

## What's Up – October 2023

### What's Up – October

#### Sun and Moon

The Last Quarter Moon falls on the 6<sup>th</sup> of October at 15h47. The New Moon occurs on the 14<sup>th</sup> of October at 19h55 and the First Quarter falls on the 22<sup>nd</sup> of October at 05h29. The Full Moon occurs on the 28<sup>th</sup> of October at 22h24.

The moon's orbit around the Earth is slightly elliptical, with the distance between the two bodies varying somewhat over the course of a month. On the 10<sup>th</sup> of October at about 05h41 the Moon will be at apogee (furthest from Earth) at a distance of about 405 426 km. On the 26<sup>th</sup> of October at about 05h02, the Moon will be at perigee (closest approach to Earth) at a distance of about 364 872 km.

A solar eclipse (more precisely, an annular solar eclipse) will occur on the 14<sup>th</sup> of October, but it will be visible in the Americas only. A partial lunar eclipse occurs on the 28<sup>th</sup> of October. The eclipse will commence at 20h01, reach its maximum at 22h14 and end at 00h26.

#### Planetary and Other Events – Morning and Evening

Saturn can be observed in the east near the stars of the constellation Aquarius throughout most of the night. It is near the Moon on the 24<sup>th</sup> of October.

Mars is located low in the west near the stars of the constellation Virgo and will only be visible in the first days of October, just after sunset. It will be near the Sun and therefore not visible for the rest of the month.

Jupiter is located in the east and is near the stars of the constellation Aries. It can be seen throughout most of the night, and it will be near the Moon on the 29<sup>th</sup> of October.

Venus shines as the bright morning star and is located in the east near the stars of the constellation Leo. It will be near the Moon on the 10<sup>th</sup> of October.

Eris, one of the dwarf planets, reaches opposition on the 22<sup>nd</sup> of October and is well positioned for observation – but you would need dark skies and a really big telescope to spot it.

Do not miss out on the Orionids meteor shower. They peak on the 22<sup>nd</sup> of October and can be seen between midnight and 04h00. Observing conditions are expected to be favourable. Meteors are caused by dust hitting the atmosphere. In the case of the Orionids the dust originated from Halley's Comet.

#### The Evening Sky Stars

The winter Milky Way still sweeps majestically across the sky from NNE to SSW in early September evenings, and the centre of our Milky Way galaxy is almost overhead. Just to the west of the zenith is the Scorpion, with the reddish star Antares at its heart. Antares (or 'rival of Mars') is a huge star 600 light years away, shining in visible light with 12000 times the power output of our own sun. But Antares is also so much cooler than the sun (hence the red colour) that most of its energy output is in infrared, and its total power output is 40000 times that of the sun. If Antares were suddenly placed at the centre of our solar system, Mercury, Venus, the Earth, Mars and the asteroid belt would be inside this monster star, whose vaguely defined surface would lie 4/5 of the way from the star's centre to the orbit of Jupiter.

Gravity at the surface of Antares is so weak that it is losing mass fast enough to create a visible nebula or gas cloud around it, lit by Antares hot companion star. In the next few million years or so, Antares may

explode as a supernova — so keep your eyes on the Scorpion if you're the patient sort.

Just NE of Scorpio in the Milky Way are the stars of Sagittarius the Archer, making a pattern a bit like a teapot. It's in this constellation that the centre of our galaxy is located, but you can't actually see the centre directly because of the thick dust clouds in between. Only one in a billion photons of visible light from the Galactic Centre can get through, and infrared cameras are needed to show what's there. Infrared observations of stars orbiting the centre suggest that right at the centre is a black hole about 3 million times as massive as our sun.

