

IAAS Monthly Astronomy Newsletter

February 2015



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.

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 and 40764 (linked to the RMRL 449.875 Eldorado Mountain repeater). More information on the WB0WDF repeater links and Allstar nodes can be found at k0jsc.com. The net meets on Tuesday nights at 7 P.M. Mountain Time (US).

The [Colorado Astronomy Net](#) now has a Facebook page. Be sure to "Like" us.

Special Notice to Denver, CO residents and visitors to the area: The Plains Conservation Center in Aurora hosts Full Moon Walks every month, weather permitting, on or near the night of the full Moon. Visit <http://www.plainsconservationcenter.org> for more information and directions.



S&S Optika hosts [Backyard Star Parties](#) in Littleton several times a month, weather permitting. Come down and enjoy the fun and check out their fine selection of optical instruments.

Excerpts from JPL mission updates are provided as a public service as part of the [JPL Solar System Ambassador / NASA Outreach](#) program.

In This Newsletter...

The Month At-A-Glance	4
The Moon	4
Phases:.....	4
Moon/Planet Pairs:	4
The Planets & Dwarf Planets.....	4
Planetary Highlights for February.....	4
Venus	5
Earth	5
Mars	5
Jupiter.....	5
Saturn	5
Uranus	5
Neptune	6
Dwarf Planets	6
Ceres.....	6
Pluto.....	6
Astronomical Events	7
Meteor Showers.....	7
Comets	7
Eclipses	7
Observational Opportunities (from evening to morning)	7
Asteroids	8
Occultations	8
Subscriber Gallery	9
Planetary/Lunar Exploration Missions	11
Cassini	11
New Horizons	12
Dawn	12
MESSENGER.....	14
Pack Your Backpack.....	14
Mars Missions	15
JMARS	15
Laboratory for Atmospheric and Space Physics.....	16
MAVEN	16
Mars Science Laboratory - Curiosity	17
Mars Exploration Rover Mission (Spirit and Opportunity)	18
Mars Reconnaissance Orbiter Mission	19
Mars Odyssey Orbiter	20
Mars Missions Status.....	21
Astronomy Links and Other Space News.....	22
Colorado Astronomy Links.....	22
Other Astronomy Links.....	23
Acknowledgments and References.....	26

Subscription Information26
Keep looking UP!26

The [Month At-A-Glance](#)

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

The Moon

Phases:

- Full Moon occurs on the 3rd.
 - Last Quarter Moon occurs on the 11th.
 - New Moon occurs on the 18th.
 - First Quarter Moon occurs on the 25th.
-
- The Moon is at Apogee on the 6th, 252,370 miles from Earth.
 - The Moon is at Perigee on the 19th, 221,826 miles from Earth.



Moon/Planet Pairs:

- Venus passes 0.8° south of Neptune on the 1st.
- The Moon passes 5° south of Jupiter on the 4th.
- The Moon passes 2° north of Saturn on the 12th.
- The Moon passes 3° north of Mercury on the 17th.
- The Moon passes 2° north of Venus on the 20th.
- The Moon passes 1.5° north of Mars on the 20th.
- Venus passes 0.5° south of Mars on the 21st.
- The Moon passes 0.3° north of Uranus on the 21st.
- The Moon passes 1.0° north of Aldebaran on the 25th.

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 February

Begin your evening viewing this month, looking west to spot Venus and Mars. Very soon after sunset, try to spot Neptune just to the right of Venus on the 1st. The highlight for February though is our largest planet, Jupiter. Jupiter reaches opposition and shines its brightest this month and provides spectacular views through even a small backyard telescope. Saturn is visible before sunrise for early morning observers. Catch Mercury early in the morning just before sunrise before it disappears from view after mid-month. Comet Lovejoy remains easy to spot with binoculars in the evening sky. If you are up very early in the morning before sunrise

you may be treated to a fireball or a bolide streaking through the skies even though this month is not a big month for meteors.

Mercury

Is stationary on the 11th. Mercury is at greatest western elongation (27° above the eastern horizon) on the 24th. Look for Mercury low to the southeast about 30 minutes before sunrise during the first 2 weeks of the month. Mercury rises at 6:39 a.m. on the 1st and about 5:28 a.m. by month's end. Mercury is in the constellation of Capricornus shining at magnitude 0.3 in the 15th.

Venus

Sets at 7:17 p.m. on the 1st and about 8:20 p.m. by month's end. Look for Venus low near the western horizon soon after sunset. On the evening of the 20th, look for Venus, Mars and a crescent Moon close to each other. Venus moves from the constellation Aquarius into Pisces shining at magnitude -3.9.

Earth

N/A.

Mars

Sets at 8:05 p.m. on the 1st and about 8:03 p.m. by month's end. Mars can be spotted above the southwest horizon about an hour after sunset. Mars moves from the constellation of Aquarius into Cetus this month shining at magnitude 1.2.

Jupiter

Is at opposition on the 6th, rising as the Sun sets. Jupiter is at its best for this year. Jupiter rises at 5:38 p.m. on the 1st and about 3:29 p.m. by month's end. Jupiter is in the constellation of Cancer shining at magnitude -2.6.

Saturn

Rises at 2:25 a.m. on the 1st and about 12:41 a.m. by month's end. Look for Saturn to the south in the early morning hours well before sunrise. Saturn is in the constellation of Scorpius shining at magnitude 0.5.

