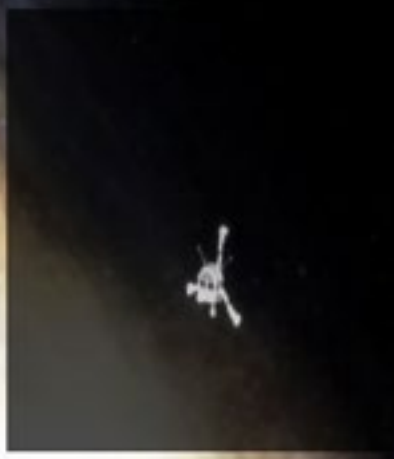
December 2014

Look Up In wonder-
a guide to Decembers Night Sky

THE PHILAE HAS LANDED



Dry Creek view Observatory

COMET 67P
CHURYUMOV-GERASIMENKO

North West Astronomy Festival 2014

ASTRO NERDS MAGAZINE

THE WIZARD NEBULA- 25/9/14

JK OBSERVATORY , LONDON, UK

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John harper F.R.A.S

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Tring Astronomy

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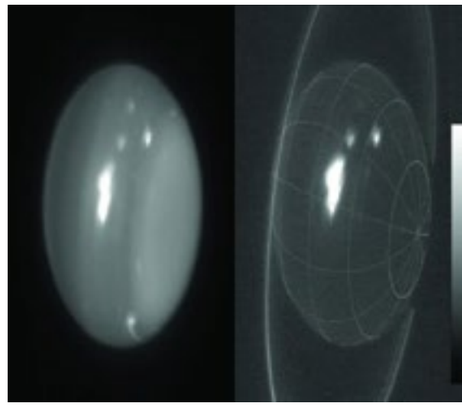
WELCOME

Seasons Geetings to all our readers. November as been an interesting month. The big event of the month was the ESA Philae Lander desend and land on Comet 67P/Churyumov–Gerasimenko. Although it eventually landed in a dark spot on the comet valuable data was beamed back to mission control. Stunning imags of storms on Uranus have been photographed by astronomers.



The Mars Rover, Curiosity went back to the base of Mt Sharp to re-examine rocks, NASA report they are looking for evidence of extreme environmental changes.

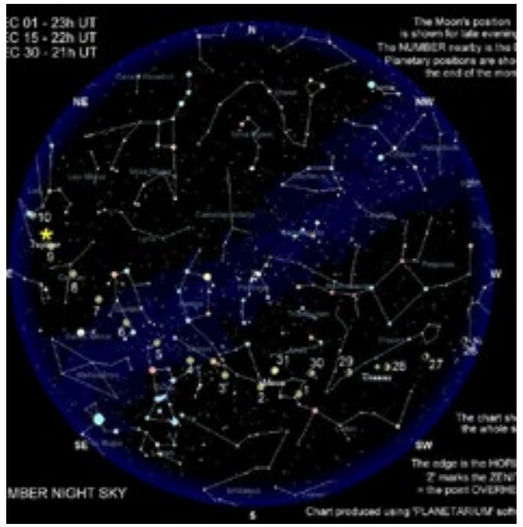
This month, and no suprises here we are focusing on the Rosetta mission, with thoughts and comments on the mission from people, from the world of astronomy and science.

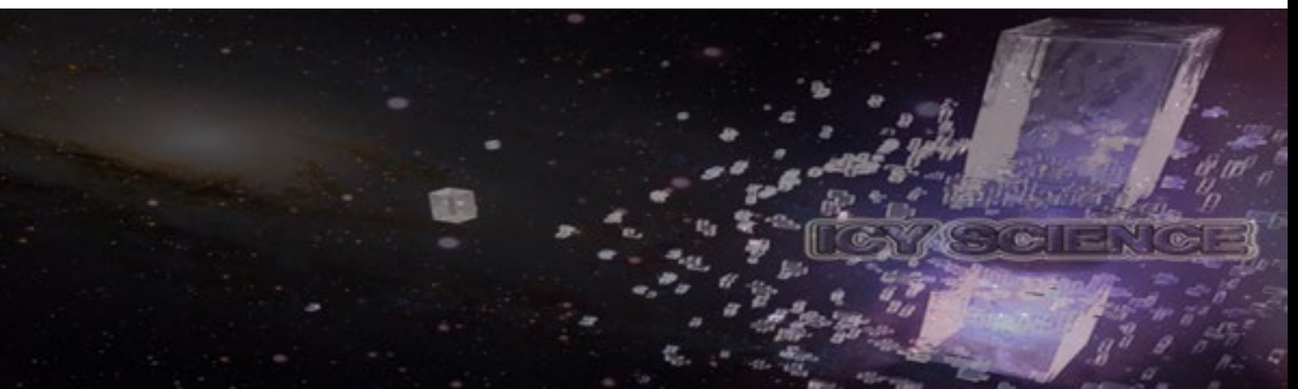
So i hope you all have a good festive period and a happy new year

David Bood--- Editor

www.icyscience.com

IN THIS EDITION





Farewell Philae - narrow-angle view

ESA/Rosetta/MPS for OSIRIS Team MPS/UPD/LAM/IAA/SSO/INTA/UPM/DASP/IDA

LIFE ON MARS

Throughout history, humans have looked at Mars in wonder and have made up myths, legends and science fiction stories about civilizations. When Mariner flew by Mars in 1965 hopes for finding a thriving civilization on the Red Planet were quickly dashed by the 22 postage stamp sized images that slowly trickled back to

Earth. The images showed a barren, rocky terrain. For many though, their passion of finding out more details kept the interest in finding life on Mars alive. In 1976 a life detecting experiment invented by Dr. Gil Levin was sent on the Viking I and II Landers to investigate whether microbial life existed in the soil on Mars. Levin named his experiment Gulliver, but it was renamed by NASA to the Labeled Release (LR) experiment. Viking I and Viking II, which were 4,000 miles away from each other, both carried the LR. A brief summary of the LR is as follows, first a sample of Martian soil is scooped up and sent into a small tube, then a squirt of nutrient radioactive 14C is added to the soil sample, and if microorganisms are present they will consume the nutrient and then give off radioactive gas. When the LR was performed on the surface of Mars, the first scoop of nutrient was added to the soil and a spike was seen on the graph indicating a positive result for life. The gas that was released by this

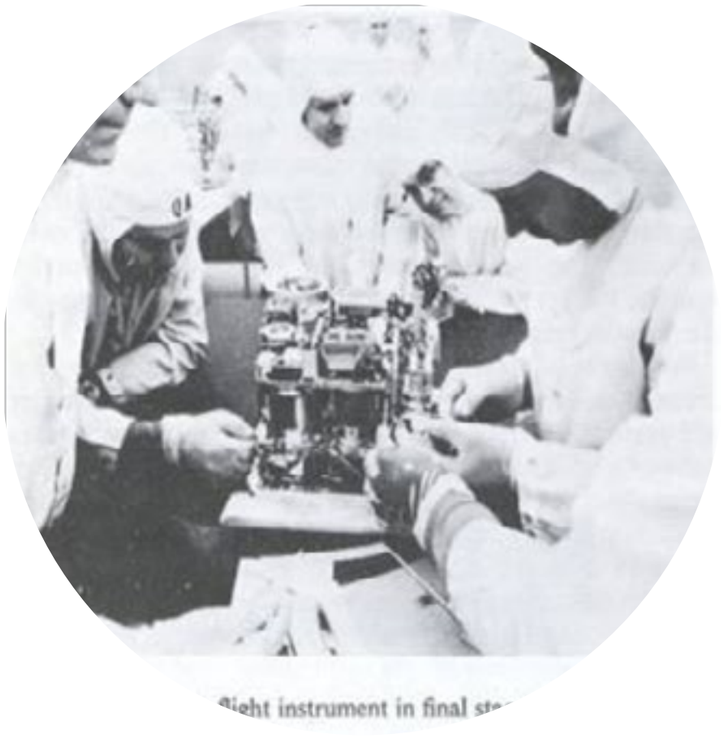
experiment persisted for the entire seven days it was run. In order to verify the results a control experiment had been designed by NASA. The control was designed to determine whether the result was chemical or biological. The control had a negative result. Chemistry cannot "die" from an experiment, but biology can. Since the control came back negative and the LR was positive then it can be ascertained that there is life on Mars. The LR detected life on Mars according to the criteria set by the Viking team at NASA. Viking I and II both had a positive result for life with the LR experiment. Several different life detecting experiments were in the payload of Viking. Each one had varying degrees of sensitivity. The LR was the only test that was positive for life, but it was much more sensitive than the others. The sensitivity of the LR was able to detect 1/1 x 106 cells in the soil, while the others were orders of magnitude less sensitive which easily explains why they were negative versus the positive results of the LR. The Gas Exchange (GEX) and the Pyrolytic Release Experiment (PR) failed to detect life in the soils of Mars. So NASA made a consensus that there was no life on the Red Planet. However, science does not work by consensus. Science is supposed to review the results and retest them. That is the scientific method every third grader

