EN

BRESSER

SKY GUIDE

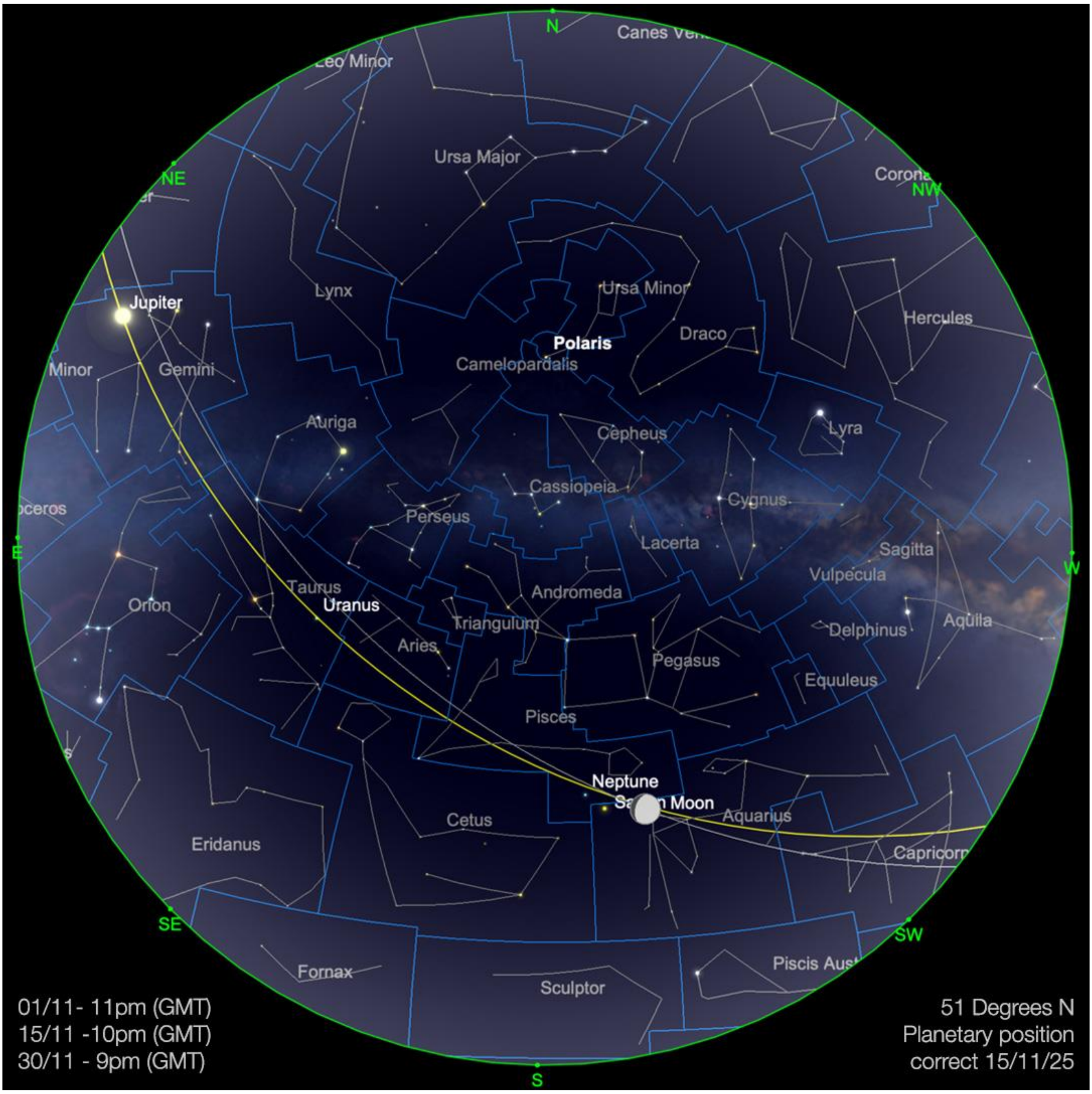
Astronomical guide for November 2025

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

Publisher: **Bresser GmbH**
Gutenbergstr. 2 · 46414 Rhede · Germany
+49 (0) 28 72 – 80 74 – 0
info@bresser.de · www.bresser.de

Original text: Kerin Smith

Expand your horizon



2025 hurtles ever closer to its conclusion. Who can believe we're in the final couple of months of the year? For astronomical observers, November is typically one of the three cloudiest months of the year, in Northern Europe. Unsurprisingly, this cloudiness also coincides with increased rainfall. Over the past few years, during November, we've seen an increase in temperatures and rainfall across Europe. Looking back a few decades, November was on average colder and drier, particularly the latter part of the month. With modern trends towards higher temperatures and wetter conditions, this part of the year is now not quite as favourable as it once was for astronomical observations. This is a pity, because as you will read below, there are some very interesting events coming up in the skies above us this month…

The Solar System

The Sun

The last full month's sunspot numbers (at time of writing) was September's. According to the NOAA, September's values were slightly above prediction, which is an improvement from previous months. There were just under 130 sunspots observed during the month of September, meaning the Sun is still giving a good account of itself in terms of activity.

Indeed, this activity continued into October with some lower-level Aurora events being detected on the nights of the 1st and 2nd, which coincided with some very strong geomagnetic activity. A similar high strength event occurred on the 18th of October. On the 21st of October, there was a very large coronal mass ejection, which erupted from the Sun's far side. While this was not facing the Earth, the vagaries of solar wind dynamics mean solar material can find its way around the Sun and directly influence our planet's magnetosphere and atmosphere, even if the event that caused it was initially facing in a very different direction. As solar activity remains high, there may be more events like this in the near future.

Readers can browse the NOAA cycle 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

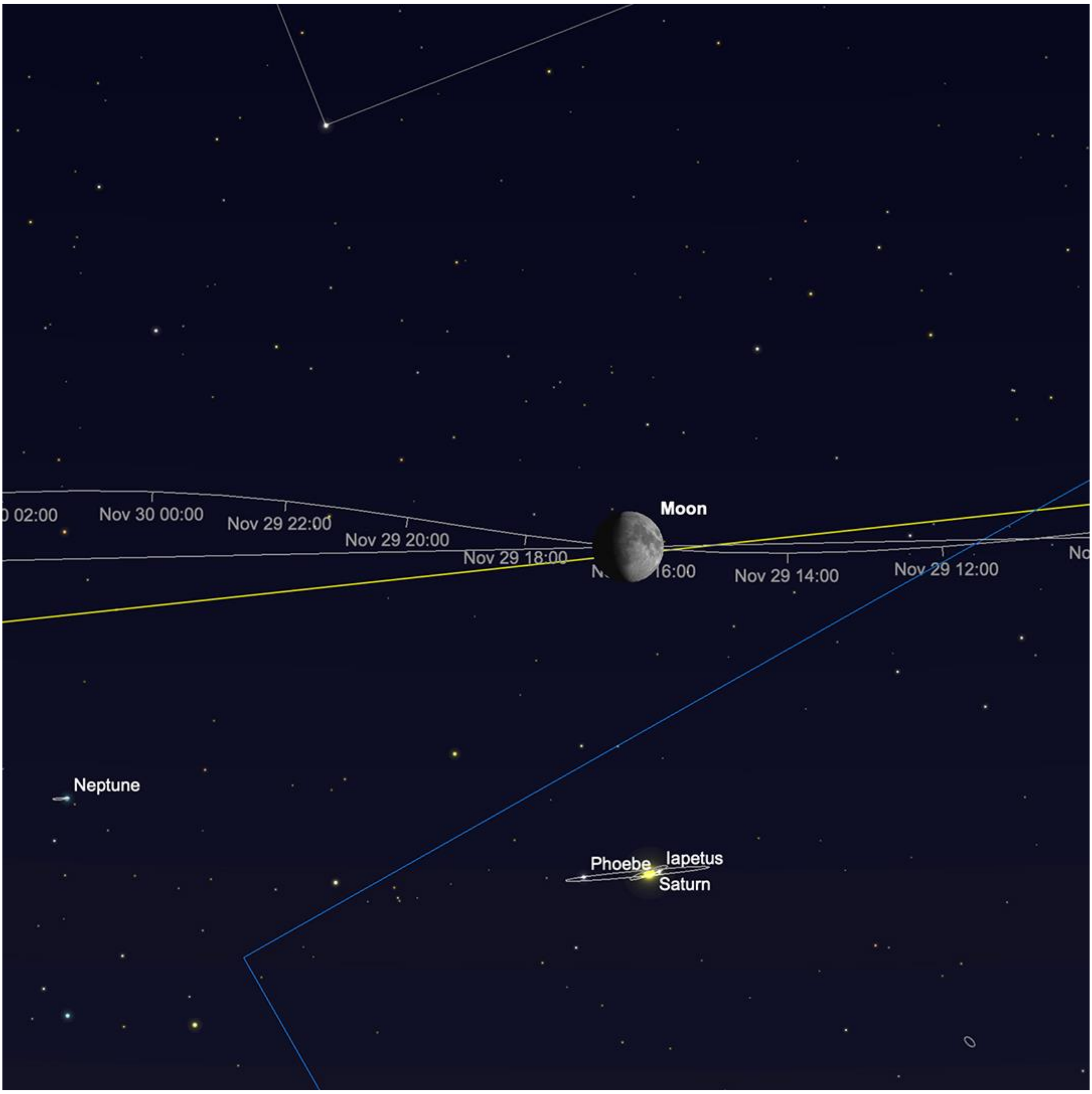
We start November with the Moon at an 80% illuminated waxing gibbous phase, a resident of Aquarius. The nights of the 1st and 2nd of November find the Moon close to both Saturn and Neptune on the Pisces/Aquarius borders.