Uranus

Sets at 10:20 p.m. on the 1st and about 8:36 p.m. by month's end. Look to the southwest to spot Uranus in the early evening sky after sunset. Uranus is in the constellation of Pisces shining at magnitude 5.9.



Neptune

Is in conjunction with the Sun on the 25th. Neptune sets at 7:16 p.m. on the 1st and about 5:31 p.m. by month's end. On February 1st, you may be able to see Neptune about 1° to the right of Venus, though it will be difficult to spot. Look for Neptune to the west low in the evening sky very early in the month as Neptune quickly disappears into the dusky haze of sunset. Neptune is in the constellation of Aquarius shining at magnitude 8.0.

Dwarf Planets

Ceres

Rises at 5:20 a.m. on the 1st and about 4:14 a.m. by month's end. Ceres will be difficult to spot to the southeast before sunrise. Ceres is in the constellation of Sagittarius shining at magnitude 9.1.

Pluto

Rises at 5:23 a.m. on the 1st and about 3:36 a.m. by month's end. Pluto is still relatively low to the eastern horizon early in the month. Pluto is in the constellation of Sagittarius shining at magnitude 14.2.

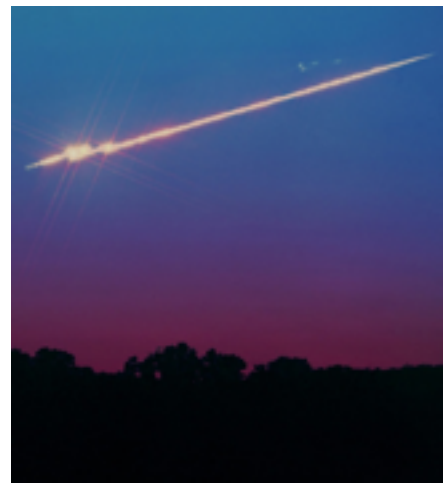
As always, good luck at spotting Neptune, Ceres and Pluto, a large telescope and dark skies will be needed.

Astronomical Events

Meteor Showers

There are a few minor meteor showers this month but none that produce rates much higher than 2-5 per hour at their peaks. However, there's a possibility that observers may see a fireball or a bolide - a meteor that explodes at the end of its path - in the early hours before sunrise associated with the Beta Herculis or Delta Serpentids minor meteor showers.

For more information about Meteor Showers, visit Gary



Kronk's Meteor Showers Online web page at <http://meteorshowersonline.com/>.

Comets

Comet Lovejoy (C/2014 Q2) is well placed in the February sky for evening viewing. Comet Lovejoy can be easily spotted with a good pair of binoculars or a small telescope or under dark skies by naked eye shining around magnitude 4.5. Look for Comet Lovejoy traveling between the constellations of Andromeda and Perseus.

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)*

- Look for Venus, Mars and Neptune to the west soon after sunset.
- Look for Uranus to the southwest in the evening sky.
- Observe Jupiter all night long this month.
- With luck, try to spot a fireball or bolide .
- Try to spot Comet Lovejoy with a small telescope or binoculars.

Asteroids

(From west to east)

- **Hebe** is in the constellation of Taurus.
- **Juno** is in the constellation of Hydra.
- **Flora** is at opposition on the 15th in the constellation of Leo.
- **Iris** is in the constellation of Leo.
- **Nysa** is in the constellation of Virgo.
- **Pallas** is in the constellation of Ophiuchus.

Information about the Minor Planets can be found at <http://www.minorplanetobserver.com> the Minor Planet Observer web site.

