

SKY GUIDE

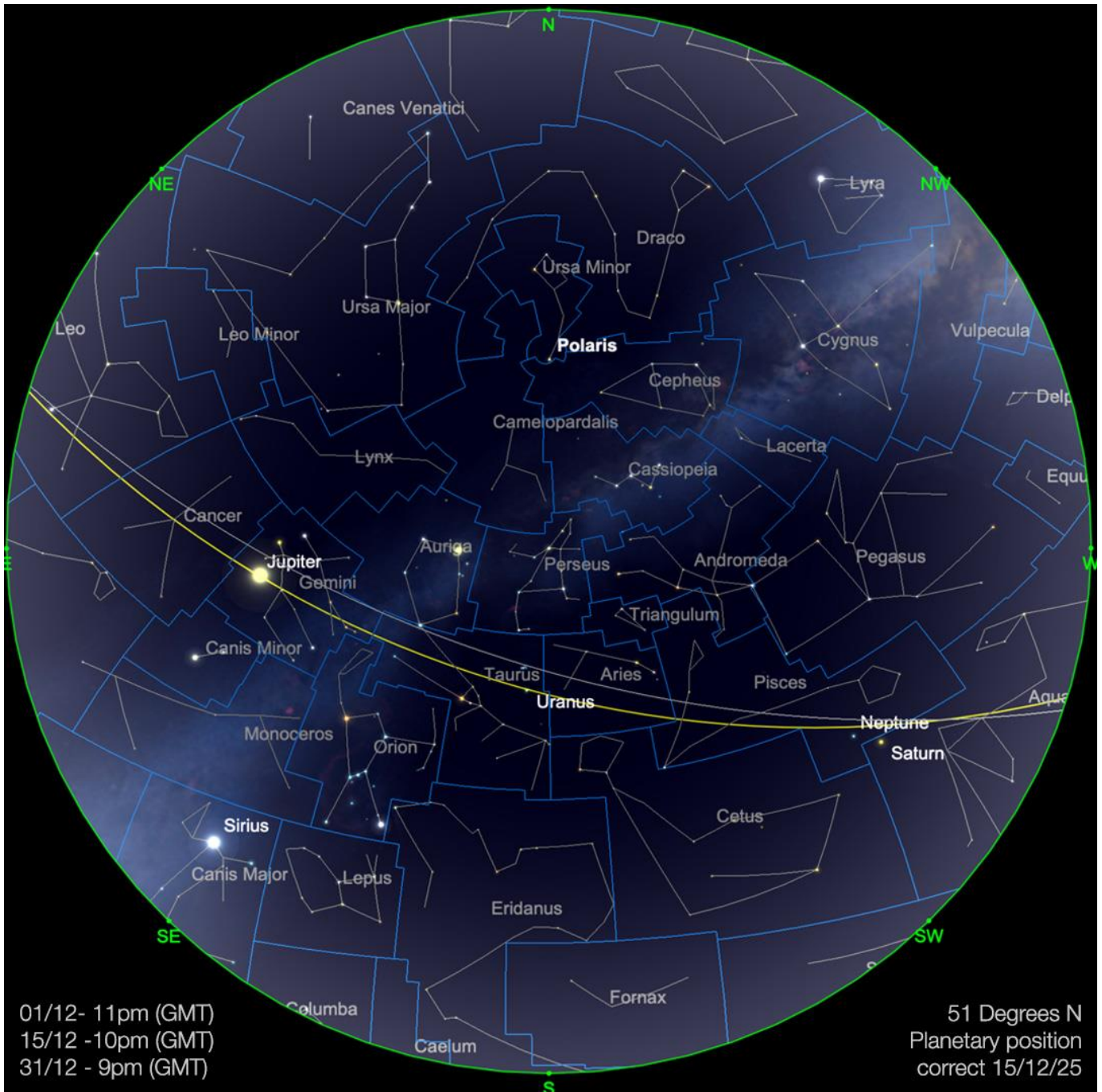
Astronomical guide for December 2025

The most up-to-date guide to planetary and lunar activity,
comet news and space wonders

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Expand your horizon



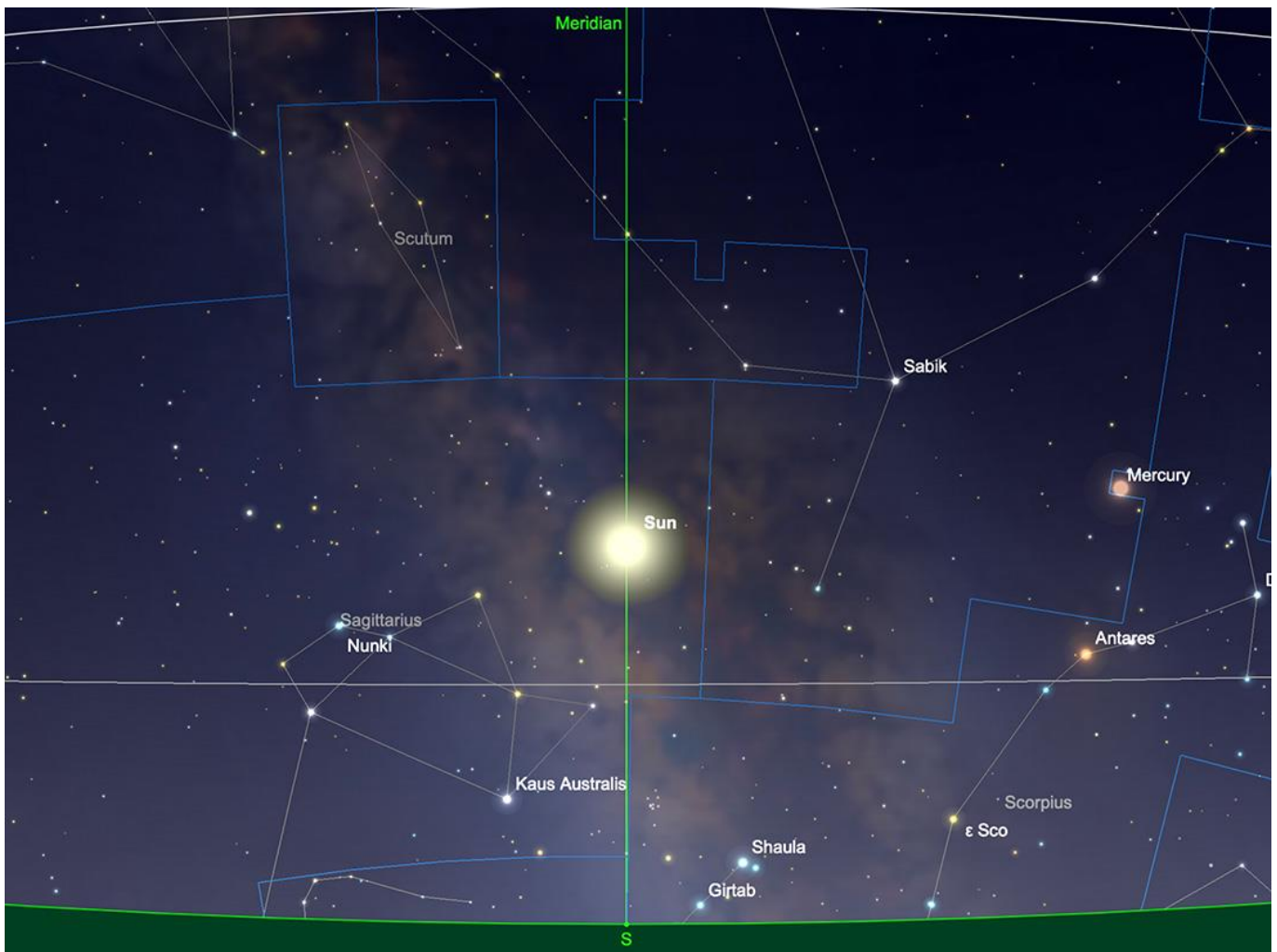
As is now traditional, at this point in December’s Sky Guide, we pause to reflect on exactly where the year went. When you consider the onward march of our planet around the Sun, it seems to go especially quickly.

