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Stalking the Hunter

A view of the Orion Nebula (M42) viewed through the dome at McCarthy Observatory and enhanced by our JJMO imaging team. For more information, see inside, page 13.

The John J. McCarthy Observatory

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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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September Astronomy Calendar and Space Exploration Almanac



"Out the Window on Your Lef<u>t</u>"

T'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).



The International Observe the Moon Night is an annual event sponsored by NASA's Lunar Reconnaissance Orbiter, NASA's Solar System Exploration Research Virtual Institute, and the Lunar and Planetary Institute to encourage lunar observation and its connection to solar system exploration. This year (2015), the event is scheduled for September 19th. Additional information on scheduled events can be found at http:// observethemoonnight.org/.

A six day old Moon will be visible on the 19th to observers with clear skies. The terminator (dividing the sunlit and shadowed portions of the near-side) will traverse the western reaches of Mare Serenitatis (Sea of Serenity), the Haemus Mountains on its southern rim, the nearby Hyginus and Ariadeus Rilles, the Apollo 16 landing site in the Descartes Highlands, and the Altair Scarp.

The Hyginus and Ariadaeus Rilles can be found near the Moon's equator, just to the west of Mare Tranquilitatis (Sea of Tranquility). Rima Ariadaeus starts near the western shore of Mare Tranquillitatis and runs towards Mare Vaporum to the west. The linear fault or graben is 186.4 miles (300 km) in length. Averaging 3.1 miles (5 km) in width, Rima Ariadaeus slices through other, presumably older geologic features. Rima Hyginus emerges from the shadows in the west and is punctuated by a series of small rimless pits and the Hyginus caldera. Its length is approximately 136 miles (219 km)

and appears to be volcanic in origin. The rille abruptly changes directions at the Hyginus caldera.

The waxing crescent on the 19th also provides an opportunity to observe the elusive Valentine Dome. The volcanic dome can be found on the western shore of Mare Serenitatis and is approximately 24 miles (39 km) across but less than 1,200 feet (350 meters) high. It's only visible when near the terminator.

The Altai Scarp is a prominent feature in the southern highlands when the Sun is low in the lunar sky. The arcing cliff rises to a height of 2 to 2½ miles (3.5 to 4 km) and is a remnant of the multiple mountain rings that typically encircle large impact basins. This particular scarp is part of the outer ring of the Nectaris impact basin, one of the oldest on the Moon.



Formerly *known as Linné Alpha* the *ellipticall feature* bisected by a rille at left of center *has been popularly dubbed Valentine Dome,* perhaps because it suggested a heart pierced by an arrow - or perhaps just a big pizza pie..[Source: NASA/GSFC/Arizona State University.]



International Observe the Moon Night

The Moon will rise shortly after noon on September 19th and set at 10:39 pm. Approximately 36% of the near-side surface will be illuminated, similar to the image captured below. Photo notations correspond to the

- 1) Valentine Dome and Mare Serenitatis;
- 2) Hyginus and Ariadeus Rilles;
- 3) Mare Tranquillitatis;
- 4) Descartes Highlands and the Apollo 16 landing sit, and
- 5) the Altai Scarp and Mare Nectaris.

View from Afar

The Deep Space Climate Observatory (DSCOVR) satellite is a collaborative mission between NASA, NOAA and the U.S. Air Force. The satellite is positioned 1 million miles from Earth, between the Earth and the Sun. Its primary mission is to provide real time data on the solar wind for use in space weather forecasts and alerts. The satellite is also equipped with a four megapixel CCD camera and telescope that is used to image the Earth as it rotates, providing data on ozone, vegetation, clouds and aerosols in the atmosphere. On July 16th, the camera also captured the Moon as it passed between the satellite and the Earth. providing a view seldom seen of the Moon's fully illuminated far side.

Unlike the side facing the Earth, there are relatively few maria on the Moon's far side. The most prominent patch of lava seen in the image is Mare Moscoviense (Sea of Moscow) in the upper left of the lunar orb.





Lunar Eclipse

On the evening of September 27th, the full Moon will slip into the Earth's shadow. Once in the shadow, the Earth will block all direct sunlight from illuminating the lunar surface. This arrangement, with the Earth in line between the Sun and the Moon, produces a lunar eclipse.

