Highlights of the January Sky...

- - - 3rd - - -

AM: Quadrantid meteor shower peaks with a zenithal hourly rate of 70 to 80 meteors per hour.

DUSK: A waxing crescent Moon is 3° to the upper left of Venus.

- - - 4th - - -

DUSK: The waxing crescent Moon is about 3° to the upper left of Saturn.

- - - 6th - - -

First Quarter Moon @ 6:56 pm EST

- - - 9th - - -

PM: A waxing gibbous Moon is within binocular range of the M45, the Pleiades cluster.

- - - 13th - - -

Full Moon @ 5:27 pm EST

PM: The Moon lines up with Castor and Pollux in Gemini.

PM: The Moon occults Mars at 9:09 pm EST. The Red Planet reappears at 10:18 pm.

- - - 15th - - -

MARS IS AT OPPOSITION. Its angular diameter is 14.6″ and shines with a ruddy hue at magnitude -1.4.

- - - 16th - - -

PM: A waning gibbous Moon is less than 6° to the lower left of Regulus, in Leo, when they rise.

- - - 17th & 18th - - -

DUSK: Venus and Saturn are about 2° apart in the southwestern sky.

- - - 21st - - -

AM: The Moon is 3½° to the lower right of Spica in Virgo.

Last Quarter Moon @ 3:31 pm EST

- - - 23rd - - -

PM: Mars is 2½° to the right of Pollux in Gemini.

- - - 29th - - -

New Moon @ 5:27 pm EST

- - - 31st - - -

DUSK: A waxing crescent Moon is around 3° to the lower right of Saturn.

Prime Focus

A Publication of the Kalamazoo Astronomical Society

★ ★ ★ January 2025 ★ ★ ★

This Month's KAS Events

General Meeting: Friday, January 10 @ 7:00 pm

Kalamazoo Area Math & Science Center • See Page 10 for Details

Member Observing: Monday, January 13 @ 8:30 pm

Occultation of Mars • Visit Schedule Page for Details

Online Viewing: Saturday, January 18 @ 9:00 pm

Held on Zoom • Click to Register • Visit OVS Page for Details

Inside the Newsletter. . .

Observations of 2024

by Richard S. Bell

What a year it has been for observational astronomy! When amateur astronomers look back to 2024, they'll no doubt first think of the total solar eclipse on April 8th. However, we also had a decent comet and a few outbreaks of aurora!

So many of our activities and outreach events between September 2023 and June 2024 were spent building up to the *Great North American Eclipse* and sharing our experiences with one another after it had passed. The Eclipse Series was in full swing when the year started. Special guest speakers included Jay Anderson, Fred Bruenjes, Fred Espenak, Alan Friedman, Xavier Jubier, Dr. Gordon Telepun, and Michael Zeiler. Of all those, I think Michael Zeiler's tour of the April 8, 2024, total solar eclipse at the February meeting was the best. It helped that Michael was the only guest speaker that was able (or willing) to join us in person, but it was also the most unique of all the presentations.

Overall, attendance for the Eclipse Series was pretty good, but live attendance could have been better. We estimated the total meeting attendance at 1,538, comprising 201 live attendees and 1,337 via Zoom. Over 45,000 people viewed the eclipse talk videos posted on our YouTube channel. My community eclipse talks also went very well. In all, I gave 38 presentations at schools and (mostly) libraries. An estimated 1,255 people attended those talks. Including our normal eclipse-focused outreach events, we easily reached over 3,000 people in the build-up to April 8th. Special thanks also go to all the members that shared eclipse reports at the May and June meetings and/or in the newsletter.

The *Introduction to Amateur Astronomy* series also returned in early 2024. My intent with the series this go-around was to help pad attendance for the Eclipse Series and sell Eclipse Shades. Both worked very well. Overall attendance was about 1,200. This makes it the lowest of the past three installments held online, but far higher than any of the past live versions.

Solar maximum arrived in 2024, and with it, lots of auroral activity! We had the Great Solar Storm on May 10th. Earth was bombarded by large solar flares and coronal mass ejections, creating the strongest geomagnetic storm in two decades—and possibly among the strongest displays of auroras on record in the past 500 years. Other geomagnetic storms produced aurora on August 11th, during the peak of the Perseid meteor shower, and on October 10th. We were fortunate enough to have clear skies on all three dates, and members snapped lots of images and shared them here in *Prime Focus*. It's safe to assume we can expect more outbreaks in 2025.

