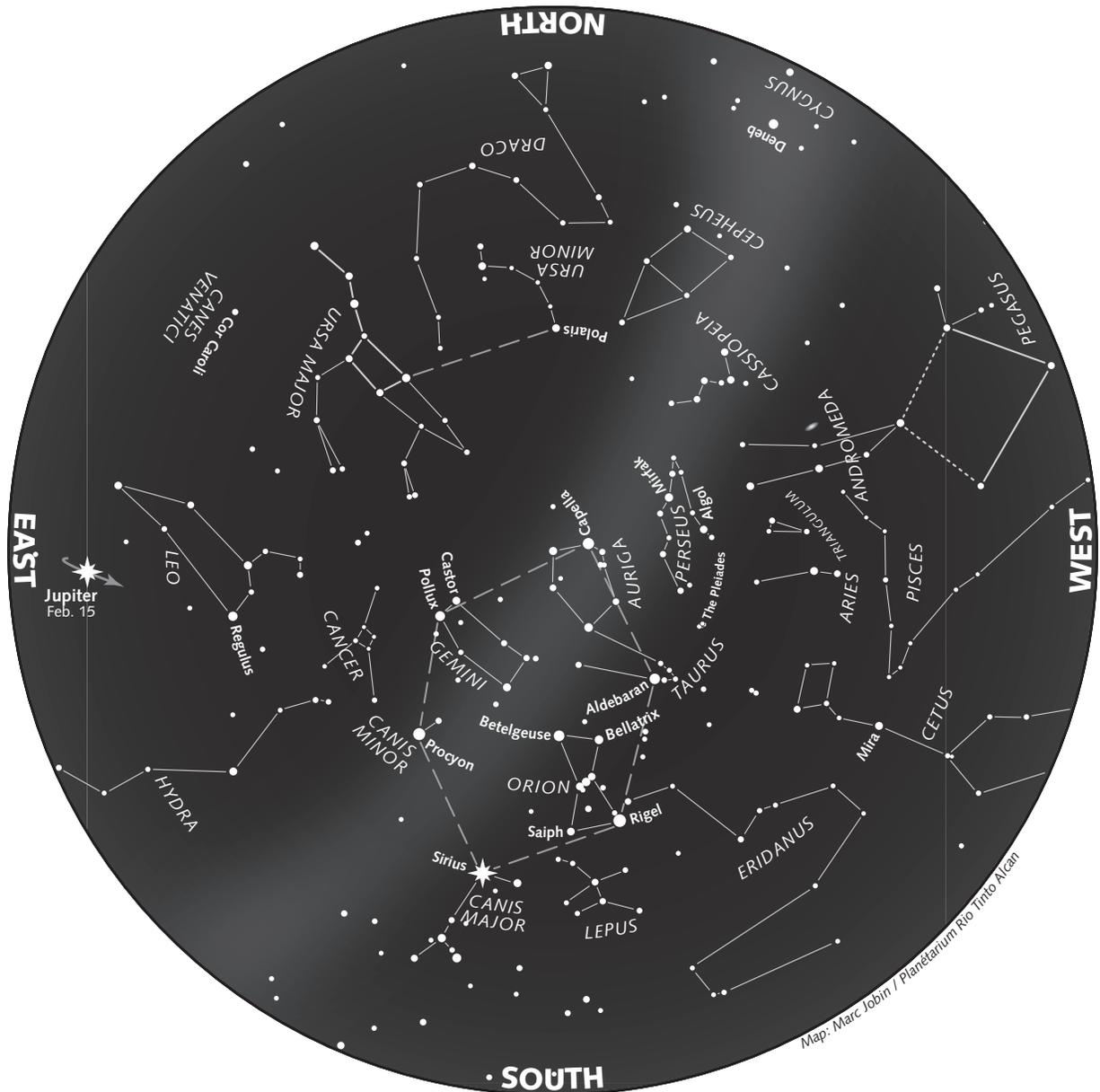


The Starry Sky — Winter 2015-16



How to Use this Map

The above map represents the night sky as it appears at the indicated times, and remains usable several hours before and after.

Hold the map up to the sky in front of you and turn it so the direction you are facing appears at the bottom. Lines identify the constellations. The light-coloured area outlines the Milky Way.

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This Star Map is Accurate on...

(Eastern Standard Time)

December 21 at midnight

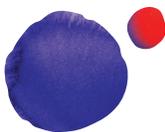
January 6 at 11 p.m.

January 21 at 10 p.m.

February 6 at 9 p.m.

February 21 at 8 p.m.

March 6 at 7 p.m.



The Sky This Winter

This winter the night is governed by Jupiter: It's the only planet visible to the naked eye in the evening.

Mars, Saturn and Venus can only be seen well after midnight and at dawn.

Jupiter rules the night

Jupiter is well placed for observing as the season gets underway. The brilliant planet shines among the stars of Leo and undergoes its retrograde loop (moving toward the right with respect to the stars) from January 8 to May 9. Jupiter rises in the east around 11 P.M. at the end of December, and progressively earlier as the season advances: When it reaches opposition on March 8, the gaseous giant rises at sunset around 6 P.M., culminates high in the south at midnight, and sets at daybreak. The time is ripe to view Jupiter through a telescope after it gains sufficient altitude: The spellbinding sight of its Galilean moons and dark cloud bands awaits the avid observer!