The image at the right was taken at the McCarthy Observatory on October 27, 2004. It shows the Moon nearing the completion of its travel through the darkest part of the Earth's shadow (or umbra). The crimson glow is from sunlight scattered by the Earth's atmosphere that has filtered out most of the blue colored light. The northern limb of the Moon is brighter as it is closest to the edge of the umbra. On the 27th, the Moon will travel through the southern half of umbra. The eclipse will be visible (weather permitting) for observers in North America, with totality starting at 10:11 pm EDT and last-



ing 72 minutes. The entire eclipse will be visible to viewers on the east coast. The Moon will be rising with the eclipse in progress for viewers on the west coast, with moonrise just before the onset of totality. "September's full moon will be the closest to the Earth in 2015 (221,755 miles or 356,880 km) and appear the largest. The next total lunar eclipse visible in the northeast U.S. will be in January 2019."

Anatomy of a Lunar Eclipse

A total lunar eclipse can only occur at Full Moon, when Earth blocks the sunlight normally reflected by the Moon. Some sunlight is bent through Earth's atmosphere, typically allowing the Moon a coppery glow. This diagram, not to scale, looks down on the solar system from above.



Total eclipse begins (Moon completely within the umbra) Total eclipse ends (Moon begins to exit umbra) 10:11:10 pm EDT 11:23:05 am EDT

New Worlds

On July 14th, after nine and one-half years and more than 3 million miles (5 million km), the wait was finally over when the New Horizons spacecraft provided earthlings their first up close view of Pluto, its companion moon and diminutive satellites. While it will take almost 16 months to transmit all the data collected by New Horizons during its whirlwind tour of the Pluto system (only 5% has been transmitted), what has been received has exceeded all expectation.

We now know that Pluto is a much different world than the other dwarf planet, Ceres, visited earlier this year. Pluto has a diverse geology with a mix of relatively young and ancient terrain, icy mountain ranges and nitrogen glaciers. Its size (1,473 miles or 2,370 km) is larger than previously estimated. Consequently, with its mass known. Pluto's density must be lower (with more ice and less rock). Its larger size also confirms its standing as "king of the Kuiper Belt." As New Horizons passed by Pluto and the planet was backlit by the Sun, a thin, hazy atmosphere was detected (primarily molecular nitrogen). New Horizon's instruments also detected a long ion tail behind the planet, the byproduct of Pluto's atmosphere being eroded by the solar winds.

Charon, Pluto's largest moon, presented an equally young and intriguing surface with mountains, ridges and canyons up to 600 miles (1,000 km) long and up to 4 to 6 miles (7 to 9 km) deep. Its north pole is darkened, covered with a thin deposit through which young impact craters can be seen. Unlike Pluto, Charon doesn't appear to have an atmosphere.

New Horizon's cameras also imaged the smaller satellites of Pluto, showing that both Nix and Hydra have an icy surface. Images of Styx



Charon and Pluto imaged before closest approach



Pluto with the heart shaped Tombaugh Reggio feature visible



Pluto's thin, hazy atmosphere encircles the dwarf planet, in this image taken when the planet was backlit by the Sun

and Kerberos will be returned in the future, as will additional scientific data that will keep scientists busy for quite some time as New Horizons continues to head out into the Kuiper Belt.

MAVEN Update

NASA's Mars Atmosphere and Volatile Evolution (MAVEN) orbiter is the first spacecraft designed exclusively to study the upper atmosphere of Mars and explore the processes through which the planet's atmosphere could have been lost to space. It entered orbit around Mars in September 2014 and during the past year observed two unexpected phenomena.

While Mars is known for its dusty atmosphere, MAVEN observed a high-altitude dust cloud 93 miles (150 km) to 190 miles (300 km) above the surface. The source and composition of the cloud, which is denser near the surface, is not known. Possibilities include dust transported from the planet's surface, dust from

After 11 years in orbit, the

Phobos and Deimos, the two moons of Mars, and/or debris orbiting the Sun. The cloud may be a temporary phenomenon, although it has been present since MAVEN arrived last September.

The second unexpected phenomenon was an aurora that extends deep into the Martian atmosphere. Mars doesn't have a global magnetic field, and the aurora doesn't appear to be associated with any geographic features. During the auroral display, the spacecraft measured a surge in energetic electrons, most likely from the Sun, striking the planet's atmosphere. Most surprising was the depth at which the auroral glow was detected, much deeper than in the atmosphere on Earth.

