

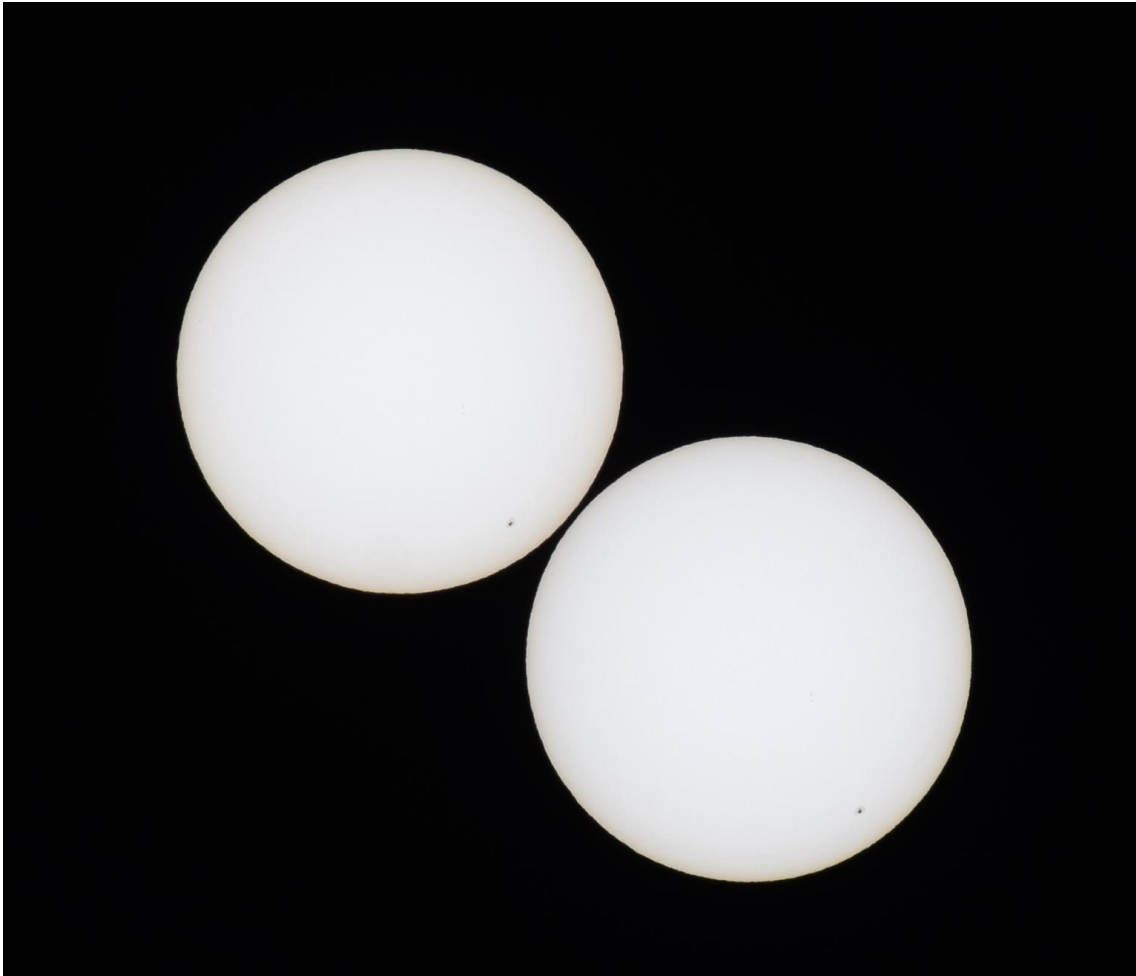
# Sun observations with NIKON D5300 and TAMRON SP 70-300mm F/4-4.5

Grischa Hahn, 2019-05-12

- The NIKON D5300 has a GPS sensor. Switch it on.
- For Sun observation use two ND filters (ND 3.0 + ND32 = 15 aperture steps) on the front of the lens.
- Use a tripod with 3-axis head (e.g. MANFROTTO MH804-3W).
- Use a cable remote release.



