PAS times

Phoenix Astronomical Society
www.pasaz.org
September 2020
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PHOENIX ASTRONOMICAL SOCIETY — ESTABLISHED 1948

Klaus Brasch via Virtual PAS Meeting Sept 3

The Research Legacy of Lowell's Great Refractor

The historic 24-inch Clark refractor at Lowell Observatory has a long and distinguished history of research and discovery. From Percival Lowell's early planetary work, through the advent of photography and spectroscopy and ultimately lunar mapping for the Apollo Program, this venerable telescope is now over 125 years old and part of the National Historic Register. Recently fully refurbished it is now a centerpiece in the public and education program at the Observatory.

Klaus Brasch is a retired bio-scientist with a life-long interest in astronomy. Educated in Canada, he joined the Royal Astronomical Society of Canada as a teenager and has been active in amateur astronomy, astrophotography and astrobiology ever since. Since retiring, he has volunteered in the public program at Lowell Observatory which recently named Asteroid 25226-Brasch in recognition of his service. He is the author of numerous articles in Sky & Telescope, Astronomy Magazine and the Journal of the RASC.

Please join PAS as we welcome Klaus Brasch for a fantastic presentation. You can access the data on how to get into the meeting on the PAS calendar listing for September 3rd. We hope to have a link set up about two days before the meeting.

PAS will plan to have the meeting link active around 7:00pm and the meeting will officially start at 7:30pm. We hope you can attend and enjoy this fantastic guest speaker with PAS. Hope to see you there!

Klaus Brasch will be this PAS year's first Virtual Guest Speaker. Klaus has provided many fantastic presentations to PAS in the past. Photo provided by Klaus.

PAS Business Meeting May 7

By Terri, Event Manager

PAS held a remote Zoom business meeting which we call the Meeting of the Minds. We logged in by computer, cell phone, and tablet around 7:15pm and the meeting began about 7:30pm. Many topics were discussed and a few decisions were made. Some of the topics were: The PVCC Scholarship, What Members can Do during this pandemic, Upcoming Summer Events and a new option for the PAS Members list serv.

We also had the PAS Elections for the Officers & Directors of the 2020-2021 PAS year which is from Sept to Aug. Here are the Officers who will be keeping PAS fun for everyone:

President Mike Marron, Vice President Paul Facuna, Newsletter Editor Don Boyd, Treasurer Eric Steinberg, Secretary Pete Turner, Meeting Host Stu Brackney and for a two year term, Member at Large Bruce Wurst.

The Event Manager position was appointed to Terri Finch (that's me) for another year ending the end of May 2021.

Along with the Editor continuing his position, Don has requested help with Preparing and Formatting Articles for the newsletter, and having another helper to prepare the photos and captions. Both of these PAS members would need to work closely with Terri, Don's Assistant Editor, Cheryl who is the Proof Reader of the articles, and Don, the Editor.

Also, Terri is looking for help with the set up of events. Two people were interested in being helpers, with a third on the fence, and there are 3+ positions available to fill. The only stipulation Don and I put on helpers for our positions is that they have to be current PAS members.

We had a turnout of 16 in attendance. We expected more club members to attend, but of the 16 of us who were there, it was a nice discussion and the meeting closed at about 9:45pm. President Mike presided over the meeting and Eric hosted the Zoom meeting and did the set up for it on his computer. Many thanks to Mike and Eric for helping to make this meeting a success. The next MOM's is scheduled for June 4 at 7:30pm and is open to PAS Members only.

For now, the Business meetings will stay closed to the public. If we have a guest speaker, the meeting will invite the public. The plan is to have a monthly business meeting through the summer months and we will evaluate if we need to continue meeting as frequently after the August Meeting of the Minds. Hope to see all the PAS members at the meetings.

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PAS Virtual Events 2020-2021

By Terri, Event Manager

PAS has been adapting to the virtual way of doing events and the plans are to have many virtual events throughout each month which may include Virtual Star Parties, definitely Virtual Meetings, and Virtual Telescope Workshops. Currently, the PAS General Meetings with Guest Speakers for Fall 2020 and Spring 2021 are set up. I have listed them here so you may add them to your calendar.

Sept 3 2020: Klaus Brasch

Oct 1 2020:

Nov 5 2020: Vincenzo Cataldo

Dec 3 2020: David Williams

Jan 14 2021:

Feb 4 2021: Tom Field

Mar 4 2021:

Apr 1 2021:

May 6 2021:

The other virtual events involve more PAS Members attending to help out, so those events are in the process of being created and scheduled. Watch the PAS calendar www.pasaz.org for updates about these events. We would love to have everyone attend. If you have ideas for future virtual events PAS could host, please contact me at Starstuff@gmail.com. Thank you for your patience while we get PAS virtually active.

PAS Goes Virtual!!!

