Galactic Observer

John J. McCarthy Observatory

Volume 5, No. 10 October 2012

Stellar Aviary

About 2,000 light years away in the constellation Cygnus ("*The Swan*"), a fiery cauldron of dust and gas swirls into fanciful shapes. Of particular fancy here is the Pelican nebula (IC 5070), about 30 light years across. To the left and out of view is the North America Nebula, part of the same vast star forming region.

Source: Marc Polansky, McCarthy Observatory

(See inside, page 15 for details)

Below: Visible light image of North America Nebula taken by Spitzer space telescope

Source: Davide De Martin; NASA, JPL Caltech

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It is through their efforts that the McCarthy Observatory has established itself as a significant educational and recreational resource within the western Connecticut community.

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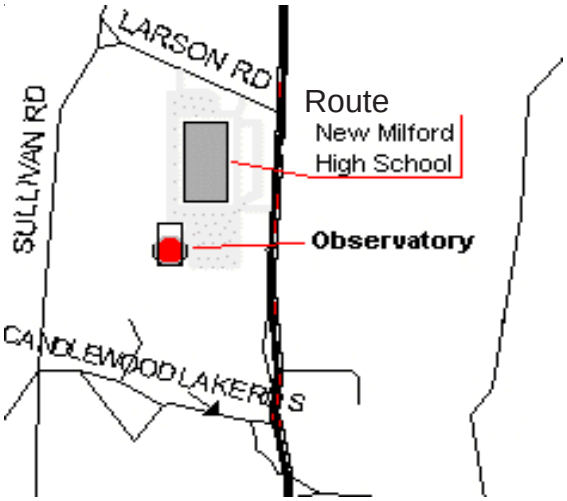


In This Issue

October Calendar and Space Exploration Almanac

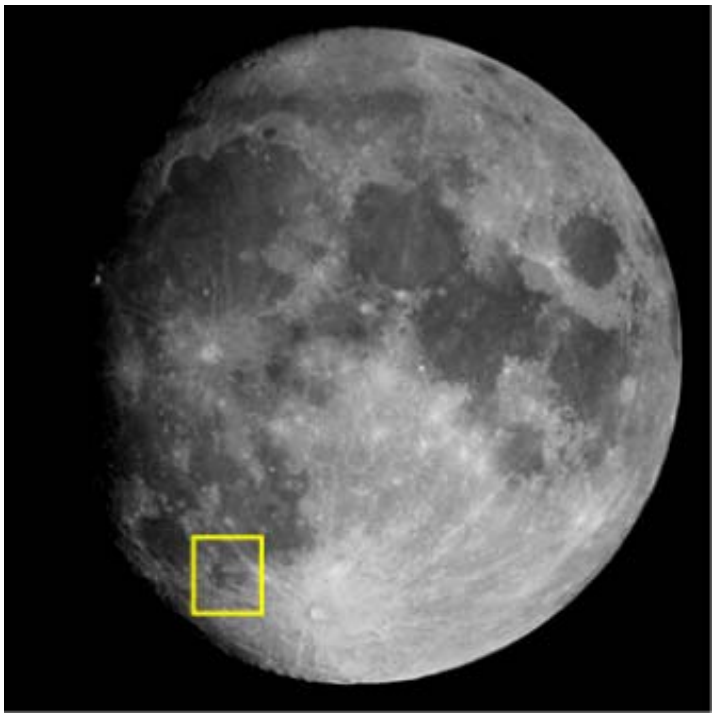
"Out the Window on Your Left"

IT'S BEEN 40 YEARS SINCE we left the last footprint on the dusty lunar surface. Sadly, as a nation founded on exploration and the conquest of new frontiers, we appear to have lost our will to lead as a space-faring nation. But, what if the average citizen had the means to visit our only natural satellite; what would they see out the window of their spacecraft as they entered orbit around the Moon? This column may provide some thoughts to ponder when planning your visit (if only in your imagination).

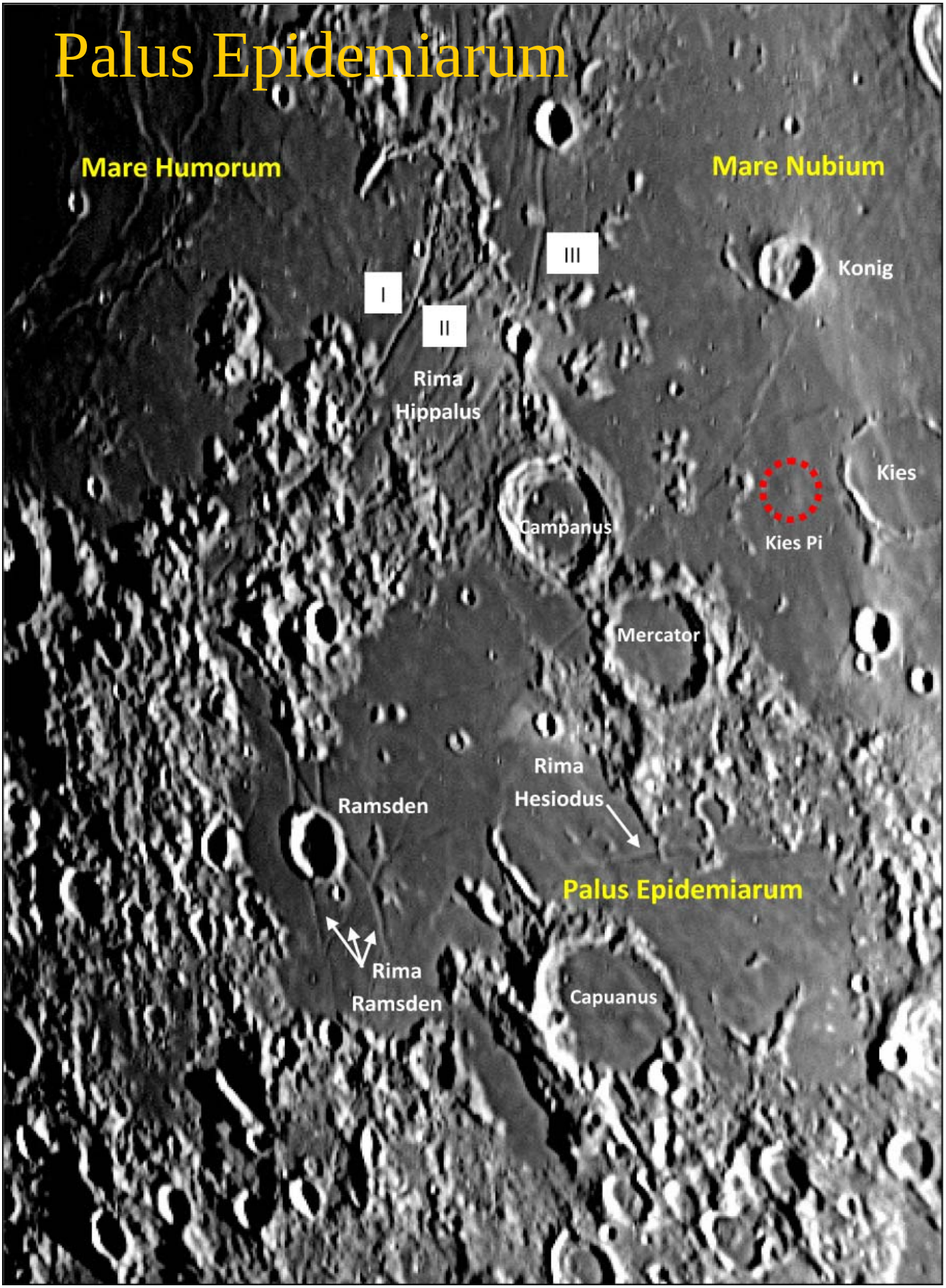
In keeping with a Halloween theme, the lunar landscape featured this month has the unsettling name "Palus Epidemiarum" or Marsh of Epidemics. While we know now that the Moon is a sterile world and devoid of any form of life, scientists as recently as 1969 weren't quite sure. Upon their return to Earth, the three Apollo 11 astronauts had to wait for the tickertape parades as they were quarantined for 21 days in a converted Airstream trailer to prevent the spread of any lunar contagions. It wasn't until after the Apollo 14 mission that the isolation requirement was eliminated.

