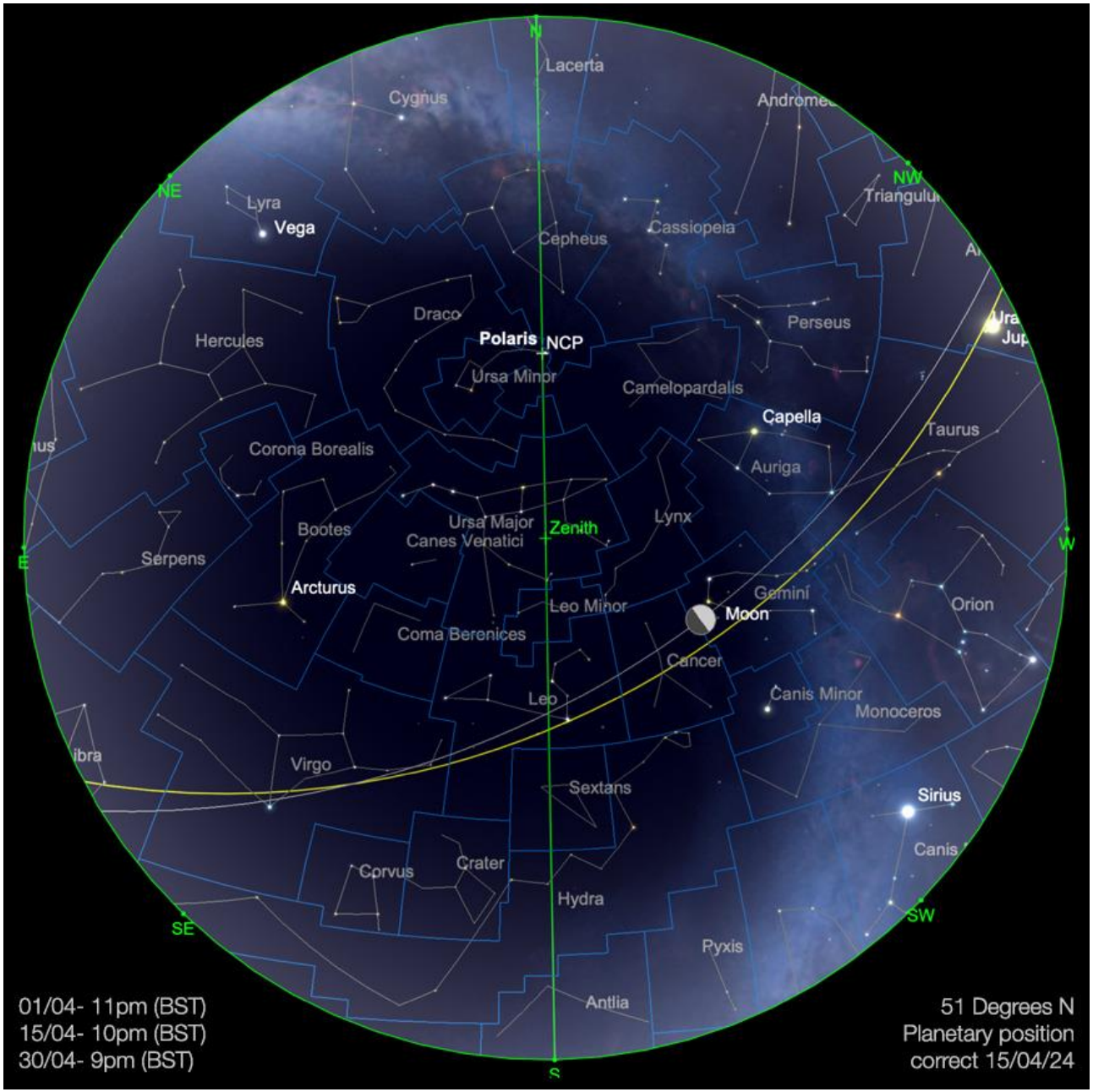

Telescope House April Sky Guide
The most up-to-date guide to Planetary and Lunar activity,
Comet News, plus Deep Sky Delights...


N
Lacerta
Cygnus
NE
Lyra
Vega
Cepheus
Cassiopeia
NW
Draco
Polaris
NCP
Perseus
Hercules
Ursa Minor
Camelopardalis
Capella
Taurus
Corona Borealis
Auriga
Bootes
Ursa Major
Canes Venati
Zenith
Lynx
Serpens
Arcturus
Leo Minor
Gemini
Moon
Orion
Coma Berenices
Cancer
Leo
Canis Minor
Monoceros
Virgo
Sextans
Sirius
Canis
Corvus
Crater
Hydra
SE
SW
Pyxis
Antlia
S
01/04- 11pm (BST)
15/04- 10pm (BST)
30/04- 9pm (BST)
51 Degrees N
Planetary position
correct 15/04/24

April 2024 Sky Guide. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

April is here and we in the northern hemisphere are now beyond the Vernal Equinox, meaning the Sun is now a resident of the northern celestial hemisphere. With this comes extra hours of daylight and decreasing hours of darkness. In this sense, April brings a mix of blessings and challenges. While it heralds the arrival of more favourable weather, particularly in milder regions, those of us residing in higher northern latitudes must confront the diminishing hours of darkness, particularly towards the month's end. Despite the common notion of "April Showers," statistical evidence, especially in Europe, suggests this may be more of a myth. In fact, April tends to be relatively dry compared to the preceding months. Nonetheless, as we eagerly anticipate improved weather conditions - no matter where you find yourself, there's plenty to see in the skies above us this month.

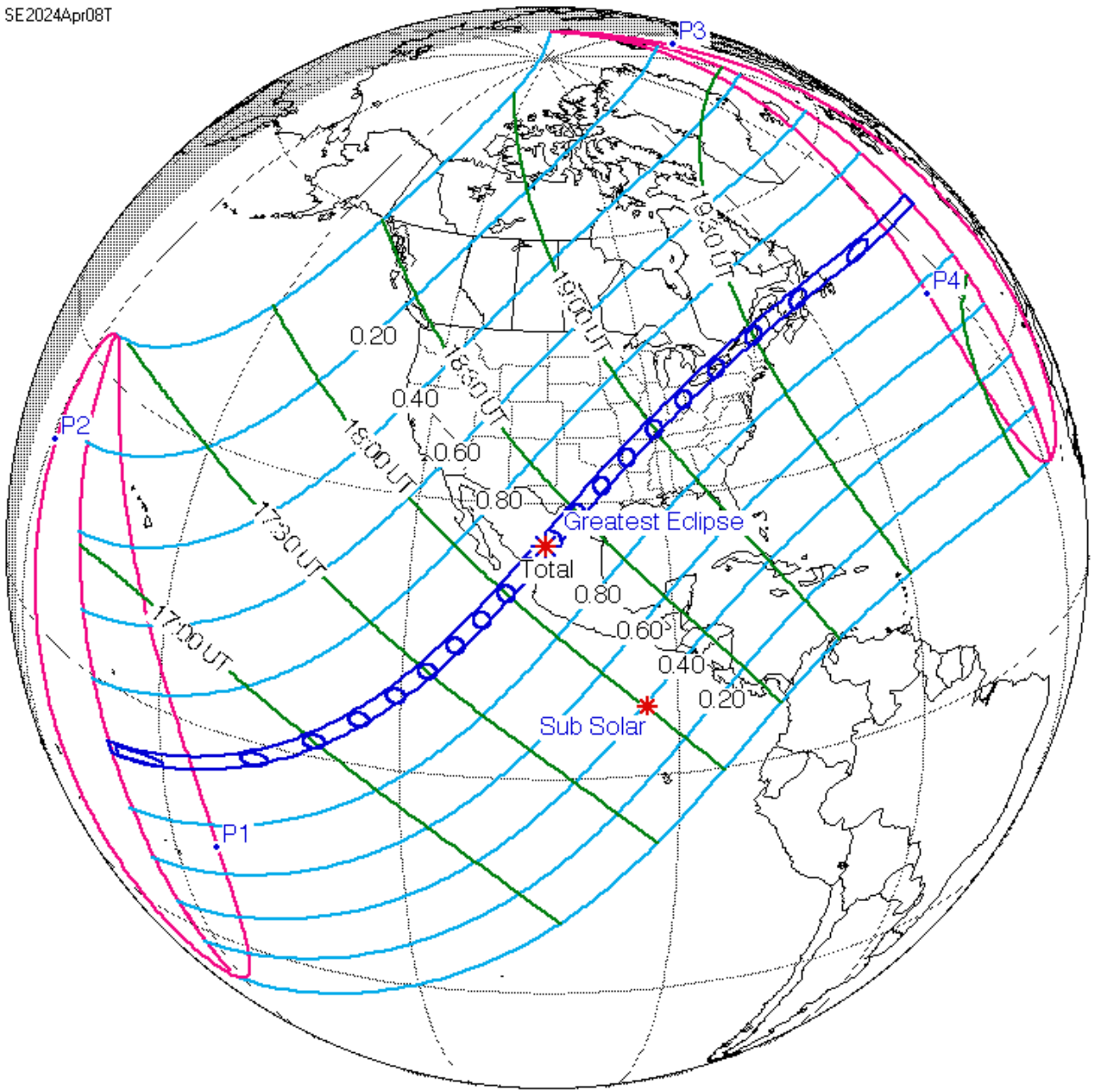
The Solar System

The Sun

The Sun's activity is still increasing, with a number of very recent outbursts, resulting in Aurora being visible from lower than usual latitudes. The every large AR3615 sunspot group appears to have been the source of the most recent - at time of writing - and threatens yet more activity. Quite when Solar Maximum will occur is still difficult to pin down. We will definitely know when it is past, but predicting the true peak is trickier. Websites such as www.spaceweather.com and Michel Deconinck's monthly newsletter: https://astro.aquarellia.com/doc/Aquarellia-Observatory-forecasts.pdf cover many aspects of solar observations and are well worth checking out.