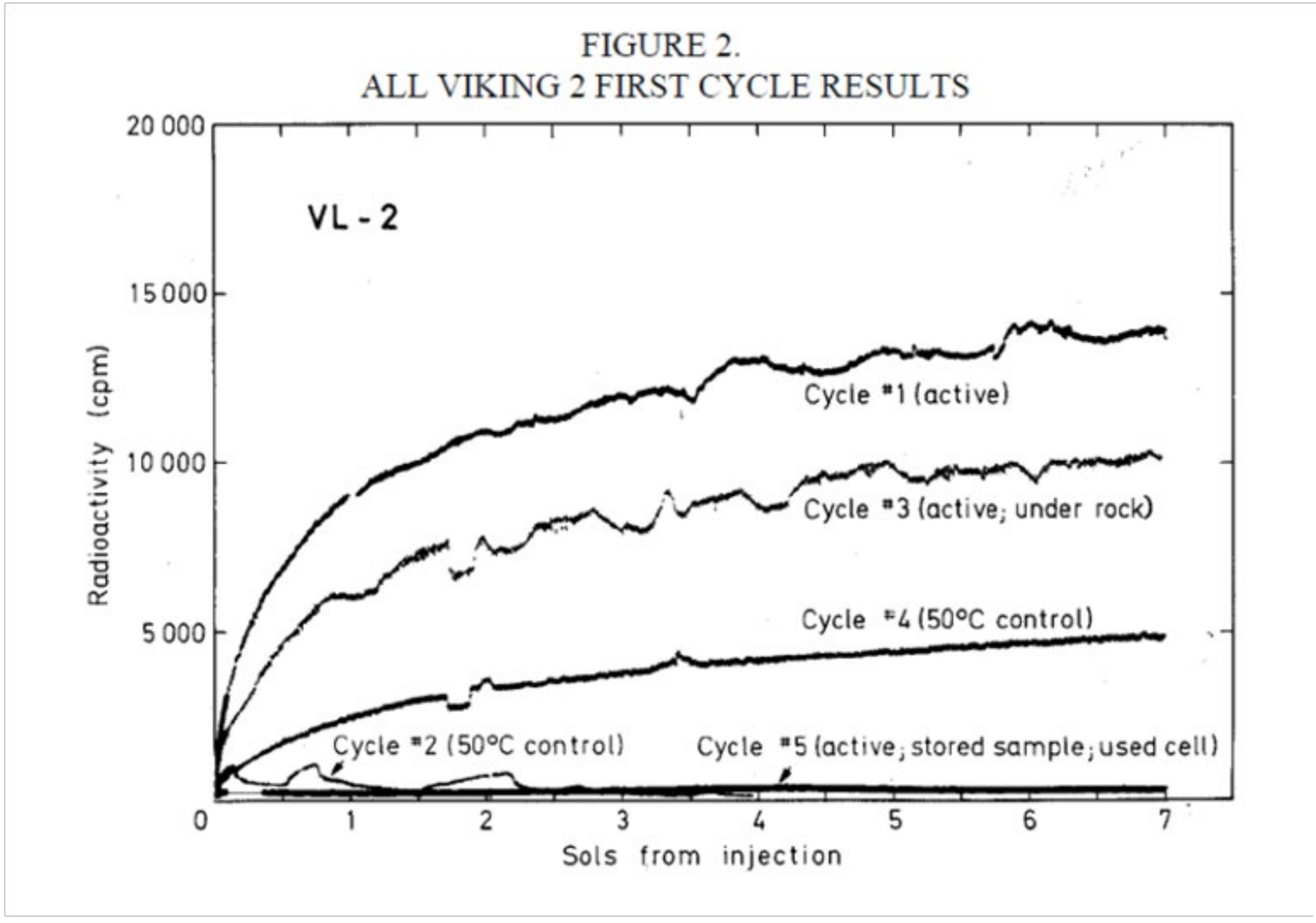
Gilbert V. Levin, Ph.D.

in America learns. Scientists must retest their experiment to get accurate results. If one out of three tests is positive, then you must rerun the experiment to get an accurate result. What scientists should not do is stop sending life detection experiments to Mars because of their ambiguous results. NASA has refused to send any other true life detection experiments to Mars since then. That is not science. Each time Levin has proposed a new life detection experiment to go to Mars, he has been denied. NASA keeps stating that they are looking for biosignatures. If we had the technology to search for life on Mars in 1976, what is stopping us from looking for life on Mars now? We have learned so much more about the Red Planet since then, it should be a slam dunk to send a life detection device to Mars. Each successive mission to Mars has discovered that Mars definitely has two things, rocks and water. The Viking missions (1976), the Pathfinder and Sojourner Rover (1997), Spirit (2004-2010) and Opportunity Rovers (2004-currently operational), Phoenix Lander (2008), and Curiosity (2012-currently operational) have all confirmed many times over that there are water and rocks on Mars. This has taken nearly 40 years to accomplish, even though we acquired that information with the Viking missions. The next rover, with a working name of Mars 2020, is to be very similar to Curiosity with the addition of a cache to store rock samples in. This cache will be stored on Mars until a later date when another rover or humans (as a NASA scientists stated tongue and cheek) will launch it back to Earth, as a sample return, for further study. According to MIT planetary scientist, Dr. Ben Weiss, about one ton per year of Martian meteorites fall to Earth, which over time equals billions of tons of rocks from Mars have arrived on Earth. He states, as do others, "It is possible we are Martians." Since that is the case, what is the purpose of sending another rover very similar to Curiosity to Mars to store a cache of rocks on the surface for an unknown amount of time? This is a perplexing set of facts. So many issues arise with this plan. Such as, contamination upon reentry, time of the cache sitting on the surface of Mars, and lack of foresight and appropriate planning. According to Dr. Robert Zubrin, President of the Mars Society, we get samples of rocks from Mars all the time. We have many meteorites from Mars in labs being studied currently. The mission that should be funded is the Icebreaker Life mission. This mission will have a one meter long drill that will peer below the surface of Mars specifically searching for conclusive evidence of life. (see blog 21 for more details) In an email from Dr. Chris McKay he stated, "We are currently working on the Icebreaker mission and we will be proposing it to the current round of Discovery missions. We expect proposals due Dec 2014. We will aim for a 2018 launch." This is a much more reasonable plan and should have been funded years ago. Since the controversial Viking results, many scientific journal articles have been published supporting the results while others have attempted to discredit them. Many new experiments have been developed that have supported the LR positive results. At this point it may be a matter of what you choose to believe regarding the LR results. However, science is true whether or not you believe it. I believe there is life on Mars. All of the necessary ingredients are on Mars for life to exist. Mars has ample

amounts of water, minerals, and other chemical nutrients in the soil. Habitability has been established and reestablished. The question is, “Do we want to find life on Mars?” It depends who you ask.

By: Nicole Willett
http://www.marssociety.org/





Images: gillevin.com

Orwell Astronomical Society is based at the observatory at Orwell Park School, Nacton, near Ipswich, where we look after the Tomline 10” refractor telescope. Members meet here on Wednesday evenings and occasional Tuesdays (STONs – Small Telescope Observing Nights). Twice a month we meet at Newbourne village hall, which enjoys a reasonably dark sky, and potential members are also welcome to come along, bring their scopes for advice & use or just themselves to find our more.

We also hold public outreach meetings in local parks in and around Ipswich and group visits to the Tomline Observatory.

There’s lots more information on our web site, from which you can download our monthly newsletter.

Martin Richmond-Hardy- Twitter @MartinG8BHC & @SuffolkMacUG

Chairman- David Murton - Twitter @chairman_oasi

http://www.oasi.org.uk/

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LOOK UP IN WONDER- DECEMBER NIGHT SKY

During the first three weeks of the month, the Sun is travelling eastwards through the constellation of Ophiuchus and crosses the border into Sagittarius at around 11h on the 18th. The earliest sunset of the year is on the 12th, and the latest sunrise is on the 31st. Between them lies the Winter Solstice, which this year takes place on December 21st at 23h03. The earth-sun distance at this time is 147,160,039 km. The earth's north pole is tilted as far away as it can be from the sun, and this day is the official start of winter, a season which lasts 88.99 days in the northern hemisphere (and of course, summer in the south).

