NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

NOVEMBER 2021

PRESIDENT'S NOTES

Happy November HACers,

I'd like to start this newsletter with a surprise to me. As president I also get one of the last proofreads of this newsletter and believe it or not I do read them. So, to say I was happily surprised is an understatement. In this month's Club Officers and Contacts box I saw that our very own Nightfall Editor, Cindy Jean Lund is now Cindy Shomenta. Wonderful news and all our best Mr. and Mrs. Shomenta! Cheers!

Now back to the humdrum.

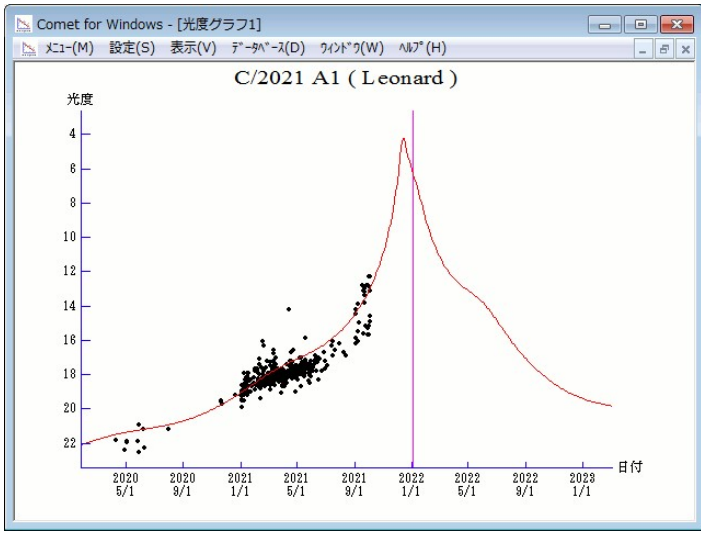
This is another one of my favorite months. Not too hot or cold. Yet, there can be a crispness in the air by mid-afternoon, and my telescopes are near ambient temperature long before the end of twilight. The skies of November have the Milky Way arching right above us. By nine o'clock the sky has stabilized, and the constellations of Cygnus, Pegasus, Delphinus, Vulpecula, and Sagitta are well up overhead. Although we are drawn to the larger, brighter constellations, even the small ones have amazing targets for your view pleasure. So, this month we'll investigate the small constellations of Vulpecula, and Sagitta, the little fox, and the arrow. But first I promised to give you more information on C/2021 A1 (Leonard), comet Leonard.

COMET C/2021 A1 (LEONARD), TAKEN 10/28/2021 WHILE IN URSA MAJOR

Source: David R., 10/27/2021.

The comet was found at the Mount Lemmon Observatory, here in Tucson, by astronomer Greg Leonard on January 3, 2021. Greg is with the Mt. Lemmon Survey (part of the Catalina Sky Survey). NASA/JPL estimates that Comet Leonard's closest approach to Earth will be on December 12, 2021, and reach perihelion on January 3, 2022. Estimates indicate it might reach a visual magnitude of around 5 or even 4 (the lower the brighter), and although at its brightest the comet will be very close to the horizon. We still might get very good views using binoculars during the days before its closest approach to Earth, in early December 2021, with visibility to the eye alone still a possibility. So far, the brightness estimates have been on track for Leonard to become naked-eye but the comet is making its first time around the sun so anything can happen.

