

Southwest Florida Astronomical Society SWFAS



The Eyepiece February 2019

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A MESSAGE FROM THE PRESIDENT

The eclipse was beautiful (but cold!) See some nice shots taken by members below.

February is probably our busiest month. This year is no exception. We have the SkyCruise at Babcock Ranch on the 8th. Then next morning we have STEMtastic at the Lee County School Complex and then that night we have a star party at Seahawk Park.

NOTE: There may have been some schedules that went out with the Feb 9th Star Party at CRP. It is not. It is at Seahawk Park.

On the 23rd we have the Burrowing Owl Festival at Rotary Park in Cape Coral.

We can use help at all these events.

The Babcock Ranch is charging a \$10/person fee for the SkyCruise event, with the proceeds being donated to our club. The plans are for people to take a 30 minute cruise on the lake with a talk about the night sky and objects being pointed out. Then they will come up on land where we will have telescopes setup looking at different objects.

STEMtastic and Burrowing Owl Festival are our general Solar Observing/Display setup and we can always use help there.

Brian

Program this Month

I am pleased to announce that Chuck Pavlick, fellow SWFAS member and accomplished astrophotographer will be presenting at the February 7th meeting of the South West Florida Astronomical Society. Chuck will proudly present his latest photographs and will offer his insights and advice for taking impressive photos of your favorite celestial objects. Chuck's presentation will begin at 7:30pm on Thursday, February 7, 2019 at the Calusa Nature Center and Planetarium in Fort Myers.

Michael J. McCauley
VP/Program Coordinator SWFAS

Star Party Schedule 2019

Big Cypress - Feb 2nd, Mar 2nd

SeaHawk Park – Feb 9th, April 13th, May 11th, June 1st, July 6th,
Aug 3rd, Aug 31st, Sept 28th, Nov 30th

Caloosahatchee Regional Park – Mar 9th, Apr 6th, May 4th, Oct 26th, Nov 2nd, Nov 30th

Rotary Park – Cape Coral – March 8th

We have scheduled some of the Seahawk Park nights to coincide with the moon being a crescent to 1st quarter stage to allow for lunar observing.

Members' Recommended Reading & News Links

Members are encouraged to submit to the editor links to recommended articles and books that might be of interest to Club members.

"Comets to Catch in 2019", Bob King, January 16, 2019, Sky and Telescope Weekly

"Space Missions to Watch in 2019", David Dickinson, December 31, 2018, Sky and Telescope Weekly

Each Weekly Newsletter of S&T has a 60-second news section. The general link for S&T Astronomy News is <https://www.skyandtelescope.com/astronomy-news/>.

"NASA's Opportunity Rover Logs 15 Years on Mars", January 24, 2019, NASA-JPL, Week in Review

See <https://www.jpl.nasa.gov/> for NASA-JPL News.

Air & Space Smithsonian Magazine is running a series of articles on the Apollo missions, Apollo Countdown. The second in the series appeared in the January issue, "The Man Who Won the Moon Race", by Richard Jurex. See airspacemag.com

In the Sky this Month

Moon:

New – Feb 4, apogee – 5 Feb; 1st Quarter – Feb 12; Full & perigee – Feb 19; Last Quarter – Feb 26.

Mercury isn't high and visible enough to see after sunset until February 12. It is more visible low in the west about 45 minutes after sunset. It is about 8° - 9° above the horizon and 7" wide. In the latter half of the month, its brightness dims from -1.2 to -0.2, but it climbs a little after each sunset so is more visible. Its greatest elongation is 18° from the Sun on the 26th.

Venus starts the month rising more than ½ hour after Jupiter and ends the month rising about 2 ½ hours afterward. Its brightness decreases a little from -4.3 to -4.1 while moving across Sagittarius. Its size decreases from 19" to 16". On the 18th at dawn, Venus and Saturn are about 1° apart. *Note: on this date in 1930, Clyde Tombaugh discovered Pluto.*

Mars is high in the southwest sky in the evening, setting around 11 p.m. The magnitude dims from -0.9 to -1.2, the size decreasing also from 6" to 5 ½".

Jupiter rises in the southeast after about 3:30 a.m. to start the month and at 2 a.m. by the end of the month. It brightens from -1.9 to -2.0 and its size increases from 33½" to 36".

Saturn is in close conjunction with Venus, at 1° between the two on the 18th. Saturn starts the month rising 1 ½ hours before sunrise (85 minutes after Venus) and over 2 ½ hours before sunrise by the end of the month. Its brightness is 0.6 all month and its disk size is about 16". On the 2nd at dawn, Saturn and the Moon are about 3° apart.

Uranus is just over 1° south of Mars on the 12th at magnitude -5.8 and 3½" wide. See <https://is.gd/urnep> for a finder chart or pages 48-49 in September issue of *Sky & Telescope*.

Neptune this month will set too soon after sunset to observe. See <https://is.gd/urnep> for a finder chart or pages 48-49 in September issue of *Sky & Telescope*.

At about dawn, February 28th, Venus (below Jupiter and above Saturn), Saturn, the Moon, Jupiter (above Venus) & Antares make a line about 50° long.

