

What's Up – December 2021

What's Up – December 2021

Sun and Moon

The New Moon occurs on the 4th of December at 09h43 and the First Quarter Moon falls on the 11th of December at 03h35. The Full Moon occurs on the 19th of December at 06h35 and the Last Quarter Moon falls on the 27th of December at 04h24.

The Moon will be at apogee (furthest from Earth) at a distance of about 406 320 km on the 18th at 04h14. The Moon will be at perigee (closest approach to Earth) at a distance of about 356 794 km on the 4th at 12h03.

There will be a total solar eclipse on the morning of the 4th of December, which will be visible from Antarctica and the Southern Ocean. The eclipse will be seen as a partial one here in Southern Africa. It will not be spectacular, as the fraction of the Sun covered by the Moon will range from 1% to about 11% depending on your location. Cape Town will have about 11,5% coverage. The partial solar eclipse will commence at 7h42, will reach its maximum at 8h19 and will end at 8h58. Remember that you must always use proper solar viewing or eclipse glasses when looking at the sun. Regular sunglasses are **not** safe for viewing the sun. Please see <https://www.nasa.gov/content/dec-4-2021-eclipse> for more details.

The Summer Solstice will occur on the 21st of December at 17h53.

Planetary and Other Events – Morning and Evening

The three bright planets Venus, Saturn and Jupiter can still be seen in the western skies just after sunset. Venus is located near the stars of the constellation Sagittarius, dazzles the evening sky brightly and will be near the Moon on 7 December. The beautifully ringed planet Saturn can be located near the stars of the constellation Capricornus, and will be near the Moon on the 8th of December. Jupiter, the biggest planet in our solar system, can be located near the stars of the constellation Aquarius, and is near the Moon on the 9th of December. Mars, the Red Planet, can be seen in the morning sky near the stars of the constellation Scorpius towards the end of the month. Mercury, the smallest planet in our solar system, is trapped in the solar glare and not visible at the beginning of the month. However, it surfaces in the last week of the month in the western skies just after sunset.

Three meteor showers are active in December, the December Phoenicids (active 3rd December – 9th December, peaking on the 6th), the Puppis-Velids (active 5th December – 7th January, peaking on the 29th) and the Geminids. The Geminids are active from the 4th to the 16th of December, peaking early morning on the 14th. Observations of the Geminids, which are one of the strongest meteor showers, can be done from 23:30 p.m. to 3:00 a.m. on the night of the 13th/14th, and the radiant is located towards the Gemini constellation in a NNE direction. Observing prospects for the Puppis-Velids are good and they are best viewed between 22:30 p.m. and 03:30 a.m. looking towards the constellations of Puppis and Vela.

The Evening Sky Stars

The stars of the Great Square of Pegasus and of Andromeda can still be seen low in the north, with the Andromeda Galaxy visible as a faint fuzzy spot below the star Beta Andromedae. It's believed that in another few billion years, this galaxy will collide with our own Milky Way. Gas and dust clouds will collide, producing large numbers of new stars, but the odds are that not even one star will collide with another. There's just too much empty space. If the Sun were a 10cm ball, the nearest star system (Alpha Centauri) would be about 3000 km away.

Much of the sky on December evenings is dominated by 'watery constellations' and birds. Above Pegasus and Andromeda are the dim

stars of the Fishes tied together at their tails with a knot, and above the Fishes is Cetus, the Whale, representing the sea monster coming to devour Andromeda. The most famous star in Cetus is one that's not usually visible. Named 'Mira', i.e. 'wonderful', it was first recognised as a periodic variable by the Dutchman Jan Holwarda, who found that this star (discovered in 1596 by Fabricius) reached peak brightness roughly every 11 months, when it would typically be visible as a fairly dim star. In between this mysterious object would disappear. We now know of many similar stars, all of them cool 'red giants' hundreds of times the diameter of our own Sun. If Mira were placed at the centre of our solar system, Earth would be inside it!

West of Cetus in the early evening sky is Aquarius (the Water Carrier), while south of Aquarius are the stars of the Southern Fish, headlined by the brightish star Fomalhaut. West of the Southern Fish is the large dim triangle made by the stars of the Sea Goat.

