IAAS Monthly Astronomy Newsletter
May 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!

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"On May 26, the Moon will take on a brilliant orange-red hue during an early-morning lunar eclipse." Astronomy Magazine, May 2021 P. 32. Stephen Rahn

The Month At-A-Glance

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

The Moon

Phases:

- Last Quarter Moon occurs on the 3rd.
- New Moon occurs on the 11th.
- First Quarter Moon occurs on the 19th.
- Full Moon occurs on the 26th.

- The Moon is at Apogee on the 11th, 252,595 miles from Earth.
- The Moon is at Perigee on the 25th, 222,023 miles from Earth.

Moon/Planet Pairs:

- The Moon passes 4° south of Saturn on the 3rd.
- The Moon passes 5° south of Jupiter on the 4th.
- The Moon passes 4° south of Neptune on the 6th.
- Mercury passes 8° north of Aldebaran on the 10th.
- The Moon passes 0.7° south of Venus on the 12th.
- The Moon passes 2° south of Mercury on the 13th.
- The Moon passes 1.5° north of Mars on the 16th.
- Venus passes 6° north of Aldebaran on the 17th.
- Mercury passes 0.4° south of Venus on the 29th.
- The Moon passes 4° south of Saturn 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 May

"Planetary action is picking up again, with three rocky planets -- Mercury, Venus, and Mars -- easily visible in the evening sky. Jupiter and Saturn feature in the predawn sky. And the western half of the U.S. enjoys a fine total lunar eclipse on May 26." Astronomy Magazine, May 2021, P. 32.

Mercury

Sets at 9:10 p.m. on the 1st and about 9:16 p.m. by month's end. Look for Mercury about 30 minutes after sunset. Mercury is in the constellation of Taurus shining at magnitude 0.2 on the 15th.

Venus

Sets at 8:40 p.m. on the 1st and about 9:46 p.m. by month's end. Look for Venus in the west soon after sunset. Venus moves from the constellation of Aries into Taurus shining at magnitude -3.9 on the 15th.

Earth

N/A.

Mars

Sets at 12:16 a.m. on the 1st and about 11:26 p.m. by month's end. Look for Mars to the west soon after sunset and follow it to the horizon as the evening progresses. Mars is in the constellation of Gemini shining at magnitude 1.6.

Jupiter

Rises at 3:05 a.m. on the 1st and about 1:12 a.m. by month's end. Look for Jupiter in the south before sunrise. Jupiter is in the constellation of Aquarius shining at magnitude -2.3.

Saturn

Rises at 2:22 a.m. on the 1st and about 12:21 a.m. by month's end. Look for Saturn in the south before sunrise. Saturn is in the constellation of Capricornus shining at magnitude 0.5.

Uranus
Rises at 6:02 a.m. on the 1st and around 4:05 a.m. by month's end. Uranus is visible in the morning during the last week or so of the month. During the first half of the month, Uranus will be lost in the morning twilight glow. Look to the east before sunrise to spot Uranus. Uranus is in the constellation of Aries shining at magnitude 5.9.

Neptune
Rises at 4:06 a.m. on the 1st and about 2:06 a.m. by month's end. Look to the east to spot Neptune in the constellation of Aquarius shining at magnitude 7.8.

Dwarf Planets
Ceres
Is Rises at 5:56 a.m. on the 1st and about 4:25 a.m. by month's end. Ceres is visible in the early morning sky before dawn. Ceres moves from the constellation of Pisces into Cetus shining at magnitude 9.2.

Pluto
Rises at 1:33 a.m. on the 1st and about 11:26 p.m. by month's end. Pluto is visible in the early morning sky before dawn. Pluto is in the constellation of Sagittarius shining at magnitude 15.2.

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

Astronomical Events

Meteor Showers

- The Eta Aquarids Meteor Showers - This shower is visible during the period of April 21 to May 12. It reaches maximum on May 5. During the period of greatest activity hourly rates usually reach 20 for observers in the northern hemisphere and 50 for observers in the southern hemisphere.

