IAAS Monthly Astronomy Newsletter March 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

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

The Moon

Phases:

- Full Moon occurs on the 5th.
- Last Quarter Moon occurs on the 13th.
- New Moon occurs on the 20th.
- First Quarter Moon occurs on the 27th.

- The Moon is at Apogee on the 5th, 252,516 miles from Earth.
- The Moon is at Perigee on the 19th, 222,192 miles from Earth.

Moon/Planet Pairs:

- The Moon passes 5° south of Jupiter on the 3rd.
- Venus passes 0.1° north of Uranus on the 4th.
- Mars passes 0.3° north of Uranus on the 11th.
- The Moon passes 2° north of Saturn on the 12th.
- The Moon passes 4° north of Neptune on the 18th.
- The Moon passes 5° north of Mercury on the 19th.
- The Moon passes 0.1° north of Uranus on the 21st.
- The Moon passes 1.0° south of Mars on the 21st.
- The Moon passes 3° south of Venus on the 22nd.
- The Moon passes 0.9° north of Aldebaran on the 25th.
- The Moon passes 6° south of Jupiter on the 30th.

For reference: The Full Moon subtends an angle of 0.5°.

The Planets & Dwarf Planets

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

(All times are local unless otherwise noted.)

Planetary Highlights for March

Spring returns to the northern hemisphere this month. Looking to the west, start your evening by observing brilliant Venus and ruddy Mars. Swing around to the east and spot our largest planet, Jupiter. After midnight, Saturn is visible before sunrise for early morning observers. Catch Mercury early in the month just before sunrise. 10th magnitude Comet Lovejoy passes through Cassiopeia this month. Icelanders will be treated to a solar eclipse on the 20th.

Mercury
Mercury rises at 5:28 a.m. on the 1st and about 6:34 a.m. by month's end. Look for Mercury low to the southeast about 30 minutes before sunrise during the first couple of weeks in March. Mercury moves from the constellation of Capricornus into Pisces shining at magnitude 0.0 on the 1st.

Venus
Sets at 8:20 p.m. on the 1st and about 8:17 p.m. by month's end. Look for Venus low near the western horizon soon after sunset. Venus moves from the constellation Pisces into Aries shining at magnitude -3.9.

Earth
Daylight Savings Time begins at 2:00 a.m. on the 8th for most of North America. The Vernal equinox occurs on the 20th at 6:45 p.m. EDT.

Mars
Sets at 8:03 p.m. on the 1st and about 8:58 p.m. by month's end. Mars can be spotted just below Venus this month rapidly approaching the western horizon. Mars moves from the constellation of Cetus into Aries this month shining at magnitude 1.3.

Jupiter
Sets at 5:37 a.m. on the 1st and about 4:29 a.m. by month's end. Jupiter is visible almost all night long. Look for Jupiter in the east soon after sunset. Jupiter is in the constellation of Cancer shining at magnitude -2.4.

Saturn
Rises at 12:41 a.m. on the 1st and about 11:34 p.m. by month's end. Saturn is best viewed after midnight this month. Saturn is in the constellation of Scorpius shining at magnitude 0.4.

Uranus
Sets at 8:36 p.m. on the 1st and about 7:42 p.m. by month's end. The best time to observe Uranus this month will be on the evening of the 4th, look for Uranus less than a full moon's width below Venus. Uranus is in the constellation of Pisces shining at magnitude 5.9.

Neptune

Has returned to the morning sky this month but remains too low to spot easily. Neptune rises at 6:30 a.m. on the 1st and about 5:31 a.m. by month's end. Look for Neptune very low to the east in the morning sky. Neptune is in the constellation of Aquarius shining at magnitude 8.0.

Dwarf Planets

Ceres

Rises at 4:14 a.m. on the 1st and about 4:53 a.m. by month's end. Ceres will be difficult to spot to the southeast before sunrise. Ceres moves from the constellation of Sagittarius into Capricornus shining at magnitude 9.1.

Pluto

Rises at 3:36 a.m. on the 1st and about 2:36 a.m. by month's end. Pluto may be a little easier to spot as it continues to rise earlier in the a.m. hours. 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 but none that produce rates much higher than 2-5 per hour, except the Gamma Normids that extend over the period of March 11 to 21, with the maximum occurring on March 16. The maximum rate reaches about 5-9 meteors per hour.