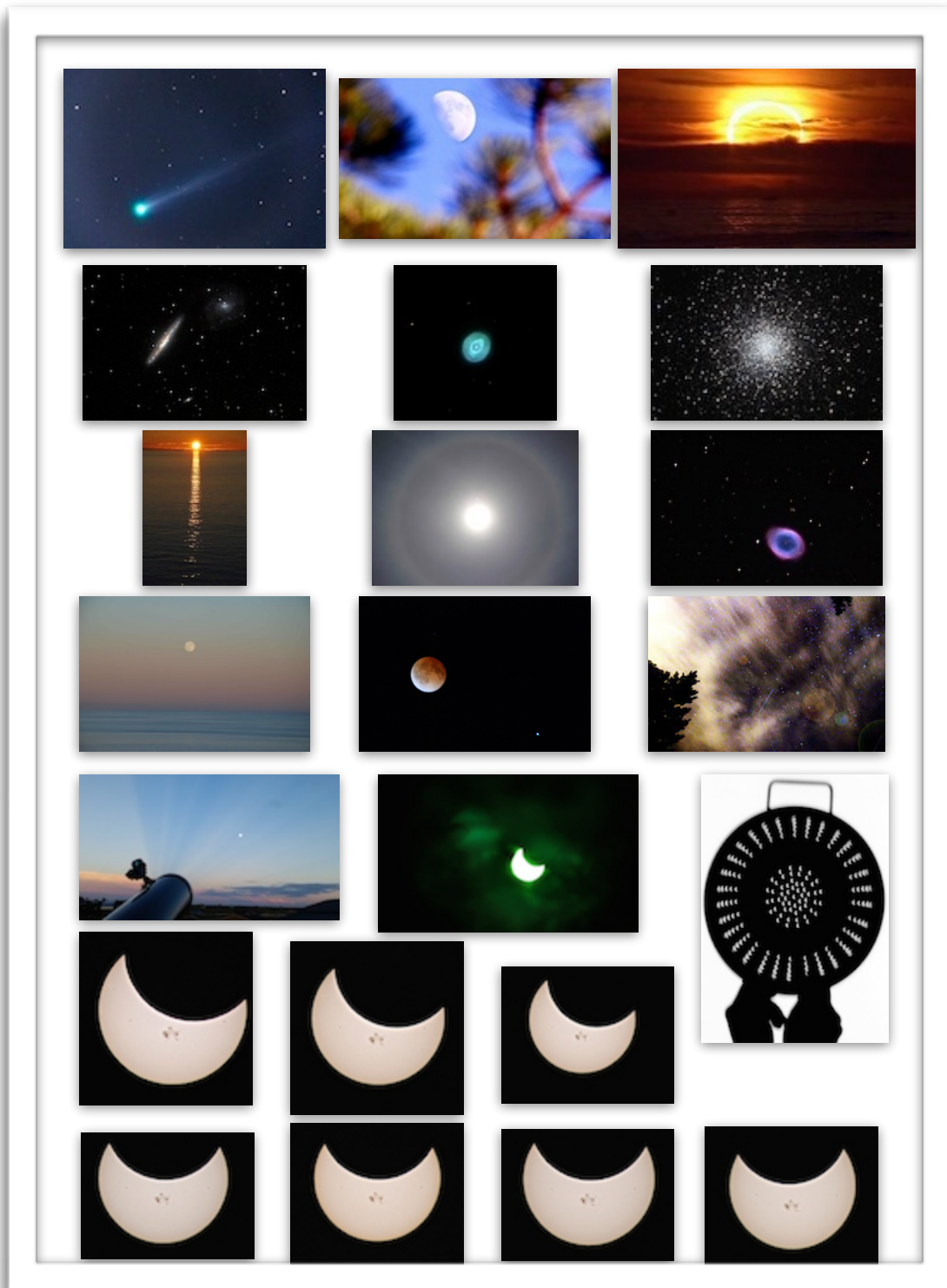
Occultations

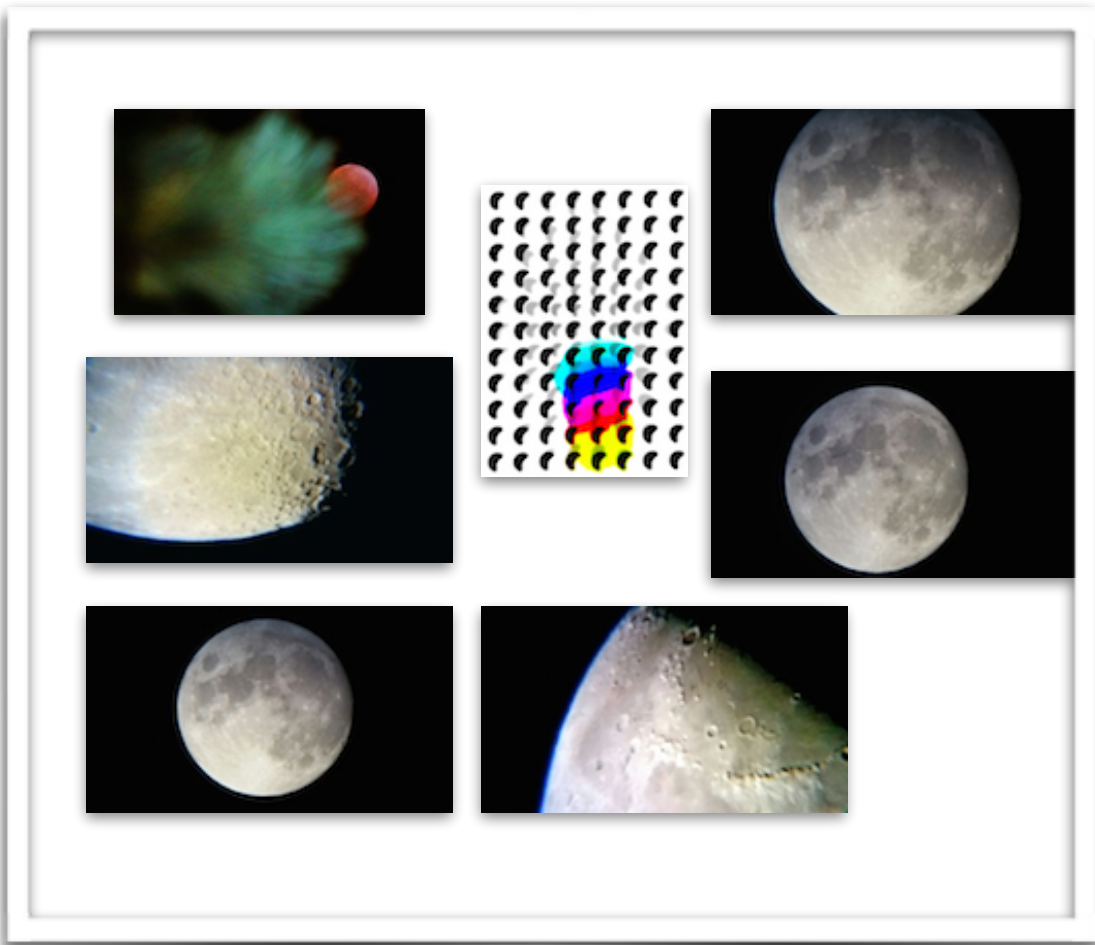
Information on various occultations can be found at <http://lunar-occultations.com/iota/iotandx.htm>, the International Occultation Timing Association's (IOTA) web site.



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.





