

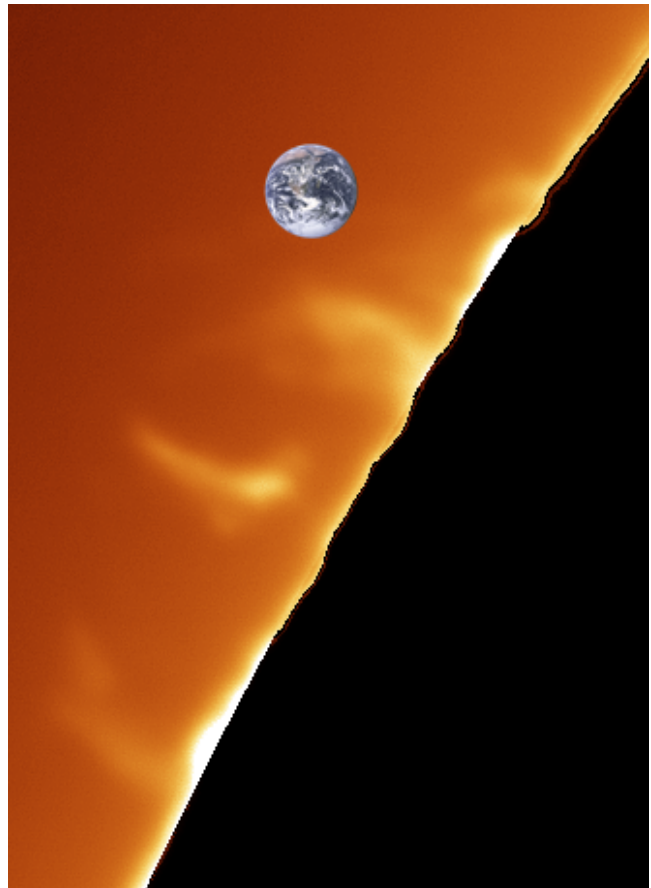
Solar Live View

Version 1.7

Introduction

Solar Live View (SLV) was created in order to attempt to bridge the gap between viewing directly down an eyepiece to the live capture view seen on screen and finally to the finished image after stacking and post-processing. As its name implies, it receives data files from your capture program, processes them in real time and it allows you to apply various effects such as colorization and sharpening. In addition, it can build an animation and all this happens automatically with very little user interaction.

See the [Quick Start Guide](#) at the end of this document.



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Table of Contents

The main screen	4
Viewing an image	5
<i>Drag and drop</i>	5
<i>SharpCap</i>	7
<i>FireCapture</i>	8
Image manipulation	8
<i>Color</i>	8
<i>Sharpening</i>	8
<i>Noise reduction</i>	9
<i>Proms and the disk</i>	9
<i>Disk outline</i>	9
<i>Darkening the disk</i>	12
<i>Adjusting prominence contrast and gamma</i>	12
<i>Adjusting and clearing the disk circle</i>	13
Display	13
<i>Zoom</i>	13
<i>The earth overlay</i>	13
<i>The alignment region</i>	13
The image tabs	15
<i>Prominences</i>	15
<i>Surface</i>	15
<i>Making a composite image</i>	15

<i>Snapshots</i>	16
Stacking a video file	17
Animations	17
<i>Starting an animation</i>	18
Miscellaneous	20
<i>Clear images</i>	20
<i>Show log</i>	20
<i>User's manual</i>	20
<i>Preferences</i>	20
<i>Capture</i>	20
<i>Stacking</i>	21
<i>Output</i>	22
<i>Equipment</i>	22
<i>Other</i>	23
Appendices	24
<i>Quick Start Guide</i>	24
<i>Troubleshooting</i>	24
<i>The configuration file</i>	25
<i>Version history</i>	27
<i>To do and known problems</i>	28

Installation

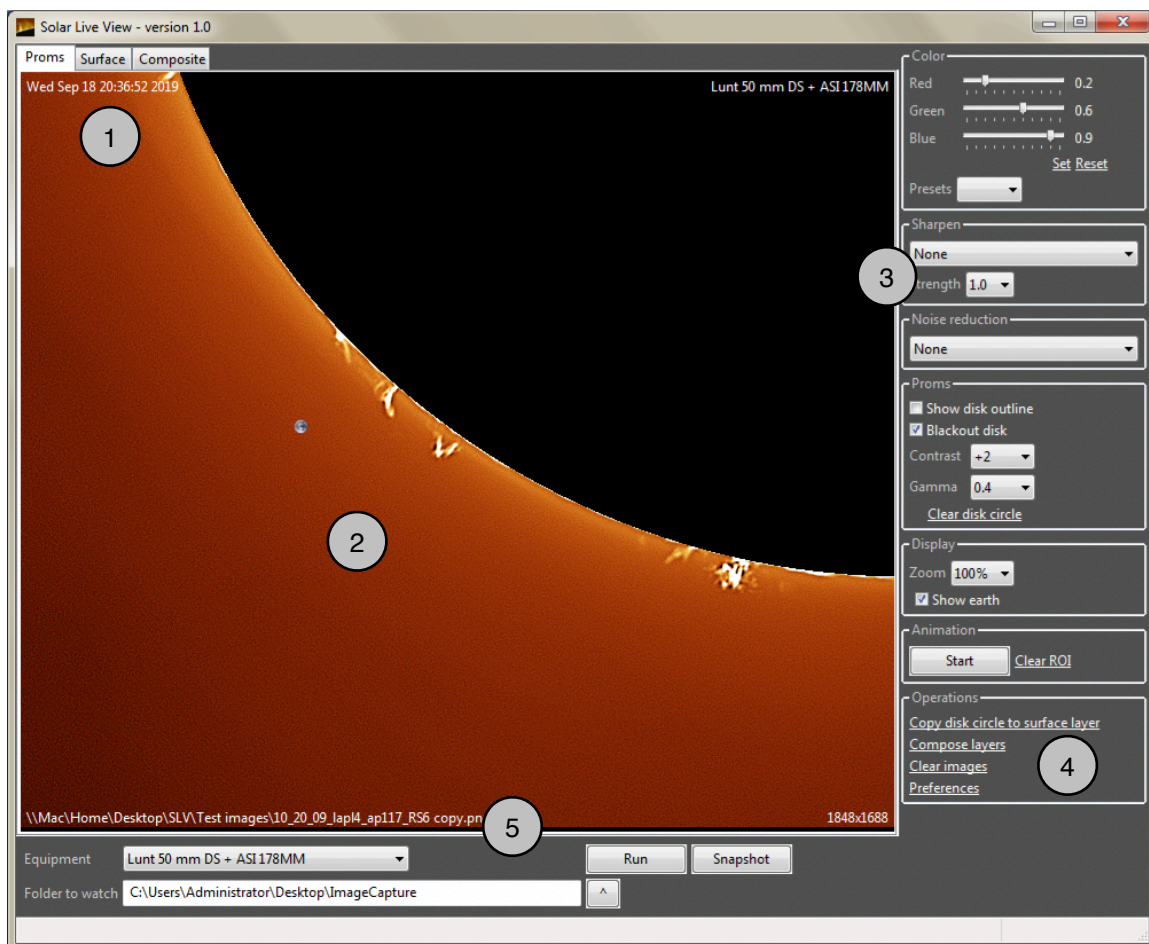
There is no installation required. Simply drag and drop the **SLV** folder to a convenient place (such as your Desktop) and run the `SolarLiveView.exe` program file. You may wish to create a shortcut to this file in your Task Bar for easy access.

The application is a Windows program and it has been tested on Windows 7 and 10. In addition to the program file, there is a configuration file, `SolarLiveView.ini`, that contains various settings. You should not need to edit this file directly but its contents are described in the [Appendix](#).

The main screen

The main screen is composed of several different sections:

1. **The image tabs** - These tabs allow you to select which of three images you would like to view. **SLV** allows you to view a prominence image, a surface image and a composite image which is automatically formed by merging the other two images.



