

# IAAS Monthly Astronomy Newsletter February 2019



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

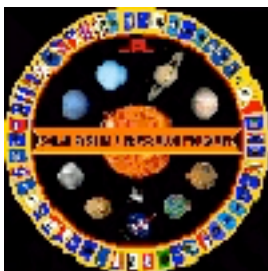


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An Open Invitation - For amateur radio operators and scanner enthusiasts, when in the Denver metro area, please join the Colorado Astronomy Net on the [Rocky Mountain Radio League's](#) WØWYX **146.94 MHz** and **449.825 MHz** repeaters. The RMRL **146.94** repeater is also linked with the WBØWDF Cripple Creek **447.400 MHz** repeater and [Allstar](#) nodes **28298, 28299, 29436**. We are also linked via Echolink, links are **k0jsc-r** and **canoncty** courtesy of KØJSC and KØGUR. More information on the WBØWDF repeater links, Allstar nodes and Echolinks can be found at [k0jsc.com](http://k0jsc.com). We are also linked with Allstar nodes in Florida as well, courtesy of KA4EPS. 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.

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.

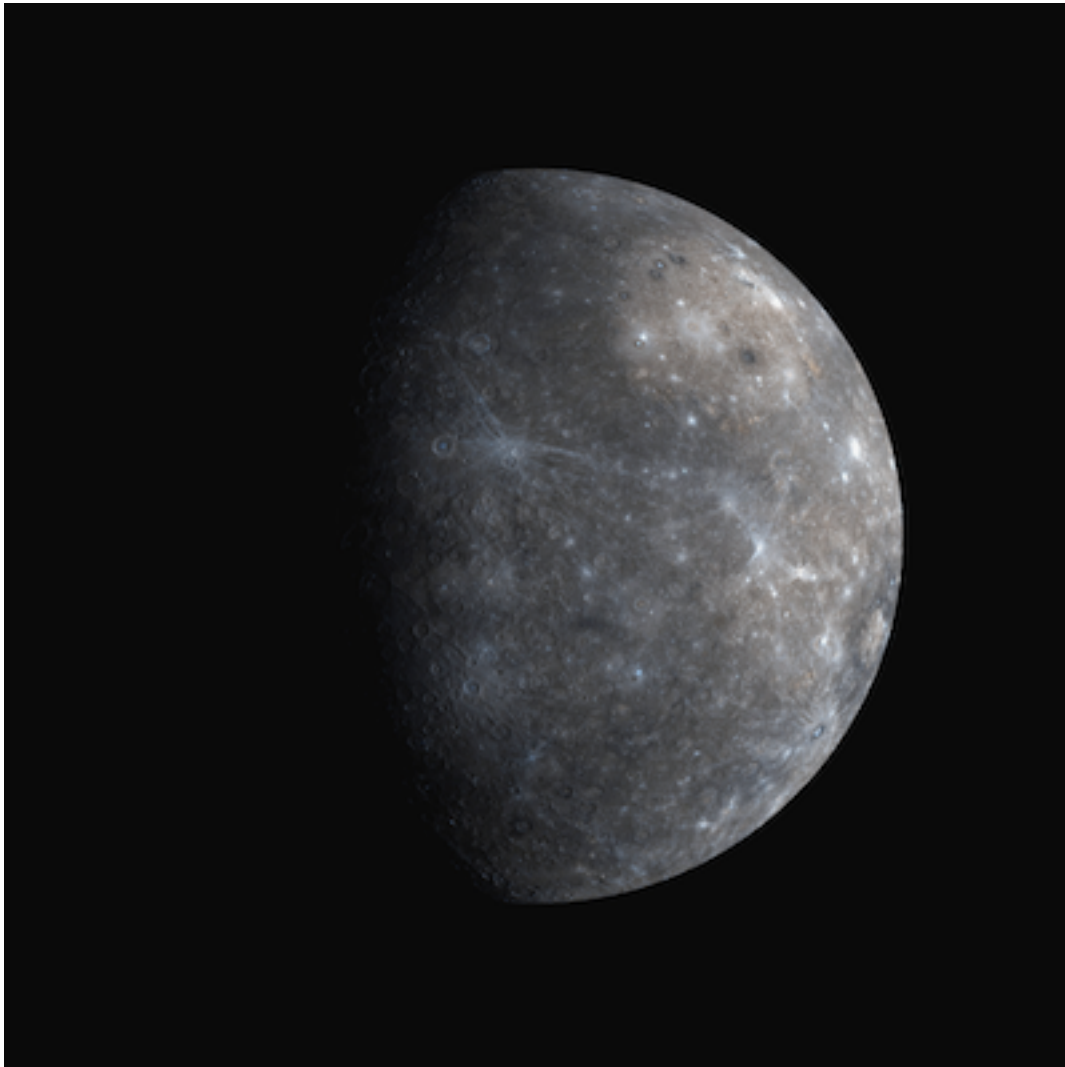
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Thank you!

