

Eugene Astronomical Society



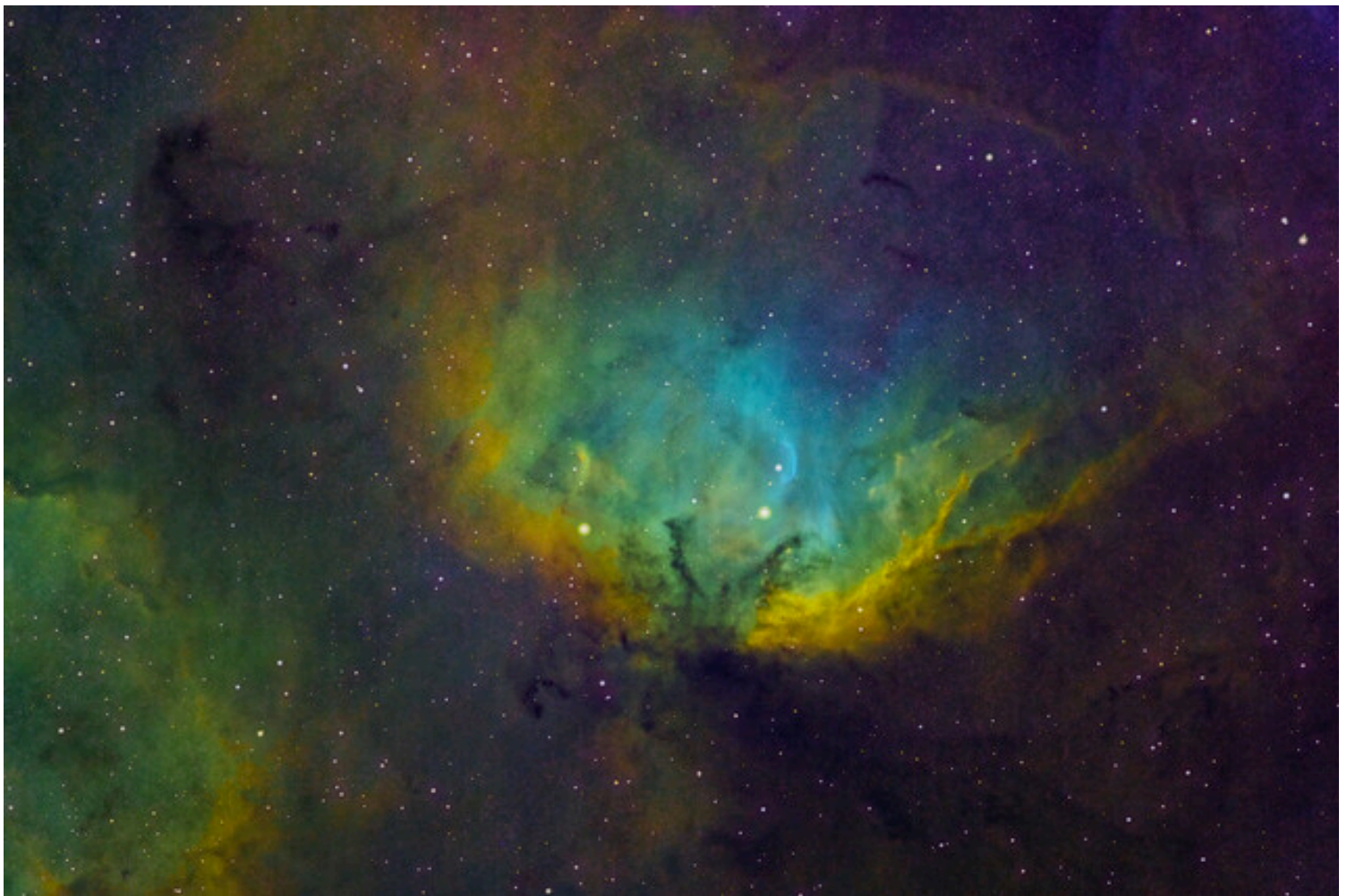
Io

February, 2022



PO Box 591 Lowell, OR 97452

www.eugeneastro.org



[1] The Tulip Nebula - SH2-101

Mark Wetzel

President: Andrew Edelen 618-457-3331

Secretary: Randy Beiderwell 541-342-4686

Board: Andrew Edelen, Randy Beiderwell, Ken Martin, Jerry Olton, Dan Beacham

February Meeting

February 17, 2022 7PM

To Be Announced

(All meetings are virtual)