The Moon continues its path through Pisces and on into Aries, where it will become full on the evening of November 5th. The Moon will rise in the early evening and transit around midnight. As is customary at this point in the sky guide, we gently mention that this part of the month will not be the best for deep sky observing or Astro photography.

This Full Moon is a Supermoon - more correctly referred to as a perigee syzygy Moon - which occurs when the Moon is at its closest approach to Earth on its slightly eccentric orbit. As we've covered in previous sky guides, a Supermoon is not of any great scientific significance, but the effect of the Moon's proximity to Earth, especially at this time of year, when the Moon is sitting reasonably low in the southern ecliptic for observers in the northern hemisphere, will Increase of perceived notion of its size. A Supermoon only appears around 14% larger than the Moon at its smallest, but atmospheric lensing (caused by refraction when the Moon is low to the horizon, when rising or setting) can also serve to make objects appear very slightly larger than they would normally do, were they higher in elevation in the sky. Both of these phenomena acting concurrently may make the Moon appear a little larger than usual. As is also customary, we remind readers that Full Moon is probably the worst time to observe our natural satellite, as its multitude of interesting surface features are completely bleached out. Neutral Density and other lunar filters may help dial down a Full Moon's brightness and make it a little more comfortable to observe, but in truth, the Moon and its features are much better observed closer to Crescent or half phases.

The excitement of the Supermoon behind us, the Moon continues its journey through the extreme northern part of the ecliptic, passing from Aries, into Taurus and on into Gemini where it joins Jupiter on the evening of the 10th. The Moon then crosses neighbouring Cancer and then into Leo, where on the evening of November 12, it reaches Last Quarter phase. The next week sees the Moon crossing the expanses of both Leo and Virgo, decreasing its phase as it goes. This part of the year is an excellent one for observation of the Crescent Moon in the morning sky from a northern hemisphere perspective. This is the Autumnal morning equivalent of the Moon's Evening High Spring Crescent phases and presents some excellent opportunities for early risers to observe the Moon at significant height above the horizon. The Moon then meets the Sun on the Libra/Scorpius borders on the 20th, becoming New.

After this point, the Moon will re-emerge from its encounter with the Sun, becoming an evening object. As the Sun is low in the sky at this time of year, from a Northern Hemisphere perspective, the Moon will also appear very low in the sky when emerging as an evening Crescent. The final week of November sees the moon skirting the horizons, through Sagittarius and Capricornus and on into Aquarius and Pisces (where it briefly rejoins Saturn and Neptune, on the evening of the 29th). The Moon ends November back in Pisces, at a waxing gibbous phase, of around 75% illumination.



Moon, Saturn and Neptune 29th November, Image created with SkySafari 6 for Mac OS X, ©2010-2024 Simulation Curriculum Corp., skysafariastronomy.com.

Mercury

The solar system's innermost planet begins the month of resident of Scorpius. It is an evening target, though a challenging one for those readers in the northern hemisphere. As mentioned in regards to the Moon's evening showing during November, Mercury appears in a similarly shallow rising part of the ecliptic at present. This has the upshot of making the planet difficult to observe from the northern hemisphere. Although just a couple of days after maximum elongation from the Sun and a reasonable

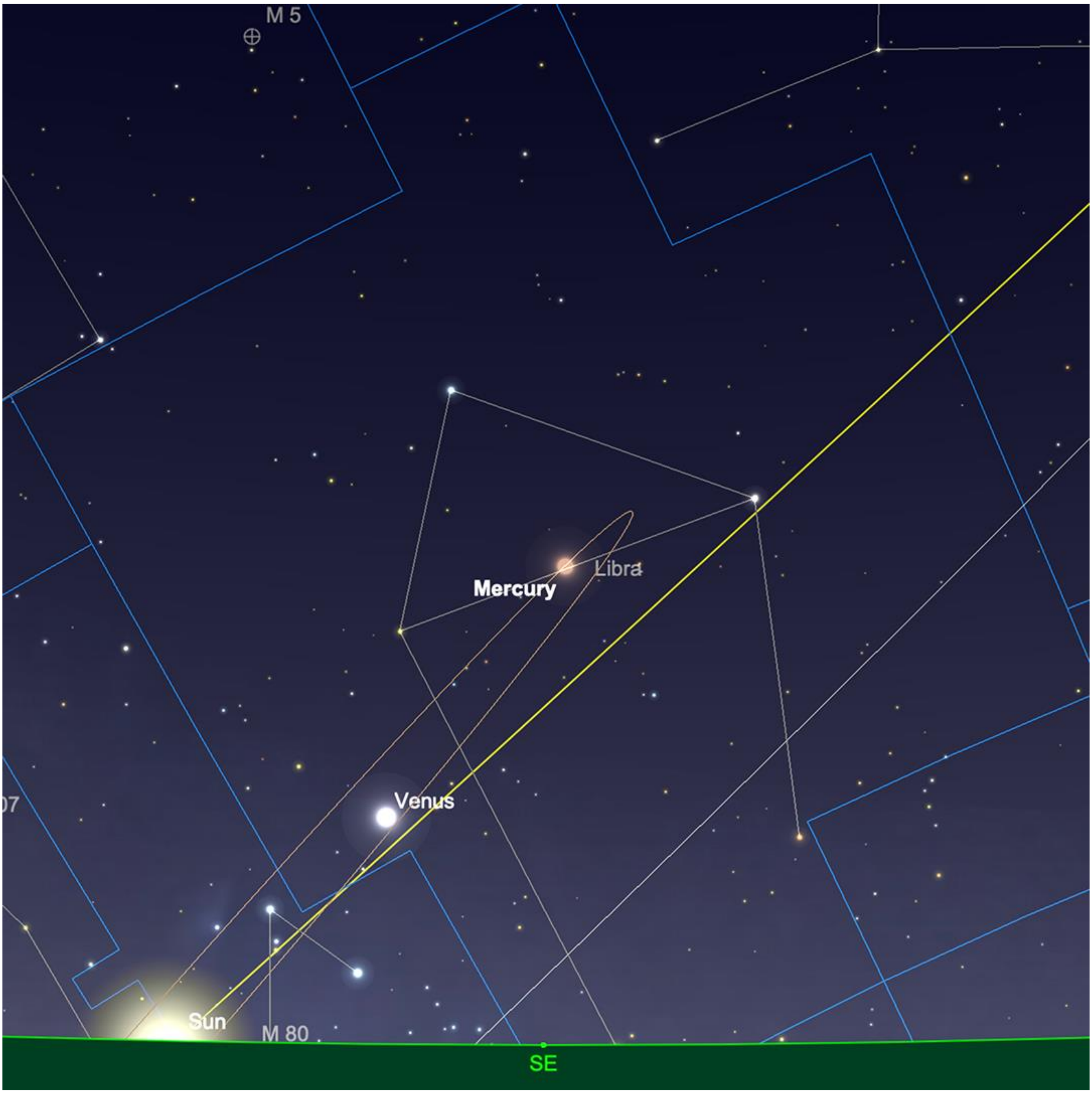
24° separation from our parent star, Mercury will only appear to sit around 4° above the horizon as the Sun sets on November 1st (as observed from 51° North). At -0.1 magnitude, presenting a 7 arc second diameter disc, illuminated by just under 56%, Mercury is actually quite a reasonable target. However, its low sitting in the sky will hamper observations somewhat.

As the month continues, Mercury will grow steadily fainter, as its phase decreases, as it swings around the Sun, closer to us here on Earth. By the middle of the month, Mercury is unobservable at +2.3 magnitude, presenting an 8.4% illuminated disc.

Mercury reaches inferior conjunction, the point inbetween the Sun and our perspective here on Earth, on November 20th - after which, it will re-emerge as a morning target.

The last week of November sees Mercury rocketing up out of the Sun’s glare, passing Venus, in Libra on the mornings of the 24th and 25th. This will make the faint planets position in the sky much easier to find, with Venus acting as an extremely bright waypoint in the south-east, just before daybreak. However, while Mercury‘s position in the sky may be straightforward to find, at +2 magnitude at this point in time, it will be still a significant challenge to observe.

By the time we get to the end of November, Mercury will appear significantly brighter at +0.3 magnitude, displaying an eight arc second diameter, 33% illuminated disc. It will attain a significant altitude above the horizon for those of us in the Northern hemisphere at this point in time. As observed from 51° North, on the morning of the 30th, Mercury appears just over 13° high above the horizon, as the Sun comes up.



Mercury, sunrise 30th November. Image created with SkySafari 6 for Mac OS X, ©2010-2024 Simulation Curriculum Corp., skysafariastronomy.com.

