

IAAS Monthly Astronomy Newsletter June 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!

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"Small telescopes reveal details in Jupiter's cloud bands when the gas giant looms large, as it does throughout June. In this Hubble Space Telescope image, the Great Red Spot looks like a bloodshot eye with the shadow of Ganymede representing its pupil." Astronomy Magazine, June 2019, p.36.

NASA/ESA/A. SIMON (GSFC)

The Month At-A-Glance

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

The Moon

Phases:

- New Moon occurs on the 3rd.
- First Quarter Moon occurs on the 10th.
- Full Moon occurs on the 17th.
- Last Quarter Moon occurs on the 25th.

- The Moon is at Perigee on the 7th, 228,978 miles from Earth.
- The Moon is at Apogee on the 23rd, 251,375 miles from Earth.

Moon/Planet Pairs:

- The Moon passes 3° south of Venus on the 1st.
- The Moon passes 4° south of Mercury on the 4th.
- The Moon passes 1.6° south of Mars on the 5th.
- The Moon passes 0.9° north of dwarf planet Ceres on the 15th.
- The Moon passes 2° north of Jupiter on the 16th.
- Venus passes 5° north of Aldebaran on the 17th.
- Mercury passes 0.2° north of Mars on the 18th.
- The Moon passes 0.4° south of Saturn on the 18th.
- The Moon passes 0.07° south of Pluto on the 19th.
- Mercury passes 6° south of Pollux on the 21st.
- Mars passes 6° south of Pollux on the 23rd.
- The Moon passes 4° south of Neptune on the 23rd.
- The Moon passes 5° south of Uranus on the 27th.

For reference: The Full Moon subtends an angle of $\sim 0.5^\circ$.

The Planets & Dwarf Planets

[Planetary Reports](#) are generated by "TheSky" software. These reports provide predicted data for the planets on the first of each month for the current year. The rise and set times for the Sun and the Moon for each day of the month as well as meteor shower radiants are also included in the reports. These reports have been optimized for the Denver, Colorado location, however, the times will be approximate for other locations on Earth.

(All times are local unless otherwise noted.)

Planetary Highlights for May

"Although June nights may be short, you can pack a lot of planet viewing into those limited hours. Most observers will spend the bulk of their time with Jupiter, which reaches peak visibility and is up all night. But you'll also want to watch Mercury and Mars as they have their closest evening conjunction more than a decade. Be sure to turn your attention toward Saturn and its magnificent rings as midnight approaches, then wrap up a memorable night with a view of Venus in morning twilight." Astronomy Magazine, June 2019, p.36.

Mercury

Is at greatest eastern elongation (25°) on the 23rd. Mercury sets at 9:32 p.m. on the 1st and about 9:48 p.m. by month's end. Look for Mercury low to the west about 30 minutes after sunset. On the evening of the 18th, Mercury passes 0.2° north of Mars in evening twilight. Mercury moves from the constellation of Taurus into Cancer this month shining at magnitude -0.1 on the 15th.



Venus

Rises at 4:35 a.m. on the 1st and about 4:44 a.m. by month's end. Look for Venus in the east about an hour before sunrise. Venus moves from the constellation of Aries into Taurus shining at magnitude -3.8.

Earth

The Summer Solstice occurs at 11:54 EDT on the 21st.

Mars

Sets at 10:38 p.m. on the 1st and about 9:50 p.m. by month's end. Look to the west soon after sunset to spot Mars. Mars moves from the constellation of Gemini into Cancer shining at magnitude 1.8.

Jupiter

Is at opposition on the 10th, rising as the Sun sets. Jupiter rises at 8:55 p.m. on the 1st and about 6:40 p.m. by month's end. Jupiter is visible all night long. Jupiter is in the constellation of Ophiuchus shining at magnitude -2.6.



Saturn

Rises at 10:57 p.m. on the 1st and about 8:52 p.m. by month's end. Saturn is now rising in the late/early evening this month. Look for Saturn to the east in late in the month and to the south/southeast any time after midnight. Saturn is in the constellation of Sagittarius shining at magnitude 0.2.

Uranus

Rises at 3:46 a.m. on the 1st and about 1:51 a.m. by month's end. Look for Uranus to the southeast very early in the morning before sunrise. Uranus is in the constellation of Aries shining at magnitude 5.9.