Palus Epidemiarum (image on next page) is a relatively obscure lunar lava plain located adjacent to and southwest of Mare Nubium (Sea of Clouds) and southeast of Mare Humorum (Sea of Moisture). The Lunar Reconnaissance Orbiter's ACT-REACT QuickMap altimetry tool shows that the mare slopes downward from west to east. The southern portion of the marsh is dominated by the crater Capuanus. At 34 miles (55 km) in diameter, its western wall rises more than 8,000 feet (2.4 km) above the plain, while other portions of the rim have been almost obliterated by lava flows and subsequent impacts. While difficult to detect, there are several low lava domes on the floor of Capuanus, as well as streaks running diagonally across its surface (possibly contrasting hued ejecta from nearby impacts). The northern boundary of the marsh is defined by the twin craters Campanus and Mercator. Running between the craters, a narrow vale leads from the marsh to the adjacent Mare Nubium and the flooded crater Kies and adjacent lava dome Pi Kies. The broad, gently sloping lava dome is approximately 525 feet (160 m) high with a distinct vent at the top.

A Lunar Rille



There are several prominent rilles (channels) in the image of Palus Epidemiarum. The three concentric rilles (to Mare Humorum), and marked by Roman Numerals I, II, and III, were created by the settling of the Humorum basin lava. A network of smaller rilles is visible around the crater Ramsden. These rilles appear to have been formed as the crust was uplifted from below. Another broader rille can be seen in the lower right of the image. Rima Hesiodus runs northeast from the center of Palus Epidemiarum, approximately 185 miles (300 km) to the crater Hesiodus in Mare Nubium.


Palus Epidemiarum
Mare Humorum
Mare Nubium
III
I
II
Konig
Rima
Hippalus
Kies
Kies Pi
Campanus
Mercator
Rima
Hesiodus
Ramsden
Palus Epidemiarum
Rima
Ramsden
Capuanus

Cassini

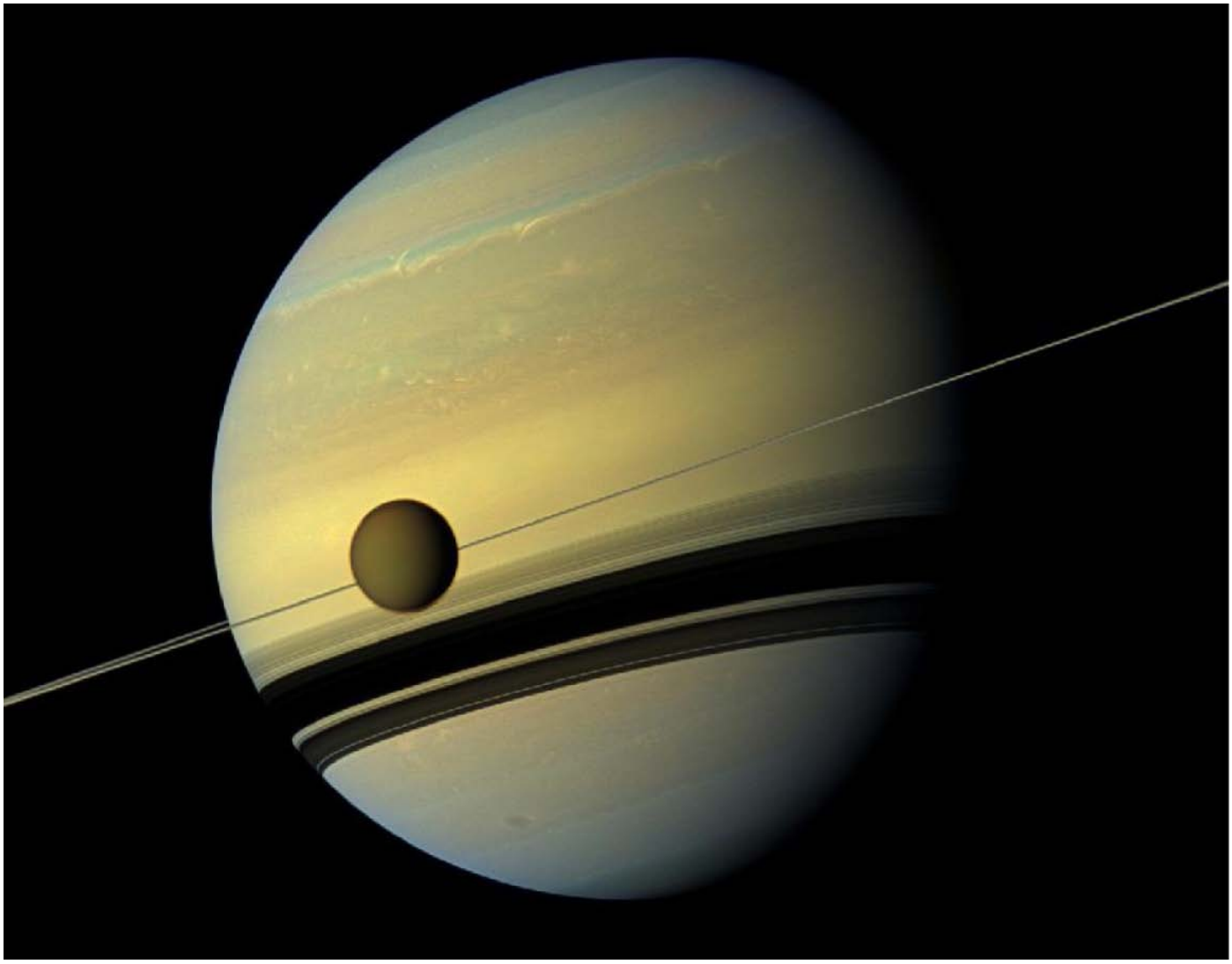
FIFTEEN YEARS AFTER it was launched on October 15, 1997, and more than eight years after entering orbit, the Cassini spacecraft is still making new discoveries and returning amazing images from the Saturnian system.

