

Society News

Observatory News

It seems the threat of an all-weather football pitch on the land adjacent to the observatory is over (*phew!*).

I attended an NPS&CA meeting recently and, it seems, there are now just two groups using the football pitch(es) on a regular basis. Both are keen to engage with the Association to ensure good relations with all users of the playing field are maintained. This really is great news for our Society and I look forward to meeting the representatives of the football clubs at future NPS&CA meetings.

Additional Sky Quality Meters

We now have another AONB funded 12 SQM devices:

- 7 self powered data loggers
- 3 ethernet connected devices
- 2 handheld units (1 on long-term loan to AONB)

I hope members will want to get involved in this large scale survey of sky conditions across the Island. I would particularly like to speak to anyone along the SW coast who is willing to have a meter for a couple of weeks.

The meters can be mounted unobtrusively and will provide us with detailed information about the night sky. The data collected will help with our Dark Sky application, so contact me or Chris Wood if you'd like to help.

Radio Astronomy

VAS member, Dudley Johnson, has recently completed a successful, software defined radio (SDR) based project which paves the way for Radio Astronomy at our observatory. During the winter months, we plan to reproduce his work and provide details of the project through a series of articles in NZ.

This promises to be something special for VAS, so if you'd like to join the group to, learn about, make and commission the receiver at the observatory, then please contact Dudley (or me) at our Thursday meetings.

Brian Curd

VAS Website: www.wightastronomy.org

Submissions or letters to New Zenith are always welcome and should be sent to:

The Editor New Zenith

35 Forest Road

Winford

Sandown PO36 0JY

Tel: **01983 864303** or email: editor@wightastronomy.org

Material for the next issue by the 6th of the month please.

VAS Registered Office

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The Vectis Astronomical Society and the Editor of the New Zenith accept no responsibility for advice, information or opinion expressed by contributors.

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Observatory Diary

Monday, 19.30hrs	Members Only by arrangement Telescope and night sky training. Contact Barry Bates 01983 872979
Thursday, 19.30hrs	Members and Public. Informal meeting and observing

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Monthly Meeting Calendar 2014

Check the website for up to the minute information.
All details correct at time of publication.

Date	Subject	Speaker
22 Aug	Are We (still) Alone? SETI and latest update on habitable exoplanets and AGM	Stephen Tonkin FRAS
26 Sep	Mysteries of the Solar System	Dr Stuart Eves Airbus Defence and Space
24 Oct	Asteroids, Comets, Impacts. Should we worry?	Robin Catchpole
28 Nov	Lucky Planet: Is the Earth Special and Are we Alone in The Universe?	David Waltham

Telescope Training

Any member who would like training on the observatory Meade LX200 should contact
Barry Bates on 872979

Observatory Visits Booked

None this month

It would be appreciated if members could avoid using the observatory at these times.

Important:

Members using the observatory outside normal Thursday meetings **MUST** enter a line or two in the Observatory Log Book.

On several recent occasions, lights, heaters and the Meade LX200 have been left on!

When you leave the observatory please ensure it is secure and all lights, heaters and telescopes are **TURNT OFF**.

VAS Contacts 2013/14

President	Barry Bates president@wightastronomy.org
Chairman	Bryn Davis chairman@wightastronomy.org
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Treasurer	David Kitching treasurer@wightastronomy.org
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NZ Distribution	Brian Bond distribution@wightastronomy.org
Others	Mark Williams Nigel Lee



**Island Planetarium
@Fort Victoria**

The Island's Telescope Professionals

Serious Stuff

TAL 200mm Newtonian Reflector OTA
180mm Maksutov Cassegrain OTA
EQ 5 mount and drives

