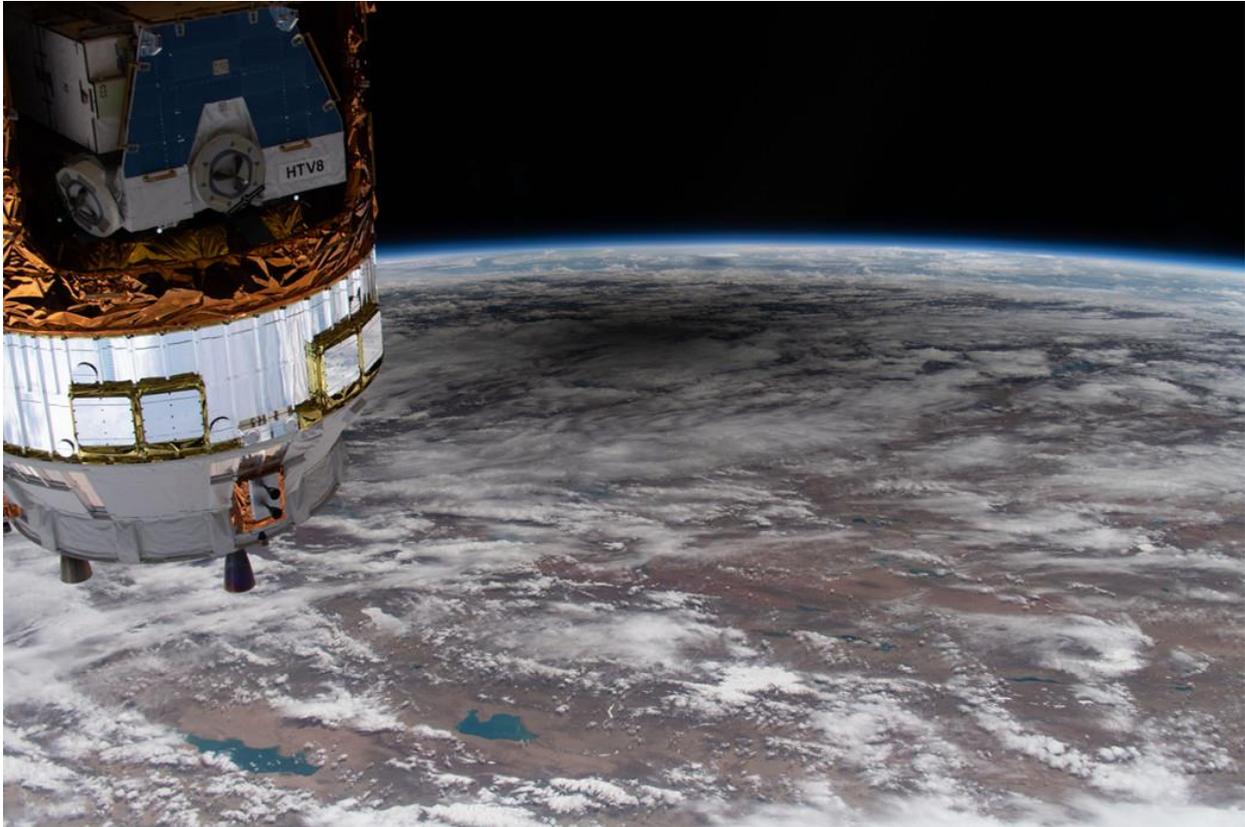


The Pulsar



Eclipse under the ISS. We weren't able to see the June 21st annular solar eclipse, but the International Space Station did, but looking down towards Earth rather than up from Earth. The view is from low Earth orbit near the border of Kazakhstan and China. In the foreground is a docked cargo spacecraft. For more info and image credits, visit <https://apod.nasa.gov/apod/ap200627.html>.