High in the NE, toward the edge of the Milky Way, is the bright star Altair in Aquila the Eagle. Altair is easy to recognize because of the dimmer stars more or less equally spaced on each side. Another bird constellation, low in the NE and thoroughly tangled in the Milky Way, is Cygnus the Swan, also known as the Northern Cross. At the NE end (top) of the Cross is Deneb, the tail of the Swan. Deneb is much more distant than most of the stars we see with the unaided eye, and its true brightness has been estimated at 190 000 suns. To the right (W) of Deneb is another bright northern star, Vega, only about 1/100 as far away at only 25 light years. Vega is really much dimmer than Deneb but appears brighter because it is so much closer. If Deneb were as close as Vega, it would be by far the brightest star in the sky, as bright as a thickish crescent moon!

Low in the NW in early evening is the bright star Arcturus, with Spica glowing low in the west. Higher in the west (and just north of the Scorpion) is the curious constellation of Ophiuchus the Serpent Holder. One half of the Serpent stretches from the hands of Ophiuchus toward Arcturus and the Northern Crown in the NW, while the other extends along the Milky Way toward the Eagle. South of the Scorpion are the Altair, the Level and the Wolf, while further south we find the Centaur (including the Pointers) and the Southern Cross. Fomalhaut is now high in the east, with bright Achernar, the ninth brightest star in the night sky, low in the southeast.

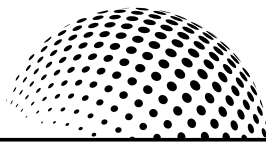
#### The Morning Sky Stars

By the time the Earth's rotation allows us to see the predawn September sky, Achernar (the 'mouth' of the celestial river Eridanus) is much higher in the south, with Fomalhaut (in the Southern Fish) low in the SW. Achernar is spinning so fast that its equatorial diameter is about 11.8 times that of the sun, while its polar diameter is only 7.6 times solar. Partly due to its very fast spin, Achernar is losing mass thousands of times as fast as our own. It is about 300 times brighter than the sun.

High in the southeastern sky is Canopus, the second brightest star in our night skies and the brightest star in the ancient constellation of Argo, the great ship. High in the east is Sirius, the brightest star in the night sky as seen from Earth. If Canopus were at the same distance as Sirius, however, it would shine about 400 times brighter.

The stars of Orion, including bright Rigel and Betelgeuse, are high in the NE before dawn this month. Charging Orion is Taurus the Bull, with Aldebaran serving as an inflamed orange eye. No wonder Orion has his hide shield raised in front of him. Behind Orion, his Small Dog (with the bright star Procyon) is prudently staying on the safer side of the contest, while totally indifferent to all this drama, Auriga the Charioteer (with the bright star Capella) drives by low in the north.

