

Galactic Observer

John J. McCarthy Observatory

Volume 6, No. 6

June 2013

Pas de Deux

A pair of galaxy clusters seems locked in a cosmic dance, ten light years apart and a billion light years from Earth. The celestial duo are connected by a bridge of hot gases, detected at optical wavelengths with ground-based telescopes and through X-ray and microwave emissions by the Planck space telescope, jointly operated by the European Space Agency and NASA.

***For more information,
go to http://www.esa.int/SPECIALS/Planck/SEMRT791M9H_0.html***

***Image credits: Sunyaev-Zel'dovich
effect: ESA Planck Collaboration;
optical image: STScI Digitized
Sky Survey***

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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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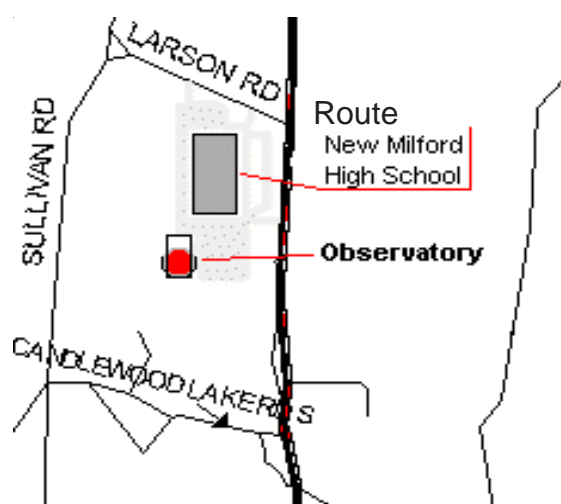
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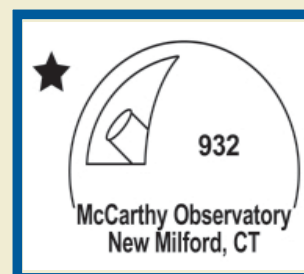
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In This Issue

OUT THE WINDOW ON YOUR LEFT	4	ASTRONOMICAL AND HISTORICAL EVENTS	10
ATLAS AND HERCULES	4	REFERENCES ON DISTANCES	12
SATURN	6	INTERNATIONAL SPACE STATION/IRIDIUM SATELLITES ...	12
KATHLEEN FISCHER SUNDIAL	7	SOLAR ACTIVITY	12
HUNTING MERCURY	7	PHOTO CREDITS	12
LUNAR RECONNAISSANCE ORBITER	7	GRAPHIC CALENDAR	13
SUMMER SOLSTICE	8	SECOND SATURDAY STARS	14
JUNE HISTORY	9		
WOMEN IN SPACE	9		
AN EXTRAORDINARY FEAT	9		
GALAXY CHECK	10		
SUNRISE AND SUNSET	10		
SUMMER NIGHTS	10		



June Astronomy Calendar and Space Exploration Almanac



"Out the Window on Your Left"

IT'S BEEN OVER 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).



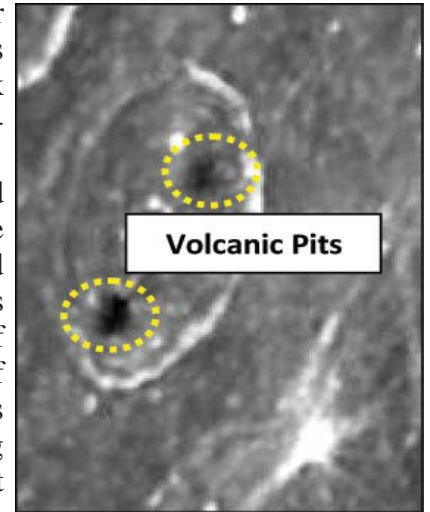
Lunar "lakes" and "seas" are actually expansive low-lying plains formed by ancient lava flows

The view this month showcases a pair of prominent craters: Atlas and Hercules, visible in the north-east quadrant of a waxing crescent moon. The craters, likely similar in appearance when first formed, have undergone dramatic changes over time and are now very different. Hercules, to the west, is the smaller of the two at approximately 43 miles (69 km) in diameter, and possibly younger. Its floor has been flooded by mare lavas that have submerged the central peak common in complex craters. Although battered, portions of the crater's ring wall still rise up to 11,000 feet above its relatively smooth floor; a floor that is dominated by a more recent impact that created an 8.6 mile (13.8 km) diameter crater.

