

In our early evening skies we have three planets visible to the unaided eye; the first is the bright planet Venus visible after sunset low in the western twilight. During November the planets phase reduces significantly from 48% to 35% as the planet moves around its orbit and the distance between Venus and Earth reduces there is a corresponding increase in apparent size. So now is a good time to observe Venus telescopically and see the planets change in phase and apparent size.

The second planet to catch early evening is the ringed planet Saturn, located low in the south west, telescopes show the characteristic ring system and the bright moon Titan. Larger telescopes (150mm OG) may also show some additional detail, subtle banding on the disk and the shadow of the disk cast onto the ring system appearing as a dark radial gap adjacent to the planets limb.

The third planet is Jupiter, unmistakably bright low in the southern aspect – Telescopes show the notable cloud belts and the four Galilean moons. Larger telescopes (150mm OG) show the tiny dark shadow transit disks of Ganymede and Callisto cast onto the cloud belts at the times specified :-

Nov 6 Jupiter's moon Callisto shadow transit starts in twilight and ends 21:20 GMT

Nov 9 Jupiter's moon Ganymede shadow transit starts in twilight and ends 18:36 GMT

Nov 16 Jupiter's moon Ganymede shadow transit starts 19:08 GMT and ends 22:36 GMT

Shadow transits take a couple of hours for the moons shadow to cross the planets disk – watch the solar system in action in real time.

There are two binocular planets and a Dwarf planet visible in binoculars to have a go at observing this month. The brightest of these is the planet Uranus, visible in the constellation of Aries and at opposition on November 5<sup>th</sup>. Easily spotted due to its characteristic green colour (note - there are no green stars) and at 5.7m magnitude is brighter than many of the field stars in the binocular field of view. – Refer to finder chart in these notes. On moonless evenings from a dark site, Uranus may be glimpsed with the unaided eye, approximately half way between the circle of stars of Cetus (marking the tail of the Whale) to the south and the bright pair of stars in Aries to the north of the planet.

Binocular observers may also find the planet Neptune using the finder charts in these notes. At 7.8m magnitude it is a harder challenge to spot, but again its `bluish hue` aids identification – use the finder chart in these notes to find Neptune in the constellation of Aquarius.

Telescopes however will show both Uranus and Neptune as a tiny disk in contrast to the background stars appearing sharper points of light.

Dwarf planet Ceres is at opposition in November and at 7.0m magnitude is surprisingly bright, its path through the Hyades star cluster and its apparent position near to the bright star Aldebaran, makes identification easier to binocular observers. The Dwarf planet appears as a star like point moving night to night against the background stars, so you will need to use the finder chart in the notes – LAS Newsletter No 310.

Late autumn skies herald the constellations of Taurus, Auriga, Orion and Gemini. The Milky Way stretches from the constellation of Aquila [The Eagle] in the west up through the `W` shaped constellation of Cassiopeia, on through Perseus high overhead down through Auriga and down into Gemini low in the east. On clear moonless evenings the Milky Way appears as a faint misty band of light, binoculars however reveal rich star clouds and dark lanes of obscuring dust, especially in the constellation of Cygnus [The Swan], a summer constellation now seen low in the west early evening.

The constellation of Taurus [The Bull] can be seen rising in the east by early evening has the red star Aldebaran a foreground star in line of sight with the V shaped Hyades star cluster [The name *al debaran* meaning `the follower` follows the seven sisters star cluster across the night sky]. The famous Pleiades (M45) (Seven Sisters) star cluster is easy to spot low in the east early evening, some people with acute eyesight may see perhaps up to 13 stars unaided, binoculars show many more of the 400 stars in the cluster located at a distance of around 380 light years.

Auriga has the bright star Capella and can be seen to the east and slightly above Taurus. The rich background of stars of the Milky Way is best seen on moonless evenings from outside the light from the town and the three fine star clusters M36, M37 and M38 can all be seen using binoculars.

Late evening, the constellation of Gemini, noted for two stars Castor and Pollux rises by late evening but can be seen throughout the late autumn, winter and spring. Gemini contains some nice star fields and the star cluster M35.

