

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

Talks Postponed

EDITORIAL

Unfortunately as you are only too aware the country is now in lockdown over the Covid-19 virus and it appears that the rest of the AAS 2019/2020 season is going to have to be cancelled. We have lost the use of the Church hall where we meet now until further notice as well. This is of course unfortunate. In order to keep you in touch with what is happening. I intend to try and produce the Spacewatch newsletter in electronic form through the coming months to keep you in touch with where we are. Of course astronomy may not be on the forefront of people's minds at the moment. It is not clear at this time when any semblance of normality may return so we are of course looking at the meetings in the early part of the 2020/2021 season as well. The hope is we can return then but with the government suggesting 6 months and then only a restricted return to social it is not clear where we stand.

On another administrative point the old Abingdonas Yahoo group has been closed and we are now only using the aaslist as set up by Chris for the future as it was becoming tricky running the two lists in parallel. The Facebook group will continue to be run.

As we are not now going to be having an AGM in May I will try and include the committee report with the May Spacewatch. If anybody is wishing to stand for the committee for the new session please contact Chris.

On a more positive note if things do return to a semblance of normality we are going to have a special outreach session to celebrate National Astronomy Week in November, currently planned for Saturday 21st Nov at Sunningwell hall.

For those hoping to go to other astronomy shows/meetings it appears that almost all of these have been cancelled or postponed until the autumn.

The editor of "SpaceWatch" is Owen Brazell, who would very much appreciate your stories & contributions. In particular whilst many fine images are being posted on the discussion group it

would be nice to have some in the SpaceWatch. Please send any news, observations, photos, etc. to:

Mail: Owen Brazell, 15 Spinage Close,
Faringdon, Oxfordshire SN7 7BW or
owen@online.rednet.co.uk



Haro 3-75 in Orion by Ian Smith

NOTICE OF ANNUAL GENERAL MEETING POSTPONEMENT

The Annual General Meeting for 2019/20, which was to have taken place on **Monday 11th May 2020** at All Saints' Methodist Church Hall, Dorchester Crescent, Abingdon at **8.00 p.m.** has been **postponed** owing to the national measures in response to the Covid-19 pandemic. New notices of the AGM will be issued once a firm date can be set.

Chris Holt, Secretary, Abingdon AS

THE NIGHT SKY FOR APRIL 2020

By Steve Creasey & Cristina Garcia Pozuelo Sanchez

Wow, what a month February was, apparently the wettest. What a surreal situation we find ourselves in, I hope everyone is well and staying safe.

It is such a shame that we have had to cut short the AAS program for this season, however, it would seem completely justified considering the potential consequences of not doing so.

Obviously, the astronomical calendar continues its progression, hopefully, with less aircraft pollution and more time to look up, we can all take advantage and at least take something positive from this.

Having just had 6 clear moonless nights in a row, one of the best runs I can remember, and not having any work, I found myself becoming almost nocturnal, imaging through until gone 4am, five nights in a row! (see some of Steve's results later in the column)

So make the most of it if you can.

Zodiacal light - A final chance to see the evening cone of the Zodiacal Light occurs on fine evenings from the 10th to the 24th.

Its appearance is of a cone of pale light of less intensity than that of the Milky Way rising up from the western sky at an angle of 60° towards the south. It is caused by the Sun back-lighting the disc of fine particles surrounding the Sun in the inner solar system; all that remains of the accretion disc which formed the planets 4.5 Billion years ago.

The Planets

Mercury – Mercury is too near to the Sun, for observation during this month. The planet reaches superior conjunction with the Sun on May 4th.

Venus – Venus is a brilliant object in the western evening sky, setting around midnight. The planet is in conjunction with the Moon on the 26th, when the crescent Moon with earthshine lies some 6° to the lower left of Venus in the NW sky. The two objects at this time lie below Capella, brightest star in the constellation of Auriga, and third brightest star north of the celestial equator. On moonless nights, and when well away from artificial lights, try to observe the shadow cast by Venus. Hold your finger up between the planet and a sheet of white paper and observe the shadow cast by the planet on

the paper. Venus is now at its greatest brilliance, with a visual magnitude of minus 4.5.

