



August 2021 EDITION

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Editorial

Welcome to the August edition of Janus.

Once again, a shortage of contributions means this month's edition is thinner than I would like. Gary Walker has provided his customary report on his observations, together with some thoughts on the commercialisation of space programmes and recent space tourism precursor flights, but I find it hard to believe that no one else has anything to offer.

I have written a piece for this month's edition highlighting the recently identified threat to radio astronomy posed by the growing number of satellites in low Earth orbit whose mission is to provide a world-wide, broad-band, internet capability. These satellites broadcast their signals on the same frequency as that at which many radio telescopes operate; the resulting interference can, quite simply, totally block the faint signals from outer space which the telescopes are designed to detect thereby severely limiting their value.

There is also a short item on the theme of dark skies which includes contact details for some sites in the UK and a link to a report on "Dark and Quiet Skies for Science and Society" produced for the United Nations.

For those wondering about future meetings, the committee has discussed how and when we might return to physical meetings. The earliest possible date is September, but there are some issues that need to be addressed before a final decision is made. Further information will be provided to members in the near future.

John



The Solar System August

MERCURY: recently passed behind the Sun at superior solar conjunction. It begins the month not readily observable since it is very close to the Sun, at a separation of only 1° from it. For the remainder of the month, it is not observable, reaching its highest point in the sky during daytime and being close to, or below, the horizon at dusk.

VENUS: recently passed behind the Sun at superior solar conjunction and, throughout the month, will be difficult to observe. It will reach its highest point in the sky during daytime and be no higher than 6° above the horizon at dusk.

MARS: will soon pass behind the Sun at solar conjunction. It begins the month not observable, reaching its highest point in the sky during daytime and being 3° below the horizon at dusk. By the end of the month, it remains not readily observable since it is very close to the Sun, at a separation of only 12° from it.

JUPITER: is currently approaching opposition and is visible as a morning object. It begins the month visible in the morning sky, becoming accessible around 22:39, when it reaches an altitude of 8° above the SE horizon. It will then reach its highest point in the sky at 02:36, 25° above the S horizon before being lost to dawn twilight around 04:58, 18° above the SW horizon. By the end of the month, it is visible between 20:35 and 04:10. Becoming accessible around 20:35, when it rises to an altitude of 7° above the SE horizon, it will reach its highest point in the sky at 00:22, 24° above the S horizon. It will become inaccessible around 04:10 when it sinks below 7° above the SW horizon.

SATURN: begins the month approaching opposition and is visible as a morning object. Becoming accessible around 22:23, when it rises to an altitude of 10° above the SE horizon it will reach its highest point in the sky at 01:18, 20° above the S horizon. It will

become inaccessible around 04:13 when it sinks towards the SW horizon. By the end of the month, having recently passed opposition, it is visible in the evening sky, becoming accessible around 20:31, 11° above the SE horizon, as dusk fades to darkness. It will then reach its highest point in the sky at 23:05, 19° above the S horizon and will continue to be observable until around 01:55, when it sinks towards the SW horizon.

URANUS: begins the month visible in the dawn sky, rising at 23:46, and reaching an altitude of 34° above the E horizon before fading from view as dawn breaks around 03:38. By the end of the month, it is visible in the dawn sky, rising at 21:51 and reaching an altitude of 53° above the S horizon, before fading from view as dawn breaks around 04:43.

NEPTUNE: begins the month as a morning object, visible in the dawn sky, rising at 22:18 and reaching an altitude of 34° above the S horizon before fading from view as dawn breaks around 03:38. By the end of the month, approaching opposition, it is visible as a morning object in the morning sky, becoming accessible around 22:57, when it reaches an altitude of 21° above the SE horizon. It will then reach its highest point in the sky at 02:01, 34° above the S horizon, before being lost to dawn twilight

MOON PHASES:

| | |
|---------------|---------|
| Last Quarter | 31 July |
| New Moon | 8 Aug |
| First Quarter | 15 Aug |
| Full Moon | 22 Aug |
| Last Quarter | 30 Aug |

Notable Events:

Observation of some of these events may require a telescope, although some will be visible with the naked eye. More information at <https://in-the-sky.org>

August

- 2 Saturn at opposition
- 11 Conjunction of the Moon and Venus
- 12 Perseid meteor shower 2021
- 18 κ-Cygnid meteor shower 2021
- 19 Asteroid 43 Ariadne at opposition
- 20 Jupiter at opposition
- 20 Uranus enters retrograde motion
- 20 Conjunction of the Moon and Saturn

- 22 Conjunction of the Moon and Jupiter
- 24 Asteroid 89 Julia at opposition

Collected Observations (and thoughts) – Gary Walker

Mars ends its current cycle – 11 Jul

On 10th July, using my telescope, I observed Mars low in the West in twilight. By now, of course, it was far away and very small, with an angular size of only 3.8' arcseconds, which is about as small as Mars gets. To put it in context, this is roughly the same angular size as Uranus!

Nevertheless, I could still see it as a disk, especially at 222X power, although it was far too small to see any features on it.

Last year, my "active" observational period of observing Mars ran from July 2020 through to about January 2021, during which time I could see features on it. The Opposition was in late September. I last saw features in February - March 2021, when the angular size of Mars was down to around 6' arcseconds.

The current cycle of Mars visibility is coming to an end as it disappears into, and beyond, the Sun's glare, before it slowly crawls back into the early morning sky, for another "season".

The Summer Triangle – 11 Jul

Sir Patrick Moore coined the term "the Summer Triangle" for the bright summer stars of Vega, Deneb, and Altair. This term is apt, as when I am sitting out in the garden on summer nights, these three stars do form a triangle.

Vega is in the constellation of Lyra and cannot be misidentified, as it is virtually overhead in the summer. It is a blue-white star, "only" 25 light years away, and is the brightest of the three stars.

Altair is in Aquila and is the furthest East of the three stars. It is even closer, at 16 light years away.

Deneb forms the Northern end of the constellation of Cygnus. It is only a bit fainter than Vega or Altair, so you could be forgiven for thinking that it must be about the same

distance away from us as the other two stars. In fact, Deneb is about 1,500 light years from Earth, thus proving that you cannot necessarily tell how far away a star is simply by its magnitude!

Some of the closest stars are the Red Dwarfs, such as Barnard's Star, Proxima Centauri and others, all of which are within a few light years of our Sun, yet none of them are visible to the naked eye, as they are so feeble!

On the other hand, Deneb is obviously a very powerful and luminous star for it to be so bright over such a great distance.

Within the Summer Triangle, other wonders include M57 (the Ring Nebula) in Lyra, and the orange and blue double star of Alberio in Cygnus. The "Double-Double" star of Epsilon Lyrae, also in Lyra, is a multiple star system of at least five stars and can be split into 2 close pairs when viewed at high powers.

Venus-Mars Conjunction – 13 Jul

On the evening of 13th July, I saw both Venus and Mars with my 'scope, in the same field of view, at 62X magnification, as they were less than half a degree apart. The two planets could, however, not be fitted into a 100X magnification field of view. Venus was to the East of Mars, so appeared to be above Mars.

Despite its low altitude, Venus was easy to see. Mars, however, took some finding - even in my scope - as it had to be observed in a twilight sky! Whilst I saw Venus with my 20 X 80 binoculars, Mars was too faint to be seen with them.

I could see that Venus was now definitely gibbous (86% phase). Venus was now about 11.8' arcseconds in angular size, whilst Mars was only 3.8' arcseconds in size.

Apart from their obvious difference in size, they were also different colours, with Venus being white and Mars being orange!

Jupiter and Saturn – 16 Jul

One cannot fail to have noticed that Jupiter and Saturn have started to creep back into the skies in the late evening. They are low in the sky, quite close to each other, with Saturn "leading" the way. Jupiter is very bright, and

it is strange to see this bright "star" suddenly appearing very low down in the treeline to the East!