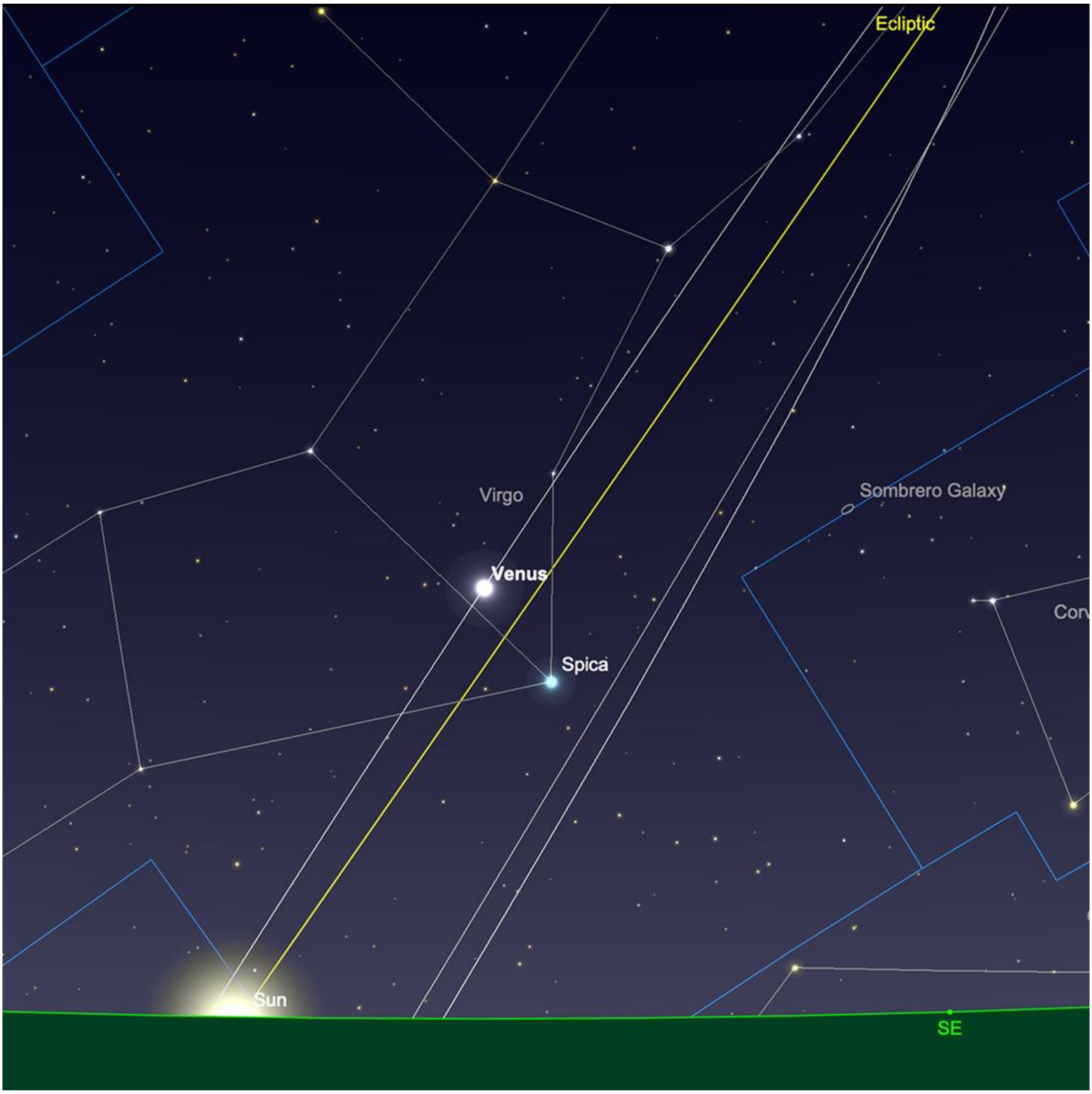
Venus

Venus is a morning target and as mentioned in previous sky guides, is headed sunwards at this point in time. The planet will appear as the brightest object after the Sun in the morning sky at the beginning of November, sitting at -3.9 magnitude and a height of just under 13 1/2° above the horizon (as observed from 51° north), on the morning of the 1st.

By mid month, Venus remains static in brightness, but will now sit a little under 10° high above the horizon at sunrise (again, as observed from 51° north).

As mentioned previously, Venus and Mercury will have a reasonably close encounter with each other during the final stages of November, with Venus acting as a bright guide to Mercury‘s position in the sky at this time.

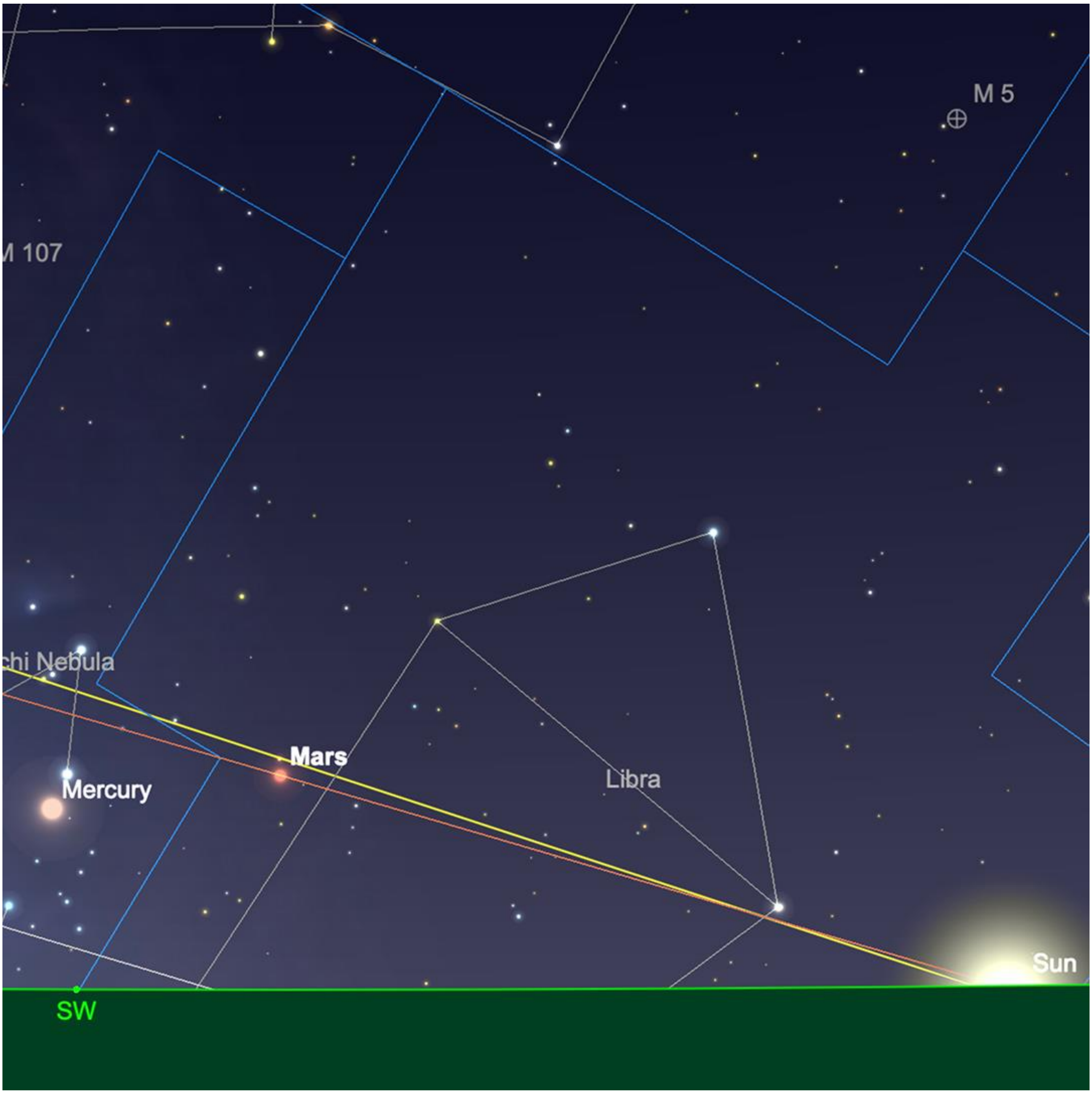
By the time we get to the end of the month, Venus remains static in brightness at -3.9 magnitude but now sits just 6° above the horizon, as observed from 51° north. We are still a little way off superior conjunction, which will occur in early January 2026. However, Venus is in a suboptimal location in the sky for visual telescopic observation at present. It may reward lower power observing, but increasing magnification will only reveal the pernicious influence of Earth’s atmosphere, when observing the planet at this time.



Venus, sunrise, 1st November. Image created with SkySafari 6 for Mac OS X, ©2010-2024 Simulation Curriculum Corp., skysafariastronomy.com.

Mars

Languishing in Libra in the early part of November, at a disappointing magnitude of +1.5, Mars is a pretty dreadful target at this point in time. Amazingly, it continues to hang on as an evening target (albeit technically) for the rest of 2025, it's extremely low altitude and tiny disc make it less than worthwhile to observe at this point in time. It will only be towards the end of 2026 that Mars begins to become a more significant target for telescopic observation again.



Mars, sunset, 1st November. Image created with SkySafari 6 for Mac OS X, ©2010-2024 Simulation Curriculum Corp., skysafariastronomy.com.