The Sun comes dramatically into focus this month with April 8th's total solar eclipse, which will be visible across a wide track of the United States of America and Mexico and eastern Canada. The eclipse will be seen outside the track of totality across a very wide area, stretching from Hawaii out into the middle of the Pacific to the West Coast of Ireland. The track of the eclipse will also skirt the very top of South America, right the way up to Alaska, though at the border of its visibility in these areas, will be extremely partial. Iceland, Scotland, Ireland, and the extreme north of Spain and Portugal Macy, the very partial phases of the eclipse at Sunset. Wherever you plan to watch this event from, as ever, we urge caution and sensible use of solar filters, solar telescopes and eclipse classes, unless the eclipse is completely

total and fully eclipsed from your observing site. We wish everyone travelling to see the full track of the eclipse, the very best of fortune with the weather.


SE2024Apr08T
P1
P2
P3
P4
Greatest Eclipse
Total
Sub Solar
0.20
0.40
0.60
0.80
0.80
0.60
0.40
0.20
15:00 UT
16:30 UT
18:00 UT
19:30 UT
17:30 UT
17:00 UT

Solar Eclipse track 8th April. Image credit: NASA, Public Domain.

The Moon

The Moon will begin April at a 60% illuminated waning gibbous phase. A resident of Sagittarius. The Moon will not rise until sometime past 3 am on the 1st, and will transit at a little before sunrise at just after 6:30 am. Being so low in the sky, in the most southern part of the ecliptic, means that lunar observations will be understandably truncated somewhat by less than ideal elevation, during this period. The Moon will reach last quarter phase on 3rd April and will spend the next week approaching the Sun and rapidly decreasing its phase as it does.

On the morning of 6th April, the Moon will draw alongside Saturn and Mars in Aquarius where its thin crescent will pass to the south of both planets as the Sun rises. The following morning, the Moon will come into close proximity with the brighter Venus making this the easier of the two conjunctions to witness.

New Moon will occur on April 8th, which, as previously mentioned, will coincide with a total solar eclipse visible from Mexico and a wide track of the continental United States and on into eastern Canada.

After the excitement of the eclipse is over, the Moon will become an evening object. Rising up at quite steep angle, our natural satellite will pass through Pisces, Aries (where it will meet Jupiter on the evening of April 10th) and on into Taurus and Gemini, where it will reach first quarter phase on April 15th. This month's evening apparition of the Moon is one of the aforementioned "High Spring Crescents" (for observers in higher northern latitudes), and represents a fantastic opportunity to view the Eastern limb of the Moon at high surface relief. Those with telescopes are thoroughly encouraged to make the most of lunar observation at this time.

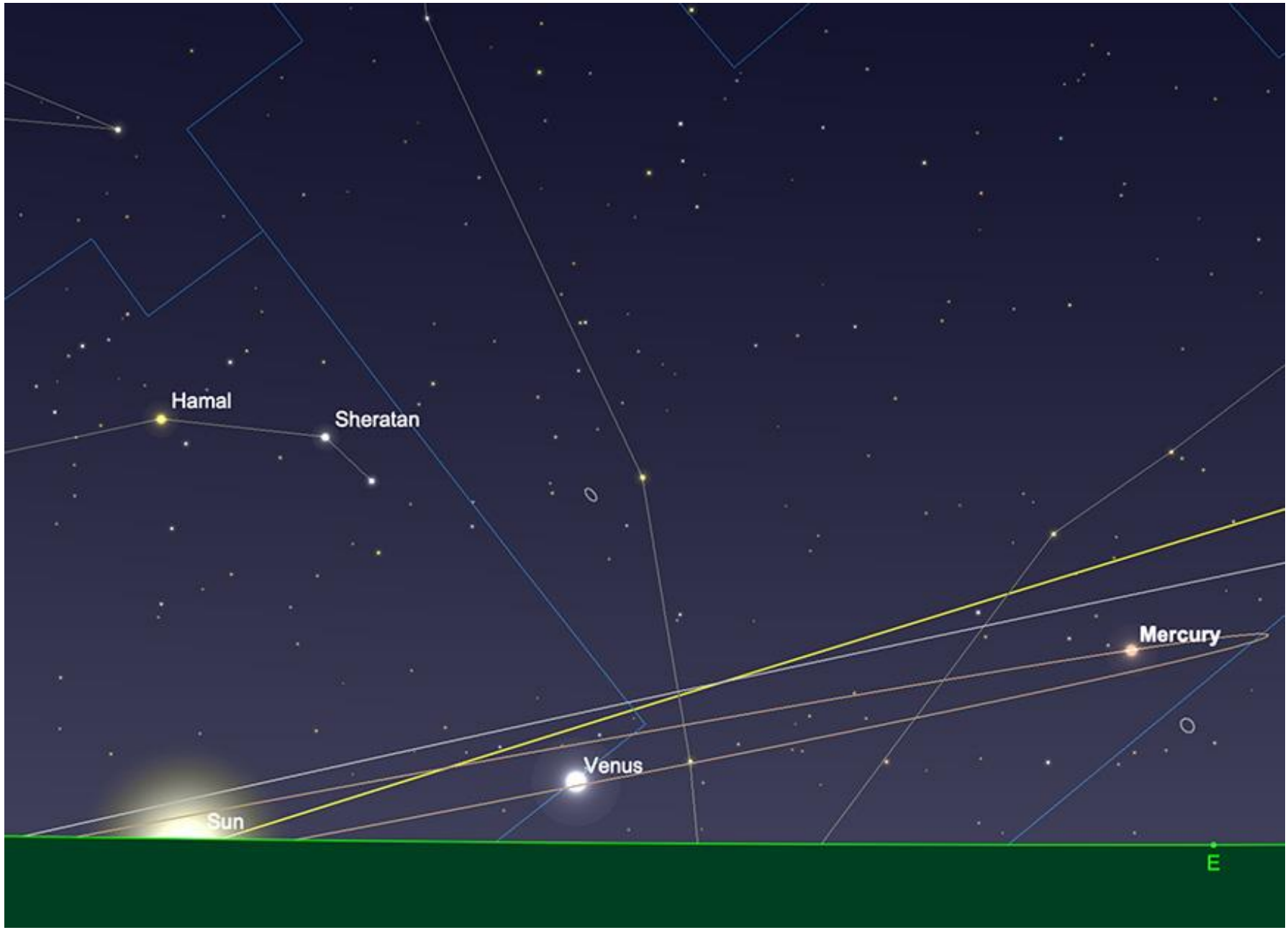
Post first quarter, the Moon continues its journey down through Cancer and on into Leo and then into Virgo where it becomes full on April 23rd. As usual, we point out that this part of the month will not be the most agreeable for deep sky observation or imaging.

After reaching full, the Moon will cross over the border from Virgo into Libra, and then on into Scorpius and Ophiuchus, before returning to Sagittarius on the 30th, where we first picked it up at the beginning of the month. By this point, the Moon will be around 66% illuminated waning gibbous phase.

Mercury

We begin April with Mercury as an evening object, in a favourable separation from the Sun, at around 15°, but rather faint at +1.7 magnitude. The reason for this is that the planet is drawing around the Sun towards us and is rapidly decreasing its phase as it does. At the beginning of April, Mercury will show a crescent phase eliminated by just under 15%. As the first week of April continues, mercury gets fainter and fainter, making it extremely difficult to pick out in the glare of the evening sky. The evening of the 7th finds Mercury at just 2.8% illumination and a visual magnitude of +3.9. By this point, readers will get no prizes for guessing, the planet will be completely unobservable.

Mercury reaches inferior conjunction, in-between the Sun and the Earth as viewed from our perspective, on April 12th. Beyond this point, it will become a morning target. However, the ecliptic plane, which Mercury runs along, rises at a very shallow angle from the horizon in the mornings at this time of year (from the northern hemisphere). As such, although Mercury will rapidly move away from the Sun, it will still remain a challenging target, even at the end of April. On the morning of the 30th, Mercury will stand around 4 1/4° high in the east (as viewed from 51° north), as the Sun rises. This, coupled with a magnitude of around +1.2 will make it a tricky target to find, unless atmospheric conditions are extremely kind.