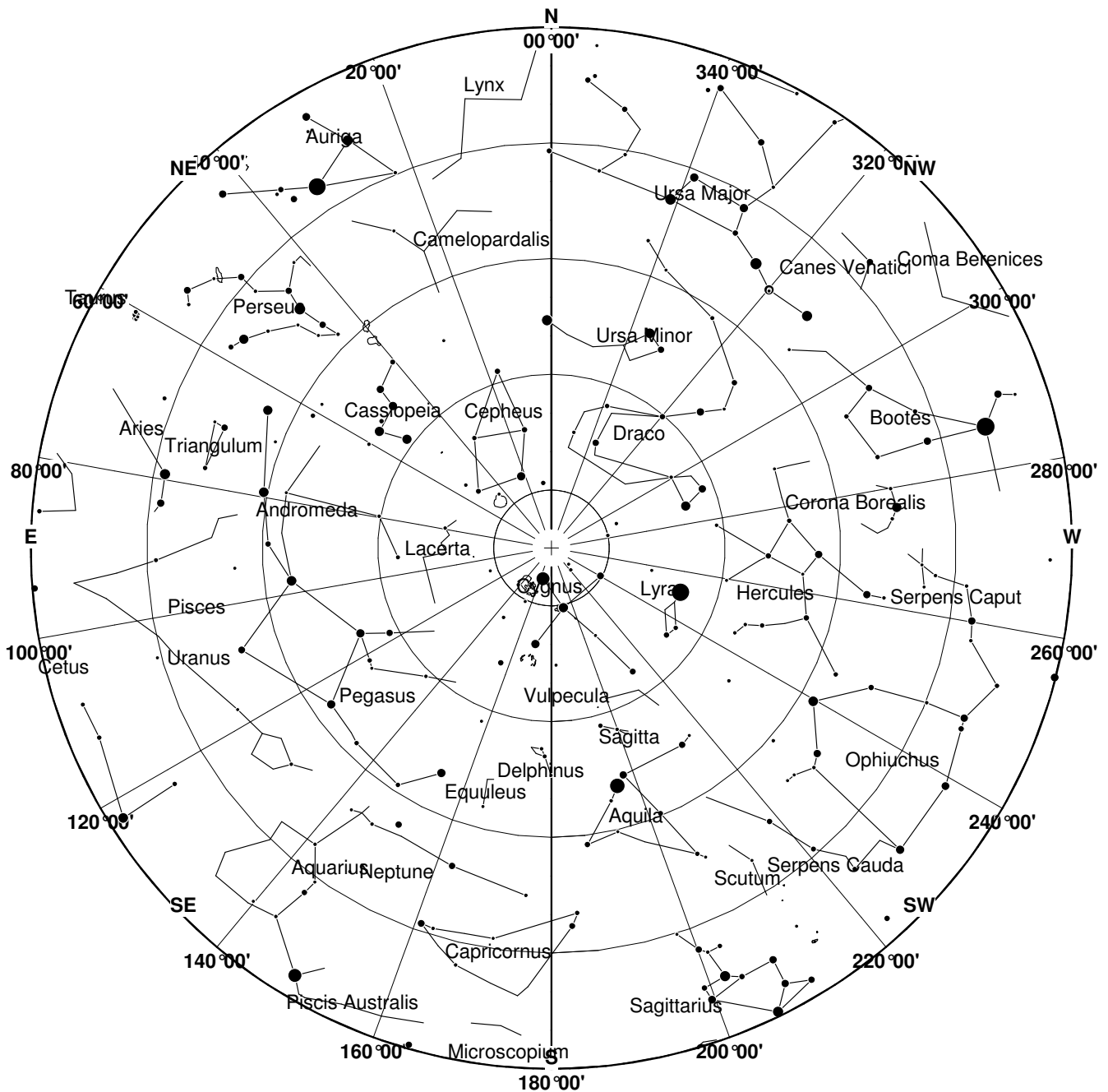
Various Used ETX 's

Also starter scopes and accessories

Discounts and deals for VAS members

Call Paul England – VAS Member
on 761555 - leave a message if I am not there
Or - enquiry@islandastronomy.co.uk

September 2014 Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 September 2014







Neptune is the eighth and farthest planet from the Sun in the Solar System. It is the fourth-largest planet by diameter and the third-largest by mass. Among the gaseous planets in the Solar System, Neptune is the most dense. Neptune is 17 times the mass of Earth and is slightly more massive than its near-twin Uranus, which is 15 times the mass of Earth but not as dense. Neptune orbits the Sun at an average distance of 30.1 astronomical units. Named after the Roman god of the sea, its astronomical symbol is Ψ , a stylised version of the god Neptune's trident.

This article is licensed under the [GNU Free Documentation License](#). It uses material from the Wikipedia article "[Neptune](#)".

September 2014 Night Sky

Moon Phases

New	First Qtr	Full	Last Qtr
			
24th	2nd	9th	16th

Planets

Mercury - This month Mercury makes a very poor appearance in the evening sky. At best it sets only about 30 minutes after the Sun, so for casual viewing is all but an impossible object. This may be a good opportunity to observe it during the day as described in last month's NZ. If you do try this be very careful not to accidentally point at the Sun. To be safe make sure that if you are using binoculars that you, and if you are using one, your telescope are in the shade.

Venus - Low down in the pre-dawn sky the Venus is showing a full disc when viewed through a telescope. It is on the far side of the Sun and is rapidly sinking down towards the sunrise. By the end of the month it will be lost to view until around the beginning of December when it will again be visible as the Evening Star.

Mars - As the twilight turns to darkness after sunset Mars can be seen low down in the south western sky. Towards the end of the month it makes a close approach to the bright star Antares 'the opposite of Mars'. They are of similar brightness with Mars just outshining its opposite number. See how their colours compare.

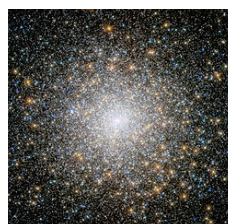
Jupiter - Jupiter replaces Venus as the brightest object in the morning sky. By the month end it is rising at 02:30.

Saturn - Saturn can be found to the right of Mars in the evening sky, Saturn is just the brighter of the two and has a distinctly yellow hue compared to the red of Mars. It is too low down for any serious observing.

