

# IAAS Monthly Astronomy Newsletter May 2017



The International Association  
for Astronomical Studies  
provides this newsletter as a  
service for interested  
persons worldwide.



This newsletter is published on the World Wide Web at <http://www.ki0ar.com/astro.html> - The Home of KI0AR - and is received nationally and internationally. A PDF formatted downloadable version of the newsletter is at [http://www.ki0ar.com/current\\_nl.pdf](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](#) **146.94 MHz** and **449.825 MHz** repeaters. The RMRL **146.94** repeater is also linked with the WB0WDF Cripple Creek **447.400 MHz** repeater and [Allstar](#) nodes **28298, 28299, 29436**. We are also linked via Echolink, links are **k0jsc-r** and **canoncty**. More information on the WB0WDF repeater links, Allstar nodes and Echolinks can be found at [k0jsc.com](http://k0jsc.com). The net meets on Tuesday nights at 7 P.M. Mountain Time (US).

Interested in obtaining 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 from 9am until 1pm.

The [Colorado Astronomy Net](#) now has a 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.

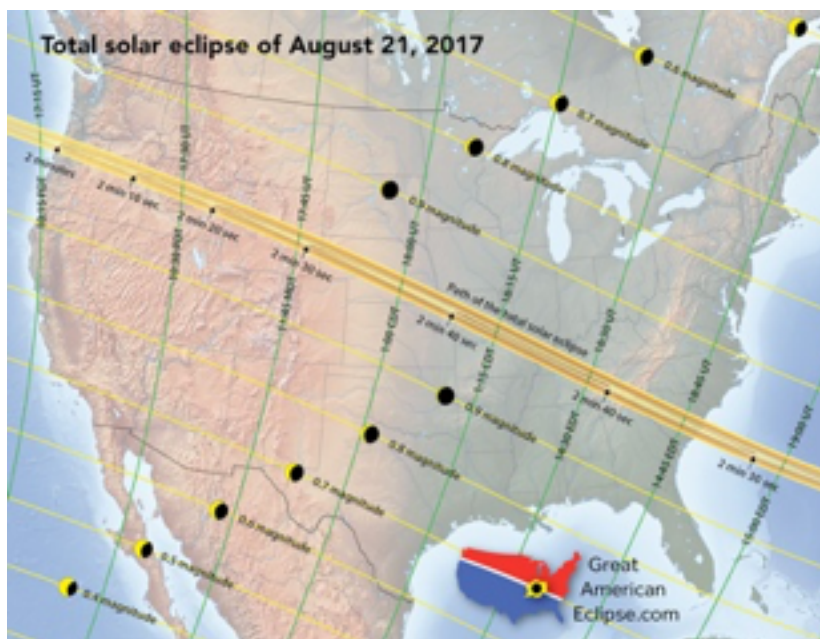
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**Solar Eclipse 2017**  
**August 21, 2017**  
[Links and Information](#)



## The Month At-A-Glance

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

### The Moon

#### Phases:

- First Quarter Moon occurs on the 2nd.
  - Full Moon occurs on the 10th.
  - Last Quarter Moon occurs on the 18th.
  - New Moon occurs on the 25th.
- 
- The Moon is at Apogee on the 12th, 252,407 miles from Earth.
  - The Moon is at Perigee on the 25th, 221,958 miles from Earth.



#### Moon/Planet Pairs:

- The Moon passes  $0.5^\circ$  south of Regulus on the 4th.
- The Moon passes  $2^\circ$  north of Jupiter on the 7th.
- Mercury passes  $2^\circ$  south of Uranus on the 7th.
- The Moon passes  $3^\circ$  north of Saturn on the 13th.
- The Moon passes  $0.5^\circ$  south of Neptune on the 20th.
- The Moon passes  $2^\circ$  south of Venus on the 22nd.
- The Moon passes  $4^\circ$  south of Uranus on the 23rd.
- The Moon passes  $1.6^\circ$  south of Mercury on the 23rd.
- The Moon passes  $5^\circ$  south of Mars on the 26th.
- The Moon passes  $0.3^\circ$  south of Regulus on the 31th.

