IAAS Monthly Astronomy Newsletter March 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 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...

"Skygazers should keep their eyes peeled for a slender crescent Moon low in the west during evening twilight March 7 and 8." Astronomy Magazine, March 2019, p.36.
Barry Burgess

The Month At-A-Glance

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

The Moon

Phases:

- New Moon occurs on the 6th.
- First Quarter Moon occurs on the 14th.
- Full Moon occurs on the 20th.
- Last Quarter Moon occurs on the 28th.

- The Moon is at Apogee on the 4th, 252,519 miles from Earth.
- The Moon is at Perigee on the 19th, 223,307 miles from Earth.

Moon/Planet Pairs:

- The Moon passes 0.3° north of Saturn on the 1st.
- The Moon passes 0.5° north of Pluto on the 1st.
- The Moon passes 1.2° south of Venus on the 2nd.
- The Moon passes 5° south of Uranus on the 9th.
- The Moon passes 6° south of Mars on the 11th.
- The Moon passes 2° south of Jupiter on the 26th.
- The Moon passes 0.5° south of Saturn on the 28th.
- The Moon passes 0.3° north 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 March

Mercury and Mars are the only two bright planets in the evening sky this month, though Mercury disappears after the first week. To see the other bright planets, rise early in the morning to see Jupiter, Saturn and Venus. Uranus is about half way between Mercury and Mars in the evening sky. Neptune swings around the back side of the Sun and will return to the morning sky later in the month. Pluto trails Saturn in the early morning as well. The Earth reaches the Vernal Equinox on the 20th.

Mercury

Is stationary on the 4th. Mercury is in inferior conjunction with the Sun on the 14th. Mercury is stationary again on the 27th. Mercury sets at 5:24 p.m. on the 1st. Mercury rises about 5:49 a.m. by month's end. Look for Mercury low to the west about 30 minutes after sunset during the first week of the month. After the 14th, Mercury returns to the morning sky but will be lost in the morning twilight glow until about the third week of the month, then look for Mercury low to the east about 30 minutes before sunrise. Mercury moves from the constellation of Pisces into Aquarius this month shining at magnitude -0.2 on the 1st.

Venus

Rises at 4:35 a.m. on the 1st and about 5:27 a.m. by month's end. Look for Venus in the southeast about an hour before sunrise. Venus moves from the constellation of Capricornus into Aquarius shining at magnitude -4.0 on the 15th.

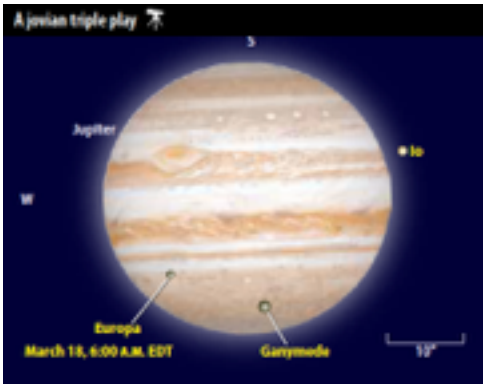
Earth

U.S. Daylight Saving Time begins on Sunday March 10, 2019 at 2 a.m local.
The Vernal Equinox occurs at 5:58 p.m. EDT on the 20th.

Mars

Sets at 10:50 p.m. on the 1st and about 11:33 p.m. by month's end. Look to the west soon after sunset to spot Mars. Mars moves from the constellation of Aries into Taurus shining at magnitude 1.3.

Jupiter
Rises at 2:06 a.m. on the 1st and about 1:15 a.m. by month's end. Jupiter is visible towards the southeast in the morning sky before sunrise. Jupiter is in the constellation of Ophiuchus shining at magnitude -2.1.



Saturn
Rises at 3:55 a.m. on the 1st and about 3:01 a.m. by month's end. Look for Saturn southeast about an hour before sunrise. Around the 13th, look for Jupiter, Saturn and Venus lined up equidistant from each other. Saturn is in the constellation of Sagittarius shining at magnitude 0.6.

Uranus
Sets at 11:38 p.m. on the 1st and about 9:52 p.m. by month's end. Look for Uranus about an hour or so after sunset to the southwest. Uranus is in the constellation of Aries shining at magnitude 5.9.

Neptune
Is in conjunction with the Sun on the 6th. Neptune will return to the morning sky after that, but will still be lost in the morning twilight glow. Neptune will not be visible this month. Neptune sets at 6:13 p.m. on the 1st. Neptune rises about 5:53 a.m. by month's end. Neptune is in the constellation of Aquarius shining at magnitude 8.0.