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/2020 R4 (ATLAS) is passing through a region heavily populated with galaxies -- the constellations of Canes Venatici and Coma Berenices. Comet ATLAS glows around 11th or 12th magnitude, so it will be difficult to distinguish from the numerous deep sky objects in this area. However, it is a treat to observe these objects while hunting for the comet.

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 lunar eclipse occurs on the morning of the 26th. The full eclipse will be visible over most of the Pacific ocean. Most of the US will only see a partial eclipse as will eastern Asia. Video animation of the eclipse.

Observational Opportunities

(from evening to morning)

- Look for Mercury, Venus and Mars in the evening.
- Look for Jupiter and Saturn in the morning before sunrise.
- Look for the Eta Aquarids meteors during the first week of the month.

Asteroids

(From west to east)

- **Vesta** is in the constellation of Leo.
- **Hebe** is in the constellation of Aquila.

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

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

April 29, 2021
In a First, Scientists Map Particle-Laden Rivers in the Sky

Full Article & Images

"Last summer, "Godzilla" came for the Caribbean and the U.S. Gulf Coast. This particular monster wasn't of the sci-fi variety, but, rather, a massive dust storm kicked up by winds from the Sahara Desert and carried an ocean away. The dust storm was an extreme example of a phenomenon that happens regularly: the global transport of dust, soot, and other airborne particles, collectively known as aerosols, by jets of winds in the atmosphere. The result is the formation of what are called aerosol atmospheric rivers."

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

March 16, 2021
NASA's Juno Reveals Dark Origins of One of Jupiter's Grand Light Shows

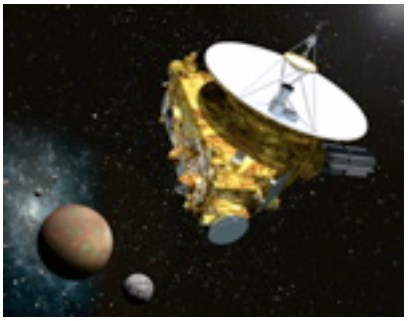
Full Article & Images

"*The gas-giant orbiter is illuminating the provenance of Jovian polar light shows.*

New results from the Ultraviolet Spectrograph instrument on NASA's Juno mission reveal for the first time the birth of auroral dawn storms – the early morning brightening unique to Jupiter's spectacular aurorae. These immense, transient displays of light occur at both Jovian poles and had previously been observed only by ground-based and Earth-orbiting observatories, notably NASA's Hubble Space Telescope. Results of this study were published March 16 in the journal AGU Advances.

First discovered by Hubble's Faint Object Camera in 1994, dawn storms consist of short-lived but intense brightening and broadening of Jupiter's main auroral oval – an oblong curtain of light that surrounds both poles – near where the atmosphere emerges from darkness in the early morning region. Before Juno, observations of Jovian ultraviolet aurora had offered only side views, hiding everything happening on the nightside of the planet. "

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
April 17, 2021
New Horizons at 50 (AU)

Full Article & Images

"On April 17, 2021, NASA's New Horizons reached a rare deep-space milepost -- 50 astronomical units from the Sun, or 50 times farther from the Sun than Earth is. New Horizons is just the fifth spacecraft to reach this great distance, following the legendary Voyagers 1 and 2 and Pioneers 10 and 11. It's almost 5 billion miles (7.5 billion kilometers) away; a remote region where a signal radioed from NASA's largest antennas on Earth, even traveling at the speed of light, needs seven hours to reach the far-flung spacecraft.

To celebrate reaching 50 AU, the New Horizons team compiled a list of 50 facts about this historic mission."

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

April 23, 2021
Neighboring Star's Bad Behavior: Large and Frequent Flares

Full Article & Images

"The star known as Proxima Centauri, the Sun's nearest interstellar neighbor, turns out to have a hair-trigger temper -- frequently erupting with potentially damaging stellar flares, including its largest ever recorded.

And these sizzling outbursts might be bad news for any potential lifeforms on the surface of a closely orbiting, probably rocky planet called Proxima b."