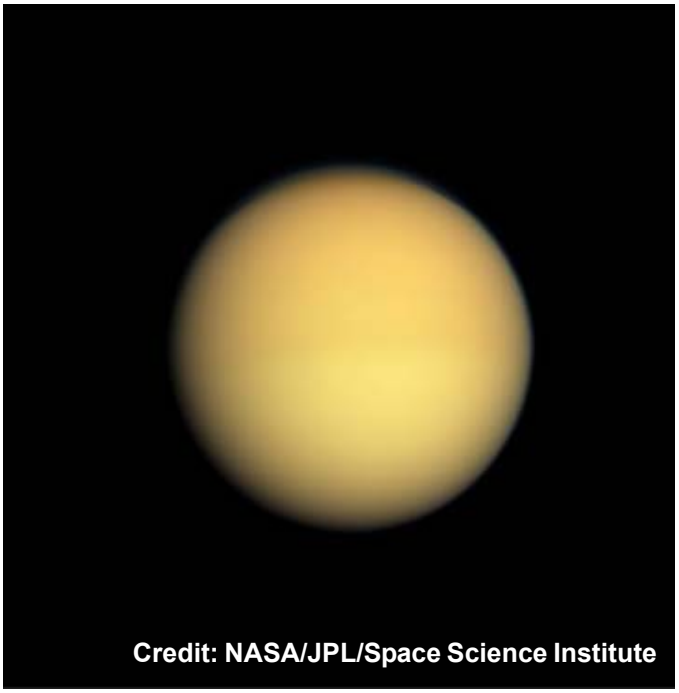
Launched from the Cape Canaveral Air Force Station in Florida, the Titan IVB/Centaur rocket was the largest booster available to NASA at the time. However, it wasn't powerful enough to propel the 13,200 pound (6,000 kg) spacecraft on a direct path to Saturn. As such, the spacecraft was sent on a more circuitous route (2.2 billion miles or 3.5 billion km) that involved flybys of Venus (twice), Earth and Jupiter for gravitational assists.

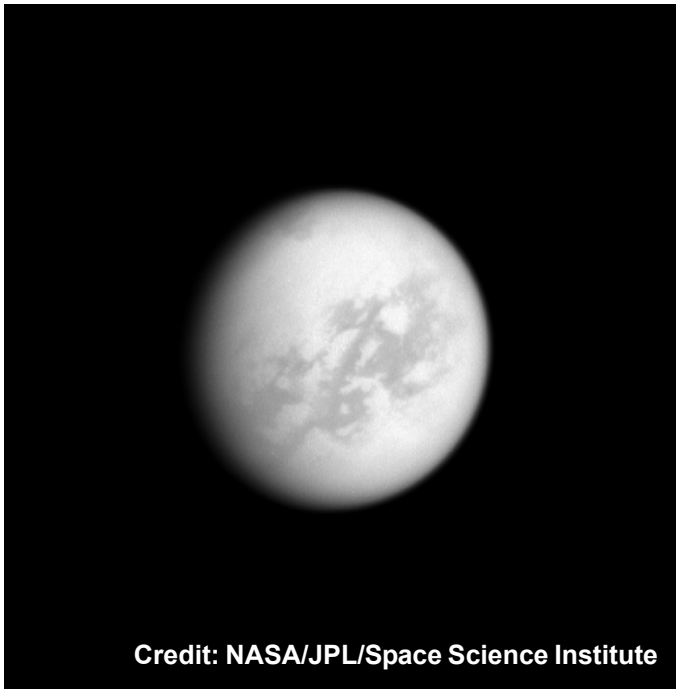
Cassini has traveled with Saturn for more than a quarter of its orbit around the Sun (29.7 years). Over this period, the spacecraft has observed seasonal changes as spring arrives in the northern hemisphere and fall in the southern (it was winter in the northern hemisphere and summer in the southern hemisphere when Cassini arrived eight years ago).

Since arriving in the Saturnian system, engineers have used Titan (Saturn's largest moon and larger than the planet Mercury) to adjust the spacecraft's speed and direction. Close encounters will Titan have allowed Cassini to modify it orbit and visit, and revisit, many of Saturn's larger moons. Orbit modification has also been used to adjust the spacecraft's viewpoint from equatorial (in the plane of the rings) to polar and back again.

The image of Saturn and Titan (below) is a mosaic taken with several filters to create a natural view of the colors. The two images of Titan (next page) show the haze shrouded moon in natural light (left) and in near-infrared light (right). Additional images of Titan and the other moons visited by the Cassini spacecraft can be found at the website: *http://www.ciclops.org/index.php (CICLOPS* - Cassini Imaging Central Laboratory for Operations).