January Meeting

Eugene Astronomical Society

PO Box 591

Lowell, OR 97452

Annual Club Dues \$25

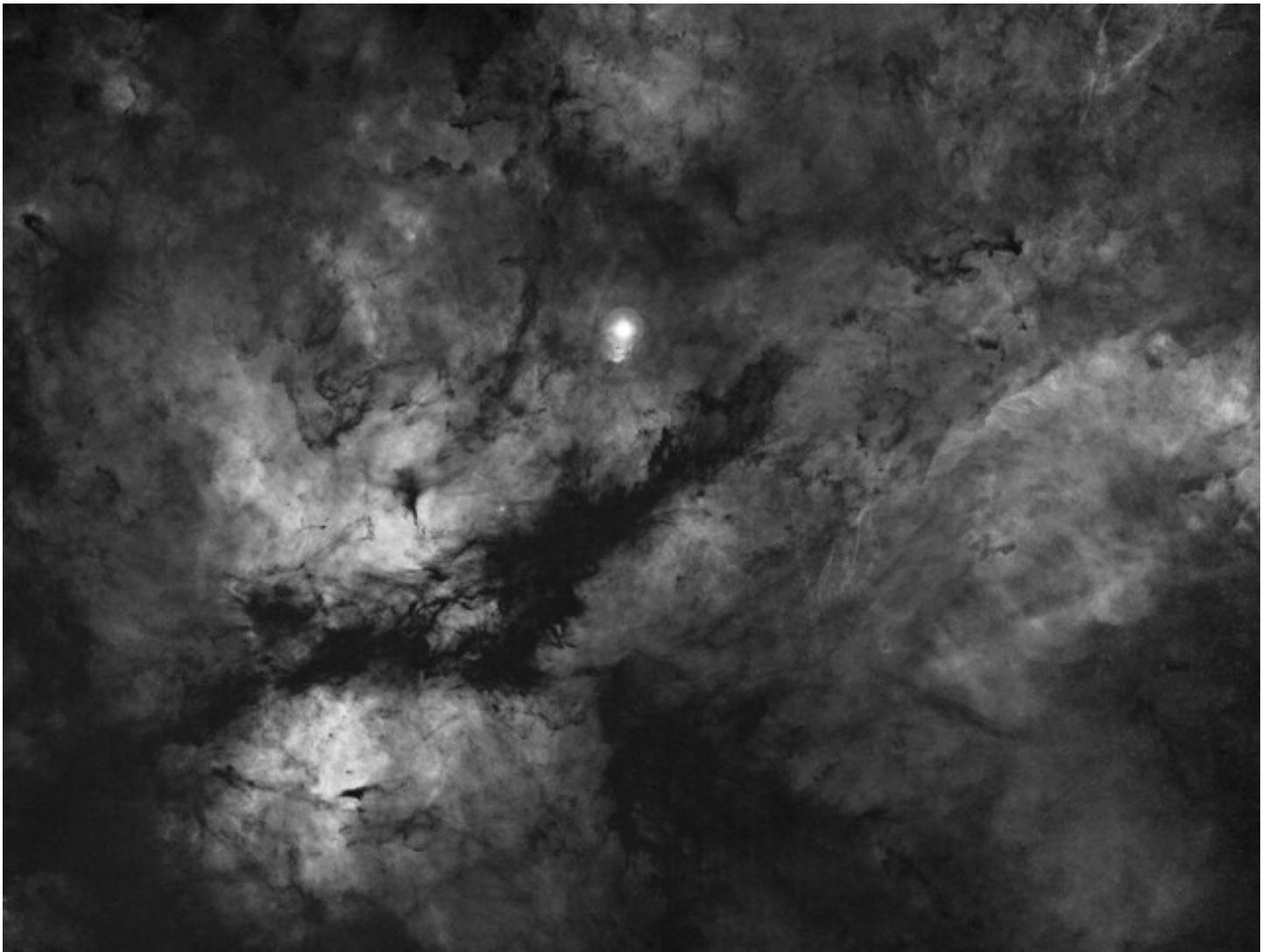
EAS is a proud member of The Astronomical League.

