IAAS Monthly Astronomy Newsletter
January 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.

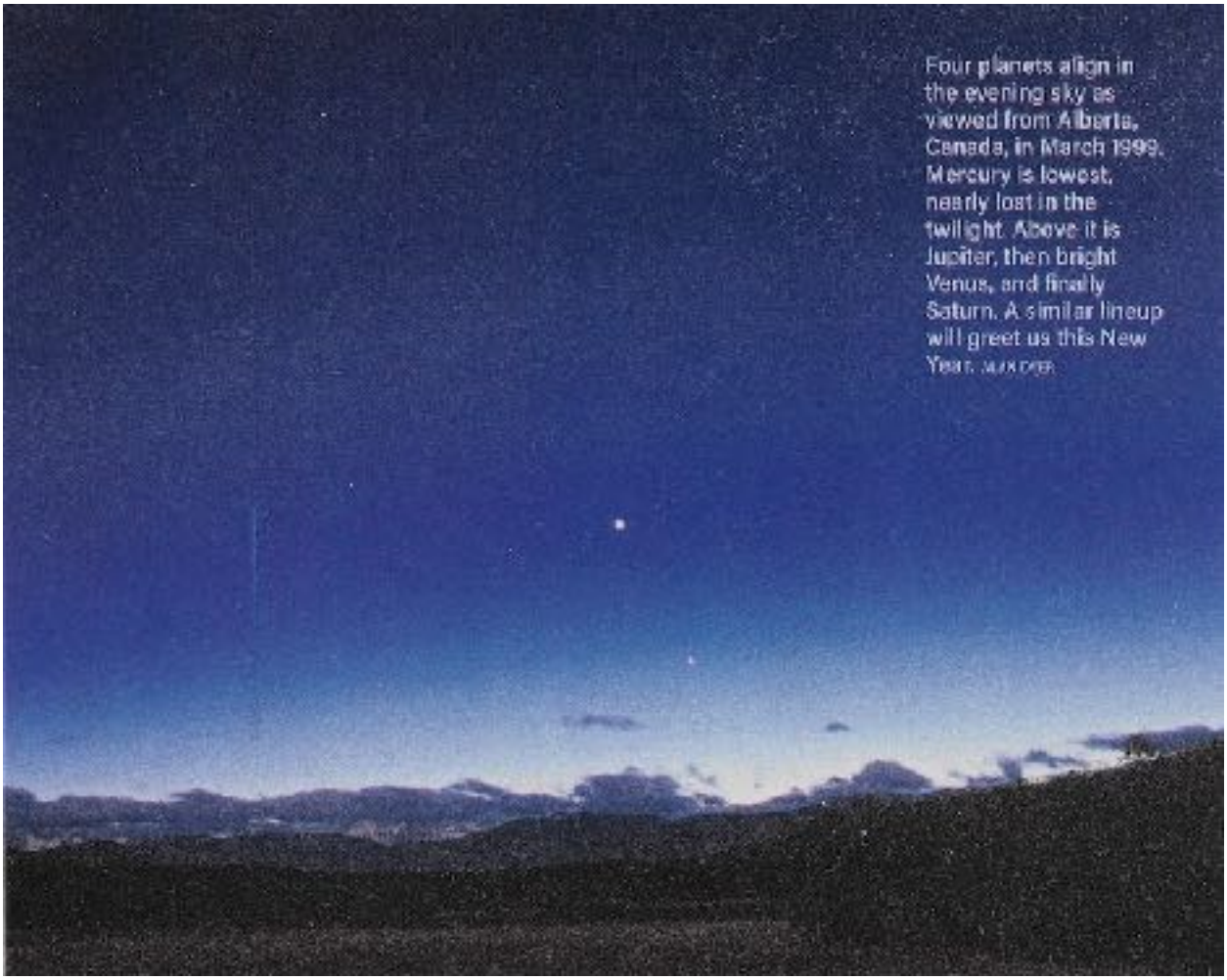
** Check the website for current info during these COVID-19 times. **

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!