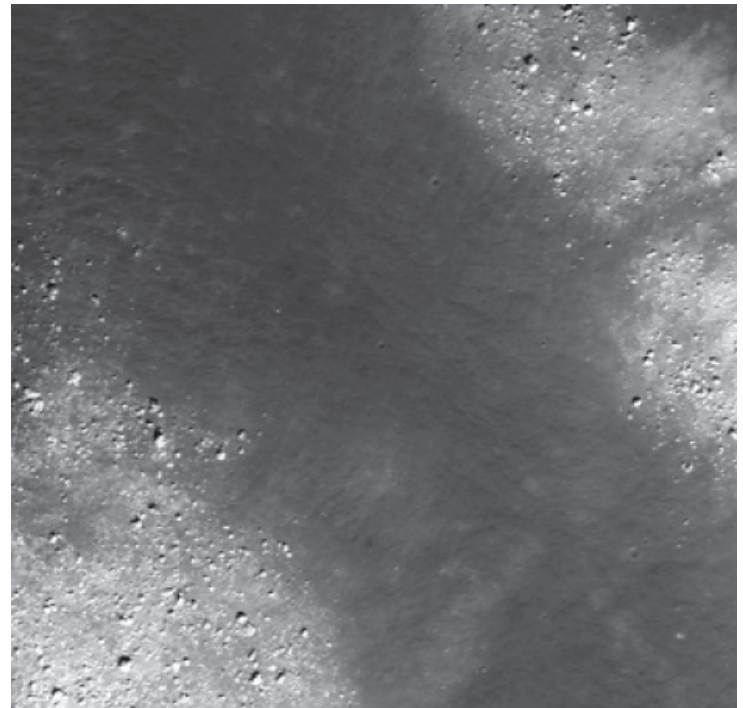
Atlas, to the east, is approximately 54 miles (87 km) in diameter. Unlike Hercules, the mare lavas

didn't spill out upon the floor, but raised the floor of Atlas from beneath, creating a network of circular and linear fractures. Under a high Sun, the floor is marked by two dark halo craters, likely volcanic pits.

A small, bright and unnamed crater to the east of Atlas, and adjacent to Lacus Temporis (Lake of Time) is the result of an oblique impact: its bright rays signifying a relatively recent event.