Event Calendar

July 18th Virtual Club Meeting, 7:30 PM
"A Quick Trip through 12 Billion Years of our Solar System"
by Lee Anne Willson

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- July 18th Virtual Club Meeting
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- Touring the Skies
- "Mars's Latest Visitor: NASA's Perseverance Rover"

July 18th Virtual Club Meeting, 7:30 PM

As mentioned last month, the rest of our meetings for this year will be virtual using Zoom. A few days before each meeting, you will be sent a link to join the meeting. All you need to do is click on the link.

If you have not used Zoom before, it is best to click on the link a few minutes before the formal start time to download the Zoom software (if needed) and to get your camera set up. Clicking on the link early may also give you a chance to chat with the other early birds, before the formal meeting starts. The topic will be:

“A Quick Trip through 12 Billion Years of our Solar System”

by Lee Anne Willson

Models for the evolution of the Sun and studies of other stars in different stages of their evolution tell us how our Sun will change in the future and what it was doing in the past. After the detection of planets orbiting other stars, our understanding of how solar systems form went through a revolution. There were also surprises about the climates of Venus and Mars that are relevant to understanding Earth’s present and future prospects. Putting these together, Lee Anne will take you on a quick trip from the early days of the solar system to the death of the Sun and the fates of the planets.

Lee Anne received her undergraduate degree in physics from Harvard University and her PhD in Astronomy from the University of Michigan. From 1973 to 2014 she was a member of the faculty at Iowa State University in the department of Physics and Astronomy. Now retired, she remains active in research on how stars like the Sun die; she is also involved with the arts community in

Ames; and she is working on a memoir of her life in astronomy.

Remembering When: 2006 to 2013

Once again, club member Allen Beers has been going through his old pictures and ran across these. How many of these club members can you recognize?

Fall Festival, August 29, 2008**Spring Festival, May 3, 2009**



Spring Festival, May 2, 2010

Iowa Star Party, August 31, 2013



Touring the Skies

By Jim Bonser (jbonser@usa.net)

Well, July has finally arrived, and summer stargazing can really begin in earnest. I say this because sunset will gradually occur earlier and earlier as the month progresses giving us more dark sky time before midnight when most of us have to be in bed if we are going to get at least a few hours rest before it's time to get up and get ready to go to work – or at least cook breakfast. On July 1st, astronomic dusk (when the geometric center of the Sun is 18 degrees below the horizon) occurs at about 11 p.m. At that point the Sun is no longer illuminating the sky and it is as dark as it is going to get until astronomic dawn which happens at 3:29 a.m. Only four and a half hours of truly dark skies. Of course, we are ignoring the Moon which will be a bright waxing gibbous on July 1st, setting at 3:26 a.m. – just three minutes before astronomic dawn. How nice. What incredible timing. If they were dancers, they'd have to be Ginger Rogers and Fred Astaire.

So, technically, not counting the lunar light pollution, July 1st gives us four and half hours of dark skies. But the nights will be steadily growing longer so that by July 31st, astronomic dusk occurs a bit earlier, at about 10:24 p.m. and astronomic dawn will occur 5 hours and 47 minutes later at about 4:11 a.m. Not a lot, I'll grant you, but that extra 36 minutes of darkness before midnight is important to us astro-imagers. And even for those who just like to see inky black skies studded with brilliant stars for just a few minutes before turning in for the night, those extra few minutes in the warm summer evenings are delicious.

On July 4th, if you are able to enjoy fireworks where you live, before getting back in the car

right after the show is over, take a moment to locate the Moon, Jupiter and Saturn near the southeastern horizon. The Full Moon leads the way, followed by bright Jupiter and then golden yellow Saturn. Both Jupiter and Saturn reach opposition this month, Jupiter on July 14th and Saturn on July 20th. The Moon moves from leading the trio on the 4th to forming a pretty triangle on the 5th with Jupiter above it and to the right and Saturn above and to the left. They clear the southeast horizon right around 10 p.m. If you have a nice view of the southeast horizon where you live, you might consider mounting your camera or cell phone on a tripod and snapping a picture. For the best effect, use a zoom lens (250mm or even 500mm), if you have one. Without the zoom, the Moon will look quite tiny. Since they will be near the horizon, the atmosphere will dim and redden the Moon, so it will be a little easier to get a nice shot without overexposing the Moon and making it look like a great big featureless blob.

