

Sky News

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DAWN & KEPLER END MISSIONS

NASA's *Kepler Space Telescope* mission has ended by running out of fuel. Launched in 2009, *Kepler* has discovered thousands of exoplanets. *Kepler* is responsible for the discovery of more than half of the known exoplanets. *Kepler* will be replaced by *TESS* (the *Transiting Exoplanet Survey Satellite*), which will look for exoplanets close to Earth. Early in the 2020s, using a catalog of information from *Kepler* and *TESS*, NASA's *James Webb Space Telescope* will follow-up on the most interesting finds.

Two days after *Kepler* ran out of fuel, NASA's *Dawn* spacecraft ran out of hydrazine fuel. *Dawn* was launched in 2007 on a mission to study our two largest bodies in the asteroid belt, Vesta and Ceres (a dwarf planet). *Dawn*'s discoveries show evidence of dwarf planet **cryovolcanism** (volcanoes that spew water and particles other than lava) liquid oceans, and found a connection between asteroids in the asteroid belt and meteorites on Earth. *Dawn* has traveled 4.3 billion miles in 11 years. It will continue to orbit Ceres for 20 to 50 years.

METEOR SHOWERS OF DECEMBER

The best meteor shower of December is the Geminids. The Geminids peak on the nights of December 13th and 14th. When Gemini (the Twins) constellation is high in the sky, about 2:00 a.m., the meteors appear to "rain" down all around with long slivery trails follow the slow-moving meteors.

Other meteor showers in December include: Puppis-Velids on the 7th, Monocerotids on the 9th, Coma Berenicids on the 15th, Leonis Minorids on the 19th, and the Ursids of the 22nd. The Ursids occur on the night of the full moon which will make them difficult to see. Look to the north from dusk to dawn.

DECEMBER COMETS

The CNEO (Center for Near-Earth Objects) missed what three amateur astronomers discovered: a new comet in the morning sky in the constellation Virgo (the Maiden). The comet, named Machholz-Fujikawa-Iwamoto (MFI), has brightened and will be visible in our sky in December. The comet will reach its **aphelion**, closest point to the Sun, just inside the orbit of Mercury on December 3-4. Scientists believe this is the first time Comet MFI has traveled to the inner solar system and is unpredictable in its stability and brightness.

Thought to be the comet of the year, Comet 46P/Wirtanen will pass within 7 million miles of Earth on December 16th. It is one of the 10 closest comets of the Space Age. Comet Wirtanen orbits the Sun every 5.4 years. It will be visible with the naked eye, binoculars, or a telescope for a few weeks. It has an unusual green atmosphere in its coma.

FOGBOW

A **fogbow** is a rainbow that's made from fog instead of rain. Fogbows are sometimes called **white rainbows**, **cloudbows**, or **ghost rainbows**. Like a rainbow, a fogbow is made the same process. Small water droplets in fog act like larger raindrops that make rainbows. The small droplets refract the sunlight. Look for thin fog when the Sun is bright. Fogbows look like a rainbow arc, and can appear white, colorless, or have weak colors.

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

www.nasa.gov, www.esa.int,

<http://www.astropixels.com>,

<https://earthsky.org>, www.spaceweather.com,

Astronomy, Sky and Telescope.

DECEMBER PLANETS

Saturn can be seen the first week of December very low on the southwestern horizon above the Teapot shape in Sagittarius (the Archer). Saturn will move into the Sun's glare and cannot be seen for the rest of the year. Saturn looks like an amber-colored star.

Mars can be seen in the southern sky after sunset passing from the constellation Capricornus (the SeaGoat) into Aquarius (the WaterBearer). Mars is still bright and easy to find among the dim background of stars. Mars sets about 11:00 all month. Mars looks like a ruddy-colored star.

Venus can be seen about 3:00 a.m. rising in the southeastern sky moving from the constellation Virgo (the Maiden), just under Spica, into Libra (the Scales). Venus appears later every morning and doesn't rise as high in the predawn sky by the end of the month. Venus looks like a bright white star.

Mercury can be seen rising in the predawn sky after Venus, passing from the constellation Libra (the Scales) into Scorpius (the Scorpion) by the end of the month. Mercury will rise later and appear lower throughout December. Mercury will pass Jupiter on the 21st and 22nd. Mercury looks like a small white star.

Jupiter can be seen rising in the southeastern sky about 5:30 a.m. in the constellation Scorpius (the Scorpion). Jupiter slowly moves farther from the Sun and is visible longer by the end of December. Jupiter looks like a very bright, yellow-colored star.

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

sunrise: 7:09 a.m.
sunset: 4:20 p.m.
length of daylight: 9 hours, 11 minutes
length of darkness: 14 hours, 49 minutes

This edition of the
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was written by
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SKY DATES

December

- 3 - Moon passes 3.6° N of Venus
- 5 - Moon passes 1.9° N of Mercury
- 7 - New moon at 1:20 a.m.
- Moon occults Saturn
- Puppis-Velid meteor shower peaks
- 8 - **Kemil Beach** FREE telescope viewing event from 5:00 to 7:00 p.m.
- 9 - Monocerotid meteor shower peaks
- 10 - CAS Christmas Party at Planetarium
- 12 - Moon at apogee (farthest point from Earth) at 251,210 miles at 6:25 a.m.
- 14 - **Geminid** meteor shower peaks (Class 1) under good conditions
- Moon passes 3.6° S of Mars
- 15 - Mercury at greatest western elongation at 21.3° W at 5:00 a.m.
- Coma Berenicid meteor shower peaks
- First quarter moon at 5:49 a.m.
- 19 - Leonis Minorid meteor shower peaks
- 21 - Shortest day of the year
- Moon passes 1.7° N of Aldebaran
- Mercury passes 1.8° from Jupiter
- **Winter solstice** at 4:23 p.m.
- Longest night of the year
- 22 - Mercury passes 5.8° N of Antares
- Jupiter passes 5.1° N of Antares
- **Full moon** called Christmas Moon, Cold Moon, Long Night Moon, and Before Yule Moon at 11:49 a.m.
- Ursid meteor shower peaks (with fireballs)
- 24 - Moon at perigee (closest point to Earth) at 223,857 miles at 3:52 a.m.
- Moon passes 0.6° S of Beehive cluster
- 26 - Moon passes 2.5° N of Regulus
- Venus at perihelion at noon
- 29 - Last quarter moon at 3:34 a.m.
- 30 - Earliest sunset for 40° N Lat. at 4:37 p.m.
- 31 - Latest sunrise of 2018 at 7:13 a.m.

FIND THE SPACE STATION

NASA has a new website to help spot the International Space Station from your location. Go to <https://spotthestation.nasa.gov> for information. The site can email or text alerts when the space station is visible from your area.