IAAS Monthly Astronomy Newsletter March 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. **

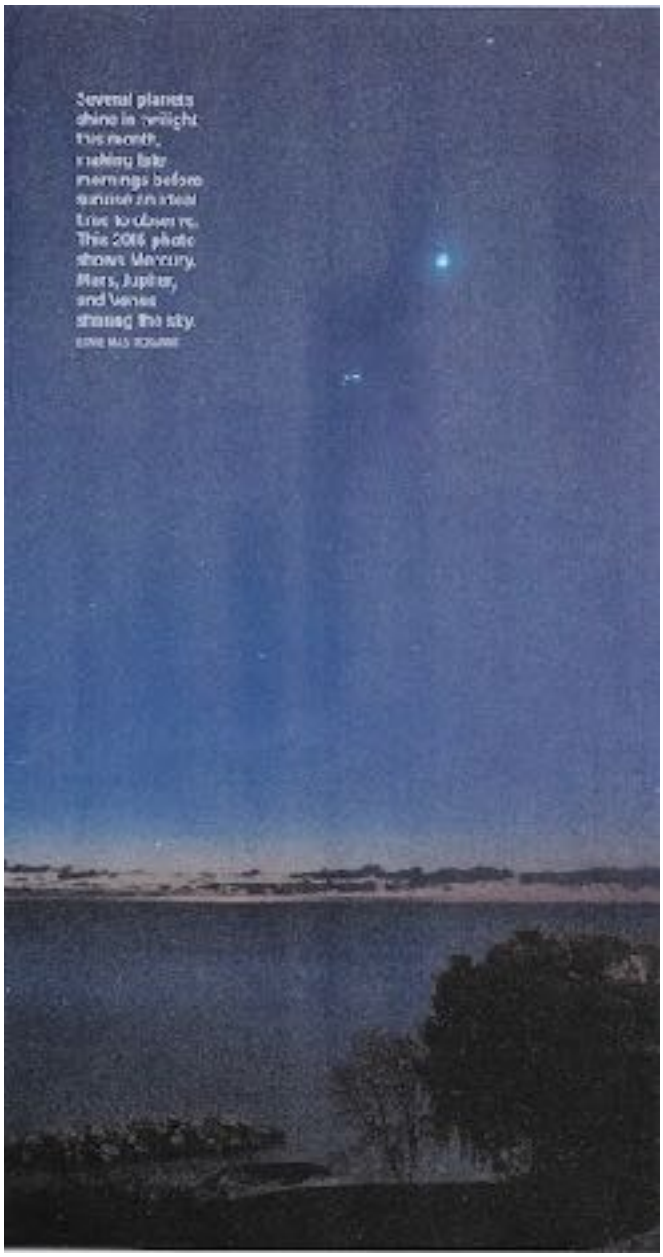
The Colorado Astronomy Net and the IAAS are on Facebook page. Be sure to "Like" us.

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!

In This Newsletter...



"Several planets shine in twilight this month, making late mornings before sunrise an ideal time to observe. This 2015 photo shows Mercury, Mars, Jupiter, and Venus sharing the sky." Astronomy Magazine, March 2010, P. 32. Ernie Mastroianni

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 13th.
- First Quarter Moon occurs on the 21st.
- Full Moon occurs on the 28th.

- The Moon is at Perigee on the 2nd, 227,063 miles from Earth.
- The Moon is at Apogee on the 18th, 251,812 miles from Earth.
- The Moon is at Perigee on the 30th, 223,886 miles from Earth.

Moon/Planet Pairs:

- Mercury passes 0.3° north of Jupiter on the 5th.
- The Moon passes 4° south of Saturn on the 9th.
- The Moon passes 4° south of Jupiter on the 10th.
- The Moon passes 4° south of Mercury on the 10th.
- The Moon passes 3° south of Uranus on the 16th.
- The Moon passes 1.9° south of Mars on the 19th.
- Vernal equinox occurs at 5:37 a.m. on the 20th.
- Mars passes 7° north of Aldebaran on the 22nd.

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 March

"During March, Mars lingers in the evening sky as a wonderful bright object as it crosses Taurus. Most of the planetary action is now in the predawn sky, with three planets congregating there: Jupiter, Saturn, and Mercury. Watch their relative dance as they jostle positions each morning." Astronomy Magazine, March 2021, P. 32.

Mercury

Mercury is at greatest western elongation (27°) on the 6th. Mercury rises at 5:21 a.m. on the 1st and about 6:16 a.m. by month's end. Look for Mercury about 30 minutes before sunrise. Mercury moves from the constellation of Capricornus into Aquarius shining at magnitude 0.3 on the 1st.