2. **The image viewer** - This is where the image is displayed. You can pan the image by left-clicking and dragging the mouse and you can zoom by rolling the mouse thumbwheel. In addition, you can quickly bring the image back to the default zoom level (typically 50%) by double-clicking the left mouse button. Note that the timestamp, equipment, capture filename and other details are overlaid on the image.
3. **The image processing area** - This area contains many controls for setting the color, sharpening and a host of other attributes. These controls are described in detail below.
4. **The other/operations area** - This area contains several commands which are described below.
5. **The capture control area** - This area contains controls that deal with the actual capture of data.
 - i. The **Equipment list** allows you to specify what equipment (i.e. the telescope, camera, etc.) that is being used. Note, the equipment choice must be chosen *before* the image is loaded. Changing the choice *after* the image is loaded will have no effect. The choices in this list are configured in the [Equipment Preferences](#).
 - ii. The **Folder to watch** is the folder that your capture program is saving frames to. Note that many capture programs will use a folder based on today's date so this folder will likely need to be reset each time you start a new session. It is usually best to start your capture program to see what folder is being used, then set this once you know the exact path.
 - iii. The **Run** button tells **SLV** to start processing frames in the watch folder. When running, the button changes its label to Pause. At any time you can pause the input and work with the currently displayed data.
 - iv. The **Snapshot** button allows you to save snapshots to the **Snapshot** folder (configured in [Output Preferences](#)). See below for more information.

Viewing an image

Drag and drop

An image or video that has already been acquired can be dragged on dropped onto either the **Prom** or the **Surface** tabs. This is a quick way to automatically apply image processing steps that are typically done manually in various image editing programs. For example, with a simple drag and drop, you can colorize an image, black out the disk, sharpen it and overlay an earth icon.

Integration with capture programs

SLV was designed to integrate with your capture program. Instead of capturing a video file to be stacked and sharpened later, you can instruct the capture application to save single frames or videos at a user-defined time interval into a specific folder. **SLV** will then monitor this folder and when new data arrives, **it** will find it, process it, display it, then (optionally) delete it.

In order for this to work, you must specify the **Folder to watch** and then press the **Run** button. Note that most capture programs will capture image files to a folder whose full path typically has the date built into it. So, it is often easier to start the capture process, then figure out where the captured files are being placed. Then you can easily select the same folder in **SLV**.

Note: **SLV** is always monitoring the **Folder to watch** whether you have pressed the **Run** button or not. If the program is not in **Run** mode, then each file in the capture folder will be moved to the “Already processed” folder (see below) and will not be processed or displayed. This is important as the capture folder could quickly fill up with data files if it was not constantly being emptied.

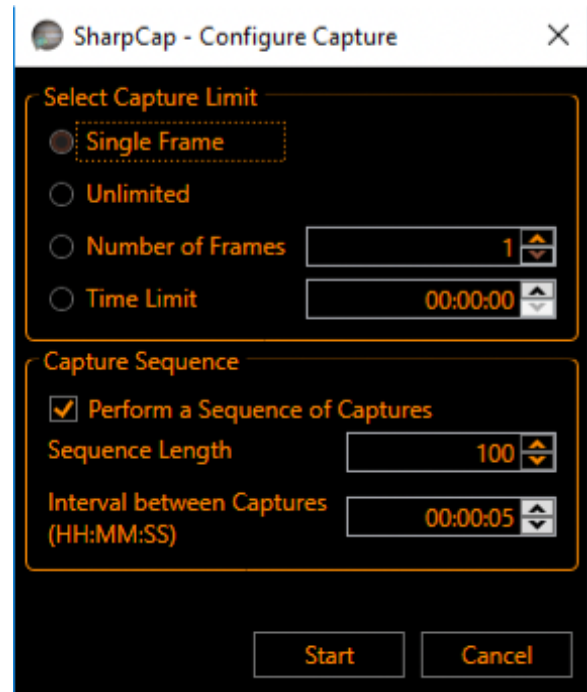
When in **Run** mode, you have the option to delete or move the data files after they are processed. This is chosen in the **Preferences**. If you do not want to process the data files later, then check the **Delete files after processing** checkbox on the **Capture** tab in the **Preferences**. If you do plan to process the data files later, then uncheck this box. In this case **SLV** will simply move the data files to a sub-folder called “Already processed” in the **Capture** folder. The ability to auto-delete these data files is an important feature as a large amount of data can be created in a very short period of time and this helps keep your disk from filling up. Note that **SLV** will ignore any data files that were present before the **Run** button is pressed so it will only process new files as they appear in the **Folder to watch**. But you can always drag and drop a data file on the main window to process it at any time.

Note: **SLV** can only process **MONOCHROME** ser files. This shouldn't be a big problem as monochrome is the recommended format anyway. Also realize that a lot of processing needs to be done in close-to-real-time so it is best to use the smallest resolution possible as this will result in the most responsive output.

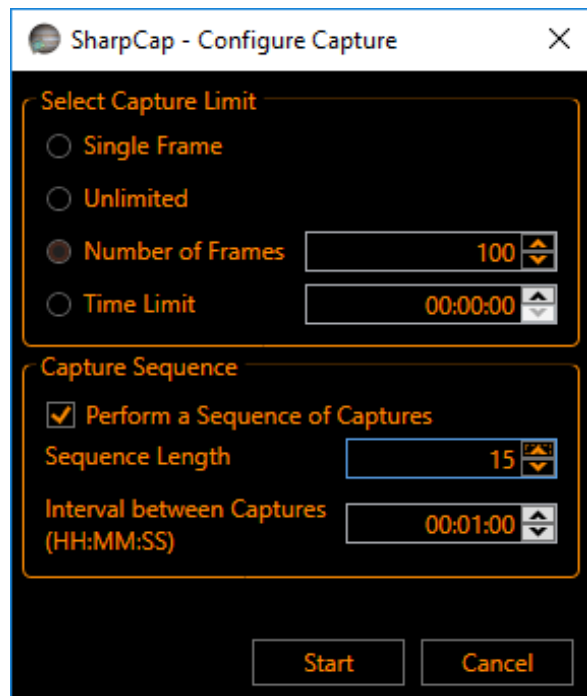
When **SLV** is running, you may want to press the **Pause** button if you have a particularly good or interesting frame that you would like to view and play with for a while. If you do not pause it, then the current frame will be replaced automatically by the next frame captured.

SharpCap

To capture individual image frames in SharpCap, choose **Capture ► Start Capture** from the main menu. The following window will appear. In the top section, choose **Single Frame** and in the bottom check **Perform a sequence of captures**. Choose a **Sequence length** that will run for awhile and an interval between frames in seconds. The **Interval** shouldn't be too short as **SLV** may not be able to keep up. For example, choosing 500 frames separated by 30 seconds is a good place to start. Press the **Start** button to begin the capture.



To capture SER movie files, select **Number of frames** in the top section. Then enter a small number of frames. **SLV** is designed to run in close-to-real-time so it is best to capture many small movie files rather than fewer longer files. In the bottom section, provide a **Sequence length** and an **Interval**. For example, you could capture 15 movie files, each with 100 frames and spaced out by one minute. Note: you can capture video files with many frames and tell **SLV** to only use the first X frames. That way, you can still capture large data sets for post-processing later but still keep a responsive update rate in **SLV**. Check out the [Stacking Preferences](#) for more information.



FireCapture

SLV can utilize data from **FireCapture** as well as **SharpCap**. The process is the same. You just capture a ser video file on a set interval and point **SLV** to the folder in which the data is captured.

Note: currently **SLV** does **not** support avi files

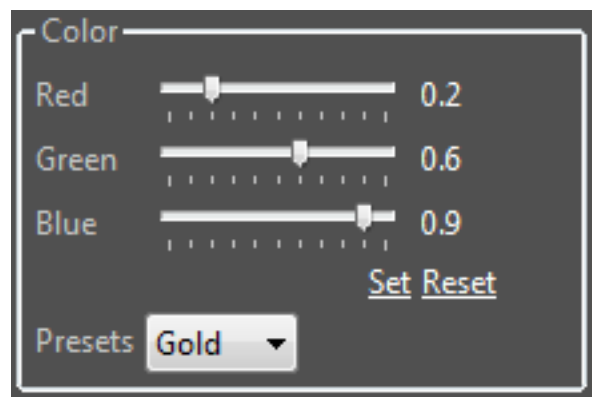
Image manipulation

Color

The color section allows you to specify an RGB combination using the sliders or by choosing from a preset list of colors. If you change the sliders, press the **Set** link to update the display.

The **Reset** link will set the color back to monochrome (0.5 for red, green and blue). The sliders actually set the gamma level for each color channel just like the Levels command in Photoshop or Gimp. A gamma of 0.5 is neutral, a gamma of less than 0.5 increases the channel's intensity and a gamma greater than 0.5 darkens the channel.