"Four planets align in the evening sky as viewed from Alberta, Canada, in March 1999. Mercury is lowest, nearly lost in the twilight. Above it is Jupiter, then bright Venus, and finally Saturn. A similar lineup will greet us this New Year." Astronomy Magazine, January 2022, 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 2nd.
- First Quarter Moon occurs on the 9th.
- Full Moon occurs on the 17th.
- Last Quarter Moon occurs on the 25th.

- The Moon is at perigee on the 1st, (222,471 miles from Earth).
- The Moon is at apogee on the 14th, (252,155 miles from Earth).
- The Moon is at perigee on the 30th, (225,093 miles from Earth).

Moon/Planet Pairs:

- The Moon passes 3° south of Mercury on the 3rd.
- The Moon passes 4° south of Saturn on the 4th.
- The Moon passes 4º south of Jupiter on the 5th.
- The Moon passes 4° south of Neptune on the 7th.
- The Moon passes 1.5° south of Uranus on the 11th.
- The Moon passes 1.2° north of dwarf planet Ceres on the 12th.
- The Moon passes 2° south of Mars on the 29th.
- The Moon passes 10° south of Venus on the 29th.
- The Moon passes 8° south of Mercury 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 January

"The new year opens with a spectacular array of planets lined up in the western sky soon after sunset. Mercury, Venus, Jupiter, and Saturn offer nightly fascination. A crescent Moon skips along this line of planets over a few nights early in the month. The inner pair of planets, Mercury and Venus, swaps places in the first week of January. Mercury remains in view through mid-month, while Jupiter and Saturn are visible all month. Uranus and Neptune can be spotted with binoculars, riding high in the southern sky after sunset. Only Mars is missing from the nightly lineup – it's over in the morning sky, transiting the rich star clouds of the Milky Way." Astronomy Magazine, January 2022, P. 32.

Mercury

Sets at 6:08 p.m. on the 1st. Mercury is at greatest eastern elongation (19°) on the 7th. Mercury is stationary on the 13th. Look for Mercury to the west about 30 minutes after sunset during the first 2 weeks of January. On New Year's day, look for Venus about 1° above Venus. Mercury is in inferior conjunction on the 23rd. After inferior conjunction, Mercury returns to the morning sky, but will be lost in the early twilight glow. Mercury rises about 5:57 a.m. by month's end. Mercury is in the constellation of Sagittarius shining at magnitude -0.7 on the 1st.

Venus

Sets at 5:49 p.m. on the 1st. Venus is in inferior conjunction on the 8th. Look for Venus during the first couple of days of the month before it disappears into the evening twilight glow. After inferior conjunction, Venus returns to the morning sky. Venus is stationary on the 29th. Venus rises about 4:52 a.m. by month's end.Look for Venus in the west soon after sunset. Venus is in the constellation of Sagittarius shining at magnitude -4.8 on the 31st.

Earth

The Earth is at perihelion (91.4 million miles from the Sun), 2 a.m. EST on the 4th.

Mars

Rises at 5:20 a.m. on the 1st and about 5:01 a.m. by month's end. Look for Mars low to the southeast before sunrise. Mars moves from the constellation of Ophiuchus into Sagittarius shining at magnitude 1.5 on the 15th.

Jupiter

Sets at 8:47 p.m. on the 1st and about 7:19 p.m. by month's end. Look for Jupiter in the southwest, soon after sunset. Jupiter is in the constellation of Aquarius shining at magnitude -2.1.

Saturn

Sets at 7:13 p.m. on the 1st and about 5:29 p.m. by month's end. Look for Saturn in the southwest, soon after sunset. Saturn is in the constellation of Capricornus shining at magnitude 0.7.

Uranus

Sets at 2:44 a.m. on the 1st and around 12:42 a.m. by month's end. By the time the Sun sets, Uranus is high in the south-southwest. Uranus is in the constellation of Aries shining at magnitude 5.8.

Neptune

Sets at 10:27 p.m. on the 1st and about 8:29 p.m. by month's end. Look to the southwest once the skies darken after sunset. Neptune is in the constellation of Aquarius shining at magnitude 7.8.

