NIGHTFALL

A PUBLICATION OF THE HUACHUCA ASTRONOMY CLUB

NOVEMBER 2020

PRESIDENT'S NOTES

Hello HACers!

it's November 2020. My Thanksgiving hope is that all of you are well wherever you are, and that you all stay that way. Now let's get down to business.

Let's start off by tackling club matters. Unless you have just joined the club, you know we have not been having any in-person meetings, neither Board nor General, since the beginning of the pandemic. However, club business remains to be done, and voting for the board members is needed. There is no contention (that I know about) this year, and all present board members have, thankfully, agreed to stay on. However, if you have a hankering to serve in any of the board positions, please make yourself known as soon as you receive this newsletter. Again, because we are not having in-person meetings it will be a web-based or email vote, but we will figure something out to make it workable and fair.

Speaking of web-based actions, we have bought a subscription Zoom Pro license that so we can hold web meetings and star parties. The Pro license allows us to hold meetings with up to 100 participants with meeting duration over 1 hour. I've been holding a couple practice sessions, and I think we have many of the problems sorted out. So we will begin having monthly scheduled meetings again (soon) and star parties with some frequency.

A lot of our norms have crashed over the last 9 or 10 months. Our formula for outreach is, well, out of reach. As well, our usual methods for gathering at meetings and star parties are, I think, obsolete. At least for the foreseeable future, our club will need to be fundamentally changed. We must go remote. When viewing as a group, whether outreach or in club, we must forgo the optical eyepiece for the electronic sensor. Sure, we will regret the passing of the "good ol' days," showing the sky's wonders and explaining them to lines of people awaiting a look through our scopes. But we should be willing to embrace change and evolve as we enter this next phase of astronomy. After all, it is what we have always done, just using different detectors.

University of Illinois Springfield provides just one example of virtual star party implementation: https://www.uis.edu/astronomy/about/starparties/

Instead of optical eyepieces and individual eyeballs, it's time to make peace with using video cameras, CCDs and CMOS detectors, translated into displayed images for outreach and to disseminate viewing for our own member parties as well. After all, this use of electronic detectors is also closer to what mainstream astronomers have been doing for years. If we do it right, we should be able to become comfortable speaking to a "crowd of people in the cloud." At least we won't need to repeat the same information over and over again. And imagine being able to direct everyone, all of them all at once, with the aid of a cursor to examine specific interesting important and or subtle features visible within the frame of our electronic eyepieces rather than having to walk each viewer over the same trail of bread crumbs to the target feature.

The same imaging methods, with slightly different protocols, could be used for live (in person) outreach. A good example might be at the Patterson or up at Kartchner Caverns. Several telescopes outfitted with cameras, laptops, light shields, and maybe second monitors facing the public could be set up at wide distances from each other. Each station would have a seated human driver for the computer driven telescope, a camera, and a table with a laptop. At a second monitor, facing the public, one more human tour guide could be standing or sitting at the side of another table to describe and direct the visitors significant object features shown on the monitor, and to describe where in the sky the object resides, and to give context (yep, frickin' (green) laser beams), history, importance, etc.

Several of our members already have such rigs or have at least dabbled at using the hardware and software. The club was given a small video setup some time ago when our focus was putting the publics' eyes through the eyepiece and telescope interface. I propose we change our focus to one focusing on the examination of telescope objects through the electronic telescope interface. We can begin with who and what we have on hand, but we must also

begin to investigate buying a couple of club rigs that we can have for outreach and at our own club outings. I miss our meetings, our club star parties, and outreach. Perhaps we can rekindle some of those old norms by constructing and embracing some new norms. As always ideas, comments, questions, grandiose schemes, and odd follies are appreciated. Speak up on the HAC group site. And, as always, get out there and stare.

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 opens on November 3. The companion exhibit highlights amateur astronomy in our area including the history of both the Patterson Observatory and the Huachuca Astronomy Club.

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.

Elections for HAC officers

Officer elections take place in November. There are eight elected seats on the board of directors, the four officers (President, Vice President, Secretary and Treasurer) and four at-large board members. A ninth seat is filled by the most recent past president. Currently, that position is filled by our previous Vice President as there are no past presidents available.