Venus

Is in superior conjunction on the 26th. Venus rises at 6:25 a.m. on the 1st and about 6:55 a.m. by month's end. After conjunction, Venus returns to the evening sky, but will be lost in the evening twilight glow until next month. Look for Venus in the east before sunrise about 30 minutes before sunrise during the first 3 weeks of March. Venus moves from the constellation of Aquarius into Pisces shining at magnitude -3.9 on the 15th.

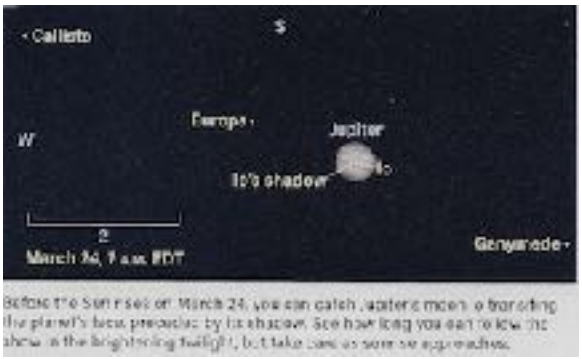
Earth

Daylight Saving Time begins for most of the U.S. at 2 a.m. local on the 14th.
Vernal equinox occurs at 5:37 a.m. EDT on the 20th.

Mars

Sets at 12:24 a.m. on the 1st and about 12:52 a.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 Taurus shining at magnitude 1.1.

Jupiter
Rises at 5:32 a.m. on the 1st and about 4:49 a.m. by month's end. Look for Jupiter low in the east before sunrise. Jupiter should be easier to spot now that it is rising earlier. Jupiter is in the constellation of Capricornus shining at magnitude -2.0.



Saturn
Rises at 5:07 a.m. on the 1st and about 4:15 a.m. by month's end. Like Jupiter, Saturn is also easier to observe this month. Saturn is in the constellation of Capricornus shining at magnitude 0.6.

Uranus
Sets at 10:30 p.m. on the 1st and around 9:35 p.m. by month's end. Uranus is visible in the evening. Look to the south-southwest soon after sunset to spot Uranus. Uranus is in the constellation of Aries shining at magnitude 5.9.

Neptune
Is in conjunction with the Sun on the 10th. Neptune sets at 6:33 p.m. on the 1st. Neptune moves to the morning sky after conjunction. Neptune will rise about 6:01 a.m. by month's end. Neptune will be lost in the twilight glow of sunsets and sunrises all month. Neptune is in the constellation of Aquarius shining at magnitude 7.8.

Dwarf Planets
Ceres
Sets at 7:28 p.m. on the 1st and around 7:27 p.m. by month's end. Ceres will be difficult to spot as it too is lost in the evening twilight glow and very close to the western horizon all month. Ceres moves from the constellation of Pisces into Cetus shining at magnitude 9.1.

Pluto
Rises at 4:30 a.m. on the 1st and about 3:30 a.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

- There are a few minor meteor showers but none that produce rates much higher than 2-5 per hour, except the Gamma Normids that extend over the period of March 11 to 21, with the maximum occurring on March 16. The maximum rate reaches about 5-9 meteors per hour.

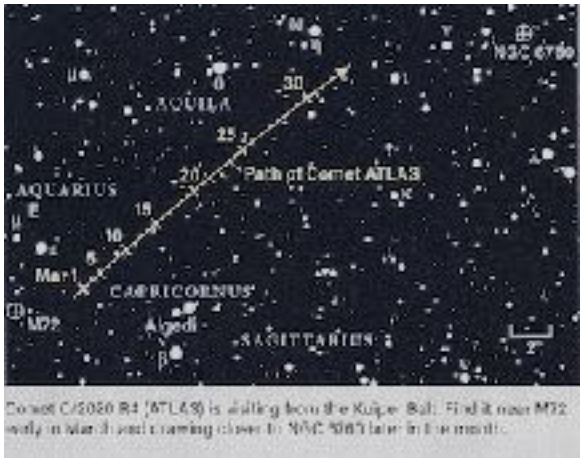
For more information about Meteor Showers, visit Gary Kronk's Meteor Showers Online web page.

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



- "Waking up from its thousand-year sleep, Comet C/2020 R4 (ATLAS) is competing for the top of the telescopic comet list this spring. It's visiting from the Kuiper belt, having traveled some four times Pluto's distance to reach us. The comet was discovered September 12 by the Asteroid Terrestrial-impact Last Alert System search program (also known as ATLAS).