The Planet Venus: Rethought, Revised, and Revisited

Bernie Bopp

Presentation to Eugene Astronomical Society January 20, 2022

<https://youtu.be/-l6mrhOHZEE>

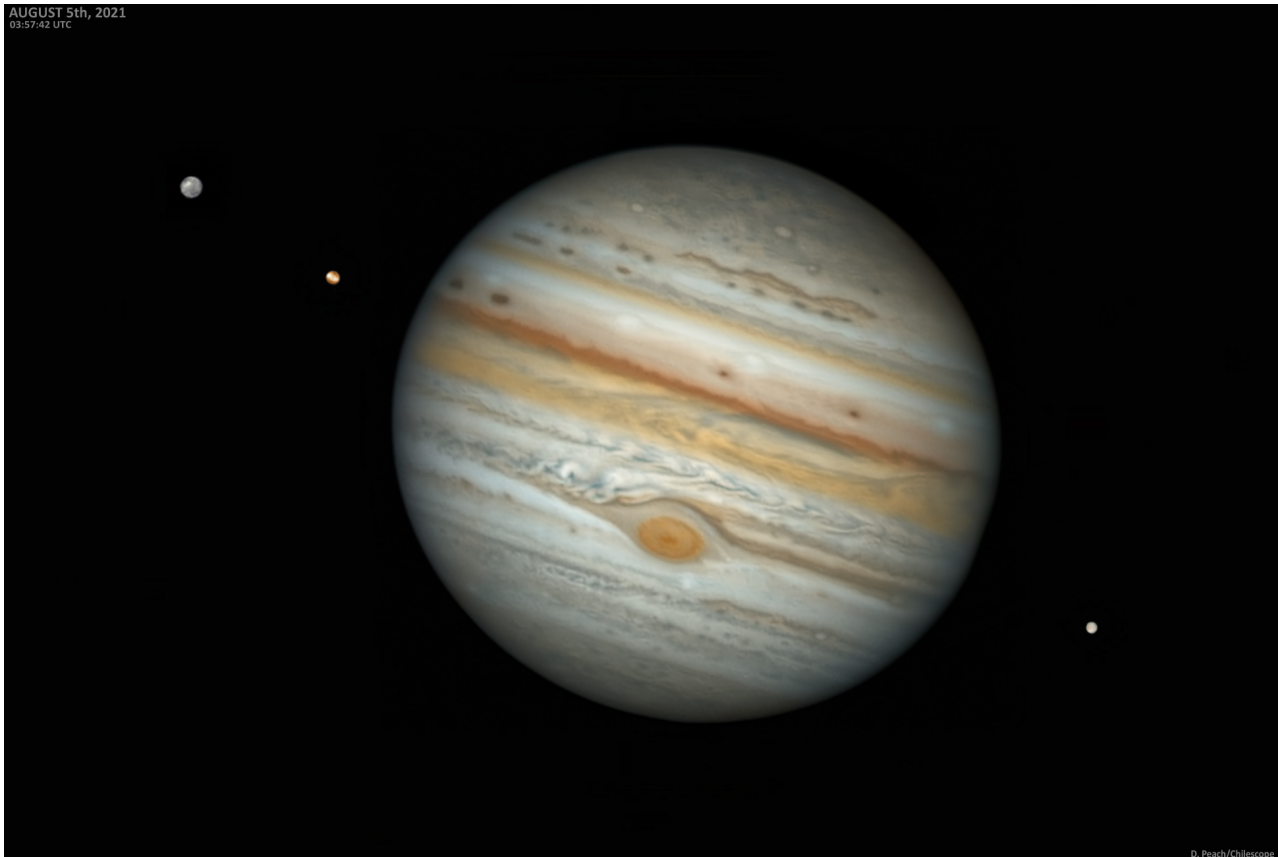


[2] Sadr Region

Ronald Perez

Planetary Imaging: Using a Planetary Camera

Part 2 - by Jeff Phillips



I want to share a little about how I take these pictures. The technique is commonly called “lucky imaging” because it does take a bit of luck to catch the best images.

So how do we improve our luck? In my mind the number one secret is “patience and practice”. Get out there and start taking pictures, especially when CSC (Clear Sky Chart) predicts above average seeing. Seeing often improves after midnight so it’s worth the trouble to get up after midnight and take pictures before opposition.

I built a small observatory last year to give myself the best shot at Mars. This year I was limited to no more than an hour of shooting as Jupiter and Saturn passed a gap in the trees. Next year will be better as Jupiter at least will spend more time above the tree tops.