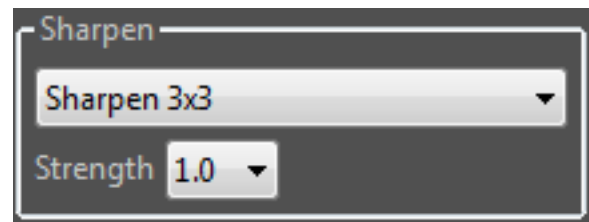
If the color list is selected, you can roll the mouse wheel to cycle through all the color presets.



Sharpening

Various sharpening algorithms can be applied to your image. It is difficult to predict which algorithm is better and this definitely depends on your data. So feel free to experiment. The **Sharpen 3x3** and **Unsharp 5x5** usually work the best and you will also need to experiment to see what **Strength** value gives the best results.

Typically a strength value of 1.0 is best. Realize that sharpening can cause artificial (and unwanted) noise so you must find the balance that suits your tastes. Note: the **High Pass** choices don't often work well and will likely be removed.



Noise reduction

You can apply a noise reduction step and this is applied after the sharpening step.

Currently only the **Median 3x3** filter is available. As with sharpening this step may or may not produce an improvement in the image. This step is also quite CPU-intensive so

it may cause the display to refresh a bit more slowly when in use. A better way to reduce noise is to stack multiple image frames from a .ser movie file rather than capturing single images. Check out [Stacking a video file](#) for more information.

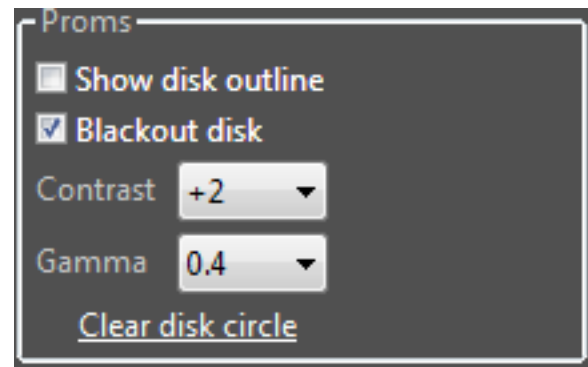


Proms and the disk

This section allows you to control the appearance of the disk and prominences.

Disk outline

When an image is displayed on the **Prominence** tab, the program will attempt to find the disk circle. It does this by finding three points on the edge and then calculating a circle with a corresponding center point and radius. When the **Show disk outline** checkbox is checked, the outline and the three points will be drawn.



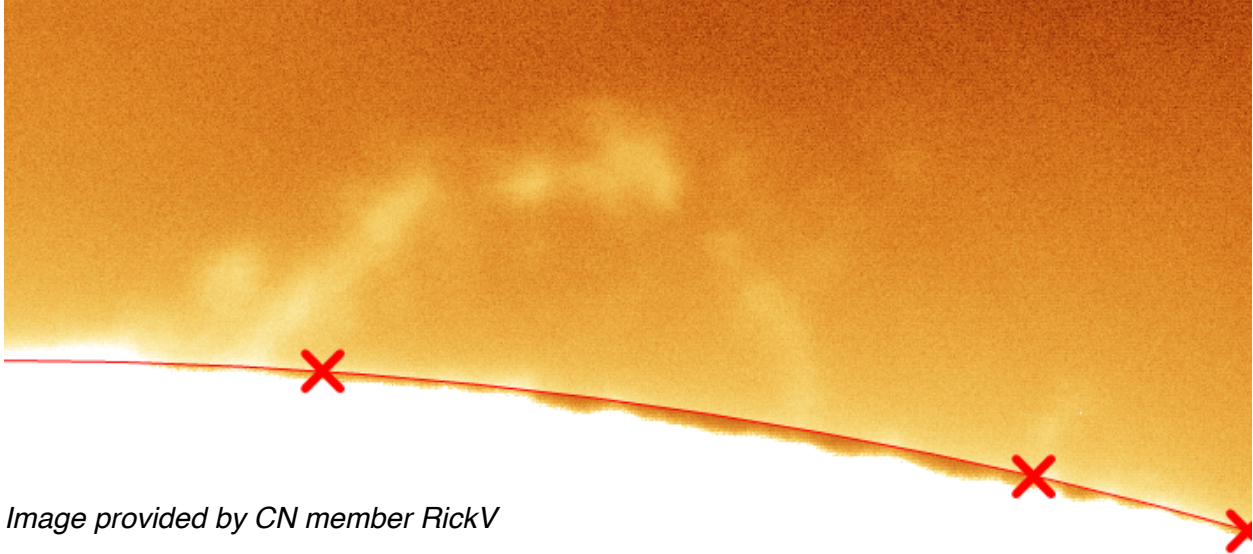


Image provided by CN member RickV

In some cases, the program may not be able to automatically find all three points and only one or two will be drawn. Or a point will be improperly located. The point-finding algorithm works best when there is a lot of contrast at the disk edge (i.e. when you are exposing for prominences). Conversely, the algorithm has much more difficulty when the image has a lot of surface detail. In these cases, you can place an additional point by **right-clicking** with the **ALT** key held down. If there are already three points, then you can relocate a point by **ALT left-clicking**. In this case, the point nearest to the click will be relocated. Note that manually placing points is really only helpful when viewing a single image frame or if you have paused the input. If new data files are being input automatically, then **SLV** will attempt to re-find the points each time a new frame arrives.

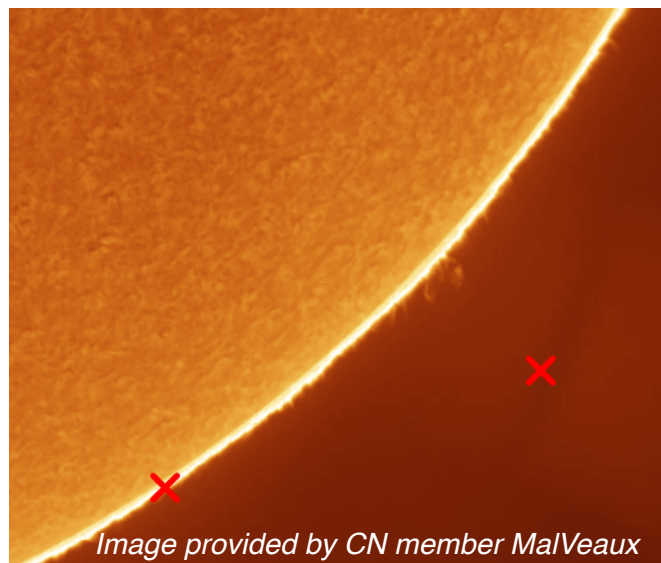
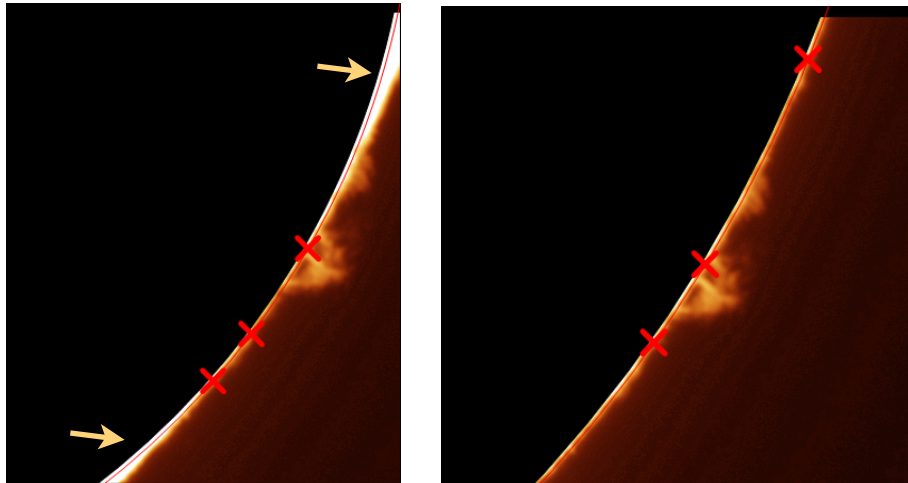


Image provided by CN member MalVeaux

Other things that help the software find the disk edge more accurately are:

- Use a larger field of view or adjust the field of view so there is more of the disk edge for the software to work with. In the image on the left, the disk outline was not found accurately as indicated by the yellow arrows. This is because there was not enough disk edge curvature to work with and the three red edge points are so close together. By moving the image over a bit, more disk edge was visible and a more accurate edge could be found.