THE MOON

The Moon is at apogee, its furthest from the earth, on the 12th at 22h, and at perigee, its nearest to the earth on the 24th at 17h

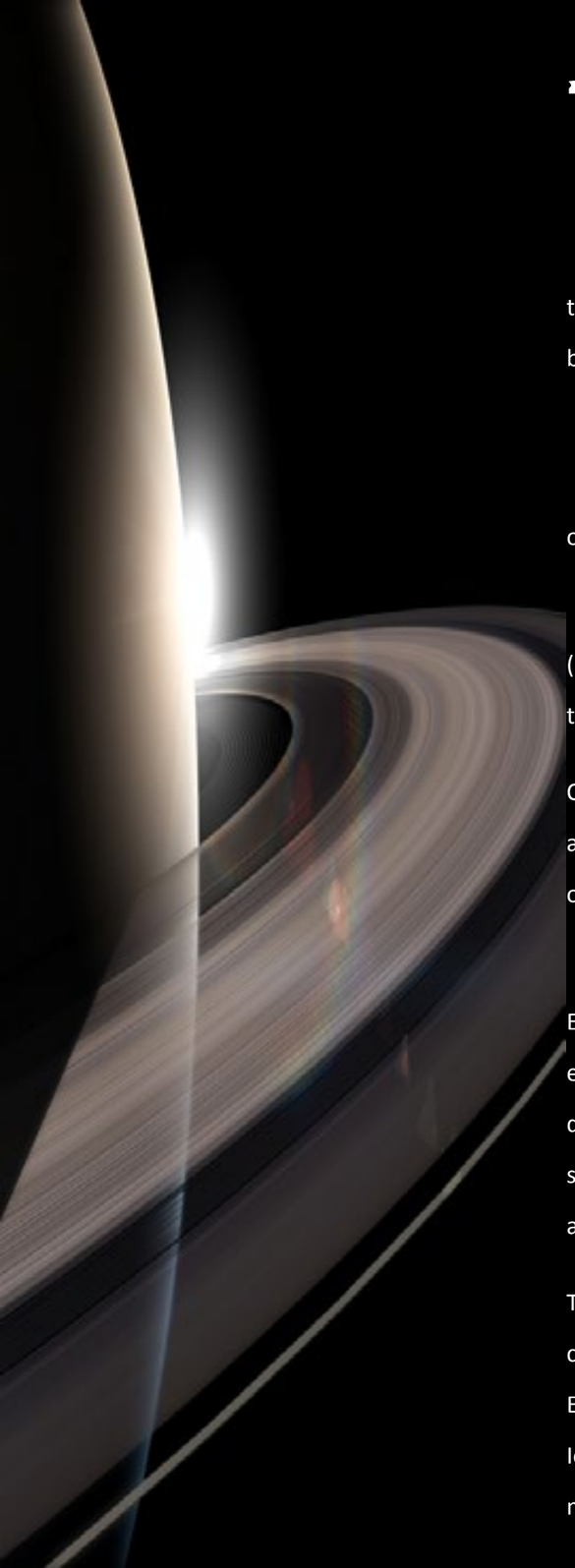
FULL MOON is at 12h27 on the 6th, in Taurus, several degrees to the east of Aldebaran. It is the highest Full Moon of the year despite the moon being 5° below the ecliptic. This variation is due to the 5° inclination of the moon's orbit in relation to the earth's orbit around the sun.

THE LAST QUARTER moon occurs at 12h52on the 14th in the southern reaches of the constellation Leo.

December's New Moon takes place at 01h36on the 22nd, a couple of hours after the Winter Solstice, in western Sagittarius. On this occasion, it passes almost 4° to the north of the sun.

FIRST QUARTER MOON, on the 28th at 18h32, is in Pisces, just to the NW of its boundary with Cetus.

It may be possible to see **EARTHSHINE** on the night hemisphere of the waning crescent moon from the 15th to the 21st and on the waxing crescent moon's dark hemisphere from the 23rd to the 27th.



THE PLANETS

MERCURY cannot be seen during most of December, superior conjunction with the sun occurring on the 8th. Thereafter it returns into the evening sky but it will not be until the end of the month that it may be glimpsed very low down in the SW sky, in the evening twilight, to the lower right of Venus. The planet lies between the 'Evening Star' and the horizon; use binoculars.

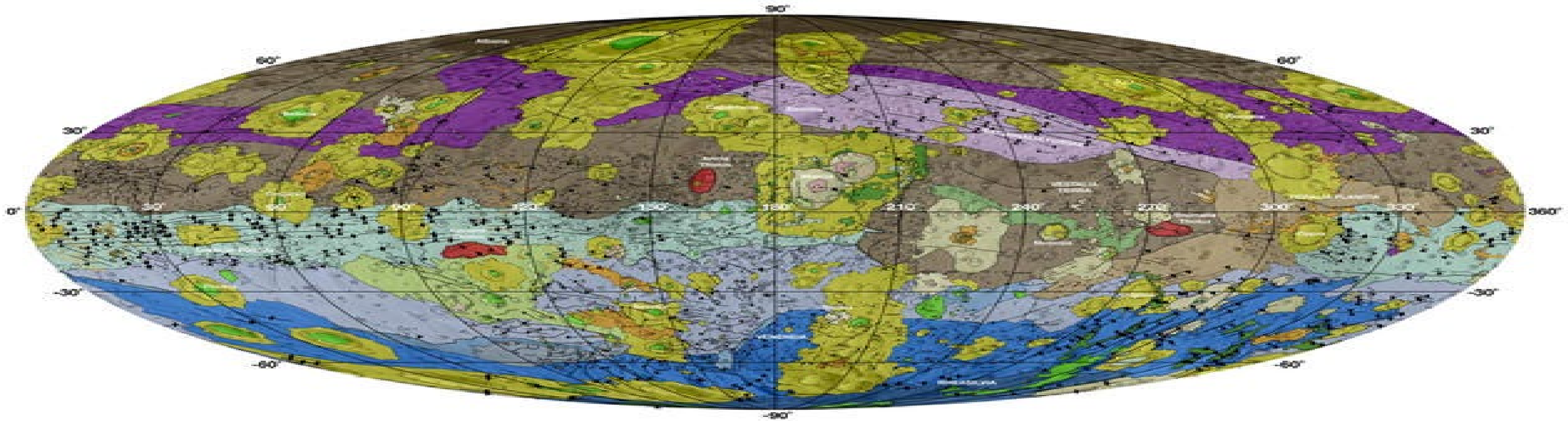
VENUS slowly emerges from the vicinity of the sun, and using binoculars may be glimpsed low down in the SW sky within an hour of sunset for most of the month. By the end of December it becomes increasingly more visible as it begins its northerly climb. This is the beginning of the excellent spring evening apparition of the planet in 2015.

Throughout December **MARS** is an evening object, setting in the SW sky between 19h00 and 20h00. It shines as a reddish tinged first magnitude 'star', a little dimmer than Altair (alpha Aquilae), which lies some 30° above the planet in the direction of the zenith. The planet moves eastwards from Sagittarius into Capricornus as the month progresses, so that by the end of the month, it is some 4° to the west (right) of the third magnitude star Deneb Algedi This star was called by the early Arabian astronomers Scheddi, (in the Bayer classification: Delta Capricorni).

On Christmas Eve the waxing crescent moon with earthshine illuminating its dark hemisphere may be seen approaching Mars in Capricornus, and will form a pretty spectacle just less than 10° above the SW horizon at 18h00, the angular distance between the two at this time is 8°. The following night the moon's easterly movement has taken the crescent above and slightly to the left of the red planet, when at the same time, at 18h00, the Moon lies 8° above Mars, in the direction of the Great Square of Pegasus.

JUPITER rises just before 22h00 as the month begins, but by 20h00 on New Year's Eve, and is visible for all of the night after those times; it completely dominates the night sky. Even the Dog Star, Sirius is outshone by the brilliance of the giant planet. When the two are visible together from 21h00 onwards, you can compare them, and you will notice the basic difference between a bright star and a bright planet in the night sky. Sirius scintillates or twinkles because it is a point of light, whereas Jupiter shines steadily and does not twinkle because it is a tiny disc not a point of light. A glimpse through binoculars of Jupiter will readily show its flattened disc, and if your binoculars are well focussed and firmly fixed, you will be able to see the Galilean satellites as they change position from night to night. Overnight on the 11th/12th at midnight, the waning gibbous moon lies 5° below and to the right of Jupiter, and the two bodies form a triangle with the star Regulus, the brightest star in Leo, to their left.

There is a double shadow transit of Jupiter's moons Europa and Io between 04h21 and 04h26 during the morning of the 9th. Between these times, if you observe the planet's disc using sufficient magnification, you will see the dark shadows of these two Galilean satellites almost in line with the planet's equator, but on either side of the disc. The smaller of the shadows is that of Europa, near the Jovian eastern limb (from the point of view of the planet), and is about to leave the disc. Io's shadow, which is much larger, has entered the disc on the planet's western limb. Io is visible as the point of light just to the left of the disc. Europa may be seen during this event, as the icy moon transits Jupiter, and may be glimpsed as a bright star-like point against the methane clouds of the equator.



SATURN becomes more readily visible as it emerges into the early morning sky between the constellations Libra and Scorpius, and by the end of the year rises shortly after 05h00. The planet should be sought within 10° of the SE horizon as twilight begins at around 07h00 mid-month. It is the only bright 'star' low in the sky in that direction, and should be fairly easy to locate. On the 19th at 07h00 the thin waning crescent moon with earthshine on its dark hemisphere, lies 7° to the upper right of Saturn, and both are approximately 10° above the SE horizon.

URANUS in Pisces is an evening object, setting within two hours after midnight for most of the month. The planet is in the same position as it was last month. It lies 3° to the SSW of delta Piscium forming a flattened isosceles triangle with the stars delta- and epsilon- Piscium; delta being at the apex of this triangle. Uranus is the faintest of the trio, but is readily visible in a field devoid of stars of a similar brightness. It shines with a greenish grey tinge and becomes a disc when viewed through a telescope with a magnifying power greater than X60.