For inhabitants of both the Northern and Southern Hemispheres, December always brings the two opposing solstices: winter for the north; summer for the south. This December, the Northern Hemisphere will experience the Winter Solstice on Sunday 21st December 2025, marking the shortest day and longest night of the year. At this point, the Sun reaches its southernmost position in the sky along the ecliptic — at present located in the constellation Sagittarius, near the border with Ophiuchus (as in previous years).

For those in mid-northern latitudes — such as around 51° — daylight hours are significantly reduced, with roughly twice as many hours of darkness as are spent in sunlight. Above the Arctic Circle, the Sun doesn’t rise at all, resulting in continuous darkness.

Conversely, in the Southern Hemisphere, 21st December marks the Summer Solstice, bringing the longest day of the year and the height of summer.

No matter where you are, we wish you a peaceful end to 2025 and clear skies — as usual, there's plenty above us this coming month to enjoy.



The Sun at transit point, on the day of the Winter Solstice. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastromy.com.

The Solar System

The Sun

The last full month's sunspot numbers (at time of writing) was October's. According to the NOAA, these values were slightly below prediction. There were just under 115 sunspots observed during the month of October, as opposed to a prediction of just above 126. This is still in line with the slow decline of activity predicted.

In early November, several powerful NOAA Space Weather Prediction Center (SWPC) alerts were issued after multiple strong solar flares and coronal mass ejections (CMEs). On 11–12th November 2025, a powerful “cannibal” CME — i.e. one CME catching up with and

merging another — struck Earth’s magnetosphere and triggered a severe geomagnetic storm. The resulting geomagnetic storm was rated up to G4 on the NOAA scale — “severe” — and locally the disturbance reached G5 over parts of the northern hemisphere. The storm produced widespread auroras - the Aurora Borealis was reported across large parts of the United States (including states as far south as Florida and Texas) and in the UK and Europe, displays were seen well beyond the usual high-latitude zones — a rare event for mid-latitude observers. As solar activity remains high, there may be more events like this in the near future.

Readers can browse the NOAA progression here: <https://www.swpc.noaa.gov/products/solar-cycle-progression#> and websites such as www.spaceweather.com and Michel Deconinck’s monthly newsletter ([Aquarellia Observatory Forecasts](#)) also cover various aspects of solar observations and provide valuable insights into the current state of our parent star. Signing up for the AuroraWatch app, developed by Lancaster University in the UK, is also highly recommended.

The Moon

We begin December with the Moon at a waxing gibbous phase, roughly 84% illuminated, rising not long after sunset for observers in Europe.

As the days pass the Moon continues its climb toward fullness. On the evening of Thursday 4th December, the Moon reaches Full. This is also a Supermoon (otherwise known as Perigee-Syzygy Moon), meaning the Moon is near its closest point to Earth and will appear slightly larger and brighter than average. The night of the 4th, the Moon rises around sunset in the east and sets around sunrise, remaining visible all night — so the Moon will be high around midnight. Around the night of Full Moon the Moon lies in the zodiacal constellation of Gemini. This evening the Moon will appear among familiar winter sky gems: near the bright clusters and stars of the winter constellations - though as we customarily point out will negatively influence the observation and astrophotography of any deep sky objects - let alone those in close proximity to it.

After the brilliance of Full Moon, the Moon begins to wane. On Thursday 11th December it reaches Last Quarter (Third Quarter). At this stage the Moon, now half-illuminated, lies in the constellation Leo.

As the month progresses, the Moon becomes a waning crescent, passing through the wide expanse of Virgo, into Libra, Scorpius and Ophiuchus, getting steadily slimmer as a crescent as it does. Then, on Saturday 20th December the New Moon occurs. At New Moon the Moon is essentially invisible in the sky — it rises and sets just to the south of the Sun — and lies in the constellation Sagittarius. With no bright Moon in the sky, the nights around New Moon offer ideal conditions for deep-sky observing, meteor watching or astrophotography.

Finally, the Moon begins its next cycle: climbing up out of the southerly part of the ecliptic, through Capricornus and on into Pisces, where on Saturday 27th December, the Moon reaches First Quarter — half-illuminated and rising around mid-afternoon/early evening and becomes easily visible after sunset, climbing into the sky as darkness falls.

The year ends with the Moon in Taurus, just a little to the west of the Pleiades star cluster. At this point it is just under 90% illuminated and thus not far off Full phase, which it reaches again on January 3rd 2026.

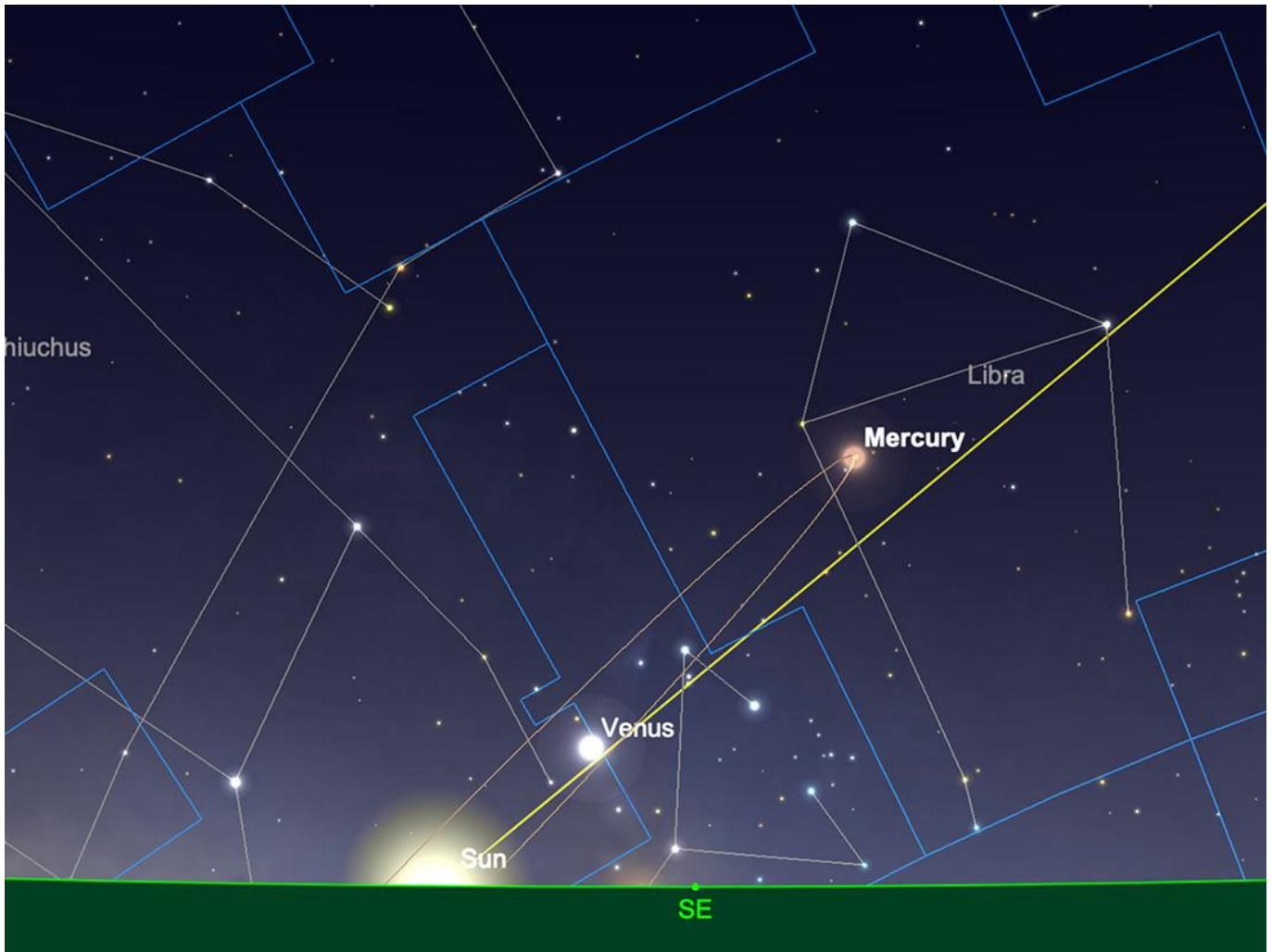
Mercury

We begin December 2025 with Mercury as a morning object - rising before the Sun in the east-southeast for observers in the northern hemisphere.

