IAAS Monthly Astronomy Newsletter September 2021

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, when in the Denver metro area, please join the Colorado Astronomy Net on the Rocky Mountain Radio League's WØWYX **146.94 MHz** and **449.825 MHz** repeaters. Due to hardware issues, links with the Allstar node, Echolink and the Cripple Creek repeater are down until further notice. The net meets on Tuesday nights at 7 P.M. Mountain Time (US).

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 on the 1st Saturday of each month at our new Eagle Street Facility, The City of Centennial, 7272 South Eagle Street, Centennial, Colorado 80112-4244 at 9am.

** Check the website for current info during these COVID-19 times. **

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

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

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!

"This starlit shot of the Athabasca River in Alberta, Canada, features the constellations of Aquarius, Pisces Austrinus, and Cetus. This same region of the sky hosts Neptune this month." Astronomy Magazine, September 2021, P. 32.
Alan Dyer

In This Newsletter...

The Month At-A-Glance

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

The Moon

Phases:

- New Moon occurs on the 6th.
- First Quarter Moon occurs on the 13th.
- Full Moon occurs on the 20th.
- Last Quarter Moon occurs on the 28th.

- The Moon is at perigee on the 11th, 228,951 miles from Earth.
- The Moon is at apogee on the 26th, 251,432 miles from Earth.

Moon/Planet Pairs:

- Venus passes 1.7° north of Spica on the 5th.
- The Moon passes 7° north of Mercury on the 8th.
- The Moon passes 4° north of Venus on the 9th.
- The Moon passes 4° south of Saturn on the 16th.
- The Moon passes 4° south of Jupiter on the 18th.
- The Moon passes 4° south of Neptune on the 20th.
- Mercury passes 1.7° south of Spica on the 23rd.
- The Moon passes 1.3° south of Uranus on the 24th.
- Mercury passes 1.7° south of Spica 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.

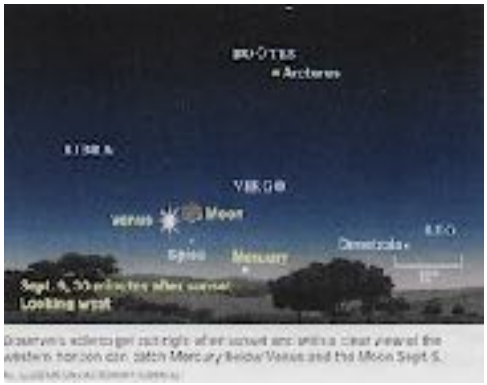
(All times are local unless otherwise noted.)

Planetary Highlights for August

"Six major planets are in view before midnight during September, offering full range of binocular and telescopic sights. Mercury and Venus hug the western horizon soon after sunset, while Jupiter and Saturn provide a dazzling spectacle in the southeast. Both planets are well placed all evening. Uranus and Neptune are best viewed in binoculars or a telescope." Astronomy Magazine, September 2021, P. 32.

Mercury

Is at greatest eastern elongation (27°) on the 13th. Mercury is stationary on the 26th. Mercury sets at 8:22 p.m. on the 1st and about 7:00 p.m. by month's end. Look for Mercury to the west about 30 minutes after sunset all month. The best evenings to try and spot Mercury are on the 8th or 9th. Mercury is in the constellation of Virgo shining at magnitude 0.2 on the 15th.



Venus

Sets at 9:03 p.m. on the 1st and about 8:30 p.m. by month's end. Look for Venus in the west soon after sunset. Venus moves from the constellation of Virgo into Libra shining at magnitude -4.1 on the 15th.

Earth

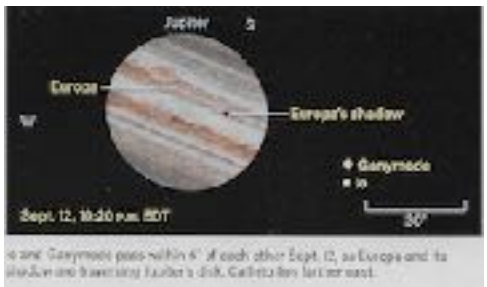
Autumnal equinox occurs at 3:21 P.M. EDT on the 22nd.

Mars

Sets at 8:02 p.m. on the 1st and about 6:48 p.m. by month's end. Mars is too close to the Sun to be visible this month. Mars will return to the morning sky in December. Mars moves from the constellation of Leo into Virgo shining at magnitude 1.7.