Jupiter

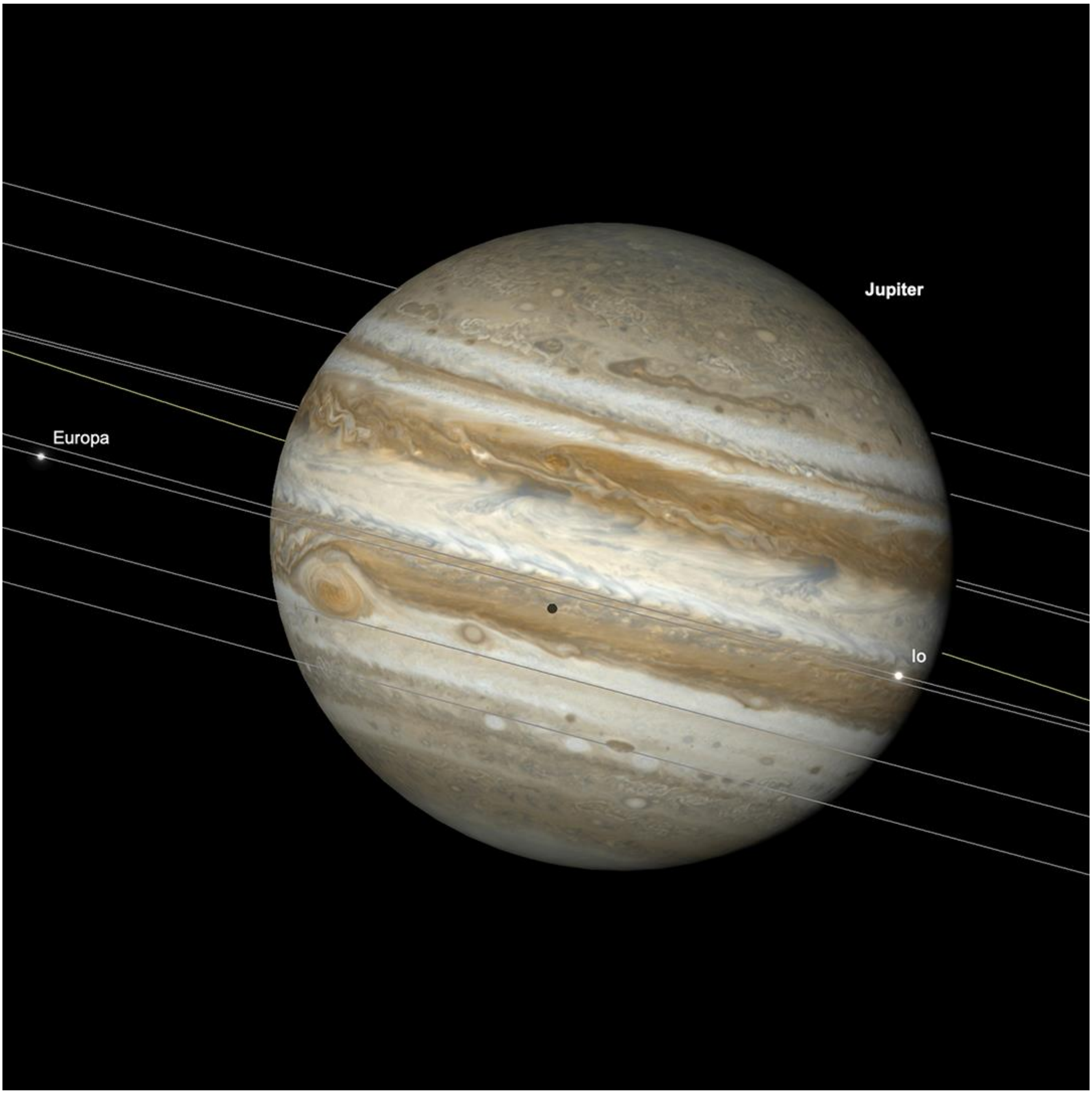
Where Mars disappoints, Jupiter in thrones. The 1st of November sees Jupiter a resident of Gemini, shining at a brilliant -2.3 magnitude and displaying a 40.6 arc second diameter disc. The planet will rise at a little after 9 pm (GMT) and will transit at a little after 5 am the following morning (around two hours before sunrise). This means the planet is still really the preserve of morning observation to see it at its best, but as soon as Jupiter has attained an elevation above 30° from your particular location, it should be able to be observed well telescopically.

Jupiter begins 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 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 -2.4 magnitude and now shows a 42.3 arc second diameter disc. It will rise a little before 8:30 pm, transiting a little before 4:30 am (both times GMT) The following morning.

By the time we reach the end of the month, Jupiter has increased its brightness again to -2.5 and now displays a 44.1 arc second diameter disc. The planet will rise at a little after 7 pm, transiting at a little after 3 am the following morning.

As ever, there are some interesting mutual Jovian transit events to observe during November. The morning of the 5th, sees a nice mutual Great Red Spot, Io and Io shadow transit event, beginning at around 6 am. Europa will also transit on the morning of the 5th, about an hour later. There’s a brief GRS and Ganymede mutual transit, which occurs around 2 am on November 11th. The following day, on the morning of the 12th at around sunrise, a mutual GRS and Io transit will take place. The morning of the 16th sees a mutual GRS and Europa transit, beginning at a little after 12:30 am. There’s another GRS and Ganymede mutual transit, which occurs at around two 2:30 am on the morning of November 18th. A brief Io, Io shadow transit and GRS transit occurs around 2:30 am on the 21st. There’s a nice GRS, Europa and Europa shadow transit which begins at around 1:30 am on the morning of the 23rd. Another GRS, Ganymede and Ganymede shadow transit begins at around 2:30 am on the morning of the 26th. The month is rounded out on the 30th by a GRS, Europa and Europa shadow transit which occurs around 4 am.



Jupiter Transits, 5th November, 6.39am (GMT). Image created with SkySafari 6 for Mac OS X, ©2010-2024 Simulation Curriculum Corp., skysafariastronomy.com.

Saturn

Saturn remains excellently placed for early evening observation during November. At +0.9 magnitude, presenting a just under 19 second diameter disc in Aquarius, Saturn is by far away the brightest ”star“ in its particular part of the sky at present. If you can find the square of Pegasus from your location and trace a route south from the centre of this, Saturn is the creamy-yellow coloured star that sits about the same depth as the Square, to the south of the its bottom.

Rising at a little after 3:30 pm (GMT) on the 1st, Saturn will transit at around 9:15 pm, setting at around 3 am the following morning.

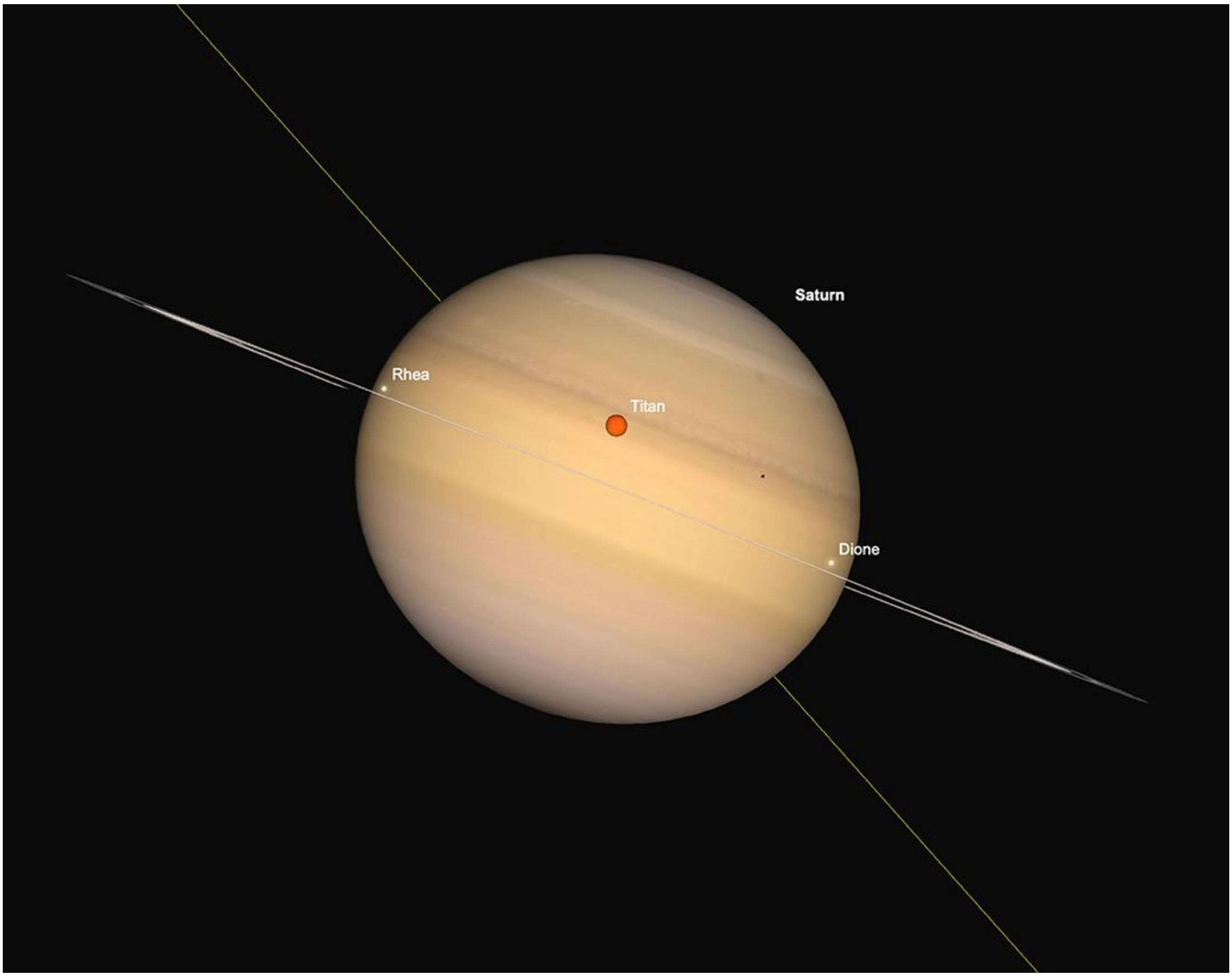
Although Saturn's rings are almost edge on to us, the planet still presents a pretty spectacular site in modern size telescopes. At present, due to the orientation of the Earth to Saturn's orbital plane, we have the opportunity to attempt to observe transits of Saturn's moons and their shadows. Due to Saturn's greater distance from the Earth and the smaller relative size of most of its family of moons, this is a much more challenging task than observing Jupiter and its major Galilean satellites transit events.