On 1st December, Mercury is to be found low in the predawn sky: you will need a clear and unobstructed horizon and arrive well before sunrise to catch it. Mercury will stand around $13\frac{1}{2}^{\circ}$ above the horizon as the Sun rises (as observed from 51° N).

As the first week of December progresses, Mercury climbs a little higher above the eastern horizon and brightens as twilight deepens. By 7th December 2025 the planet reaches its greatest western elongation — about 20.7° west of the Sun — which marks the best morning apparition of the year for observers in the Northern Hemisphere. Expect Mercury to rise more than an hour before sunrise and by roughly 45 minutes before sunrise it may be visible a few degrees above the east-southeast horizon — given a good horizon and clear seeing conditions. At greatest elongation, Mercury appears at its most favourable: its phase as seen from Earth is about 61% illuminated (just over a “first-quarter” phase in planetary terms), and its apparent diameter will be around 6.7 arc seconds. The planet’s magnitude will be about -0.4 to -0.5 , bright enough to be a clear naked-eye or binocular object if twilight and horizon conditions cooperate. After 7th December, Mercury remains a morning object throughout the first half of the month, visible low in the eastern sky before sunrise. As the days pass, it moves progressively closer to the Sun’s glare: its altitude at a given time before sunrise decreases, thus the window for observing becomes shorter. By about 23–25th December, Mercury will fade from visibility for most observers in the Northern Hemisphere, sinking too close to the brightening dawn to be reliably seen.

Thus December 2025 offers a brief but favourable morning apparition of Mercury: its best chance comes around the early part of the month, peaking on 7th December’s greatest elongation. For those willing to rise early, with a clear southeastern horizon and minimal twilight interference, Mercury will present a modest but rewarding target — small and low, but shining distinctly, and displaying a recognisable planetary phase if viewed through binoculars or a small telescope.



Mercury at Greatest Western Elongation, Dec 7th 2025. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Venus

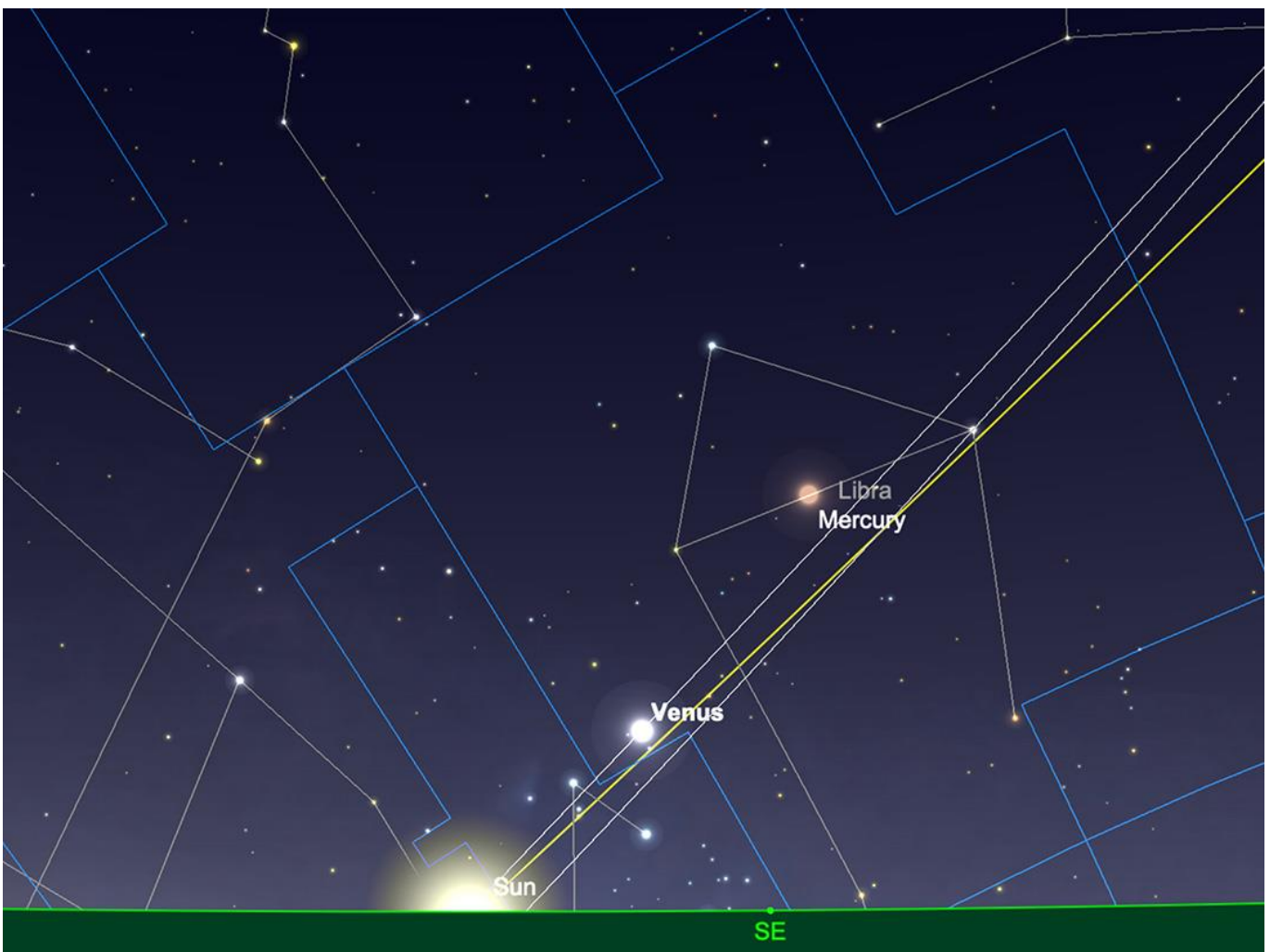
Venus begins December 2025 as a morning object, but already sinking toward the Sun in the dawn sky - even lower than neighbouring Mercury, though much brighter. Although still the brightest “star” in the sky at this hour, its separation from the Sun is shrinking and from the latitude of around 51° N a clear, low eastern horizon is essential if you hope to observe it at all. Venus remains technically a “morning planet,” but is a real challenge to see at all

Over the first few days of the month, Venus will rise with the dawn twilight already well advanced, giving only a narrow window for naked-eye observation — and only if the horizon is clear and free of obstructions. As the days tick by, Venus slides gradually closer to the Sun’s glare, making that predawn window ever shorter and more challenging. In early December Venus can be found in the constellation Ophiuchus.