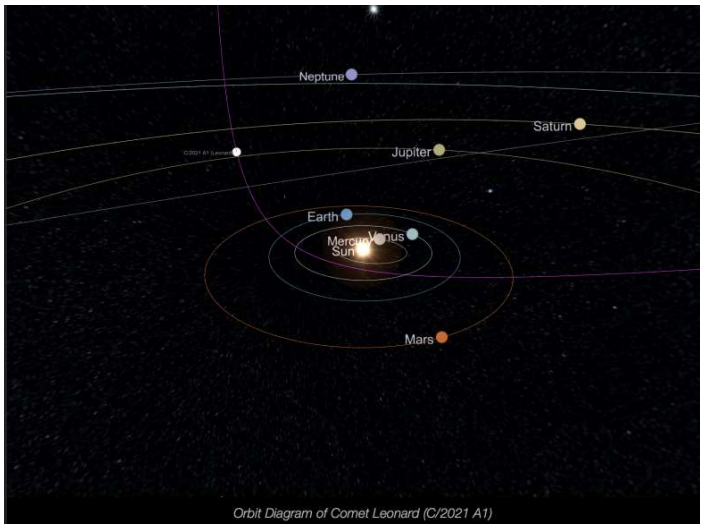
MAGNITUDES GRAPH FOR COMET C/2021 A1



Source: http://aerith.net/comet/catalog/2021A1/2021A1.html
Copyright(C) Seiichi Yoshida (comet@aerith.net)

Comet Leonard is also making its last time around the sun as it has a hyperbolic orbit, that is, an orbit that'll carry it only once through the inner solar system. So, this is a one-shot deal, gang! The illustration below shows its path. We will have our best chance of seeing it on its way in before its closest approach to the sun. Folks in the southern hemisphere will get their shot on its way out, when it will be its warmest and slushiest; they may get a nice view.

Comet C/2021 A1 (Leonard) Calculated Trajectory

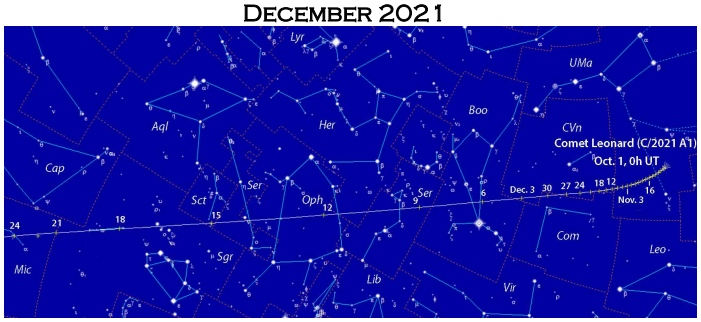


"This perspective on Comet C/2021 A1 (Leonard) shows its trajectory through our solar system. North is up. You can see that its orbit will cause it to be initially visible from Earth's Northern Hemisphere, and then from the Southern Hemisphere. Chart via Dominic Ford's In-the-Sky."

Source: Image and caption. https://earthsky.org/astronomy-essentials/comet-leonard-might-become-2021s-brightest-2022/ . Viewed 10/13/2021.

So, what about all of us in Cochise County? December, we'll get our chance. Although the comet will be close to the horizons, we should have nice views using cameras, binoculars and even the smallest telescopes. Depending on the brightness and development of a tail, you should get ready with equipment that have wide fields of view.

Finder chart for C/2021 A1 Leonard through December 2021



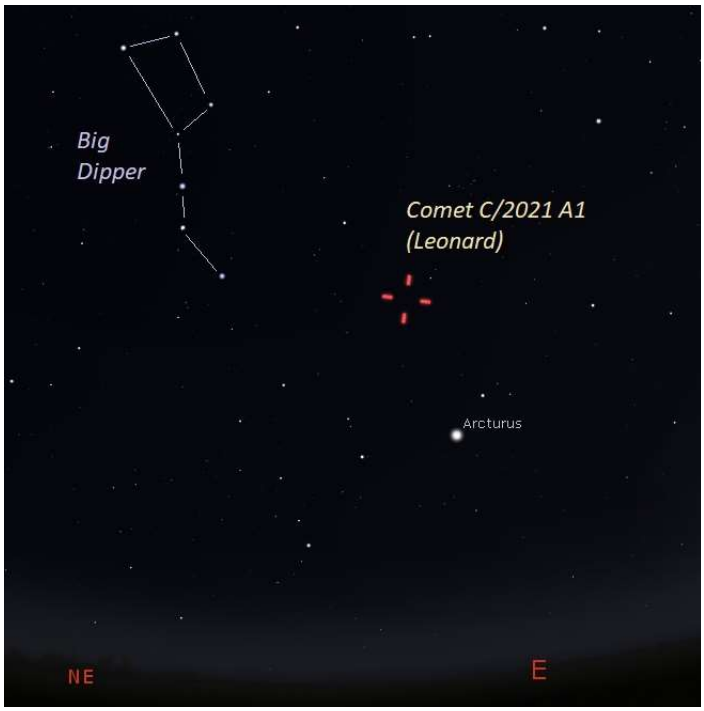
Source: https://skyandtelescope.org/astronomy-news/comet-watch-2021/
Chris Marriott's SkyMap Visited 10/11/2021

This comet is fast moving, so you'll need to keep up to follow it. On December 1st the comet will be seen in the morning sky in the east.