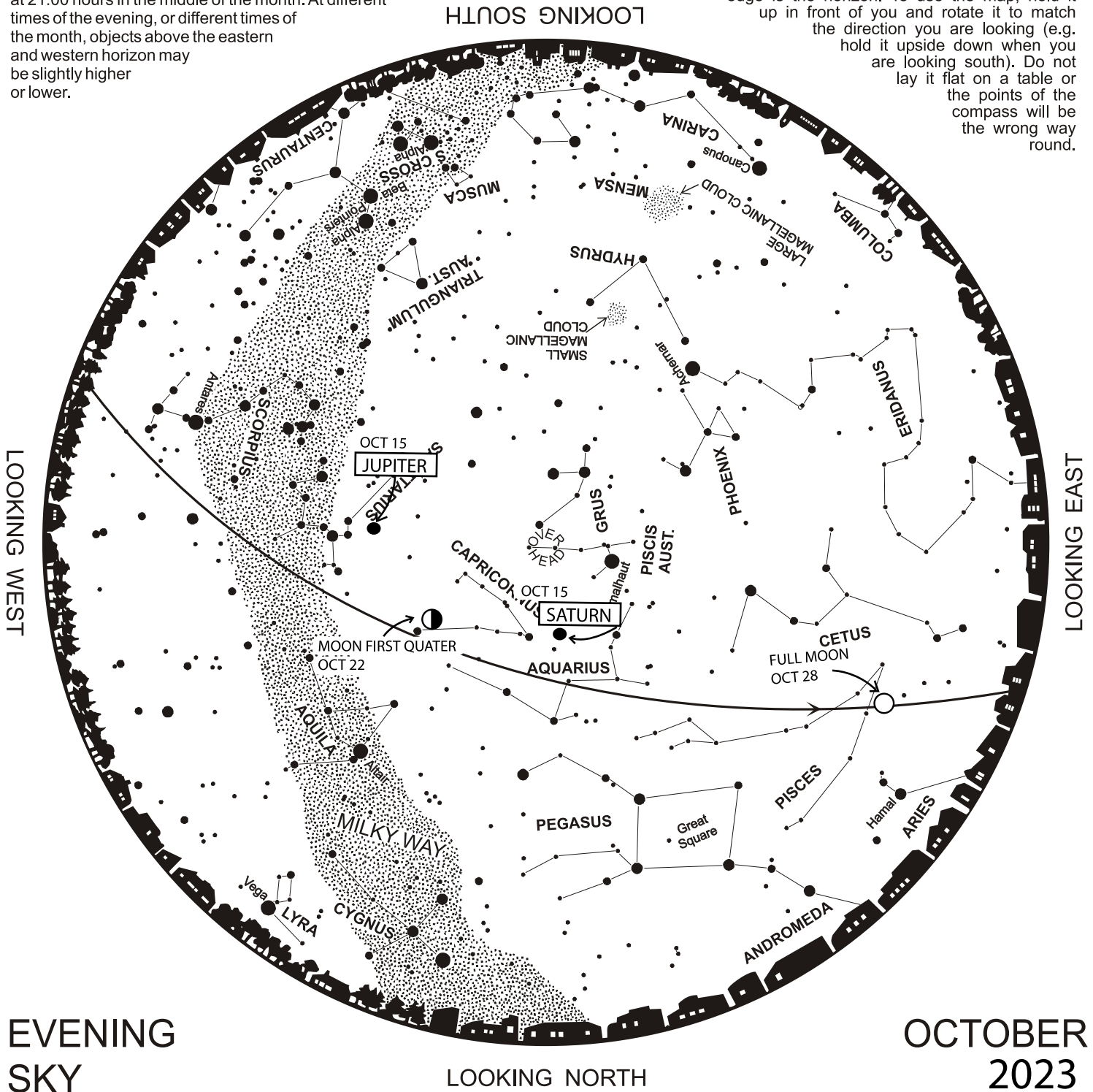
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# IZIKO PLANETARIUM AND DIGITAL DOME

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

## OCTOBER 2023

Look towards the north-east this month as Pegasus (winged-horse) and its 'Great Square' of stars return to our spring skies, pursuing Cygnus (swan). Along the Milky Way, Cygnus trails Aquila (eagle) and its rapidly rotating hot star Altair (which only takes ~10 Earth hours to spin once on its axis). Following the Milky Way to the south, the Southern Cross remains prominent in our evening sky. In the south, the Large Magellanic Cloud (LMC, a neighbouring galaxy) looms over the constellation Mensa. This faint group of stars, identified by French astronomer Nicolas-Louis de Lacaille in the mid-18th century, was named

after Cape Town's Table Mountain as the LMC reminded him of the mountain's occasional cloud cover. Further east, the longest constellation Eridanus (river) winds its way from the bright blue star Achenar down to the eastern horizon. The Full Moon, or 'Whale Moon' (in South Africa) coincides with an umbral lunar eclipse on 28 October (during which a dark sliver of the Earth's shadow may be seen on the Moon's surface, with maximum eclipse at 22:14:08 SAST). High in the east in the early evening, a bright Saturn is visible throughout October, chasing Mars which is close to the western horizon. Jupiter rises a few hours after sunset in the constellation Aries (ram).

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