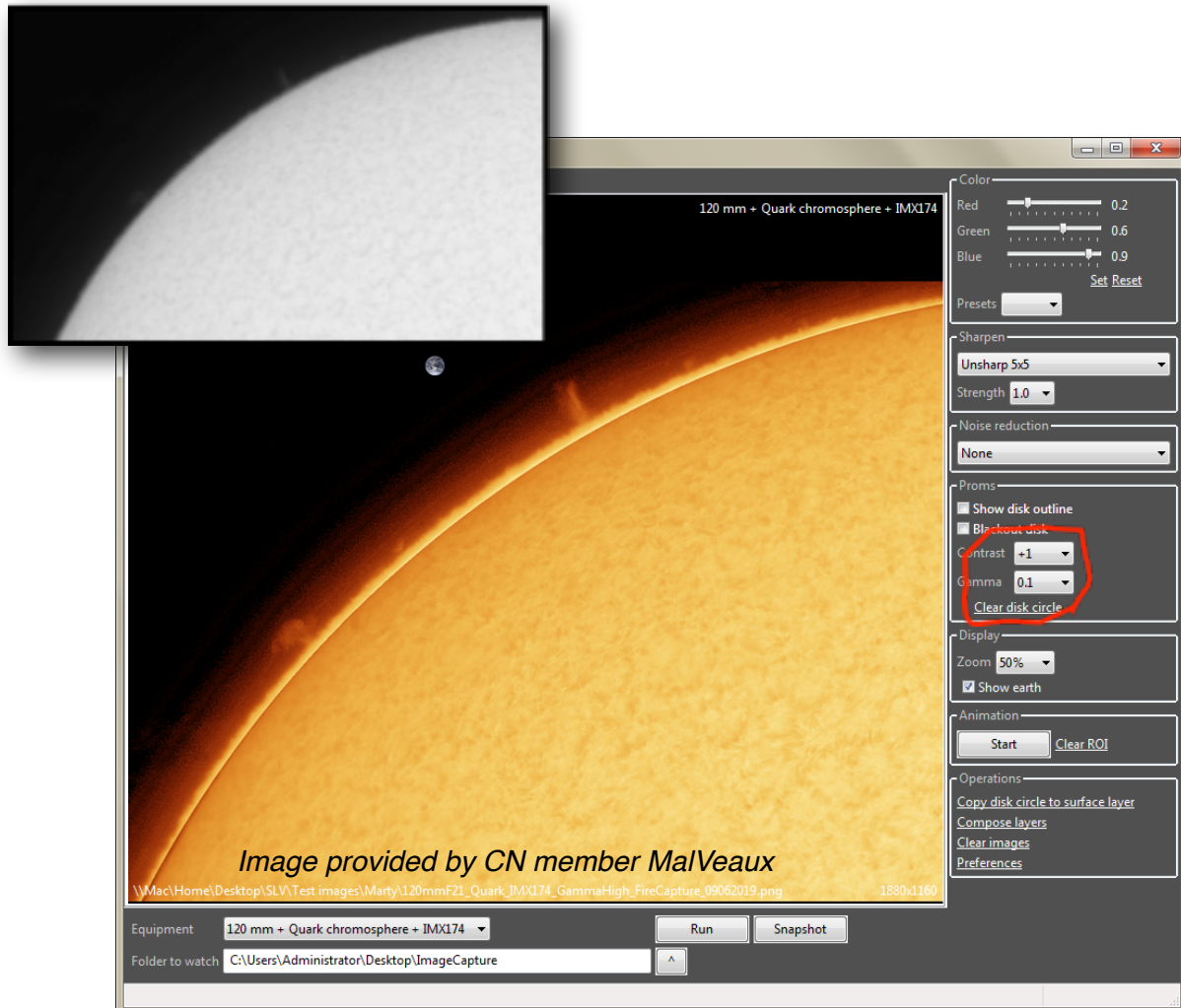
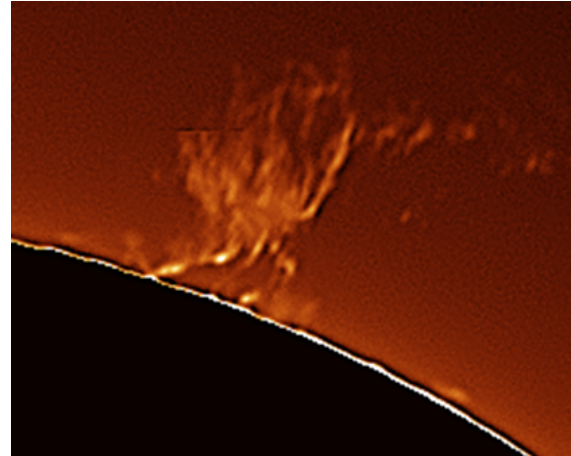
- Try to keep the image centered in the field of view.

Darkening the disk

Check the **Blackout disk** check box to darken the disk. This is useful when viewing prominences. Note that this function does nothing if the disk outline has not been determined (see above).

Adjusting prominence contrast and gamma

Features outside the disk such as prominences can be enhanced by adjusting the gamma (this brightens the prominences) and contrast (which tends to highlight them more). Here is an example.



The inset is the original frame as captured in **FireCapture**. The larger image was created by **SLV** after it highlighted the prominences by adjusting the gamma. These functions work together and can be very useful in bringing out prominences that would

otherwise be nearly invisible. As with the **Blackout disk**, these functions only work after a disk circle has been determined.

Adjusting and clearing the disk circle

As noted above, you may need to adjust the disk circle by ALT left-clicking on the image. You can also clear all three points and start over by clicking **Clear disk circle**.

Display

Zoom

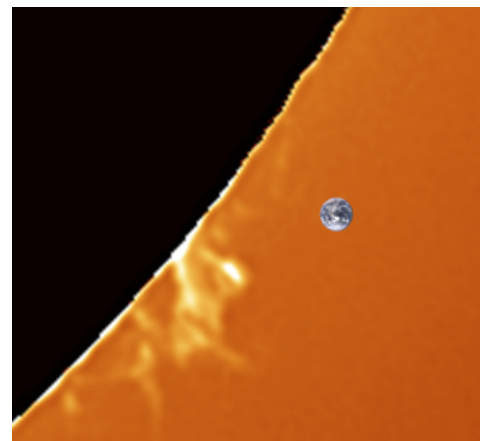
The zoom level can be adjusted by making a choice in the zoom level list. If the list is selected you can use the mouse thumb wheel to zoom in and out. If you have panned over to an area of the image far from the center, be careful when zooming as the entire image can be zoomed out of view.



The earth overlay

A scaled earth globe can be overlaid on the image by checking the **Show earth** checkbox. By default, the globe is placed in the upper-left corner but you can move it anywhere by holding down the **left** mouse button where you want it to be placed and then pressing the **e** keyboard key. Note, the globe size is calculated as 0.9% of the sun's disk and the accuracy of the sun's disk circle is determined by how widely spread the three disk edge points are. Therefore, an image with a full disk or a good portion of the disk will result in a much more accurate size calculation than an image with just a short length of the disk's edge (as in the image to the right). Because of this, the globe may fluctuate in size a bit from frame to frame as the calculated disk diameter changes.

You can always double-click on the image viewer to reset the zoom to 50% and center the image.



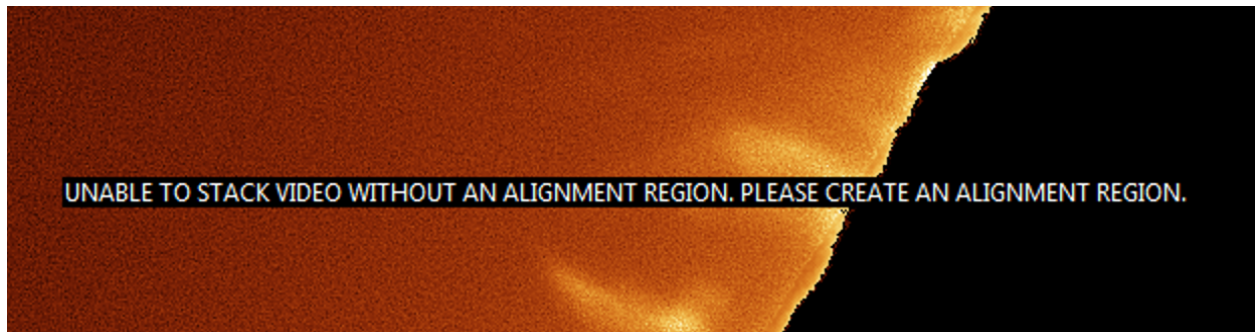
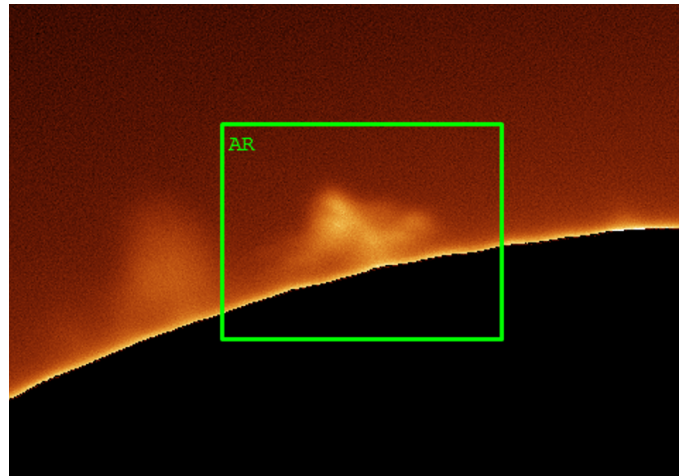
The alignment region

The alignment region (AR) is a rectangular region that is used when stacking images in a movie file. If you do not define an AR, then subsequent video files received from your capture program cannot be stacked. To

define this region, **drag the left mouse button with the ALT key pressed**. The region will be displayed as a **green** box overlay.