Eddie Irizarry of the Sociedad de Astronomía del Caribe (Astronomical Society of the Caribbean) has a good write-up on Comet Leonard on the EarthSky website. https://earthsky.org/astronomy-essentials/comet-leonard-might-become-2021s-brightest-2022/

He promises to keep updating his article as the comet nears, so watch that space. I've included some of the illustrations from his article to help guide your efforts in finding the comet.

Location of Comet C/2021 A1 (Leonard) on December 1, 2021.

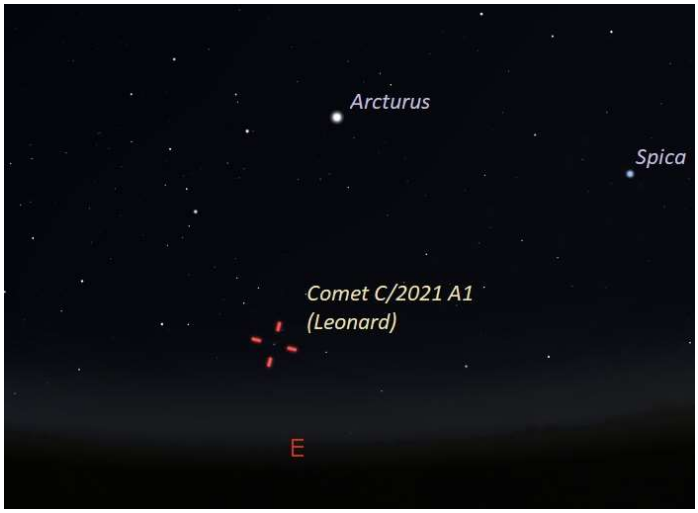


"Facing east about 90 minutes before sunrise. The Big Dipper asterism in the constellation Ursa Major the Great Bear will provide a good reference for observers to locate the comet. Illustration by Eddie Irizarry using Stellarium."

Source: https://earthsky.org/astronomy-essentials/comet-leonard-might-become-2021s-brightest-2022/ Viewed 10/13/2021

By December 10th, it will be quite near the eastern horizon just before sunrise, and we will know if this comet is going to put on a show or be a fizzler.

Location of Comet C/2021 A1 (Leonard) on December 10, 2021.



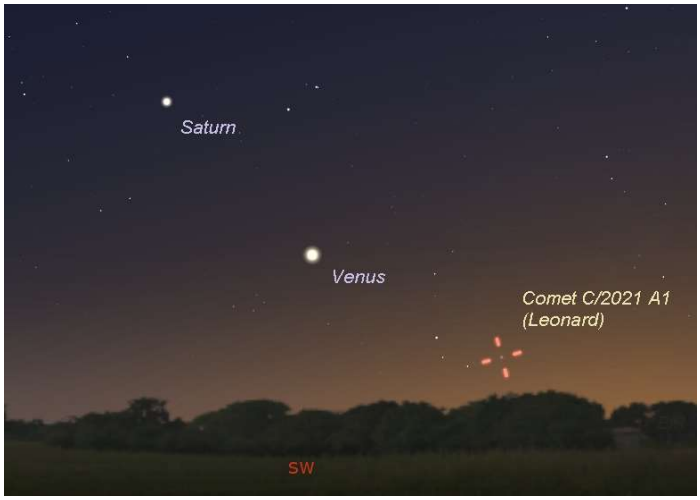
"By then [December 10], it will be brighter but closer to the horizon. As seen from U.S. about 30 minutes before sunrise. Illustration by Eddie Irizarry, using Stellarium."