*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

Start this month off by observing Mars before it disappears into the evening twilight glow by the end of the month. Jupiter continues to rise earlier each evening and is visible almost all night long. Saturn also rises in the late evening and is prominent in the morning sky before sunrise. Neptune, Venus, Uranus and Mercury are all visible before sunrise as well, though Venus shines the brightest of all these morning apparitions. Comet 41P is also visible for northern observers all night long and could be as bright as 6th magnitude in early May.

### Mercury

Is stationary on the 2nd. Mercury is at greatest western elongation ( $26^\circ$  west of the Sun) on the 17th. Look for Mercury in the east about 30 minutes before sunrise during the second half of the month. Mercury will be a little easier to spot by the end of the month as it brightens slightly. Mercury rises at 5:24 a.m. on the 1st and about 4:38 a.m. by month's end. Mercury moves from the constellation of Pisces into Aries this month shining at magnitude 0.6 on the 15th.

### Venus

Rises at 4:17 a.m. on the 1st and about 3:28 a.m. by month's end. Look for Venus in the early morning towards the east before sunrise. On the 22nd, look for the waning crescent Moon pass within  $2^\circ$  of the planet. Venus is in the constellation of Pisces shining at magnitude -4.6.



### Earth

N/A.

### Mars

Sets at 10:03 p.m. on the 1st and about 9:40 p.m. by month's end. Look for Mars about 30 minutes or so after sunset to the west. Mars continues to descend towards the western horizon as the month progresses. Mars is in the constellation of Taurus shining at magnitude 1.6.

### Jupiter

Rises at 5:31 p.m. on the 1st and about 3:19 p.m. by month's end. By the time the Sun sets, Jupiter is relatively high in the evening sky and will be one of the first objects visible as the skies darken. Follow Jupiter across the skies almost all night long. Jupiter is in the constellation of Virgo shining at



magnitude -2.3.

## **Saturn**

Rises at 11:22 p.m. on the 1st and about 9:12 p.m. by month's end. Now that Saturn is rising earlier, it promises to be the highlight planet for evening viewing for the entire summer. Saturn moves from the constellation of Sagittarius into Ophiuchus shining at magnitude 0.2.

## **Uranus**

Has returned to the morning sky rising at 5:23 a.m. on the 1st and about 3:25 a.m. by month's end. Uranus is best viewed towards the end of the month once it has moved out of the morning twilight glow. Uranus is in the constellation of Pisces shining at magnitude 5.9.

## **Neptune**

Is in a much better position this month in the morning sky before sunrise to be easily visible under dark skies. Neptune rises at 3:44 a.m. on the 1st and about 1:44 a.m. by month's end. Neptune is in the constellation of Aquarius shining at magnitude 7.9.

## **Dwarf Planets**

### **Ceres**

Sets at 9:27 p.m. on the 1st and about 8:26 p.m. by month's end. Ceres is visible in the early evening this month; however, it may be lost in the evening twilight glow by the end of the month. Ceres is in the constellation of Taurus shining at magnitude 8.8.

### **Pluto**

Rises at 12:56 a.m. on the 1st and about 10:49 p.m. by month's end. Pluto is visible in the early morning skies before sunrise. 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.

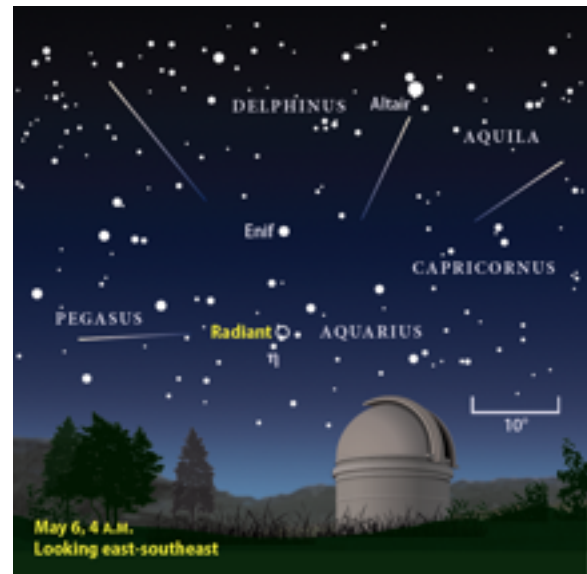
# Astronomical Events

## Meteor Showers

The Eta Aquarids Meteor Shower - This shower is visible during the period of April 21 to May 12. It reaches maximum on May 5. During the period of greatest activity hourly rates usually reach 20 for observers in the northern hemisphere and 50 for observers in the southern hemisphere.