For those who like a challenge, there is an occultation of the star delta Piscium around midnight on the 1st/2nd, when the star disappears behind the dark limb of the waxing gibbous moon, and at 00h30, the moon is in conjunction with Uranus. Ensuring that the moon is taken out of the upper field of view, you may spot Uranus just 19 minutes of arc (half a moon width) below the moon's south pole.

During December **NEPTUNE** is best seen during the early evening at around 20h00, at an altitude of 20° in the SW, but a little lower as the month proceeds. This 'below naked eye visibility' planet is located some 4° to the left of the fourth magnitude star Ancha (theta Aquarii). First you will spot the fifth magnitude star sigma Aquarii in that direction. Having placed sigma to the left in the binocular field, Neptune will be found 1° (two moon widths) to the right. A telescope with adequate magnification is necessary to see this remote world as a tiny bluish grey disc.

The maximum of the Geminid meteor shower takes place overnight between the 13th/14th of December. At this time you should be able to see the bright, fast moving shooting stars associated with asteroid 3200, Phaethon, the remains of a spent comet. Geminids tend to be most numerous around 02h00 when Gemini, their apparent point of origin, is almost overhead. On good nights it is possible to see up to 100 meteors an hour, making this the best of the annual showers, although typically inclement weather may get in the way. This year there may also be interference from a gibbous waxing moon.

Peaking overnight on the 22nd/ 23rd is the Ursid meteor shower (fragments of comet Tuttle), which produces about 10 meteors an hour, with occasional outbursts resulting in a greater number being seen. Turn your back to the gibbous waning moon and watch for shooting stars in the northern quadrant of the sky.

Constellations visible in the south around midnight, mid-month, are as follows: Lepus the Hare, Orion, Taurus and Auriga the Charioteer.

All times are GMT 1° is one finger width at arm's length.

SKY NOTES PROVIDED BY JOHN HARPER FRAS

IMAGE LEFT BY MARY SPICER

M45. It was taken with a Helios 102mm refractor on an EQ5 Pro mount, and a Canon 1100D. It's a stack done of images taken on 2 different nights, as follows:

14/11/14: 20 x 120 seconds at ISO-800 + 20 darks and 10 flats

23/11/14: 20 x 120 seconds at ISO-1600 +20 darks and 10 flats

Total exposure time of 80 minutes.

Processed using Photoshop CS2 with RC Astronomy Tools and Adobe Lightroom.

THE GALLERY

Picture top left : Waning Moon from 12th November 2014. Taken with my Sky-Watcher Explorer

200P Telescope. 25mm Eyepiece. 2x Barlow Lens. 80x Magnification. Nikon Coolpix L810 camera.

Processed using GIMP 2.6.

Picture botton left: Waxing Crescent Moon from 24th November 2014. Nikon Coolpix L810 camera.

PHOTOS: David Blanchflower

Images by Dave Walker

top right: Cocoon nebula

bottom right: Pacman Nebula

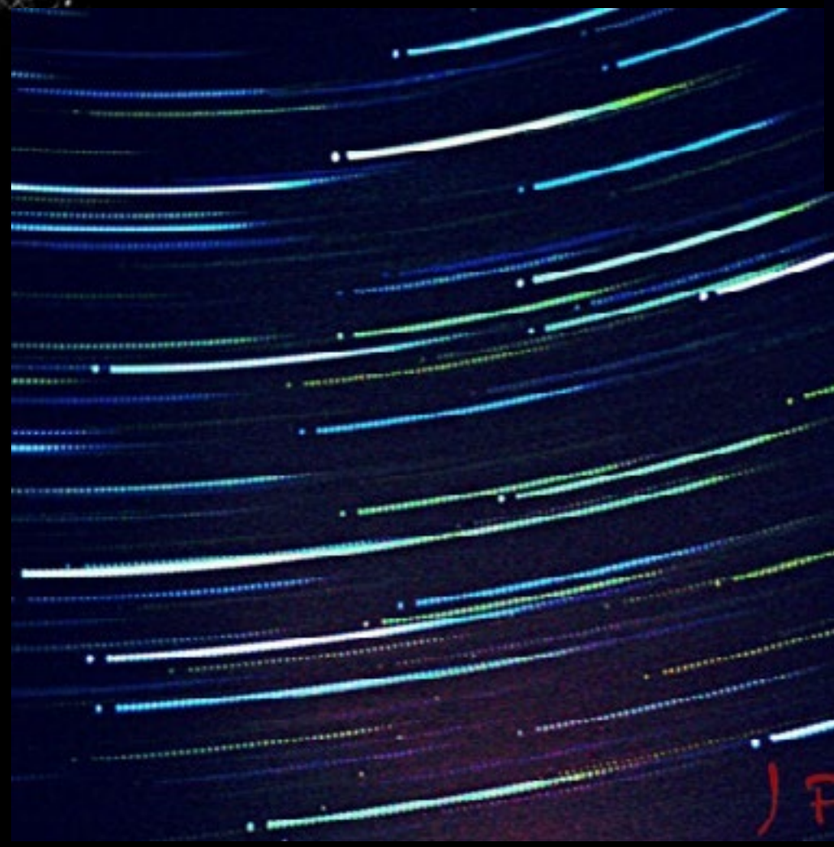
took them in the Trough of Bowland, and found them thanks to SkySafari Pro on my Android.

IMAGE TOP: David White taken 14th November 2014

18.05 UT) of Iridium 59 flaring as it passed into the stars of the constellation Camelopardalis. The asterism of stars known as Kemble's Cascade can be seen at the very bottom of the pic to the right of centre.

Canon 450D 50mm. ISO1600 f4. 30s.

Sheffield UK.

