IAAS Monthly Astronomy Newsletter December 2023

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 (MDT-US) (Wednesday at 0200 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 the Amateur Radio Relay League website to find out more information about 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!
Your contributions are tax deductible.
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...

The Month At-A-Glance

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

The Moon

Phases:

- Last Quarter Moon occurs on the 5th.
- New Moon occurs on the 12th.
- First Quarter Moon occurs on the 19th.
- Full Moon occurs on the 26th.

- The Moon is at apogee (251,249 miles from Earth) on the 4th.
- The Moon is at perigee (228,603 miles from Earth) on the 16th.

Moon/Planet Pairs:

- The Moon passes 4° south of Venus on the 9th.
- The Moon passes 4° south of Mercury on the 13th.
- The Moon passes 2° south of Saturn on the 17th.
- The Moon passes 1.3° south of Neptune on the 19th.
- The Moon passes 3° north of Jupiter on the 22nd.
- The Moon passes 3° north of Uranus on the 23rd.

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.

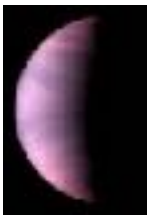
(All times are local unless otherwise noted.)

Planetary Highlights for December

"Catch a glimpse of innermost planet Mercury soon after sunset in early December. Once darkness falls, you'll find Saturn descending in the south and Jupiter high in the east. Both are ideally located for easy telescopic views in the early evening. Jupiter is near its best for the year and you'll have many hours to watch its rotating cloud belts until well after midnight. Uranus and Neptune remain within reach of binoculars, while Venus lights up the morning sky, rising a few hours before dawn." Astronomy Magazine, December 2023, P. 28.

Mercury

Is at greatest eastern elongation (21°) on the 4th. Mercury is stationary on the 12th. Mercury is in inferior conjunction on the 22nd. Mercury sets at 6:16 p.m. on the 1st. After inferior conjunction, Mercury returns to the morning sky, rising about 5:52 a.m. by month's end, but will not be visible until next month. Look for Mercury in the evening sky very low on the horizon within 30 minutes of sunset during the first week or so of December. Mercury moves from the constellation of Sagittarius into Ophiuchus shining at magnitude -0.4 on the 1st.



Venus

Rises at 3:24 a.m. on the 1st and about 4:27 a.m. by month's end. Look for Venus to the east before sunrise. Venus moves from the constellation of Virgo into Scorpius shining at magnitude -4.1 on the 15th.

Earth

Winter solstice occurs at 10:27 P.M. EST on the 21st.

Mars
Rises at 6:45 a.m. on the 1st and about 6:31 a.m. by month's end. Mars is still too close to the Sun this month for observation. Mars moves from the constellation of Scorpius into Sagittarius shining at magnitude 1.4 on the 15th.

Jupiter
Sets at 4:26 a.m. on the 1st and about 2:17 a.m. by month's end. By the time the Sun sets, Jupiter is high in the south-southeast. Jupiter is stationary on the 31st. Jupiter is in the constellation of Aries shining at magnitude -2.7.

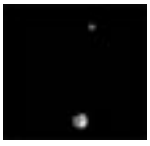
Saturn
Sets at 10:52 p.m. on the 1st and about 9:01 p.m. by month's end. By the time the Sun sets, Saturn is visible in the southwest soon after sunset. Saturn is in the constellation of Aquarius shining at magnitude 0.9.

Uranus
Sets at 5:35 a.m. on the 1st and about 3:29 a.m. by month's end. Uranus follows just about 30-45 minutes behind Jupiter, visible in the southeast soon after sunset. Uranus is in the constellation of Aries shining at magnitude 5.7.

Neptune
Sets at 12:56 a.m. on the 1st and about 10:51 p.m. by month's end. Neptune is stationary on the 6th. Look for Neptune following Saturn by about 2 hours in the south-southwest soon after sunset. Neptune is in the constellation of Pisces shining at magnitude 7.8.

Dwarf Planets

Ceres
Rises at 6:24 a.m. on the 1st and about 5:27 a.m. by month's end. Ceres may be visible sometime after mid-month in the early morning sky to the east. Ceres moves from the constellation of Scorpius into Ophiuchus shining at magnitude 8.9.



Pluto
Sets at 8:00 p.m. on the 1st and about 6:03 p.m. by month's end. Look for Pluto in the southwest in the early evening when it is highest in the sky; however, Pluto may be too low and too dim to spot. 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.

Constellation information provided by Go Astronomy.

Astronomical Events

Meteor Showers

- **The Geminids** - This shower is active during the period December 6 to December 19. Upon reaching maximum activity during December 13 to 14, hourly rates are typically near 80. The meteors are described as rapid and yellowish, with about 4% displaying persistent trains. They possess an average magnitude of 2.4.

- **The Ursids** - Occurring primarily between December 17 and 24, this meteor shower reaches maximum on December 22... The maximum hourly rate is usually between 10 and 15... Meteors belonging to this stream are typically faint.