In the south east the familiar constellation of Orion can be seen rising late evening, noted by the three stars of Orion's belt, the red giant star Betelgeuse (top left), the white star Rigel (bottom right) and the misty patch of the Orion Nebula (M42) of the sword, just below the belt stars. M42 is a fine

object when viewed with binoculars or a telescope, the hot young stars known as 'The Trapezium' light up the surrounding clouds of gas and dust that form the nebula. Also note the smaller 'apostrophe shaped' nebula M43 near to the dark 'V' shaped nebula within M42 a feature known as 'the fishes mouth'. Visual observers may also benefit by using a UHC/LPR type filter to darken the background field.

In the south west the large box shaped constellation of Pegasus can be a useful signpost to finding the constellation of Andromeda, a chain of several stars just east of Pegasus and is famed for the Andromeda Galaxy (M31). Visible to the unaided eye from dark skies on moonless evenings as a faint misty patch, the galaxy can best be seen in binoculars the spiral arms extending to an apparent size being around six Full Moon diameters at 3° apparent diameter.

In the west the familiar stars of Vega (in the constellation Lyra), Deneb (in Cygnus, or The northern Cross) and Altair (in Aquila) form the asterism 'The Summer Triangle' and now heads into the early evening twilight.

In the north Ursa Major, The Plough asterism or The Great Bear, can be seen low down. Use the right hand pair of stars Dubhe and Merak (The pointers) to find the faint pole star Polaris and hence the position of North.

The Leonid meteor shower maxima occur around Nov 18<sup>th</sup>, however the rates predicted are low around 15/ hour. Increased activity is associated with perihelion passage of the parent comet 55P Temple-Tuttle, every 33 years and it may be towards the end of the decade before activity is enhanced by the parent comet. Full moon conditions makes this years Leonid maxima unfavourable.

The Taurid meteor shower(s) peak around Nov 5<sup>th</sup> and Nov 12<sup>th</sup> (more favourable) both peaks have low rates ZHR just 5/hour. UK observers around Nov 5<sup>th</sup> in town may also have to contend with fireworks but the Nov 12<sup>th</sup> is favourable after moonset late evening.

Comet interest this month is provided by C/2021 A1 Leonard which is faint 12<sup>th</sup> magnitude in Ursa Major but 'may' brighten to 7<sup>th</sup> magnitude prior to perihelion in early Jan 2022. Although comet brightness is uncertain, the expectation is that the comet may become a binocular object from late Nov in pre-dawn skies before disappearing southward from UK skies in early/ mid December. (LAS Newsletter No 308).

Comet 67P Churyumov – Gerasimenko, noted for the successful ESA Rosetta mission to the comet reaches perihelion this month and is also at its closest distance to Earth on November 12<sup>th</sup> at 0.41 AU, 62 million km. The comet is currently predicted to peak at around 10<sup>th</sup> magnitude as a 'faint fuzzy'. However its apparent path through Gemini puts it favourably close to β Geminorum (Pollux) – LAS Newsletter No 311. Perhaps this favours imaging techniques rather than visual observation.

The partial lunar eclipse on Nov 19<sup>th</sup> does not favour UK observers, penumbral stage occurring from 06:02 GMT just prior to moonset and the umbral stage starting 07:18 GMT i.e. within 10 minutes of moonset at 07:28 GMT

### Planets in November 2021

Mercury is poorly placed low in dawn twilight with the planet reaching superior conjunction on Nov 29<sup>th</sup>.

Venus is visible low in evening twilight and shows reducing phase throughout the month.

Mars returns to dawn twilight, +1.7m magnitude and small apparent diameter just 3.6 arc sec

Jupiter shines brightly low in the south mid evening – shadow transits noted

Saturn is positioned low in evening twilight to the west of Jupiter – nice view telescopically

Uranus is located in the constellation of Aries. (See notes Binocular / Telescope required)

Neptune in the constellation of Aquarius (see notes Binocular / Telescope required)

### Moons phases in November 2021

New Moon	Nov 4 <sup>th</sup>	Moonless, best time for deep sky observing and Comets
First Quarter	Nov 11th	Best days to see shadow details in lunar craters (early evening)
Full Moon	Nov 19th	Best days to see bright ray craters like Copernicus / Tycho.
Last Quarter	Nov 27th	Moon visible in daytime skies. Do not look directly at the Sun

## Meteor Showers in November

Taurids maxima Nov 5<sup>th</sup> (favourable) and Nov 12<sup>th</sup>, ZHR 10 / hour – slow meteors, fireballs possible.