Jupiter

Rises at 6:52 p.m. on the 1st and about 4:47 p.m. by month's end. Jupiter is still near it's best viewing for the year and is visible almost all night long. Jupiter is in the constellation of Capricornus shining at magnitude -2.8.



Saturn
Rises at 6:00 p.m. on the 1st and about 3:59 p.m. by month's end. Along with Jupiter, Saturn is also near its best viewing for the year and is visible almost all night long. Saturn is in the constellation of Capricornus shining at magnitude 0.3.

Uranus
Rises at 10:06 a.m. on the 1st and around 8:06 p.m. by month's end. Uranus is returning to the evening sky this month and should be visible later after sunset. Follow Uranus across the sky with binoculars or a telescope almost all night long. Uranus is in the constellation of Aries shining at magnitude 5.7.

Neptune
Is at opposition on the 14th, rising as the Sun sets. Neptune rises at 7:58 p.m. on the 1st and about 5:58 p.m. by month's end. Neptune is at it's best for the year. As with Uranus, follow Neptune across the sky with binoculars or a telescope almost all night long. Neptune is in the constellation of Aquarius shining at magnitude 7.8.

Dwarf Planets
Ceres
Rises at 11:48 a.m. on the 1st and about 10:03 p.m. by month's end. Even though, Ceres is now rising in the late evening, it is best observed after midnight, when it is higher in the southern sky. Ceres is in the constellation of Taurus shining at magnitude 8.6.

Pluto
Sets at 2:45 a.m. on the 1st and about 12:45 a.m. by month's end. Pluto is visible in the evening sky, but will require moonless, dark sky nights well away from city lights. Pluto is in the constellation of Sagittarius shining at magnitude 14.3.

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

Astronomical Events

Meteor Showers

- The Alpha Aurigids - This shower's duration seems to persist from August 25 to September 6. Maximum occurs on September 1. The annual maximum hourly rate may be as high as 9, but outbursts of over 30 occurred in 1935, 1986, and 1994, and observers recorded up to 130 meteors per hour in 2007.

- The Epsilon Perseids meteor shower is a relatively new meteor shower which can be observed from September 4 to the September 14. The Epsilon Perseids peaks on the night of the September 9, morning of September 10. Observers may expect to see up to 5 or 6 meteors per hour during the peak.

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

- "SEVEN YEARS AGO, the Rosetta spacecraft surveyed Comet 67P/Churyumov-Gerasimenko by dropping the Philae probe onto the surface, later finishing the adventure with its own soft landing.

  The comet rises before midnight along with the Pleiades in the northeast, but you'll want to wait until the wee hours of the morning for it to get above the thickest part of our atmosphere. Our two-week Moon-free window closes midmonth. Glowing feebly at magnitude 10 to 11, Churyumov-Gerasimenko requires an 8- to 10-inch scope from a dark site." Astronomy Magazine, September 2021, p. 38.

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.

- No lunar eclipse activity this month.

Observational Opportunities

(from evening to morning)

- Look for Mercury, Venus in the early evening, just before sunset.
- Look for Saturn and Jupiter almost all night long.
- Look for Neptune and Uranus in the late evening and early morning.

Asteroids

(From west to east)

- **Hebe** is in the constellation of Sagittarius.
- **Victoria** is in the constellation of Aquila.
- **Julia** is in the constellation of Aquarius.
- **Pallus** is at opposition on the 10th in the constellation of Aquarius.
- **Harmonia** is in the constellation of Cetus.
- **Iris** is in the constellation of Gemini.

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
3587-2015	2015-11-22 17:38 MST	CO	Kevin S	3587aw
3829-2015	2015-12-05 18:06 MST	CO	Burness A	3829a
3871-2015	2015-11-13 01:55 MST	CO	Charles N	3871a
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

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.

Jupiter/Saturn Conjunction December 21, 2020

Several images from the recent conjunction.
Courtesy of Milton Omoto and Ed Hubbs

Planetary/Lunar Exploration Missions

(Excerpts from recent mission updates)

JPL Latest News

The Latest from Space

JPL Latest News

August 17, 2021
Astronomers Find a 'Break' in One of the Milky Way's Spiral Arms

Full Article & Images

"The newly discovered feature offers insight into the large-scale structure of our galaxy, which is difficult to study from Earth's position inside it.

Scientists have spotted a previously unrecognized feature of our Milky Way galaxy: A contingent of young stars and star-forming gas clouds is sticking out of one of the Milky Way's spiral arms like a splinter poking out from a plank of wood. Stretching some 3,000 light-years, this is the first major structure identified with an orientation so dramatically different than the arm's.