International Space Station: The ISS is visible in the early evening from 8-12 February over Ft Myers, and during early morning from the 20th to the 25th. See this link for specific times and routes for the ISS: <http://www.heavens-above.com/>

The **Hubble Space Telescope** will be visible during through February 19 during the early evening hours. See this link for specific times and routes for the HST: <http://www.heavens-above.com/>

Southwest Florida Astronomical Society, Inc. Event Schedule for 2019

Date	Event	Location	Time/Note
Feb 7 th , 2019	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
Feb 8 th , 2019	Sky Watch Cruise	Babcock Ranch – Fee for participation	Dusk Mike McCauley
Feb 9 th , 2019	STEMtastic Day of Discovery	Lee County School Board Complex	10am – 3pm Brian Risley
Feb 9 th , 2019	Monthly Star Party	Seahawk Park	Dusk
Feb 16 th , 2019	Solar Observing	Bayshore Live Oak Park Port Charlotte	9:00 am - Noon
Feb 23 rd , 2019	Burrowing Owl Festival	Rotary Park Cape Coral	10:00 am – 4pm
March 1 st , 2019	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
March 2 nd , 2019	Big Cypress Observing Night	Big Cypress Welcome Center Ochopee	7:30pm
March 7 th , 2019	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
March 8 th , 2019	Rotary Park Star Party	Rotary Park Cape Coral	Dusk
March 9 th , 2019	Monthly Star Party	Caloosahatchee Regional Park	Dusk
March 15 th , 2019	Carefree Lunar Observing Party	Resort at Carefree Blvd	Dusk – Private Event – Mike McCauley
Mar 16 th , 2019	Solar Observing	Ponce deLeon Park Punta Gorda	9:00 am - Noon
April 4 th , 2019	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
April 5 th , 2019	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
April 20 th , 2019	Solar Observing	Harbour Heights Park Port Charlotte	9:00 am - Noon
May 2 nd , 2019	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm
May 3 rd , 2019	Public Observing	FSW Moore Observatory Punta Gorda Campus	Dusk
May 18 th , 2019	Solar Observing	Gilchrist Park Punta Gorda	9:00 am - Noon
June 6 th , 2019	Monthly Meeting	Calusa Nature Center Planetarium	7:30pm

All observing events are Weather Permitting.

If it is cloudy or a chance of rain, we may not setup at all.

There may be no way to provide advance notice of cancellation.

Events may be cancelled several hours before scheduled time based on observed conditions and forecasts at that time and weather may change.

Monthly Star Parties: These are held at either Seahawk Park in Cape Coral or at Caloosahatchee Regional Park (CRP) off SR78 7 miles east of SR31. Other than park fees noted, these are free and open to the public. Those wanting to learn how to use equipment can bring it to the monthly star parties or the monthly meetings. We are always glad to help people learn how to use their telescopes. It is also a great way to learn about different telescopes and try some out before making a purchase.

Seahawk Park is in North Cape Coral off Wilmington Blvd. (Nelson Rd or Chiquita Blvd are the nearest cross streets.) There is a brown sign in the center median at the entrance to the park. (GPS may not get you to the park, as some of the local roads have been closed.) You will make a big J hook before getting to the parking area. Seahawk Park is managed by the *Cape Coral R/Seahawks* Club for Radio Controlled Planes and they have priority. They are usually done by sunset but may be there before sunrise. Park in the lot and transport your equipment to the concrete staging area before the runway. This park is handicap capable as there is level concrete leading from parking to the staging area.

CRP has a gate that closes at dusk, you can check the county's website for current gate closing times and the status of the park's Northside entrance as that is where we observe from. (They may close the area if there are issues with the trails.) There is a parking fee of \$1/hr or \$5/day at CRP. Park in the main Northside parking lot. We sometimes setup down the dirt road that goes to the east. That area is grassy and may not be level, so one should walk on the dirt road as much as possible and watch their step.

Big Cypress: The Big Cypress Visitor Center is located off US41 5 miles east of SR29 about 25 miles east of Naples. Big Cypress has earned a Dark Sky Park designation. They hold observing events down the road that extends south of the Visitor Center during the winter months. This is a real dark sky site. Their observing events are free.

Solar Events: We have daytime solar events where one can safely look at the Sun. Things such as sunspots and prominences may be visible. These are free unless tied to another event that may have an entrance fee. There are seasonal monthly events held at different parks around Charlotte County as well as at other major public events in SW FLA.

Rotary Park Star Party: This is a free public star party held at Rotary Park at the south end of Pelican Blvd in South Cape Coral. Park to the west of the main building and walk to where we are setup to the east of the main building.

Moore Observatory, FSW Punta Gorda Campus: The campus is located off Airport Rd just east of I-75. Go to the right around the lake and park. The observatory is located down the path along the lake. Besides the telescope in the observatory, additional scopes may be setup around the observatory. This is a free event.