Dwarf Planets
Ceres
Rises at 12:52 a.m. on the 1st and about 12:07 a.m. by month's end. Ceres can be spotted low to the south in the early morning hours before sunrise. Ceres is in the constellation Ophiuchus shining at magnitude 8.4.

Pluto
Rises at 4:14 a.m. on the 1st and about 3:14 a.m. by month's end. Pluto trails Saturn by about 15 to 20 minutes all month, which may aid in spotting this elusive planet. Pluto is in the constellation of Sagittarius shining at magnitude 14.3.

As always, good luck at spotting Neptune, Ceres and Pluto, a large telescope and dark skies will be needed.

Astronomical Events

Meteor Showers

- There are a few minor meteor showers but none that produce rates much higher than 2-5 per hour, except the Gamma Normids that extend over the period of March 11 to 21, with the maximum occurring on March 16. The maximum rate reaches about 5-9 meteors per hour.

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 46P/Wirtanen has dimmed to about 10th magnitude as it moves away from Earth. A 4 to 6 into telescope will be need to see Comet Wirtanen as it passes through the southern part of Ursa Major into northern Leo Minor.

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

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

Eclipses

- No eclipse activity this month.

Observational Opportunities

(from evening to morning)

- View Mercury, Mars, Uranus and Neptune in the early evening sky after sunset.
- Look for Venus, Jupiter and Saturn shining brightly in the morning sky.

• Try to spot Comet 46P/Wirtanen passing from Ursa Major into Leo Minor.

Asteroids

(From west to east)

- **Juno** is in the constellation of Orion.
- **Hebe** is in the constellation of Orion.
- **Herculina** is in the constellation of Leo.
- **Iris** is in the constellation of Corvus.
- **Pallas** is in the constellation of Boötes.
- **Vesta** is in conjunction with the Sun on the 7th.

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.

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

February 27, 2019
Why Do Some Galactic Unions Lead to Doom?

Full Article & Images

"Three images from NASA's Spitzer Space Telescope show pairs of galaxies on the cusp of cosmic consolidations. Though the galaxies appear separate now, gravity is pulling them together, and soon they will combine to form new, merged galaxies. Some merged galaxies will experience billions of years of growth. For others, however, the merger will kick off processes that eventually halt star formation, dooming the galaxies to wither prematurely."

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

February 22, 2019
DRAMATIC JUPITER

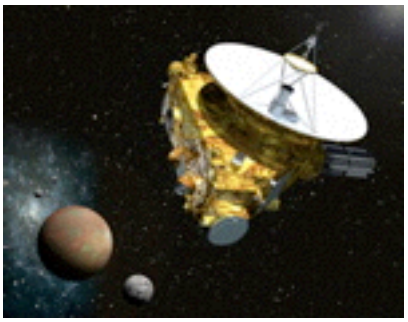
Full Article & Images

"Dramatic atmospheric features in Jupiter's northern hemisphere are captured in this view from NASA's Juno spacecraft. The new perspective shows swirling clouds that surround a circular feature within a jet stream region called 'Jet N6.'"

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

February 22, 2019
New Horizons Spacecraft Returns Its Sharpest Views of Ultima Thule

Full Article & Images

"The mission team called it a "stretch goal" - just before closest approach, precisely point the cameras on NASA's New Horizons spacecraft to snap the sharpest possible pics of the Kuiper Belt object nicknamed Ultima Thule, its New Year's flyby target and the farthest object ever explored.

Now that New Horizons has sent those stored flyby images back to Earth, the team can enthusiastically confirm that its ambitious goal was met."

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

February 27, 2019
Do-It-Yourself Dwarf Planet: Exploring Ceres in Labs

Full Article & Images

"Ceres, the dwarf planet between Mars and Jupiter, is a mysterious and exotic world, with its complicated history and recent geologic activity. Since scientists can't currently visit or bring back a sample, they are trying to make a little bit of Ceres on Earth."

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

TESS

February 5, 2019
Tour Alien Worlds with New Multimedia Treats

Full Article & Images

"Explore the plethora of planets outside our solar system with new multimedia experiences from NASA's Exoplanet Exploration Program (ExEP). In addition to a new Exoplanet Travel Bureau poster celebrating a molten world called 55 Cancri e, space fans can enjoy a 360-degree visualization of the surface of the same planet, a multimedia journey into the life and death of planetary systems, and a major update to the popular Eyes on Exoplanets app."

