IAAS Monthly Astronomy Newsletter November 2022

The International Association for Astronomical Studies provides this newsletter as a service for interested persons worldwide.

This newsletter is published on the World Wide Web at The Home of KIØAR - and is received nationally and internationally. Download the PDF formatted version of the newsletter.

An Open Invitation - For amateur radio operators and scanner enthusiasts, please join the Colorado Astronomy Net on the Rocky Mountain Radio League's **K1DUN** repeater on **449.450 MHz** or other repeaters connected to the SKYHUBLINK system. The net meets on Tuesday nights at 7 P.M. Mountain Time (US) (Wednesday at 0100 GMT). Connecting to the SkyHubLink system will expand our coverage in the U.S., Canada and internationally. All Amateur radio operators worldwide are welcome. If anyone wishes to "listen" to the net, the RMRL provides a "Live Audio Feed" using Broadcastify.

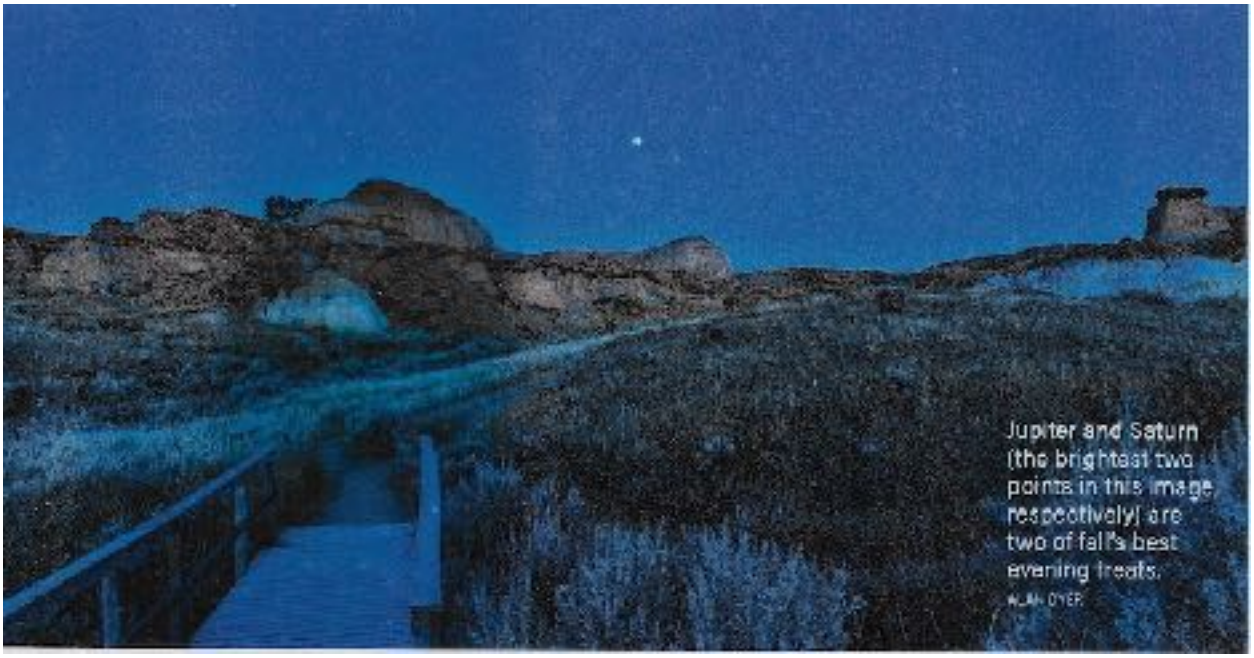
Obtain your Amateur Radio (Ham) License or your General Radio Operator's License (GROL)! Visit the South Metro VE Team website for more information. The South Metro VE Team provides test sessions by appointment only. Check the website for current information. All others interested in Amateur Radio, check out your local area for information in becoming an Amateur Radio operator.

The Colorado Astronomy Net and the IAAS are on Facebook page. Be sure to "Like" us.

Donate to the IAAS!
Shop Smile.Amazon.com, sign up or sign in to smile.amazon.com and select the **International Association for Astronomical Studies**. 0.5% of every purchase will be donated to the group. Thank you for your support!

