IAAS Monthly Astronomy Newsletter
May 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, 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 9 a.m.

** 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!

In This Newsletter...

"This stunning trick of perspective makes it look as if the European Southern Observatory's Very Large Telescope is shouldering the weight of Earth's eclipsed satellite. A longer-than-usual total lunar eclipse will delight skywatchers this month." Y. Beletsky (LCO)/ESO. Astronomy Magazine, May 2022, p. 32.

The Month At-A-Glance

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

The Moon

Phases:

- First Quarter Moon occurs on the 8th.
- Full Moon occurs on the 16th.
- Last Quarter Moon occurs on the 22nd.
- New Moon occurs on the 30th.

- The Moon is at apogee (251,833 miles from Earth) on the 5th.
- The Moon is at perigee (223,879 miles from Earth) on the 17th.

Moon/Planet Pairs:

- The Moon passes 1.8° south of Mercury on the 2nd.
- The Moon passes 0.008° south of dwarf planet Ceres on the 4th.
- Mars passes 0.6° south of Neptune on the 17th.
- The Moon passes 4° south of Saturn on the 22nd.
- The Moon passes 4° south of Neptune on the 24th.
- The Moon passes 3° south of Mars on the 24th.
- The Moon passes 3° south of Jupiter on the 24th.
- The Moon passes 0.2° south of Venus on the 26th.
- The Moon passes 0.3° south of Uranus on the 28th.
- Mars passes 0.6° south of Jupiter on the 28th.

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

"A total eclipse of the Moon greets observers of the sky this month. It's perfectly timed for the evening of May 15 across the U.S. and the early morning hours of May 16 in Europe, Africa, and the Middle East. Meanwhile, catch Mercury early in May, ending its period of best evening viewing this year for Northern Hemisphere skygazers. It quickly sinks out of view. This leaves planetary observers to enjoy the pre-dawn treat of four visible planets, starting out with Venus and Jupiter spectacularly close, while Saturn and Mars continue to climb higher in the morning sky." Astronomy Magazine, May 2022, p. 32.

Mercury

Is stationary on the 10th. Mercury is in inferior conjunction on the 21st. Mercury sets at 9:42 p.m. on the 1st. After inferior conjunction, Mercury returns to the morning sky. Mercury rises about 5:02 a.m. by month's end. Look for Mercury to the west about 30 minutes after sunset during the first week of the month. After that, Mercury is lost in the evening and morning twilight glow. Mercury is in the constellation of Taurus shining at magnitude 0.5 on the 1st.

Venus

Rises at 4:22 a.m. on the 1st and about 3:52 a.m. by month's end. Look for Venus to the southeast before sunrise. Venus moves from the constellation of Pisces into Aries shining at magnitude -4.0.

Earth

N/A.

Mars

Rises at 3:45 a.m. on the 1st and about 2:39 a.m. by month's end. Look for Mars to the southeast before sunrise. Mars passes 0.6° south of Neptune on the 17th. Mars passes 0.6° south of Jupiter on the 28th. Mars moves from the constellation of Aquarius into Pisces shining at magnitude 1.0.

Jupiter
Rises about 4:20 a.m. on the 1st and about 2:32 a.m. by month's end. Jupiter can be spotted to the southeast before sunrise. Jupiter is in the constellation of Pisces shining at magnitude -2.2.

Saturn
Rises at 2:56 a.m. on the 1st and about 12:58 a.m. by month's end. Look for Saturn to the southeast before sunrise. Saturn is in the constellation of Capricornus shining at magnitude 0.7.

Uranus
Is in conjunction with the Sun on the 5th. Uranus sets at 8:06 p.m. on the 1st. After conjunction, Uranus returns to the morning sky. Look low to the southeast before sunrise to spot Uranus during the last week of the month. Uranus rises about 0:17 a.m. by month's end. Uranus is in the constellation of Aries shining at magnitude 5.9.

Neptune
Rises about 4:12 a.m. on the 1st and about 2:12 a.m. by month's end. Look for Neptune low to the southeast before sunrise. Neptune is in the constellation of Pisces shining at magnitude 7.8.

Dwarf Planets
Ceres
Sets at 11:34 p.m. on the 1st and about 10:32 p.m. by month's end. Look for Ceres towards the southwest in the early evening. Ceres is in the constellation of Taurus shining at magnitude 8.9.

Pluto
Rises at 1:43 a.m. on the 1st and about 11:36 p.m. by month's end. 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.

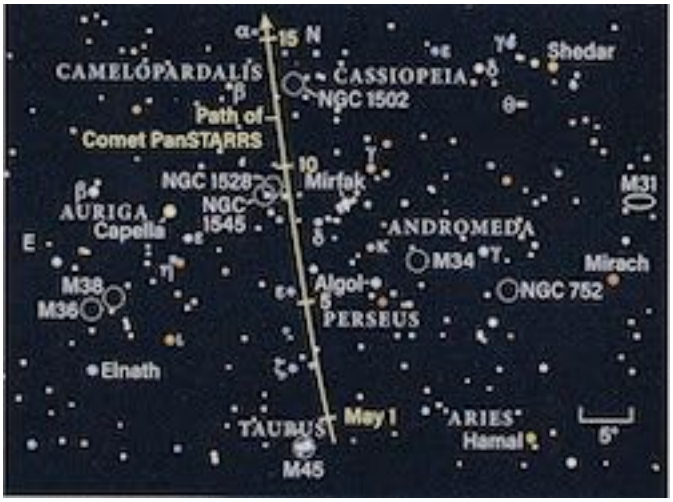
For more information about Meteor Showers, visit Gary Kronk's Meteor Showers Online web page.