While certainly not a great comet, C/2023 A3 (Tsuchinshan–ATLAS) put on a fine show in the Northern Hemisphere in mid-October. Many members shared their images on our Facebook group and in *Prime Focus*. The last three of five nights of *CometWatch* at Richland Township Park were successful. The local media and a large majority of the membership ignored *CometWatch*, but attendance was still decent. We also pulled off 7 out of 12 Public Observing Sessions at the Nature Center, which is a pretty typical percentage.

All of these special activities and events resulted in another dramatic increase in membership. We finished 2024 with 378 memberships, which beats the previous all-time high of 337 set last year. If we can retain a large portion of members that still need to renew, we have a real chance of surpassing 400 in 2025! Never would I have dreamed we would come close to that figure when my journey with the KAS began 30 years ago. It's fine if we don't, but it would be amazing if we did!

Winter Solstice Party REPORT

The Kalamazoo Astronomical Society's annual meeting, featuring the third Winter Solstice Party (WSP), began at 5:30 pm EST on Saturday, December 7, 2024. Westwood United Methodist Church, located at 538 Nichols Road, hosted this year's gathering. The location was very convenient for many of our members, and the church had lots of space. Attendance was 32 members and guests, up slightly from last year's historic low of 26 but still disappointing nonetheless. KAS membership is at record highs, but the question remains: **Where are they?** It should be noted that 35 people registered, but there were three no-shows. The KAS still had to pay for these missing people.

Organizers for the year's December gathering were **Phyllis Lubbert** and **Mike Sinclair**. Phyllis made all the preparations for dinner, including the wonderful celestial table centerpieces. Mike organized the BINGO and door prizes.

We enjoyed a buffet-style dinner again this year, and it was as excellent as last year but only $15.00 (a saving of $10 compared to the last two years). Appetizers consisted of fruits, vegetables, plus cheese and crackers. Entrée choices included chicken breast, pork loin, and vegetarian lasagna (with a gluten-free option). Side dishes were cheesy potatoes, wild rice, green bean almondine, buttered corn, assorted rolls, and butter and jams. Last but not least were chocolate cake and apple cobbler for dessert.

Special thanks also go to **Suzanne Schauer**, who helped prepare and serve dinner, and **Brenda Tiffenthal**, who washed all the dishes behind the scenes.

The lucky BINGO winners (from left to right): Ruth Price, Matt Borton (double winner), and Scott Macfarlane.

Members enjoy dinner and conversation at the Winter Solstice Party. (L to R) Dale Thieme, Joe & Ellen Comiskey, George Drake, and Melody & Dave Woolf.

Once dinner was complete and everyone had a chance to relax and converse, we played four highly competitive rounds of BINGO. Here are the lucky winners:

- **Matt Borton** – Celestron 7×50 Cometron Binoculars – *Donated by the KAS*
- **Scott Macfarlane** – *Observer's Handbook 2025* – *Donated by himself!*
- **Ruth Price** – Deep Space Mysteries Calendar – *Donated by Anonymous*
- **Matt Borton** (double winner!) – S&T Mars Globe – *Donated by Molly Williams*

With all the festivities complete, we moved on to the annual meeting. It began with final nominations and the election of 2025 officers and at-large board members. There was one open member-at-large position, and Matt Borton nominated himself. With all nominees running unopposed, Mike Sinclair made the motion to ignore Article 5 of the KAS Bylaws and forego voting by secret ballot. Joe Comiskey seconded. All members present unanimously voted to approve the motion. Please see page 2 for the list of 2025 KAS board members.

Thanks to Anna Daly and Dave Garten, who leave the board after serving with distinction for the past three and five years, respectively.

At the start of his President's Report, Richard thanked Phyllis Lubbert and Mike Sinclair for organizing this year's Winter Solstice Party. After 20 years of helping to organize the old Holiday Party and two years of the Winter Solstice Party, he knows the amount of work that goes into it.

Richard also thanked everyone that renewed their KAS membership thus far. To date, he estimates that about one-third of those needing to renew have done so. He plans to send out the next email reminder in mid-December. Members that renew early make it possible for Richard to focus on other KAS responsibilities and personal projects.