Viewed through my telescope, the North Equatorial Belt was prominent, but the South Equatorial Belt was very thin and fragmentary. Over time, the South Equatorial Belt is prone to fading and change. That is one of the reasons why Jupiter is so fascinating to observe, because you only see the top of its atmosphere and, being gaseous, it is constantly liable to change! North of the North Equatorial Belt there was a thinner belt, the North Temperate Belt.

Although Saturn's rings are slowly closing up, they are still wide open this year.

Space Flights – 20 Jul

Well, the month of July has seen some Spaceflight milestones! First, on 11th July, Sir Richard Branson finally managed to get into Space aboard his Virgin Galactic rocket plane. It left the ground attached to the mother plane, then separated from it, rocketing up to apogee, before coming back down, and eventually gliding back to the ground. The craft reached a maximum height of 53.3 miles above the Earth.

Then, on 20th July, another millionaire, Jeff Bezos, launched from the Texas desert and, on reaching an altitude height of over 62 miles, the capsule with large windows for panoramic views separated from the booster and parachuted back to the ground, all in just over 20 minutes! With him aboard the craft were Wally Funk, now 82 years old, who was originally training on the Mercury 7 missions in 1959, but never made it to space, and 18-year-old, Oliver Daemon - the youngest person (so far!) to make a trip into space.

The female commentator, kept on repeating "What a day!"

Incidentally, and deliberately, they chose 20th, as it was exactly 52 years since Apollo 11 landed on the Moon.

Private companies launching missions into Space are now a reality and have been ever since the first successful launch of Space X, at the end of May 2020. Companies such as the Mullard Space Science Laboratory, and others making parts for satellites in

Stevenage and Surrey, have, of course, been in operation for years, but running Space Programmes is no longer entirely the province of large organisations such as NASA, ROSCOSMOS or CNES!

I have watched these recent launches on my mobile phone – a new experience in itself!

The US airline Pan Am originally had plans to take passengers to the Moon. Many bought tickets for it, but it never came to pass and, indeed, Pan Am itself has ceased to exist.

There are also proposals for "Space Ports" in the UK - in Cornwall and Scotland!

Sadly, for some time to come, space travel will remain the preserve of the extremely rich. Only millionaires, as seen this month, and in the last few years, have managed to hitch a ride into Space. So, it may be a while, before members of the Ewell Astronomical Society will be buying their seats and, of course, reporting their experiences in Janus!

So, in the meantime, "Watch This Space" (please excuse the pun!)

Nova in Cassopia again – 23 Jul

The Nova in Cassopia has flared up again. Normally, it has been, on average, about twice as bright as a star which is close to the left of it (actually, it is on the right-hand side but, like mirrors, SCT telescopes reverse images). In addition, a quite bright star, about a quarter of a degree to the North of the Nova, is roughly twice as bright as the Nova.

On 22nd - 23rd July, however, I saw that the Nova was of about the same magnitude as this star. In fact, when I first looked at it, the starfield in my scope looked sufficiently unfamiliar for me to think that my telescope had pointed incorrectly - I was using the GOTO!

This Nova first appeared on 18th March and, after 4 months, is still going strong. It is about half a degree to the north of the open star cluster of M52. Since March, it has fluctuated between about magnitude 8, and up to magnitude 6.5, and back again. It reached magnitude 5.5 in late July. On 28th July, the Nova seemed to be off-white, or even with a tinge of orange in its colour, whilst the star about one quarter of a degree to the North of it was bluish white in colour.

The threat to Radio Astronomy from LEO satellite constellations - John Davey

Readers will be familiar with the concerns raised by astronomers regarding the pollution of astrophotography images caused by clusters of satellites in LEO constellations such as Starlink and OneWeb. These satellites are being launched in large numbers to provide broad-band internet access, particularly to more remote areas of the world. The chains of intensely bright, star-like "dots" visible in short duration exposures, whilst certainly annoying, tend to be prevalent only during the early stages of the satellites' deployment, disappearing once the satellites have reached their higher altitude operational orbit. The wider-spaced "dots" and streaks which appear in longer duration exposures are, however, of more concern as they can distort more sensitive scientific observations.