By Terri Finch, Event Manager

Welcome Back for another Phoenix Astronomical Society Year! The PAS year runs concurrent with the school year - September 2020 to May 2021. This year will be a challenge for all astronomy clubs. Social distancing due to the Coronavirus is creating a challenge for everyone. PAS will be adjusting and seeking ways to do virtual events. The events PAS has in the planning stages may be Virtual PAS Meetings each month on the first Thursday of the Month (unless a change is needed), Virtual Star Parties that are in the planning stages for one per month, and Virtual Telescope Workshops. PAS greatly appreciates everyone's patience while we create and make these virtual events happen.

Watch the PAS online Calendar on the NEWLY Designed PAS website www.pasaz.org. The new site has many bugs that need to be fixed, so if you run across a bug in the site, or a dead link, please, inform PeteTurner@pasaz.org, the new PAS Webmaster. He's been working on the site all summer and your help with photos of the errors emailed to him will help greatly with making the PAS site awesome!

Thank you all for continuing to make PAS an awesome astronomy club! We welcome guests to all our Public Events. Looking forward to seeing you in attendance.

Meeting of the Minds July 16

By Terri Finch, Event Manager

PAS held a Meeting of the Minds (Business Meeting of the Club) which started about 7:20pm and ended around 9:15pm. There were about 16 PAS Members in attendance. Many topics were discussed but the main topics were about upcoming In-Person Meetings, Star Parties, Workshops and the current Coronavirus situation. A few club members attended to find out what the new PAS site is going to look like, so Pete took everyone on a brief tour of the site that will be going live sometime in July. A lesser discussed but informational item that was talked about was that both campuses of PVCC are NOT having in-person anything in the Fall 2020 Semester. This means no PAS Meetings or Telescope Workshops on the Main Campus and no Black Mountain Campus Star Parties.

It was a very nice meeting, held through Google Meet. It was also decided that for future meetings, Zoom would be preferred. No next Meeting of the Minds date was set.

Pinnacle Peak Park Star Party June 12

By Mark Johnston

On June 12th, with the permission of the City of Scottsdale, I resumed doing star parties at Pinnacle Peak Park. We limited the group to 12 participants and practiced social distancing. Everyone sanitized their hands before we started, and we disinfected any parts of the step ladder or telescope touched by anyone between observers. It was a big success! We observed M81/82, Albireo, Alpha Canes Venatici, M57, Mizar, the Stargate cluster, M11, M51, and Epsilon Lyra.

Observing Report of June 19

By Mark Johnston, PAS Member

On June 19, Sam Insana and I drove up separately to my favorite dark site just north of Flagstaff. We measured SQM of 22.1 (Bortle 1 darker than Antennas) and an elevation of 5300 ft which helps with seeing and transparency. There were no light domes in any direction. We had some light smoke haze in the north from the Grand Canyon fire. The road is paved right to the site.

We observed all night. I took 112 iPhone photos through my telescope and got a number of 'firsts' including some galaxies I hadn't seen and capturing Pluto with my iPhone. Attached are three iPhone photos: my telescope set up at the site waiting for dark, the Lagoon Nebula, and the dark nebula Barnard86.

It was a great evening and I will return!

By Sam Insana, PAS Member

I was at the Doney Park dark site with Mark June 19th. It was 22.04 on my sky quality meter, a Bortle 1. It was 180 miles from my house vs 330 miles to the Bortle 1 located 20 miles north of the Grand Canyon north rim. Round trip, this saves 300 miles and five hours of driving! It also has bathrooms (locked at the moment because of the Coronavirus). The roads are paved all the way.

I highly recommend this dark site. My 8-inch Newtonian reflector showed both spirals in the M51 galaxy, a beautiful view. I also saw Comet Panstarrs C/2017 T2 near Ursa Major, and many other deep sky objects.

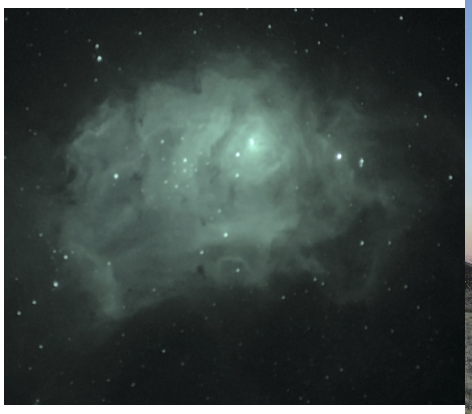
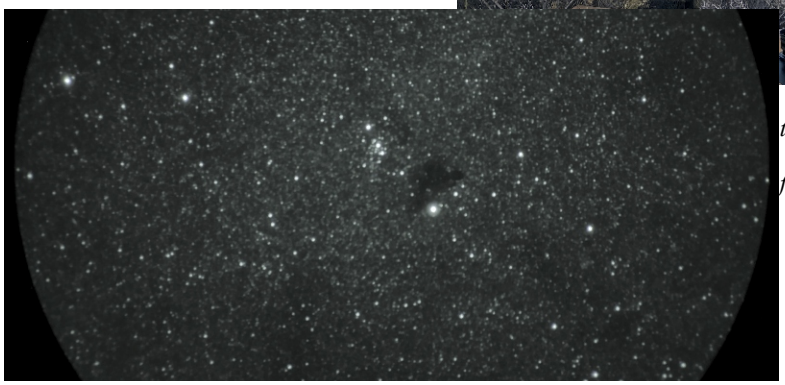


Image is of Barnard 86 and taken by Mark

Mark's awesome telescope at Sunset, waiting patiently for the observing to begin. Photo by Mark.