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

Comets

Comet Lovejoy (C/2014 Q2) is passing through the constellation of Cassiopeia this month making is visible for northern observers all night long. Shining at 10th magnitude, Comet Lovejoy will be difficult to spot unless observed from dark sky sites. Comet Lovejoy passes about 1° west of open cluster M103 on the 17th.

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 Uranus to the west soon after sunset.
- Observe Jupiter all night long this month.
- Observe Saturn and Mercury in the early morning sky before sunrise.
- Try to spot Comet Lovejoy with a small telescope or binoculars.

Asteroids

(From west to east)

- **Juno** is in the constellation of Cancer.
- **Iris** is at opposition on the 6th in the constellation of Leo.
- **Eleanora** is at opposition on the 5th in the constellation of Leo.
- **Nysa** is at opposition on the 22nd in the constellation of Virgo.
- **Massalia** is in the constellation of Virgo.
- **Herculina** is in the constellation of Ophiuchus.
- **Pallas** is in the constellation of Ophiuchus.

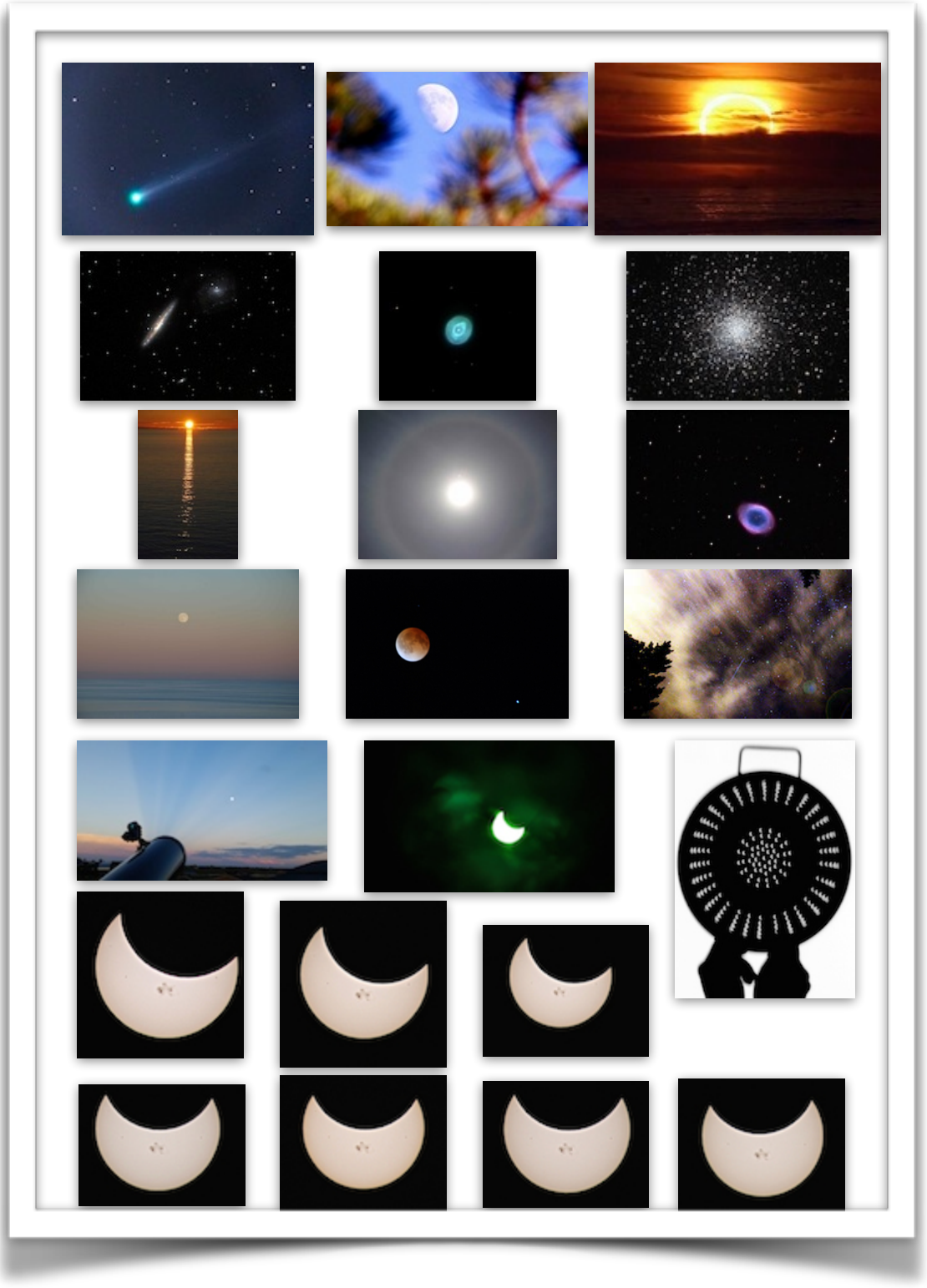
Information about the Minor Planets can be found at http://www.minorplanetobserver.com the Minor Planet Observer web site.

