Roanoke Valley Astronomical Society

Amateur Astronomy News and Views In Southwestern Virginia

Volume 38—Number 3 March 2021

RVAS February Meeting Report

Perseverance approaches Mars

By **Mike Hutkin, RVAS Secretary**

President John Goss opened the virtual pre-meeting chat session at 7:00 pm and members and guests quickly began joining the February meeting of RVAS. John, along with **Treasurer and Membership Chairperson Frank Baratta**, took the opportunity, as people signed in, to welcome guests and members. The pre-meeting discussions are always interesting because there is no agenda or format, just good conversation. We learned that **Joe Sgroi** was expecting delivery of his new telescope tonight; **William Krause's** Sierra Nevada screen background prompted some discussion on travel; there was a wide range of opinions and theories offered on telescope mirror construction; some equatorial mounting thoughts; of course, the upcoming Perseverance landing on Mars; discussion about the artifacts and paintings attendees have shown on their Zoom room walls; and the trials and tribulations of trying to capture images of the International Space Station (ISS). This is a rapid-fire half-hour of good open discussion about all things astronomy (and sometimes not astronomy).

*Page 1 of Zoom attendees – **Zoom photo***

*Page 2 of Zoom attendees – **Zoom photo***

It was now 7:30 pm and **President Goss** called the official meeting to order and began with some general comments. He welcomed everyone and recognized that one of the benefits of the Zoom format in winter is that extreme weather conditions do not deter attendance. For this evening's meeting, there were 43 members and 2 guests. Our guests included **Trish Cerulli**, who we all know from her role as Outreach Coordinator at Claytor Nature Center of the University of Lynchburg, and **Hayden Ringer**, a Virginia Tech Ph.D. student.

(Meeting Continued on page 2)

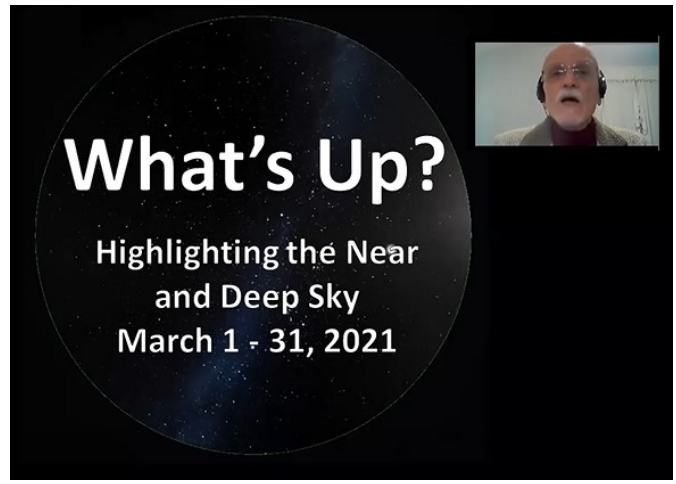
(Meeting Continued from page 1)

One thing that does suffer in times of inclement weather is observing opportunities and this time of year we are often facing cold temperatures and cloudy skies.

John brought the group up to date on RVAS actions to replace the Yahoo groups with an equivalent Google groups communication tool. We should soon be getting an email with signup instructions, so be on the lookout.

Next was an introduction of the club officers and a reminder that the election of new RVAS officers will occur in June of this year. It is important for the continued success of RVAS that members consider stepping forward and volunteer to fill a leadership position. In 2021, this includes a need to fill the position of Astronomy Day coordinator, which has been performed by **Rand Bowden** for several years. Rand is stepping out of this role and looks forward to training his replacement.

Michael Martin** shows his Constellation Hunter award – **Zoom photo



Frank Baratta** begins his "What's Up" presentation – **Zoom photo

John reminded everyone about the vote for the change to the Bylaws so that RVAS may proceed to file for 501(c)(7) tax-exempt status. All members have previously received voting instructions by email and the voting closes on March 5.

While the weather prevented many observing opportunities, President Goss did call on **Immediate Past President Michael Martin** to speak about his recent accomplishments. Michael has completed the Astronomical League's Constellation Hunter for Northern Skies and the Solar System Observing programs. Michael took some time to describe these programs and the satisfaction he has gotten from working on them. He encouraged others to get involved with the Astronomical League observing programs.