Hamal
Sheratan
Mercury
Venus
Sun
E

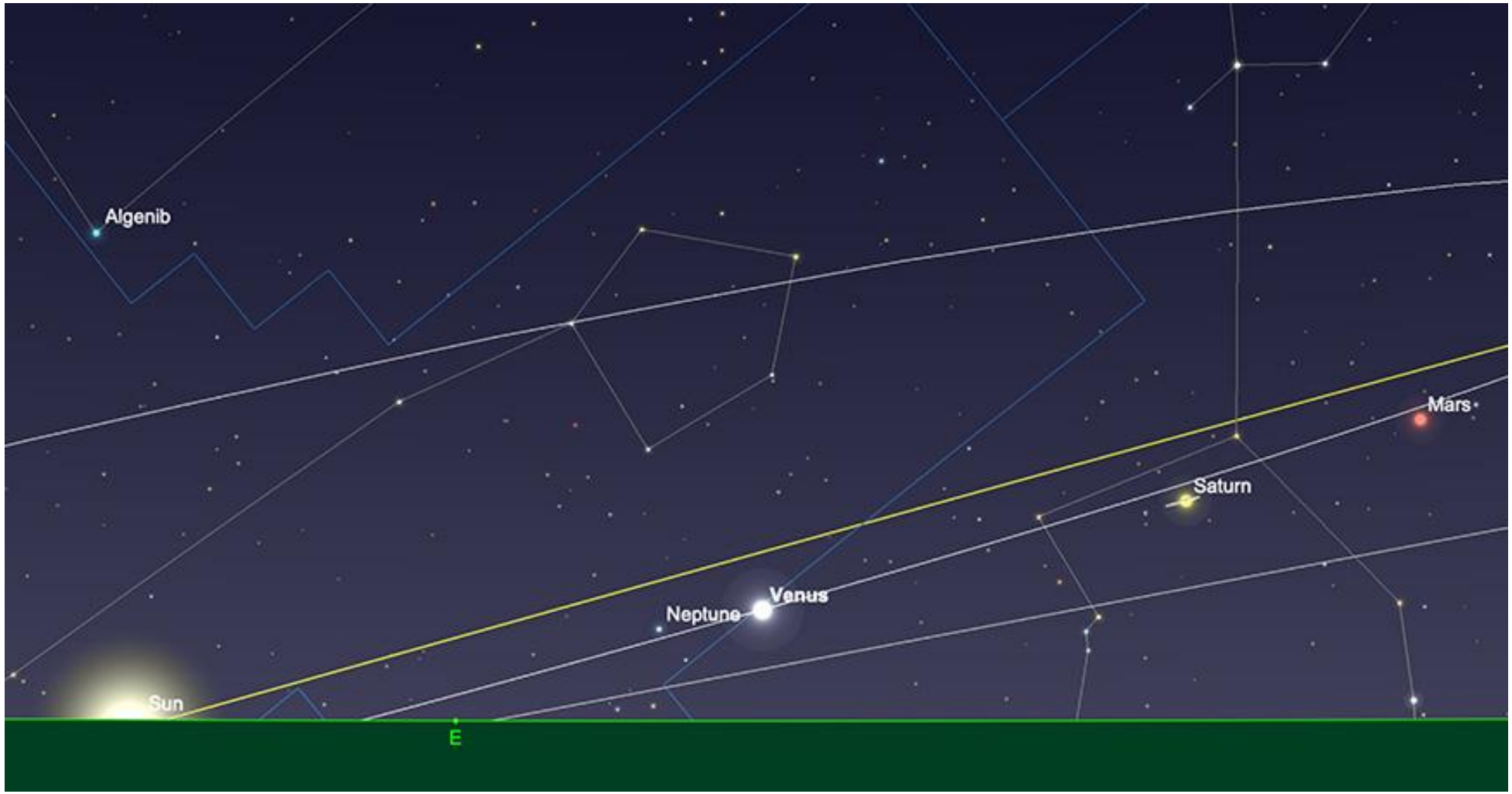
Mercury, sunrise, 30th April. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Venus

The planet Venus displays an impressive visual magnitude of -3.9 at April's beginning. A resident of the Pisces Aquarius borders, the planet sits around 17° from the Sun at the beginning. However, as previously mentioned, in regards to Mercury, Venus is sitting in a very low-lying part of the ecliptic as viewed in the morning sky. As such, the planet will only attain an altitude of around 2 1/2° high as the Sun rises (as observed from 51° north). It is perfectly possible to see Venus during daylight hours, the fact the planet is sitting so low to the horizon at sunrise does not count in its observing favour.

Venus is still headed sunward - and by the time we reach the middle of April, has decreased its separation from the Sun to just over 13°. This has done Venus no favours whatsoever and the plan is considerably more challenging to observe, attaining a height of under 2° elevation as the sunrises on the morning of the 15th.

Fast forwarding to the end of April, Venus has decreased its separation from the Sun to around 9 1/2° and will now sit a little over one 1/4° high above the horizon (as observed from 51° north), as the Sun rises. Remarkably, Venus is still some weeks from superior conjunction, which will reach in early June. Those in the equatorial regions of the Earth will fair distinctly better as far as observing Venus is concerned, but those of us in mid northern latitudes will be advised to look elsewhere for observing highlights.

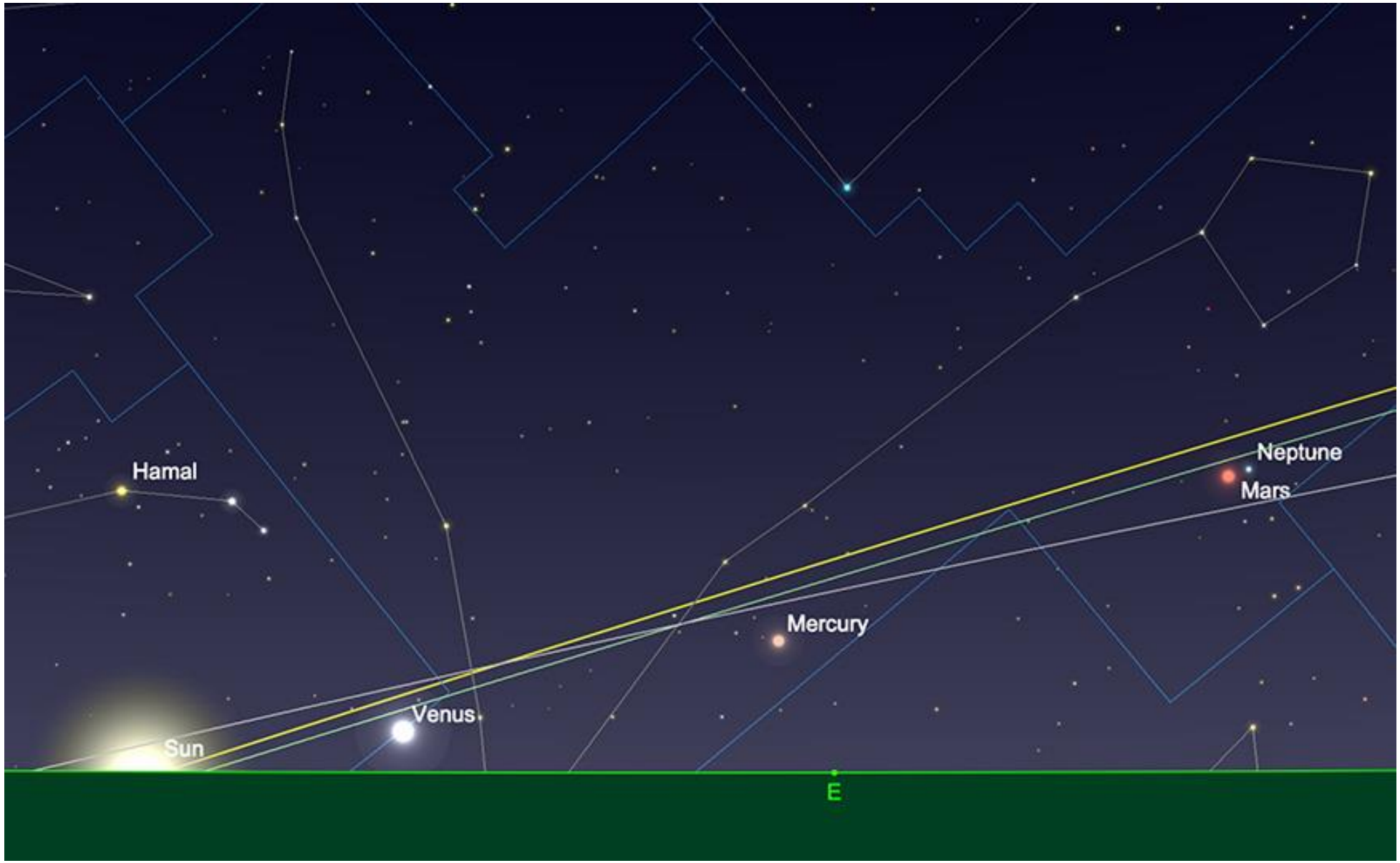


Venus at sunrise, 1st April. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Mars

The Red Planet starts April as a resident of Aquarius and most definitely a morning target. The planet, at the month's beginning, is separated from the Sun by just under 35° and will attain an elevation above the horizon of about 7 and 1/4 degrees (as observed from 51° north), as the Sun rises on the 1st. At a visual magnitude of +1.2, Mars will still be a tricky target to pick out in the dawn sky at this point.

The trend as far as Mars is concerned, is upwards, albeit slowly. By the end of April, Mars will be sitting in Pisces at a visual magnitude of +1.1, and an elevation of just under 10 degrees (as observed from 51° north). By this point, Mars will have separated itself from the Sun by just under 41°. It will still be a relatively tricky target to pick out in the glare of the morning sky, and is still somewhere off its best, which it will reach at the end of this year and beginning of the next.