However, it is possible to observe Saturn's largest moon, Titan, and its shadow transiting the Saturnian disc. The opportunity to do so comes on the evening of November 6th, starting at a little after 8:30 pm. Titan and its shadow will track across Saturn's disc for around seven hours. Two of Saturn's other major moons Dione and Rhea will also transit during this evening

- though these events will be much, much more difficult to observe. Those with larger telescopes and reasonable power eyepieces will be able to witness the Titan transit - as long as the weather is kind.

Titan will also transit Saturn again on the evening of November 23rd, starting at around 7 pm.

By the time we get to the end of November, Saturn has dimmed fractionally to +1.1 magnitude and is now showing an 18.1 arc second diameter disc. The planet will remain well-placed for early evening observation, transiting at a little before 7:30 pm and setting at just after 1 am the following morning. Those with telescopes are encouraged to make the most of Saturn while observable at such a clement hour of the evening.



Saturn, with Titan Transit, 11.28pm (GMT), 6th November. Image created with SkySafari 6 for Mac OS X, ©2010-2024 Simulation Curriculum Corp., skysafariastronomy.com.

Uranus and Neptune

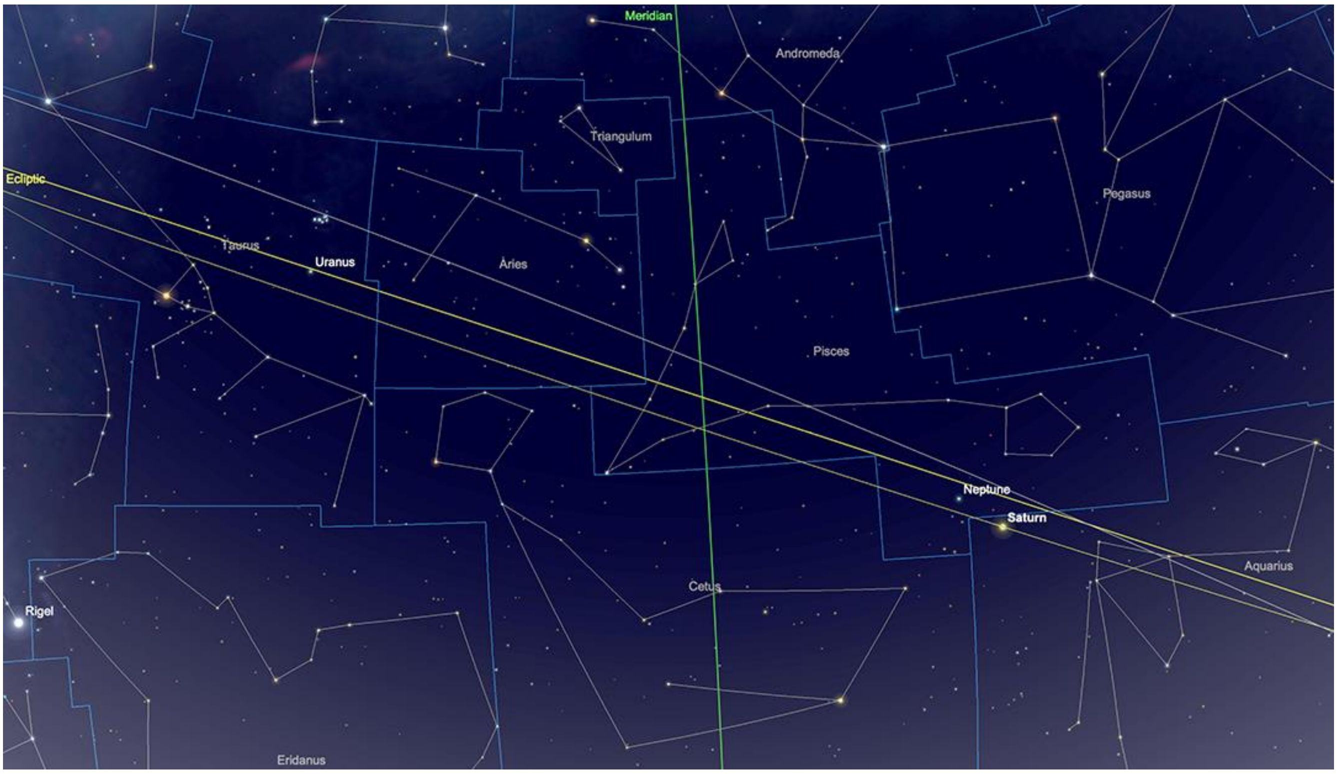
The highlight of the outer planets this month is the opposition of Uranus, which it reaches on the 21st. Found in Taurus, around 4 1/2° to the south of the Pleiades star cluster, Neptune is +5.6 magnitude brightness and reaches 3.8 arc seconds diameter on the night of opposition. The planet is technically a naked eye target from a dark sky site, but is still easily enough to resolve in smaller binoculars from more challenging environments.

Uranus will rise at just after 4 pm on the evening of opposition, transiting at little before midnight. Its position in the northerly ecliptic makes the planet well-situated for observation by northern hemisphere observers.

Discovered by Sir William Herschel, in 1781, Uranus' grey-green globe is usually pretty featureless, though on rare occasions, cloud belts have been noted in larger telescopes. Much more challenging will be attempting to observe Uranus' system of moons. The largest and most prominent of these are Titania and Oberon, discovered again by Herschel in 1787. Titania is large at 1580 km across, Oberon is a slightly smaller 1520 km - both hover at around the +13.8 to 14th mag level of brightness from here on Earth so are tricky to observe, but can be seen in larger telescopes. Two further satellites, Umbriel and Ariel are a little fainter normally, but are in reach of larger amateur instruments, though the fifth Uranian Moon, Miranda skirts above the 16th magnitude, so is much more of a challenge. In addition to these 5 primary satellites, Uranus has another 22 further Moons, all below 150km in diameter. Many of these were discovered during the NASA space probe Voyager 2's journey through the Uranian system in 1986, though further Earth-base observations were needed to con rm these discoveries and led to further Moons being found.

Uranus famously has a ring system, orbiting the planet's equator, which is highly inclined to the plane of our solar system - indicating a violent encounter in Uranus' past. These rings, unlike those of Saturn, are completely invisible to all but professional instruments and are never seen visually - or are they? Intriguing observations by Sir William Herschel hint at his suspicion of a ring around the planet. On February 22nd, 1789, he wrote in his observations of Uranus: "A ring system was suspected", also noting they were "a little inclined to the red [in colour]". His sketch of the ring location and orientation tallies with fact - as does the colour of the brightest Epsilon ring, which has been confirmed by modern spectroscopic observations. However, Herschel never saw the ring again, and abandoned the idea after later observations failed to confirm it. Herschel's power of observational skill should not be underestimated, but could conditions conspired to give him a brief view of the ring, albeit faint and fleeting? Uranus was in Cancer in 1789, high in the northern part of the Ecliptic and thus in a great position for observation from England. It would be 1977 before the ring of Uranus was definitely discovered - by the instrument aboard the Gerard P. Kuiper Airbourne Observatory, operated by NASA. Infrared images of a star occultation by the Uranian system captured by the KAO's Cassegrain telescope appeared to dip in brightness prior to the star's occultation of the planet - this could only have been caused by Moons, or a series of rings. The chance alignments of unseen Moons for this event was extremely unlikely, especially as the dips occurred in the star's light post- occultation too, so a ring system was correctly suspected. This was confirmed by Voyager 2's pictures and later Hubble Space Telescope and ground-based observations.