  Nicely timed to cap off a long night of deep-sky Messier marathoning midmonth, ATLAS floats near M72." Astronomy Magazine, March, 2021, P. 38.

For information, orbital elements and ephemerides on observable comets visit the Observable Comets page from the Harvard-Smithsonian Center for Astrophysics.

For more information about Comets, check out Gary Kronk's 6-volume series of books on Cometography.

Eclipses

- No solar eclipse activity this month.
-
- No lunar eclipse activity this month.

Observational Opportunities

(from evening to morning)

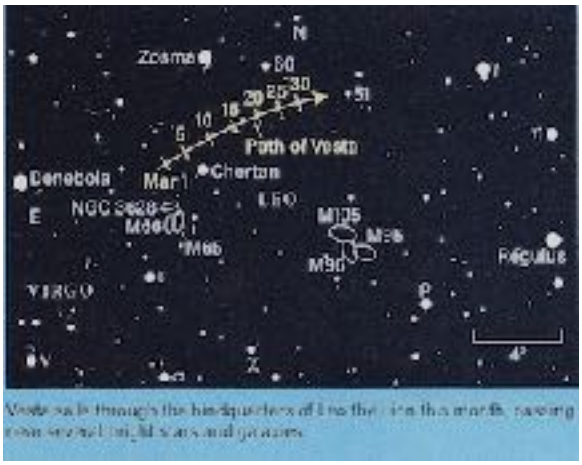
- Look for Mars and Uranus in the evening.
- Look for Mercury, Jupiter, Saturn and Venus in the morning before sunrise.

Asteroids

(From west to east)

- **Eunomia** is in the constellation of Gemini.
- **Amphitrite** is in the constellation of Leo.
- **Vesta** is at opposition on the 4th in the constellation of Leo.
- **Metis** is in the constellation of Virgo.

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

February 25, 2021
Testing Proves Its Worth With Successful Mars Parachute Deployment

Full Article & Images

"The giant canopy that helped land Perseverance on Mars was tested here on Earth at NASA's Wallops Flight Facility in Virginia.

Test. Test again. Test again.

Testing spacecraft components prior to flight is vital for a successful mission.

Rarely do you get a do-over with a spacecraft after it launches, especially those bound for another planet. You need to do everything possible to get it right the first time.

Three successful sounding rocket missions from NASA's Wallops Flight Facility in Virginia in 2017 and 2018 to test a supersonic parachute proved their worth with the successful landing of the Perseverance mission on the Red Planet.

After traveling 293 million miles (472 million kilometers), the supersonic parachutes, designed to slow the rover's descent to the planet's surface, successfully deployed and inflated. They made the smooth touchdown of Perseverance possible."

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

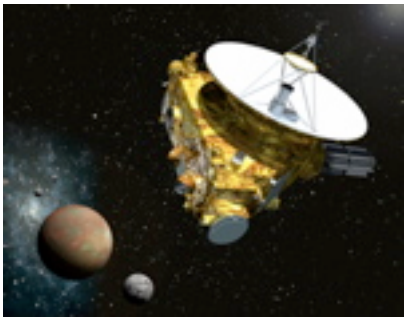
For special JPL programs and presentations in your area visit the JPL Solar System Ambassador web site.

Juno
January 13, 2021
NASA's Juno Mission Expands Into the Future

Full Article & Images

"New Horizons roared into the skies aboard a powerful Atlas V rocket at 2 p.m. EST on Jan. 19, 2006. It separated from its solid-fuel kick motor 44 minutes, 53 seconds after launch, and mission controllers at the Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, Md., where the spacecraft was designed and built, received the first radio signals from New Horizons a little more than five minutes later. The radio communications, sent through NASA's Deep Space Network antennas in Canberra, Australia, confirmed to controllers that the spacecraft was healthy and ready to begin initial operations."

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
November 4, 2020
The PI's Perspective: New Plans Afoot

Full Article & Images

"New Horizons is healthy and continuing to send data back from the flyby of the Kuiper Belt object (KBO) Arrokoth back in late 2018 and early 2019, even as it speeds deeper into the Kuiper Belt and farther from the Earth and the Sun.

By next spring, New Horizons will be 50 times as far from the Sun as the Earth is – only the fifth operating spacecraft to reach that distance. But as far as we've come, there's much more ahead! We plan to upgrade the spacecraft system and instrument software aboard New Horizons to enhance the mission's scientific capabilities and to search for new KBO targets to study or even fly by. I'll describe both of those plans just below."