Pollution of astrophotography images results from the LEO satellites being illuminated by the sun; hence, it only occurs when the appropriate sun-satellite-observer geometry exists and can, at least for short duration exposures, be avoided. Recently, however, the radio astronomy community has added its concerns to those of the optical astronomy community.

Radio astronomy's problems with satellite constellations differ from those faced by optical astronomy. Satellite-reflected light is noise, so getting rid of it by coating the satellites or by changing their orientation may well have little or no effect on the satellite's mission. However, communications satellites use radio waves to deliver their signals to users and, for obvious reasons, can't perform their mission if their radio output is blocked.

Radio astronomy competes for usable spectrum with other radio applications. During the 20th century, agencies such as the International Telecommunications Union and the U.S. Federal

Communications Commission were charged with allocating frequencies to commercial carriers and government agencies as well as to astronomers. These allocations are discussed and agreed annually at the World Radio Conference (WRC). Initially, when frequencies were readily available, radio astronomers managed to secure protection for important parts of the radio spectrum. In recent decades, however, the radio spectrum has become more crowded, and most bands are now shared by multiple categories of user, including satellites. In some cases, priority is given to one category of user over another, but this gives limited protection. The seemingly endless expansion of radio transmission to make use of higher frequencies (which provide more band width), and the general proliferation of radio transmissions in space will make radio astronomy even more vulnerable.

The beams of the communication satellites in low Earth orbit scan continually across the ground, which presents a major problem if their tracks scan across radio telescopes. This is because the signals transmitted from the satellites are 60-100 dB¹ stronger than the faint astronomical sources in the sky that the telescopes were built to record. The signals can overload antennas and, in extreme cases, may even destroy sensitive receivers. Satellite signals also can spill over into adjacent frequencies which, it is claimed, has been a problem for 20 years with the Iridium fleet. The Dark Skies report of the International Astronomical Union specifically recommended avoiding illumination of radio telescopes or quiet zones with satellite beams or side lobes. If this recommendation were implemented, then satellite operators would have to turn off transmissions when overflying these areas, potentially causing significant interruptions to internet data streams.

Other satellite businesses pose new threats. A drop in the price of synthetic aperture radar for Earth mapping resulted in the launch of several start-up companies with plans to scan the world using a few dozen radar satellites. Radio astronomers can ask companies not to illuminate their telescopes, but the companies don't have to comply with those requests. With, in some cases, kW-class powers, these beams are like "death rays" for radio astronomy receivers - at best they totally mask any incoming signals, at worst they would cause irreparable damage to the receiver.

An interesting article on the effects of satellites on ground based astronomy is at: https://www.osa-opn.org/home/articles/volume_32/may_2021/features/will_satellites_cripple_ground-based_astronomy/

Information on Dark Skies - John Davey

Dark skies are important to all astronomers - the darker the sky, the better the viewing conditions. The continuing growth in light pollution is a world-wide problem. Such is the concern that the UN Office for Outer Space Affairs held a 5-day long on-line workshop on the subject from 5th - 9th October 2020. The outcome was a lengthy report "Dark and Quiet Skies for Science and Society" which reviewed the findings of the workshop and made recommendations to alleviate the problems identified. The full report is available at <https://www.iau.org/static/publications/dqskies-book-29-12-20.pdf> and a summary of the recommendations ("Keep Dark and Quiet Skies for Science and Society") is at <https://www.iau.org/static/publications/uncopuos-stsc-crp-8jan2021.pdf>

A comprehensive guide to the many publications on the subject "Dark Skies and Light Pollution: A Resource Guide [with a section on Radio Interference]", published in January 2021, is at https://astrosociety.org/file_download/inline/9cb75e29-0883-441e-aa45-be8af726e306

For those who might be contemplating an astronomy "staycation" in UK, the Federation of Astronomical Societies (FAS) has an initial list of people who have indicated that they are open to approaches from members of FAS looking to access a dark skies site for astronomical purposes. Copies of their letter and the list of contacts are reproduced below.