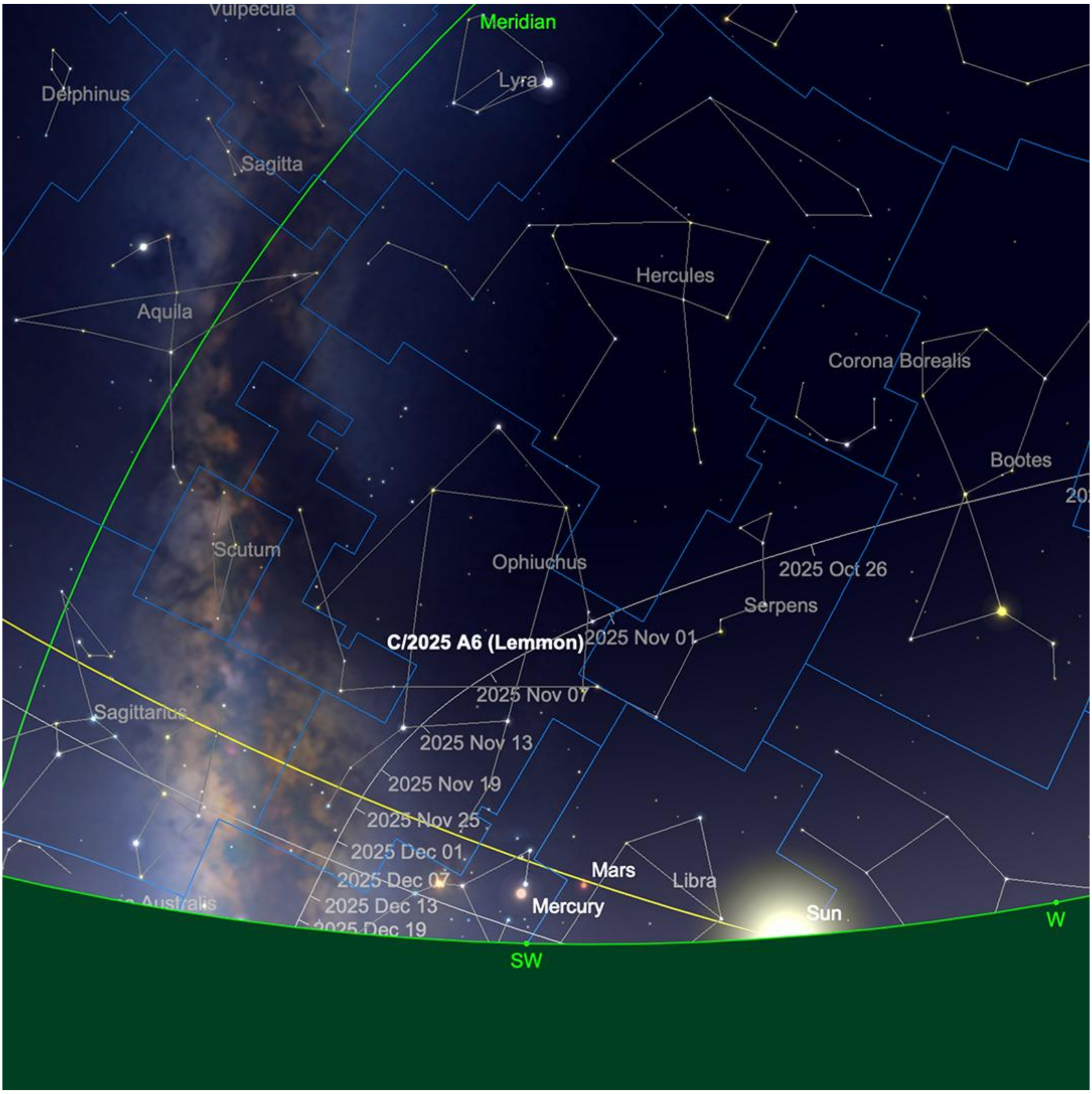
Neptune is a little past its own opposition, but still well situated, near to Saturn in Pisces. At +7.8 magnitude, the solar system's furthest flung true planet is always more challenging to observe than its neighbour. However, its current proximity to Saturn makes it simpler to find this elusive outer world. During the middle of November, Neptune will rise in the early afternoon and transit at a little after 8:30 pm (GMT).



Uranus and Neptune, November. Image created with SkySafari 6 for Mac OS X, ©2010-2024 Simulation Curriculum Corp., skysafariastronomy.com.

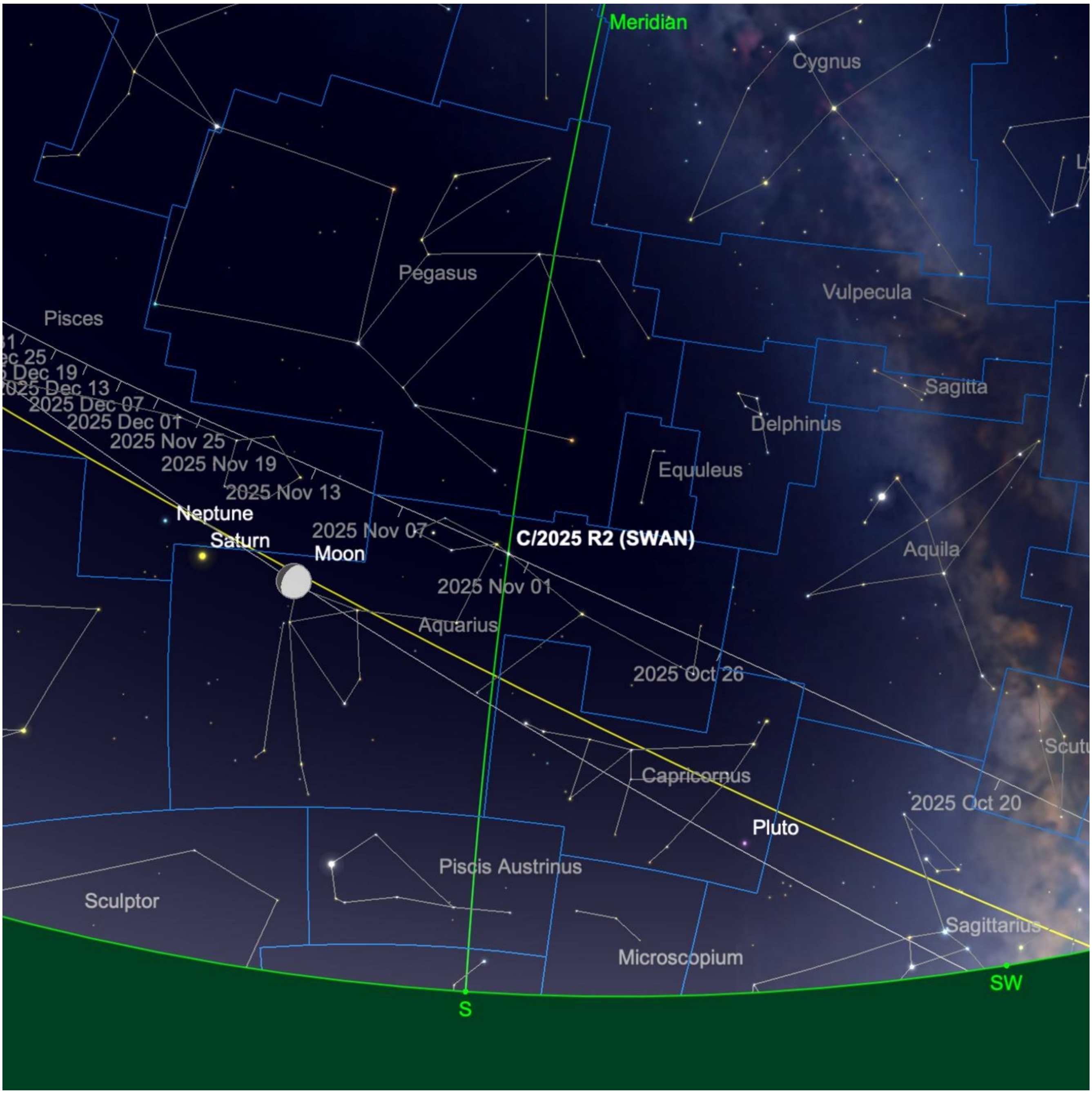
Comets

C/2025 A6 (Lemon) reached its closest point to eEarth on the 21st of October, at which point it was around 90,000,000 km (0.6 AU) from us. The comet peaked at around +4.5 magnitude, which is around the median of what was expected. During early November, Comet Lemon motors in a southerly direction through Ophiuchus. It is likely to fade a little during this period, but should still remain a binocular object. Past the middle of November, the comet's path will loop back towards the Sun and this, coupled with its southerly direction, will make it a challenge for Northern Hemisphere observers. Catch this one early while you still can.



Comet Lemmon Path November. Image created with SkySafari 6 for Mac OS X, ©2010-2024 Simulation Curriculum Corp., skysafariastronomy.com.

Better placed is the slightly fainter C/2025 R2 (Swan). This comet peaked at around 5.5-6th magnitude in late October, but should still be visible in early November as it glides through Aquarius into Pisces. The Gibbous Moon in reasonable proximity to the comet will spoil things somewhat in the early part of November. However, the comet will linger in this area of sky during the majority of the month and as we move into mid-November, when the Moon is New, there should still be Some opportunity to observe and photograph this comet under a truly dark sky.