This images is of the Beautiful Lagoon Nebula. Photo taken and provided by Mark Johnston.

What's Up For September?

By Don K. Boyd, PAStimes Editor

Name	Date	Rise	Set
Mercury	09-15-20	07:58	19:25
Venus	09-15-20	02:51	16:27
Mars	**09-15-20**	**20:15**	**08:39**
Jupiter	**09-15-20**	**15:04**	**01:04**
Saturn	**09-15-20**	**15:34**	**01:43**
Uranus	**09-15-19**	**20:36**	**10:02**
Neptune	**09-15-20**	**18:21**	**06:01**
Pluto	**09-15-20**	**15:27**	**01:28**

All Times Arizona Time

Bold means the object is "visible" in the evening

September 15, 2020

Sunrise: 6:12

Sunset: 18:34

Full: September 1

Q3: September 10

New: September 17

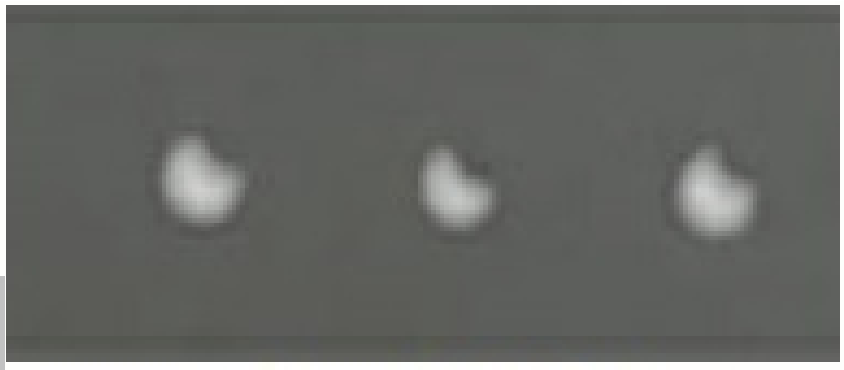
Q1: September 23

PAS is incorporated in the state of Arizona as a non-profit, scientific and educational 501(c)(3) organization. Our newsletter PAStimes is published monthly from September to May and distributed viahe Internet. All Issues are available for download on our website www.pasaz.org . Ads for astronomy equipment are provided as a courtesy to sellers and buyers, and do not constitute any endorsement by PAS. All Photos by Don Boyd unless otherwise credited.

Israel Solar Eclipse

By Leah Sapir, PAS Member

On Sunday, June 21, 2020, there was an annular solar eclipse in the Middle East. In Israel it was only a partial eclipse - about 40%. But I made a pinhole projector and took a few pics! (Equipment used: Galaxy S10 cellphone). ***



Our EAA Journey

By Mark Johnston

Diane Hakala and I have recently been exploring opportunities for Electronically Assisted Astronomy (EAA). While night vision astronomy has helped me significantly extend the number of objects I can show the public during outreach events, it still depends on one person at the eyepiece at a time. With EAA, we hope to be able to point to deep space objects and have our cameras send live images to attached PCs, which in turn live-stack the data and provide a slowly improving, nice colorful image on a large monitor. This has the advantage that large numbers of people can view the object simultaneously, is much friendlier with those wearing glasses, and does not create challenges for the very young, the very old, or the vertically challenged! We have the equipment and have been doing test sessions to understand what software settings and filters are optimized with which objects. Most recently Ted Blank hosted us at his observatory in Fountain Hills where we compared notes on the technique. The current challenge is finding a way to quickly produce a reasonable image - the number of settings that need to be adjusted is daunting and at this early stage not very quick! Our goal however is to get to a point where we can share the night sky while practicing social distancing. Eventually, once we're good at this, we can extend it to the internet and do live on-line presentations. Stay tuned!

Electronically Assisted Astronomy (EAA) set up. Photo by Mark Johnston.

Comet NEOWISE in City Lights

By Leah Sapir, PAS Member

I first became aware of Comet NEOWISE due to Mark Johnston's notice in the PAS email discussion group, and the beautiful photos posted there by several PAS members a few days later. At the time, the comet was a pre-dawn object, and I'm not usually up and about at that time. But on July 9, I happened to be up at 5:00am, so I grabbed my binoculars and walked down the street to a place with a clear eastern horizon. I pointed my binocs at Capella, and swung down towards the horizon - and there it was! A little yellow tadpole, with a head and a tiny tail, over the Judean desert. A morning to remember!

The comet was supposed to become an evening object soon afterwards, but here in Jerusalem, dark skies are not easily found, and my western horizon faces the city. Jerusalem is great for archaeology, but dark skies are not one of its attributes.

