IAAS Monthly Astronomy Newsletter November 2019

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. The RMRL **146.94** repeater is also linked with the WBØWDF Cripple Creek **447.400 MHz** repeater and Allstar node **28368**. We are also linked via Echolink - **canoncty** - courtesy of KØJSC and KØGUR. More information on the WBØWDF 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.

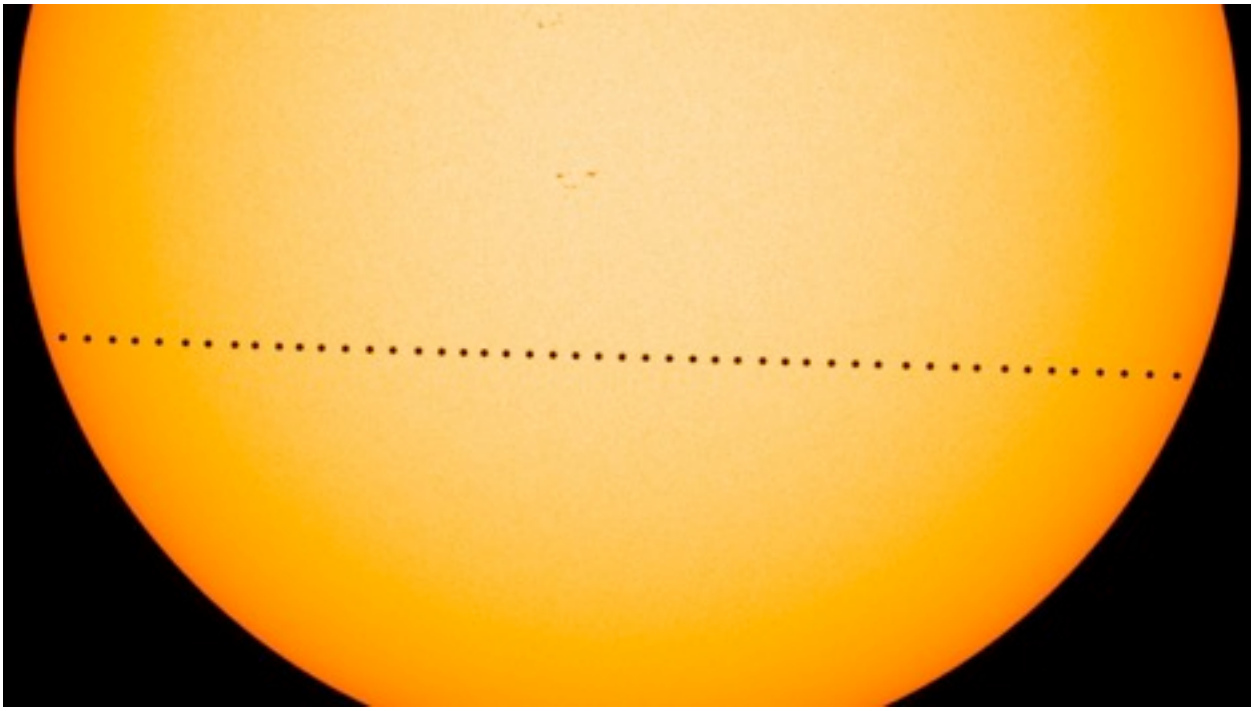
The Colorado Astronomy Net and the IAAS are on Facebook page. Be sure to "Like" us.

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!

In This Newsletter...



"NASA's Solar Dynamics Observatory captured Mercury transiting the solar disk May 9, 2016. The inner planet gives us a repeat performance November 11." Astronomy Magazine, November 2019, p.36.
NASA/GSFC/SDO/GENNA DUBERSTEIN

The Month At-A-Glance

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

The Moon

Phases:

- First Quarter Moon occurs on the 4th.
- Full Moon occurs on the 12th.
- Last Quarter Moon occurs on the 19th.
- New Moon occurs on the 26th.

- The Moon is at Apogee on the 7th, 251,691 miles from Earth.
- The Moon is at Perigee on the 23rd, 227,867 miles from Earth.