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*"Mercury's surface details stand out in this view from NASA's MESSENGER spacecraft. A view through earthly telescopes reveals only the planet's size and phase." Astronomy Magazine, February 2019, p.36.*

*NASA/JHUAPL/CIW*

# The Month At-A-Glance

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

## The Moon

### Phases:

- New Moon occurs on the 4th.
- First Quarter Moon occurs on the 12th.
- Full Moon occurs on the 19th.
- Last Quarter Moon occurs on the 26th.
  
- The Moon is at Apogee on the 5th, 252,622 miles from Earth.
- The Moon is at Perigee on the 19th, 221,681 miles from Earth.



### Moon/Planet Pairs:

- The Moon passes  $0.6^\circ$  north of Saturn on the 2nd.
- The Moon passes  $0.6^\circ$  north of Pluto on the 2nd.
- The Moon passes  $1.1^\circ$  north asteroid Vesta on the 6th.
- The Moon passes  $3^\circ$  south of Neptune on the 7th.
- The Moon passes  $6^\circ$  south of Mars on the 10th.
- The Moon passes  $5^\circ$  south of Uranus on the 10th.
- Mars passes  $1.1^\circ$  north of Uranus on the 13th.
- Venus passes  $1.1^\circ$  north of Saturn on the 18th.
- The Moon passes  $2^\circ$  south of Jupiter on the 27th.

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

## The Planets & Dwarf Planets

[Planetary Reports](#) are generated by "TheSky" 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 February

"The evening sky boasts the majority of planets this month. Mercury leads the way as it makes its best evening appearance of 2019 for Northern Hemisphere observers. Although the inner world outshines its solar system siblings, particularly nearby Neptune, Mars appears almost as prominent. Be sure to catch the Red Planet when it slides past Uranus in mid-February.

The other three planets occupy the morning sky. With the late sunrises at this time of year, it shouldn't be too hard to get up before dawn and enjoy Jupiter, Venus, and Saturn. The waning crescent Moon adds a lovely touch when it joins these worlds February 27 and 28." Astronomy Magazine, February 2019, p.36.

### Mercury

Is at greatest eastern elongation ( $18^\circ$ ) on the 26th. Mercury has returned to the evening sky this month. Mercury sets at 5:24 p.m. on the 1st and about 7:21 p.m. by month's end. Look for Mercury low to the west about 30 minutes after sunset. Mercury moves from the constellation of Capricornus into Pisces this month shining at magnitude  $-0.4$  on the 28th.



### Venus

Rises at 4:12 a.m. on the 1st and about 4:35 a.m. by month's end. Look for Venus in the southeast about an hour before sunrise. Venus passes  $1.1^\circ$  north of Saturn on the morning of the 18th. Venus moves from the constellation of Sagittarius into Capricornus shining at magnitude  $-4.2$  on the 15th.



### Earth

N/A.