Planetary/Lunar Exploration Missions

(Excerpts from recent mission updates)



Cassini

January 28, 2015

Cassini Catches Titan Naked in the Solar Wind

[Full-Res: PIA19055](#)

"Researchers studying data from NASA's Cassini mission have observed that Saturn's largest moon, Titan, behaves much like Venus, Mars or a comet when exposed to the raw power of the solar wind. The observations suggest that unmagnetized bodies like Titan might interact with the solar wind in the same basic ways, regardless of their nature or distance from the sun.

Titan is large enough that it could be considered a planet if it orbited the sun on its own, and a flyby of the giant moon in Dec. 2013 simulated that scenario, from Cassini's vantage point. The encounter was unique within Cassini's mission, as it was the only time the spacecraft has observed Titan in a pristine state, outside the region of space dominated by Saturn's magnetic field, called its magnetosphere.

"We observed that Titan interacts with the solar wind very much like Mars, if you moved it to the distance of Saturn," said Cesar Bertucci of the Institute of Astronomy and Space Physics in Buenos Aires, who led the research with colleagues from the Cassini mission. "We thought Titan in this state would look different. We certainly were surprised," he said."

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. More information about Cassini is available at the following sites:

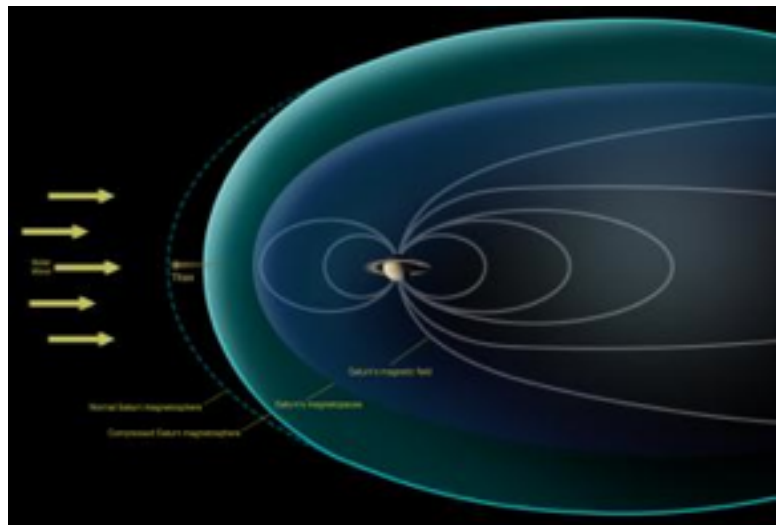
<http://www.nasa.gov/cassini>

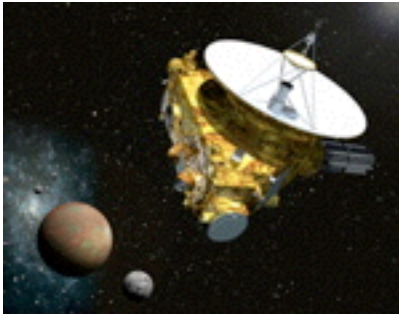
<http://saturn.jpl.nasa.gov>

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

Cassini Imaging Team's website - <http://ciclops.org>.

For the latest mission status reports, visit <http://saturn.jpl.nasa.gov/home/index.cfm>. The speed and location of the spacecraft can be viewed on the "[Present Position](#)" web page.





New Horizons

January 23, 2015
Something Special in the Air

"The earliest stages of our Pluto encounter have begun, and New Horizons remains healthy and on course.

Already, the SWAP, PEPSSI and SDC instruments are taking daily science data — measuring the charged particle and dust environment of the space near Pluto's orbit. Next week, on Jan. 25, the sensitive LORRI long focal length camera aboard New Horizons will begin imaging the Pluto system for navigation purposes. This will yield dozens of images that our navigation teams will analyze for positional information about Pluto and Charon against star fields, allowing us to home in more accurately than by radio navigation from Earth alone."

[What is Pluto? -Video](#)

[Follow New Horizons on its journey to Pluto and beyond.](#)

"How Do We Get to Pluto? Practice, Practice, Practice"

Part I: The Encounter Begins - [Small mp4](#) (38 MB, 640x360)
 - [Large mp4](#) (116 MB, 1280x720)

Part II: Passing Pluto - [Small mp4](#) (34 MB, 640x360)
 - [Large mp4](#) (102 MB, 1280x720)

Find New Horizons in the iTunes App Store here. (<http://itunes.com/apps/newhorizonsanasavoyagetopluto>)

[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

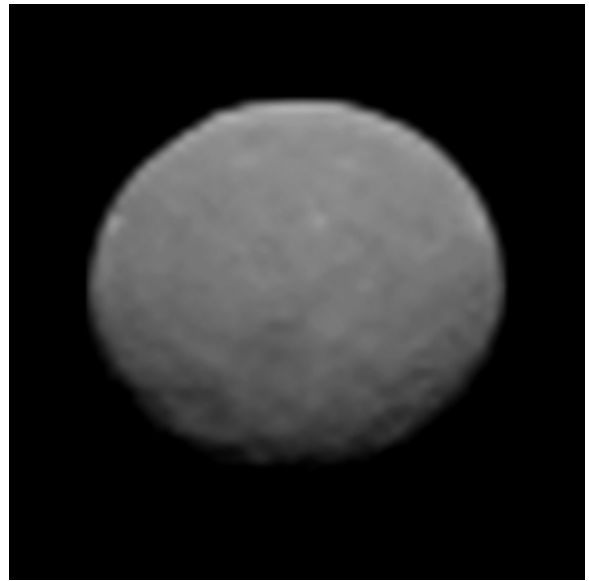
January 27, 2015
NASA's Dawn Spacecraft Captures Best-Ever View of Dwarf Planet

"NASA's Dawn spacecraft has returned the sharpest images ever seen of the dwarf planet Ceres. The images were taken 147,000 miles (237,000 kilometers) from Ceres on Jan. 25, and represent a new milestone for a spacecraft that soon will

become the first human-made probe to visit a dwarf planet.

