“Helix NGC 7293”
by M. J. Post
Nov 6
Upcoming Events

No LAS Meeting in December!!

The next LAS banquet/meeting will be in January. The exact date depends on reservation availability; it may be necessary to shift from our regular 3rd Thursday meeting time.

Featured Images

The image on the front cover is M. J. Post's image of the Helix Nebula, NGC 7293. M. J. used his 11 inch RASA scope, QHY 367C color camera, and Astrodon LP filter to obtain the exposures. A dozen 5 minutes subs were used to produce this great image.

The center fold image this month is Stephen Garretson's h-alpha image of the rosette nebula. Stephen acquired the images with a William Optics FLT 132 APO refractor, WO Flat7 (0.8X) ZWO ASI 1600 MM camera, Starlight Xpress filter wheel, Baader 3.5nm Ha filter on Paramount MyT mount. Ninety 120s subs for 3 hours integration time.

David Elmore's wide field image of Seagull Nebula IC 2177 is the back cover image this month. David used a Borg FL55 200mm astrograph, a ZWO ASI 1600MM Pro astro-camera on iEQ45 mount. The combination produced a 5° x 3° field. Image is created with 11 15 minute exposures in H-alpha and 11 15 minute exposures in OIII (7 hours exposure). H-alpha was used for red and OIII for blue and green (HOO).

From Our Newsletter Archives

December 2008

LAS annual banquet meeting on Jan 18, 2009 will be at Johnny Carinos across the street from Twin Peaks Mall. Dave Gingerich is to give a presentation on the Stardust mission which is to pass near earth Jan. 14, 2009. Dr. Bob will do an astronomy summary for the year.

December 1998

Persons nominated for LAS officers in 1999 were President: Leigh Pierson; Vice President: Brian Kimball, Gary Garzone, and Steve Lynch; Secretary/Treasurer: Melinda Duran; ALCor: Paul Hale; and Newsletter Editor: Karen Mendenhall.

The LAS annual banquet will be at the Santa Fe Grill on north Main Street.

NASA's Galileo spacecraft shows closeup view of a fault on Jupiter's icy moon Europa.

December 1988

The 1989 officer nominations were president: Jim Getson and Greg Dickinson; vice president: Tom Johnston, Kirk Schneider, and Jim Wilson; secretary: Bud Cohee and Jennifer Getson; treasurer: Jenifer Getson and Greg Dickinson; ALCor: Bob Spohn, Judy Cairnes, and Bud Cohee; newsletter editor: Tom Johnston.
The Longmont Astronomical Society is a 501 c(3), non-profit corporation which was established in 1987. The Longmont Astronomical Society’s main goal is to promote local amateur astronomy. This is accomplished through regular monthly meetings, star parties and public observing sessions.

Regular meetings are held every month (except December) on the third Thursday. The current location is at the IHop Restaurant, 2040 Ken Pratt Boulevard in Longmont. Meetings are open to the public and begin at 7:00 PM. A group of us have dinner at the IHop before the meeting around 6 pm.

A broad spectrum of topics are covered at the meetings and include such things as deep sky observing, planetary imaging, narrow band imaging, equipment discussions and demonstrations just to name a few. These subjects are presented by both club members as well as special guests who are professional astronomers or experts in a particular field.

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Renew your membership or become a member at [https://www.longmontastro.org/membership](https://www.longmontastro.org/membership)
December Solar System Highlights

**Mercury**

Mercury becomes visible without optical aid after Dec 6 in the morning sky around 6 am. It is magnitude 0.3 and disk is 8.1 arc sec across.

**Venus**

Venus is visible in the morning sky in constellation Virgo. It is around magnitude -4.7 and decreases to magnitude -4.5 at the end of December. Its disk decreases from 41 arc sec across to 25 arc sec this month.

**Mars**

Mars is visible in the evening sky in constellation Aquarius; it moves into Pisces on December 21st. It decreases in brightness from magnitude +0 to +0.5 this month; its disk decreases in apparent size from 9.2 to 7.3 arc sec across.

**Jupiter**

Jupiter becomes visible in the morning sky about mid-month in the constellation Ophiuchus. It will be magnitude -1.8 and its disk will be 31 arc sec across.

**Saturn**

Saturn is visible in the early evening around 6 pm in the constellation Sagittarius; it is magnitude +0.6 in brightness this month. Its disk is 15 arc sec across. It disappears into the evening twilight around December 7.