Star Party Etiquette: Bright white flashlights are not welcome. We use red flashlights to preserve our night vision. At the parks, please use just your parking lights if possible. As there may be cords and tripod legs that are hard to see in the dark, we ask that all children be well behaved and cautious around the telescopes. If you need help in moving around in the dark, just ask. Someone will be happy to guide you with a red light. If you have a telescope and need help with it, just ask. Someone will be glad to show you how to use it.

Golden Rules to Telescope Observing: Move your eye to the telescope, don't try to move the telescope to your eye! Ladders/chairs are there for your support, the telescopes do not provide support and should not be touched.

Minutes of the Southwest Florida Astronomical Society – January 3, 2019

The regular monthly business meeting of the Southwest Florida Astronomical Society was called to order at 7:34 pm by president Brian Risley in the Calusa Nature Center Planetarium.

Thirty-nine people were present, including one new member.

Allyson Rae, chief meteorologist of NBC-2 News presented the program on weather forecasting of interest to astronomy applications.

At 8:46pm the business meeting resumed.

The past events listed in the printed agenda were reviewed.

Tom Segur handed out astronomy calendars for 2019 from FSW.

Upcoming events listed in the printed agenda were discussed.

John MacLean audited the financial records for 2018 and reported that everything is in order.

Ron Madl donated a Nexstar 5 to the club. Brian is checking it out and making sure everything is in working order.

Mike McCauley has been in contact with Babcock Ranch about an event and will present more information at next month's meeting.

The Club annual state corporate registration fee is due. It is around \$65-70. Bruce Dissette made a motion, seconded by Ed Sidor, to authorize paying it. The motion passed on a voice vote.

Vice President Mike McCauley suggested asking for volunteers to bring refreshments for the meeting each month. Tim Barrier volunteered for February. Contact Brian Risley to volunteer.

If you are not receiving the monthly newsletter e-mail, check your spam folder.

Bruce Dissette made a motion, seconded by John MacLean, to approve the minutes of the December meeting as contained in the January newsletter. The motion passed on a voice vote.

Treasurer Tim Barrier presented the December treasurer's report, with an ending balance of \$1457.66. The annual fee for use of the Planetarium will not be paid until January. Tony Heiner made a motion, seconded by Ed Sidor, to approve the report. The motion passed on a voice vote.

Librarian Maria Berni reported four new books.

Equipment Coordinator Brian Risley reported the CPC1100 is not tracking properly.

Website Coordinator Bill Francis is coordinating with John MacLean for Astronomical League links.

Anyone with program ideas or suggestions should contact Mike McCauley.

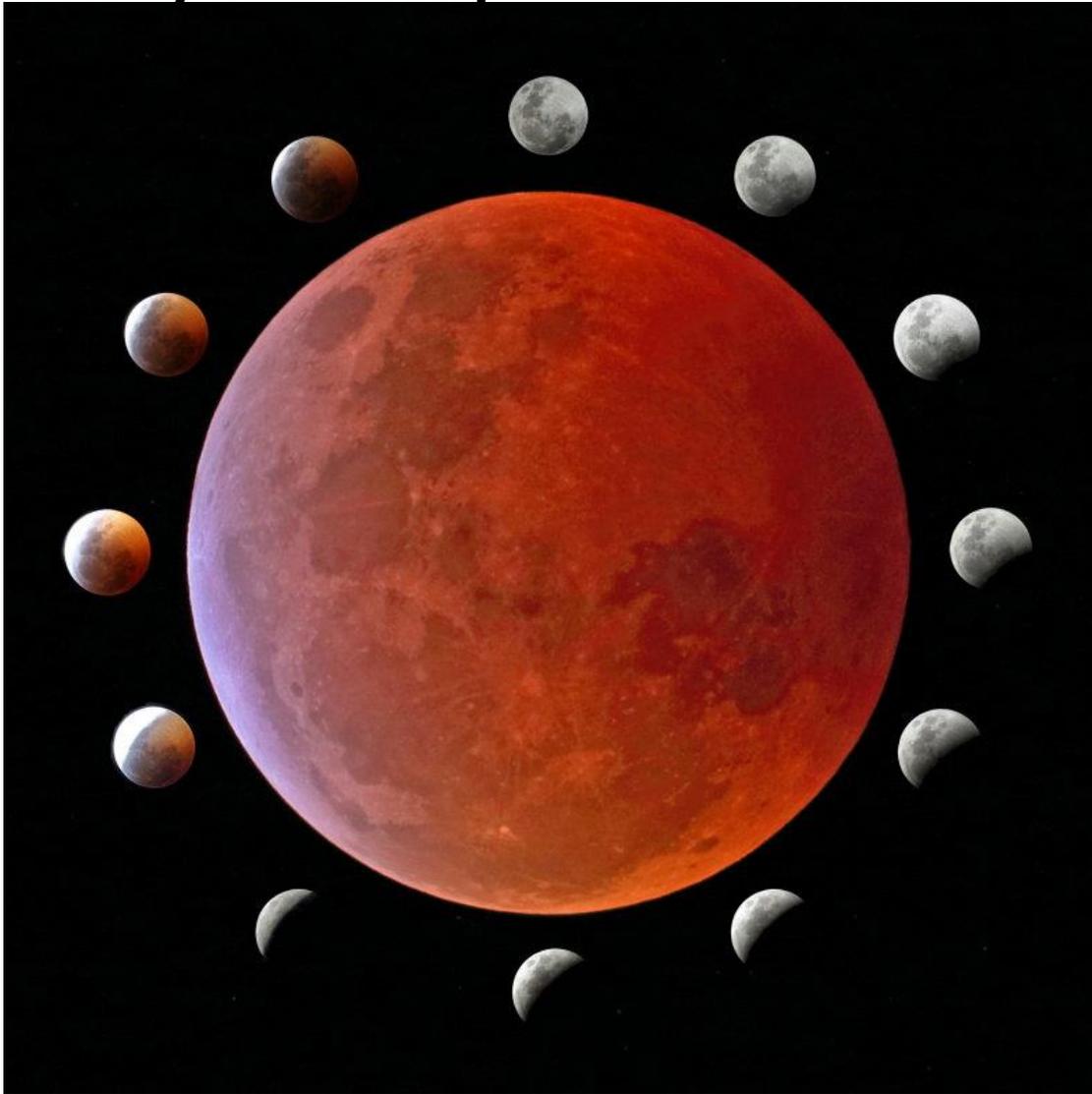
Astronomical League coordinator John MacLean is hoping to put articles about the Astronomical League in the Newsletter.