Dwarf Planets

Ceres

Sets at 4:08 a.m. on the 1st and about 2:13 a.m. by month's end. Ceres is stationary on the 16th. Look for Ceres in the evening, when it is highest in the southern sky. Ceres is in the constellation of Taurus shining at magnitude 8.0.

Pluto

Sets at 5:48 p.m. on the 1st. Pluto is in conjunction with the Sun on the 16th. After conjunction, Pluto returns to the morning sky, rising about 6:26 a.m. by month's end. Pluto is lost in the evening and morning twilight and will not be visible all month. Pluto is in the constellation of Sagittarius shining at magnitude 14.8.

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

Astronomical Events

Meteor Showers

- The Quadrantids - This shower is generally visible between December 28 and January 7, with a very sharp maximum of 45 to 200 meteors per hour occurring during January 3 and 4. The meteors tend to be bluish and possess an average magnitude of about 2.8.

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 A1 (LEONARD) claimed the title of comet of the year in 2021, but it plummets to 12th magnitude by January's end.

- Next up: Nicely placed on the evening stage well to the left of Jupiter is the periodic Comet 19P/Borrelly, floating near Diphda, the 2nd-magnitude nose star of Cetus. Though it's not a contender for this year's title, Borrelly should sport a broad, short fan extending to the south. Even from darker country skies, a 4-inch scope won't show much more than an out-of-round pale gray cotton ball glowing at 10th magnitude." Astronomy Magazine, January 2022, 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 Venus, Mercury, Saturn and Jupiter in the early evening, just after sunset.
- Look for Neptune and Uranus in the evening, following Jupiter.
- Look for Mars in the early morning before sunrise.
- Look for Venus in the early morning before sunrise late in the month.

Asteroids

(From west to east)

- **Nysa** is in the constellation of Taurus.
- **Iris** is at opposition on the 13th in the constellation of Gemini.
- **Massalia** is in the constellation of Leo.
- **Juno** is in conjunction with the Sun on the 11th.

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

December 28, 2021
Biggest Moments on Mars: NASA's Perseverance Rover 2021 Year in Review

Full Article & Images

"A new video looks back on the six-wheeled scientist's first 10 months on the Red Planet and all that it's accomplished so far.

NASA's Perseverance rover has been busy since its harrowing touchdown in Mars' Jezero Crater this past February.

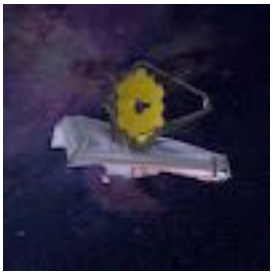
In the 10 months since, the car-size rover has driven 1.8 miles (2.9 kilometers), set a record for the longest rover drive in a Martian day, taken more than 100,000 images, and collected six samples of Martian rock and atmosphere that could eventually be brought to Earth for further study.

And then there's NASA's Ingenuity Mars Helicopter, which hitched a ride to the Red Planet with Perseverance: Proving that powered, controlled flight is possible in Mars' thin atmosphere, the 4-pound (1.8-kilogram) rotorcraft has logged 18 flights and counting."

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

December 25, 2021
NASA's Webb Telescope Launches to See First Galaxies, Distant Worlds

Full Article & Images

"***Editor's note:*** *This release was updated on Dec. 25 to reflect the observatory's release at approximately 870 miles (1,400 kilometers).*

NASA's James Webb Space Telescope launched at 7:20 a.m. EST Saturday on an Ariane 5 rocket from Europe's Spaceport in French Guiana, South America.

A joint effort with ESA (European Space Agency) and the Canadian Space Agency, the Webb observatory is NASA's revolutionary flagship mission to seek the light from the first galaxies in the early universe and to explore our own solar system, as well as planets orbiting other stars, called exoplanets."

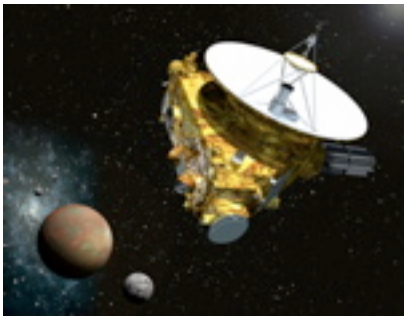
More information on the James Webb Space Telescope mission is available at The James Webb Space Telescope website.
The public can follow the mission on Facebook, Twitter and YouTube.