**Uranus**

Uranus is visible in the early evening in constellation Aries; it moves into constellation Pisces on the 3rd. It is magnitude 5.7 in brightness and its disk is 3.7 arc sec across.

**Neptune**

Neptune is visible in the early evening in constellation Aquarius; it is magnitude 7.9 and brightness and its disk is 2.2 arc seconds across.

**Meteors Showers**

The annual Geminids meteor shower peaks on the night of December 13-14. Circumstances to view it are very good as the moon sets around 10:30 pm. Expect to see up to 120 per hour. The meteor radiant is located north of the star Castor in constellation Gemini (see chart below).
Comet 46P Wirtanen is currently magnitude 3.4 and may reach magnitude 2.4 by the 15th. It is expected to dim to magnitude 3.6 by the end of December. Its coma is 87 arc min across and is expected to increase to 2.2 degrees. It is now in constellation Cetus and will move to Eriodanus on the 4th, to Cetus o the 9th, to Taurus on the 11th, to Auriga on the 19th, and then to Lynx on Dec. 28th.
**Comet C/2018 V1 (Machholz-Fujikawa-Iwamoto)** is magnitude 4.4 and its coma is 7.6 arc min across. It is currently in constellation Ophiuchus but will enter constellation Serpens Caput on the 5th, Scutum on the 7th, and then to Sagittarius on Dec. 14th. It is predicted to dim to magnitude 8.5 by the end of December.
Comet C/2018 L2 (Atlas) is in constellation Ophiuchus. It is now magnitude 9.3 and will dim to about magnitude 9.4 in brightness by month end. Its coma increases from 5.2 to 5.3 arc minutes.

Comet 46P Wirtanen is currently magnitude 3.4 and may reach magnitude 2.4 by the 15th. It is then expected to dim to magnitude 3.6 by the end of December. Its coma is 87 arc min across and is expected to increase to 2.2 degrees. It is now in constellation Cetus and will move to Eridanus on the 4th, to Cetus on the 9th, to Taurus on the 11th, to Auriga on the 19th, and then to Lynx on Dec. 28th.
Comet 64P Swift-Gehrels is 10.3 magnitude in brightness in constellation Triangulum; it moves into constellation Aries on Dec. 22nd. It is expected to dim to magnitude 12.2 by the end of December. Comet 64P Swift-Gehrels was discovered by Lewis Swift in 1889 at the Warner Observatory in Rochester, New York. It was re-discovered in 1973 by Tom Gehrels at the Palomar Observatory.

Its orbital period is 9.23 years.
Navigating the December Night Sky

For observers in the middle northern latitudes, this chart is suitable for late November at 9 p.m. or early December at 8 p.m.

The stars plotted represent those which can be seen from areas suffering from moderate light pollution. In larger cities, less than 100 stars are visible, while from dark, rural areas well over ten times that amount are found.

The Ecliptic represents the plane of the solar system. The sun, the moon, and the major planets all lie on or near this imaginary line in the sky.

Navigating the late fall night sky: Simply start with what you know or with what you can easily find.

1. Face south. Almost overhead is the "Great Square" with four stars about the same brightness as those of the Big Dipper. Extend an imaginary line southward following the Square's two westernmost stars. The line strikes Fomalhaut, the brightest star in the southwest. A line extending southward from the two easternmost stars, passes Deneb Kaitos, the second bright star in the south.

2. Draw another line, this time westward following the southern edge of the Square. It strikes Altair, part of the "Summer Triangle."

3. Locate Vega and Deneb, the other two stars of the "Summer Triangle. Vega is its brightest member while Deneb sits in the middle of the Milky Way.

4. Jump along the Milky Way from Deneb to Cepheus, which resembles the outline of a house. Continue jumping to the "W" of Cassiopeia, to Perseus, and finally to Auriga with its bright star Capella.

Binocular Highlights

A and B: Examine the stars of the Pleiades and Hyades, two naked eye star clusters.

C: The three westernmost stars of Cassiopeia's "W" point south to M31, the Andromeda Galaxy, a "fuzzy" oval.

D: Sweep along the Milky Way from Altair, past Deneb, through Cepheus, Cassiopeia and Perseus, then to Auriga for many intriguing star clusters and nebulous areas.

Astronomical League www.astroleague.org/outreach; duplication is allowed and encouraged for all free distribution.
If you can observe only one celestial event this month, consider this one:

The Scene: Mars Passing Faint Neptune

On December 6 and 7, bright Mars passes faint Neptune, making the 8th planet relatively easy to find with steadily held binoculars – if the sky is clear and dark. Look for Mars at 7:30 p.m. just below the Great Square of Pegasus in the south-southwest.