All the 2019 star party dates have been e-mailed.

The business meeting was adjourned at 9:28 pm.

Submitted by Don Palmer, secretary

January Lunar Eclipse Photos



[Chuck Pavlick](#)



Tony Heiner



Bruce Tompkins

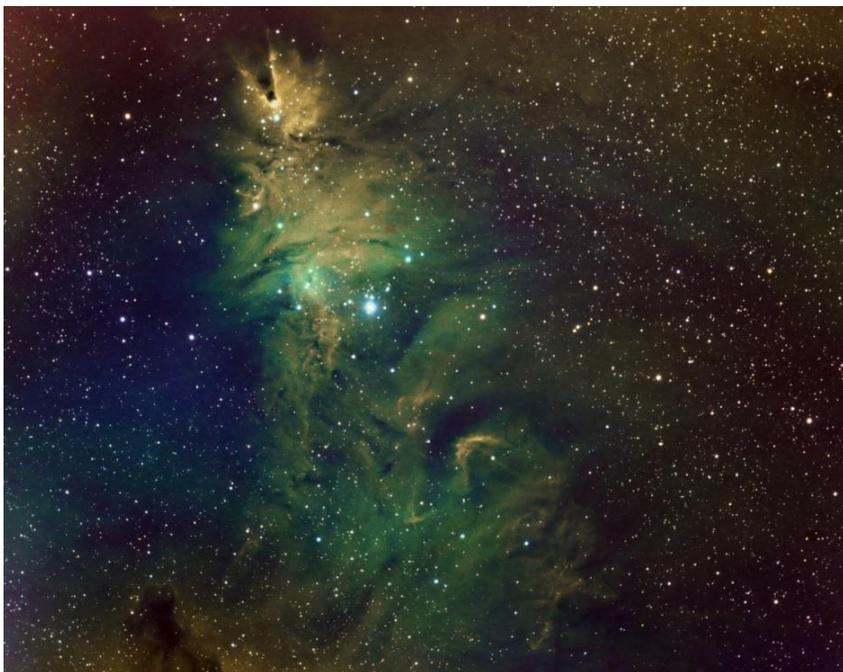


Robert Robbins

Photos by Chuck Pavlick



Fish Head Nebula

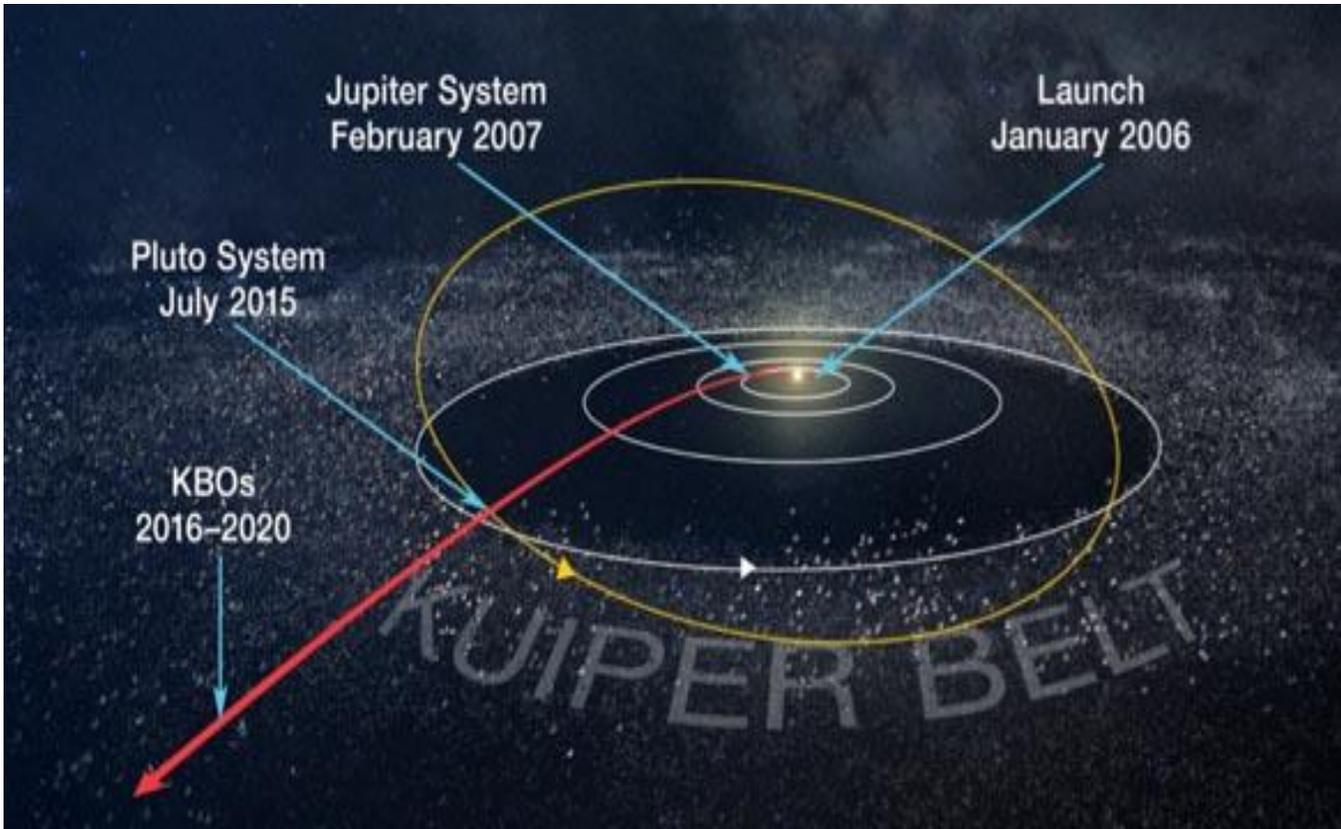


Christmas Tree Nebula

New Horizons Reaches "Ultima Thule" - Sky & Telescope

Sky & Telescope Weekly Letter, January 4, 2019

NASA's outward-bound explorer rings in the new year with the most distant flyby in space-exploration history.



Having visited Pluto and the small Kuiper Belt object 2014 MU₆₉, NASA's New Horizons spacecraft is headed out of the solar system. NASA / JHU-APL / SwRI