Frank Baratta was then called upon for our "What's Up" sky review for March 2021, highlight-

(Meeting Continued on page 3)

The Roanoke Valley Astronomical Society is a membership organization of amateur astronomers dedicated to the pursuit of observational and photographic astronomical activities. **Meetings are held at 7:30 p.m. on the third Monday of each month. See calendar on last page of newsletter for location. Meetings are open to the public.** Observing sessions are held one or two weekends a month at a dark-sky site. Yearly dues are: Individual, $20.00; Senior Individual, $18.00; Family, $25.00; Senior Family, $22.00; Student, $10.00. Articles, quotes, etc. published in the newsletter do not necessarily reflect the views of the RVAS or its editor.

Officers/Executive Committee/Editor/Webmaster

John Goss, President (*president@rvasclub.org*)
Todd Atkins, Vice President (*vicepresident@rvasclub.org*)
Mike Hutkin, Secretary (*secretary@rvasclub.org*)
Frank Baratta, Treasurer (*treasurer@rvasclub.org*)
Ray Bradley, Member at Large (*memberatlarge@rvasclub.org*)
Michael Martin, Immediate Past President (*immediatepastpresident@rvasclub.org*)
Dan Chrisman, Past President (*pastpresident@rvasclub.org*)
David E. Thomas, RVAS Newsletter Editor (editor@rvasclub.org)
David E. Thomas, Webmaster (webmaster@rvasclub.org)

RVAS web page: *http://rvasclub.org*

(Meeting Continued from page 2)

Magic Monocular – ***Product photo***

ing the near and deep-sky. For a summary of Frank's program, see this issue's "What's Up Highlights," and the entire PowerPoint by clicking here.

In the pre-meeting discussion, **President Goss** had offered a "teaser" about an unbelievable telescope opportunity that he would discuss as part of tonight's agenda and it was time for the "reveal".

Enter the 10x – 300x "Magic Monocular" and a review by Ed Ting, who is a well-known amateur astronomer with his website, www.scopereviews.co.

John first showed us a short video produced as an advertisement for the product, which was called the "Starscope". The video began by explaining why the designer decided the world needed such a product before moving on to describe the many wonderful things the product was capable of doing. Once hearing this information, and with a $19.99 price tag, most amateur astronomers would be rushing to add one to their toolkit. But remember the adage, *Caveat Emptor* or buyer beware. The next video was the Ed Ting review of the Starscope. Ed secured a sample device and proceeded to perform a serious examination of the product from unboxing to mounting on a tripod and observation of a distant object. While being a serious reviewer, Ed seemed unable to hide his disdain for what was an overhyped product with little resemblance to the actual product's physical or performance specifications. His final thought was "Be careful out there with your money". Considering all of the astronomy-related products we see, if it is too good to be true, it probably is.

It was now time for the feature presentation by **Member at Large Ray Bradley**. With the February 18 anticipated landing of Perseverance Rover on Mars, this was an excellent opportunity to get an update on the program's status.

Much of what we learned from Ray was based on the comparisons between the Perseverance rover and the Curiosity rover that had landed on Mars on August 12, 2012 and has been hard at work since.

Ed Ting reviews the "Starscope" – ***Zoom photo***

With the rapid pace of technology, it was no surprise to see the changes in the equipment onboard the new rover. However, using the adage, if it is not broken, don't fix it, Ray noted that the Perseverance rover has the same chassis and basic dimensions as Curiosity. Even though Curiosity is still operating, for now, nine years, its mission was targeted to be 1 Mars year (approximately 2 Earth years) which is the same plan for Perseverance. One big difference in the mission focus is that Curiosity was looking to see if Mars was habitable in its early years of existence while Perseverance is looking for actual evidence of life in the Martian past.

In the search for evidence of past microbial life on Mars, Ray explained that the mission has four core objectives. These will focus on Geologic studies,

Perseverance update – **All images credited to NASA**

(Meeting Continued on page 4)

(Meeting Continued from page 3)

Astrobiology or the search for evidence of life in the planet's past, the collection and storage of core samples, and preparations for the arrival of future robotic and human missions to the planet.

Preparation for the Mars 2020 mission began a few months after Curiosity's successful landing in July 2012. A major milestone in the mission timeline was the selection of Jezero crater as the landing site in 2018. The next two years were largely spent rigorously testing the rover and support systems in preparation for the arduous 6+-month journey from Earth to Mars. That journey began with the successful launching of Perseverance aboard an Atlas V rocket from Cape Canaveral Air Force Station on July 30, 2020. Nearly 300 million miles later brings us to today with the anticipated landing being on Thursday, February 18, 2021, a mere 3 days away.