## Mars

Sets at 11:04 p.m. on the 1st and about 10:50 p.m. by month's end. Look to the southwest soon after sunset to spot Mars. Mars passes  $1.1^\circ$  north of Uranus on the 13th. Mars moves from the constellation of Pisces into Aries shining at magnitude 1.0.

## Jupiter

Rises at 3:38 a.m. on the 1st and about 2:06 a.m. by month's end. Jupiter is visible in the morning sky before sunrise. Jupiter is in the constellation of Ophiuchus shining at magnitude -2.0.

## Saturn

Rises at 5:34 a.m. on the 1st and about 3:55 a.m. by month's end. Look for Saturn southeast about an hour before sunrise. Saturn is in the constellation of Sagittarius shining at magnitude 0.6.

## Uranus

Sets at 11:38 p.m. on the 1st and about 9:52 p.m. by month's end. Look for Uranus about an hour or so after sunset to the southwest. Uranus is in the constellation of Aries shining at magnitude 5.8.

## Neptune

Sets 7:58 p.m. on the 1st and about 6:13 p.m. by month's end. Neptune is visible to the southwest about an hour after sunset. Neptune may disappear into the evening twilight glow during the last week of the month. Neptune is in the constellation of Aquarius shining at magnitude 8.0.

## Dwarf Planets

### Ceres

Rises at 2:07 a.m. on the 1st and about 12:52 a.m. by month's end. Ceres can be spotted low to the south in the early morning hours before sunrise. Ceres moves from the constellation of Scorpius into Ophiuchus shining at magnitude 8.7.

### Pluto

Has returned to the morning skies this month but still may be too low to see very well. Pluto rises at 6:01 a.m. on the 1st and about 4:14 a.m. by month's end. Pluto is in the constellation of Sagittarius shining at magnitude 14.3.

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 this month but none that produce rates much higher than 2-5 meteors per hour at their peaks. However, there's a possibility that observers may see a fireball or a bolide in the early hours before sunrise associated with the Beta Herculids or Delta Serpentids minor meteor showers.

For more information about Meteor Showers, visit Gary Kronk's Meteor Showers Online web page at <http://meteorshowersonline.com/>.

### [Meteor Shower Radiant Report](#)

Meteor Scatter (or Meteor burst communications) - [http://en.wikipedia.org/wiki/Meteor\\_burst\\_communications](http://en.wikipedia.org/wiki/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.

## Comets

Comet 46P/Wirtanen has dimmed slightly and optimistic predictions are that the comet will glow around 7th magnitude (or as faint as 9th magnitude for the less optimistic predictions) this month as it passes through Ursa Major. A 4 to 6 inch or larger telescope is recommended to be able to spot Comet Wirtanen. The best time to spot this comet will be during the first week of the month when the Moon will not interfere with observing.



For information, orbital elements and ephemerides on observable comets visit the Observable Comets page from the Harvard-Smithsonian Center for Astrophysics. (<http://cfa-www.harvard.edu/iau/Ephemerides/Comets/index.html>)

For more information about Comets, visit Gary Kronk's Cometography.com web page at <http://cometography.com/>.

## Eclipses

- No eclipse activity this month.

## Observational Opportunities

(from evening to morning)

- View Mercury, Mars, Uranus and Neptune in the early evening sky after sunset.
- Look for Venus, Jupiter and Saturn shining brightly in the morning sky.
- Try to spot Comet 46P/Wirtanen passing through Ursa Major.

## Asteroids

(From west to east)

- **Juno** is in the constellation of Taurus.
- **Eros** is in the constellation of Orion.
- **Hebe** is in the constellation of Orion.
- **Herculina** is at opposition on the 5th in the constellation of Leo.
- **Pallas** is in the constellation of Virgo.

Information about the Minor Planets can be found at <http://www.minorplanetobserver.com> the Minor Planet Observer web site.



## Occultations



Information on various occultations can be found at <http://lunar-occultations.com/iota/iotandx.htm>, the International Occultation Timing Association's (IOTA) web site.