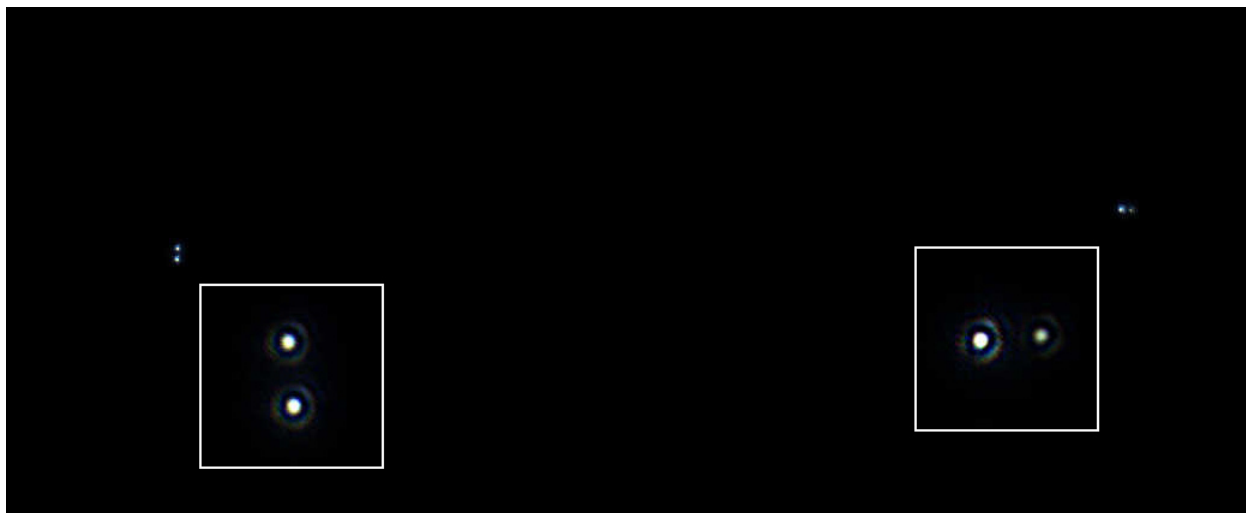




On the back of my C11 I use a GSO two speed crayford focuser, an Explore Scientific 2x Focal Extender, and a ZWO ADC. This combination gives me a focal ratio of $f/19$ which is just about perfect for the ZWO 224 MC color camera and UV/IR cut filter. I use the external focuser to compensate for the moving mirror in my SCT, and I use the ADC to compensate for the color fringing on planets that are only about 30 degrees above the horizon.

Collimation is another important factor. While C8's and C9.25's seem to hold collimation well, the C11 will go out of collimation easily. In his classic article "The Collimation" Thierry Legault suggests using a high power eyepiece to center the diffraction rings around a star in focus. I've gotten my best results when I collimate the scope using the camera and image train just as I plan to use it for imaging.

To show just how critical collimation is on the C11, take a look at this highly magnified image of E Lyra, the double-double. One pair is almost perfectly centered in the diffraction rings while the other just arc-minutes away is slightly off.



Larger scopes need cooling. I could simply set the C8 outside after dinner and be good to go in an hour. With the C11 I'll open the observatory door and hatch in the late afternoon and allow the scope to cool for several hours before imaging. Chris go in the Philippines has cut holes in the back of his C14 to install cooling fans. Darryl Milika in Australia has been known to use bags of ice to cool his scope to below 0°C.

Light gathering power increases with the square of aperture, but thermal mass increases with the cube. A twelve inch SCT can weigh up to 8 times as much as a C6, so take cooling into account.



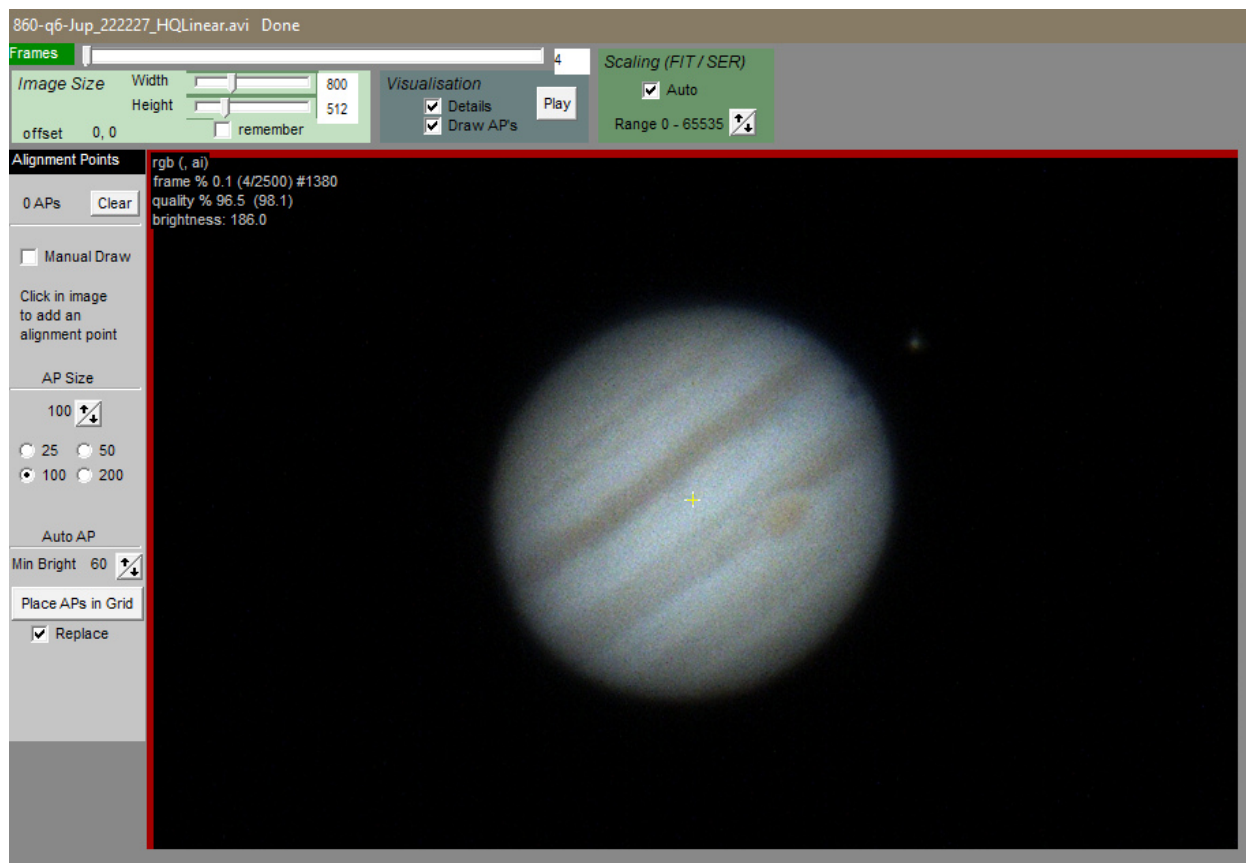
You can see frost on my foil faced dew shield in February. You can also see a plastic bag keeping the dew away from my ZWO ASI120 MC camera.