Mars – Throughout April, the magnitude of Mars increases from +0.8 to +0.4 as it moves eastwards through the constellation of Capricornus. During the month Mars is the easternmost of three visible planets; the other two being Saturn and Jupiter. Jupiter is the brightest of the trio in the constellation of Sagittarius and at a magnitude of minus 2.2. Saturn shines at magnitude +0.7 and lies between Mars and Jupiter. In the early hours of the 16th, the waning crescent Moon lies 3° below Mars low in the SE sky around 04h

Jupiter – may be seen low in the SE sky in Sagittarius during April, and is the brightest object in that part of the sky. The last quarter Moon is in conjunction with Jupiter during the early morning of the 15th. The Moon lies 4° to the lower left of Jupiter and the fainter star-like object 5° to the upper left of the Moon is Saturn. The three objects form a pleasant trio in the SE sky at around 04h. Mars lies to the east of the trio.

Look for the Galilean moons through well-focused and firmly fixed binoculars or telescope as they change position night by night.

Saturn – is on the Sagittarius/Capricornus boundary, and by the end of the month is the fainter of the three planets in that part of the sky. As mentioned in the Jupiter notes, the last quarter Moon is in conjunction with Saturn and Jupiter on the 15th.

Uranus – is too near to the Sun to be seen during April and is in conjunction with the Sun on the 26th in the constellation of Aries.

Neptune – similarly Neptune in Aquarius is too near the Sun in the morning twilight sky to be observed.

Meteor showers

The Lyrid meteor shower takes place annually between 16th April and 25th April and in 2020 it will peak late in the evening of 21st April and the morning of the 22nd April. This particular shower is visible in both the Northern and Southern Hemispheres, offering stargazers a chance to see up

to 18 meteors per hour during its peak. The Lyrid meteor shower is associated with Thatcher's Comet discovered in 1861, and the normal limits of activity are from the 14th to the 30th. The radiant culminates at 04h, so the greatest number of meteors may be expected towards dawn on the 22nd.

The maximum number of meteors per hour is 15, and they seem to radiate from an area near Vega, the second brightest star in the northern sky.

Lyrid meteors are typically as bright as the stars in Ursa Major. Some are much more intense, even brighter than Venus, these are called 'Lyrid fireballs', these may be bright enough to cast shadows for a split second and leave behind trails that sometimes linger for minutes.

The ionised gas in the meteor trail burns up as it enters the Earth's atmosphere, creating the glow which can be seen streaking across the night sky. The shower occurs as the Earth passes through the dust left over from Comet Thatcher (C/186 G1) which makes a full orbit of the Sun once every 415 years. Comet Thatcher last visited the inner solar system in 1861 (before the widespread use of photography) and is not expected to return until the year 2276 (hence there are no photographs of it).

Flakes of comet dust (called Meteoroids), most no bigger than grains of sand, strike Earth's atmosphere travelling 49 km/s (110,000 mph) and disintegrate as streaks of light.

Comets

C/2017 T2 (PanSTARRS) mag 8.7, in the constellation of Cassiopeia. T7 is not as bright as perhaps hoped but does show a nice fan shaped dust tail.

C/2019 Y1 (ATLAS) mag 8.5 and brightening in April. In the constellation of Pegasus It was surprisingly easy to see with my large telescope at the recent curtailed star party so keep an eye on this one too.

C/2019 Y4 (ATLAS) This is one to keep a close eye on, currently in Cancer heading towards Perseus, with the potential to be the brightest comet in decades!

Y4 was discovered on December 29, 2019, by the Asteroid Terrestrial-impact Last Alert System (ATLAS) search program, one of the several automated sky surveys looking for potential Earth-crossing asteroids. Discovering comets is essentially a by-product of this endeavour. At the time, C/2019 Y4 was a feeble magnitude 19.6 and located at nearly 3 astronomical units from the Sun — almost twice as far from our star as

Mars. (One astronomical unit, or AU, is the average Earth-Sun distance.)