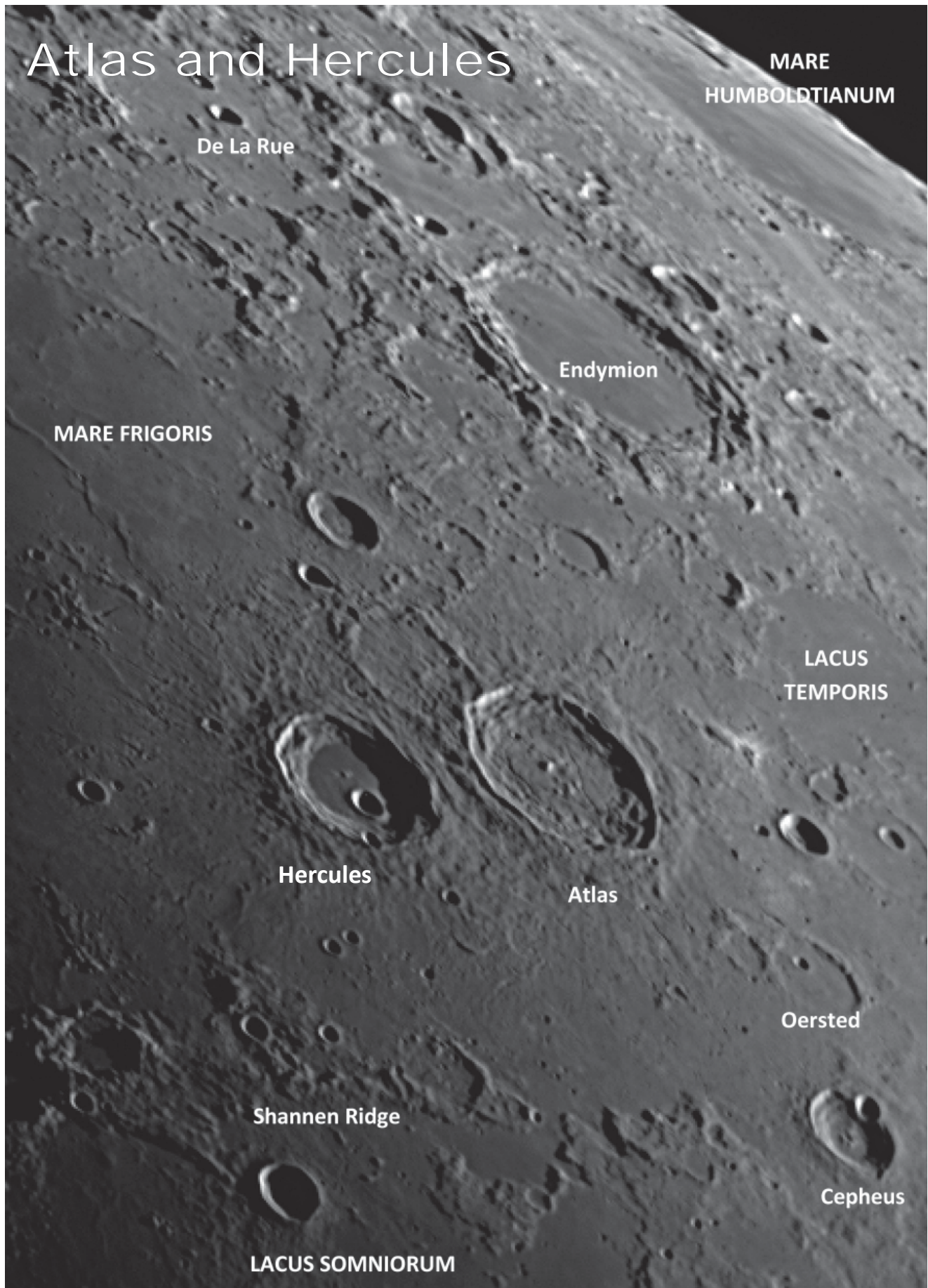


Looking towards the limb, you can see the large ringed plain Endymion and Mare Humboldtianum (Humboldt Sea), a patch of mare lava that fills an ancient multi-ring basin that straddling the Moon's near and far sides. Humboldt's main basin ring of mountains is over 400 miles (650 km) in diameter, and likely formed during the earliest of the moon's geologic ages. The crust under the Humboldt basin is at its thinnest according to the gravity maps generated by the GRAIL spacecrafts, exposing minerals associated with the Moon's mantle.



The interior of a crater-floor fracture within Atlas crater, taken by the Lunar Reconnaissance Orbiter. Source [NASA/GSFC/Arizona State University].

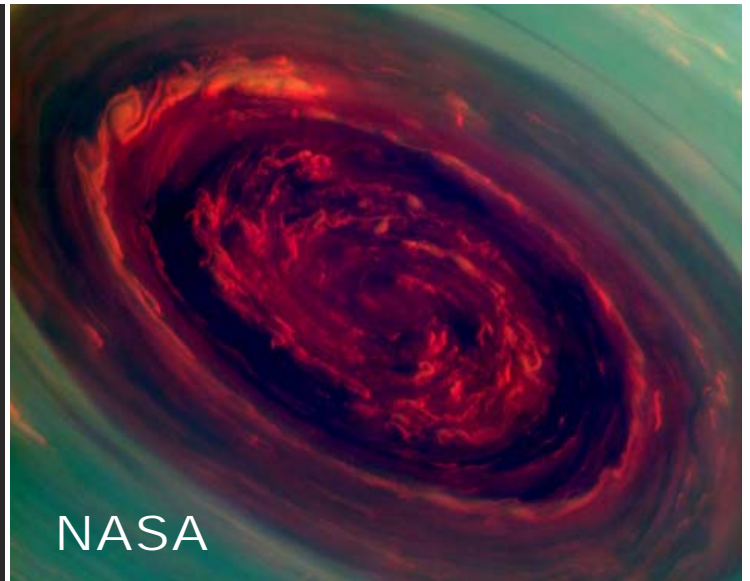
Atlas and Hercules



Saturn

While the distance between the Earth and Saturn is increasing, the ringed planet is still well placed in June for evening observers. As shown in the image below, Saturn is at its highest (due south) a little more than an hour after sunset (on the 12th). Saturn can be found in Virgo just to the east of the bright star Spica and approximately 40° above the horizon.

Saturn's north pole is now receiving sunlight for the first time in years (seasons on Saturn are due to its 27° axial tilt and last for seven Earth years). Sunlight has revealed a large stationary hurricane at the north pole, spinning inside a hexagonal weather pattern.



Kathleen Fischer Sundial

Daytime visitors to the John J. McCarthy Observatory this summer will discover a wonderful addition to the adjacent gardens and grounds. Resting on a one-ton granite disk in the center of the “outdoor classroom” in Galileo’s Garden is a magnificent, stainless steel sundial (pictured on page 3). The equatorial sundial stands nine feet tall, with a bronze replica of Galileo’s first telescope integrated into the gnomon pointing to the north celestial pole. The shadow arms span five feet and the engraved time scale is adjustable so that both “clock time” and “sun time” can be read. The time scale contains both standard time and daylight saving time engravings.