Hamal
Neptune
Mars
Mercury
Venus
Sun
E

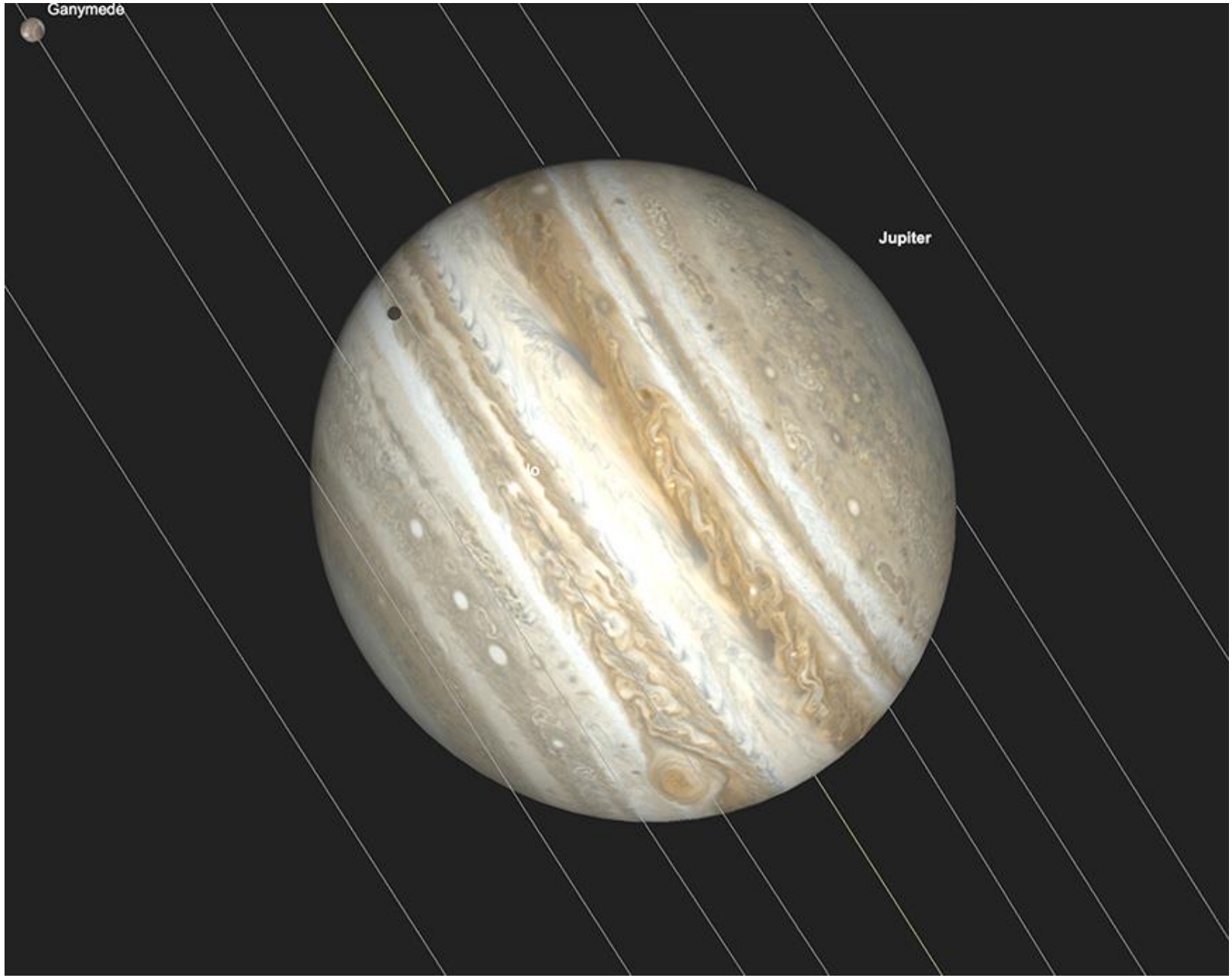
Mars at sunrise, 30th April. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Jupiter

The King of the Planets is still in a reasonably favourable position for observation in the early evening in early April. The evening of the 1st sees Jupiter standing around 29° high in the sky (as observed from 51° north) and shining at a steadily brilliant visual magnitude of -2.1. The planet at this time presents a disc of around 34 arc seconds diameter and will set at around 3 1/4 hours after the Sun.

However, as alluded to in last month's sky guide, the window for meaningful observation of Jupiter for this season is rapidly closing. The planet is headed sunward - and by mid-April will stand at around 19 1/2° above the horizon at sunset. By the time we get to the end of the month, this is decreased yet further to just under 9 1/2°. As such, it is obvious that those interested in observing Jupiter really must skew observations to the early part of the month to make the most of the opportunity this gives us. Jupiter will reach superior conjunction in mid-May, and will then emerge as a morning target.

There were a few mutual transit events as far as Jupiter is concerned that are worth observing during April. The evening of the 1st, sees a mutual Great Red Spot and Io/Io shadow transit, which begins at round 8:40 pm (BST). There is a nice Io and Io shadow transit, which occurs as a little before 8 pm on April 17th. There's also a favourable Ganymede and GRS transit, which occurs just before sunset on April 30th.

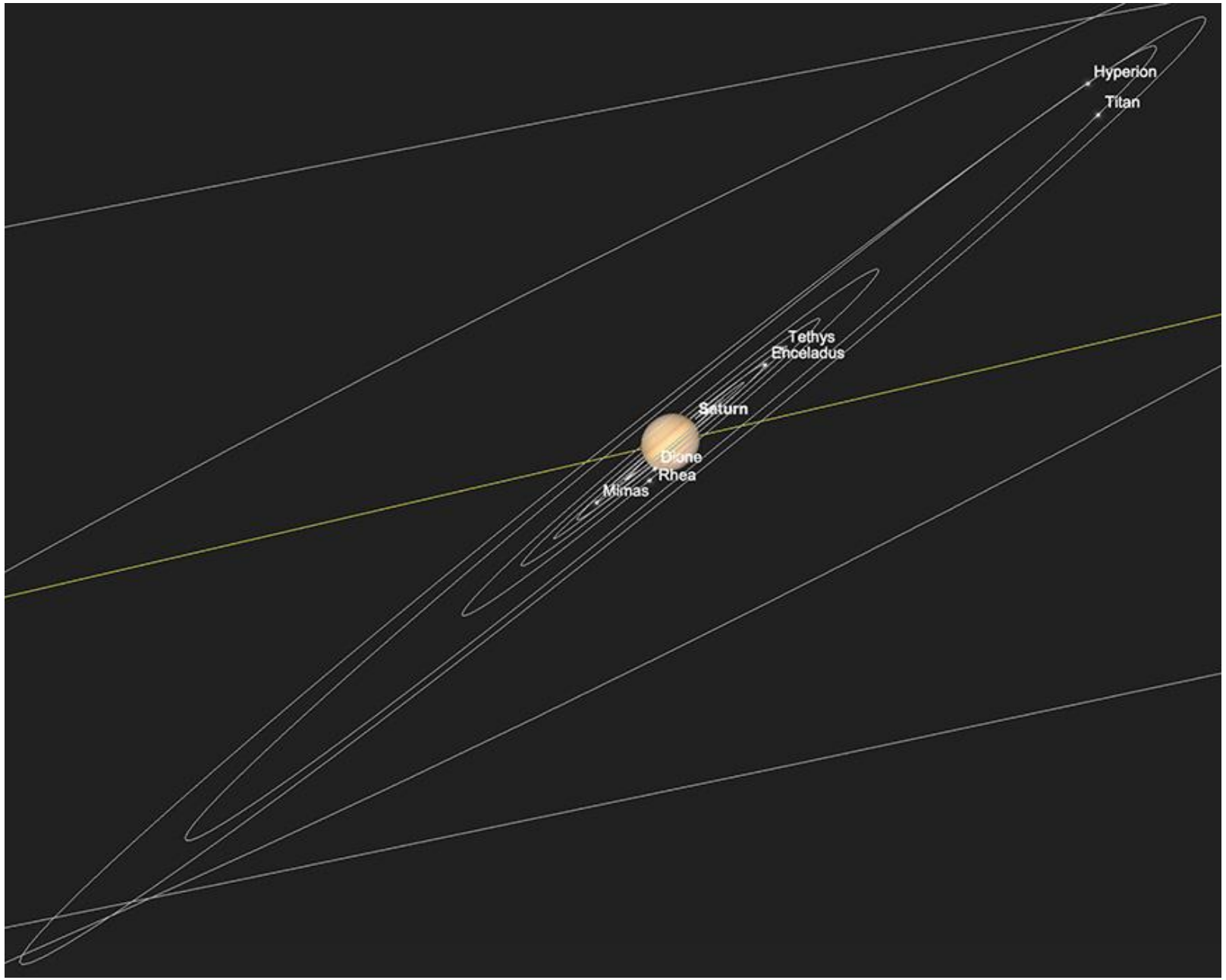

Ganymede
Jupiter
Io

Jupiter and GRS, Io and Io Shadow transit, 9.30pm, 1st April. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Saturn

Saturn, like Mars and Venus is a morning target at the beginning of April, and just like it neighbours is sitting in a very shallow rising part of the ecliptic at present. At +1.1 magnitude and apparent size of 15.7 seconds diameter on the morning of the first, Saturn will be difficult to pick up without optical assistance in the glare of the morning sky. The planet will stand at an altitude of around 5° elevation as the sunrise is on the 1st, which will make it doubly challenging to observe. The brighter Venus, sitting around 11 1/2° to the west, will serve as a useful marker for finding the Ringed Planet. However, as previously mentioned, the elevation of all the planets in the morning sky at present, is pretty pitiful from higher northern latitudes and precludes meaningful telescopic observation at any significant magnification.

By the time we reach the end of the month, Saturn has faded a little to +1.2 magnitude, but has increased its angular size to just over 16 seconds. The reason for this decrease in magnitude, while the planet has increased its angular size, is largely down to the separation of its rings, which are closing at present and thus decreasing the planet's overall brightness. While we challenge most, if not all, observers to tell the difference between 0.1 of a magnitude's difference in relatively bright object, it is certainly interesting to consider the part that Saturn's rings play in its overall brightness. The narrower Saturn rings get from our perspective here on Earth, the less light that they reflect back to us. The mean difference in brightness of Saturn when its rings are wide open, to when they are completely closed is around half a magnitude. We will cross Saturn's ring plane from our perspective on earth on 23rd March 2025.