In the frigid, silent depths of the Kuiper Belt, the New Horizons spacecraft successfully flew past a tiny world nicknamed "Ultima Thule" (*UL-ti-muh THOO-lee*), meaning "beyond the known world," in the first hours of 2019. (Its official designation is 2014 MU₆₉.) The highly anticipated flyby, at 5:33 Universal Time today, came 3½ years after the spacecraft's historic encounter with Pluto on July 14, 2015, and occurred some 4.1 billion miles (6.6 billion km) from Earth — the most distant object ever visited at close range.



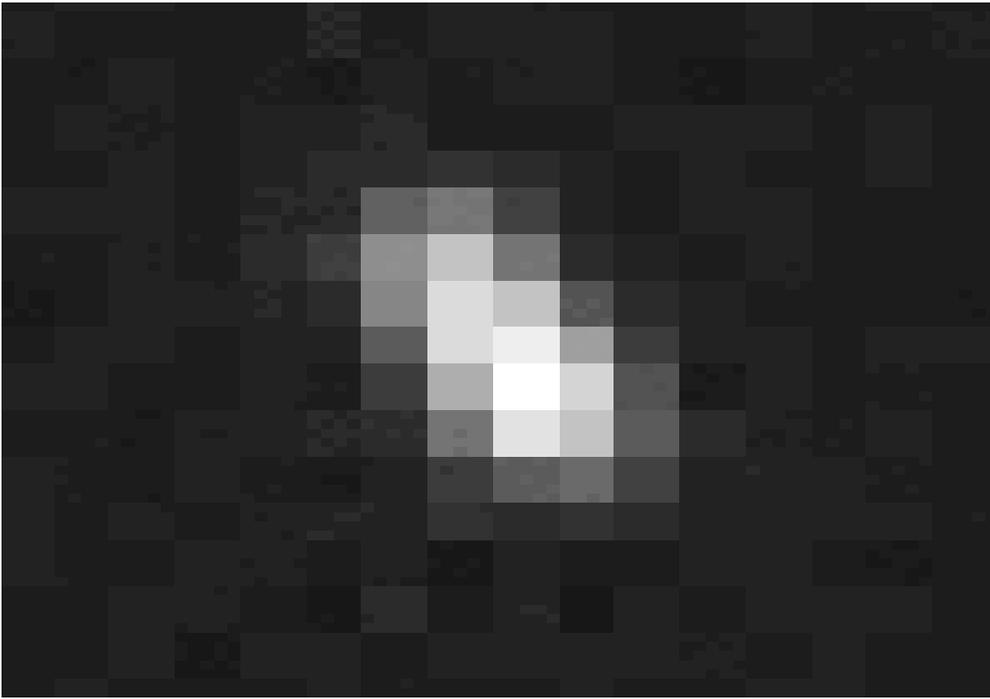
Artistic portrayal of NASA's New Horizons spacecraft cruising by 2014 MU₆₉ on January 1, 2019. Steve Gribben / NASA / JHU-APL / SwRI

