SPACEWATCH

the newsletter of the Abingdon Astronomical Society

Next Talk
6th April 2020
Astrophotography
Mel Gigg
Chipping Norton AS

EDITORIAL

As we approach the mid point of the observing season it is worth pointing out that March has the last planned observing session of the season as the skies are too bright in April for observing. Hopefully all the events noted will go ahead but with the Coronavirus issue popping up please watch out for notes about meetings just in case we are forced to cancel. I hope you did manage some observing last month despite it being the wettest February on record. I did note there were a number of clear nights (usually when the moon was too bright) but felt that the skies from Oxfordshire at least were rather cloudy. My thanks to those who helped out at the Star gazing evening for Uffington Primary School in Cristina, John, Themos and Lucasz for bringing along telescopes and binoculars.

Just for interest with National Astronomy Week coming in November and centred around the Mars opposition we are looking at ways we can do an outreach event for that, possibly on Saturday 14th November.

Moon and Venus in conjunction on 27th Feb images by Owen Brazell

THE NIGHT SKY FOR MARCH 2020

By Steve Creasey & Cristina Garcia Pozuelo Sanchez

Wow, what a month February was, apparently the wettest February on record.
Needless to say, not much observing or imaging got done.
We did get a little bit lucky Wednesday 26th, with a Stargazing event at Uffington primary school, the skies stayed clear for about 2 hours, which was all we needed to show some very enthusiastic children, teachers and parents the 9% waxing crescent Moon, Venus and a few other deep sky objects. Thanks to Cristina, John, Themos and Lucasz for bringing along telescopes and binoculars.

The Planets

Mercury – Mercury is a morning object low in the east-southeast mid-month. A balancing act then takes place: as the planet becomes brighter it drops south beneath the ecliptic and loses altitude. It reaches greatest western elongation on **24 March** (27.8˚) but will only be visible for a short time before the sunrise.

Venus – Venus hits a big milestone, reaching its greatest elongation (46 degrees east) from the sun on March 24th, this places Venus high in the western sky at sunset.

Living at a mid-northern latitude, you might be surprised at how high Venus appears at sundown, and also how long this planet stays out after dark. Whenever Venus reaches a greatest evening elongation in close concert with the spring equinox, Venus turns into a virtual night owl. Although Venus reaches a greatest evening elongation 5 times every 8 years, the favourable convergence of greatest elongation with the spring equinox only happens in cycles of 8 years. Enjoy Venus while the time is at hand!
At mid-northern latitudes, Venus sets about 3 3/4 hours after sunset at the beginning of the month, and about 4 hours after sundown by the month's end. What's more, Venus will remain in good view all through April 2020.

From a far-northern Arctic outpost, such as Barrow, Alaska (71 degrees north latitude), Venus at its greatest elongation will actually be out all night (and all day) long, mimicking the midnight sun of summer. In fact, from that far north, Venus will become circumpolar (above the horizon all day long) starting around March 17, 2020, and Venus will remain circumpolar (that far north) throughout April 2020.

Mars – Mars is the first bright planet to rise into the morning sky in the beginning of March 2020, followed by Jupiter and then Saturn. But in the great race of the morning planets, Jupiter will catch up with Mars around the March equinox, to pass 0.7 degrees to the North of Mars on March 20, 2020.

Then Mars will sweep by Saturn by the month's end, to swing 0.9 degrees south of Saturn on March 31, 2020. In April 2020, Jupiter will be the first bright planet to rise in the morning sky, followed by Saturn and then Mars.

At mid-northern latitudes, Mars rises about 3 hours before the sun throughout March.
Let the waning crescent moon help guide your eye to Mars (and nearby Jupiter!) for several mornings, centred on or near March 18.
Mars was in conjunction with the sun – or almost behind the sun as seen from Earth – on September 2, 2019. It remains far across the solar system from us, with Earth speeding around in its orbit, trying to catch Mars again. It'll be some months before we catch Mars, the swiftest-moving superior planet. And so it is, always, for Mars, which alternates years appearing bright in our sky, or faint. 2019 was a dull year, but 2020 will be an exciting one, for Mars!