Hyperion
Titan
Tethys
Enceladus
Saturn
Dione
Rhea
Mimas

Saturn and inner moons, sunrise, 30th April. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

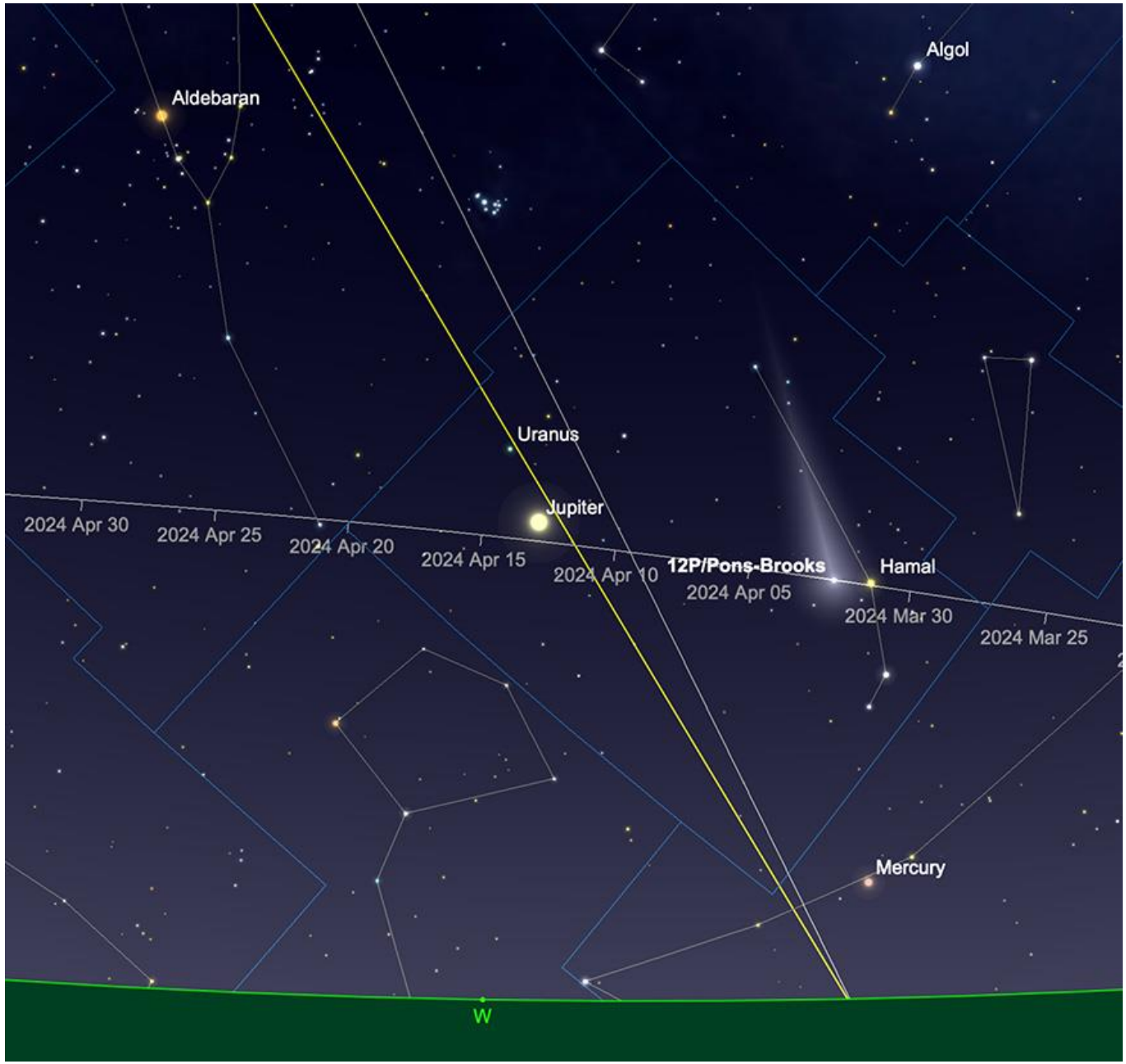
Uranus and Neptune

Of the two outer gas giants, Uranus is by far and away the best observing target during April. Uranus' proximity to Jupiter during April, makes it relatively easy to find in the constellation of Aries in the evenings. Towards the end of the month, on the evenings of the 20th and 21st, Uranus and Jupiter can be found around half a degree from each other in the sky. This means the both planets will fit into a low-power telescopic view, making ready identification of Uranus even easier.

Neptune, on the other hand, is located between Venus and the Sun in early April, but will be impossible to find in the glare of the dawn. The latter part of the month sees Neptune and Mars exceptionally closely placed to each other. On the morning of the 30th, the two will be found just over three arc minutes from each other in the sky. Unfortunately, while it may be possible to locate Mars in exceptional circumstances, it will be impossible to view Neptune with the sky being so light and both planets being so low in the sky.

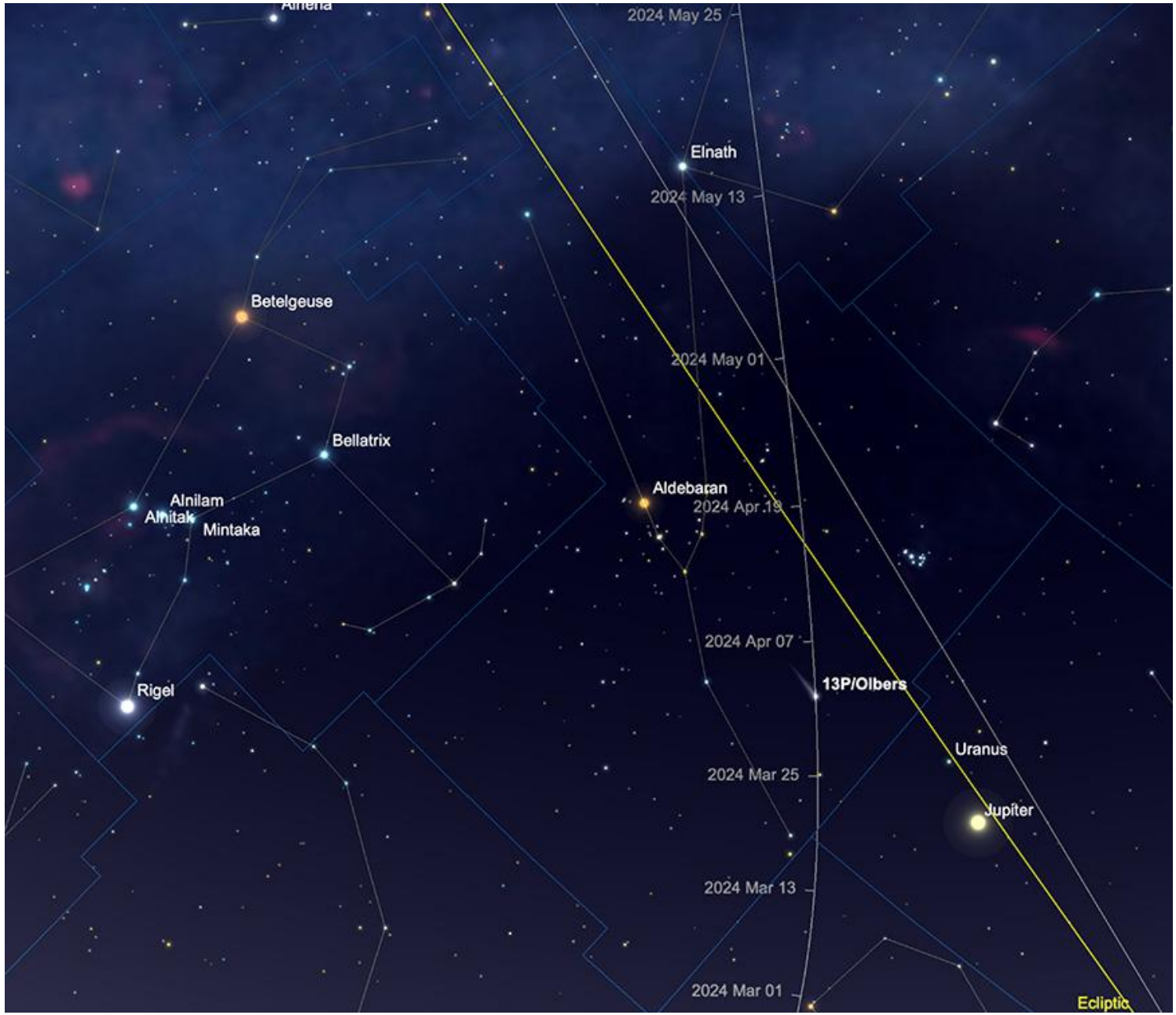
Comets

12P/Pons-Brooks is the only comet of reasonable brightness easily observable during the first part of April. It should start the month around 5th magnitude and will be observable in the evening sky. The comet is a resident of Aries in early to mid-month and will set at a little before 11 pm and rises at just after 6.30 am the following morning on the 1st/2nd April. As the month begins the comet into be found close to Alpha Arietis, Hamal - the principal star in Aries. 12/P will drift towards Jupiter towards the end of the first week of the month, making its location easier to find. Although 5th magnitude is technically naked eye, the comet's brightness will be spread out over a wide area, so will definitely need binoculars and/or a telescope to observe it. As the month progresses, the comet brightens, but sinks further towards the Sun, making it increasingly difficult to observe. The Moon will also start to potentially affect observing beyond the 10th. As long as the weather improves, there is a good chance of observing the comet at close to its best.


Algol
Aldebaran
Uranus
Jupiter
2024 Apr 30
2024 Apr 25
2024 Apr 20
2024 Apr 15
2024 Apr 10
12P/Pons-Brooks
2024 Apr 05
Hamal
2024 Mar 30
2024 Mar 25
Mercury
W

Comet 12P/Pons-Brooks, path through April. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

13P/Olbers will be making its way through Taurus during April. This will be considerably less prominent than 12P at around 10th magnitude (though some estimations of brightness at time of writing are already higher than this). The comet should be relatively straightforward to find in larger binoculars and small telescopes. 13P will continue to brighten after the end of the month and should reach 7th magnitude - possibly brighter - in May, June and July.