Juno
December 21, 2021
JUPITER WITH IO AND CALLISTO

Full Article & Images

"The main image and the inset image were taken by the JunoCam imager a few hours before its closest approach to Jupiter on its 38th perijove pass, on Nov. 29, 2021, during an encounter with the Jovian moon Io. After snapping a series of Io images, JunoCam acquired this picture of Jupiter and Io together. Much fainter and more distant is Jupiter's moon Callisto, barely visible below and to the right of Io."

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
December 17, 2021
The PI's Perspective: Looking Back, Looking Forward

Full Article & Images

"New Horizons remains healthy and continues to send valuable data from deep in the Kuiper Belt – more than 5 billion miles away -- even as it speeds farther and farther from the Earth and Sun.

As 2021 winds down, I want to recount what the New Horizons project has accomplished this year, and also look ahead to tell you about our plans for 2022.

During a busy and productive 2021, our science team published or submitted for publication no less than 49 research papers detailing discoveries about our flyby targets in the Pluto system and at the Kuiper Belt object (KBO) Arrokoth, other KBOs and dwarf planets, the outer heliosphere of the Sun, and even cosmology! Meanwhile, our mission operations and engineering teams have planned and executed literally dozens of new scientific observations, tested and uploaded new main-computer software to enhance spacecraft data-collection capabilities, and tested and uploaded software that enables new capabilities for our Solar Wind Around Pluto (SWAP) and Alice spectrometers. We've also sent another year's worth of data and six separate "metaproduct" datasets to NASA's Planetary Data System for use by anyone in the world, researcher or private citizen, and we've continued outreach and communications activities that inform the public about discoveries and other New Horizons news."

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

December 2, 2021
An eight-hour year

Full Article & Images

"As far as extrasolar planets go, 'GJ 367 b' is a featherweight. With half the mass of Earth, the newly discovered planet is one of the lightest among the nearly 5000 exoplanets known today. It takes the extrasolar planet approximately eight hours to orbit its parent star. With a diameter of just over 9000 kilometres, GJ 367 b is slightly larger than Mars. The planetary system is located just under 31 light years from Earth and is thus ideal for further investigation. The discovery demonstrates that it is possible to precisely determine the properties of even the smallest, least massive exoplanets. Such studies provide a key to understanding how terrestrial planets form and evolve."

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

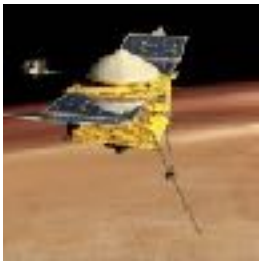
JMARS

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

December 14, 2021
NASA awards $14 million to CU-LASP for two new CubeSat missions

Full Article & Images

"Two new CubeSats, to be built by the Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado Boulder, will provide first-of-their-kind measurements of gravity waves in Earth's upper atmosphere and explosions in the Sun's corona. This information will fill existing data gaps that are urgently needed for scientists to better predict the effects of space weather on critical human infrastructure and technologies, from satellites in low-Earth orbit to radio communications on airplanes."

Visit LASP and MAVEN for more information.

Mars 2020 - Perseverance

December 15, 2021
NASA's Perseverance Mars Rover Makes Surprising Discoveries

Full Article & Images

"*The findings by rover scientists highlight the diversity of samples geologists and future scientists associated with the agency's Mars Sample Return program will have to study.*

Scientists with NASA's Perseverance Mars rover mission have discovered that the bedrock their six-wheeled explorer has been driving on since landing in February likely formed from red-hot magma. The discovery has implications for understanding and accurately dating critical events in the history of Jezero Crater – as well as the rest of the planet.

The team has also concluded that rocks in the crater have interacted with water multiple times over the eons and that some contain organic molecules."

Learn more about the Mars 2020 (Perseverance) mission.