Observations from MAVEN are expected to add to our understanding of how a planet such as Mars can lose its atmosphere over time, and the atmosphere's role in the changing climate, from one that may have been wet and warm in the distant past to today's dry and cold.



Tethys



False color image of the red arcs on Tethys Credits: NASA/JPL-Caltech/Space Science Institute

Cassini spacecraft continues to make new discoveries in the Saturn system. Details visible on Saturn's moons change with each new orbit as the Cassini orbiter views its targets under different illumination, from varying distances and changing vantage points. Images of the moon Tethys earlier this year revealed faint, red arcs in the northern hemisphere. The arcs appear to be a relatively recent phenomenon as they cross over geologically older features such as impact craters. The arcs are only a few miles wide but extend several hundred miles in length. The unusually colored features are similar to that

observed on Jupiter's moon Europa which is suspected to have a subsurface ocean. Science planning is underway to revisit Tethys later this year.

Riding the Comet

It's been more than a year since the European Space Agency's Rosetta spacecraft rendezvoused with the Comet 67P/Churyumov-Gerasimenko. The comet orbits the Sun once every 6.45 years and was inbound at the time of the encounter. Traveling with the comet, Rosetta has been able to monitor changes in the icy wanderer as it made its closest approach to the Sun in August.

In July, the spacecraft witness a dramatic outburst from the region connecting the comet's two icy lobes. The image sequence (below) was taken from a distance of 116 miles (186 km). The



time span between the first image (with no jet visible) and the last (with only a faint remnant of the jet remaining) is approximately 36 minutes. The jet was estimated to be moving at a minimum speed of 33 feet per second (10 m/s).



Comet 67P/Churyumov-Gerasimenko as seen during Rosetta's initial encounter in 2014. Credit: ESA/Rosetta/MPS for OSIRIS Team MPS/UPD/LAM/IAA/SSO/INTA/UPM/DASP/IDA



Outburst on Comet 67P/Churyumov-Gerasimenko just prior to perihelion in 2015 Credit: ESA/Rosetta/MPS

Three Years on Mars

The Mars Science Laboratory, Curiosity, continues to work its way along the lower elevations of Mount Sharp at the center of Gale Crater. The rover has been working in an area called Marias Pass for several weeks where it has found unusually high levels of silica and hydrogen.

Curiosity did take time out to take a selfie after the rover's most recent and successful drilling/ sampling activity.



Autumnal Equinox

The Sun crosses the celestial equator at 4:28 am EDT on the morning of September 23rd, marking the beginning of the fall season in the northern hemisphere.

Aurora and the Equinoxes:

Geomagnetic storms that are responsible for auroras happen more often during the months around the equinox (March and September). Check your evening sky or log onto *www.space weather.com* for the latest on solar activity.

September Nights

Enjoy the jewels of the summer Milky Way while the nights are still warm and the skies are clear. From Cygnus to Sagittarius, follow the star clouds and dust lanes that comprise the inner arms of our spiral galaxy. In the south after sunset, the stars in the constellation Sagittarius form an asterism, or pattern, of a teapot. The spout of the teapot points the way to the center of the Milky Way galaxy with its resident black hole. Check out the July/August calendar for more details.

Present and Future Pole Stars

Vega, the fifth brightest star and located in the constellation Lyra, is placed high in the evening sky during September. Vega is also destined to become the Pole Star in 12,000 years. Precession, or the change in the direction of the rotational axis of the Earth over time, is best exemplified in a comparison of the position of Vega to that of Polaris (the current Pole Star).

Sunrise and Sunset							
Sun	Sunrise	<u>Sunset</u>					
September 1st (EDT)	06:19	19:27					
September 15th	06:34	19:03					
September 30th	06:49	18:38					