For performance reasons, the AR should be relatively small and should just surround an area with a lot of detail and contrast changes.

You can choose to display or hide this region by checking the **Show alignment region** checkbox. You can clear the region by pressing the **Clear alignment region** link. See **Stacking** for more information. Note that if you do not have an AR defined, there will be an overlay reminding you to do so.



Mouse operations

- Shift **left** and drag to define an ROI
- Alt **left** and drag to define an AR
- Double-click **left** to zoom to 50%
- Alt **right** click to define/move a point on the disk circle
- Control **left** drag to move the disk circle
- Press the 'e' key with the **left** button down to move the earth overlay.

The image tabs

The main screen has three image tabs: one for a prominence image that typically has a longer exposure and higher gain, one for surface image that usually has shorter exposure and lower gain and a tab for a composite image that **SLV** automatically creates by combining the prominence and surface images.

Prominences

When this tab is selected, any image or video file that is imported either automatically from the watch folder or by drag and drop, will appear on this tab.

The tab is special as **SLV** will attempt to find the disk circle and center when a new image is added. This does not happen on the **Surface** tab.

Surface

When this tab is selected, any image or video file that is imported either automatically from the watch folder or by drag and drop, will appear on this tab. **SLV** will not attempt to find the solar disk circle. This is because the edge contrast is much more subtle than on the prominence image and is therefore more likely to be incorrect. You can manually select points on the disk edge to define the disk circle (as described above) or you can use the **Copy disk circle to surface** command (see below) instead.

Making a composite image

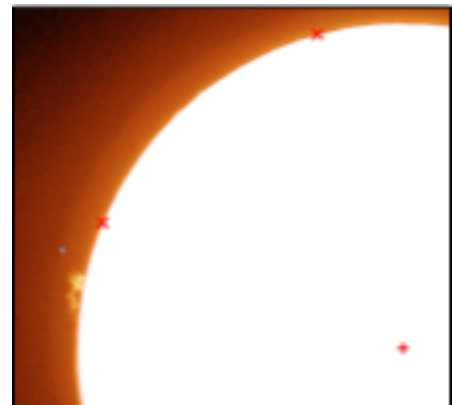
SLV allows you to capture a prominence image and a surface image and then automatically combine them into a composite. To do this:

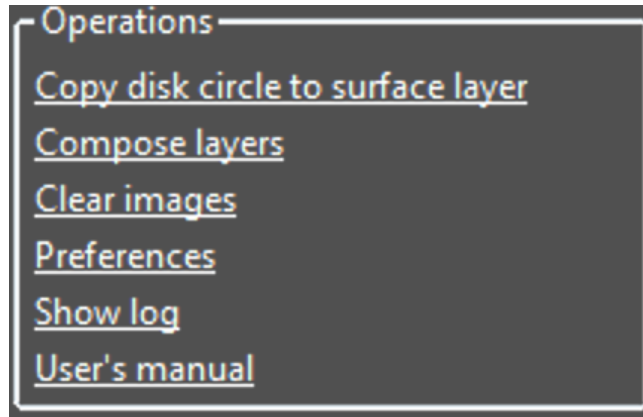
1. Select the **Prominence** tab and adjust your exposure settings in your capture program to capture a prominence image. Once you have captured a quality image, be sure press the **Pause** button. Otherwise **SLV** will import whatever new data may be coming from you capture program.

2. Select the **Show disk outline** checkbox and adjust the disk outline if needed.

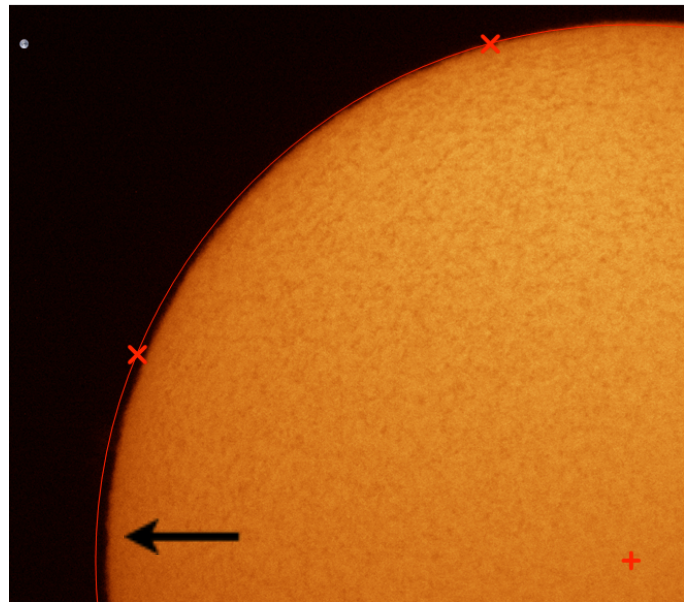
3. Select the **Surface** tab and unPause the program if needed. Adjust your exposure settings in your capture program to capture a surface image. Once you have captured a quality image, be sure press the **Pause** button.

4. In the **Operations** area, press **Copy disk circle to surface layer**.





5. With the **Surface** layer displayed, select the **Show disk outline** checkbox. It is possible/likely that the disk outline will not perfectly match the surface disk (black arrow in image to the right). Move the circle to correct this by **control** left-clicking and dragging the mouse. Once the disk circle is in the proper place, press **Compose layer** in the **Operations** area.



6. The composite image will be displayed on the **Composite** tab. Note that you cannot edit this image as you can on the other tabs. But you can save a snapshot if desired.

Snapshots

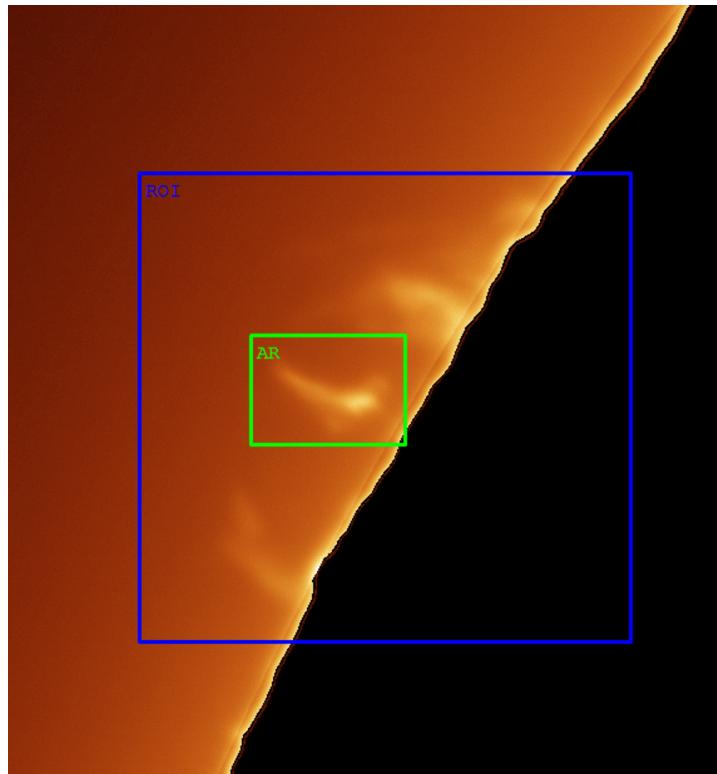
Snapshots of the currently displayed image on the selected image tab can be saved to a folder that you designate. You can specify the **Snapshots** folder in **Preferences** (see below). If you have not specified a folder, then you will be prompted before the image can be saved.

