

December 2009

Space News

Approaching "Marquette Island"



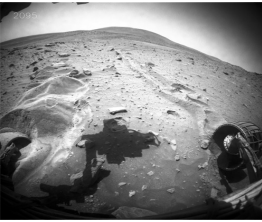
NASA's Mars Exploration Rover Opportunity took this picture of a rock informally named "Marquette Island" as the rover was approaching the rock for investigations that have suggested the rock is a stony meteorite.

Opportunity used its navigation camera to record this image during the 2,056th Martian day, or sol, of the rover's mission on Mars (Nov. 5, 2009).

The dark-toned rock stood out so prominently in more distant views on earlier sols that the rover team referred to it as "Sore Thumb" before assigning the Marquette name in accord with an informal naming convention of choosing island names for the isolated rocks that the rover is finding as it crosses a relatively barren plain on its long trek from Victoria Crater toward Endeavour Crater.

Image Credit: NASA/JPL-Caltech

Little Movement in Spirit's Sol 2099 Drive



This blink comparison aids evaluation of a drive by NASA's Mars Exploration Rover Spirit during the rover's 2,099th Martian day, or sol (Nov. 28, 2009). A stall by the right-rear wheel ended the drive after the first 1.4 meters (4.6 feet) of wheel movement in a two-step drive that had been planned to include a total of 5 meters (16.4 feet) of wheel movement. As anticipated, nearly all of the wheel movement was slippage.

The two wide-angle views shown one after the other in this comparison come from the right-side eye of Spirit's front hazard-avoidance camera, one taken on Sol 2095 (Nov. 24) after the last drive prior to Sol 2099, and the other taken after the drive on Sol 2099. The most obvious change is in the position of the shadow of the rover arm, a change unrelated to the rover's movement during the drive. The shadow is farther to the right in the "before" (Sol 2095) image than on the "after" (Sol 2099) image.

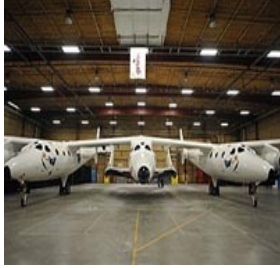
The view is looking northward. In the "after" image, the near face of a mound of sand in front of Spirit's left-front wheel has eroded slightly northward. Analysis of data from the drive indicates that the center of the rover moved 0.5 millimeters (0.02 inch) forward, 0.25 millimeters (0.01 inch) to the left and 0.5 millimeters (0.02 inch) downward.

The rover team began commanding extrication drives in November after months of Earthbound testing and analysis to develop a strategy for attempting to drive Spirit out of this soft-soil site, called "Troy." The extrication drives are expected to make slow, if any, progress in coming weeks, and the probability of success in escaping from Troy is uncertain.

Image Credit: NASA/JPL-Caltech

Branson unveils Virgin Galactic spaceliner

Los Angeles (AFP) Dec 7, 2009



Richard Branson unveiled Monday a commercial spaceliner offering tourists a cheaper chance to experience the thrill of weightlessness and view the splendor of the Earth from space.

The British billionaire hopes to offer tickets aboard his spacecraft at a cost of 200,000 dollars each, giving adventurous, well-heeled travellers a chance to experience space for a fraction of the cost of a seat on a NASA shuttle or Russian spaceship.

Announcing the roll-out of the Virgin Galactic spaceliner in California's Mojave desert, Branson said he planned to be on the craft's first passenger flight some 18 months from now, accompanied by his family and the American designer of the space ship, Burt Rutan.

The craft is composed of two parts -- the SpaceShipTwo and the WhiteKnightTwo, the prototype of which has been dubbed Virgin MotherShip Eve in a tribute to Branson's mother.

The futuristic-looking craft emblazoned with the image of a young woman that represents Branson's mother Eve diving through space, resembles two jet aircraft joined together at their wing tips.

The White Knight will transport the two-pilot, six-passenger SpaceShipTwo high above the Earth where the space pod will break away and propel beyond the atmosphere. "It is attached to the mothership in the middle and when the mothership gets up to 60,000 feet, the spaceship will drop away," Branson said of SpaceShipTwo at the unveiling. "They will ignite the rocket and it will go from zero to 2,500 miles per hour in 10 seconds, so a real rush."