"We know so little about our vast solar system, but thanks to economical missions like Dawn, those mysteries are being solved," said Jim Green, Planetary Science Division Director at NASA Headquarters in Washington.

At 43 pixels wide, the new images are more than 30 percent higher in resolution than those taken by NASA's Hubble Space Telescope in 2003 and 2004 at a distance of over 150 million miles. The resolution is higher because Dawn is traveling through the solar system to Ceres, while Hubble remains fixed in Earth orbit. The new Dawn images come on the heels of initial navigation images taken Jan. 13 that reveal a white spot on the dwarf planet and the suggestion of craters. Hubble images also had glimpsed a white spot on the dwarf planet, but its nature is still unknown."



This animation of the dwarf planet Ceres was made by combining images taken by NASA's Dawn spacecraft on Jan. 25. The spacecraft's framing camera took these images, at a distance of about 147,000 miles (237,000 kilometers) from Ceres, and they represent the highest-resolution views to date of the dwarf planet.

Image Credit: NASA/JPL

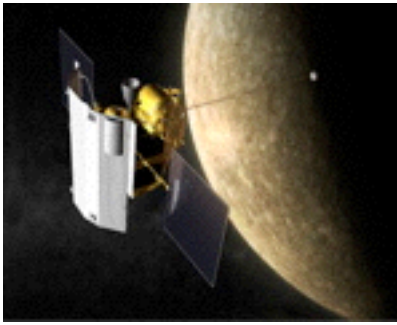
Ion Propulsion Dawn Video

Ion propulsion isn't something found only in science fiction. Ion engines are a real deal and drive NASA's Dawn spacecraft, en route to dwarf planet Ceres. Big things do come in small packages.

Dawn's Virtual Flight over Vesta

A gallery of images can be found online at: http://www.nasa.gov/mission_pages/dawn/multimedia/gallery-index.html.

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



MESSENGER

January 21, 2015

MESSENGER Mission News

Maneuver Successfully Delays MESSENGER's Impact, Extends Orbital Operations

"MESSENGER mission controllers at the Johns Hopkins University Applied Physics Laboratory (APL) in Laurel, Md., successfully conducted a maneuver today designed to raise the spacecraft's minimum altitude sufficiently to extend orbital

operations and delay the probe's inevitable impact onto Mercury's surface until early next spring.

The immediately previous maneuver, completed on October 24, 2014, raised MESSENGER to an altitude at closest approach from 25.4 kilometers (15.8 miles) to 184.4 kilometers (114.6 miles) above the planet's surface. Because of progressive changes to the orbit over time, the spacecraft's minimum altitude continued to decrease.

At the time of this most recent maneuver, MESSENGER was in an orbit with a closest approach of 25.7 kilometers (16.0 miles) above the surface of Mercury. With a velocity change of 9.67 meters per second (21.62 miles per hour), the spacecraft's four largest monopropellant thrusters (with a small contribution from four of the 12 smallest monopropellant thrusters) nudged the spacecraft to an orbit with a closest approach altitude of 105.1 km (65.3 miles)."

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](#)

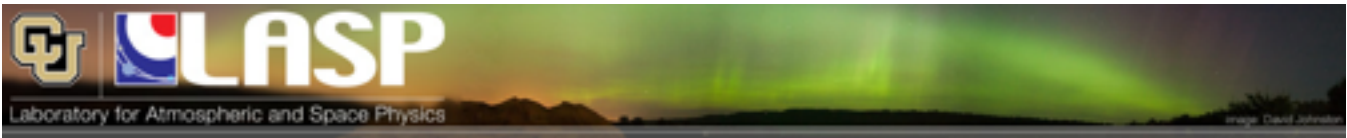


JMARS

<https://jmars.mars.asu.edu/>

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

the general public.



Laboratory for Atmospheric and Space Physics

"The Laboratory for Atmospheric and Space Physics (LASP) at the University of Colorado Boulder (CU) began in 1948, a decade before NASA. We are the world's only research institute to have sent instruments to all eight planets and Pluto.

LASP combines all aspects of space exploration through our expertise in science, engineering, mission operations, and scientific data analysis. As part of CU, LASP also works to educate and train the next generation of space scientists, engineers and mission operators by integrating undergraduate and graduate students into working teams. Our students take their unique experiences with them into government or industry, or remain in academia to continue the cycle of exploration.

LASP is an affiliate of [CU-Boulder AeroSpace Ventures](#), a collaboration among aerospace-related departments, institutes, centers, government labs, and industry partners."