Images are automatically saved with the current timestamp. If you press the **Snapshot** button **without** the shift key pressed, then the image will be saved as displayed (including the cropping and zoom) and with the various overlays such as the earth globe and the various text messages. If you press the **Snapshot** button **with the shift key pressed**, then the raw image will be saved in full resolution without the aforementioned overlays.

Stacking a video file

Importing a single captured image works well but these images tend to suffer from a lack of detail and/or a large amount of noise. To improve the resulting image, lucky imaging techniques can be employed to generate a much higher quality image from a stack of many static frames. The process is as follows:

1. Setup your capture program to capture a video file (currently only ser files are supported) every few minutes.
2. In **Preferences**, on the **Stacking** tab, make your selections. For example, you can choose to use just the first 100 frames and to stack the best 10%. Press the **Apply** button.
3. Begin capturing data.
4. When the first video file is received and displayed by **SLV**, you will notice that a banner is displayed indicating that you need to define an Alignment Region (AR). Note that the image quality is poor as only the first frame is displayed and no stacking has taken place. Define an AR by **dragging the mouse with the left button down and the ALT key pressed**. The AR is displayed as a **green** box. Remember that the AR should be relatively small and should just surround just a high-contrast detail.
5. When the next video file is received, it will use this AR to sort the frames by quality and align/stack them. You should notice a dramatic improvement in image quality.
6. At anytime, you can define a **region of interest** (the **blue** box) and begin creating an animation (see below).



Animations

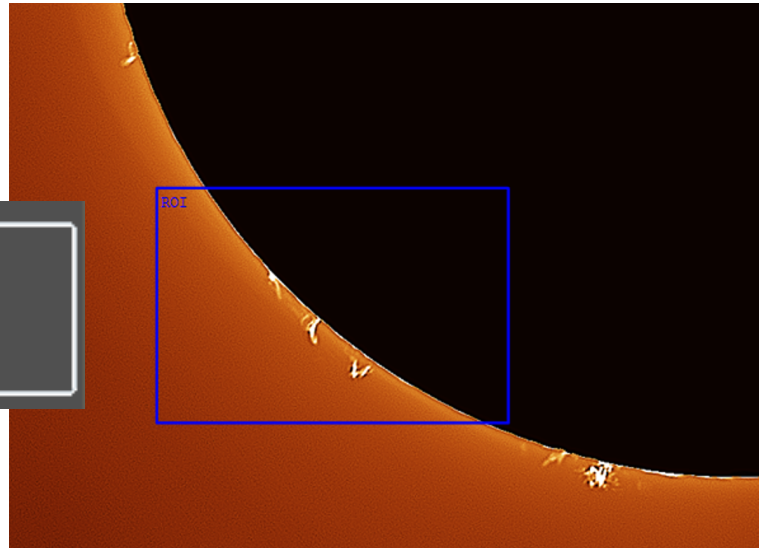
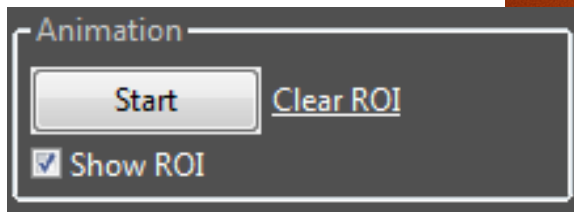
An animation can be created while you are viewing images in the main display area. To do this, you define a region of interest (ROI), then press the **Start** button in the animation area. An animation window will appear and it will already contain the current image. The animation window allows you to scroll back and forth and to delete frames that you don't like. Once you are done collecting frames, just close the animation window or press the **Save** button to save the animation as an animated gif file. All saved animations will be saved in the **Snapshots** folder to a file with date and timestamp as the name.

Setting a region of interest

To define a region of interest, just drag a rectangle with the **left** mouse button while holding down the **shift** key. The ROI will be drawn as a **blue** box. You can choose to hide the ROI but unchecking the **Show ROI** check box.

Starting an animation

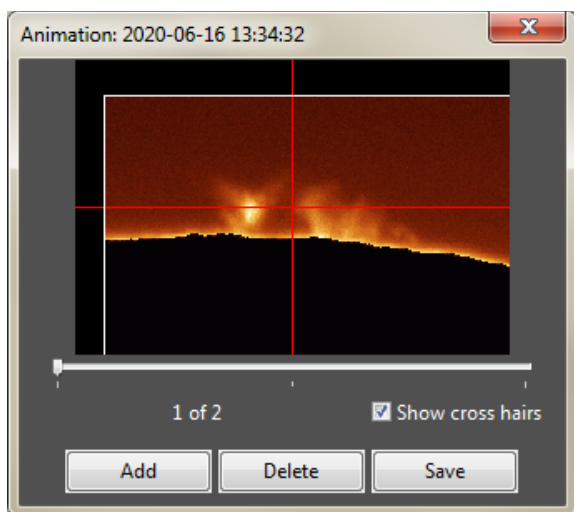
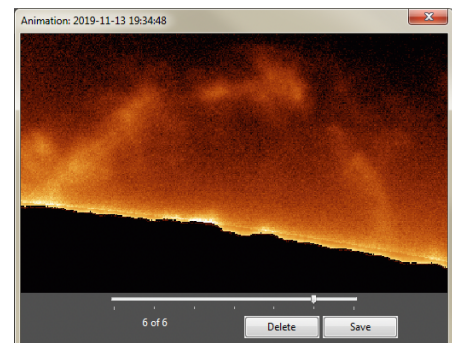
Once an ROI has been defined, start the animation by pressing the **Start** button. A new window will appear with the image in the



ROI added as the first frame. As new data is imported into the main window, a new frame will be added to the animation.

If a frame is added that you don't like, simply scroll to it and press the **Delete** button to remove it.

You can add the currently displayed image by pressing the **Add** button.

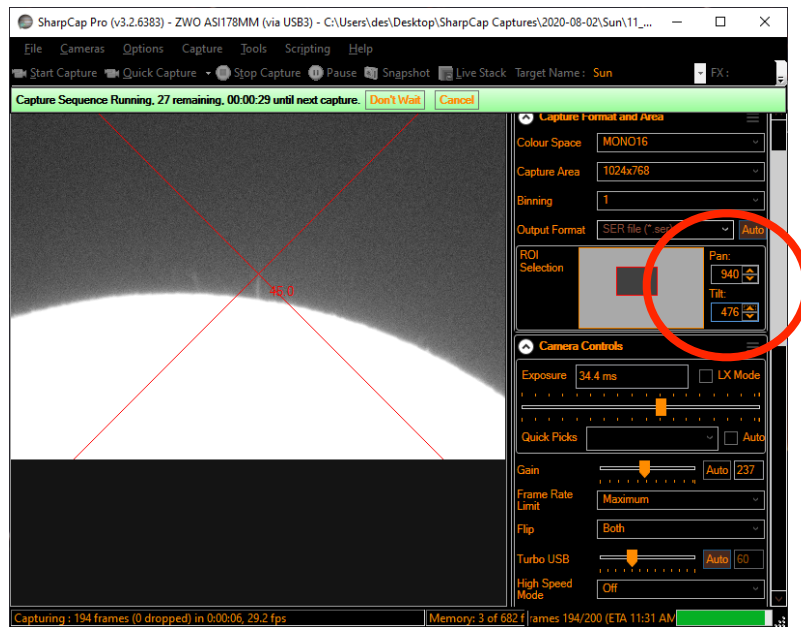


It is not uncommon for your image to jump around a bit if your tracking is not perfect. You can adjust the position of each frame by left-clicking and dragging the image into the proper position. Select the **Show cross hairs** checkbox to display crossed lines to help you with your positioning. Scroll back and forth through the frames to verify that you have eliminated all the jitter.

In addition to using the mouse, you can also use the arrow keys to move each frame and you can use the **<** (press the **comma** key *without* the **shift** key) and **>** (press the **period**

key *without* the **shift** key) keys to go to the previous and next frame. The program will automatically apply the (x,y) offset that you may have manually applied to the last to the next frame. This helps keep the level of jitter to a minimum.

You can also try to minimize jitter by controlling the exact position of the sensor in your capture program. For example, in SharpCap, you can display a cross reticle. By carefully maintaining the position of the reticle with the pan and tilt controls in the ROI area, you can prevent your area of interest from moving over time.