Leonids range from Nov 15<sup>th</sup> to Nov 20<sup>th</sup>, peak Nov 18<sup>th</sup>. Unfavourable, rates remain low ZHR 15 / hour in 2021

## Highlights of the month

Star clouds of the Milky Way high overhead in the constellations Cassiopeia and Perseus, noted for the famous double cluster (NGC 884, NGC 869) a superb sight telescopically at low magnification.

Constellation of Taurus with the Hyades star cluster [Mel 25] and Seven Sisters star cluster (M45)

Constellation of Orion with super giant orange star Betelgeuse and the famous Orion Nebula (M42),

The constellation of Andromeda and the famous Andromeda Galaxy (M31) a misty patch visible to the unaided eye on clear, moonless evenings can be viewed from a dark site (away from lights).

Dwarf planet Ceres at opposition passes the Hyades star cluster – Binocular /Imaging (see notes)

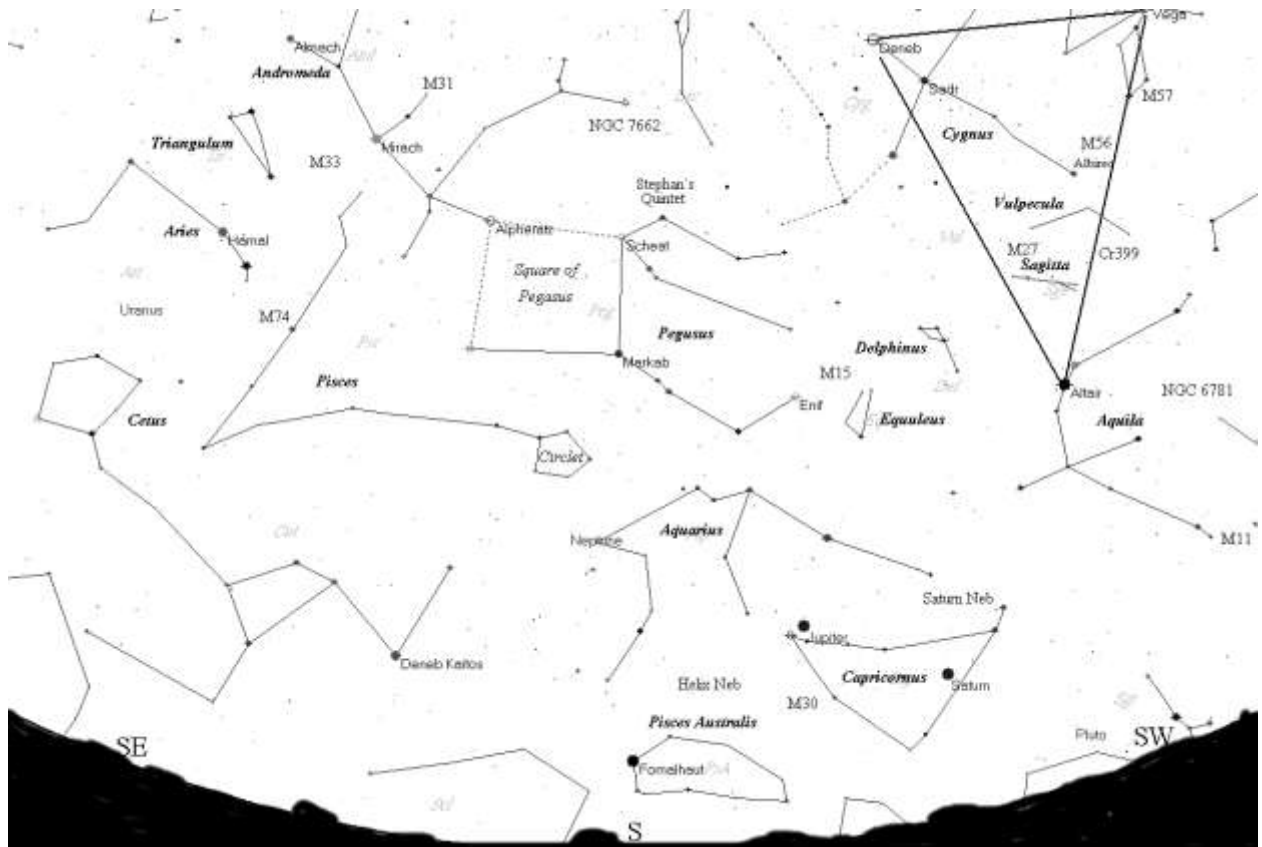
Crescent Moon visibility. November 5<sup>th</sup>, a slender 1% waxing crescent Moon is visible very low in the west **look only after sun has completely set** until moonset at 16:51 GMT).