In mid-March, Y4 ATLAS surged 4 magnitudes, fuelling rumours that it will just keep getting brighter, peaking at magnitude -8. But back in 2000, C/1999 S4 (LINEAR) dropped the same amount on its approach and dissolved rapidly.

David Levy wrote that "Comets are like cats. They have tails and they do whatever they want." Despite the best observations and understanding, these dirty snowballs can fizzle out with no notice even farther from the Sun than Mars' orbit, a distance Y4 ATLAS reaches at April's start.

The description here covers what we could hopefully witness: a fantastic display like Comet C/1975 V1 West delivered in 1976. Stay hopeful for the comet of a generation and realize that, at worst, it will still be a nice binocular object.

The Northern Hemisphere has great seats from now right up until the comet reaches perihelion on May 31, when ATLAS makes its closest approach to the Sun and performs a sharp turn around our star. Observers from 40 to 60 degrees north latitude are close to the stage, with those from 50 to 55 degrees north getting front-row seats. Equatorial and southern locations get one decent week starting May 28, but then Y4 stays low and fades quickly into the distance, like an object viewed out the back window of a fast-moving car.



Image of Y4 by Steve Creasey. Green background due to strong moonlight

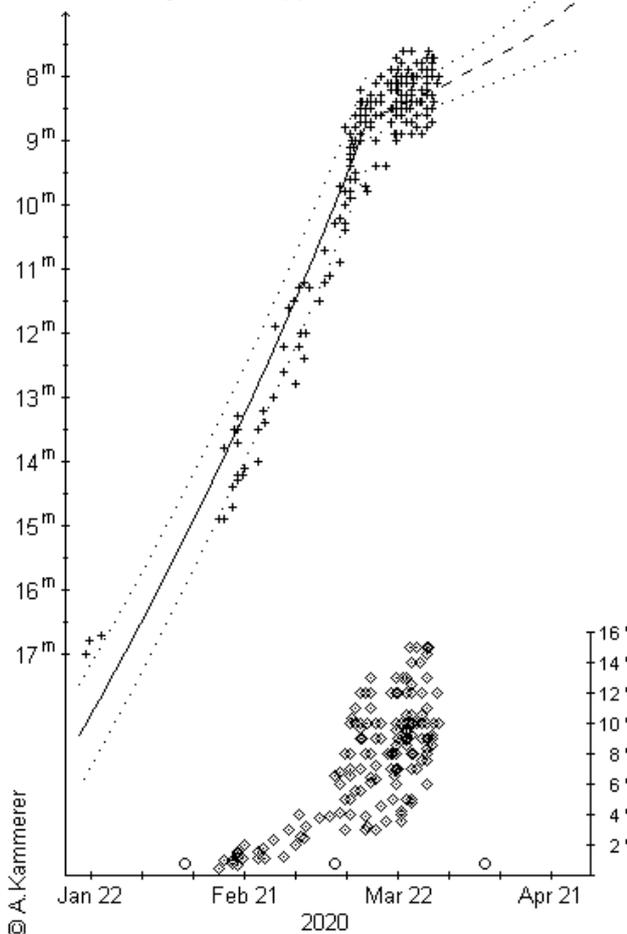
By mid- to late April, which includes the New Moon on April 22, ATLAS is already large and diffuse for its distance. Note that reported magnitudes are integrated, which essentially crunches all its light

into a point, rather than spreading it out between the coma and tails. Magnitude 2 is easy for the unaided eye, but from the city a big halo will be invisible through the light pollution. Striking halfway between Polaris and brilliant Capella, Y4 might resemble a lopsided Andromeda Galaxy.