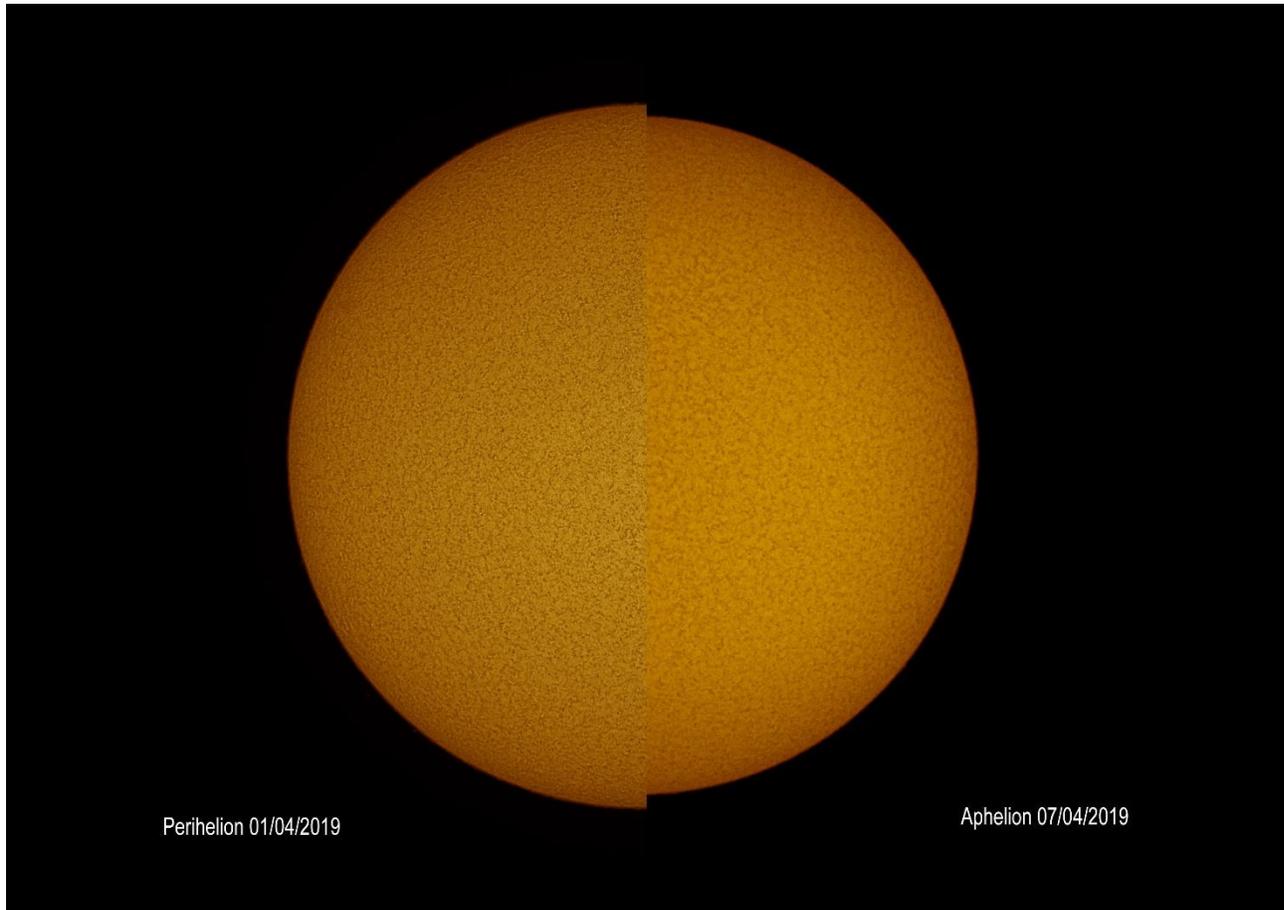
Mars rises around 12:30 a.m. at the beginning of July. It rises a little earlier all month and by July 31st, it will be visible clearing the horizon around 11:15 p.m. Mars is still several months from opposition, but it will be getting large enough to begin to see some surface details. The best telescopic views will be in the morning before dawn this month when Mars is highest in the sky.