Most of the current officers and board members are willing to continue in their present roles or are candidates for other positions. The current leadership has served for a number of years. "Willingness to step down in favor of a new candidate" is perhaps universal at this point.

If you are willing to serve on the board, please speak up. If you know of another member that has expressed interest in serving, please encourage them – and let a current member of the board know who they are.

This year's election will be held electronically.

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

2021 RASC Handbook

Published annually for over 100 years by the Royal Astronomical Society of Canada, the Observer's Handbook

has become the must-have reference book for people interested in astronomy. Whether you are a professional astronomer, a beginner or educator this book is designed for you. The over 350-page guide includes comprehensive information about upcoming astronomical events and references.

We will make a group order of these handbooks to earn a volume discount, placing the order the first week of December and including any member that pays $23 by December 1. Please notify treasurer Ted Forte (tedforte511@gmail.com) and then either mail your check for $23 made out to Huachuca Astronomy Club to PO Box 922, Sierra Vista 85626 or use the PayPal donate button on www.hacastronomy.org to pay by credit card or pay pal account.

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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PLEASE NOTE THIS CHANGE Regarding Calendars for 2021:

In past years, Astronomy has offered their Deep Space Mysteries Calendar to club members at half price only when purchased through the club, by the treasurer. But now, members can just go online and get their discount by visiting MyScienceShop.com/ASYClubs and using the code CAL50 at checkout.

Therefore, we will not be making a group order for calendars this year. If you would like a discounted calendar, just go online and purchase it.

OSIRIS-REx Update

By Ted Forte

The OSIRIS-REx mission has successfully stowed the spacecraft's Sample Return Capsule (SRC) and its abundant sample of asteroid Bennu. On Wednesday, Oct. 28, the mission team sent commands to the spacecraft, instructing it to close the capsule – marking the end of one of the most challenging phases of the mission.

NASA's OSIRIS-REx spacecraft completed the final step of the sample stowage process: closing its SRC. To seal the SRC, the spacecraft closed the lid and then secured two internal latches. The sample of Bennu is now safely stored and ready for its journey to Earth.

The mission team spent two days working around the clock to carry out the stowage procedure, with preparations for the stowage event beginning last weekend. The process to stow the sample is unique compared to other spacecraft operations and required the team's continuous oversight and input over the two-day period. For the spacecraft to proceed with each step in the stowage sequence, the team had to assess images and telemetry from the previous step to confirm the operation was successful and the spacecraft was ready to continue. Given that OSIRIS-REx is currently more than 205 million miles (330 million km) from Earth, this required the team to also work with a greater than 18.5-minute time delay for signals traveling in each direction.

Throughout the process, the OSIRIS-REx team continually assessed the Touch-And-Go Sample Acquisition Mechanism's (TAGSAM) wrist alignment to ensure the collector head was being placed properly into the SRC. Additionally, the team inspected images to observe any material escaping from the collector head to confirm that no particles would hinder the stowage process. StowCam images of the stowage sequence show that a few particles escaped during the stowage procedure, but the team is confident that a plentiful amount of material remains inside of the head.

"Given the complexity of the process to place the sample collector head onto the capture ring, we expected that it would take a few attempts to get it in the perfect position," said Rich Burns, OSIRIS-REx project manager at NASA's Goddard Space Flight Center in Greenbelt, Maryland. "Fortunately, the head was captured on the first try, which allowed us to expeditiously execute the stow procedure."

By the evening of Oct. 27, the spacecraft's TAGSAM arm had placed the collector head into the SRC. The following morning, the OSIRIS-REx team verified that the collector head was thoroughly fastened into the capsule by performing a "backout check." This sequence commanded the TAGSAM arm to attempt to back out of the capsule – which tugged on the collector head and ensured the latches are well secured.

"On the afternoon of Oct. 28, following the backout check, the mission team sent commands to disconnect the two mechanical parts on the TAGSAM arm that connect the sampler head to the arm. The spacecraft first cut the tube that carried the nitrogen gas that stirred up the sample through the TAGSAM head during sample collection, and then separated the collector head from the TAGSAM arm itself.

That evening, the spacecraft completed the final step of the sample stowage process – closing the SRC. To secure the capsule, the spacecraft closed the lid and then fastened two internal latches. As of late Oct. 28, the sample of Bennu is safely stored and ready for its journey to Earth.