Excerpts from JPL mission updates are provided as a public service as part of the JPL Solar System Ambassador / NASA Outreach program.

In This Newsletter...


Jupiter and Saturn (the brightest two points in this image, respectively) are two of fall's best evening treats.

The Month At-A-Glance

The current month's calendar displaying the daily astronomical events.

The Moon

Phases:

- First Quarter Moon occurs on the 1st.
- Full Moon occurs on the 8th.
- Last Quarter Moon occurs on the 16th.
- New Moon occurs on the 23rd.
- First Quarter Moon occurs on the 30th.

- The Moon is at apogee (251,606 miles from Earth) on the 14th.
- The Moon is at perigee (225,450 miles from Earth) on the 25th.

Moon/Planet Pairs:

- The Moon passes 4° south of Saturn on the 1st.
- The Moon passes 1.0° south of asteroid Juno on the 3rd.
- The Moon passes 3° south of Neptune on the 4th.
- The Moon passes 2° south of Jupiter on the 4th.
- The Moon passes 0.7° north of Uranus on the 8th.
- The Moon passes 2° north of Mars on the 11th.
- The Moon passes 4° south of Saturn on the 28th.
- The Moon passes 1.2° north of asteroid Juno on the 30th.

For reference: The Full Moon subtends an angle of ~0.5°.

The Planets & Dwarf Planets

Planetary Reports are generated by "TheSkyX" software. These reports provide predicted data for the planets on the first of each month for the current year. The rise and set times for the Sun and the Moon for each day of the month as well as meteor shower radiants are also included in the reports. These reports have been optimized for the Denver, Colorado location, however, the times will be approximate for other locations on Earth.

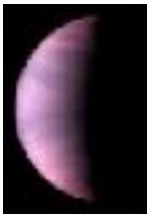
(All times are local unless otherwise noted.)

Planetary Highlights for November

"An outer-planet bonanzas in store this month. Saturn never fails to deliver and is visible in the early evening. Jupiter offers up stunning views, along with a nice series of repeating Europa and Ganymede transits. The distant giants Uranus and Neptune are easy to star-hop to for intriguing sights. And finally, there's Mars, high in Taurus after midnight in the most favorable apparition in years for Northern Hemisphere observers. It's closing in rapidly for an early December opposition, yet is closest to Earth on the last day of the month." Astronomy Magazine, November 2022, P. 28.

Mercury

Is in superior conjunction on the 8th. Mercury rises at 7:06 a.m. on the 1st. After superior conjunction, Mercury returns to the evening sky, but will not be visible until the third week of the month. Mercury sets about 5:15 p.m. by month's end. Look for Mercury low to the west about 30 minutes after sunset during the last week of the month. Mercury moves from the constellation of Virgo into Ophiuchus shining at magnitude -0.6 on the 30th.



Venus

Sets at 6:07 p.m. on the 1st and about 5:11 p.m. by month's end. Look for Venus low to the west after sunset during the last week of the month; however, Venus may be too close to the Sun to view safely. Venus moves from the constellation of Libra into Ophiuchus shining at magnitude -3.9 on the 15th.

Earth

Daylight Saving Time ends for most of the U.S. at 2 a.m. local time on the 6th.

Mars

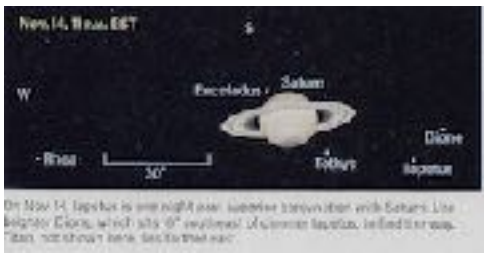
Rises at 8:25 p.m. on the 1st and about 4:51 p.m. by month's end. Look for Mars in the evening soon after the Sun sets. Mars continues to get brighter as opposition approaches next month. Mars comes closest to Earth (50.6 million miles away) on the 30th. Mars is in the constellation of Taurus shining at magnitude -1.8 on the 30th.

Jupiter

Is stationary on the 24th. Jupiter rises at 4:19 p.m. on the 1st and about 1:18 p.m. by month's end. Look for Jupiter in the south soon after sunset. Jupiter is still well positioned for early evening viewing. Jupiter's moon Io transits the planet on the 1st around 9 p.m. EDT. On the 2nd, Ganymede transits Jupiter starting around 8:22 p.m. EDT. Jupiter is in the constellation of Pisces shining at magnitude -2.7.