Mars Science Laboratory - Curiosity

December 20, 2021
NASA-JPL's 'On a Mission' Podcast New Season Rolls Out With Mars Rovers

Full Article & Images

"*With the first episode available now, Season Four shares the personal stories of the people who've helped put NASA's six-wheeled explorers on the Red Planet.*

On a Mission: Season 4: Episode 1: Driven To Mars

For 25 years, NASA's Jet Propulsion Laboratory has been sending rovers to Mars. From the first tentative tracks of Sojourner to the agency's newest rover, Perseverance, NASA rovers have descended into craters, gotten mired in sand traps, and climbed mountains. And with Ingenuity Mars Helicopter, the agency has taken to the Martian skies, adding an aerial dimension to Red Planet exploration.

The fourth season of JPL's "On a Mission" podcast covers all this and more. Told through personal stories of mission scientists and engineers, the podcast explains why NASA sends rovers to Mars and the challenges to making this kind of space exploration possible.

Hosted by Leslie Mullen, the 14-episode series will feature one new 30-to-45-minute episode each month, starting on Dec. 20. In Episode One, "Driven to Mars," JPL's Jennifer Trosper, who serves as Perseverance's project manager, shares the personal journey she's taken while helping put all of NASA's six-wheeled explorers on Mars.

You can find "On a Mission" at NASA or Soundcloud, as well as on Apple podcasts and Google podcasts. And don't miss the previous three award-winning seasons, which focus on the Mars InSight mission, asteroids, and Earth science."

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

Mars Reconnaissance Orbiter Mission

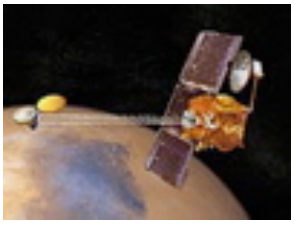
November 15, 2021
How's the Weather on Mars? (NASA Mars Report for November 15, 2021)

Full Article & Images

"Seasons change even on Mars and NASA's fleet of explorers are helping scientists learn more about the effects on the Red Planet. NASA's Perseverance and Curiosity rovers provide daily weather reports by measuring conditions such as humidity, temperature, and wind speed on the surface. Orbiters including Odyssey, Mars Atmosphere and Volatile EvolutioN (MAVEN), and the Mars Reconnaissance Orbiter (MRO) survey the scope and scale of storms from above. Changing weather conditions can be challenging for the spacecraft. The Ingenuity Mars Helicopter recently increased its rotor speed from 2,537 rpm to 2,700 rpm to fly in a thinner summer atmosphere. Meanwhile, NASA's InSight lander, which is studying Mars' interior, recently measured one of the biggest, longest-lasting marsquakes the mission has ever detected."

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

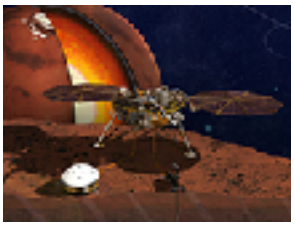
"NASA's 2001 Mars Odyssey spacecraft launched 20 years ago on April 7, making it the oldest spacecraft still working at the Red Planet. The orbiter, which takes its name from Arthur C. Clarke's classic sci-fi novel "2001: A Space Odyssey" (Clarke blessed its use

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
September 22, 2021
NASA's InSight Finds Three Big Marsquakes, Thanks to Solar-Panel Dusting

Full Article & Images

"*The lander cleared enough dust from one solar panel to keep its seismometer on through the summer, allowing scientists to study the three biggest quakes they've seen on Mars.*

On Sept. 18, NASA's InSight lander celebrated its 1,000th Martian day, or sol, by measuring one of the biggest, longest-lasting marsquakes the mission has ever detected. The temblor is estimated to be about a magnitude 4.2 and shook for nearly an hour-and-a-half.

This is the third major quake InSight has detected in a month: On Aug. 25, the mission's seismometer detected two quakes of magnitudes 4.2 and 4.1. For comparison, a magnitude 4.2 quake has five times the energy of the mission's previous record holder, a magnitude 3.7 quake detected in 2019."

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!

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