Moon/Planet Pairs:

- The Moon passes 0.6° south of Saturn on the 2nd.
- The Moon passes 0.4° south of Pluto on the 2nd.
- The Moon passes 4° south of Neptune on the 6th.
- Mars passes 3° north of Spica on the 8th.
- Venus passes 4° north of Antares on the 9th.
- The Moon passes 4° south of Uranus on the 10th.
- The Moon passes 4° north of Mars on the 24th.
- Venus passes 1.4° south of Jupiter on the 24th.
- The Moon passes 1.9° north of Mercury on the 24th.
- The Moon passes 0.7° north of Jupiter on the 28th.
- The Moon passes 1.9° north of Venus on the 28th.
- The Moon passes 0.9° south of Saturn on the 29th.
- The Moon passes 0.5° south of Pluto on the 29th.

For reference: The Full Moon subtends an angle of ~0.5°.

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 November

"Most amateur astronomers prefer nighttime viewing, avoiding daylight like the vampires of lore. But it shouldn't take much convincing to make an exception this month and watch Mercury pass directly in front of the Sun. As the fourth of 14 such transits this century, it's a rare event you won't want to miss." Astronomy Magazine, November 2019, p.36.

Venus and Jupiter are prominent in the evening sky soon after sunset. Saturn trails behind in the southwest by a few hours. Uranus is still near peak and is visible most of the night. Mars brightens in the morning sky as it continues to appear higher in the early morning.

Mercury

Transits the Sun on the 11th. Mercury is in inferior conjunction on the 11th (10 a.m. EST). Mercury is stationary on the 20th. Mercury is at greatest western elongation (20°) on the 28th. Mercury sets at 6:38 p.m. on the 1st. On the 11th, Mercury will rise with the Sun. After Mercury transits the Sun, Mercury will return to the morning sky, rising before the Sun but will be lost in the early morning twilight glow until the last week of the month. Mercury rises at 5:19 a.m. by months end. Look for Mercury low to the southwest about 30 minutes after sunset during the first few days of November, then during the last week of the month before sunrise. Mercury is in the constellation of Libra this month shining at magnitude -0.6 on the 30th.

November 11, 2019 Mercury Transit Information.
Mercury Transit Animation.

Venus

Sets at 6:58 p.m. on the 1st and about 6:24 p.m. by month's end. Look for Venus soon after sunset to the southwest throughout the month, though it doesn't get much higher than 5° above the horizon making it difficult to spot. Venus is in conjunction with Jupiter

on the 24th. Watch Venus and Jupiter appear to get closer each day until then. Venus moves from the constellation of Scorpius into Sagittarius shining at magnitude -3.8 on the 15th.

Earth

Daylight Saving Time ends for most of the U.S. at 2 a.m. on the 3rd.

Mars

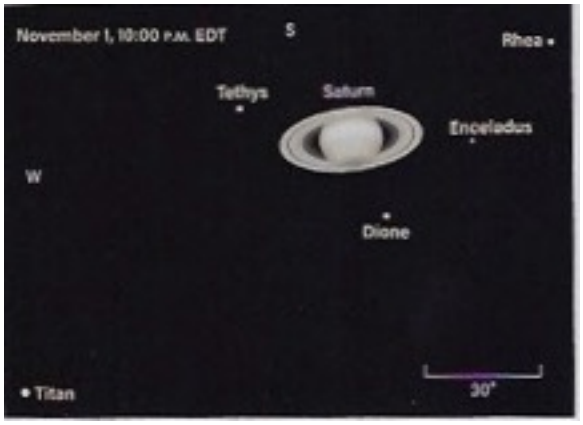
Rises at 5:45 a.m. on the 1st and about 4:26 a.m. by month's end. Mars continues to rise earlier making is easier to view in the morning sky before dawn. Look to the east about an hour before sunrise anytime after the 8th of the month when it will be high enough above the horizon to spot. Mars moves from the constellation of Virgo into Libra shining at magnitude 1.8.

Jupiter

Sets at 8:27 p.m. on the 1st and about 5:56 p.m. by month's end. Watch Jupiter descend towards the western horizon as Venus appears to rise to meet it. Jupiter and Venus will be in conjunction on the 24th. Jupiter will continue its descent as Venus continues its rise after conjunction. Look for Jupiter low in the west soon after the skies darken after sunset. Jupiter moves from the constellation of Ophiuchus into Sagittarius shining at magnitude -1.9.