1<sup>st</sup>) Double exposure of the object with fixed camera with 2 - 2.5 minutes time difference:



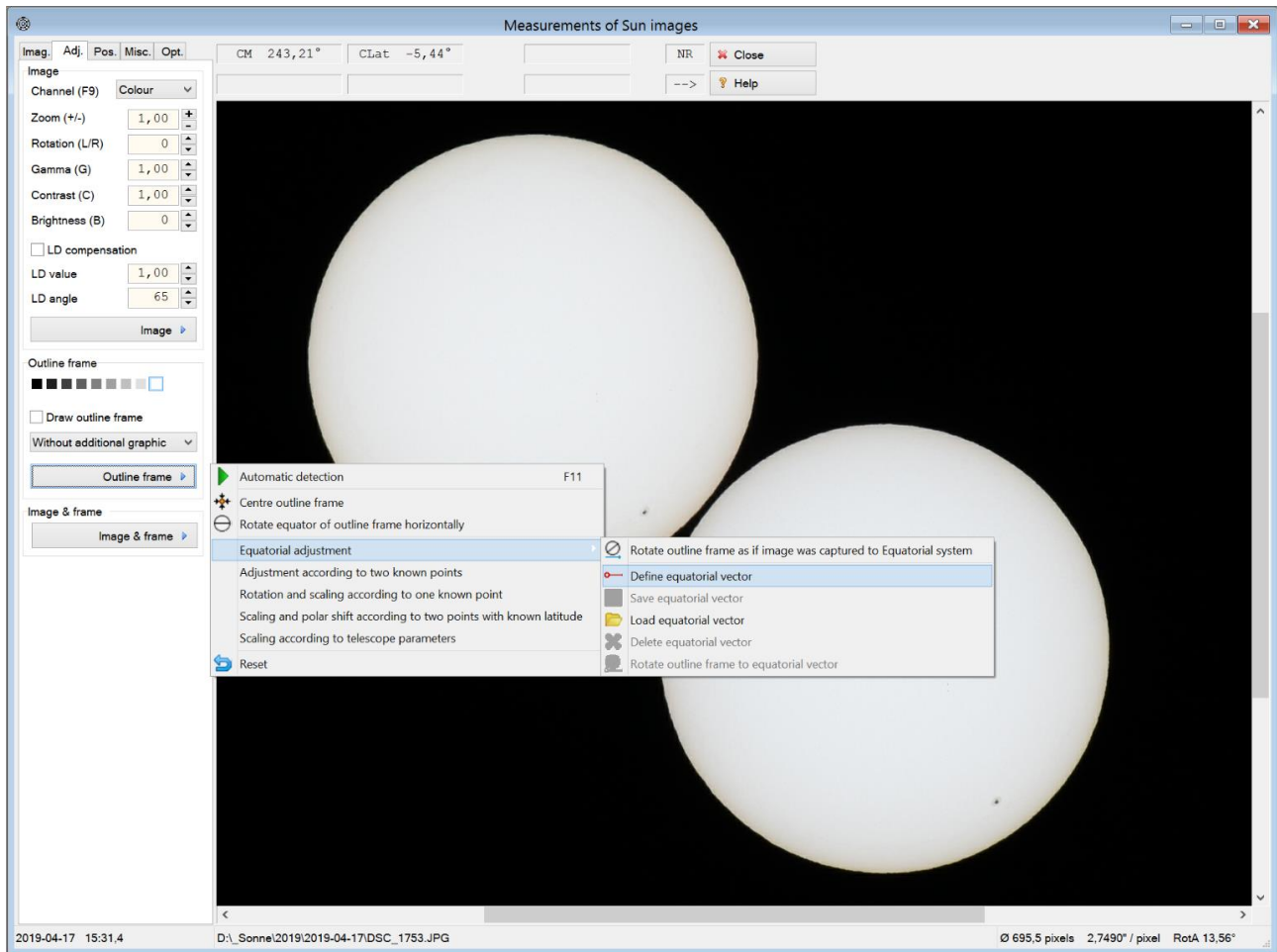
2<sup>nd</sup>) Make immediately after 1<sup>st</sup>) 30 single shots with fixed camera with  $\sim 2$  seconds time difference. Do not move the tripod between 1<sup>st</sup>) and 2<sup>nd</sup>). Do not tilt the camera between 1<sup>st</sup>) and 2<sup>nd</sup>). Only adjust horizontal and vertical angle to move the object in the middle of the image.