Source: https://earthsky.org/astronomy-essentials/comet-leonard-might-become-2021s-brightest-2022/ Viewed 10/13/2021

Less than a week later, December 14-16, Comet C/2021 A1 (Leonard) will become visible just after sunset, very low in the

southwest horizon. If the brightness curve proves correct, "visible" means: use a telescope or binoculars.

LOCATION OF COMET C/2021 A1 (LEONARD) ON DECEMBER 15, 2021.

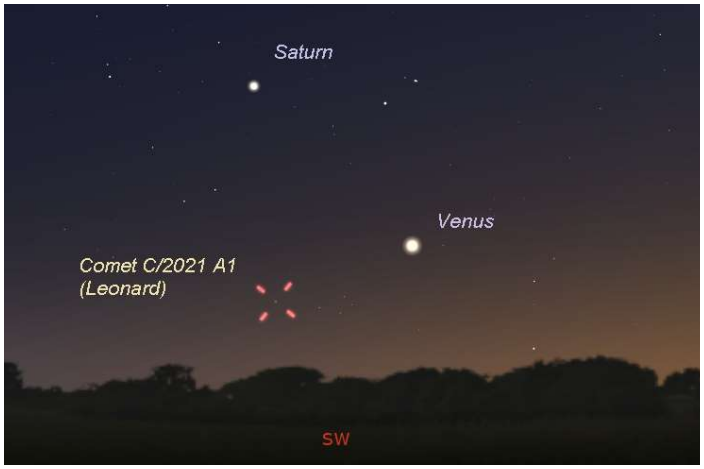


"About 30 minutes after sunset. Facing Southwest, as seen from U.S. Illustration by Eddie Irizarry using Stellarium."

Source: https://earthsky.org/astronomy-essentials/comet-leonard-might-become-2021s-brightest-2022/ Viewed 10/13/2021

The comet's position will improve for a few nights as it shifts south along the southwest horizon and, who knows, the comet might start falling apart and give a grand performance. It's a small chance but enough to hope. Besides, nobody is going to be sleeping well anyway, the James Webb Telescope launch is currently targeted for December 18, 2021.

LOCATION OF COMET C/2021 A1 (LEONARD) ON DECEMBER 19, 2021.



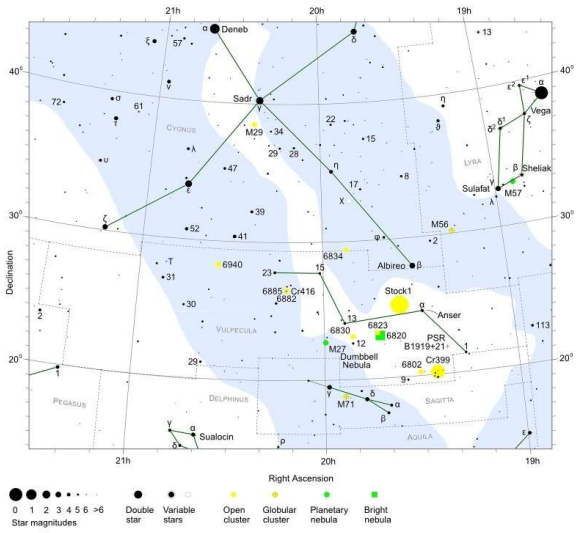
"December 19, 2021, about 30 minutes after sunset. Facing Southwest, as seen from U.S. Illustration by Eddie Irizarry using Stellarium."

Source: https://earthsky.org/astronomy-essentials/comet-leonard-might-become-2021s-brightest-2022/Viewed 10/13/2021

By late December the comet is moving south quickly, so if turns out to surprise us and dazzle after its passage around the sun on January 3, the southern hemisphere will get the payoff. Personally, I'm hoping the comet is slushy, with lots of loose material and wears itself out before it gets around the sun. However, I don't have a very good track record on predicting these things.

