NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

DECEMBER 2020

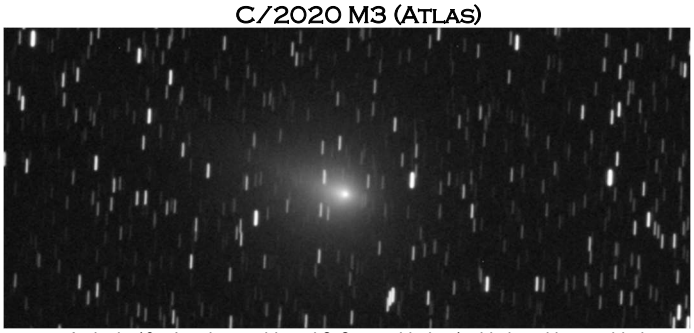
PRESIDENT'S NOTES

December? Coming up quickly will be the Geminids. The meteor shower runs from December 4 to December 17, with the peak on the night of December 13 and into the morning of December 14. Don't bother going out in the cold until after 10pm for these, but think strongly about checking them out. This year the peak comes while the moon is nearly new and out of the way, so we should see a good stream, including those smaller ones that can get obscured by bright moonlight. Geminids are bright and slow as meteors go, so you can usually catch quite a few of them over a night. Some people also see color in the Geminids. Expect 10-20 per hour, unless we are lucky enough to hit a dense section of the debris field from the shower's parent object, asteroid 3200 Phaethon. If we do go through a dense patch, we could witness 150 meteors per hour, although the high rate does not last as long as an hour. The vast majority of meteors will seem to be coming from somewhere in the constellation of Gemini, but don't focus on any one spot. Rather, let your eyes patrol well beyond the constellation's confines. The streaks can appear anywhere in the sky. The key is that if you follow their direction of travel back to their origins, they will point to Gemini.

There are two other meteor showers in December that are normally under-viewed due to the holidays: the Ursids, active December 17-26, and the Quadrantids, from December 27 to January 10, 2021. This year the moon will also get in the way of both. So, if you want meteors then the Geminids are the ones to catch. As always, try to get to the darkest sky site you can with clear view of not just the constellation but the whole sky. Dress warm, keep hydrated, and enjoy.

There are also a good half dozen comets accessible to viewers with large telescopes (16" or larger) and even a few comets visible to medium (8"-10" aperture) and larger scopes. But all are quite dim and easily dismissed as a dim galaxy. However, if you attach a camera to the same size scopes, you do have a chance at continuing to collect comets (in case you started with C/2020 F3 Neowise a couple of months ago). C/2020 M3 (Atlas) has been showing a short tail and from time to time a thin ion tail as well. It is making its way through Taurus. Comet 88P/Howell, small but bright, is gracing the evening sky east of Jupiter and Saturn. C/2020 S3 (Erasmus) is moving towards the Sun in the morning sky. By the time you read this it might be lost in the Sun's glare.

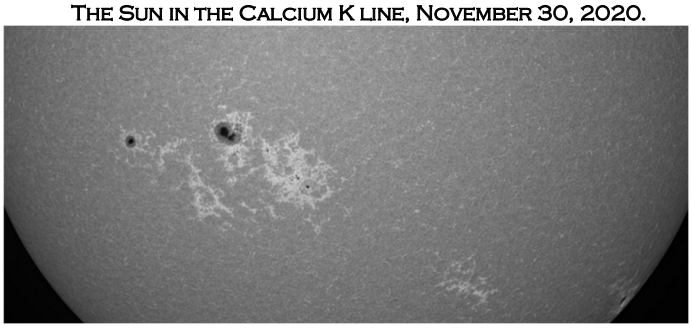
C/2020 M3 (ATLAS)



A single 10m Luminance binned 2x2, unguided, w/ orbital tracking enabled.
Source: Craig Anderson, RISS Remote Observatory, November 2020.

For those of you who want to sleep at night (a strange concept in my opinion), the Sun has shown some activity recently. Although the consensus is that this will be another quiet cycle, at least there is a hope of spot activity and it should be monitored whenever possible. And hey, at this time of year a nice sunny day isn't too bad to be out in. As always, remember we are at almost 5,000 ft, and the Arizona atmosphere is exceptionally good about transferring UV rays into the human body. So, wrap up and or gloop sun-blocker liberally.

THE SUN IN THE CALCIUM K LINE, NOVEMBER 30, 2020.



Captured using a ZWO ASI174MM camera on a Mac with oaCapture software. Post-processed on Windows (via VirtualBox on a Mac) using PIPP, Autostakkert and Registax.
Source: Ralph Jung, from the always clear skies of Denver, Co.