The sundial was dedicated on June 9, 2012 to Kathy Fischer, an inspirational science teacher, advocate for science literacy, and long-time supporter of the Observatory’s mission, who passed away in 2010. She and her husband Larry loved the teaching possibilities of a sundial. Along with family members and friends, Kathy and Larry were the primary benefactors that allowed the concept to become a reality.

Hunting Mercury

June is a good time to spot Mercury, one of the more elusive naked eye planets. Usually submerged in the glare of the Sun, the diminutive planet’s visibility increases during periods of greatest elongation (or apparent separation from the Sun). This occurs on the 12th when Mercury is 24° degrees from the setting Sun in the evening twilight. On that evening, approximately an hour after sunset, Mercury is joined by Venus and a thin crescent Moon.



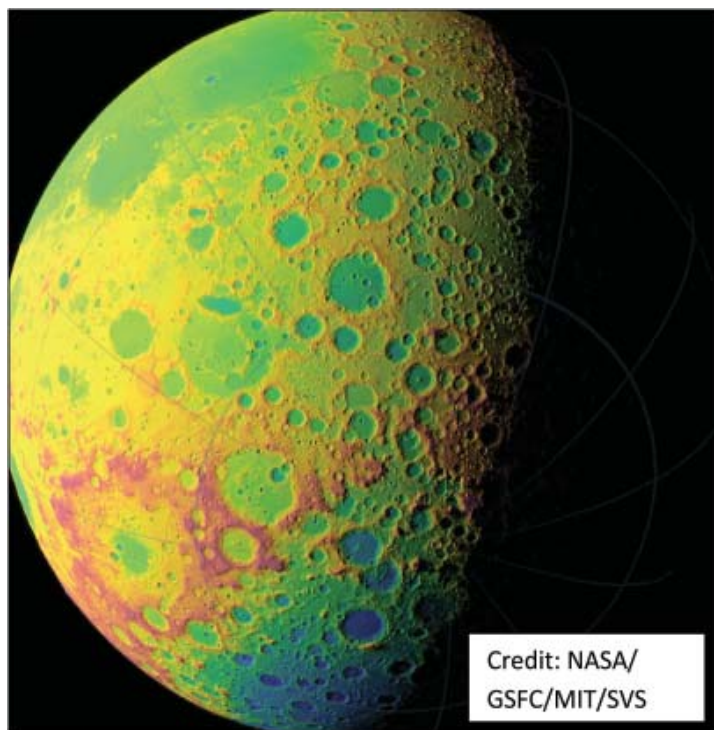
Lunar Reconnaissance Orbiter

On the evening of June 18, 2009, an Atlas V 401 rocket lifted off from Cape Canaveral carrying NASA’s Lunar Reconnaissance Orbiter (LRO). In the four years since entering polar orbit, the spacecraft has been mapping the Moon from as close as 14 miles (22 km) above the lunar surface.

Although the images from the spacecraft’s wide and narrow field cameras provide dramatic vistas of the lunar landscape, a compact instrument package weighing just 21 pounds, and bouncing a laser pulse off the Moon’s surface, is revolutionizing the way we see the Moon. The Lunar Orbiter Laser Altimeter (LOLA) is constructing topographical maps of the

rough visible surface as well as those areas hidden by perpetual shadow. The data gathered by the altimeter is providing an unprecedented depiction of the lunar landscape: information invaluable in assessing future landing sites, identifying means of access to resources (for example, polar ice), and for general lunar navigation and exploration.

The topographic map of the moon's southern hemisphere is presented in false colors to indicate elevation, with blue representing the lowest elevations and



red the highest. This particular image shows one of the largest impact basins in the solar system, the South Pole-Aitken, at the lower left of the globe (in deep blue). The western limb shows features on the far side, while the terminator (day/night dividing line) shows the southern highlands on the near side.

Summer Solstice

On the morning of June 21st the Sun will rise over a prehistoric structure on the Salisbury Plain in southern England as it has for the last 4,000 years. For those individuals standing within the 100 foot diameter circle of 30 sandstone or sarsen-stones (weighing up to 50 tons each), the Sun will appear over a large naturally shaped stone (Heel Stone) located outside and to the northeast of the circle. The alignment signals the start of the longest day, midsummer, or the summer solstice.