By mid-May, ATLAS is second in brightness only to Venus! During the deep blue of nautical twilight, it is only 15° high, dropping lower as the calendar ticks onward. Avoid observing from locations just south of a city — there's no point looking through a light dome. Instead, an open field to the north lets you observe as long as possible. See the chart at the end of the newsletter for its track

Comet C/2019 Y4 (ATLAS)

Total visual magnitude m1 (+), Coma diameter (◊)



Just to put a dampener on some of the more extreme speculation above about Y4 however the above chart from the German Comet group shows the comets brightening flattening somewhat. Also note that if it does get bright it will be very close to the sun at that point. I see that already the media is getting excited about it. All I can say is remember Kouhoutek and ISON.

Deep Sky Objects

April deep sky targets

Lots of Galaxies this month

NGC 5395 and 5394 interactive spiral galaxies in the constellation of Canes Venatici

M104 The Sombrero Galaxy in Virgo

NGC 2903 is a Barred spiral galaxy in Leo

M109 a Barred spiral galaxy in Ursa Major

NGC 4565 The Needle galaxy in Coma Berenices

NGC 2683 The UFO galaxy in Lynx

M63 The Sunflower galaxy in Canes Venatici

NGC 4151 is an Intermediate spiral Seyfert galaxy in Canes Venatici

Markarian's Chain – a chain of at least 15 galaxies in Virgo, view from a dark site with binoculars or small telescope.



NGC 5395



M 104



M64 in Coma



M 109 – all above images by Steve Creasey



M81 in UMa – above images by John Napper



NGC 6781 in Aquila

LAST MONTHS TALK

March 2020's talk

Gwyneth Hunter

March 2020, and luckily our early end to our season came with a very mind-expanding talk came from Dr Floor van Leeuwen from the institute of Astronomy in Cambridge. He worked on the Hipparcos star position data and his talk was “the nearby Open Clusters as observed in the Second Gaia data release”.

The Gaia satellite continues to make very accurate observations of star positions and uses the Earth's orbit as a baseline so that it can record their parallaxes. By recording star positions over six month intervals over time it can also record stars' proper motions across the sky. Its optics have a folded focal length of 35m and has two mirror units separated by 106° whose images are projected onto

the same focal plane. All this provides excellent triangulations and very accurate stellar parallaxes down to ten micro-arcseconds.

The detectors are 100CCDs which are elongated; this enables them to scan to a high or a low resolution depending on the direction of scan.

They need to be kept to a very accurate temperature and cannot scan in the plane of the ecliptic for fear of looking at the Sun and being fried. In practice Gaia is kept facing 45° from the Sun so the best coverage is of the zone within 45° of the poles although all sky coverage has been completed.

The positions of around 1.7 billion stars was released on 25/4/18. This was the second data release after the first one in 2016.

The data contained positions of open clusters and he has based his research on those clusters within 240 parsec of us. These include our familiar friends the Hyades, the Alpha Persei group, Pleiades, Praesepe and less familiar ones such as Blanco 1. It is able to detect stars down to magnitude 20.

In the case of the Hyades, 480 stars have been found to be part of the group and their average distance is 47.6pc. Van Leeuwen used data from 300 of the stars. They appear to be moving away from us towards a converging point. They display a proper motion, especially those nearer to us. There are also stars moving through the cluster but their proper motions don't fit. There are also stars that are right on the converging point so they don't have a proper motion, just a parallax (line of sight effect), as they move directly away from us. Using the data he was able to construct a 3D view of the cluster, and that it appears flattened along the plane of the Milky Way.

Gathering data depends on the distance. Anything beyond 250pc is hard to see. If the cluster members are not moving quickly through space that also makes movement harder to detect. Praesepe is such an example. Coming back to the Hyades, he placed its members onto the HR diagram and they produce a lovely main sequence line with a thin second line running along just above it. These are double stars so their combined light makes them appear .75 of a magnitude brighter. There are already some white dwarfs. The Hyades are only about 790 million years old.

