

# IAAS Monthly Astronomy Newsletter

## April 2021



The International Association  
for Astronomical Studies  
provides this newsletter as a  
service for interested  
persons worldwide.



This newsletter is published on the World Wide Web at [The Home of KIØAR](#) - and is received nationally and internationally. Download the [PDF](#) formatted version of the newsletter.

An Open Invitation - For amateur radio operators and scanner enthusiasts, when in the Denver metro area, please join the Colorado Astronomy Net on the [Rocky Mountain Radio League](#)'s WØWYX **146.94 MHz** and **449.825 MHz** repeaters. Due to hardware issues, links with the Allstar node, Echolink and the Cripple Creek repeater are down until further notice. The net meets on Tuesday nights at 7 P.M. Mountain Time (US).

Obtain your Amateur Radio (Ham) License or your General Radio Operator's License (GROL)! Visit the [South Metro VE Team](#) website for more information. The South Metro VE Team provides test sessions on the 1st Saturday of each month at our new Eagle Street Facility, The City of Centennial, 7272 South Eagle Street, Centennial, Colorado 80112-4244 at 9am.

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

The [Colorado Astronomy Net](#) and the [IAAS](#) are on Facebook page. Be sure to "Like" us.



Excerpts from JPL mission updates are provided as a public service as part of the [JPL Solar System Ambassador / NASA Outreach](#) program.

**Donate to the [IAAS](#)!**

Shop Smile.Amazon.com, sign up or sign in to [smile.amazon.com](#) and select the **International Association for Astronomical Studies**. 0.5% of every purchase will be donated to the group. Thank you!

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A crescent Moon and three planets peek out from the early morning clouds above Bursa, Turkey. Most planetary observing this month is best done in the hours before sunrise. [www.astronomy.com](#)

*"A crescent Moon and three planets peek out from the early morning clouds above Bursa, Turkey. Most planetary observing this month is best done in the hours before sunrise." Astronomy Magazine, April 2021 P. 32. Tunç Tezel*

# The Month At-A-Glance

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

## The Moon

### Phases:

- Last Quarter Moon occurs on the 4th.
  - New Moon occurs on the 11th.
  - First Quarter Moon occurs on the 20th.
  - Full Moon occurs on the 26th.
- 
- The Moon is at Apogee on the 14th, 252,351 miles from Earth.
  - The Moon is at Perigee on the 27th, 222,064 miles from Earth.

### Moon/Planet Pairs:

- The Moon passes  $4^\circ$  south of Saturn on the 6th.
- The Moon passes  $4^\circ$  south of Jupiter on the 7th.
- The Moon passes  $4^\circ$  south of Neptune on the 9th.
- The Moon passes  $2^\circ$  south of Uranus on the 13th.
- The Moon passes  $0.1^\circ$  south of Mars on the 17th.

*For reference: The Full Moon subtends an angle of  $\sim 0.5^\circ$ .*

# 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 April

"Planet viewing this month is limited to the evening and morning hours, with a broad stretch of nighttime devoid of major planets. Mars drifts through Taurus and into Gemini, while Mercury and Venus make a late April appearance. Jupiter and Saturn start the month in Capricornus, now appearing in the predawn sky. They climb higher as the month progresses." Astronomy Magazine, April 2021, P. 32.

### Mercury

Mercury is in superior conjunction on the 18th. Mercury rises at 6:16 a.m. on the 1st. After conjunction, Mercury returns to the evening sky. Mercury sets about 9:10 p.m. by month's end. Look for Mercury about 30 minutes before sunrise during the first week of the month and about 30 minutes after sunset during the last week of the month. Mercury moves from the constellation of Aquarius into Taurus shining at magnitude -1.3 on the 30th.

### Venus

Sets at 7:30 p.m. on the 1st and about 8:40 p.m. by month's end. Look for Venus in the west soon after sunset during the last half of the month as it is lost in the evening twilight glow during the first part of April. Venus moves from the constellation of Pisces into Aries shining at magnitude -3.9 on the 30th.

### Earth

N/A.

### Mars

Sets at 12:52 a.m. on the 1st and about 12:16 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 moves from the constellation of Taurus into Gemini shining at magnitude 1.4.



## Jupiter

Rises at 4:49 a.m. on the 1st and about 3:05 a.m. by month's end. Look for Jupiter low in the east before sunrise. Jupiter will be easier to spot and continue to brighten now that it is rising earlier. Jupiter moves from the constellation of Capricornus into Aquarius shining at magnitude -2.1.



## Saturn

Rises at 4:15 a.m. on the 1st and about 2:22 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

Is in conjunction with the Sun on the 30th. Uranus sets at 9:35 p.m. on the 1st and around 7:46 p.m. by month's end. Uranus is visible in the evening during the first week or so of the month. After midmonth, Uranus will be lost in the evening twilight glow. Look to the south-southwest soon after sunset to spot Uranus. Uranus is in the constellation of Aries shining at magnitude 5.9.