3<sup>rd</sup>) Cut the images from 2<sup>nd</sup>) but do not rotate.

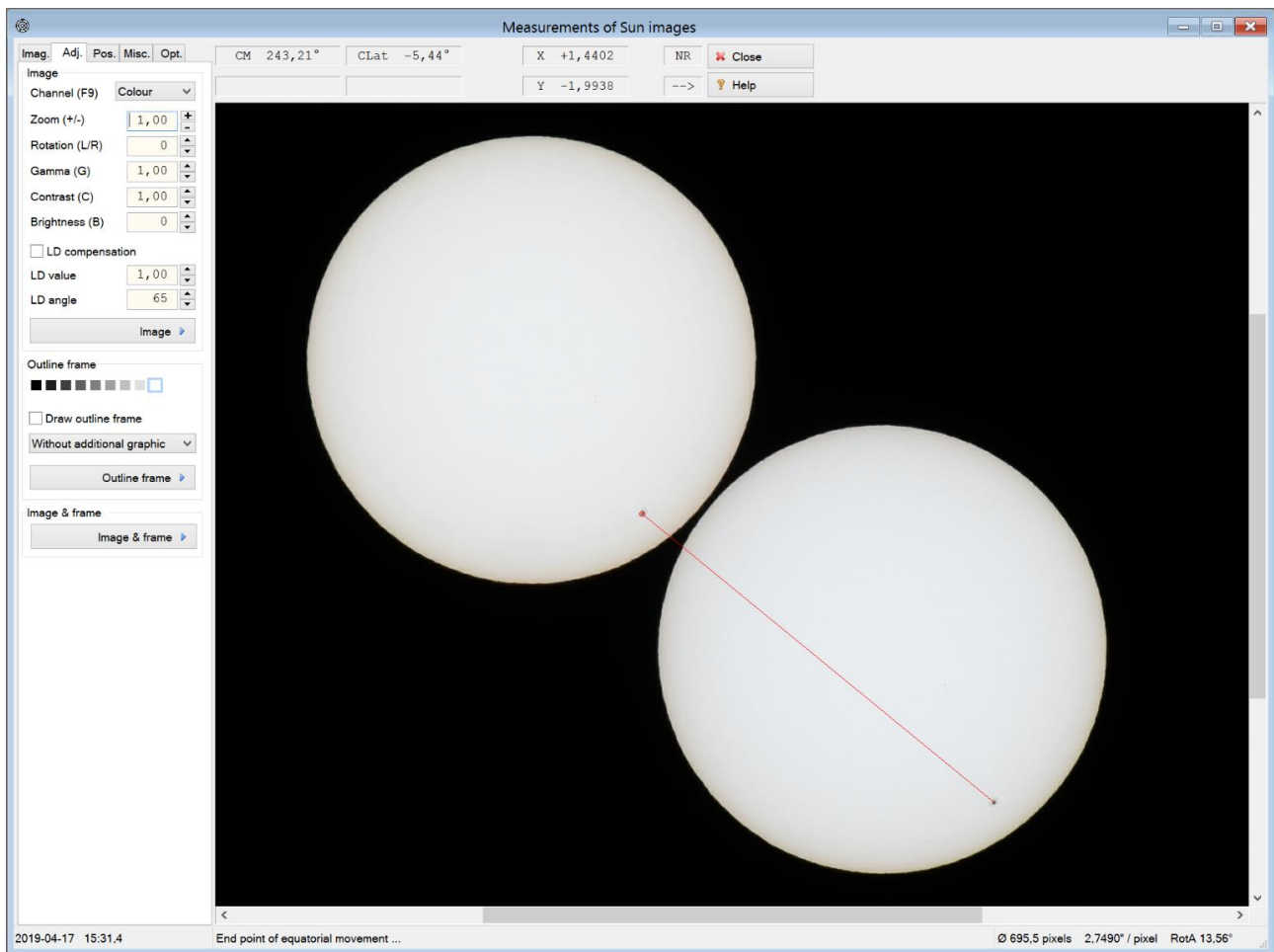
Open WinJUPOS.