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](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 SSB CW and see if you can hear any pings.

## Comets

"Comet 41P/Tuttle-Giacobini-Kresak is perfectly placed for Northern Hemisphere observers this month. The periodic visitor remains visible from dusk to dawn as it slides southward through eastern Hercules. The comet appears in the vicinity of brilliant Vega, which makes a convenient signpost for finding the dirty snowball. Astronomers expect 41P could reach 6th magnitude in early May, and it should be a fine target through binoculars and telescopes if you're far from city lights.



The comet's brightest part should be the slightly oval, yellow-white ball of gas and dust known as the coma, or head. Look for a greenish gas tail extending from the coma. If the comet performs like it did at its last observed apparition, this tail should resolve into multiple strands when viewed through a telescope. The comet's dust tail curves westward from the head." Astronomy Magazine, May 2017, p.42.



- Comet Johnson (C/2015 V2) passes through the constellation of Boötes also expected to glow around 6th magnitude.
- Comet PANSTARRS (C/2015 ER61) can be spotted low in the east just a few degrees from Venus shining around 7th magnitude.

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

- Solar Eclipses
  - N/A.
- Lunar Eclipses
  - N/A.

## Observational Opportunities

*(from evening to morning)*

- Observe Mars in the early evening after sunset.
- Enjoy Jupiter almost all night long.
- Look for Venus and Saturn morning skies before sunrise.
- Try to spot Comet 41P/Tuttle-Giacobini-Kresak passing through Hercules.
- Try to spot some of the Eta Aquarids meteors early in the month.

## Asteroids

*(From west to east)*

- **Vesta** is in the constellation of Cancer.
- **Hebe** is in the constellation of Ophiuchus.
- **Hygiea** is in the constellation of Sagittarius.

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	<a href="#">3587aw</a>
3829-2015	2015-12-05 18:06 MST	CO	Burness A	<a href="#">3829a</a>
3871-2015	2015-11-13 01:55 MST	CO	Charles N	<a href="#">3871a</a>

## [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.



Venus at greatest illumination -4.9 magnitude  
Feb. 17, 2017, 25% lit crescent  
Taken by: Milton Omoto  
Location: Highlands Ranch, CO

# Planetary/Lunar Exploration Missions

(Excerpts from recent mission updates)



## JPL Latest News

### The Latest from Space

"Read the latest news and discoveries from JPL's dozens of active space missions exploring Earth, the solar system and worlds beyond. "

[JPL Latest News](#)



## Juno

March 24, 2017

### NASA's Juno Spacecraft Completes Fifth Jupiter Flyby

[Full Article & Images](#)

*"Updated March 27, 2017 at 1:45 p.m. PDT*

*NASA's Juno mission accomplished a close flyby of Jupiter on Monday, March 27, successfully completing its fourth science orbit.*

All of Juno's science instruments and the spacecraft's JunoCam were operating during the flyby, collecting data that is now being returned to Earth. Juno's next close flyby of Jupiter will occur on May 19, 2017.

NASA's Juno spacecraft will make its fifth flyby over Jupiter's mysterious cloud tops on Monday, March 27, at 1:52 a.m. PDT (4:52 a.m. EDT, 8:52 UTC).

At the time of closest approach (called perijove), Juno will be about 2,700 miles (4,400 kilometers) above the planet's cloud tops, traveling at a speed of about 129,000 miles per hour (57.8 kilometers per second) relative to the gas-giant planet. All of Juno's eight science instruments will be on and collecting data during the flyby."

Juno has successfully orbited Jupiter four times since arriving at the giant planet, with the most recent orbit completed on Feb. 2. Its next close flyby of Jupiter will be March 27."