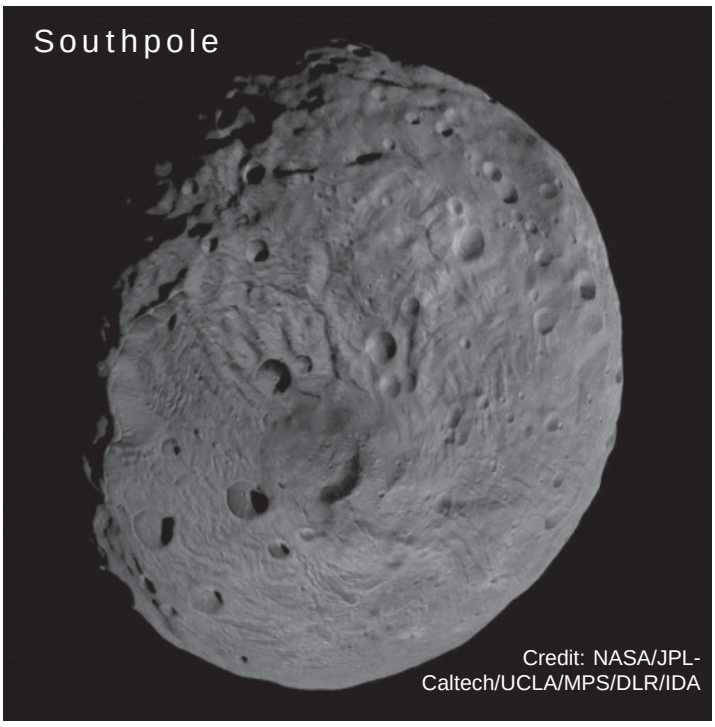






Dawn Mission – On to Ceres

On September 5th (EDT), the Dawn spacecraft set off on its journey to the dwarf planet Ceres after spending more than a year in orbit around the asteroid Vesta. Dawn's exploration of Vesta, the second largest asteroid in the solar system, revealed a rocky body that had completely melted in the distant past. The melting produced a layered structure and a large iron core between 133 and 140 miles in diameter (214 to 226 km) – almost one-third the diameter of the asteroid. A differentiated planetary body such as this is more consistent with expectations for a protoplanet than for an asteroid.



The spacecraft also found evidence that Vesta had been significantly modified over time (as have all solid bodies in the solar system) by impacts that included two cataclysmic events. The impacts that created overlapping impact basins at its south pole (Rheasilvia, the largest impact basin on Vesta at 310 miles [500 km] in diameter and the older, partially underlying Veneneia at 250 miles in diameter [400 km]). Vestian impacts also produced swarms of meteoroids, some of which eventually reached the Earth (it is estimated that Vesta accounts for approximately 6 percent of all meteorites recovered on Earth). The Dawn spacecraft confirmed that the meteorites found on Earth and classified as HEDs (Howardites/Eucrites/Diogenites) are from Vesta.

Dawn will reach the dwarf planet Ceres in approximately two-and-a-half-years (early 2015). The spacecraft is in good health except for its reaction wheels (used for precise orientation of the spacecraft). The wheels have been powered off after developing excessive friction. The loss isn't expected to impact Dawn's asteroid belt transit, as the spacecraft is now using its thrusters to maintain its alignment for communications with Earth.

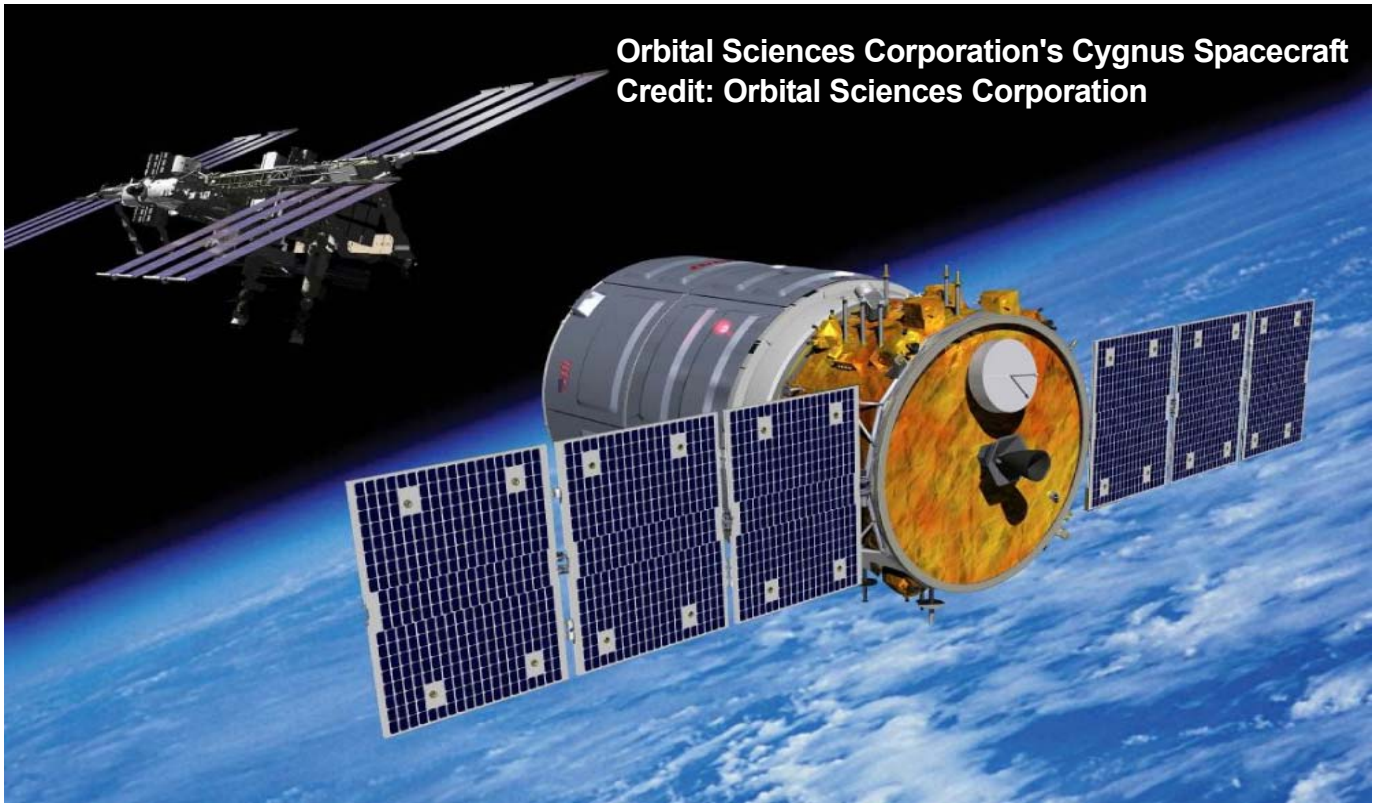
Dragon and Cygnus

Space X and Orbital Sciences are participating in NASA's Commercial Orbital Transportation Services or COTS program. The two companies have scheduled flights from their respective launch sites

to the International Space Station (ISS) in October. The COTS program is designed to assist private industry in developing the capabilities needed to resupply the ISS through 2015, a capability the U.S. lost in the retirement of the space shuttle. In May 2012, SpaceX made history when its spacecraft became the first commercial vehicle to rendezvous and dock with the ISS.

The configuration of the two spacecraft in orbit is shown on the following page. The photo of the Dragon spacecraft was taken from the ISS during its demonstration flight. Cygnus is scheduled for a similar demonstration in October. As such, the Cyngus image is an artistic representation of a rendezvous with the ISS.