## Neptune

Rises at 6:01 a.m. on the 1st and about 4:06 a.m. by month's end. Neptune will be lost in the morning twilight glow until about midmonth. Look to the east to spot Neptune in the constellation of Aquarius shining at magnitude 7.8.

## Dwarf Planets

### Ceres

Is in conjunction with the Sun on the 7th. Ceres will rise with the Sun for most of the month and will be lost in the morning and evening twilight glow of the Sun all month. Ceres moves from the constellation of Cetus into Pisces shining at magnitude 9.0.

### Pluto

Rises at 3:30 a.m. on the 1st and about 1:33 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

- The Lyrids [meteor shower] are typically visible between April 16 and 25. Maximum occurs during April 21-22. Although the maximum rate is about 10, there have been instances during the last 200 years when rates were near or over 100 per hour. The average magnitude of the meteors is near 2.4 and the speed is described as rapid. About 15% of the meteors leave persistent trains.

For more information about Meteor Showers, visit Gary Kronk's [Meteor Showers Online](#) web page.



## [Meteor Shower Radiant Report](#)

[Meteor Scatter](#) (or Meteor burst communications) -- "is a radio propagation mode that exploits the ionized trails of meteors during atmospheric entry to establish brief communications paths between radio stations up to 2,250 kilometres (1,400 mi) apart." Tune your shortwave or your HF amateur radio to 54.310 MHz USB CW and see if you can hear any pings. Try other frequencies as well... 6m FT8 digital - 50.313 Mhz & 50.276 Mhz, JP-65 digital mode and the carrier frequencies of the lower VHF bands for TV channels 2, 3 & 4.

[Meteor Rx How-To](#) by Terry Bullett (WØASP).

## Comets

- Comet C/2020 R4 (ATLAS) is passing through the Coma-Virgo cluster of galaxies this month shining around 11th magnitude. Beginning in Aquila, ATLAS passes rapidly across the sky. Due to the comet and Earth orbiting in opposite directions, ATLAS will appear to cover at least 3-4 degrees each night.

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 in the evening.
- Look for Jupiter and Saturn in the morning before sunrise.
- Look for Mercury and Venus in the evening sky late in the month.
- Look for the Lyrid meteors around midmonth.

## Asteroids

(From west to east)

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

<u>Event ID</u>	<u>Date/Time</u>	<u>Location</u>	<u>Observer</u>	<u>Link</u>
3587-2015	2015-11-22 17:38 MST	CO	Kevin S	<a href="#">3587aw</a>
3829-2015	2015-12-05 18:06 MST	CO	Burness A	<a href="#">3829a</a>
3871-2015	2015-11-13 01:55 MST	CO	Charles N	<a href="#">3871a</a>
986-2020	2020-02-21 22:20 MST	CO	Lukas S	<a href="#">986</a>
3716-2020	2020-07-24 23:22 MDT	CO	Lukas S	<a href="#">3716</a>