Astronomers have a rough idea of the size and shape of the Milky Way's arms, but much remains unknown: They can't see the full structure of our home galaxy because Earth is inside it. It's akin to standing in the middle of Times Square and trying to draw a map of the island of Manhattan. Could you measure distances precisely enough to know if two buildings were on the same block or a few streets apart? And how could you hope to see all the way to the tip of the island with so many things in your way?"

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.

Juno
August 5, 2021
NASA’s Juno Celebrates 10 Years With New Infrared View of Moon Ganymede

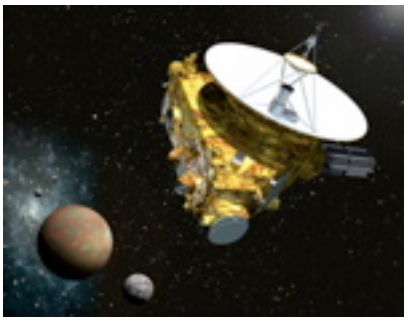
Full Article & Images

"*The spacecraft used its infrared instrument during recent flybys of Jupiter’s mammoth moon to create this latest map, which comes out a decade after Juno’s launch.*

The science team for NASA’s Juno spacecraft has produced a new infrared map of the mammoth Jovian moon Ganymede, combining data from three flybys, including its latest approach on July 20. These observations by the spacecraft’s Jovian Infrared Auroral Mapper (JIRAM) instrument, which “sees” in infrared light not visible to the human eye, provide new information on Ganymede’s icy shell and the composition of the ocean of liquid water beneath.

JIRAM was designed to capture the infrared light emerging from deep inside Jupiter, probing the weather layer down to 30 to 45 miles (50 to 70 kilometers) below Jupiter’s cloud tops. But the instrument can also be used to study the moons Io, Europa, Ganymede, and Callisto (known collectively as the Galilean moons in honor of their discoverer, Galileo)."

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
July 14, 2021
Great Exploration Revisited: New Horizons at Pluto and Charon

Full Article & Images

"Six years ago today, NASA's New Horizons spacecraft made history with the first up-close exploration of the Pluto system – providing breathtaking views and detailed data on Pluto and its largest moon, Charon, revealing the surfaces of these distant, mysterious worlds at the outer reaches of our solar system.

These simulated flights over Pluto and Charon include some of the sharpest images and topographic data that New Horizons gathered during its historic flyby on July 14, 2015. These are the first "movies" of Pluto and Charon made from the highest-resolution black-and-white image strips, taken by New Horizons' Long Range Reconnaissance Imager (LORRI), as the spacecraft zipped by at more than 30,000 miles per hour."

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

August 4, 2021
NASA's TESS Tunes into an All-sky 'Symphony' of Red Giant Stars

Full Article & Images

"Using observations from NASA's Transiting Exoplanet Survey Satellite (TESS), astronomers have identified an unprecedented collection of pulsating red giant stars all across the sky. These stars, whose rhythms arise from internal sound waves, provide the opening chords of a symphonic exploration of our galactic neighborhood.

TESS primarily hunts for worlds beyond our solar system, also known as exoplanets. But its sensitive measurements of stellar brightness make TESS ideal for studying stellar oscillations, an area of research called asteroseismology."

A paper describing the findings, led by Hedges, was published in The Astronomical Journal."

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 our Be A Martian app.
Download on Mobile Devices
Android | iPhone | Windows Phone

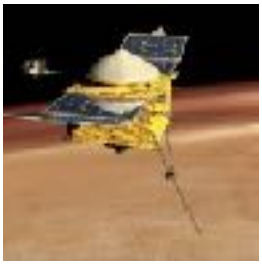
JMARS

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/MAVEN

August 17, 2021
LASP researcher Scott Piggott named AIAA Professional Engineer of the Year

Full Article & Images

"The Rocky Mountain Section of the American Institute of Aeronautics and Astronautics, the world's largest aerospace technical society, has selected researcher Scott Piggott as its 2020–2021 Professional Engineer of the Year. Piggott, a spacecraft guidance, navigation, and control software engineer at the University of Colorado's Laboratory for Atmospheric and Space Physics (LASP), has worked on several programs from inception through flight, including the SpaceX Dragon cargo capsule, the Orion capsule, and the Emirates Mars Mission (EMM)."

Visit LASP and MAVEN for more information.