Uranus - At mid month Uranus is to be found due south at about 02:30. It is in the constellation of Pisces and makes a neat equilateral triangle with the two stars Delta and Epsilon Piscium, being about 3 degrees below and left of Delta and 3 degrees below and right of Epsilon.

Neptune - Neptune is at opposition in the constellation of Aquarius located close to the stars Sigma and 58 Aquarii. The finder chart shows stars out to about 1 degree from the Star Sigma and the path of Neptune until the end of the year, by which time it will be becoming a rather difficult object for observation.

Deep Sky



M15 Globular Cluster RA 21h 30m Dec 12° 10' mag 7.5

This impressive globular is quite bright and very easily found in binoculars. Follow the line from Baham to Enif, about 4 degrees beyond the horses nose to find this rather large fuzzy looking star.

Through a telescope it reveals its self as a bright core surrounded by a halo of much fainter stars. As with all globulars the view becomes more impressive with increasing aperture. This is one of only a few globular clusters to contain a planetary nebula, it is however about 14th magnitude and for visual beyond all but those with the largest telescopes and best eyes.



M72 Globular Cluster RA 20h 54m Dec -12° 31' mag 10.0

Visually a rather small globular but it can be forgiven its apparent size when you consider that it is on the other side of the galaxy from us. It can be just seen in binoculars and a small to medium sized telescope with some magnification is needed to resolve any of the stars. It is not as tightly packed in the core as many globulars.



Collinder 399 The Coat Hanger Cluster RA 19h 26m Dec 20° 12' mag 3.6

The universe really does have a sense of humour; this is a coat hanger, floating above the starry background out there in the Milky Way. It can be seen with the naked eye as a brighter knot in the Milky Way just on the Vulpecula side of the border with Sagita.

Any optical aid shows the coat hanger with it's rather over sized hook. A telescope may be too much for this cluster unless the magnification can be kept very low. If a telescope is available try to spot NGC6802, this rather small magnitude 8.8 cluster would make the seventh and most eastward star in the bar of the hanger.