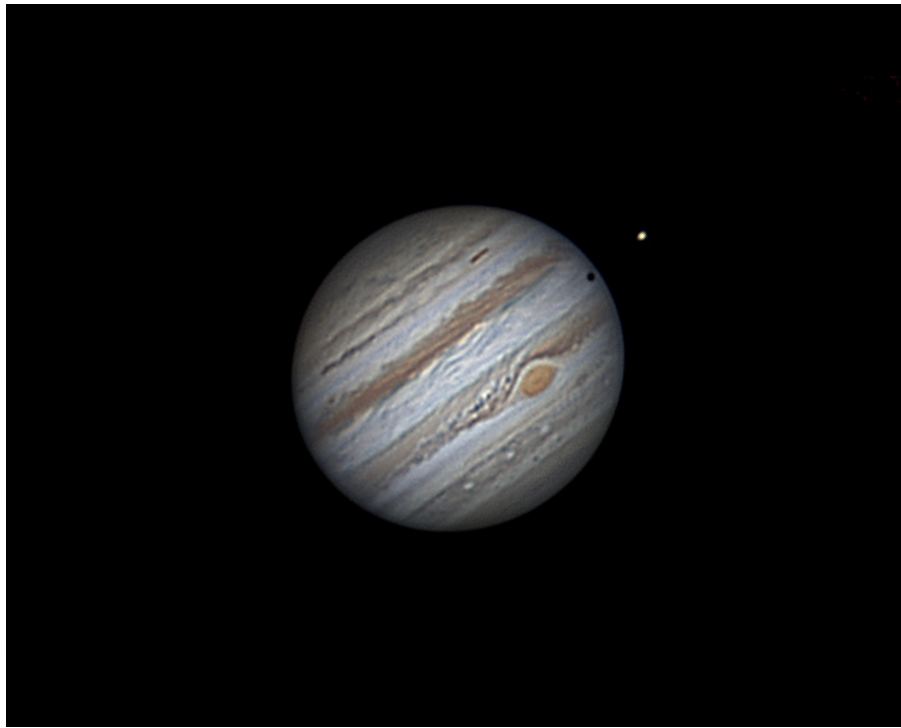
Focus is critical. A deep space imager might be satisfied with a full width half maximum of 1.5 or 2 arc-seconds. When we're looking for sub arc-second planetary detail that's not good enough. I enlarge the image in Firecapture and focus by eye.

Darryl Milika says focusing by eye reminds him of the skill his ancestors used to hunt game in the Australian outback. Damian Peach says automatic focusing doesn't work very well for planetary imaging. Damian likes to bring a good sized monitor out to the observatory to help him focus.

The next picture shows a single frame from a three minute video, Over the course of two hours I took a series of three minute videos of Jupiter, fine tuning the image the best I could using the one arc-second shadow of Europa and the white band around the Great Red Spot. These images were stacked with Autostakkert! and sharpened with Registax 6.

As I step through these images, some are better than others. I selected the sharpest images to combine with Winjupos. As you can see I wound up with a really terrific C8 image of Jupiter.

