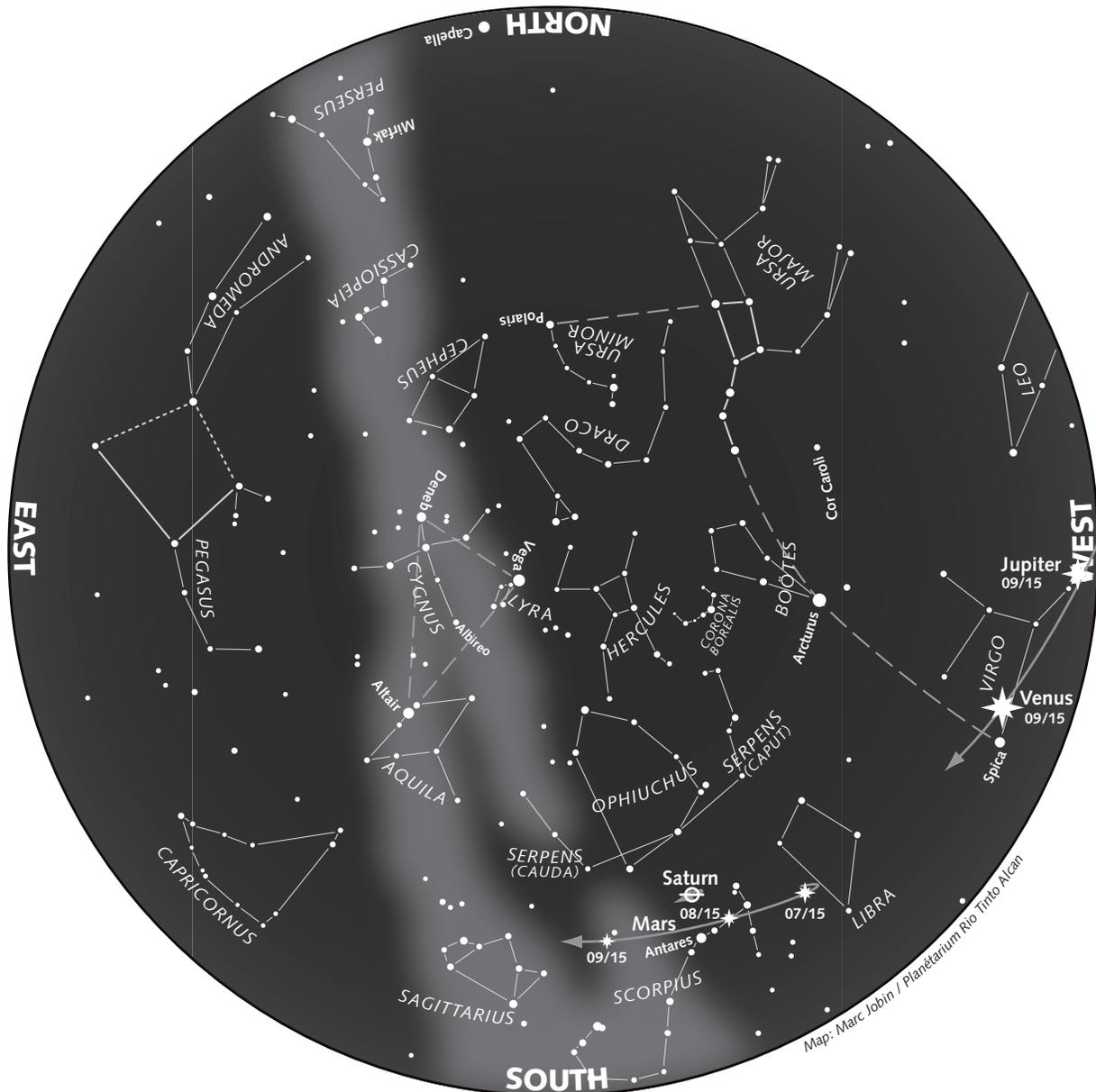


## The Starry Sky — Summer 2016



### 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 Daylight Time)

June 21 at 1 a.m.

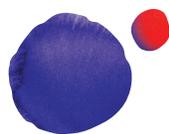
July 6 at midnight

July 21 at 11 p.m.

August 6 at 10 p.m.

August 21 at 9 p.m.

September 6 at 8 p.m.



# The Sky This Summer

*Mars and Saturn remain the “stars” of the summer sky, while Jupiter and Venus enjoy a twilight rendezvous at the end of August.*

## Mars' dizzying itinerary

The optimum period for observing **Mars** is nearing an end. The Red Planet is now getting farther from Earth, and its apparent size diminishes rapidly as revealed through a telescope. Though Mars was very bright at the start of the season, it gradually fades over the coming months; even so, the notable orange planet remains as resplendent as the brightest stars throughout the summer.

From this point forward, the show gets interesting for naked-eye observers. On June 29, Mars completes its retrograde loop in Libra and resumes its direct movement among the stars. This season, the Red Planet's itinerary will carry it through Scorpius (beginning August 2), Ophiuchus (as of August 21), back into Scorpius (from August 27 to September 1), and into Ophiuchus again, before crossing into Sagittarius just in time for Autumn. Mars can easily be tracked travelling among the constellations until next spring.

From August 22 to 25, the Red Planet will pass within 2 degrees to the north of Antares, the Alpha star of Scorpius, whose name stems from the ancient Greek Anti-Ares, meaning “rival of Mars”. Comparing the colour of these two celestial objects, the origin of this rivalry becomes obvious! During the same period, from August 23 to 24, Mars will cross an imaginary line connecting Saturn and Antares, making it easy to visualise the planet's rapid orbital movement around the Sun.