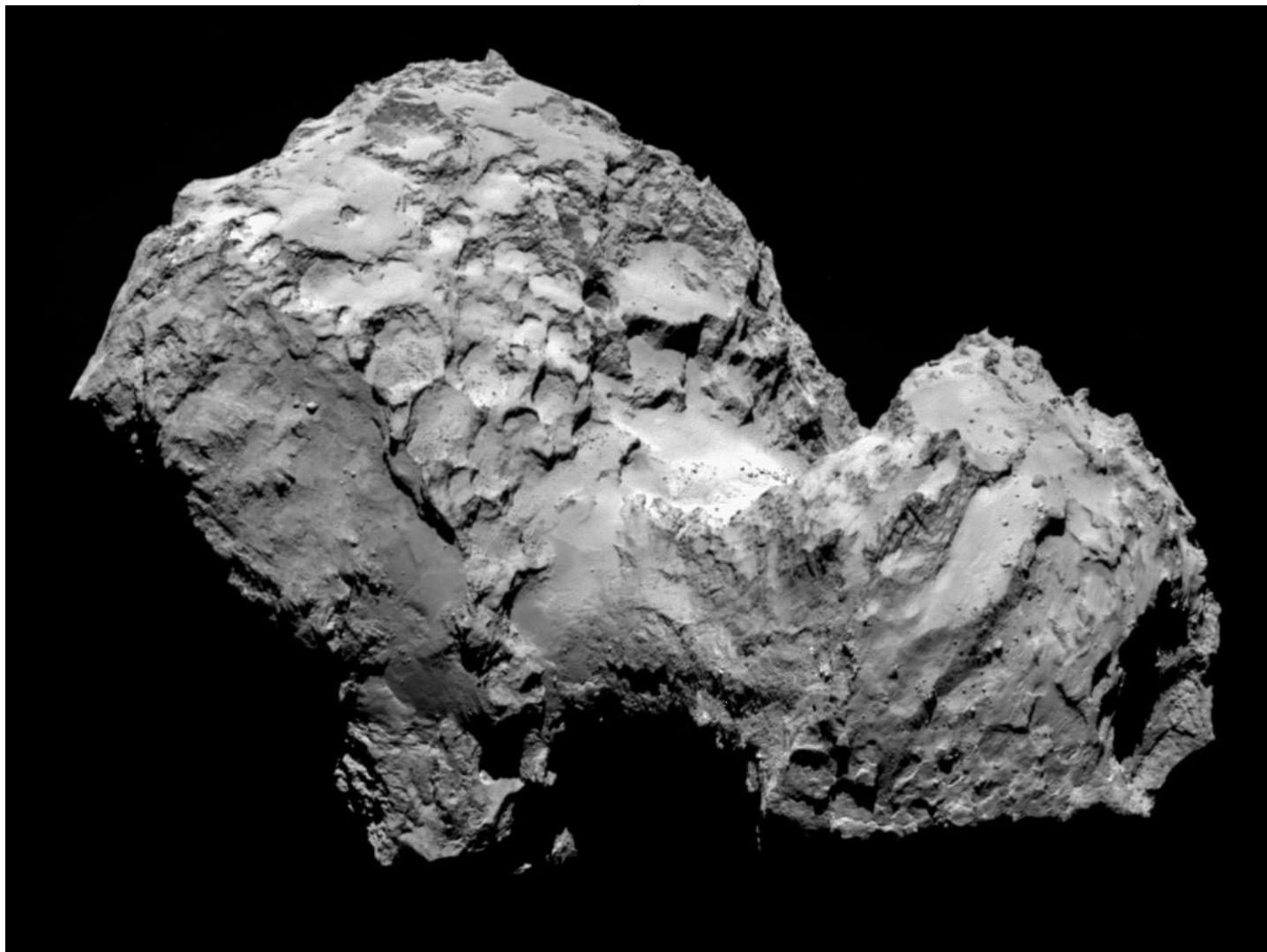
Peter Burgess

NASA e-Books

NASA have a collection of over 30 e-Books available for free download.

The books are offered in formats suitable for most readers (MOBI, EPUB and PDF).

Get them from: <http://www.nasa.gov>



Rosetta Arrives At Comet Destination

6 August 2014

After a decade-long journey chasing its target, ESA's Rosetta has today become the first spacecraft to rendezvous with a comet, opening a new chapter in Solar System exploration.

Comet 67P/Churyumov - Gerasimenko and Rosetta now lie 405 million kilometres from Earth, about half way between the orbits of Jupiter and Mars, rushing towards the inner Solar System at nearly 55 000 kilometres per hour.

The comet is in an elliptical 6.5-year orbit that takes it from beyond Jupiter at its furthest point, to between the orbits of Mars and Earth at its closest to the Sun. Rosetta will accompany it for over a year as they swing around the Sun and back out towards Jupiter again.

Comets are considered to be primitive building blocks of the Solar System and may have helped to 'seed' Earth with water, perhaps even the ingredients for life. But many fundamental questions about these enigmatic objects

remain, and through a comprehensive, in situ, study of the comet, Rosetta aims to unlock the secrets within.

The journey to the comet was not straightforward. Since its launch in 2004, Rosetta had to make three gravity-assist flybys of Earth and one of Mars to help it on course to its rendezvous with the comet. This complex course also allowed Rosetta to pass by asteroids Šteins and Lutetia, obtaining unprecedented views and scientific data on these two objects.

"After ten years, five months and four days travelling towards our destination, looping around the Sun five times and clocking up 6.4 billion kilometres, we are delighted to announce finally 'we are here'," says Jean-Jacques Dordain, ESA's Director General.

"Europe's Rosetta is now the first spacecraft in history to rendezvous with a comet, a major highlight in exploring our origins. The discoveries can begin."

Today saw the last of a series of ten rendezvous manoeuvres that began in May to adjust Rosetta's speed and trajectory gradually to match those of the comet. If any of these manoeuvres had failed, the mission would have been lost, and the spacecraft would simply have flown by the comet.

"Today's achievement is a result of a huge international endeavour spanning several decades," says Alvaro Giménez, ESA's Director of Science and Robotic Exploration.

"We have come an extraordinarily long way since the mission concept was first discussed in the late 1970s and approved in 1993, and now we are ready to open a treasure chest of scientific discovery that is destined to rewrite the textbooks on comets for even more decades to come."

The comet began to reveal its personality while Rosetta was on its approach. Images taken by the OSIRIS camera between late April and early June showed that its activity was variable. The comet's 'coma' – an extended envelope of gas and dust – became rapidly brighter and then died down again over the course of those six weeks.

In the same period, first measurements from the Microwave Instrument for the Rosetta Orbiter, MIRO, suggested that the comet was emitting water vapour into space at about 300 millilitres per second.

Meanwhile, the Visible and Infrared Thermal Imaging Spectrometer, VIRTIS, measured the comet's average temperature to be about -70°C , indicating that the surface is predominantly dark and dusty rather than clean and icy.

Then, stunning images taken from a distance of about 12 000 km began to reveal that the nucleus comprises two distinct segments joined by a 'neck', giving it a duck-like appearance. Subsequent images showed more and more detail – the most recent, highest-resolution image was downloaded from the spacecraft earlier today and will be available this afternoon.

"Our first clear views of the comet have given us plenty to think about," says Matt Taylor, ESA's Rosetta project scientist.

"Is this double-lobed structure built from two separate comets that came together in the Solar System's history, or is it one comet that has eroded dramatically and asymmetrically over time? Rosetta, by design, is in the best place to study one of these unique objects."

Today, Rosetta is just 100 km from the comet's surface, but it will edge closer still. Over the next six weeks, it will describe two triangular-shaped trajectories in front of the comet, first at a distance of 100 km and then at 50 km.