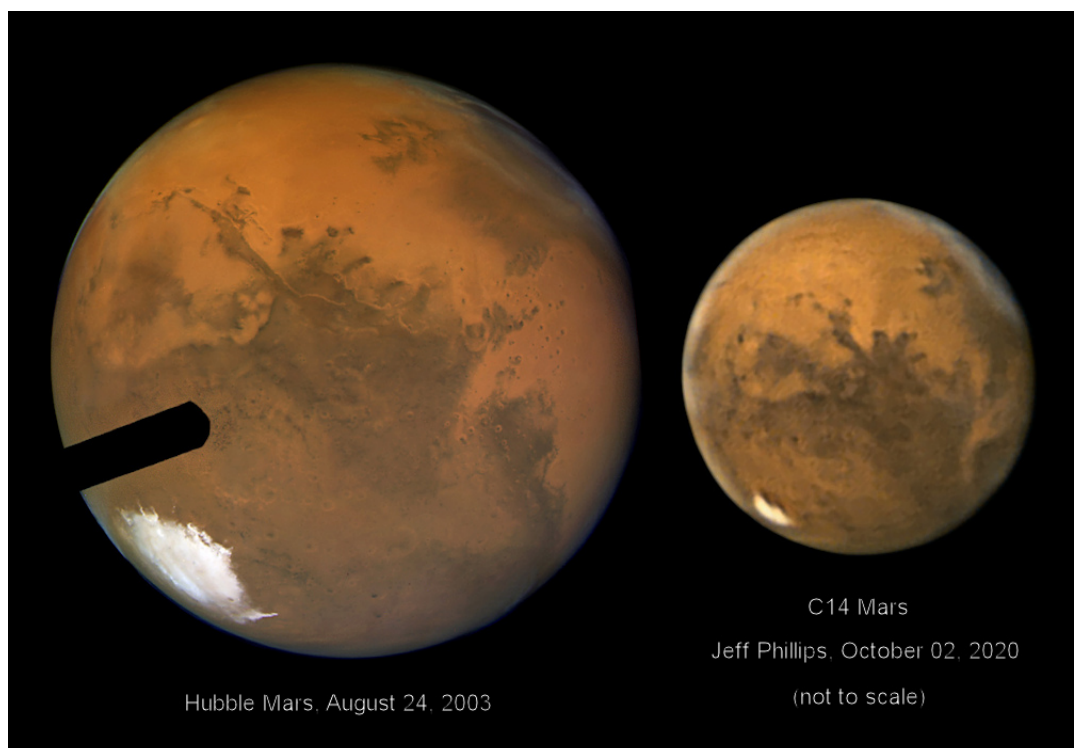




This article is a shortened version of a talk I gave to the Eugene Astronomical Society at our October 2021 meeting. If you'd like to watch the Zoom version of this talk you can see it at: <https://youtu.be/Rtvj9CTrCCE>

Most of what I know about planetary imaging I learned right here on the Cloudynights forums. I'll also attach a list of resources you can turn to if you want to try planetary imaging for yourself. I'll leave you with one last image, a delightful view of Mars:

Jeff Phillips
Eugene, Oregon



Member astrophotography in this issue

[1] The Tulip Nebula by Mark Wetzel

Monmouth, OR

September 3 and 4, 2021, Reprocessed January 14, 2022

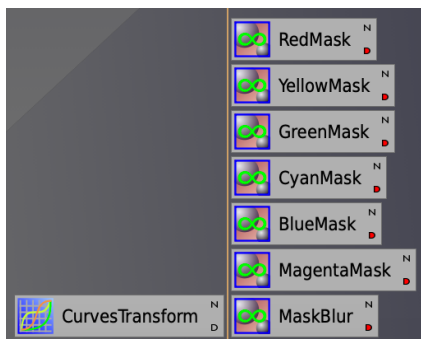
With additional data, I reprocessed the Tulip Nebula narrowband filter images using the Hubble pallet (Sulfur-II to Red, Hydrogen-alpha to Green and Oxygen-III to Blue channels, SHO). Several new tools and techniques were tested in PixInsight, so the resulting false color image is a work in progress. In the first processing version, I had created a HSO color image that made the tulip glow in red-yellow hues. This time, I wanted to create more of a rainbow effect and utilize starless images in the processing workflow. While the image is no longer scientifically relevant, it does show more details in the nebula than the previous version.

Key steps in the image processing workflow:

