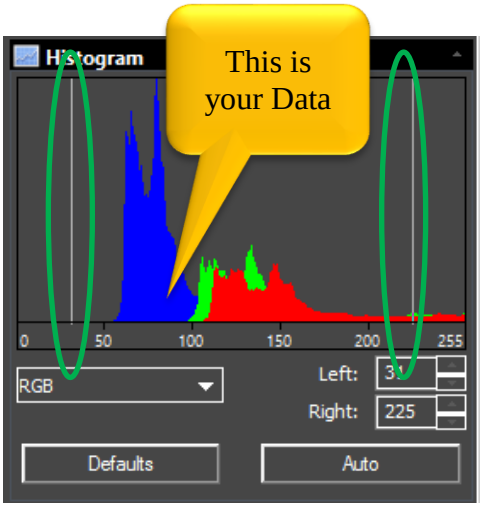


You can also manually set the size of the **ROI** by **clicking** on either the **horizontal** or **vertical** size indicator in the **ROI Tab**. A Window will open-up that allows you to manual select the Horizontal or Vertical size as determined by you.





Histogram



A **Histogram** illustrates how pixels in an image are distributed by graphing the number of pixels at each color intensity level. The **Histogram** shows detail in the shadows (shown in the left part of the histogram), mid-tones (shown in the middle), and highlights (shown in the right part).

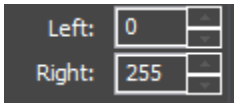
A **Histogram** can help you determine whether an image has enough detail to make a good correction.

The **Top Window** in the expanded **Histogram Control shows the Histogram** of current active video.

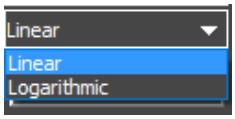
Two vertical **line markers** (white) show the **upper** and **lower** limits of the intensity levels. These markers can be dragged with mouse (**Left-Click-Hold and Drag**), or you can enter in specific values to place the vertical Line markers.

You use the Histogram to aid you in determining the best exposure value for your particular object. But try not to get too aggressive, as you can easily clip (remove) important data form your image.

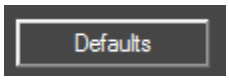
If you are looking at a color image, the **Histogram** will reflect the **RGB** (**R**ed, **Green** and **Bl**ue channels histogram at the same time) values with shading of the same color. You can also use the **Pull-Down** to select the **Histogram** for just the **Red,** or just the **Green**, or just the **Blue** channel.



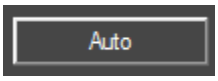
You can also enter directly the desired values in the **Left** or **Right** boxes below the **Histogram chart** for both **Left** and **Right** Histogram boundaries.



You can select how you would like the Histogram data displayed. You have a choice of either **Linear** or **Logarithmic**.



Left Click on the **Defaults Button** to return the **Left** and **Right** Histogram boundaries to their original settings.



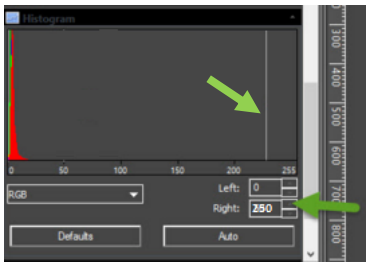
Left-Click on the **Auto Button** to automatically locate the **Left** and **Right** boundaries thus letting MallincamSky determine the best video quality.

Set the exposure so that the **Peak of the Histogram** is some place between **50** and **100**.

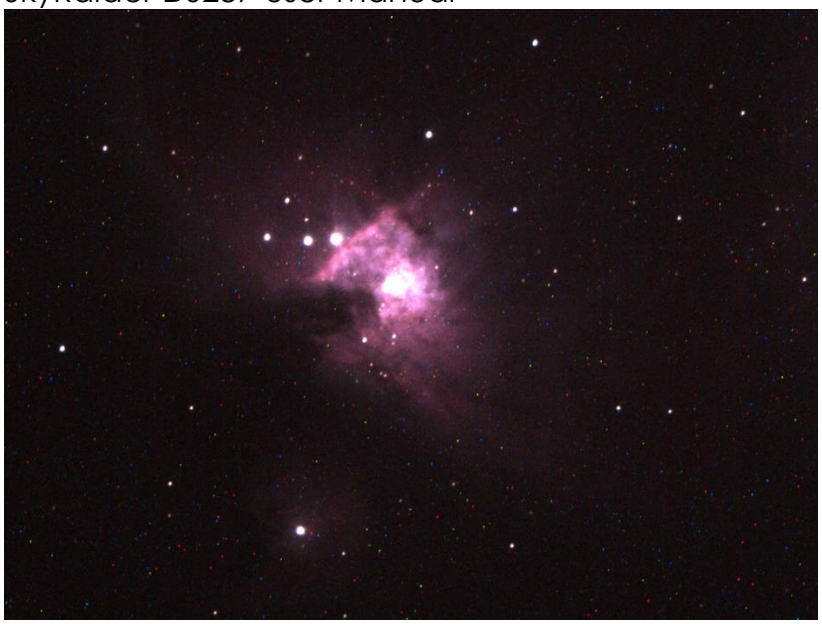
To illustrate what you can do with the Histogram, I have (thanks to **Jim Meadow's** amazing images) included some before and after pictures.

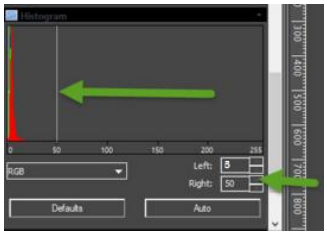
- **Increasing** the **Left** Bar **Darkens** the image
- **Decreasing** the **Right** Bar **Brightens** the image

The Before image is a 3 second exposure with **Left at 0** and **Right at 250**



The After image, same 3 second exposure, with the **Left at 3** and the **Right at 50**

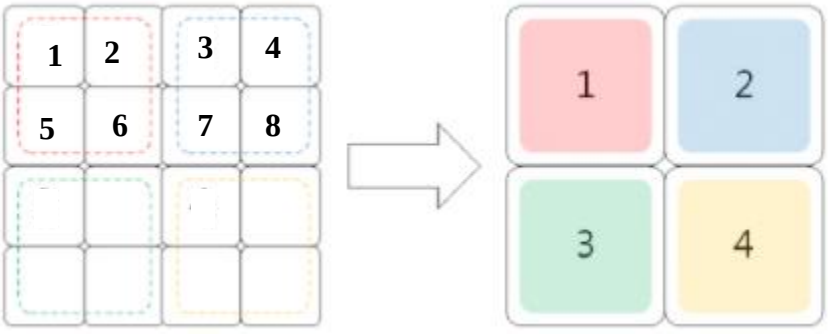




Notice that in both Histograms, the data was **mostly** to the left. This tells we have some exposure room the play with. Don't forget **Gain** and **Brightness** also has a role as well.

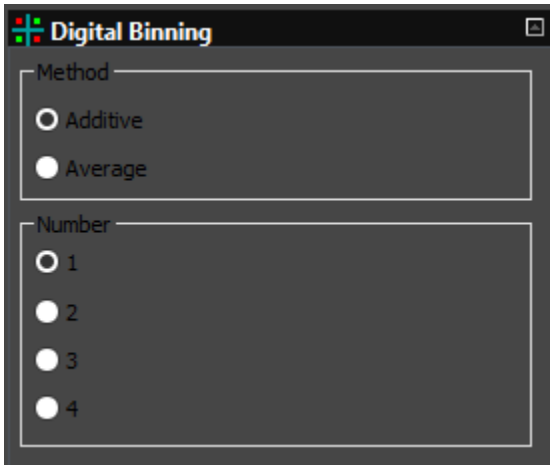
Digital Binning

This process allows you to increase the sensitivity of the Mallincam Camera by providing you the option of combining sensor cells together to increase the photon capture area. For example, a 2 x 2 binning will link 4 cells (in a 2 by 2 array) together so you have about 4 times the capture area than one cell. But, remember nothing is free, it gives up the number of horizontal and vertical pixel resolution by that same factor. You can have the Mallincam either Avera the pixels or Add the pixels. The supported Binning available is 1x1, 2x2, 3x3 and 4x4. As an added bonus, Digital Binning helps increase sensitivity and reduces noise to some extent by improving Signal to Noise Ratio.



As a user, you will make a decision as to what level of Digital Binning you will use. You can use a shorter exposure time to achieve an image, but the image will cover more space on the chip.

When you select the Digital Binning Tab, it opens up to provide the following settings.

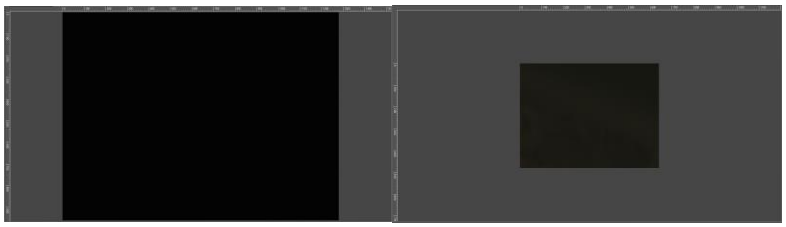


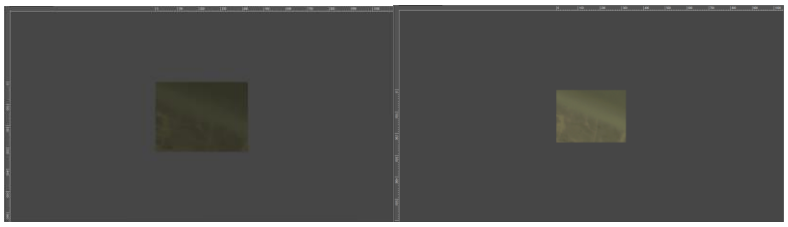
Method
You have two choices here, either **Additive** or **Average**. For Deep sky objects you will choose **Additive**. For Planets and the moon, try **Average** to see if it improves your image.

Number
You now have the choice of the type of binning you would:

None: : set to number to **1**
2 x 2 binning: set the number to **2**
3 x 3 binning: set the number to **3**
4 x 4 binning: set the number to **4**

For each binning level you choose, the video screen window size will adjust (as you are combining more pixels as one), effectively lowering the number of pixels in the image resolution. You can use the Zoom controls to increase the image size to your needs.





You will notice that the brightness of the image will dramatically increase with the larger binning number, so you will need to adjust the exposure setting accordingly.

Usage suggestion in digital binning.

Use the large value **4 x 4** or **3 x 3** to shorten the exposure time, so that you can quickly locate (and if necessary focus) the deep sky image you are interested in. Then choose a smaller **2 x 2** or **1 x 1** binning to produce a more detailed (higher resolution) image.

The DS287, DS16 and DS2.3 cameras have large chips, so using binning setting will still provide enough resolution (and Size) to image most deep sky objects.

Dark Frame subtraction in Digital Binning

You must make dark frames with the same Digital **Binning** settings, else, weird looking images will occur. We suggest saving a set of **Darks** for each of the binning modes.

Use a naming convection or a file location so that it is easy to not only choose the correct Darks for a binning setting, but with-in that binning setting a Dark that match your exposure and other settings.

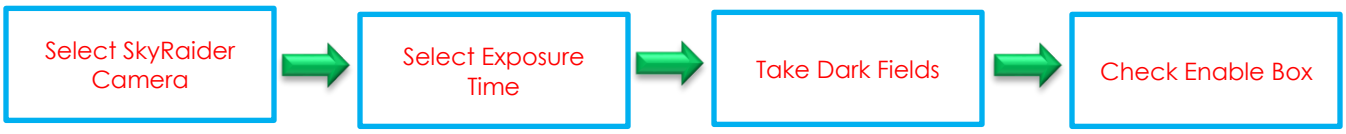
If you find that the video window size doesn't want to return back to its **1 x 1** full screen, just select the **Video Mode**, then return back to **Tigger Mode**.

Dark Field Correction

What makes the **Mallincam SkyRaider** series of cameras unique is the built-in ability to take **Dark Fields**.

The best explanation of what a **Dark Field** is came from **Simon Hanmer**. See Appendix for his explanation.

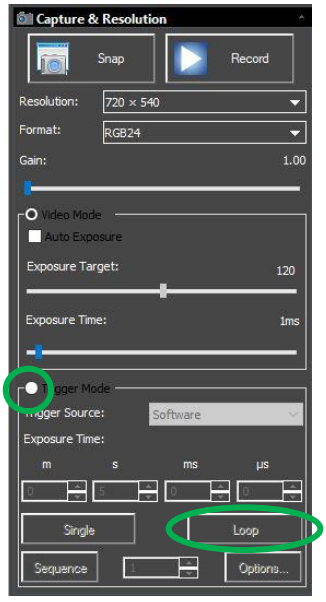
To have the **SkyRaider** camera to automatically apply **Dark Fields**, you need to follow the following procedures before imaging.



Select the **SkyRaiderDS287** from the **Camera List** in the **Camera Tab.**

Select an Exposure Time for Dark Field Correction and Start Exposing

With the **Camera Tab** selected on the **Left SideBar**, **Left-Click** on the **Capture & Resolution.** The **Exposure & Gain Window** will expand select the exposure time for the **Dark Field**.



You must determine what you believe will be the maximum exposure for this session. As, you will create Dark Field's with this time (or close to it). Also, to want to try to match the other settings in the DS287 in the Dark Field as you would have when imaging the Object.

If you are taking a maximum exposure under 5s, then select **Video Mode**, but since most **Deep Sky Objects** will require an exposure of over 5s, choose **Trigger Mode**.

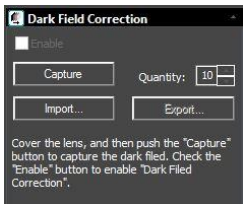
Either enter the time into the appropriate box or use the **up** and **down** arrows beside the chosen Exposure time unit to set your maximum time.

Start the **SkyRaider DS287** taking continuous exposures, **Left-Click** on the **Loop** button.

Step 3

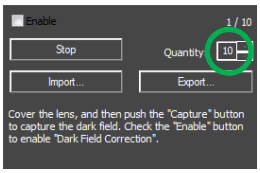
Take Dark Field Correction

Ensure that the cover is either on the **SkyRaider Camera** or the Telescope itself is covered, then **Left-Click** on the **Dark Field Correction Line**.



The **Dark Field Correction box** will open up allowing you to select the **Quantity** of **Dark Fields** and the option to start the **Dark Field Capture** process.

Select up to **99** (5 to 10 recommended) for the **Quantity,** then **Left-Click** on the **Capture Button**. The Software will display its progress above the selected **Quantity**. Remember, it is beneficial to set the Dark Field exposure time greater than the longest time you will be imaging at.



Note

As the Dark Fields are being exposed, you can watch the **exposure counter** in the **Dark Field Correction Tab** go up, and on the bottom right side of the MallincamSky window, you will see a counter letting you know how long is left in that particular exposure.

Hint

Once you have finished taking your **Dark Fields**, don't forget to **remove the lens cap** on your camera (or Telescope), so that you can actually image (I won't mention any names…).

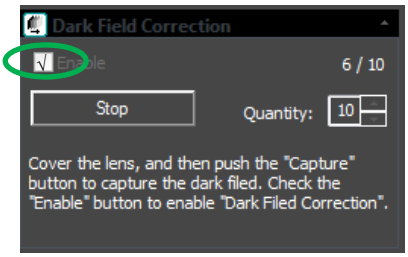
Note

Once you have collected your **Dark Fields**, you can then **save** them with the **Export Button** (choose a location and File name that allows you to locate the correct Dark Fields if you would like to reuse them. Name the folders so that it is easy to retrieve Dark Fields that match for current imaging plan (60s times 5). You can load previously saved **Dark Fields** via the **Import Button**. Just browse to the folder where you saved them when you used the **Export Button**.

Step 4

To activate the Dark Field's just **Left-Click** in the **Enable check box** in the Dark Field Correction's box to have **Dark Fields** applied in real time to your images.

To image without using Dark Field's, just uncheck the **Enable checkbox**.



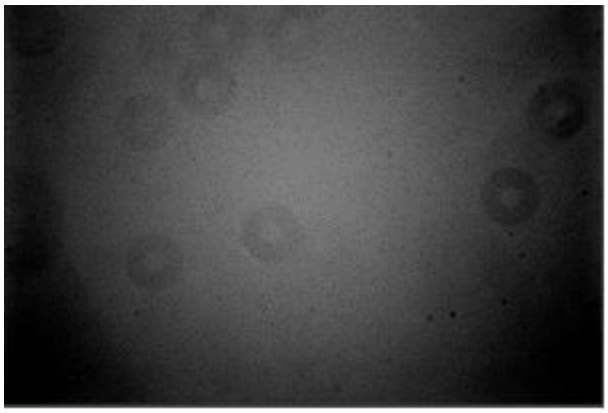
Flat Field Correction

Introduction:

When imaging using a CCD/CMOS device, and when trying to use those images for scientific purposes, it is essential to reduce the amount of unwanted signal and unwanted noise from each image frame. The optical path "noise" (some of which is actually signal), is such a problem that many astronomers had to suffer with. The resolution to this problem came from the use of Flats and applying those Flats to the images.

Optical Path Noise:

Telescopes, CCD/CMOS chips, filters, lenses all block light as well as transmit light. They also harbor dust, finger prints, and other unwanted shadow producing things in the light path. The result of such optical path obscuration is an unevenly illuminated CCD/CMOS chip. These noise variations are usually caused either by variances in sensitivity from pixel to pixel, or by the telescope optics. Main causes due to the telescope are vignetting and out-of-focus dust on one of the lenses in the optical system. This is a real challenge for anyone doing real science or pushing their images to the highest level. Optical path vignetting, and other physical path obstructions will also cast large, non-discernable shadows onto your CCD/CMOS, causing poor even illumination across the image field. Flat fields are used to remove variations in the brightness of pixels across the CCD chip. The plan is to then "subtract" this consistent noise from the images being produced by the camera.



Taking Flats:

A Flat Field is an image taken of an evenly illuminated object like the dusk sky, or a special illuminated white card hanging on the wall of the observatory or even a white T-shirt placed over the telescope.

These images are ideally taken through the telescope:

- at the same temperature as your nightly images
- through the same filter/s as your nightly work.
- Do not change your imaging train (this include adding or subtracting filters, extenders, reducers, or even rotating the camera) after you have taken your flats.
- with integration times to allow the flat to produce an image that captures of "noise", but Flat images should never bloom, but should also not be less than a second in integration time.

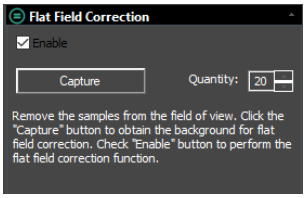
For precision work, 5 to 30 or more flats at an exposure of not greater than a couple of seconds. You want an image that shows the faults, not one that is over exposed. Practice, Practice, and yes, even more practice to get the flats correct. Each flat will then be averaged together to create a master flat which is then divided out of your light frame on a pixel by pixel basis.

Visit the following site for before and after images when applying Flats:

http://theworldofastronomy.blogspot.ca/2016/04/astrophoto-flat-field-illustration.html

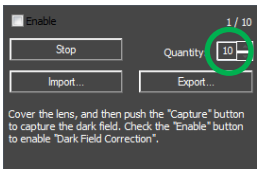
Step 1

Take Flat Field Correction



Ensure that you are pointing the telescope at your Flat Field source (dusk sky, white board), select an exposure time, then **Left-Click** on the **Flat Field Correction Line**.

The **Flat Field Correction Line** will open up allowing you to select the **Quantity** of **Flat Fields** and the option to start the **Flat Field Capture** process.

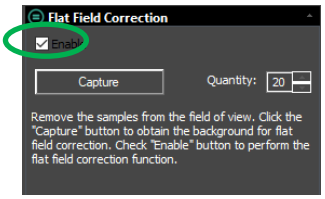


Select up to **99** for the **Quantity**, then **Left-Click** on the **Capture Button**. The Software will display its progress above the selected **Quantity**. Remember, the images you select the more averaged will be the Flat Field.

Note

As the Flat Fields are being exposed, you can watch the **exposure counter** in the **Flat Field Correction Tab** go up, and on the bottom right side of the MallincamSky window, you will see a counter letting you know how long is left in that particular exposure.

Step 2



To activate the Flat Field's just **Left-Click** in the **Enable check box** in the Flat Field Correction's box to have **Flat Fields** applied in real time to your images.

To image without using Flat Field's, just uncheck the **Enable checkbox**.

With the **Flat Field enabled**, any imaging will have the Flats automatically removed.

Black Level

Black Level is defined as the level of brighness of the darkest (blackest) part of the image. In technical terms, the black level is the pixel level (in electrons, or volts) which corresponds to a pixel value of zero. The Black level adjustment on the MallincamSky allows you to adjust that value through the use of a slider.

The slider provides you a range of suttle darkness adjustments from a starting point of **0** to an end point of **31**. In using this control, you can tweak your image to slightly "brighten" (towards level 31) or "dim" (towards level 0) the starting point for the image's backest location.

Using this slider allows you to define what you believe (based on your current image) should be the optimum black. This control is most useful when you are experiencing a glow due to a bright object near the object you are imaging, and you want to tweak the darkness.

Since MallincamSky gives you the ability choose the **Black Level** for the camera, you can use this feature to assist in reducing the **amp glow** present in your image, You can also use the Black Level to create a well-balanced dark background against the stars in your image.

Just have fun and experiment, as every telescope and seeing conditions provide for a different envonment for the SkyRaider.

Live Stack

MallincamSky comes with the ability to stack images to improve the signal to noice ratio. This feature will allow you to stack short exposures to produce an image that otherwise would of required a larger exposure time. This comman allows users whose equipment will not all for long exposures (such as Alt-Az Mount), but can also be very beneficial to all mounts.

The follwing images captured live illustrate the advantages of Stacking :

M5, a **single** 5 second exposure using SkyRaider DS287 on 10" VRC.

M5, **two** 5 second exposures stacked using SkyRaider DS287 on 10" VRC.

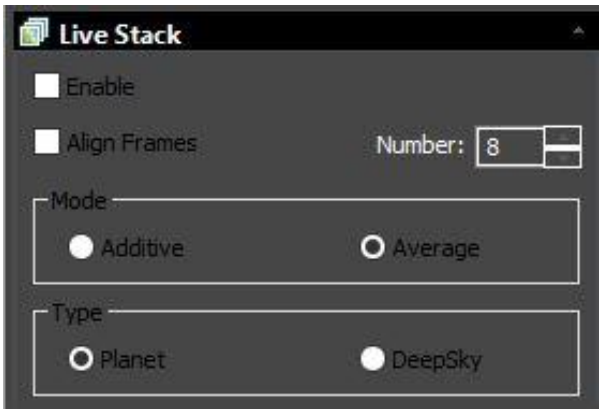
M5, **three** 5 second exposures stacked using the SkyRaider DS287 on a 10" VRC.

M5, **four** 5 second exposures stacked using the SkyRaider DS287 on a 10" VRC.

M5, **five** 5 second exposures stacked using the SkyRaider DS287 on a 10" VRC.

Left-Clicking on this command will open up the **Live Stack Window**

We wil see that there at two types of stacking (**Additive** and **Average**). You will use **additive** to increase the image brightness, and you will use **average** to decrease the noise.



Here you can activate the stacking by check-boxing the **Enable**, you can have MallincamSky **Align** the frames by checking the **Align Frames Box**. You can select the number of frames you would like stacked in the **Number Box**. You can tell MallincamSky if you would like the images **Added** (made brighter), or **Meaned** (made sharper), plus inidcate is you are stacking **Planets** or **Deep Sky Objects**. This command will provide a live status of its stacking process in this Window.

Step 1 First select the object Type (**Planet** or **DeepSky**)

Step 2 Now select if you would like the images Stacked (**Additive**)or Averaged (**Average**) by making a selection in the **Mode Box**.

Step 3 Next enter in the **Number of Frames** you would like stacked. You can stack from **1** to **99** Frames

Step 4

Now determine if you would like the Stacking process to Align the Frames. This will produce a better Image but will take a bit longer. The process examines the image and determines alignment stars for the process. If there isn't enough alignment starts the command will indicate that there is a problem, and you may need to increase the gain or exposure to produce more stars for the alignment routine.

Note

You **want** the stacking to align the frames, then checking the **Align Frames Box**. (else you may obtain a Pink Floyd psychedelic effect for the image).

Step 5

Start the Stacking by checking the **Enable Box**.

The stacking process will keep you informed with its status by indicating you what the current **input** stacking number is, what the current **output** (how many frames are stacked), and via the status, if there are any issues.

If you told MallincamSky to stack 5 images, then when the 6th image is taken, it will keep displaying just the last 5 images stacked (the first image will be removed, this is a rolling stack).

Hint

You can disable the Stacking process by just **unchecking** the **Enable Box**.

Hint

Don't be afraid to also turn on Dark Field Subtraction to help eliminate the background noice.

Note

If the Status tells you it has an alignment failure (Not enough Stars), then just increase the gain. This should make more stars available to the alignment algorithm.

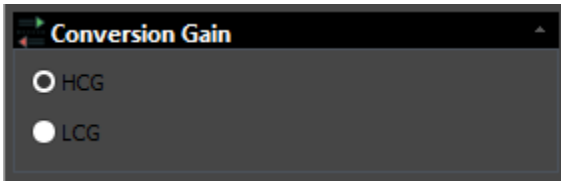
Conversion Gain

A Higher Conversion Gain means higher sensitivity, as one signal electron can be more easily detected. The high-CG sensor shows a very clear responsivity advantage; however, the trade off is clearly seen in the much lower full-well capacity as the sensor's linear range ends at a much lower exposure.

