

IAAS Monthly Astronomy Newsletter

January 2018

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 <http://www.ki0ar.com/astro.html> - The Home of KI0AR - and is received nationally and internationally. A PDF formatted downloadable version of the newsletter is at http://www.ki0ar.com/current_nl.pdf.

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 146.94 MHz](#) and [449.825 MHz](#) repeaters. The RMRL [146.94](#) repeater is also linked with the WB0WDF 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 K0JSC and K0GUR. More information on the WB0WDF repeater links, Allstar nodes and Echolinks can be found at 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).

Interested in obtaining 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 from 9am until 1pm.

The [Colorado Astronomy Net](#) now has a 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!

If you shop 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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"On October 8, 2014, the Full Moon passed into Earth's umbral shadow and created this stunning total lunar eclipse. On January 31, observers across more than half the globe can witness a similar event."

Damian Peach

The [Month At-A-Glance](#)

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

The Moon

Phases:

- Full Moon occurs on the 1st. ([Supermoon](#))
 - Last Quarter Moon occurs on the 8th.
 - New Moon occurs on the 16th.
 - First Quarter Moon occurs on the 24th.
 - Full Moon occurs on the 31st. ([Supermoon](#))
-
- The Moon is at Perigee on the 1st, 221,559 miles from Earth.
 - The Moon is at Apogee on the 14th, 252,565 miles from Earth.
 - The Moon is at Perigee on the 30th, 223,068 miles from Earth.



Moon/Planet Pairs:

- The Moon passes 0.9° north of Regulus on the 5th.
- Mars passes 0.2° south of Jupiter on the 7th.
- The Moon passes 4° north of Jupiter on the 11th.
- The Moon passes 5° north of Mars on the 11th.
- The Moon passes 0.4° south of asteroid Vesta on the 11th.
- Mercury passes 0.6° south of Saturn on the 13th.
- The Moon passes 3° south of Saturn on the 14th.
- The Moon passes 3° north of Mercury on the 15th.
- The Moon passes 1.6° south of Neptune on the 20th.
- The Moon passes 5° south of Uranus on the 23rd.
- The Moon passes 0.7° north of Aldebaran 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 January

The Moon takes top billing this month with the Full Moon on the 1st. This will be the second of 3 "[Supermoons](#)" in a row. The first occurred last month. The third "Supermoon" also appears this month. The Full Moon on the 31st is also a "Supermoon", it is also a "Blue Moon" (the second full Moon in a single month) and will also be a Full Lunar Eclipse as well. Uranus and Neptune are well placed for early evening viewing soon after sunset. Venus also disappears behind the Sun early in the month, returning to the evening sky by month's end. Look for Mercury, Mars, Jupiter and Saturn in the morning sky before sunrise. Before dawn on the 7th, Mars passes within 0.2° of Jupiter. On the morning of the 11th, look for the waning crescent Moon passing just north of both Mars and Jupiter.



Mercury

Is at greatest western elongation (23°) on the 1st. Mercury rises at 5:37 a.m. on the 1st and about 6:43 a.m. by month's end. Mercury is visible in the morning sky for the first 3 weeks of the month, then disappears into the morning twilight glow. Mercury moves from the constellation of Ophiuchus into Capricornus this month shining at magnitude -0.3 on the 1st.

Venus

Is in superior conjunction with the Sun on the 9th. Venus is not visible this month. Venus will return to the evening sky in late winter. Venus moves from the constellation of Sagittarius into Capricornus.

Earth

Is at perihelion (91.4 million miles from the Sun) on the 3rd.

Mars

Rises at 2:54 a.m. on the 1st and about 2:28 a.m. by month's end. On the morning of the 7th before dawn, Mars is within 0.2° of Jupiter. Look to the southeast to spot Mars as it moves from the constellation of Libra into Scorpius shining at magnitude 1.4.

Jupiter

Rises at 3:07 a.m. on the 1st and about 1:26 a.m. by month's end. Watch Jupiter and Mars throughout the month. Mars appears to get closer to Jupiter until the 7th when these two planets will pass each other and then recede as the month progresses. Jupiter is in the constellation of Libra shining at magnitude -1.9.

Saturn

Has returned to the morning sky this month, but will be low just a few degrees above the eastern horizon. On the morning of the 13th, look for Saturn and Mercury within 0.6° of each other. The best time to spot Saturn will be during the last week of the month to the east when it will be about 10° above the eastern horizon. Saturn is in the constellation of Sagittarius shining at magnitude 0.5.

Uranus

Sets at 1:21 a.m. on the 1st and about 11:17 p.m. by month's end. By the time the Sun sets, Uranus will easily be visible towards the southwest through a good pair of binoculars. Uranus is in the constellation of Pisces shining at magnitude 5.8.