- Neptune lies immediately to the upper left of Mars on Dec. 6. It will be very faint and to the left of a star of similar brightness. Mars, Neptune and the star will form a small, fat isosceles triangle.
- Neptune lies just to the lower right of Mars on Dec. 7. As the nights proceed, Mars moves proportionally farther away from Neptune.
Member Images

"IC 1848 in SHO"
Stephen Garretson
Nov 16
“NGC 2244, Rossette Nebula in H-Alpha”
Stephen Garretson.
Nov 28
"NGC 281 in SHO"
Stephen Garretson
Nov 18
Gamma Cygni in SHO
M. J. Post
Nov 21
November 15, 2018 Meeting Notes by Vern Raben

If you plan on imaging the moon or planets with your telescope, the first thing you should do is to check your telescope’s collimation. Otherwise you should probably just pack up and go to bed; it is extremely important to do if you wish to capture any details in your images.

Collimation is a process of making a series of small adjustments so that the focal point of your scope coincides as near as possible with the centerline of the telescope’s main mirror. The first time you do this it may take several hours but with practice it only takes a couple minutes.

To begin slew your scope to a second magnitude or brighter star that is about half way up to the zenith. This makes adjusting the collimation screws easier without having to be on a ladder.

The capture software such as “FireCapture” or “SharpCap” have a round reticle overlay that can be turned on and used to center the star.

You may then defocus the star so that its diameter is slightly less than the reticle’s outer ring. After carefully centering the defocused star take a look at the gap between the reticle and the outside edge of the defocused ring. The gap should be the same all the way around.

Vern Raben, president, opens and moderates:

Announcements

No December meeting. January is the annual banquet and officer elections. Restaurant is not yet selected. We may need to shift meeting date if we can’t schedule that particular time.

Introductions - Officers

Vern Raben – president
Gary Garzone – vice president
Joe Hudson - secretary (absent)
Marty Butley – treasurer
Joe Hudson – secretary
Brian Kimball – board member (absent)
Jim Elkins – board member
Tally O’Donnell – board member

Introductions - Imagers

•Marty Butley
•David Elmore
•Glenn Frank
•Stephen Garretson
•Gary Garzone
•Eddie Hunnell
•Brian Kimball (not present)
•Tally O’Donnell
•M. J. Post

primary mirror.

When checking collimation you should use the same setup that you will use when you acquire the planetary images.

To begin slew your scope to a second magnitude or brighter star that is about half way up to the zenith. This makes adjusting the collimation screws easier without having to be on a ladder.

The capture software such as “FireCapture” or “SharpCap” have a round reticle overlay that can be turned on and used to center the star.

You may then defocus the star so that its diameter is slightly less than the reticle’s outer ring. After carefully centering the defocused star take a look at the gap between the reticle and the outside edge of the defocused ring. The gap should be the same all the way around.
In this image the gap is slightly wider to the lower right. To correct you would tighten one knob and loosen an adjacent knob about one eighth of a turn. If the defocused ring moved to the lower right then the correct knobs are being turned. If not turn them back where they originally were and select two other knobs. It is important to turn the knobs 1/8th of a turn or less; the defocused ring should remain visible on the computer’s screen at all times. After each adjustment slew your scope until the defocused ring is centered in the reticle. Repeat the process until the gap between the ring and reticle are the same all the way around.

After the collimation is correct you are ready to capture images. The objective is to capture as many images as possible in the shortest time with correct exposure. The planet is rotating so if we take too long capturing images we’ll get rotation smear. The faster the planet rotates the less time we have. Jupiter with its 9 hour 56 minute rotation period is particularly problematic. For Jupiter the total capture time including filter changes should be less than one minute for focal lengths of 5000 mm or more.
Focus is of course important as well. A motorized focuser with a readout is very helpful. You may use the readout to find the two places where the image goes out of focus and then set the focus position to the average reading.

**Processing**

The software program “AutoStakkert!” by Emil Kraaikamp is probably the best program currently available to align, register, and stack planetary images. It is very easy to use. Just click on the “1) Open” button and select the video you wish to process. If the disk of the planet is completely visible set the image stabilization setting to “Planet COG” and the quality estimator setting to “edge”. If the object fills the frame (as with lunar or solar features) set the image stabilization to “Dynamic Background” and the quality estimator to “Gradient”.