NASA's JunoCam website can be visited at:

<https://www.missionjuno.swri.edu/junocam>

More information on the Juno mission is available at: <http://www.nasa.gov/juno>

The public can follow the mission on Facebook and Twitter at:

<http://www.facebook.com/NASAJuno>

<http://www.twitter.com/NASAJuno>



## **Cassini**

**April 27, 2017**

### **NASA Spacecraft Dives Between Saturn and Its Rings**

[Full Article & Images](#)

"NASA's Cassini spacecraft is back in contact with Earth after its successful first-ever dive through the narrow gap between the planet Saturn and its rings on April 26, 2017. The spacecraft is in the process of beaming back science and engineering data collected during its passage, via NASA's Deep Space Network Goldstone Complex in California's Mojave Desert. The DSN acquired Cassini's signal at 11:56 p.m. PDT on April 26, 2017 (2:56 a.m. EDT on April 27) and data began flowing at 12:01 a.m. PDT (3:01 a.m. EDT) on April 27.

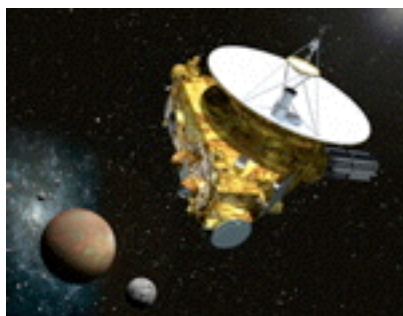
"In the grandest tradition of exploration, NASA's Cassini spacecraft has once again blazed a trail, showing us new wonders and demonstrating where our curiosity can take us if we dare," said Jim Green, director of the Planetary Science Division at NASA Headquarters in Washington."

The Cassini-Huygens mission is a cooperative project of NASA, the European Space Agency and the Italian Space Agency. JPL, a division of the California Institute of Technology, Pasadena, manages the mission for NASA's Science Mission Directorate in Washington.

Raw images are available at <http://saturn.jpl.nasa.gov/photos/raw/index.cfm>.

More information about Cassini is available at the following sites:

<http://saturn.jpl.nasa.gov> & <http://www.nasa.gov/cassini>.



## **New Horizons**

**March 23, 2017**

### **Blue Rays: New Horizons' High-Res Farewell to Pluto**

[Full Article & Images](#)

"This is the highest-resolution color departure shot of Pluto's receding crescent from NASA's New Horizons spacecraft, taken when the spacecraft was 120,000 miles

(200,000 kilometers) away from Pluto. Shown in approximate true color, the picture was constructed from a mosaic of six black-and-white images from the Long Range Reconnaissance Imager (LORRI), with color added from a lower resolution Ralph/Multispectral Visible Imaging Camera (MVIC) color image, all acquired between 15:20 and 15:45 UT -- about 3.5 hours after closest approach to Pluto -- on July 14, 2015. The resolution of the LORRI images is about 0.6 miles (1 kilometer) per pixel; the sun illuminates the scene from the other side of Pluto and somewhat toward the top of this image."

### [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 26, 2017**

**Dawn Observing Ceres; 3rd Reaction Wheel Malfunctions**

[Full Article & Images](#)

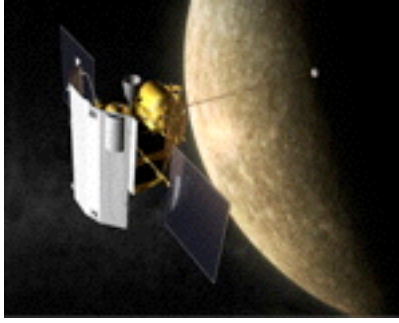
### Mission Status Report

"NASA's Dawn spacecraft is preparing to observe Ceres on April 29 from an "opposition" position, directly between the dwarf planet's mysterious Occator Crater and the sun. This unique geometry may yield new insights about the bright material in the center of the crater.

While preparing for this observation, one of Dawn's two remaining reaction wheels stopped functioning on April 23. By electrically changing the speed at which these gyroscope-like devices spin, Dawn controls its orientation in the zero-gravity, frictionless conditions of space.

The team discovered the situation during a scheduled communications session on April 24, diagnosed the problem, and returned the spacecraft to its standard flight configuration, still with hydrazine control, on April 25. The failure occurred after Dawn completed its five-hour segment of ion thrusting on April 22 to adjust its orbit, but before the shorter maneuver scheduled for April 23-24. The orbit will still allow Dawn to perform its opposition measurements. The reaction wheel's malfunctioning will not significantly impact the rest of the extended mission at Ceres."

For more information on the Dawn mission, visit the Dawn home page: [http://www.nasa.gov/mission\\_pages/dawn/main/index.html](http://www.nasa.gov/mission_pages/dawn/main/index.html).