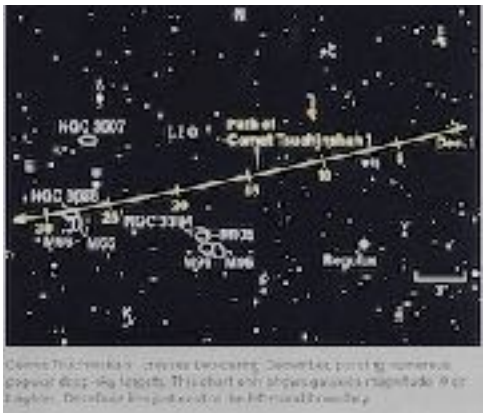
For more information about Meteor Showers, visit Gary Kronk's Meteor Showers Online web page.

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 62P/Tsuchinshan (also called Tsuchinshan 1) will brighten to about 7th magnitude this month, passing through the constellation of Leo. The best time and dates to look for Comet Tsuchinshan will be after 1 a.m. between the 5th and 17th when the Moon will not interfere with viewing.

For information, orbital elements and ephemerides on observable comets visit Observable Comets.

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 Jupiter, Saturn, Uranus and Neptune in the evening.
- Look for Venus in the morning.

Asteroids

(From west to east)

- **Melpomene** is in the constellation of Cetus.
- **Vesta** is at opposition on the 21st in the constellation of Gemini.
- **Metis** is at opposition on the 22nd in the constellation of Gemini.
- **Astraea** is at opposition on the 27th in the constellation of Gemini.
- **Lutetia** is in the constellation of Leo.

Information about the Minor Planets can be found at the MinorPlanet.info 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
5300-2023	2023-09-11 22:04 MDT	CO	Lukas S	5300

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.

Annular Solar Eclipse

October 14, 2023

Movie Courtesy of Burness Ansell (KIØAR)
5 min 22 sec movie covering all of totality.
Location: 37° 12' 10.19" N, 109° 56' 02.05" W
Elevation: 5143 ft.
Taken with: Dwarf II, with solar filter, Movie mode

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

November 30, 2023
NASA's 6-Pack of Mini-Satellites Ready for Their Moment in the Sun

Full Article & Images

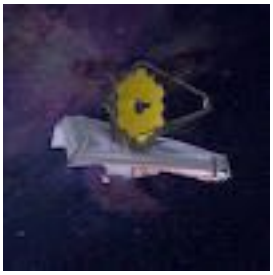
"The satellites are part of the agency's SunRISE mission, which will study the physics behind explosions that the Sun generates.

Most NASA missions feature one spacecraft or, occasionally, a few. The agency's Sun Radio Interferometer Space Experiment (SunRISE) is using half a dozen. This month, mission members completed construction of the six identical cereal box-size satellites, which will now go into storage and await their final testing and ride to space. SunRISE will launch as a rideshare aboard a United Launch Alliance Vulcan rocket, sponsored by the United States Space Force (USSF)'s Space Systems Command (SSC)."

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

November 30, 2023
Webb Study Reveals Rocky Planets Can Form in Extreme Environments

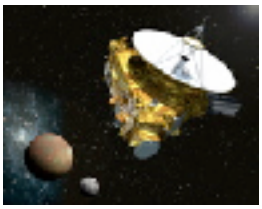
Full Article & Images

"An international team of astronomers has used NASA's James Webb Space Telescope to provide the first observation of water and other molecules in the highly irradiated inner, rocky-planet-forming regions of a disk in one of the most extreme environments in our galaxy. These results suggest that the conditions for

terrestrial planet formation can occur in a possible broader range of environments than previously thought."

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

November 9, 2023
NASA's Juno Finds Jupiter's Winds Penetrate in Cylindrical Layers

Full Article & Images

"*The finding offers deeper insights into the long-debated internal structure of the gas giant.*

Gravity data collected by NASA's Juno mission indicates Jupiter's atmospheric winds penetrate the planet in a cylindrical manner, parallel to its spin axis. A paper on the findings was recently published in the journal Nature Astronomy.

The violent nature of Jupiter's roiling atmosphere has long been a source of fascination for astronomers and planetary scientists, and Juno has had a ringside seat to the goings-on since it entered orbit in 2016. During each of the spacecraft's 55 to date, a suite of science instruments has peered below Jupiter's turbulent cloud deck to uncover how the gas giant works from the inside out."

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.

TESS

November 29, 2023
Discovery Alert: Watch the Synchronized Dance of a 6-Planet System

Full Article & Images

"**The discovery:** Six planets orbit their central star in a rhythmic beat, a rare case of an "in sync" gravitational lockstep that could offer deep insight into planet formation and evolution.

Key facts: A star smaller and cooler than our Sun hosts a truly strange family of planets: six "sub-Neptunes" – possibly smaller versions of our own Neptune – moving in

a cyclic rhythm. This orbital waltz repeats itself so precisely it can be readily set to music.

Details: While multi-planet systems are common in our galaxy, those in a tight gravitational formation known as "resonance" are observed by astronomers far less often. In this case, the planet closest to the star makes three orbits for every two of the next planet out – called a 3/2 resonance – a pattern that is repeated among the four closest planets."