More than that, the observations from [New Horizons' seven experiments](http://pluto.jhuapl.edu/Mission/Spacecraft.php#Payload) [<http://pluto.jhuapl.edu/Mission/Spacecraft.php#Payload>], now safely stashed on the craft's solid-state recorders, promise to reveal secrets of the "Third Zone" of the Sun's realm — distant objects that have remained frozen in time since the formation of our solar system's formation 4½ billion years ago.

Confirmation of the flyby's success didn't reach the mission's control center — Johns Hopkins University's Applied Physics Laboratory (JHU-APL) in Laurel, Maryland — for 10 hours. That's because the spacecraft remained out of contact as it scrutinized its target and because its telemetry now takes 6 hours to reach Earth. "We have a healthy spacecraft," announced mission manager Alice Bowman.

Once this "phone home" status report reached the ground, hundreds of anxious mission scientists, news media, and others erupted with applause. "I can't promise you success," principal investigator Alan Stern had warned the day before. "We are straining the capabilities of this spacecraft."

The flyby is also straining the patience of the mission's scientists. By design, the spacecraft returns its observations to Earth very slowly, at no more than 1,000 bits per second, and Stern cautions that the very best images and spectra of 2014 MU₆₉ might not be in hand until February. Highest priority will be transmitting data that reveal the object's geology, its composition, and whether it's surrounded by rings or very small satellites.



***This sequence of three images, received on December 31, 2018, and taken 70 and 85 minutes apart by New Horizons' LORRI camera, shows the rotation of "Ultima Thule."
NASA / JHU-APL / SwRI***

When its closest to 2014 MU₆₉, the spacecraft passed by just 2,200 miles (3,500 km) away, zipping by at 9 miles (14 km) per second. So the encounter was brief and intense. For now, the best view is just a few pixels across, recorded as part of "fail safe" observations taken when New Horizons was still roughly 500,000 miles away.

But that fuzzy view is enough to confirm that "Ultima" is distinctly elongated — shaped like a peanut or, conceivably, two objects orbiting each other very closely — measuring about 22 by 10 miles (35 by 15 km). [This shape matches the outcome of three risky occultations \[https://www.skyandtelescope.com/astronomy-news/2014-mu69-fascinates-puzzles-observers/\]](https://www.skyandtelescope.com/astronomy-news/2014-mu69-fascinates-puzzles-observers/), recorded in mid-2017 by telescope-toting observing teams in South America and Africa when the object passed directly in front of faint stars.

Unexpectedly, 2014 MU₆₉ appears to be spinning slowly like a propeller, with its rotation axis pointing roughly toward the Sun. Consequently, despite its irregular shape, the object does not exhibit brightness changes. (This trait was first detected during [intensive observations by the Hubble Space Telescope in mid-2017](https://arxiv.org/abs/1812.04758). [<https://arxiv.org/abs/1812.04758>])

It also suggests that some of the surface remained in shadow as New Horizons approached flew past.



Musician-astronomer Brian May speaks to reporters during the New Horizons flyby of 2014 MU₆₉. J. Kelly Beatty / Sky & Telescope

The science observations will continue trickling back to Earth, though transmissions will be suspended from January 4th to 7th, when the line of sight to the spacecraft passes close to the Sun. More detailed observations, including the first color views of 2014 MU₆₉, should be available tomorrow, and I'll be reporting on those results too — so check back here soon.

Finally, to underscore how the New Horizons mission has, literally, broadened our scientific horizons, onlookers at JHU-APL were treated to the debut of a song written by Brian May, best known as the guitarist for Queen but who also holds a doctorate in astronomy and serves as a science collaborator (specializing in stereo imagery) with the mission. [Have a listen!](#)

See also "Initial Results from the Ultima Thule Flyby", Alan Stern, January 23, 2019, Sky & Telescope Weekly, January 25, 2019.

See <http://pluto.jhuapl.edu/Mission/Spacecraft.php#Payload> for a description of the New Horizons Mission and payload.

