

IAAS Monthly Astronomy Newsletter June 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 W0WYX **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).

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.

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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"With Saturn looming large and the rings wide open, this month promises exquisite views of the planet's ring structure, including the broad Cassini Division and thin Encke Gap." Astronomy Magazine, June 2018, p.36.

NASA/ESA/The Hubble Heritage Team (STScI/AURA)

The Month At-A-Glance

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

The Moon

Phases:

- Last Quarter Moon occurs on the 6th.
 - New Moon occurs on the 13th.
 - First Quarter Moon occurs on the 20th.
 - Full Moon occurs on the 28th.
-
- The Moon is at Apogee on the 2nd, 251,852 miles from Earth.
 - The Moon is at Perigee on the 14th, 223,385 miles from Earth.
 - The Moon is at Apogee on the 29th, 252,315 miles from Earth.



Moon/Planet Pairs:

- The Moon passes 3° north of Mars on the 3rd.
- The Moon passes 2° south of Neptune on the 6th.
- Venus passes 5° south of Pollux on the 8th.
- The Moon passes 5° south of Uranus on the 9th.
- The Moon passes 2° south of Venus on the 16th.
- Venus passes 0.4° north of the Beehive cluster (M44) on the 19th.
- The Moon passes 4° north of Jupiter on the 23rd.
- Mercury passes 5° south of Pollux on the 25th.
- The Moon passes 0.3° north of asteroid Vesta on the 27th.
- The Moon passes 1.8° north of Saturn on the 27th.
- The Moon passes 5° north of Mars on the 30th.

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 June

Saturn reaches opposition this month and is at its best for the year. Jupiter and Venus continue to shine brilliantly in the evening skies in June. Mars joins the evening planets as well, but best viewing is still after midnight. Mercury joins the evening planets after mid-month. Summer officially begins this month for those in the northern hemisphere and winter begins in the southern hemisphere. There are several meteor showers that are visible throughout the month and a couple that are daylight showers of interest to amateur radio operators interested in meteor scatter operations.

Mercury

Is in superior conjunction on the 5th. Mercury is stationary on the 28th. Mercury is lost in the morning and evening twilight glow early in the month but after mid-month, Mercury will be visible low to the north-northwest about 30 minutes after sunset. Mercury sets at 7:56 p.m. on the 1st and about 10:02 p.m. by month's end. Mercury moves from the constellation of Taurus into Cancer this month shining at magnitude 0.0 on the 30th.

Venus

Venus sets at 11:00 p.m. on the 1st and about 10:54 p.m. by month's end. Venus reverses its direction this month, headed back towards the western horizon. Venus moves from the constellation of Gemini into Leo this month shining at magnitude -4.1.

Earth

The Summer Solstice occurs at 6:07 a.m. EDT on the 21st.

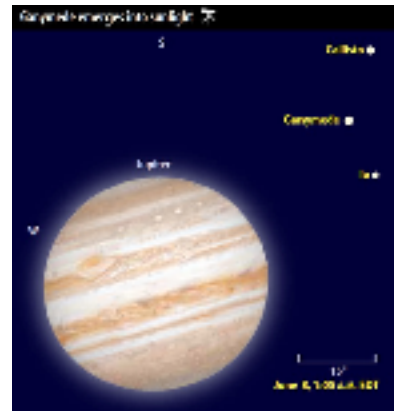
Mars

Rises at 12:09 a.m. on the 1st and about 10:29 p.m. by month's end. Mars is stationary on the 28th. Mars will reach its best appearance in 15 years in late July. Observe Mars through a telescope this month as it changes almost a full magnitude in brightness (from -1.2 to -2.1). Note the differences as it brightens. Mars is in the constellation of Capricornus shining at magnitude -1.6 on the 15th.



Jupiter

Rises at 6:01 p.m. on the 1st and about 3:53 p.m. by month's end. Jupiter dims slightly since reaching opposition last month but still provides excellent views through a telescope. Jupiter is in the constellation of Libra shining at magnitude -2.4.



Saturn

Is at opposition on the 27th, rising as the Sun sets. Saturn rises at 10:07 p.m. on the 1st and about 8:00 p.m. by month's end. Saturn is at its peak visibility this month and looks quite spectacular through a telescope. Saturn is in the constellation of Sagittarius shining at magnitude 0.1.



