IAAS Monthly Astronomy Newsletter November 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 KIØAR - 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 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. 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...

"Saturn (top) and Mars (right) appeared near the bright globular star cluster M22 in late March. Although Mars has long since moved on, Saturn remains in the same binocular field as M22." Astronomy Magazine, October 2018, p.36.
Damian Peach

The Month At-A-Glance

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

The Moon

Phases:

- New Moon occurs on the 7th.
- First Quarter Moon occurs on the 15th.
- Full Moon occurs on the 23rd.
- Last Quarter Moon occurs on the 29th.

- The Moon is at Apogee on the 14th, 251,245 miles from Earth.
- The Moon is at Perigee on the 26th, 227,807 miles from Earth.

Moon/Planet Pairs:

- The Moon passes 10° north of Venus on the 5th.
- Mercury passes 1.8° north of Antares on the 9th.
- The Moon passes 7° north of Mercury on the 9th.
- The Moon passes 1.5° north of Saturn on the 11th.
- The Moon passes 0.9° north of Pluto on the 12th.
- The Moon passes 1.0° south of Mars on the 15th.
- The Moon passes 3° south of Neptune on the 17th.
- The Moon passes 5° south of Uranus on the 20th.

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

"Several bright planets linger in November's evening sky. You'll want to catch Jupiter early in the month before it disappears in the Sun's glow. Mercury holds on a bit longer, but it succumbs to the solar glare after midmonth. Saturn fares much better, delivering nice views well after darkness falls, though even it pales in comparison to dazzling Mars. The ruddy world dominates the sky until midnight. Then, after an hours-long lull without any bright planets, brilliant Venus emerges into the predawn sky. " Astronomy Magazine, November 2018, p.36.

Mercury

Is at greatest eastern elongation (23°) on the 6th. Mercury is stationary on the 16th. Mercury is in inferior conjunction on the 27th. Mercury is visible in the evening sky during the first half of the month, setting at 6:54 p.m. on the 1st and about 4:09 p.m. by month's end. Look for Mercury low to the west about 30 minutes after sunset. Mercury moves from the constellation of Scorpius into Libra this month shining at magnitude 0.1 on the 15th.

Venus

Is stationary on the 13th. Venus has returned to the morning sky this month. Venus rises at 6:51 a.m. on the 1st and about 3:40 a.m. by month's end. Venus moves from the constellation of Libra into Virgo this month. Venus brightens from a magnitude of -4.2 at the beginning of the month to an impressive magnitude -4.9 by month's end.

Earth

Daylight Saving Time ends on the 4th at 2 a.m. for most of the United States and other parts of the world.

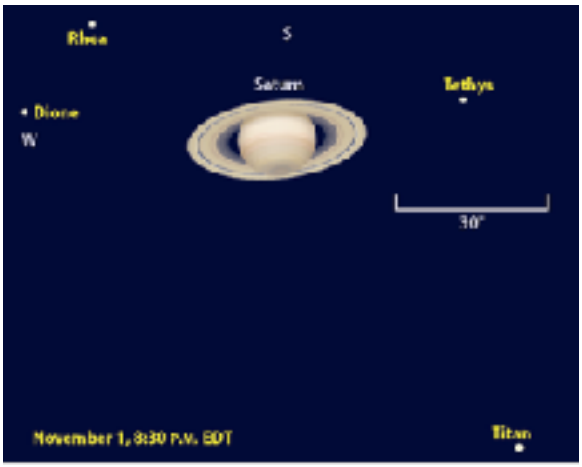
Mars

Sets at 1:02 a.m. on the 1st and about 11:38 p.m. by month's end. Look to the south soon after sunset to spot Mars. Mars is in the constellation of Capricornus shining at magnitude -0.3.

Jupiter

Is in conjunction with the Sun on the 26th. Jupiter sets at 6:57 p.m. on the 1st and about 4:22 p.m. by month's end. Jupiter disappears into the evening twilight glow after the second week of the month and will not be visible again until it returns to the morning sky next month. Jupiter is in the constellation of Libra shining at magnitude -1.7 on the 1st.

Saturn



Sets at 9:18 p.m. on the 1st and about 6:33 p.m. by month's end. Look for Saturn towards the southwest. The best views of Saturn will still be through a telescope during the first two weeks of the month early in the evening while the planet is still relatively high above the horizon. Saturn is in the constellation of Sagittarius shining at magnitude 0.6.

Uranus

Uranus rises at 5:28 p.m. on the 1st and about 2:28 p.m. by month's end. Look for Uranus about an hour or so after sunset to the southeast. Uranus is in the constellation of Pisces shining at magnitude 5.7.

Neptune

Is stationary on the 25th. Neptune sets 2:58 a.m. on the 1st and about 11:56 p.m. by month's end. Neptune is well placed for evening viewing as well. Neptune is relatively close to Mars, just east along the ecliptic. Mars actually moves closer to Neptune's position in the sky as the month progresses. Neptune is in the constellation of Aquarius shining at magnitude 7.9.