Saturn

Sets at 12:50 a.m. on the 1st and about 9:55 p.m. by month's end. Look for Saturn to the southwest soon after sunset. Saturn is in the constellation of Capricornus shining at magnitude 0.7.



Uranus

Is at opposition on the 9th rising as the Sun sets. Uranus rises at 6:14 p.m. on the 1st and about 3:12 p.m. by month's end. Uranus is at its best viewing in November. Uranus is highest in the southern sky around local midnight. Uranus is in the constellation of Aries shining at magnitude 5.7.

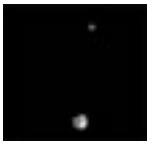
Neptune

Sets at 3:43 a.m. on the 1st and about 12:44 a.m. by month's end. Look to the south-southwest once the skies darken. Neptune is in the constellation of Aquarius shining at magnitude 7.7.

Dwarf Planets

Ceres

Rises at 2:40 a.m. on the 1st and about 12:36 a.m. by month's end. Look for Ceres to the southeast in the early morning before sunrise. Ceres is in the constellation of Leo shining at magnitude 8.7.



Pluto

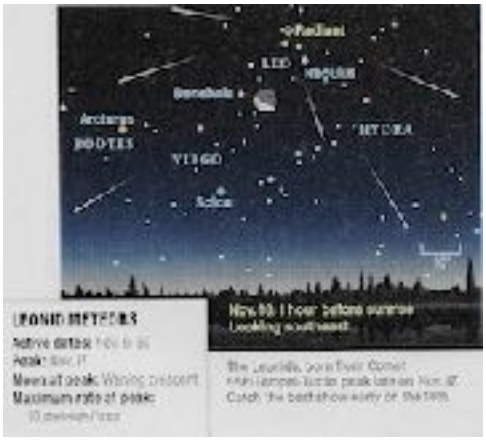
Sets at 10:48 p.m. on the 1st and about 7:53 p.m. by month's end. Look for Pluto to the west-southwest once the skies are very dark. Pluto is in the constellation of Sagittarius shining at magnitude 14.4.

As always, good luck at spotting Neptune, Ceres and Pluto, a large telescope and dark skies will be needed.

Astronomical Events

Meteor Showers

•The Leonids - The duration of this shower covers the period of Nov. 14-20. Maximum occurs on Nov. 17. The maximum hourly rate typically reaches 10-15, but most notable are periods of enhanced activity that occur every 33 years - events that are directly associated with the periodic return of comet Tempel-Tuttle. During these exceptional returns, the Leonids have produced rates of up to several thousand meteors per hour. The Leonids are swift meteors, which are best known for leaving a high percentage of persistent trains.



For more information about Meteor Showers, visit Gary Kronk's Meteor Showers Online web page.

Meteor Shower Radiant Report

Meteor Scatter (or Meteor burst communications) -- "is a radio propagation mode that exploits the ionized trails of meteors during atmospheric entry to establish brief communications paths between radio stations up to 2,250 kilometres (1,400 mi) apart." Tune your shortwave or your HF amateur radio to 54.310 MHz USB CW and see if you can hear any pings. Try other frequencies as well... 6m FT8 digital - 50.313 Mhz & 50.276 Mhz, JP-65 digital mode and the carrier frequencies of the lower VHF bands for TV channels 2, 3 & 4.

Meteor Rx How-To by Terry Bullett (WØASP).

Comets

•Comet C/2022 E3 (ZTF) can be found in the constellation of Serpens Caput, south of Corona Borealis, shining around 10th magnitude. A 6-inch telescope and dark skies will be needed after mid-month. This comet is expected to grow in brightness to around 5th magnitude in February.

For information, orbital elements and ephemerides on observable comets visit the Observable Comets page from the Harvard-Smithsonian Center for Astrophysics.

For more information about Comets, check out Gary Kronk's 6-volume series of books on Cometography.

Eclipses

•No solar eclipse activity this month.