At the same time, more of the suite of instruments will provide a detailed scientific study of the comet, scrutinising the surface for a target site for the Philae lander.

Eventually, Rosetta will attempt a close, near-circular orbit at 30 km and, depending on the activity of the comet, perhaps come even closer.

"Arriving at the comet is really only just the beginning of an even bigger adventure, with greater challenges still to come as we learn how to operate in this uncharted environment, start to orbit and, eventually, land," says Sylvain Lodiot, ESA's Rosetta spacecraft operations manager.

As many as five possible landing sites will be identified by late August, before the primary site is identified in mid-September. The final timeline for the sequence of events for deploying Philae – currently expected for 11 November – will be confirmed by the middle of October.

"Over the next few months, in addition to characterising the comet nucleus and setting the bar for the rest of the mission, we will begin final preparations for another space history first: landing on a comet," says Matt.

"After landing, Rosetta will continue to accompany the comet until its closest approach to the Sun in August 2015 and beyond, watching its behaviour from close quarters to give us a unique insight and realtime experience of how a comet works as it hurtles around the Sun."

More at: <http://www.esa.int/>

VAS Members and families get 2 for 1 entry to the planetarium during July and August.
Booking is advised as we do get very busy particularly if it is cold or wet.
Please bring a copy of this advert with you for eligibility

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Please contact VAS Member Jean-Luc Belon at
jean-luc.belon@gknaerospace.com

or

07740 322758

Telescope can be viewed at the Observatory

Tour of the Universe!

Rocket Scientist Neil Phillipson is teaming up with some of the UK's most renowned astronomers to put on a show with a difference – Tour of the Universe!

With special guests including broadcaster Jane Green and other astronomy household names, Neil is touring the country to share this innovative theatrical experience, launching at Dorking Halls on October 4th with special guest Dr Chris Lintott.

Neil says: "It's a night like no other – we take our audience on a whistle-stop journey through space and time – showing the incredible nature of the Universe in a humorous, passionate and inspiring way.

"We'll give people a real feel for the scale of the Universe – from the Earth and Sun to the Galaxy beyond, with plenty of incredible concepts to make you gasp".

Stunning planetarium-style presentations provide the backdrop to an intimate and uniquely insightful look at the wonders of the Cosmos to guide the audience to a jaw-dropping appreciation of the night sky. Neil and his guests bring the images alive with this interactive, light-hearted and illuminating show.

Neil adds: "Suitable for adults and children over 8, regardless of their level of knowledge, this is a truly galactic getaway, a topical comedy chat-show where the Universe provides both the challenge and inspiration! This is one physics lesson you really won't want to miss."

Local astronomy groups will be supporting the shows around the country.

For more information visit the website www.touroftheuniverse.co.uk Media Partner: BBC Sky at Night Magazine

The nearest event to the IW is:

**Kings Theatre, Albert Road,
Southsea, Portsmouth, PO5 2QJ.**

28th October 2014

7.30pm – 10.00pm

**Guests: Jane Green and
Dr Maggie Aderin-Pocock**

**Tickets (from £15) available at:
http://touroftheuniverse.co.uk/?page_id=54**

Thanks to David Kitching for this notice

Civilians in Abandoned McDonald's Seize Control of Wandering Space Satellite



Their mission control console is a refurbished flat screen and some parts found on eBay. Yes, this is really happening.

For the first time in history, an independent crew is taking control of a NASA satellite and running a crowd-funded mission. They're doing it all from a makeshift mission control center in an abandoned McDonald's in Mountain View, California, using old radio parts from eBay and a salvaged flat screen TV.

"If I could come up with another absurd detail, I would," Keith Cowing, the project's team lead, told Betabeat.

The ISEE-3 is a disco-era satellite that used to measure space weather like solar wind and radiation, but went out of commission decades ago. Now, a small team led by Mr. Cowing has taken control of the satellite with NASA's silent blessing.

Mr. Cowing is a former NASA employee, and now runs a handful of space news sites, like NASA Watch and SpaceRef. Sitting out in the desert one night after a documentary shoot, Mr. Cowing asked Bob Farquhar, an old NASA researcher who worked with the ISEE-3 in its glory days, what it would take to bring the satellite out of retirement.

The satellite's battery has been dead for over 20 years, but it had solar panels to power 98 percent of the satellite's full capabilities. In its heyday, it ran missions around the Moon and Earth, and flew through the tail of a comet. But technology gets old, and everyone happily let the successful satellite go, knowing it would be back in Earth's orbit someday - namely, 2014.

Since the satellite went offline, the team had retired, the documentation was lost and the equipment became outdated. They could still hear the satellite out there talking, but they'd need to build the equipment to talk back.

But the satellite had been built for longevity with very simple technology. To get it back would simply be like trying to make concrete with the original Roman recipe. In other words, they'd need a few outdated parts, but it could definitely be done.