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 WEATHER
Mars Daily Weather Report

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

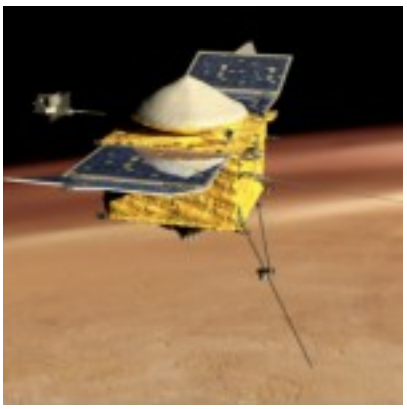
JMARS is an acronym that stands for Java Mission-planning and Analysis for Remote Sensing. It is a geospatial information system (GIS) developed by ASU's Mars Space Flight Facility to provide mission planning and data-analysis tools to NASA's orbiters, instrument team members, students of all ages, and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

February 11, 2019
MAVEN shrinking its orbit to prepare for Mars 2020 rover

Full Article & Images

"The 4-year-old atmosphere-sniffing MAVEN mission is embarking on a new campaign today to tighten its orbit around Mars. The operation will reduce the highest point of the MAVEN spacecraft's elliptical orbit from 3,850 to 2,800 miles (6,200 to 4,500 kilometers) above the surface and prepare it to take on additional responsibility as a data-relay satellite for NASA's Mars 2020 rover, which launches next year."

Visit LASP and MAVEN for more information.

Mars Science Laboratory - Curiosity
February 28, 2019
Sol 2333: Back in action at Midland Valley

Full Article & Images

"Curiosity returned to science planning today after a two week hiatus because of a technical issue. Our most recent science plan, described in the blog for Sols 2320-2323, included a drive towards a blocky outcrop called "Midland Valley." The drive was a success, bringing us right on top of the beautiful chunk of rock shown above - but before we could reach out and touch it, Curiosity went into safe mode. While the engineers worked to return Curiosity to nominal operations, the science team stood down from planning, eagerly awaiting our chance to get a closer look at Midland Valley."

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.

Mars Exploration Rover Mission (Spirit and Opportunity)
February 13, 2019

Full Article & Images

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's Mission Is Complete - *sols 5347 to 5353, Feb. 7, 2019 - Feb. 13, 2019:*

"No response has been received from Opportunity since Sol 5111 (June 10, 2018), amid a planet-encircling dust storm on Mars. With the last uplink transmission on Sol 5352 (Feb. 12, 2019), the rover recovery efforts are concluded. The Opportunity mission is complete.

The team will begin the project close out phase. A NASA press conference was held on Wednesday, Feb. 13, 2019, at NASA's Jet Propulsion Laboratory in Pasadena, California, to report on the end of the rover mission.

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

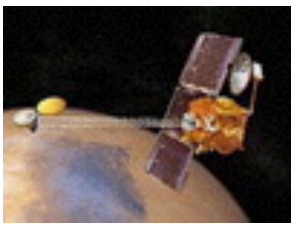
February 11, 2019
InSight Seismometer's Wind and Thermal Shield Seen from Space

Full Article & Images

"NASA's InSight spacecraft and its recently deployed Wind and Thermal Shield were imaged on Mars on Feb. 4 by the HiRISE camera aboard NASA's Mars Reconnaissance Orbiter."

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

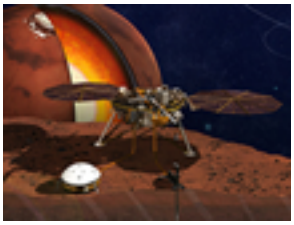
Full Article & Images

"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.

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.



Journey to Mars
InSight - Revealing the Heart of Mars
February 19, 2019
InSight Is the Newest Mars Weather Service

Full Article & Images

"No matter how cold your winter has been, it's probably not as chilly as Mars. Check for yourself: Starting today, the public can get a daily weather report from NASA's InSight lander.

This public tool includes stats on temperature, wind and air pressure recorded by InSight. Sunday's weather was typical for the lander's location during late northern winter: a high of 2 degrees Fahrenheit (-17 degrees Celsius) and low of -138 degrees Fahrenheit (-95 degrees Celsius), with a top wind speed of 37.8 mph (16.9 m/s) in a southwest direction. The tool was developed by NASA's Jet Propulsion Laboratory in Pasadena, California, with partners at Cornell University and Spain's Centro de AstrobiologÌa. JPL leads the InSight mission."

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!

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Keep looking UP!

73 from KI0AR

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JPL Solar System Ambassador, Colorado
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