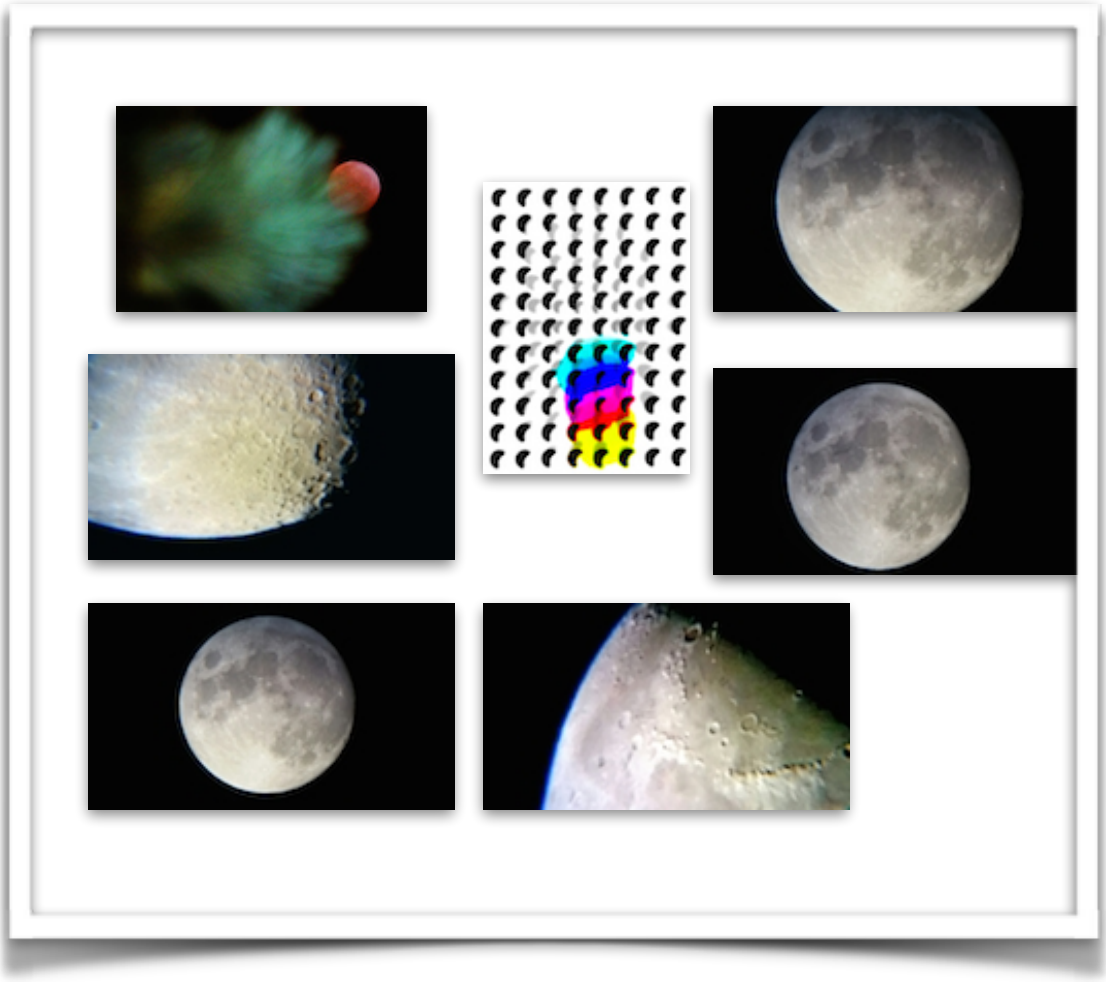
Occultations

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

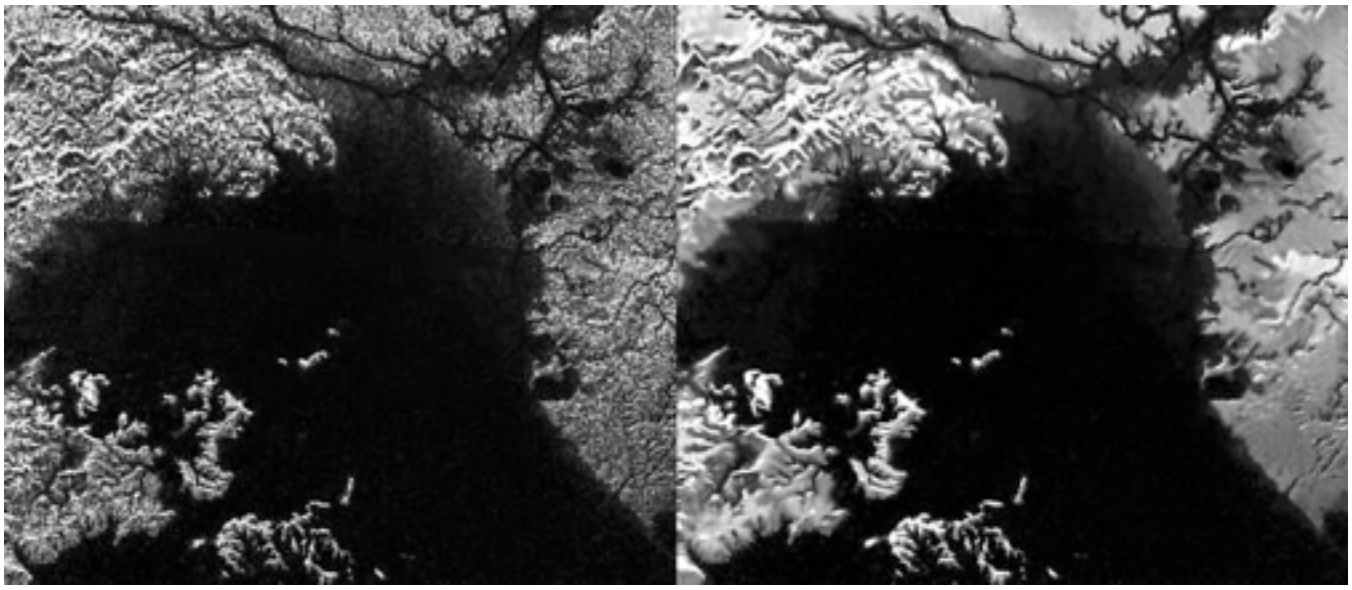
(Excerpts from recent mission updates)

Cassini

February 12, 2015

A New Way to View Titan: 'Despeckle' It

Full image and caption



"-- Radar images of Titan have always had a grainy appearance due to electronic noise.

-- A new tool suppresses the noise, resulting in clearer views than ever before.

During 10 years of discovery, NASA's Cassini spacecraft has pulled back the smoggy veil that obscures the surface of Titan, Saturn's largest moon. Cassini's radar instrument has mapped almost half of the giant moon's surface; revealed vast, desert-like expanses of sand dunes; and plumbed the depths of expansive hydrocarbon seas. What could make that scientific bounty even more amazing? Well, what if the radar images could look even better?

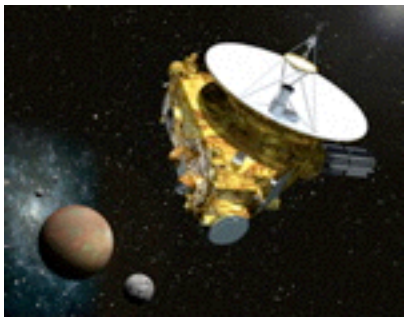
Thanks to a recently developed technique for handling noise in Cassini's radar images, these views now have a whole new look. The technique, referred to by its developers as "despeckling," produces images of Titan's surface that are much clearer and easier to look at than the views to which scientists and the public have grown accustomed."

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

February 18, 2015

85 Years after Pluto's Discovery, New Horizons Spots Small Moons Orbiting Pluto

"Exactly 85 years after Clyde Tombaugh's historic discovery of Pluto, the NASA spacecraft set to encounter the icy planet this summer is providing its first views of the small moons orbiting Pluto.

