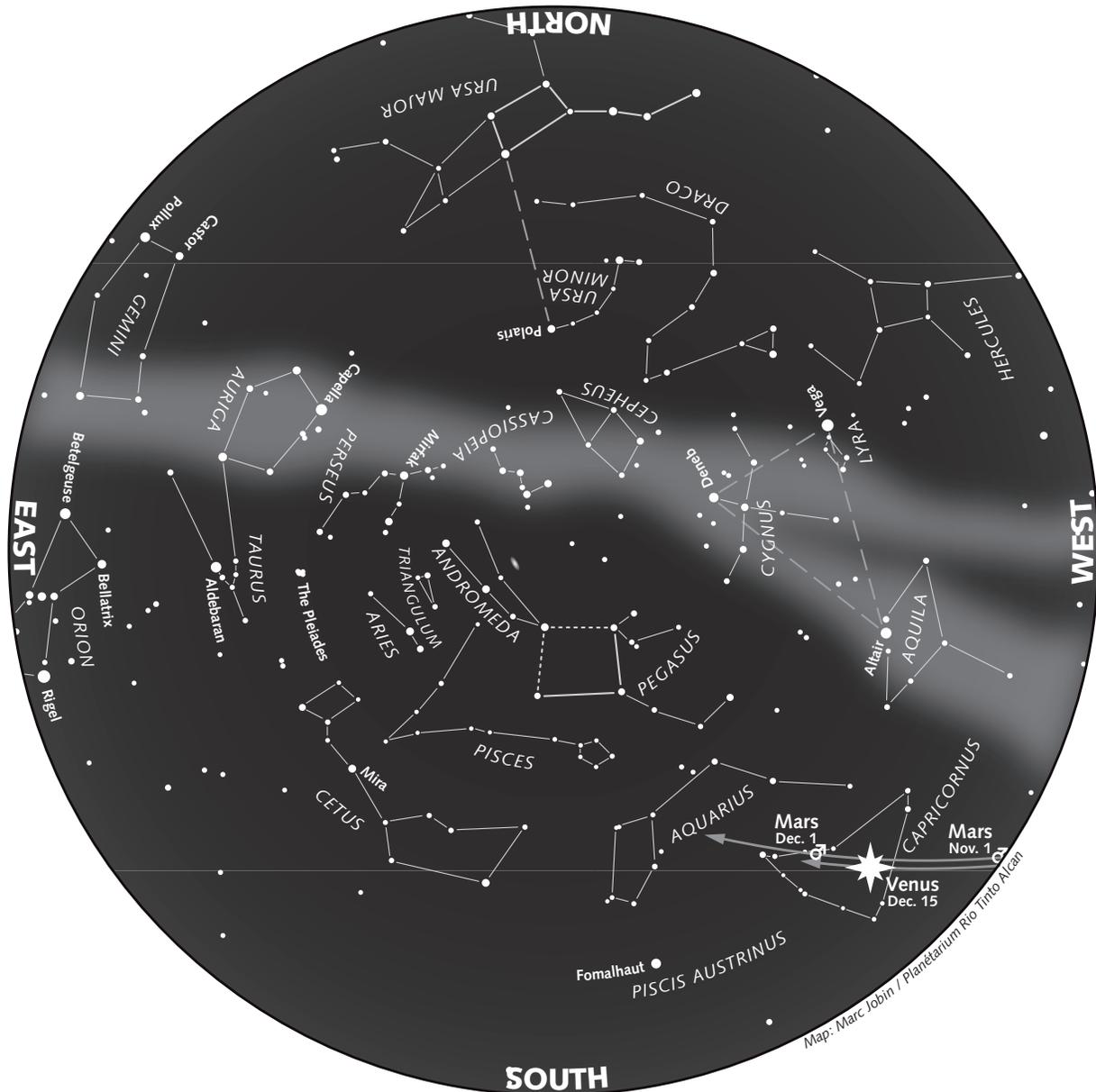


## The Starry Sky — Autumn 2016



### 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, except where mentioned otherwise)

- September 21 at 1 a.m.
- October 6 at midnight
- October 21 at 11 p.m.
- November 6 at 9 p.m. EST
- November 21 at 8 p.m. EST
- December 6 at 7 p.m. EST

# The Sky This Autumn

*Mars, Saturn and Venus are visible in the evening this fall, while Jupiter and Mercury shine in the morning sky.*

## Mars flees the Sun

Though several months have passed since its opposition last May, **Mars** remains visible in about the same position, evening after evening, above the west-southwest horizon at twilight. Due to its rapid orbital motion, the Red Planet manages to escape the glare of the Sun, which seems unable to keep up. The constellations also lag behind: This fall, Mars passes through Sagittarius, Capricornus and Aquarius. At the same time, the Red Planet continues to move away from Earth and becomes gradually fainter: It now blends in with the brightest stars, but its characteristic orange hue gives it away. To further help identify Mars, the lunar crescent will appear nearby on October 7 & 8 (first quarter is on the 8<sup>th</sup>), and again on November 5 & 6 and December 4 & 5.