Ray then walked us through a rundown of the basic systems on Perseverance, often comparing their form, fit, and function to similar systems on Curiosity. This included:

. Mastcam-Z: The 2 cameras on the mast are Perseverance's eyes. Both are zoomable, can take 3D images, and produce Hi-def video. This is a major enhancement over the two fixed-focal-length cameras on Curiosity's mast.

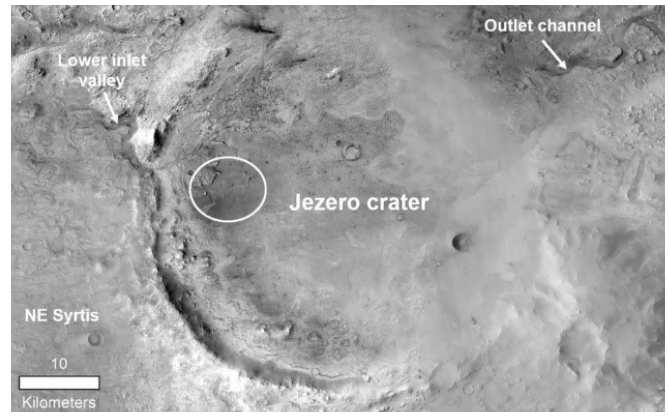
. RIMFAX – This is a ground-penetrating radar system that uses radar waves to see geologic features and terrain under the surface.

. MEDA – This is Perseverance's weather station for analyzing the Martian environment.

. SuperCam – Mounted on the mast, it uses both an infrared and a green laser having four spectrometers to analyze the chemical composition and determine the presence of molecules and organic compounds.

. SHERLOC and WATSON - the 2 "detectives" on board that use a UV laser and camera to detect signs of life such as carbon-carbon bonds, and organic molecules.

. PIXL – This is the Planetary Instrument for X-ray Lithochemistry, which identifies chemical elements at a tiny scale and can take pictures of rock and soil textures as small as a grain of salt.



*Jezero Crater –**Image credited to NASA***

. RSS - This is the rover's drill. Unlike the Curiosity drill, which produced a hole and analyzed the resulting dust, RSS drill bits are hollow and extract a core sample that can be stored onboard then deposited in a cache for retrieval by a follow-on mission.

Ray next went on to explain the two technology demonstrations that will be performed on Mars as part of this mission. The first is Ingenuity. This is the autonomous helicopter that will take five short distance flights using its two cameras for navigation and picture taking. Because of the distance between Earth and Mars and the resultant signal delay, Ingenuity is on its own to perform these travels. Sadly, once these short hops are performed and pictures relayed to Perseverance, Ingenuity will remain alone as the rover moves on.

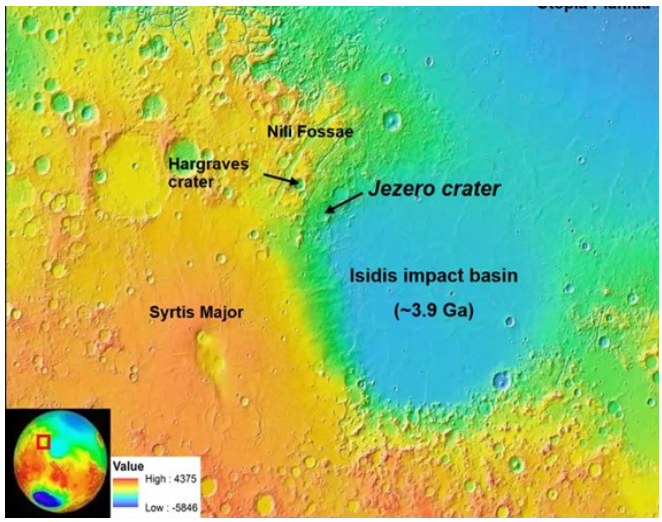
The other technology demonstration will be done by equipment called MOXIE. This is the Mars Oxygen In-situ Resource Utilization Experiment and will look at the efficiency of extracting oxygen from the Mars atmosphere. This experiment will tell NASA whether, and how effectively, they can produce rocket fuel and breathable oxygen on Mars.

Having learned about the equipment and the basic Perseverance mission of looking for signs of life that existed in the early days of the planet, where is Perseverance going to land?

We learned that the target is the Jezero crater within the Isidis Impact Basin. Why there? Ray introduced us to some of the planet geographies in that region and related it to similar conditions on Earth. Pictures taken by the Mars Reconnaissance Orbiter show evidence of water having flowed from highlands to lowlands, a river inlet to the crater (Jezero) that was once filled with water, and a river delta that is potentially full of evidence of mi-

(Meeting Continued on page 5)

(Meeting Continued from page 4)



Isidis Impact Basin ***-Image credited to NASA***

crobial life from the Noachian period or the first billion years after Mars was formed.