"What's so hard about that?" Mr. Cowing remembers asking.

Two weeks later, they began a crowdfunding campaign that would beat its \$125,000 goal and go on to raise \$160,000. Within another six weeks, a small team was in Puerto Rico, running around Arecibo Observatory running tests, hoisting a transmitter into place with a helicopter, ready to make contact.

McMoon's

At the outset of the crowdfunding campaign, they brought the idea to NASA, but there was no precedent on which to base an agreement. No external organization has ever taken command of a spacecraft, but NASA didn't want to say no, so they asked the team if they needed any help.

To start, they needed space for their control center. The neighbourhood near Ames Research Center in Mountain View, once a teeming hub of activity in the days of the space race, had become a shell of its former self.

"There were a few abandoned buildings - one was a barbershop, and one was an abandoned McDonald's," Mr. Cowing said. "Someone hit the barbershop with a truck, so we took the McDonald's."

Their new control center, dubbed "McMoon's," fit all of the criteria they needed: the doors locked, and it was free. For their console, they pulled a broken flatscreen TV from a government dumpster and fixed the power supply. The other pieces are from eBay, including a Mac laptop and some radio parts.

With just those bare-bones pieces, they were able to MacGyver a computer-radio hybrid that made contact with the ISEE-3.

Once they were able to communicate with the satellite, they established a new orbit around the Sun, slightly larger than the Earth's orbit. It'll remain close enough to the Earth for a while, allowing the crowd-sourced community to run tests for a long time. But for how long?

"No idea," Mr. Cowing said. "It's been on for 36 years, so another 36? Nobody knows. A long time."

In the mean time, they'll be constantly taking in solar weather data - and then sharing it with everyone.

Read more at: Betabeat.com

Dark Skies Project - Aug 2014

Brian and I continue to progress VAS Dark Skies project and IW Dark Skies Initiative to gain International Dark Skies status for the Isle of Wight.

We have monthly meetings with Fiona Hanna, Lead Officer of Wight AONB to develop IW Dark Skies Initiative. Work continues with WIGHT-AONB and with their financial sponsorship, to develop an IW-wide project to purchase and install up to twenty Sky Quality Meter (SQM) stations across the island. Stations have already been established over summer 2014 at Newchurch Observatory, Wootton, Bleakdown and NT HQ at Mottistone. The rest of the equipment has now been received and will be deployed over the next few months. Together with test data received from the first stations, all SQM station's data will be added by Mark Williams to his map at http://www.darkwightskies.com/sqm_maps/

I continue to work with CPRE-IW and CPRE National Office and was invited to join Bob Mizon and the British Astronomical Association Campaign for Dark Skies (BAA CfDS) at their stand at Bournemouth Local Government Association (LGA) conference in July, and at their stand at South West Astronomy Fair at Norman Lockyer Observatory (NYO) Sidmouth, Devon in August. Chris will also attend the Artificial Lighting at Night (ALAN) conference at Leicester University in September.

Brian continues to maintain and develop the VAS Dark Skies web-site www.darkwightskies.com

Brian has been invited to attend a special meeting with Isle of Wight Councillors in September where all aspects of Lighting Policy, Dark Skies, LED lighting, etc., relating to the Isle of Wight will be openly discussed. This meeting will be supported by WIGHT-AONB, CPRE-IW and hopefully other significant national Dark Skies supporters such as Bob Mizon.

The renowned Isle of Wight photographer Chad Powell continues to support us as his popularity spreads globally. He kindly continues to allow us to use some of his spectacular photographs for our publicity. Chad's work has been featured on Microsoft's web site and mentioned recently on the IDA web site, see: http://www.darksky.org/assets/documents/eNews/2014/Feb21_2014eNews.pdf

Fiona Hanna of WIGHT-AONB continues to develop close links with International Dark Skies Association (IDA) Programme Director, and Fiona also continues to develop close links with other UK Dark Skies sites such as Kielder in Northumberland.

Chris Wood

Glow-in-the-dark paint creates 'Starpath' to light up London park



The 'Starpath' will cost the council £25,000 (Picture: Hammersmith and Fulham Council)

A London council is spending £25,000 on lighting up park paths by using a glow-in-the-dark coating instead of floodlighting.

Hammersmith and Fulham are using the spray-on substance, which absorbs UV rays during the day and expels them with a blue glow at night, on a dimly-lit commuter route through William Parnell Park.

The council said as well as ruling out the need for traditional lighting, the bioluminescent material repairs and reinforces the surfaces it is sprayed onto.

A spokesman said the process of creating the 'Starpath' will cost the council about £24,700.

Hammersmith and Fulham Council leader, Nicholas Botterill, said: "It may look like something out of science fiction film but this product has very real benefits.

"As well as improving safety by lighting up one of our less well lit parks, Starpath is environmentally sound, with no ongoing energy costs or light pollution - and it breathes new life into old pathways.

"If Starpath proves popular with park users here it could be rolled out to other under-lit public places in the borough that are a little more off the beaten track."