## Venus returns as the Evening Star

**Venus** returns to the evening sky! As fall begins, the dazzling planet is fairly low on the southwest horizon at twilight, but its visibility gradually increases over the coming weeks. The improvement will be more dramatic in November; as the ecliptic steepens Venus rapidly gains altitude. By December, the brilliant Evening Star will remain visible more than 3 hours after sunset. But the best is yet to come later this winter...

On the evening of **October 3**, a thin crescent moon hovers less than 4 degrees above Venus: Look for the pair in the twilight, close to the west-southwest horizon, 30 minutes after sunset. **On October 29**, it's Saturn's turn: The ringed planet will appear 3 degrees above Venus, in the southwest, 45 minutes after sunset. A few evenings later, **on November 2 & 3**, the lunar crescent arrives on the scene, forming a triangle

together with the two planets. One last autumn pairing will occur on the evenings of December 2 & 3 when the Moon appears near Venus.

## Mercury shines at dawn

**Mercury** is the closest planet to the Sun; as such, it's only visible at dawn or dusk, close to the Sun's glare, and is normally hard to spot in the encroaching light of day. But from the end of September to mid-October, Mercury offers its best morning apparition of the year: Look for a tiny point of light against the glow of dawn, close to the eastern horizon, 45 to 60 minutes before sunrise. **On the morning of September 29**, a thin lunar crescent will come to rest just one degree below the furtive planet. Then **at dawn on October 11**, Mercury encounters Jupiter (see **Jupiter** below). After mid-October, Mercury plunges toward the horizon once more and passes behind the Sun on the 27<sup>th</sup> (superior conjunction); it reappears in the evening sky toward the end of November. At the beginning of December, the tiny planet will be visible with some difficulty, low in the southwest, 30 minutes after sunset. After mid-December, Mercury rapidly fades and is lost from view in the glow of twilight; it passes between the Sun and Earth (inferior conjunction) on the 28<sup>th</sup>.

## Jupiter reappears in the morning sky

**Jupiter** isn't visible at the beginning of fall, as it passes behind the Sun (conjunction) on September 26. But the giant planet rapidly pulls away from the Sun's glare and emerges in the dawn sky after the first week of October. **On October 11**, Jupiter encounters Mercury: the two planets will be just  $\frac{3}{4}$  of-a-degree apart, but quite low in the east, 30 to 45 minutes before sunrise. **On October 28**, a thin lunar crescent will rest just one degree to the left of the brilliant planet: They'll be visible above the east-southeast horizon during the pre-dawn period until daybreak—the scene should be particularly alluring an hour before sunrise. A crescent moon will appear near Jupiter again on November 25 & 26, before dawn and sunrise, in the southwest. As the weeks pass, Jupiter will emerge progressively earlier: By the end of autumn, the gaseous giant rises in the east before 2:00 a.m.—more than five hours ahead of the Sun—and culminates in the south at dawn.

## A super "supermoon"

The full moon of November 14 (at 8:52 a.m. EST) coincides almost exactly with its perigee, the moment when its orbit takes it closest to Earth (356,310 km at 6:27 a.m. EST). So the night of November 13 to 14 will be lit by a particularly bright Moon: Not only will it be **the largest and brightest full moon of 2016** ("supermoon"), but calculations indicate there hasn't been one this striking since 1948! And the next perigee full moon of the same amplitude won't occur until 2034! The full moons of October 16 and December 13 also occur within 24 hours of their perigee, completing this series of three "supermoons" for 2016. Note that the greatest tides of the year also occur during perigee full moons: those of us who are near the coast should beware! When combined with storm conditions, and strong winds blowing toward the shore, these "supertides" can cause flooding in some coastal sectors.

## So long Saturn

**Saturn** appears progressively closer to the horizon at twilight, during the first weeks of autumn. But there's still a chance to spot it low in the southwest, 45 minutes after sunset. On the evening of October 5 & 6, the crescent moon will be in Saturn's neighbourhood; and **on the last evenings of the month**, dazzling Venus will appear just a few degrees away, acting as a guidepost for the ringed planet. In November, Saturn gradually begins to fade into the glare of sunset and passes behind the Sun (conjunction) on December 10; it reappears in the morning sky at the beginning of the new year.

*Clear skies!*

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Adaptation: **Louie Bernstein**

## Phases of the Moon

(Eastern Daylight Time)

except \* = Eastern Daylight Time)

First quarter	Full moon
Sept. 9 at 7:49	Sept. 16 at 15:05
Oct. 9 at 0:33	Oct. 16 at 0:23
Nov. 7 at 14:51*	Nov. 14 at 8:52*
Dec. 7 at 4:03*	Dec. 13 at 19:05*
Last quarter	New moon
Sept. 23 at 5:56	Sept. 30 at 20:11
Oct. 22 at 16:04	Oct. 30 at 13:38
Nov. 21 at 3:33*	Nov. 29 at 7:18*
Dec. 20 at 20:56*	Dec. 29 at 1:53*

## Seasonal Milestones

The **autumn equinox** occurs on September 22 at 10:21 A.M. EDT, and the **winter solstice** takes place December 21 at 5:44 A.M. EST. Autumn 2016 will last exactly 89 days 20 hours 23 minutes.

We **return to Eastern Standard Time** early on the morning of Sunday, November 6: Clocks are set back one hour.