As seen in the picture of the basin, this would be a challenging landing even with an onboard pilot. Fortunately, Perseverance has the next best thing: Terrain-Relative Navigation which provides precision guidance during the landing approach while avoiding hazardous obstacles. This location is where reconnaissance data shows a variety of delta deposits that scientists hope to examine in greater detail because of their relationship to the existence of microbial life.

Ray then explained other things that the scientists hope to learn from this mission, including,

- Was Mars inhabited?
- Characteristics of prebiotic environments
- Formation and differentiation of rocky planets
- Early crust formation
- Surface environmental and climatic evolution
- History of the Martian dynamo and the magnetic field
- Validation/calibration of cratering chronology models for Mars

Ray explained a bit about each of these before moving on to offer additional comments about the anatomy of the Jezero crater. Here he focused on what we know and what we hope to learn from this area and the samples that will be taken for analysis. He noted that the crater floor had evidence of lava flow which could be used for dating purposes, the olivine and carbonate-bearing areas on the outer edges of the crater floor which bears evidence of water, the western delta which brought in and concentrated materials, the shoreline where there is evidence the water stopped, and finally the crater wall which exposes deep crustal material and provides clues to the differentiation that took place as the planet cooled from a molten state early in its formation.

Ray then provided an interesting planetary comparison looking at the evolution of Mars as it compares to Earth. We know how Earth transformed but how can we relate this to Mars? Both formed about 4.5 billion years ago, and we know that in the first billion earth-years is when microbial life emerged. Did the same occur on Mars?

Toward that end, Perseverance will drill and cache many core samples for retrieval to Earth by a later (2030?) mission conducted by NASA and the European Space Agency.

Ray finished by summarizing the goals of the mission:

- Explore an ancient lake system on Mars.
- Reveal details about the history of the environment.
- Seek biosignatures of life.
- Pave the way for future exploration.

Since the February meeting occurred before the actual landing, Ray addressed the possible opportunities to watch the landing live on Thursday.

After the presentation, a period of Q & A was offered, and members took advantage of the opportunity to probe a little deeper into the Perseverance mission. Thanks to **Roger Pommerenke, Trish Cerulli, Rand Bowden, Harry Kessler,** and **guest Hayden Ringer** for their thought-provoking questions.

Before closing the meeting, Vice President Todd Atkins was called on to tell us a bit about what we hope to see in March and April. The highlight for March will be Ed Dixon talking about remote imaging and in April we will hear from Anne Roemer who is the NASA person responsible for astronaut selection.

With Todd leaving his position as Vice President (due to Bylaws term limits), he also took the time to explain his duties so that members might consider filling the role next year.

With all business concluded, the meeting was

adjourned at 9:00pm.

Notice

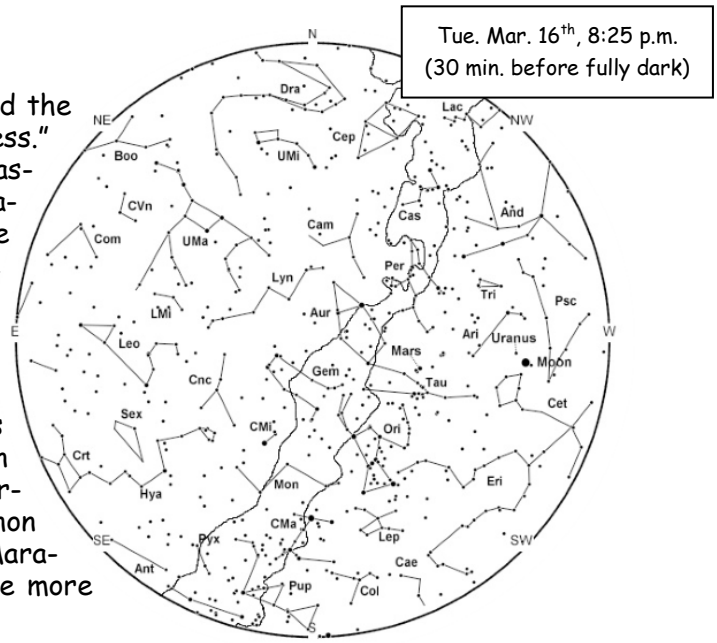
If you would like another means of connecting with amateur astronomers in the Roanoke area, why not join the RVAS Google Groups? If you would like to be sent an invitation, simply send an email to president@rvasclub.org.