<http://www.london24.com>

Product info: <http://www.pro-teqsurfacing.com/>

Initial Garlic Festival Report

We had a busy, but rewarding weekend at the annual IW Garlic Festival although numbers seemed down on last year.

We had plenty of visitors to our tent, lots of new observers looking through telescopes and there was a lot of interest in the Dark Skies Initiative in particular.

On the Saturday we were lucky enough to have a decent view of the moon against a lovely blue late summer sky. Sunday though, was rather different with a constant wind, cloudy skies until late afternoon all topped off with about 25 mins of torrential rain! Thank goodness we had a decent tent, which, by the way, is now fully colour coded to enable easy erection next year!



The telescope raffle this year raised just over £100 and the winning ticket number, 534 was drawn by Caitlin Quew from the neighbouring stall.

Caitlin's dad, Andrew, was representing the charity CRY (Cardiac Risk in the Young - <http://www.C-R-Y.org.uk>) and also has his own page at <http://justgiving.com/andrew-quew> in memory of his wife and Caitlin's mum, Gemma Quew.



The lucky telescope winner was Daniel Perfect from Lake, shown here collecting his prize.

Daniel has a young family and is hoping to get started with some star-gazing as soon as possible.

Thanks to all those who helped marshal the event and who gave a hand on the VAS stand.

As stated many times before, the Garlic Festival provides us with a substantial part of our income and volunteers at the event really do help keep us solvent.

Why not keep an eye on <http://www.garlic-festival.co.uk/> and get ready to book your diary in 2015?

Brian Curd

CfDS at Norman Lockyer



I assisted the BAA Campaign for Dark Skies (CfDS) on their stand at the recent South West Astronomy Fair at Norman Lockyer Observatory (NLO), Sidmouth, Devon all day Saturday 9th August.

The stand was frequently visited by many people who were interested in discussing the issues regarding street lighting, LED lighting, and issues surrounding Dark Skies.

The NLO is an impressively large site consisting of a lecture theatre, meeting rooms, planetarium and main telescope all in a well-equipped sizeable main building, surrounded by several individual telescope buildings including a very active radio astronomy section.

More info at: <http://www.normanlockyer.com/>

Chris Wood

Station Spacewalkers Deploy Nanosatellite, Install and Retrieve Science

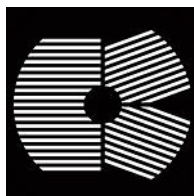
18 Aug 2014 - Two Expedition 40 spacewalkers, clad in Russian Orlan spacesuits, wrapped up a 5-hour, 11-minute excursion outside the International Space Station at 3:13 p.m. EDT Monday. Flight Engineers Alexander Skvortsov and Oleg Artemyev deployed a small science satellite, retrieved and installed experiment packages and inspected components on the exterior of the orbital laboratory.

Shortly after the spacewalk began at 10:02 a.m., Artemyev manually deployed Chasqui 1, a Peruvian nanosatellite designed to take pictures of the Earth with a pair of cameras and transmit the images to a ground station. The project is part of an effort by the National University of Engineering in Peru to gain experience in satellite technology and emerging information and communication technologies.

More at: <http://nasa.gov>

Bahtinov Mask

The Bahtinov mask is a device used to accurately focus astronomical telescopes. It is named after its inventor Pavel Bahtinov. Accurate focusing of telescopes and astrographs is particularly of concern to those involved in astrophotography.



*Bahtinov mask
example*

The mask consists of three separate grids, positioned in such a way that the grids produce three angled diffraction spikes at the focal plane of the instrument for each bright image element (star). As the instrument's focus is changed the central spike appears to move from one side of the star to the other. In reality, all three spikes move but the central spike moves in the opposite direction to the two spikes forming the 'X'. Optimum focus is achieved when the middle spike is centered on the star and symmetrically positioned between the other two spikes. Small deviations from optimal focus are easily visible.

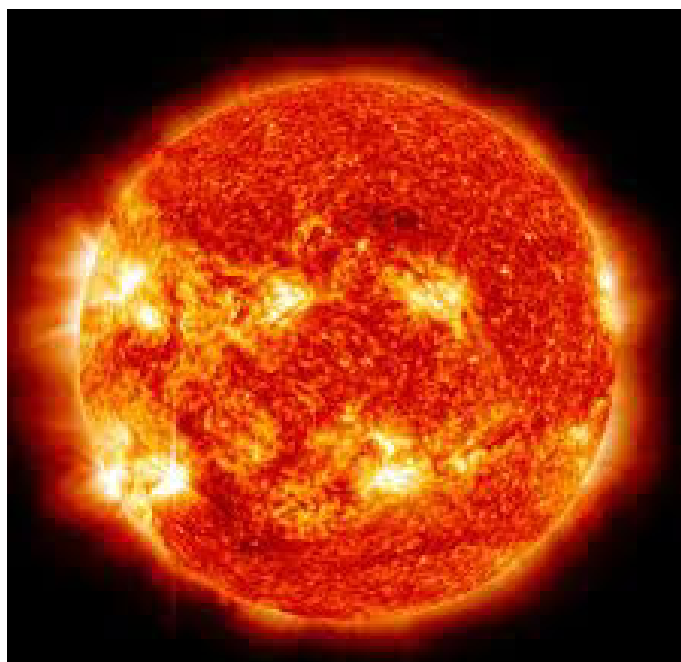
In the example below, the center pattern shows good focus. The central spike is noticeably displaced from the center position in the left and right images. The direction of this displacement provides information on which way focus needs to be made. The operator will place the mask over the front aperture of the telescope in the same orientation each time. He/she will then become familiar with the direction clue provided by the central spike. Rotating the mask through 180 degrees will reverse the direction of spike movement, hence the need to place the mask on the scope with consistent orientation. Very bright star and very dark sky is required for focusing. Otherwise the spikes are not very well visible or not visible at all. The mask must be removed after accurate focusing is achieved.