Astronomical and Historical Events

- 1st Neptune at Opposition, rising with the setting Sun and visible all night
- 1st History: flyby of Saturn by the Pioneer 11 spacecraft (1979)
- 2nd Scheduled launch of the next expedition crew to the International Space Station aboard a Soyuz spacecraft from the Baikonur Cosmodrome, Kazakhstan
- 2nd History: discovery of asteroid 3 Juno by Karl Harding (1804)
- 3rd Kuiper Belt Object 145452 (2005 RN43) at Opposition (39.636 AU)
- 3rd History: controlled impact of the SMART-1 spacecraft on the lunar surface at the conclusion of a successful mission; precursor of NASA's LCROSS mission (2006)
- 3rd History: Viking 2 spacecraft lands on the Martian surface (1976)
- 4th Mercury at its Greatest Eastern Elongation (27°), apparent separation from the Sun in the morning sky
- 5th Last Quarter Moon
- 5th Asteroid 9 Metis at Opposition (8.8 magnitude)
- 5th History: launch of Voyager 1 to the planets Jupiter and Saturn (1977) now at almost 12 billion miles (19.8 billion km) from Earth Voyager 1 now has entered the interstellar space
- 6th Kuiper Belt Object 2010 RF43 at Opposition (52.174 AU)
- 8th Distant flyby of Saturn's moon Dione by the Cassini spacecraft
- 8th History: sample return canister from the Genesis spacecraft crashes back to Earth when drogue parachute fails to deploy. Spacecraft was returning to Earth from Lagrange Point 1 with its collection of solar wind particles (2004)
- 8th History: launch of the Surveyor 5 spacecraft (lunar science mission); landed on Mare Tranquillitatis three days later (1967)
- 8th History: first Star Trek episode airs on television (1966)
- 8th History: Marshall Space Flight Center's dedication by President Eisenhower (1960)
- 9th Distant flyby of Saturn's moon Helene by the Cassini spacecraft
- 9th History: launch of Conestoga I, first private rocket (1982)
- 9th History: launch of Soviet spacecraft Venera 11 (Venus lander) to the planet Venus (1978)
- 9th History: launch of Viking 2 (Mars Orbiter/Lander) (1975)

Astronomical and Historical Events (continued)

- 9th History: discovery of Jupiter's moon Amalthea by Edward Barnard (1892)
- 10th Distant flyby of Saturn's largest moon Titan by the Cassini spacecraft
- 10th History: launch of the GRAIL spacecraft aboard a Delta 2 rocket from the Canaveral Air Force Station; lunar gravity mapping mission (2011)
- 10th History: debut flight of the Japanese H-2 Transfer Vehicle (or HTV) to the International Space Station (2009)
- 10th History: discovery of Dysnomia, moon of the dwarf planet Eris, by Mike Brown, et al (2005)
- 11th History: Mars Global Surveyor enters orbit around Mars (1997)
- 11th History: flyby of Comet Giacobini-Zinner by the International Cometary Explorer (ICE), first spacecraft to visit a comet (1985)
- 12th Second Saturday Stars Open House at the McCarthy Observatory
- 12th History: Japanese sample return probe Hayabusa arrives at asteroid 25143 Itokawa (2005)
- 12th History: launch of Soviet Luna 16; first robotic probe to land on the Moon and return a sample to Earth (1970)
- 12th History: launch of Gemini XI with astronauts Charles Conrad and Richard Gordon (1966)
- 12th History: launch of the Soviet spacecraft Luna 2, first to impact the Moon's surface (1959)
- 12th History: Gervase of Canterbury and Chinese astronomers observe the transit of Mars across Jupiter (1170)
- 13th New Moon
- 13th History: launch of the Japanese Moon orbiter "Kaguya" (Selene 1) (2007)
- 14th Moon at apogee (furthest distance from the Earth)
- 14th History: launch of Soviet spacecraft Venera 12 (Venus lander) to the planet Venus (1978)
- 14th History: discovery of Jupiter's moon Leda by Charles Kowal (1974)
- 14th History: John Dobson born, architect of the Dobsonian alt-azimuth mounted Newtonian telescope (1915)
- 17th History: Konstantin Tsiolkovsky born in Izhevskoye, Russia; one of the fathers of rocketry and cosmonautics, along with Goddard and Oberth (1857)
- 17th History: discovery of Saturn's moon Mimas by William Herschel (1789)
- 18th History: discovery of Comet Ikeya-Seki by Ikeya and Tsutomu Seki (1965)
- 18th History: launch of Vanguard 3, designed to measure solar X-rays, the Earth's magnetic field, and micrometeoroids (1959)
- 19th International Observe the Moon Night (http://observethemoonnight.org/)
- 19th History: NASA unveiled plans to return humans to the moon (2005)
- 19th History: first launch of the Wernher von Braun-designed Jupiter C rocket from Cape Canaveral (1956)
- 19th History: discovery of Saturn's moon Hyperion by William and George Bond and William Lassell (1848)
- 21st First Quarter Moon
- 21st Kuiper Belt Object 2010 RE64 at Opposition (52.026 AU)
- 21st History: orbital insertion of the MAVEN (Mars Atmosphere and Volatile Evolution) spacecraft (2014)
- 21st History: second flyby of Mercury by the Mariner 10 spacecraft (1974)
- 21st History: Gustav Holst born, composer of the symphony "The Planets" (1874)
- 21st History: Soviet spacecraft Zond 5 returns after circumnavigating the Moon (1968)
- 21st History: Galileo spacecraft impacts Jupiter after completing its mission (2003)
- 22nd Kuiper Belt Object 120347 Salacia at Opposition (43.654 AU)
- 22nd History: Deep Space 1 spacecraft passes within 1,400 miles (2,200 km) of the 5 mile long potato-shaped nucleus of Comet Borrelly (2001)
- 23rd Autumnal Equinox at 04:28 am (EDT)
- 23rd History: discovery of Saturn moons Siarnaq, Tarvos, Ijiraq, Thrymr, Skathi, Mundilfari, Erriapus and Suttungr by Brett Gladman and John Kavelaars (2000)
- 23rd History: Johann Galle discovers the planet Neptune (1846)
- 24th Asteroid 4 Vesta closest approach to Earth (1.427 AU)
- 24th History: orbital insertion of India's MOM (Mars Orbiter Mission) spacecraft (2014)
- 24th History: John Young born (1930), first person to fly in space six times, including Gemini 3 (1965), Gemini 10 (1966), Apollo 10 (1969), Apollo 16 (1972), STS-1, the first flight of the Space Shuttle (1981), and STS-9 (1983)