Comparison of Launch Vehicles and Capabilities		
	Orbital Sciences	Space X
Launch Vehicle	Antares	Falcon 9
Stages	2	2
Engines	1st Stage: 2 / 2nd Stage: 1	1st Stage: 9 / 2nd Stage: 1
Fuel		
1st Stage	Liquid Oxygen/Kerosene	Liquid Oxygen/Kerosene
2nd Stage	ATK Solid	Liquid Oxygen/Kerosene
Launch Site	Wallops Island, Virginia	Cape Canaveral, Florida
Spacecraft	Cygnus	Dragon
Cargo Capacity	2,000/2,700 kg	6,000 kg
Reusable	No	Yes



Orbital Sciences Corporation's Cygnus Spacecraft
Credit: Orbital Sciences Corporation

Orbital Sciences Corporation's Cygnus Spacecraft
Credit: Orbital Sciences Corporation

The Solar Cycle

The Sun's activity waxes and wanes on an eleven year cycle. One measure of activity is the number of sunspots on the side of Sun facing Earth. The abundance correlates with the total solar irradiance (brightness summed across all wavelengths), solar wind pressure and solar radio emissions. As with weather on Earth, solar weather can be unpredictable.

The current Solar Cycle 24 was originally expected to begin in 2008. Instead of the activity increasing, the Sun defied expectations and headed into a deeper minimum. There were no sunspots observed on 266 of that year's 366 days (73%) (the least active period since 1913). A comparable spotless period (71%) followed in 2009. Solar activity returned in 2010 with only 14% of the days without a visible sunspot, followed by a near continuous parade of sunspots across the solar disk in 2011 and 2012. Current predictions are for a peak of activity in early 2013; however, this could be the least active sunspot cycle in over 100 years.

Imagination and Vision

One hundred and thirteen years ago (1899), on a quiet October afternoon in Worcester, Massachusetts, a 17 year old Robert Goddard climbed a tall cherry tree in the backyard to trim some dead limbs. From high in the tree, he looked out upon the horizon and imagined how wonderful it would be to create a means of traveling to the planet Mars. Twenty-seven years later, in 1926, Goddard would launch the world's first liquid fuel rocket from a field in nearby Auburn. Today he is considered one of the founding fathers of modern rocketry.

Source: NASA

Martian Invasion

In the late 1930s, a critically acclaimed New York drama company was founded by Orson Welles and John Houseman (with total monetary assets of $100). Together, they produced "The Mercury Theatre on the Air." The first show was broadcast on CBS radio in July 1938. Originally without a sponsor, the program was picked up by Campbell's Soup after the October 30th broadcast of H.G. Wells' "War of the Worlds." Orson Welles' adaptation incorporated simulated news

bulletins of a Martian invasion during a seemingly ordinary broadcast of a local orchestra. Many listeners panicked, fearing a real Martian invasion and the reported destruction of Grovers Mill, New Jersey. While the production was strongly denounced for its deceptive tactics, it did propel the 23 year old Welles on his way to fame and fortune.

You can download the complete radio broadcast at http://www.mercurytheatre.info/.


The New York Times

NEW YORK, MONDAY, OCTOBER 31, 1938.

MEAD STANDS PAT AS A NEW DEALER IN BID FOR SENATE

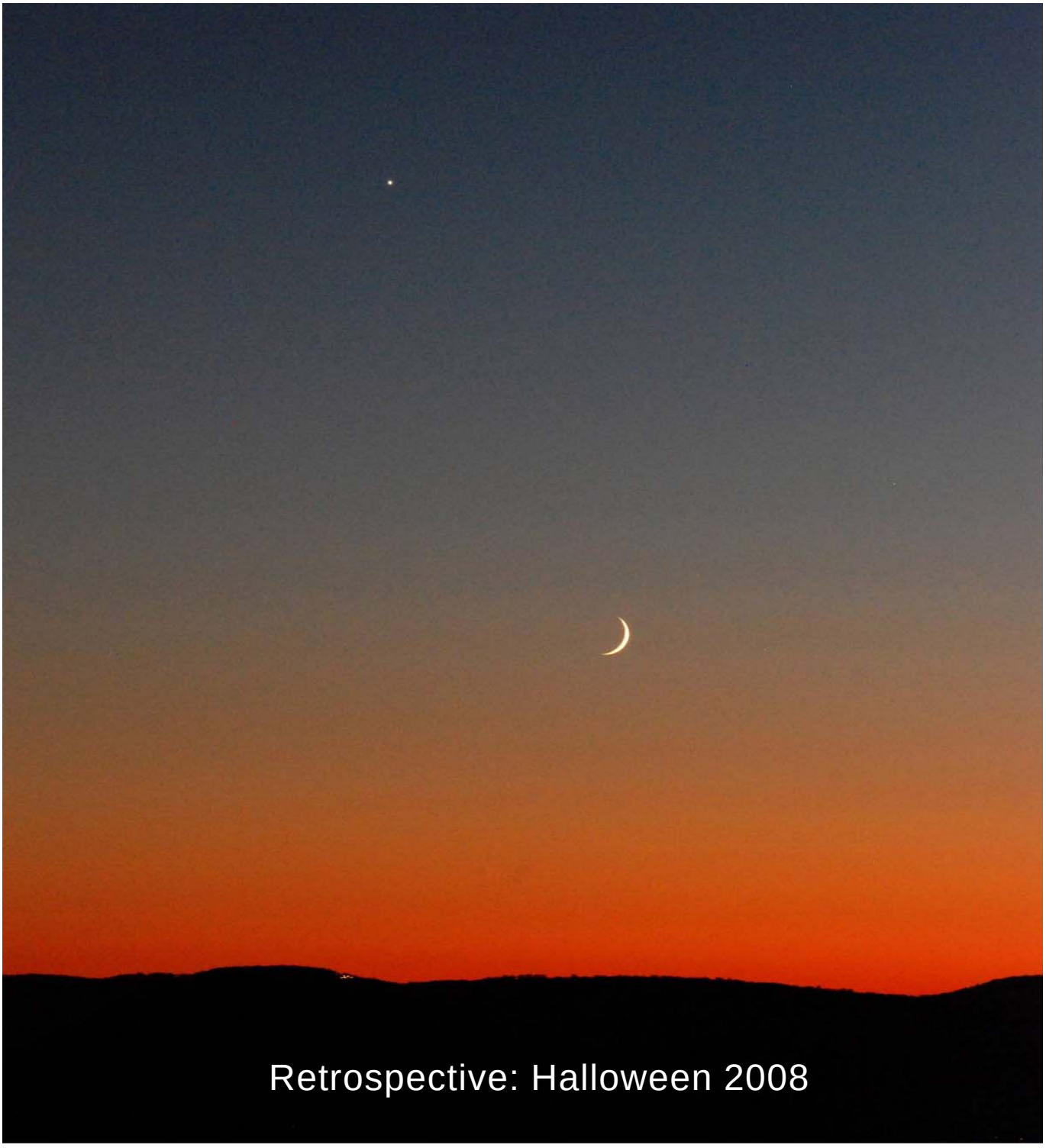
Democratic Candidate Opposes

Radio Listeners in Panic, Taking War Drama as Fact

Many Flee Homes to Escape 'Gas Raid From Mars'—Phone Calls Swamp Police at Broadcast of Wells Fantasy