Saturn

Sets at 10:05 p.m. on the 1st and about 7:20 p.m. by month's end. Look to the south-southwest about an hour after sunset to spot Saturn. Saturn is in the constellation of Sagittarius shining at magnitude 0.6.



Uranus

Rises at 5:39 p.m. on the 1st and about 2:38 p.m. by month's end. Uranus still remains near its best and brightest following opposition in late October. By the time the Sun sets and the skies darken, Uranus is at least 20° above the eastern horizon. By late November, Uranus is highest in the south around 9:30 p.m. local time. Uranus is in the constellation of Aries shining at magnitude 5.7.

Neptune
Sets at 3:10 a.m. on the 1st and about 12:11 a.m. by month's end. Neptune is stationary on the 27th. Look for Neptune to the south around 8:30 p.m. local time about halfway to the zenith. Neptune is in the constellation of Aquarius shining at magnitude 7.9.

Dwarf Planets
Ceres
Sets at 8:20 p.m. on the 1st and about 6:09 p.m. by month's end. Ceres sets just a few minutes after Jupiter all month. However, Ceres is much dimmer compared to Jupiter and will be extremely difficult to spot. Ceres moves from the constellation of Ophiuchus into Sagittarius this month shining at magnitude 9.2.

Pluto
Sets at 10:27 p.m. on the 1st and about 7:32 p.m. by month's end. Pluto still trails Saturn by less than 20 minutes all month long, however, this will not aid much in spotting this elusive planet as it is now much closer to the horizon and possibly lost in the evening twilight glow of sunset. 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

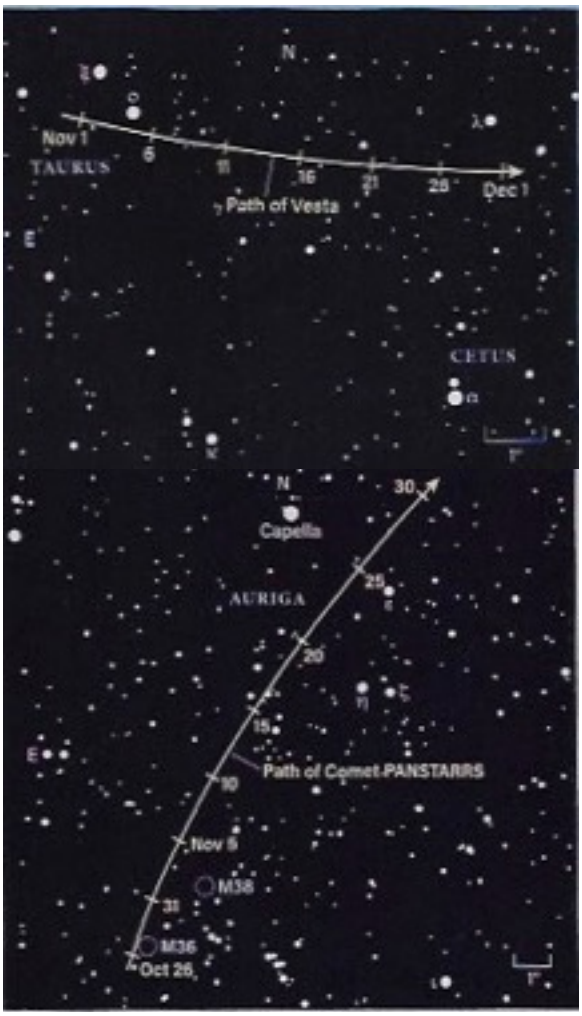
Meteor Showers
- The Leonids - The duration of this shower covers the period of Nov. 14-20. Maximum occurs on Nov. 17. The maximum hourly rate typically reaches 10-15, but most notable are periods of enhanced activity that occur every 33 years - events that are directly associated with the periodic return of comet Tempel-Tuttle. During these exceptional returns, the Leonids have produced rates of up to several thousand meteors per hour. The Leonids are swift meteors, which are best known for leaving a high percentage of persistent trains.

This year, the waning gibbous Moon will interfere with all but the brighter meteors from this shower.

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.



