

SPACEWATCH

the newsletter of the Abingdon Astronomical Society

8th October 2012

Richard Fleet
(Newbury Astronomical Society)
'Night Sky Glows'

No, not the glow from streetlights! Richard will be talking about natural atmospheric or astronomical glows, bows and haloes.

The nights are drawing in now as the Earth has passed the autumnal equinox. This means you don't have to stay up to see the night sky, but you do have to start wrapping up a bit against the cold. Remember that if you go to Uffington White Horse for the month's observing evening, especially your feet as they are the first to feel cold.

The new website is now up and running. Ian has been very busy with the new site. You can get there by the old address: www.abingdonastro.org.uk which after a few seconds redirects to the new site. Check it out soon and feed any comments back to Ian or me. Thank you.

THE NIGHT SKY THIS MONTH

by Bob Dryden

Mercury: Unfortunately, the evening apparition that Mercury is having this session is a very unfavourable. Greatest eastern elongation occurs on 26th October when the planet will be 24° away from the Sun. This sounds promising but as Mercury is never more than 4° above the horizon at sunset it means the planet will be very difficult to see.

Venus: Although Venus is now well past greatest elongation it remains easily visible just before dawn. Venus is slowly moving back towards the Sun with elongation decreasing to 33° by mid-November. Presently in Leo, Venus moves in to Virgo towards the end of October. It rises around 03.00 UT in mid-October which is close to 4 hours before Sun and will reach 30° altitude by sunrise. Even by mid-November Venus still appears a good 3 hours before the Sun. Shining at magnitude -3.9, the planet is hard to miss. On the morning of 12th October a crescent Moon will be just to the east of Venus giving a pleasant view. This will be repeated on the morning of 11th November if you miss the October date.

Mars: Mars is too close to the Sun at present to be seen.

Jupiter: Currently crossing the constellation of Taurus, Jupiter shines at magnitude -2.7 so is the brightest object in that part of the sky. Now rising by about 20.00 UT, the planet reaches its greatest altitude (culmination) at 04.00 UT. This gives you many hours to make observations, and enables you to actually record the features rotating across the disc. By mid-November Jupiter rises by 18.00 UT and will be a massive 60°

high by 02.00 UT. On the evening of 1st November a bright gibbous Moon will be approximately 1° away from the bright planet.

Saturn: as Saturn is in conjunction with the Sun on 25th October it will be inaccessible for most of this session. If you are very keen, you might just be able to see it by mid-November low in the south east in Virgo just before sunrise but it will not be easy. As a guide, on the morning of 12th November a crescent Moon will be about 10° west (right) of Saturn.

Uranus & Neptune: Both these planets are well placed for observations this session. Uranus is magnitude +5.7 in the constellation of Pisces. It culminates at 23.00 UT when it is about 40° high in the south. By mid-November culmination occurs at 21.00 UT. Neptune is a bit further west in Aquarius, meaning it culminates earlier (at 22.00 UT mid-October and 19.00 UT by mid-November) and at a lower height (25°). Neptune is also slightly fainter than Uranus shining at magnitude +7.8. Both planets are visible in binoculars if you have a good finder chart.

Meteors: There are two major meteor showers active this session.

The first is the Orionids which can be seen between 16th and 30 October. A broad maximum occurs on the nights of 20th/21st and 21st/22nd October when rates are 25 meteors an hour under perfect conditions. As the Moon is around 6 or 7 days old at the time of maximum and sets early in the evening, observing conditions are very favourable.

The second active meteor shower is the Taurids. This one starts on the 20th October and goes on until 30th November so there will be plenty of opportunity to see some of these meteors. There are two maxima, one on 5th November and the second on 12th November. The one on the 5th is ruined somewhat by a bright gibbous Moon which is two days before Last Quarter. The second maximum is much more favourable as the Moon is just one day before New. Do not expect many meteors an hour from this shower. At best the hourly rate is just 10. However, Taurid meteors are often slow and bright so you notice them easily.

Asteroids: The same three asteroids mentioned in the last Spacewatch are the ones on view this session.

1 Ceres continues to brighten, reaching magnitude +7.9 by mid-November, so it will be easily visible in binoculars. The asteroid is currently in Gemini, close to the border with Orion.

2 Pallas is fading and this will be your last chance to track it down this apparition. Pallas reaches magnitude +9.0 by

November so you will need either a big pair of binoculars or a small telescope. It is not too far below Uranus, in the constellation of Cetus.

4 Vesta is the brightest of the three asteroids this session, reaching magnitude +7.1 by November as it moves amongst the stars of Taurus.

Comets: There are still no bright comets predicted to be on view at the moment (although it now looks like that there may be two in a year or so if they behave as predicted). So if you absolutely need to see a comet, the only reasonably bright one is our old friend from last month, comet LINEAR C/2011 F1. It is far from easy to see however, being very, very low in the south west immediately after sunset. Technically, it is getting a bit brighter, reaching magnitude +10.3 by mid-November, but it is also moving southward so this will make it more and more difficult to find. This is your last chance to see it before it moves too far south.

MOON PHASES:

Last Qtr: 8th Oct.; New: 15th Oct.; First Qtr: 22nd Oct.; Full: 30th Oct.; Last Qtr: 8th Nov.



DOING SCIENCE WITH A SPACECRAFT'S SIGNAL

by David Doody

Mariner 2 to Venus, the first interplanetary flight, was launched August 27 fifty years ago. This was a time when scientists were first learning that Venus might not harbor jungles under its thick atmosphere after all. A Russian scientist had discovered that atmosphere during the rare Venus transit of 1761, because of the effects of sunlight from behind.