As December advances toward mid-month, Venus becomes increasingly difficult to pick out against the brightening pre-sunrise sky. By this time the planet's elongation from the Sun is small and the classical "morning star" show is effectively ending for the year.

By the last third of December, for most observers at mid-northern latitudes Venus will likely be lost in the Sun's glare. The combination of a very low altitude at rise, shortening visibility window and increasing twilight brightness all conspire to make Venus essentially unobservable in the mornings.

December ends with Venus just a few days away from Superior Conjunction - the opposite side of the Sun to Earth - which it reaches on January 6th 2026.

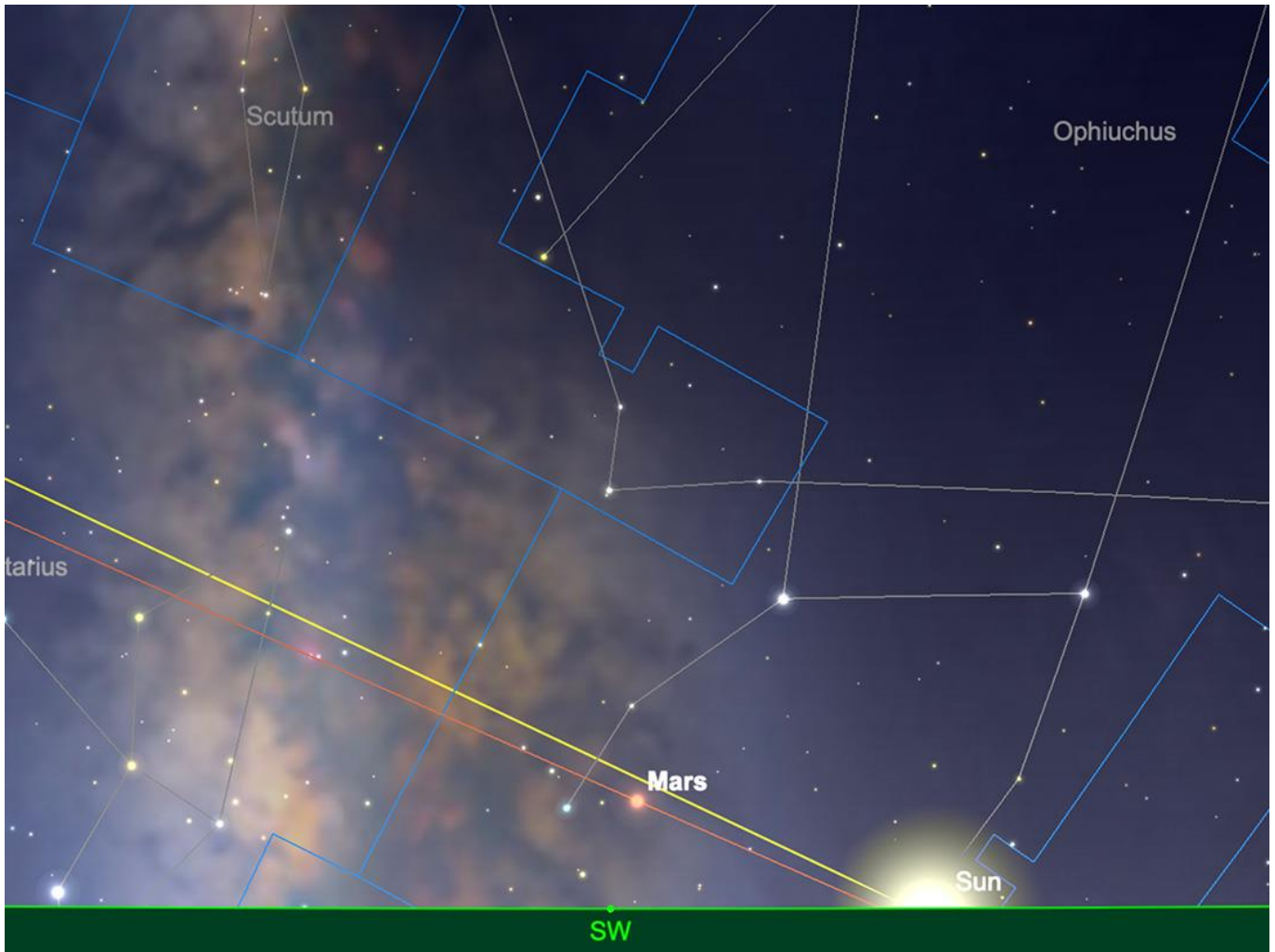


Venus, sunrise, 1st December. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Mars

Mars starts December in Ophiuchus, just 10° from the Sun (as observed from 51° N). It is in a pretty dreadful part of the sky to attempt any observations of and this situation is only

compounded by its steady march towards the Sun, which continues throughout the month. By the time of year end, Mars is just over a week from Superior Conjunction and invisible from Earth.



Mars, sunset, 1st December. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Jupiter

In stark contrast to Mars, Jupiter is spectacular during December. The 1st sees Jupiter a resident of Gemini, shining at a brilliant -2.5 magnitude and displaying a 44.3 arc second diameter disc. The planet will rise a little after 7 pm (GMT) and will transit a little after 3 am the following morning (around two hours before sunrise). This means the planet is still really the preserve of early morning observation to see it at its best, but as soon as Jupiter has reached beyond an elevation 30° from your particular location, it should be able to be observed well telescopically.

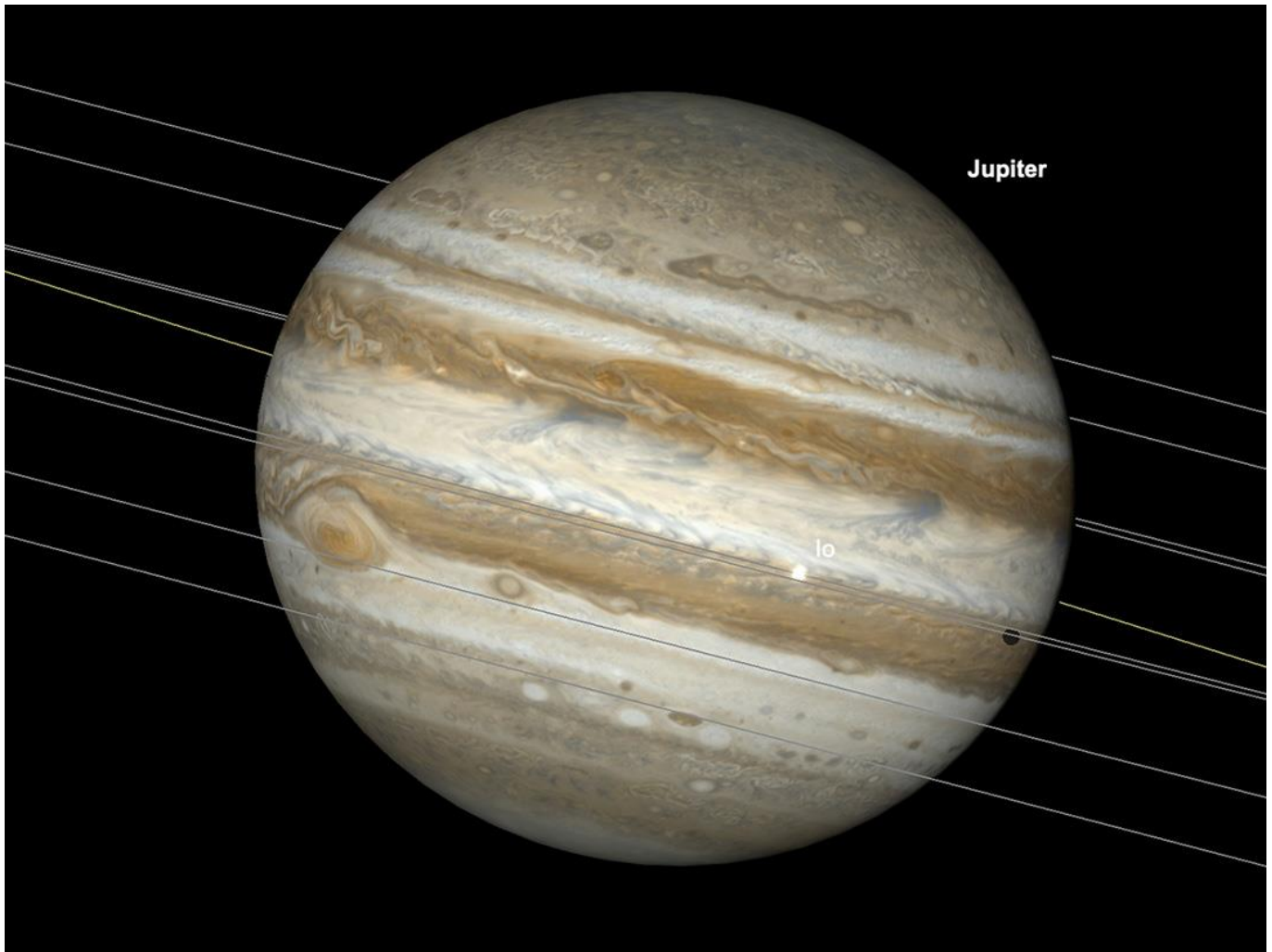
Jupiter began retrograde motion on the 11th of November, marking a significant point prior to opposition, which it will reach in January 2026. The outer planets appear to “go retrograde” a little time before opposition, as we on Earth begin to catch up with the exterior planet on our faster interior orbit. Jupiter’s movement against background sky has nothing to do with its