Neptune

Is stationary on the 21st. Neptune rises at 1:57 a.m. on the 1st and about 11:55 p.m. by month's end. Look for Neptune to the southeast very early in the morning before sunrise. Neptune is in the constellation of Aquarius shining at magnitude 7.9.

Dwarf Planets

Ceres

Rises at 7:39 p.m. on the 1st and about 5:22 p.m. by month's end. Ceres can be spotted low to the east in late evening and to the south in the early morning hours before sunrise. Ceres moves from the constellation Scorpius into Libra shining at magnitude 7.4.

Pluto

Rises at 11:11 p.m. on the 1st and about 9:11 p.m. by month's end. Pluto continues to trail 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 14.2.

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. 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 C/2017 M4 (ATLAS) is passing along the border of constellations of Lupus and Centaurus during the first week of June. Observers will need a 12-inch or larger telescope to see this 13th magnitude object.

- Comet ASASSN (C/2018 N2) can be spotted in the northeastern part of Cetus the Whale rising about an hour before morning twilight. Currently shining around 12th magnitude, it is expected to brighten to about 11th magnitude sometime in the fall.



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 Mars and Mercury in the early evening sky after sunset.
- View Jupiter all night long.
- Look for Ceres in the late evening sky.
- Look for Saturn, Pluto, Neptune, Uranus and Venus in the morning sky.

Asteroids

(From west to east)

- **Pallas** is in the constellation of Coma Berenices.
- **Parthenope** is in the constellation of Libra.
- **Melpomene** is in the constellation of Scutum.
- **Eunomia** is in the constellation of Aquarius.



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.

<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.

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](#)

May 24, 2019

NASA's Mars 2020 Mission Drops in on Death Valley

[Full Article & Images](#)

"On a test flight in Death Valley, California, an Airbus helicopter carried an engineering model of the Lander Vision System (LVS) that will help guide NASA's next Mars mission to a safe touchdown on the Red Planet. During the flight - one in a series - the helicopter (which is not part of the mission and was used just for testing) and its two-person crew flew a pre-planned sequence of maneuvers while LVS collected and analyzed imagery of the barren, mountainous terrain below."

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

May 20, 2019

NASA's Juno Finds Changes in Jupiter's Magnetic Field

[Full Article & Images](#)

"NASA's Juno mission to Jupiter made the first definitive detection beyond our world of an internal magnetic field that changes over time, a phenomenon called secular variation. Juno determined the gas giant's secular variation is most likely driven by the planet's deep atmospheric winds."

The discovery will help scientists further understand Jupiter's interior structure - including atmospheric dynamics - as well as changes in Earth's magnetic field. A paper on the discovery was published today in the journal Nature Astronomy."

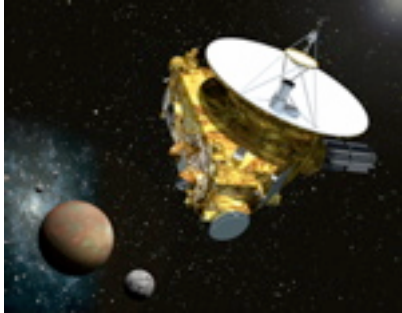
NASA's JunoCam website can be visited at: <https://www.missionjuno.swri.edu/junocam>

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

May 23 2019

The PI's Perspective: We Made the Cover of the 'Rolling Stone' (for Nerds)!

[Full Article & Images](#)

"The New Horizons spacecraft and its seven scientific instruments are performing well, with no problems. New Horizons is now more than 100 million miles past our first

KBO flyby target, 2014 MU69 (nicknamed Ultima Thule, or UT), and plowing deeper into the Kuiper Belt every day. Estimates are that we won't leave the Kuiper Belt for eight more years.

Meanwhile, after almost four months of intensive data downlink to Earth, about 25% of all the bits collected during the flyby are now on the ground. More data comes back every week."

[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

April 10, 2019

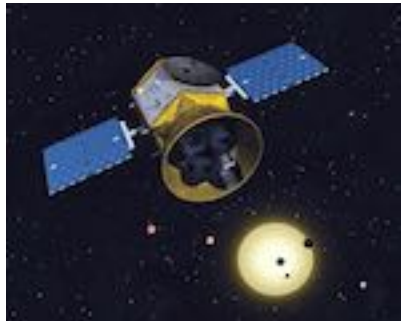
NASA's Dawn Mission Honored by Space Foundation

[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: http://www.nasa.gov/mission_pages/dawn/main/index.html.



