# Biggest and brightest

This month's two brightest planets, Venus and Jupiter, outshine everything except the Moon in their respective skies. In the predawn skies at the end of September, Venus, the brightest planet, reached its maximum brightness. At sunset in the latter half of October, Jupiter reaches its greatest apparent size and brightness and is visible throughout the night.

## Venus

This month Venus will move along its orbital path toward western elongation, its maximum separation from the Sun. During this time, Venus reaches what is known as *dichotomy*, when half of the planet disk, as viewed from Earth, is illuminated. As Venus approaches and then passes western elongation, it will undergo subtle phase changes similar to those of our Moon (Figure 1).

Continued observation of Venus for the next few months will reveal that its apparent size is decreasing as its phase appearance waxes, or increases. As Venus continues along its orbital path, it pulls away from us. At the same time, the angle between Venus, the Sun, and Earth increases allowing for more reflection of sunlight. In effect, as the apparent size of Venus decreases it also becomes more and more gibbous shaped. Unfortunately for us, by the time Venus is at full phase it will be at superior conjunction (on the other side of the Sun from the Earth).

## Jupiter

Jupiter, like Venus, is at its brightest and (nearly) its biggest apparent size this month. Unlike Venus, however, an outer planet can achieve a full phase that is visible from Earth. This happens at opposition, a positioning arrangement similar to that which produces a full moon phase, wherein the faster-moving Earth comes in between the outer planet and the Sun. What makes this a particularly good opposition is that this past May Jupiter reached *perihelion*, its minimum distance from the Sun. This coincidence of opposition very near to perihelion means that Jupiter is at its brightest and nearly its biggest, as viewed from Earth.

NASA

Galileo *passes over Pillan Patera.*

## *Galileo* at Jupiter

The *Galileo* spacecraft, launched in 1989, arrived at the Jupiter system in 1995 for what turned out to be a very successful two-year exploration of the giant planet and several of its moons. Thanks in part to the durability of the spacecraft, and some fancy maneuvering using thrusters and the gravitational fields of the moons, the mission was extended by two years to explore the Jovian system in greater detail. As part of this extended "Ice, Water, and Fire" mission, *Galileo* has already examined the watery composition of Jupiter's atmosphere, the icy/slushy moon Europa, and the heavily cratered Callisto. The remaining fiery phase of the mission will take it within 600 km of Io's surface, passing over the active volcano Pillan Patera. A second, closer swing-by in November will take the spacecraft to within 300 km of the moon's surface, near its south pole. These two encounters signal the end of the *Galileo* at Jupiter project.

### *Relevant websites*

- *Galileo* Europa Mission: *www.jpl.nasa.gov/galileo/gem*
- Ice, Water, and Fire—The *Galileo* Europa Mission Fact Sheet: *www.jpl.nasa.gov/galileo/gem/gem1.html*

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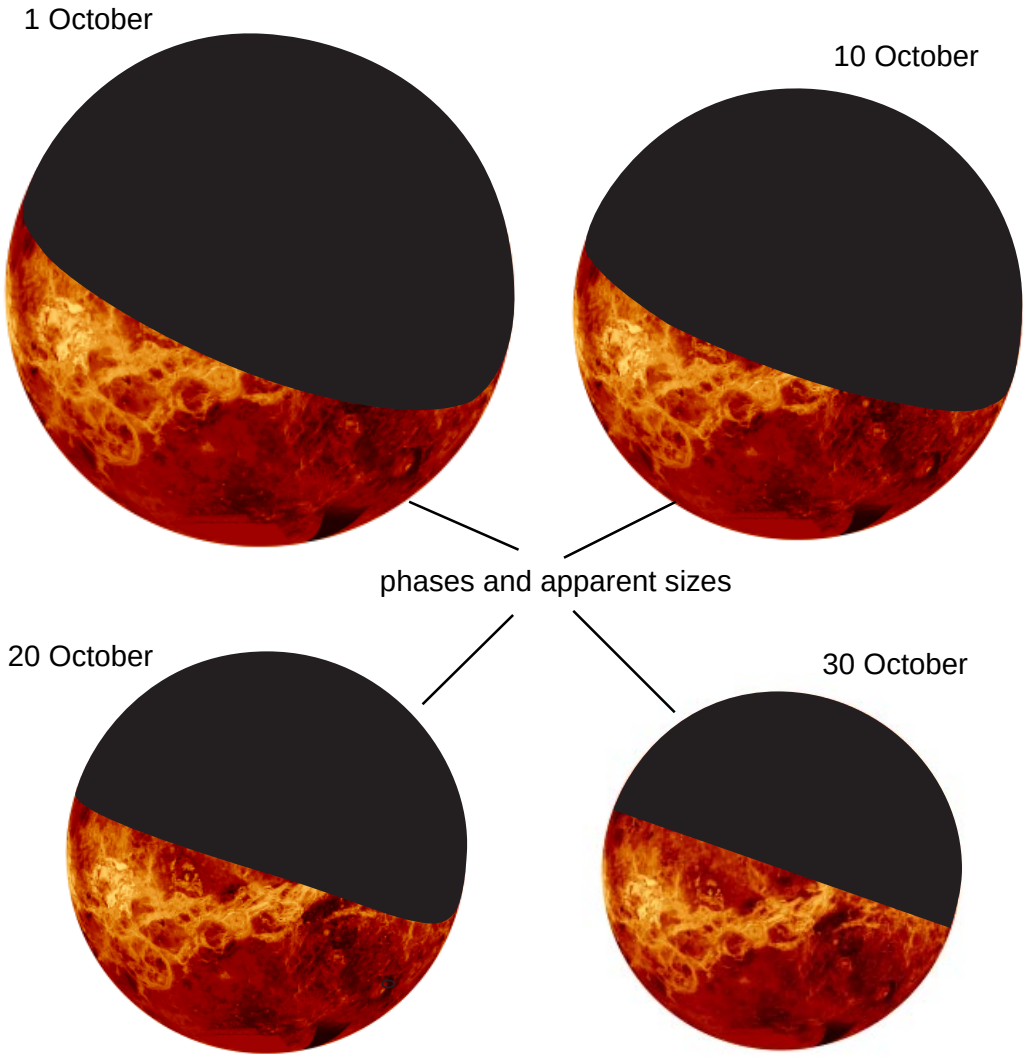
**FIGURE 1** **Phases and apparent size of Venus during the month of October**




## Visible planets

Mercury is visible late in the month over western horizon at sunset.
Venus is very visible over eastern horizon before sunrise.
Mars is dim and low over southwestern horizon at sunset.
Jupiter rises at sunset and is visible all night.
Saturn is visible over eastern horizon after sunset.

## Moon phases

| | October | November |
|---|---|---|
| Last Quarter | 10/02 | —— |
| New Moon | 10/09 | 11/08 |
| First Quarter | 10/16 | 11/16 |
| Full Moon | 10/24 | 11/23 |
| Last Quarter | 10/31 | 11/29 |