Passengers aboard the SpaceShipTwo will be able to remain strapped in and view the Earth from portholes next to their seats, or unbuckle and experience weightlessness, once the craft passes beyond the atmosphere. "This is a very big space ship so you have got a lot of room to float around, lots of windows to look out," Branson said. "There will be two astronauts at the front, but the six passengers will be astronauts by the time they are finished." In an interview with CNN before the unveiling, Branson described the space ship's unique design, which will allow it to return to Earth in an unusual fashion. "At that stage the space ship effectively turns into a giant shuttlecock -- that would be the genius of Burt Rutan, the engineer behind it," he said. "And so it literally feathers its way back into the Earth's atmosphere so it doesn't have the enormous heat buildup that some of the NASA spaceships have had in the past." The mothership completed a year of "rigorous and successful" first phase flight testing prior to the attachment of SpaceShipTwo, the company said. Another period of intensive testing will follow.

Built from carbon composite materials like the mothership, SpaceShipTwo is to be powered by a hybrid rocket motor that is still under development, Branson's company said.

In a statement, Branson said the unveiling "takes the Virgin Galactic vision to the next level and continues to provide tangible evidence that this ambitious project is not only moving rapidly, but also making tremendous progress towards our goal of safe commercial operation." Some 300 passengers have reportedly paid in advance for tickets on the spaceliner. They will be among guests invited to a VIP roll-out at the Mojave Air and Space Port. California Governor Arnold Schwarzenegger and New Mexico Governor Bill Richardson will christen the spaceliner Virgin Space Ship Enterprise. New Mexico is building a space port in Upham, New Mexico with a 10,000-foot (three kilometer) runway that is scheduled to be completed by mid-2010.

SpaceShipTwo is successor to SpaceShipOne, a single-seat suborbital spaceplane also designed by Rutan, which won the 2004 Ansari X-Prize for the first manned private spacecraft. Rutan made aviation history in 1986 with the Voyager, the first plane to fly around the world without stopping or refuelling. He is the founder of Scaled Composites, LLC, an aircraft design and prototyping outfit, in Mojave, California.

What's Up from SAAO

Sun and Moon

Full moon occurs on the 2nd, with last quarter (half moon in the morning sky) falling on the 9th. The new moon starts on the 16th and first quarter (half moon in the evening sky) is on the 24th. A second full moon occurs (also referred to as a blue moon) in this month on the 31st, which coincide with a lunar eclipse. A lunar eclipse happens when the moon finds itself inside the Earth's shadow and appear darker than normal. The eclipse is predicted to start at about 19:15 and finishes at about 23:30 local time. The eclipse will be visible from all of South Africa.

The young lunar crescent may be visible with optical aid from a small part of the South Pacific just east of the date line on the 16th. It is visible on the 17th from South America, most of North America except Alaska and northern Canada, southern Spain, Sicily, the SW corner of Turkey, all of Africa, Syria and the Levant, the Arabian Peninsula, southern Iran and Pakistan, India except the northernmost parts, South east Asia and the western 2/3 of Australia. It may be visible with optical aid from northern Spain, southern France, Italy, Greece and the Balkans, Turkey, most of the rest of Iran, Pakistan and India, the rest of Australia and New Guinea, the Philippines and South China. First possible sighting from South Africa is predicted on December 17th.

On the 4th at 16:13 the Moon will be at perigee (closest approach to Earth) at a distance of 363478 km. It will be at apogee (furthest from Earth) at a distance of 405730 km on the 20th at 16:55.

Winter solstice (when Sun reaches its most southerly position as viewed from Earth) falls on the 21st at 19:47 local time. This also corresponds to the longest day of year, for those located in the southern hemisphere.

Planetary and other events – morning and evening

Mercury will be setting about an hour after sunset at start of the month, while getting closer to the sun as the month progresses and being closet to the sun by month end. Venus rises shortly before sunrise and remaining close to the sun all month. Mars rises about an hour after midnight at start of the month and an hour before midnight by month end.

Jupiter can be seen early in the evening until 23:30 at start of the month and until 21:30 by month end. Saturn rises at just after 01:00 in the morning at start of the month and just before midnight by month end. Uranus can be seen all night, setting at around midnight all month. Neptune is up during the evenings until about one to two hours before midnight.