Jupiter encounters the gibbous moon on the nights of December 30 & 31, and January 27. **On the night of February 23 to 24**, the gibbous lunar orb will pass 2 degrees below the giant planet. Then at the end of the season, **on the night of March 21 to 22**, the waxing gibbous moon will once again be 2½ degrees below Jupiter.

Seasonal Milestones

The **winter solstice** occurs on December 21, 2015, at 23:48 (EST) and the **spring equinox** will take place on March 20 at 0:30 (EDT). Winter will last exactly 88 days 23 hours 42 minutes.

On January 2 at 18:00, Earth is at **perihelion**, the closest point in its orbit to the Sun; the Earth-Sun distance will then be 147 100 176 km.

We return to **Eastern Daylight Time** early on the morning of March 13: Clocks are set forward one hour, and in so doing we lose an hour of sleep.

Phases of the Moon

(Eastern Standard Time, except * = Eastern Daylight Time)

New moon	First quarter
Dec. 11 at 5:29	Dec. 18 at 10:14
Jan. 9 at 20:30	Jan. 16 at 18:26
Feb. 8 at 9:39	Feb. 15 at 2:46
March 8 at 20:54	March 15 at 13:03*
Full moon	Last quarter
Dec. 25 at 6:11	Jan. 2 at 0:30
Jan. 23 at 20:46	Jan. 31 at 22:28
Feb. 22 at 13:20	March 1 at 18:11
March 23 at 8:01*	March 31 at 11:17*

Mars prepares for opposition

Mars is the second bright planet to rise in the sky this winter, but you'll need to wait until 2 o'clock in the morning to view it low in the southeast. The Red Planet is still relatively faint at the beginning of the season, but as it approaches Earth its brightness grows with increasing rapidity: Mars crosses the psychological zero-magnitude threshold around March 12 and reaches opposition on May 22. It appears like an orange star that gradually moves eastward (to the left) among the constellations... In December it's near the blue star Spica, in Virgo; on January 17 it moves into Libra; and on March 14 it ventures into Scorpius. Starting in April, the Red Planet is close enough to allow interesting telescopic observation. While we await spring, the Moon will appear near Mars on the mornings of January 3 and February 1, as well as February 29 and March 1.

Saturn reappears as the night ends

This winter, **Saturn** is only visible late in the second half of the night. The ringed planet currently shines among the stars of Ophiuchus, a few degrees north of Scorpius and the bright star Antares—a region of sky that never rises very high above the southern horizon. By the end of December, Saturn rapidly moves apart from the Sun and appears progressively earlier in the southeast at dawn. During the first half of January, dazzling Venus approaches Saturn, and on the morning of January 7, the crescent Moon appears just to the left of the planetary duo. **On the morning of January 9**, the two planets are only a third-of-a-degree from one another: They shine together, an hour before sunrise, about a dozen degrees above the southeast horizon. In a telescope, they both appear in the same field of view and have the same 15 arc-second apparent diameter (Saturn's rings, which measure 40 arc-seconds across and are currently tilted 26 degrees, are much wider than the globe of the planet itself). **On the morning of March 2**, the third quarter moon will sit 2½ degrees to the left of Saturn.

Venus heads into the dawn

Venus dominates the dawn sky as the winter season begins. The dazzling Morning

Star shines about twenty degrees above the southeast horizon an hour before sunrise; but the gap between Venus and the Sun is diminishing and its presence in the sky rapidly deteriorates. By the end of January, Venus will have lost about ten degrees of altitude! And it doesn't stop there: After mid-February, the dazzling planet is no more than 5 degrees above the east-southeast horizon 30 minutes before Sunrise. Despite its brilliance, Venus becomes increasingly hard to see as springtime approaches; in April, it disappears completely in the glow of dawn.

During the first half of January, Venus and Saturn accompany each other in the dawn sky, and the waning lunar crescent joins the two planets on January 6 and 7. Two mornings later, **on January 9**, Venus and Saturn are only a third-of-a-degree apart! Following that, Venus continues to head toward the Sun leaving Saturn behind. **On the morning of February 6**, the waning moon forms a celestial triangle with Venus and Mercury. And finally, on March 7 at dawn, the lunar crescent will appear less than 3 degrees from Venus.

Mercury offers two apparitions

Mercury, the closest planet to the Sun, provides two interesting apparitions this winter. The first takes place in the evening sky: **Between December 21 and January 4**, look for the tiny planet just above the southwest horizon 30 minutes after sunset. Mercury is brightest at the beginning of this period and rapidly gets fainter after January 1, until it finally vanishes in the twilight. Mercury next appears at dawn, **from the end of January to mid-February**: half-an-hour before sunrise, the furtive planet is visible in the east-southeast, a few degrees to the lower left of Venus. During this second apparition, Mercury grows steadily brighter from day to day. **At dawn on February 6**, the waning moon will sit 3½ degrees above Mercury, forming a celestial triangle together with Venus.

Clear skies!

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