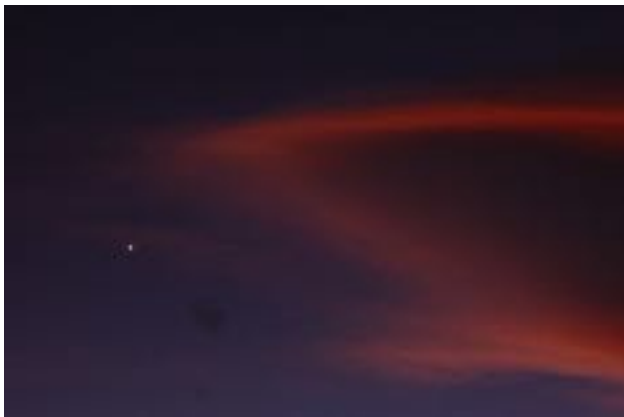
## Subscriber Gallery

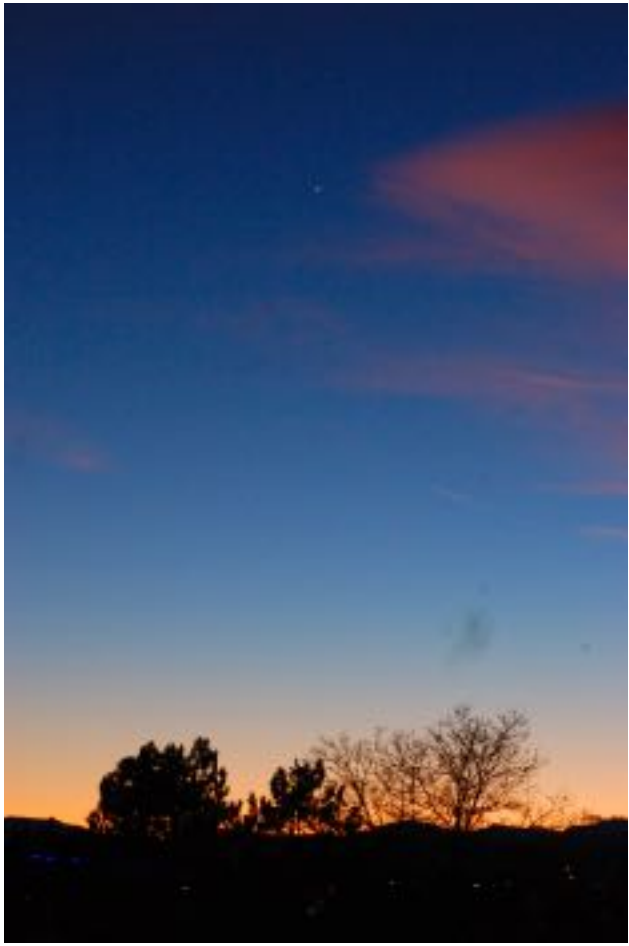
I have created a web page containing images taken and submitted by subscribers to the email newsletter, check-ins to the Colorado Astronomy Net and readers of the online newsletter and some of my own images. Any one wishing to submit their images to the gallery, please let me know. The images must be 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](#)

**March 29, 2021**

### **NASA Begins Final Assembly of Spacecraft Destined for Asteroid Psyche**

[Full Article & Images](#)

"Set to launch next year, the agency's Psyche spacecraft will explore a metal-rich asteroid in the main asteroid belt between Mars and Jupiter.

A major component of NASA's Psyche spacecraft has been delivered to the agency's Jet Propulsion Laboratory in Southern California, where the phase known as assembly, test, and launch operations is now underway. Over the next year, the spacecraft will finish assembly and undergo rigorous checkout and testing before it's shipped to Cape Canaveral, Florida, for an August 2022 launch to the main asteroid belt."

Read the latest news and discoveries from JPL's dozens of active space missions exploring Earth, the solar system and worlds beyond.

[Past, Present, Future and Proposed JPL Missions](#)

For special JPL programs and presentations in your area visit the [JPL Solar System Ambassador](#) web site.



## **Juno**

**March 16, 2021**

### **NASA's Juno Reveals Dark Origins of One of Jupiter's Grand Light Shows**

[Full Article & Images](#)

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

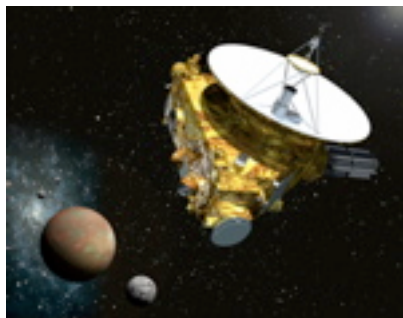
New results from the Ultraviolet Spectrograph instrument on NASA's Juno mission reveal for the first time the birth of auroral dawn storms – the early morning brightening unique to Jupiter's spectacular aurorae. These immense, transient displays of light occur at both Jovian poles and had previously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

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

Images from NASA's [JunoCam](#).

More information on the Juno mission is available at [Juno](#) and [Mission Juno](#).

The public can follow the mission on [Facebook](#) and [Twitter](#).



## **New Horizons**

**March 23, 2021**

**The PI's Perspective: Far From Home**

[Full Article & Images](#)

"New Horizons remains healthy and continues to send valuable data from the Kuiper Belt, even as it speeds farther and farther from Earth and the Sun.

I'm going to focus this PI's Perspective on a major upcoming mission mile marker — namely, New Horizons being 50 astronomical units (AU) from the Sun next month. But first, some mission news.

Our biggest news is that most of our latest flight software upgrades, which will provide new scientific capabilities on the spacecraft, are in final test and on track to be uplinked in July. In fact, one of those updates, for our solar wind instrument called SWAP, is already aboard the spacecraft — and being used to produce new science! That software, transmitted to New Horizons in mid-February and tested for a week at the end of February, allows us to see much finer structures in the solar wind as we plow toward the heliopause, the outer edge of the heliosphere that surrounds the solar system."

### **[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

March 04, 2021

**A blazing nearby super-Earth**

[Full Article & Images](#)

"A hot super-Earth in our neighbourhood promises to be a suitable candidate to test rocky planet atmosphere models.