Binoculars show the unlit part of the Moon made faintly visible by reflected sunlight from Earth (Earthshine) during waxing crescent moon phase Nov 6<sup>th</sup> to Nov 9<sup>th</sup>.

**Caution Do NOT look directly at the Sun with the unaided eye or any form of optical aid.**

More detailed sky notes and LAS Newsletters / finder charts are available to members

View looking south 8pm in early November 2021

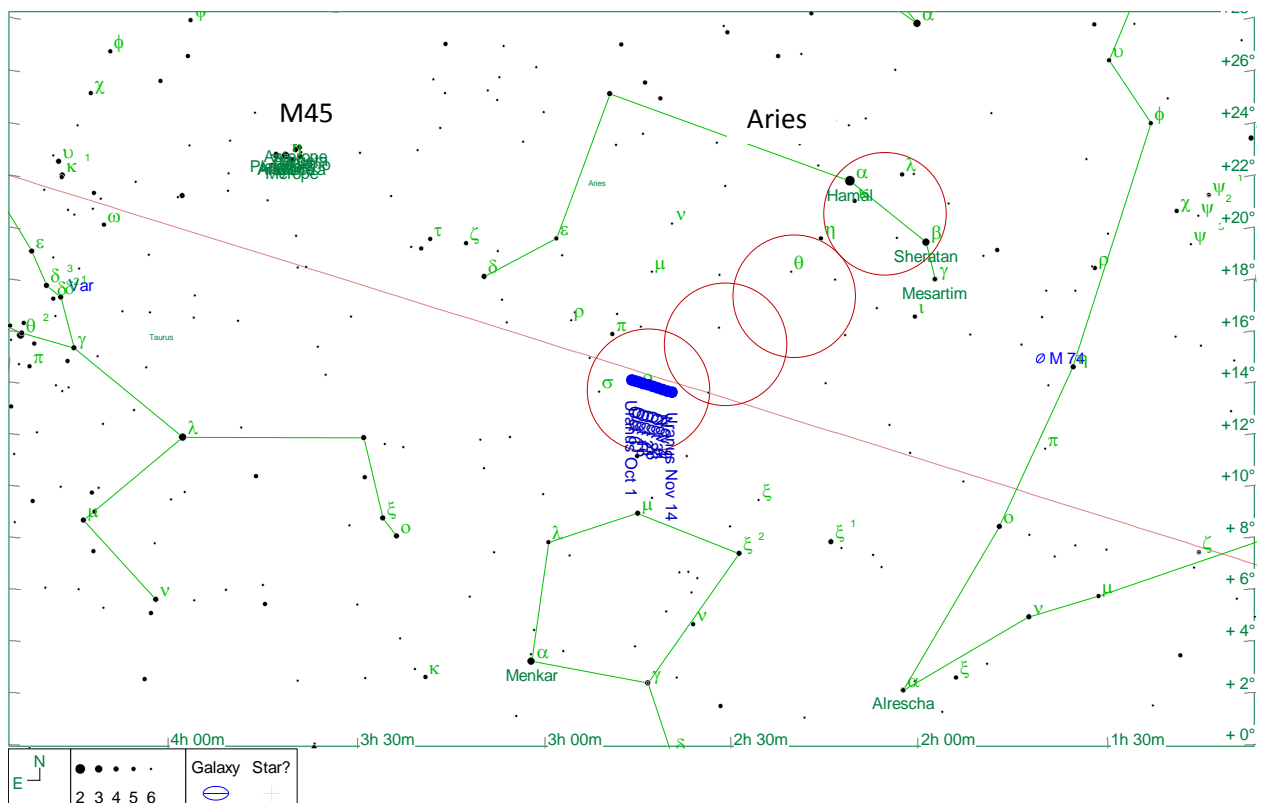


Looking south the 'signpost' asterism of the Square of Pegasus lies on the meridian mid evening.