Alhena
2024 May 25
Elnath
2024 May 13
Betelgeuse
2024 May 01
Bellatrix
Alnilam
Alnitak
Mintaka
Aldebaran
2024 Apr 19
2024 Apr 07
13P/Olbers
Rigel
Uranus
2024 Mar 25
Jupiter
2024 Mar 13
2024 Mar 01
Ecliptic

13P/Olbers path during April. Image created with SkySafari 6 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

C/2023 A3 (Tsuchinshan-ATLAS) is still showing very reasonable progress. The comet is 12th magnitude at time of writing, but it now predicted to reach around a minimum magnitude of +0.0 - and could become even more spectacular - when it reaches its peak in September to November of this year. While much remains uncertain in the interim period between now and then, we maintain a cautious, yet hopeful outlook for a good showing from this comet.

Meteors

Peaking on the night of the 21st-22rd April, the Lyrids are a regular, reliable shower. While rarely as spectacular as the major showers such as the Perseids and Geminids, they are nonetheless worthwhile looking out for. Unfortunately, this year, the Moon - the ever-present nemesis of meteor showers - is very close to full around the peak of the shower and will spoil its potential.

The Lyrid meteor shower originates from its parent comet, C/1861 G1 (Thatcher), which is a medium-period comet set to return around 2276. When these comet remnants collide with the Earth's atmosphere, they do so at a relatively gentle pace of 48 kilometers per second. Consequently, the resulting meteors tend to have modest kinetic energy. Additionally, due to their small grain sizes, Lyrid meteors generally aren't exceptionally bright, averaging around +2.0 magnitude. However, approximately every 30 to 60 years, Earth encounters a denser portion of Comet Thatcher's debris field, leading to zenith hourly rates that can reach several hundred. In typical years, the Lyrid meteor shower peaks at a zenith hourly rate of around 20, although not all may be visible. Despite the lunar interference, with clear skies in your area, you could still capture the brightest Lyrids with short-exposure DSLRs or USB imagers equipped with All Sky Lenses.

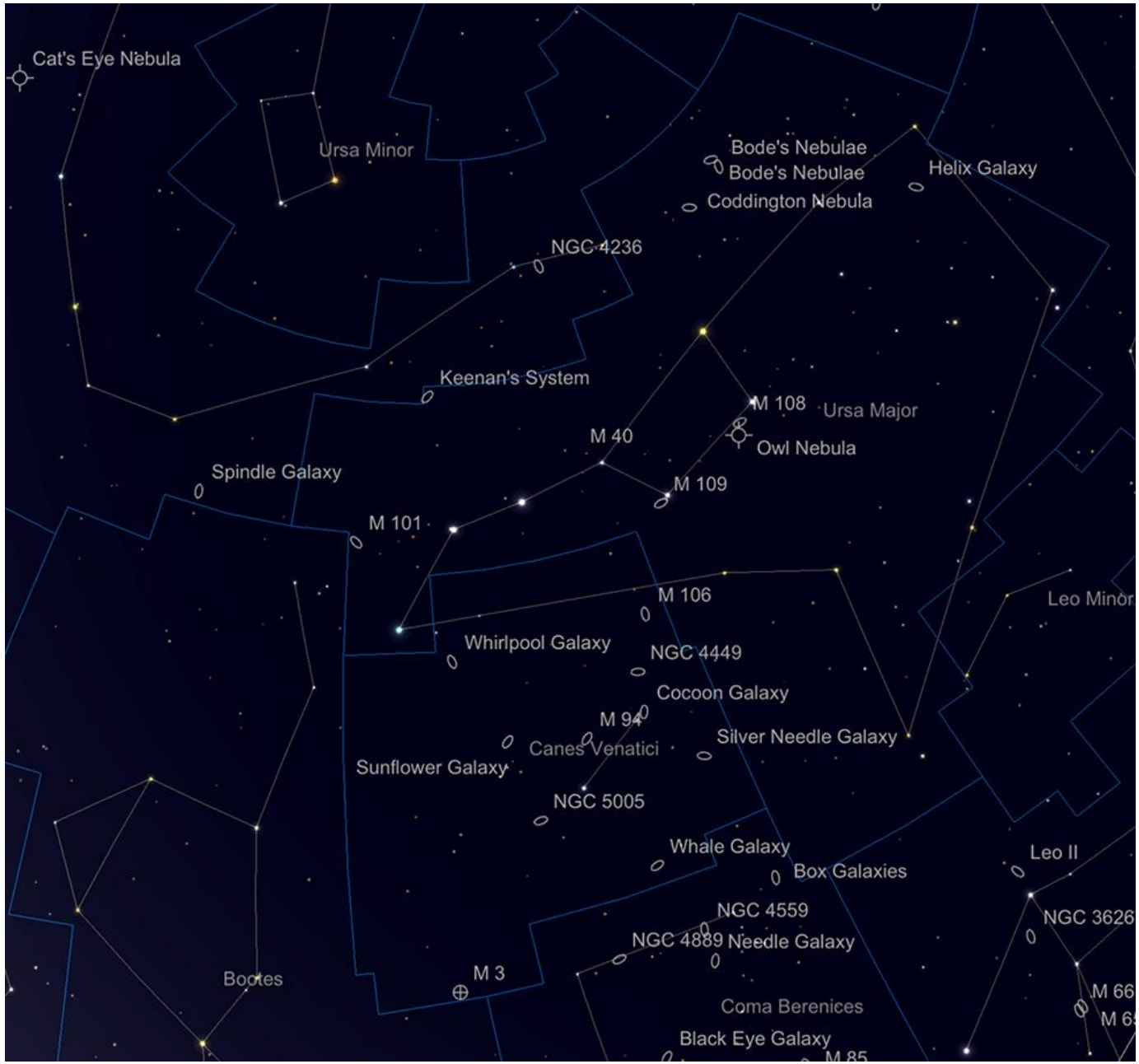
Deep Sky Observation - Welcome to Galaxy Season

Part 1: Ursa Major and Canes Venatici

Springtime is traditionally seen as Galaxy Season, so for the next three months, we'll be concentrating on the rich area of the heavens that runs from Ursa Major and Canes Venatici in the North, through Coma Berenices, on into the Zodiacal constellations of Leo and Virgo. This area of sky is well removed from the sweep of our Milky Way's axis and is a major "window" from our perspective out into extra-galactic space. The arc we will be covering, from M81 and M82 in the North of Ursa Major to M104, the Sombrero Galaxy in the South of Virgo takes in 90 degrees of sky and is full of easily-found and observed galaxies.

We start in the far Northern part of this arc (with suitable apologies to readers in the Southern Hemisphere), in the large and imposing constellation of Ursa Major, the Great Bear.

Known the world over for the distinctive question mark-shaped asterism of the Plough or the Big Dipper, Ursa Major actually extends over a much larger area. As such, it is actually the third largest constellation of all, after Hydra and Virgo.


Cat's Eye Nebula
Ursa Minor
Bode's Nebulae
Bode's Nebulae
Coddington Nebula
Helix Galaxy
NGC 4236
Keenan's System
M 108
Ursa Major
M 40
Owl Nebula
Spindle Galaxy
M 109
M 101
M 106
Leo Minor
Whirlpool Galaxy
NGC 4449
Cocoon Galaxy
M 94
Silver Needle Galaxy
Canes Venatici
Sunflower Galaxy
NGC 5005
Whale Galaxy
Box Galaxies
Leo II
NGC 4559
NGC 3626
NGC 4889
Needle Galaxy
Bootes
M 3
Coma Berenices
M 66
Black Eye Galaxy

Ursa Major and Canes Venatici. Image created with SkySafari 5 for Mac OS X, ©2010-2016 Simulation Curriculum Corp., skysafariastronomy.com.

Ursa Major is rich with deep sky objects, the first of which we shall cover is one of the fainter members of this group, NGC2685, the Helix Galaxy. At +11.30 mag and 4.6 x2.5 arc minutes across, the Helix Galaxy is hardly bright or indeed large, but still worth searching out. It can be found in the extreme west of Ursa Major, some 3 3/4 degrees SE of Muscida, Omicron Ursae Majoris - the star that marks the Great Bear's nose. NGC2685 is what's known as a Polar Ring Galaxy, a curious formation caused by the collision and/or interaction between two large galaxies. This causes great loops and rings of stars to form around the exterior of a central galaxy complex. These filament-like structures of gas and star material are often extremely attractive and NGC2685 is a prime example of this. This galaxy is also of the Seifert type, meaning it is energetically emitting radiation, probably as a result of the collision which formed its outer Helix-like structure. It is only in very large telescopes that it is possible to see the delicate ring structures, but they appear as very evident in long duration astrophotographs. The Helix is thought to lie around 42 million light years from Earth.

NGC2685 by Ken Crawford http://www.imagingdeepsky.com/Galaxies/NGC2685/NGC2685.htm - Creative Commons

12 degrees or so to the NE of the Helix lie two of the most celebrated objects in the sky and one of the great astronomical "odd couples" (another of which later): M81 and M82. These two galaxies are separated by just over half a degree, but are quite different-looking objects. Of the two, M81 is the dominant - a marvellous sweeping spiral, almost perfectly presented to our perspective, with two major arms, surrounding a large, bright core. At +6.90 mag and 24.9 x 11.5 arc minutes dimensions, M81 can easily be seen in telescopes and binoculars of all sizes - some keen eyed observers have even reported being able to see it with the naked eye under perfect conditions. If this is the case, at 12 million light years distance, it must be the most distant object visible to humans unaided. The M81 group of galaxies are thought to be the nearest collection of galaxies to our own local group. Indeed, some sources suggest that we should actually see our local group of galaxies and the M81 group as a larger collective, as there is some evidence of gravitational interaction between the two.