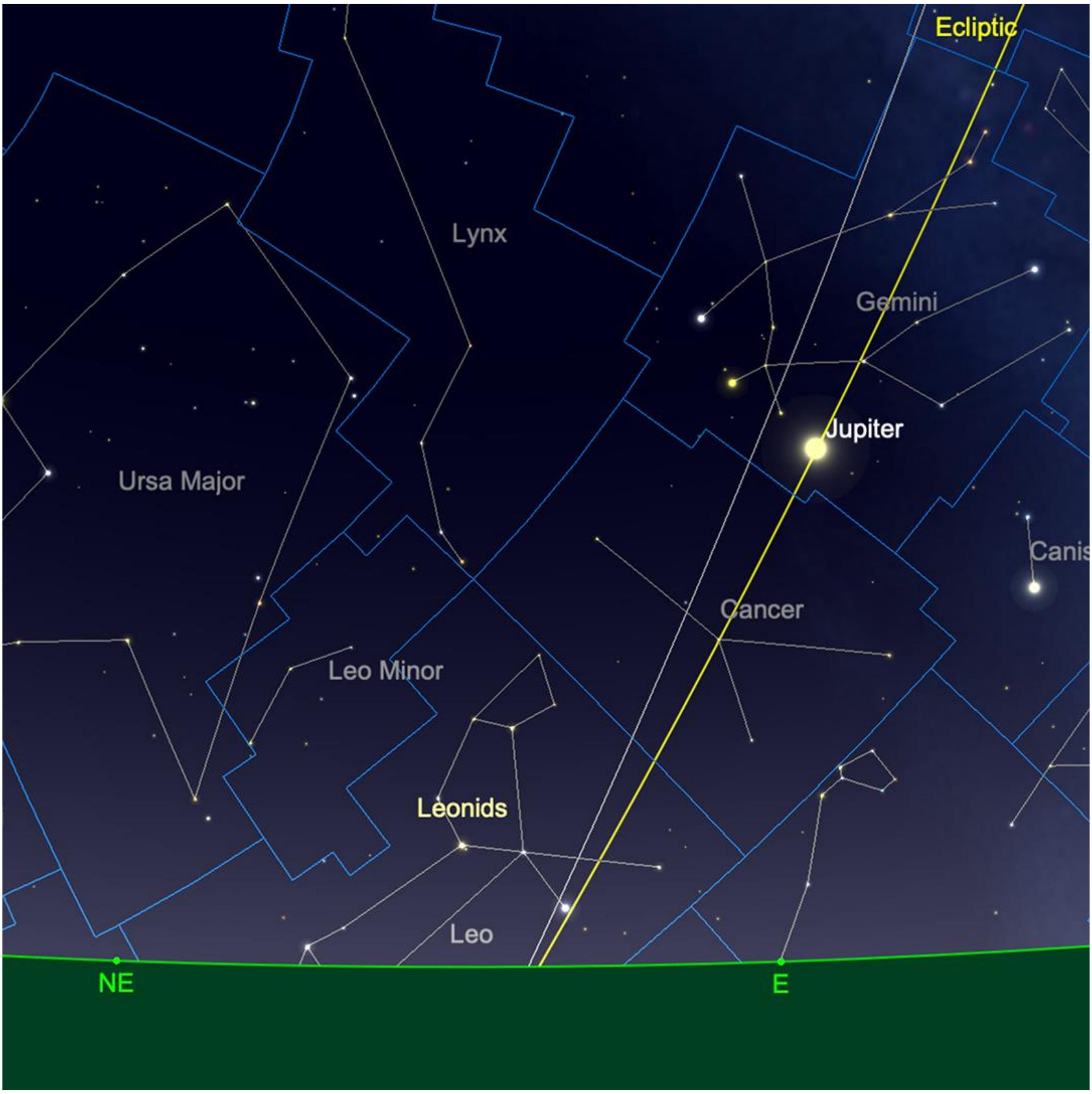


Comet Swan path during November. Image created with SkySafari 6 for Mac OS X, ©2010-2024 Simulation Curriculum Corp., skysafariastronomy.com.

Meteors

November brings us one of the most mercurial of meteor showers: the Leonids. This shower is ordinarily quite low in number - peaking at around 10-15 meteors an hour maximum from any given location. However, once its parent comet, 55P/Tempel-Tuttle returns to the inner solar system (which it does every 33 years), the chances of a really active shower becomes much more likely. We now know a little more about modelling the positioning and density of debris left over from Tempel-Tuttle, so can predict a little more accurately. Suffice to say, this year's Leonids won't be anything near storm levels, but with the Moon being a very Old Crescent for the peak evening - that of the 17th November -

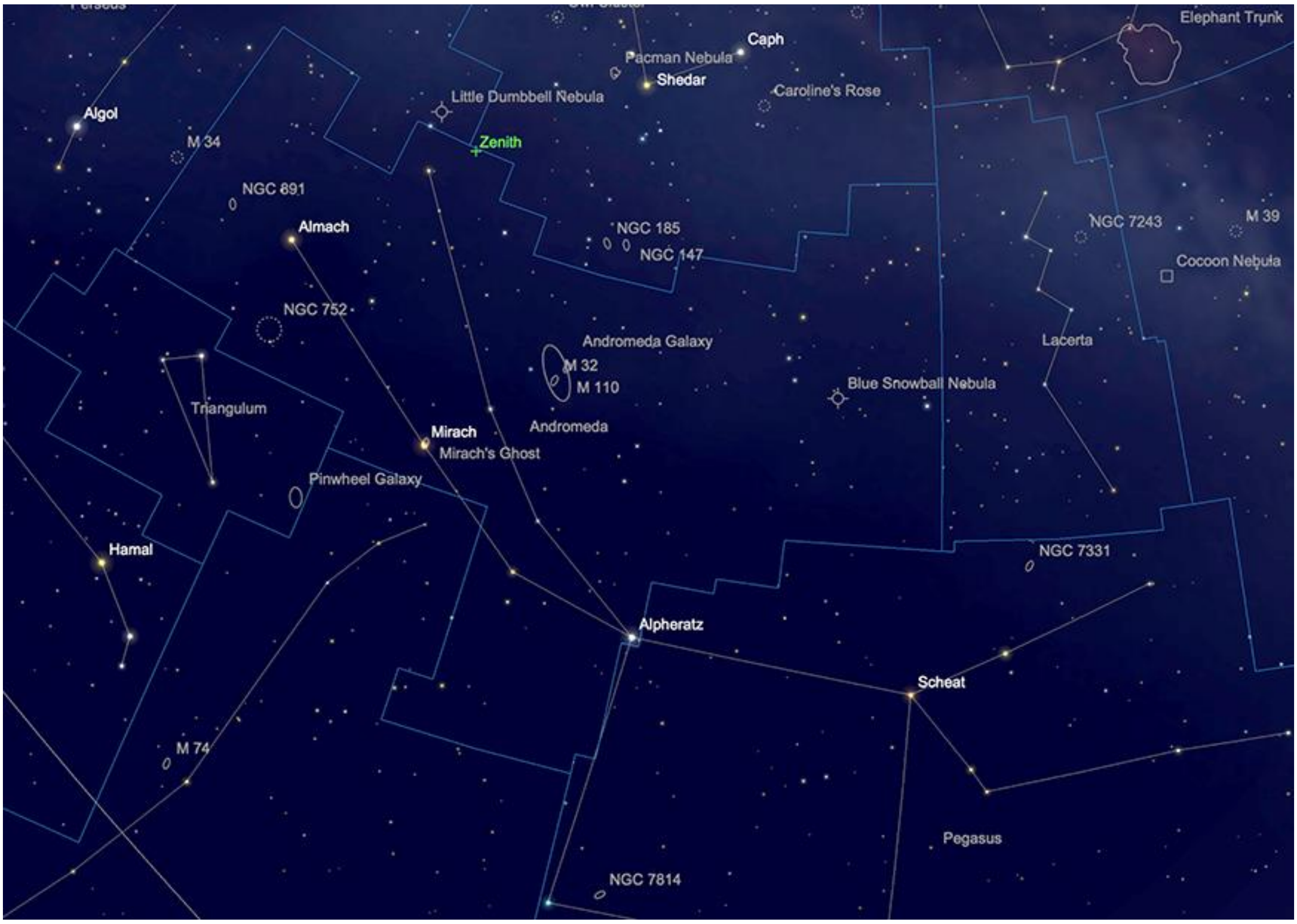
and out of the way for much of the night, there will at least be pretty ideal conditions for catching a few meteors. The next real peak of the Leonids won't occur until around 2033, though it is suggested by some orbital analysis that the Earth has the potential to intersect some older, denser material fields before then - leading to brief outbursts.



Leonid radiant rising , midnight, November 17th. Image created with SkySafari 6 for Mac OS X, ©2010-2024 Simulation Curriculum Corp., skysafariastronomy.com.

Deep Sky Delights in Andromeda

The constellation Andromeda is a prominent feature of the autumn sky in the Northern Hemisphere and is most famous for containing the Andromeda Galaxy (M31), the closest spiral galaxy to the Milky Way. Named after the mythical princess Andromeda, it is located in between the constellations of Pegasus, Perseus, and Cassiopeia, making it a part of the well-known "Perseus Group" of constellations. In Greek mythology, Andromeda was the daughter of Cepheus and Cassiopeia, the king and queen of Ethiopia. Cassiopeia’s vanity, claiming her daughter was more beautiful than the sea nymphs, angered Poseidon, who sent a sea monster, Cetus, to ravage their land. To appease Poseidon, Andromeda was chained to a rock as a sacrifice. However, the hero Perseus rescued her, slaying the sea monster and later marrying her. The constellation commemorates her tale, depicting Andromeda bound and waiting for her rescue.