Ok, so back to the topic Vulpecula, and Sagitta. They are small constellations but one rich in mythology. Sagitta is said to represent the arrow that Hercules used to kill Aquila the Eagle that perpetually ate the liver of Prometheus (I love that story). There's more backstory, but of course you remember it, so I won't waste time and space. As for Vulpecula, it is just a little fox, a filler constellation. There aren't any wonderous myths, so I'd say you're free to make up your own. And while you're using your imagination on myth creation also figure out how someone got an image of a fox out of those stars.

SAGITTA AND VULPECULA CHART



Source: https://freestarcharts.com/vulpecula

None of the stars in Vulpecula or Sagitta are very bright but they are noticeable. I find I can connect the dots of Sagitta and imagine it as an arrow, and I can sometimes remember that the dim string of stars between Sagitta and Cygnus is Vulpecula

MESSIER 27 AND MESSIER 71

Messier 27, a planetary nebula.

Messier 71, a globular cluster.

Note: Objects not at equivalent scale.

Source: David R

Two notable objects reside in these two constellations. Messier 71, a globular star cluster, is nearly in a direct line between the two brightest stars in Sagitta (upsilon and delta) and Messier 27, the Dumbbell planetary nebula, in Vulpecula just about three degrees north of Upsilon Sagitta. Messier 71 (also known as M71 or NGC 6838), is designated as a very loosely concentrated globular cluster. While it might be bright

enough to see with an unaided eye under excellent conditions (it's magnitude 6.1), it is easily viewed in binoculars and small telescopes. As you might expect, it does look a bit comet-like, especially with the dim stars that make up the object. Still, it is interesting and easy to find if you're getting ready for your Messier Marathon.

Messier 27 (also known as the Dumbbell Nebula, Apple Core Nebula, M 27, and NGC 6853), is a showpiece in telescopes 4" and larger. In an 8" Schmidt Cassegrain Telescope at 100x, it shows as a large disc, looking a bit like a cat eye with a subtle shape of an hourglass inside the eye. Dark, calm skies allow the central star to be visible in the same size scope. Larger scopes reveal more stars seemingly inside the nebula, but they are in front of or behind the bubble. Also evident with larger scopes are textures within the nebula, including the seemingly straight beam connecting the two brighter nodes that denoted the dumbbell shape to early astronomers.

There are several dimmer objects to look for in these two constellations, but I just looked at how much I have already rambled on… so I'll stop here. Till next time, get out there and stare.

Welcome our new members

The Lighthill family of Sierra Vista (Richard, Denese, Jennifer, Anthony, Katrina and Cynthia) joined after attending the October Public Night. Nathan Webb of Sierra Vista joined at the JWST Community Event at Patterson. He is our newest student member. Also joining in October were Sean Obrien of Hereford, and Bill Green and Betsy Cooley, also of Hereford, who joined as a family. Welcome, we are glad you joined!

At the November Meeting

The November meeting of the Huachuca Astronomy Club will be held on Friday, November 19 at 7pm in the library commons at Cochise College, 901 N Colombo Avenue, Sierra Vista.

A Fusion of Art and Astronomy

Astronomer Stephen Strom's research career spanned more than fifty years, during which he made contributions to a number of fields: stellar atmospheres, the evolution of galaxies, and most prominently, the evolution of stars and planetary systems. During the latter part of his career, Dr. Strom developed a passion for photography, and for the past forty years has published eleven books in which his landscape photography complements poems and essays that speak to current cultural or environmental issues. His photography has been exhibited widely throughout the United States and is held in several permanent collections.

In his talk on November 19 Dr. Strom will reflect on both his careers, following both the evolution of his photographic vision as well as his efforts to understand how solar systems like our own came to be. He will end by offering thoughts regarding the likelihood that life-bearing planets are common or rare.

Officer Elections will be held at the November meeting. Please contact Bert Kelher (spotted_toad@hotmail.com) to make nominations or to self-nominate. We must elect the four officers (President, Vice President, Secretary and Treasurer) as well as four members at large.

2022 Dues can be paid at the November meeting. Most memberships expire in December. Dues are $35 family, $25 individual or active-duty military family, $20 active-duty military individual, and $10 student with valid ID. Cash or check will be accepted at the meeting. Makes checks payable to Huachuca Astronomy Club.