Comets

- Comet PANSTARRS (C/2017 T2) should peak around 9th or 10th magnitude this month. Hopefully, by next spring, it will brighten enough to see with binoculars, but for now, you will need a 4-inch telescope or larger and very dark skies to see Comet PANSTARRS passing through the constellation of Auriga.

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, visit Gary Kronk's Cometography web page.

Eclipses

- No solar eclipse activity this month.

- No lunar eclipse activity this month.

Observational Opportunities

(from evening to morning)

- Watch the transit of Mercury across the face of the Sun on the 11th.
- Look for Jupiter, Venus and Saturn in the early evening sky soon after sunset.
- Follow Neptune and Uranus in the late evening and early morning.
- Look for Mars in the early morning before sunrise.
- Watch the Leonid meteor shower which peaks before sunrise on the 17th.

Asteroids

(From west to east)

- **Eunomia** is in the constellation of Aquarius.
- **Amphitrite** is in the constellation of Pisces.
- **Metis** is in the constellation of Pisces.
- **Vesta** is at opposition on the 12th in the constellation of Cetus.

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

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.

Event ID	Date/Time	Location	Observer	Link
3587-2015	2015-11-22 17:38 MST	CO	Kevin S	3587aw
3829-2015	2015-12-05 18:06 MST	CO	Burness A	3829a
3871-2015	2015-11-13 01:55 MST	CO	Charles N	3871a

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

October 29, 2019
NASA's Latest Exoplanet Posters Are a Halloween Treat

Full Article & Images

"Just in time for Halloween, NASA has released two new posters celebrating some truly terrifying exoplanets, or planets outside our solar system. Free to download, the entertaining posters recall vintage horror movie advertisements but have a decidedly astronomical focus."

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.

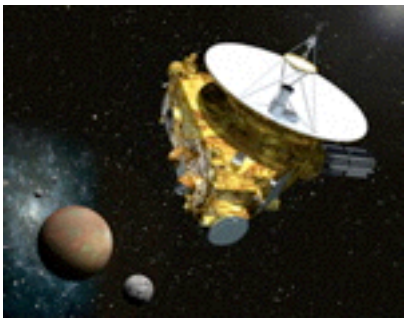
Juno

October 1, 2019
NASA's Juno Prepares to Jump Jupiter's Shadow

Full Article & Images

"Last night, NASA's Juno mission to Jupiter successfully executed a 10.5-hour propulsive maneuver ó extraordinarily long by mission standards. The goal of the burn, as it's known, will keep the solar-powered spacecraft out of what would have been a mission-ending shadow cast by Jupiter on the spacecraft during its next close flyby of the planet on Nov. 3, 2019."

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

October 22, 2019
The PI's Perspective: Looking Back and Exploring Farther

Full Article & Images

"New Horizons and its seven scientific instruments are healthy and performing well. As our spacecraft plows ever deeper into the Kuiper Belt ñ billions of miles from home ñ we continue to collect many kinds of new data."

New Horizons gallery

For more information on the New Horizons mission -- the first mission to the ninth planet -- visit the New Horizons home page.

Dawn

April 10, 2019
NASA's Dawn Mission Honored by Space Foundation

Full Article & Images

"The Space Foundation presented NASA's Dawn mission with the 2019 John L. "Jack" Swigert, Jr., Award for Space Exploration at the opening ceremony of the foundation's 35th Space Symposium on April 8, 2019.

Dawn is managed by NASA's Jet Propulsion Laboratory in Pasadena, California. Project Manager Marc Rayman of JPL and Dave Gallagher, associate director for strategic integration at JPL, accepted the award in front of about a thousand symposium attendees in Colorado Springs, Colorado."

For more information on the Dawn mission, visit the Dawn home page.

TESS
October 8, 2019
A Glimpse of a Rocky Exoplanet's Surface

Full Article & Images

"Discovered in 2018 by NASA's Transiting Exoplanet Satellite Survey (TESS) mission, planet LHS 3844b is located 48.6 light-years from Earth and has a radius 1.3 times that of Earth. It orbits a small, cool type of star called an M dwarf - especially noteworthy because, as the most common and long-lived type of star in the Milky Way galaxy, M dwarfs may host a high percentage of the total number of planets in the galaxy."