The photo (right) shows the current state of the stone circle. Many of the original stones are missing or damaged. Over time, they were taken to

build houses and roads, chipped away by visitors and taken as souvenirs. What remains represents the last in a progressive sequence of monuments erected at the site between 3,000 and 1,600 B.C. The Heel Stone (photo at right) is adjacent to the access road to the site. The ancient people who constructed this monument left no written record of their accomplishments or the



intended use of the stone circle. Its purpose has been widely debated, and many groups have attempted to claim ownership. However, archeologists have clearly shown that the construction of Stonehenge predates the appearance of most modern cultures in Britain.

In the 1960s, Gerald Hawkins, an astronomer at the Smithsonian Astrophysical Observatory, found that each significant stone aligns with at least one other to point to an extreme position of the sun or moon ("Stonehenge Decoded," Doubleday & Company). That Stonehenge is an astronomical observatory or celestial calendar is intriguing, as the precision and architectural refinement by which it was constructed certainly suggests a significant purpose for this megalithic monument.



June History

Women in Space

On June 16, 1963, Valentina Tereshkova became the first woman in space. Shortly after Yuri Gagarin's flight, the Soviets began a search for suitable female candidates for spaceflight. With few female pilots, the majority of the candidates were women parachutists (Valentina had joined an amateur parachuting club at the age of 18). Control

of the Vostok spacecraft was completely automatic, so piloting experience was not required. However, since the Vostok was not designed to return its occupant safely to Earth, the cosmonaut was required to eject from the spacecraft after re-entry and parachute to the landing site.



The selection of Valentina Tereshkova for the flight was made by Premier Khrushchev. In addition to experience and fitness, qualifications included being an ideal Soviet citizen and model Communist Party member. On June 16th, Valentina rode Vostok 6 into orbit with the call sign "Chaika" (Seagull). The mission was not without incident and included space-sickness, leg cramps and other discomforts from being strapped into the capsule for three days. More importantly, the capsule ended up in the wrong orientation and, had it not been corrected, would not have allowed her to return to Earth.

Valentina's three days in space was more flight time than all the American astronauts combined (at that time). After fulfilling her duties to her country, Tereshkova retired to a small house on the outskirts of Star City. The house was topped with a seagull weathervane, the call sign of her flight.

Twenty years later on June 18th, Sally Ride became the first American woman in space. Launched aboard the space shuttle Challenger, Sally served as the mission specialist on the five person crew.



An Extraordinary Feat

If you have ever seen a Gemini space capsule (there is one on display at the Air and Space Museum in Washington, D.C.) it is difficult to comprehend how two people could have spent any length of time inside its cramped interior (Frank Borman and Jim Lovell spent 14 days orbiting the Earth in Gemini 7). The reentry module, where the two astronauts sat, is approximately 11 feet long with a maximum diameter of 7½ feet and filled with instrumentation and controls.



James A. McDivitt (foreground) and Edward H. White II inside their Gemini-4 spacecraft

On June 3, 1965, Gemini 4 lifted off on a four day mission. The highlight of the mission was to be a spacewalk by Ed White. NASA was very concerned with "putting guys in vacuums with nothing between them but that little old lady from Worcester, Massachusetts [the seamstress at the David Clark Company], and her glue pot and that suit." However, the Soviets had challenged the United States with a spacewalk by Cosmonaut Alexei Leonov in March during a Voskhod II mission, and the United States did not want to appear to be falling behind its adversary.

After struggling with a faulty hatch, Ed White finally exited the spacecraft as it passed over the Pacific Ocean. Using a gun



powered by compressed oxygen, he was able to maneuver outside the capsule, just avoiding the flaming thrusters of the Gemini capsule. After a 23 minute spacewalk, Jim McDivitt struggled to get the six foot tall Ed White back inside the capsule and close the balky door.

Unfortunately, after making history as the first American to walk in space, Ed White died during a test of the Apollo 1 spacecraft when the pure oxygen atmosphere exploded, killing all three astronauts.

Galaxy Check

For those hockey enthusiasts, June signals the end of a long season, culminating in the award of Lord Stanley's Cup to the league's best team. As a fitting tribute, the CCD camera on the 16-inch telescope at the McCarthy Observatory was used to acquire an image of the "Hockey Stick" galaxy (NGC



4656). The galaxy is located 30 million light years away in the constellation Canes Venatici and is so named because of its peculiar shape. The distorted shape appears to have resulted from an unfortunate encounter with another nearby galaxy (NGC 4631).

Sunrise and Sunset

<u>Sun</u>	<u>Sunrise</u>	<u>Sunset</u>
June 1 st (EDT)	05:22	20:22
June 15 th	05:19	20:30
June 30 th	05:23	20:32

Summer Nights

For the more adventurous and sleep deprived individuals, the summer sky sparkles as twilight deepens and the summer Milky Way rises. The Milky Way is heralded by the three stars of the summer triangle Vega, Deneb and Altair. Appearing like a gossamer stream of stars, it flows across the night sky, emptying into the constellation Sagittarius. In our light-polluted skies, it may be easier to see on nights when the Moon is absent (in the weeks preceding and following the New Moon on the 8th).