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

February 12, 2021
NASA's TESS Discovers New Worlds in a River of Young Stars

Full Article & Images

"Using observations from NASA's Transiting Exoplanet Survey Satellite (TESS), an international team of astronomers has discovered a trio of hot worlds larger than Earth orbiting a much younger version of our Sun called TOI 451. The system resides in the recently discovered Pisces-Eridanus stream, a collection of stars less than 3% the age of our solar system that stretches across one-third of the sky.

The planets were discovered in TESS images taken between October and December 2018. Follow-up studies of TOI 451 and its planets included observations made in 2019 and 2020 using NASA's Spitzer Space Telescope, which has since been retired, as well as many ground-based facilities. Archival infrared data from NASA's Near-Earth Object Wide-Field Infrared Survey Explorer (NEOWISE) satellite -- collected between 2009 and 2011 under its previous moniker, WISE -- suggests the system retains a cool disk of dust and rocky debris. Other observations show that TOI 451 likely has two distant stellar companions circling each other far beyond the planets."

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

February 14, 2021
Hope Probe returns its first image of Mars capturing Olympus Mons at Sunrise

Full Article & Images

"The Emirates Mars Mission (EMM), the first interplanetary exploration undertaken by an Arab nation, achieved a major milestone on 9 February 2021 when it entered into orbit around Mars. It will spend one Martian Year (about two Earth years) orbiting the red planet gathering crucial science data."

Visit LASP and MAVEN for more information.

Mars 2020 - Perseverance

February 24, 2021
NASA's Perseverance Rover Gives High-Definition Panoramic View of Landing Site

Full Article & Images

"*A 360-degree panorama taken by the rover's Mastcam-Z instrument will be discussed during a public video chat this Thursday.*

NASA's Mars 2020 Perseverance rover got its first high-definition look around its new home in Jezero Crater on Feb. 21, after rotating its mast, or “head,” 360 degrees, allowing the rover's Mastcam-Z instrument to capture its first panorama after touching down on the Red Planet on February 18. It was the rover's second panorama ever, as the rover's Navigation Cameras, or Navcams, also located on the mast, captured a 360-degree view on Feb. 20."

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

Mars Science Laboratory - Curiosity

January 12, 2021
NASA's Curiosity Rover Reaches Its 3,000th Day on Mars

Full Article & Images

"*As the rover has continued to ascend Mount Sharp, it's found distinctive benchlike rock formations.*

It's been 3,000 Martian days, or sols, since Curiosity touched down on Mars on Aug. 6, 2012, and the rover keeps making new discoveries during its gradual climb up Mount Sharp, the 3-mile-tall (5-kilometer-tall) mountain it has been exploring since 2014. Geologists were intrigued to see a series of rock "benches" in the most recent panorama from the mission."

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

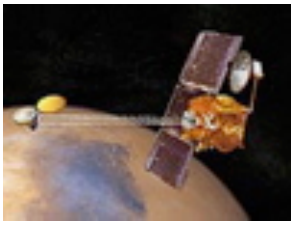
"*A new NASA paper provides the most detailed map to date of near-surface water ice on the Red Planet.*

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

June 8, 2020
Three New Views of Mars' Moon Phobos

Full Article & Images

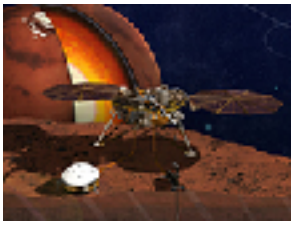
"Three new views of the Martian moon Phobos have been captured by NASA's Odyssey orbiter. Taken this past winter and this spring, they capture the moon as it drifts into and out of Mars' shadow.

The orbiter's infrared camera, the Thermal Emission Imaging System (THEMIS), has been used to measure temperature variations across the surface of Phobos that provide insight into the composition and physical properties of the moon. Further study could help settle a debate over whether Phobos, which is about 16 miles (25 kilometers) across, is a captured asteroid or an ancient chunk of Mars that was blasted off the surface by an impact."

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
February 12, 2021
InSight Is Meeting the Challenge of Winter on Dusty Mars

Full Article & Images

"*As dust collects on the solar panels and winter comes to Elysium Planitia, the team is following a plan to reduce science operations in order to keep the lander safe.*

NASA's InSight lander recently received a mission extension for another two years, giving it time to detect more quakes, dust devils, and other phenomena on the surface of Mars. While the mission team plans to continue collecting data well into 2022, the increasing dustiness of the spacecraft's solar panels and the onset of the Martian winter led to a decision to conserve power and temporarily limit the operation of its instruments."

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!

73 from KI0AR
Created by Burness F. Ansell, III
ki0ar@ki0ar.com

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