Uranus

Rises at 3:35 a.m. on the 1st and about 1:40 a.m. by month's end. Look to the east to find Uranus about 20° above the horizon just before sunrise. Uranus is in the constellation of Aries shining at magnitude 5.9.

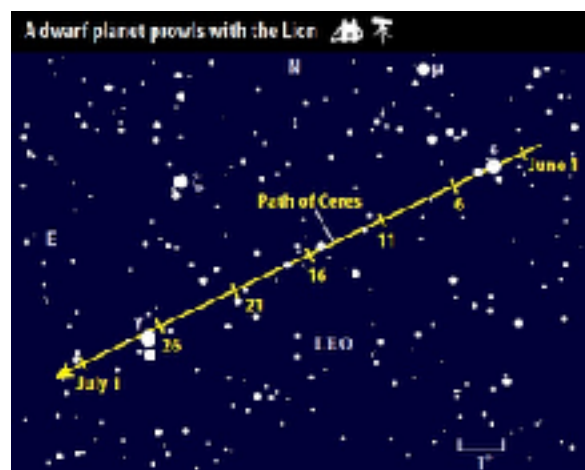
Neptune

Is stationary on the 19th. Neptune rises 1:50 a.m. on the 1st and about 11:48 p.m. by month's end. Still, the best time to observe Neptune will be before dawn. Neptune is in the constellation of Aquarius shining at magnitude 7.9.

Dwarf Planets

Ceres

Sets at 1:34 a.m. on the 1st and about 11:56 p.m. by month's end. Ceres should be relatively easy to spot to the west this month as it passes through Leo passing near some of the brightest stars of this constellation. Ceres moves from the constellation of Sagittarius into Leo this month shining at magnitude 8.7.



Pluto

Rises at 11:00 p.m. on the 1st and about 9:00 p.m. by months 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

- The Arietids Meteor Shower - This is the strongest daylight meteor shower of the year. The duration extends from May 22 to July 2, with maximum activity occurring on June 8. The hourly rate is near 60 at maximum.
- The June Lyrids - This shower is active during June 10 to 21, producing predominantly blue and white meteors at a maximum hourly rate of 8 per hour on June 15. The average magnitude of this shower is near 3, while 32% of the meteors leave trains.
- The Zeta Perseids - This daylight shower occurs during May 20 to July 5. Maximum occurs on June 13. Radar surveys have revealed the activity of this shower to be near 40 per hour.
- The June Boötids - This shower is currently active during June 27 to July 5 and possesses a maximum of activity that falls on the 28th... The shower is notable in that its meteors are primarily faint, with an average magnitude near 5; however, bright meteors do occur regularly.

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 M1) passes through the constellation of Sagittarius, shining around 10th magnitude. On the 9th and 10th, it passes less than a degree of 8th magnitude globular cluster M54 and on the 12th/13th, it passes near globular cluster M70. The best time to observe Comet PANSTARRS will be between 2-3 a.m.



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.
- No lunar eclipse activity this month.

Observational Opportunities

(from evening to morning)

- Enjoy Venus, Jupiter and Saturn in the evening skies after sunset.
- Look for Mars after midnight.
- Try to spot Comet PANSTARRS passing through Sagittarius.
- Enjoy several evening and daylight meteor showers as well.

Asteroids

(From west to east)

- **Amphitrite** is at opposition on the 15th in the constellation of Libra.
- **Metis** is at opposition on the 16th in the constellation of Libra.
- **Vesta** is at opposition on the 19th in the constellation of Ophiuchus.
- **Juno** is at in the constellation of Pisces.

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	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](#)

May 24, 2018

Take a Virtual Trip to a Strange New World with NASA

[Full Article & Images](#)

"Are you looking for an exotic destination to visit this summer? Why not take a virtual trip to an Earth-size planet beyond our solar system with NASA's interactive [Exoplanet Travel Bureau?](#)

We live in a universe teeming with exoplanets, or planets outside our solar system. Unfortunately, even the nearest exoplanets are light-years away, so sending spacecraft and humans to these intriguing worlds remains a distant dream.

But on NASA's [Exoplanet Exploration website](#), you can explore an imagined surface of an alien world via 360-degree, interactive visualizations. As you investigate each planet's surface, you'll discover fascinating features, like the blood-red sky of [TRAPPIST-1d](#), or stand on a hypothetical moon of the massive planet [Kepler-16b](#), which appears larger than either of the planet's two suns. The view from each planet's surface is an artist's impression based on the limited data that is available; no real photos of these planets exist."

