

# SPACEWATCH

the newsletter of the Abingdon Astronomical Society

**Next Talk**  
**11th April 2016**  
**“Archaeoastronomy”**  
**Professor Clive Ruggles**  
**University of Leicester**

## THE NIGHT SKY THIS MONTH

by Bob Dryden

**Earth:** This year's spring equinox arrives at 04.30 UT on 20th March. Days will then be longer than the nights for a while.

**Mercury:** Superior Conjunction occurs on 23rd March following which Mercury will reappear in the evening sky by then end of the month. On 30th March Mercury sets about 45 minutes after the Sun, but shines at a very bright -1.8 magnitude so you might stand a chance of seeing it given a clear horizon. By the end of this session the planet has faded to -0.6 magnitude (which is still quite bright) but is above the horizon for 90 minutes following sunset. Its altitude at sunset is 15°, and given the brightness, it will be easily visible to the naked eye once the twilight sky gets a bit darker.

On the evening of 8th April the thin crescent Moon will be approximately 5° to the left of Mercury and the pair will not set for an hour after the Sun.

**Venus:** Venus is becoming increasingly difficult to see despite its very bright magnitude of -3.9. The whole of this session, it is barely 2° high by sunrise. In fact, by mid-April it rises just 15 minutes before the Sun.

**Mars:** The red planet is low, but getting brighter, so is an easy naked eye target. It reaches -0.9 magnitude by mid-April, and the apparent size of the planetary disc reaches 13" so it is well worth pointing your telescope towards it.

In mid-March, Mars is in the top of Scorpius (close to the top of the 'claw') and rises just after midnight. Culmination occurs at 04.00 UT and the planet is about 19° high in the south west by dawn. Mars moves in to the constellation of Ophiuchus on the 3rd April and starts to get nearer to Saturn. On 29th March the waning gibbous Moon forms a very large triangle with Mars and Saturn.

By mid-April the planet rises at approximately 23.00 UT and culminates around 03.00 UT. By then it is 15° from Saturn. At the end of this session Mars, Saturn, and Antares (the brightest star is Scorpius) form a large right angled triangle shape.

**Jupiter:** Now just a few days past opposition, Jupiter is well placed for observation for most of the night. Shining at -2.5 magnitude in Leo, it culminates around midnight at a height of 45°. By mid-April it is already 25° high in the east as the Sun

sets, culminates at 22.00 UT and sets in the west around 04.00 UT. On the evening of 21st March the waxing gibbous Moon is approximately 2° from Jupiter.

**Saturn:** Still in the constellation of Ophiuchus, Saturn is at +0.5 magnitude so an easy naked eye object. The rings are wide open at an angle of 26°, so easy to see in a small telescope. The planet is a morning object, currently rising at 01.30 UT, reaching culmination at 18° around 05.30 UT, just a short time before the Sun rises. By mid-April Saturn is rising at 23.00 UT and culminating about 03.30 UT. It is low in the south west by sunrise.

**Uranus & Neptune:** Both of these planets are too near the Sun to be seen properly. Uranus reaches solar conjunction on 9th April and, while Neptune has just passed conjunction (28th February) and does move in to the morning sky, it remains very low in the morning twilight.

**Occultations:** There is an interesting, but probably very difficult to see, planetary occultation on 6th April. Venus is occulted by the Moon at 07.30 UT, and reappears again at 08.01 UT. Obviously, by that time it will be daylight, so you will need to find Venus just before the Sun rises and follow it with your telescope into the daylight, or use GoTo settings to find it later. Be aware though that the planet will only be 15° from the Sun, so take great care to avoid pointing your telescope anywhere near the Sun by accident.

A much easier to see, normal, stellar occultation occurs on 10th April when the pair of stars,  $\theta^1$  and  $\theta^2$  Taurus are covered by the Moon at 20.02 UT and 20.07 UT respectively.  $\theta^1$  is +3.8 magnitude while  $\theta^2$  is +3.4. The 3 day old crescent Moon will be 30° high in the west at the time, but the occultations will take place only 15 minutes after sunset, so the sky will be very bright.