The moons Nix and Hydra are visible in a series of images taken by the New Horizons spacecraft from Jan. 27-Feb. 8, at distances ranging from about 125 million to 115 million miles (201 million to 186 million kilometers). The long-exposure images offer New Horizons' best view yet of these two small moons circling Pluto, which Tombaugh discovered at Lowell Observatory in Flagstaff, Arizona, on Feb. 18, 1930.

"Professor Tombaugh's discovery of Pluto was far ahead its time, heralding the discovery of the Kuiper Belt and a new class of planet," says Alan Stern, New Horizons principal investigator from Southwest Research Institute, Boulder, Colorado. "The New Horizons team salutes his historic accomplishment."

Assembled into a seven-frame movie, the new images provide the spacecraft's first extended look at Hydra (identified by a yellow diamond) and its first-ever view of Nix (orange diamond). The right-hand image set has been specially processed to make the small moons easier to see."

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)

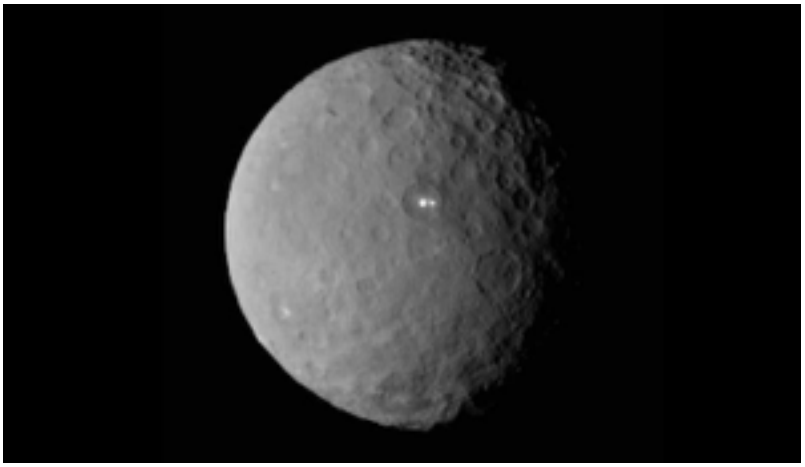
Find New Horizons in the iTunes App Store here. (http://itunes.com/apps/newhorizonsanasavoyagetopluto)

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

February 25, 2015
'Bright Spot' on Ceres Has Dimmer Companion



"Dwarf planet Ceres continues to puzzle scientists as NASA's Dawn spacecraft gets closer to being captured into orbit around the object. The latest images from Dawn, taken nearly 29,000 miles (46,000 kilometers) from Ceres, reveal that a bright spot that stands out in previous images lies close to yet another bright area.

"Ceres' bright spot can now be seen to have a companion of lesser brightness, but apparently in the same basin. This may be pointing to a volcano-like origin of the spots, but we will have to wait for better resolution before we can make such geologic interpretations," said Chris Russell, principal investigator for the Dawn mission, based at the University of California, Los Angeles.

Using its ion propulsion system, Dawn will enter orbit around Ceres on March 6. As scientists receive better and better views of the dwarf planet over the next 16 months, they hope to gain a deeper understanding of its origin and evolution by studying its surface. The intriguing bright spots and other interesting features of this captivating world will come into sharper focus."

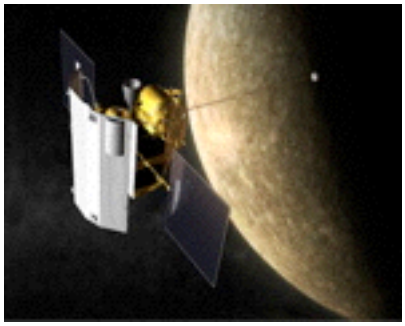
Ion Propulsion Dawn Video

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

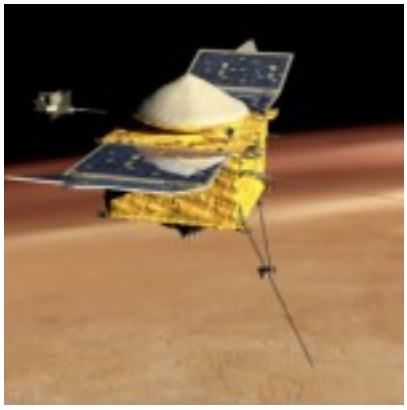
https://jmars.mars.asu.edu/
JMARS is an acronym that stands for Java Mission-planning and Analysis for Remote Sensing. It is a geospatial information system (GIS) developed by ASU's Mars Space Flight Facility to provide mission planning and data-analysis tools to NASA's orbiters, instrument team members, 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: February 11, 2015