For the third year in a row, the Paramount Charter Academy has invited us to participate in their STEM Night. This year's event takes place on January 22nd from 5:30 to 7:00 pm. Jack Price is currently the only person planning to volunteer.

Richard said that he is still hoping to write and send out a fundraising email sometime in February or March. The goal is to purchase new CMOS cameras and a computer for the Remote Telescope.

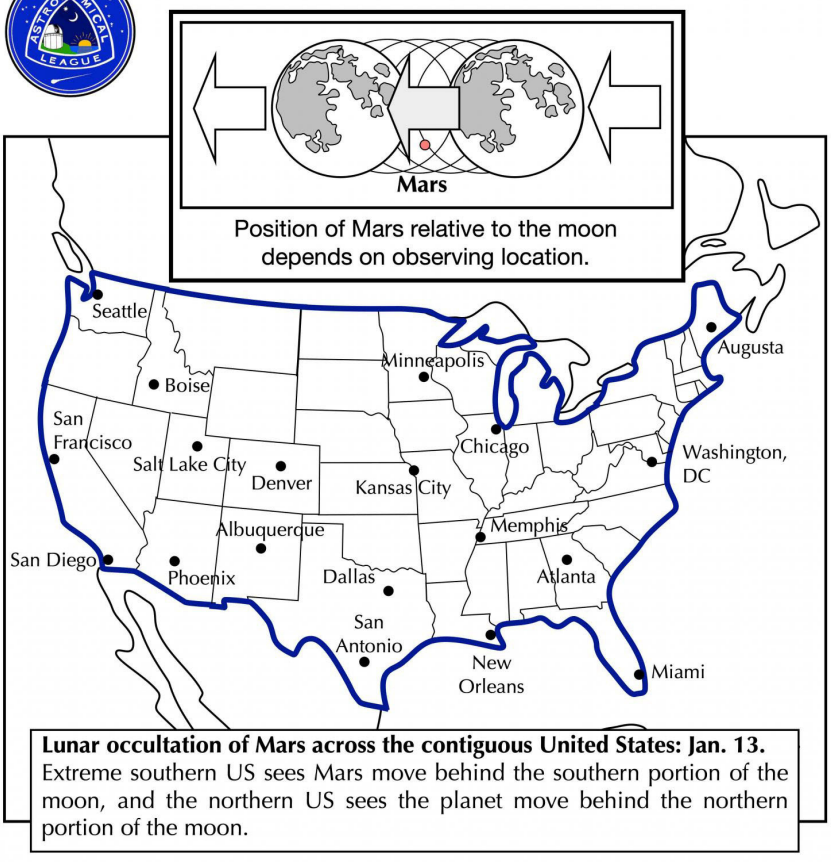
With the coming of the great Michigan perma-cloud in November, there were no observing reports. Richard shifted his focus from discussing astronomical news to providing a preview of upcoming KAS activities. The astrophysicist that first theorized about the large-scale structure of the universe (a.k.a. the Cosmic Web), J. Richard Gott from Princeton University, will join us via Zoom during the January meeting. Please see page 10 for details.

We held door prize drawings using Google's random number generator. Thanks to all the members that donated prizes this year. Here are ALL the lucky winners (in order):

Molly Williams (*Atlas of Solar Eclipse: 2020 to 2024* by Michael Zeiler and Michael Bakich), **George Drake** (Fall Cardinal Light), **Meagan Fitzhenry** (Snoopy Meteor Bites), **Karen Sinclair** (Rocket Astronaut Projector), **Janet Macfarlane** (Aurora Puzzle), **Mike Sinclair** (*100 Things to See in the Night Sky* by Dean Regas), **Genevivie Burns** (Apertura Ember Headlamp), **Karen Woodworth** (Sony Headphones), **Phyllis Lubbert** (Sweet Dreaming Mug), **David Latimer** (Celestial Color Changing Mug), Klay **Woodworth** (*Alien Worlds: Color Cosmic Kingdoms* by Kerby Rosanes), **Richard Bell** (2025 Moon Phase Calendar), **Elaine Ritter Shirk** (Bandi Stunt Kite), **Melody Woof** (Fall Cardinal Light), **Tony Gurczynski** (Shawl Wrap), **Dale Thieme** (Fall Cardinal Light), and **Katie Weller** (Nature's Wonders Calendar).