Low conversion gain (**LCG**) for large charge handling capacity in bright scenes. High Conversion Gain (**HCG**) mode with increased sensitivity and low read noise for lowlight scenes, providing tremendous benefit for real time imaging.

The **LCG** mode is comparable to the old NO GAIN, while the **HCG** mode is comparible to high gain is **HCG**. The trade off is the effective-lower readout noise and doubling the signal output, while halving the dynamic range.

Use the appropriate mode to either push the sensitivity (decreases the dynamic range), or increase the dynamics range (decreases the sensitivity). The choice depends upon the object being images. Experiment.



The following images illustrate the benefits of using **HCG**. In both images the exposure time was the same. The left image had **LCG** checked, while the right image have the **HCG** checked.

LCG

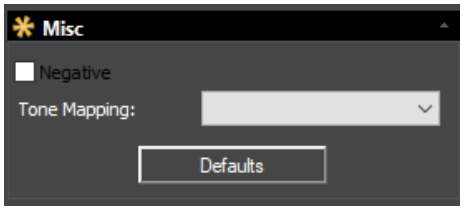
HCG

Sharpen

This control allows you to sharpen the image. Remember that being too aggestive will induce some rough edges around youyur image. Just use the slider to sharpen the image from none to 500%

Misc

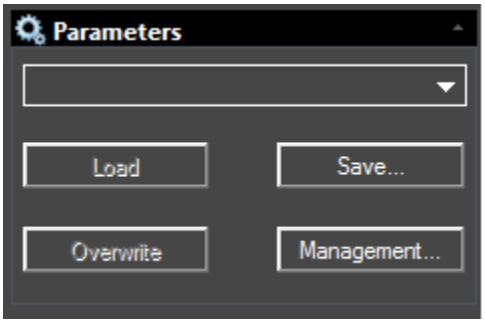
Currently this control will allow you todisplay the image in its **inverse**. That is, while background wit black stars. Just use the check box to activate.



Parameters

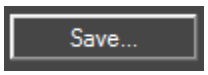
The **Parameters** control allows you to:

Load a previous set of camera control parameters, or **Save** the current camera control parameters for another session. The parameters includes most of the settings in the **SideBar** including the **Rectangle Regions of Interest**.

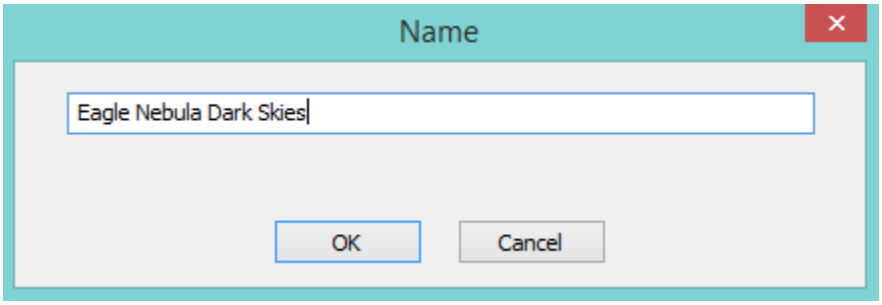


The **Drop-Down** control provides a list of previous (if any) saved parameter settings. Just sellect the parameter session that you require from the list.

Left-Click on the **Load** command and it will load the control parameters from the above file in the **Drop-Down List**.

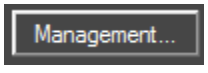


Left-Click on the **Save** command and **MallioncamSky** will open a window that will allow you to give a name to the current sessions, and then will save the current camera parameters under that name (see **Management command** below).

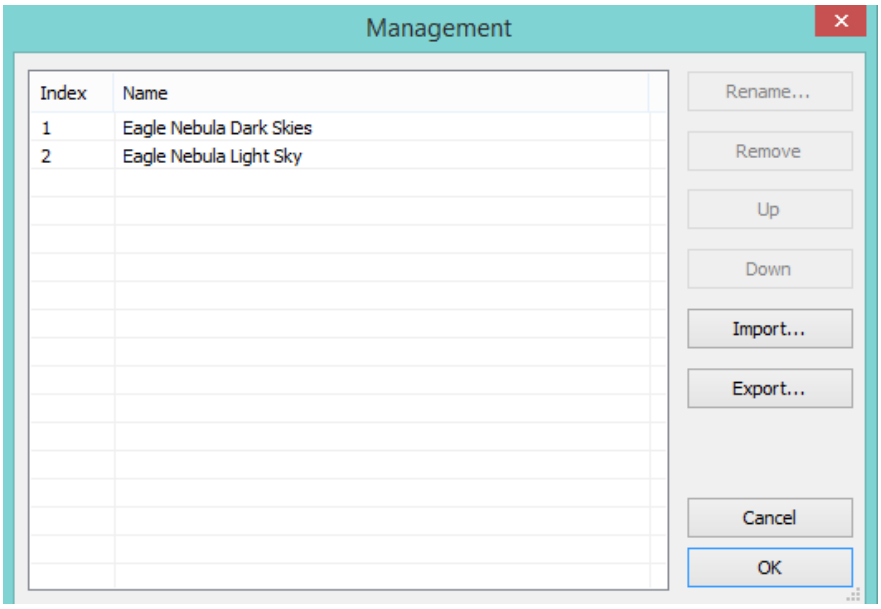


Give a **Name** that is easy to determine what the parameters in the file contain. That is, choosing a name like **Eagle Nebula Dark Skies**, would indicate that the parameters in the File are designed for the Eagle Nebula when you have great dark skies.

Left-Click on the **Overwrite** command and it will overwrite any setting changes you made to the current parameter file.



Left-Click on the **Management** command and a **Management Dialoge Window** will open up.



This **Dialog Window** will allow you to:

- **Rename** the **Parameter File** name
- **Remove** the **Parameter File** from the computer
- **Re-order** how the Parameter names appear in the list.

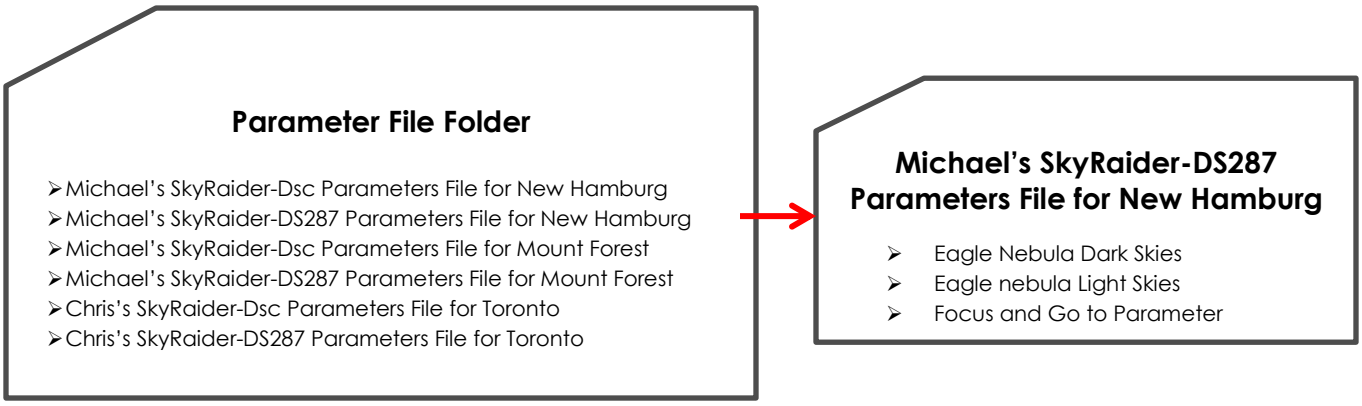
The **Management Dialog** will also allow you to export **all** of the **Parmeter Files** to a ***.pgt** file, so that you can send this ***.pgt** file (which contains **all** of your parameter files) to a collegue.

The **Management Dialog** will also allow you to import a collegues **set** of parameter files (single ***.pgt** file whci contains **al**l of their parameter files) into your MallincamSky folders.

When you import a set of parameter files into your system**, it will overwrite all of your parameter files**. So use caution. See **Hint** below.

After you have created a list of parameter files that you are using. **Save** them in a **Parameters File Folder** (pick a l**ocation** and **name** for **This Folder** such as **Parameter Files**) on your computer under a name that indicates that these files are yours (**such as Michael's SkyRaider-DS287 Parameters Files for New Hamburg**).

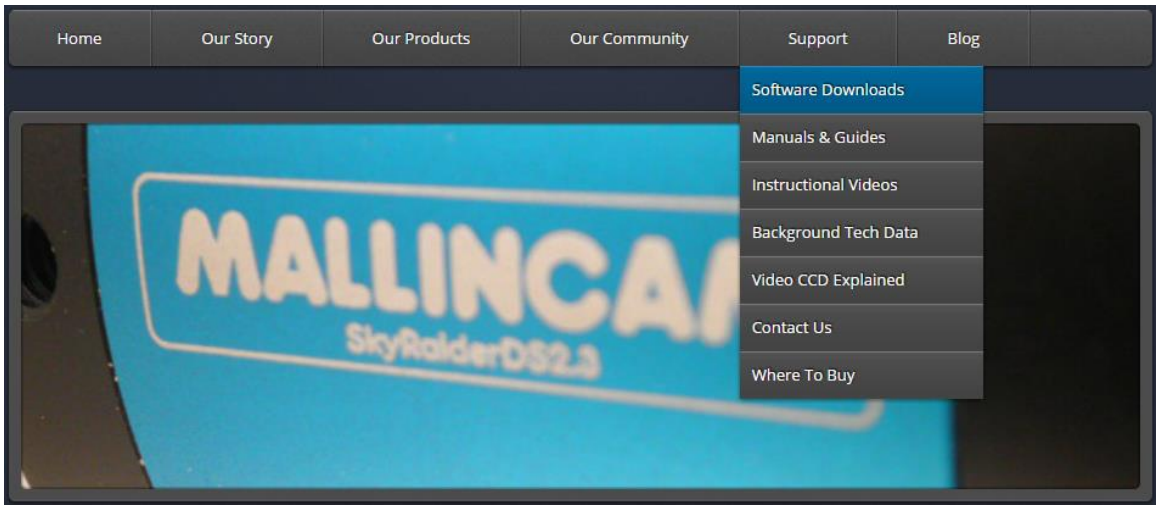
This way you can save a **another set** of parameter files for another **SkyRaider Camera** In the same folder (**Parameters File Folder**) this way you can load parameter files for a specific camera. Also you can also include other collegues parameters files in the same Folder (**Chris's skyRaider-DS287 Parameter Files for Toronto**). This allows you a method to reload your parameter files after trying colleagues (and not have them overwtitten).



7. Installing Optional Software

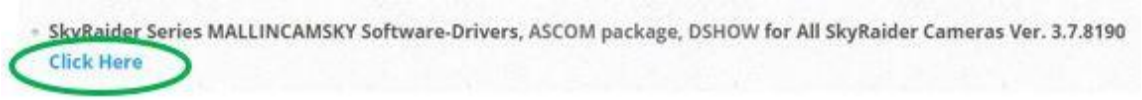
Step 1

Visit the Software Downloads Page in the Support Tab located on the website: www.mallincam.net



Step 2

Select the **Blue Click Here Button** to download the Drivers and MallincamSky Software for a Windows PC.



Note

If you have a Mac, or Linux computer, just choose the appropriate download form the download page. The following instruction will represent a Windows Computer.

Note

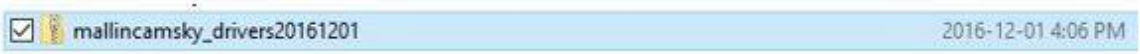
There may be a download for a Later version as updates come along.

Your Browser should download a zipped file called mallincamsky2016mmdd (the last eight number may be different as they will change if software is updated).

Step 3

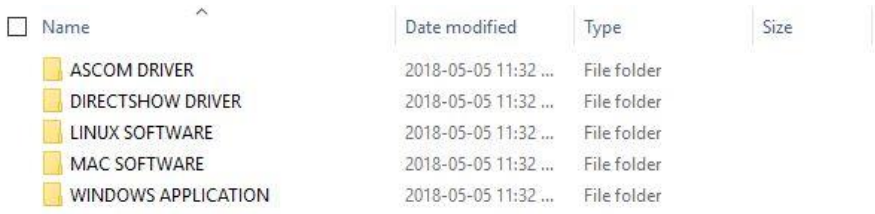
Place your mouse on the zipped file, **Right-Click** to pop-up an **Action Window**, and choose **Extract All …**

Just **Click** on the **Extract** button, when the next Window pops-up. Windows should now open up the actual folder that contains the software to install.



Step 4

Un-Zip the folder, then **Double-Click** on it to open it up, revealing the 5 programs it contains (or 1 program if just downloading MallincamSky).



The **ASCOM DRIVER** folders contains the ASCOM Drivers for the camera
The **DIRECTSHOW DRIVER** folder contains the Direct Show Drivers for the camera
The **WINDOWS APPLICATION** folder contains the camera control software.

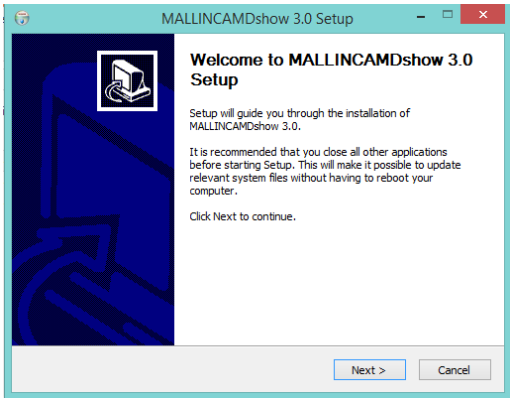
Installing DirectShow Driver

Step 1

Open up the **DIRECTSHOW DRIVER** folder, then **Double-Click** on the **MALLINCAMDshowSetup** File

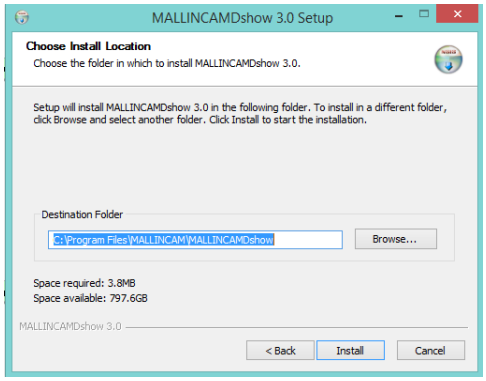
Windows may display a warning asking for permission to run the program, if it does, select **YES**

The following **MallincamSky Setup Screen** will appear:

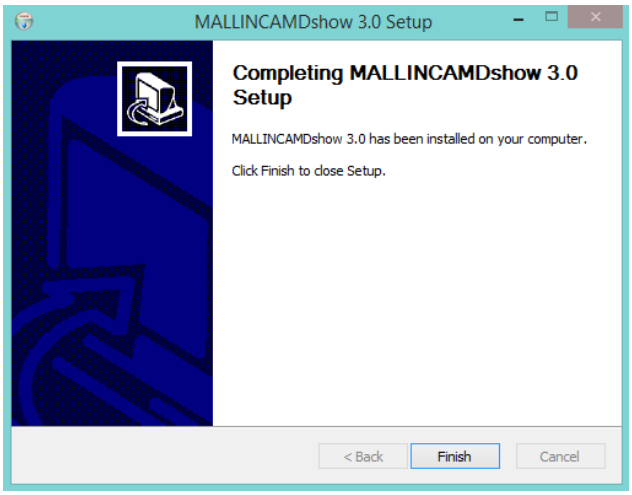


Step 2

Click on **Next** to start the installation process.



Step 3 Click on I**nstall** to start the installation process.



Step 4 Click on **Finish** to close the process.

Note The **DirectShow** driver will give you the ability to display the **SkyRaider** video using other video display software. The software that uses the **DirectShow** video protocol, will always have a button that pops up the **DirectShow Control Window** where you can control the exposure, and other settings on the **SkyRaider** camera.

Installing Mallincam ASCOM Driver

Note

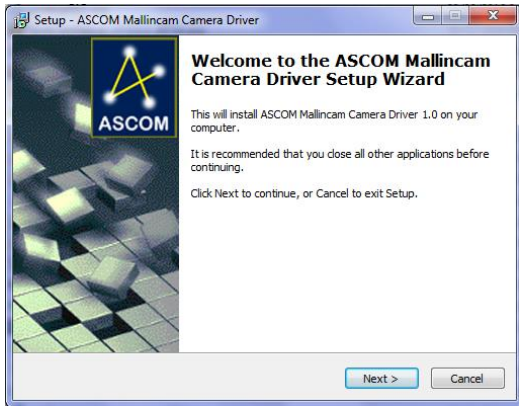
You must have already installed the latest **ASCOM Platform** on your computer (www.ascom-standards.org).

Step 1

Open up the **ASCOM DRIVER** folder, then **Double Click** on the **ASCOMMallincamSetup** file to Start the installation process. Depending upon the version of Windows, the following screen might appear.

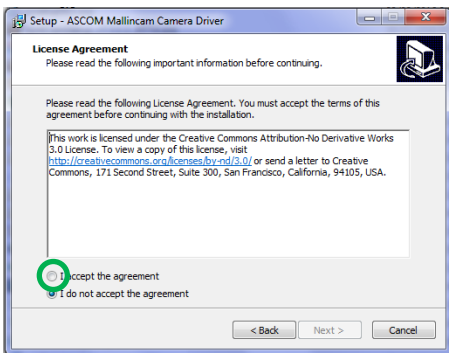
Step 2

Click on the **Run Button**. The following Window should now Pop-Up.



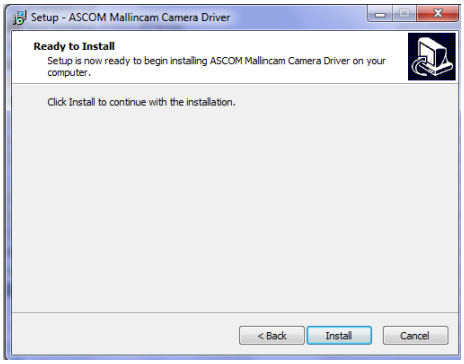
Step 3

Click on **Next** to Continue. The **License Agreement Window** should now appear.



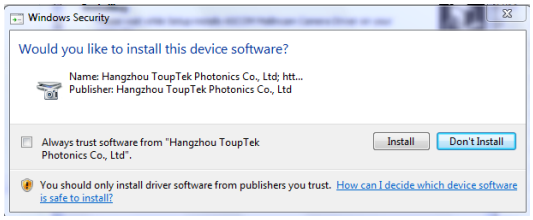
Step 4

Click in the '**I accept the agreement'** Radial Button, then **Click** on **Next**. The **Ready to Install** Window will appear.



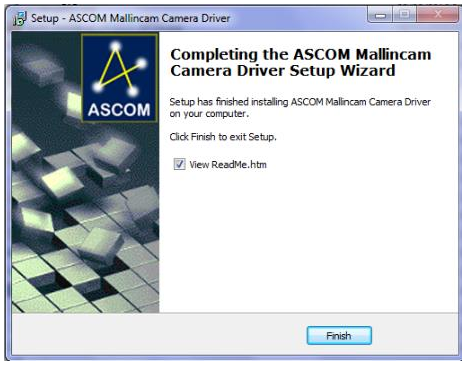
Step 5

Click on Install to install the ASCOM Driver. Depending upon the version of Windows, you may see the Following Pop-up. **Install** it.



Step 6

That's it. The installation process will provide you with the final Pop-up window to inform you that the installation was successful. **Click** on the **Finish Button** to acknowledge.



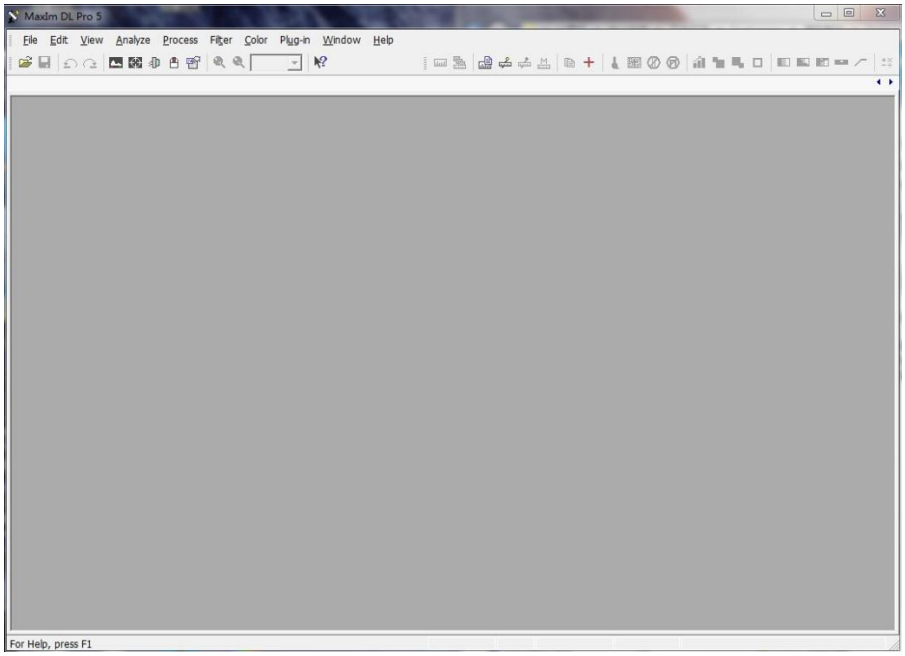
8. AutoGuiding with SkyRaider

Guiding with MaximDL and Mallincam ASCOM

The following is a pictorial procedure on how to select the **Mallincam ASCOM driver** (assumes you have already installed this driver on your computer) in **MaximDL.**

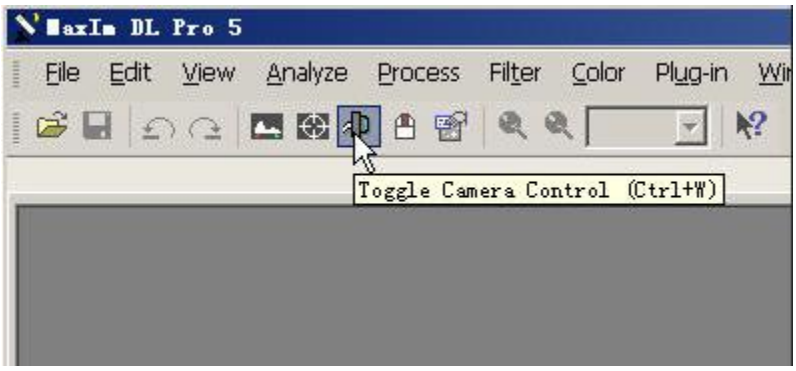
Step 1

Start **MaximDL**



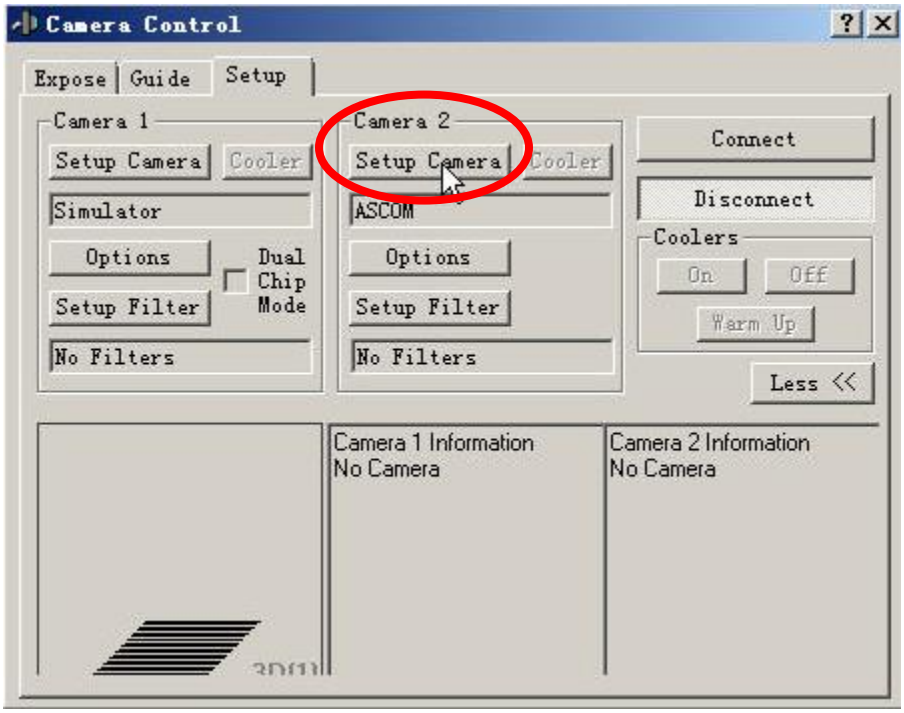
Step 2

Left-Click the **Toggle Camera Control Icon** (**Camera Control Window** will open up).