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
April 11, 2018
NASA's Juno Mission Provides Infrared Tour of Jupiter's North Pole

[Full Article & Images](#)

"Scientists working on NASA's Juno mission to Jupiter shared a 3-D infrared movie depicting densely packed cyclones and anticyclones that permeate the planet's polar regions, and the first detailed view of a dynamo, or engine, powering the magnetic field for any planet beyond Earth. Those are among the items unveiled during the European Geosciences Union General Assembly in Vienna, Austria, on Wednesday, April 11."

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 Legacy
April 26, 2018
Cassini Significant Events 3/28/18 - 4/24/18

[Full Article & Images](#)

"Tuesday April 24

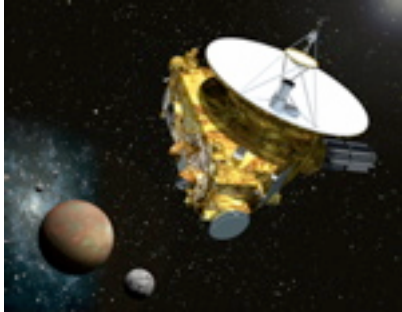
Cassini spacecraft engineers presented papers at two different conferences held this week. The 2018 IEEE International Vacuum Electronics Conference (IVEC) in Monterrey, California included "The Flight Operations History of the Cassini X-Band Traveling Wave Tube Amplifiers (TWTAs)," and the 36th annual Space Power Workshop in Los Angeles included "Cassini Spacecraft Radioisotope Thermoelectric Generators (RTG) Power and Thermal Analysis During the 20 Year Mission."

Featured as NASA's "Astronomy Picture of the Day" today is a fanciful creation that renders ring-brightness into musical notes: <https://apod.nasa.gov/apod/ap180424.html>."

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

April 11, 2018

Charon's First Official Feature Names

[Full Article & Images](#)

"Map projection of Charon, the largest of Pluto's five moons, annotated with its first set of official feature names. With a diameter of about 755 miles, the Texas-sized moon is one of largest known objects in the Kuiper

Belt, the region of icy, rocky bodies beyond Neptune. "

[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

March 14, 2018

NASA Dawn Reveals Recent Changes in Ceres' Surface

[Full Article & Images](#)

"Observations of Ceres have detected recent variations in its surface, revealing that the only dwarf planet in the inner solar system is a dynamic body that continues to evolve and change.

NASA's Dawn mission has found recently exposed deposits that give us new information on the materials in the crust and how they are changing, according to two papers published March 14 in Science Advances that document the new findings.

Observations obtained by the visible and infrared mapping spectrometer (VIR) on the Dawn spacecraft previously found water ice in a dozen sites on Ceres. The new study revealed the abundance of ice on the northern wall of Juling Crater, a crater 12 miles (20 kilometers) in diameter. The new observations, conducted from April through October 2016, show an increase in the amount of ice on the crater wall."

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



TESS

May 18, 2018

NASA's New Planet Hunter Snaps Initial Test Image, Swings by Moon Toward Final Orbit

[Full Article & Images](#)

"NASA's next planet hunter, the Transiting Exoplanet Survey Satellite (TESS), is one step closer to searching for new worlds after successfully completing a lunar flyby on May 17. The spacecraft passed about 5,000 miles from the Moon, which provided a gravity assist that helped TESS sail toward its final working orbit.

As part of camera commissioning, the science team snapped a two-second test exposure using one of the four TESS cameras. The image, centered on the southern constellation Centaurus, reveals more than 200,000 stars. The edge of the Coalsack Nebula is in the right upper corner and the bright star Beta Centauri is visible at the lower left edge. TESS is expected to cover more than 400 times as much sky as shown in this image with its four cameras during its initial two-year search for exoplanets. A science-quality image, also referred to as a "first light" image, is expected to be released in June."

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.