I started searching the western horizon on July 12, but all I could see was city lights. I kept trying, and on July 15 I saw the comet for the first time in the evening: with a head and fuzzy tail, and a slight yellowish color, close to the horizon over a dark hill northwest of Jerusalem. From where I stood on the sidewalk, with street lights all around me, reflecting in my binoculars, the comet was not as clear as it had been on that morning of July 9. But it was there! And I had seen it!

I was even happier a few days later, when the comet was high enough to be seen from my back yard - which also has street lights all around, but if I position myself correctly, I can get a tree to hide the closest street light. I had been admiring the beautiful, detailed pictures that had been posted by other PAS members, and I wondered if I might be able to get a photo for myself - even though I don't have a fancy camera, just an old Canon A620, 7 megapixels, with a few manual settings. But with expert advice from Sam and Ted, PAS Members - I managed to get some pictures! (Thanks, guys!) My pictures are not great astrophotography, of course; nothing to compare with the beautiful photos posted by others. But I was excited that I managed to get any pictures at all, in my light-polluted location.

These two pics were taken on July 21, 2020, with my Canon A620, shutter speed 6 sec, aperture F4.5, ISO 400, optical zoom x4. (I have an option for digital zoom as well, but it made the picture fuzzier.) In picture #1, the fuzzy stars at the left, above the tree, are Tania Australis and Tania Borealis; Theta UMa can be seen at the edge of the picture, on the right; and in the middle, Comet NEOWISE, with a bit of its tail visible. In picture #2, taken about half an hour later, Tania Australis and Borealis are next to the tree, and the comet is above the palm tree. 2 Photos at top of page 6.

The view of the comet in the photos is similar to what I was able to see in binoculars. Of course, in my binocs, the stars are pinpoints - they only appear as fuzzy circles in the pics because I had to keep the shutter open longer to catch the comet.

I continued watching the comet every night in my binoculars till the end of July, as it moved through Ursa Major and into Coma Berenices, until it was no longer visible in my sky.

Summer 2020 Big News: Naked Eye Comet!!!

By Many Comet Viewing PAS Members

By Sam Insana

July 7th: My son Frank and I saw Comet Neowise this morning from 4:00am to 4:30am about 50 miles north of Central Phoenix, on the east side of I-17 across from Sunset Point. It was about 5 degrees above the horizon. It should look better over the next week or so. It was cool this morning, the comet, then Venus, then Mars, then the moon, then Saturn and finally Jupiter, all in a row from the East to the West along the ecliptic. I took this photo with my DSLR and a 300mm telephoto lens. We could see it naked eye, but it looked spectacular with our 10 power binoculars.

By Ted Blank

Here's my photo from about 4:10am this morning, **July 8th**. Canon T6i, 300mm telephoto lens, f/5, 1 second exp. It's easy to see naked eye too, but in binos it's great.

By Mark Johnston

July 8th: Here are my attempts to photograph comet Neowise from this morning. A handheld night vision image at 3:45am when it was still dark, then a dawn view at 4:20am and another about 4:40am. Had difficulty with the tripod so not super sharp. But fun to see!

By Sam Insana

July 8th: My son Frank and I saw the comet this morning from 4:00am to 4:30am about 50 miles north of Central Phoenix, on the east side of I-17 across from Sunset Point. It was about 5 degrees above the horizon. It should look better over the next week or so. It was cool this morning, the comet, then Venus, then Mars, then the moon, then Saturn and finally Jupiter, all in a row from the East to the West along the ecliptic. I took this photo with my DSLR and a 300 mm telephoto lens. We could see it naked eye, but it looked spectacular with our 10 power binoculars.

By Bob Ewing

July 8th: This is from my patio in Carefree, this a.m. Nikon D60, f/5.6, 200mm, 5 sec.

By Sam Insana

On **July 15th**, Vera and I went out in the evening, about four miles west of the I-17 freeway just off Carefree Hwy. I took the attached two photos. The lighter one was at twilight about 8:45pm the darker one about 9:15pm. There were about six cars on the side of the road with around a dozen people enjoying the comet.

By Ted Blank

July 15: Here is a pic of NEOWISE from tonight, taken from the back yard over the dome of my observatory. Last night it was too low and in the clouds, next few nights will be higher. Canon T6i, 300mm lens, f/5, ISO 6400, 3.2 second exposure.

By Sam Insana

Saturday **July 18th**: I drove to a new viewing area, Agua Fria National Monument, 50 miles north of my house which is in Central Phoenix. The site is a few miles south of Cordes Junction just east of I-17. I used my sky quality meter to determine it is a bortle 2.5 site. I took the attached photo with my Canon EOS rebel T6i DSLR and 100mm telephoto lens for 10 seconds ISO 12800 and F4.5. It shows the two tails, the large dust tail and the smaller ionized plasma tail. It was in good view from 9:00pm until 10:15pm. I took this photo at 9:50pm. I could not see the second tail with my naked eyes, but could see it with my 10x binoculars.