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

Send your name to Mars
onboard the Mars 2020 rover

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

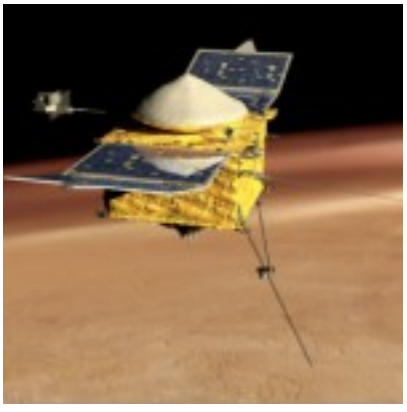
JMARS is an acronym that stands for Java Mission-planning and Analysis for Remote Sensing. It is a geospatial information system (GIS) developed by ASU's Mars Space Flight Facility to provide mission planning and data-analysis tools to NASA's orbiters, instrument team members, students of all ages, and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

October 2, 2019

An India-Pakistan nuclear war could kill millions, threaten global starvation

Full Article & Images

"A nuclear war between India and Pakistan could, over the span of less than a week, kill 50-125 million people--more than the death toll during all six years of World War II, according to new research.

A new study conducted by researchers from CU Boulder and Rutgers University examines how such a hypothetical future conflict would have consequences that could ripple across the globe. Today, India and Pakistan each have about 150 nuclear warheads at their disposal, and that number is expected to climb to more than 200 by 2025.

The picture is grim. That level of warfare wouldn't just kill millions of people locally, said LASP atmospheric scientist Brian Toon, who led the research published today in the journal Science Advances. It might also plunge the entire planet into a severe cold spell, possibly with temperatures not seen since the last Ice Age."

Visit LASP and MAVEN for more information.

Mars Science Laboratory - Curiosity

October 24, 2019

New Selfie Shows Curiosity, the Mars Chemist

Full Article & Images

"A new selfie taken by NASA's Curiosity Mars rover is breathtaking, but it's especially meaningful for the mission's team: Stitched together from 57 individual images taken by a camera on the end of Curiosity's robotic arm, the panorama also commemorates only the second time the rover has performed a special chemistry experiment."

To 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.

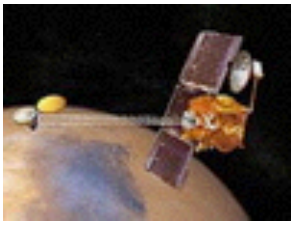
Mars Reconnaissance Orbiter Mission
July 12, 2019
HiRISE Spots Curiosity Rover at Mars' 'Woodland Bay'

Full Article & Images

"A dramatic Martian landscape can be seen in a new image taken from space, showing NASA's Curiosity rover examining a location called "Woodland Bay." It's just one of many stops the rover has made in an area referred to as the "clay-bearing unit" on the side of Mount Sharp, a 3-mile-tall (5-kilometer-tall) mountain inside of Gale Crater."

MARS RECONNAISSANCE ORBITER HIRISE IMAGES

View all of the archived HiRISE images.
More information about the MRO mission is available online.



Mars Odyssey Orbiter
August 23, 2019
What's Mars Solar Conjunction, and Why Does It Matter?

Full Article & Images

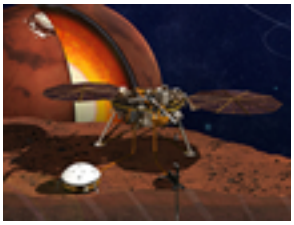
"The daily chatter between antennas here on Earth and those on NASA spacecraft at Mars is about to get much quieter for a few weeks.

That's because Mars and Earth will be on opposite sides of the Sun, a period known as Mars solar conjunction. The Sun expels hot, ionized gas from its corona, which extends far into space. During solar conjunction, this gas can interfere with radio signals when engineers try to communicate with spacecraft at Mars, corrupting commands and resulting in unexpected behavior from our deep space explorers."

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.



InSight - Journey to Mars

InSight - Revealing the Heart of Mars
October 27, 2019
Mars InSight's Mole Has Partially Backed Out of Its Hole

Full Article & Images

"After making progress over the past several weeks digging into the surface of Mars, InSight's mole has backed about halfway out of its hole this past weekend. Preliminary assessments point to unusual soil conditions on the Red Planet. The international mission team is developing the next steps to get it buried again."

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