Neptune

Sets at 9:44 p.m. on the 1st and about 7:47 p.m. by month's end. By the time the skies darken well after sunset, Neptune will be visible in the southwest with a small telescope. Neptune will be lower and further west than Uranus so look for Neptune first when you begin your evening viewing. Neptune is in the constellation of Aquarius shining at magnitude 7.9.

Dwarf Planets

Ceres

Is at opposition on the 31, rising as the Sun sets. Ceres rises at 7:08 p.m. on the 1st and about 4:25 p.m. by month's end. Once the skies darken, Ceres may be spotted to



the east maybe an hour or two after sunset. Ceres moves from the constellation of Leo into Cancer shining at magnitude 7.1.

Pluto

Is in conjunction with the Sun on the 9th and is not visible this month. Pluto is in the constellation of Sagittarius.

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 at <http://meteorshowersonline.com/>.

[Meteor Shower Radiant Report](#)

Meteor Scatter (or 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.

Comets

Comet PANSTARRS (C/2016 R2) is passing through Taurus this month, passing the head of the bull (The Hyades) and near the Pleiades by the end of the month. The best time to spot this comet will be during the middle of the month. An 4 inch telescope (or larger) and dark skies will be required to spot this 10th to 11th magnitude fuzzball.



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 solar eclipse activity this month.
- A Total Lunar Eclipse occurs on the night of the 31st, visible to much of North America, the Pacific Ocean, Asia and Australia.

Observational Opportunities

(from evening to morning)

- Enjoy the Full Moon in the 1st.
- Enjoy Uranus and Neptune in the evening skies after sunset.
- Look for Jupiter, Venus, Mercury and Mars in the morning skies before sunrise.
- Try to observe some of the Quadrantids meteors during the first week of the month.
- Try to spot Comet PANSTARRS in Taurus.
- Watch the Total Lunar Eclipse on the 31st.



Asteroids

(From west to east)

- **Iris** is in the constellation of Aries.
- **Pallas** is in the constellation of Eridanus.
- **Massalia** is in the constellation of Taurus.
- **Flora** is at opposition on the 2nd in the constellation of Gemini.
- **Vesta** is in the constellation of Libra.

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



Occultations

The Moon occults Aldebaran for most of North America on the 30th.



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](#)'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 | 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 |

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.



August 21, 2017 - Total Solar Eclipse - "Bailey's Beads" and the "Diamond Ring"
Taken by: Burness Ansell, Location: Guernsey, WY - More to come. I will be creating a special Solar Eclipse page to showcase subscriber contributions.

Planetary/Lunar Exploration Missions

(Excerpts from recent mission updates)



JPL Latest News

The Latest from Space

[JPL Latest News](#)

December 22, 2017

Arecibo Radar Returns with Asteroid Phaethon Images

[Full Article & Images](#)

"After several months of downtime since Hurricane Maria struck the island of Puerto Rico, the Arecibo Observatory Planetary Radar has returned to normal operation, providing the highest-resolution images to date of near-Earth asteroid 3200 Phaethon during its December 2017 close approach to Earth. The radar images, which are subtle at the available resolution, reveal the asteroid is spheroidal (roughly ball-shaped) and has a large concavity, or depression, at least several hundred meters in extent near its equator, and a conspicuous dark, circular feature near one of the poles. Arecibo's radar images of Phaethon have resolutions as fine as about 250 feet (75 meters) per pixel."

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 18, 2017

NASA Solves How a Jupiter Jet Stream Shifts into Reverse

[Full Article & Images](#)

"Speeding through the atmosphere high above Jupiter's equator is an east–west jet stream that reverses course on a schedule almost as predictable as a Tokyo train's. Now, a NASA-led team has identified which type of wave forces this jet to change direction.

Similar equatorial jet streams have been identified on Saturn and on Earth, where a rare disruption of the usual wind pattern complicated weather forecasts in early 2016. The new study combines modeling of Jupiter's atmosphere with detailed observations made

over the course of five years from NASA's Infrared Telescope Facility, or IRTF, in Hawai'i. The findings could help scientists better understand the dynamic atmosphere of Jupiter and other planets, including those beyond our solar system."

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>



Cassini
December 20, 2017
Happy Holidays

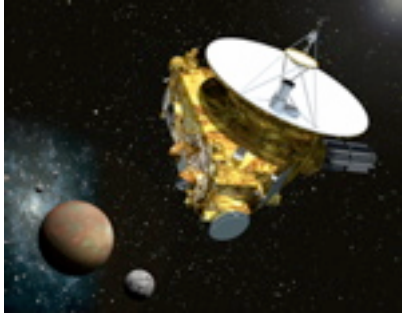


"Holiday greetings from the Cassini mission to Saturn.

Credit
NASA/Jet Propulsion Laboratory-Caltech"

Raw images are available at <http://saturn.jpl.nasa.gov/photos/raw/index.cfm>.