•A total lunar eclipse occurs on the 8th. Parts of Europe, the Middle East, Asia and Australia will see parts of the eclipse. The eclipse lasts about 85 minutes. For U.S. observers, the eclipse begins in the early a.m. hours before sunrise. Those in the Pacific basin, from the western U.S. to Japan, from Northern Siberia to Mid-Canada, south to New Zealand will see the eclipse in its entirety. Watch the Eclipse Map and Animation.

Observational Opportunities

(from evening to morning)

- Look for Mars, Jupiter, Saturn, Uranus and Neptune in the evening.
- Look for Mercury and Venus late in the month in the evening.
- Watch the lunar eclipse in the 8th, either visually or on live feeds.
- Watch the Leonids meteor shower after the 14th. Look for fireballs.

Asteroids

(From west to east)

- **Vesta** is in the constellation of Aquarius.
- **Juno** is in the constellation of Aquarius.
- **Euterpe** is at opposition on the 12th in the constellation of Taurus.
- **Bamberga** is at opposition on the 21st in the constellation of Aries.
- **Pallas** is in the constellation of Canis Major.
- **Hebe** is in the constellation of Hydra (near the head).

Information about the Minor Planets can be found at the Minor Planet Observer web site.

Occultations

Information on various occultations can be found at the International Occultation Timing Association's (IOTA) web site.

Member Meteor Sightings

In this section I will post meteor, fireball, etc sightings that have been published on the American Meteor Society's web site. I want to make this an active section of the web pages and newsletter and would like to publish the links to member sightings. If you have any published sightings, please provide me with the links and I will post them here for all to enjoy.

Event ID	Date/Time	Location	Observer	Link
3871-2015	2015-11-13 01:55 MST	CO	Charles N	3871a
3587-2015	2015-11-22 17:38 MST	CO	Kevin S	3587aw
3829-2015	2015-12-05 18:06 MST	CO	Burness A	3829a
986-2020	2020-02-21 22:20 MST	CO	Lukas S	986
3716-2020	2020-07-24 23:22 MDT	CO	Lukas S	3716
4774-2021	2021-08-13 21:57 MDT	UT	Lukas S	4774
7044-2021	2021-10-28 20:37 MDT	CO	Burness A	249058
6763-2022	2022-10-06 05:56 CDT	OK	Mike C	6763

Subscriber Gallery

I have created a web page containing images taken and submitted by subscribers to the email newsletter, check-ins to the Colorado Astronomy Net and readers of the online newsletter and some of my own images. Any one wishing to submit their images to the gallery, please let me know. The images must be taken by the submitter and be astronomy related. Please include a description and your information so that I can give proper credit to your work. I will post the most recent submissions here.

StarLink Train (G4-3)
STARLINK-3200 and others

December 03, 2021

Courtesy of Burness Ansell

Taken with iPhone X @ 6:43 P.M. MST

Traveling from WSW to E passing close to the bright star Altair in Aquila.

Planetary/Lunar Exploration Missions

(Excerpts from recent mission updates)

JPL Latest News

The Latest from Space

The Origin of JPL (a Youtube video-1 Hour 29 minutes).

JPL Latest News

October 28, 2022
NASA's Lunar Flashlight Ready to Search for the Moon's Water Ice

Full Article & Images

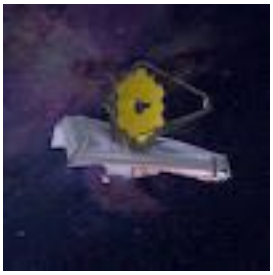
"Set for a November launch, the small satellite mission will use lasers to search for water ice inside the darkest craters at the Moon's South Pole.

It's known that water ice exists below the lunar regolith (broken rock and dust), but scientists don't yet understand whether surface ice frost covers the floors inside these cold craters. To find out, NASA is sending Lunar Flashlight, a small satellite (or SmallSat) no larger than a briefcase. Swooping low over the lunar South Pole, it will use lasers to shed light on these dark craters – much like a prospector looking for hidden treasure by shining a flashlight into a cave. The mission will launch aboard a SpaceX Falcon 9 rocket in mid-November."

Read the latest news and discoveries from JPL's dozens of active space missions exploring Earth, the solar system and worlds beyond.

Past, Present, Future and Proposed JPL Missions

For special JPL programs and presentations in your area visit the JPL Solar System Ambassador web site.