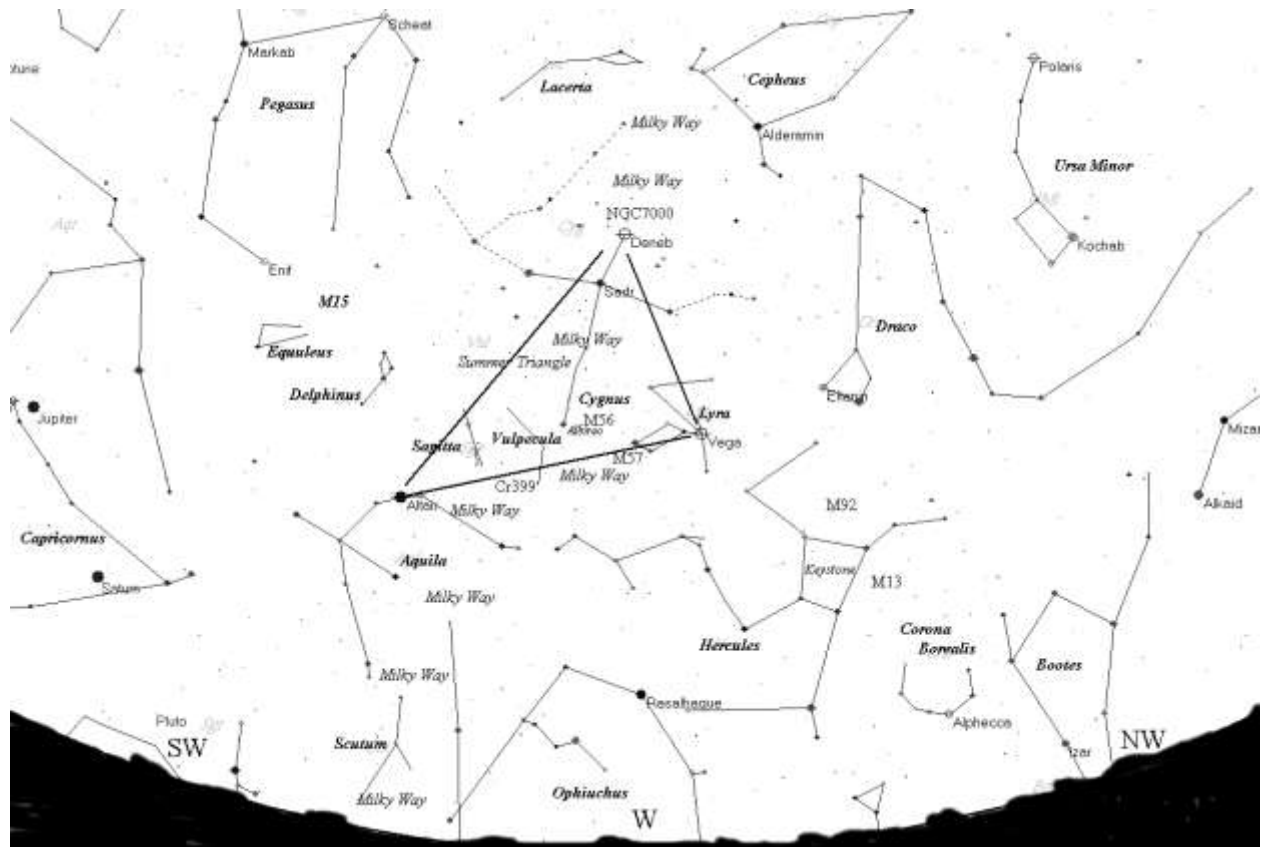
Uranus is a binocular object in Aries. [Half way between the stars Hamel in Aries and Menkar in Cetus]

The square points to the bright star Fomalhaut in the constellation of the Southern Fishes (Pisces Australis) – at UK latitude (52° N) this constellation is glimpsed low on the southern aspect.