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/2021 O3 (PanSTARRS) continues to be a promising visual spectacle for the next couple of weeks as it continues to climb into the early night sky. Comet PanSTARRS begins to fade into binocular view after the 10th, but is passing through areas rich with stellar objects. Comet PanSTARRS begins in Taurus, alongside of the Pleiades star cluster and climbs through the constellations of Perseus, Auriga and into Cassiopeia and Camelopardalis by the 15th. Plan on traveling to dark sky areas to spot this 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 total lunar eclipse occurs on the 15th/16th.
  May 15-16, 2022 Total Lunar Eclipse (Blood Moon)

Observational Opportunities

(from evening to morning)

- Look for Jupiter, Mars, Venus and Saturn in the early morning before sunrise.
- Look for Mercury in the evening early in the month.

Asteroids

(From west to east)

- **Hygiea** is in the constellation of Draco.
- **Vesta** is in the constellation of Capricornus.

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

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 W 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

JPL Latest News

April 27, 2022
NASA Wins 3 Webby Awards, 5 People's Voice Awards for 2022

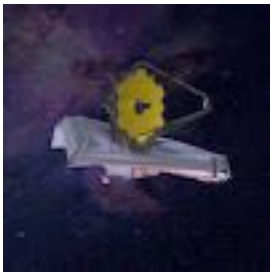
Full Article & Images

"NASA has earned three Webby awards and five People's Voice awards in the 26th annual Webby Awards Competition, recognizing excellence in online communications. The awards are NASA's 24th, 25th, and 26th Webby Awards since 1998 and represent the breadth of the agency's digital communications, including NASA's first interactive graphic novel."

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

April 13, 2022
Webb Telescope's Coldest Instrument Reaches Operating Temperature

Full Article & Images

"NASA's James Webb Space Telescope will see the first galaxies to form after the big bang, but to do that its instruments first need to get cold – really cold. On April 7, Webb's Mid-Infrared Instrument (MIRI) – a joint development by NASA and ESA (European Space Agency) – reached its final operating temperature below 7 kelvins (minus 447 degrees Fahrenheit, or minus 266 degrees Celsius).

Along with Webb's three other instruments, MIRI initially cooled off in the shade of Webb's tennis-court-size sunshield, dropping to about 90 kelvins (minus 298 F, or minus 183 C). But dropping to less than 7 kelvins required an electrically powered cryocooler. Last week, the team passed a particularly challenging milestone called the "pinch point,"

when the instrument goes from 15 kelvins (minus 433 F, or minus 258 C) to 6.4 kelvins (minus 448 F, or minus 267 C)."

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.

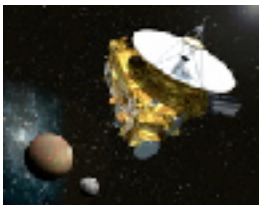
Juno

March 16, 2022
NASA'S JUNO SPACECRAFT GLIMPSES JUPITER'S MOONS IO AND EUROPA

Full Article & Images

"NASA's Juno mission captured this view of Jupiter's southern hemisphere during the spacecraft's 39th close flyby of the planet on Jan. 12, 2022. Zooming in on the right portion of the image (Figure B) reveals two more worlds in the same frame: Jupiter's intriguing moons Io (left) and Europa (right)."

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

March 29, 2022
Pluto's giant ice volcanos may have formed from multiple eruption events

Full Article & Images

"Scientists on NASA's New Horizons mission team have determined multiple episodes of cryovolcanism may have created some kinds of surface structures on Pluto, the likes of which are not seen anywhere else in the solar system. Material expelled from below the surface of this distant, icy planet could have created a region of large domes and rises flanked by hills, mounds and depressions. New Horizons was NASA's mission to make the first exploration of Pluto and its system of five moons."

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

January 13, 2022
Citizen Scientists Spot Jupiter-like Planet in NASA TESS Data

Full Article & Images

"Tom Jacobs of Bellevue, Washington, loves treasure hunts. Since 2010, the former U.S. naval officer has participated in online volunteer projects that allow anyone who is interested — "citizen scientists" — to look through NASA telescope data for signs of exoplanets, planets beyond our solar system.

Now, Jacobs has helped discover a giant gaseous planet about 379 light-years from Earth, orbiting a star with the same mass as the Sun. The Jupiter-size planet is special for astronomers because its 261-day year is long compared to many known gas giants outside our solar system. The result also suggests the planet is just a bit farther from its star than Venus is from the Sun. The finding was published in the Astronomical Journal and presented at an American Astronomical Society virtual press event on Jan. 13."