When van Leeuwen plotted Praesepe along with the Hyades he found their velocities suggested they were of the same origin. Praesepe's distance averages 186pc and its age is around 710 million years. It contains at least 771 stars. Unfortunately a lot of the stars are too faint for Gaia to obtain enough data.

In the case of the Pleiades and Blanco 1 their double stars also follow the main sequence line on the HR diagram, slightly above the main line.

In total, van Leeuwen used nine clusters in his study, and he combined them all onto the HR diagram. Although these clusters are all quite young, you can see the more massive stars have already been leaving the main sequence and turning into white dwarfs (at the bottom left) but on the bottom right are small stars that haven't yet evolved onto the main sequence line.

Other findings are that the Pleiades members are spread out to 11° in diameter. All we see from the ground is about 6° .

Sizes of globular clusters can also be scanned out to be much bigger than first thought: Omega Centauri is $3-4^\circ$ and 47 Tucanae is much bigger than the Moon in our sky.

The Gaia mission is hoping to continue up to 2025, with two more data releases in the pipeline. The longer we can observe these local clusters, the clearer the proper motions of their stars will become.

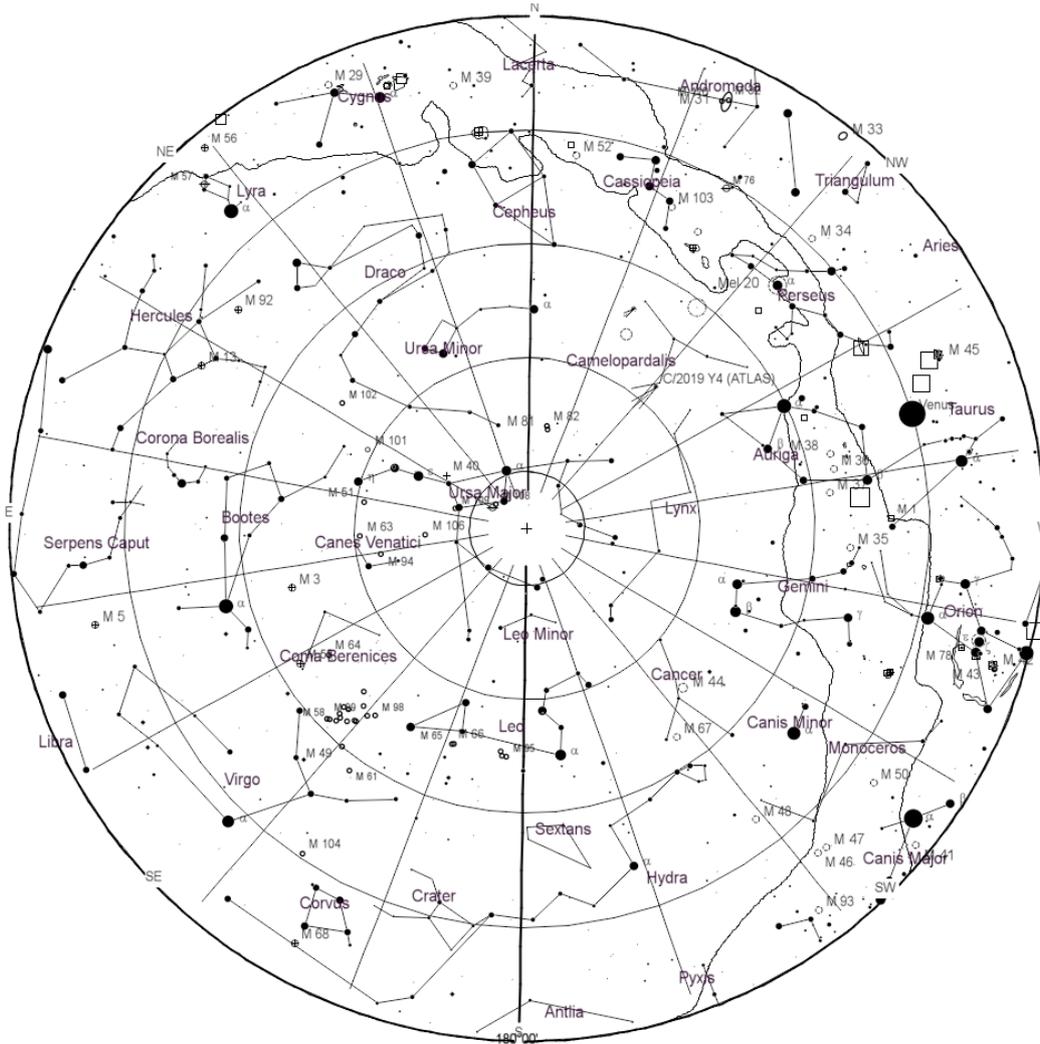
Bear in mind that these data releases will be made available to citizen science, and that you can access these archives yourself should you wish. You just have to register. Beware though that there is so much stuff that you would take a day to download it and your computer would need to have petabytes of capacity. The best Gaia website is www.gaia.ac.uk (The nine star clusters used in the study are: Hyades, Pleiades, Praesepe, Alpha Persei group, Coma Berenices, NGC 2451, Blanco 1, IC 2602, IC 2391)