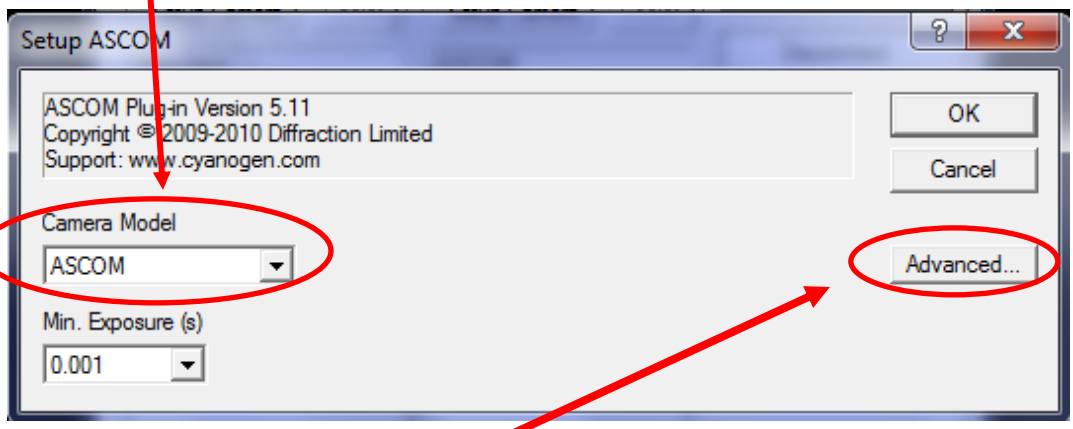
Step 3

Left-Click the **Setup Camera** button on Camera 2 from the **Setup Tab**.



Step 4

Choose **ASCOM** (from **Camera Model** in **Setup ASCOM** popup Window)

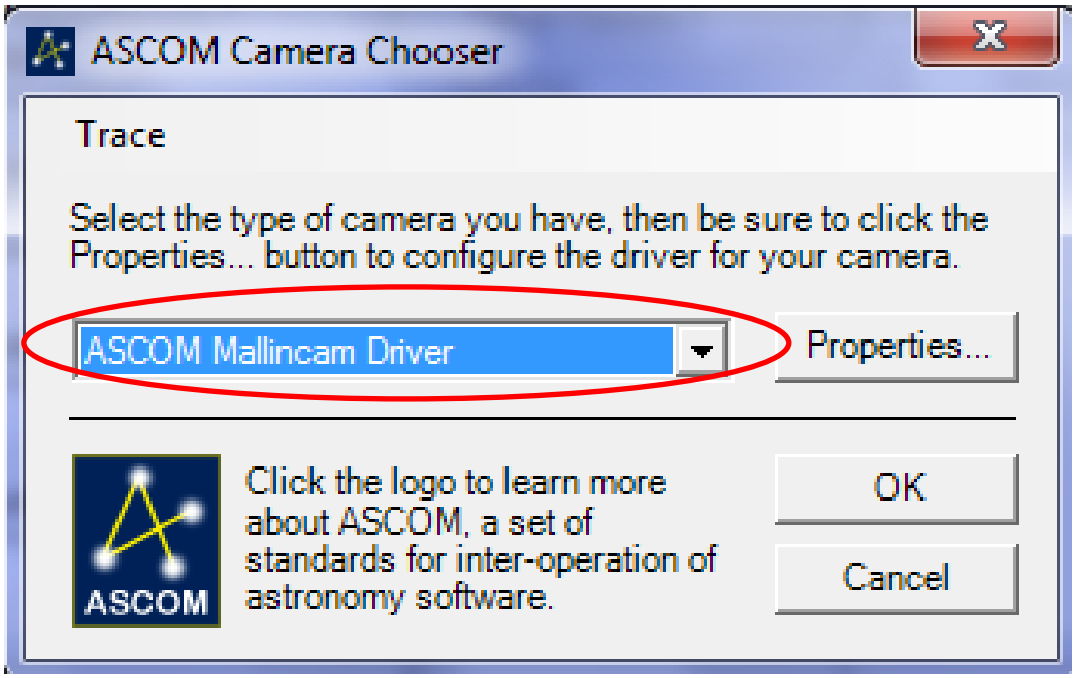


Step 5

Now **Left-Click** on the **Advanced…** Button in the **Setup ASCOM** popup Window. This will pop up the **ASCOM Camera Chooser** Window.

Step 6

Choose **ASCOM Mallincam Driver** from the pull-down selector.

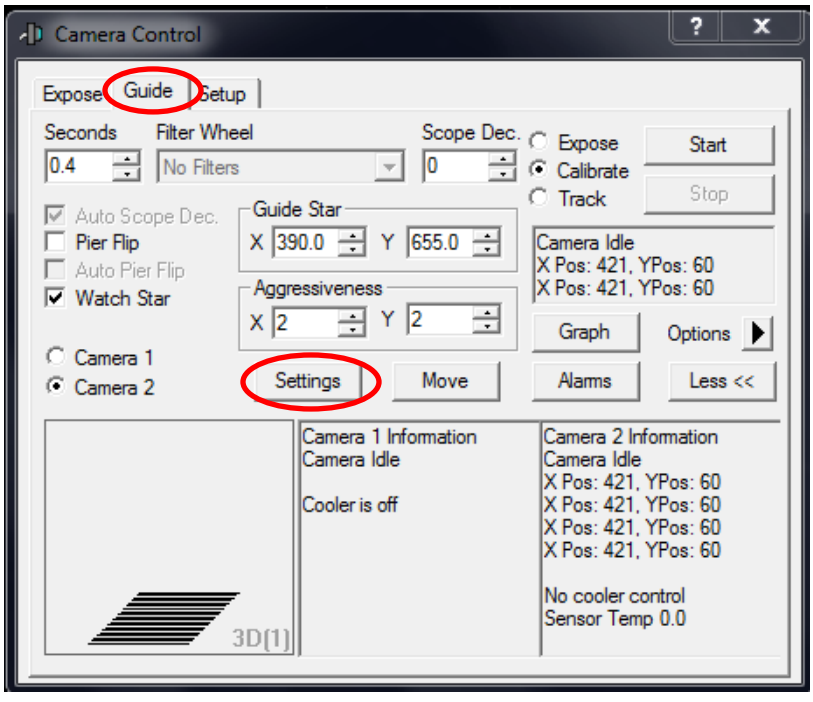


Step 7

Left-Click on the **OK** Button to accept the Mallincam Driver in the **ASCOM Camera Chooser** Window. You will be returned to the **Setup ASCOM** window, then **Left-Click** on its **OK** button to accept this, and you will be returned to the **Camera Control** Window.

Step 8

Left-Click on the **Guide Tab** to switch to the Guide Options screen.

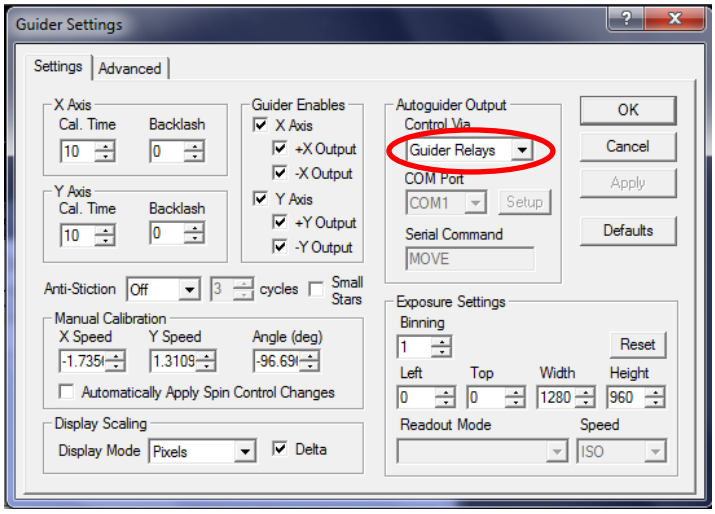


Step 9

Left-Click on the **Settings Button** in the **Guide Tab**, and the **Guider Settings** Window will pop up.

Step 10

Select **Guider Relays** in the **Autoguider Output Control** pull down selector.



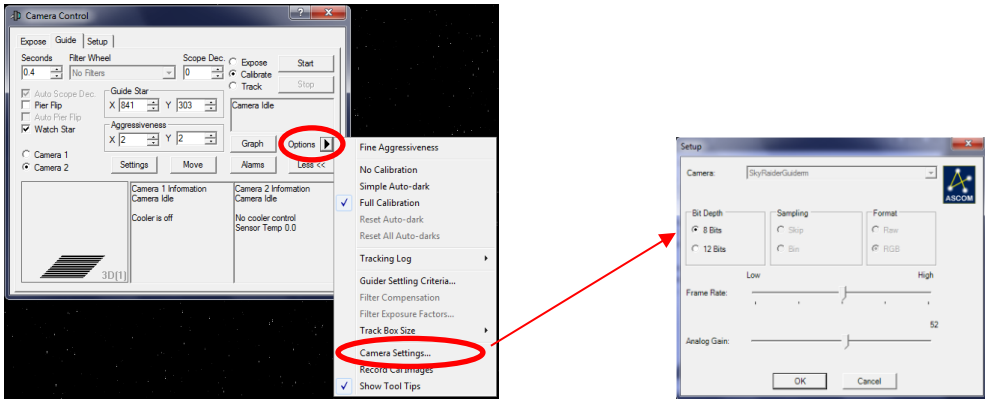
Step 11

Left-Click on the **OK** Button to accept the settings and return to the **Camera Control** Window.

All you need to do now is select **Connect** from the **Setup Tab** to activate the camera and start using MaxImDL as you normally would Remember that MaxIm-DL control the **exposure** via the **Seconds selector** in the **Guide Tab**.

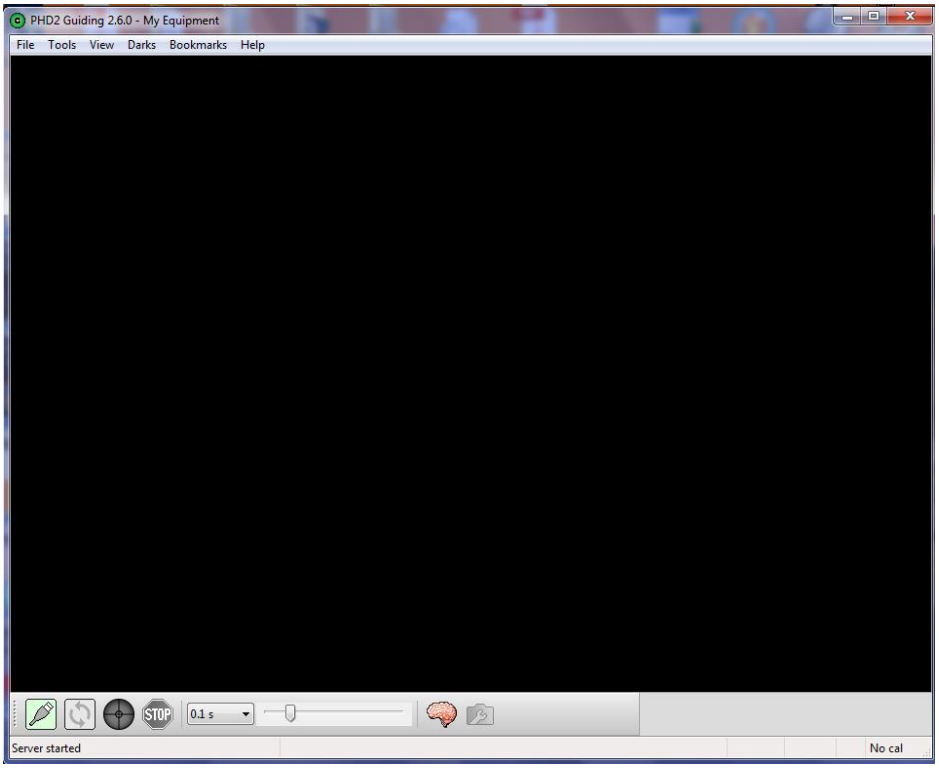
Note

In the **Guide Tab Options** display, you can use **Camera Settings** to adjust a few of the SkyRaider's settings such as **Bit Depth** and **Gain**.

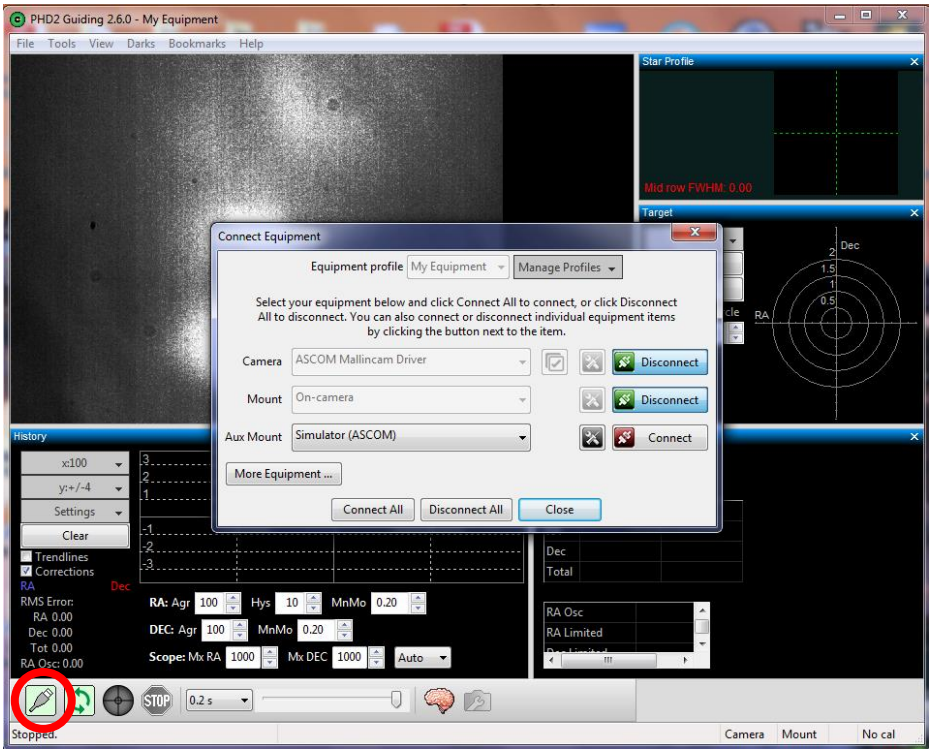


Guiding in PHD2 with Mallincam ASCOM Driver

Step 1 Start the **PHD2** software.

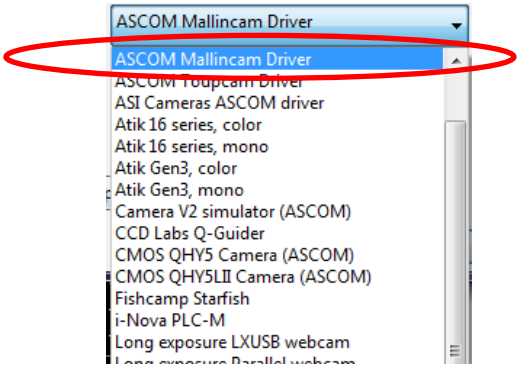


Step 2 Click on the **Connection Icon** to open up **Connect Equipment Window**.



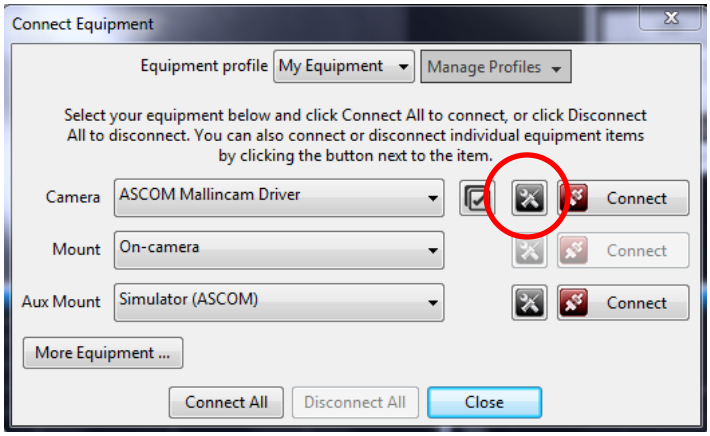
Step 3

Choose **ASCOM Mallincam Driver** from **Camera Drop Down List.**



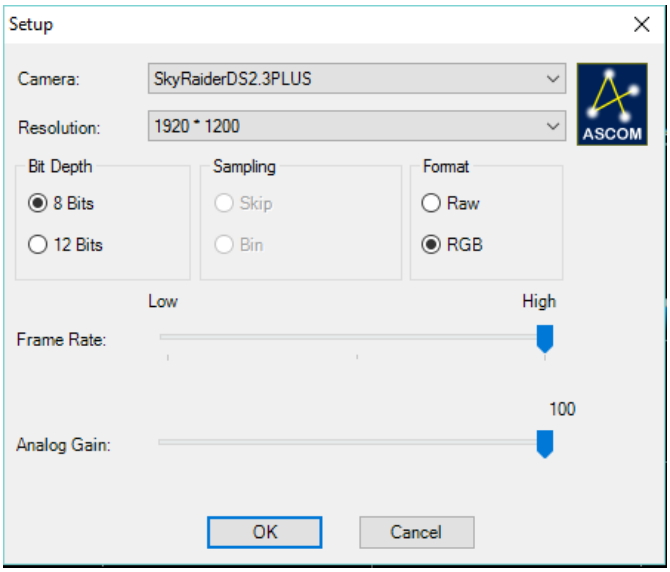
Step 4

Left-Click on the **Camera Setup Button** to open **Setup** Window.



Step 5

Setup Recommendations for SkyRaider is to use **640 * 480 Resolution** with the **8 Bit Depth** and **Low Frame Rate**. **Left-Click** on **OK** to go back to **Connect Equipment Window**.



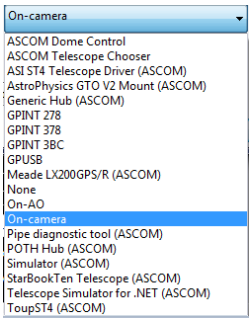
Don't be afraid to adjust these settings to match your requirements.

Step 6

Left-Click on the **Connect** button on **Camera List** to connect camera.

Step 7

Select **On-Camera** from the **Mount Dropdown** list

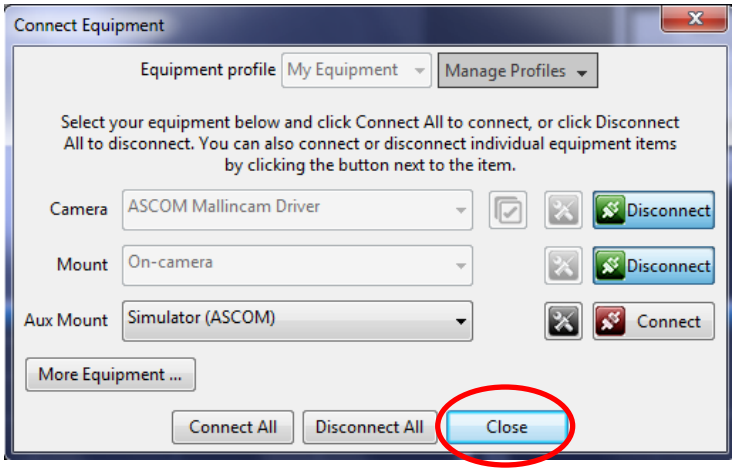


Step 8

Left-Click on the **Connect** on **Mount List** and select **On-camera** to tell **PHD2** that the mount that the **SkyRaider** controls the ST4 port itself.

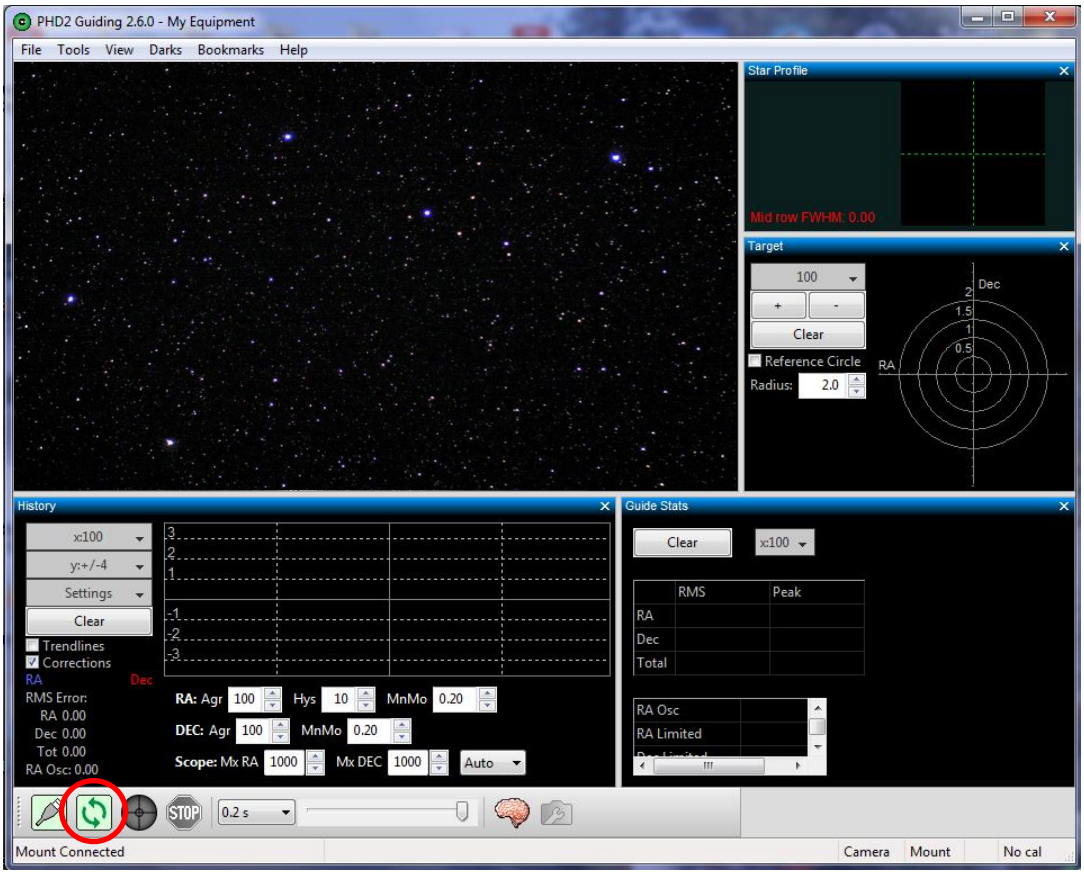
Step 9

Left-Click on the **Close** to close the **Connect Equipment Window.**



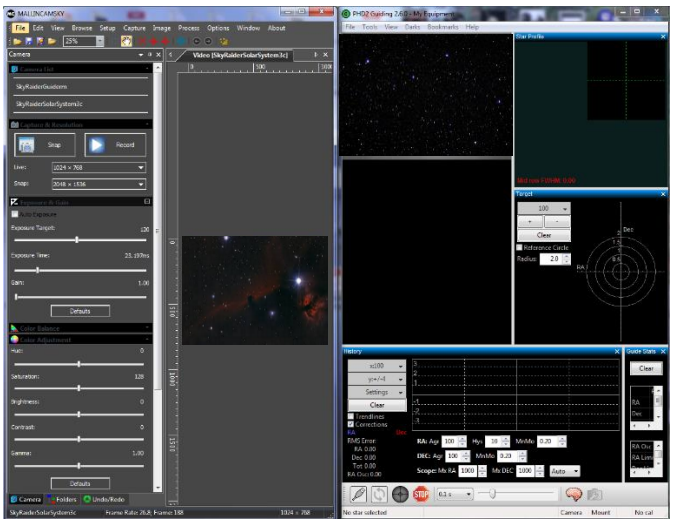
Step 10

Left-Click on the **Looping Icon** to start the **SkyRaider** imaging and then start using **PHD2** as you normally would. PHD can control the exposure time of the SkyRaider Camera with the exposure drop down button.



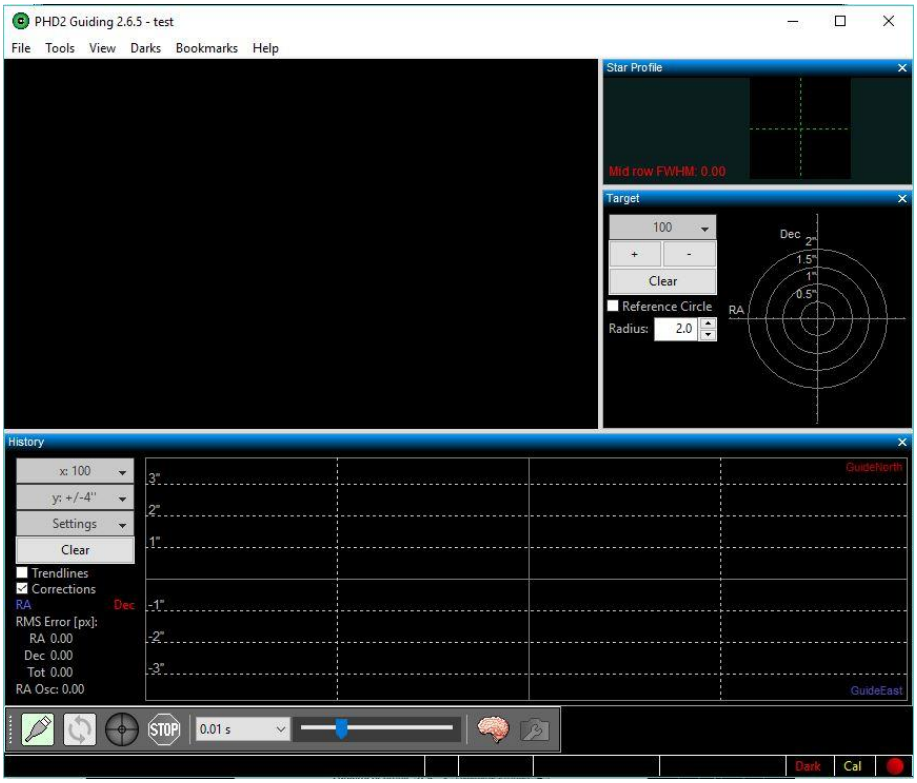
Note

If you are using a Mallincam **SkyRaider DS287** camera to do your auto-guiding with PHD, and you are using another MallinCam camera, say the **DS** model, for imaging in **MallincamSky**, then: **Connect the Guide camera with PHD first**, followed by connecting the **DS** model to **MallincamSky**.