Our evening concluded at about 8:30 pm. Thanks to everyone that attended and made it a wonderful evening!

If you can see only one celestial event this January, see this one.



Lunar occultation of Mars across the contiguous United States: Jan. 13. Extreme southern US sees Mars move behind the southern portion of the moon, and the northern US sees the planet move behind the northern portion of the moon.

Be sure to use binoculars!

Occultations demonstrate the moon's eastward orbital motion as Earth's rotation causes it to move in a westward arc across the night night sky.

Full Moon occults Bright Mars

In the evening hours of **January 13**, the brilliant full moon passes in front of bright Mars, which is near opposition. It may not be easy to spot because of the moon's bright glare!, but give it a try!

Approximate local times of disappearance and reappearance.
Begin viewing ten minutes before your estimated time. Mars' time and position of reappearance is difficult to judge since the planet lies concealed behind the moon beforehand.

City	Disappearance	Reappearance
Albuquerque	6:51 pm	7:52
Augusta	9:29	10:44
Atlanta	9:06	10:13
Boise	7:06	7:49
Boston	9:26	10:42
Chicago	8:08	9:16
Dallas	7:54	8:57
Denver	6:57	7:57
Kansas City	8:00	9:06
Memphis	8:00	9:07
Minneapolis	8:08	9:10
Los Angeles	5:51	6:45
Miami	9:30	9:53
New Orleans	8:00	8:59
New York	9:21	10:37
Phoenix	6:49	7:48
Salt Lake City	6:59	7:52
San Antonio	7:52	8:50
San Diego	5:49	6:45
San Francisco	5:58	6:45
Seattle	6:23	6:39
Washington DC	9:16	10:31

Celebrating 20 Years Night Sky Network

by **Vivian White & Kat Troche**

NASA's Night Sky Network is one of the most successful and longstanding grassroots initiatives for public engagement in astronomy education. Started in 2004 with the PlanetQuest program out of the Jet Propulsion Laboratory and currently supported by NASA's Science Activation, the Night Sky Network (NSN) is critical in fostering science literacy through astronomy. By connecting NASA science and missions to support amateur astronomy clubs, NSN leverages the expertise and enthusiasm of club members, who bring this knowledge to schools, museums, observatories, and other organizations, bridging the gap between NASA science and the public. Now in its 20th year, NSN supports over 400 astronomy clubs dedicated to bringing the wonder of the night sky to their communities across the U.S. and connecting with 7.4 million people across the United States and its territories since its inception.

Public Observing Session at the Kalamazoo Nature Center/Owl Observatory, July 13, 2024. Credit: Kalamazoo Astronomical Society/Richard Bell

Humble Beginnings

It all started with an idea – astronomy clubs already do significant outreach, and club members know a lot about astronomy (shown definitively by founder Marni Berendsen's research), and they love to talk with the public. How could NASA support these astronomy clubs in sharing current research and ideas through informal activities designed for use in the places where amateur astronomers conduct outreach? Thanks to funding through NASA JPL's PlanetQuest public engagement program, the Night Sky Network was born in 2004, with more than 100 clubs joining in the first year.

International Observe the Moon Night, September 2024. Credit: Oklahoma City Astronomy Club/Dave Huntz

As quoted from the first NSN news article, "NASA is very excited to be working closely with the amateur astronomy community," said Michael Greene, current Director of Communications and Education and former head of public engagement for JPL's Navigator Program and PlanetQuest initiatives. "Amateurs want more people to look at the sky and understand astronomy, and so do we. Connecting what we do with our missions to the sense of wonder that comes when you look up at the stars and the planets is one of our long-term objectives. We have a strong commitment to inspiring the next generation of explorers. Lending support to the energy that the amateur astronomy community brings to students and the public will allow NASA to reach many more people."

Taking off like a rocket, Night Sky Network had over 100 clubs registered on their website within the first year.