James Webb Space Telescope

October 28, 2022
NASA's Webb Reveals Dust, Structure in Pillars of Creation

Full Article & Images

"The observatory's Mid-Infrared Instrument (MIRI) provides a different view of the famous pillars, revealing young stars that have not yet cast off their dusty "cloaks."

This is not an ethereal landscape of time-forgotten tombs. Nor are these soot-tinged fingers reaching out. These pillars, flush with gas and dust, enshroud stars that are slowly forming over many millennia. NASA's James Webb Space Telescope has snapped this eerie, extremely dusty view of the Pillars of Creation in mid-infrared light – showing us a new view of a familiar landscape."

More information on the James Webb Space Telescope mission is available at The James Webb Space Telescope website.
The public can follow the mission on Facebook, Twitter and YouTube.

Juno

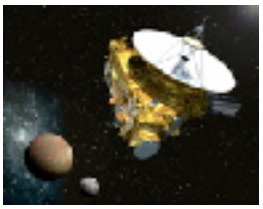
October 6, 2022
Citizen Scientists Enhance New Europa Images From NASA's Juno

Full Article & Images

"*Science enthusiasts have processed the new JunoCam images of Jupiter's icy moon, with results that are out of this world.*

Citizen scientists have provided unique perspectives of the recent close flyby of Jupiter's icy moon Europa by NASA's Juno spacecraft. By processing raw images from JunoCam, the spacecraft's public-engagement camera, members of the general public have created deep-space portraits of the Jovian moon that are not only awe-inspiring, but also worthy of further scientific scrutiny."

Images from NASA's JunoCam.
More information on the Juno mission is available at Juno and Mission Juno.
The public can follow the mission on Facebook and Twitter.



New Horizons

August 23, 2022
The PI's Perspective: Extending Exploration and Making Distant Discoveries

Full Article & Images

"New Horizons remains healthy from its position deep in the Kuiper Belt, even as it speeds farther and farther from the Earth and Sun by about 300 million miles per year. The spacecraft is about 54 times farther from the Sun than Earth, which is about two billion miles farther out than our first science flyby target, Pluto, and about a billion miles farther out than Arrokoth, the Kuiper Belt object (KBO) New Horizons explored in 2019.

As planned, the spacecraft was put into hibernation mode on June 1, and will remain so until March 1, 2023. Hibernation saves fuel, wear and tear on spacecraft electronics; it also saves money, because less mission control and planning effort is needed to

operate the spacecraft. But hibernation doesn't mean a pause in science data collection. In fact, our Venetia Burney Student Dust Counter (called SDC) and both the PEPSSI and SWAP charged-particle plasma spectrometers are measuring the distant environment around the clock. This is truly unique and highly valuable data for understanding the space weathering environment of KBOs and Kuiper Belt dwarf planets, and also for understanding how the far reaches of the Sun's heliosphere interface to the interstellar medium, or the environment beyond the Sun's cocoon of space."

New Horizons gallery

Find New Horizons in the iTunes App Store.

For more information on the New Horizons mission -- the first mission to the ninth planet -- visit the New Horizons home page.

TESS

October 20, 2022
'Marshmallow' World Orbiting a Cool Red Dwarf Star

Full Article & Images

"Kitt Peak National Observatory telescope helps determines that Jupiter-like Planet is lowest-density gas giant ever detected around a red dwarf.

Astronomers using the WIYN 3.5-meter Telescope at Kitt Peak National Observatory in Arizona, a Program of NSF's NOIRLab, have observed an unusual Jupiter-like planet in orbit around a cool red dwarf star. Located approximately 580 light-years from Earth in the constellation of Auriga the Charioteer, this planet, identified as TOI-3757 b, is the lowest-density planet ever detected around a red dwarf star and is estimated to have an average density akin to that of a marshmallow."

For more news and information on the TESS mission, visit the Latest Tess Stories page.

Past, Present, Future and Proposed JPL Missions.

Mars Missions

Be A Martian

Mars website mobile version is here!
Simply type
http://mars.jpl.nasa.gov
into your mobile browser.