Venus will add its brilliance to the Hyades star cluster this month and will make another great photographic target shining just a degree from the bright pumpkin colored Aldebaran on July 11th.

Another note for astro-photographers. If you have a solar filter for your telescope, the Earth will reach aphelion (its greatest distance from the Sun) at 6:35 a.m. CDT on July 4th. It won't seem any dimmer that day or look any different as it rises, but a photograph taken at apogee will show a noticeable difference to one taken with the same equipment when the Sun is at perigee. The

next perihelion of the Sun happens January 2nd, 2021 at 8:50 a.m.

Clear Skies!



The Sun at perihelion versus aphelion, taken by Jim Bonser in 2019.



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!

Mars's Latest Visitor: NASA's Perseverance Rover

David Prosper and Vivian White

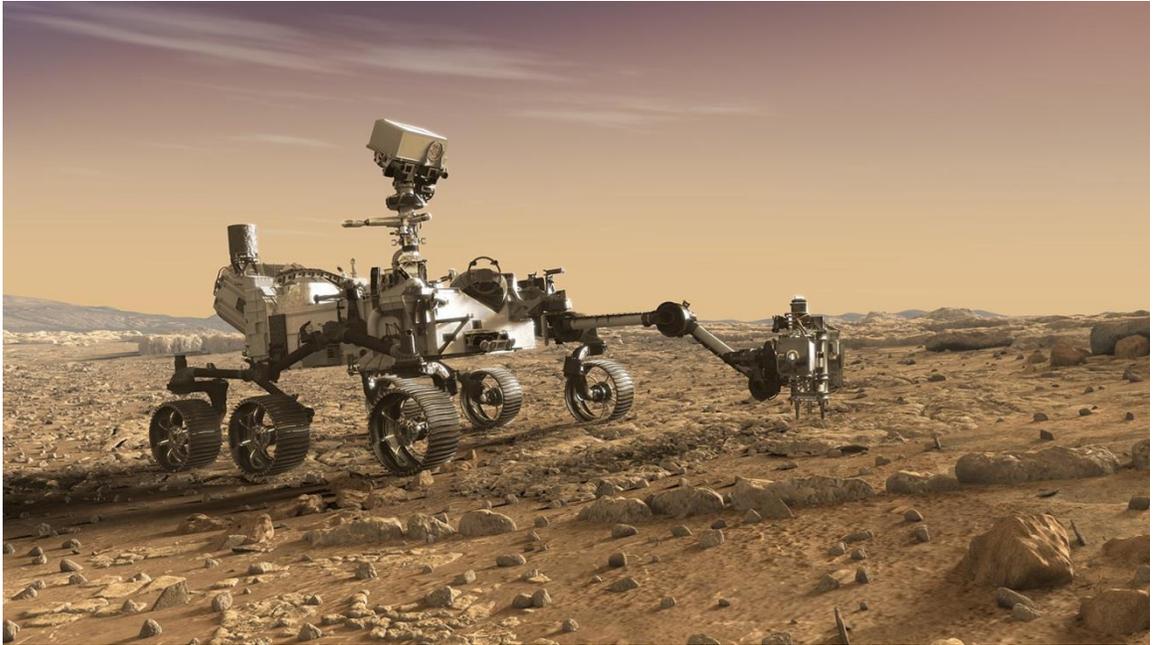
NASA's latest Mars rover, Perseverance, is launching later this month! This amazing robot explorer will scout the surface of Mars for possible signs of ancient life and collect soil samples for return to Earth by future missions. It will even carry the first off-planet helicopter: Ingenuity. Not coincidentally, Perseverance will be on its way to the red planet just as Mars dramatically increases in brightness and visibility to eager stargazers as our planets race towards their closest approach in October of this year.