On the 15th at around 04:30 in the morning the bright star Antares, near the heart of the Scorpion, can be seen close to a waning crescent Moon.

The Evening Sky Stars

The stars of the Great Square of Pegasus and of Andromeda can still be seen low in the north, with the Andromeda Galaxy visible as a faint fuzzy spot below the star Beta Andromedae. It's believed that in another few billion years, this galaxy will collide with our own Milky Way. Gas and dust clouds will collide, producing large numbers of new stars, but the odds are that not even one star will collide with another. There's too much empty space. If the sun were a 10cm

ball, the nearest star system (Alpha Centauri) would be about 3000 km away.

Much of the sky on December evenings is dominated by 'watery constellations' and birds. Above Pegasus and Andromeda are the dim stars of the Fishes, tied together at their tails with a knot, and above the fishes is Cetus the Whale, representing the sea monster coming to devour Andromeda. The most famous star in Cetus is one that's not usually visible. Named 'Mira', i.e. 'wonderful', it was first recognised as a periodic variable by the Dutchman Jan Holwarda, who found that this star (discovered in 1596 by Fabricius) reached peak brightness roughly every 11 months, when it would typically be visible as a fairly dim star. In between this mysterious object would disappear. We now know of many similar stars, all of them cool 'red giants' hundreds of times the diameter of our own sun. If Mira were placed at the centre of our solar system, Earth would be inside it!

West of Cetus in the early evening sky is Aquarius the water carrier, with the planet Uranus just visible to the naked eye on a dark night for those who know just where to look, while south of Aquarius are the stars of the Southern Fish, headlined by the brightish star Fomalhaut. West of the Southern Fish is the large dim triangle made by the stars of the Sea Goat, where Neptune can be found by those with a telescope.

High in the south is the bright star Achernar, with the stars of the Phoenix (the Fire Bird) just above it and the stars of the Toucan and the Crane to the right. The Peacock is moderately low in the SW, below and to the right of the Toucan. Continuing the birds-and-water theme, we find the Water Snake (which looks like a triangle!) directly below Achernar, while the celestial river Eridanus runs its course from Achernar to the knee of Orion, whose stars are rising in the east.

Below Achernar and to the right, among the stars of the Toucan, is the dim glow of the Small Magellanic Cloud. The Large Cloud, below Achernar and to the left, is a bit easier to see, and was imagined by some South African groups to be a hunting plain for the gods. The two brightest stars in the sky, Canopus and Sirius, are rising in the south-east and east, respectively, with Orion shouldering his way into the summer skies in the north-east, preceded by Taurus the Bull. The small cluster of stars on the Bull's shoulder, the Pleiades, were used all over Africa to keep track of the seasons. Rising in the east as well is the Milky Way, dimmer than the brilliant Milky Way of winter, but still very impressive on a dark Karoo night.

The Morning Sky Stars

The Cross and the Pointers (the two brightest stars in Centaurus) are rising higher in the south-east this month. Just above the Southern Cross and the Housefly are the stars of the great ship Argo as it sails along the Milky Way, accompanied by the dim stars of the Flying Fish. The Milky Way still stretches across the pre dawn sky from the south-east to the north-west as it did last month, running from Scorpio in the ESE through the Wolf and the Centaur to Argo, then west through the stars of the Unicorn, Orion and the Twins. The southern part is much brighter with obvious dark patches, but all of it will reward a scan with binoculars, revealing beautiful clumps and clusterings of stars. Away from the Milky Way, bright Arcturus glows orange in the NE, with blue-white Spica rising in the E and lonely Alphard, heart of the great Water Serpent, above Saturn and Regulus high in the north.

If you look carefully at where most of the bright stars are, you'll notice that they are concentrated near the Milky Way, but offset a bit. These local bright stars are part of a 'spur' sticking out at a bit of an angle from the local spiral arm in the great pinwheel of stars that is our Milky Way Galaxy. Ironically, although most of the stars visible in the night sky are brighter than our sun, most of the stars in the Milky Way Galaxy are much dimmer than the sun. The common red dwarf stars that make up most of the population are too dim to see unless they are extremely close, while the rare super giants are visible thousands of light years away.

The Telescope

Can you find the words listed in this box of letters below? They may be horizontally, vertically or diagonally, either forwards or backwards, but always in straight lines.