The Astronomical League

As a member of the Southwest Florida Astronomical Society you are automatically also a member of the Astronomical League, a nationwide affiliation of astronomy clubs. Membership in the AL provides a number of benefits for you including receipt of The Reflector, the AL's quarterly newsletter, use of the Book Service, through which you can buy astronomy related books at a 10% discount. You can also participate in the Astronomical League's Observing Clubs. The Observing Clubs offer encouragement and certificates of accomplishment for demonstrating observing skills with a variety of instruments and objects. These include the Messier Club, Binocular Messier Club, the Herschel 400 Club, the Deep Sky Binocular Club, and many others. To learn more about the Astronomical League and its benefits for you, visit <http://www.astroleague.org>

Introduction to the Astronomical League Observing Programs

There are some 50 formal Observing Programs available to choose from covering the whole gamut of object types accessible to the amateur astronomer. In addition there are from time to time additional programs set up for special targets including comets, eclipses, transits and so forth. Certificates and pins are awarded for successful completion and submission of the required observations for a particular program. There is no time limit for completing observations. The programs are categorized by level of difficulty (Novice, Intermediate, and Advanced) and each program is also categorized by recommended equipment ranging from the naked eye through binoculars and telescope aperture. There are programs for Imagers and also for solar observers using H-alpha scopes. Visit <http://www.astroleague.org/observing> to obtain full details. Starting in February 2019, we will highlight one or two programs each month in the Newsletter.

Seeing Red – The AL Carbon Star Program

Almost all carbon stars are red giants that have depleted the hydrogen in their cores. As the core is compressed and heated the helium atoms fuse to form carbon and oxygen. Convective currents are formed which dredge up carbon and oxygen into the star's outer layers and these form additional molecules in the outer atmosphere that scatters blue light enhancing the red appearance of the star. All carbon stars are variable with periods ranging from a few months to well over a year.

The Carbon Star Observing Program lists 100 targets that are visible throughout the year. Most of these are great targets even from heavily light polluted city backyards. Colors may range from yellow or orange to deep reds at minimum. The use of Go-To scopes is allowed but not encouraged as there is a good learning process in finding one's way around via star-hopping. The recommended minimum aperture is 8 inches although very many of these are easily accessible with much smaller aperture. If participating in the formal program, the transparency and seeing conditions must be documented along with a description of the star's color. A sketch showing other field stars must also be submitted. The AL publishes a special "Guide to the Carbon Star Observing Program" which can be purchased from their online bookstore. Star charts are a must to locate the stars manually. I normally use the Sky & Telescope Pocket Star Atlas but in checking out a handful of carbon stars on the list found that one (RT Orioni) was not included. It was

included on the Sky Atlas 2000 charts, however. In all cases the AAVSO site for variable star observing is invaluable and you will be able to use the AAVSO Variable Star Plotter (VSP) to print out detailed charts for any of the objects.

Seeing Double – The AL Double Star Programs

Double Stars are also inviting targets for less than pristine observing conditions. Separate programs are provided for Binoculars and Telescopes.

Binocular Double Star Observing Program

This program complements concurrent observations for the Messier Binocular and Deep Sky Binocular programs. Wide double star pairs are targeted and span the entire night sky and were chosen to enable the observer to enjoy some of the most interesting and spectacular night sky regions. A list of 120 of the finest binocular double and multiple star systems is provided from which any 50 may be chosen to qualify for the certificate and pin. The program is suitable for any binocular aperture 20 mm and above. Seeing and Transparency conditions must be documented along with a description. No sketch is required.

Double Star (Telescopic) Observing Program

This program is designed to introduce observers to 100 of the finest double and multiple star systems in the heavens. Small telescopes are fine for this program with a suggested minimum aperture of 3 inches. For formal submission, the Seeing and Transparency conditions must be documented and a simple sketch is required with the stars represented as dots. The dot size is used to represent magnitude and the distance between dots is used to represent separation. As is the case with carbon stars, the AL prefers star hopping to be used for object location but is fine with use of Go-To scopes as long as the observing requirements are fully met and documented.

Double Star Resources. The AL suggests the following resources for more information on double stars:

Bright Star Atlas 2000.0 (Tirion)

The Cambridge Double Star Atlas (Mullaney, Tirion)

Double and Multiple Stars and How to Observe Them (Springer, 2005)

Observing and Measuring Visual Double Stars (Argyle)



This article is distributed by NASA Night Sky Network

The Night Sky Network program supports astronomy clubs across the USA dedicated to astronomy outreach. Visit nightsky.jpl.nasa.org to find local clubs, events, and more!

Hexagon at Night, Quartet in the Morning

By David Prosper

The stars that make up the **Winter Hexagon** asterism are some of the brightest in the night sky and February evenings are a great time to enjoy their sparkly splendor. The Winter Hexagon is so large in size that the six stars that make up its points are also the brightest members of six different constellations, making the Hexagon a great starting point for learning the winter sky. Find the Hexagon by looking southeast after sunset and finding the bright red star that forms the "left shoulder" of the constellation Orion: **Betelgeuse**. You can think of Betelgeuse as the center of a large irregular clock, with the Winter Hexagon stars as the clock's hour numbers. Move diagonally across Orion to spot its "right foot," the bright star **Rigel**. Now move clockwise from Rigel to the brightest star in the night sky: **Sirius** in Canis Major. Continue ticking along clockwise to **Procyon** in Canis Minor and then towards **Pollux**, the brighter of the Gemini twins. Keep moving around the circuit to find **Capella** in Auriga, and finish at orange **Aldebaran**, the "eye" of the V-shaped face of Taurus the Bull.