Load the JPG from 1<sup>st</sup>) into „Image measurement “. Date, time and the geographic position of the shot will be automatically adopted from the EXIF data of the JPG.

Define the „Equatorial vector “:



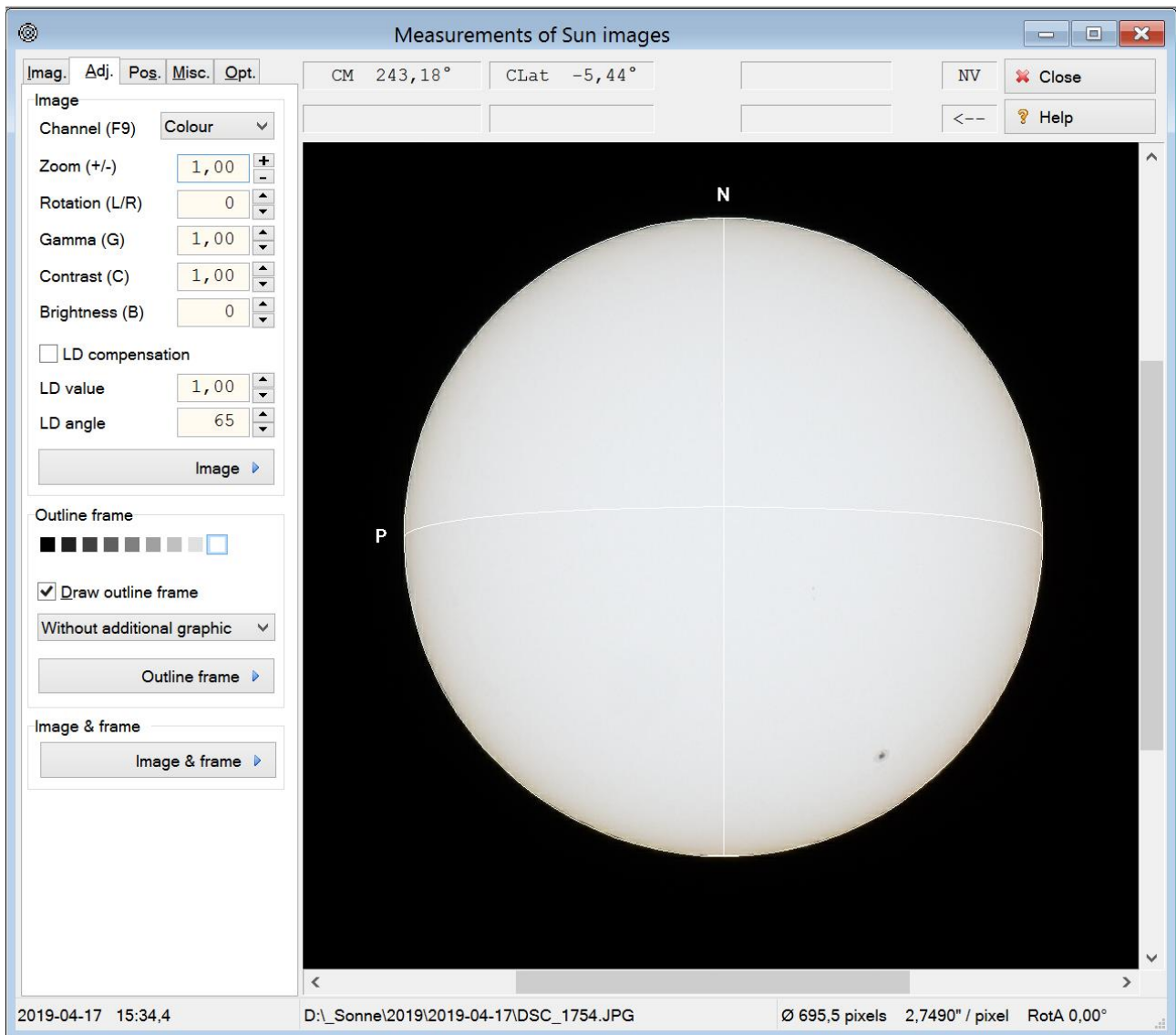
Click two points in the first and the second image of the object.