The excitement will build slowly, though. In March 2020 … you'll still find Mars only modestly-bight, rather low in the southeast before dawn. We'll be rushing along in our smaller, faster orbit, trying to catch up with Mars. As northern summer 2020 approaches, Mars will begin to change. It'll brighten more dramatically as, finally, Earth begins to close in on Mars. The red planet will appear brightest in our sky – very bright indeed and fiery red – around the time of its opposition – when Earth passes between Mars and the sun – on October 13, 2020.

Jupiter – the second-brightest planet – is a morning planet all month long. At mid-northern latitudes, Jupiter rises about 2 1/2 hours before the sun in early March, and about 3 1/2 hours before the sun by the month's end. At temperate latitudes in the Southern Hemisphere, Jupiter rises about 4 hours before the sun in early February, and about 5 3/4 hours before the sun by the month's end.

Before sunrise on or near February 18, let the slender waning crescent moon help guide you to Jupiter (and nearby Mars!).

Watch for Jupiter to gain prominence in the morning sky throughout March 2020. On March 20, 2020, Jupiter and Mars will have a dazzling planetary conjunction in the predawn sky.

Saturn – Saturn is the last of a string of three bright morning planets – Mars, Jupiter and Saturn – to rise into the morning sky. Nonetheless, Saturn rises before dawn for most of the world (except far-northern latitudes). Look first for brilliant Jupiter and you'll find Saturn a short hop to the east of Jupiter. Remember, east is in the direction of sunrise.

From mid-northern latitudes, Saturn rises about 2 hours before the sun at the beginning of the month, and about 3 hours before sunrise by the month's end. From temperate latitudes in the Southern Hemisphere, Saturn rises about 3 1/2 hours before sunrise in early March and about 5 3/4 hours before sunrise by the month's end.

Watch for the waning crescent moon to swing close to Saturn on or near March 19.

Uranus – Uranus spends all of 2020 in the constellation of Aries the Ram. It can be spotted in the evening sky from Jan. 1 to April 8, then shift to the morning sky from May 12 to Oct. 30. Uranus returns to the evening sky from Oct. 31 to Dec. 31

Neptune – Neptune spends all of 2020 in the constellation of Aquarius the Water Carrier. At a peak magnitude of +7.8, this bluish-hued world is only visible with good binoculars or a telescope. Neptune is in conjunction with the Sun on 8 March

and is not currently visible. Neptune will be visible in the morning sky from March 24 to Sept. 10. It returns to the evening sky from Sept. 11 to Dec. 31.

Meteor showers

There are no major meteor showers this month, however February is the start of the evening fireball season, when an abundance of fireballs seem to occur. This lasts well into April as seen from the northern hemisphere.

Comets

C/2017 T2 (PanSTARRS) mag 9 and brightening, in the constellation of Cassiopeia

C/2020 A2 (Iwamoto) mag 11 moving from Cepheus to Cassiopeia

C/2019 Y1 (ATLAS) mag 10 in March. In the constellation of Pegasus

C/2019/ Y4 (ATLAS) this is a newish comet that has brightened rather suddenly and now has magnitude estimates around 12 or brighter if you are an imager. It is currently moving through UMa

Deep Sky Objects

March deep sky targets

Lots of Galaxies as you would expect this time of year, with a few Globular clusters and a Planetary Nebula.

M96 is an intermediate spiral galaxy about 31 million light-years away in the constellation Leo.

Perhaps often overlooked as well is the bright galaxy NGC 2903 in the head of Leo. There is also the HII region NGC 2905 associated with the galaxy. At 10th Mag it should be within the range of large binoculars or a small telescope form a dark sky.

NGC 3242 the Ghost of Jupiter, is a planetary nebula located in the constellation Hydra.

NGC 3628, also known as the Hamburger Galaxy is one part of the Leo Triplet, along with M65 and M66.

NGC 4147, Globular cluster in the constellation of Coma Berenices, 60,000 lightyears away.

M104 The Sombrero Galaxy, a beautiful edge on galaxy in the constellation of Virgo.

NGC 3521 The Bubble Galaxy, is a flocculent intermediate spiral galaxy located around 26 million light-years away in the constellation Leo.

M68 a Globular Cluster in the constellation of Hydra NGC 2992 and 2993 two galaxies in the constellation of Hydra, both displaying signs of interaction.