## MESSENGER

The MESSENGER mission is officially ended but there is a lot to learn about the planet closest to our Sun. Visit the new, updated MESSENGER website:

### [UNLOCKING THE MYSTERIES OF PLANET MERCURY](#)

for resources, to learn, and to explore.

(Click Link above for Full Article & Images)

### TOP 10 SCIENCE RESULTS AND TECHNOLOGY INNOVATIONS

"After more than 10 years in operation, the MErcury Surface, Space ENvironment, GEochemistry, and Ranging (MESSENGER) spacecraft impacted the surface of Mercury on April 30, 2015, at a speed of more than 3.91 kilometers per second (8,750 miles per hour), marking the end of operations for the hugely successful Mercury orbiter. At the MESSENGER Nears End of Operations media and public event, scientists and engineers discussed the mission's accomplishments, providing the top 10 scientific discoveries, as well as the technological innovations that grew out of the mission."

The [MESSENGER app](#) is available for download on iTunes.

For more information on the MESSENGER mission, visit the MESSENGER home page: <http://messenger.jhuapl.edu/>.

### Pack Your Backpack

Calling all explorers! Tour JPL with our new Virtual Field Trip site. Stops include Mission Control and the Rover Lab. Your guided tour starts when you select a "face" that will be yours throughout the visit. Cool space images and souvenirs are all included in your visit.

+ <http://virtualfieldtrip.jpl.nasa.gov/>

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>.

# 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

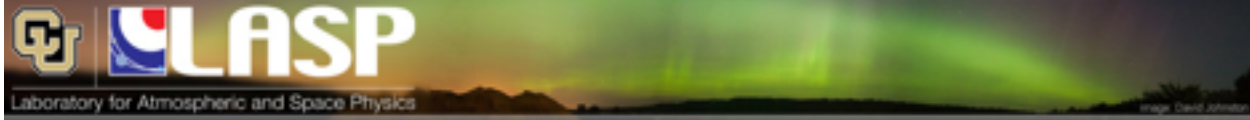
[Android](#) | [iPhone](#) | [Windows Phone](#)



### **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**

**April 10, 2017**

### **MAVEN Discovers Metals in Mars' Atmosphere**

[Full Article & Images](#)

"Mars has electrically charged metal atoms (ions) high in its atmosphere, according to new MAVEN results. The metal ions can reveal previously invisible activity in the mysterious electrically charged upper atmosphere (ionosphere) of Mars.

"MAVEN has made the first direct detection of the permanent presence of metal ions in the ionosphere of a planet other than Earth," said Joseph Grebowsky of NASA's Goddard Space Flight Center in Greenbelt, Maryland. "Because metallic ions have long lifetimes and are transported far from their region of origin by neutral winds and electric fields, they can be used to infer motion in the ionosphere, similar to the way we use a lofted leaf to reveal which way the wind is blowing." Grebowsky is lead author of a paper on this research appearing April 10 in Geophysical Research Letters."

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



## Mars Science Laboratory - Curiosity

April 26, 2017

### Curiosity Mission Updates

#### Sol 1679: Another day of TAG (Touch and Go)

[Full Article & Images](#)

"Our drive yestersol went as planned and added another 28.3 meters to Curiosity's odometer. The science team was pleased to see that more interesting outcrop would be reachable by Curiosity's arm from our new location, so we decided to plan contact science followed by an afternoon drive in the Sol 1679 plan. We call sols like this "Touch and Go" sols. Curiosity will be examining interesting color variations in the rock target "Maple Spring" using MAHLI and APXS. We also had a few minutes left in the morning to allow us to take ChemCam observations of Maple Spring that will complement our contact science observations. After the morning science, Curiosity will go for an afternoon drive, followed by some post-drive imaging, environmental science observations, and automated targeting of the ChemCam instrument using the AEGIS (Autonomous Exploration for Gathering Increased Science) software."

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 (requires Kinect)

Visit the Mars Science Laboratory page at <http://mars.jpl.nasa.gov/msl>.



## **Mars Exploration Rover Mission (Spirit and Opportunity)**

**April 11, 2017**

### **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 Nears 'Perseverance Valley' - sols 4692-4698, April 05, 2017-April 11, 2017:**

"Opportunity is continuing the drive south to 'Perseverance Valley' on the rim of Endeavour Crater.