By Ron Walker

July 22: I used my Digital Rebel 800 ISO f1.2 55mm with a 3 sec single exposure to get the image you see here.

We hope everyone reading this article has enjoyed the photos shared by PAS Members and their experiences with photographing the Comet, as well as had a chance to see the Comet while it was visible from Phoenix.

*Comet Neowise - Picture #1 Photo by Leah 2 Photos taken **July 21**.*

Comet Neowise - Picture #2 Photo by Leah

*Comet Neowise taken on **July 7th** around 4:30am by Sam Insana with his DSLR Camera and a 300 mm telephoto lens.*

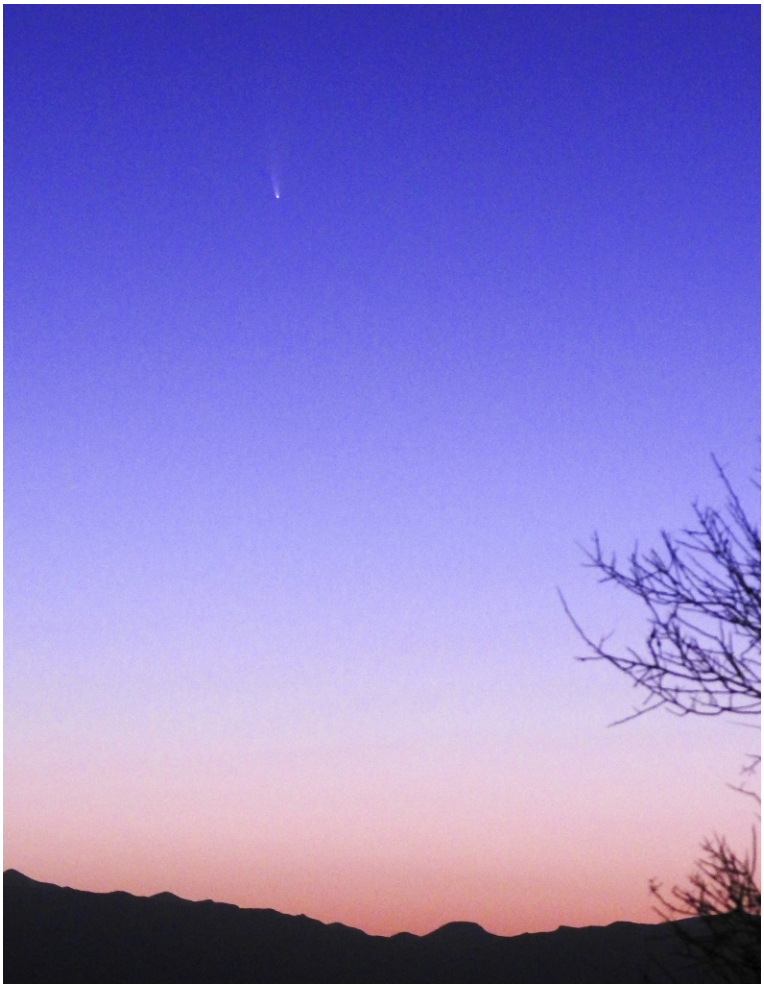
*Sam Insana took this photo with his Canon EOS rebel T6i DSLR and 100mm telephoto lens for 10 seconds ISO 12800 and F4.5 on **July 18th** at 9:50pm.*

*Ted Blank took this photo on **July 8th** around 4:10am. He used a Canon T6i, 300mm telephoto lens, f/5, 1 second exp.*

*On **July 22nd**, Ron Walker took this photo of the Comet using his Digital Rebel 800 ISO f1.2 55mm with a 3 sec single exposure.*

*This image of the Comet was taken by Bob Ewing at 4:06am on **July 8th**. He used a Nikon D60, f/5.6, 200mm, with an exposure of 5 seconds.*

*This is an image of the Comet at dawn on **July 8th** Taken at 4:20am by Mark Johnston.*



*Mark also took this image at 4:40am on **July 8th.***

*Photo by Mark Johnston taken on **July 8th**. It's a handheld night vision image at 3:45am.*

*This image was taken at 9:15pm by Sam Insana on **July 15**.*

*Taken at 8:15pm on **July 15th** by Sam Insana.*

*Ted Blank was able to capture this amazing photo of the Comet over his observatory in Fountain Hills on **July 15th**. This photo is taken with a Canon T6i, 300mm lens, f/5, ISO 6400, 3.2 second exposure.*

Summer Triangle Corner: Deneb

By David Prosper

The Summer Triangle is high in the sky after sunset this month for observers in the Northern Hemisphere. Its component stars seemingly brighter than before, as they have risen out of the thick, murky air low on the horizon and into the crisper skies overhead. Deneb, while still bright when lower in the sky, now positively sparkles overhead as night begins. What makes Deneb special, in addition to being one of the three points of the Summer Triangle? Its brilliance has stirred the imaginations of people for thousands of years!