- 1) I used the Ha, Oiii and Sii calibrated and integrated images generated in the previous HSO image processing version. Each channel image had been cropped and then denoised with the Mure Denoise script.
- 2) Russ Croman's StarXTerminator was used to create starless and stars images for each channel in the linear state. The one issue with StarXTerminator using the Version 7 AI weighting is that very faint ghosts of stars remain in the combined starless image, resulting in subtle mottling where stars are not present in the image combined with the stars image.
- 3) The stars narrowband images were combined into one RGB image and the Photometric Color Calibration was used to create some semblance of acceptable star colors. Short of taking RGB data, there is probably a better way to handle the stars images to obtain more realistic colors.
- 4) The stars RGB image was stretched and processed to get a desired number of stars with adequate brightness and morphology. The CurvesTransformation tool was used to tweak the star brightness and how many stars were visible and to make the background black for subsequent combination with the processed starless image.
- 5) The Ha, Oiii and Sii channels were linearized with LinearFit to the brightest channel without saturating any one channel. To determine which image was the brightest (or dimmest), the Statistics tool was used, and the Mean and Median values defined the ranking. Each channel when combined would then have similar or enhanced brightness. Starless images provide great capability and flexibility for image processing.
- 6) The narrowband starless images were combined with the ChannelCombine tool using the Hubble Pallet assignment (SHO) to create an RGB color image. This made Sii and Oiii contributions strong and there was no green cast to be removed.
- 7) The Luminance was extracted from the RGB image.
- 8) The Luminance image was stretched, denoised (background) and sharpened. I downloaded and tried the Generalized Hyperbolic Stretch script to stretch the image in several passes. The tool provides excellent curve shaping parameters. The downside is that there is no real time preview when moving sliders, so I had to use the histogram after the first stretch. This script allows you to shape the curve to prevent clipping stars while being more aggressive with the midtone and shadow regions. I used this script for all image stretching, including the RGB starless and stars images. Sharpening was done with the Histogram Equalization process tool with three kernel sizes and bit depths to sharpen details for different scales. Denoising was done with the TVGDenoise process tool using a low contrast mask and a support mask.
- 9) The starless RGB image was stretched, denoised with the MultiscaleLinearTransform tool, and then it was blurred with the Convolution tool.
- 10) The Luminance image was then combined with the starless RGB image using the LRGB Combine process tool.
- 11) I started using a new set of PixelMath expressions to create and then blur color masks that seem to produce better masks than the Color Mask script. The LRGB starless image was adjusted with several color masks (Yellow, Green, Blue, Cyan and Magenta) and the Curves and Histogram Transformation tools. The color mask PixelMath process icons can be downloaded from the lumatico YouTube channel at (<https://drive.google.com/drive/folders/138L6Z2vbTzNAutbfe5cuhL9PI0-iltRp>). Process Icon Merge was used to integrate these icons into my PixelMath_Comos workspace. First, a color mask is created using the stretched starless image. Next, the MaskBlur is applied to the new mask. Finally, the mask is applied to the starless image and the CurvesTransformation is used to adjust brightness, hue and saturation. Although the mask has been blurred, Curves have to be somewhat subtle to prevent the creation of color artifacts.

Member astrophotography in this issue

[1] The Tulip Nebula by Mark Wetzel (continued)



12) The starless image was saved as 16-bit TIF and then opened in Photoshop 2022 to selectively sharpen (sharpen tool), dodge and saturate (sponge tool) different regions of the image.

13) The starless and stars images were combined in PixInsight using the PixelMath combine function with the op_screen() option [combine(stars,starless,op_screen())]. Note that there are far fewer stars, and they are somewhat dimmed so that they do not overwhelm the nebula. There are some minor color artifacts on the edges of the stars that may have been created with the Ha, Oiii and Sii stars images, their combination or color calibration.

Imaging details:

Celestron 9.25" Edge HD SCT

Celestron 0.7x Focal Reducer (FL = 1645mm, f/7)

Celestron off-axis guider with a ZWO ASI 174MM mini guide camera

Losmandy G11 mount with Gemini 2

ZWO ASI 2600MM Pro cooled monochrome camera (-10oC)

ZWO 36mm Hydrogen-a, Oxygen-III and Sulfur-II filters

Software: Sequence Generator Pro, ASTAP plate solving, PHD2 guiding,
Losmandy Gemini ASCOM mount control and web client interface,
SharpCap Pro for polar alignment with the Polemaster camera.
Software for image processing on a Macbook Pro:
PixInsight 1.8.8-12, StarXTerminator for PixInsight, and Photoshop 2022

Hydrogen-alpha 10 min x 21 subframes (210 min), Gain 100, Offset 68, 1x1 binning

Oxygen-III 10 min x 16 subframes (160 min), Gain 100, Offset 68, 1x1 binning

Sulfur-II 10 min x 15 subframes (150 min), Gain 100, Offset 68, 1x1 binning

[2] Sadr Region by Ronald Perez

I haven't been able to process most of my images from the past year (pesky career, school, and child) so I was glad to find the time to process this one. I've decided to just process black and white for now because of the stunning contrast and purity of monotone. Hopefully I'll be able to process everything by the time star season is back!