When you are done with animation, press the **Save** button and/or simply close the window. Note that you can save the animation any number of times as it builds over time but each save will overwrite the previous one. This way you always keep the latest animation saved. In **Preferences**, on the **Output** tab, you can choose between saving the animation as a `.gif` or an animated `png` file.

Tips to keep your animation centered:

- Use the pan/tilt controls in SharpCap to move the ROI if it drifts
- Drag the image as needed in the **Animation** window or use the arrow keys. Use the cross hairs to keep a specific detail centered.
- As a last resort, use the slew keys to physically move your mount.

You can clear the ROI by choosing **Clear ROI**. Note that the ROI can't be changed or cleared while an animation is in progress.

Miscellaneous

Clear images

This command is used to remove the current image. The images on all three tabs will be cleared. It will also clear your ROI and AR rectangles if defined. This command is needed when you change the resolution of the images your are capturing. So if you are capturing at one resolution, then change to another resolution, use the **Clear images** command or else **SLV** will not accept the new image.

Show log

This command will display a small scrolling window that will show the various log messages generated by the program. This is only needed to help debug an issue and shouldn't typically be needed for normal operation.

User's manual

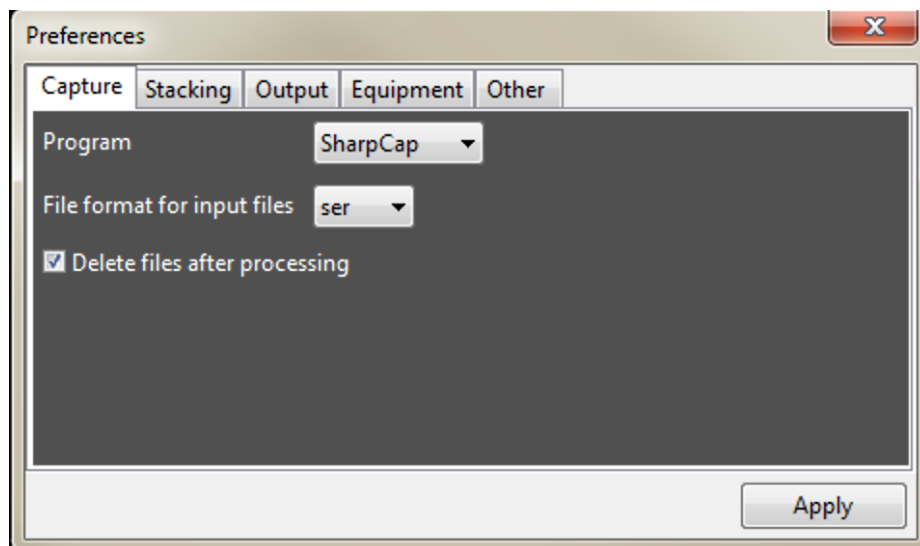
This command will show the User's manual file. You will need a program that can view pdf files in order for this to work properly.

Preferences

There are many preferences and settings you can use to modify how the program performs. There are several tabs. After you make a change, press the **Apply** button. You do *not* need to close the **Preferences** window.

Capture

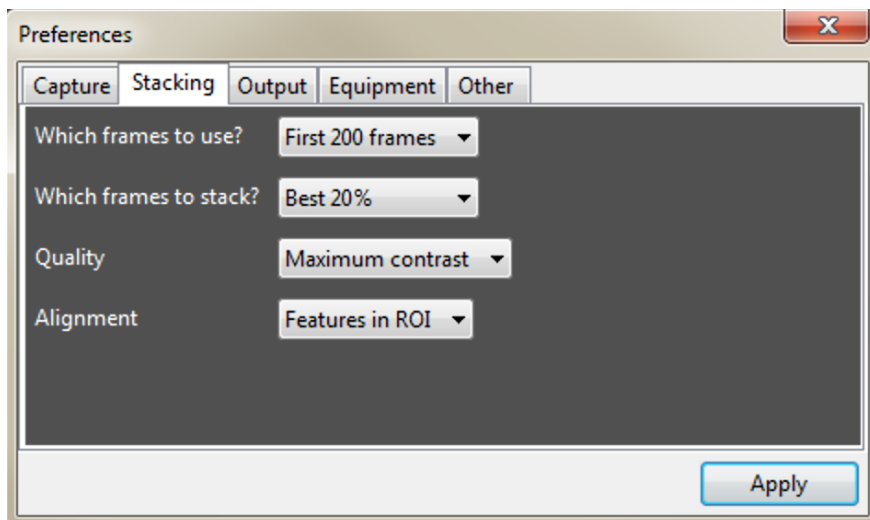
The **Capture** tab allows you to specify what capture program is being used and the file type being captured. It is important to choose the correct file type and to update this as needed if you change your capture process. If the incorrect file type is chosen then **SLV** will not find your data files and your display will likely be blank.



You can also specify what to do with the data files once processed. If you are using **SLV** purely for observation, then you should select the **Delete files after processing** checkbox. Otherwise you will accumulate a ton of data very quickly. If you are collecting video files that you intend to process later, then uncheck this box. In this case, data files will be moved to a subfolder inside the **Capture** folder.

Stacking

The **Stacking** tab allows you to specify how video data files (i.e. ser files) are processed.



Which frames to use? determines how many frames of the input file will be processed. If you are collecting large video files, then **SLV** can take quite awhile to process them. Since **SLV** was designed to be a near-real-time display, it is usually best to choose **First 50 frames** or **First 100 frames**. All subsequent frames will simply be ignored.

Which frames to stack? determines how the frames are stacked. The choices are:

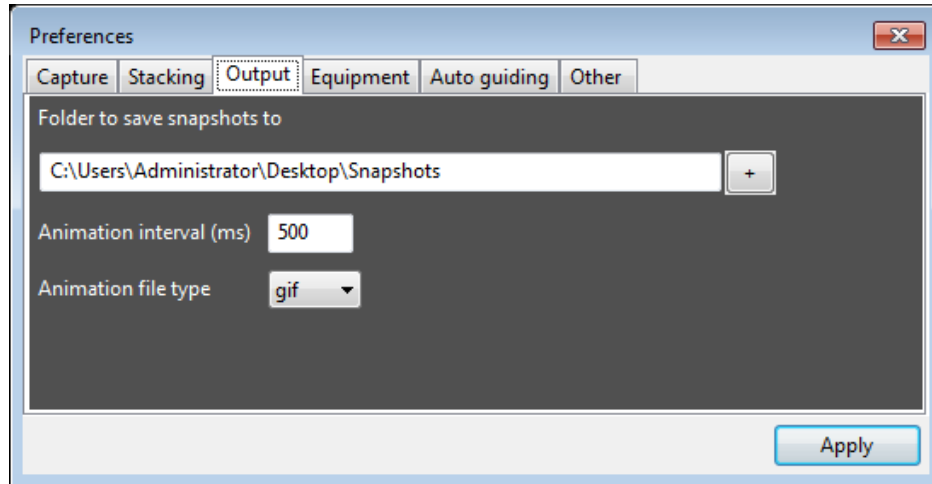
- First frame only - this is very fast but the first frame is likely not very high quality
- All frames - This may be a good choice for video files with very few frames but the resulting image may be blurry.
- Best frame - This will attempt to choose the best frame so the detail may be good but since there is no stacking, the resulting image will be noisy.
- Best 5, 10, 20, 25% - Stacking the best X percent is usually the best option. This results in the best image detail and will have a much better SNR. However, the more you stack, the slower the process is. Typically stacking 10 or % gives a good balance between speed and image quality.

Quality determines how the quality of each frame is calculated. Currently there is only once choice and that is an algorithm based on contrast very similar to that used in **AutoStackert**.

Alignment determines how each frame is aligned/registered with other frames. There is currently only one choice and that uses the Alignment Region (see above) around a particular detail to find the best match/offset between frames.