Other options for remit of dues:

1. You can mail your dues check to the Huachuca Astronomy Club PO Box 922, Sierra Vista AZ 85636
2. You can pay online by visiting www.hacastronomy .org and pulling down the membership menu. You'll be directed to Pay Pal where you can use your Pay Pal account OR your credit card.
3. If you have a Pay Pal account, you can use PayPal Direct to send your payment to paypal@hacastronomy.org
4. If you have a Zelle account with your bank, you can make a dues payment by transferring funds to twforte@powerc.net

2022 RASC Handbook (FINAL CHANCE). The treasurer will be taking orders for the handbooks at the November meeting. Please pay $25 when ordering, cash or check made out to the Huachuca Astronomy Club. You may also pay for the book using your PayPal account or credit card by using the Donate button on the HAC website www.hacastronomy.org and emailing tedforte511@gmail.com to explain the purpose of the payment. Once we place our group order on Nov 22, no more orders will be taken.

Calendars The club also gets a discount (50% off) on the Deep Space Mysteries calendars offered by Astronomy Magazine each year. Members can just go online and get their discount by visiting MyScienceShop.com/ASYClubs and using the code **CAL50** at checkout.

NASA Night Sky Notes November 2021

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!

Measure the Night Sky

Fall and winter months bring longer nights, and with these earlier evenings, even the youngest astronomers can get stargazing. One of the handiest things you can teach a new astronomer is how to measure the sky – and if you haven't yet learned yourself, it's easier than you think!

Astronomers measure the sky using degrees, minutes, and seconds as units. These may sound more like terms for measuring time - and that's a good catch! – but today we are focused on measuring angular distance. Degrees are largest, and are each made up of 60 minutes, and each minute is made up of 60 seconds. To start, go outside and imagine yourself in the center of a massive sphere, with yourself at the center, extending out to the stars: appropriately enough, this is called the celestial sphere. A circle contains 360 degrees, so if you have a good view of the horizon all around you, you can slowly spin around exactly once to see what 360 degrees looks like, since you are in effect drawing a circle from inside out, with yourself at the center! Now break up that circle into quarters, starting from due North; each quarter measures 90 degrees, equal to the distance between each cardinal direction! It measures 90 degrees between due North and due East, and a full 180 degrees along the horizon between due North and due South. Now, switch from a horizontal circle to a vertical one, extending above and below your head. Look straight above your head: this point is called the zenith, the highest point in the sky. Now look down toward the horizon; it measures 90 degrees from the zenith to the horizon. You now have some basic measurements for your sky.

Use a combination of your fingers held at arm's length, along with notable objects in the night sky, to make smaller measurements. A full Moon measures about half a degree in width - or 1/2 of your pinky finger, since each pinky measures 1 degree. The three stars of Orion's Belt create a line about 3 degrees long. The famed "Dig Dipper" asterism is a great reference for Northern Hemisphere observers, since it's circumpolar and visible all night for many. The Dipper's "Pointer Stars," Dubhe and Merak, have 5.5 degrees between them - roughly three middle fingers wide. The entire asterism stretches 25 degrees from Dubhe to Alkaid - roughly the space between your outstretched thumb and pinky. On the other end of the scale, can you split Mizar and Alcor? They are separated by 12 arc minutes - about 1/5 the width of your pinky.

Keep practicing to build advanced star-hopping skills. How far away is Polaris from the pointer stars of the Big Dipper? Between Spica and Arcturus? Missions like Gaia and Hipparcos measure tiny differences in the angular distance between stars, at an extremely fine level. Precise measurement of the heavens is known as astrometry. Discover more about how we measure the universe, and the missions that do so, at nasa.gov.