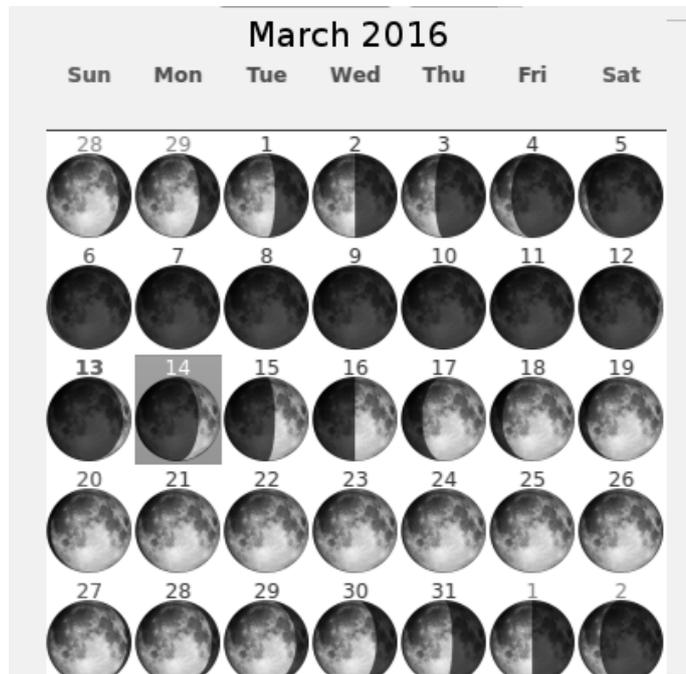
**Asteroids:** This is not the best time for those of you who like hunting for asteroids. There is only one asteroid on view at the moment that is above 10th magnitude, and that is 10 Hygeia. It is in southern Leo and fades from +9.5 magnitude in March to +10.0 magnitude in April.

**Comets:** This is your last chance to see comet 2013 US10 Catalina above 10th magnitude. Presently around +9.5 magnitude in Camelopardalis, it moves in to Perseus on 16th March. By the end of the month it will have faded to around 10th magnitude, and by the end of this session in mid-April it will be closer to 10.5 magnitude.

Comet P2001 D1 SOHO is on view in the morning sky but is moving rapidly towards solar conjunction on 10th April. It starts in Delphinus at a predicted magnitude of +4.7. On 16th March it moves in to Pegasus and then into Pisces on 27th March. During this time it will be brightening, reaching 2nd magnitude towards the end of the month. However, the increase in brightness will probably be cancelled out by the comets motion towards the ever brightening morning twilight. Could still be worth having

a look though. It is also worth noting that almost as bright as US 10 is comet C/2014 S2 (PANSTARRS). It is well placed up by Ursa Minor and shows a nice tail.

### MOON PHASES:



### LAST MONTH'S TALK

by Gwyneth Hueter

February's talk, 2016

Dr Eric Dunford is a space scientist from RAL. We do get great support from RAL and even though the topics sometimes overlap there is always much knowledge of interest to be had.

This time the subject was 'Infra-Red Astronomy from Space'.

Dr Dunford started working on astronomical satellites in the late 60s and he gave us a run through of the various IR spaceborne observatories that have had a European and personal interest to him.

There are problems with observing in IR, in that the atmosphere's water vapour stops most wavelengths of IR, and also that spaceborne observatories will in themselves give off heat radiation, some of which will be IR. This makes it essential for these satellites to have sunshields, and detectors have to be supercooled so that their own radiation doesn't mess up the observations.

The first, and very successful one was the Infra-Red Astronomical Satellite (IRAS) in 1983. This was in the days before CCDs, and it had lots of different detectors of three different wavelengths. The mirror was 33 cm in diameter and the instruments were kept at a temperature of 2.5 kelvin, thanks to the gradual evaporation of a helium jacket. The data was downloaded every 12 hours and the helium evaporation ended up keeping IRAS going for 319 days, leaving us with

observations of 400,000 objects. It is still out there, orbiting at 900km from Earth. It also discovered a comet which was also discovered visually, Comet IRAS-Araki-Alcock.

Vega was used as a calibration object but it turned out to be a flop because it had a protoplanetary system around it so was not a stellar point source.

The IR Space Observatory (ISO) survived for about 2.5 years and had a 60 cm mirror and detectors giving 1000x more sensitivity than IRAS. Dr Dunford then explained that it was very difficult to do any testing on these kinds of gadgets prior to launch as you had to test them cold, i.e. 2.5 kelvin on Earth, and that made all the materials brittle.

Herschel was the next IR telescope with European interests and was launched in May 2009.

It is still the largest mirror we have put into space, 3.5m. It was launched with Planck (a far IR and submillimetre telescope he did not touch on) on an Ariane 5 rocket. It moves around in the L2 point (in a line from the Sun through the Earth/Moon). It had three detectors (SPIRE) observing in wavelengths longer than what IRAS used, going into far infra-red to submillimetre wavelengths. It was able to detect water on Mars.

The PACS detector looked at shorter wavelengths (70 to 160 microns) and were used more to look at stars and galaxies. The resolution of M31 and the Rosette Nebula was stunning. The ground based James Clerk Maxwell Telescope in Hawaii was able to observe in these wavelengths but its field of view was minute in comparison. Herschel ran out of fuel in April 2013 but the data is still being analysed.