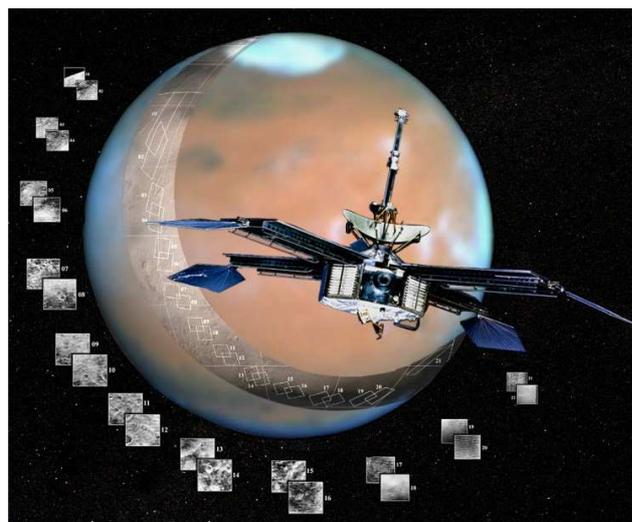
Mariner 2 proved interplanetary flight was possible, and our ability to take close-up images of other planets would be richly rewarding in scientific return. But it also meant we could use the spacecraft itself as a "light" source, planting it behind an object of our choosing and making direct measurements.

Mariner 4 did the first occultation experiment of this sort when it passed behind Mars as seen from Earth in July 1965. But, instead of visible light from the Sun, this occultation experiment used the spacecraft's approximately 2-GHz radio signal.

The Mariner 4 experiment revealed Mars' thin atmosphere. Since then, successful radio science occultation experiments have been conducted at every planet and many large moons. And another one is on schedule to investigate Pluto and its companion Charon, when the New Horizons spacecraft flies by

in July 2015. Also, during that flyby, a different kind of radio science experiment will investigate the gravitational field.

The most recent radio science occultation experiment took place September 2, 2012, when the Cassini spacecraft carried its three transmitters behind Saturn. These three different frequencies are all kept precisely "in tune" with one another, based on a reference frequency sent from Earth. Compared to observations of the free space for calibration just before ingress to occultation, the experiment makes it possible to tease out a wide variety of components in Saturn's ionosphere and atmosphere.



In this poster art of Mariner 4, you can see the parabolic reflector atop the spacecraft bus. Like the reflector inside a flashlight, it sends a beam of electromagnetic energy in a particular direction. Credit: NASA/JPL/Corby Waste.

Occultation experiments comprise only one of many categories of radio science experiments. Others include tests of General Relativity, studying the solar corona, mapping gravity fields, determining mass, and more. They all rely on NASA's Deep Space Network to capture the signals, which are then archived and studied.

Find out more about spacecraft science experiments in "Basics of Space Flight," a website and book by this author, <http://www2.jpl.nasa.gov/basics>. Kids can learn all about NASA's Deep Space Network by playing the "Uplink-Downlink" game at <http://spaceplace.nasa.gov/dsn-game>.

This article was provided courtesy of the Jet Propulsion Laboratory, California Institute of Technology, under a contract with the National Aeronautics and Space Administration.

LAST MONTH'S MEETING

by Gwyneth Hueter

Our introduction to the new season was given by Bob Mizon, who is the coordinator for the Campaign for Dark Skies for the BAA.

'Oddities of the Solar system' was a tour around the more unusual sights of the Solar system.

Points of interest:

- The Sun is a lone star and that is unusual because most stars have formed in groups and still have neighbours.
- Mercury has the most variation in temperature, from -136 °C to 427°C. There is also an odd effect caused by the fact that it rotates very slowly, so that its day is much slower than its year. That makes the Sun sometimes bob up and down on the horizon four days before perihelion. The speed of Mercury at this point in its orbit (it has a very eccentric orbit) means that its speed is the same as its rotation so the Sun sort of stops in the sky.
- Earth is claimed to have a second, more distant moon, called 3753 Cruithne, which is 15km across and mag 15.1 at its brightest. Its orbit does not quite follow that of Earth, and is described as a Resonant Near Earth Object (RNEO).
- The Mars rover Opportunity photographed some kind of anomaly on the Martian surface, which has been named the 'Mars rabbit'. (Google it for pictures; it looks like a piece of kit that's come off the craft.)
- Jupiter's Galilean moons have surfaces depicting different stages in the age of the Solar system, with the ancient Callisto furthest from Jupiter, and Io closest and having the youngest surface.
- The Oort cloud (icy remnants left over from the cloud of debris that formed the Solar system) is about one light year in radius (at least?)

This was an entertaining tour, more suited to the beginners meetings. (Can we borrow it and use it again!?)

FURTHER DISCUSSION

Why not take a look at our new website? Ian has been working hard over the summer to update the website and make it a little more interactive. It should be going live

at the same address very soon:
www.abingdonastro.org.uk.

If you are not already on our internet mailing list, then why not log on to YahooGroups. 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. 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/>.

Further discussion on astronomy and many other topics takes place at the Spread Eagle pub in Northcourt Road after the main meetings. You are most welcome to join us.

DATES FOR YOUR DIARY

15th-17th Oct. 8pm (first clear night) Observing evening at White Horse Hill, Uffington. Ring Ian on 07557 373401 to confirm on the night.

22nd Oct. 8pm Beginners' Meeting in the Perry Room.

12th Nov. 8pm Talk by Dr Phil Evans (Univ. Leicester) "Gamma Ray Bursts and Swift"

The editor of "SpaceWatch" is Andrew Ramsey, who would very much appreciate your stories & contributions. Please send any news, observations, photos, etc. to:

Mail: A.T.Ramsey, 28 Raymund Road,
OXFORD, OX3 0SW.

E-mail: AbAstro@ATRamsey.com

Phone: 01865 426269 / 07808 706144