Finder chart for planet Star Uranus (binocular / telescope required). Red circles FOV 10x50 finder /binocular

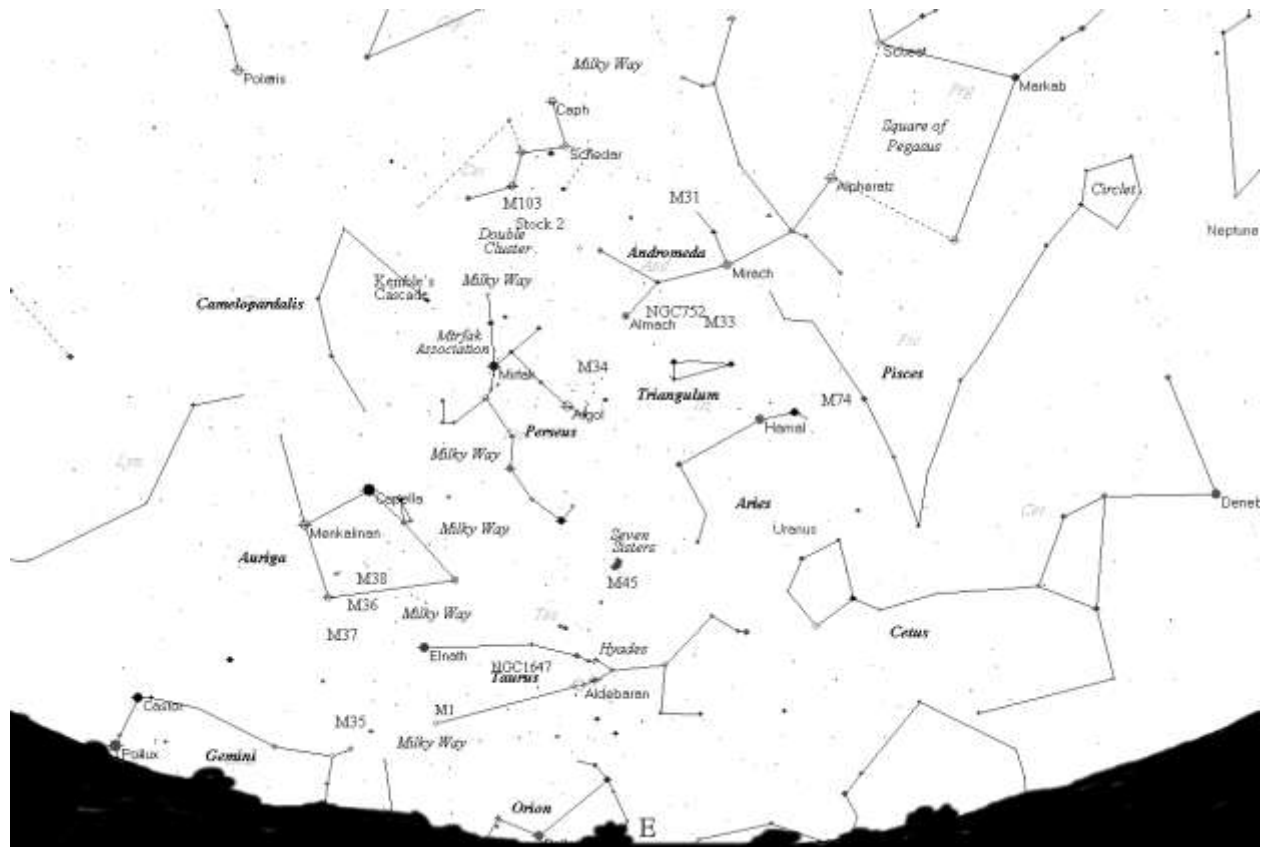


View looking west 8pm in early November 2021



Looking west the summer constellations of Cygnus, Lyra and Aquila head into evening twilight.