The James Webb Space Telescope, about which we heard much in our January speaker meeting, will also be observing in the near infra-red. Dr Dunford was pleased to tell us that the last telescope segment was installed in the week before his talk.

### THE REALM OF BURIED GIANTS



*The sky around the star formation region RCW 106 (wide-field view) Credit:ESO*

In this huge new image, clouds of crimson gas are illuminated by rare, massive stars that have only recently ignited and are still buried deep in thick dust clouds. These scorching-hot, very young stars are only fleeting characters on the cosmic stage and their origins remain mysterious. The vast nebula where these giants were born, along with its rich and fascinating surroundings, are

captured here in fine detail by ESO's VLT Survey Telescope (VST) at the Paranal Observatory in Chile.

RCW 106 is a sprawling cloud of gas and dust located about 12 000 light-years away in the southern constellation of Norma (The Carpenter's Square). The region gets its name from being the 106th entry in a catalogue of H II regions in the southern Milky Way. H II regions like RCW 106 are clouds of hydrogen gas that are being ionised by the intense starlight of scorching-hot, young stars, causing them to glow and display weird and wonderful shapes.

RCW 106 itself is the red cloud above centre in this new image, although much of this huge H II region is hidden by dust and it is much more extensive than the visible part. Many other unrelated objects are also visible in this wide-field VST image. For example, the filaments to the right of the image are the remnants of an ancient supernova, and the glowing red filaments at the lower left surround an unusual and very hot star. Patches of dark obscuring dust are also visible across the entire cosmic landscape.

Astronomers have been studying RCW 106 for some time, although it is not the crimson clouds that draw their attention, but rather the mysterious origin of the massive and powerful stars buried within. Although they are very bright, these stars cannot be seen in visible-light images such as this one as the surrounding dust is too thick, but they make their presence clear in images of the region at longer wavelengths.

For less massive stars like the Sun the process that brings them into existence is quite well understood — as clouds of gas are pulled together under gravity, density and temperature increase, and nuclear fusion begins — but for the most massive stars buried in regions like RCW 106 this explanation does not seem to be fully adequate. These stars — known to astronomers as O-type stars — may have masses many dozens of times the mass of the Sun and it is not clear how they manage to gather, and keep together, enough gas to form.

O-type stars likely form from the densest parts of the nebular clouds like RCW 106 and they are notoriously difficult to study. Apart from obscuration by dust, another challenge is the brevity of an O-type star's life. They burn through their nuclear fuel in mere tens of millions of years, while the lightest stars have lifetimes that span many tens of billions of years. The difficulty of forming a star of this mass, and the shortness of their lifetimes, means that they are very rare — only one in every three million stars in our cosmic neighbourhood is an O-type star. None of those that do exist are close enough for detailed investigation and so the formation of these fleeting stellar giants remains mysterious, although their outsized influence is unmistakable in glowing H II regions like this one.

#### FURTHER DISCUSSION

Why not take a look at our website? It's at: [www.abingdonastro.org.uk](http://www.abingdonastro.org.uk).

If you are not already on our internet mailing list, then why not log on to Yahoo Groups. The list is called 'abingdonas'. Members use the list to alert each other about celestial events and to chat about amateur astronomy. The list is quite active, with several messages most weeks. To read through previous messages click on:

<http://groups.yahoo.com/group/abingdonas/>.

To join the abingdonas list, please go to <http://www.yahogroups.com>. You can also unsubscribe from the list here.

To post messages to the list, please send them to [abingdonas@yahogroups.com](mailto:abingdonas@yahogroups.com). Please note that you will need to sign up with a YahooID if you do not already have one. You can do this on the above page.

Further information about the mailing list can be found on the abingdonas webpage at :

<http://groups.yahoo.com/group/abingdonas/>.

#### DATES FOR YOUR DIARY

**21st March 8pm** Beginners' Meeting in the Main Hall.

**Observing evening: Next Observing evening is the FCN Week April 4th - 6th at Frilford Heath Golf Driving Range. Keep an eye on the AAS group mailing list.**

**Mercury Transit: Monday 9th May – AAS public observing event on sports field adjacent to Abingdon United ground in Northcourt Road, Abingdon, 12 pm – 7.30 pm**

#### NOTICE OF ANNUAL GENERAL MEETING

The AGM for 2015/16 will be on **Monday 9th May 2016** at All Saints' Methodist Church Hall, Dorchester Crescent, Abingdon at **8.30 p.m.**, and will be followed by a 'My Eclipse Trip' – a talk by Gwyneth Hueter.

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

E-mail: [owen@online.rednet.co.uk](mailto:owen@online.rednet.co.uk)

# STAR CHART

The night sky at 10 pm (GMT) on Tuesday 15<sup>th</sup> March 2016