MAVEN

MAVEN Status Update: December 3, 2014

"David F. Mitchell, MAVEN Project Manager at NASA's Goddard Space Flight Center"

"MAVEN is now fully into its Science Phase at Mars and the scientists have been releasing exciting results, not

the least of which were recent findings from the Comet Siding Spring encounter. The Imaging Ultraviolet Spectrometer was able to observe intense emissions from magnesium and iron ions in the atmosphere in the aftermath of the comet encounter. The Neutral Gas and Ion Mass Spectrometer directly sampled and determined the composition of comet dust in Mars' atmosphere, something that has never been done before. Our Solar Energetic Particle instrument observed significant solar activity both in the form of flares and coronal mass ejections from the Sun to Mars. We also generated a map of Mars' ozone layer in the lower atmosphere. Finally, we've been able to provide a view of the escaping



atmosphere of Mars showing the loss of atomic oxygen, atomic carbon, and atomic hydrogen. Great science with much more to come!"

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



Mars Science Laboratory - Curiosity

January 30, 2015

Sol 884: Sample Transfer to CheMin

"By Lauren Edgar

After successfully drilling the target "Mojave2" on Sol 882, the next step is to deliver the sample

to CheMin for analysis. We acquired some great [Mastcam](#) and [MAHLI](#) images of the drill hole and mini drill hole, and we're looking forward to learning more about the composition of this sample.

The main activities in today's plan are to transfer, sieve, and drop-off the sample to CheMin, and also to acquire APXS on the drill tailings. The plan also includes a few additional frames to fill in the MAHLI self portrait.



And even though today is a Friday and we would normally be planning 3 sols to cover the weekend, the team has decided to take advantage of some Saturday operations to maximize our number of planning days. A big thanks to those team members who volunteered to work tomorrow! The rest of us will be traveling to Pasadena this weekend for our team meeting next week. I'm sure there will be a lot of new data to discuss!

--Lauren is a Research Geologist at the USGS Astrogeology Science Center and a member of MSL science team."

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)

January 27, 2015



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: everal Drives This Week Put Opportunity Near Marathon Distance - sols 3909-3914, January 22, 2015-January 27, 2015:

"Opportunity is on the west rim of Endeavour Crater heading towards "Marathon Valley," a putative location for abundant clay minerals now about 984 feet (300 meters) away.

The project is operating the rover without using the Flash storage system to avoid reset problems and is using instead random access memory (RAM) for temporary storage of telemetry. The project is preparing to mask off the troubled sector of Flash and resume using the remainder of the Flash file system in normal operations.

Opportunity drove on Sols 3909, 3911 and 3914 (Jan. 22, Jan. 24 and Jan. 27, 2015), totaling almost 279 feet (85 meters). On the evening of Sol 3912 (Jan. 25, 2015), an atmospheric argon measurement was collected with the Alpha Particle X-ray Spectrometer. Targeted color imagery is being collected as the rover makes progress towards the "Spirit of St. Louis" crater and Marathon Valley.

As of Sol 3914 (Jan. 27, 2015), the estimated solar array energy production was 534 watt-hours with an atmospheric opacity (Tau) of 0.891 and an inferred solar array dust factor of 0.636.

Total odometry is 26.02 miles (41.88 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

December 12, 2014

Signs of Ancient Mars Lakes and Quakes Seen in New Map

[Full image and caption](#)

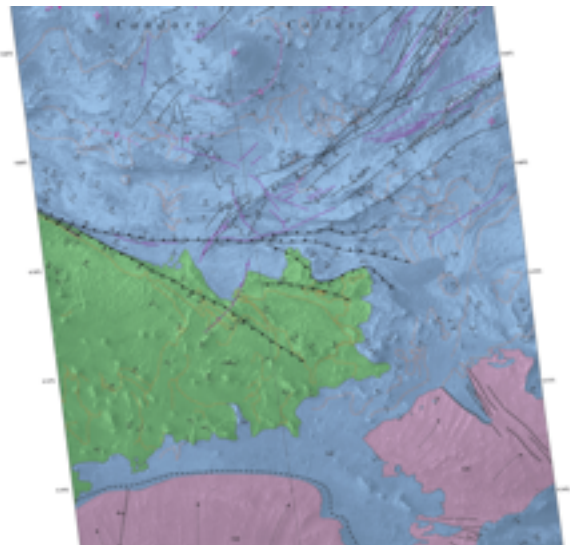
Video

This animation simulates a flyover of a portion of a Martian canyon detailed in a geological map produced by the U.S. Geological Survey and based on observations by the HiRISE camera on NASA's Mars Reconnaissance Orbiter. The landforms include a series of hills called Candor Colles.

"Long ago, in the largest canyon system in our solar system, vibrations from "marsquakes" shook soft sediments that had accumulated in Martian lakes.

The shaken sediments formed features that now appear as a series of low hills apparent in a geological map based on NASA images. The map was released today by the U.S. Geological Survey (USGS).

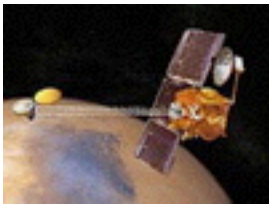
This map of the western Candor Chasma canyon within Mars' Valles Marineris is the highest-resolution Martian geological map ever released by USGS. It is derived from images taken by the High Resolution Imaging Science Experiment (HiRISE) camera on NASA's Mars Reconnaissance Orbiter, which reveal details smaller than a desk. The map is available for download at: <http://pubs.usgs.gov/sim/3309/>"



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

December 02, 2014
NASA's Journey to Mars

"NASA is developing the capabilities needed to send humans to an asteroid by 2025 and Mars in the 2030s - goals outlined in the bipartisan NASA Authorization Act of 2010 and in the U.S. National Space Policy, also issued in 2010.