Mars 2020 - Perseverance

August 26, 2021
NASA's Perseverance Plans Next Sample Attempt

Full Article & Images

"*The rover will abrade a rock this week, allowing scientists and engineers to decide whether that target would withstand its powerful drill.*

In its search for signs of ancient microbial life on Mars, NASA's Perseverance rover is once again preparing to collect the first of many rock core samples that could eventually be brought to Earth for further study.

This week, a tool on the rover's 7-foot-long (2-meter-long) robotic arm will abrade the surface of a rock nicknamed "Rochette," allowing scientists to look inside and determine whether they want to capture a sample with the rover's coring bit. Slightly thicker than a pencil, the sample would be sealed in one of the 42 remaining titanium tubes aboard the rover."

Learn more about the Mars 2020 (Perseverance) mission.

Mars Science Laboratory - Curiosity

August 17, 2021
NASA's Curiosity Mars Rover Explores a Changing Landscape

Full Article & Images

"*A new video rings in the rover's ninth year on Mars, letting viewers tour Curiosity's location on a Martian mountain.*

Images of knobbly rocks and rounded hills are delighting scientists as NASA's Curiosity rover climbs Mount Sharp, a 5-mile-tall (8-kilometer-tall) mountain within the 96-mile-wide (154-kilometer-wide) basin of Mars' Gale Crater. The rover's Mast Camera, or Mastcam, highlights those features in a panorama captured on July 3, 2021 (the 3,167th Martian day, or sol, of the mission).

This location is particularly exciting: Spacecraft orbiting Mars show that Curiosity is now somewhere between a region enriched with clay minerals and one dominated by salty minerals called sulfates. The mountain's layers in this area may reveal how the ancient environment within Gale Crater dried up over time. Similar changes are seen across the planet, and studying this region up close has been a major long-term goal for the mission."

Check out information about NASA's partnership with Foursquare.

Mars Rover Landing - Free for the Xbox 360 (requires Kinect)

Visit the Mars Science Laboratory page.

Mars Reconnaissance Orbiter Mission

August 16, 2021
Global Trio of Orbiters Shows Small Dust Storms Help Dry Out Mars

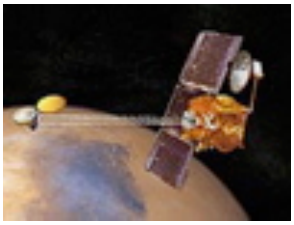
Full Article & Images

"By combining observations from three international spacecraft at Mars, scientists were able to show that regional dust storms play a huge role in drying out the Red Planet.

Dust storms heat up higher altitudes of the cold Martian atmosphere, preventing water vapor from freezing as usual and allowing it to reach farther up. In the higher reaches of Mars, where the atmosphere is sparse, water molecules are left vulnerable to ultraviolet radiation, which breaks them up into their lighter components of hydrogen and oxygen. Hydrogen, which is the lightest element, is easily lost to space, with oxygen either escaping or settling back to the surface."

MARS RECONNAISSANCE ORBITER HIRISE IMAGES

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



Mars Odyssey Orbiter

April 7, 2021
NASA's Odyssey Orbiter Marks 20 Historic Years of Mapping Mars

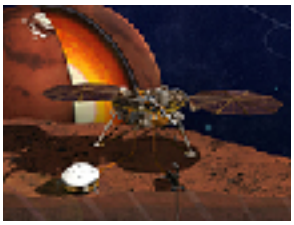
Full Article & Images

"NASA's 2001 Mars Odyssey spacecraft launched 20 years ago on April 7, making it the oldest spacecraft still working at the Red Planet. The orbiter, which takes its name from Arthur C. Clarke's classic sci-fi novel "2001: A Space Odyssey" (Clarke blessed its use before launch), was sent to map the composition of the Martian surface, providing a window to the past so scientists could piece together how the planet evolved."

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
July 22, 2021
NASA's InSight Reveals the Deep Interior of Mars

Full Article & Images

"*Three papers published today share new details on the crust, mantle, and molten core of the Red Planet.*

Before NASA's InSight spacecraft touched down on Mars in 2018, the rovers and orbiters studying the Red Planet concentrated on its surface. The stationary lander's seismometer has changed that, revealing details about the planet's deep interior for the first time.

Three papers based on the seismometer's data were published today in Science, providing details on the depth and composition of Mars' crust, mantle, and core, including confirmation that the planet's center is molten. Earth's outer core is molten, while its inner core is solid; scientists will continue to use InSight's data to determine whether the same holds true for Mars."

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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Keep looking UP!

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