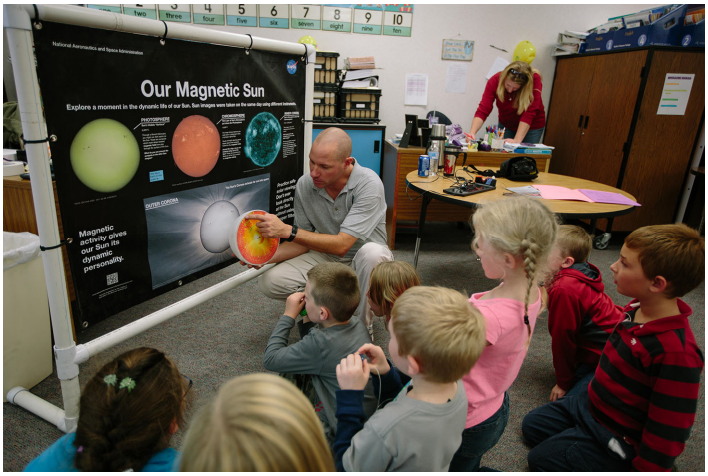
The Toolkits

Outreach Toolkits were developed to assist clubs with their endeavors. These kits include educational materials, hands-on activities, and guides for explaining topics in an accessible way. So far, 13 toolkits have been created on topics ranging from the scale of the universe to how telescopes work. To qualify for these free Toolkits, clubs must be active in their communities, hosting two outreach events every three months or five outreach events within a calendar year. Supplemental toolkits were also created based on special events like the solar eclipses and the 50th anniversary of Apollo's Moon landing. A new toolkit is being developed to teach audiences about solar science, and NSN is on track to support clubs well into the future.

NSN also hosts archived video trainings on these toolkits and other topics via its YouTube channel and a monthly webinar series with scientists from various institutions worldwide. Lastly, a monthly segment called *Night Sky Notes* is produced for clubs to share with their audiences via newsletters and mailing lists.

Sharing the Universe

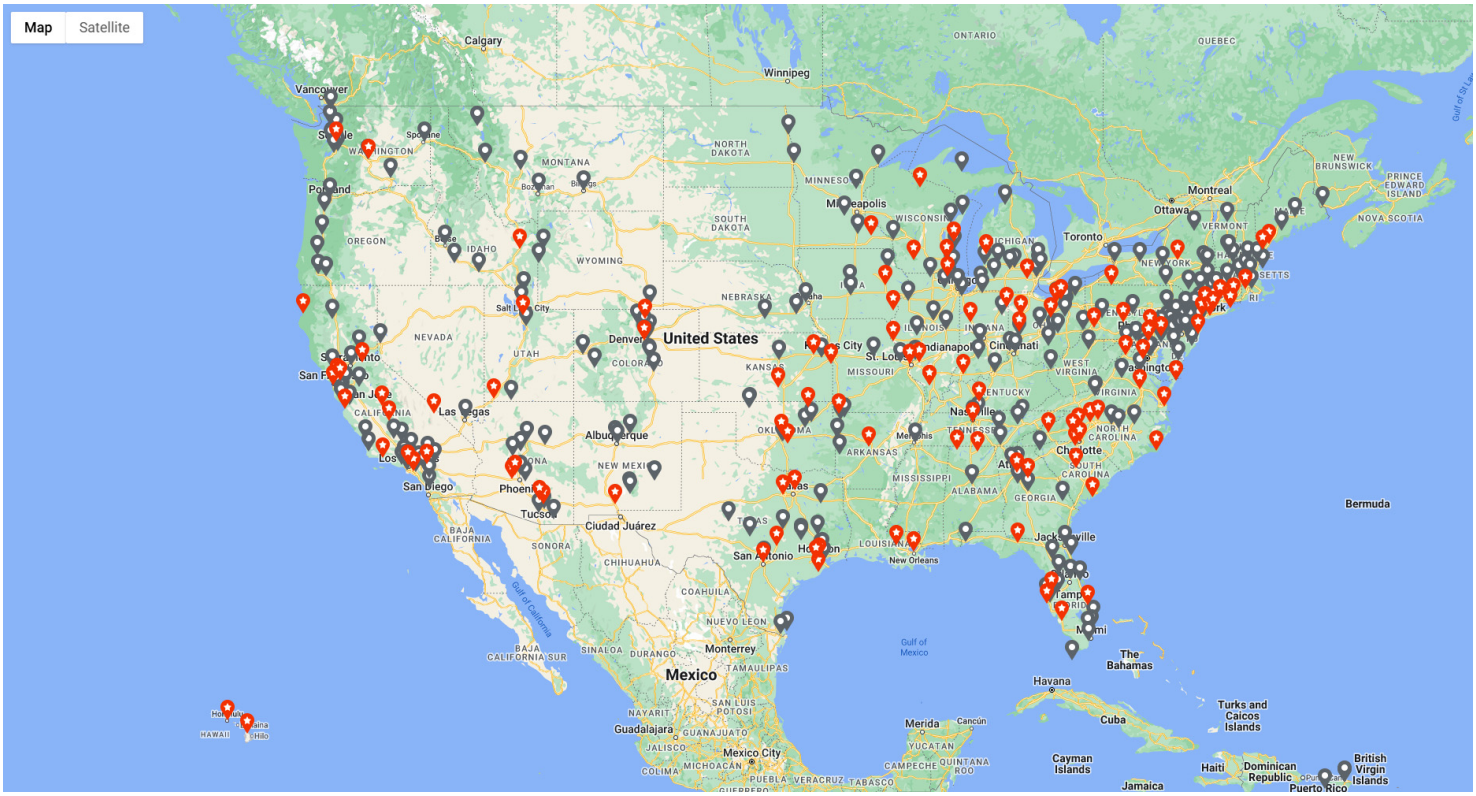
In 2007, a National Science Foundation grant funded further research into astronomy club needs. From that came three club resources: the Growing Your Astronomy Club and Getting Started with Outreach video series, an updated website with a national calendar, and club and event coordination. Now, you can find hundreds of monthly events nationwide, including virtual events you can join from anywhere.