OUSTED JEWS FIND REFUGE IN POLAND AFTER BORDER STAY

Exiles Go to Relatives' Homes



Retrospective: Halloween 2008

Lost Opportunity

On Wednesday, October 28th (2009), the Ares I-X test vehicle took to the Florida skies for its first and only flight. As part of NASA's Constellation Program, the Ares I rockets were designed to launch the Orion crew exploration vehicles to low-Earth orbit and beyond. Cost overruns, and the decision by the Obama administration to entrust the ferrying of astronauts to private companies, led to the program's cancellation. The photo below shows the various components of the 308 foot high rocket in the Vehicle Assembly Building in early May (2009).

October Nights

As the nights grow longer and cooler our view of the night sky begins to change. Summer evenings showcase our own galaxy, the Milky Way. The center of our spiral galaxy is in the direction of the constellation Sagittarius, which appears in the southern sky throughout the summer. In the autumn, as Sagittarius disappears into the west, the stars forming the Great Square of Pegasus rise in the east. Following Pegasus is the Andromeda Galaxy, one of the most distant objects that can be seen with the unaided eye at approximately 2.5 million light years (14.7 million trillion miles). With the rising of Andromeda, we begin to look outward to the outer arms of our own galaxy and to other galaxies far, far away.

Sunrise and Sunset

Sun	Sunrise	Sunset
October 1st (EDT)	06:51	18:35
October 15th	07:06	18:12
October 31st	07:25	17:49

Astronomical and Historical Events

1st History: NASA created by the National Aeronautics and Space Act (1958)
2nd History: opening of the Hayden Planetarium (1935)
3rd History: launch of the fifth Mercury flight, piloted by astronaut Walter Schirra (1962)
3rd History: fall of the Zagami Martian meteorite in Katsina Province, Nigeria; the meteorite is classified as a Shergottite and is the largest single individual Mars meteorite ever found at 40 pounds (1962)
3rd History: fall of the Chassigny Martian meteorite in Haute-Marne province, France; the meteorite is distinctly different from other Martian meteorites (shergottites and nakhilites) and is classified as its own subgroup – "chassignites" (1815)
4th Moon at apogee (furthest distance from Earth in its orbit)
4th History: Japanese lunar probe "Selenological and Engineering Explorer" (SELENE) enters lunar orbit; also known as Kaguya, the spacecraft was designed to study the geologic evolution of the Moon (2007)
4th History: SpaceShipOne rockets to an altitude of almost 70 miles to win the $10 million Ansari X Prize (2004)
4th History: launch of Luna 3; Soviet spacecraft was first to photograph the far side of the Moon (1959)
4th History: launch of Sputnik 1, world's first artificial satellite (1957)
5th History: Robert Goddard born, founding father of modern rocketry (1882)
6th History: Asteroid 2008 TC3 discovered by astronomers on Mt. Lemmon less than 24 hours before exploding over the Sudan. The McCarthy Observatory submitted the last accepted observation. Fragments of the asteroid were eventually recovered. (2008)
6th History: launch of the space shuttle Discovery and the solar polar orbiter spacecraft Ulysses (1990)
8th Last Quarter Moon
8th History: discovery of Supernova 1604 (Kepler's Nova) (1604)
9th Draconids Meteor Shower peak (produced by debris from Comet Giacobini-Zinner)
9th History: LCROSS impacts crater Cabeus near the Moon's south pole in search of water (2009)
9th History: Peekskill meteorite fall; 27 pound meteorite hits a 1980 Chevy Malibu sitting in its driveway in Peekskill, NY (1992)
10th History: inauguration of the Very Large Array, one of the world's premier astronomical radio observatories; located west of Socorro, New Mexico (1980)
10th History: enactment of the Outer Space Treaty: 1) prohibited placement of nuclear and other weapons of mass destruction in orbit, on the Moon or other celestial body and 2) limited the use of the Moon and other celestial bodies to peaceful purposes (1967)
10th History: discovery of Neptune's moon Triton by William Lassell (1846)
11th History: NASA's historic 100th space shuttle flight as Discovery carries the Z1 Truss (first piece of the ISS structural backbone) into space (2000)

Astronomical and Historical Events for October (continued)