actual orbital motion. At no point does Jupiter physically change the direction that orbits the Sun. However, the analogy often used is of a car overtaking a slower vehicle, which then appears to move backwards from the perspective of the overtaking car. This is - roughly speaking - what retrograde motion of the outer planets is caused by.

By mid month, Jupiter will have increased its brightness fractionally to -2.6 magnitude and now shows a 45.6 arc second diameter disc. It will rise around 6:15 pm (GMT), transiting a little after 2 am (GMT), the following morning.

By the time we reach the end of the month, Jupiter has increased its brightness again to -2.7 and now displays a 46.5 arc second diameter disc. The planet will rise at a little after 5 pm, transiting at a little after 1 am the following morning.

As ever, there are some interesting mutual Jovian transit events to observe during November. The morning of the 14th there's a good mutual Great Red Spot, Io and Io shadow transit, starting at a little after 3 am (GMT). There's a decent GRS, Europa and Europa shadow transit, starting at around 10pm on December 17th. Another mutual Great Red Spot, Io and Io shadow transit, occurs, starting at a little after 10.30 pm (GMT) on the 22nd. There's another GRS, Europa and Europa shadow transit, starting at around 12.15 am on December 25th.



Jupiter, Great Red Spot and Io/Io shadow transit, 3.53 am, 1st December 2025. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

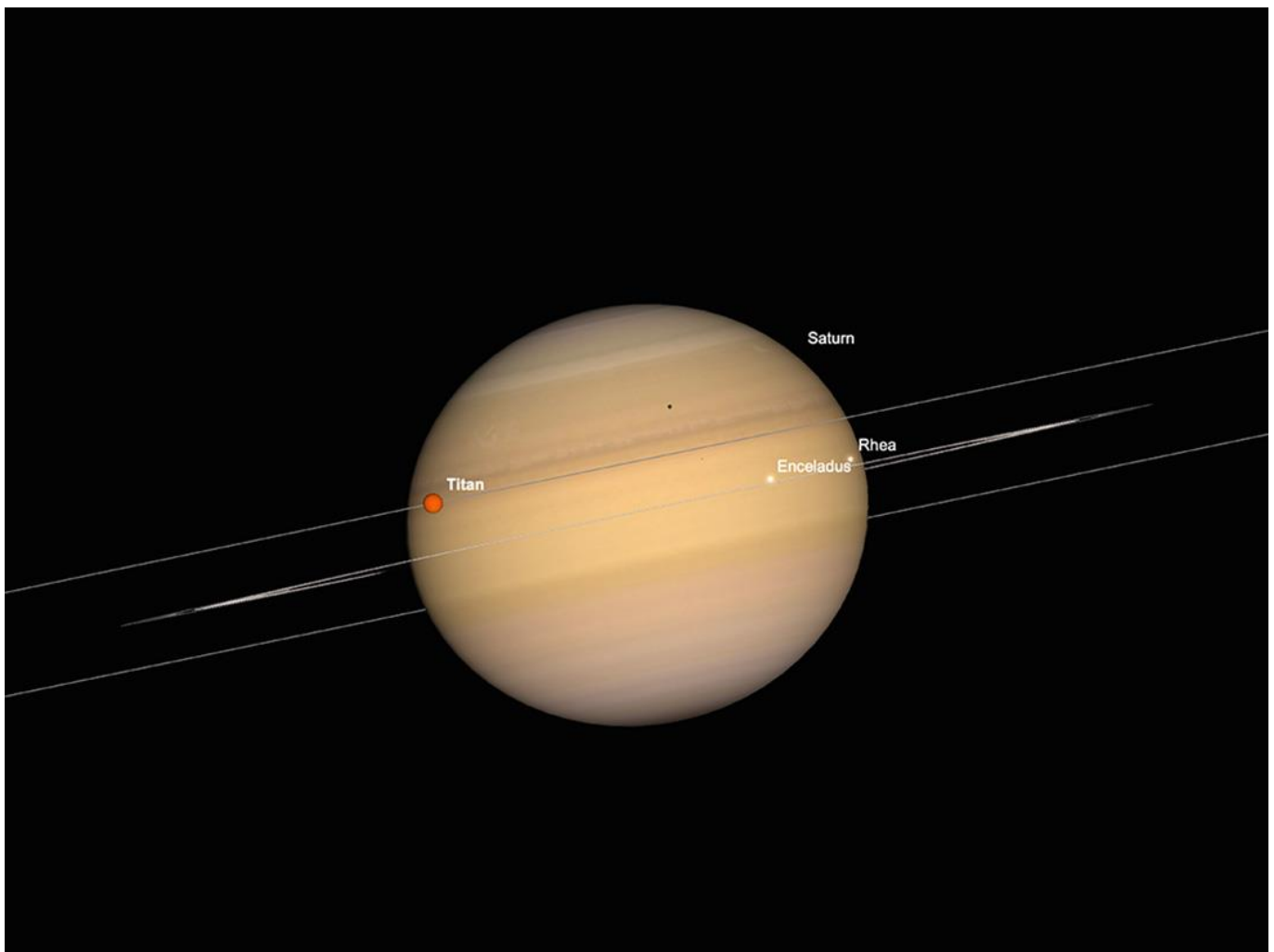
Saturn

We begin December 2025 with Saturn a readily identifiable target in the early-evening southern sky. During December, the planet sits in the constellation Aquarius. As darkness falls, it stands out well against the backdrop of Aquarius, under the Square of Pegasus and to the south of the faint stars of the Pisces “Circlet.” Saturn is currently about 9.18 AU from Earth (roughly 1.37 billion kilometres) and at a heliocentric distance close to 9.55 AU — in other words, still near its average orbital radius about nine and a half times the Earth–Sun distance. From a typical Northern European site (around 50–51° N) Saturn will already have risen in daylight hours and will be transiting the meridian around 7.10 GMT on the 1st, reaching a modest altitude suitable for telescopic work once darkness deepens.