Rye Science Day, October 2014. Credit: Southern Colorado Astronomical Society/Malissa Pacheco

Night Sky Network: Current and Future

As of November 2024, NSN has over 400 clubs as far north as Washington State, west as Hawaii, and south as far as Puerto Rico. Astronomy clubs worldwide share the wonder of the day and night sky with their communities, and the Night Sky Network is happy to support US clubs with public engagement tools. Through their outreach efforts, member clubs have reached more than 7 million people to date, and the community is still going strong. Find an upcoming star party near you on our new public website.



Map of Night Sky Network clubs within the United States as of November 2024. The KAS has been a member since 2017.

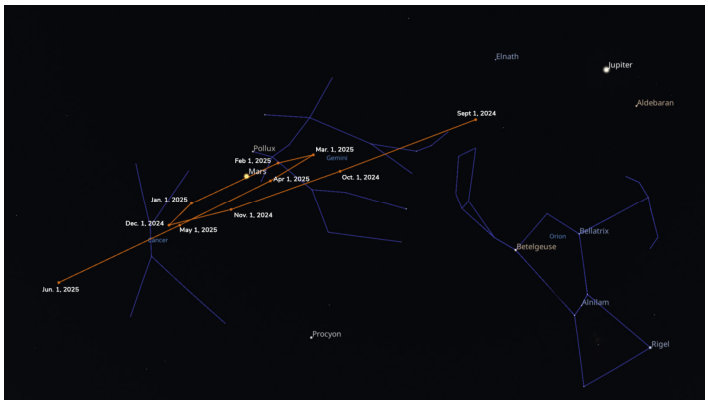
The Red Planet

by **Kat Troche**

Have you looked up at the night sky this season and noticed a bright object sporting a reddish hue to the left of Orion? This is none other than the planet Mars! January will be an excellent opportunity to spot this planet and some of its details with a medium-sized telescope. Be sure to catch these three events this month.

Martian Retrograde

Mars entered retrograde (or backward movement relative to its usual direction) on December 7, 2024, and will continue throughout January into February 23, 2025. You can track the planet's progress by sketching or photographing Mars' position relative to nearby stars. Be consistent with your observations, taking them every few nights or so as the weather permits. You can use free software like Stellarium or Stellarium Web (the browser version) to help you navigate the night as Mars treks around the sky. You can find Mars above the eastern horizon after 8:00 pm local time.



This mid-January chart shows the path of Mars from September 2024 to June 2025 as it enters and then exits in retrograde motion. Mars appears to change its direction of motion in the sky because Earth is passing the slower-moving Mars in its orbit. Credit: Stellarium

Hide and Seek

On the night of January 13th, you can watch Mars 'disappear' behind the Moon during an occultation. An occultation is when one celestial object passes directly in front of another, hiding the background object from view. This can happen with planets and stars in our night sky, depending on the orbit of an object and where you are on Earth, similar to eclipses.