- 11th History: Magellan spacecraft burns up in the Venusian atmosphere after completing its mission to map the planet with its imaging radar (1994)
- 11th History: launch of first manned Apollo mission (Apollo 7) with astronauts Schirra, Eisele and Cunningham (1968)
- 11th History: launch of WAC Corporal, first man-made object (16 foot rocket) to escape Earth's atmosphere (1945)
- 12th History: launch of Voskhod 1; Soviet spacecraft was first to carry multiple (3) cosmonauts (a pilot, scientist and physician) into space. Due to the cramped conditions the crew flew without spacesuits, ejection seats, or an escape tower (1964)
- 12th History: first Symposium on Space Flight held at the Hayden Planetarium in New York City; participants included Wernher von Braun, Willy Ley, and Fred L. Whipple; topics included an orbiting astronomical observatory, survival in space, circumlunar flight, a manned orbiting space station, and the question of sovereignty in outer space (1951)
- **13th Second Saturday Stars** at the McCarthy Observatory (7:00 PM)
- 13th History: launch of Shenzhou 6, China's second manned spacecraft (2005)
- 13th History: launch of Explorer 7; spacecraft measured solar X-rays, energetic particles, and cosmic rays (1959)
- 13th History: formation of the British Interplanetary Society by Phillip Cleator in Liverpool (1933)
- 14th History: three main belt asteroids discovered by the McCarthy Observatory while searching for NEOs. 2003 TG10 (its provisional name) was subsequently named after Monty Robson (115449 Robson), the founder and director of the observatory (2003)
- 14th History: launch of Shenzhou 5, first Chinese manned spacecraft (2003)
- 14th History: Air Force Captain Chuck Yeager breaks the sound barrier in the Bell X-1 rocket plane (called "Glamorous Glennis" as a tribute to his wife). The plane reached a speed of 700 miles per hour after being launched from the bomb bay of a Boeing B-29 (1947)
- 15th New Moon
- 15th Dwarf Planet Eris (formally 2003 UB313 and/or Xena) at Opposition; first Kuiper Belt object discovered to be larger than Pluto (95.542 AU)
- 15th History: launch of the Cassini spacecraft to the planet Saturn (1997)
- 16th Moon at perigee (closest distance to Earth)
- 16th History: launch of GOES 1, first weather satellite placed in geosynchronous orbit (1975)
- 17th Kuiper Belt Object 55636 (2002 TX300), discovered by the Palomar Mountain Near-Earth Asteroid Tracking (NEAT) program in 2002, at Opposition (41.885 AU)
- 18th History: launch of the space shuttle Atlantis (STS-34) and Galileo spacecraft to Jupiter (1989)
- 18th History: discovery of Chiron by Charles Kowal; Chiron has the characteristics of both a comet and an asteroid. These types of objects are called Centaurs after a mythological being that are half human/half horse (1977)
- 18th History: Soviet spacecraft Venera 4 enters the atmosphere of Venus; first probe to analyze the environment (in-situ) of another planet (1967)
- 18th History: discovery of Asteroid 8 Flora by John Hind (1847)
- 19th History: flyby of the planet Venus by the Mariner 5 spacecraft (1967)
- 19th History: Subrahmanyan Chandrasekhar born; awarded Nobel Prize in Physics (1983) for studies of the structure and evolution of stars; NASA named its premier X-ray observatory the Chandra X-ray telescope in his honor (1910)
- 20th History: launch of the Soviet spacecraft Zond 8; moon flyby mission (1970)
- 20th History: discovery of asteroid 577 Rhea by Max Wolf (1905)
- 21st First Quarter Moon
- 21st Orionids meteor shower peak (produced by debris from Comet Halley)

Astronomical and Historical Events for October (continued)

21st Kuiper Belt Object 15760 (1992 QB1); first resident of the Kuiper Belt found beyond Pluto makes its closest approach to Earth (40.160 AU)

21st History: opening of the Yerkes Observatory in Williams Bay, Wisconsin; home of the world's largest refractor with its 40-inch objective lens manufactured by Alvan Clark and Sons (1897)

22nd History launch of Chandrayaan-1, India's first mission to the Moon (2008)

22nd History: Soviet spacecraft Venera 9 touches down on Venus and transmits first pictures (black and white) of its surface (1975)

22nd History: launch of the Soviet Moon orbiter Luna 12 to take high-resolution photos of the Moon's surface from lunar orbit (1966)

23rd Scheduled launch of a Soyuz spacecraft from the Baikonur Cosmodrome in Kazakhstan with members of the next Expedition crew to the ISS

23rd History: first time female commanders led orbital missions at the same time: Pamela Melroy commanded space shuttle Discovery (STS-120) to the ISS while Peggy Whitson led the Expedition 16 team aboard the ISS in the installation of a new orbital node (2007)

24th History: launch of Chang'e-1, Chinese lunar orbiter, from the Xichang Satellite Launch Center in the southwestern province of Sichuan (2007)

24th History: launch of Deep Space 1; first of a series of technology demonstration probes developed by NASA's New Millennium Program; propulsion was provided by a xenon ion engine that operated for a total of 16,265 hours (1998)

24th History: discovery of Uranus' moons Umbriel and Ariel by William Lassell (1851)

25th History: launch of the twin Solar Terrestrial Relations Observatories (STEREO A and B); 3-D studies of the Sun and coronal mass ejections (2006)

25th History: Soviet spacecraft Venera 10 touches down on Venus 2,200 km from its twin Venera 9; lands on a flat boulder that was determined to be similar in composition to basalt on Earth (1975)

25th History: discovery of Saturn's moon Iapetus by Giovanni Cassini (1671)

25th Scheduled launch from the Cape Canaveral Air Force Station, Florida, of the Air Force's prototype spaceplane (X-37B) aboard an Atlas 5 rocket on its third mission

26th Mercury at its greatest eastern elongation; separation from the Sun in the evening sky (24°)

27th History: first test flight of the Saturn I rocket (1961)

27th History: Canon City meteorite fall; hit garage (1973)

28th History: first test flight of the Ares I-X rocket; a two minute powered suborbital flight (2009)

28th History: launch of Prospero spacecraft, Great Britain's first space launch (1971)

29th Full Moon (Full Hunter's Moon)

29th History: launch of the space shuttle Discovery (STS-95) with astronaut and then U.S. Senator, John Glenn (1998)

29th History: flyby of asteroid Gaspra by the Galileo spacecraft on mission to Jupiter (1991)

30th Kuiper Belt Object 55637 (2002 UX25) at Opposition; trans-Neptunian object discovered by the Spacewatch program on October 30, 2002 (40.313 AU)

30th History: discovery of the Los Angeles (Mars) Meteorite (1999)

30th History: launch of Venera 13, Soviet Venus lander; lander survived for 127 minutes on the surface where the temperature was recorded at 855 °F (1981)

30th History: Mercury Theatre broadcasts Orson Welles' adaptation of H.G. Wells "War of the Worlds" (1938)

31st Kuiper Belt Object 84522 (2002 TC302) at Opposition; large trans-Neptunian object discovered on October 9, 2002 by Mike Brown's team at the Palomar Observatory (45.806 AU)

31st History: birthday of Apollo 11 Command Module pilot Michael Collins (1930)

31st History: first rocket engine tests by three young rocketeers that would be the beginning of what would become the Jet Propulsion Laboratory (1936)

References on Distances

• The apparent width of the Moon (and Sun) is approximately one-half a degree (½°), less than the width of your little finger at arm's length which covers approximately one degree (1°); three fingers span approximately five degrees (5°)

• One astronomical unit (AU) is the distance from the Sun to the Earth or approximately 93 million miles

International Space Station/Space Shuttle/Iridium Satellites

Visit *www.heavens-above.com* for the times of visibility and detailed star charts for viewing the International Space Station, the Space Shuttle (when in orbit) and the bright flares from Iridium satellites.