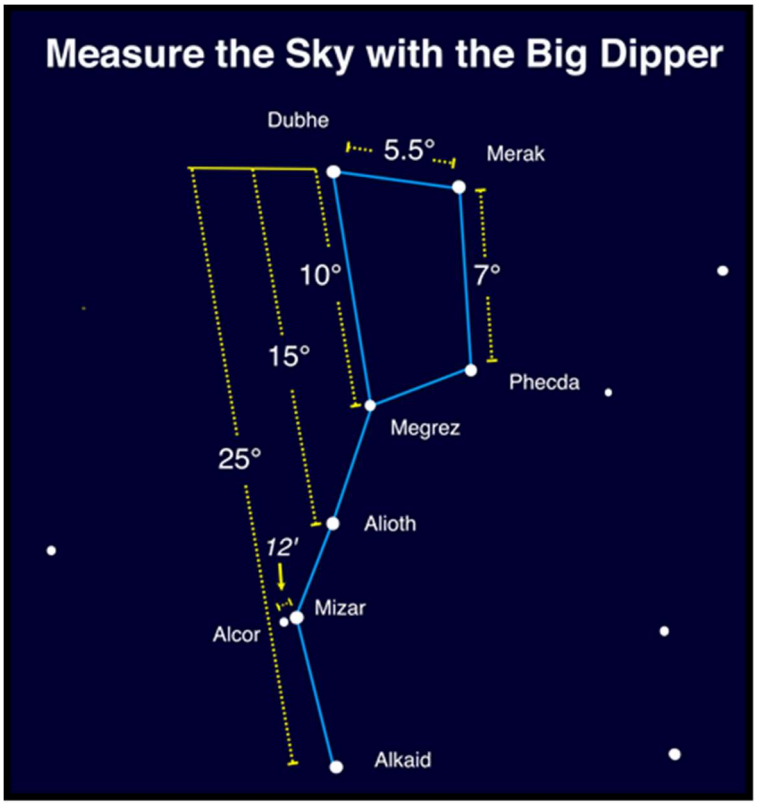


Image created with assistance from Stellarium

My favorite new toy

By Ted Forte

With many thanks to Max Mirot, who introduced me to white phosphor night vision and gave me a head start on the waiting list at the manufacturer (TNVC), I'd like to report on a remarkable product. One, that has rather revolutionized my observing and quite possibly saved my hobby from the ravages of cataracts and other age-related vision defects.

The PVS-14 Gen III monocular I'm using is a military grade night vision device. Turning it to the sky reveals more stars than I care to try and count. When adapted to the telescope it provides really remarkable views. The addition of an h-alpha filter makes emission nebulae glow so bright that they simply can't be missed, even at 1x, and that is, I think, the main benefit.

I've been just marveling at what the device reveals when turned toward areas like the Gamma Cygni complex, the North American Nebula or the Heart and Soul nebulae in Cassiopeia. So far, I've enjoyed using it as a stand-alone and in a range of telescopes from my home-made Paul Rini 75mm refractor up to the 30-inch Star Splitter!

Here it is attached to a 10-inch Dob using an adapter to connect to 48mm threads (standard 2" filter threads) machined into the eyecup end of a Russel Optics 50mm Plossl.

The device is 4.5" long and weighs 12.4 ounces. Alone, it gives a 40o field of view.

It runs on a single AA battery for up to 50 hours. It's waterproof. It is supposed to be able to withstand submersion to 60' for 2 hours. Not something I'm likely to test.

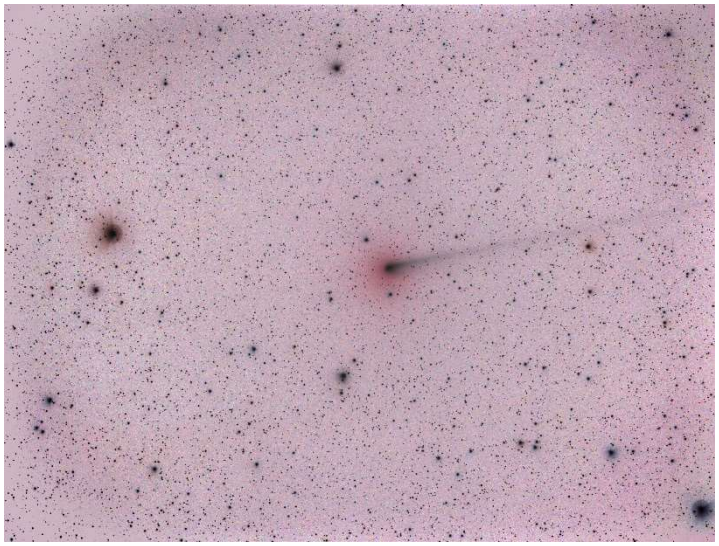
As I mentioned, with an h-alpha filter in the light path, it excels at making emission nebulae bright. Very bright. The view of IC 434, appearing bright and obvious, with an inky black and perfectly defined horse head standing out in stark contrast is, to me, alone, worth the 4k price tag! It is far superior to the green image enhancers of decades ago. The view of nebulae is very reminiscent of viewing a black and white photo.