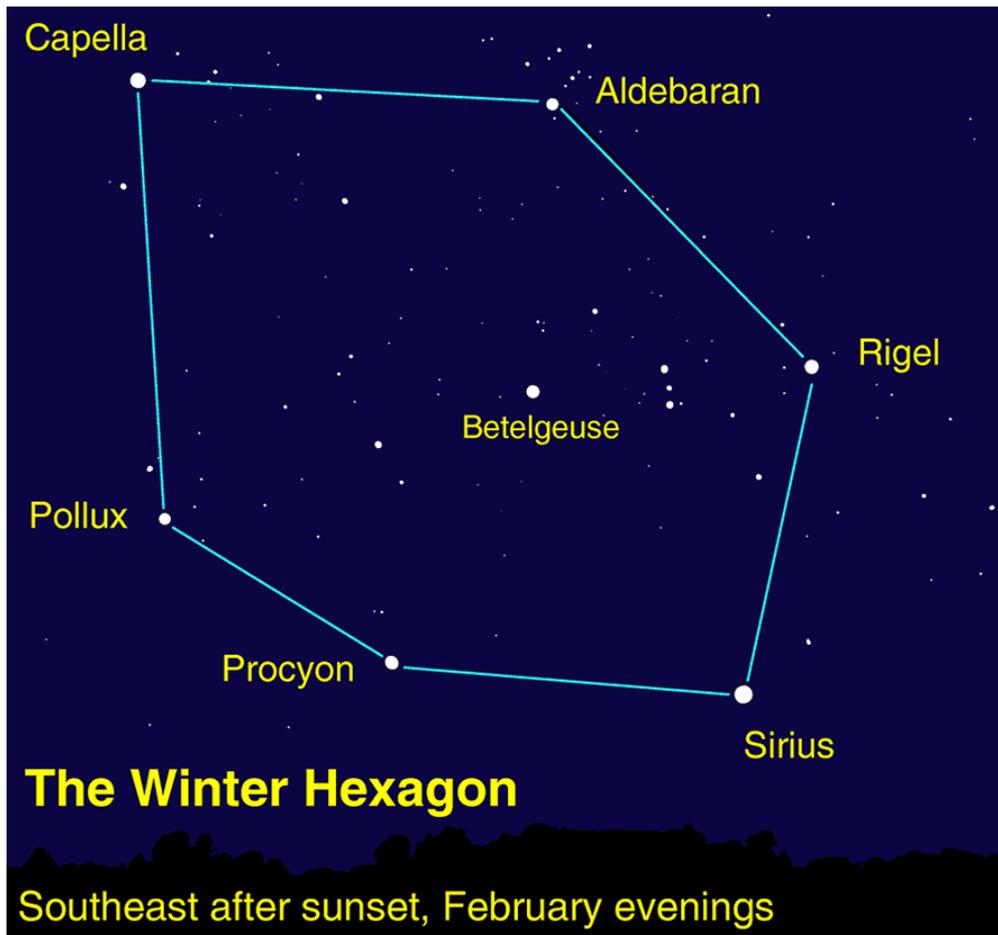
Two naked-eye planets are visible in the evening sky this month. As red **Mars** moves across Pisces, NASA's InSight Mission is readying its suite of geological instruments designed to study the Martian interior. InSight and the rest of humanity's robotic Martian emissaries will soon be joined by the Mars 2020 rover. The SUV-sized robot is slated to launch next year on a mission to study the possibility of past life on the red planet. A conjunction between Mars and **Uranus** on February 13 will be a treat for telescopic observers. Mars will pass a little over a degree away from Uranus and larger magnifications will allow comparisons between the small red disc of dusty Mars with the smaller and much more distant blue-green disc of ice giant Uranus.

Speedy **Mercury** has a good showing this month and makes its highest appearance in the evening on February 27; spot it above the western horizon at sunset. An unobstructed western view and binoculars will greatly help in catching Mercury against the glow of evening twilight.

The morning planets put on quite a show in February. Look for the bright planets **Venus**, **Jupiter**, and **Saturn** above the eastern horizon all month, at times forming a neat lineup. A crescent **Moon** makes a stunning addition on the mornings of February 1-2, and again on the 28th. Watch over the course of the month as Venus travels from its

position above Jupiter to below dimmer Saturn. Venus and Saturn will be in close conjunction on the 18th; see if you can fit both planets into the same telescopic field of view. A telescope reveals the brilliant thin crescent phase of Venus waxing into a wide gibbous phase as the planet passes around the other side of our Sun. The Night Sky Network has a simple activity that helps explain the nature of both Venus and Mercury's phases at bit.ly/venusphases

You can catch up on all of NASA's current and future missions at nasa.gov



*Caption: The stars of the Winter Hexagon
Image created with help from Stellarium*

Annual Dues Reminder

Dues were increased to \$25.00 per year as of the November 2018 meeting. We are now collecting the 2019 dues. If you had already paid the 2019 dues, you do not have to worry about the difference. If you have any issues, please privately contact an officer. Dues can be mailed to: SWFAS, Inc. P.O. Box 100127 Cape Coral, FL 33910

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