Our after-tea talk was Dan Larkins who informed us of various websites where you can have free access to astronomy books and magazines. The best links are Epub, project Gutenberg and Internet Archive.

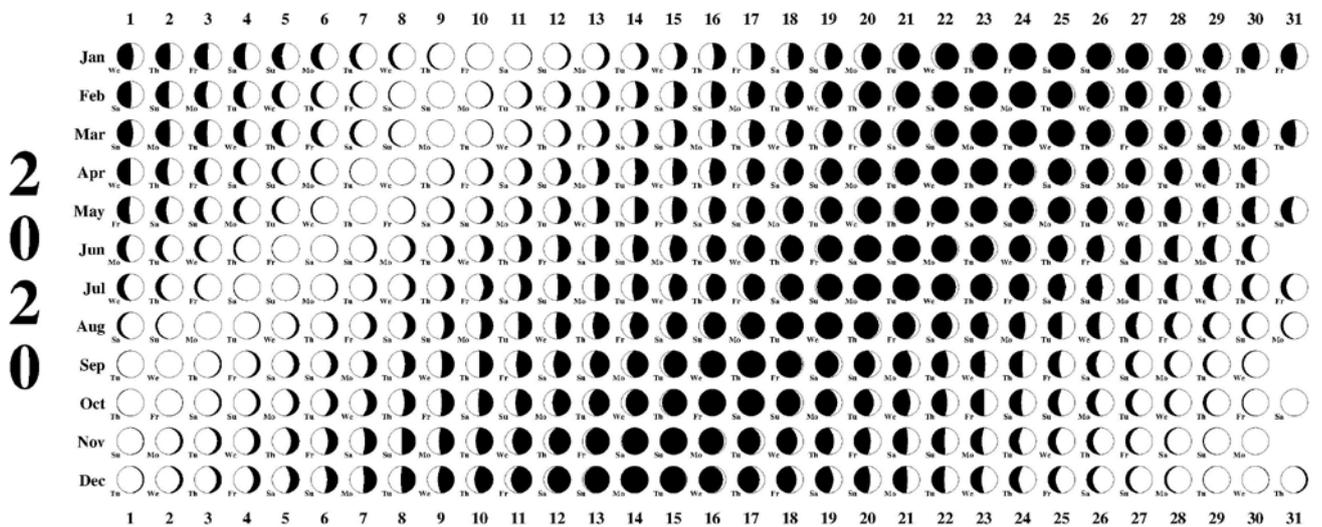
Observing evening: There are no further Observing evenings this session. This is due to the fact that it is now too light and not to Covid-19, we hope to restart these in the next session.