The planet remains relatively bright, around magnitude **+1.1**, keeping it one of the more prominent “stars” in the southern early-evening sky. With binoculars or a small telescope it will appear as pale-yellow point of light, though — as is typical in 2025 — its rings will remain almost edge-on, making them hard to discern, unless using higher powers of magnification. The aftermath of the early 2025 ring-plane crossing means the rings present

a narrow, subtle profile rather than the broad, open vista of a decade ago. This low ring tilt gives observers a different set of delights to chase — shadow contrasts and subtle structure rather than a wide, showy ring — and makes accurate timing of moon and shadow transits particularly worthwhile.

Observers should note two particularly useful events in the second half of the month when planning an evening at the telescope. Titan, Saturn’s largest moon, produces detectable transits of the planet’s disc on two December evenings. Titan transits spanning the afternoon and evening of 8th December (roughly 5.28–11.52 pm GMT) and another on 24th December 2025 (roughly 4:58–10:59 pm GMT) — these long events present the best chances for smaller telescope observers to spot a dark shadow or a tiny satellite silhouette against the planet and rings. These are exacting but rewarding targets: Titan’s shadow is the easiest of Saturn’s moons to detect, while the smaller inner satellites’ transits remain a greater challenge except for those with much larger apertures and very steady seeing conditions.

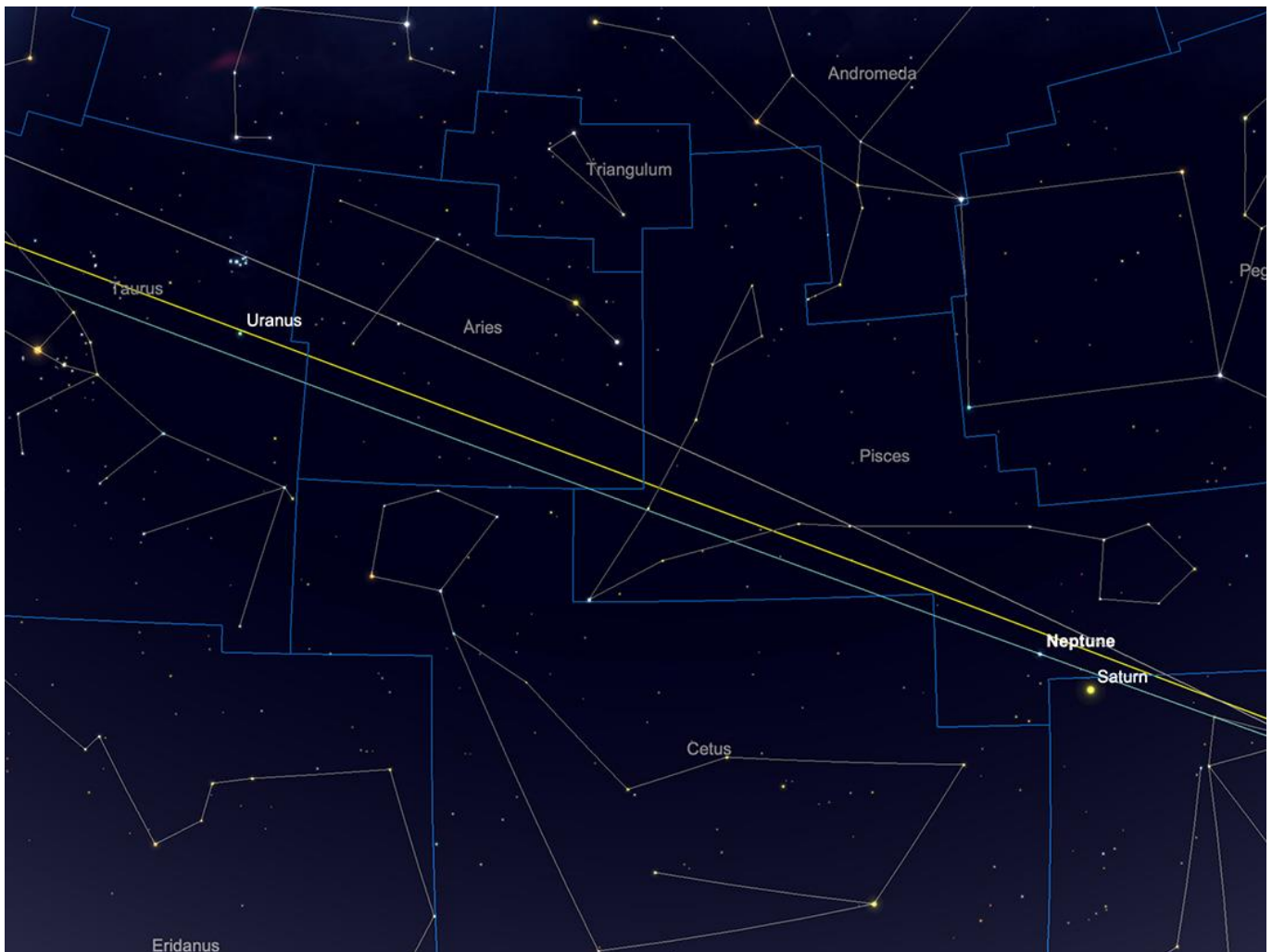


Saturn, with Titan transit, 6 pm, 8th December. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastromy.com.

Uranus and Neptune

Uranus and Neptune are both well situated for observation during December. Uranus sits in Taurus, just under the Pleiades star cluster. At +5.6 magnitude it can be seen with the naked eye from decently dark locations, but is much easier in binoculars. Transiting at a little after 10pm (GMT), mid-month, Uranus will stand around 58° high in the south (as observed from 51° N).

Neptune, always fainter than its neighbour (currently +7.9 magnitude) is to be found further west, in Pisces. It is still not far from Saturn, making it a little easier to find than usual. Neptune will transit at a little after 6.30 pm (GMT) and stand around 38° high as it does (as observed from 51° N).