Save the vector with „Adj. / Outline frame / Equatorial adjustment / Save equatorial vector “.

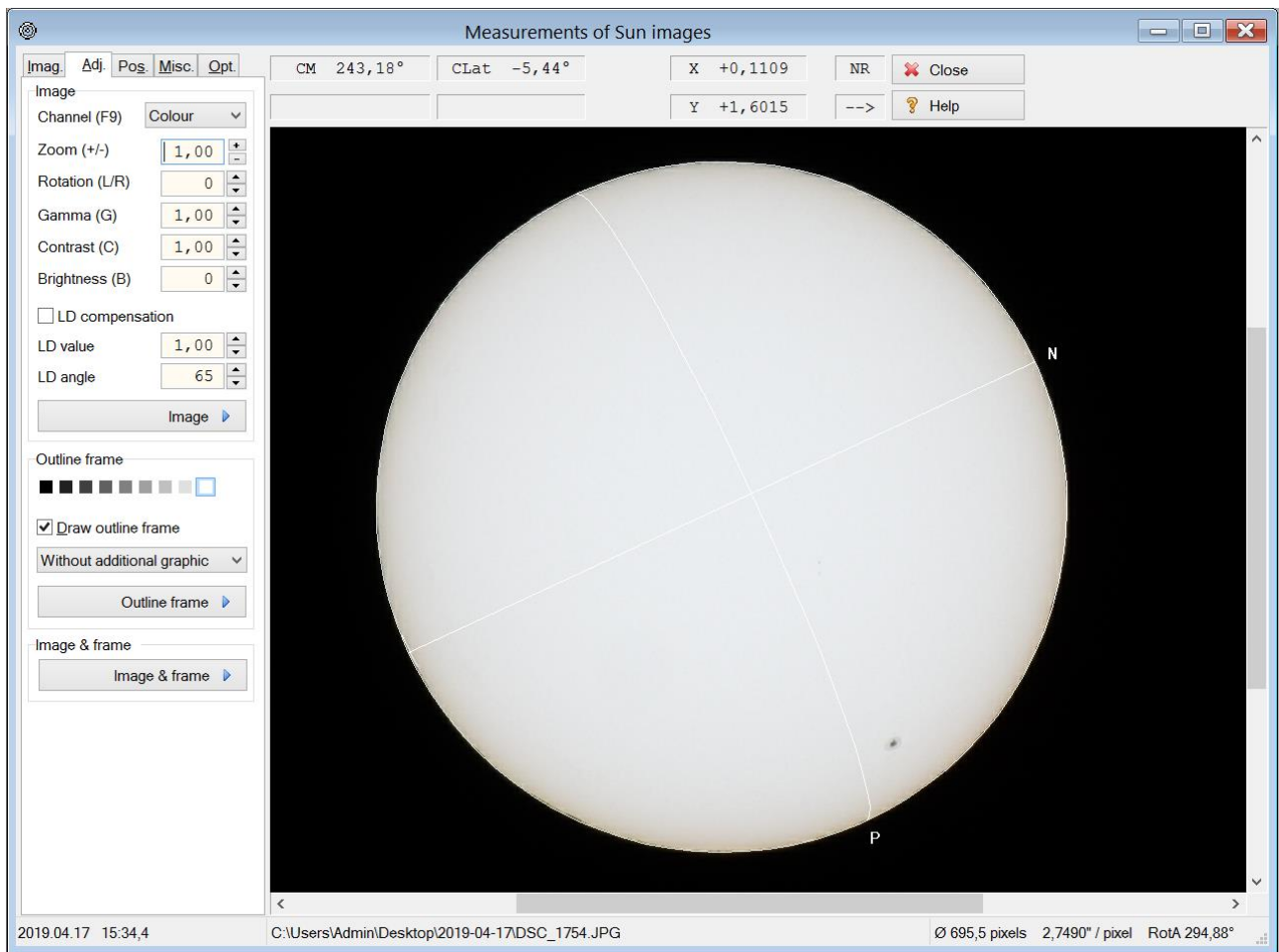
Load first image from 2<sup>nd</sup>). Date, time and the geographic position of the shot will be automatically adopted from the EXIF data of the JPG.