"Bruce Jakosky, MAVEN principal investigator at CU-Boulder's Laboratory for Atmospheric and Space Physics"

"MAVEN is about to carry out its first "deep-dip" campaign. This involves lowering the lowest altitude in the orbit from about 150 km above the surface to about 125 km. We do this so that we can measure the properties of that additional 25 km of the upper atmosphere between 150 and 125 km. It doesn't seem like much, but this lets us go all the way down to the top of what we call the lower atmosphere, and it will let us make the connection then from the top of the upper atmosphere all the way down to the surface.

We'll use three rocket-motor burns to lower the orbit, spread over three days. We do it gradually so that the spacecraft can "walk in" and we don't get taken by surprise by anything along the way. Then we'll stay in the "deep dip" orbit for five days, which covers about 20 orbits around the planet. Finally, we'll use two maneuvers to "walk" back out and get back to our regular science mapping orbit."

Visit LASP and MAVEN for more information.

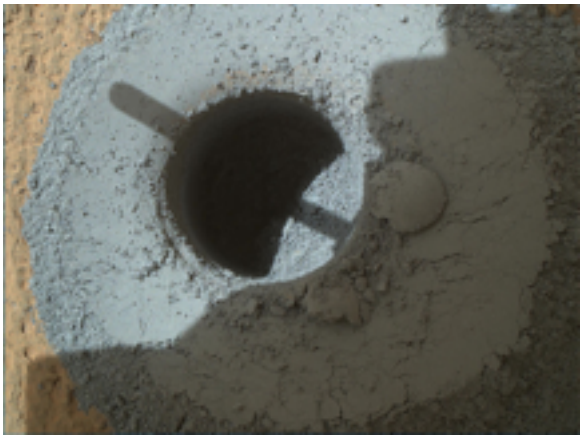
Mars Science Laboratory - Curiosity

February 25, 2015

NASA's Curiosity Mars Rover Drills at 'Telegraph Peak'

Hole at 'Telegraph Peak' Drilled by Mars Rover Curiosity

This hole, with a diameter slightly smaller than a U.S. dime, was drilled by NASA's Curiosity Mars rover into a rock target called "Telegraph Peak." The rock is located within the basal layer of Mount Sharp. The hole was drilled on Feb. 24, 2015. Credit: NASA/JPL-Caltech/MSSS



-- "Telegraph Peak" is third drilling site in outcrop at base of Mount Sharp

-- Choice of drilling site motivated by chemistry measurements

-- Mission heading through "Artist's Drive" and higher on Mount Sharp

"NASA's Curiosity Mars rover used its drill on Tuesday, Feb. 24 to collect sample powder from inside a rock target called "Telegraph Peak." The target sits in the upper portion of "Pahrump Hills," an outcrop the mission has been investigating for five months.

The Pahrump Hills campaign previously drilled at two other sites. The outcrop is an exposure of bedrock that forms the basal layer of Mount Sharp. Curiosity's extended mission, which began last year after a two-year prime mission, is examining layers of this mountain that are expected to hold records of how ancient wet environments on Mars evolved into drier environments.

The rover team is planning to drive Curiosity away from Pahrump Hills in coming days, exiting through a narrow valley called "Artist's Drive," which will lead the rover along a strategically planned route higher on the basal layer of Mount Sharp.

The Telegraph Peak site was selected after the team discussed the large set of physical and chemical measurements acquired throughout the campaign. In particular, measurements of the chemistry of the Telegraph Peak site, using the Alpha Particle X-ray Spectrometer (APXS) on the rover's arm, motivated selection of this target for drilling before the departure from Pahrump Hills."

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: Solar Panels Get a Small Energy Boost - sols 3928-3936, February 10, 2015-February 18, 2015:

"Opportunity is on the west rim of Endeavour Crater heading towards "Marathon Valley," a putative location for abundant clay minerals now only about 492 feet (150 meters) away.