What's Up Highlights

March 1-31, 2021

A summary of the What's Up program presented at the February 15th Zoom meeting.
The complete PowerPoint is available for viewing by clicking here.

This Month:



Wow! It's March already! Spring is just around the corner. And with March comes "March Madness." No, not the college basketball kind. It's the astronomy brand of madness that tempts us amateurs to forgo an entire night's sleep to race through deep-sky objects telescopically: the "Messier Marathon"! Observe all 110 (or, as some say, 109, one possibly a duplicate) in a single dusk-to-dawn session. A quirk in their positioning opens an opportunity each March to try. New moon on Saturday, March 13th is this year's best option. For a Messier Objects list and an optimized viewing order list, email Treasurer@rvasclub.org. But for safety, do the Marathon with at least two or three others. And if a Marathon doesn't strike your fancy, try some of the more mentally benign events below!

Celestial Events:

- Mon., 1st – From a dark site spot the hazy cone of the Zodiacal Light rising from the western horizon into Taurus and Gemini for the next three weeks.
- Tue., 2nd – Moon at perigee; distance 227,049 miles (avg. 238,900 miles).
- Fri., 5th, 6:15 a.m. – Binocular Challenge Observation! Jupiter 0.36° SE of Mercury 30 minutes before sunrise; mag. –2.0 and mag. 0.1, respectively.
- Sun., 14th, 2:00 a.m. – Begin Daylight Saving Time. Set clocks forward one hour when heading for bed on Saturday night.
- Thu., 18th – Waxing crescent Moon, Mars and the Pleiades and Hyades clusters together within a 15° circle half-way up in the WSW sky.
- Thu., 18th – Moon at apogee; distance 251,842. (10.9% farther than on 2nd and 12.5% than on 30th.)
- Sat., 20th, 5:40 a.m. – March (Vernal) Equinox. Beginning of spring.
- Tue., 30th – Moon at perigee; distance 223,880 miles.

Sunset and Twilight:

Sunset Range: 6:14 p.m. (Mar. 1st) to 7:42.m. (Mar. 31st)
Twilight Ends: 7:41 p.m. (Mar. 1st) to 9:11.m. (Mar. 31st)

Moon Phases:

Fri., 5th – Last Quarter
Sat., 13th – New Moon
Sun., 21st – First Quarter
Sun., 28th – Full Moon

Weekend Observing Opportunities:

Mar. 5th/6th
Mar. 12th/13th

RVAS from the Past

By **Bill Dillon**

RVAS 25 Years Ago

(In March 1996, the first ever photos of Pluto were taken by the Hubble Space Telescope. Comet Hyakutake approached to within 9.5 million miles of Earth.)

In Roanoke, RVAS members were busy filling the pages of our March Newsletter with articles on Comet C/1996 B2 discovered in January by amateur Japanese astronomer Yuji Hyakutake. The big news on the Comet headlined the March Newsletter and was followed by a full-page article of "finder charts", and another describing the "loneliness of the long-period comet".

A report on VAAS 1996 provided Club members with the details of the latest version of the annual event to be sponsored this year by the Back Bay Amateur Astronomers on April 13th at the Chesapeake Planetarium. To generate more interest in the event, the Back Bay group encourages fellow amateurs to present short talks.

Not to forget the local events coming up and the administrative duties of our Club, members were reminded of 1996 National Astronomy Day coming up on April 20th when amateurs across the country "take astronomy to the people", and of upcoming Club elections where every Officer position needed to be filled.

RVAS 10 Years Ago

(Space Shuttle Discovery makes its final landing after 39 flights. "Messenger" spacecraft enters orbit around Mercury.)

The March 2011 edition of the Club's Newsletter led off with an interesting, well-written article by Neal Sumerlin, PH.D. titled "How Many Nearby Earthlike Planets?" I suppose the first place to start might be what is your definition of "Nearby", "Earthlike", and "Planet", but I digress. Drawing on his in-depth reading and research, primarily on the results achieved by the Kepler spacecraft, Dr. Sumerlin offered a great deal of statistics regarding the number of "planets" discovered to date, their size in reference to our solar system planets and the current "scientific best guess" as to how many could support life of some kind as we know it. Surprisingly, the answer at that point in time was 54, not "around 50 or so", but exactly 54. That was ten years ago. I wonder what the answer would be today.