¹ Decibel (dB) is a unit for expressing the ratio between two physical quantities, usually amounts of acoustic or electric power, or for measuring the relative loudness of sounds. One decibel (0.1 bel) equals 10 times the common logarithm of the power ratio. For example, a 60-dB, or 6-bel, signal is six powers of 10 (i.e., 10⁶, or 1,000,000) times more intense than a barely detectable signal of 1 dB

Publications

publications@fedastro.org.uk

01623 759954



Dear Member,

You will find below a short initial list of people who have indicated that they are open to approaches from members of the FAS in regard to accessing a dark skies site for astronomical purposes. If you know of further sites that could be included on this list, please contact me by the email address or telephone number above.

To book a site please contact the site directly on the phone number provided as the Federation is not a booking agency for this nor will we intervene in the commercial negotiations between you and the land occupier. When booking check what is being provided and then make your arrangements accordingly.

As regards facilities, each site will offer a weather resistant surface, vehicle access to within a quarter of a mile though some will have mains, weather shelter and in a couple of cases on-site toilet facilities.

Planning regs do allow the occasional caravan/motor home to be parked convenient for observers though one or two are commercial caravan sites with a rally field. The booker should confirm that bringing them and other temporary structures like gazebos will be OK.

If your society has taken out public liability (from any provider) you will be insured against PLI claims only if the site is booked in its name, otherwise the booker must arrange to provide proof of insurance cover themselves if requested.

Please be mindful of other users of the site if present.

Neil Mudford,
Publications Officer,
Federation of Astronomical Societies.

The Federation of Astronomical Societies
Secretary: 3 Campion Gardens, Kirkby in Ashfield, Nottinghamshire, NG17 8RG
secretary@fedastro.org.uk; 01623 756922

Dark Skies Site List, July 1st, 2021

England, Alnwick

NE67 5HX, 0797 6900668, middlemoorfarm@btconnect.com

Mrs. Jane Armstrong, Middlemoor Farm, North Charlton, Alnwick

www.middlemoorfarmholidays.co.uk

** Mrs Armstrong is looking for a society in her area to advise on developing this income stream.

England, Borders

TD1 2PN, 04478 66553248, JGThomson@hotmail.co.uk

Mr. John Thompson, Chapel Mains Farm, Blainslie, Galashiels, Selkirkshire

(Same owner as T10 6UP)

England, Borders

TD10 6UP, 04478 66553248, JGThomson@hotmail.co.uk

Mr. John Thompson, Caldside Farm Cottages, Greenlaw, Duns.

(Same owner as TD1 2PN)

England, Oxfordshire

OX7 5RH, 01608 737536 (Answerphone)

Mrs Marilyn Chapman, Manor Farm, Great Rollright, Oxfordshire

England, Winchester

SO21 3NZ, 07407 240519, oatkinson@bcm.co.uk

Mr Oliver Atkinson, BCM, The Old Dairy, Sutton Scotney, Winchester

England, Wisbech

PE14 8QN, 07768 088085

Mr. Giles Shakespeare, Bridge Farm, Stow Road, Outwell, Wisbech, Cambridgeshire

Wales, Brecon

LD3 8RD, 01554 773779, 01874 638220

Mr. Stuart Poulson, Bronydd-Mawr Farm, Llwel, Brecon, Powys, Wales

Wales, Cardigan

SA431PR, 01239 612196, info@cardiganisland.com

Mr. Lyn Jenkinson, Cardigan Island Coastal Farm Park, Gwbert, Cardigan, Ceredigion, Wales

Up Next:

**NEXT MEETING: 8pm Friday 10
September 2021 - Nonsuch High School
and/or Virtual meeting via Zoom**

Dr Pauline Norris will talk about The Ancient Egyptians and their astronomy. If you would like further details, please contact Antia King. Please register before attending here

Ron Canham will also deliver his Sky at Night presentation for the month to come.

NEXT USER GROUP:

Suspended until further notice.

NEXT DENBIES OBSERVING SESSION:

Suspended until further notice.

AD HOC OBSERVING AT WARREN FARM:

These will be at short notice when the weather is favourable. Please watch our Whats App feed for alerts.