More information about Cassini is available at the following sites:
<http://saturn.jpl.nasa.gov> & <http://www.nasa.gov/cassini>.



New Horizons
December 21, 2017
New Horizons Enters Last Hibernation Period Before Kuiper Belt Encounter

[Full Article & Images](#)

"NASA's New Horizons spacecraft has entered its last hibernation phase before its January 2019 encounter with Kuiper Belt object 2014 MU69."

Mission controllers at the Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, Maryland, verified that New Horizons - acting on commands uplinked to its main computer the week before - went into its hibernation mode today at 9:31 a.m. EST. With the spacecraft now about 3.8 billion miles (nearly 6.2 billion kilometers) from Earth, the radio signals carrying that confirmation message from New Horizons needed five hours and 42 minutes - traveling at the speed of light - to reach the APL mission operations center through NASA's Deep Space Network station near Madrid, Spain."

[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/>.



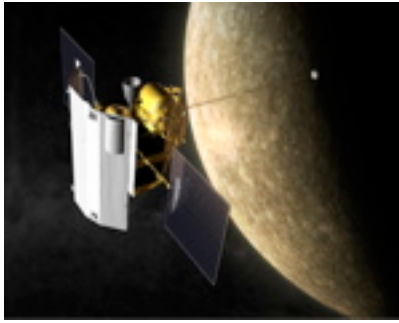
Dawn
December 12, 2017
Bright Areas on Ceres Suggest Geologic Activity

[Full Article & Images](#)

"If you could fly aboard NASA's Dawn spacecraft, the surface of dwarf planet Ceres would generally look quite dark, but with notable exceptions. These exceptions are the hundreds of bright areas that stand out in images Dawn has returned. Now, scientists have a better sense of how these reflective areas formed and changed over time -- processes indicative of an active, evolving world."

"The mysterious bright spots on Ceres, which have captivated both the Dawn science team and the public, reveal evidence of Ceres' past subsurface ocean, and indicate that, far from being a dead world, Ceres is surprisingly active. Geological processes created these bright areas and may still be changing the face of Ceres today," said Carol Raymond, deputy principal investigator of the Dawn mission, based at NASA's Jet Propulsion Laboratory in Pasadena, California. Raymond and colleagues presented the latest results about the bright areas at the American Geophysical Union meeting in New Orleans on Tuesday, Dec. 12."

For more information on the Dawn mission, visit the Dawn home page: http://www.nasa.gov/mission_pages/dawn/main/index.html.



MESSENGER

The MESSENGER mission is officially ended but there is a lot to learn about the planet closest to our Sun. Visit the new, updated MESSENGER website:

[UNLOCKING THE MYSTERIES OF PLANET MERCURY](#)

for resources, to learn, and to explore.

(Click Link above for Full Article & Images)

TOP 10 SCIENCE RESULTS AND TECHNOLOGY INNOVATIONS

"After more than 10 years in operation, the MErcury Surface, Space ENvironment, GEochemistry, and Ranging (MESSENGER) spacecraft impacted the surface of Mercury on April 30, 2015, at a speed of more than 3.91 kilometers per second (8,750 miles per hour), marking the end of operations for the hugely successful Mercury orbiter. At the MESSENGER Nears End of Operations media and public event, scientists and engineers discussed the mission's accomplishments, providing the top 10 scientific discoveries, as well as the technological innovations that grew out of the mission."

The [MESSENGER app](#) is available for download on iTunes.

For more information on the MESSENGER mission, visit the MESSENGER home page: <http://messenger.jhuapl.edu/>.

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.

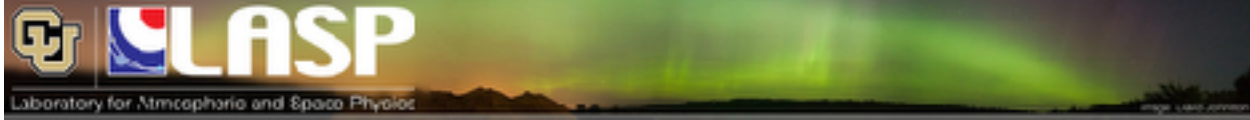
Download on Mobile Devices

[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. <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

December 13, 2017

MAVEN Sheds Light on Habitability of Distant Planets

[Full Article & Images](#)

"How long might a rocky, Mars-like planet be habitable if it were orbiting a red dwarf star? It's a complex question but one that MAVEN can help answer.

"The MAVEN mission tells us that Mars lost substantial amounts of its atmosphere over time, changing the planet's habitability," said David Brain, a MAVEN co-investigator and a professor at the Laboratory for Atmospheric and Space Physics, or LASP, at the University of Colorado Boulder. "We can use Mars, a planet that we know a lot about, as a laboratory for studying rocky planets outside our solar system, which we don't know much about yet."