Deneb is the brightest star in Cygnus the Swan and is positioned next to a striking region of the Milky Way, almost as a guidepost. The ancient Chinese tale of the Cowherd (Niulang) and the Weaver Girl (Zhinü) - represented by the stars Altair and Vega - also features Deneb. In this tale the two lovers are cast apart to either side of the Milky Way, but once a year a magical bridge made of helpful magpies – marked by Deneb – allows the lovers to meet. Deneb has inspired many tales since and is a staple setting of many science fiction stories, including several notable episodes of Star Trek.

Astronomers have learned quite a bit about this star in recent years, though much is still not fully understood – in part because of its intense brightness. The distance to Deneb from our Sun was measured by the ESA's Hipparcos mission and estimated to be about 2,600 light years. Later analysis of the same data suggested Deneb may be much closer: about 1,500 light years away. However, the follow-up mission to Hipparcos, Gaia, is unable to make distance measurements to this star! Deneb, along with a handful of other especially brilliant stars, is too bright to be accurately measured by the satellite's ultra-sensitive instruments.

Deneb is unusually vivid, especially given its distance. Generally, most of the brightest stars seen from Earth are within a few dozen to a few hundred light years away, but Deneb stands out by being thousands of light years distant! In fact, Deneb ranks among the top twenty brightest night time stars (at #19) and is easily the most distant star in that list. Its luminosity is fantastic but uncertain, since its exact distance is also unclear. What is known about Deneb is that it's a blue-white supergiant star that is furiously fusing its massive stocks of thermonuclear fuel and producing enough energy to make this star somewhere between 50,000 and 190,000 times brighter than our Sun if they were viewed at the same distance! The party won't last much longer; in a few million years, Deneb will exhaust its fuel and end its stellar life in a massive supernova, but the exact details of how this will occur, as with other vital details about this star, remain unclear.

Discover more about brilliant stars and their mysteries at nasa.gov.

Long exposure shot of Deneb (brightest star, near center) in its richly populated Milky Way neighborhood. Photo credit: Flickr user jpstanley.
Source: https://www.flickr.com/photos/jpstanley/1562619922 License:https://creativecommons.org/licenses/by-nc-sa/2.0/

Summer Astrophotography

By Mark Johnston

First Attempts to Capture Jupiter and Saturn: On the night of Jupiter's opposition, July 13th, PAS Members Mark Johnston and Diane Hakala got together to do some experimentation with equipment and software as part of our journey to learn about EAA (Electrically Assisted Astronomy). Later that evening Jupiter and Saturn were well positioned, so we decided to try to capture them with Diane's ZWO ASI224MC camera on Mark's TEC140ED refractor. We used a 2x Barlow and a UV/IR filter. We captured about a minute or two of video for each object on a PC running Sharpcap. Later, Diane ran software to separate out the frames, pick the best ones, stack them, and sharpen them. Then Mark did some minor tweaking with Photoshop. We are very happy with our first attempt! We've learned things already that should make future photos even better.

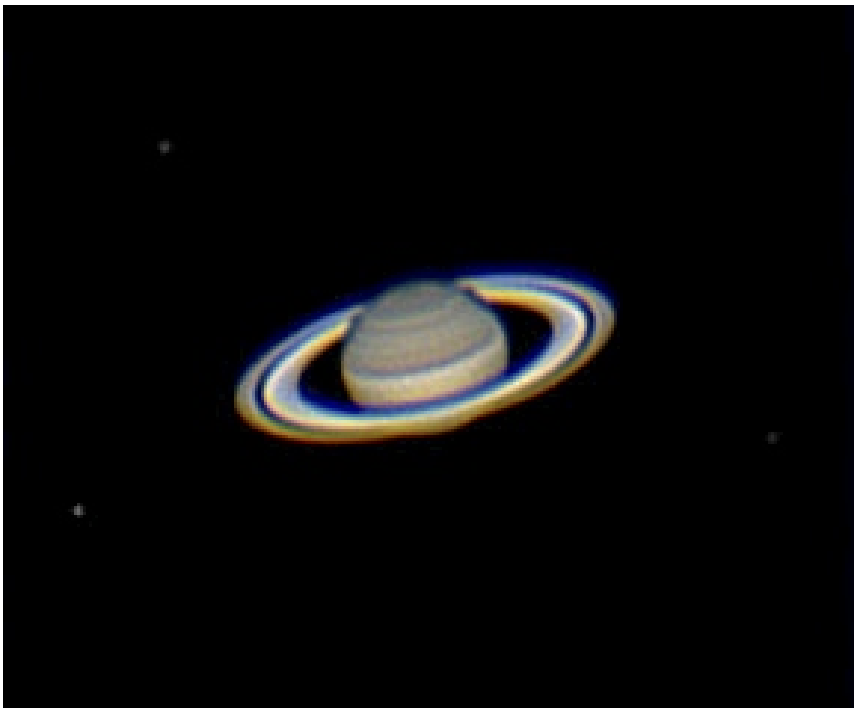


Image of Saturn taken on July 13 by Mark Johnston & Diane Hakala.