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!

The International Space Station: 20 Continuously Crewed Years of Operation

By David Prosper

Did you know that humans have been living in the International Space Station, uninterrupted, for twenty years? Ever since the first crew members docked with the International Space Station (ISS) in November 2000, more than 240 people have visited this outpost, representing 19 countries working together. They have been busy building, upgrading, and maintaining the space station - while simultaneously engaging in cutting-edge scientific research.

The first modules that would later make up the ISS were launched into orbit in 1998: the Russian Zarya launched via a Proton-K rocket, and the US-built Unity module launched about a week and a half later by the Space Shuttle Endeavour. Subsequent missions added vital elements and modules to the Space Station before it was ready to be inhabited. And at last, on November 2, 2000, Expedition-1 brought the first three permanent crew members to the station in a Russian Soyuz capsule: NASA astronaut William M. Shepherd and Russian cosmonauts Sergei Krikalev and Yuri Gidzenk. Since then, an entire generation has been born into a world where humans continually live and work in space! The pressurized space inside this modern engineering marvel is roughly equal to the volume of a Boeing 747, and is sometimes briefly shared by up to 13 individuals, though the average number of crew members is 6. The unique microgravity environment of the ISS means that long-term studies can be performed on the space station that can't be performed anywhere on Earth in many fields including space medicine, fluid dynamics, biology, meteorology and environmental monitoring, particle physics, and astrophysics. Of course, one of the biggest and longest experiments on board is research into the effects of microgravity on the human body itself, absolutely vital knowledge for future crewed exploration into deep space.

Stargazers have also enjoyed the presence of the ISS as it graces our skies with bright passes overhead. This space station is the largest object humans have yet put into orbit at 357 feet long, almost the length of an American football field (if end zones are included). The large solar arrays – 240 feet wide - reflect quite a bit of sunlight, at times making the ISS brighter than Venus to observers on the ground! Its morning and evening passes can be a treat for stargazers and can even be observed from brightly-lit cities. People all over the world can spot the ISS, and with an orbit only 90 minutes long, sometimes you can spot the station multiple times a night. You can find the next ISS pass near you and receive alerts at sites like NASA's Spot the Station website (spotthestation.nasa.gov) and stargazing and satellite tracking apps.

Hundreds of astronauts from all over the world have crewed the International Space Station over the last two decades, and their work has inspired countless people to look up and ponder humanity's presence and future in space. You can find out more about the International Space Station and how living and working on board this amazing outpost has helped prepare us to return to the Moon - and beyond! - at nasa.gov.

The ISS photobombs the Sun in this amazing image taken during the eclipse of August 21, 2017 from Banner, Wyoming. Photo credit: NASA/Joel Kowsky More info: bit.ly/eclipseiss

A complete view of the ISS as of October 4, 2018, taken from the Soyuz capsule of the departing crew of Expedition 56 from their Soyuz capsule. This structure was built by materials launched into orbit by 37 United States Space

Shuttle missions and 5 Russian Proton and Soyuz rockets, and assembled and maintained by 230 spacewalks, with more to come! Credit: NASA/Roscosmos More info: bit.ly/issbasics

Pictures from HAC Members

Mars 2020 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

President: David Roemer **Vice President:** Dwight Hoxie

Secretary: Bert Kelher **Treasurer:** Ted Forte

Past Vice President: Bill Howard

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

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HAC Nov/Dec Calendar of Events

SU	MO	TU	WE	TH	FR	SA
1 Nov Daylight Savings Time Ends	**2** **ALL IN-PERSON EVENTS ARE**	**3** 	**5** **SUSPENDED INDEFINITELY**	**5**	**6**	**7**
8 **6:46AM**	**9**	**10**	**11** 	**12**	**13**	**14** **10:07PM**
15 Mars Stationary	**16** Leonid Meteors	**17** Leonid Meteors	**18** Leonid Meteors	**19** Jupiter 2° N of moon. Saturn 3° N of Moon	**20**	**21** **9:45PM**
22	**23**	**24**	**25**	**26** 	**27**	**28**
29	**30** **2:30AM**	**Dec 1**	**2**	**3**	**4**	**5**
6	**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** 		

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