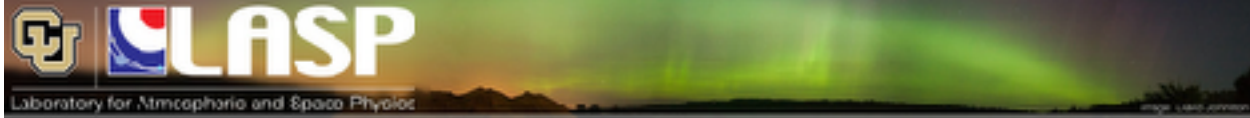
Download on Mobile Devices

[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

May 25, 2018

Sol 2063-2066: Sample drop-off testing

[Full Article & Images](#)

"Some of the Duluth drill sample was dropped into CheMin on Sol 2061, but not enough for a proper mineralogical analysis. So the top priority for today's plan is to again test the new drop-off procedure. Since the drill feed mechanism became unreliable over a year ago, drill samples can no longer be sieved and processed in CHIMRA, as they were earlier in the mission. Instead, portions of the sample must be dropped from the tip of the drill directly into the analytical instruments. This new Feed-Extended Sample Transfer (FEST) procedure will be repeated on Sol 2064, over bedrock and over the closed SAM inlet cover. Mastcam images will be taken both before and after the drop-off in both locations, to allow the size of the sample portion to be estimated. The results of these tests will be used to inform future drop-off 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)

May 15, 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: Opportunity Collects Panoramas for Site Awareness and Future Drive Planning - sols 5080 to 5086, May 9, 2018 - May 15, 2018:

"Opportunity is still about halfway down in "Perseverance Valley" on the west rim of Endeavour Crater, pursuing hypotheses as to the origin of the valley.

The rover is positioned next to some tabular rocks that are the subject of an in-situ (contact) investigation. On Sol 5081 (May 10, 2018), using the robotic arm (IDD), Opportunity moved the Alpha Particle X-ray Spectrometer (APXS) less than half an inch (about 1 centimeter) to collect an offset measurement relative to the previous sampling. While performing contact measurements, the rover is also collecting targeted, multi-spectral images of the rocks using the Panoramic Camera (Pancam).

On Sol 5083 (May 12, 2018), the rover bumped about 6.2 feet (1.9 meters) to new targets. As with all moves, a wide, multi-frame Navigation Camera (Navcam) panorama is collected for site awareness and future drive planning. However, the last drive ended with a very small rock under the right-front wheel.

This raises questions about rover stability when using the robotic arm. Thus, on Sol 5086 (May 15, 2018), the rover was commanded to rotate the right-front wheel backward about 45 degrees of rotation. That kicked out the pebble and now all rover wheels are firmly on the ground for robotic arm use.

As of Sol 5086 (May 15, 2018), the solar array energy production was 659 watt-hours with an atmospheric opacity (Tau) of 0.651 and a solar array dust factor of 0.795.

Total odometry is 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

February 20, 2018

Nearly a Decade After Mars Phoenix Landed, Another Look

[Full Article & Images](#)

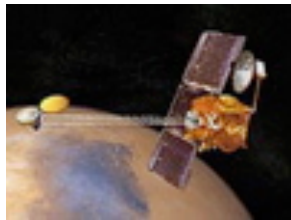
"A recent view from Mars orbit of the site where NASA's Phoenix Mars mission landed on far-northern Mars nearly a decade ago shows that dust has

covered some marks of the landing.

The Phoenix lander itself, plus its back shell and parachute, are still visible in the image taken Dec. 21, 2017, by the High Resolution Imaging Science Experiment (HiRISE) camera on NASA's Mars Reconnaissance Orbiter. But an animated-blink comparison with an image from about two months after the May 25, 2008, landing shows that patches of ground that had been darkened by removal of dust during landing events have become coated with dust again."

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.

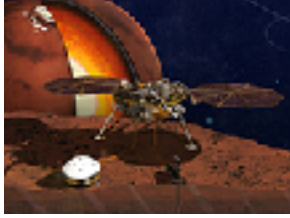
The Thermal Emission Imaging System (THEMIS) camera on NASA's Mars Odyssey orbiter observed Phobos on Sept. 29, 2017. Researchers have combined visible-wavelength and infrared data to produce an image color-coded for surface temperatures of this moon, which has been considered for a potential future 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
May 23, 2018
InSight Steers Toward Mars

[Full Article & Images](#)

"NASA's InSight lander has made its first course correction toward Mars.

InSight, short for Interior Exploration using Seismic Investigations, Geodesy and Heat Transport, is the first mission dedicated to exploring the deep interior of Mars.

The lander is currently encapsulated in a protective aeroshell, which launched on top of an Atlas V 401 rocket on May 5 from Vandenberg Air Force Base in Central California. Yesterday, the spacecraft fired its thrusters for the first time to change its flight path. This activity, called a trajectory correction maneuver, will happen a maximum of six times to guide the lander 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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