Switch „Adj. / Draw outline frame “= ON. Be sure that the N pole of the outline frame is up. Use [Tab] if necessary. Call „Adj. / Outline frame / Automatic detection “. You get following result:



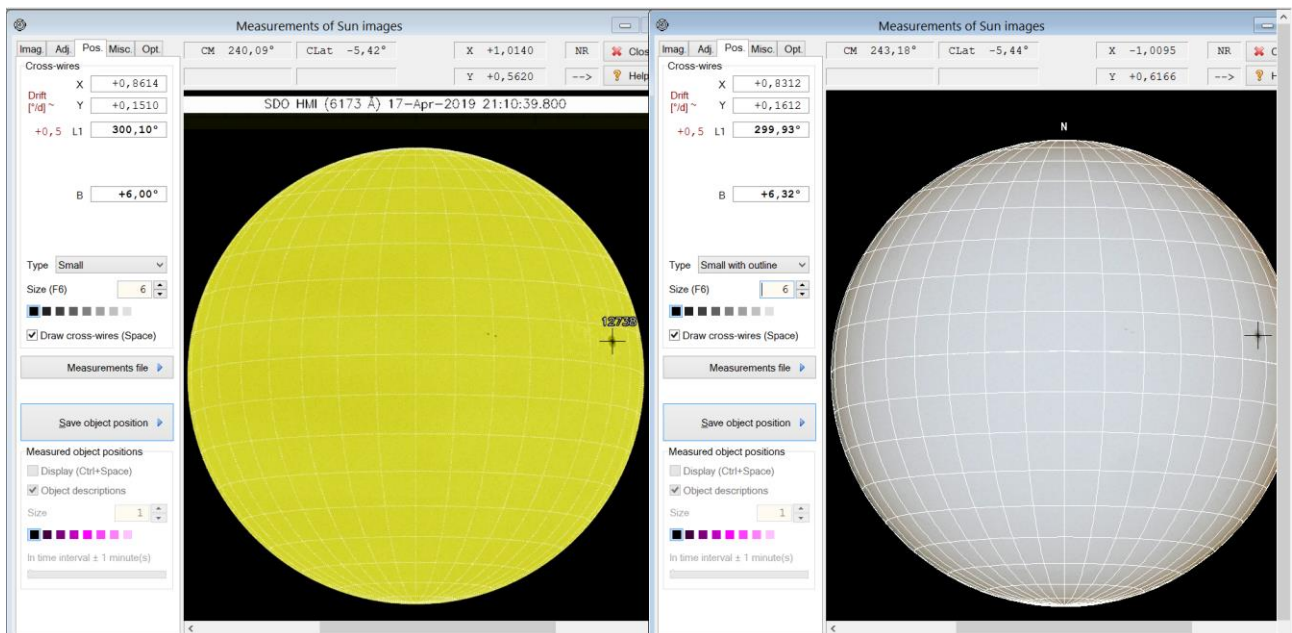
Load the saved vector with „Adj. / Outline frame / Equatorial adjustment / Load equatorial vector “. Call „Adj. / Outline frame / Equatorial adjustment / Rotate outline frame to equatorial vector “. This function needs correct Date, time and the geographic position. Now you get a full adjusted outline frame:





Now you have a correct defined "Image measurement". Save the settings (\*.ims).











Here a comparison to <https://solarmonitor.org> (left):



## Image stacking

To improve the image quality, you can stack and sharpen all the images from 2<sup>nd</sup>). I recommend AutoStakkert! and Registax.

Alternatively you can transfer the Image measurement setting from the first image of 2<sup>nd</sup>) to all other. Call "Misc. / Create settings files (\*.ims) for an image stack" and choose all the other images. Additionally 29 ims files will be created. If you have JPGs with GPS data, you get file names like these:

-  2019-04-17-1534.4.ims
-  2019-04-17-1534.5\_DSC\_1755.ims
-  2019-04-17-1534.5\_DSC\_1756.ims
-  2019-04-17-1534.5\_DSC\_1757.ims
-  2019-04-17-1534.6\_DSC\_1758.ims
-  2019-04-17-1534.6\_DSC\_1759.ims
-  2019-04-17-1534.6\_DSC\_1760.ims
-  2019-04-17-1534.7\_DSC\_1761.ims
-  2019-04-17-1534.7\_DSC\_1762.ims
-  2019-04-17-1534.7\_DSC\_1763.ims