During the recent two and a half decades, astronomers have discovered thousands of exoplanets made of gas, ice and rock. Only a few of them are Earth-like. However, probing their atmospheres with the currently available instrumentation is challenging at best. Now, astronomers of the CARMENES consortium have published a new study, led by Trifon Trifonov from the Max Planck Institute for Astronomy, which reports the discovery of a hot rocky super-Earth orbiting the nearby red dwarf star Gliese 486. Despite its small separation from the parent star, the planet designated Gliese 486b possibly has retained a part of its original atmosphere. Therefore, Gliese 486b is uniquely suited to examine its atmosphere and interior with the next generation of space-borne and ground-based telescopes. The results are published in the journal Science today."

For more news and information on the TESS mission, visit the [Latest Tess Stories](#) page.

[Past, Present, Future and Proposed JPL Missions.](#)

# Mars Missions

## [Be A Martian](#)



Mars website mobile version is here!  
Simply type  
<http://mars.jpl.nasa.gov>  
into your mobile browser.

## [MARS WEATHER](#)

### Mars Daily Weather Report



#### **Mars on the Go! NASA Be A Martian Mobile App**

If you want the latest news as it happens, try our Be A Martian app.

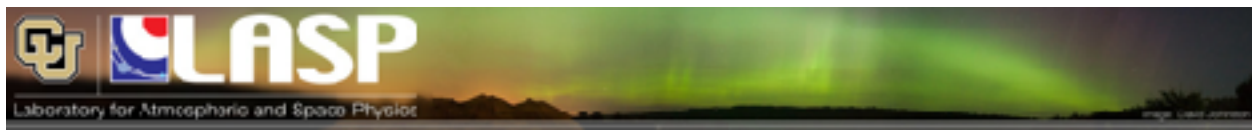
Download on Mobile Devices

[Android](#) | [iPhone](#) | [Windows Phone](#)



#### **JMARS**

[JMARS](#) is an acronym that stands for Java Mission-planning and Analysis for Remote Sensing. It is a geospatial information system (GIS) developed by ASU's Mars Space Flight Facility to provide mission planning and data-analysis tools to NASA's orbiters, instrument team members, students of all ages, and the general public.



## Laboratory for Atmospheric and Space Physics

"The Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado Boulder (CU) began in 1948, a decade before NASA. We are the world's only research institute to have sent instruments to all eight planets and Pluto.

LASP combines all aspects of space exploration through our expertise in science, engineering, mission operations, and scientific data analysis. As part of CU, LASP also works to educate and train the next generation of space scientists, engineers and mission operators by integrating undergraduate and graduate students into working teams. Our students take their unique experiences with them into government or industry, or remain in academia to continue the cycle of exploration.

LASP is an affiliate of [CU-Boulder AeroSpace Ventures](#), a collaboration among aerospace-related departments, institutes, centers, government labs, and industry partners."



### LASP/MAVEN

March 9, 2021

**Hope Probe captures new images of Mars with the Emirates Ultraviolet Spectrometer**

[Full Article & Images](#)

"Key takeaways:

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

Visit [LASP](#) and [MAVEN](#) for more information.



## Mars 2020 - Perseverance

March 23, 2021

**NASA Ingenuity Mars Helicopter Prepares for First Flight**

[Full Article & Images](#)

*"Now uncocooned from its protective carbon-fiber shield, the helicopter is being readied for its next steps."*

NASA is targeting no earlier than April 8 for the Ingenuity Mars Helicopter to make the first attempt at powered, controlled flight of an aircraft on another planet. Before the 4-pound (1.8-kilogram) rotorcraft can attempt its first flight, however, both it and its team must meet a series of daunting milestones.

Ingenuity remains attached to the belly of NASA's Perseverance rover, which touched down on Mars Feb. 18. On March 21, the rover deployed the guitar case-shaped graphite composite debris shield that protected Ingenuity during landing. The rover currently is in transit to the "airfield" where Ingenuity will attempt to fly. Once deployed, Ingenuity will have 30 Martian days, or sols, (31 Earth days) to conduct its test flight campaign."

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.*

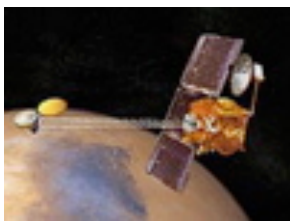
So you want to build a Mars base. Where to start? Like any human settlement, it would be best located near accessible water. Not only will water be crucial for life-support supplies, it will be used for everything from agriculture to producing the rocket propellant astronauts will need to return to Earth.

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)

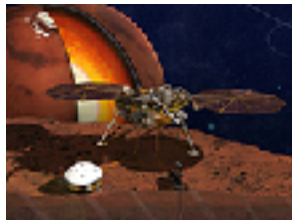
across, is a captured asteroid or an ancient chunk of Mars that was blasted off the surface by an impact."

### **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!

## **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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