High in the June sky is the constellation Hercules. Shaped like a keystone or trapezoid, Hercules is home to one of the finest globular star clusters in the northern hemisphere. The Great Hercules Cluster (M13) is a collection of several hundred thousand suns located near the galactic core of the Milky Way Galaxy at a distance of approximately 25,000 light years. Hercules rises in the evening after the constellation Boötes with its bright star Arcturus and before the constellation Lyra with its bright star Vega. The cluster can be found on the side of the keystone asterism facing Boötes.

Astronomical and Historical Events

- 1st History: launch of the ROSAT (Röntgen) X-ray observatory; cooperative program between Germany, the United States, and United Kingdom; among its many discoveries was the detection of X-ray emissions from Comet Hyakutake (1990)
- 2nd History: launch of the Mars Express spacecraft and ill-fated Beagle 2 lander (2003)
- 2nd History: launch of the Space Shuttle Discovery (STS-91); ninth and final Mir docking (1998)
- 2nd History: launch of Soviet Venus orbiter Venera 15; side-looking radar provided high resolution mapping of surface in tandem with Venera 16 (1983)
- 2nd History: discovery of Comet Donati by Italian astronomer Giovanni Battista Donati; brightest comet of the 19th century and first comet to be photographed (1858)
- 3rd History: launch of Gemini 4; Ed White becomes first American to walk in space (1965)
- 3rd History: launch of Gemini 9 with astronauts Thomas Stafford and Eugene Cernan (1966)
- 3rd History: dedication of the 200-inch Hale Telescope at Palomar Mountain (1948)
- 4th Kuiper Belt Object 174567 (2003 MW12) at Opposition (46.386 AU)

Astronomical and Historical Events (continued)

- 4th History: maiden flight of Space X's Falcon 9 rocket; launched from Cape Canaveral, Florida (2010)^{5th}
Scheduled launch of the European Space Agency's fourth cargo-carrying Automated Transfer Vehicle (named Albert Einstein) aboard an Ariane 5 ES rocket from Kourou, French Guiana to the International Space Station
- 6th History: launch of Soviet Venus orbiter Venera 16; side-looking radar provided high resolution mapping of surface in tandem with Venera 15 (1983)
- 7th Scheduled launch of a Chinese crew aboard a Long March 2F rocket from Jiuquan, China to the orbiting Tiangong 1 laboratory module
- 8th New Moon
- 8th **Second Saturday Stars/Open House at the McCarthy Observatory 8:00 to 10:00 pm**
- 8th History: New Horizons spacecraft, on its way to Pluto, crosses the orbit of Saturn (2008)
- 8th History: launch of Soviet Venus orbiter/lander Venera 9; transmitted the first black and white images of the surface of Venus (1975)
- 8th History: Giovanni Cassini born, observer of Mars, Jupiter and Saturn (1625)
- 9th Moon at apogee (furthest distance from Earth)
- 9th History: dedication of the Kathleen Fischer Sundial at the McCarthy Observatory (2012)
- 10th Kuiper Belt Object 28978 *Ixion* at Opposition (39.650 AU)
- 10th History: launch of Mars Exploration Rover A (Spirit) in 2003
- 10th History: launch of Explorer 49, Moon orbiter and radio astronomy explorer (1973)
- 11th History: flyby of Venus by Soviet spacecraft Vega 1 on its way to Comet Halley; dropped off lander and a balloon to study middle cloud layers (1985)
- 12th Mercury at its Greatest Eastern Elongation (24° Degrees); apparent separation from the Sun in the evening sky
- 12th History: launch of Venera 4, Soviet Venus lander; first to enter atmosphere of another planet (1967)
- 13th History: return of the sample capsule from the Hayabusa (MUSES-C) spacecraft (2010)
- 14th History: launch of Mariner 5; Venus flyby mission (1967)
- 14th History: launch of Venera 10; Soviet Venus orbiter/lander (1975)
- 15th History: flyby of Venus by Soviet spacecraft Vega 2 on its way to Comet Halley; dropped off lander and a balloon to study middle cloud layers (1985)
- 16th First Quarter Moon
- 16th Kuiper Belt Object 50000 *Quaoar* at Opposition (42.047 AU)
- 16th History: Liu Yang becomes the first Chinese woman in space aboard a Shenzhou-9 spacecraft, joining two other crew members on a thirteen day mission to the orbiting Tiangong 1 laboratory module (2012)
- 16th History: Valentina Tereshkova; first woman in space aboard Soviet Vostok 6 (1963)
- 17th History: discovery of the Dhofar 378 Mars Meteorite (2000)
- 18th History: launch of the Lunar Reconnaissance Orbiter (LRO) and Lunar CRater Observation and Sensing Satellite (LCROSS) to the Moon (2009)
- 18th History: Sally Ride becomes the first American woman in space aboard the Space Shuttle Challenger (1983)
- 19th History: flyby of Earth by the ill-fated Nozomi spacecraft on its way to Mars (2003)
- 20th History: discovery of Nova 1670 in Vulpeculae (1670)
- 21st Summer Solstice at 05:04 UT (1:04 am EDT)
- 22nd History: launch of Soviet space station Salyut 5 (1976)
- 22nd History: founding of the Royal Greenwich Observatory (1675)
- 22nd History: discovery of Pluto's largest moon *Charon* by Jim Christy (1978)
- 23rd Full Moon (Strawberry Moon); largest of 2013
- 23rd Moon at perigee (closest distance from Earth)
- 24th History: launch of the Salyut 3 Soviet space station (1974)
- 24th History: Fred Hoyle born; British astronomer and proponent of nucleosynthesis (1915)
- 24th History: Sir William Huggins makes first photographic spectrum of a comet (1881)
- 25th History: Rupert Wildt born, German-American astronomer and first to hypothesize that the CO₂ in the Venusian atmosphere was responsible for the trapped heat (1905)
- 25th History: Hermann Oberth born, father of modern rocketry and space travel (1894)
- 26th History: Charles Messier born, famed comet hunter (1730)
- 27th Kuiper Belt Object 2002 MS₄ at Opposition; a Trans-Neptunian object discovered in 2002 by Chad Trujillo and Michael E. Brown (46.018 AU)
- 27th History: discovery of the Mars meteorite SAU 060, a small 42.28 g partially crusted grey-greenish stone found near Sayh al Uhaymir in Oman (2001)
- 27th History: flyby of the asteroid *Mathilde* by the NEAR spacecraft (1997)