*Example diffraction patterns produced by
a Bahtinov mask*

From Wikipedia, the free encyclopedia

The Sun as a Red Giant



In about 5 to 6 billion years, the Sun will have depleted the hydrogen fuel in its core and will begin to expand. At its largest, its surface (photosphere) will approximately reach the current orbit of the Earth. It will then lose its atmosphere completely; its outer layers forming a planetary nebula and the core a white dwarf.

The evolution of the Sun into and through the red-giant phase has been extensively modelled, but it remains unclear whether the Earth will be engulfed by the Sun or will continue in orbit. The uncertainty arises in part because as the Sun burns hydrogen, it loses mass causing the Earth (and all planets) to orbit farther away. There are also significant uncertainties in calculating the orbits of the planets over the next 5 – 6.5 billion years, so the fate of the Earth is not well understood.

At its brightest, the red-giant Sun will be several thousand times more luminous than today but its surface will be at about half the temperature. In its red giant phase, the Sun will be so bright that any water on Earth will boil away into space, leaving our planet unable to support life.

Well known examples

Prominent bright red giants in the night sky include Aldebaran, Arcturus, and Gamma Crucis, whereas the even larger Antares and Betelgeuse are red supergiants.

- Mira, a red M-type asymptotic-giant-branch giant.
- Albireo, a K-type giant.
- 4 Cassiopeiae, an M-type giant.

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Planetary Symbols

I had trouble this month displaying a symbol for Neptune in the FrameMaker application used to produce New Zenith, and after a bit of detective work discovered the proper way to get a decent result without having to import graphics.

I found various websites with suggestions that the characters could be typed using Unicodes and certain fonts to display them properly. Anyhow, to save everyone searching for a similar solution, I made the following table:

Planet	Symbol	Unicode	Represents
Mercury	☿	U + 263F	Mercury's winged helmet and caduceus
Venus	♀	U + 2640	Venus' hand mirror
Earth	♁	U + 2641	Globus cruciger, or an inverted symbol for Venus
	♁	U + 2295	Globe with equator and a meridian
Mars	♂	U + 2642	Mars' shield and spear
Jupiter	♃	U + 2643	Jupiter's thunderbolt, an eagle, or the letter zeta or Z for Zeus
Saturn	♄	U + 2644	Saturn's sickle or scythe
Uranus	♅	U + 26E2	Platinum (Use DejaVu Font)
	♅	U + 2645	Globe surmounted by the letter H (for Herschel)
Neptune	♆	U + 2646	Neptune's trident[

The characters shown can be typed into a document using the Unicode or, in Windows, by using a small utility called [UnicodeInput](#). This adds a logo in the system tray and is called from inside your word processor by pressing the ALT and + keys together, entering the unicode numbers and clicking SEND. This will put the required character into your document then you need to change the font for the symbols (which will probably appear as question marks) to Arial Unicode MS (or anything with [good Unicode support](#)).

An explanation of Unicode and a list of suitable fonts for Windows, Mac and Linux is available on Wikipedia at http://en.wikipedia.org/wiki/Unicode_font.

Joke heard at this year's Edinburgh Fringe

“My ideal crime? I'd steal the roof off the Planetarium. Nobody would notice until the next day.”

John Langley

Observatory

For your own safety, when visiting the VAS observatory, please bring a torch. Also, please make sure you close and lock the car park gate if you are the last to leave - if you need the combination to the lock, please contact a member of the committee.

Articles Needed

New Zenith needs letters, articles, reviews or pictures related to all aspects of astronomy. Contributions to the Editor please at the email or postal address on the front page.

“Do not take life too seriously. You'll never get out of it alive”
Elbert Hubbard

“The trouble with having an open mind, of course, is that people will insist on coming along and trying to put things in it”
Terry Pratchett

“Technological progress has merely provided us with more efficient means for going backwards”
Aldous Huxley

“A satellite has no conscience”
Edward R. Murrow