## Member Meteor Sightings

This is a new section where I will post meteor, fireball, etc sightings that have been published on the [American Meteor Society](http://www.americanmeteorology.com)'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>

## [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.

### **Lunar Eclipse January 20/21, 2019**



A short video clip of images taken by some of our subscribers on the evening of January 20, 2019 during the Super Blood Moon Lunar Eclipse. (Click on the image above to start the video.)

# Planetary/Lunar Exploration Missions

(Excerpts from recent mission updates)



## JPL Latest News

The Latest from Space

[JPL Latest News](#)

**January 31, 2019**

### 'Mars Buggy' Curiosity Measures a Mountain's Gravity

[Full Article & Images](#)

"Apollo 17 astronauts drove a moon buggy across the lunar surface in 1972, measuring gravity with a special instrument. There are no astronauts on Mars, but a group of clever researchers realized they have just the tools for similar experiments with the Martian buggy they're operating.

In a new paper in *Science*, the researchers detail how they repurposed sensors used to drive the Curiosity rover and turned them into gravimeters, which measure changes in gravitational pull. That enabled them to measure the subtle tug from rock layers on lower Mount Sharp, which rises 3 miles (5 kilometers) from the base of Gale Crater and which Curiosity has been climbing since 2014. The results? It turns out the density of those rock layers is much lower than expected.

Just like a smartphone, Curiosity carries accelerometers and gyroscopes. Moving your smartphone allows these sensors to determine its location and which way it's facing. Curiosity's sensors do the same thing but with far more precision, playing a crucial role in navigating the Martian surface on each drive. Knowing the rover's orientation also lets engineers accurately point its instruments and multidirectional, high-gain antenna."

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 - <http://www.jpl.nasa.gov/missions>.

For special JPL programs and presentations in your area visit the JPL Solar System Ambassador web site at <http://www2.jpl.nasa.gov/ambassador/index.html>.



**Juno**  
**December 11, 2018**  
**NASA's Juno Mission Halfway to Jupiter Science**

[Full Article & Images](#)

"On Dec. 21, at 8:49:48 a.m. PST (11:49:48 a.m. EST) NASA's Juno spacecraft will be 3,140 miles (5,053 kilometers) above Jupiter's cloud tops and hurtling by at a healthy clip of 128,802 mph (207,287 kilometers per hour). This will be the 16th science pass of the gas giant and will mark the solar-powered spacecraft's halfway point in data collection during its prime mission.

Juno is in a highly-elliptical 53-day orbit around Jupiter. Each orbit includes a close passage over the planet's cloud deck, where it flies a ground track that extends from Jupiter's north pole to its south pole."

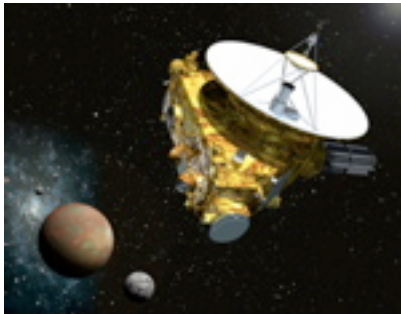
NASA's JunoCam website can be visited at: <https://www.missionjuno.swri.edu/junocam>

More information on the Juno mission is available at: <http://www.nasa.gov/juno>

The public can follow the mission on Facebook and Twitter at:

<http://www.facebook.com/NASAJuno>

<http://www.twitter.com/NASAJuno>



**New Horizons**  
**January 24, 2019**  
**New Horizons' Newest and Best-Yet View of Ultima Thule**

[Full Article & Images](#)

"The wonders - and mysteries - of Kuiper Belt object 2014 MU69 continue to multiply as NASA's New Horizons spacecraft beams home new images of its New Year's Day

2019 flyby target.

This image, taken during the historic Jan. 1 flyby of what's informally known as Ultima Thule, is the clearest view yet of this remarkable, ancient object in the far reaches of the solar system – and the first small "KBO" ever explored by a spacecraft."