High in the south is the bright star Achernar, with the stars of the Phoenix (the Fire Bird) just above it and the stars of the Toucan and the Crane to the right. The Peacock is moderately low in the SW, below and to the right of the Toucan. Continuing the birds-and-water theme, we find the Water Snake (which looks like a triangle!) directly below Achernar, while the celestial river Eridanus runs its course from Achernar to the knee of Orion, whose stars are rising in the east.

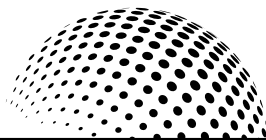
Below Achernar and to the right, among the stars of the Toucan, is the dim glow of the Small Magellanic Cloud. The Large Magellanic Cloud, below Achernar and to the left, is a bit easier to see, and was imagined by some South African groups to be a hunting plain for the gods. The two brightest stars in the sky, Canopus and Sirius, are rising in the southeast and east, respectively, with Orion shouldering his way into the summer skies in the northeast, preceded by Taurus the Bull. The small cluster of stars on the Bull's shoulder, the Pleiades, were used all over Africa to keep track of the seasons. In isiXhosa, the Pleiades are called isiLimela. Rising in the east as well is the Milky Way, dimmer than the brilliant Milky Way of winter, but still very impressive on a dark Karoo night.

The Morning Sky Stars

The Cross and the Pointers (the two brightest stars in Centaurus) are rising higher in the southeast this month. Just above the Southern Cross and the Housefly are the stars of the great ship Argo as it sails along the Milky Way, accompanied by the dim stars of the Flying Fish. The Milky Way still stretches across the predawn sky from the southeast to the northwest as it did last month, running from Scorpio in the ESE through the Wolf and the Centaur to Argo, then west through the stars of the Unicorn, Orion and the Twins. The southern part is much brighter with obvious dark patches, but all of it will reward a scanner with binoculars, revealing beautiful clumps and clustering of stars. Away from the Milky Way, bright Arcturus glows orange in the NE, with blue-white Spica rising in the E and lonely Alpheratz, heart of the great Water Serpent, above Regulus high in the north.

If you look carefully at where most of the bright stars are, you'll notice that they are concentrated near the Milky Way, but offset a bit. These local bright stars are part of a 'spur' sticking out at a bit of an angle from the local spiral arm in the great pinwheel of stars that is our Milky Way Galaxy. Ironically, although most of the stars visible in the night sky are brighter than our Sun, most of the stars in the Milky Way Galaxy are much dimmer than the Sun. The common red dwarf stars that make up most of the population are too dim to see unless they are extremely close, while the rare super giants are visible thousands of light years away.