T R I E J F A O S H D M I E M P Z T Z F H I O F B
U W H U X Y D K D E L N L X O T M E W I N U P U U
U T A C U X I I C C R C O L D X S L U N O G E H E
F I W R Y O G L K I R I A U E I Z E Q D I I V M M
N E W T O N I A N I W R W Q G R T S R E T C I F I
K W P I F N H B C C A S U S T G P C J R A O N B M
W O A L A M M G I X S A T N S D L O L S C O T M L
N A I T C H N Z I D T B O A Y O E P E C I O L E X
G Y I I R I E S Q O F O E T R O R E N O F N N N L
T O N M T O K X R O A K T Y R D I C S P I Q A K N
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H V E L E R A S Y I N W A C G S A A N T G H Q O G
G S M C Q L K P I L T O X T Z I U R G C A F N N W
B K N Y M X B I J H H W N V V R E C N O M C K H Q
C U I O F N J K T R U X G K X O M W T O N C O C E
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P I Z W N R Y J C U I J Y F S R N O I L I H I R C
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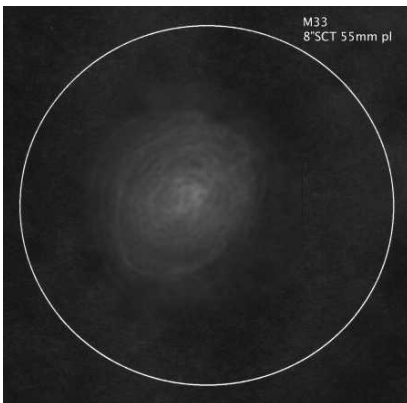
ALTAZIMUTH
COUNTER WEIGHT
CROSSWIRES
DECLINATION
DOBSONIAN
DRIVE
EQUATORIAL MOUNT
EYEPIECE
FINDER SCOPE
FOCUSING KNOB
LENS
MAGNIFICATION
MIRROR
NEWTONIAN
POLAR AXIS
REFLECTOR
REFRACTOR
RIGHT ASCENSION
SETTING CIRCLE
SPIDER
STAR DIAGONAL
TELESCOPE
TUBE
WEDGE

Challenge for the Month

Triangulum

Since any three points make up the corners of a triangle it is unsurprising, if somewhat unimaginative, to find a triangle among the constellations. Triangulum was known to the Greeks who called it Deltoton, for its shape resembled a capital delta. Aratus described it as an isosceles triangle, having two equal sides and a shorter third side. Eratosthenes said that it represented the Nile river delta. According to Hyginus, some people also saw it as the island of Sicily, which was originally known as Trinacria on account of its three promontories. Trinacria was the home of Ceres, goddess of agriculture. Since the volcano Etna is on Sicily, it is possible to see the mountain's smoke drifting away from the island in the form of M33, a galaxy visible with binoculars.

Like the Andromeda galaxy, M33 is 2 million light years distant and may be a satellite galaxy to the larger wonder. It is also known as the Pinwheel galaxy, M33 spans 50,000 light years and is 15 times less massive than Andromeda – it is still a binocular wonder and a naked-eye challenge.



M33 were discovered by Charles Messier on 25 August 1764 “*nebula discovered between the head of the northern fish and Triangulum, close to a sixth magnitude star. The nebula's light is whitish, and almost even in density, but is slightly brighter over the central two-thirds of its diameter, and it does not contain any stars. It is difficult to see with a simple one-foot refractor. Its position was determined relative to α Trianguli. Observed again 27 September 1780*”.

At 23x in the 4inch, the galaxy's light is compressed into a shimmering disk of optimal contrast, with several faint spiral arms sweeping away from a tight, lens-shaped nuclear region.

Lets move over to the 4th magnitude Gamma (γ) Trianguli, which is part of a very pritty coincidental triple star; the other members being 5th magnitude Delta (δ) Trianguli and similarly bright 7 Trianguli. Delta is 35 light years distant, Gamma is 118 light years distant, and 7 Trianguli is 295 light years away from us.