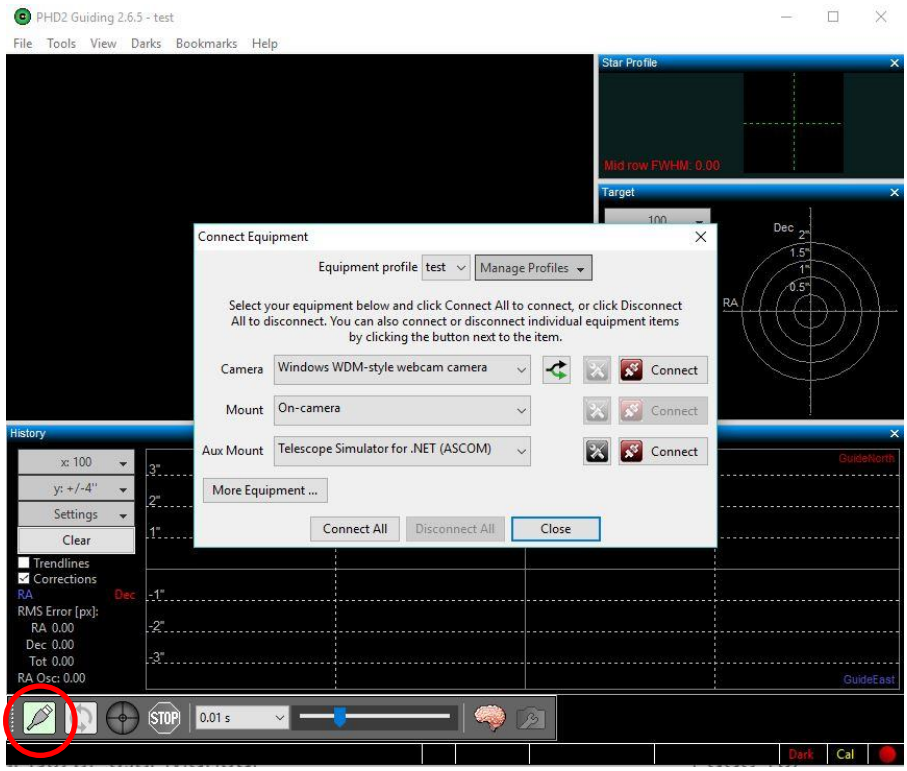


Running PHD2 with WDM Driver + ToupST4 Driver

Step 1 Start **PHD2** software

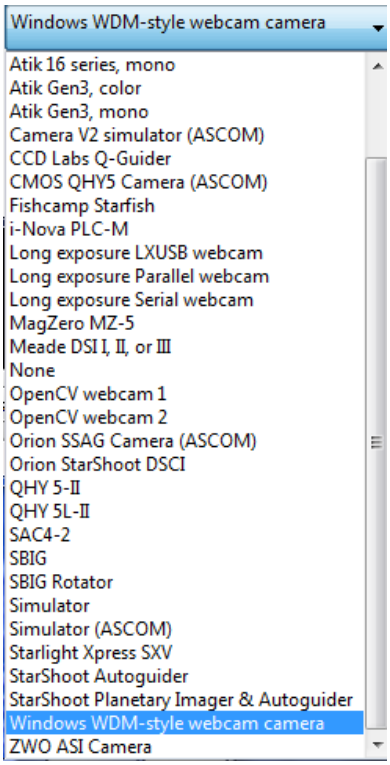


Step 2 Click on the **Connection Icon** to open-up **Connect Equipment Window.**



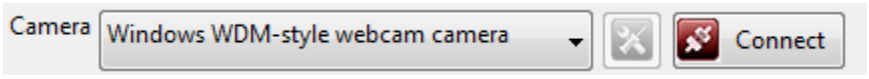
Step 3

Choose **WDM-style webcam camera** from Camera Dropdown List.



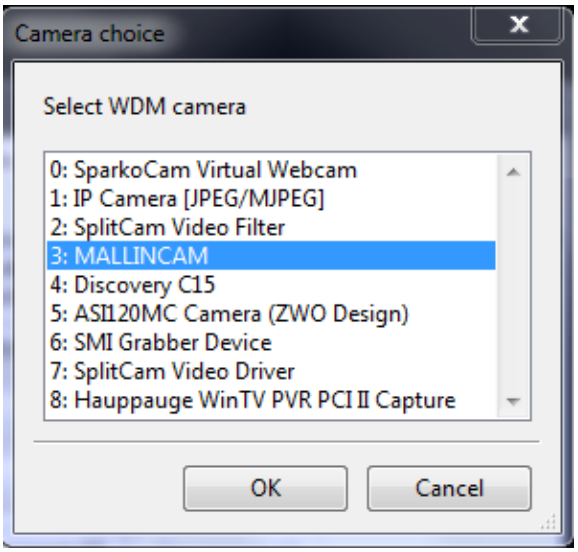
Step 4

Left-Click on the **Connect button** on **Camera List**.

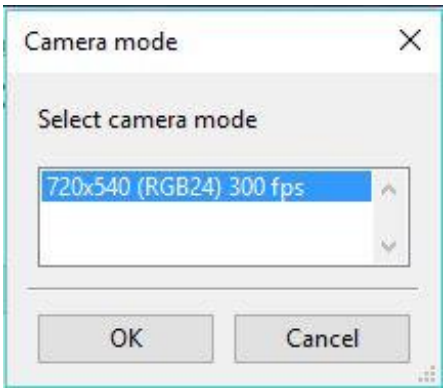


Step 5

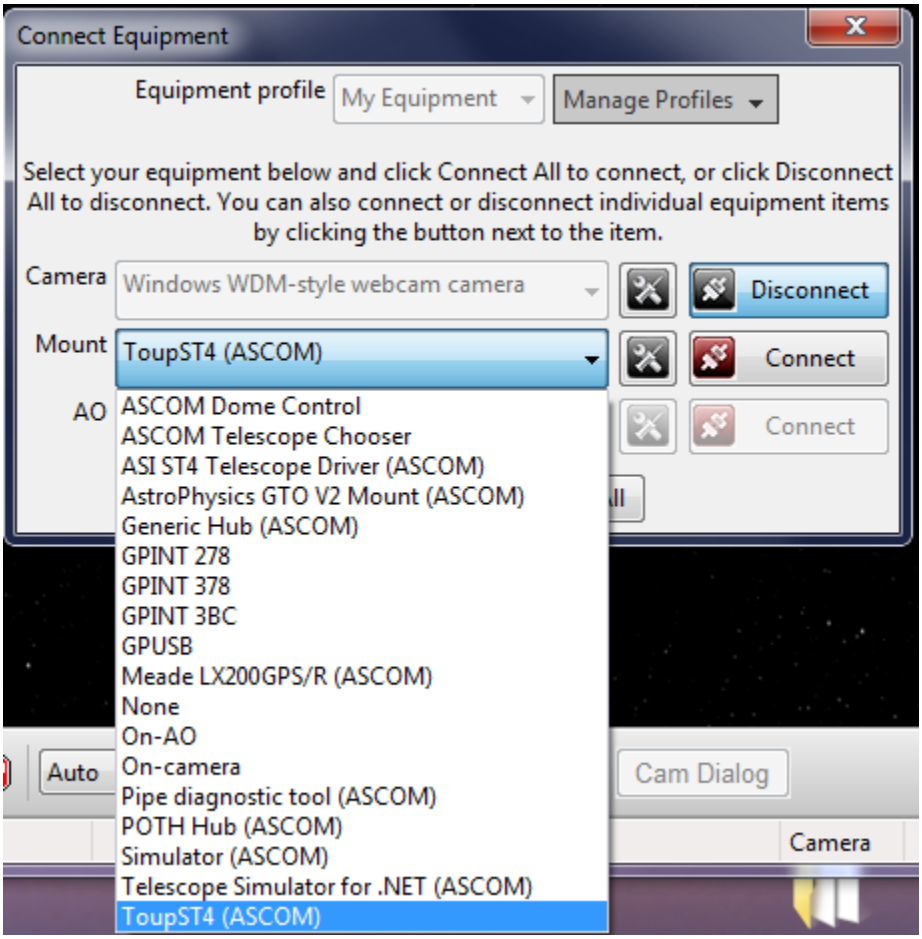
The **Camera choice** window will pop-up. Select **MALLINCAM** and **Click** on **OK.**



Step 6 Select **Resolution** (recommend **720x540 or lowest possible**) and Click on **OK**



Step 7 Choose **ToupST4 (ASCOM)** from the **Mount Dropdown List**



Note

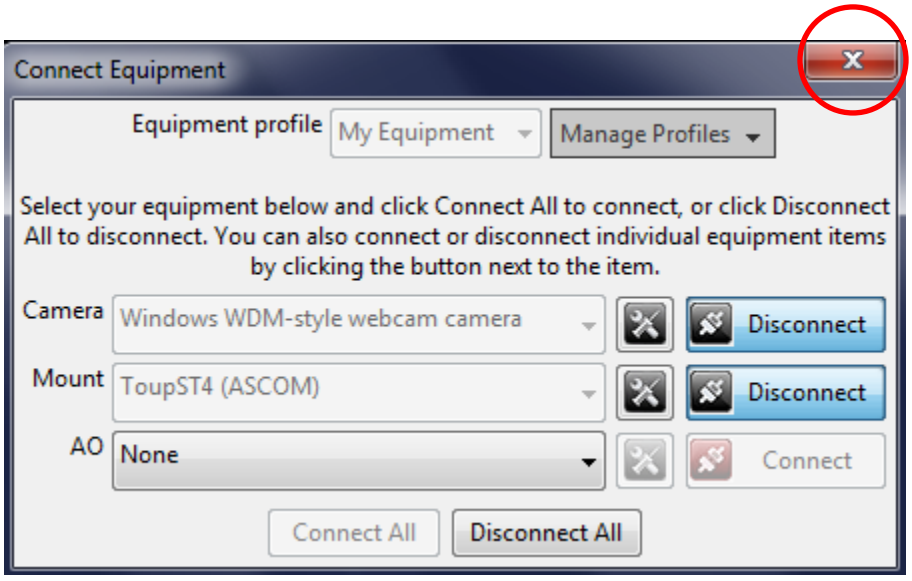
You can check to see if the **SkyRaider** can control your Mount by **Left Clicking** on the **Mount Setup Icon** and use the **Arrow Buttons** to see if your mount moves.

Step 8

Left-Click on the **Mount Connect Button** activate the connection.

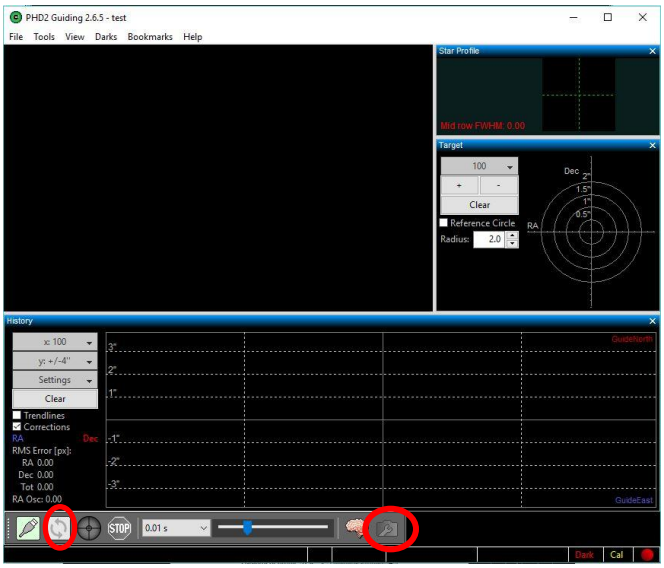
Step 9

Click on **Red X** to close the **Connect Equipment** Window.



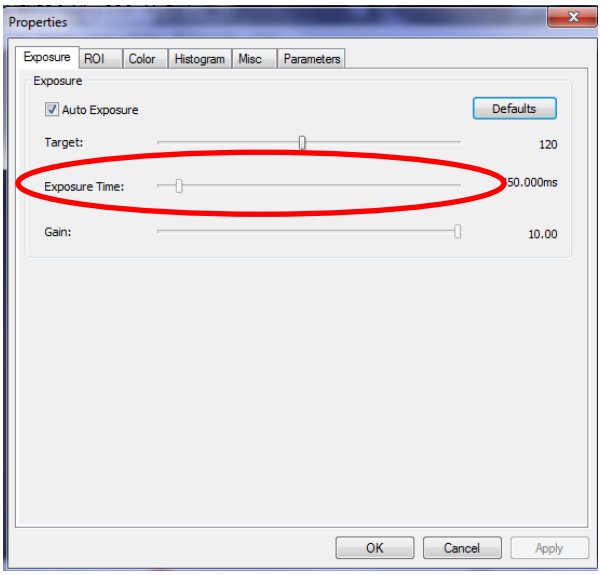
Step 10

Left-Click on the **Looping Icon** to start the **SkyRaider** imaging.



Step 11

Since **WDM** is only a **Video image** from the **SkyRaider**, you will need to set the PHD2 **Exposure Duration** to a value other than **AUTO** (say **1 second**). This will **NOT** control the actual exposure rate of the SkyRaider, but rather show what the **SkyRaider** has on its video image every **1 second**. **Left-Clicking** on the **Cam Dialog Box** (see image above) in **PHD2** will open a window where you can adjust the parameters of the **SkyRaider Camera** (such as the actual **Exposure**, as the **Exposure control** in PHD2 does not control **WDM** driver's actual exposure, but rather just **the refresh rate**). It you can, set both the **Actual Exposure** and the PHD **exposure duration** to the same value (experiment).



Note

If you see a rectangular Box in your Window, go to the **ROI Tab** in the **Cam Dialog Box**, and move and shrink the box to one side of your window so it doesn't affect the image.

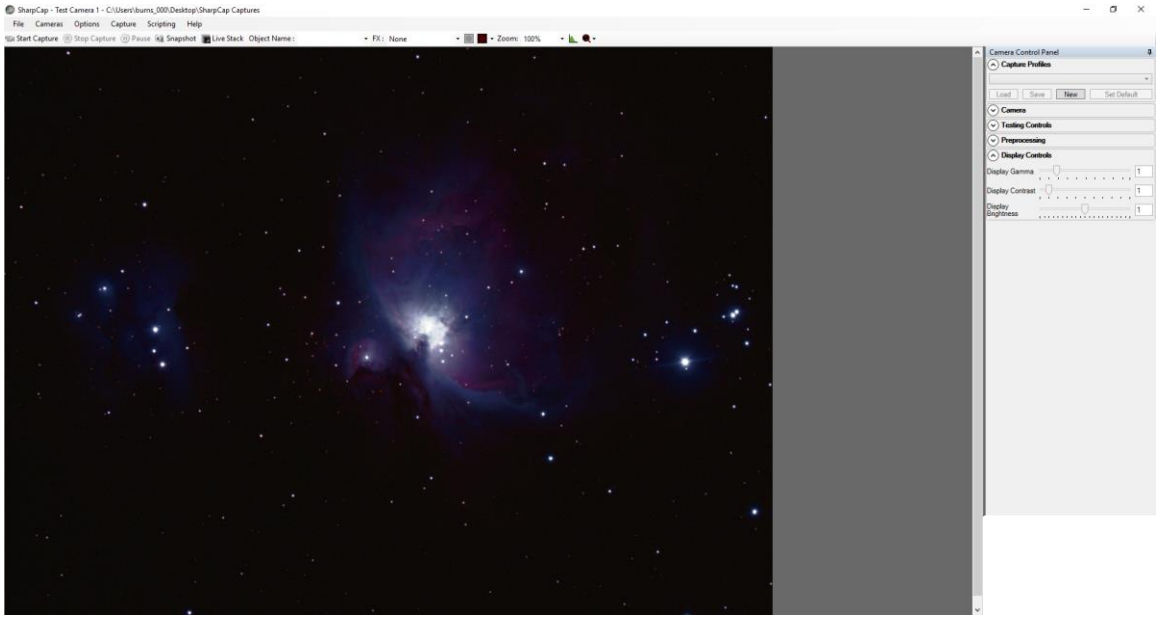
9. Appendix

Imaging in SharpCap

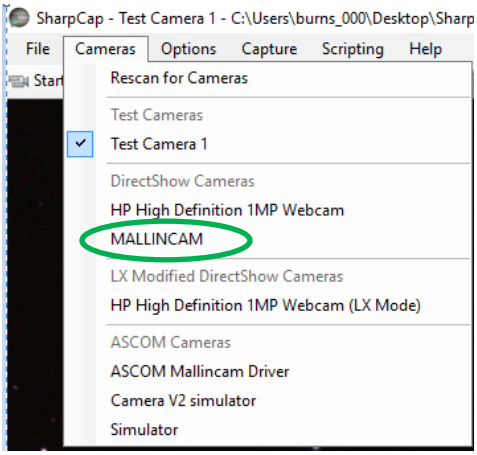
With the addition of the SkyRaider Direct Show Driver, you can control the SkyRaider with a variety of other pieces of Software such as SharpCap. Now this is the first generation of DirectShow/Sharpcap driver interaction and as such, not all of the commands are perfect for user control.

SharpCap can be obtained at http://www.sharpcap.co.uk/

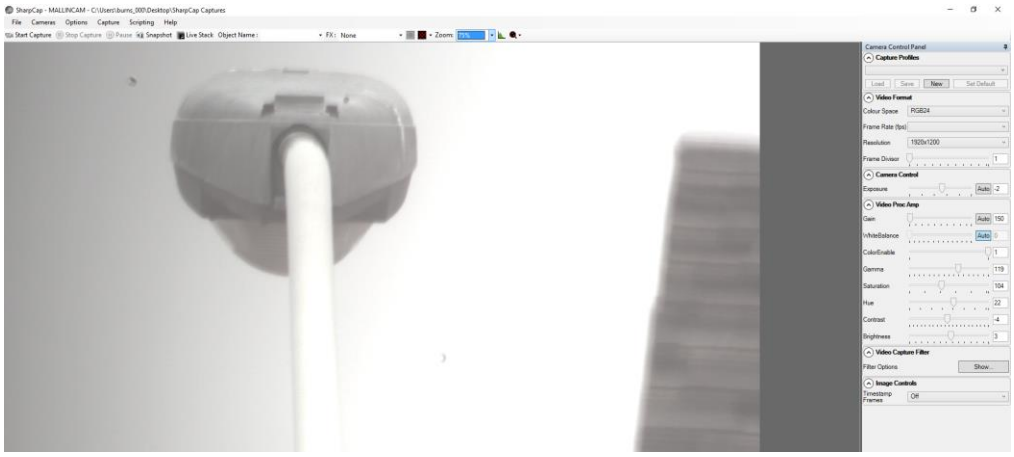
Start SharpCap



Chose **Cameras** from the Top Heading Tab, then in the **DirectShow Cameras**, pick **MALLINCAM**.



Once you have selected, the Mallincam Directshow Driver, SharpCap will display what the SkyRaider is imaging.



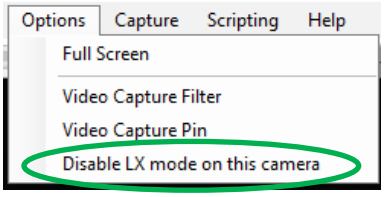
The controls on the right of the screen (**Exposure, Gain, Gamma, …)** allow you to change the settings of the SkyRaider.

It takes a bit of practice to become familiar with the settings as these are more generic controls, the majority of the controls have their own scales (the exposure does not indicate seconds, but has an equivalent range from 0 seconds to 5 seconds). You will need to record those numbers to assist you.

Note

SharpCap recognizes that the DS287 does have an **extended mode** for exposures that are over 5 seconds.

To turn on the **extended mode** (over 5 seconds), then enable the **LX Mode** in the **Options Tab** on the Top of the screen. This lets the exposure slider now provide exposures over 5 seconds (even though you don't actually see the time on the slider). **Disable LX mode** to return to the 5 second max exposure

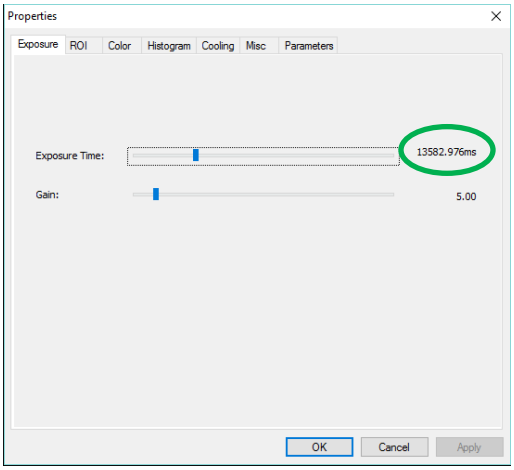


Sharpcap will display the exposure you have set on the bottom of the SharpCap window after the first exposure is taken.

Note

SharpCap has the ability to Pop-Up the SkyRaider **Video Filter** (DirectShow control window). **Click** on the **Show Button** in the **Video Capture Control**

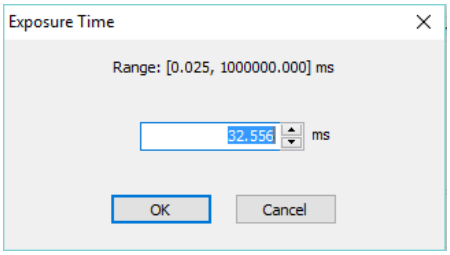
The Pop-Up Window gives you some familiarity with settings as it provides you with more comfortable units (exposure time in ms).



You can choose the **Exposure Tab** in the **Filter window** to slide the **Tab** to match the exposure time in **ms** (divide by 1000 to get seconds).

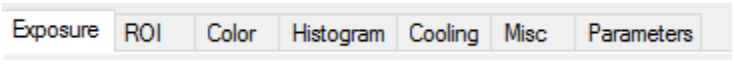
Note

You can also **Click** on the **Time setting** on the right of the **Slider** to Pop-Up a window that allows you to directly enter in the time in **ms**.



You can also control the **Gain** in the window.

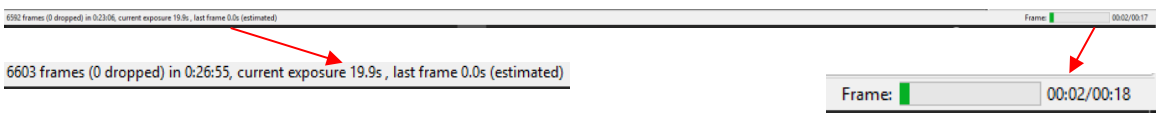
The other Tabs in the Window will also you to adjust other settings in the SkyRaider Camera.



Once you are comfortable with the settings, **Click** on the **OK** Button in the Properties window to close it.

Note

SharpCap will start the imaging process and will, on the bottom of the window, display information about the exposure and remaining time. You can watch the green status bar move to the right as the exposure is being taken.



AstroToaster and MallinamSky

AstroToaster is a freeware application for obtaining semi-live views of astronomical images using the SkyRaider camera. These instructions are just a quick guide to get you going, read the **AstroToaster User Guide**.

AstroToaster uses the **Deep Sky Stacker (DSS) Processing Engine**. It accomplishes what **DSSLive** does, but it uses the full capabilities of DeepSkyStacker. AstroToaster also has a Viewer with easy to use color and light enhancement tools to aid in fine tuning the image.

AstroToaster can be downloaded from: http://www.astrotoaster.com/

AstroToaster Work Flow

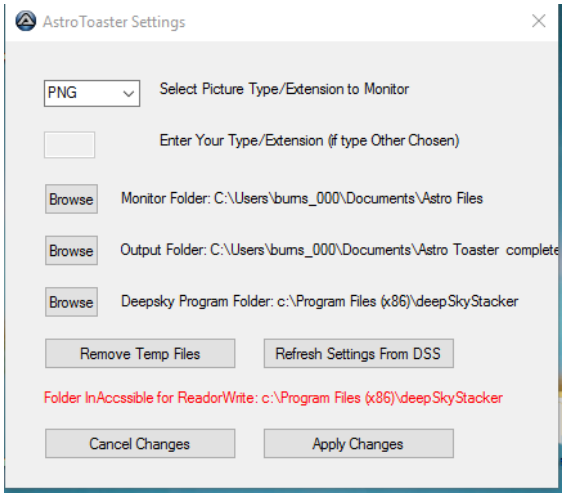
Images are sent by **MallincamSky** to a folder that **AstroToaster** is monitoring ⇨ AstroToaster will the **align** and **stack** those images producing an enhanced image ⇨You can then **tweak** the final stack image to your standards.