It does have limitations, of course. It does not enhance OIII emission and is therefore less than exciting on most planetary nebulae. It also does not like bright objects. Bright stars bloom with halos, and planets become bright featureless blobs. But faint stars are revealed in their multitudes and Max reports that faint meteors are made easily visible too. I'm looking forward to employing it on the Geminids next month.

Looking back over my am-astro 'career' there are only a few purchases that have expanded my enjoyment of this hobby disproportionately in a cost/benefit sense. My 18-inch Obsession telescope is one and this night vision device will, I trust, be another.

Pictures by HAC Members

67P/Churyumov-Gerasimenko by David Roemer



M33 Triangulum Galaxy by Mark Orvek

NGC 7000 North America Nebula by Mark Orvek

Perseus Double Cluster by Richard Pattie

FOR SALE

I own a Celestron NexStar 8 SE Schmidt-Cassegrain Computerized Telescope. A Celestron Power Tank. Eye pieces, and various other accessories. They are in excellent shape and am trying to sell the items. If anyone in your astronomy club is interested in purchasing please contact me at the email address below. I will provide photos to anyone interested. Contact Craig Riley Email: criley1974@yahoo.com

Patricia Houser has two telescopes to sell. Her husband was the astronomer, and can no longer pursue the hobby. She did not mention what the scopes are but would be open to potential buyers coming out to see them (Whetstone). That's all the information we have, so if you have questions please contact Ms. Houser directly at iamtennis@peoplepc.com

Celestron 6SE. (Schmidt Cassegrain) Includes two scope buggies for it. Also includes an equatorial tripod for the 2nd buggy. See pictures below
Contact JD Maddy at 602-672-2032 Will deliver

Club Officers and Contacts

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Vice President: Dwight Hoxie

Secretary: Bert Kelher

Treasurer: Ted Forte

Past Vice President: Bill Howard

Board Members-at-Large

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Facebook: http://www.facebook.com/HuachucaAstronomyClub

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Farpoint Astronomy http://www.farpointastro.com/

Starizona http://starizona.com/

HAC November/December 2021 Calendar of Events

SU	MO	TU	WE	TH	FR	SA
31 Oct	**1 Nov**	**2**	**3**	**4** 2:15PM BSA Troop 431 Patterson 6PM	**5**	**6** Rune Winnery Observing Event 6:30pm
7 Daylight Savings Time Ends	**7**	**9**	**10**	**11** 5:48PM **Pat Public Night 6PM**	**12** Seniors at Patterson Daytime	**13**
14	**15**	**16** Leonid Meteors	**17** Leonid Meteors	**18** Business at Twilight PAT open House 5-6:30 PM	**19** 1:59AM **HAC Meet Library Commons**	**20**
21	**22**	**23**	**24**	**25** 	**26**	**27** 5:29 AM
28	**29**	**30**	**Dec 1**	**2**	**3**	**4** 12:44 AM
5	**6**	**7**	**8**	**9** **PAT Public Night 6PM**	**10** 6:37PM	**11**
12	**13** Geminid meteors	**14** Geminid meteors	**15**	**16**	**17** **HAC Meeting Student Union or Party TBA**	**18** 9:37PM JWST Launch?
19	**20**	**21** Winter Solstice 8:59AM	**22**	**23**	**24** 	

All times local MST

Join **HacAstro** to keep up to date with all of the Huachuca Astronomy Club events

Send an email to: HACAstro+subscribe@groups.io

Watch the group for notice when in person events and meetings will resume