MARS WEATHER
Mars Daily Weather Report

Mars on the Go! NASA Be A Martian Mobile App
If you want the latest news as it happens, try out the "Be A Martian" app.
Download on Mobile Devices
Android | iPhone | Windows Phone

JMARS

JMARS is an acronym that stands for Java Mission-planning and Analysis for Remote Sensing. It is a geospatial information system (GIS) developed by ASU's Mars Space Flight Facility to provide mission planning and data-analysis tools to NASA's orbiters, instrument team members, students of all ages, and the general public.

Laboratory for Atmospheric and Space Physics
"The Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado Boulder (CU) began in 1948, a decade before NASA. We are the world's only research institute to have sent instruments to all eight planets and Pluto.

LASP combines all aspects of space exploration through our expertise in science, engineering, mission operations, and scientific data analysis. As part of CU, LASP also works to educate and train the next generation of space scientists, engineers and mission operators by integrating undergraduate and graduate students into working teams. Our students take their unique experiences with them into government or industry, or remain in academia to continue the cycle of exploration.

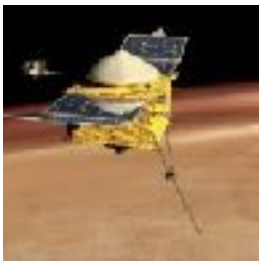
LASP is an affiliate of CU-Boulder AeroSpace Ventures, a collaboration among aerospace-related departments, institutes, centers, government labs, and industry partners."

LASP
September 15, 2022

2022 awardees chosen for the Charles A. Barth Scholarship for undergraduate space research

Full Article & Images

"The University of Colorado Boulder established the Charles A. Barth scholarship for undergraduate space research in 2013 to honor his lasting legacy of teaching and mentoring of the next generation of space researchers. Several undergraduate students with focused studies in space research are supported by this scholarship each year."



MAVEN
August 31, 2022
MAVEN and EMM make first observations of patchy proton aurora at Mars

Full Article & Images

"NASA's MAVEN (Mars Atmosphere and Volatile Evolution) mission and the United Arab Emirates' Emirates Mars Mission (EMM) have released joint observations of dynamic proton aurora events at Mars. Remote auroral observations by EMM paired with in-situ plasma observations made by MAVEN open new avenues for understanding the Martian atmosphere. This collaboration was made possible by recent data-sharing between the two missions and highlights the value of multi-point

observations in space. A study of these findings appears in the journal Geophysical Research Letters."

Visit LASP and MAVEN for more information.

Mars 2020 - Perseverance

October 28, 2022
NASA and ESA Agree on Next Steps to Return Mars Samples to Earth

Full Article & Images

"*The agency's Perseverance rover will establish the first sample depot on Mars.*

The next step in the unprecedented campaign to return scientifically selected samples from Mars was made on Oct. 19 with a formal agreement between NASA and its partner ESA (European Space Agency). The two agencies will proceed with the creation of a sample tube depot on Mars. The sample depot, or cache, will be at "Three Forks," an area located near the base of an ancient river delta in Jezero Crater."

Learn more about the Mars 2020 (Perseverance) mission.

Mars Science Laboratory - Curiosity

October 19, 2022
Curiosity Mars Rover Reaches Long-Awaited Salty Region

Full Article & Images

"*The rover has arrived at a special region believed to have formed as Mars' climate was drying.*

Ten years ago today, a jetpack lowered NASA's Curiosity rover onto the Red Planet, beginning the SUV-size explorer's pursuit of evidence that, billions of years ago, Mars had the conditions needed to support microscopic life.

After journeying this summer through a narrow, sand-lined pass, NASA's Curiosity Mars rover recently arrived in the "sulfate-bearing unit," a long-sought region of Mount Sharp enriched with salty minerals.

Scientists hypothesize that billions of years ago, streams, and ponds left behind the minerals as the water dried up. Assuming the hypothesis is correct, these minerals offer

tantalizing clues as to how – and why – the Red Planet's climate changed from being more Earth-like to the frozen desert it is today."

Check out information about NASA's partnership with Foursquare.
Visit the Mars Science Laboratory page.