LAST MONTHS TALK

2020 January's talk

Gwyneth Hunter

Rob Slack is a member of Swindon Stargazers. His talk 'The Grand Tour - Mission to the Giants', namely the Voyager missions took us back to the sixties and the space race and the two people who made the Grand Tour possible. I will introduce the second person first: Gary Flandro, who worked out that we could use gravity assist on spacecraft to propel them from one gas giant to the other. Also that an amazing planetary alignment would take place in September 1977 and that there would not be another chance for 175 years.
These gravity assists were a recent big thing and could be used to speed up or slow a vehicle to help it cross the interplanetary vastness of space. This was actually part of Flandro's postgraduate studies, so he wasn't high on the academic ladder at that point. Rob then introduced another person (person number one!) whose computations enabled Flandro to make his own amazing proposition: Michael Minovitch. He was a mathematician who was set a challenge to work on the 'three body problem', in other words you have scenarios of the Sun, a planet, and a third object such as a comet, asteroid or spacecraft acting on each other. He was given time on the massive IBM 7090 computer at UCLA in order to work out different trajectories and came up with gravity assists. This was in 1961 and sadly the space race meant it got buried.
Luckily Flandro was around to build on it and in 1969 NASA wanted a ten year mission to the outer planets.At the time it was not known how populated the asteroid belt was, and how strong was Jupiter's radiation. (James Alfred) Van Allen had done lots of work on the radiation belts around the Earth, but it was not known yet that Jupiter's Van Allen belts are millions of times stronger. (If you have a short wave

radio you can hear Jupiter, mainly as Io moves through its magnetic field.)

Those with longer memories may already know that the two Pioneer craft (1972/73) did not even have proper cameras; they had photopolarimeters, which were brightness sensors and those wonderful Jupiter and Saturn pictures they returned were created by the spacecraft spinning and scanning in the brightness changes. The energy to run everything was created by electricity coming from thermocouples wrapped around plutonium which was so radioactive that it was kept on booms away from the main craft. Pioneer 11 gave us views of Saturn and Titan but its route via Jupiter had to be altered in order to miss the worst of Jupiter's radiation belts.

By the time the Voyagers came along the use of gyros meant that the craft did not need to spin in order to take pictures. There was a ten day launch window for the grand tour originally calculated by Flandro but now they were able to launch the two craft on 20th August and 5th September 1977 respectively. (Voyager 2 was the first one to leave.) Energy came from a radioisotope thermoelectric generator. Fortran was the computer language. The Jupiter closest approaches were V1 5/3/79 and V2 9/7/79.
Their cameras were a kind of cathode ray colour tv tube. Voyager 2 had a slightly better camera, and it was able to detect aurorae and lightning on Jupiter and lightning discharges from Io. It photographed Jupiter's ring. Amazingly there had been no plans to photograph the Galilean satellites but sense prevailed and we now have visible records of the extreme volcanic activity on Io. We now know Io's surface changes day by day as it gets mangled by Jupiter's effects. Europa's frozen watery landscape was seen to be riddled with lines.

Voyager 1's arrival at Saturn was hastened in order to allow it to view Titan. It then swung up out of the Solar System. On 14/2/90 it looked down on the Solar System and took a 'family portrait' series of shots of the Sun and planets. Remember the 'pale blue dot' (the Earth, less than a pixel size) and the poignant words of Carl Sagan, reminding us how anyone who'd ever lived had been on that tiny dot. Voyager 1's cameras were turned off after that. Voyager 2 stayed on the ecliptic to continue to the other planets.
In 1980 the spokes on Saturn's rings were detected, as were the 'shepherd satellites' that meandered along the ring edges. Uranus and Neptune….Rob didn't really talk about them but the pictures are well remembered: greenish tilted Uranus and the storms on blue Neptune.

Voyager 2 continues to send back data, although the signal is very weak. In December 2018 the number of solar particles dropped and cosmic rays increased, indicating it has reached the heliopause and is entering interstellar space. It is still generating enough heat to keep equipment going, although it is now functioning at much lower temperatures than expected.

Next Beginners meeting is Monday 16th March at the usual venue. Talks will include Observing Galaxy Clusters, ISS, Constellation of the Month seasons, although talks subject to change.