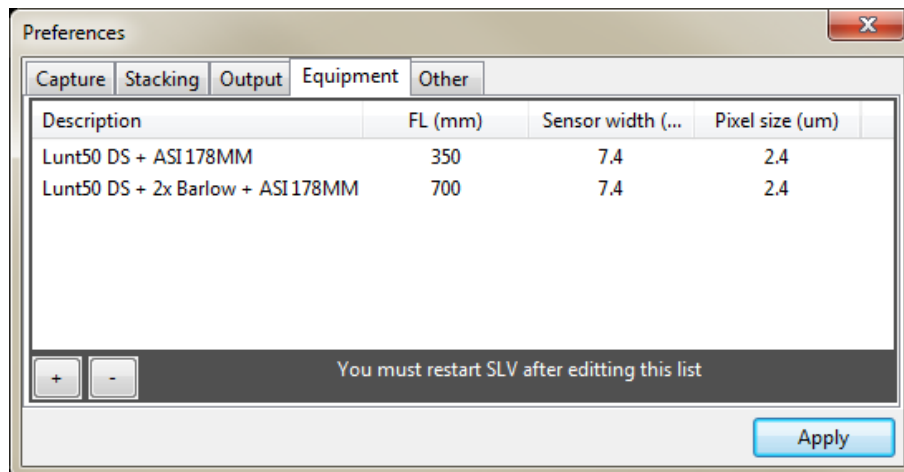
Output

The **Output** tab allows you to specify where your **Snapshots** will be saved to, the time interval (in ms) used when animations are played back and the format to save your animations.



Equipment

The **Equipment** tab allows you to enter your various imaging configurations. Up to 5 different configurations can be entered. You can add and remove entries by pressing the + and - keys, respectively. You can edit the selected one by double-clicking on it. Note that each configuration allows you to enter a focal length, sensor width and pixel size. These are optional but will be used to calculate the proper size of the earth



overlay. If not provided, then the earth overlay calculation will be done based on a small

percentage of the size of the sun's disk but this method is not as accurate. Also note that any changes made to the equipment list will not be available until the program is restarted.

Other

The **Other** tab allows the **Debug log level** to be set. This should typically be 0 and that will log only minimal information. Log levels 1 and 2 log more information and are only needed when investigating a problem. All log entries are saved in `SolarLiveView.log` in the folder from which the program was run.

Appendices

Quick Start Guide

1. Start your capture program and set the exposure and gain to focus on the prominences.
2. In **Preferences**, on the **Capture** tab, select the capture program and the file type to import.
3. On the main screen, select the folder in which your capture program is creating the data files.
4. Select the Prominence image tab on the main screen.
5. Press the **Run** button.
6. Adjust the color and play with the various controls on the right side of the main screen.
7. If capturing a movie file, remember to define an **Alignment Region** so that the movie file can be stacked.

Troubleshooting

Q: Why is my screen blank?

A: There are a few reasons why you are not seeing anything.

- You may not have setup your input file type properly in **Preferences**.
- You may not have specified the correct capture file folder.
- You may not have pressed the **Run** button.
- Or you have panned and zoomed the main screen in such a way as to have the image out of view. Double click in the main screen to revert the screen back to default settings for pan and zoom.

Q: Why is the program running so slowly?

A: Each selectable option generally incurs a good deal of CPU overhead. For example, stacking only the best quality frames in a SER file and then applying a sharpener, a noise filter and then boosting the prominences can be slow depending on your system. Try unselected some of these options and see how it affects performance. Also, try using smaller image files and/or movie files with fewer frames. The program, to date, has not been optimized for speed so there is definitely room for improvement in this area. **For stacking movie files, a good place to start is to capture at 1024x768 every 30 seconds. Once you know how well your system is handling the load you can increase or decrease from there.**

Q: Why do I get an error message when trying to start the application about a dll file missing?

A: As with all Windows programs, this program requires various helper .dll files. The

necessary ones should be included in the **SLV** folder. However, if you receive a message when trying to start the application about a dll file that is missing, please let me know and I will fix the omission.

The configuration file

SolarLiveView.ini is the configuration file that lives in the same folder as the program file. It is a standard Windows .ini file with [SECTIONS] in square brackets and individual NAME=VALUE settings in each section. Comments lines begin with a semicolon symbol.

```
[GENERAL]
; The folder that the program will look in for new data files
FolderToWatch=C:\Users\Dave\Desktop\ImageCapture

; The folder that the program will stored snapshots and
; animations into
SnapshotFolder=C:\Users\Dave\Desktop\Snapshots

; the period in seconds that the program will sleep before
; checking for a new data file
SleepInterval=2

; The number of ms used when playing an animated gif
AnimationInterval=200

; This setting determines how verbose the logging will be.
; 0 is the least (default) and 2 is the most.
DebugLogLevel=0

; The number of pixels to clip from the edges of the input
; data. This helps remove edge artifacts that can confuse the
; disk finding algorithm
ClippedMarginWidth=20
DiskPointDistanceFraction=40
EdgeDetectionPercentage_DimDisk=30
EdgeDetectionPercentage_BrightDisk=70

[COLOR]
; The default RGB values
Red=0.2
Green=0.6
Blue=0.9
; Up to 5 preset color combinations.
```

```
; FORMAT: label red green blue
; This list must be manually edited currently
Preset1=Gold 0.2 0.6 0.9
Preset2=Violet 0.2 0.4 0.3
Preset3=
Preset4=
Preset5=

[CAPTURE]
Program=SharpCap
; This is the file type the SLV will look for in the
; Folder To Watch
FileExtension=ser

; If true, the each file will be deleted after it is processed
; by SLV. If false, then each file will be kept but will be
; moved to sub-folder in the Folder To Watch
DefaultFilesAfterProcessing=true

[STACKING]
WhichFrames=First 100 frames
NumberOfFrames=Best 20%
AlignmentAlgorithm=Features in ROI
QualityAlgorithm=Maximum contrast
ContrastThreshold=30

[SHARPEN]
Algorithm=Unsharp 5x5
Strength=1.0

[DENOISE]
Algorithm=Median 3x3

[PROM]
ShowDiskOutline=no
BlackoutDisk=yes
Contrast=2+
Gamma=0.4

[DISPLAY]
Zoom=100%
ShowEarth=yes
; A list of equipment setups. Choice1 is the default
```

```
; Format: DESCRIPTION FOCAL_LENGTH SENSOR_WIDTH
; Note that the fields are separated by tabs
```

```
[EQUIPMENT]
```

```
Choice1=Lunt50 DS + ASI 178MM!350! 7.4
Choice2=Lunt50 DS + 2x Barlow + ASI 178MM!700! 7.4
Choice3=
Choice4=
Choice5=
```

Version history

Version 1.0 - Initial release

Version 1.1 - Added the ability to center and move individual frames when creating an animation.

Version 1.2 - The controls on the right side of the screen can now be scrolled so they are all accessible on lower-resolution screens.

Version 1.3

- Changed default animation frame delay to 100 ms
- Bug fix - The animation interval setting was not loaded from the ini file properly.
- The Show Alignment Region checkbox was not always checked by default at startup.
- Can now use the Arrow keys +/- the Shift key to center each animation frame.
- Improved support for FireCapture when ser files are created and exist in the capture folder
- but the capture isn't complete. Also better error handling when invalid ser files are loaded.
- Can now use < and > arrow keys to change the current frame in the Animation window.
- Fixed incorrect caption when setting the capture folder.

Version 1.4

- Improved ability to find disk circle. Many changes including the requirement to make sure each point is spread from each other. No longer based on the total distance between points as this would allow to points right on top of each other.
INSTALLATION NOTE: change to DiskPointDistanceFraction=10 in SolarLiveView.ini

Version 1.5

- FindDiskCircle will now try the configured Value for DiskPointDistanceFraction and will then decrease by 5% and try again.
- Data files are no longer deleted if SLV is Paused. Instead they are moved to the "Already processed" folder.

Version 1.6

- Now only data files created after the Run button is pressed are processed. All older files are ignored but are still processed if they are dragged and dropped.
- Snapshots are now saved as jpeg files as there were issues with improper transparency areas when saved as png. The RAW screenshots (with Shift key pressed) are still saved as in png format.
- The Black out disk no longer has an ugly jagged edge.
- Can save animations as either gif or animated png files.

Version 1.7

- Bug fix - The image would sometimes jump offscreen when double-clicking in the animation window.
- Cosmetic - some of the controls on the main scene were not sized proportionally to the screen font.
- Bug fix - fixed at least one cause of the animation window going blank (after deleting a bad frame).
- Each added frame automatically uses the offset from the last added frame. This should keep the frame jitter mimimized.
- Dramatically improved the image quality of animations.

To do and known problems

- **SLV** gets very confused if you change your capture resolution while it is running. To avoid problems, press the **Pause** button before changing the resolution in your capture program.
- Optimize core algorithms to speed things up. Currently, **SLV** can get bogged down on large video files, or if you have selected alot of display options like sharpening, noise reduction, etc.
- Handle images with surface exposure levels better. Currently, **SLV** is definitely focused on prominences.
- Better sharpening
- Handle avi files.