[New Horizons gallery](#)

For more information on the New Horizons mission - the first mission to the ninth planet - visit the New Horizons home page: <http://pluto.jhuapl.edu/>.



## **Dawn**

**November 07, 2018**

### **Cosmic Detective Work: Why We Care About Space Rocks**

[Full Article & Images](#)

"The entire history of human existence is a tiny blip in our solar system's 4.5-billion-year history. No one was around to see planets forming and undergoing dramatic changes before settling in their present configuration. In order to understand what came before us -- before life on Earth and before Earth itself -- scientists need to hunt for clues to that mysterious distant past.

Those clues come in the form of asteroids, comets and other small objects. Like detectives sifting through forensic evidence, scientists carefully examine these small bodies for insights about our origins. They tell of a time when countless meteors and asteroids rained down on the planets, burned up in the Sun, shot out beyond the orbit of Neptune or collided with one another and shattered into smaller bodies. From distant, icy comets to the asteroid that ended the reign of the dinosaurs, each space rock contains clues to epic events that shaped the solar system as we know it today -- including life on Earth."

For more information on the Dawn mission, visit the Dawn home page: [http://www.nasa.gov/mission\\_pages/dawn/main/index.html](http://www.nasa.gov/mission_pages/dawn/main/index.html).



## **TESS**

**January 7, 2019**

### **NASA's TESS Rounds Up its First Planets, Snares Far-flung Supernovae**

[Full Article & Images](#)

"NASA's Transiting Exoplanet Survey Satellite (TESS) has found three confirmed exoplanets, or worlds beyond our solar system, in its first three months of observations.

The mission's sensitive cameras also captured 100 short-lived changes — most of them likely stellar outbursts — in the same region of the sky. They include six supernova explosions whose brightening light was recorded by TESS even before the outbursts were discovered by ground-based telescopes."

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

# 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 our Be A Martian app.

Download on Mobile Devices

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### **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. <https://jmars.mars.asu.edu/>



## 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."



### **MAVEN**

**September 20, 2018**

**MAVEN Selfie Marks Four Years in Orbit at Mars**

[Full Article & Images](#)

"Today, NASA's MAVEN spacecraft celebrates four years in orbit studying the upper atmosphere of the Red Planet and how it interacts with the Sun and the solar wind. To mark the occasion, the team has released a selfie image of the spacecraft at Mars."

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



## Mars Science Laboratory - Curiosity

January 30, 2019

Sols 2306-2307: Stepping Up to the Edge

[Full Article & Images](#)

"In today's plan, Curiosity is venturing further into the clay unit territory.

Prior to departure, we'll be looking at several targets with Mastcam color and ChemCam to try to characterize the chemistry and texture of this new terrain. We'll also be taking a ChemCam RMI mosaic of "Buchan Ridge," an upcoming area of exploration within the clay unit, to aid in navigation and traverse planning."

To follow the Mars Curiosity rover and NASA on Foursquare, visit: <http://www.foursquare.com/MarsCuriosity> and <http://www.foursquare.com/NASA>



For information about NASA's partnership with Foursquare, visit: <http://www.nasa.gov/connect/foursquare.html>.

[Mars Rover Landing](#) - Free for the Xbox 360 (requires Kinect)

Visit the Mars Science Laboratory page at <http://mars.jpl.nasa.gov/msl>.



## Mars Exploration Rover Mission (Spirit and Opportunity)

December 20, 2018

**SPIRIT UPDATE: Spirit Remains Silent at Troy - sols 2621-2627, May 18-24, 2011:**

"More than 1,300 commands were radiated to Spirit as part of the recovery effort in an attempt to elicit a response from the rover. No communication has been received from Spirit since Sol 2210 (March 22, 2010). The project concluded the Spirit recovery efforts on May 25, 2011. The remaining, pre-sequenced ultra-high frequency (UHF) relay passes scheduled for Spirit on board the Odyssey orbiter will complete on June 8, 2011.

Total odometry is unchanged at 7,730.50 meters (4.80 miles)."