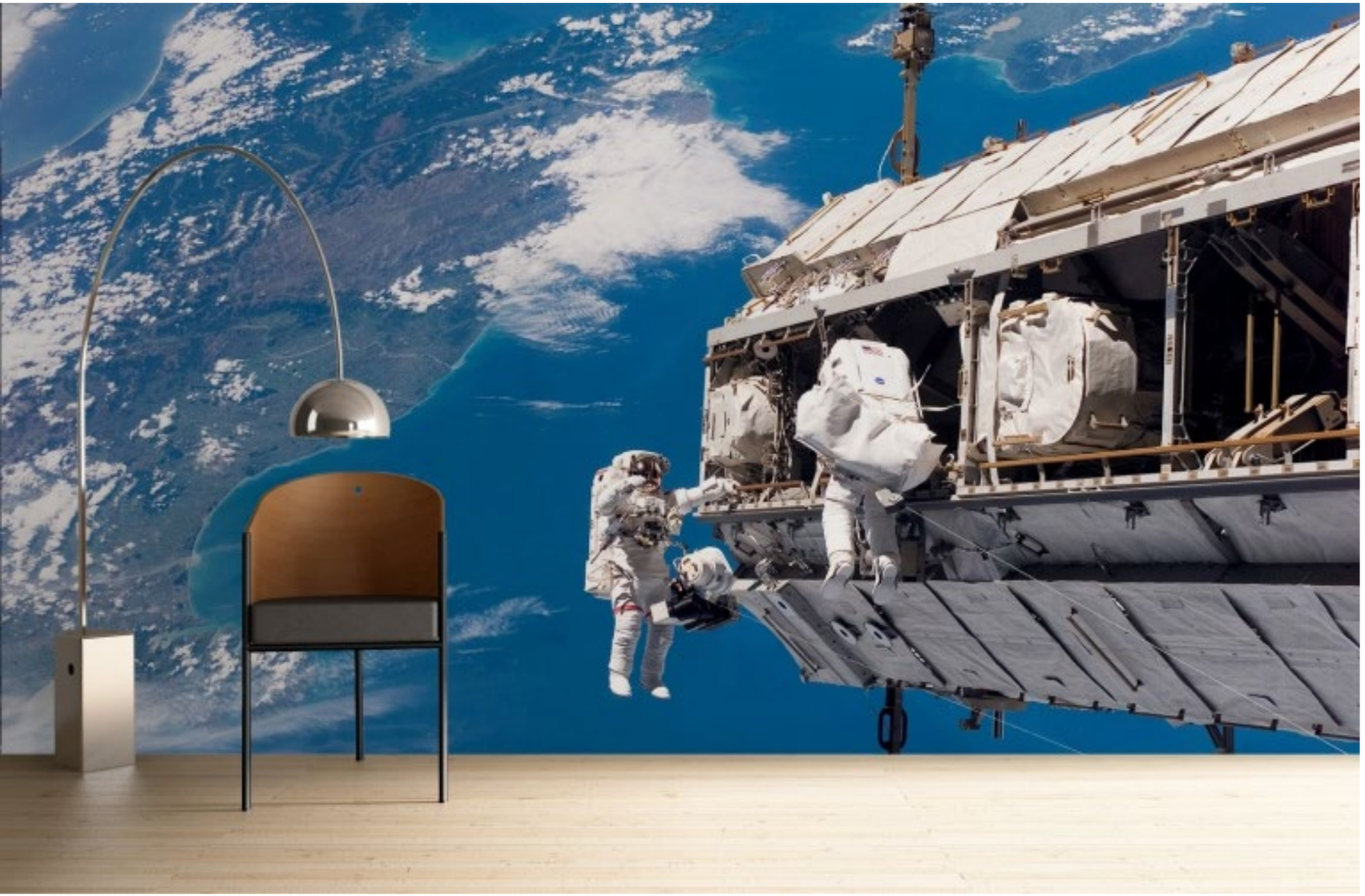


IMAGES BY JAMES PARKER

D3100 SLR and Celestron Advanced VX8 SCT

TWITTER: @JP_Astronomy

WEB: FLICKR



http://www.muralswallpaper.co.uk/space-walk-mural-wallpaper

Dry Creek View Observatory

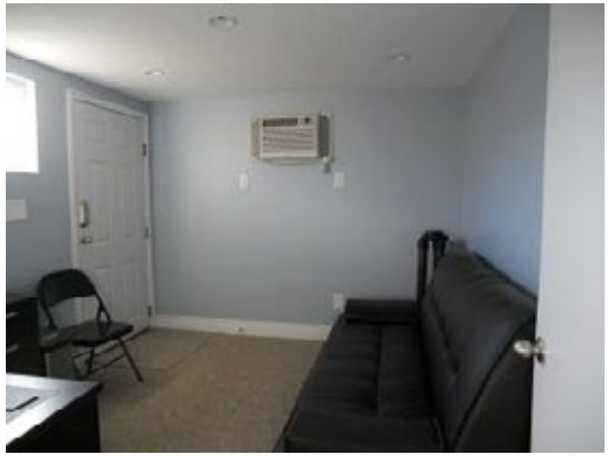
The Birth of an Observatory

After setting up and tearing down the scope every time I wanted to view the heavens, it became apparent that a permanent home for the scope was needed. I initially settled in on a “Roll off Roof design as I wanted to see the entire sky while viewing. Domes needed to be custom built or were way too expensive. My son again influenced me and said, “Get a Dome”. I started researching and too my surprise, there were some manufacturers that provided Domes at a reasonable price. I settled in on Explora-Dome as they were the correct size, right price and good quality. I got my information on the Explora-Dome at their web site Explora-Dome by Polydome. I purchased the Dome through one of their dealers Stellar Vision & Astronomy Science Store in Arizona.

I viewed many designs by looking at Dome Observatories at the web site Amateur Astronomical Observatories. This time my wife influenced my decision. Without her, this project would not have been possible. She was supportive all the way and her only request was make it match the house, add a shed for garden tools, and finish the inside. In other words, make it nice. I hired a local contractor, and the construction process began. The dimensions of the “Scope Room are 10’ X 10’ X 4.5’to match the Expora-Dome roof support design. The “Warm Room” is 10’ X 12” X 7’. We added a “Shed” with a roll up door for housing lawn mowers and garden tools.

INSIDE THE OBSERVATORY

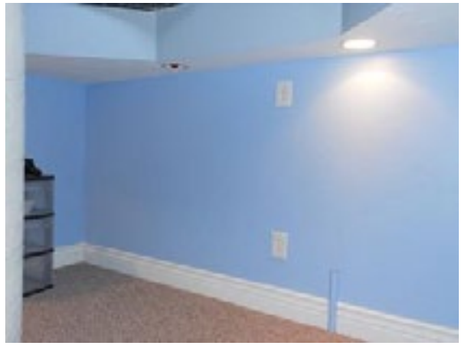
The “Warm Room”



The warm room was sheet-rocked, textured, painted, and carpeted. This 12x10 foot room is just the right size to fit a couch, computer desk and a few chairs. The room is heated with a wall insert 120 V heater that is thermostatically controlled. There is 1 Red light in the center of the room and 4 white lights. I chose “Can Lights” so that fixtures will not be hanging from the ceiling. Below are some pictures of the finished “Warm Room”

The Scope Room

The scope room is not insulated and not heated. I had it carpeted just like the warm room so that if I accidentally dropped an Eyepiece or other piece of equipment, it would have a soft landing. The sheet-rock gives this room a finished look and a nice place to work. Again I used “Can Lights” for lighting. There is one White light on each of the 4 sides giving a total of 4 white



lights. There is also one red light on each of the 4 sides giving a total of 4 red lights. All lights can be controlled either from the Warm Room or the Scope Room. I had a “Trap Door” carpeted and installed over the steps leading up to the scope room. You must watch your head entering or leaving the scope room, but once inside you can completely stand up. The dome is 8 feet in diameter and has a height of over 4 feet. You can comfortably have 4 people at one time in the scope room. Below are pictures of the scope room. The Dry Creek View Observatory was officially finished on September 3, 2011 when the concrete was placed for the sidewalks and patio. It took a little over 1 year to build. It could have been finished in months, but the contractor worked on this in his spare time. The entire cost of building the Observatory including cement work, finish work, furnishings and dome was approximately $14,000. Sounds like allot but spreading out the costs over a year made it less painful.

Why a Dome?

Why did I purchase a dome instead of a roll off roof design? The dome costs more, and you cannot see the entire sky at a given time. My son said the dome looks neat and it is more what you expect an observatory to look like. That reason alone was not why I purchased the dome. I first determined

what I really wanted to do with my scope. I wanted to take pictures. I live in an area near the mouth of a canyon and we get East winds almost every night in the summer. With a dome, I am sheltered from the winds and that makes the scope more stable. I am also not affected by lights from the surrounding houses. For these reasons I chose the dome. I like roll off roofs, but the dome provided me with more protection.

Things I would do differently.

The major thing I would do differently is to insulate the scope room. I didn't want to insulate it, because the scope needed to be at ambient temperature. I have found that when the dome is open, the temperature comes into equilibrium quite quickly. I do not see an advantage of not insulating the scope room. It will help with the summer hot temperatures and winter cold temperatures. I definitely would insulate the floor. Since it is off the ground, it gets cold on the feet. If possible, I would put electric heating on the floor for the sake of the toes on cold winter nights. Because I take my shoes off in the scope room, I presently stand on a heating pad when it is cold.

I would change the location of the light switches in the Scope Room. The switches are handy near the trap door when entering and leaving. However, if I could do it again, I would mount the switches just below the dome ring on the wall by the trap door. That way I don't need to stoop down when turning on or off the lights while in the Scope Room

Words: Travis Smith

http://dcvobservatory.com

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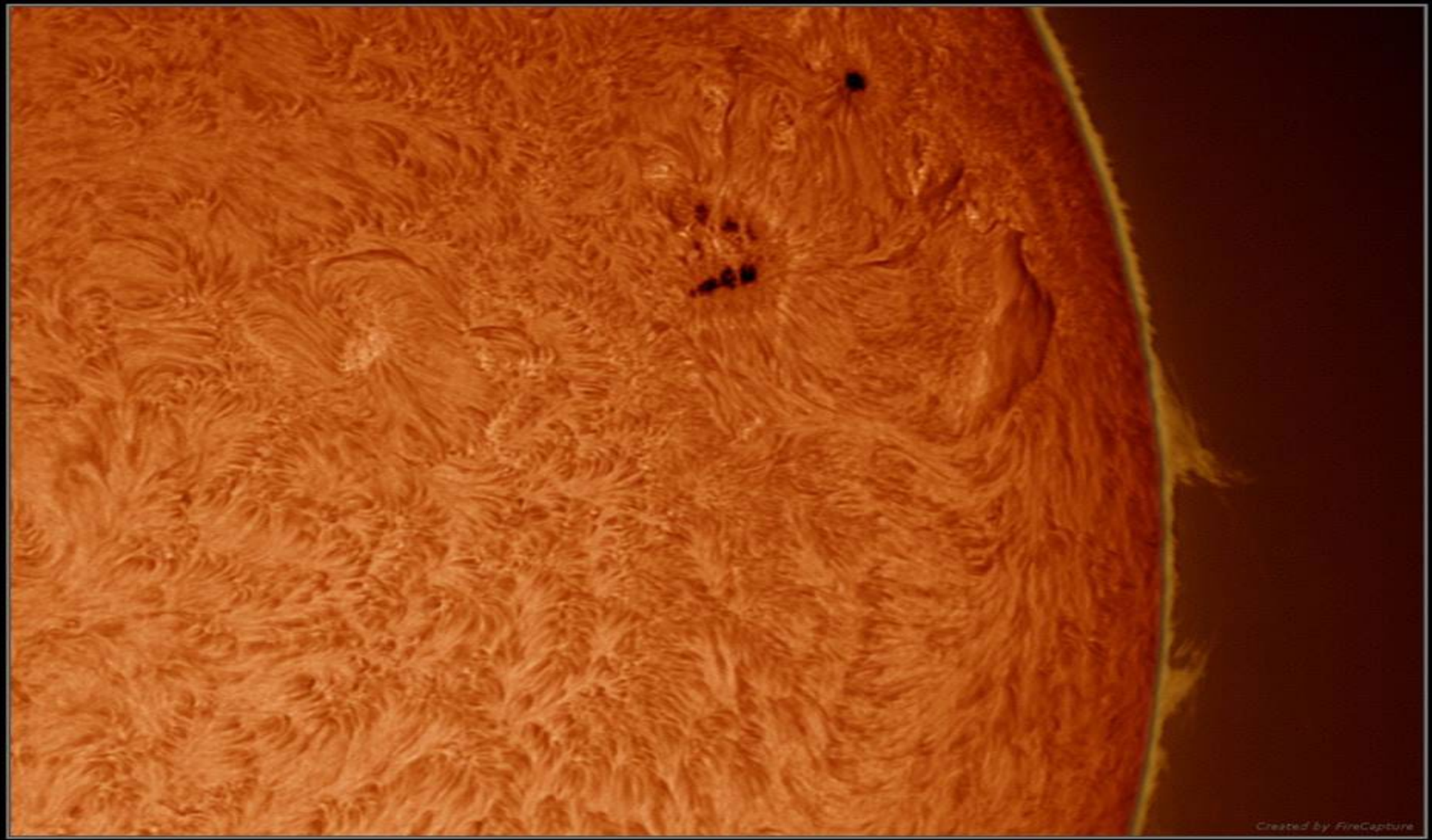