All of this is done in real time.

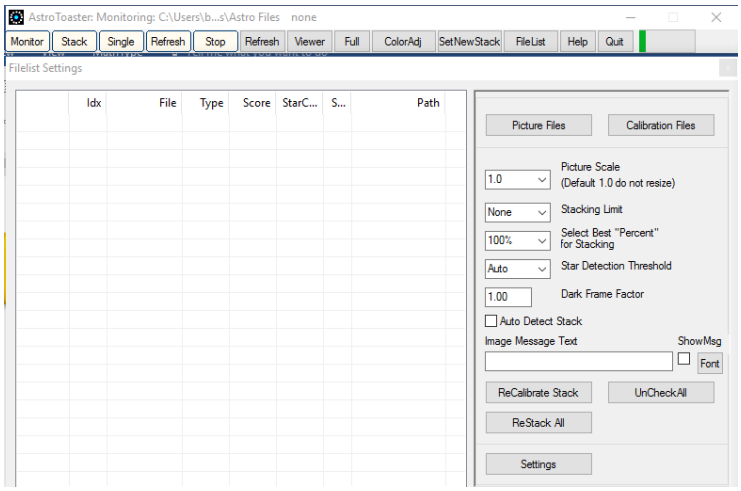
Start AstroToaster

Note

When you run AstroToaster for the first time the **Settings Screen** will appear, you will need to select your **Monitoring Folder** (this is where MallincamSky will save the images), **Output Folder** (can be the same as the Monitoring Folder), Verify that the Deepsky program folder is correct. You should also enter the Picture type/extension of the images produced by your camera (png, tiff).



The AstroToaster Main Screens will open up (A File Monitoring Window and most likely a View Window).



The **File List Monitoring Window** manages the image files, sent by MallincamSky, used by AstroToaster. If the **Monitor Button** is activated, then any new files appearing in the monitoring folder will automatically appear in the **FileList**.

AstroToaster uses color to aid in identifying the files.

- **Yellow** - are the images to be stacked.
- **Green** - is the stacked image.

There is a **check box** next to the files. All **checked** files will be combined into the current stacked final image.

Note

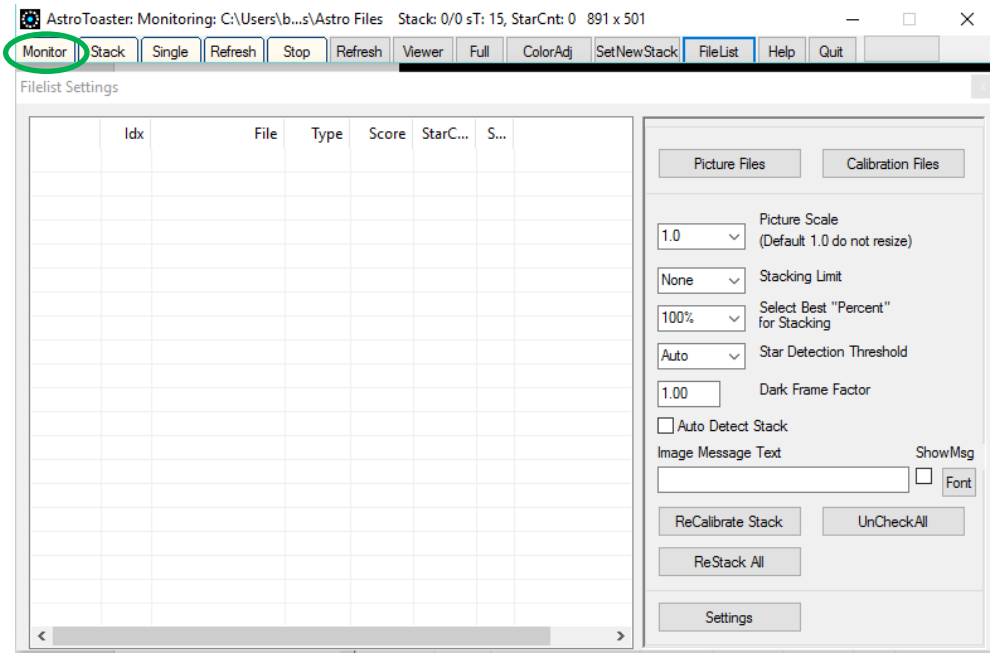
If you **Click** on a File in the **FileList** it will appear in the **Viewer Window**.

Preparing AstroToaster

Click on the **View Tab** located on the Top of **AstroToaster** to activate the **View Window**.

The Folder where you told AstroToaster to Monitor will be empty (we have not told MallincamSky to Save images, yet).

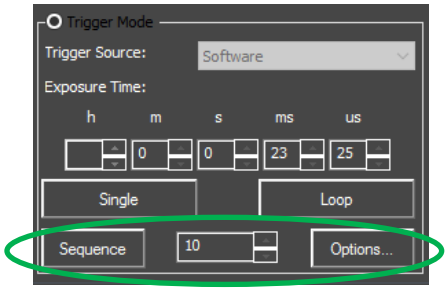
Click on **Monitor** on AstroToaster Tab line, so it will see and analyze the file images as they are added to the Monitoring Folder.



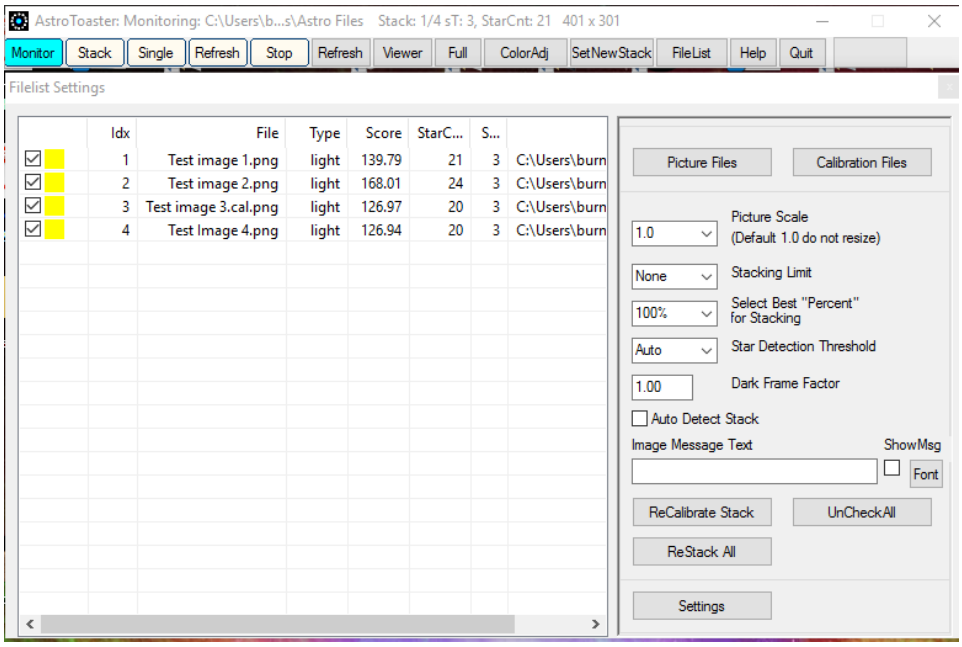
Tell MallincamSky to Save images in to the Monitoring Folder of AstroToaster.

For example, if you are using **Trigger Mode**, after setting the exposure so that you are seeing the correct amount of detail in the **Video Window**. Use the **Options Button** in Trigger Mode to choose the same folder that AstroToaster is monitoring. It is recommended that you choose the **File naming** convention that includes **nnnn**.

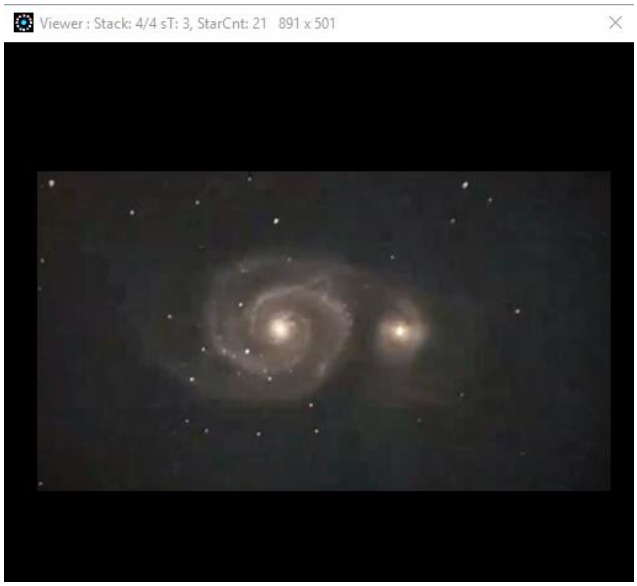
Stop the **Looping** of the SkyRaiderDS287, **Choose** the number of images you are interested in capturing. **Click** on the **Sequence Button** to start sending those images to AstroToaster.



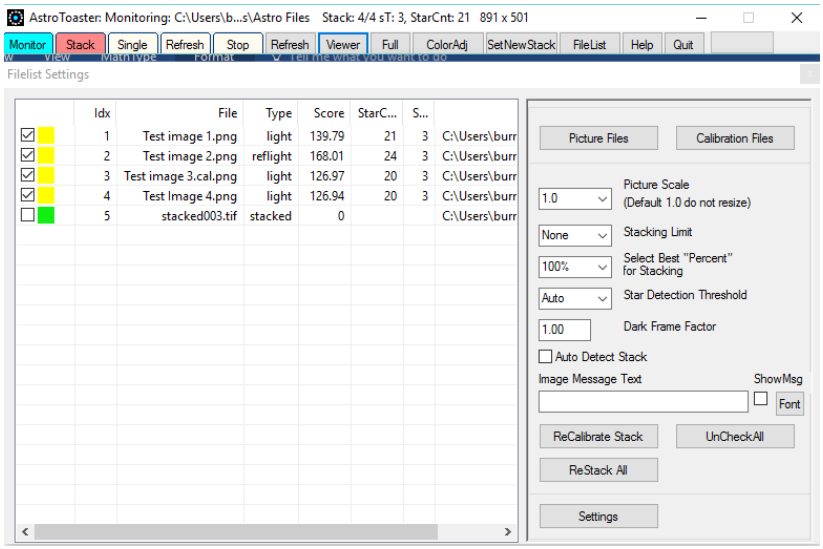
As MallincamSky sends the images to the **Monitoring Folder**, you will see them appear with **Yellow squares** besides their name



Click on the **Stack Tab** on AstroToaster and **Viewer Tab** (if not activated) to activate the automatic Stack and watch the results appear in the Viewer in real time as each image is stacked.

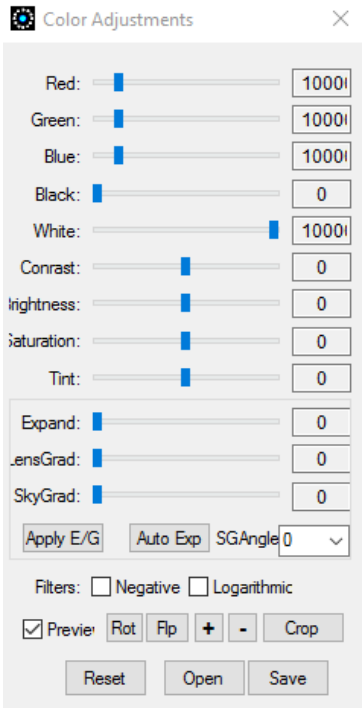


You will notice in the AstroToaster **FileList**, a file named **stacked###.tif** with a Green Square besides its name. This is the Stacked image that you are seeing in the AstroToaster **Viewer Window**.



Adjust the Image in AstroToaster

Click on **Color Adj Tab** to popup a window that will allow you to adjust the display parameters of your stacked image, as well as save the final image.



AstroLive and the SkyRaiderDS287

AstroLive is a software package to control your entire electronically-assisted or video astronomy setup. With AstroLive you can control your telescope mount and the ASCOM-based SkyRaiderDS287.

AstroLive is the work of Kyle Goodwin and can be obtained at:

⇨http://astroprecisioninstruments.com/products/astro-live

As of this writing, the Version of AstroLive is v1.4. This version did not have the SkyRaider series of camera in mind. But, the MALLINCAM ASCOM Driver does partly work with AstroLive. This allows you to do imaging, and you are able to adjust and save your images.

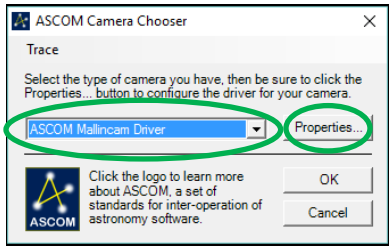
There is an update coming soon, that will allow you to control USB cameras such as the Mallincam SkyRaider series.

Start AstroLive

You will be presented with the following Window

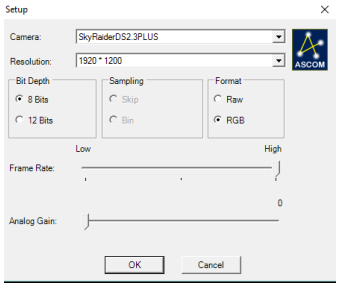
Click on the Choose Still Button from the **ASCOM Still Camera** line

A popup window will appear.



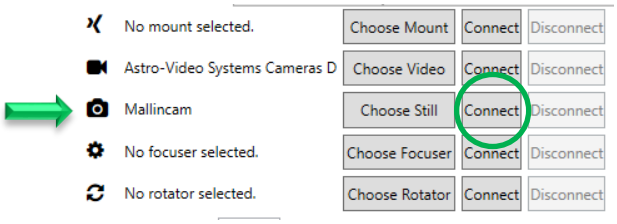
➡ **From the Pull-Down list select ASCOM Mallincam Driver**.

➡ **Click on the Properties Box** to pop-up the SkyRaider **Setup Control Window**

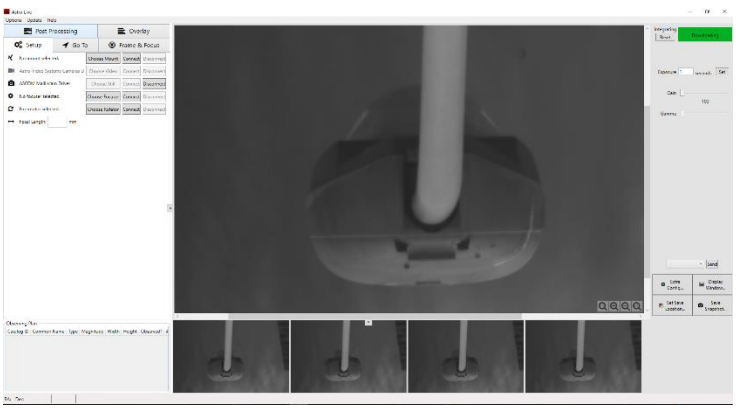


➡ Make any adjustments you need, then **Click** on the **OK** Button, to Accept. You will be returned to the ASCOM Camera Chooser Window, **Click** on **OK** to return to the AstroLive Window.

➡ To activate the SkyRaider camera, **Click on the Connect Button** on the line now labelled **Mallincam**.



You will now be presented with a **live** connection to the SkyRaider camera. Have fun and experiment to see what you can do with AstroLive.



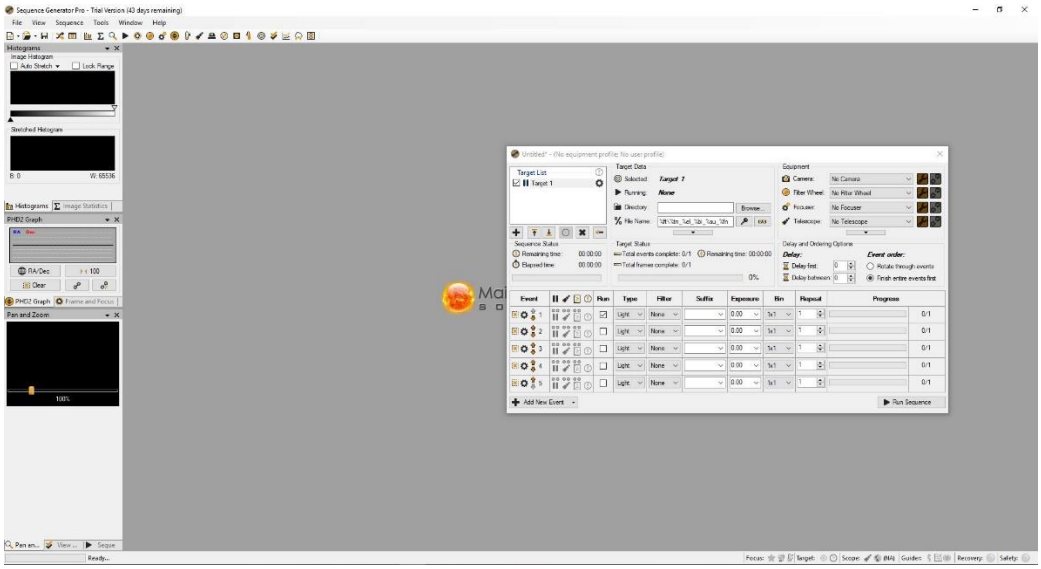
Sequence Generator Pro and SkyRaiderDS287

Sequence Generator Pro is a software package that is capable of executing complex sequences of capture events which will allow you to spend more time using and less time fighting with your equipment. You have lots of hardware that is sometimes difficult to get it all working together. Sequence Generator pro work with ASCOM-based SkyRaiderDS287.

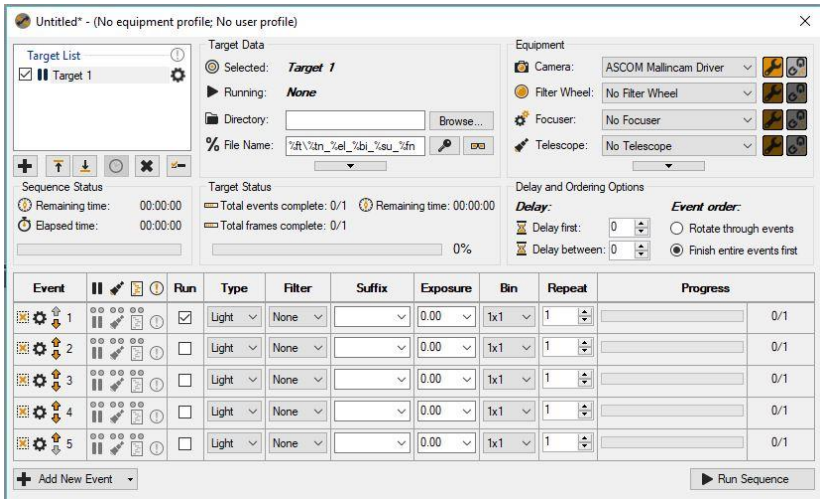
Note

Make sure you are using the latest version of ASCOM (both the **ASCOM core** and **ASCOM Mallincam Driver**).

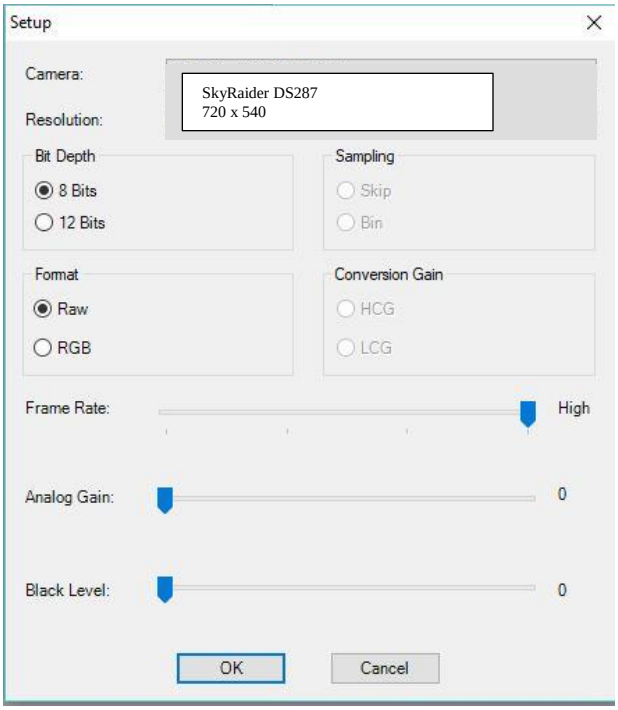
Start Sequence Generator Pro



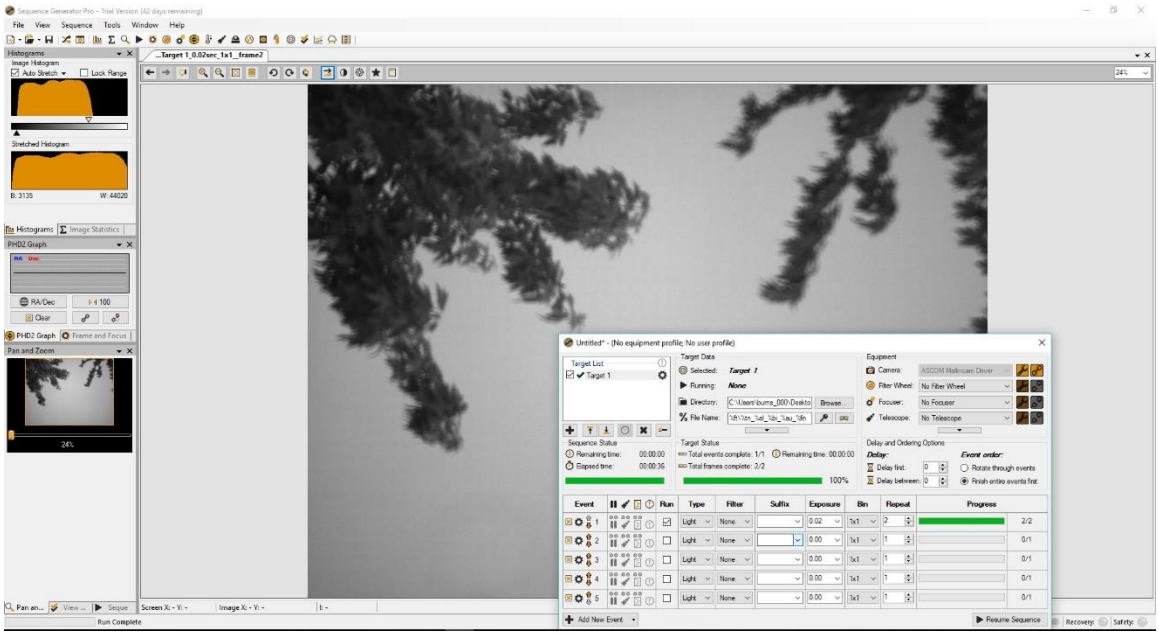
Select **ASCOM Mallincam Driver** as the camera in equipment profile



Select the required resolution and ensure that you are using **Raw** as the format.



Start **Running Sequences** based on your needs.



Note

If you are using Sequence Generator Pro then you will need to save flats, biases, and darks as you would with every other camera.

How Do I …

How do I get rid of the Green Exposure Rectangle?

First remember the **Green Exposure Rectangle** is only used for the **auto-exposure** process, but it can be annoying when you are imaging.

- The way to remove it from the Video Window is to **uncheck** the auto-exposure box.

If you require the **Exposure & Gain** Control to be expanded (so you can adjust the exposure), but still do not want the **Green Rectangle** in the middle of your screen, try this.

- Chose **Fit to Window** from the **Zoom** Drop down Box (on the **Icon Tool Bar**). Now just drag the **Green Rectangle** (**Left-Click and Hold** technique) to the lower left of the window.

- Next grab one of the corners of the **Green Rectangle** and drag it to the matching corner of your **Video Window**. Next, grab the opposite corner of the **Green Rectangle** and drag it to the same location as the first corner. This will make a zero-size rectangle.

How do I Select a part of the Image and Zoom in?

- In **Video Mode**, expand the **ROI** control (a **Blue Rectangle** should appear around you image). Using the **Left-Click Hold and Drag** technique, maneuver and size the **Blue Rectangle** so that it encloses the area you are interested in. **Left-Click** on **Apply** and watch the part of the image in **Blue Rectangle**, be the whole image in the **Video Window**.

- Now, **Left-Click** in the **Blue Rectangle**, and use the scroll wheel on your mouse to enlarge or reduce the image (you can also use the **Fit to Window** control on the **Icon Tool Bar**).

- **Left-Click** on **Defaults** to get back to Full screen.

- See **ROI** section in Manual for creating an **ROI** in **Trigger Mode**.

How do I automatically save 1 image every 30 seconds?

- Choose **the Time-Lapse (Auto Capture)** from the **Capture Menu** on the **Top Menu Line**. Now determine your naming convention and location.
- Enter **30** in the **Time slot**
- Enter the total number of images you would like (or leave unchecked, and you will manually stop the process when you are ready).
- **Left-Click** on **OK**

At the bottom of the MallincamSky Window; a running count will be displayed.

- **Left-Click** on **Stop Time-lapse (Auto Capture)** to stop the process.

How do I adjust the brightness in my monochrome SkyRaider?