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



Mars Science Laboratory - Curiosity

December 20, 2017

Sols 1911-1912: Filling Up on Pre-Holiday Data Treats

[Full Article & Images](#)

"This morning we found ourselves back on familiar ground, near the targets "Lismore" and "Leadhills" that we imaged back on sol 1905. We drove here to take a closer look at the transition between the blue-gray and red rocks in order to understand the geologic processes that may be responsible for this color change.

Since we pulled up right alongside this transition, we were able to plan a monster, 180 frame Mastcam stereo mosaic that will cover the entire area with very high-resolution color information. Downlinking all of these frames from Mars to Earth may take some time, but fortunately we'll have some great opportunities to get big data downlinks during the upcoming holiday. I'm very much looking forward to spending the break unwrapping the data bundles and seeing what's there!"

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 18, 2017

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: Opportunity Takes Extensive Imagery to Decide Where to Go - sols 4935 - 4942, Dec. 11, 2017 - Dec. 18, 2017:

"Opportunity is continuing her winter exploration of "Perseverance Valley" on the west rim of Endeavour Crater.

The rover is positioned upstream of a fork in the flow channels. The team is collecting imagery to decide which fork, the north fork or the south fork, to explore next. To support that decision, extensive imagery is being collected on almost every sol.

On Sol 4941 (Dec. 17, 2017), the robotic arm was used to collect a Microscopic Imager (MI) mosaic of a surface target within the work volume of the arm. The Alpha Particle X-ray Spectrometer (APXS) was then placed on that target.

With the upcoming holidays, the rover will remain in place for a while. This will allow multiple sols of APXS integration on this target. Late on Sol 4942 (Dec. 18, 2017), Opportunity collected a twilight panorama using the Panoramic Camera (Pancam) color stereo imager.

As of Sol 4942 (Dec. 18, 2017), the solar array energy production was 390 watt-hours with an atmospheric opacity (Tau) of 0.459 and a solar array dust factor of 0.622.

Total odometry is 28.01 miles (45.08 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

November 20, 2017

Recurring Martian Streaks: Flowing Sand, Not Water?

[Full Article & Images](#)

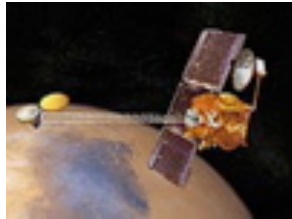
"Dark features on Mars previously considered evidence for subsurface flowing of water are interpreted by new research as granular flows, where grains of sand and dust slip downhill to make dark streaks, rather than the ground being darkened by seeping water.

Continuing examination of these still-perplexing seasonal dark streaks with a powerful camera on NASA's Mars Reconnaissance Orbiter (MRO) shows they exist only on

slopes steep enough for dry grains to descend the way they do on faces of active dunes."

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

October 4, 2017

Examining Mars' Moon Phobos in a Different Light

[Full Article & Images](#)

"NASA's longest-lived mission to Mars has gained its first look at the Martian moon Phobos, pursuing a deeper understanding by examining it in infrared wavelengths.

The Thermal Emission Imaging System (THEMIS) camera on NASA's Mars Odyssey orbiter observed Phobos on Sept. 29, 2017. Researchers have combined visible-wavelength and infrared data to produce an image color-coded for surface temperatures of this moon, which has been considered for a potential future human-mission outpost."

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

October 3, 2017

Another Chance to Put Your Name on Mars

[Full Article & Images](#)

"When it lands on Mars in November of 2018, NASA's InSight lander will be carrying several science instruments -- along with hundreds of thousands of names from members of the public.

In 2015, nearly 827,000 people signed up to add their names to a silicon microchip onboard the robotic spacecraft. NASA is now adding a second microchip, giving the public another chance to send their names to Mars.

New submissions will be accepted through Nov. 1, 2017, at the following link:

<https://mars.nasa.gov/syn/insight>

"Mars continues to excite space enthusiasts of all ages," said Bruce Banerdt, the InSight mission's principal investigator at NASA's Jet Propulsion Laboratory in Pasadena, California. "This opportunity lets them become a part of the spacecraft that will study the inside of the Red Planet."

This fly-your-name opportunity comes with "frequent flier" points reflecting an individual's personal participation in NASA's exploration of Mars. These points span multiple missions and multiple decades. Participants who sent their names on the previous InSight opportunity in 2015 can download a "boarding pass" and see their "frequent flier" miles.

As part of this frequent flier program, a chip carrying the names of 1.38 million people also flew aboard the first flight of NASA's Orion spacecraft in 2014. NASA is building Orion to carry astronauts to deep space destinations that will enable future missions to Mars."

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!

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Keep looking UP!

73 from KI0AR

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