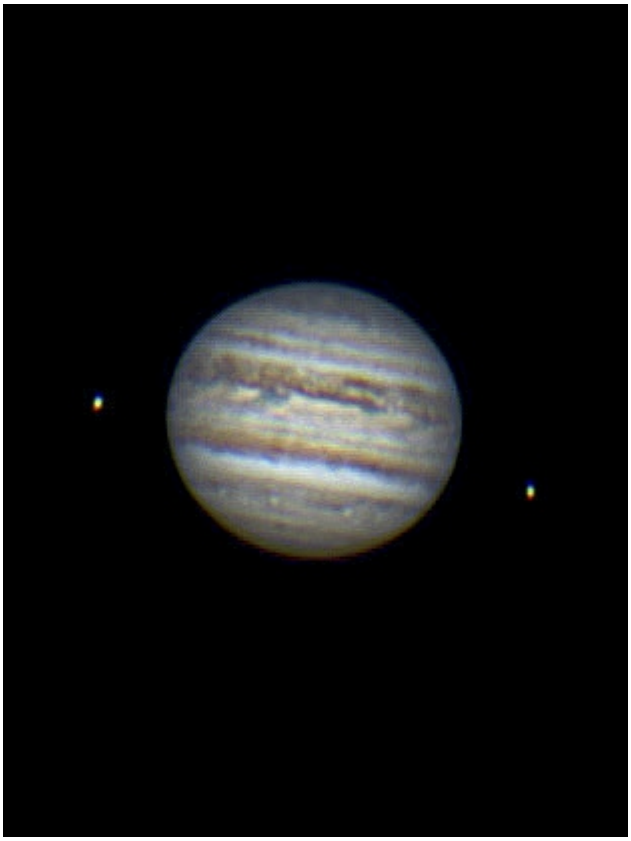


Image of Jupiter taken on July 13 by Mark Johnston & Diane Hakala.

Trivia: Moon Facts

Originally received from Stu Brackney, PAS Member.
Source:
www.moonconnection.com/moon_facts.phtml

Dr. Eugene Shoemaker, a Geological Surveyor, who educated the Apollo mission astronauts about craters, never made it into space himself, but it had always been one of his dreams. He was rejected as an astronaut because of medical problems.

2020 PAS GUEST SPEAKER LINE-UP

By Terri Finch, Event Manager
Events@pasaz.org

Due to the Covid-19 pandemic, PAS Meetings are being held via Zoom over the internet. It is planned that a few days before the meeting, the Zoom link will be added to the calendar listing for that night's meeting. Please visit the PAS calendar to find out more about these upcoming Virtual Meetings and Guest Speakers.

Do you have an idea for a guest speaker? Email Terri Finch, Paul Facuna, or Mike Marron the details (their email addresses are at the top of page 2 of this newsletter).

Here are the next scheduled guest speakers at PAS:

Sep 3: Speaker: Klaus Brasch

Oct 1: Speaker: TBA

Nov 5: Vincenzo Cataldo: Planetary Science

Dec 3: Dr. David Williams, Title: "Titan: The Past and Future Exploration of Saturn's Largest Moon."