You will have noticed that the **Brightness** command in the **Color Adjustment** control is deactivated. You can use the **Gamma** command (moving it to the left will brighten the whole image, but the better control is the **Histogram** command in the **SideBar**.

By move the **Left Marker Line** or the **Right Marker Line** (or a combination of both) to the left will brighten up you image in a more controlled manner.

How do I Broadcast my image onto Night Skies Network (NSN)?

As a direct way is not yet available, you will need to use a third-party software to assist you.

Obtain one of the following: **KVYcam**, **WebCam Max**, **SplitCam** (different opinions on which is the best, it becomes a personal preference). Each of these software programs will allow you to capture what is happening on your computer screen. The software packages also act as a webcam to NSN.

Therefore, whatever screen image these software packages are capturing, will display on NSN as a webcam image.

See **Setting up to Broadcast on Night Skies Network** in the **Appendix** for more detailed instructions.

Can I Use MallincamSky with One SkyRaider and Auto-Guide with another?

Yes, as long as you use **DirectShow**, **WDM** or **ASCOM** with the second **SkyRaider**.

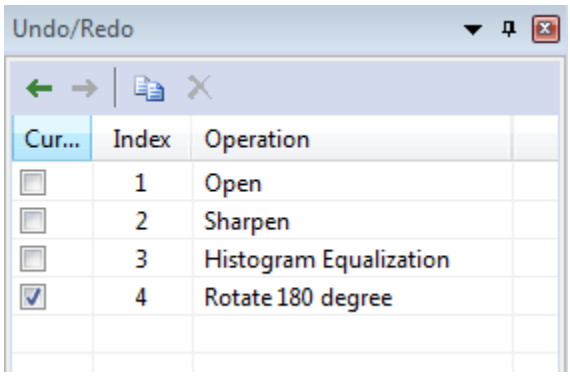
Remember if you are using **DirectShow** or **WDM**, the guiding software CANNOT control the exposure setting on the camera; look for a **Settings** or **Property Tab** button that pops up the **SkyRaider** exposure control window.

How Do I Pause the Video?

You can Pause or Resume the live video by either choose **Setup>Pause** from the **Top Menu Line**, or even easier, just press on the **pause key** on your keyboard.

How do I Undo an Operation?

On the **SideBar**, there is an **Undo/Redo Tab**; Just **Left-Click** on the Tab and the Tab will open with a list of all the operations you have performed on your Image (not Video, you cannot undo video operations such as contrast).



Just **Left-Click** on the location before the operation you would like to undo and **MallincamSky** will revert the image back to that step.

How do I make my ROI the whole Image Again?

Just **Left-Click** on the **Defaults Button** in the **SideBar's ROI** control. Note, by changing the **ROI,** the **Dark Fields** will be removed from the **SkyRaide**r.

How do I Turn Off Dark Field correction?

Just **Left-Click** in the **Enable** box to remove the check mark in the **Dark Field** correction control on the **SideBar**. Place a check mark back in the **Enable** box to reactivate Dark Field correction.

How Do I take Another Dark Field?

You have to either disconnect the **SkyRaider**, or even easier just **Left-Click** on the **Video Window Title** and Choose **Close** to disconnect. Now **Left-Click** on the **SkyRaider** camera in the **Camera** control on the **SideBar** to reactivate it. Now you just retake your Dark Fields.

Note: If you change the **ROI**, then the **Dark Fields** will be removed from the **SkyRaider**.

My ROI Window is Black?

You must wait until the next exposure until the ROI Window gets filled.

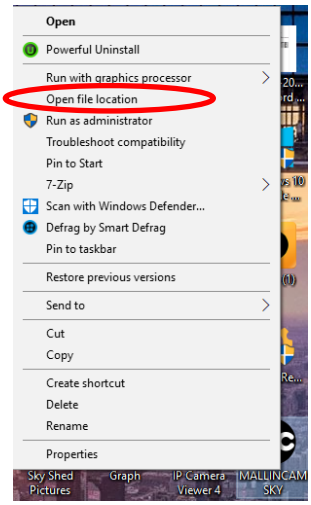
Upgrading my SkyRaider Camera Software

Rock has his engineering always looking at improving the software to make it work better for you. Once an update is made available, you will be notified on the Mallincam Groups website: https://groups.io/g/MallinCam/topics.

There are a variety of ways of updating the software, but the following method seems to have the best success rate when working with Windows.

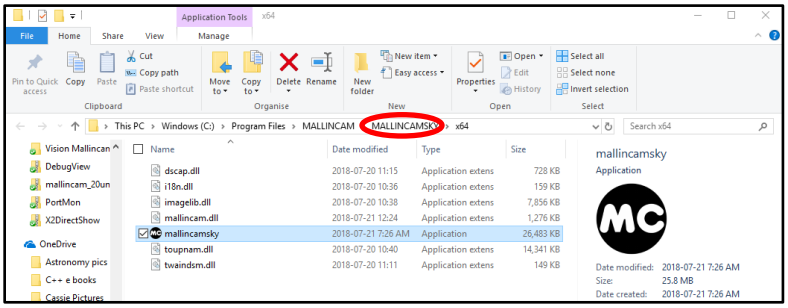
Step 1

Uninstall SkyRaider Software



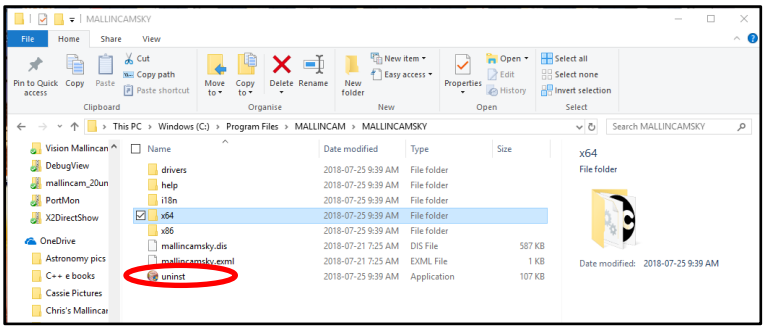
- Unplug the SkyRaider Camera from your computer.
- Locate the MallincamSky **Icon** on your Desktop and **Right-Click** on the Icon to open-up a selection window.
- In this window select **Open file location**

Windows will then open-up the File folder that contains the software and drivers from MallincamSky.

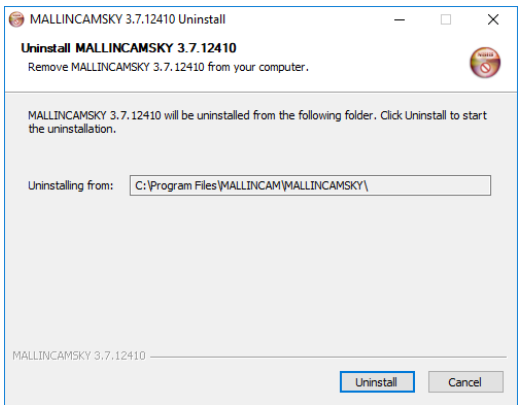


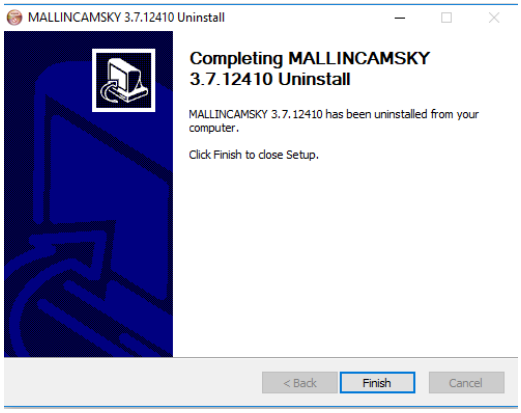
We want to jump back one folder (since this contains the Uninstall software for MallincamSky).

- With the folder still open, just **Click** on the word **MALLINCAMSKY** located in the folder address (see above image). This will take us back one folder.



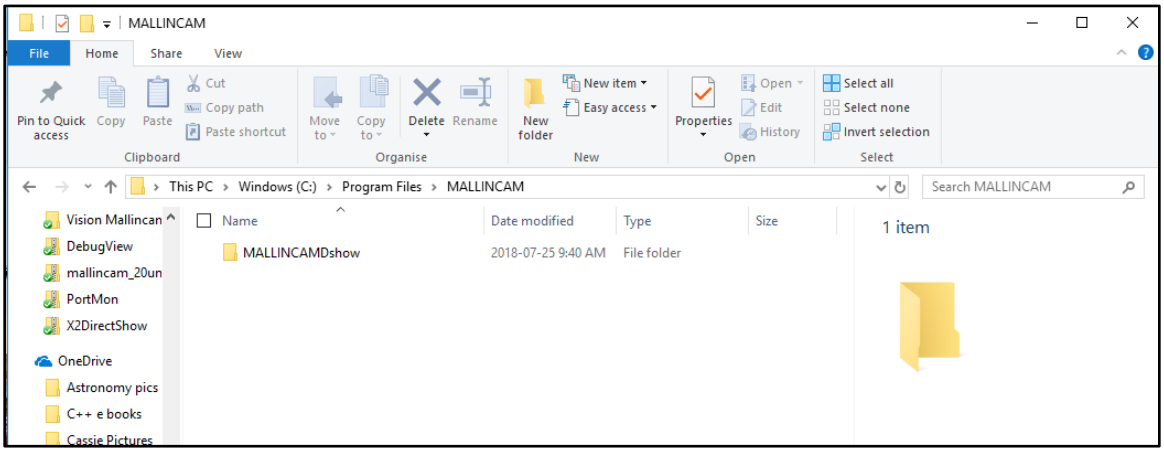
- We want to run the program **uninst**. So, **Double-Click** on the program name **uninst** and follow the instructions as Windows uninstalls MallincamSky.





Once MallincamSky is uninstalled, Windows will take you back to the **MALLINCAM** folder.

This Folder may be empty, or if you have also installed the Mallincam DirectShow drivers you will see a folder named **MALLINCAMDshow** in the window.

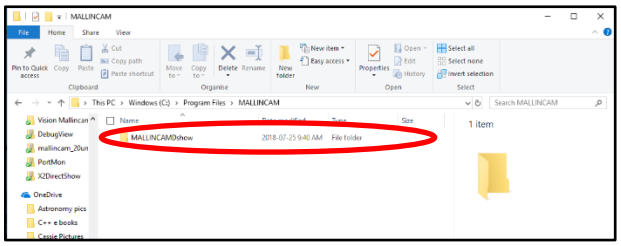


If you did not install the **DirectShow** drivers then jump to **Step 3**, else follow **Step 2** to uninstall the DirectShow drivers.

Step 2

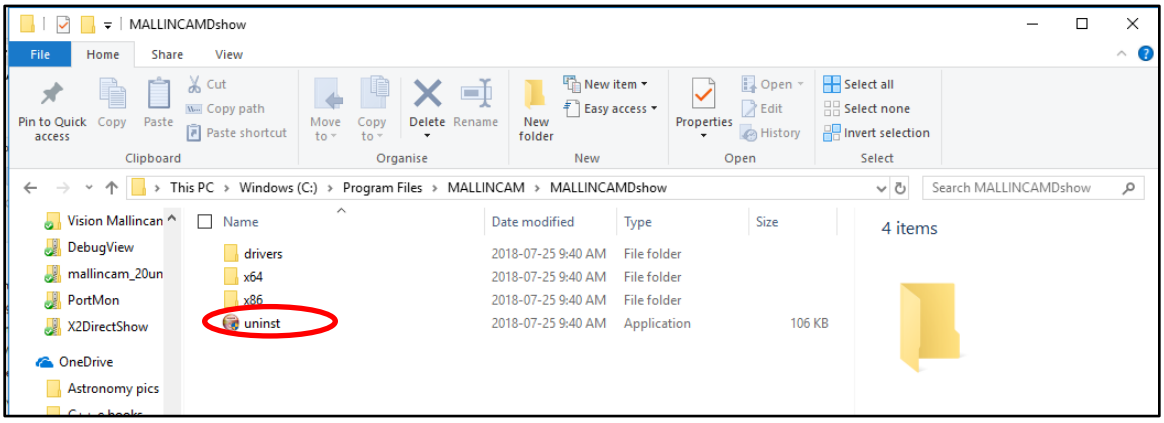
Uninstall SkyRaider DirectShow Drivers

Continuing from **Step 1**, you should have the **MALLINCAM** folder Windows open with the only file folder named **MALLINCAMDshow** displayed.

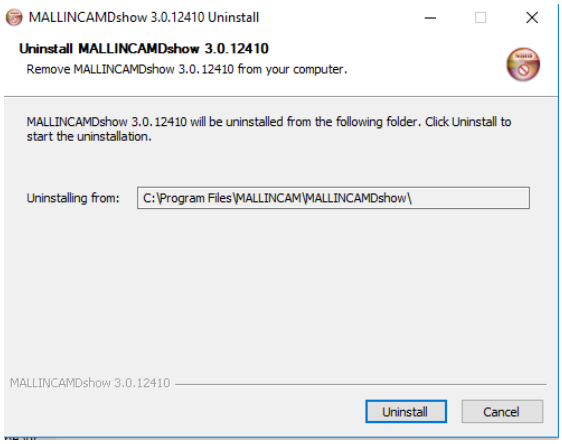


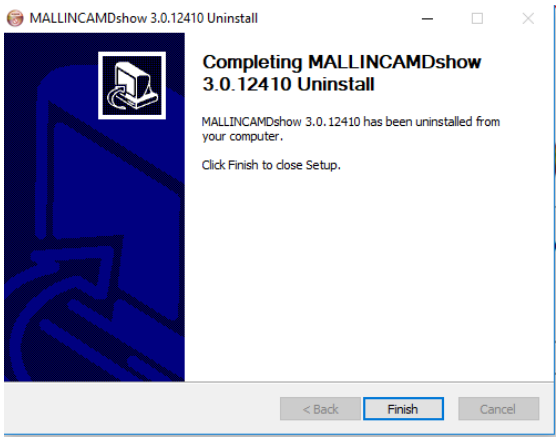
- **Double-Click** on the folder name to open it up.

Window will then open-up the **MALLINCAMDshow** folder displaying its contents.

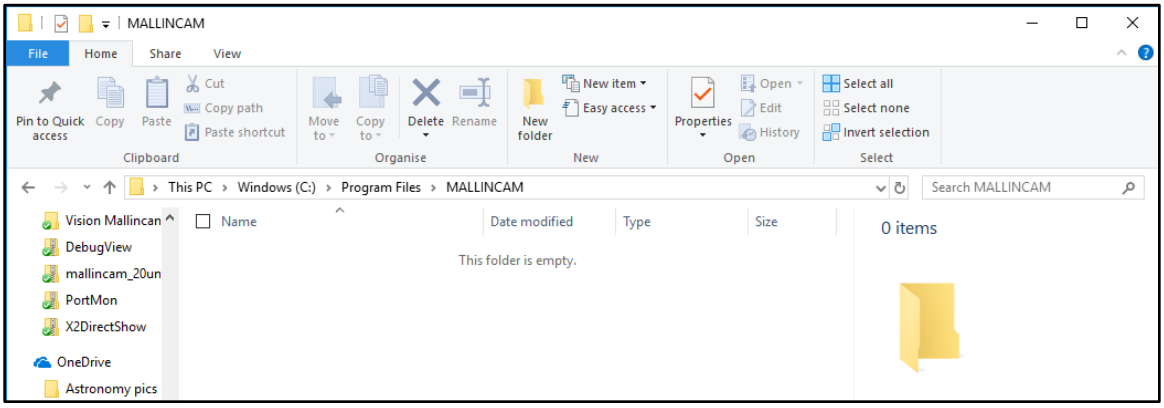


- Again, there is a program named **uninst**, **Double-Click** on the **uninst** program name and follow instructions to uninstall the DirectShow drivers.





Once the DirectShow drivers have been uninstalled, Windows will take you back to the MALLINCAM folder to show you that it is empty.

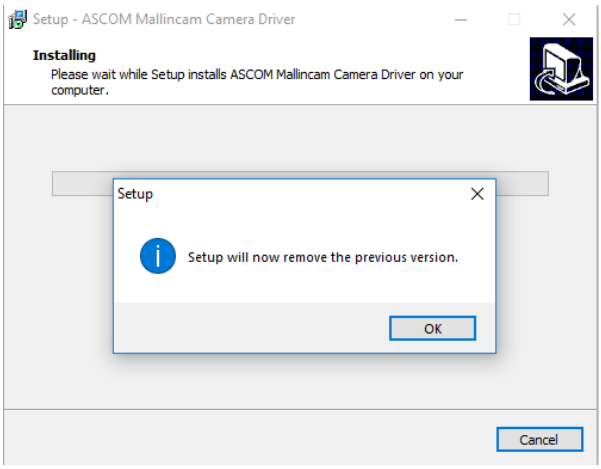


If you didn't install the ASCOM drivers, then jump to **STEP 4**.

Step 3

Uninstall SkyRaider ASCOM Drivers

This step is very easy as **ASCOM** will automatically uninstall the previous drivers when it installs the latest drivers, so just follow the instructions above in **Section 7** of the User Manual on installing ASCOM drivers.



Step 4

Finish the Uninstalling Procedure

- This is a very important step as it clears out the Windows registries. Reboot your computer via the **restart** option.

Now, if you haven't already done so, **download** and **install** the latest version of MallincamSky, the DirectShow, and the ASCOM drives at **www.mallincam.net**.

- **SkyRaider Series MALLINCAMSKY Software-Drivers, Windows, Mac (Lite), Linux, ASCOM package, DSHOW for All SkyRaider Cameras. Ver. 3.7.12128.20180614** Click Here

Note

Don't forget to plug back in the SkyRaider camera after installing the software.

First Aid for the SkyRaider Series

When I click on the SkyRaider camera from the Camera list, a message pops up saying Failed to Start: SkyRaider

There is an issue establishing fulltime communications with the camera. This can occur for a variety of reasons but the mist common one is the cable is too long for the USB port on that specific computer to establish the correct timing protocol. This is more so with USB 3.0 devices.

Recommended solution: if you need to use a longer length of USB 3.0 cable for the DS287, then there are two options:

- Connect a **powered USB 3.0 hub** to the computer and connect the USB cable between the hub and the SkyRaider camera.
- Connect an active (not passive) USB 3.0 extension cable between the camera and the included USB 3.0 cable. Something along the lines of the Tripp-Lite USB 3.0 SuperSpeed Active Extension Repeater Cable

When I try to connect I receiver message "Catastrophic failure (Exception from HRESULT:0x8000FFF(E_UNEXPECTED))"

This message indicates that something has blocked or over written the driver. Installing another driver or even a major Windows update has played havoc with the original SkyRaider Drivers.

Recommended Solution: Uninstall the current driver through the **Control Panel** (or if you cannot find it in the **Control Panel** check out the **c:/PROGRAM FILES/MALLINCAM/MALLINCAMSKY** folder, there is a program called **uninst**. **Double-Click** on **uninst** to uninstall MallincamSky and its drivers).

Once uninstalled, reboot your computer, then reinstall MallincamSky again. This should fix the issue.

All I see is a White image

Recommended Solution: Move Gain to the extreme Left (1). Ensure automatic exposure is off. Make sure you are in Video Mode. Move exposure to minimal value say 10ms. Now slowly cover telescope to see if image darkens up to black as you completely cover up the telescope. If this occurs, then SkyRaider is working properly so you need to check your telescope and focus setup.

How do I Optimize my Computer?

Recommended Solution: Optimizing your windows computer sometime is a never-ending process but visit the website:

https://www.youtube.com/watch?v=Hdb4iybN8gg

for some great suggestions on how to optimize your computer.

Also visit https://www.mallincam.net/software-downloads.html

To summarize as per the research done by **Doug Murphy**

Add a much RAM as you can into your system

Settings/System/Privacy Settings

General:	all off
Location:	all off
Camera:	all off
Microphone:	yes (for messaging, voice recorder)
Notifications:	off
Speech:	ignore
Account info:	on
Contacts:	off
Calendar:	off
Call history:	off
Email:	on
Tasks:	off
Messaging:	off
Radios:	on (for Bluetooth)
Feedback:	basic/off/never

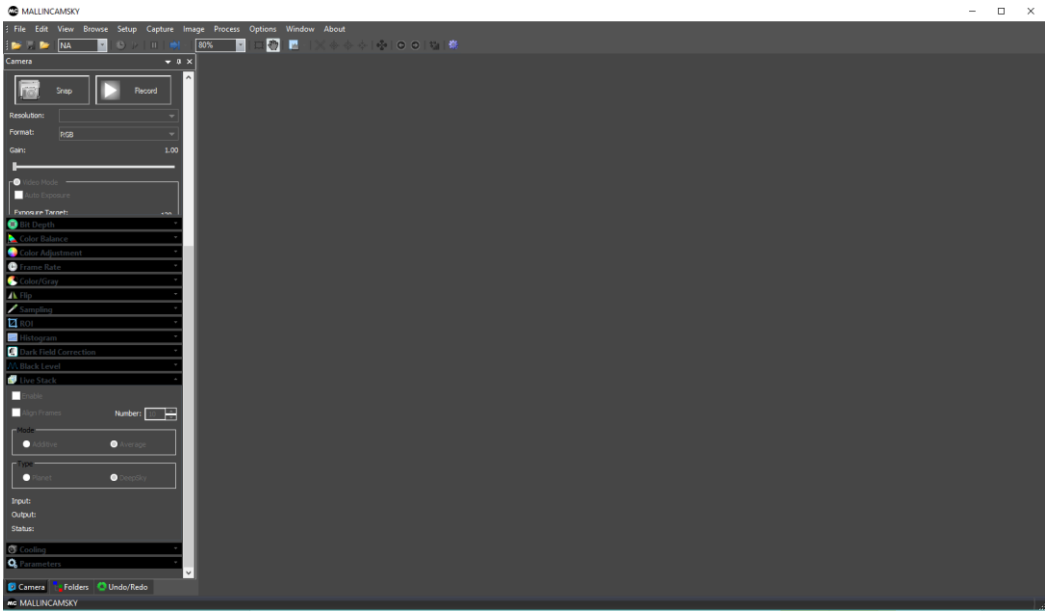
Background apps leave on alarms and clock, photos, settings, sticky notes, voice recorder (need for broadcasting)

Stacking is going very slow or Stops completely?

The reason for the slowing or freezing of the stacking process is not completely understood, but it is encountered by many processes that task the usb and video processes of computers. This problem is experienced by many video gamers and the solution that resolves this problem is to select only 1 or 2 of the CPUs running the program. The work around, is to tell MallincamSky to use only 1 processor rather than all of them.

Step 1

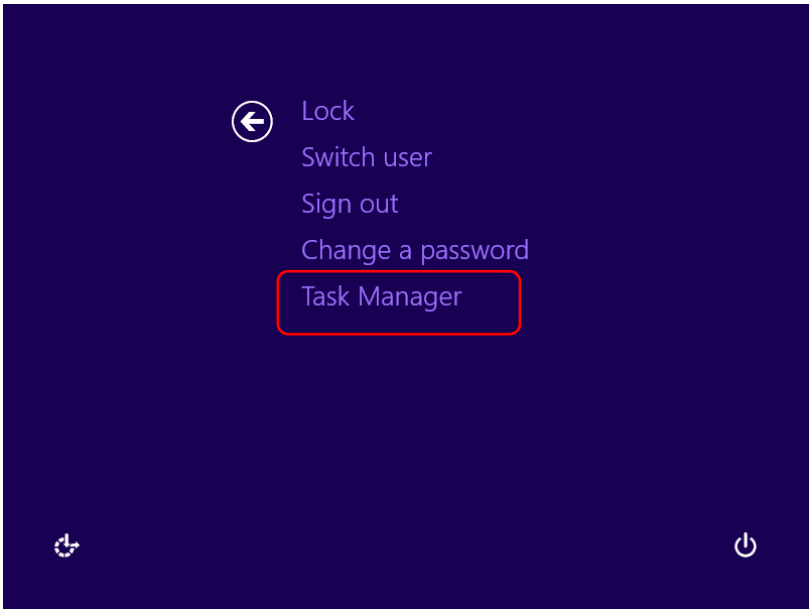
Start MallincamSky



Step 2

In this Step we want to activate the **Task Manger**. There are a variety of ways to perform this task, but I find that the **CTRL-ALT-DEL** method is the fastest.