Next press “2) Analyze”. The program will go through all frames in the video and rate them as to quality.

Toward the right of your screen you’ll see another window which may be used to set the alignment points. Usually you’ll want to set alignment points to “multiple” and the AP Size to the minimum number (25). If your final image ends up with visible seams you should increase this. Also increase it if you end up with more than 100 alignment points.

Next set the stack options. I usually set the number of frames to stack to 127. I’ve found that 64 or less leaves noise in the image. Setting more than 256 may decrease image quality as you are stacking more lower quality images.
Sharpening

The program “Registax 6” by Cor Berrevoets is great for sharpening features in planetary images.

Select an image that was previously aligned and stacked with “AutoStakkert!”.

Waveletscheme is left at the default of “linear” and wavelet filter is left as “gaussian”. Check the box “Use Linked Wavelets”.

Lately I tend to change the settings for only the first two layers. Basically layer #1 is used to reduce noise and layer #2 is used to sharpen; I leave the settings for all other layers at the defaults.

I usually set the denoise filter size step for layer #1 somewhere between 0.30 and 0.45. The sharpening step for layer #1 is set to a low value or even 0; the slider setting for layer #1 is set quite high, even 100.

I do most, if not all, the sharpening in layer #2. The denoise filter size is set somewhere between 0.20 and 0.45 as before. The sharpen filter size is set to 0.10 or less. The slider setting for layer #2 is set fairly high, generally 50 to 70 work fairly well. You don’t want to over do the sharpening here; leave some of that for Photoshop.
Although the images were captured as gray scale, they are actually RGB color images. In Photoshop we may change that by setting the image mode to grayscale. On the top menu select “Image”, “Mode”, and then “Grayscale”. Repeat that for each red, green, and blue image.

Next step is to assign the gray scale images to the corresponding channel. To do that bring up the “Channels” menu (if not visible select “Window” and then “Channel”). Select the icon at the upper right in the Channels menu. Select “Merge Channels”.

You would then adjust brightness levels and perhaps adjust color balance, etc ...

LAS has had an all sky camera in operation for over seven years. The current one has run continuously for the last 4 years. In other words, it is time for it to be upgraded.

Although not final the following is a brief summary of what is to be built.
The proposed lens is a Fujinon FE-185C086HA. It has a field-of-view of 185 degrees with a 1" sensor. This is the same lens used by the SBIG all sky camera.

The ZWO ASI 183 MC camera is being considered. It has a 1" diagonal sensor so should match nicely with the Fujinon lens above.

A Raspberry Pi 3 will probably be used to control the camera and process the images locally. The Pi 3 has wireless networking.

The estimated cost of the camera is $1203. This compares favorably with those commercially available. The proposed camera will have 4 times the resolution of the commercial equivalents.

LAS currently has 86 members. Financially we are in reasonably good shape with over $15 K in various accounts.

Please consider volunteering to be a LAS Officer in 2019. The term of office for all positions is one year.

We need to fill the following positions:

President - lead meetings and make decisions regarding the club with assistance of other officers and board members

Vice president - assist president and direct meetings if president absent

Treasurer - handle club finances, receive payments and deposit funds

Secretary - keep records of meetings and any votes

Newsletter editor - publish treasurer notes and present club news

Webmaster - maintain the club’s website

Board Member (3 positions) - make various decisions regarding club policies and finances
InSight was launched from Vandenberg Air Force Base in California on May 5. The lander touched down on Monday, Nov. 26, near Mars' equator on the western side of Elysium Planitia. The picture above was taken by the Instrument Deployment Camera. The camera’s transparent dust cover is still on to prevent particulates kicked up during landing from settling on the camera’s lens.

Credits: NASA/JPL-Caltech
NASA’s OSIRIS-REx spacecraft completed a 1.2 billion-mile journey to the asteroid Bennu on December 2nd. Now, at about 11.8 miles from Bennu, OSIRIS-REx will begin a preliminary survey of the asteroid. The spacecraft will begin flyovers of Bennu’s north pole, equatorial region, and south pole region. It will get as close as 4 miles above Bennu during each flyover. The spacecraft will begin orbiting around Bennu on Dec. 31. Bennu is the smallest object ever orbited by a spacecraft. The goal of the OSIRIS-REx mission is to collect and deliver at least two ounces of regolith (dirt and rocks) to Earth.
Seagull in HOO
David Elmore
Nov 8