Solar Activity

For the latest on what's happening on the Sun and the current forecast for flares and aurora, check out *www.spaceweather.com.*

Image Credits

Front page design and graphic calendars: Allan Ostergren

Page 1 "The Pelican Nebula": Imaged with the ST-10 CCD on the Takahashi FSQ-106 telescope. Narrowband- H-Alpha = Red, SII = Green, OIII = Blue. Roughly 7 hours total combined exposure, stacked and color combine in MaximDL 5. Image by Marc Polansky

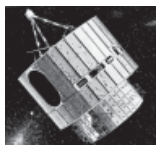
Page 3 Photo: "Earthshine" or the Moon's "ashen glow" is particularly noticeable when the Moon is a thin crescent. The portion of the Moon not directly illuminated by sunlight is visible due to sunlight reflected off the Earth. It was first explained by Leonardo da Vinci over 500 years ago. During this phase, astronauts on the Moon would see a dazzling, nearly full Earth in the sky (50 times brighter than a Full Moon).

Image by Bill Cloutier

All other non-credited photos were taken by the author: Bill Cloutier

October 2012

Celestial Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1  NASA created by the National Aeronautics and Space Act (1958)	**2**  Hayden Planetarium founded (1935)	**3** Launch of Mercury-Atlas 8 with Walter Schirra (1962)   Chassigny meteorite, determined origin of Mars (1815) Zagami Martian meteorite in Katsina Province, Nigeria (1962) 	**4** Sputnik 1 first artificial satellite (1957)   Luna 3; Soviet spacecraft, was first to photograph the far side of the Moon (1959)  SpaceShipOne, 70 miles up, to win Ansari X Prize (2004)  World Space Week, Oct. 4-10	**5**  Robert Goddard born, founding father of modern rocketry (1882)	**6**  Launch of space shuttle Discovery and solar polar orbiter spacecraft Ulysses (1990) Asteroid 2008 TC3, tracked by McCarthy Observatory, explodes over Sudan (2008) 
7  Launch of Explorer 6, with "paddlewheel satellite," a photocell scanner transmitting a crude picture of the earth's surface and cloud cover (1959))	**8**  Discovery of Supernova 1604 - Kepler's Nova (1604) Pioneer Venus orbiter concludes mission and begins fiery plunge into Venusian atosphere (1992) 	**9**  Draconids meteor shower peak LCROSS impacts Moon's south pole (2009)   Peekskill meteorite hits Chevy Malibu (1992)	**10** Enactment of outerspace treaty (1967)   Inauguration of the Very Large array in New Mexico (1980) Discovery of Uranus' moon Triton by William Lassell (1846) 	**11** WAC Corporal, first rocket to escape Earth's atmosphere (1945)   100th space shuttle flight carries Z1 Truss, backbone of the ISS (2000) Launch of first manned Apollo mission (1968) 	**12**  Launch of Voskhod 1, Soviet spacecraft, first to carry multiple cosmonauts (1964)  1st symposium on space travel, held at Hayden Planetarium (1951)	**13**  Launch of Explorer 7 spacecraft (1959) Launch of Shenzou 6, China's 2nd manned spacecraft (2005)   British Interplanetary Society founded (1933)  2nd Saturday Stars Open House McCarthy Observatory
14  Launch of Shenzou 6, China's 2nd manned spacecraft (2005) Chuck Yeager breaks sound barrier (1947)   Three main belt asteroids discovered by McCarthy Observatory (2003)	**15** Dwarf Planet Eris (formally 2003 UB313 and/or Xena) at Opposition (95.542 AU)   Launch of Cassini spacecraft to planet Saturn (1997)	**16**  Launch of GOES 1, first weather satellite in geosynchronous orbit (1975)	**17**  Mae Carol Jemison born, American physician and NASA astronaut; became first black woman in space aboard the Shuttle Endeavour on September 12, 1992; has appeared on television several times, including an episode of *Star Trek: The Next Generation.* (1956)	**18**  Soviet spacecraft Venera 4 probes atmosphere of Venus; (1967) Discovery of Asteroid 8 Flora by John Hind (1847)   Discovery of asteroid/comet Chiron in Taurus by Charles Kowal (1977) Launch of space shuttle Atlantis and Galileo spacecraft to Jupiter (1989) 	**19** Subrahamanyan Chandrasekar wins Nobel physics prize for study of star evolution (1983)	**20** Discovery of asteroid 577 Rhea by Max Wolf (1905) Launch of Soviet spacecraft Zond 8, Moon flyby mission (1970)
21 Opening of the Yerkes Observatory, Williams Bay, Wisonsin, with world's largest refractor lens (40") (1897) Orionids meteor shower peak	**22** Soviet spacecraft Venera 9 lands on Venus, takes first b/w pictures of Moon's surface(1975) Launch of the Soviet orbiter Luna 12 to take high-resolution photos of the Moon's surface from lunar orbit (1966) Launch of India's first Moon mission Chandrayaan-1 (2008) 	**23** Pamela Melroy and Peggy Whitson first women to lead two missions at same time (shuttle and space station) (2007)	**24** Launch of Deep Space 1 (1998) Launch of Chang'e-1, Chinese lunar orbiter (2007) Discovery of Uranus' moons Umbriel and Ariel by William Lassell (1851)	**25** Discovery of Satum's moon Iapetus by Giovanni Cassini (1671) Launch of twin Solar Terrestrial Relations Observatories (STEREO A&B) for 3-D studies of Sun (2006) Scheduled launch of the Air Force's prototype spaceplane (X-37B) aboard an Atlas 5 rocket on its third mission	**26** Mercury at its greatest eastern elongation; separation from the Sun in the evening sky (24°)	**27** first test flight of the Saturn I rocket (1961) Cañon City, Colorado meteor hits garage - 1973
28 First test flight of the Ares I-X rocket; a two minute powered suborbital flight (2009) Launch of Prospero, Britain's first space mission (1971)	**29** Launch of space shuttle Discovery (STS-95) with astronaut and former senator John Glenn (1998) Flyby of asteroid Gaspra by the Galileo spacecraft on mission to Jupiter (1991)	**30** Mercury Theatre War of Worlds broadcast with Orson Welles produces panic (1938) Discovery of the Los Angeles (Mars) Meteorite (1999) Launch of Venera 13, Soviet Venus lander; survived for 127 minutes on the surface where the temperature was recorded at 855 °F (1981) 	**31** Apollo 11 Command module pilot Michael Collins born (1930) First rocket engine tests that spawned the Jet Propulsion Laboratory (1936) 	

Phases of the Moon

Oct 8 Oct 15

Oct 21 Oct 29

Second Saturday Stars

FREE EVENT

Every Month at the
John J. McCarthy Observatory
Behind the New Milford High School
860.946.0312
www.mccarthyobservatory.org

October 13th

7:00 - 9:00 pm

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Refreshments
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