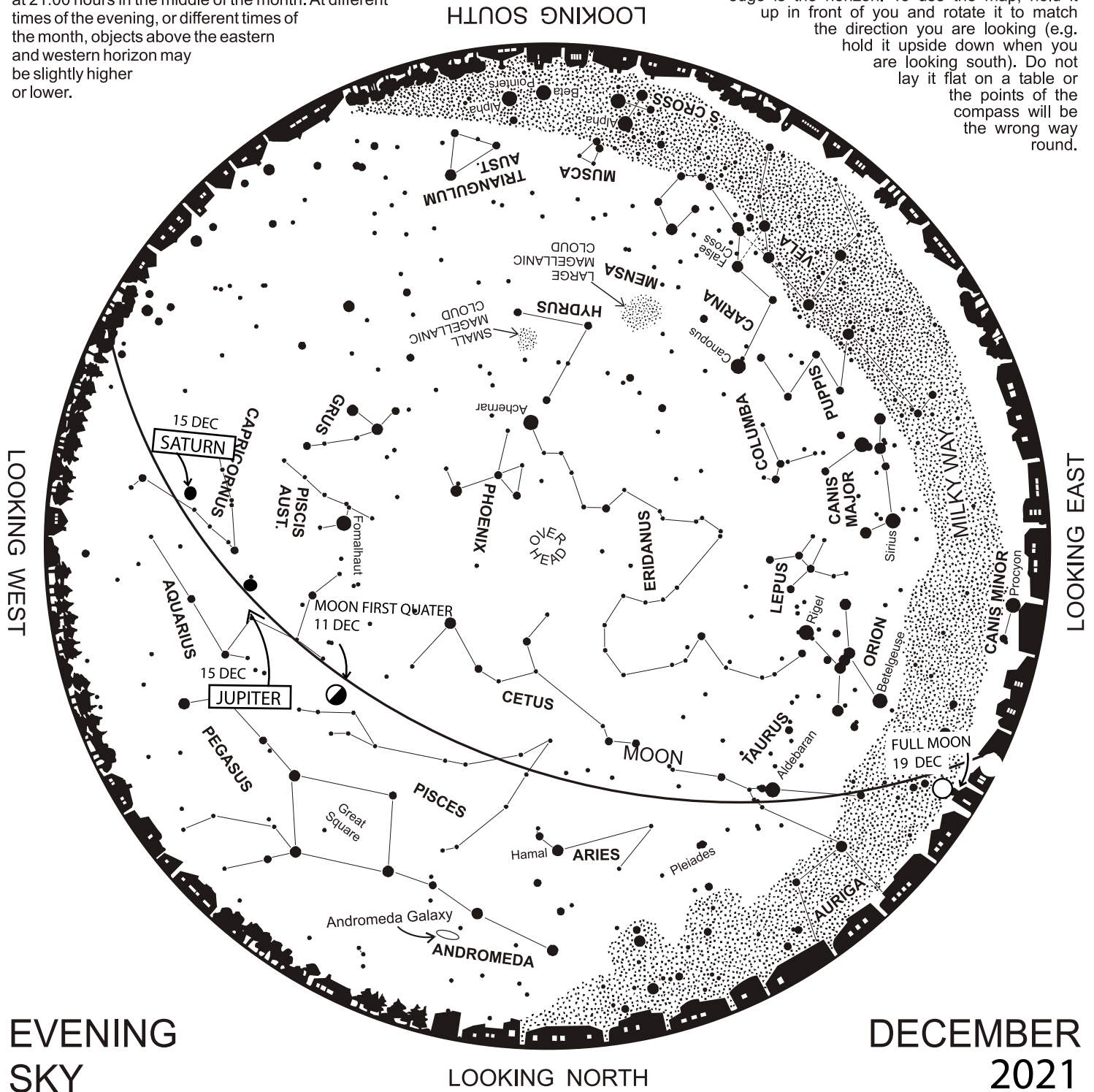
Sivuyile Manxoyi, 1 December 2021
sivuyile@saa.ac.za



IZIKO PLANETARIUM AND DIGITAL DOME

The map shows the night sky visible above the Cape at 21:00 hours in the middle of the month. At different times of the evening, or different times of the month, objects above the eastern and western horizon may be slightly higher or lower.

The centre of the map is the overhead point, the edge is the horizon. To use the map, hold it up in front of you and rotate it to match the direction you are looking (e.g. hold it upside down when you are looking south). Do not lay it flat on a table or the points of the compass will be the wrong way round.



EVENING SKY

DECEMBER 2021

As the year draws to an end, keep an eye out for the impressive 'open cluster' of stars; the Pleiades (isiLimela) in the north-east just below Aries (ram). Although only a few of the cluster's stars are visible to the naked eye, binoculars reveal hundreds more, all formed from the same giant molecular cloud with roughly the same age. The summer constellations Taurus (bull) and Orion (hunter) return to our evening skies, followed closely by the Milky Way as it stretches across our eastern horizon. Sirius, the brightest star in the night sky, lies within Canis Major (big dog) in the east. The second brightest star, Canopus, is in the south-east in Carina (ship's keel).

Since Sirius rises later than Canopus, in Xam Bushman starlore, Sirius was thought of as 'the grandmother of Canopus', trailing behind the more agile Canopus.

Break out your suitable eclipse viewing glasses for a partial solar eclipse on 4 December (observable to those in south-west South Africa, Cape Town start and max at 07:42:41 and 08:19:21 resp., see the Sky Guide Africa South 2021 for more details). Venus, Saturn, and Jupiter continue to be bright evening objects in the west. The Moon will be in our evening skies from 5 to 24 December, with Full Moon (the 'Springbok Moon', see cfah.org.za/fullmoon/ for more details) on 19 December.