The project is preparing to mask off the troubled Bank 7 sector of the Flash file system with a new version of the flight software to be uploaded shortly. On Sols 3928 and 3929 (Feb. 10 and 11, 2015), Opportunity performed some targeted color Panoramic Camera (Pancam) observations. On Sol 3930 (Feb. 12, 2015), the rover drove about 66 feet (20 meters) to get a view into Marathon Valley. This was followed by a post-drive Navigation Camera (Navcam) panorama. Opportunity drove again on Sol 3932 (Feb. 14, 2015), bumping near a potential surface target. An atmospheric argon measurement with the Alpha Particle X-ray Spectrometer (APXS) was made. On the following two sols a 360-degree Navcam panorama was collected.

A small dust cleaning events occurred on Sol 3934 (Feb. 16, 2015) improving energy production by about 12 percent. On Sol 3935 (Feb. 17, 2015), the robotic arm was used to collect a Microscopic Imager (MI) mosaic of the surface target "Jean Baptiste Charboneau" followed by an APXS placement on the same for a multi-hour integration. Opportunity drove

again on Sol 3936 (Feb. 18, 2015), with a 9.8-meter drive to get a better view into the interior of Marathon Valley.

As of Sol 3936 (Feb. 18, 2015), the solar array energy production was 559 watt-hours with an atmospheric opacity (Tau) of 0.816 and an improved solar array dust factor of 0.695.

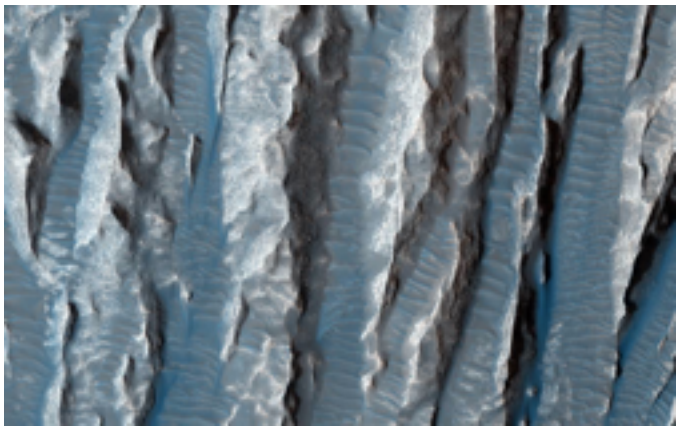
Total odometry is 26.13 miles (42.05 kilometers)."

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

February 09, 2015
NASA Spacecraft Completes 40,000 Mars Orbits
Full image and caption



-- NASA's Mars Reconnaissance Orbiter, at Mars since 2006, has now orbited the Red Planet more than 40,000 times

-- The continuing mission studies the whole planet and has shown that Mars is diverse and dynamic

"NASA's Mars Reconnaissance Orbiter passed a mission milestone of 40,000 orbits on Feb. 7, 2015, in its ninth year of returning information about the atmosphere, surface and subsurface of Mars, from equatorial to polar latitudes.

The mission's potent science instruments and extended lifespan have revealed that Mars is a world more dynamic and diverse than was previously realized. Now in its fourth mission extension after a two-year prime mission, the orbiter is investigating seasonal and longer-term changes, including some warm-season flows that are the strongest evidence so far for liquid water on Mars today.

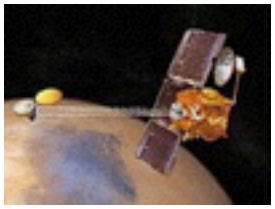
The orbiter has returned 247 terabits of data, which is more than the combined total from every other mission that has ever departed Earth to visit another planet."

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.

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

NEW **Star Cruiser Bill's Astrophotography -** http://www.kd0npt-astro.net - Great astrophotography from Aurora Colorado.

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://ncastro.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 out universe and contribute to science.

Distant Suns - http://www.distantsuns.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

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 -
http://ki0ar.com/pipermail/astronews_ki0ar.com/

- Full documentation of the online administration system is available at http://ki0ar.com/mailman/listinfo/astronews_ki0ar.com.

- The latest version of the newsletter is accessible from http://www.ki0ar.com/astro.html.

Keep looking UP!

73 from KI0AR

Created by Burness F. Ansell, III
ki0ar@ki0ar.com

COO, Director of Aerospace Technologies, IAAS
JPL Solar System Ambassador, Colorado
Last modified: March 01, 2015