Perseverance's engineers built upon the success of its engineering cousin, Curiosity, and its design features many unique upgrades for a new science mission! In February of 2021, Perseverance will land at the site of an ancient river delta inside of Jezero Crater and ready its suite of seven primary scientific instruments. The rover will search for traces of past life, including possible Martian fossils, with WATSON and SHERLOC, two advanced cameras capable of seeing tiny details. The rover also carries an amazing instrument, SuperCam, to blast rocks and soil outside of the rover's reach with lasers to determine their chemical makeup with its onboard suite of cameras and spectrometers. Perseverance will also take core samples of some of the most promising rocks and

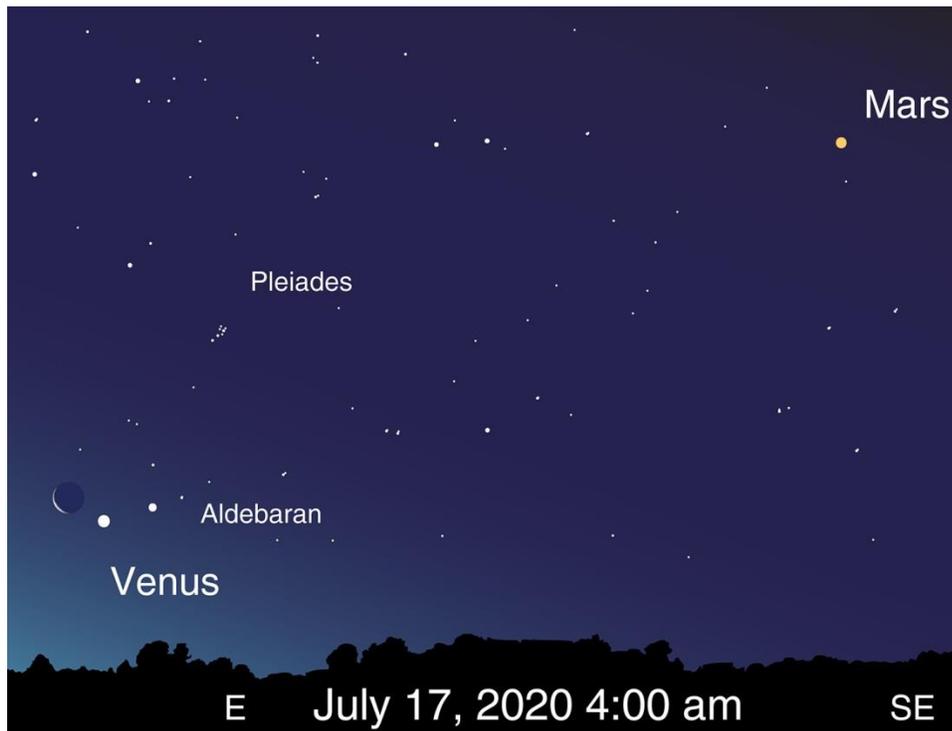
soil, storing them for later study with its unique caching system. Future missions will retrieve these samples from the rover and return them for detailed study by scientists on Earth. Perseverance also carries two microphones so we can hear the sounds of Mars and the noises of its instruments at work. It will even launch a small helicopter - Ingenuity - into the Martian atmosphere as a trial for future aerial exploration!

Would you like to contribute to Mars mission science? You can help NASA's rover drivers safely navigate the Martian surface by contributing to the AI4Mars project! Use this tool to label terrain features on photos taken of the Martian surface by NASA missions to help train an artificial intelligence algorithm to better read their surrounding landscape: bit.ly/AI4Mars

The launch of Mars Perseverance is, as of this writing, scheduled for July 20, 2020 at 9:15am EDT. More details, updates, and livestreams of the event are available on NASA's official launch page: bit.ly/Mars2020Launch. Dig deep into the science of the Mars 2020 mission and the Perseverance rover at: mars.nasa.gov/mars2020/. Find out even more about past, present, and future Mars missions at nasa.gov.