As December closes it's time to open your presents, clean your eyepieces, and get ready for 2021. You have elected the entire HAC Board for another year of services so in January we should talk more about what's coming up and what your and our New Year's resolutions are. So, send me your resolutions and ideas, and I'll start by giving mine next time. Until then, stay warm, get out and stare.

OH, Oh, Oh! Have a Happy, Health, Holidays!

Jupiter and Saturn Conjunction

Be sure to watch Jupiter and Saturn as they head toward their closest conjunction since 1623. This is actually the closest *visible* conjunction since 1226! The two planets close the gap between them by about 6.5 minutes every day and by December 13, they will be close enough to share a low power eyepiece field of view. They are at their closest, just 6 minutes apart, on the evening of Dec 21. Unfortunately, they will be quite low in the southwest at sunset and we can expect no more than a half hour to catch them before they set.

Daytime occultation of Venus

A thin crescent moon will occult Venus at about 2:31PM on the afternoon of December 12th. The moon, just 5% illuminated, may be difficult to spot without binoculars. Look for it low in the southwest.

Astronomy Exhibit at Henry F. Hauser Museum

The Henry F. Hauser Museum' *Discover Exoplanets* exhibit from the Space Science Institute's National Center for Interactive Learning and NASA's Universe of Learning opened on November 3 and will run through the end of the year. The companion exhibit highlights amateur astronomy in our area including the history of both the Patterson Observatory and the Huachuca Astronomy Club. Several of HAC's astro-photographers are represented by examples of their work

The museum is located at 2950 East Tacoma Street in Sierra Vista and will be open Monday-Wednesday from 10 a.m. to 4 p.m., and Thursday-Friday from 10 a.m. to 1 p.m. The number of visitors who can enter at one time will be limited. The astronomy themed display runs through December.

Announcing a "Dues Holiday" for current HAC members

The HAC board of directors recognizes that this has been an exceptionally odd, and for some, quite a difficult year. The club has been mostly inactive since March and it is assumed that many of our members have experienced some financial challenges during the COVID lockdowns.

Therefore, we are announcing a "Dues Holiday" for all current members. Everyone's HAC membership will be automatically extended to December 2021 or twelve months from their current membership expiration date whichever is LONGER. In November, the treasurer will be sending out emails to members notifying them of their new expiration dates.

In lieu of dues, we will graciously accept donations. Think of it as a year's worth of voluntary dues payment, but if you find yourself a little strapped this year, there is no need to pay dues to remain a member through 2021.

Any donation amount will be appreciated, of course, but if you wish to make a donation equivalent to your owed dues, please do so. Normal family membership is $35, individual membership is $25. Active duty military would normally pay $25 family and $20 individual.

To make a donation, you can pay by check made out to Huachuca Astronomy Club and mailed to PO Box 922, Sierra Vista, 85636. You can pay on line with your credit card or PayPal account at www.hacastronomy.org – the "Donate" button is in the right-hand column If you have a Pay Pal account, you can use PayPal Direct to send your payment to paypal@hacastronomy.org and if you have a Zelle account with your bank, you can make your donation to HAC by transferring funds to twforte@powerc.net

Support the Patterson Observatory

You can support the Patterson Observatory by purchasing a "star". Your name, inscribed on a star plaque will be displayed in the Patterson classroom for a $100 donation to the University South Foundation.
Visit https://www.universitysouthfoundation.com/how-to-give and click on "Sponsor a Star".

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NASA Night Sky Notes--November 2020

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!

Visitors to Both Jupiter and Saturn

By David Prosper

Have you observed Jupiter and Saturn moving closer to each other over the past few months? On December 21, the two worlds will be at their closest, around 1/5 of a full Moon apart! While the two gas giants may *appear* close, in reality they are hundreds of millions of miles apart. Despite this vast distance, a select few missions have visited both

worlds by using a gravity assist from giant Jupiter to slingshot them towards Saturn, saving time and fuel.

Pioneer 11 was the first mission to visit both worlds! Launched in 1973, the probe flew past Jupiter in late 1974, passing just 26,4000 miles above its stormy clouds. In 1979, it became the first spacecraft to encounter Saturn. Pioneer 11 took the first up-close photos of Saturn and its satellites, and made many exciting discoveries, including the detections of its magnetic field and a faint "F" ring, before departing Saturn and eventually, the solar system.

The Voyager missions quickly followed up, taking a "Grand Tour" of the four largest and most distant planets in our solar system. Both probes were launched within two weeks of each other in 1977. Voyager 1 flew past Jupiter in March 1979, discovering Jupiter's faint ring and two new moons, along with active volcanoes on Io's surface! The probe then flew past Saturn in November 1980, discovering five new moons, a new "G" ring, mysterious ring "spokes," and "shepherd moons" shaping the rings. After a brief encounter with Titan revealed evidence of complex organic chemistry and liquid on the moon's frigid surface, Voyager 1 was flung out of the plane of the solar system. Following close behind, Voyager 2 took detailed photos of Jupiter's moons and cloud tops in July 1979. Flying past Saturn in August 1981, Voyager 2 measured the thickness of Saturn's rings and took detailed photos of many of its moons. This second explorer then captured images of Uranus and Neptune before leaving our solar system.