Astronomical and Historical Events (continued)

- 27th History: launch of SEASAT, the first Earth-orbiting satellite designed for remote sensing of the Earth's oceans (1978)
- 27th History: Alexis Bouvard born, French astronomer, director of Paris Observatory, postulated existence of eighth planet from discrepancies in his astronomical tables for Saturn and Uranus. Neptune was subsequently discovered by John Couch Adams and Urbain Le Verrier after his death where he had predicted (1767)
- 28th History: Nakhla meteorite fall in Egypt (Mars meteorite), a piece of which was claimed to have vaporized a dog; first direct evidence of aqueous processes on Mars; (1911)
- 29th History: George Ellery Hale born, founding father of the Mt. Wilson Observatory (1868)
- 30th Last Quarter Moon
- 30th History: death of 3 cosmonauts in Soyuz 11 when capsule depressurizes on reentry – capsule was too cramped for cosmonauts to wear spacesuits (1971)
- 30th History: Tunguska Explosion Event (1908)

References on Distances

- The apparent width of the Moon (and Sun) is approximately one-half a degree ($\frac{1}{2}^\circ$), 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.

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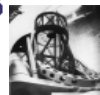








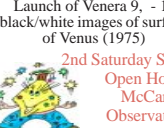









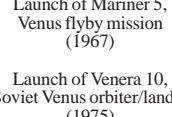



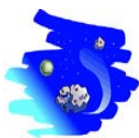







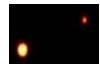






















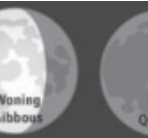

Front page design and graphic calendars: Allan Ostergren

Second Saturday Stars poster: Sean Ross, Ross Designs

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

June 2013

Celestial Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
May 2013 S M T W T F S 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31			Jul 2013 S M T W T F S 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31			1  Launch of ROSAT (Röntgen) X-ray observatory (1990)
2  Launch of Soviet Venus Orbiter, Venera 15 to map surface of Venus, in tandem with Venera 16 (1983)  Launch of Mars Express spacecraft and ill-fated Beagle 2 lander. (2003)	3  200-inch Hale Telescope dedication (1948)  Gemini 9 launch, Thomas Stafford, Eugene Cernan. (1966)  Launch of Gemini 4; Ed White 1st American to walk in space (1965)	4  Maiden flight of Space X Falcon 9 rocket (2010)	5  Scheduled launch of the European Space Agency's fourth cargo-carrying Automated Transfer Vehicle (named Albert Einstein) aboard an Ariane 5 ES rocket from Kourou, French Guiana to the International Space Station	6  Venera 16 - last of Soviet Venus orbiter/lander missions to map Venusian landscape (1983)	7  "Three flames ate the sun, and big stars were seen." - etching on Chinese oracle bones indicating ancient solar eclipse, with three coronal streamers and stars visible in the darkened sky. (1302 BC)	8  Giovanni Cassini born, observer of Mars, Jupiter and Saturn (1625)  Launch of Venera 9, - 1st black/white images of surface of Venus (1975)  2nd Saturday Stars Open House McCarthy Observatory
9  Full Moon at Apogee (farthest from earth)  Dedication of the Kathleen Fischer Sundial at the McCarthy Observatory (2012)  Johann Gottfried Galle, German astronomer, born - first to view planet Neptune, using calculations of Urban Le Verrier 1846. (1812)	10  Launch of Explorer 49 - moon orbiter and radio astronomy explorer (1973)  Launch of Mars Exploration Rover A Spirit (2003)	11  Flyby of Venus by Soviet spacecraft Vega 1 on its way to Comet Halley - dropped off lander and a balloon to study middle cloud layers (1985)	12  Launch of Venera 4, Soviet Venus lander, first to enter orbit of another planet (1967)	13  Return of sample capsule from the Hayabusa (MUSES-C) spacecraft, taken from near-Earth asteroid Itokawa (2010)	14  Launch of Mariner 5, Venus flyby mission (1967)  Launch of Venera 10, Soviet Venus orbiter/lander (1975)	15  flyby of Venus by Soviet spacecraft Vega 2 on its way to Comet Halley; dropped off lander and a balloon to study middle cloud layers (1985)
16  Liu Yang becomes the first Chinese woman in space (2012)  Valentina Tereshkova, 1st woman in space (1963)	17  Discovery of the Dhofer 378 Mars meteorite (2000)	18  Sally Ride, 1st U.S. woman in space (1983)  Launch of Lunar Reconnaissance Orbiter and LCROSS satellite to Moon (2009)	19  Flyby of Earth by the ill-fated Nozomi spacecraft on its way to Mars (2003)	20  Discovery of Nova 1670 in Vulpeculae by Pere Dom Voiture Anthelme, a Carthusian monk in Dijon, France (1670)	21  Summer Solstice 05:04 UT (1:04 AM EDT)  Yáng Liwei, a Chinese major general, military pilot and a CNSA astronaut; was first man sent into space by the Chinese space program and his mission, Shenzhou 5, made China the third country to independently send people into space (1965)	22  Royal Greenwich Observatory founded (1675)  Discovery of Pluto's largest moon Charon by Jim Christy (1978)  Launch of Soviet space station Salyut 5 (1976)
23  Full strawberry Moon at perigee (closest to earth and largest of year)  Martin John Rees born, British cosmologist and astrophysicist, has contributed to knowledge of the cosmic background radiation, galaxy clustering and formation, and on the final disproof of Steady State theory. (1942)	24  Fred Hoyle born, British astronomer and proponent of nucleosynthesis (1915)  Sir William Huggins makes 1st photographic spectrum of a comet (1881)	25  Rupert Wildt born, German astronomer (1905)  Hermann Oberth born, father of modern rocketry and space travel (1894)	26  Charles Messier born, famed comet hunter (1730)  German astronomer Walter Baade discovers near-earth asteroid 1566 Icarus inside orbit of Mercury, which became the subject of asteroid-busting "project Icarus." (1949)	27  Alexis Bouvard born, postulated existence of 8th planet, later identified as Neptune (1767)  launch of SEASAT 1, first Earth-orbiting satellite designed for remote sensing of oceans (1978)  Flyby of the asteroid Mathilde by the NEAR spacecraft (1997)	28  Nakhla meteor fall in Egypt - A piece of Mars object fabled to have hit dog (1911)	29  George Ellery Hale born, founding father of Mt. Wilson Observatory (1868)  Shuttle Atlantis docks with Russian space station Mir to form the largest man-made satellite ever to orbit the Earth - the second time ships from two countries had linked up in space (1995).
30  Death of 3 cosmonauts in Soyuz 11 when capsule depressurizes in reentry (1971)  Tunguska explosion event (1908)	Phases of the Moon  New Moon  Waxing Crescent  First Quarter  Waxing Gibbous  Full Moon  Waning Gibbous  First Quarter June 8 June 16 June 23 June 30					

Second Saturday Stars

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