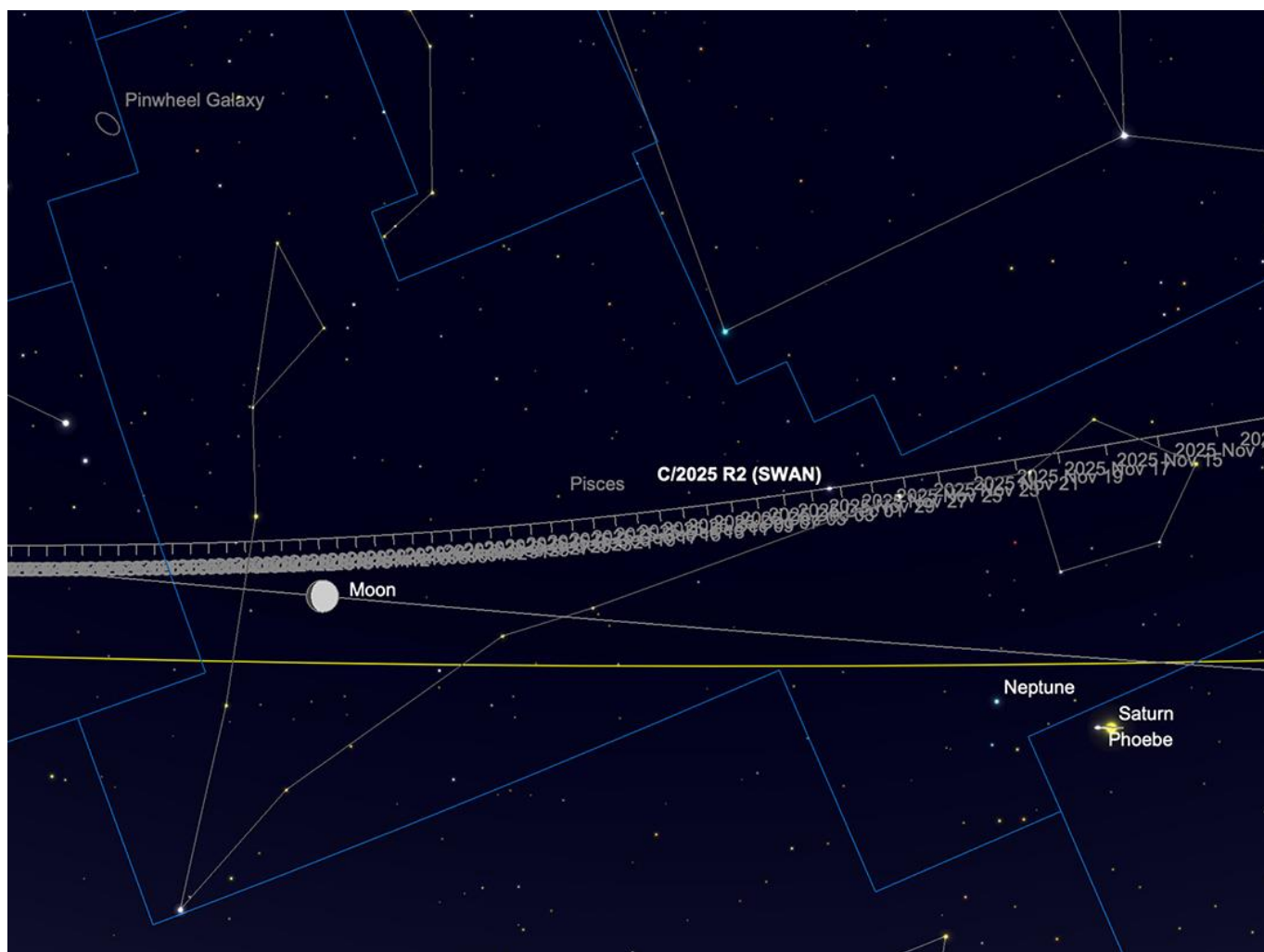
Uranus and Neptune relative sky positions, mid-December. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Comets

C/2025 A6 (Lemmon) has been a fine target for evening observation during recent times peaking at around 4th magnitude. However, it is now headed south from Ophiuchus into Scorpius and this means that northern hemisphere occupants will no longer be able to observe it. Its proximity to the Sun during early December means it will be difficult from every part of the planet and as it is now fading, the best of this comet is now in the past.

C/2025 K1 (ATLAS) is now circumpolar for northern hemisphere observers and underwent a fragmentation during November, with two distinct sections having broken off the main nucleus. Although fading, it is still observable in larger instruments.

C/2025 R2 (SWAN) continues to be a decent target, though is also now fading. It is heading east through Pisces during December and will still be observable in larger binoculars and telescopes.



C/2025 R2 (SWAN) path through Pisces, December. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastromy.com.

C/2025 T1 (ATLAS) is an interesting target that seems to have become slightly brighter than expected. The comet will be drifting south through Vulpecula, Sagitta, Aquila and Aquarius during December, so will remain a decently situated target for northern hemisphere observers through the month.

C/2024 E1 (Wierzchos) will be brightening and is due to peak at possibly around 6th magnitude in early February. While it won't be quite that bright during December, it will be potentially observable in the early evening in Ophiuchus. It is in reasonable proximity to the Sun and will have quite a short window for observation in the evening sky during early December.



C/2024 E1 (Wierzchos) path during December. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastromy.com.

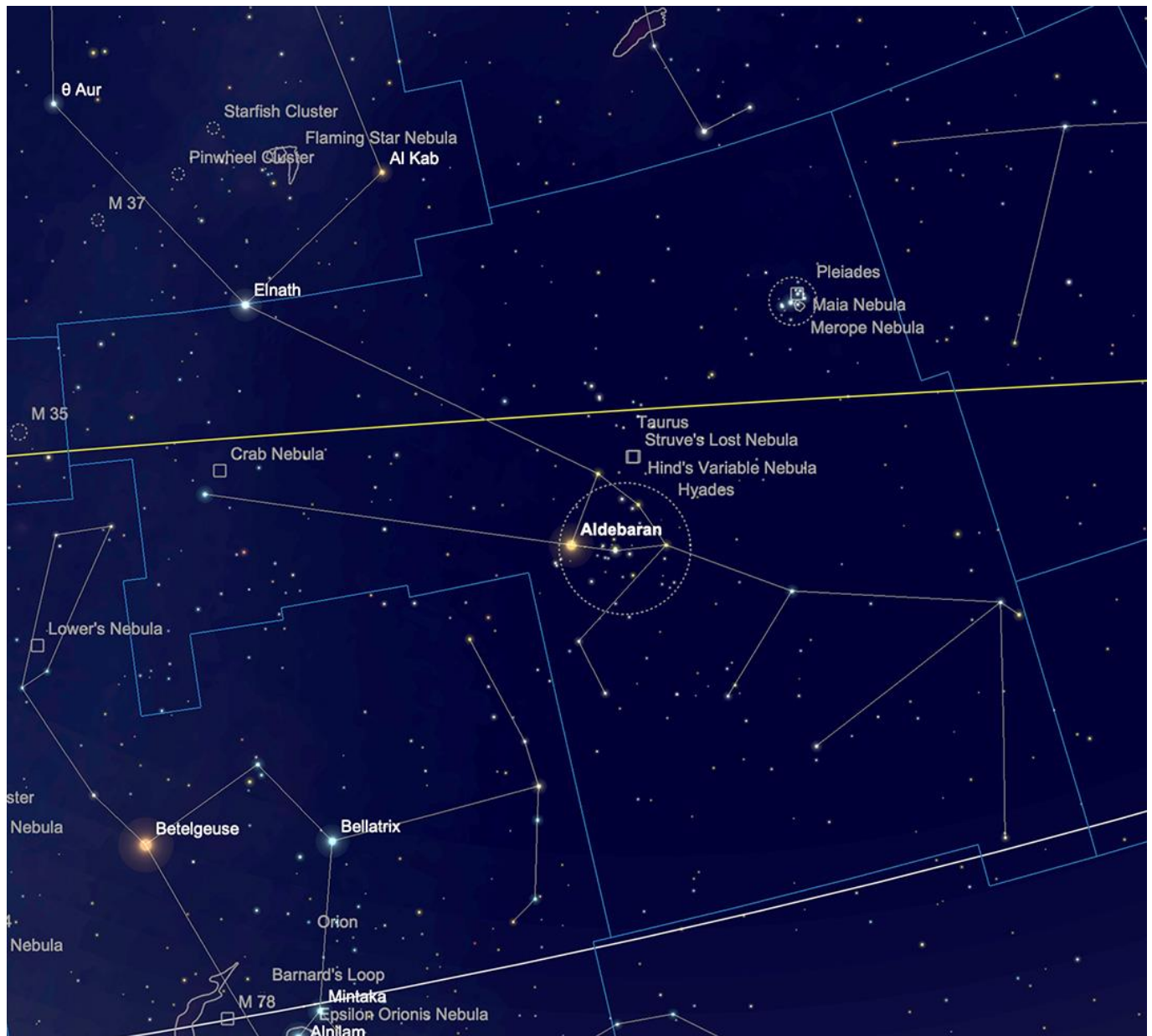
Meteors

The annual spectacle of the Geminid Meteors, which peak on the night of the 13th-14th December, are always worth looking forward to. Peaking at anything up to 100 meteors per hours (not all of which will be visible from any given location), the Geminids are arguably the most reliable shower of the year, fed by the mysterious "rock comet" asteroid 3200 Phaethon. The shower is expected to be visible from 4th/5th to the 17th December this year.