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

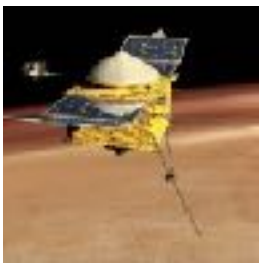
JMARS

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

March 9, 2021
Hope Probe captures new images of Mars with the Emirates Ultraviolet Spectrometer

Full Article & Images

"Key takeaways:

- March 9th marks one month since the Hope Probe successfully entered into orbit around Mars.
- The Emirates Ultraviolet Spectrometer (EMUS) took its first science images on February 20th, 2021, providing information on the composition of Mars' upper atmosphere.
- The orbiter, named 'Hope' (Al Amal in Arabic), and two of the three science instruments on board, Emirates eXploration Imager (EXI) and Emirates Mars Ultraviolet Spectrometer (EMUS) were developed at LASP in partnership with MBRSC engineers.
- The mission, the first interplanetary exploration undertaken by an Arab nation, will spend one Martian Year (about two Earth years) orbiting around the red planet gathering crucial scientific data on its atmosphere."

Visit LASP and MAVEN for more information.

Mars 2020 - Perseverance

April 30, 2021

NASA's Ingenuity Helicopter to Begin New Demonstration Phase

Full Article & Images

"NASA's Ingenuity Mars Helicopter has a new mission. Having proven that powered, controlled flight is possible on the Red Planet, the Ingenuity experiment will soon embark on a new operations demonstration phase, exploring how aerial scouting and other functions could benefit future exploration of Mars and other worlds."

Learn more about the upcoming Mars 2020 (Perseverance) mission.

Mars Science Laboratory - Curiosity

March 30, 2021

NASA's Curiosity Mars Rover Takes Selfie With 'Mont Mercou'

Full Article & Images

"At the start of March, NASA's Curiosity Mars rover began approaching an impressive rock formation that scientists dubbed "Mont Mercou," a nickname taken from a mountain in France. Standing about 20 feet (6 meters) tall, the outcrop is captured in all its majesty in a new selfie, as well as in a pair of panoramas that offer a 3D view. The selfie shows Curiosity in front of Mont Mercou with a new drill hole nearby at a rock sample nicknamed "Nontron" -- the mission's 30th sample to date."

Follow the Mars Curiosity rover on Foursquare.

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

February 8, 2021
Where Should Future Astronauts Land on Mars? Follow the Water

Full Article & Images

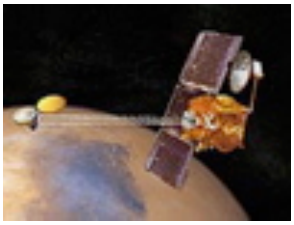
"*A new NASA paper provides the most detailed map to date of near-surface water ice on the Red Planet.*

So you want to build a Mars base. Where to start? Like any human settlement, it would be best located near accessible water. Not only will water be crucial for life-support supplies, it will be used for everything from agriculture to producing the rocket propellant astronauts will need to return to Earth.

Schlepping all that water to Mars would be costly and risky. That's why NASA has engaged scientists and engineers since 2015 to identify deposits of Martian water ice that could be within reach of astronauts on the planet's surface. But, of course, water has huge scientific value, too: If present-day microbial life can be found on Mars, it would likely be nearby these water sources as well."

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

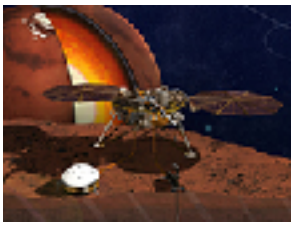
Full Article & Images

"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
April 1, 2021
NASA's InSight Detects Two Sizable Quakes on Mars

Full Article & Images

"NASA's InSight lander has detected two strong, clear quakes originating in a location of Mars called Cerberus Fossae -- the same place where two strong quakes were seen earlier in the mission. The new quakes have magnitudes of 3.3 and 3.1; the previous quakes were magnitude 3.6 and 3.5. InSight has recorded over 500 quakes to date, but because of their clear signals, these are four of the best quake records for probing the interior of the 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!

Subscription Information

- Email Newsletter archives.
- Full documentation of the online administration system.
- The latest version of the newsletter.

Keep looking UP!

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JPL Solar System Ambassador, Colorado
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