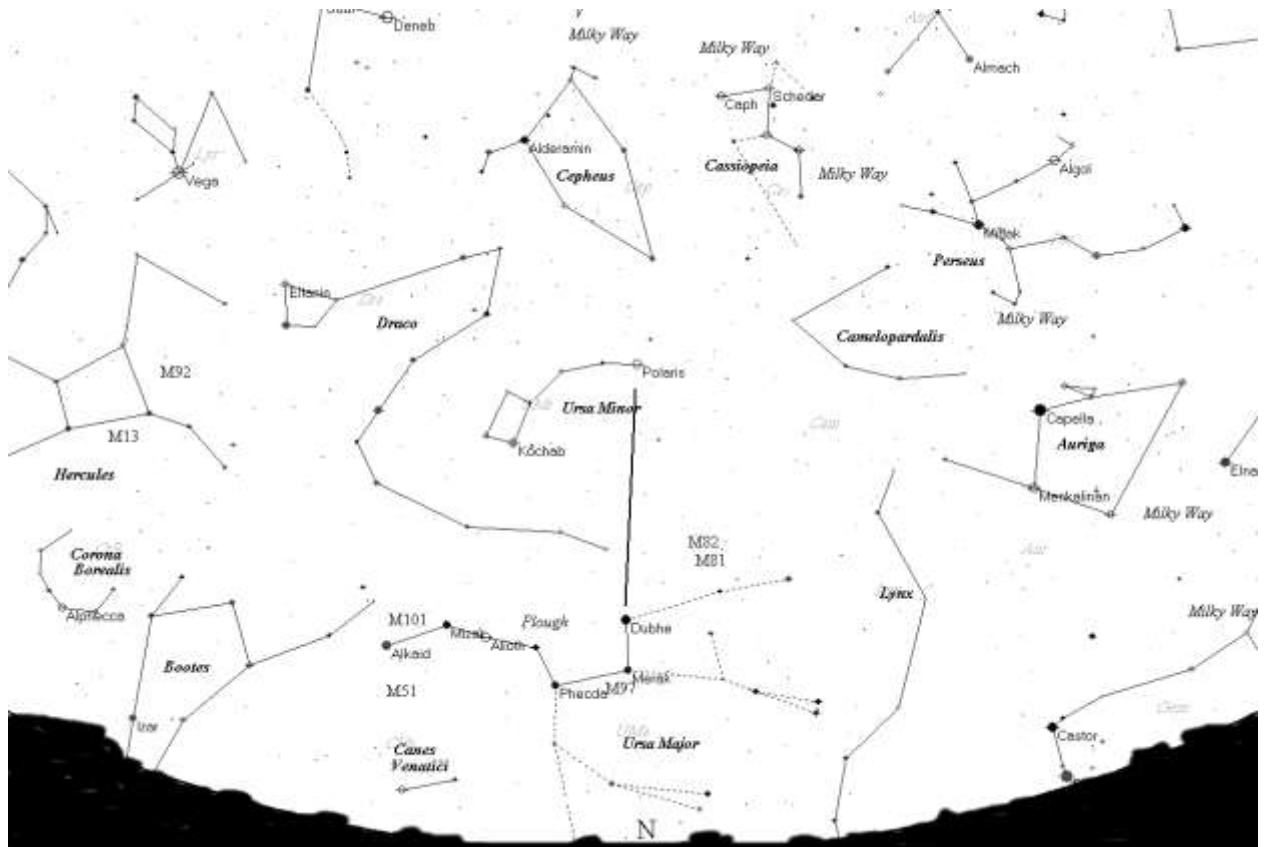
View looking east 8pm in early November 2021



The Milky Way stretches up from the north east horizon through the constellations of Gemini, Auriga, Perseus and Cassiopeia – use binoculars on crisp clear moonless evenings from a dark site to see some very nice rich star fields.

The seven sisters' star cluster can be seen with the unaided eye, but how many can you see?