Depending on where you are within the contiguous United States, you can watch this event with the naked eye, binoculars, or a small telescope. The occultation will happen for over an hour in some parts of the US. You can use websites like Stellarium Web or the Astronomical League's 'Moon Occults Mars' chart to calculate the best time to see this event.

A simulated view of the Moon as Mars begins its occultation on January 13, 2025. Credit: Stellarium

Closer and Closer

As you observe Mars this month to track its retrograde movement, you will notice that it will increase in brightness. This is because Mars will reach **opposition** by the evening of January 18th. Opposition happens when a planet is directly opposite the Sun, as seen from Earth. You don't need to be in any specific city to observe this event; you only need clear skies to observe that it gets brighter. It's also when Mars is closest to Earth, so you'll see more details in a telescope.

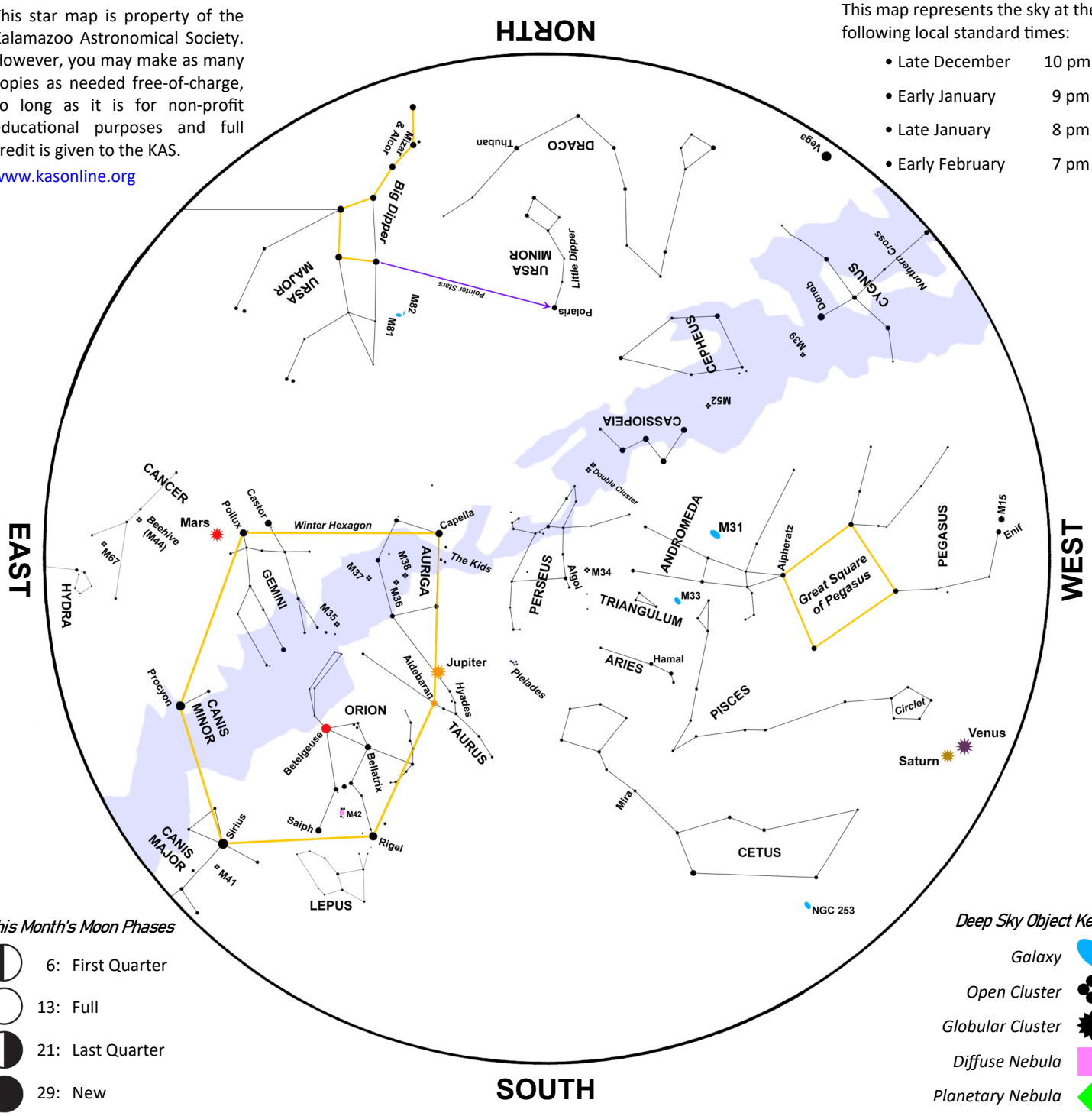
Want a quick and easy way to illustrate what opposition is for Jupiter, Saturn, Mars, or other outer worlds? Follow the instructions on our Toolkit Hack: Illustrating Opposition with Exploring the Solar System page using our Exploring Our Solar System activity!