Astronomical and Historical Events (continued)

- 24th History: Soviet spacecraft Luna 16 returns 101 grams of lunar soil to Earth (1970)
- 26th History: Cosmonauts V. Titov and Strekalov escape moments before Soyuz T-10-1 explodes on the pad (1983)
- 27th Full Moon (Full Harvest Moon)
- 27th Total Lunar Eclipse
- 27th Moon at perigee (closest distance to Earth)
- 27th Plutino 2001 QF298 at Opposition (42.347 AU)
- 27th History: launch (2007) of the Dawn spacecraft to Vesta (2011) and Ceres (2015)
- 27th History: launch of SMART-1, the first European lunar probe (2003)
- 28th Flyby of Saturn's largest moon Titan by the Cassini spacecraft
- 28th History: launch of Soviet lunar orbiter Luna 19; studied lunar gravitational fields and mascons (mass concentrations), radiation environment, and the solar wind (1971)
- 28th History: launch of Alouette, Canada's first satellite (1962)
- 28th History: discovery of Jupiter's moon Ananke by Seth Nicholson (1951)
- 29th History: launch of Salyut 6, first of a second generation of Soviet orbital space station designs (1977),
- 30th Distant flyby of Saturn's moons Dione, Calypso, Mimas, Tethys, Aegaeon and Telesto by the Cassini spacecraft
- 30th History: all instruments deployed on the Moon by the Apollo missions are shut off (1977)
- 30th History: discovery of Jupiter's moon Themisto by Charles Kowal (1975)
- 30th History: first photo of the Orion Nebula taken by Henry Draper (1880)

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*.

Image Credits

Front page design and graphic calendars: Allan Ostergren

Page 3 Image: Composite image of the Moon during the 2004 lunar eclipse and a six day-old crescent. A fully eclipsed Moon will be visible on September 27th to observers in North America and a six day old crescent on the 19th for the International Observe the Moon Night. Photo Credits: Bill Cloutier

Second Saturday Stars poster: Marc Polansky

Front Page image: RGB Composite, using Red, Green, Blue and Luminance filters primarily on the Takahashi FSQ-106. Luminance frames of the core taken on the 16" Meade were composited in for added detail. Roughly an hour and a half of combined exposure time, under less than ideal conditions (moon, fog, clouds, or some combination over the course of 5 nights). Stacking in MaximDL, processing in Photoshop. Image by M. Polansky with JJMO equipment.