M81 was discovered by Johann Bode in 1774, along with neighbouring M82. As such, both objects are often rather confusingly known as Bode's Nebula. Pierre Mechain independently discovered it in 1779 and Messier added both M81 and M82 to his catalogue two years later. In a telescope of 8-inch aperture and above, the true Spiral nature of M81 really begins to reveal itself - indeed, it is one of the few spirals that show real evidence of its shape at such apertures. In long duration images, M81 practically leaps out of the darkness and given it and M82's proximity to one another; it is hardly surprising that these two objects are amongst the most photographed in the entire sky.

M82 by contrast is a very unusual object - otherwise known as the Cigar Galaxy (for very obvious reasons). This galaxy is somewhat fainter than its neighbour at +8.39 mag, but is also considerably smaller in area at 11.2 x 4.3 arc minutes dimensions. Subsequently, the surface brightness of M82 is not dissimilar to M81's. M82 is thought to have been somewhat deformed from a regular spiral structure by interaction with M81 and is bisected by a deep red lane of heavy star forming material. This bisection is clearly visible in telescopes and spectacularly revealed in even modest length exposures. This region looks almost organic in images, with feathery, root like structures shooting in both directions perpendicular to the galaxy's major axis. The power behind this structure seems to be Supernovae, which have been thought to have occurred in M82 with almost metronomic regularity - estimates put the figure at once every decade, though not all of these have been directly observed. The last Supernova event, a type Ia, in M82 was observed in January 2014 and brightened to +8 mag - it was the closest and brightest observed Supernova since the LMC Supernova in 1987.


M81 Bode's & M82 Cigar Galaxies
© 2017 Mark L Blundell

M81 and 82 by Mark Blundell. Image used with kind permission.

In addition to M81 and M82, a smaller outlying galaxy, NGC 3077, which is a 5.2 x 4.7 arc minute +9.89 mag object, forms a sort of equilateral triangle with its two more dominant neighbours. This is a little more difficult from a visual perspective, though shows up well in images.

You don't need a large telescope to observe these galaxies, binoculars and a reasonable sky will show them, but the beauty of M81 and the mysterious nature of M82 are a joy to behold in a medium to large-sized telescope.

The curious Coddington's Nebula, IC 2574, lies around 3 degrees to the E of M81 and M82 in the direction of Dubhe, Alpha Ursae Majoris. This galaxy is an outlying member of the M81 group too. At +10.39 mag and 13.2 x 5.4 arc minutes area, it is somewhat low in surface brightness and not nearly as conspicuous as its neighbours - subsequently it was overlooked until Edwin Foster Coddington discovered it in 1898.

Follow Duhbe down the "Bowl" of the Big Dipper to Merak, or Beta Ursae Majoris. A degree and a half E of Merak lies another "odd couple" - the galaxy M108 and the planetary nebula, M97, otherwise known as the Owl Nebula. Both were discovered by Pierre Mechain in the early 1780s, though M108 was not officially added to the Messier list until the 1950s. M108 is a fine spiral galaxy, viewed nearly edge on and showing a distinct mottling in its texture. At +10 mag and 8.6 x 2.4 arc minutes, M108 can be seen fairly easily in most small telescopes and shows some notable H II nebulous regions with a UHC filter or similar in larger scopes. This galaxy is thought to be an outlying member of the M81 group and lies some 35 million light years away.

M97, or the Owl, is much closer at 1900 light years away and is very much a part of our galactic neighbourhood - its association with its neighbour is merely a lucky line of sight event and has no further significance than that. Unlike M108, the Owl was originally classified by Messier in 1781. When one observes the Owl through a reasonable sized telescope, most successfully when using an OIII filter, the reason for its nickname become apparent. This Planetary shows two distinct dark "eyes" like the face of an owl looking out through the cosmic gloom. These eyes are simply regions in the toroidal structure of the nebula where there are voids of gas - these are quite common features of many Planetary nebulae - the less material in these sections leads to a lower contrast area. The Owl has a central star, which is difficult to observe in smaller telescopes.


M97 Owl Nebula
M108 Surfboard Galaxy
Const: Ursa Major
By Mark Blundell
1st May 2016 (AM)

M97 and 108 by Mark Blundell. Image used with kind permission.

This pair of lovely objects, much like M81 and M82 is understandably a perennial subject for imagers.

Moving east along the bowl of the Dipper, or the blade of the Plough, we come to Phecda, or Gamma Ursae Majoris. Some 38 arc minutes to the E of Phecda is the stunning galaxy M109. Like M108, this is a latter addition to the Messier list, though discovered by Mechain in 1781. M109 is a +9.80 mag, 7.5 x 4.4 arc second target and one of the most beautiful Barred Spiral Galaxies in the entire sky. It can be spotted in binoculars under good conditions, though larger telescopes are needed to show evidence of its spiral arms and prominent central bar. M109 has three major arms which become evident under higher magnification in larger telescopes, though suffered the indignity of being incorrectly classified as a Planetary nebula by Sir William Herschel. Under lower magnification, M109 looks distinctly egg-shaped, so this might go some way to explaining the great Astronomer's error! Lying around 75 million light years away, M109 is the most prominent member of the larger Ursa Major group of galaxies, which are distinct from the closer M81 group.


M109 Barred Spiral Galaxy
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M109 by Mark Blundell. Image used with kind permission.

From M109, we now travel up the bowl of the Big Dipper, along the handle, passing Megrez, Alioth and the double star Mizar and Alcor. If we continue to trace a line from Alioth, through Mizar, to the point where this line would be bisected by a perpendicular line moving up Northward from the last star in the handle, Alkiad, we come to the location of the last of the galaxies in Ursa Major we will cover this month: the face-on spiral M101.

M101 is a large galaxy, taking up an area 28.8 x 26.9 arc minutes across - much larger than even M81. Although its brightness is listed as around +7.9 mag, due to its face-on presentation, this brightness is spread over a very wide area, leading to quite a dim overall target. This galaxy was discovered by Mechain in 1781 and is one of the final original Messier objects, as it was added to the list by Messier later in the same year. Although studied by many astronomers in the interim period, it was only when Lord Rosse turned his 72-inch Leviathan of Parsonstown Reflector towards it in 1851 that its true spiral nature was revealed. Although some observers claim to have seen the first suggestion of spiral structure with instruments as small as 4 inches aperture, it will take exceptional sky conditions to be able to achieve this - or a much larger telescope. Larger telescopes, when combined with UHC, or similar Hydrogen-responsive filters, will start to reveal some of M101's remarkably rich HII regions, where star formation is rife. Indeed, M101 is somewhat of a monster in size, as it is estimated to be twice the diameter of our own Milky Way. It lies around 22 million light years away.


M101 Pinwheel Galaxy
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M101 by Mark Blundell. Image used with kind permission.

Somewhat confusingly, M101 is one of the three galaxies in the sky known by the nickname "The Pinwheel" - M33 in Triangulum and M99 in Coma Berenices also share this title.

Moving on from Ursa Major, we dive south into neighbouring Canes Venatici - the hunting dogs. Whereas Ursa Major is a large constellation with prominent stars, Canes Venatici is exactly the opposite - but what it lack is bright stars, it certainly makes up for in galaxies!

The first and best-known of all these is the remarkable M51 - the Whirlpool Galaxy. The Whirlpool is possibly the archetypal face-on spiral galaxy. Whereas M101 is large and relatively faint, M51 at +8.39 mag and 11.2 x 6.9 arc minutes area is more compact and brighter. This galaxy has two massive spiral arms, bound around one another. On the tip of the Northern arm, is a companion galaxy, NGC5195, which is in the process of heavy tidal interaction with M51.

M51 is a true Messier object - it was discovered by him in 1773, though Pierre Mechain discovered NGC5195 later in 1781. Lord Rosse made a famous sketch of M51 through is 72 inch reflector in 1845, which clearly showed M51's Spiral and its satellite - it is this sketch that gave rise to the nickname "Rosse's Question Mark" - for obvious reasons.

Although M51 can be found relatively easily in binoculars, a dark sky will be needed to active this. Small telescopes will show M51's core easily and the first suggestion of a halo surrounding this. However, once the 12-inch barrier is broken in terms of aperture, then M51, really begins to come into its own. This aperture and above will show the Whirlpool in all its glory - and notable features such as the bridge between M51 and NGC5195 and M51's numerous H II regions really begin to stand out. However, it is in long duration images that M51 really reveals all - and in this respect is a constant source of inspiration to astrophotographers.


M51 Whirlpool Galaxy
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M51 by Mark Blundell. Image used with kind permission.

M51 is thought to be of a similar size to both our galaxy and M31, the Andromeda Galaxy, and lies around 27 million light years away.

Just under 40 arc minutes to the S of M51 lies the elliptical galaxy NGC5173, otherwise known as the Southern Integral Sign. Although +12.19 mag in brightness, it is relatively compact at just 1 x 0.9 arc minutes dimensions and is thus quite evident in small telescopes, though rather disappointingly bland in relation to the many spirals that surround it.

Just under 6 degrees to the South of M51 lies the lovely M63, the Sunflower Galaxy. This is a truly beautiful object - a tightly packed spiral with a bright core and fainter outlying arms. It certainly does look distinctly flower-like in long duration images.

The Sunflower has the distinction of being the first discovery made by Pierre Mechain - Charles Messier's partner and major contributor to his list. At +8.6 mag and 12.6 x 7.2 arc minutes across, M63 makes for a relatively straightforward target in most small telescopes, though larger instruments will be needed to make out the spiral structure. This was first noted by Lord Rosse during his survey of spiral nebulae during the 1840s.