Dwarf Planets

Ceres

Has returned to the morning sky, rising at 6:10 a.m. on the 1st and about 4:17 a.m. by month's end. Ceres can be spotted just north of Venus in the morning sky as long as

you have nice dark skies. Ceres will be easier to spot towards the end of the month. Ceres is in the constellation of Virgo shining at magnitude 8.8.

Pluto

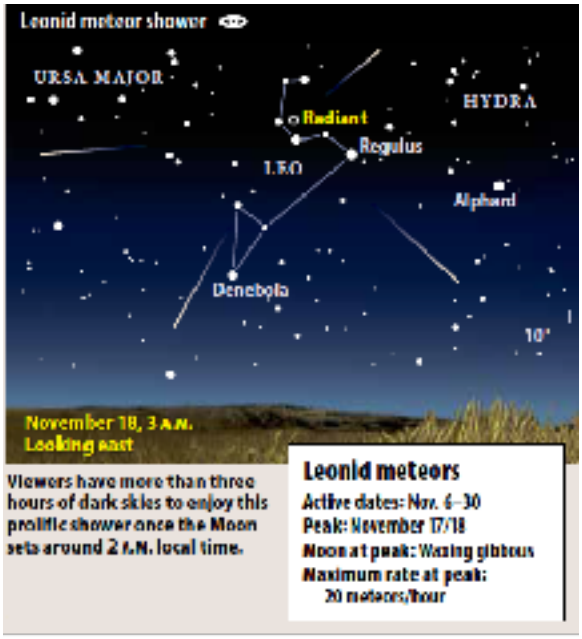
Sets at 10:20 p.m. on the 1st and about 7:25 p.m. by months end. Pluto lies just east of Saturn. Pluto is in the constellation of Sagittarius shining at magnitude 14.3.

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.



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

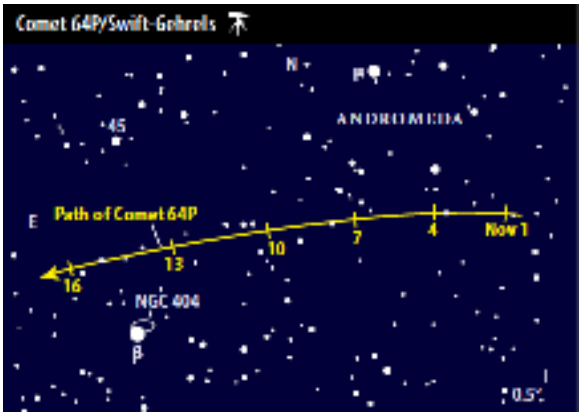
Meteor Shower Radiant Report

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. 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 21P/Giacobini-Zinner has now faded, so set your sites on Comet 64P/Swift-Gehrels, which passes nearly overhead in the evening. Look for Swift-Gehrels during

the first half of November as the Moon will not interfere with viewing. Comet Swift-Gehrels is expected to glow around 10th magnitude as it passes through the constellation of Andromeda.



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

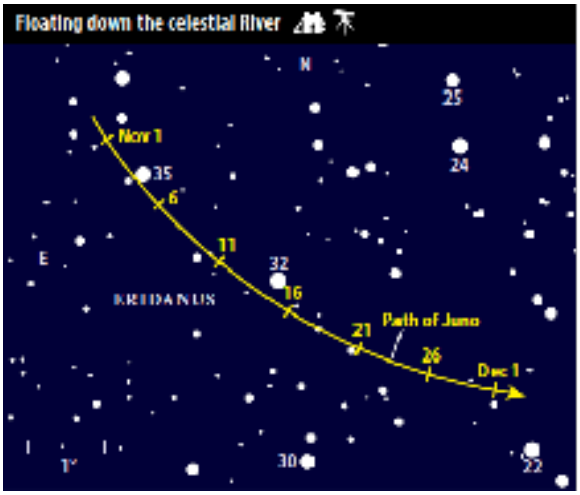
(from evening to morning)

- Mercury, Jupiter, Saturn and Mars in the early evening sky after sunset.
- Look for Venus shining brightly in the morning sky.
- Watch for the Leonid meteors.
- Try to spot Comet 64P/Swift-Gehrels, passing through Andromeda.

Asteroids

(From west to east)

- **Vesta** is in the constellation of Sagittarius.
- **Juno** is at opposition on the 17th in the constellation of Eridanus.
- **Harmonia** is in the constellation of Orion.
- **Hebe** is in the constellation of Monoceros.
- **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'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.

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

October 30, 2018
NASA Retires Kepler Space Telescope

Full Article & Images

"After nine years in deep space collecting data that indicate our sky to be filled with billions of hidden planets - more planets even than stars - NASA's Kepler space telescope has run out of fuel needed for further science operations. NASA has decided to retire the spacecraft within its current, safe orbit, away from Earth. Kepler leaves a legacy of more than 2,600 planet discoveries from outside our solar system, many of which could be promising places for life."