The gibbous moon will form a large triangle together with Mars and Saturn, on the evening of August 11.

## Time for Saturn

This year, **Saturn** shines among the stars of Ophiuchus, a few degrees above Antares, and the head of Scorpius: It lies in the south-southwest at nightfall, close to the Red Planet. There's still time left for quality telescopic observation of Saturn's rings, but it's crucial to start early in the evening, before the planet sinks too near the horizon. Saturn reached opposition at the beginning of June,

and its retrograde path ends on August 13 as it resumes its direct movement among the stars. Since Mars orbits the Sun more rapidly than Saturn, it quickly approaches the ringed planet, passing it around August 24.

The gibbous moon sits 3 degrees below Saturn on the evening of July 15, and will be near the ringed planet again during the evenings of August 11 and 12 (see **Mars** above); on September 8, the first quarter moon will shine, once more, 3 degrees below Saturn.

## Jupiter and Venus meet at twilight

As summer begins, **Jupiter** is still the first celestial object to appear at twilight (other than the Moon), but the giant planet sinks lower and lower in the west as the season progresses: We lose sight of it in the glare of the setting sun during the first evenings of September. The crescent moon will sit less than 5 degrees below Jupiter at twilight, on July 8, and less than 2 degrees below it on August 5, right after sunset. One last challenge: on the evening of September 2, 20 minutes after sunset, scan the horizon with binoculars and try to spot a thin lunar crescent suspended less than a quarter-of-a-degree beneath Jupiter; a perfectly clear horizon is required.

**Venus**, on the other hand, passed behind the Sun (superior conjunction) on June 6, and gradually re-emerges in the evening twilight around mid-July. What's the earliest date you can spot it? Using binoculars will help: On August 1, Venus lingers just 2 degrees above the west-northwest horizon, 30 minutes after sunset.

As Jupiter closes in on the Sun, Venus gains distance. **The two brightest planets converge in the twilight and meet on August 27:** That evening, they will be separated by scarcely  $\frac{1}{10}$ th of a degree—the closest conjunction of Venus and Jupiter in over 25 years! To the naked eye, the two luminous points will appear to practically merge. Unfortunately, this spectacular convergence occurs very low in the west. To spot the two planets, start scanning the horizon with binoculars as soon as the Sun sets: about 30 minutes later, just before they set, the sky will darken and the view should improve. It goes without saying that a clear sky, and unobstructed horizon, are absolutely essential.

## Mercury is hard to spot

Neither of the two windows of observation for Mercury is favourable this summer. The furtive planet is first visible, with difficulty, in the morning sky during the last week of June: Use binoculars, and try to spot the tiny point of light in the dawn twilight, just above the east-northeast horizon, about 20 minutes before sunrise. Mercury then passes behind the Sun (superior conjunction) on July 6,

## A good year for the Perseids

This promises to be a good year for observing the Perseids, if you are willing to stay up late—or rise early. The most famous of the annual meteor showers should reach maximum activity between 9:00 and 11:30 a.m. (Eastern Time), on August 12; though some specialists think this maximum could occur anywhere between 4:00 a.m. and 6:00 p.m. Either way, for those in eastern Canada, the observing period closest to maximum will be **during the pre-dawn hours on the night of August 11 to 12.** Some models predict another peak might occur about 12 hours earlier, which would favour observers in Europe.

The Moon, nearly at first quarter, will set around midnight, leaving the sky set for shooting stars. To make the most of the show, it will be worth the effort to leave the city and find a dark observing site as far from light pollution as possible. Under good conditions, expect to count about 50 meteors per hour, but less than half that number if the sky is slightly more polluted.

If weather interferes, you can resort to the preceding and following nights, though it will be necessary to curb expectations: The number of meteors rapidly decreases each day on either side of the maximum. A few Perseids can even be observed beginning around mid-July and up to the third week of August. For more details see

[espacepourlavie.ca/en/perseids](http://espacepourlavie.ca/en/perseids)

and reappears in the evening sky during the second half of the month. The planet is again visible, with difficulty, 30 minutes after sunset, near the west-northwest horizon, to the upper left of Venus. On the evening of August 4, a thin lunar crescent will lie suspended to the lower left of Mercury. After the second week of August, the tiny planet grows fainter and becomes even harder to find. Mercury passes between the Earth and Sun on September 12, and reappears in the morning sky for an excellent apparition at the beginning of fall.

*Clear skies!*

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Adaptation: **Louie Bernstein**

## Phases of the Moon

(Eastern Daylight Time)

First quarter	Full moon
June 12 at 4:10	June 20 at 7:02
July 11 at 20:52	July 19 at 18:57
August 10 at 14:21	August 18 at 5:27
Sept. 9 at 7:49	Sept. 16 at 15:05
Last quarter	New moon
June 27 at 14:19	July 4 at 7:01
July 26 at 19:00	August 2 at 16:45
August 24 at 23:41	Sept. 1 at 5:03
Sept. 23 at 5:56	Sept. 30 at 20:11

## Seasonal Milestones

The **summer solstice** takes place on June 20, 2016 at 6:34 P.M. EDT, and the **autumn equinox** occurs on September 22 at 10:21 A.M. Summer 2016 will last exactly 93 days 15 hours 47 minutes.