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Peter J Williamson FRAS

2014/11/24 11:00 UT
Telescope
Coronado 90mm Solarmax II f/8.8 H/Alpha 2x Barlow

H-Alpha
ZWO ASI120MM
Whittington Observatory Shropshire UK

North West Astronomy Festival 2014 by Mary Spicer

During the weekend of 11th & 12th of October, I was fortunate enough to be at the 2nd North West Astronomy Festival, organized by Sue and Andrew Davies of The Knowledge Observatory. On this occasion I was there representing the UK Women in Astronomy Network, which officially launched at the show the previous year. I spent a lot of time during the run up to the festival creating posters showcasing the work of 22 different amateur female astrophotographers, aged from just 4 years old to 40 plus, so I could use them on the exhibition stand. On the evening of Friday 10th October, I packed all my exhibition materials together, and we set off for Runcorn. We arrived at The Heath at around 9:30pm and got the exhibition stand set up. I was really pleased with how eye-catching the posters had turned out and was so excited to talk to people about them over the weekend! We headed back to the hotel and got an early night, ready for our busy weekend.

Will Gater at the end of his talk with festival organiser Andrew Davies

SATURDAY 11TH OCTOBER:

We met up with my Mum over breakfast, then headed over to the Heath at around 9:30am. There was already a great buzz around the conference centre and there was a fantastic line up of talks to look forward to throughout the day. As with most of the big astronomy events around the UK, it was just like one giant reunion of all the astronomy friends I speak to online on a daily basis. The first talk was at 11am so I had an hour on the exhibition stand saying hello to people and telling them all about the UK Women in Astronomy Network. That hour passed like lightning and it was soon time to head off to the first talk.

For the first presentation of the day, we were in the presence of astrophotography royalty; Damien Peach was talking about The Giant Planet, Jupiter. He began by giving us an overview of Jupiter's composition and how the distinctive cloud belts form. He then talked about the Great Red Spot, and how its size has changed over the years. Astronomers' sketches were originally the only way that records could be kept of how Jupiter's features evolved, and Sir Patrick Moore was one of the people who took very detailed sketches of it. It wasn't until 1879 that the first photographs of Jupiter were taken, but it was many years later before improvements in technology allowed astrophotography to become widely used. Since the 1990s, we have seen huge increases in image quality from digital camera technology compared to photographic film.

Damien first imaged Jupiter in 1998, and he showed his progression, constantly improving his images ever since then. He talked about how having a worldwide network of imagers has helped astronomers to make new discoveries about the planet, and helped with recording things like the impact of Comet Shoemaker-Levy in 1994. He talked about some of the processing methods he has used over the years and how programs such as Win Jupos can allow you to de-rotate images and produce flattened out maps of Jupiter. This allows a really quick and easy overview of changes from year to year. He finished by talking about the JUNO mission, which will arrive at Jupiter in 2016. At the end of his presentation, Damien was presented with a hand-made Jupiter cushion to say thank you!

DAMIEN RECEIVING HIS HAND-MADE JUPITER CUSHION

After the talk I went back to the exhibition stand so I could spend some time chatting to festival visitors before the next talk. It was really good to see so many families with young children attending the festival. I go to a lot of astronomy events during the year, but North West Astronomy Festival is by far the most family friendly and I think it's really important that we continue to inspire our younger generation. On the exhibition stand, the posters were a real talking point and I spent the whole of my time before the next talk talking to people about astrophotography, sharing tips and ideas, and telling people about UK Women in Astronomy.

Once again time flew, and it was soon time to head back to the lecture theatre for next talk, where we had Will Gater talking about Secrets of Celestial Light. He began by saying that there is much more to the universe than first meets the eye, with the Hubble Extreme Deep Field image showing five and a half thousand galaxies in just one tiny portion of sky. He talked about what makes the Sun burn, how heavier elements are formed in the cores of dying stars, supernova explosions and their remnants, planetary nebulae. He then

talked about what makes stars appear to have different colours, brown dwarfs and the cosmic microwave background radiation. He talked about why nebulae appear to glow different colours and did a great audience participation demonstration about electron excitation using different coloured balloons. Using a black light, he showed that tonic water fluoresces under UV light and explained that is how aurora are formed. He went on to talk about why astronomers use filters of different wavelengths to study nebulae, the Sun and other planets. He finished by talking how light spectra can tell us the composition of exoplanet atmospheres and gas clouds, and how gravitational lenses allow us to look at very distant galaxies. It was a really interesting and engaging presentation. After the talk it was straight back to the exhibition stand where I met and spoke to lots more lovely people. I blinked and it was time to head back to the lecture theatre for the final presentation of the day, Astronomer's Question Time. Chaired by Helen Keane, the panel included Damien Peach, solar physicist Philippa Browning, Nick Howes, Will Gater, and The Sky at Night presenter Chris North.

There were many and varied questions for the panel again this year, and included questions about what

drives the nitrogen geysers on Triton, the British space programme, wide-field astrophotography mounts, what research is taking place at Jodrell Bank, pulsars, cosmic microwave background radiation research, star and galaxy formation, conspiracy theories(!) and future space missions. Towards the end of the session, we were told that there were some special guests joining us, and much our delight we were joined by impressionist and Sky at Night presenter Jon Culshaw and fellow Sky at Night presenter Paul Abel. Jon treated us to his monologue about Sir Patrick Moore, which was delivered in the voice of Sir Patrick. Even though I'd heard this before at Astrofest in London, it still made me emotional to hear it. We thought that was going to be the end of the session, when it was announced that there was yet another special guest, and we were joined by Professor Chris Lintott from The Sky at Night! So many amazing people in one place, I thought I was going to explode with excitement!

At the end of the session, I was invited to stay back along with the ambassadors of The Knowledge Observatory for a 10 minute private audience with the panel. At first I felt a bit daunted by being in the company such an esteemed group of people, but they were all very personable and we had a nice, fun chat with them all. Before we left, I had the opportunity to have my photo taken with everybody. I think I have looked at this photo at least once a day ever since it was taken and I still have a huge grin on my face! So many incredible people in just one photo!

TOP RIGHT: The esteemed panel at Astronomer's Question Time Jon Culshaw delivering his monologue

BOTTOM RIGHT: Mary & the Knowledge Observatory Ambassadors with the astronomy panel

I was buzzing when I went back to the exhibition stand after that session! I spoke to more visitors, then once it started to quieten down we went back to the hotel room for a rest before returning for the evening entertainment.

The evening kicked off with a hilarious talk by Helen Keane. If you haven't seen or heard Helen talk, then you really must try to. You won't be disappointed! Then we went back to the bar area for drinks, food and more entertainment from Jon Culshaw and Paul Abel. They made a very entertaining double act! Then all of the speakers were presented with unique hand-made gifts to say thank you for the time they had given up for the festival. It was great to have an evening to spend time catching up with fellow exhibitors and my best astronomy friends. Then tiredness caught up with us all, and we headed back to the hotel for some rest before doing it all again the next day.