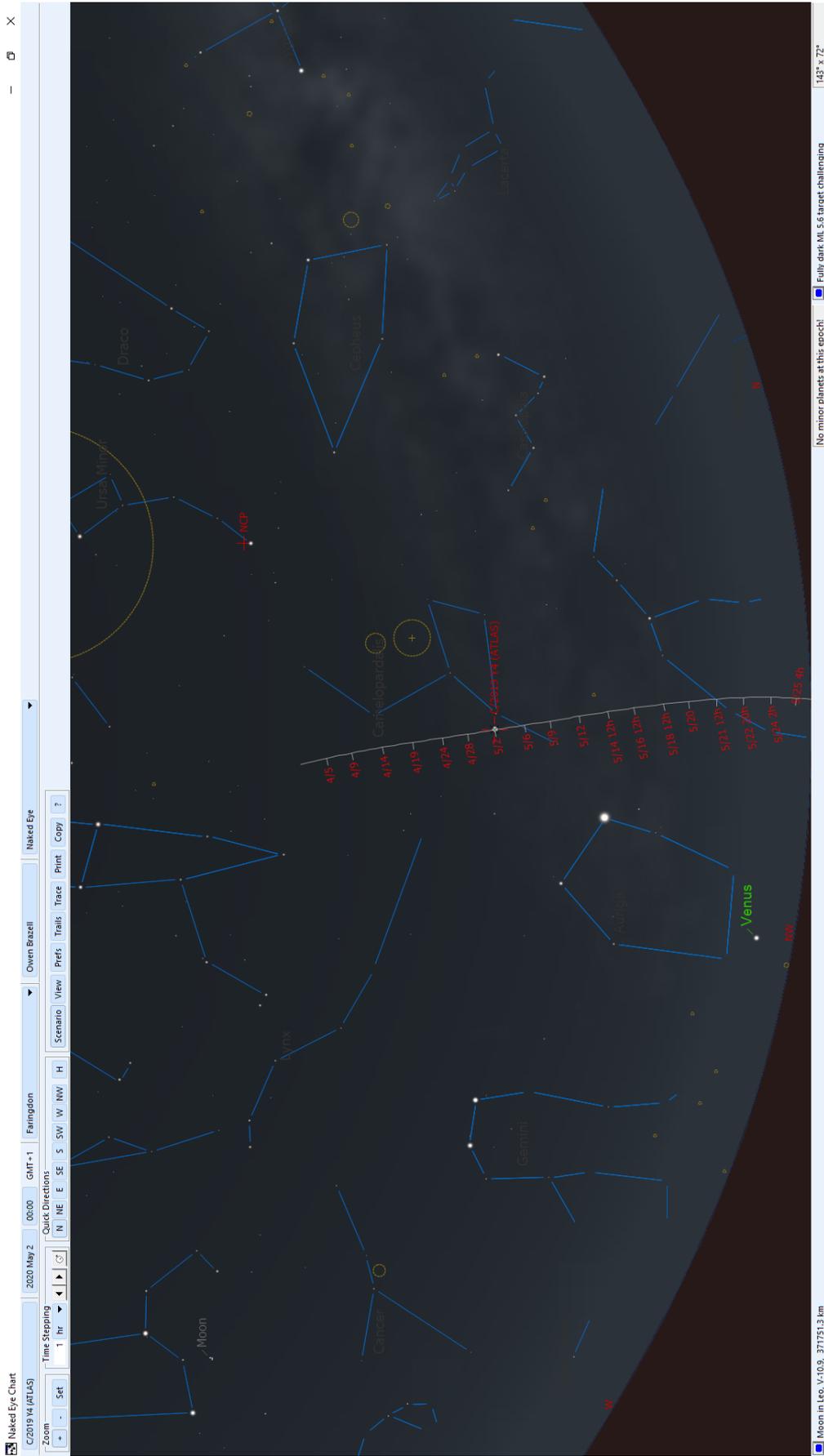
STAR CHART

The night sky at 22:00 (BST) Wednesday 15th April 2020

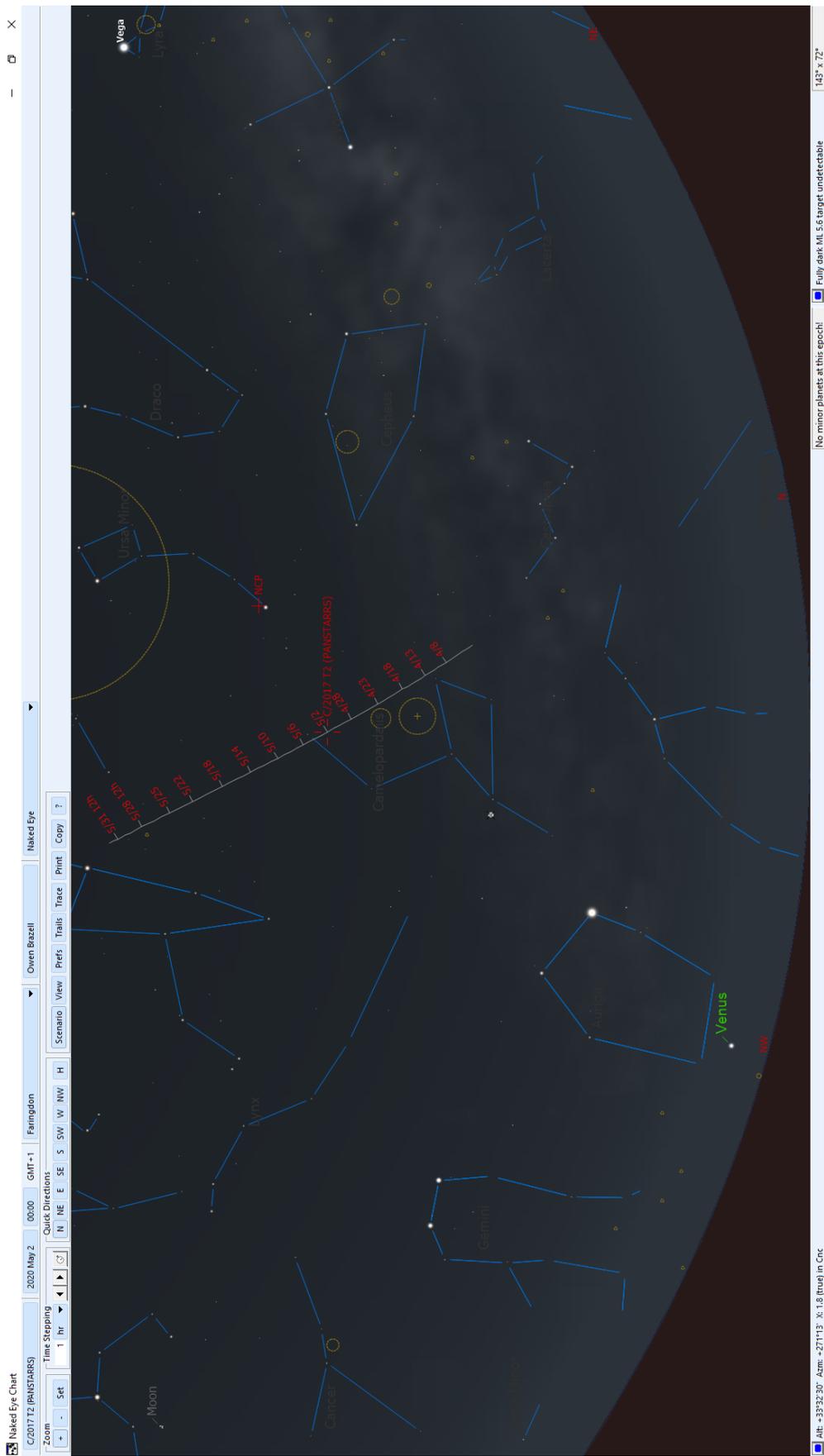


MOON PHASES: 2020





Track for Comet C/2019 Y4 – taken from SkyTools 4



Track for Comet C/2017 T2 through May – taken from SkyTools 4