The constellation of Andromeda. Image created with SkySafari 6 for Mac OS X, ©2010-2024 Simulation Curriculum Corp., skysafariastronomy.com.

First we turn our attention to the less well-known, but prominent and easily-found galaxy in the constellation: the wonderful NGC891. Discovered by Sir William Herschel in 1784, NGC891 is a spiral galaxy, potentially much like our own, presented absolutely edge-on to our perspective. At +9.89 mag, it is not especially bright, but it is well-condensed. Its axis is bisected by a dark dust lane, splitting the object in two. In telescopes of moderate aperture, NGC9891 appears like a shard - or rather two parallel shards of light, with a very small bulge of the galaxy’s core in the centre. It is a lovely object - maybe not having the glamour of its neighbour M31 (NGC891 is 30 million light years away from us), but a very rewarding galaxy to observe or photograph.

NGC891, by Mark Blundell. Image used with kind permission.

3-degrees to the west of NGC891 can be found Gamma Andromedae, or Almach - an easy pointer to the galaxy, but an equally interesting object in its own right. Almach is one of the sky's best double stars: a pair of orange-yellow and striking greeny-blue stars of +2.17 and +4.75 mag respectively. The principle element of the system is a K3 giant star, nearing the end of its life. However, the fainter secondary green-blue star is itself a double - albeit a very difficult one. It will take telescopes in the 30-inch + class to split this second double. However, in coming years, this secondary element will become steadily easier to split with smaller instruments as the elements drift apart around their mutual gravitational centre - although it will be the mid-2020s before they are resolvable with 8-inch class telescopes.

The main elements of Gamma Andromedae are gloriously split in most small telescopes. Even those with the smallest of telescopes should have a go at splitting this star.

Andromeda is, of course, home to the most prominent galaxy in the sky - M31 and its attendant satellite galaxies M32 and M110. As a major member of our Local Group of Galaxies, the M31 system is the largest gravitational influence on our own Milky Way and in under 4 Billion years it is likely the two Spirals will collide and eventually form a large Spheroid elliptical Galaxy. Approaching the Milky Way at around 300km per second, M31 is already a huge angular size - the boundaries of which stretch over 6 times the width of the Full Moon in the sky. At +3.4 mag, M31 was probably one of the first Deep Sky objects - certainly the first galaxy - to be noticed by humanity. First recorded by the great Persian Astronomer Abdul al-Rahman al-Su in his 962CE text "Book of Fixed Stars", al-Rahman described M31 as the "Little Cloud" - and while his is the first record of the object, it was doubtlessly noticed sooner, being the most prominent deep sky object alongside the Pleiades and Hyades in Taurus and M42 in Orion. Simon Marius first turned a telescope to M31 in 1612, though made no claim to its discovery - he may have been aware of it from earlier star charts - a Dutch example dating from 1500 shows the object. Throughout the 17th and 18th Centuries, the Galaxy was "re-discovered" independently by astronomers. While there was clearly communication between astronomers of the era regarding M31, many, including Edmund Halley, erroneously credited the discovery of the object to different people. Charles Messier credited its discovery to Marius, when forming his famous Messier list in 1764. Theories abounded as to the true nature of M31: a nascent Solar System forming, a cloud of glowing gas forming stars, a dying, decomposing star. Spectroscopy hinted at the true nature of M31. William Huggins, the early adopter of telescopic spectroscopy found that unlike many other nebulae, M31 exhibits a broad, continuous spectral response, rather than the definitive lined spectra of a gaseous nebula. Something that clearly set M31 apart from the likes of M42. In 1887, the first of many, many photographs of the galaxy was taken by Isaac Roberts from Crowborough in Sussex (just a short journey from the locations of Bresser UK/Telescope House offices in Edenbridge). Robert's beautiful picture clearly shows dust lanes in the outer spiral arms and the satellite galaxies of M32 and M110, much as Mark Blundell's more modern portrait does below.

Roberts subscribed to the theory that M31 was a Solar System in the early stages of formation. However, this theory was put to bed by mounting evidence of Novae observed and photographed within the reaches of M31. Heber Curtis discovered his first Nova in M31 in 1917 and went on to find a further 11. These were observed to be a mean of 10 magnitudes fainter than those observed within our own galaxy, leading to Curtis to suspect that M31 was considerably further away than first thought. Curtis was amongst those Astronomers that put forward the theory that objects of this type were "Island Universes". This was famously debated in a meeting between Curtis and Harlow Shapely in 1920 - Curtis was for, Shapely against.

The matter was settled in 1925 by Edwin Hubble, who discovered the first Cepheid Variable in M31. Comparisons with these variables and the Cepheids in our Galaxy proved that M31 was a separate conglomeration of stars, distinct from the Milky Way. Although underestimating the distance of M31 by a factor of two, Hubble proved that the Universe was a much larger and more mysterious place.

Walter Baade, using the 200-inch Palomar Reflector discovered two separate types of Cepheids Variables in the population of M31, which had the effect of doubling Hubble's pervious distance estimate in 1943. Current distance estimates are around the 2.5 million light years mark. M31 was also discovered to be heavily blueshifted in its spectral lines, proving via the Doppler effect that unlike the vast majority of galaxies in the sky, it is actually advancing towards us (or more accurately, both galaxies are attracting one another).

M31 can be observed with (or without) all manner of optical equipment. It is probably best seen in large Binoculars (70mm objective size +) from a reasonably dark location. Rich field, short focal ratio telescopes like Dobsonians, and shorter Refractors show it well too, but due to its large angular size, powers must be kept low to see the Andromeda Galaxy in all its glory. Both satellite galaxies, M32 and M110 are easy to spot too (M32 the easier of the two). In larger instruments, with suitable filtration, it is possible to observe nebulous regions in M31 - similar features to the Orion Nebula in the Milky Way. This is a challenge, but a rewarding one! We'll never see the true beauty of our own galaxy from the outside, so must content ourselves with the marvellous vista that M31 offers us. Some of M31's globular clusters, including the remarkably large G1 are also visible though instruments of 10-inch aperture and above.

However, it is in long duration photography that M31 really reveals its true extent and size. A 30 second unguided exposure with a wide field lens will easily show M31, though a small, high-quality refractor on an equatorial mount will be ideal in terms of framing the whole object on a standard DSLR chip. Multiple exposures, when stacked in a free program such as Deep Sky Stacker, will reveal the huge dust lanes and knotted, hydrogen rich areas of nebulosity. M31 is a prime beginner's Deep Sky photographic target, but it is such a rewarding photographic object that Astrophotographers feel compelled to return to it time and time again. That it is well-placed for those of us in the northern hemisphere during the winter months is indeed fortuitous. All though observable through much of the year, now is the time to take full advantage of this fabulous Deep Sky wonder.

M31, by Mark Blundell. Taken with an Explore Scientific 102 ED Apo, with matching 0.7x Focal reducer/corrector. Image used with kind permission.

To the western side of Andromeda, 2.5-degrees to the W of Iota Andromedae is the lovely NGC7662 - otherwise known as the Blue Snowball Nebula. This Planetary Nebula is a great object - albeit compact, at 0.5 minutes of arc - and is well seen in telescopes of most apertures. A 6-8-inch class telescope will show it clearly as a blue-green ball of light. However in larger telescopes, the subtleties of NGC7662 really become noticeable - its internal rings and slight elongated internal lobes can be distinct. The Blue Snowball can exhibit “blinking” just like the famous Blinking Planetary and Saturn Nebula. The Blue Snowball’s central white dwarf star shows distinct variability - peaking at +12 mag, but sometimes dimming down to below +16 mag. Current distance estimates put it at 5,600 light years distance from us and 0.8 light years in diameter.

The Blue Snowball - Hubble Space Telescope Image. Public domain.

Drifting back east, beyond M31 and its companions, we come to two unusual objects. Mirach and Mirach's Ghost are formed by Beta Andromedae and a condensed elliptical galaxy, NGC404. Line of sight from our perspective on Earth place these two completely unrelated objects in a very close pairing - they are separated by just under 7 arc minutes, making this galaxy easy to locate, but not necessarily so easy to see! Mirach has a tendency to overpower its neighbour, due their differences in brightness. In clear, calm conditions NGC404 can be spotted in large binoculars, though telescopic observation can be a little trickier. Higher magnification can help under some conditions, though aperture will help as well. Photography of NGC404 is a challenge as well, but a worthwhile one. Mirach and Mirach's Ghost are one of those interesting "Odd Couples" of the night sky, that perspective and chance throws our way. It would be a pity to let the perceived difficulty of observation stand in the way of taking a look.

Another of Andromeda's obscurer residents is the open cluster NGC752. Consisting of over 70 stars of around the 9th magnitude, NGC752's cumulative magnitude stands at +5.7. Best seen in giant binoculars, this cluster has some particularly elderly residents for a star cluster: its A2-class stars indicate an age of over a billion years. The cluster is full of star chains and occupies an area of over 75 minutes of arc in the sky. It lies over 1500 light years from Earth.