Mars has fascinated humanity for centuries, with its earliest recorded observations dating back to the Bronze Age. By the 17th century, astronomers were able to identify features of the Martian surface, such as its ice caps and darker regions. Since the 1960s, exploration of the Red Planet has intensified with robotic missions from various space organizations. Currently, NASA has five active missions, including rovers and orbiters, with the future focused on human exploration and habitation. Mars will always fill us with a sense of wonder and adventure as we reach for its soil through initiatives such as the Moon to Mars Architecture and the Mars Sample Return campaign.

January Night Sky

This map represents the sky at the following local standard times:

- Late December 10 pm
- Early January 9 pm
- Late January 8 pm
- Early February 7 pm



This Month's Moon Phases

- 6: First Quarter
- 13: Full
- 21: Last Quarter
- 29: New

Deep Sky Object Key

- *Galaxy*
- *Open Cluster*
- *Globular Cluster*
- *Diffuse Nebula*
- *Planetary Nebula*

The Quadrantid meteor shower peaks during the early morning hours of January 3rd. This brief but intense shower can produce up to 80 meteors per hour. Clouds may interfere with viewing, but the Moon will not!

A waxing crescent Moon will be about 3° to the upper left of Venus at dusk on January 3rd. That is close enough to enjoy with either 7×50 or 10×50 binoculars. On January 4th, the crescent Moon hangs 3° to the upper left of Saturn high in the south-southwest.

A waxing gibbous Moon visits the Pleiades in Taurus on the night of January 9th. Binoculars will be needed to see the Pleiads through the Moon's glare.

The full Moon occults Mars on January 13th. Around 9:09 pm EST, the southwestern section of the Moon slowly eclipses the Red Planet over a period of 29 seconds. Mars will reappear in a similar time period behind the Moon's southeastern limb at about 10:18 pm. Mars is closest to Earth on January 12th and reaches opposition on January 16th.

Venus and Saturn are separated by about 2° at dusk on January 17th and 18th.

General Meeting Preview

A Journey to the Cosmic Web and Return to Earth

by Prof. J. Richard Gott

Emeritus Professor of Astrophysical Sciences at Princeton University, J. Richard Gott, will tell how his high school science project on spongelike polyhedra led him to a new understanding of the large-scale structure of the universe. If the large-scale structure was seeded by random quantum fluctuations in the inflationary early universe, then the topology of large-scale structure should look spongelike today. This spongelike structure, with clusters of galaxies connected by filaments of galaxies, has been confirmed many times and is now known as the Cosmic Web. Gott will also tell how a new kind of polyhedron he discovered recently led him to make (with Goldberg and Vanderbei) the most accurate flat map of Earth yet. TIME selected it as one of the 100 best inventions of 2021 and featured it on the cover.

— About the Speaker —

John Richard Gott III is a Professor of Astrophysical Sciences at Princeton University who is noted for his contributions to cosmology and general relativity. He received a BS in Mathematics from Harvard University in 1969. Just three years later, he completed an award wining PhD thesis in Astrophysics from Princeton University, where he spent the most of his career since then. He has received the Robert J. Trumpler Award, an Alfred P. Sloan Fellowship, the Astronomical League Award, and Princeton's President's Award for Distinguished Teaching.

Friday, January 10th @ 7:00 pm EST

Kalamazoo Area Math & Science Center

Use Dutton St. Entrance • Locked by 7:10 pm

Also held on Zoom • Click to Register