

Sky News

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MOON TERMS

NEW SPACE JUNK CATCHERS

So many new terms are being used to describe Earth's moon, it's time to figure out what they mean.

Perigee and **apogee** are terms for the closest point and farthest point of the moon in its orbit around Earth. Bodies in space seem to orbit in oval or elliptical paths, not circular paths. (Could it be because all bodies are traveling at great speeds through space causing a lag?) For example, the solar system orbits around the center of the Milky Way galaxy, and the Milky Way galaxy moves in the direction of the Virgo supercluster, etc.

Now for unofficial terms. **Supermoon** is a full moon near perigee (closer to Earth), appearing bigger. Those conditions are what is generally referred to as a **Super Full Moon** or supermoon. It looks about 7% bigger than an average full moon and 16% brighter too. A **Super New Moon** is a new moon near perigee, but can't be seen in this phase.

Micromoon is the opposite of supermoon. If a full moon or a new moon is near apogee (farthest from Earth), it appears smaller. Micromoon has been called **Minimoon**, **Mini Full Moon**, or **Mini New Moon** too. A micromoon appears smaller by about 7% and about 16% dimmer than an average moon.

The moon's distance changes its apparent size and brightness. At their extremes, a super full moon can appear 30% brighter than a micro full moon and about 14% larger, when viewed from Earth.

The following sources were used
for this issue of *Sky News*:

www.physics.valpo.edu, www.casonline.org,
<http://www.astropixels.com>, www.timeanddate.com
<http://www.jpl.nasa.gov>, <http://spaceweather.com>,
<http://www.seasky.org>, www.metoffice.gov.uk,
www.skyandtelescope.com, www.esa.int,
Astronomy, and *Sky and Telescope*.

A range of new techniques to deal with space junk removal in orbit around Earth are being revealed, using robotic arms, nets, harpoons, and magnets. One interesting problem is their size variances.

Scientists estimate that a half a million pieces of space debris are larger than a pea. There are 23,000 objects larger than a baseball and they are being tracked by the U.S. Joint Operations Command. Most of the large objects are defunct or discarded boosters. The numbers increase annually.

Large pieces, like broken satellites, could be magnetically pulled or pushed into a better or safer orbit or **deorbit**, out of orbit completely to burn up in Earth's atmosphere during reentry. The technique is called **magnetic grappling**. For nonmetallic pieces, like solar panels, **gecko grippers** may be used. Based on the structure of a gecko's toes, rows of microscopic hairs increase the contact surface area. Using van der Waals forces (a weak force between molecules), the gecko grippers adhere very well, even in the vacuum of space.

GLOBAL CLIMATE STUDY OF 2016

The State of the Climate in 2016 report by the American meteorological Society indicate global temperatures were the highest in 2015-2016 since temperatures began to be recorded in 1850. There are other indicators as well. Severe droughts included 12% of Earth's surface. The ocean surface temperatures were at record highs. Sea levels reached record highs. Atmospheric carbon dioxide concentrations are at a record high, like Earth's atmosphere 800,000 years ago. Arctic Sea ice levels of summer have decreased by 13% every year since 1979! Glaciers are losing ice for the 37th year in a row. Extreme heat waves increased in the U.S., Europe, the Middle East, and India.

OCTOBER PLANETS

Jupiter can be seen for the first week of October setting just a half hour after sunset in the western sky in the constellation Virgo (the Maiden). Jupiter is very bright, even on the horizon. Jupiter will return to the predawn eastern sky in early November. Jupiter looks like a very bright, yellow-colored star.

Mercury can be seen returning to the evening sky after passing behind the sun from Earth's view on October 8th. Mercury can be seen in the constellation Virgo (the Maiden) for about a half hour after sunset in the southwestern sky by the end of October. Mercury looks like a small white star.

Saturn can be seen low in the southwestern sky after sunset in the constellation Ophiuchus (the Snake-Bearer), above the Scorpion's stinger. Saturn's rings are great to view this month as their angle of tilt give Saturn a spectacular appearance. Saturn sets a few hours after sunset. Saturn looks like an amber-colored star.

Venus can be seen rising in the predawn eastern sky passing from the constellation Leo (the Lion) into Virgo (the Maiden). Venus appears lower throughout October, passing Mars on October 5th. It's the closest Venus and Mars have been since November 1995. Faster moving Venus gets lost in the sun's glare at the end of the month. Venus looks like a bright white star.

Mars can be seen rising just after Venus early in October in the southwestern sky moving from the constellation Leo (the Lion) into Virgo (the Maiden). Mars rises later every morning. Mars is barely visible by the end of the month. Mars looks like a rusty, orange-reddish colored star.

SKY DATES

October

- 3 - Venus at perihelion at 3:00 a.m.
- Moon passes 0.7° S of Neptune at 7:00 a.m.
- 5 - Venus passes 0.2° N of Mars at 8:00 a.m.
- **Full moon** called Hunter, Blackberry, Fruit, Kindly, or Blood Moon at 1:40 p.m.
- 6 - Moon passes 4.0° S of Uranus at 11:00 a.m.
- 7 - Mars at perihelion at 5:00 p.m.
- **VU Public Lecture** "Monster Lurking at the Heart of the Milky Way" by Dr. Brian Murphy, Butler University in Neils Science Center, room 234 7:30 to 8:30 p.m.
- **VU Observatory** open 8:30 to 9:30 p.m.
- **SARA Telescope Remote Viewing** 9:30 p.m.
- 8 - **Draconid** meteor shower peaks (Class III)
- Mercury at superior conjunction at 4 p.m.
- 9 - Moon at perigee (closest point to Earth) at 227,452 miles at 12:55 a.m.
- Moon passes 0.6° N of Aldebaran
- 12 - Last quarter moon at 7:25 a.m.
- 13 - Moon passes 3.0° N of Beehive cluster
- 15 - Moon passes 0.2° N of Regulus
- 17 - Crescent Moon/Venus/Mars together
- Moon passes 1.8° N of Mars
- Moon passes 2.0° N of Venus
- 18 - Epsilon Geminid meteor shower (Class II)
- 19 - Uranus at opposition at 1:00 p.m.
- New Moon at 2:12 p.m.
- 21 - **Orionid meteor shower** peaks; 20-60/ hour fairly bright, midnight to dawn (Class I)
- 22 - Leonis Minorid meteor shower (Class II)
- 24 - Moon passes 3.3° N of Saturn
- Moon at apogee (farthest point from Earth) at 251,194 miles at 9:25 p.m.
- 26 - Jupiter in conjunction at 1:00 p.m.
- 27 - First Quarter Moon at 5:22 p.m.
- 28 - **CAS FREE viewing** at Conway 7 p.m. to ?
- **VU Observatory** open 8:30 to 9:30 p.m.
- Asteroid Pallas at opposition
- 29 - Asteroid Iris at opposition
- 30 - Moon passes 0.9° S of Neptune
- 31 - Cross-quarter day (half-way point of fall)

OCTOBER SUNRISE AND SUNSET (times are for mid-month)

sunrise:	7:01 a.m.
sunset:	6:09 p.m.
length of daylight:	11 hours, 8 minutes
length of darkness:	12 hours, 52 minutes

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was written by
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