Mars Reconnaissance Orbiter Mission

June 28, 2022
Help NASA Scientists Find Clouds on Mars

Full Article & Images

"*By identifying clouds in data collected by NASA's Mars Reconnaissance Orbiter, the public can increase scientists' understanding of the Red Planet's atmosphere.*

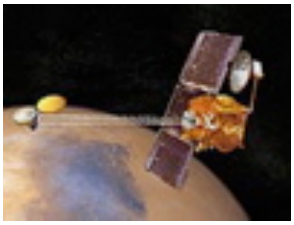
NASA scientists hope to solve a fundamental mystery about Mars' atmosphere, and you can help. They've organized a project called Cloudspotting on Mars that invites the public to identify Martian clouds using the citizen science platform Zooniverse. The information may help researchers figure out why the planet's atmosphere is just 1% as dense as Earth's even though ample evidence suggests the planet used to have a much thicker atmosphere.

The air pressure is so low that liquid water simply vaporizes from the planet's surface into the atmosphere. But billions of years ago, lakes and rivers covered Mars, suggesting the atmosphere must have been thicker then.

How did Mars lose its atmosphere over time? One theory suggests different mechanisms could be lofting water high into the atmosphere, where solar radiation breaks those water molecules down into hydrogen and oxygen (water is made of two hydrogen atoms and one oxygen atom). Hydrogen is light enough that it could then drift off into space."

MARS RECONNAISSANCE ORBITER HIRISE IMAGES

View all of the archived HiRISE images.
More information about the MRO mission is available online.



Mars Odyssey Orbiter

May 5, 2022
Science at Sunrise: Solving the Mystery of Frost Hiding on Mars

Full Article & Images

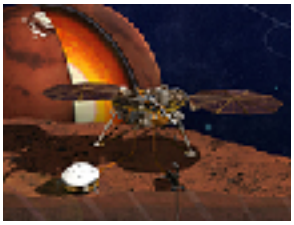
"*A new study using data from NASA's Mars Odyssey orbiter may explain why Martian frost can be invisible to the naked eye and why dust avalanches appear on some slopes.*

Scientists were baffled last year when studying images of the Martian surface taken at dawn by NASA's Mars Odyssey orbiter. When they looked at the surface using visible light – the kind that the human eye perceives – they could see ghostly, blue-white morning frost illuminated by the rising Sun. But using the orbiter's heat-sensitive camera, the frost appeared more widely, including in areas where none was visible."

DAILY MARS ODYSSEY THEMIS IMAGES
Thermal Emission Imaging System (THEMIS) web site.

The Odyssey data are available through a new online access system established by the Planetary Data System.

Visit the Mars Odyssey Mission page.



Mars InSight - Journey to Mars

InSight - Revealing the Heart of Mars
October 27, 2022
NASA's InSight Lander Detects Stunning Meteoroid Impact on Mars

Full Article & Images

"*The agency's lander felt the ground shake during the impact while cameras aboard the Mars Reconnaissance Orbiter spotted the yawning new crater from space.*

NASA's InSight lander recorded a magnitude 4 marsquake last Dec. 24, but scientists learned only later the cause of that quake: a meteoroid strike estimated to be one of the biggest seen on Mars since NASA began exploring the cosmos. What's more, the meteoroid excavated boulder-size chunks of ice buried closer to the Martian equator than ever found before – a discovery with implications for NASA's future plans to send astronauts to the Red Planet."

Interactive selection of raw images taken by the cameras aboard InSight.

Learn more about the InSight mission.

Mars Missions Status

New Mars missions are being planned to include several new rover and sample collection missions. Check out the Mars Missions web page and the Mars Exploration page.

Astronomy Links and Other Space News

(If you have a link you would like to recommend to our readers, please feel free to submit it.)

Colorado Astronomy Links

Radio Astronomy Links

Other Astronomy Links

Acknowledgments and References

Much of the information in this newsletter is from "Astronomy Magazine" (Kalmbach Publishing), JPL mission status reports, "Meteor Showers - A Descriptive Catalog" by Gary W. Kronk and other astronomical sources that I have stashed on my book shelves.

The author will accept any suggestions, constructive criticisms, and corrections. Please feel free to send me any new links or articles to share as well. I will try to accommodate any reasonable requests. Please feel free to send questions, comments, criticisms, or donations to the email address listed below. Enjoy!

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- Email Newsletter archives.
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- The latest version of the newsletter.

Keep looking UP!

73 from KI0AR
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COO, Director of Aerospace Technologies, IAAS
JPL Solar System Ambassador, Colorado
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