View looking north 8pm in early November 2021

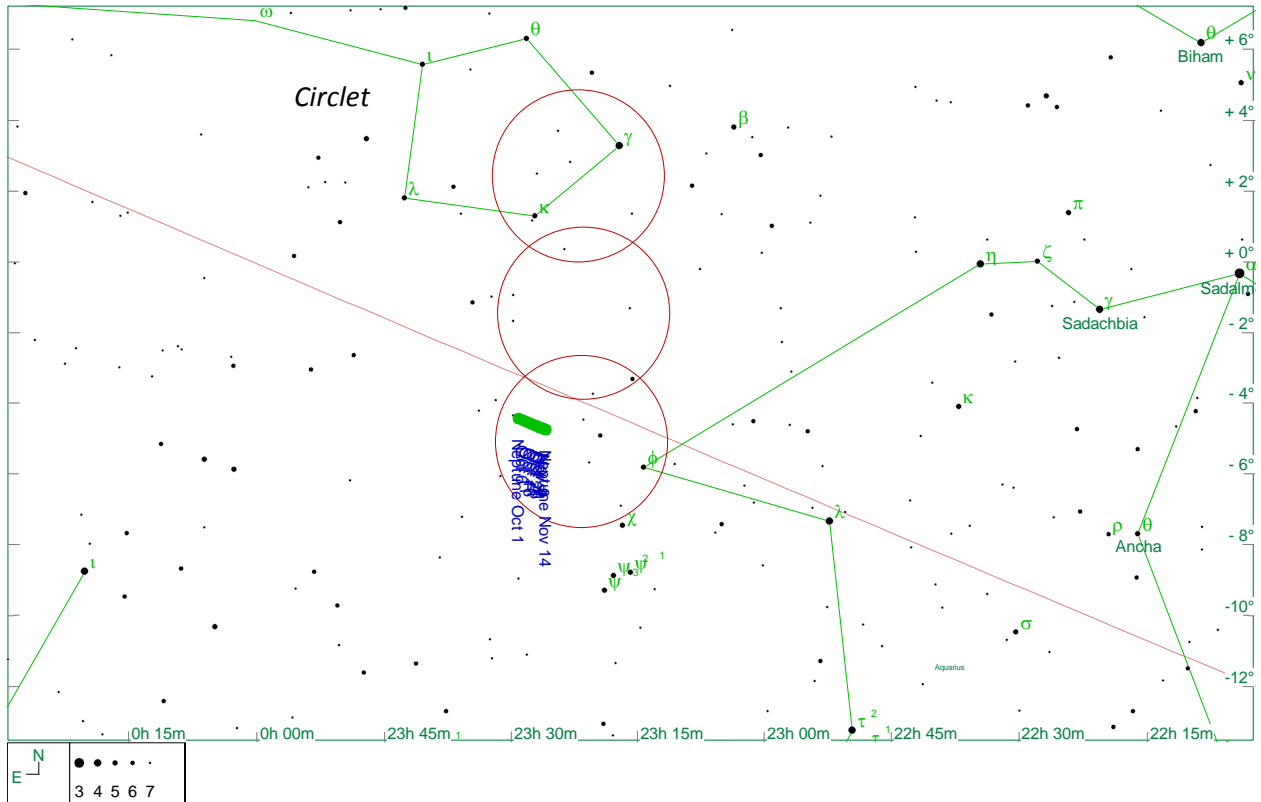


Low in the northern aspect the constellation of Ursa Major is easily recognisable as `the Plough` star asterism. Locate Polaris the pole star using the pointers (Merak and Dubhe, 5 times the spacing)

Early evening Ursa Major [The Great Bear] strides across the northern horizon.

Additional finder charts for November 2021

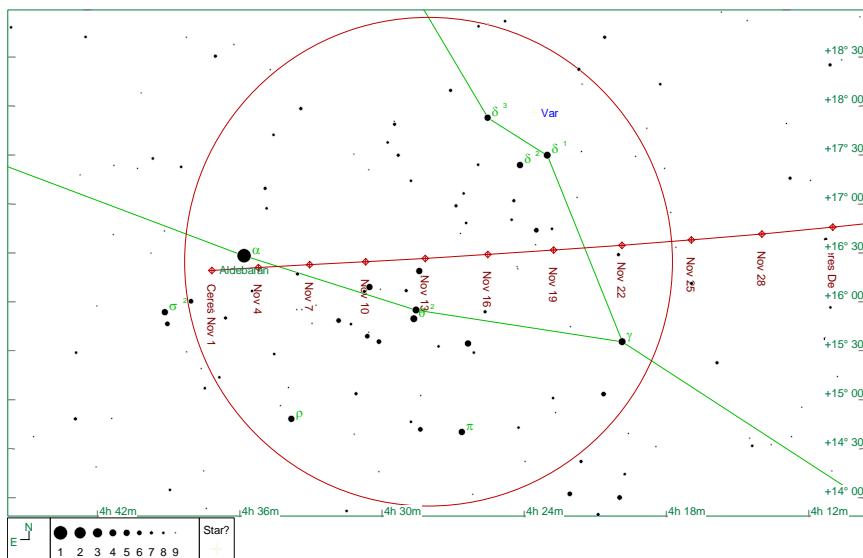
Neptune (Finder chart) - Circles represent the FOV of a 10x50 binocular / finderscope.



Binoculars show Neptune as a blue coloured star, telescopes only show very tiny disks in comparison with pin sharp stars. Nearest finder star is Phi Aquarii

Detailed finder chart (LAS Newsletter No 302A is available to Luton Astronomical Society members.)

Dwarf planet Ceres - Finder Chart (LAS Newsletter 310 - is available to Luton Astronomical Society members.)



Clear skies, there is a lot to see in our November night sky.