Summer Triangle Corner: Altair

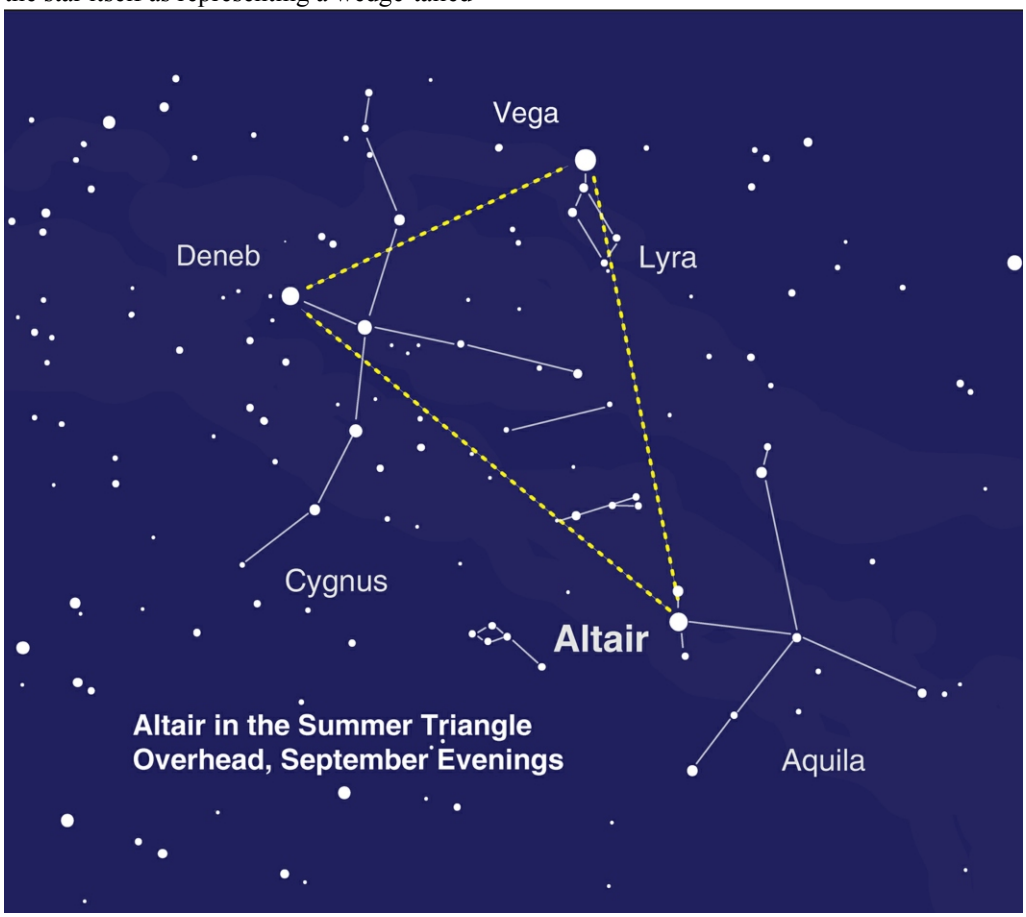
David Prosper

Altair is the final stop on our trip around the Summer Triangle! The last star in the asterism to rise for Northern Hemisphere observers before summer begins, brilliant Altair is high overhead at sunset at the end of the season in September. Altair might be the most unusual of the three stars of the Triangle, due to its great speed: this star spins so rapidly that it appears "squished."

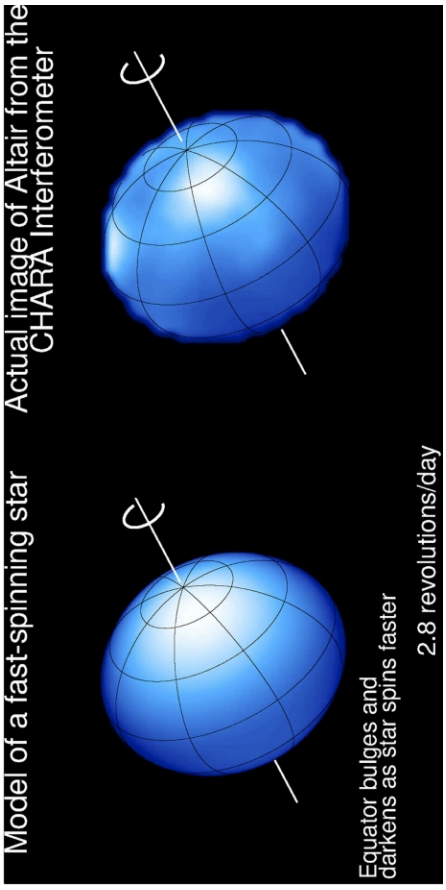
A very bright star, Altair has its own notable place in the mythologies of cultures around the world. As discussed in our previous edition, Altair represents the cowherd Niulang in the ancient Chinese tale of the "Cowherd and the Weaver Girl." Altair is the brightest star in the constellation of Aquila the Eagle; while described as part of an eagle by ancient peoples around the Mediterranean, it was also seen as part of an eagle by the Koori people in Australia! They saw the star itself as representing a wedge-tailed eagle, and two nearby stars as his wives, a pair of black swans. More recently one of the first home computers was named after the star: the Altair 8800.

Altair's rapid spinning was first detected in the 1960s. The close observations that followed tested the limits of technology available to astronomers, eventually resulting in direct images of the star's shape and surface by using a technique called interferometry, which combines the light from two or more instruments to produce a single image. Predictions about how the surface of a rapidly spinning massive star would appear held true to the observations; models predicted a squashed, almost "pumpkin-like" shape instead of a round sphere, along with a dimming effect along the widened equator, and the observations confirmed this! This equatorial dimming is due to a phenomenon called gravity darkening. Altair is wider at the equator than it is at the poles due to centrifugal force, resulting in the star's mass bulging outwards at the equator. This results in the denser poles of the star being hotter and brighter, and the less dense equator being cooler and therefore dimmer. This doesn't mean that the equator of Altair or other rapidly spinning stars are actually dark, but rather that the equator is dark in comparison to the poles; this is similar in a sense to sunspots. If you were to observe a sunspot on its own, it would appear blindingly bright, but it is cooler than the surrounding plasma in the Sun and so appears dark in contrast.

As summer winds down, you can still take a Trip Around the Summer Triangle with this activity from the Night Sky Network. Mark some of the sights in and around the Summer Triangle at: bit.ly/TriangleTrip. You can discover more about NASA's observations of Altair and other fast and furious stars at nasa.gov.



Altair is up high in the early evening in September. Note Altair's two bright "companions" on either side of the star. Can you imagine them as a formation of an eagle and two swans, like the Koori?



The image on topwas created using optical interferometry: the light from four telescopes was combined to produce this image of Altair's surface. Image credit: Ming Zhao. More info:bit.ly/altairvsmodel