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

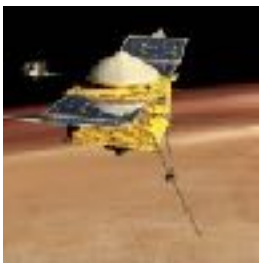
JMARS

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
April 27, 2022
LASP instrument selected for the next NASA 'Living With a Star' mission

Full Article & Images

LASP
"An instrument to be jointly designed and built at the University of Colorado Boulder (CU Boulder) and the University of California, Berkeley (UCB) has been selected to fly on NASA's next mission to study Earth's upper atmosphere.

The instrument, known as the Atmospheric Electrodynamics probe for THERmal plasma (AETHER), will measure electron density and temperature from a constellation of Earth-orbiting satellites as part of NASA's Geospace Dynamics Constellation (GDC) mission. These measurements will be vital to GDC's aim to understand the fundamental processes that govern the dynamic coupling between Earth's magnetic field and our planet's upper atmosphere."

MAVEN
February 3, 2022
The MAVEN Team Playlist
"Ever wonder what the MAVEN team is listening to while studying the Red Planet? We asked the scientists and engineers behind the MAVEN mission what they listen to while working and what they thought MAVEN's favorite songs might be. This led to an

amazing playlist with songs of all different genres. Listen along to MAVEN's favorite hits!"

Listen on Spotify!

Visit LASP and MAVEN for more information.

Mars 2020 - Perseverance

April 27, 2022
NASA's Mars Helicopter Spots Gear That Helped Perseverance Rover Land

Full Article & Images

"NASA's Ingenuity Mars Helicopter recently surveyed both the parachute that helped the agency's Perseverance rover land on Mars and the cone-shaped backshell that protected the rover in deep space and during its fiery descent toward the Martian surface on Feb. 18, 2021. Engineers with the Mars Sample Return program asked whether Ingenuity could provide this perspective. What resulted were 10 aerial color images taken April 19 during Ingenuity's Flight 26."

Learn more about the Mars 2020 (Perseverance) mission.

Mars Science Laboratory - Curiosity

April 25, 2022
NASA Extends Exploration for 8 Planetary Science Missions

Full Article & Images

"Following a thorough evaluation, NASA has extended the planetary science missions of eight of its spacecraft due to their scientific productivity and potential to deepen our knowledge and understanding of the solar system and beyond.

The missions – Mars Odyssey, Mars Reconnaissance Orbiter, MAVEN, Mars Science Laboratory (Curiosity rover), InSight lander, Lunar Reconnaissance Orbiter, OSIRIS-REx, and New Horizons – have been selected for continuation, assuming their spacecraft remain healthy. Most of the missions will be extended for three years; however, OSIRIS-REx will be continued for nine years in order to reach a new destination, and InSight will be continued until the end of 2022, unless the spacecraft's electrical power allows for longer operations."

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

Mars Reconnaissance Orbiter Mission

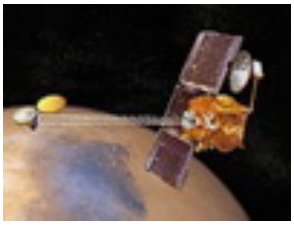
February 14, 2022
How Do Spacecraft Deal with Dust Storms on Mars?

Full Article & Images

"A large dust storm on Mars, nearly twice the size of the United States, covered the southern hemisphere of the Red Planet in early January 2022, leading to some of NASA's explorers on the surface hitting pause on their normal activities. NASA's Insight lander put itself in a "safe mode" to conserve battery power after dust prevented sunlight from reaching the solar panels. NASA's Ingenuity Mars Helicopter also had to postpone flights until conditions improved. A fleet of NASA orbiters monitor Martian dust storms like this one and serve as lifelines to Earth by relaying data from the rovers and lander on the ground back to the team. This includes the Mars Reconnaissance Orbiter, MAVEN, and Odyssey. Odyssey, while facing its technical issue, was able to recover quickly enough to come to InSight's aid during the dust storm."

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

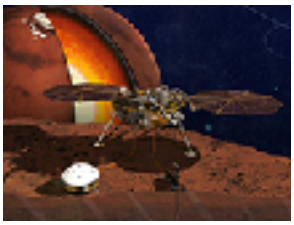
Full Article & Images

"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
January 11, 2022
NASA's InSight Sees Power Levels Stabilize After Dust Storm

Full Article & Images

"***Updated Feb. 15, 2022, at 2:35 p.m. PST (5:35 p.m. EST):***

Several weeks after the end of a dust storm on Mars, the solar panels of NASA's InSight lander are producing almost as much power as they did before the storm. That power level should enable the lander to continue science operations into the summer.

The team anticipates that continued dust accumulation will progressively diminish the spacecraft's overall power budget in the months ahead and has been carefully conserving energy by turning on science instruments for limited periods of time. Having completed all primary mission science objectives, the goal now is to enable the spacecraft to operate through the end of its extended mission in December. A passing whirlwind that removes dust or a new dust storm that increases the dust accumulation could alter the timeline."

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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