After that start "De-rotation of images..." and add all the ims files:

De-rotation of images 2019-04-17-1534\_9-de-rotated

Image measurements to be used

Image measurement	Weighting	LD value
2019-04-17-1534.9_DSC_1768	1,00	1,00
2019-04-17-1534.9_DSC_1769	1,00	1,00
2019-04-17-1535.0_DSC_1770	1,00	1,00
2019-04-17-1535.0_DSC_1771	1,00	1,00
2019-04-17-1535.0_DSC_1772	1,00	1,00
2019-04-17-1535.1_DSC_1773	1,00	1,00
2019-04-17-1535.1_DSC_1774	1,00	1,00
2019-04-17-1535.1_DSC_1775	1,00	1,00

Optimize Image measurements

Image to be computed

Reference time (UT) 2019.04.17 15:34,9

Destin. directory C:\Users\Admin\Desktop\2019-04-17

File name 2019-04-17-1534\_9-de-rotated.png

Observer

Image info de-rotated

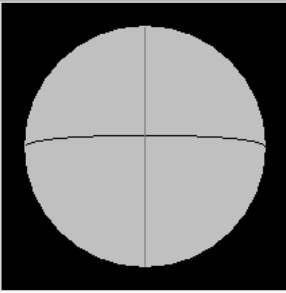
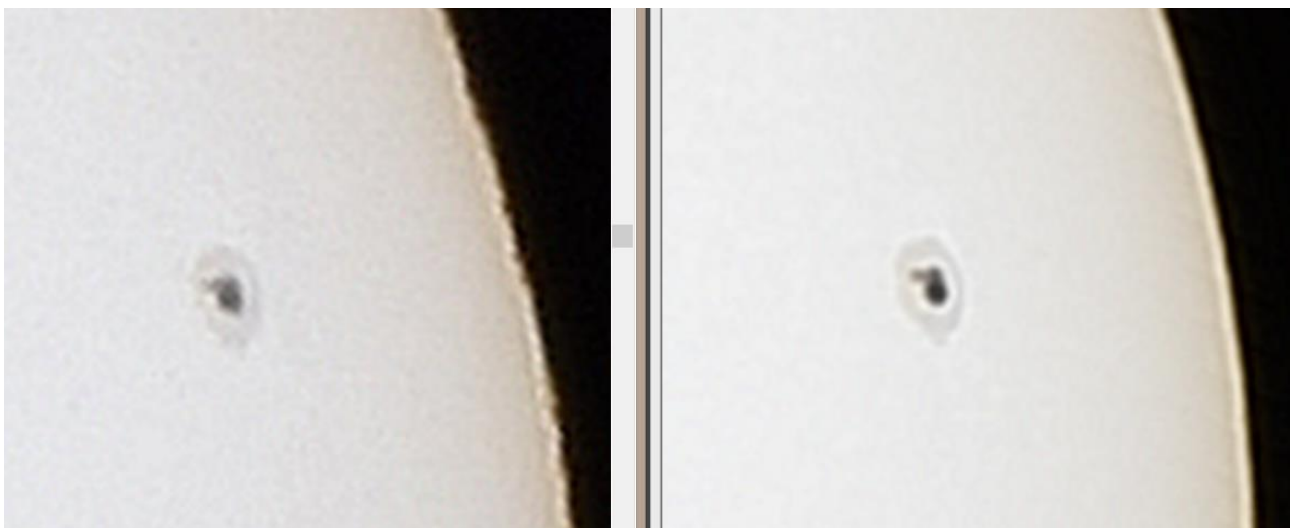
Quadratic image size 835 pixels

Image type PNG - Portable Network Graphics (48 bit)

Image orientation  
 North at top  
 South at top

Stretch luminance to maximum dynamic range

Close  
Help  
Compile image (F12)  
Settings  
Reset  
Save (F2)  
Load (F3)

Left a single original image; right the stacked / de-rotated image