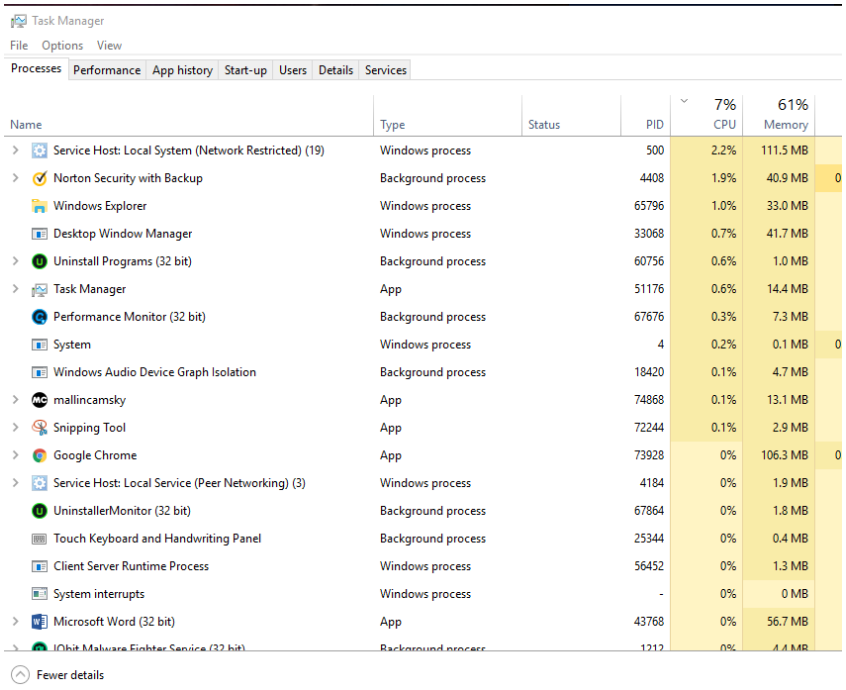
Press and Hold the **CTRL-ALT-DEL** buttons at the same time to pop-up the Control Window.



Step 3

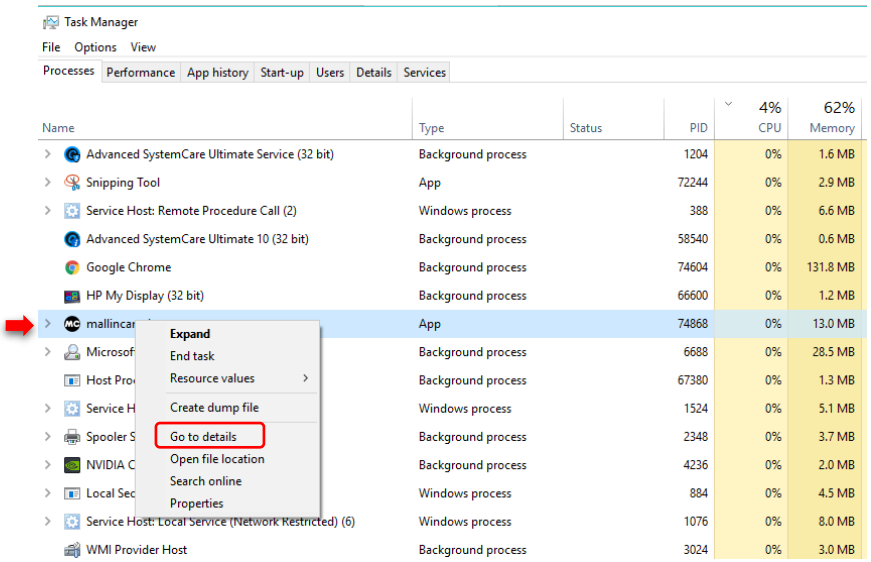
Using your mouse, Choose **Task Manager** from the list.

This will open-up the task **Manager Window**.



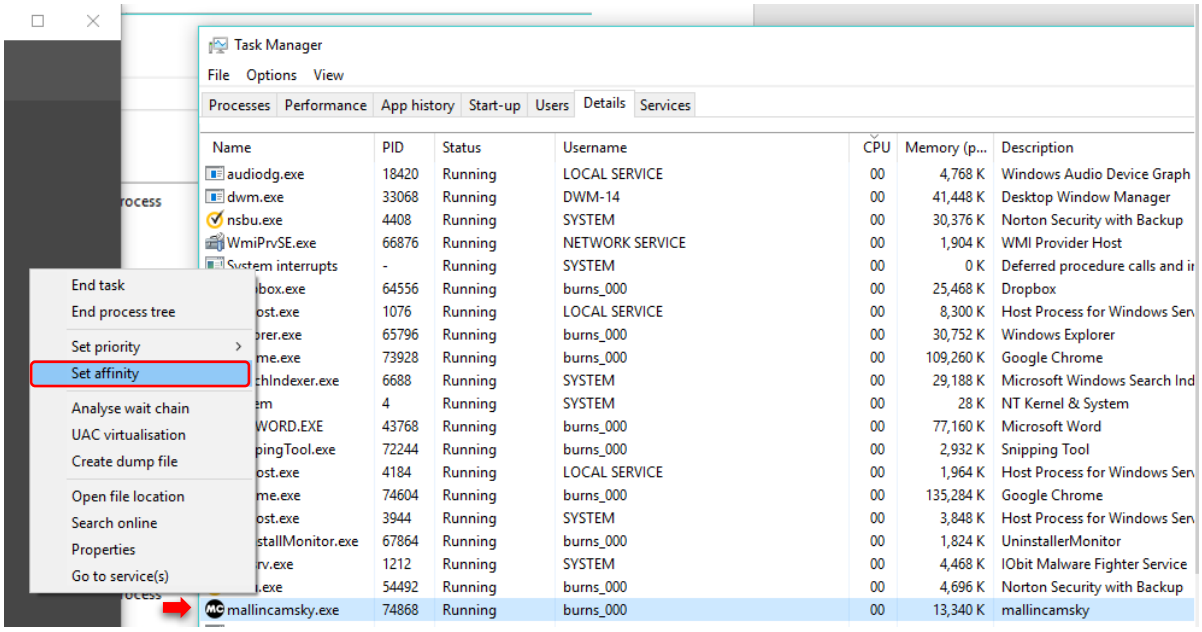
Step 4

Locate and **Right-Click** on **mallincamsky** Process located in the **Task Manager**. This will open up a small Selection Window, **Click** on **Go to details** in that selection window. This select the **Details Tab** in the **Task Manager**.

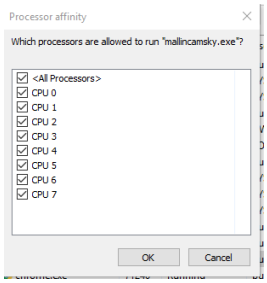


Step 5

In the **Task Manager Window** locate and **Right-Click** on the **mallincamsky.exe** file and another selection window will appear, choose **Set affinity** from that list.



This will pop-up the **Processor affinity** window.

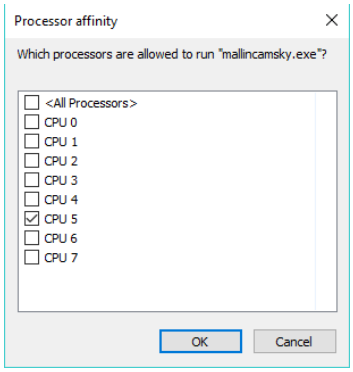


Step 6

Uncheck **<all Processors>**

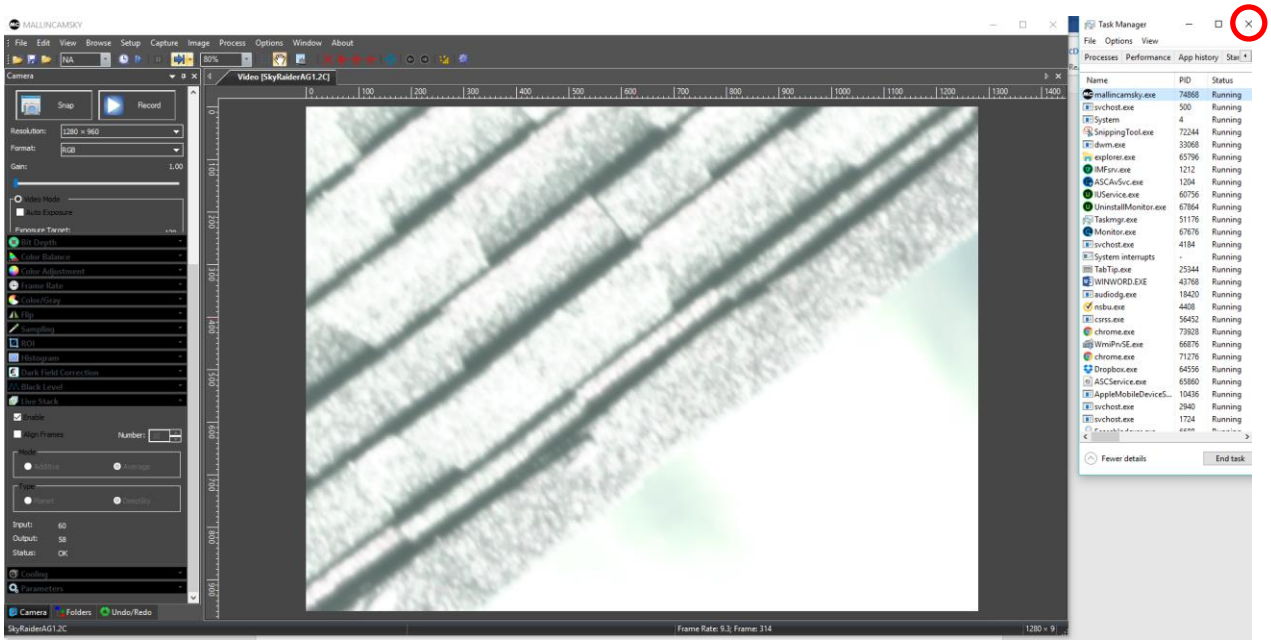
Step 7

Then **Check** a processor of choice (I usually select **CPU 5**), then Click **OK** to return back to the task manager window.



Step 8

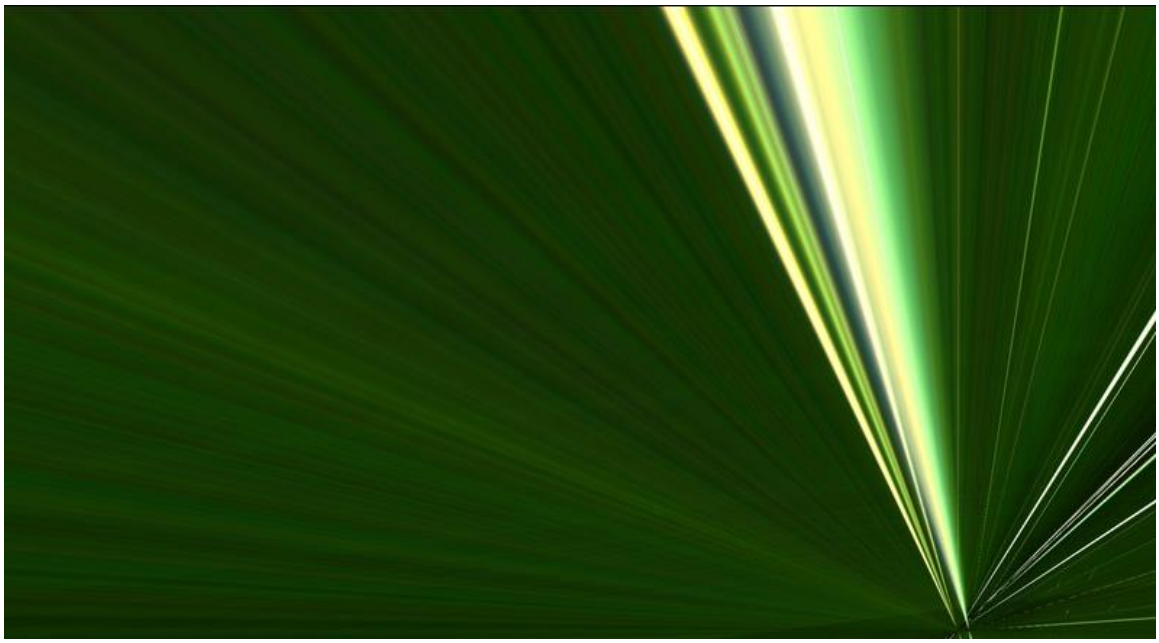
Close the **Task Manager Window**



Note: you will have to repeat this every time you restart the MallincamSky, as windows doesn't remember you selecting 1 processor from the **Task Manager**.

I see a Pink Floyd Kaleidoscope effect on my Screen

This effect has to do with star alignment difficulties when stacking images. You need bright stars to get a successful frame alignment. In other words, increase gain or increase exposure or re-adjust histogram to deliver a brighter image. Also, investigate adjusting the GAMMA and Contrast.



Note

Some users have had some success by choosing **Planet** rather than **DeepSky** in the Live Stack **Type** checkbox.

Dark Field Explanation

The following is the best explanation of what Dark Field is, and it comes from the work of **Simon Hanmer**.

Dark Frame vs Dark Field

Dark Frame Subtraction

First, take an image with the camera shutter closed or the camera/scope covered under the same conditions of exposure time and temperature as the light frames you are going to capture of your astronomical target. Many astronomers will take ten or more such dark frames and then combine them into a master dark frame, principally for statistical reasons: the more sub-frames, the better quality of master frame.

This will give you a single (master) frame of hot and warm pixels generated in the imaging chip, electronically and thermally, including amplifier glow.

Second, subtract the dark frame from each of the light frames in order to remove hot and warm pixels and amplifier glow. However, other noise will remain and needs to be removed with other manipulations and software.

Dark Field Correction

Dark Field correction is another matter entirely. It does not refer to a single image and the recommended/default 10 frames captured to perform the **Dark Field** correction are not used to generate a master frame – nor are they simply subtracted from the light frames.

Instead, the 10 frames are first used to perform a **running stacking**, analogous to the stacking procedure applied in both the SSI software and the new Universe/SSI software.

Running Stacking: the first frame in the series of 10 is recorded in the camera as is. Then the first and second frames in the series of 10 are combined to form a new frame that is also recorded. Then the third frame is combined with the preceding 2 frames to form yet another combined frame that is also recorded … and so on until you end up with 10 frames in a series that represent 1, 2, 3, 4, 5, 6, 7, 8, 9 and 10 combined frames, respectively.

Note that stacked and combined frame #10 represents information derived from all 10 frames.

But hold on … we are not talking CCD imaging here – this is video. When a CCD chip is activated it cranks at full blast and requires effective cooling to prevent it from rapidly heating up beyond a user-determined temperature. But video chips work differently: they heat up slowly and progressively. This means that the first frame of the series of 10 was taken at a lower chip temperature than the final one. Therefore, each of the 10 frames records different levels of thermal noise. In other words, when stored in the camera, these 10 combined frames represent a library of information that the camera and software can now choose from and use to CORRECT (note: not **« subtract from »**) the light image that we want to display on our computer screen.

Now, how does this work in practice – and why is it called a **Dark Field** correction?

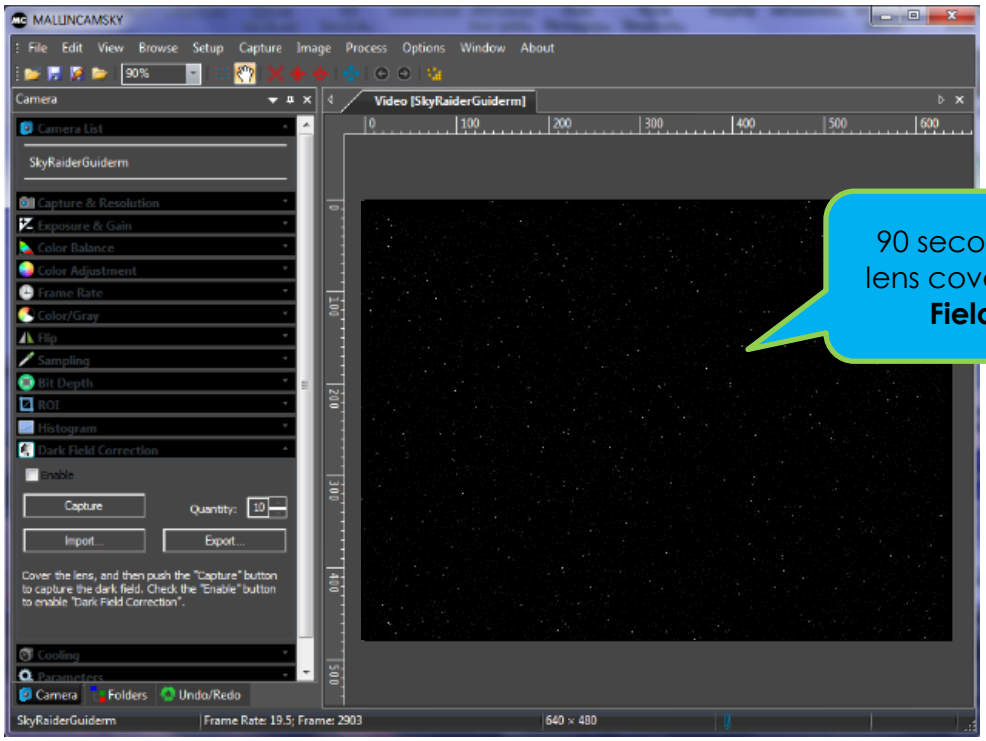
The **Dark Field** correction is prepared by the user at the beginning of an observing session by covering the camera or scope, pre-determining the exposure time and setting the software to automatically taking up to 10 images. We all know our equipment and the skies we observe under (or we certainly will with a bit of practice). We also have an idea of what range of filters we might use that night and the effect they have with respect to exposure times. Take this into account when selecting your exposure time for your 10 dark images.

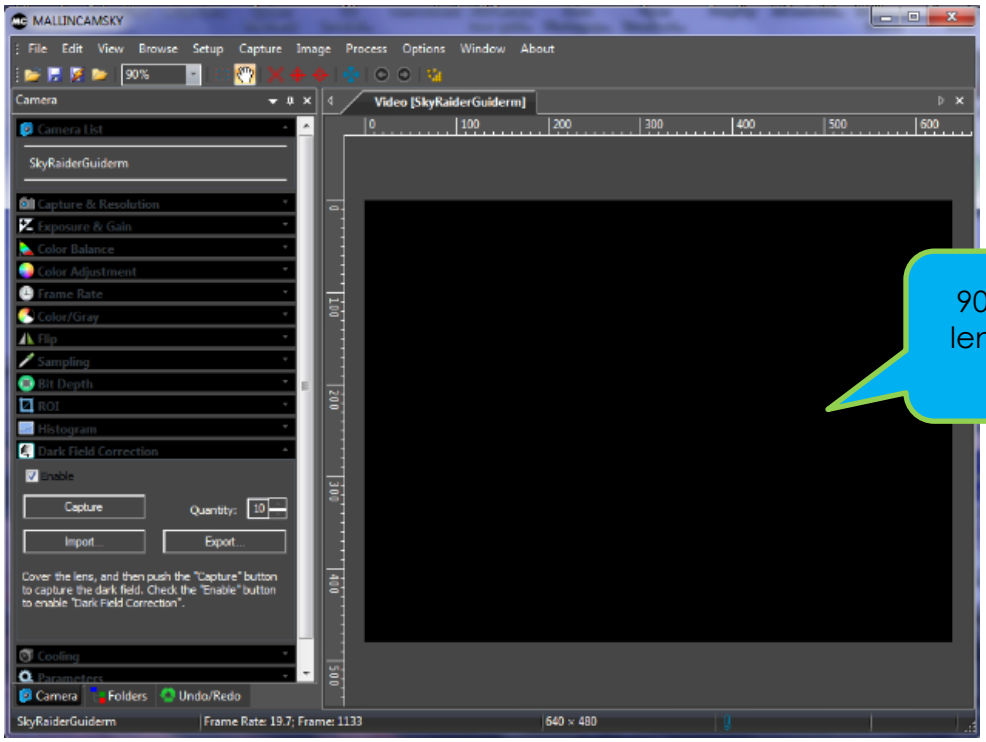
But remember: this is NOT a **Dark Frame** subtraction – the exposures required for dark frame subtraction must be close to those used for the light frames of our astro-targets. Not so for **Dark Field** correction. The camera and software in the latter case are not looking for a single FRAME to subtract based on exposure time. They are looking at the 10 combined frames to see which one has the noise level that most closely matches the noise level in the light frame itself. In other words, they are looking for a noise FIELD. The point here is that camera and software will select the appropriate **Dark Field** for the correction, for both shorter and longer light frame exposure times from the same **« library ».**

In addition, unlike the single frame of a CCD dark frame, the images used for **Dark Field** correction are interlaced combinations of odd and even scan lines. Apparently, this too factors into the fact that this correction removes ALL NOISE, not just hot and warm pixels.

The important point to retain here is that, because of the stacking and combining to form the library of images for the correction procedure, long light exposures do NOT require similarly long exposures for the **Dark Field** correction images. For example, a 2-minute light exposure using a narrow-band h-alpha filter may still only require the user to prepare ten 30 second dark images for the dark field correction. The precise numbers will vary with your equipment and conditions.

The two screen captures below demonstrate the difference that applying a Dark Field to an image can provide.





Setting up to Broadcast on Night Skies Network

Introduction

I found that when I first started connecting tonight Skies Network (NSN), things started happening too fast for me to keep track of everything at once. So, pre-planning was the most the most crucial step for me. I found that by doing test runs in the comfort of my house allowed me to develop my techniques that work for the equipment and software that I use. Below are the results and steps that I use to broadcast on NSN, feel free to follow them and/or made modification as you deem as necessary.

Note

Computer real-estate will be your nemesis. So, depending upon the size of the monitor (laptop), then number of screens that you are using, then number of software programs that using are simultaneously are using, will dictate how you will manage your windows. I will describe how I have organized my windows under a variety of situations (1 computer, 1 computer with 2 monitors, which software packages am I using, and what am I trying to do this session). Remember, it's all about having fun, and ***time*** and ***patience*** are your best friends (not to mention all the guys and gals, and the Yahoo – MallinCam site:

http://tech.groups.yahoo.com/group/mallincam/messages

One of the most important decisions you will need to make with broadcasting the image of the SKYRAIDER is what Video capture software are you going to use. Some simple suggestions:

Currently MallincamSky is not capable of modifying the Video Image and having that Video Image be directly captured by NSN Flash. So, if you want to use all the features of the MallincamSky software and broadcast those results, as well as save screen shots and videos of your images, then we need another program to capture MallincamSky's output and have the output from that program linked to NSN's Flash grabber.

You currently have many choices for that screen capture program: KVYcam, Splitcam, Manycam, WebcamMax. All have about the same features, some of these have versions that will cost you, but all have a version that is free (reduced functions, advertisements, etc.). My current program of choice is KVYcam (Visit www.mallincam.net software downloads for website address). You will then use KVYcam/Splitcam/Webcam Max along with MallincamSky Software to broadcast the images on NSN.

Step 1 ***Plug in the SKYRAIDER camera into an USB port on your computer.***

Note

Always use the same port for your connected devices. I even mark on my laptop which USB port is for which device.

Step 2

Start MallincamSky

Get the image of your object on the Image Window of MallincamSky, adjust the settings on the software for your planned object and size the window so you have room for other software on your monitor real-estate. If you have a dual Monitor system, move MallincamSky to the second monitor.

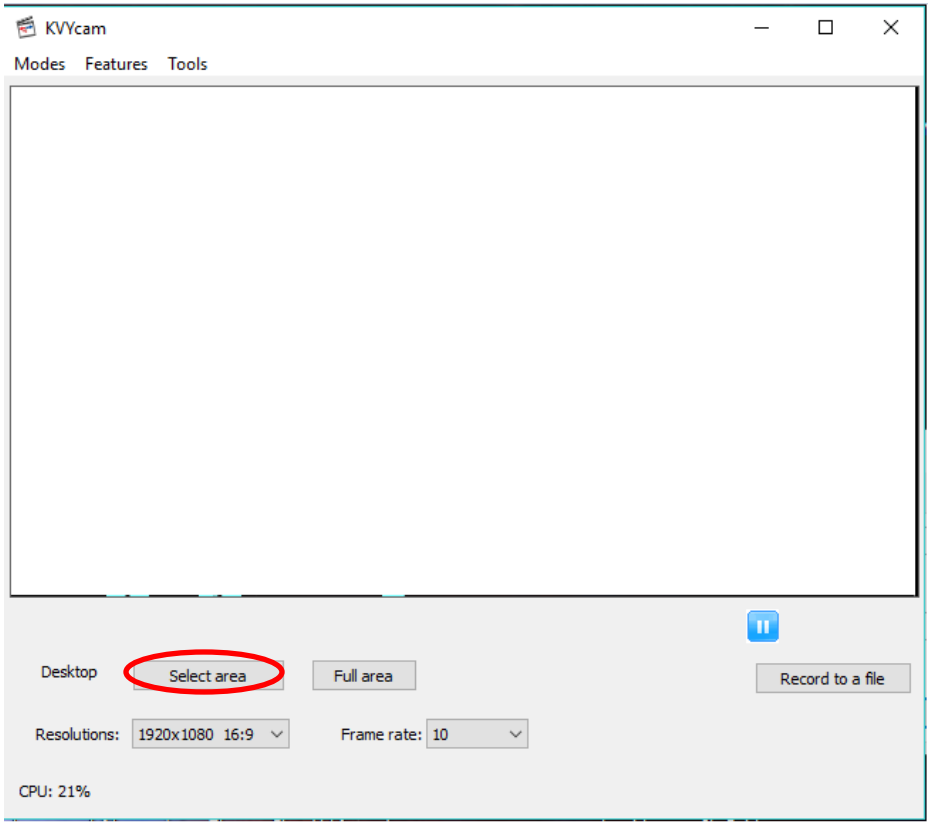
Note

During your initial ***NSN*** experience, you will find it easier to even get the object of interest onto the MallincamSky Software window. This allows you to spend some time playing and adjusting the settings prior to connecting to NSN. As you become more comfortable, you will not worry about that and will adjust while connected to NSN (with the whole universe watching you live).