NGC 752 (Caldwell 28)

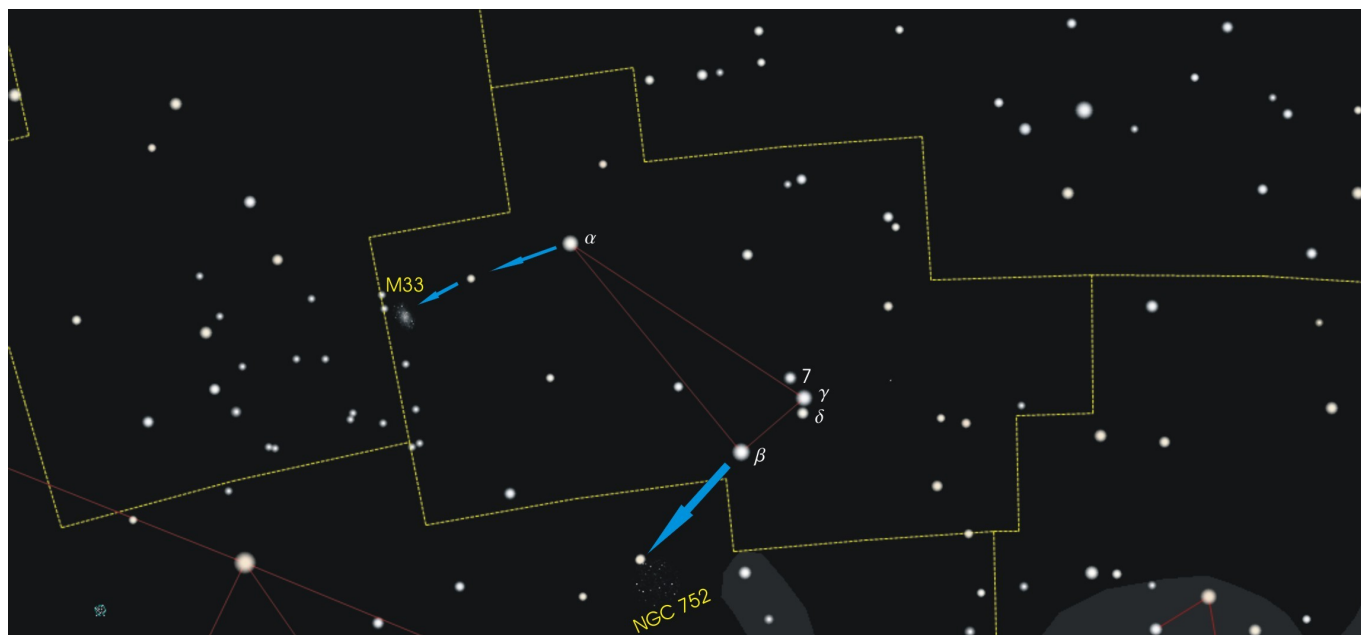


It was probably discovered by Hodierna before 1654, together with M33. Afterwards, it was not found again until Caroline Herschel observed it on September 29, 1783, and added it to her list as No. 13. William Herschel added it to his catalogue as HVII.32 based on his observation of September 21, 1786. “*A very large coarsely scattered cluster of very bright stars. Irregularly round. Very rich. Takes up $\frac{1}{2}^{\circ}$, like a nebulous star to the naked eye.*”

The cluster is visible to the naked eye if you are far away from any light pollution. This is also an excellent binocular object, because of its large apparent diameter and splash of bright 8th to 12th magnitude stars. Telescopic views of NGC 752 will be best in a rich-field instrument at very low power. According to Rodger Clark the optimum magnification for detecting this cluster is 7x with a 2” (60mm) telescope and 27x with an 8” (203mm).

Unlike most open clusters, which are tens or hundreds of millions of years old, NGC 752 is about 2

billion years old. NGC 752's very open nature itself hints at the clusters seniority. Unlike globular clusters, whose hundreds of thousands of stars exert a mutual gravitation that keeps them moving in a tight pack, an open cluster tends to loosen as it ages. Stars lining the cluster's edge are lost to the gravitational pulls of passing stars, molecular clouds, and other clusters. At 23x in a 4" NGC 752 seems to fill the field of view, but it is hard to know where the cluster's boundaries end.



Enjoy the hunt.

Dates for Suikerbosrand outings for 2010 has been submitted. I will post them to the mailing list as soon as we receive confirmation from Suikerbosrand management.

Hope you have a good Xmas and all the best for 2010!!!

Clear skies
Constant