ABOVE: The speakers receiving their hand-made gifts

SUNDAY 12TH OCTOBER:

We were back at the conference centre nice and early on the Sunday morning, ready for another busy day. Even though I was representing the UK Women in Astronomy, we had just as many men coming to the stand to talk about astronomy and astrophotography and that's great because the Facebook and Twitter pages do not exclude anybody. I talked about photographing aurora, creating star trails, and how blown away we all were at the standard of the images displayed on the posters, in particular those taken by Milly Howes, aged 4, and Olivia Williamson, aged 11. All too quickly it was time to head back to the lecture theatre for a talk by

somebody who was featured on one of the biography pages on the UK Women in Astronomy exhibition stand and is somebody who I personally admire greatly. Solar physicist Philippa Browning from Manchester University was talking about Our Active Sun and the Weather in Space. She began by talking about how our Sun is a very ordinary, middle-aged star, and explained the structure of it, including the photosphere, chromosphere and corona. She explained all about solar wind and how total eclipses can show the complex structure of the corona. The corona is best studied in X-ray wavelengths, so because our atmosphere absorbs X-rays we need space telescopes in order to study it in at those wavelengths. She went on to explain that the Sun is made of plasma, i.e., a gas that is so hot that it breaks up into its constitute parts and becomes a sea of positively charged ions and negatively charged electrons. She explained how complex the Sun's magnetic field is and that plasma outlines the magnetic field lines. She then went on to talk about sunspots and the solar cycle. Next, she talked about space weather and how it is affected by solar flares. A typical X-class flare will produce 30 million million million million joules of energy in just a few minutes. That's 100,000 times the entire annual energy consumption of the whole world! She finally talked about the STEREO mission, which in 2011 placed 2 satellites, STEREO A and STEREO B in orbit around the Sun, allowing us to gain a 360 degree view of the Sun for the first time. She concluded with a brief overview of solar research being carried out at Jodrell Bank, including the 2017 Solar Orbiter mission, which will study the polar regions of the Sun. This was a really interesting talk, especially for keen solar observers such as myself. After the talk I was able to have a quick one to one chat with Philippa, which was amazing! One the way back from the lecture theatre we had a look through some brilliant solar telescopes and saw some of the features that Philippa had described. It was so good seeing young children looking at the Sun through the special eclipse glasses provided.

As soon as I had finished chatting to Philippa, I took a few minutes for a quick look around all the other exhibition stands, as I hadn't had chance the day before. Then it was back to my own stand where I spoke to even more lovely people and had a really long chat with a fellow solar observer.

Astrophotographer & friend Carol Grayson with Mary Spicer at the UKWIAN exhibition stand

Then once again it was time to head back to the lecture theatre for the final talk of the 2014 festival. The final talk was by one of my favourite speakers, Nick Howes, who was talking about The Greatest Telescope on Earth. To begin with, Nick gave us a very quick overview of the history of telescopes. While Hans Lippershey is widely credited with inventing the telescope, much earlier the Vikings were crafting lenses. Galileo made incredible discoveries with his telescope, so did the British astronomer Thomas Harriot. Isaac Newton refined the Newtonian reflector, and his theory of gravity was able to predict the orbit of comets. William Herschell was another great mirror grinder. Nick then moved away from optical telescopes to talk about radio telescopes. Radio telescopes can give amazing detail, but they need to be very large. These days radio astronomy is done via arrays rather than a single telescope, such as the VLA – Very Large Array. When linked together, these arrays effectively act like one giant telescope. He then started to talk about the main part of his talk; the Square Kilometre Array (SKA). If the numbers involved with this project don't make your head hurt then you haven't thought about it properly – it is a truly awesome project! A collaboration between 11 countries, the SKA will be an array of 3 million small radio masts. It needs to be located well away from civilization and the radio noise that you get from populated areas. Each telescope will produce 6 gigabytes of data per day, so on a daily basis, the SKA will be producing 1.4 zettabytes (that is 1,000,000,000,000,000,000,000 bytes of data per day! He went on to talk about what the SKA will be used for. It will help us to study galaxy evolution, the nature of gravity and challenge the theory of general relativity. It will also study pulsars, and will probe the cosmic dawn, looking at the formation of the first black holes. It will also look for signs of complex molecules and changes to those molecules which may signal the existence of life elsewhere in the cosmos. This array will be able to detect a mobile phone from a distance of 5 light years! All we can hope is that currently technology continues to advance at its current rate, otherwise there will be no computer on Earth that could cope with this level of data output! At the end of his talk, Nick allowed us to look at some of his Apollo memorabilia which was awesome!

NICK HOWES

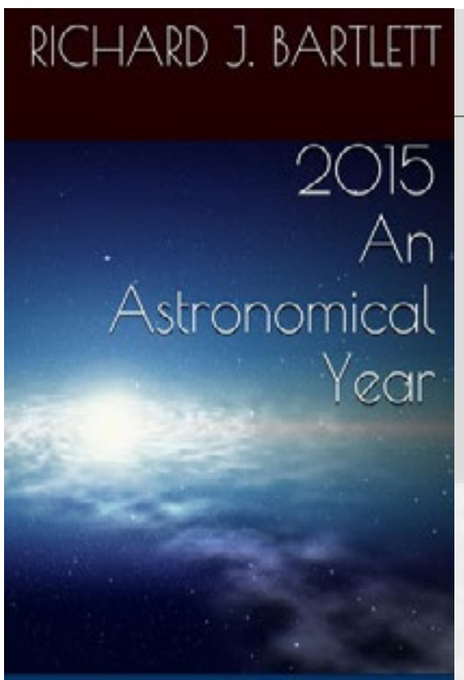
Nick Howes preparing for his presentation

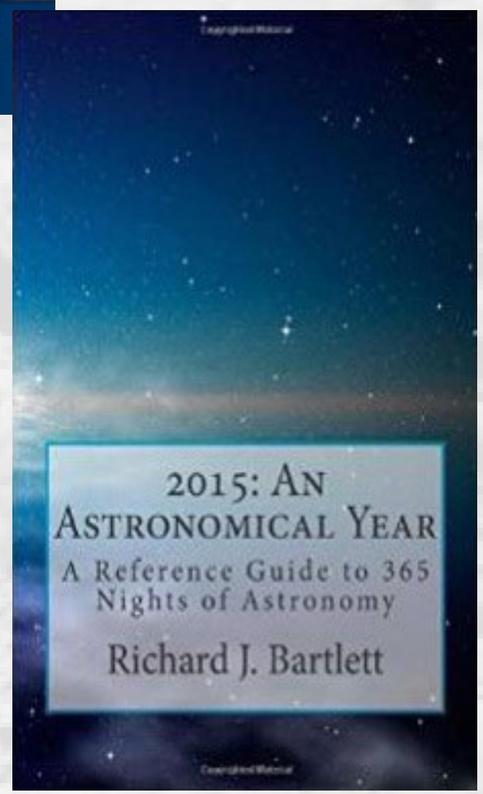
Once Nick's talk had finished (and my brain was officially hurting!) I went back to the exhibition for one last time. When things began to quieten down, it was time to dismantle the exhibition and pack everything away before doing a flying visit around everywhere to say goodbye to the old and new friends I'd spent time with over the weekend. As with the previous year, the festival was a huge success. It was a joy to see people of all ages getting involved in the various activities that were going on throughout the weekend, and seeing children in particular getting excited by all things astronomy was brilliant. For those of you who don't know this already, The Knowledge Observatory do some incredible work. They work with disengaged young people and use astronomy as a vehicle for teaching maths, English and life skills. The North West Astronomy Festival is a not-for-profit event and any money that is made from the event goes straight back into the work they do with those young people. It was an honour for me to be a part of this festival and I travelled back to Oxfordshire with a big smile on my face. Here's to North West Astronomy Festival 2015!