Mars is a rich destination for scientific discovery and robotic and human exploration as we expand our presence into the solar system. Its formation and evolution are comparable to Earth, helping us learn more about our own planet's history and future. Mars had conditions



suitable for life in its past. Future exploration could uncover evidence of life, answering one of the fundamental mysteries of the cosmos: Does life exist beyond Earth?

While robotic explorers have studied Mars for more than 40 years, NASA's path for the human exploration of Mars begins in low-Earth orbit aboard the International Space Station. Astronauts on the orbiting laboratory are helping us prove many of the technologies and communications systems needed for human missions to deep space, including Mars. The space station also advances our understanding of how the body changes in space and how to protect astronaut health.

Our next step is deep space, where NASA will send a robotic mission to capture and redirect an asteroid to orbit the moon. Astronauts aboard the Orion spacecraft will explore the asteroid in the 2020s, returning to Earth with samples. This experience in human spaceflight beyond low-Earth orbit will help NASA test new systems and capabilities, such as Solar Electric Propulsion, which we'll need to send cargo as part of human missions to Mars. Beginning in FY 2018, NASA's powerful Space Launch System rocket will enable these "proving ground"

missions to test new capabilities. Human missions to Mars will rely on Orion and an evolved version of SLS that will be the most powerful launch vehicle ever flown."

[See the Mars As Art Gallery](#)

[Dulles Airport Full News Release](#)

[Global Martian Map](#)

A simulated fly-through using the newly assembled imagery is available online at http://www.nasa.gov/mission_pages/mars/missions/odyssey/20060313.html.

The fly-through plus tools for wandering across and zooming into the large image are at <http://themis.asu.edu/>.

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>.

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

Cloudbait Observatory, Guffey Colorado - <http://www.cloudbait.com> - Submit your fireball reports here. Interesting, knowledgeable site.

Colorado Springs Astronomical Society - <http://csastro.org> - The Colorado Springs Astronomical Society (CSAS) is a nonprofit organization dedicated to the enjoyment of the nighttime sky.

Denver Astronomical Society - <http://www.denverastrosociety.org> - Promotes the enjoyment and understanding of astronomical phenomena, history and lore by providing educational and observing opportunities for our members, general public, and outreach activities at the University of Denver's historic Chamberlin Observatory, schools, and nature centers.

Gateway2Space - <http://www.gateway2space.com> - More information about the Star Light -- Star Bright Observatory.

Little Thompson Observatory - <http://www.starkids.org/> - The Little Thompson Observatory (LTO) offers no-charge public access to the wonders of the night sky, either on one of our regularly scheduled [public nights](#), or as a [private group affair](#). When the weather co-operates, each session includes a guided tour of the sky using our large (18") telescope.

Mike Coletta's SatWatch - <http://www.kg0ufo.com> - Orbiting object and satellite watching. ORBITING OBJECT TRACKING ... It's the thrill of the chase. Promoting and supporting the hobby of amateur radio, Mike - KG0UFO, along with many other radio hobbyists around the globe use the reflected signals of the AF Space Fence to detect orbiting objects as they make their way over the US. - The AF Space Fence was shut down in Sept. 2013. These are recordings of Mike's many observations.

National Space Science & Technology Institute - <http://www.nssti.org> - NSSTI runs the Star Light--Star Bright Observatory in Colorado Springs, Colorado.

Northern Colorado Astronomical Society - <http://ncaastro.org/> - The purpose of our organization is to encourage the understanding & interest in the science & hobby of astronomy.

Rocky Mountain Star Stare - <http://www.rmss.org> - The Premier Star Party in The Rocky Mountains

Sangre Stargazers - <http://sangrestargazers.skymtn.com/> - New astronomy club in the Wet Mountain Valley of Custer County (about 45 miles due west of Pueblo, CO).

Southern Colorado Astronomical Society - <http://www.scaspueblo.com> - The Southern Colorado Astronomical Society, CSU-P and the Pueblo Nature and Raptor Center welcomes everyone to participate in the discovery of our night sky.

Other Astronomy Links

*****NEW*** A Sea of Stars - Voyages of a Merchant Mariner & Amateur Astronomer** - <http://gloriousseas.blogspot.com/> - I'm a retired Navy veteran, currently sailing with the US Navy's Military Sealift Command as an Operations Chief. My dominant interests are science (esp. astronomy), history and photography, and I enjoy naval and military wargaming WHEN I can find the time.

A Guide to the Galaxy Right from our Bedroom Window - <http://www.bedroomfurniturespot.com/guide-to-galaxies> - An interesting site suggested by the students from Lexington Middle School Science Club in Nebraska. Lots of good basic astronomy information.

A Kid's Guide to Astronomy - <http://www.jmacsupply.com/astronomy-guide-for-kids-a/316.htm> - A great site with other links to learn about stars and astronomy for kids of all ages.

"TheSky" Software - <http://www.bisque.com> - Astronomy software by Software Bisque.

A Short Guide to Celestial Navigation - <http://www.celnav.de/> - Celestial navigation is the art and science of finding one's geographic position by means of astronomical observations, particularly by measuring altitudes of celestial objects – sun, moon, planets, or stars.

Amateur Radio Relay League - <http://www.arrl.org> - Information about amateur radio and how to become an amateur radio operator.

Astrogirl Homepage - <http://www.astrogirl.org> - Family friendly educational astronomy website.

Astronomical Lexicon - <http://www.ki0ar.com/astrolex.html> - Many of the astronomical terms used in this newsletter are defined here.