Cassini-Huygens was the last mission to visit both worlds. Launched in 1997, the mission flew past Jupiter in late 2000 and took incredibly detailed photos of its stormy atmosphere and faint rings. Cassini entered into Saturn's orbit on July 1, 2004. The Huygens probe separated from Cassini, landing on Titan to become the first probe in the outer solar system. Cassini discovered geysers on Enceladus, fine details in Saturn's rings, many more moons and "moonlets," the changing oceans of Titan, and seasonal changes on Saturn itself. After revolutionizing our understanding of the Saturnian system, Cassini's mission ended with a fiery plunge into its atmosphere on September 15, 2017.

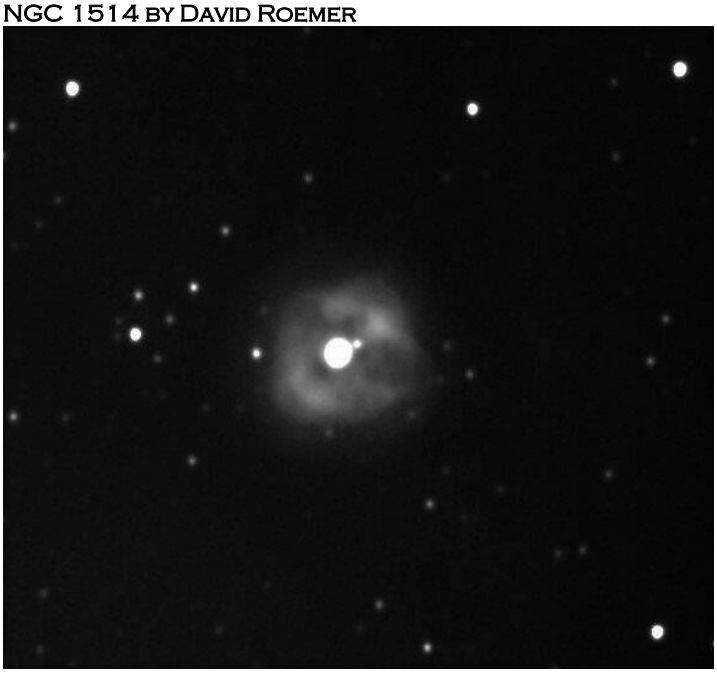
What's next for the exploration of the outer worlds of our solar system? While Juno is currently in orbit around Jupiter, there are more missions in development to study the moons of Jupiter and Saturn. Discover more about future NASA missions to the outer worlds of our solar system at nasa.gov.

The difference in technology between generations of space probes can be stunning! The top two photos of Jupiter and Saturn were taken by Pioneer 11 in 1974 (Jupiter) and 1979 (Saturn); the bottom two were taken by Cassini in 2000 (Jupiter) and 2016 (Saturn). What kinds of photos await us from future generations of deep space explorers?

Pictures from HAC Members

C/2020 S3 Erasmus by Ted Forte

NGC 1514 by David Roemer



M76 by David Roemer

FOR SALE

Takahashi Mewlon 250 (10") About 9 yrs old. Seldom used. Dealer (Anacortes) installed field-flattener and upgraded manual focuser with an electric (computer-controllable) focuser. Asking just $4,700. (new price ~$ 8,000). Contact Alex Woronow at Alex@FaintLightPhotography.com

(Alex lives in Silver City NM (SW Corner) but would meet a buyer halfway to deliver the scope).

Club Officers and Contacts

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HAC Dec/Jan Calendar of Events

SU	MO	TU	WE	TH	FR	SA
6 Dec **No in-person events are scheduled**	**7** **5:37PM**	**8**	**9**	**10** 	**11**	**12** Venus/Moon Geminid Meteors
13 Geminid Meteors	**14** **9:17 AM** Geminid Meteors	**15**	**16** Jupiter/Saturn and Moon	**17**	**18** Hanukkah Ends	**19**
20	**21** **4:41 PM** Jupiter 0.1° south of Saturn	**22**	**23**	**24**	**25** 	**26**
27	**28**	**29** **8:28 PM**	**30**	**31** 		**2** Quadrantid Meteors
3 Quadrantid Meteors	**4**	**5**	**6** **2:38 AM**	**7**	**8**	**9**
10	**11** Venus 1.5° N of Moon	**12** **10:02 PM**	**13**	**14**	**15**	**16**
17	**18** 	**19**	**20** **2:03 PM**	**21**	**22**	**23**
24	**25**	**26**	**27**	**28** **12:18 PM**	**29**	

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