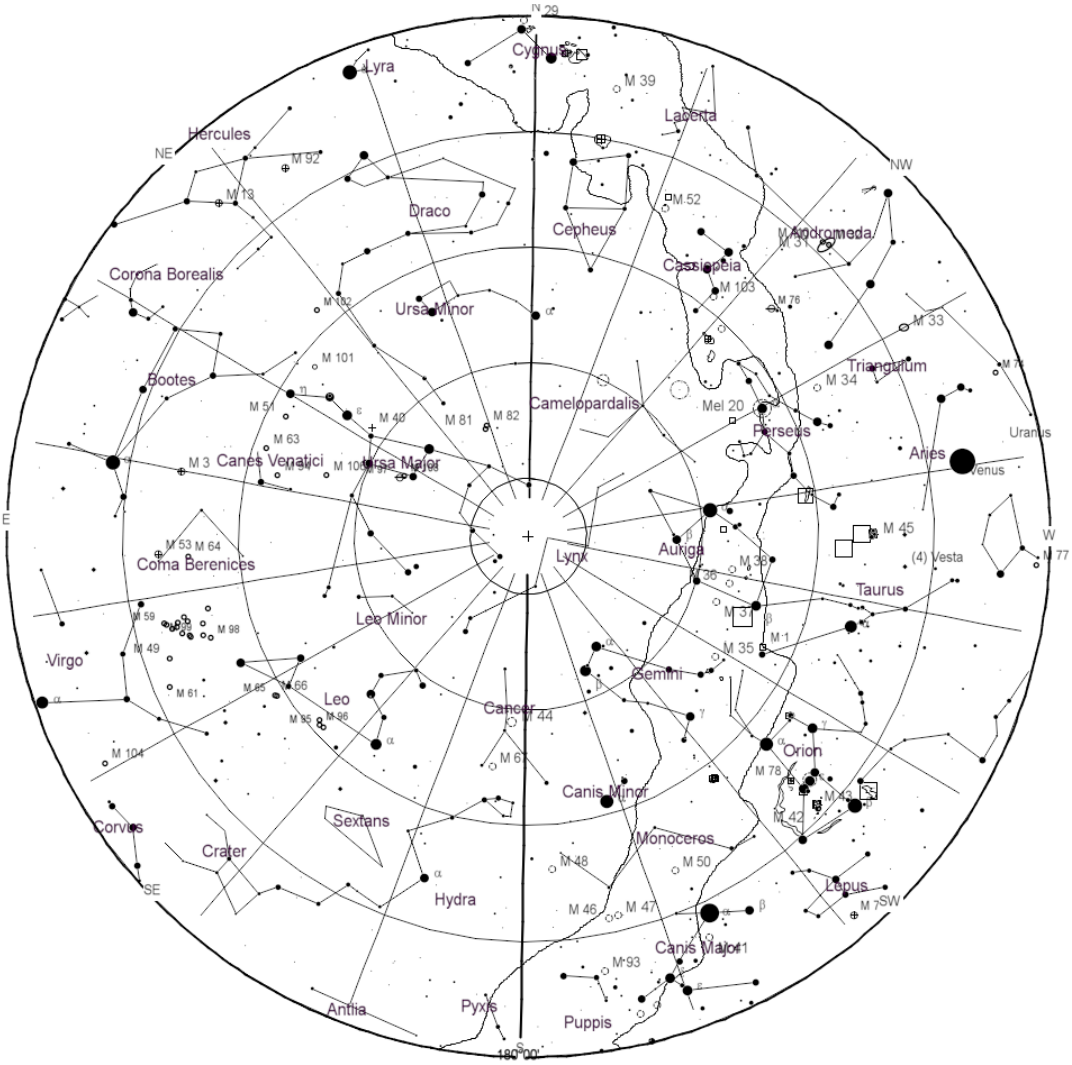
Observing evening: Observing evening: Observing evening: The next observing session will be on the FCN 23rd March - 25th March at Frilford Heath Tubney Golf driving range, note that this is a new location and maps will be on the website. As always go/no go notes will be posted on the newsgroup as well as the Facebook page so please look there for more info or contact Steve Creasey for details. Note this will be the last Observing session of the season as the clocks go Forward and it will be too light in April

Practical Astronomy Show Kettering 21st March details at https://practicalastroshow.com/ note this is free entry and free talks.

ATOM Science festival. Abingdon Town Centre Saturday 14th March 2020. Volunteers wanted

STAR CHART

The night sky at 21:00 (GMT) Saturday 15th March 2020



MOON PHASES: 2020