Additional articles were offered by John Goss, "Globe at Night Project"; by Michael Good, "Venus, Vesta, and M42"; by Jack Gross, "An Alien Visit to Our Galaxy"; and by (I believe) the Newsletter Editor who offered astronomical warnings, not to be believed, and why, in a column titled "The Open Cluster".

All the above resulted in another professional Newsletter of which to be proud and enjoy.

RVAS Member Anniversaries

Congratulations to the following members who reach the indicated number of consecutive years with the RVAS since joining or re-joining during the month of March:

Harry Montoro (1991) – 30 years
Tom and Dolores Skelly (2000) – 21 years
Rand Bowden (2003) – 18 years
Mike and Barbara Hutkin (2016) – 5 years
Brady Martin (2019) – 2 years
David Rauchle (2019) – 2 years

A special acknowledgement to Harry Montoro for reaching 30 consecutive years with the club!!!
Thanks to Harry and all for being RVAS members!

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.gov to find local clubs, events, and more!

Taking the Dog Stars for a Springtime Walk: Sirius and Procyon

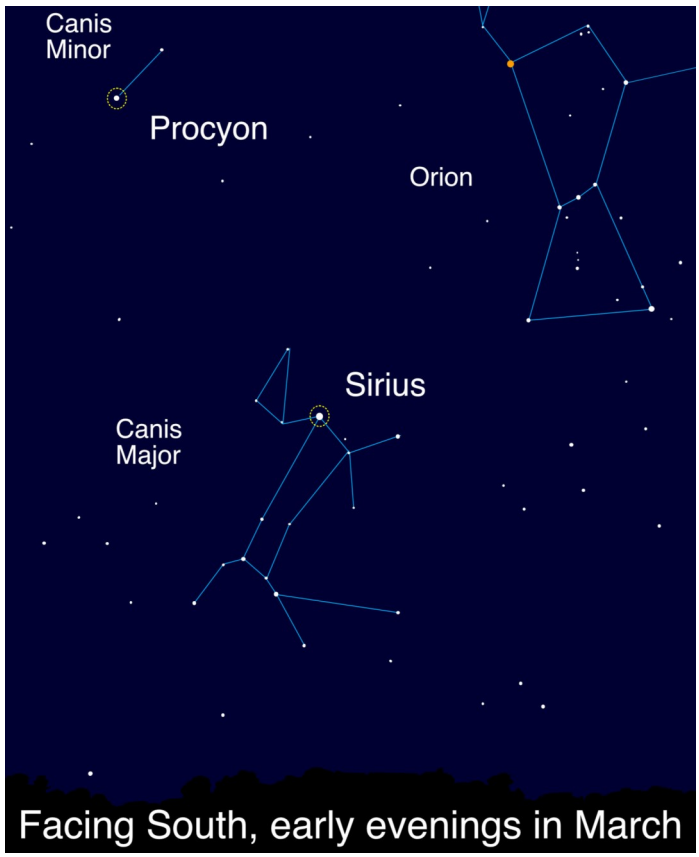
David Prosper

March skies feature many dazzling stars and constellations, glimmering high in the night, but two of the brightest stars are the focus of our attention this month: Sirius and Procyon, the dog stars!

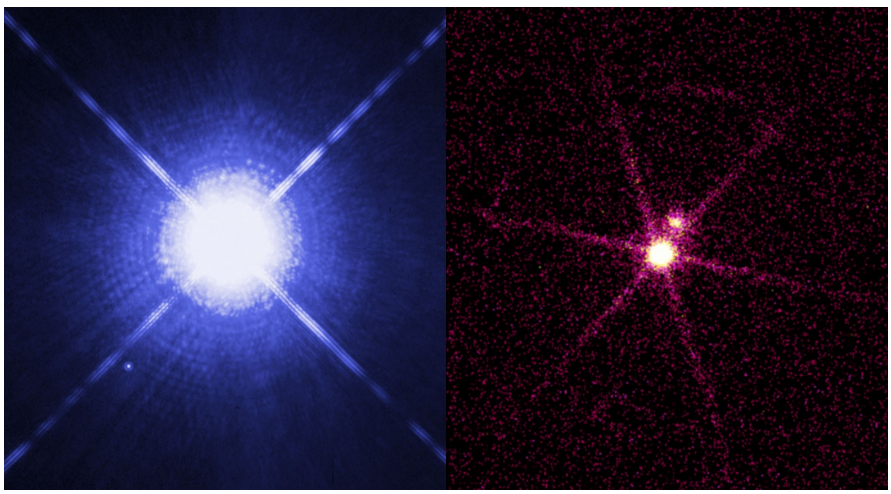
Sirius is the brightest star in the nighttime sky, in large part because it is one of the closest stars to our solar system at 8.6 light years away. Compared to our Sun, Sirius possesses twice the mass and is much younger. Sirius is estimated to be several hundred *million* years old, just a fraction of the Sun's 4.6 *billion* years. Near Sirius - around the width of a hand with fingers splayed out, held away at arm's length - you'll find Procyon, the 8th brightest star in the night sky. Procyon is another one of our Sun's closest neighbors, though a little farther away than Sirius, 11.5 light years away. While less massive than Sirius, it is much older and unusually luminous for a star of its type, leading astronomers to suspect that it may "soon" – at some point millions of years from now – swell into a giant star as it nears the end of its stellar life.