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

October 24, 2018
NASA's Juno Mission Detects Jupiter Wave Trains

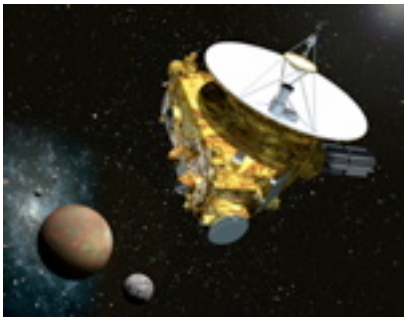
Full Article & Images

"Massive structures of moving air that appear like waves in Jupiter's atmosphere were first detected by NASA's Voyager missions during their flybys of the gas-giant world in 1979. The JunoCam camera aboard NASA's Juno mission to Jupiter has also imaged the atmosphere. JunoCam data has detected atmospheric wave trains, towering atmospheric structures that trail one after the other as they roam the planet, with most concentrated near Jupiter's equator."

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

October 24, 2018
Media Briefing: New Horizons Team to Preview Ultima Thule Flyby

Full Article & Images

"On Wednesday, Oct. 24, at 12:15 p.m. (EDT), members of the New Horizons team previewed the mission's New Year's 2019 flyby of the Kuiper Belt object nicknamed Ultima Thule during a media briefing at the American Astronomical Society's Division for Planetary Sciences Meeting in Knoxville, Tennessee.

Slides from the briefing can be viewed here »

The Ultima flyby, with closest approach set for 12:33 a.m. EST in Jan. 1, will be the most distant planetary encounter in history. Team members will cover the significance and challenges of this flyby, its science goals and operational timelines, and the Kuiper Belt in the context of solar system exploration."

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

October 26, 2018
The Surprising Coincidence Between Two Overachieving NASA Missions

Full Article & Images

"Two vastly different NASA spacecraft are about to run out of fuel: The Kepler spacecraft, which spent nine years in deep space collecting data that detected thousands of planets orbiting stars outside our solar system, and the Dawn spacecraft, which spent 11 years orbiting and studying the main asteroid belt's two largest objects, Vesta and Ceres."

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

TESS

September 25, 2018
NASA Is Taking a New Look at Searching for Life Beyond Earth

Full Article & Images

"Since the beginning of civilization, humanity has wondered whether we are alone in the universe. As NASA has explored our solar system and beyond, it has developed increasingly sophisticated tools to address this fundamental question. Within our solar system, NASA's missions have searched for signs of both ancient and current life, especially on Mars and soon, Jupiter's moon Europa. Beyond our solar system, missions, such as Kepler and TESS, are revealing thousands of planets orbiting other stars."

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

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
October 03, 2018
Curiosity Rover to Temporarily Switch 'Brains'

Full Article & Images

"Engineers at NASA's Jet Propulsion Laboratory in Pasadena, California, this week commanded the agency's Curiosity rover to switch to its second computer. The switch will enable engineers to do a detailed diagnosis of a technical issue that has prevented the rover's active computer from storing science and some key engineering data since Sept. 15."

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)
October 22, 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: Still No Signal From Opportunity - *sols 5238 to 5244, Oct. 18, 2018 - Oct. 22, 2018:*

"The dust storm on Mars has ended and atmospheric opacity (tau) over the rover site hovers around a typical seasonal value between 1.0 and 1.1.

No signal from Opportunity has been heard since Sol 5111 (June 10, 2018). Opportunity likely experienced a low-power fault, a mission clock fault and an up-loss timer fault. The team has been listening for the rover over a broad range of times using the Deep Space Network (DSN) Radio Science Receiver since loss of signal. In addition, more recently they have been commanding "sweep and beeps" throughout the daily DSN pass to address a possible complexity with certain conditions within mission clock fault.

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

September 25, 2018
Opportunity Emerges in a Dusty Picture

Full Article & Images

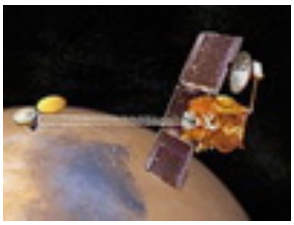
"NASA still hasn't heard from the Opportunity rover, but at least we can see it again.

A new image produced by HiRISE, a high-resolution camera aboard NASA's Mars Reconnaissance Orbiter (MRO), shows a small object on the slopes of the Red Planet's Perseverance Valley. That object is Opportunity, which was descending into the Martian valley when a dust storm swept over the region a little more than 100 days ago.

The storm was one of several that stirred up enough dust to enshroud most of the Red Planet and block sunlight from reaching the surface. The lack of sunlight caused the solar-powered Opportunity to go into hibernation."

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

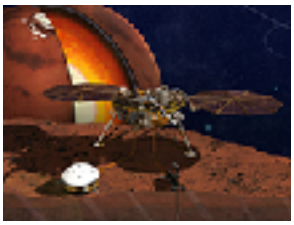
Full Article & Images

"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
October 31, 2018
Five Things to Know About InSight's Mars Landing

Full Article & Images

"Every Mars landing is a knuckle-whitening feat of engineering. But each attempt has its own quirks based on where a spacecraft is going and what kind of science the mission intends to gather.

On Nov. 26, NASA will try to safely set a new spacecraft on Mars. InSight is a lander dedicated to studying the deep interior of the planet - the first mission ever to do so."

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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- Full documentation of the online administration system is available at 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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JPL Solar System Ambassador, Colorado
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