TESS

April 15, 2019

NASA's TESS Discovers its First Earth-size Planet

[Full Article & Images](#)

"NASA's Transiting Exoplanet Survey Satellite (TESS) has discovered its first Earth-size world. The planet, HD 21749c, is about 89% Earth's diameter. It orbits HD 21749, a K-type star with about 70% of the Sun's mass located 53 light-years away in the southern constellation Reticulum, and is the second planet TESS has identified in the system. The new world is likely rocky and circles very close to its star, completing one orbit in just under eight days. The planet is likely very hot, with surface temperatures perhaps as high as 800 degrees F (427 degrees C)."

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

[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.

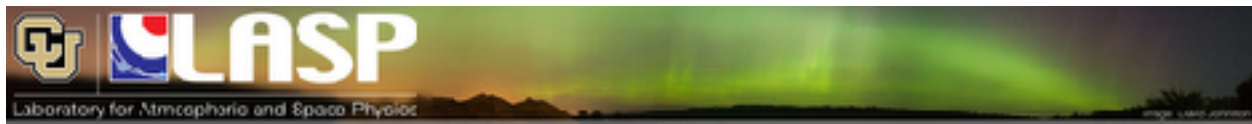
Download on Mobile Devices

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. <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

April 29, 2019

MAVEN sets its sights beyond Mars

[Full Article & Images](#)

"For more than four years, NASA's Mars Atmosphere and Volatile Evolution (MAVEN) mission has explored the mysteries of the Red Planet's upper atmosphere. More recently, the spacecraft has gotten up close and personal with that same expanse of gas."

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



Mars Science Laboratory - Curiosity

May 29, 2019

NASA's Curiosity Mars Rover Finds a Clay Cache

[Full Article & Images](#)

"NASA's Curiosity rover has confirmed that the region on Mars it's exploring, called the "clay-bearing unit," is well deserving of its name. Two samples the rover recently drilled at rock targets called "Aberlady" and "Kilmarie" have revealed the highest amounts of clay minerals ever found during the mission. Both drill targets appear in a new selfie taken by the rover on May 12, 2019, the 2,405th Martian day, or sol, of the mission."

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)

Opportunity's Mission Is Complete

[Full Article & Images](#)

"For mission highlights and resources, visit the mission [website](#). You can also send the Opportunity rover and team a [postcard](#)."



Mars Reconnaissance Orbiter Mission

May 15, 2019
NASA's MRO Completes 60,000 Trips Around Mars

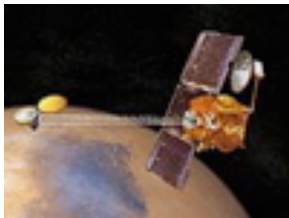
[Full Article & Images](#)

"NASA's Mars Reconnaissance Orbiter hit a dizzying milestone this morning: It completed 60,000 loops around the Red Planet at 10:39 a.m. PDT (1:39 p.m. EDT). On average, MRO takes 112 minutes to circle Mars, whipping around at about 2 miles per second (3.4 kilometers per second).

Since entering orbit on March 10, 2006, the spacecraft has been collecting daily science about the planet's surface and atmosphere, including detailed views with its High Resolution Imaging Science Experiment camera (HiRISE). HiRISE is powerful enough to see surface features the size of a dining room table from 186 miles (300 kilometers) above the surface."

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.



Mars Odyssey Orbiter

May 9, 2019
Why This Martian Full Moon Looks Like Candy

[Full Article & Images](#)

"For the first time, NASA's Mars Odyssey orbiter has caught the Martian moon Phobos during a full moon phase. Each color in this new image represents a temperature range detected by Odyssey's infrared camera, which has been studying the Martian moon since September of 2017. Looking like a rainbow-colored jawbreaker, these latest observations could help scientists understand what materials make up Phobos, the larger of Mars' two moons."

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.



InSight - Journey to Mars

InSight - Revealing the Heart of Mars

May 6, 2019

For InSight, Dust Cleanings Will Yield New Science

[Full Article & Images](#)

"The same winds that blanket Mars with dust can also blow that dust away. Catastrophic dust storms have the potential to end a mission, as with NASA's Opportunity rover. But far more often, passing winds cleared off the rover's solar panels and gave it an energy boost. Those dust clearings allowed Opportunity and its sister rover, Spirit, to survive for years beyond their 90-day expiration dates."

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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