Sirius and Procyon are nicknamed the "Dog Stars," an apt name as they are the brightest stars in their respective constellations – Canis Major and Canis Minor – whose names translate to "Big Dog" and "Little Dog." Not everyone sees them as canine companions. As two of the brightest stars in the sky, they feature prominently in the sky stories of cultures around the world. Sirius also captures the imaginations of people today: when rising or setting near the horizon, its brilliance mixes with our atmosphere's turbulence, causing the star's light to shimmer with wildly flickering color. This vivid, eerie sight was an indication to ancient peoples of changes in the seasons, and even triggers UFO reports in the modern era!

Both of these bright stars have unseen companions: tiny, dense white dwarf stars, the remnants of supermassive companion stars. Interestingly, both of these dim companions were inferred from careful studies of their parent stars' movements in the 1800s, before they were ever directly observed! They are a challenging observation, even with a large telescope, since their parent stars are so very bright that their light overwhelms the much dimmer light of their tiny companions. The white dwarf stars, just like their parent stars, have differences: Sirius B is younger, brighter, and more energetic than Procyon B. Careful observations of these nearby systems over hundreds of years have helped advance the fields of: astrometry, the precise measurement of stars; stellar evolution; and astroseismology, the study of the internal structure of stars via their oscillations. Discover more about our stellar neighborhood at nasa.gov!



Sirius and Procyon, the loyal hunting dogs of nearby Orion the Hunter! What other stories can you imagine for these stars? Learn about "Legends in the Sky" and create your own with this activity: https://bit.ly/legendsinthesky *Image created with assistance from Stellarium.*



Sirius A and B imaged by two different space telescopes, revealing dramatically different views! Hubble's image *(left)* shows Sirius A shining brightly in visible light, with diminutive Sirius B a tiny dot. However, in Chandra's image *(right)* tiny Sirius B is dramatically brighter in X-rays! The "Universe in a Different Light" activity highlights more surprising views of some familiar objects: http://bit.ly/different-light-nsn *NASA, ESA, H. Bond (STScI), and M. Barstow (University of Leicester) (left); NASA/SAO/CXC (right)*

On February 23 at 7:17 PM, the moderately bright star Kappa Geminorum was to be occulted by the bright 12 day old Moon. Ten minutes before the occultation was to begin, it was photographed using an iPhone mounted on a 8 inch f/4 reflector. The star was covered by the Moon at 7:17:55.

Photo by ***John Goss***

Member Astrophoto

The Constellation Orion
Canon SL2, Samyang 135mm, F/2.0, ISO 200, iOptron SkyGuider Pro 100 Separate 20 Second Light Frames, 127 Dark Frames, 73 Flat Frames, 62 Bias Frames DeepSkyStacker 4.2.5, PixInsight 1.8.8

Photo by ***Michael Martin***

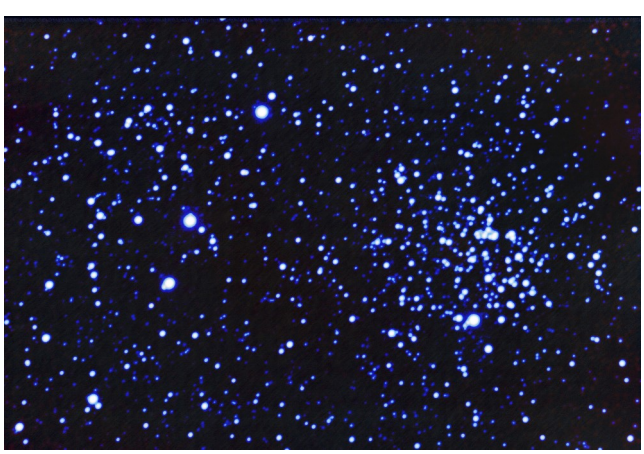
Wanted

Astro photos by members for display on the RVAS web site. Send to editor@rvasclub.org

Observing reports or articles from members about astronomy activities in which they may be involved

E-mail any material you would like to submit for publication to: **editor@rvasclub.org**

NGC 4631 supernova false color image to bring out all the detail I could, but you can see the dim little dot where that object is supposed to be, so I think I may have got it.