I will specifically demonstrate broadcasting using KVYcam, but any of the other video capture software will have similar procedure.

Step 3

Start KVYcam



Note

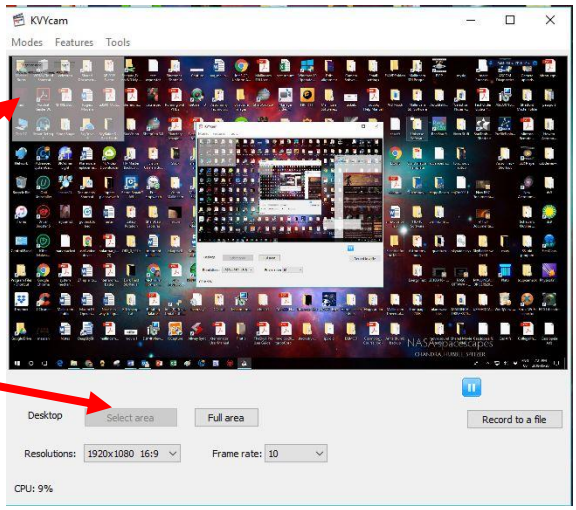
Choose **Select area** and size the KVYcam window so that is beside the MallincamSky Window and you can see both with little overlap. If you have a dual monitor system, you can slide both the MallincamSky Software Window and the KVYcam window to the second monitor.

Step 4

Have KVYcam grab the window image

KVYcam will display a translucent rectangle on the upper left corner of your window. By **left-click and dragging** and/or grabbing a side or corner and **left-click and resizing** overlay the sizing window on top of your ***MallincamSky Software Image Window***. You may need to play with the sizes until you obtain the ideal combination of both the fit in your screen. You want to ensure that you get a good image of whatever the MallincamSky Software is looking at inside the KVYcam window.

This allows you to select the size and location of the desktop that you want on the KVYcam. Just slide and adjust the overlay on top of your MallincamSky's Software image.



Step 5

Adjust the Resolution and frames/second (fps) value on KVYcam

Note

This will be trial and error; it all depends upon resolution, bandwidth, and what over members on NSN experience from your broadcasted image. You will end up adjusting both on the KVYcam side as well and on the NSN side to get the best image. A helpful hint: I slide over the KVYcam window so that some of the text appears in the KVYcam window. Can the members on NSN read the words? If not, adjust. Remember, this may take a couple of sessions until you obtain the ideal resolutions for your setup. KVYcam will automatically set the resolution based upon the size on window you are overlaid (for me usually about 1280 x 720). I will match this resolution as close as I can on NSN. I have the best success with a frame rate of about 15 fps.

Step 6

Minimize the KVYcam software window

Click on the **little underscore** on the top right side of the KVYcam window. This will minimize the KVYcam window from your desktop (it should now appear in the **^** located at the bottom of your desktop monitor) but note that the software is still running and still has hold of your desktop (MallincamSky) Image location. Click on the KVYcam icon in the **^** location to reopen the window

Note

Do not move the MallincamSky Window around your desktop when broadcasting, since KVYcam is just grabbing the real-estate location that currently your MallincamSky Software image is situated at. If you move the MallincamSky Software Window, then KVYcam will still grab the desktop location, but may not grab the whole MallincamSky Video Image. Don't be afraid to practice moving the MallincamSky Software window when not broadcasting to learn how it affects the displayed KVYcam Window. If you need to, you can again use the KVYcam desktop select icon and select or change the location or size of the window for it to grab.

If you have a dual monitor, you can leave the KVYcam window open on the second monitor since real-estate will not be an issue in the situation.

Step 7

Start your Web Browser of Choice

You may have to play with several Browsers to see which one works well with your particular computer setup. I have had success with many browsers: ***Chrome***, ***Internet Explorer***, ***Firefox,*** and ***Edge***

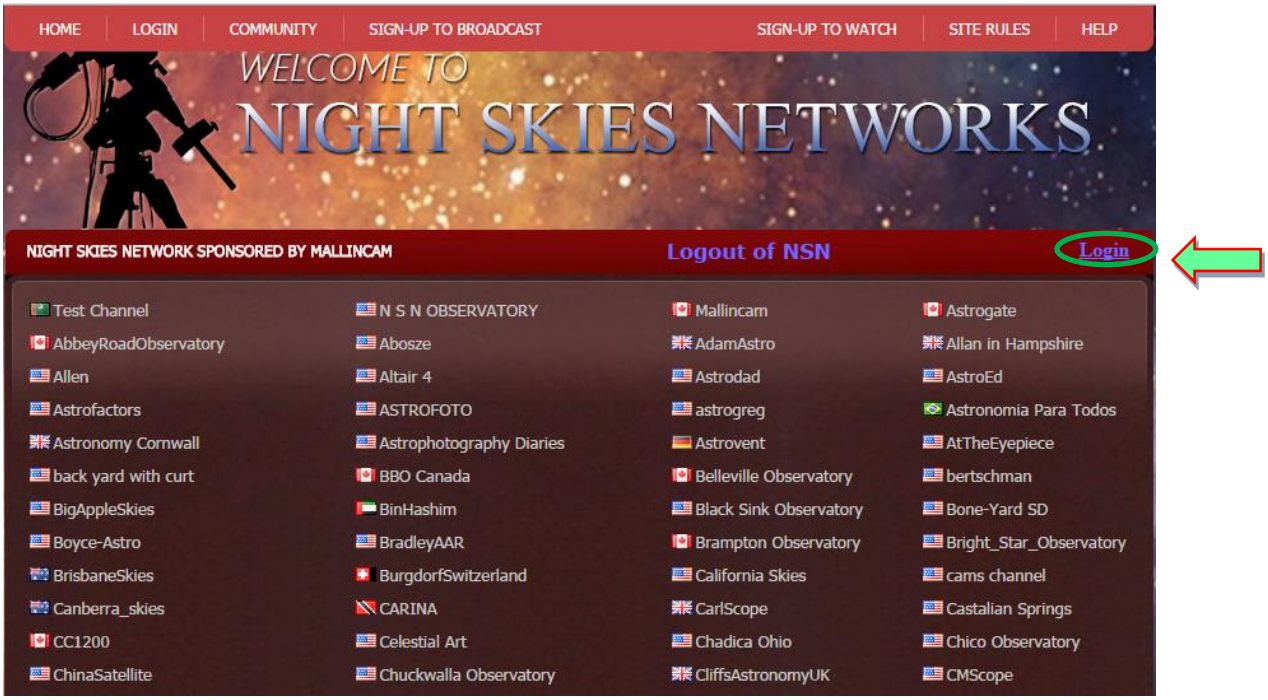
Step 8

Log into Night Skies Network (NSN)

Have your Web Brower go to the location: http://www.nightskiesnetwork.ca/ . Locate and **click** on the orange ***SIGN IN*** button at middle right of the screen or **click** on the ***Login*** button at the top of the screen.

A popup Window will appear, where you will enter your **Username** and Password. Click on the orange **LOGIN** button to accept.

You will next be presented with the ***Channel Line Up*** screen for Night Skies network. Click on the ***Login*** selection on the upper right-hand side of the screen.



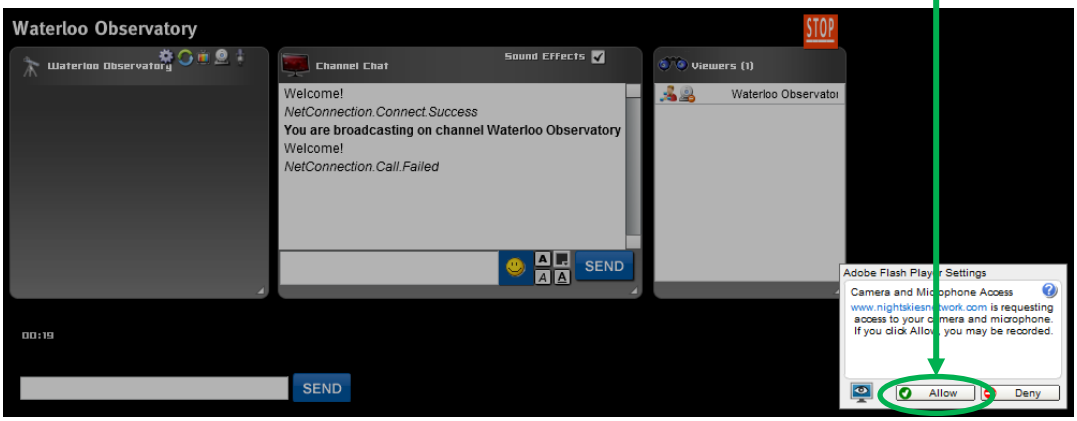
Another Login Window will appear, again asking again for your **Username** and **Password**.

Enter in the information and **Click** on the **PUBLISH CHANNEL** button to accept these and start the Broadcasting routine.

Step 9

Allow Adobe Flash to use your KVYcam/Splitcam/WebcamMax

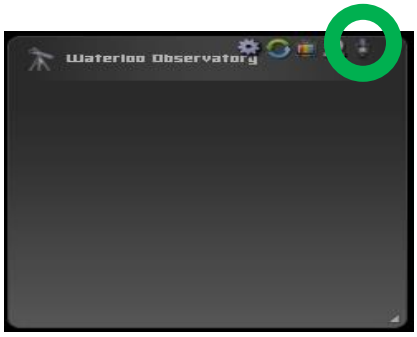
The ***Adobe Flash Player Settings*** window will pop up on your screen asking you for permission to use your camera and your microphone. Select ***Allow***.



Step 10

Turn off your Microphone

Until you have your microphone figured out, it is best to initially turn it off. If you do not, the viewers on NSN may hear an extreme loud buzzing (feedback noise). Later on, we will look at using the microphone, but until then I recommend ***CLICKING*** on the little ***microphone symbol*** on the upper right corner of the NSN video display window to disable the microphone.



Step 11

Set a message for the NSN observers

It is a good idea to display a message above the NSN display window, so that the other NSN views understand what you are doing. When initially setting up (which usually takes longer when you are learning), I usually type the message "***Setting Up the Camera***" then ***CLICK*** on the ***SEND*** button to have it displayed.

Note

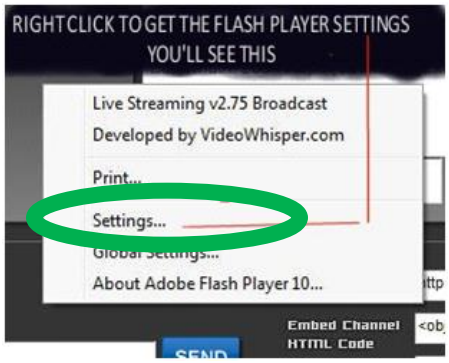
When you are us and running and everything is working as it should, you will change the message to indicate, what telescope, mount, and camera you are using. For that is the most frequently asked question from the NSN viewers.

Step 12

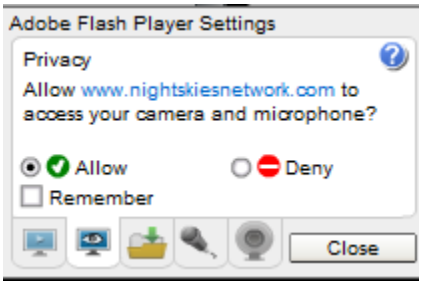
Select the Camera

Now is the time to activate the camera, or in our case have NSN driver point to our KVYcam/Splitcam/Webcam Max output.

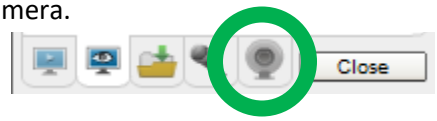
- ***RIGHT CLICK*** inside the NSN Video window to bring up a ***Settings Window***



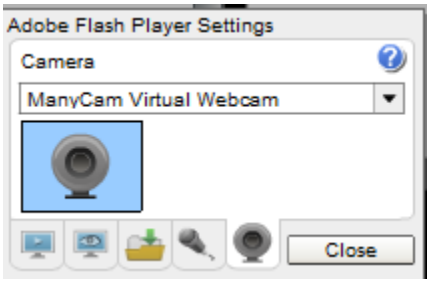
- ***CLICK*** on the ***Settings*** choice and you will be presented with the ***Adobe Flash Player Settings Window.***



- ***CLICK*** on the ***Camera Icon*** and you will be presented with a ***pull-down menu*** to select your camera.



- ***CLICK*** on the ***Pull Down*** list to select your camera of choice.



- ***CLICK*** on ***CLOSE*** to Continue.

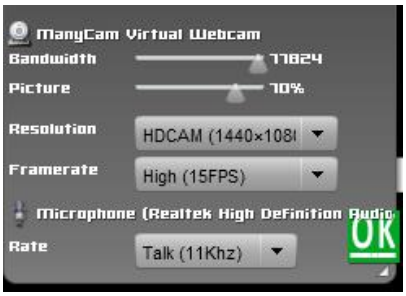
NSN will remember what camera you chose from the last visit. So usually you only must go through this process whenever you want to change what camera device you would like the ***NSN flash driver*** to use.

Step 13

Choose your Camera Settings

We will now select the settings for our camera. We have the option of changing: The ***Bandwidth***, ***Picture***, ***Resolution***, ***Framerate***, and even the ***microphone rate*** (when you are ready). The changes will **not be activated** until you ***CLICK*** on the Green ***OK*** symbol in the window.

- ***LEFT CLICK*** anywhere inside the NSN video Window to bring up the ***Camera Settings Window*****.**



- ***Use the sliders*** for ***Band Width*** and ***Picture*** values. I usually have both of my sliders way on the right. Over time you will find the sweet spot for your system.

- Select your ***Resolution*** from the ***Pull-Down Menu***. Select a starting value of ***(1280 x 720***) for the system. Again, play with these to see what settings the NSN viewers say is the best (try to match what KVYcam has as its resolution).

- Select your ***Frame Rate***. From its ***Pull, Down Menu***. I usually leave it at 15 fps, but I have used 30 fps at times. A gain, trial and error for your system.

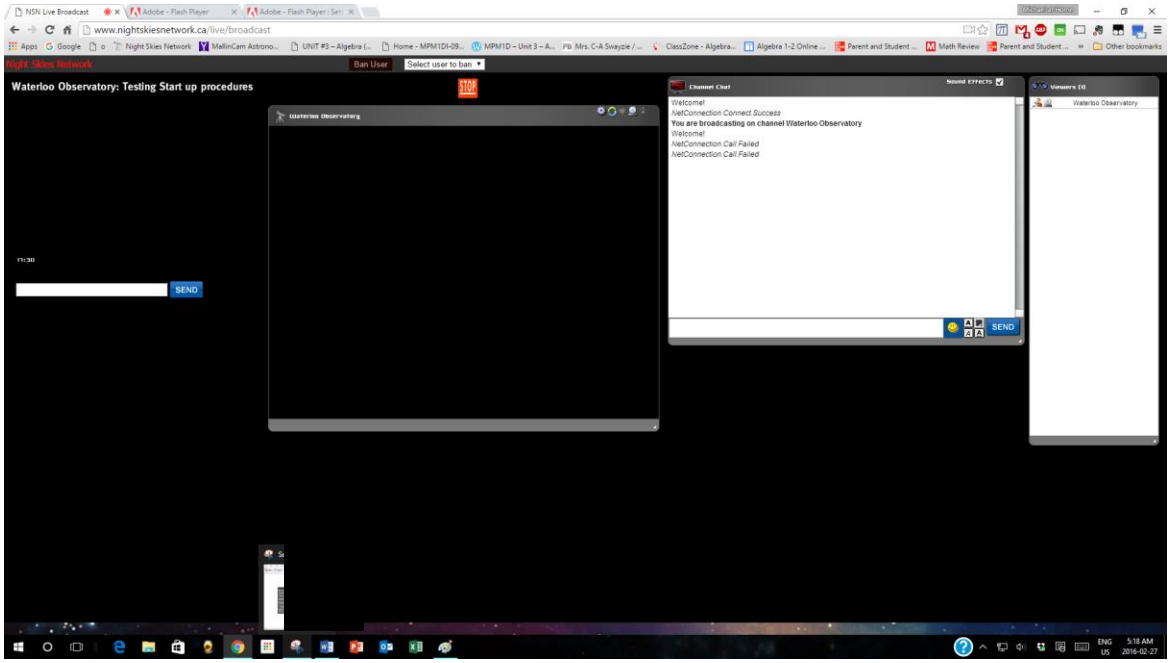
- ***CLICK*** on the green ***OK*** symbol to accept these settings.

That's it, you are done. If everything is working well and the Window's gods are in a good mood, you should be broadcasting whatever object the **SkyRaider** is capturing. You should now enter another Message and ***SEND*** it out to indicate what system you are using and what object you are viewing.

Note

There is a time delay on what you say (if you have your microphone activated) and do on your computer as compared to what others see (and hear) on the NSN broadcast.

You can now re-adjust the different windows in the Night Skies Network to make the best use of your screen. You will be seeing what you are Broadcasting in the **NSN View Window**, you can see who has logged into your Channel in the **User's Window**, and you can Participate in the **Channel Chat Window**.



Using your Desktop Real-estate wisely

You want to control MallincamSky and at the same time monitor the **Chat Window**, but they both take up a lot of space. What to do? What to do?

Here are a few suggestions that people use. It all depends upon what computer equipment you are using.

Suggestion 1: Get a second cheap monitor.

This way you can have NSN (running in your browser) on one monitor, and MallincamSky running on a second monitor. This is the best approach.

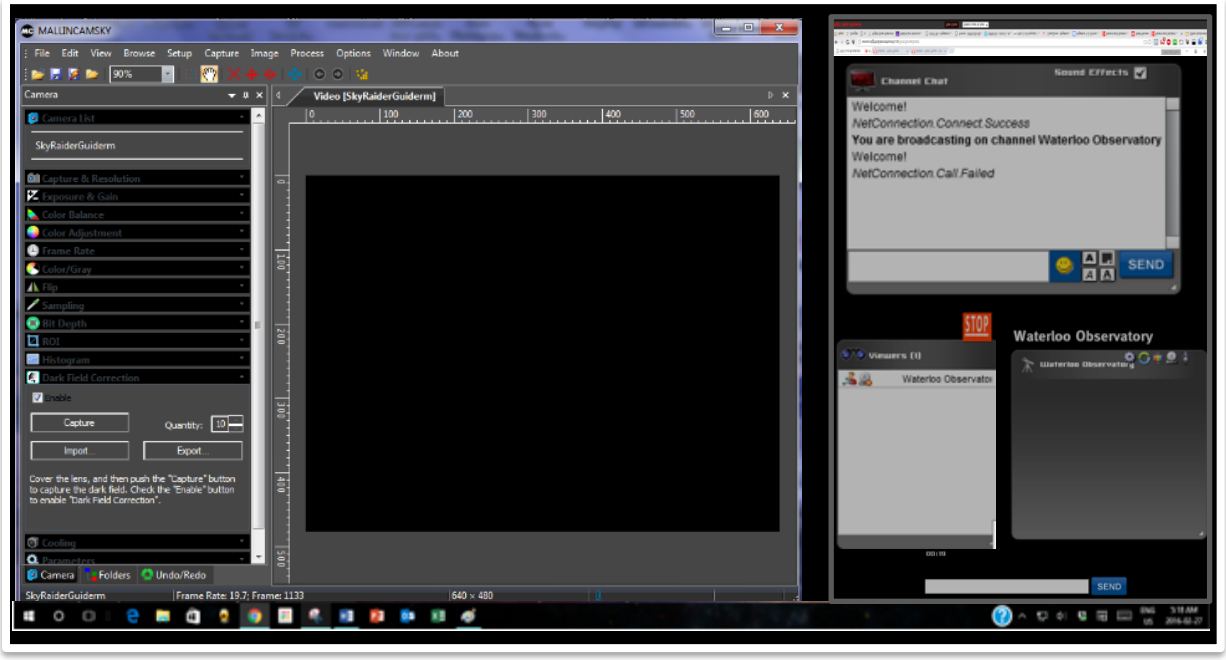
Suggestion 2: Minimize the Browser Window running NSN, and use another computer, tablet, or smartphone to monitor the messages (turn off the sound on that devise).

This way you always have full control of MallincamSky, and you don't miss-out on any conversation or questions that happen your way.

Suggestion 3: Resize MallincamSky and Browser (running NSN), so you can work on both simultaneously.

This way you have both MallincamSky and Brower running is same window. This requires monitor real-estate and software placement skills.

The following is a possible arrangement scenario.



You would have KVYcam select the region of the window that encloses MallincamSky.

Note

You will freeze (and I don't mean like what Rock does when he broadcasts in winter till 3am), I mean from time to time your NSN connection will freeze for no apparent reason. It happens to us all. When this happens, you can simply terminate the Web browser program (Ctrl –Alt-Del). Then restart your browser and Log back into NSN. This usual is a very quick process. But, sometimes we all have to restart our computer (this takes longer for we need to power down hardware and software) and reactivate everything before login back in. Don't worry, the NSN viewers sense what is happening and will keep the conversations going while waiting for you to come back on.

Don't be afraid to ask for advice by typing in on the Video chat window, as we are all learning and are willing to assist whenever we can.

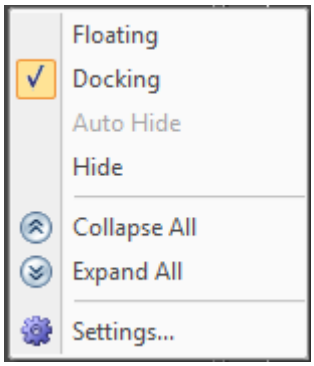
When ready, try activating the microphone (click on the microphone symbol). Other will let you know if they can hear you, or if there is noise. Remember there are settings for the microphone in the camera settings window.

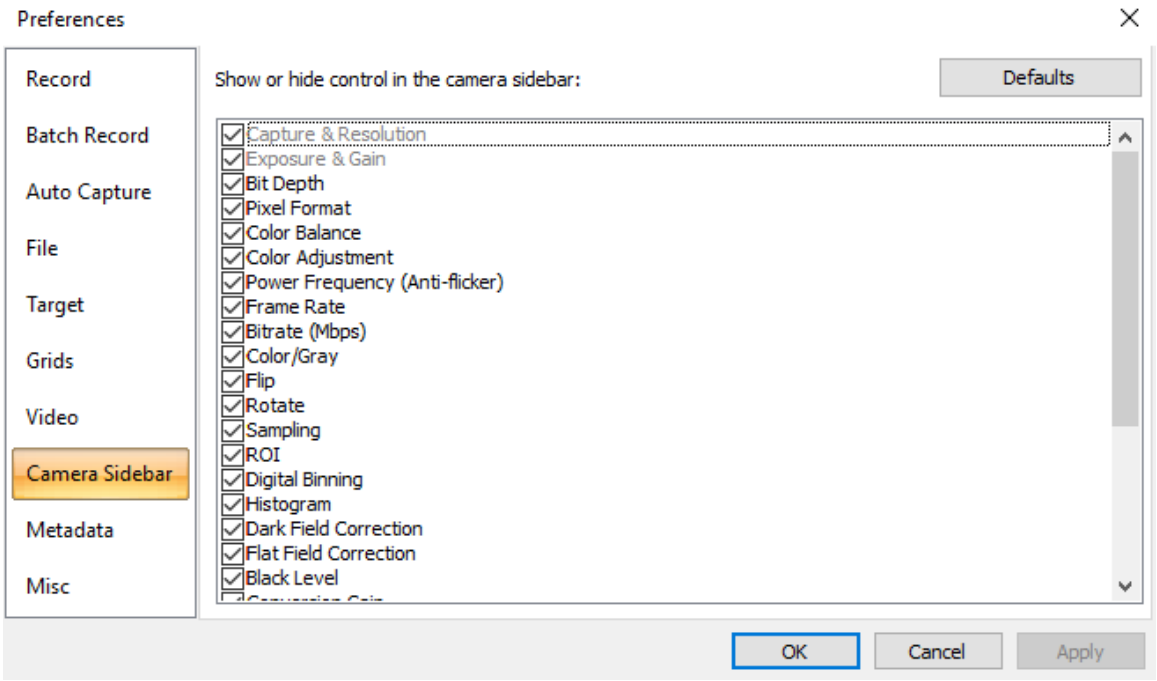
Note

When you are finished with your session, you simply say your good nights to the crowd of NSN viewers to let them know that your session is ending. ***CLICK*** on the red ***STOP*** button on your NSN Window and NSN will shut down your channel and you can power down your system and call it an evening (It won't force the NSN viewers off the channel and some viewers will continue chatting long after you have gone to bed).

Customizing the Screen

You can customize what controls (and the defaults for most of the controls) you want active, by **Left-Clicking** anywhere in the Left Control Panel then choose the **Settings** choice to open-up a **Preference Window** that allows you to make various setting changes.





Focal Reducers

MFR-8 Mk II Focal Reducer

The new MFR-8 was design for all the MallinCam SkyRaider Series of Cameras. Included are a multi coated 25mm dual elements hand selected lens assembled right here in our Mallincam facilities. Machining is also done at a local machine shop. It comes equipped with two 10 mm spacers and one 5mm spacer for precision F/ ratio reduction to suit just about any telescope configuration. The MFR-8 is part of our high end MFR-5II which feature precision threads and it ready to accept any filters or 1.25" size. Reduction from 0.55X to 0.39X is achievable (depending upon telescope and lens configuration).

User Notes