M63 Sunflower Galaxy
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M63 by Mark Blundell. Image used with kind permission.

M63 is thought to lie around 34 million light years from us and is part of the group of galaxies in this area of sky of which M51 is the dominant gravitational member.

4 and 3/4 degrees to the W of M63, we find the distinct galaxy M94, which was another discovery of Mechain in 1781 - and was added to the Messier list in the same year. M94 is, like its major neighbours, a spiral galaxy - albeit a rather unusual one. At +8.19 mag and 14.1 x 12.1 arc minutes area, M94 lies about half the distance from us - 14 million light years - than either M51 and M63. Its structure is notable - a tight compact, very bright spiral core, surrounded by two concentric fainter rings of stars. It is due to this structure that it has gained the nickname in some circles of the Cat's Eye Galaxy. This suggestion of spiral structure shows up well in even small telescopes, though instruments of 8-inches aperture + are needed in order to see much of the outer rings. M94 can be found in binoculars, if sky conditions are kind, though a telescope is definitely needed to see anything more than a faint smudge. When imaged, M94 gives up considerable detail, especially in its outer ring.


M94 (NGC 4736) Galaxy
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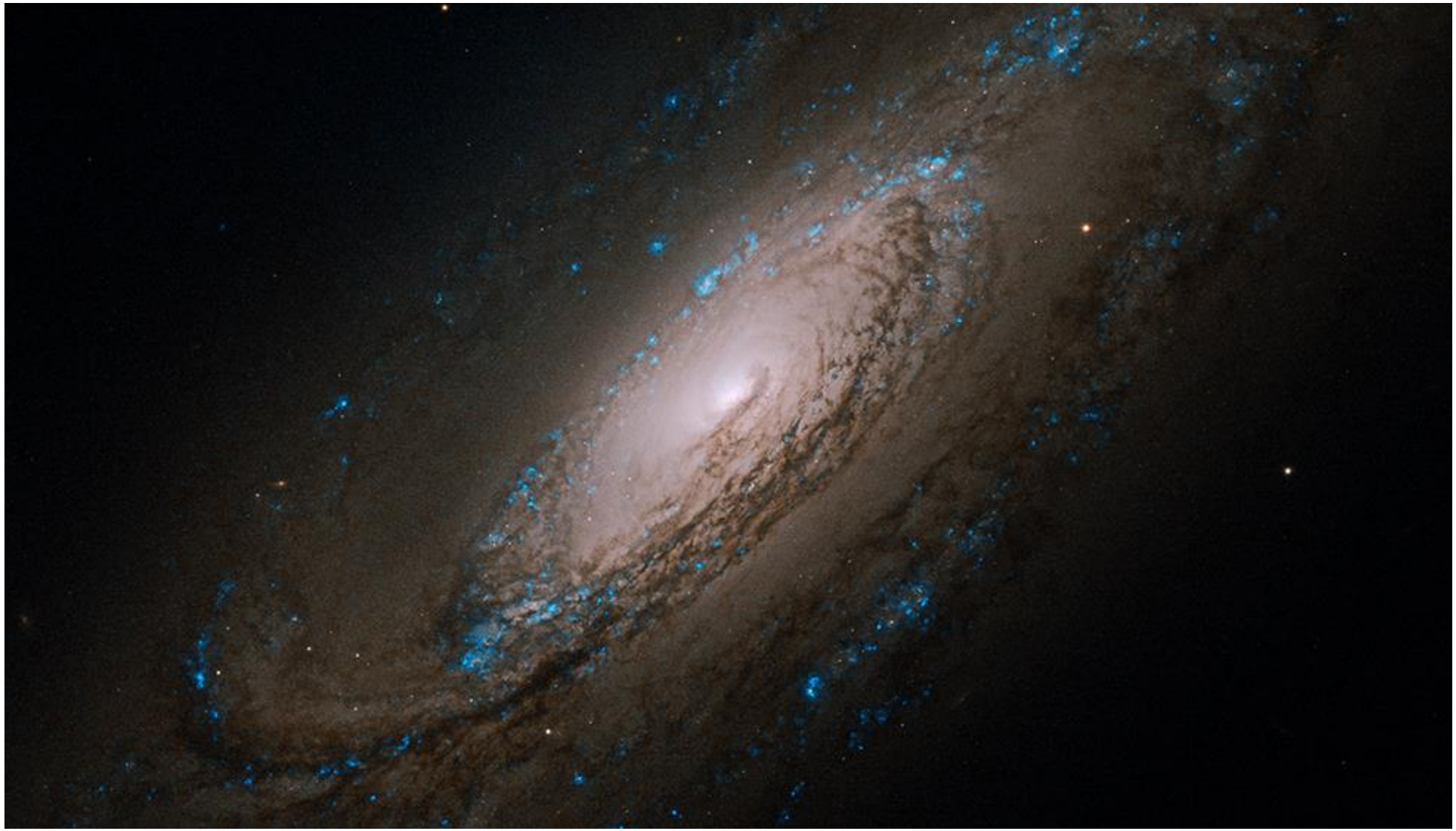
M94 by Mark Blundell. Image used with kind permission.

Just over 5 1/2 degrees further S from M94, lies NGC5005 - yet another spiral galaxy. At +9.80 mag and 5.8 x 2.9 arc seconds area, this object has a really bright nucleus, surrounded by a much darker, almost sooty-looking outer arms. In larger telescopes, the elongated aspect of NGC5005 really begins to revel itself, though in truth, this galaxy is a rather disappointing object in smaller instruments and binoculars.



NGC5005 - HST Image. Public Domain.

Under 7 1/2 degrees to the SW of NGC5005, sits the slightly easier to observe NGC4631, otherwise known as the Whale Galaxy. This +9.19 edge-on spiral galaxy does indeed resemble a galactic whale swimming through the cosmos. At 15.2 arc minutes long by just 2.8 arc

minutes wide, the Whale has quite high surface brightness and is therefore a relatively easy object in most large binoculars and small telescopes. A companion galaxy, NGC4657, sits to the N of the Whale and is thought to be responsible for some of the larger galaxy's elongation. Both objects lie around 25 million light years away and were discovered by Sir William Herschel in 1787. To the SE of the Whale, by around half a degree, sits another spiral galaxy, NGC4656, otherwise known as the Hockey Stick. Photographic evidence reveals why, as one edge of NGC4656 appears bent - just like a hockey stick. Just like NGC4631, the Hockey Stick was discovered by Herschel, though lies a little further from us than its neighbour, at 30 million light years away..


NGC4631 Whale Galaxy
NGC4656 Hockey Stick Galaxy
By Mark Blundell
31st May 2014

NGC4631 and 4656 by Mark Blundell. Image used with kind permission

Under 8 degrees to the NW of the Whale, lies the superficially very similar NGC4244 - the Silver Needle Galaxy. This is another spiral which lies edge-on to our perspective and although a little fainter at +10.6 mag than its neighbour is well worth seeking out. At 16.6 x 1.9 arc minutes in area, the Silver Needle has a somewhat lower surface brightness that the Whale, but is impressive enough in larger telescopes. Although difficult to see from our point of view, NGC4244 is thought to be a barred spiral structure with two wide arms. Sources differ as to the distance this galaxy lies from us, with most seeming to favour the 14 million light years mark, though some putting it as close as 6.5 million light years away. If the latter is closer to the truth, NGC4244 is possibly an outer member of our own local group rather than a galaxy belonging to the Canes Venatici family.

NGC4244 - HST Image. Public Domain.

4 1/2 degrees to the NE of NGC4244 sits two interaction galaxies, NGCs 4485 and 4490 - otherwise known as the Cocoon. These 6.4 x 3.2 arc minute objects have a cumulative magnitude of +9.80 and have undergone a catastrophic interaction with each other - much as the Milky Way and M31 are thought to experience in the far future. Although both galaxies are now moving away from each other, there are some remnants of spiral structure left in a massive arc of stars and material stretching 24000 light years in length between both objects. This seemingly destructive interaction, as it often does, has sparked a huge amount of star formation in this region. Both galaxies - or what's left of them - are thought to lie some 31-50 million light years away from us.

NGC4485 and 4490 - HST Image. Public Domain.

2 1/2 degrees to the N of the Cocoon, sits NGC4449. This galaxy is something of a rarity in this part of the sky, being of an irregular, rather than a spiral structure.

NGC4449 was discovered by Sir William Herschel in 1788 and is +9.6 mag in brightness and 6.4 x 4.4 arc minutes in size. NGC4449 is superficially very similar to the larger of our two satellite galaxies, the Large Magellanic Cloud, though observations of this diminutive galaxies in radio wavelengths have revealed that the visible part of NGC4449 is dwarfed by a huge, optically invisible halo of gas, which is 14 times its diameter. NGC4449 is easily enough found in larger telescopes, and the mottling of its HII regions is impressive if enough aperture is directed its way - though admittedly this galaxy does lack some of the glamour of its neighbours.

NGC4449 - HST Image. Public Domain.

Just over 3 1/2 degree to the N of NGC4449, lies the last galaxy in our epic jaunt around this area of sky - M106. This +8.39 mag spiral galaxy was discovered by Mechain in 1781, but was not added to the catalogue by Messier at the time. M106 is, like some previously mentioned galaxies, a later, 20th century addition to the original list. M106 is a fine galaxy - well-presented from our perspective and bright enough to be seen in diminutive telescopes. However, a 12-inch + class of telescope will really start to reveal the two massive bound spiral structure of the arms and the darker material that lies between. At 18.6 x 7.2 arc minutes, M106 is a healthy size for a galaxy - larger than M51 and as such, should probably get a little more attention than often does.


M106 Galaxy
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M106 by Mark Blundell. Image used with kind permission.

Original text - Kerin Smith