Perseverance inspects a cluster of interesting Martian rocks with its instruments in this artist rendering by NASA JPL/Caltech



Observe Mars yourself over the next few months! Mars can be found in early morning skies throughout July, and by the end of the month will rise before midnight. Mars gradually brightens every night until the close approach of Mars in October. The pre-dawn skies of July 17 present an especially nice view, as the waning crescent Moon will appear near Venus and Aldebaran.

Observatory Equipment Checkout List

Here is a list of the equipment that is available for checkout by members at the Adams Observatory. Many of the items have their accompanying eyepieces and other necessary equipment either in the box with them or in a smaller case in the large grey cupboard that holds all of the eyepieces in the main observing area.

There is a sign-out system in the warming room, and we ask that you please write down your name, the date you check out the equipment using the pen next to the item card rack. Place the card under the "Out" slot in the rack, and you are ready to go. **Also, please email the Observatory Manager anytime you'll be checking something out in case it is needed for any outreach events.** When you return the item, fill out the date of return and place the card in the "In" portion of the rack.

If you have any questions about how to use this equipment, don't hesitate to contact any of our officers, listed in the directory to the right. It doesn't take long to go through all of the particulars of each item, and you'll get much more enjoyment out of using them if you know where all the pieces go!

- 1.25" Binoviewer
- Bausch & Lomb 11x80 Binoculars
- Coronado PST Solar telescope
- Quantum Maksutov 4"
- Meade ETX 90AT Autostar in JMI case
- Meade ETX-90
- Meade Starfinder 6" f/8 Dobsonian
- Orion 8" f/8 Dobsonian
- Jason 60 mm Refractor
- Meade DSI I and II CCD imaging cameras
- Meade LX90 8" Schmidt-Cassegrain
- Meade DS 114 Newtonian

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About Us

The Pulsar is the monthly newsletter of the Ames Area Amateur Astronomers (AAAA).

The AAAA is a non-profit, 501(c)3 educational corporation whose goals are to inform and excite people about the wonders of the night sky, and encourage preservation of dark skies.

This newsletter is distributed at the beginning of the month indicated at the top of the page. We encourage contributions of all kinds from our readers, including articles, photographs, sketches and poems. Please submit your items by the 25th of each month to assure inclusion.

Please note that copyrighted material must have proper permission from the copyright holder and that submissions are subject to

editing. More information is available from our website: www.amesastronomers.com.

Crescent Moon over Principal Tower

Club member Brian Ritchey sent this picture of the crescent moon of June 25th hanging over the Principal Tower in Des Moines. Cool!



AAAA Membership and Contribution Form

Name _____
 Street _____
 City _____ State _____ Zip Code _____
 Phone _____
 Email _____

Amount Enclosed for Membership Dues _____
 Newsletter Format: Printed _____ Email _____

Amount Enclosed for Donation _____
 Purpose of Donation _____

Do you wish to be a part of the Aurora Network to be called in case of aurora activity in the area? No _____ Yes _____
 (If "yes", please indicate latest time to be called. _____)

Mail to:
 AAAA
 Attn: Treasurer
 PO Box 1961
 Ames, Iowa 50010-1961

Annual Membership Dues

Junior (under 18): \$10
 Regular: \$20
 Family: \$25
 Supporting: \$35
 Sustaining: \$50
 Benefactor: \$100

Payment is made to: Treasurer, AAAA. Dues are payable July first and prorated for memberships that are initiated after that date. To prorate to the end of the year:

$$\text{Dues} = (\text{\$}) \times (\text{\#months to the next July 1}^{\text{st}}) / 12$$

Example:
 For a Junior in early November: $(\$10 \times 8) / 12 = \6.66

Please indicate if you prefer to not have personal data included in publications.

Dues rate effective July 2014