For more news and information on the TESS mission, visit the Latest Tess News 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 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
October 13, 2023

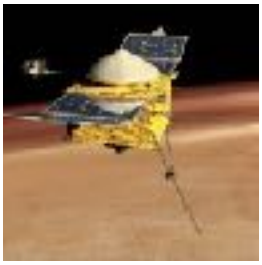
7 reasons to get excited about CU Boulder in space

Full Article & Images

"This year, the Laboratory for Atmospheric and Space Physics (LASP) celebrates its 75th anniversary—marking 75 years of CU Boulder's exploration of space, from the fringes of Earth's atmosphere to the wide expanse of interstellar space.

The university is just getting started. In the year ahead, scientists and engineers from across campus will take part in the first U.S. landing on the moon's south pole, launch several pint-sized satellites into orbit around Earth, and begin a journey to Jupiter's dark and frigid moon Europa.

Follow along to learn what the next year holds in store for CU Boulder in space."



MAVEN
November 18, 2023
T-Minus 10 stories of NASA's MAVEN launch

Full Article & Images

"Ten years ago, on November 18, 2013, NASA's MAVEN (Mars Atmosphere and Volatile Evolution) mission launched from Cape Canaveral on an Atlas V rocket, the first step of its epic nine-month journey to Mars.

The mission has since helped unlock some of the Red Planet's many mysteries, from how solar wind stripped the planet's atmosphere to discovering different types of Martian aurora. "Results from the MAVEN mission have transformed our understanding of the planet's upper atmosphere," said Shannon Curry, the Principal Investigator of the MAVEN mission. "The mission continues to produce incredible, cross-divisional science, and the team is excited for our future science campaigns and relay activities in the years to come. I have worked on MAVEN since I watched it launch 10 years ago and it has truly been an honor and a privilege."

Visit LASP and MAVEN for more information.

Mars 2020 - Perseverance

November 22, 2023
NASA Uses Two Worlds to Test Future Mars Helicopter Designs

Full Article & Images

"*Engineers will go beyond the ends of the Earth to find more performance for future Mars helicopters.*

For the first time in history, two planets have been home to testing future aircraft designs. On this world, a new rotor that could be used with next-generation Mars helicopters was recently tested at NASA's Jet Propulsion Laboratory in Southern California, spinning at near-supersonic speeds (0.95 Mach). Meanwhile, the agency's Ingenuity Mars Helicopter has achieved new altitude and airspeed records on the Red Planet in the name of experimental flight testing."

Learn more about the Mars 2020 (Perseverance) mission.

Mars Science Laboratory - Curiosity

November 6, 2023
NASA's Curiosity Rover Clocks 4,000 Days on Mars

Full Article & Images

"*The mission team is making sure the robotic scientist, now in its fourth extended mission, is staying strong, despite wear and tear from its 11-year journey.*

Four thousand Martian days after setting its wheels in Gale Crater on Aug. 5, 2012, NASA's Curiosity rover remains busy conducting exciting science. The rover recently drilled its 39th sample then dropped the pulverized rock into its belly for detailed analysis."

Visit the Mars Science Laboratory page.

Mars Reconnaissance Orbiter Mission

October 5, 2023
A Bear on Mars?

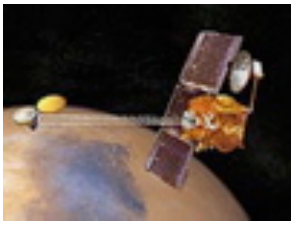
Full Article & Images

"The Mars Reconnaissance Orbiter (MRO) captured this bit of ursine pareidolia on Dec. 12, 2022. While it resembles a bear we might see on Earth, this is actually a hill on Mars with a peculiar shape. A V-shaped collapse structure

makes the nose, two craters form the eyes, and a circular fracture pattern shapes the head. The circular fracture pattern might be due to the settling of a deposit over a buried impact crater."

MARS RECONNAISSANCE ORBITER HIRISE IMAGES

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



Mars Odyssey Orbiter

November 28, 2023
NASA Orbiter Snaps Stunning Views of Mars Horizon

Full Article & Images

"*The Odyssey orbiter captured clouds and dust in the Red Planet's skies, along with one of its two tiny moons.*

Astronauts often react with awe when they see the curvature of the Earth below the International Space Station. Now Mars scientists are getting a taste of what that's like, thanks to NASA's 2001 Mars Odyssey orbiter, which completed its 22nd year at the Red Planet last month.

The spacecraft captured a series of panoramic images that showcases the curving Martian landscape below gauzy layers of clouds and dust. Stitched end to end, the 10 images offer not only a fresh, and stunning, view of Mars, but also one that will help scientists gain new insights into the Martian atmosphere."

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

Visit the Mars Odyssey Mission page.

Mars Missions Status

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

More 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!

73 from KIØAR
Created by Burness F. Ansell, III
Email

COO, Director of Aerospace Technologies, IAAS
JPL Solar System Ambassador, Colorado
Last modified: December 01, 2023