The rover drove on Sols 4693 and 4695 (April 6 and April 8, 2017), covering 46 feet (14.11 meters) and 138 feet (41.94 meters), respectively and is now within 0.2 miles (350 meters) of the valley. Targeted Panoramic Camera (Pancam) images were taken before each drive with Navigation Camera (Navcam) and Pancam panoramas collected after the drives. Color clast surveys of the ground were performed on Sols 4692, 4694 and 4696 (April 5, April 7 and April 9, 2017). On Sol 4697 (April 10, 2017), the robotic arm was used to collect a Microscopic Imager (MI) of an exposed outcrop target. The Alpha Particle X-ray Spectrometer (APXS) was placed on the same target for a multi-hour integration.

As of Sol 4698 (April 11, 2017), the solar array energy production was 414 watt-hours with an atmospheric opacity ( $\tau$ ) of 0.996 and a solar array dust factor of 0.596.

Total odometry is 27.59 miles (44.41 kilometers)."

Landing sites link - <http://marsoweb.nas.nasa.gov/landingsites/>

Visit the Mars Exploration Rover page at <http://marsrovers.jpl.nasa.gov/home/index.html>.



## **Mars Reconnaissance Orbiter Mission**

**April 21, 2017**  
**New Look at 2004's Martian Hole-in-One Site**

[Full Article & Images](#)

"A new observation from NASA's Mars Reconnaissance Orbiter (MRO) captures the landing platform that the rover Opportunity left behind in Eagle Crater more than 13 years and 27 miles (or 44 kilometers) ago.

A series of bounces and tumbles after initial touchdown plunked the airbag-cushioned lander into the crater, a mere 72 feet (22 meters) across, on Jan. 25, 2004, Universal Time (Jan. 24, PST).

The scene includes Eagle Crater and Opportunity's nearby parachute and backshell, from the April 10, 2017, observation by MRO's High Resolution Imaging Science Experiment (HiRISE) camera.

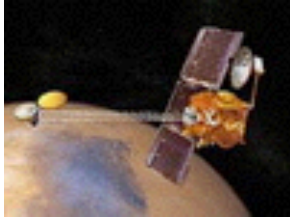
This is the first color view from HiRISE of the Eagle Crater scene. Mars Reconnaissance Orbiter began orbiting Mars more than two years after Opportunity's landing. One of the first images from HiRISE in 2006 showed Opportunity at the rim of a much larger crater, Victoria, nearly 4 miles (about 6 kilometers) south of the landing site. The camera also recorded a monochrome view of Eagle Crater that year.

Eagle Crater is at the upper right of the new image. The lander platform's job was finished once the rover rolled off it. The parachute and backshell are at the lower left.

The smattering of small craters on a broad plain is a reminder of the amazement expressed in 2004 about Opportunity achieving a "hole-in-one" landing. When the lander's petals opened and Opportunity sent home its first look at its surroundings, it provided the first-ever close-by view of sedimentary rocks on Mars, in Eagle's rim."

### **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**

**January 04, 2017**

### **NASA Mars Odyssey Orbiter Resumes Full Operations**

[Full Article & Images](#)

#### **"MARS ODYSSEY MISSION STATUS REPORT**

*UPDATED Jan. 4, 2017, at 2 p.m. PST*

*NASA's Mars Odyssey spacecraft has resumed full service following recovery after entering a safe standby mode on Dec. 26, 2016.*

The orbiter resumed communication relay assistance to Mars rovers on Dec. 30, 2016. Science observations of Mars by instruments on Odyssey resumed on Jan. 3, 2017, with its Thermal Emission Imaging System, and on the next day with its High Energy Neutral Spectrometer and the Neutron Spectrometer."

#### **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**

**September 02, 2016**

### **NASA Approves 2018 Launch of Mars InSight Mission**

"InSight (Interior Exploration using Seismic Investigations, Geodesy and Heat Transport) is a NASA Discovery Program mission that will place a single geophysical lander on Mars to study its deep interior.

NASA is moving forward with a spring 2018 launch of its InSight mission to study the deep interior of Mars, following final approval this week by the agency's Science Mission Directorate."

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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- 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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