## **OPPORTUNITY UPDATE: Over 600 Recovery Commands Have Been Sent To Opportunity - sols 326 to 5332, Jan. 16, 2019 - Jan. 22, 2019:**

"Mars atmospheric opacity ( $\tau$ ) over the rover site is uncertain due to recent storm activity.

No signal from Opportunity has been heard since Sol 5111 (June 10, 2018) during the historic global dust storm. Opportunity likely experienced a low-power fault, a mission clock fault and an up-loss timer fault. The team is continuing to listen for the rover over a broad range of times, frequencies and polarizations using the Deep Space Network (DSN) Radio Science Receiver.

The team is continuing to command "sweep and beeps" throughout each daily DSN pass to address a possible complexity with certain conditions within mission clock fault on the rover. Since loss of signal, over 600 recovery commands have been radiated to the rover.

Total odometry is unchanged at 28.06 miles (45.16 kilometers)."

Landing sites link - <http://marsoweb.nas.nasa.gov/landingsites/>

Visit the Mars Exploration Rover page at <https://mars.nasa.gov/mer/home/>.



### **Mars Reconnaissance Orbiter Mission**

**December 21, 2018**

**The von Kármán Lecture Series: 2019**

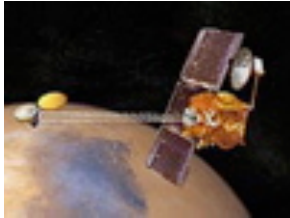
[Full Article & Images](#)

### **"Red Planet Rovers and Insights January 10 & 11**

Get the scoop on the latest missions at Mars. This lecture will bring you up to speed on all things Mars, including: The biggest dust storm in a decade, rolling (and drilling) on "Rubin Ridge," a new rover under construction, and a recent arrival on Mars preparing to get down to business."

### **MARS RECONNAISSANCE ORBITER HIRISE IMAGES**

All of the HiRISE images are archived here: <http://hirise.lpl.arizona.edu/>.  
More information about the MRO mission is available online at <http://www.nasa.gov/mro>.



## **Mars Odyssey Orbiter**

**July 30, 2018**

**Mars Terraforming Not Possible Using Present-Day Technology**

[Full Article & Images](#)

"Science fiction writers have long featured terraforming, the process of creating an Earth-like or habitable environment on another planet, in their stories. Scientists themselves have proposed terraforming to enable the long-term colonization of Mars. A solution common to both groups is to release carbon dioxide gas trapped in the Martian surface to thicken the atmosphere and act as a blanket to warm the planet."

### **DAILY MARS ODYSSEY THEMIS IMAGES**

Thermal Emission Imaging System (THEMIS) web site: (<http://themis.asu.edu/gallery>)

The Odyssey data are available through a new online access system established by the Planetary Data System at: <http://starbrite.jpl.nasa.gov/pds/>

Visit the Mars Odyssey Mission page at <http://mars.jpl.nasa.gov/odyssey/index.html>.



## **Journey to Mars**

**InSight - Revealing the Heart of Mars**

**January 25, 2019**

**Raw Images**

[Full Article & Images](#)

Interactive selection of raw images taken by the cameras aboard InSight.

Learn more about the InSight mission at: <http://www.jpl.nasa.gov/missions/insight/>

### **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: <http://mars.jpl.nasa.gov/missions/> and the Mars Exploration page: <http://marsprogram.jpl.nasa.gov/>.

## **[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 -

[http://ki0ar.com/pipermail/astronews\\_ki0ar.com/](http://ki0ar.com/pipermail/astronews_ki0ar.com/)

- Full documentation of the online administration system is available at [http://ki0ar.com/mailman/listinfo/astronews\\_ki0ar.com](http://ki0ar.com/mailman/listinfo/astronews_ki0ar.com).

- The latest version of the newsletter is accessible from <http://www.ki0ar.com/astro.html>.

## **Keep looking UP!**

73 from KI0AR

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