The Geminids radiate from an area inside the constellation of Gemini and are usually very well seen from the northern hemisphere. 2025's shower is quite a reasonable scenario in terms of the influence of Moonlight, with the Moon at waning crescent phase completely out of the way until past 1 in the morning. The Geminids present great opportunities for

astrophotographic record - all you need is a solidly mounted camera, capable of timed exposures, with a reasonably wide field lens. Once set up - even in a fairly light polluted environment - you will be unlucky not to capture a couple of brighter meteors, given an hour-or-so's multiple exposures. The brightest of the Geminids will cut through even the worst influence of light pollution.

Deep Sky Delights in Taurus



The constellation of Taurus. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

The zodiacal constellation of Taurus, The Bull, is home to some of the most outstanding deep sky objects in the sky, the most notable of these is perhaps M45, the Pleiades, or the Seven Sisters. At collective magnitude of +1.5, M45 is easily seen with the naked eye and has been

recorded by numerous cultures throughout the world. The ancients knew the Pleiades by different names: Subaru in Japanese, Krittika in Hindi, Soraya in Persian amongst many others. The Pleiades are mentioned in Homer's Odyssey and Iliad, the Bible and the Quran. It is known that cultures as far apart as the Maori and Aborigines and the Native Plains Tribes of North America had knowledge of this star cluster - which makes it pretty well-known worldwide!

M45 presents its nine major members, (named after siblings from classical Greek mythology), the "sister" stars of Merope, Sterope, Electra, Maia, Tygeta, Celaeno and Alcyone - along with the "parent" stars Atlas and Pleione - to the naked eye from a very dark location, but most people with reasonable eyesight can split six under average skies. Telescopes and binoculars reveal many more of the 1000-or so members of the cluster and larger instruments and photography can pick up blue-hued reflection nebulosity surrounding the cluster - particularly around Maia and Merope. This nebulosity is caused by illumination of left-over material from the cluster's formation. The view of M45 with a widefield, low power eyepiece is one of the most glorious sights in any telescope, though at 2 degrees in diameter, one has to be careful about eyepiece choice in order to get the outlying members in a useable field of view.

The Pleiades are thought to be around 100 million years old and lie between 430 and 440 light years away.



The Pleiades by Mark Blundell. Image used with kind permission.

Two interesting objects - or rather one, these days - lie to the north of the Pleiades: NGC 1554 - Struve's Lost Nebula and NGC 1555 - Hind's Variable Nebula.

NGC 1555, or Hind's Variable Nebula, is a reflection nebula near T Tauri (mag 9–13) in Taurus, discovered in 1852. Hind's Nebula, once easier to observe, now appears as a faint haze west of T Tauri, near a 14th-magnitude star, forming an arc in photos. T Tauri, central to NGC 1555, is a prototype for young stars, with its surrounding reflection nebulae illuminated by shifting dust clouds that cast dynamic shadows on interstellar gas.

T Tauri, at the heart of NGC 1555, is the amongst the first type of young stars emerging from the dusty outer shells of the nebula that formed them to be definitively recognised as such. The surrounding complex features reflection nebulae, illuminated as shifting dust clouds alternately block or reveal light from the star, casting dynamic shadows across the interstellar gas.

NGC 1554, or Struve's Lost Nebula, was discovered in 1868 by Otto Wilhelm Struve and confirmed by Heinrich d'Arrest. Listed in J.L.E. Dreyer's New General Catalogue, it disappeared within a decade. NGC 1554 was definitely verified by d'Arrest, and catalogued as nebulosity nearby a 13th-magnitude star, but hasn't been seen since, earning the name "Struve's Lost Nebula."

Dreyer described it as "variable, small, round, with a nucleus north of a 13th-magnitude star." Modern sources often group NGC 1554 with NGC 1555, though it's absent from modern sky surveys. At its reported position, 4 arc minutes west-southwest of T Tauri, a 14th-magnitude star is visible. The Lost Nebula may have been a fleeting part of the local reflection nebula complex.



NGC 1555, Hind's Variable Nebula. Adam Block/Mount Lemmon SkyCenter/University of Arizona, Creative Commons.

Next door - though not cosmically speaking - to the Pleiades is the older and more spread-out Hyades cluster. Its major naked eye members are arranged in a V-shape which marks the head of Taurus. Again, similarly to M45, the Hyades have been known since antiquity and were traditionally seen by the Ancient Greeks as being the sisters of the Pleiades - via their shared father Atlas.

The Hyades lie 152 light years away, and as such are nearest star cluster to us on Earth (though arguably the stars in the Plough or Big Dipper in Ursa Major can actually be thought of as a cluster and are closer). The Hyades consist of over 300 individual stars and modern estimates put its age at around the 600+ million year mark - making it markedly older than the Pleiades. The Hyades share a galactic trajectory with M44, the Beehive in nearby Cancer, again suggesting a common origin point in space. However, the Beehive appears to be slightly older at 600-730 million years.

Line of sight puts Taurus' principle Alpha star Aldebaran - the eye of the Bull - within the boundaries of the Hyades, though this Red Giant is unrelated and distinctly closer to us at 65 light years.

Reaching East down the Southerly "horn" of the Bull, we come to the +3 mag star Zeta Tauri. This star is a convenient location point for another jewel of the night sky - the Crab Nebula, M1 on Messier's List.

The Crab Nebula is the remnant of a star which went Supernova in the year 1054 (to us here on Earth). This event was recorded throughout the world, from New Mexico to China. It would have been a dazzling sight, peaking at -6 mag, brighter than the planet Venus and visible in daylight. After it faded, the event receded from popular consciousness and it was nearly 700 years later, in 1731, that the object that would become known as the Crab was discovered by Astronomer John Bevis. Messier rediscovered it when searching for the return of Halley's Comet 27 years later in 1758. First thinking the object was a comet, it was the Crab that prompted Messier to compile his list, so other comet-hunters would not be confused by these static, cloud-like objects when searching the heavens.

Lord Rosse, observing the Crab with what was then the largest telescope in the world at his Birr Castle Observatory in Ireland, in 1844, made a sketch that showed claw-like protrusions - presumably the filament structure of the outer lying regions. The object was nicknamed the Crab - and the moniker stuck.

Early 20th Century photographic observations of M1 showed that the object was expanding rapidly. This expansion was extrapolated backwards and it was noted that the object should have started its expansion around 900 years previously. A little bit of astronomical detective work ensued and the events of 1054 and the Crab were tied together.

Although a hardly dazzling +8.39 mag, the Crab's is quite well condensed and as such its surface brightness is fairly high. It can be found as a misty patch with ordinary binoculars, though larger binoculars reveal it as a definite elongated, round-edged feature. Telescopically, the texture of the Crab becomes evident in refractors of 4-inches aperture or reflectors of the 6-8-inch class. Reflectors of 16+ inches in aperture and dark

skies are needed to glimpse the filament structures of M1's outlying regions and real striation in its core. Filtration will help with this object, especially in small instruments where it can sometimes be difficult to isolate the nebulosity of the object from the rich background of the Milky Way.

Photographically, the Crab Nebula is a rewarding target, with the "Hubble Palette" of H-Alpha, OIII and SII being particularly useful in bringing out the tangled, chaotic structure of the object's core, as displayed by Mark Blundell's picture below.

No-one with any form of optical equipment should ignore the Crab Nebula. While not as spectacular as the neighbouring Orion Nebula, it is the only easily-observed remnant of a Supernova that humans have actually observed in relatively recent history. Given the dearth of Supernovae in our galaxy in recent times, the Crab remains a special object to us.



The Crab Nebula by Mark Blundell. Image used with kind permission.