Tech Details:

iOptron CEM40EC

Stellarvue 70t

Orion 50mm guidescope

ZWO 178 guide camera

ZWO 1600 imaging camera

56 x 240s h-alpha

Processed in PixInsight

Observing in February 2022

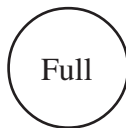


New

1st Q



Full



Last Q



Jan 31, 9:46 PM	Feb 8, 5:50 AM	Feb 16, 8:57 AM	Feb 23 2:32 PM
Mercury Rise: 6:25 AM	Mercury Rise: 6:02 AM	Mercury Rise: 5:58 AM	Mercury Rise: 6:00 AM
Venus Rise: 5:18 AM	Venus Rise: 4:55 AM	Venus Rise: 4:41 AM	Venus Rise: 4:33 AM
Mars Rise: 5:29 AM	Mars Rise: 5:22 AM	Mars Rise: 5:13 AM	Mars Rise: 5:05 AM
Jupiter Set: 7:29 PM	Jupiter Set: 7:08 PM	Jupiter Set: 6:46 PM	Jupiter Set: 6:27 PM
Saturn lost in Sun	Saturn lost in Sun	Saturn Rise: 6:49 AM	Saturn Rise 6:24 AM
Uranus Set: 1:07 AM	Uranus Set: 00:36 AM	Uranus Set: 00:05 AM	Uranus Set: 11:35 PM
Neptune Set: 8:43 PM	Neptune Set: 8:13 PM	Neptune Set: 7:43 PM	Neptune Set: 7:17 PM
Pluto lost in Sun	Pluto Rise: 6:27 AM	Pluto Rise: 5:56 AM	Pluto Rise: 5:29 AM

All times Pacific Standard Time (November 7, 2021 - March 12, 2022 = UT -8 hours) or Pacific Daylight Time (March 13 - Nov 5, 2022 = UT -7 hours)

Date	Moon Rise	Moon Set	Twilight Begin	Sun Rise	Sun Set	Twilight End
2/1/2022	08:19	18:04	05:51	07:30	17:23	19:02
2/2/2022	08:51	19:21	05:50	07:28	17:24	19:03
2/3/2022	09:16	20:35	05:49	07:27	17:26	19:04
2/4/2022	09:39	21:45	05:48	07:26	17:27	19:06
2/5/2022	09:59	22:53	05:47	07:25	17:28	19:07
2/6/2022	10:20	23:59	05:45	07:24	17:30	19:08
2/7/2022	10:41		05:44	07:22	17:31	19:09
2/8/2022	11:05	01:04	05:43	07:21	17:33	19:11
2/9/2022	11:33	02:08	05:42	07:20	17:34	19:12
2/10/2022	12:06	03:11	05:41	07:18	17:35	19:13
2/11/2022	12:47	04:11	05:40	07:17	17:37	19:14
2/12/2022	13:36	05:07	05:38	07:16	17:38	19:15
2/13/2022	14:32	05:55	05:37	07:14	17:39	19:17
2/14/2022	15:35	06:36	05:36	07:13	17:41	19:18
2/15/2022	16:42	07:11	05:34	07:11	17:42	19:19
2/16/2022	17:51	07:40	05:33	07:10	17:44	19:20
2/17/2022	19:00	08:05	05:32	07:08	17:45	19:22
2/18/2022	20:09	08:27	05:30	07:07	17:46	19:23
2/19/2022	21:20	08:48	05:29	07:05	17:48	19:24
2/20/2022	22:32	09:09	05:27	07:04	17:49	19:25
2/21/2022	23:46	09:33	05:26	07:02	17:50	19:27
2/22/2022		09:59	05:24	07:01	17:52	19:28
2/23/2022	01:02	10:31	05:23	06:59	17:53	19:29
2/24/2022	02:18	11:12	05:21	06:57	17:54	19:31
2/25/2022	03:32	12:03	05:20	06:56	17:56	19:32
2/26/2022	04:37	13:07	05:18	06:54	17:57	19:33
2/27/2022	05:31	14:20	05:17	06:52	17:58	19:34
2/28/2022	06:14	15:38	05:15	06:51	18:00	19:36

All times are for Eugene, Oregon Latitude 44° 3' Longitude 123° 06'

Items of Interest This Month

First few days and last week of the month:

Look for zodiacal light in the west after sunset. (You need dark sky for this.)

All month: Good time to catch asteroid 20

Massalia (in Cancer) and asteroid 1 Ceres (in Taurus).

All Month: Comet Borrelly is cruising through Pisces into Aries. It's about 8th-9th magnitude, so you'll need binoculars or a telescope to see it, but it's pretty obviously a comet.

2/8 Algol at minimum brightness for two hours centered on 10:42 PM.

2/9–2/16 Mercury visible in early morning.

2/9 Moon occults two bright stars (Kappa 1 & 2 Tauri) almost simultaneously at 7:21 PM. This is a don't-miss event.

Reappearance at 8:46 and 8:52. The Moon will be 68° high in the south, an easy sight from just about anywhere.

2/11 Algol at minimum brightness 7:31 PM.

2/12 Venus at maximum brightness (mag. -4.9)

2/13 Moon in line with Castor and Pollux ~6:00 PM.

2/22 Moon occults Zubenelgenubi 2:44 AM. (Dimmer companion occulted at 2:36.)