Another one is the cluster M52. I took this one just because I wanted to add to my Messier collection.

Finally there is one from last year, NGC 3384. This one (I guess) was badly overexposed sadly. Or maybe something else took place. Again just one for the records but not to frame on the wall! Still cool to see some galaxies.

Photo taken through an 8" Celestron Ultima 2000 with a Sony SLT-A33 in video mode at prime focus then used PIPP to pull out a snapshot that I processed in GIMP. Unfortunately, my camera battery died just before contact, so this is as close as I got to capturing the occultation.

Photo by ***Ray Bradley***

Use Our Message Line!

Want to check whether anyone is getting out on a scheduled observing session night or share that you're planning to do so? Have questions about the club or need its assistance? Call the RVAS Message Line,

540-774-5651, and leave a message or listen for any information available.

Monthly Calendar

MONTHLY ZOOM MEETING: Monday, March 15th, 7:30 p.m. What if you could command a high quality imaging telescope under very dark skies without leaving home? You can! For our March meeting program, member Ed Dixon will be discussing remote imaging, astrophotography using telescopes located at remote sites. Many services, all internet based, provide this capability. iTelescope, a subscription service, is one example Ed will explain, including its multiple facilities in both hemispheres, high-end CCD cameras and instruments up to 20-inch reflectors, the time-based cost to use them, and how the mostly automatic process works. Join us at our monthly Zoom meeting for Ed's eye-opening talk. We'll also have our other regular meeting segments, including reports and announcements, monthly sky review and other activities. And plan to join us at 7:00 p.m. for our informal, pre-meeting chat session. Mark your calendar for the 15th and watch for your Zoom invitation!

WEEKEND OBSERVING OPPORTUNITIES: During the continuing COVID-19 health emergency, the following information on Fridays and Saturdays that may be suitable for observing is provided solely as a courtesy to RVAS members and other readers. The RVAS assumes no responsibility for the health and safety of anyone venturing out to stargaze, and cautions all doing so to observe social distancing and other health and safety precautions.

-- **Friday and Saturday, March 5th and 6th**. Sunset is at 6:19 p.m. Astronomical twilight ends at 7:46 p.m. The Moon rises at 1:51 and 2:56 a.m., respectively.

-- **Friday and Saturday, March 12th and 13th**. Sunset is at 6:26 p.m. Astronomical twilight ends at 7:52 p.m. The Moon sets at 5:46 and 6:47 p.m., respectively.

-- **Future Weekend Observing Opportunities:** April 2nd and 3rd; 9th and 10th.

ROANOKE CITY PARKS and RECREATION PUBLIC STARGAZE: The next session is to be held on May 8th, 6:45 p.m. at Cahas Knob Overlook, milepost 139 on the Blue Ridge Parkway, pending a decision nearer that date as to whether safe viewing can be provided. For information/registration, contact the Department at 540-853-2236. Registration's not required for RVAS members, but recommended in order to receive any cancellation notice.

Astro-Quiz

Percival Lowell is credited with predicting the position of Pluto, which was finally discovered by Clyde Tombaugh in 1930. But a rival astronomer also correctly predicted where Pluto was to be found. Who was Lowell's rival?

Answer to Last Month's Quiz: Last time we asked whether any other stars of magnitude 3.0 or brighter come closer to Roanoke's zenith (point directly overhead) than Vega, and, if so, to name them. We gave Roanoke's latitude as N 37° 16' 15.6", meaning that its zenith is at declination +37° 16' 15.6". Moreover, we indicated that Vega, magnitude 0.03, passes 1.8° from our zenith. And we gave a hint: a link to a listing of stars giving their magnitudes and declinations, among other data. Once again, Harry Montoro, using the hint to his full advantage, was first to the finish line. Harry correctly answered that, yes, two stars come closer: Theta Aurigae, which has no proper name, at mag. 2.65, and Cor Caroli (alpha Canum Venaticorum), at mag. 2.80. Theta Aurigae passes just 3.5' from our zenith and Cor Caroli, 1.3° from it. Have an answer to this month's quiz (or a future question and answer to suggest)? E-mail it to astroquiz@rvasclub.org!