Astronomy Picture of the Day - <http://antwrp.gsfc.nasa.gov/apod/astropix.html> - A different picture of the cosmos every day.

Astronomy 2009 - <http://www.surveillance-video.com/astronomy-sept-2009.html> - This site has some good links a young, interested student wishes to share.

Be an Astronomer right from your Window - <http://www.blindschalet.com/kba-be-an-astronomer-right-from-your-window-240.html> - At-home astronomy techniques.

Black Hole Encyclopedia - <http://blackholes.stardate.org/> - Excellent site from StarDate - University of Texas McDonald Observatory (<http://mcdonaldobservatory.org/>)

Caelum Observatory - <http://www.caelumobservatory.com/index.html> - The LARGEST dedicated public telescope in the Southwest at the Mount Lemmon SkyCenter!

Celestial Bodies and Astronomy - <http://ellejet.com/celestial-bodies.php>.

Celestron Telescopes - <http://www.celestron.com/> - Celestron telescopes.

Clear Skies Observing Guides - <http://www.clearskies.eu> - CSOG, short for Clear Skies Observing Guides is a new concept in visual amateur astronomy. It is a digital publication that will enable observers to target all deepsky objects and carbon stars within reach of their equipment.

The Constellations and Their Stars - <http://www.astro.wisc.edu/~dolan/constellations/constellations.html> - Good site for finding out more about the 88 constellations and their associated stars.

CosmoQuest - <http://cosmoquest.org/> - The place where you map other worlds, explore our universe and contribute to science.

Distant Suns - <http://www.distantstars.com/> - Desktop Astronomy package for PCs.

EarthSky - <http://earthsky.org> - Astronomy news.

Green Laser - <http://www.greenlaser.com> - If you're looking for a reasonably priced laser pointer that is great for astronomy work, visit this site.

Groovy Adventures - <http://www.groovyadventures.com> - Unique adventures and vacations including astronomy related vacations.

Heavens Above - <http://www.heavens-above.com> - As the name implies - What's up in the heavens, particularly satellite passes.

The International Dark-Sky Association - <http://www.darksky.org> - To preserve and protect the nighttime environment and our heritage of dark skies.

informED: 10 Teaching Tools for Educators - <http://www.opencolleges.edu.au/informed/teacher-resources/> - informED - Teacher Resources.

iTelescope.net - <http://www.itelescope.net> - iTelescope.Net is the world's premier network of Internet connected telescopes, allowing members to take astronomical images of the night sky for the purposes of education, scientific research and astrophotography.

JPL Solar System Ambassador Program - <http://www.jpl.nasa.gov/ambassador/front.html> - "Volunteers Bringing the Solar System to the Public"

JPL Solar System - http://www.jpl.nasa.gov/solar_system/ - Jet Propulsion Laboratory information on our solar system.

Kids Space Center - Telescopes and Astronomy - <http://www.orlandofuntickets.com/kids-space-center-telescopes-and-astronomy/> - Another site suggested by a young student - Great info about telescopes.

Mars Exploration, Mars Rovers Information, Facts, News, Photos - <http://science.nationalgeographic.com/science/space/space-exploration/mars-exploration-article/> - National Geographic - Mars Exploration - Investigating the Red Planet.

Meade Advanced Products Users Group - <http://www.mapug-astronomy.net/> - Mapug-Astronomy Topical Archive & information resource, containing a massive 335 page archive of discussions about Meade equipment, and much more: observatories, observing lists, permanent piers, equatorial wedges, remote operations, software, eyepieces, etc.

My Stars Live - <http://www.mystarslive.com/> - Interactive Star Chart

NASA - Lunar and Planetary Science - <http://nssdc.gsfc.nasa.gov/planetary/planets/cometpage.html> - General information, Missions to Comets, Data, Press Releases, Meteors and Meteorites, Other topics of Interest.

NASA Science News - <http://science.nasa.gov/> - NASA missions, updates, astronomy news, excellent resource.

National Archives info on space exploration - <http://www.archives.gov/research/alic/reference/space-exploration.html> - Archives Library Information Center (ALIC) - Space Exploration - Information about the United States' space flight programs, including NASA missions and the astronauts who participate in the efforts to explore space.

Skymaps.com - <http://www.skymaps.com> - Free sky maps each month.

Skywatch Sightings from NASA - <http://spaceflight.nasa.gov/realdata/sightings/> - This site gives you the best times to watch the ISS pass over or near your location.

Space.com - <http://space.com> - Interesting space and astronomy articles.

Spaceflight Now - <http://spaceflightnow.com/> - Launches and satellite news.

SpaceLinks/Space Careers - <http://www.spacelinks.com/SpaceCareers/> - SPACELINKS is a specialist staffing consultancy sourcing and supplying high caliber professionals for a wide range of world class organizations in the Space and Defense industry.

"SpaceRef.com" - <http://www.spaceref.com/> - SpaceRef's 21 news and reference web sites are designed to allow both the novice and specialist alike to explore outer space and Earth observation.

Space Weather - <http://www.spaceweather.com> - Check out what the Sun is doing as seen from space.

Stellarium - <http://www.stellarium.org> - Free, downloadable planetarium/astronomy software.

Universe Today - <http://www.universetoday.com> - Short, interesting articles about space and related topics.

Wikisky - <http://www.wikisky.org> - WIKISKY is a non-commercial project. The main purpose of WIKISKY is to consolidate astronomical, astrophysical and other information about different space objects and astrophysical facts.

Acknowledgments and References

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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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