FREE EVENT

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

September 12th 8:00 - 10:00 pm Kid's Night Oserving the Mysteries of the

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Refreshments Family Entertainment Handicapped Accessible ASL Interpretation Available with Prior Notice Rain or Shine

Strac



September 2015 Celestial Calendar

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 Flyby of Saturn by Pioneer spacecraft (1979)	2 Discovery of asteroid 3 Juno by Karl Harding (1804)	3 Viking 2 lands on Mars (1976) SMART-1 spacecraft controlled impact on Moon (2006)	4 Final States of the study of Meteorities and other astenomer, contributed to the study of Meteorities - a science that deals with meteorities and other extraterrestrial materials (1902)	5 Launch of Voyager 1 to Jupiter and Saturn (1977)
6 John Henry Dallmeyer born - Anglo-German optician, who developed the rapid rectilinear lens that is symmetrical about its stop to reduce radial distortion (1830)	7 James Alfred van Allen born, an American space scientist whose proposal to use geiger counters on Explorer missions to detect charged particles gave his name to the van Allen Belt (1914)	8 Comet Ikeya-Seki (1965) Marshall Space Center born (1960) Iaunch of the Surveyor 5 spacecraft to Mars (1967) Iaunch of the Surveyor 5 spacecraft to Mars (1967) First Star Trek episode airs on television (1966)	9 Launch of Conestoga 1, first private rocket 1982	10 GRAIL spacecraft launch to study Moon's gravity (2011) James Edward Keeler, American astronomer, discovered gap in Saturn's rings; later gave name to Keeler Gap, discovered by Voyager (1857)	11 Mars Global Surveyor enters orbit around Mars (1997) Flyby of Comet Giacobini- Zinner by the ICE spacecraft, first to visit a comet (1985)	12 Launch of to impact Moon's surface (1959) and Luna 16, 1 st robotic probe to Earth (1970) Launch of Gemini XI with astronauts Charles Conrad and Richard Gordon (1966) 2nd Saturday Stars Open House McCarthy Observatory
13 Trans-Neptunian dwarf planet, 2003 UB313, is officially named "Eris", after Greek goddess of strife and conflict; estimated to be 27% more massive than pluto (2006)	Moon at Apogee (farthest from earth) 1.4 Image: Description of the second from earth) Image: Description of the second father of dobsonian telescope (1915) Discovery of Jupiter's moon Leda by Charles Kowal (1974) Image: Description of the second father o	15 January	16 Robert Jay GaBany born, American amateur astro- nomer and astrophotographer, developed use of smaller telescopes and CCD cameras to produce long-exposure high resolution images of distant galaxies (1954)	17 Discovery of Saturn's Moon Mimas by William Herschel - 1789 Konstantin Tsiolkovsky born in Izhevskoye, Russia; one of the fathers of cosmonautics, along with Goddard and Oberth (1857)	18 Launch of Vanguard 3, designed to measure solar x-rays, the Earth's magnetic field and micrometeoroids (1959)	Launch of You Braun- designed Jupiter-Crocket from Cape Canaveral (1956) Discovery of Saturn's Moon Hyperion by William and George Bond and William Lassell (1848) International Observe the Moon Night
20 Surveyor 2 lunar lander launched, loses mission control, tumbles and crashes onto surface of Moon two days later (1966)	Composer of The Planets (1874)	22	23 Autumnal Equinox at 04:28° pm EDT) Johann Gottfried Galle discovers planet Neptune (1846)	24 John Young born - first to fly six times in space (1930) Soviet spacecraft Luna I6 returns 101 grams of lunar soil to Earth (1970)	25 Launch of NASA Mars Observer spacecraft, also known as the Mars Geoscience/Climatology Orbiter, a robotic space probe; communication with the spacecraft was lost on August 21, 1993, 3 days prior to orbital insertion. (1992)	26 Cosmonauts V. Titov and Strelkov escape moments before Soyuz T-10-1 explodes on pad (1983)
Moon at Perigee (closest to earth) 27 Total Lunar Eclipse SMART-1, 1 st European lunar probe - 2003 Launch of Dawn spacecraft to Vesta and Cerse (2007)	28 Discovery of Jupiter's moon Ananke by Seth Nicholson (1951) Launch of Alouette, Canada's first satellite (1962)	29 SpaceshipOne X1 achieves altiude of 102.9 kilometers, first of two flights to win X Prize competition (2004) Launch of Salyut 6, first of a second generation of Soviet orbital space station designs (1977)	30 Discovery of Jupiter's moon Themisto by Charles T. Kowal (1975)	P Last Quarter Sept 5 Sept 21	hases of the Moo Woring Rescent New Moon Sept 13 Full Moon Sept 27	M Wexing Crescent