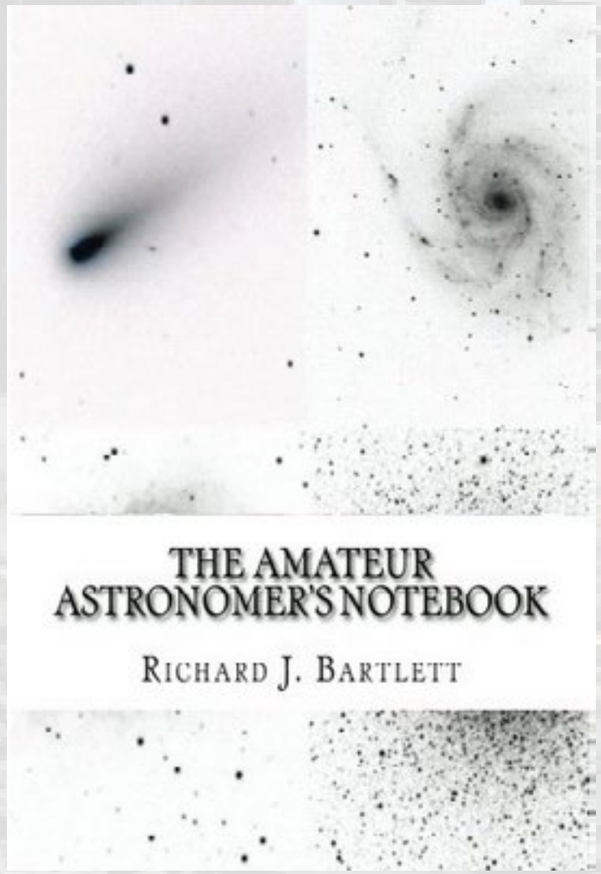
Article: Mary Spicer

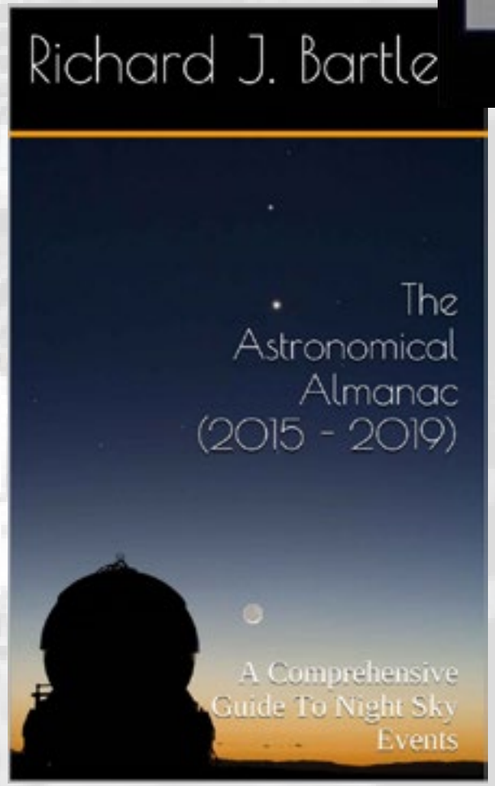
RICHARD J BARLETT ON AMAZON

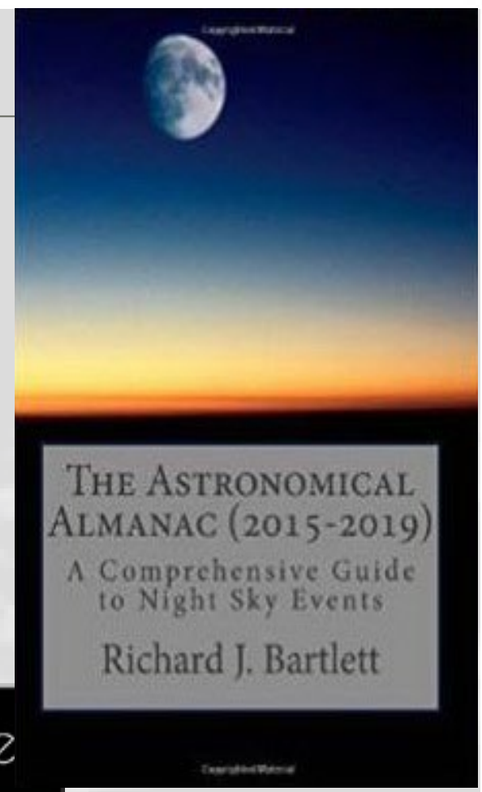
CLICK AMAZON ABOVE TO FOLLOW THE LINK











THE PHILAE HAS LANDED

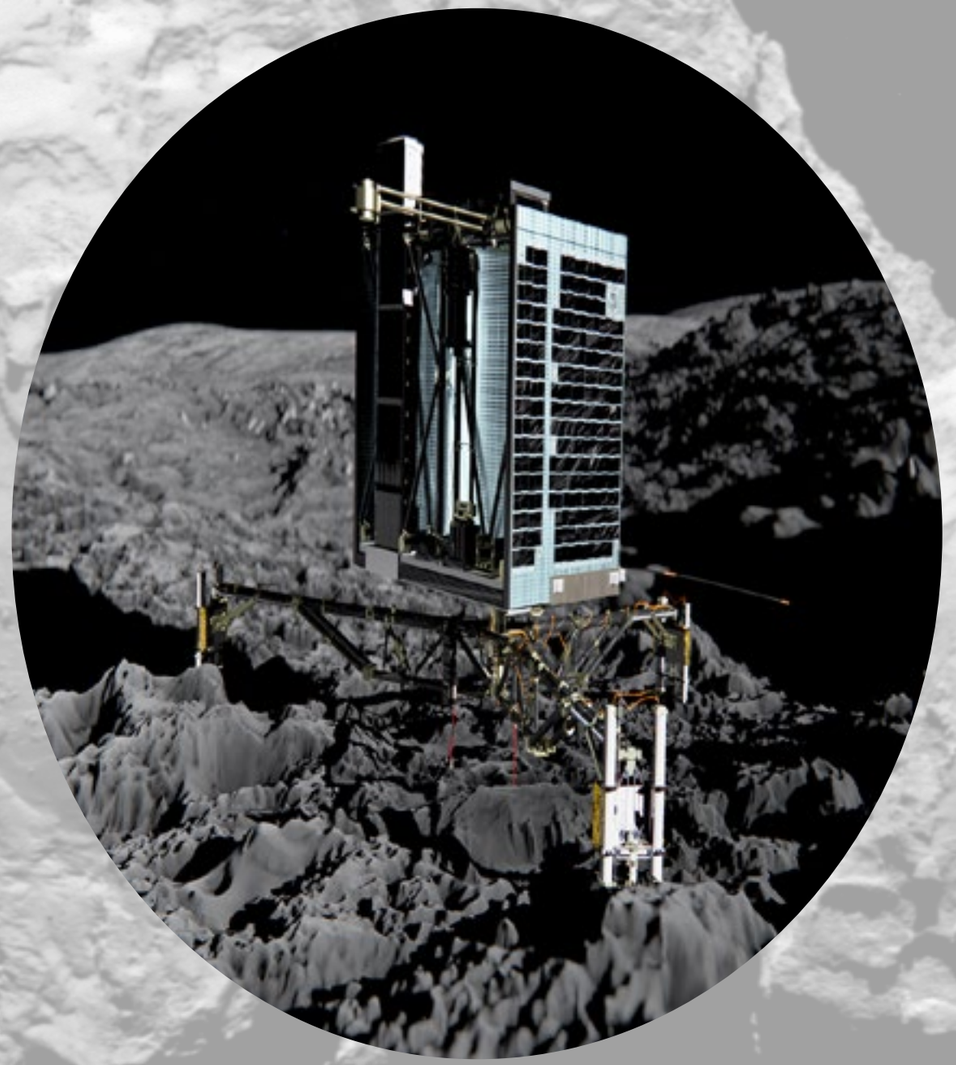
November 12th 2014, is the day history was made. The Philae Lander is the first human made object to do a soft landing on a comet. The target comet was 67P Churyumov-Gerasimenko. The ESA streamed the events live around the world, social media was buzzing with the #CometLanding.

THE PROJECT

The Rosetta project is a good example of how private and public money can be used, how many nations can build a dream, and push the boundaries of engineering and science.

First conceived in the 1970's the mission was finally approved in 1993 by the ESA's Science Programme Committee. The original mission was to land on Comet 46P Wirtanen, however when 2004 became a clear launch date Comet 67P Churyumov-Gerasimenko was chosen instead. Rosetta and the Philae Lander would need to be launched then with the aid of four gravity assists it would make its journey in too deep space. En-route it would flyby asteroids 2867 Steins (2008) and 21 Lutetia (2010).

On the 2nd March 2004 the Rosetta spacecraft was launched from Kourou , French New Guiana on the Ariana 5G+ rocket.



Copyright: ESA/ATG medialab

In June 2011 Rosetta went into hibernation until 20th January 2014 when the craft was woken up. Once up a running the journey to 67P began and on the 6th august 2014 Rosetta reached the target comet.

As Rosetta approached the comet a series of images were beamed back to Earth. It was soon discovered the comet was an odd shape. During Rosetta's journey and approach to the comet data was being taken about the comet.

THE PHILAE LANDER

Philae is the European Space Agency (ESA) comet Lander. The Lander which is about the size of a modern washing machine, as a launch mass of 100 kg.

The Lander is a product of cooperation or a consortium of the ESA, CNES institutes from Austria, Finland, France, Hungry, Ireland, Italy and the UK which is overseen by the German Aerospace Research Institute (DLR).

Philae is packed with instruments which will enable the Lander to conduct tests, collect data and analyse material.

THE PHILAE HAS LANDED

On November 12th Philae made the first ever soft landing on a comet. However the landing was not smooth. The harpoons designed to secure the Lander failed to deploy and Philae moved, bounced and drifted before coming to a rest. Unfortunately Philae landed in a dark spot which meant it would be unable to recharge its cells. The good news is the Philae was able to run some experiments and send back the data before going into

hibernation mode. The Rosetta team are hoping that Philae will able to get enough sunlight to recharge itself as the comet gets closer to the sun. From the world of amateur astronomy and science we have pulled together some peoples thoughts on the Philae landing.

Biology graduate, astronomy & science geek!

Twitter

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"I was glued to Twitter and ESA's live-streaming coverage all day Wednesday waiting for news about whether Philae had made it to the surface of 67P. I actually had tears in my eyes when heard it had touched down and I cried again watching The Sky at Night Rosetta special on the Sunday night! I am interested in every space exploration mission, but there are some that stand out because of their amazing technical achievements. The Apollo missions, Voyager probes, Mars Rovers, Cassini-Huygens, Hubble Space Telescope, and now Rosetta and Philae, are all shining examples of what can be done when our technological knowledge is pushed to its limit. I'm impressed that we have even got Rosetta to 67P accurately in the first place, because it is so small and so far away. But to have managed to then get Philae to actually land on the surface! It is just so incredible that I still feel emotional when I think about it. I know things didn't go exactly as planned, but despite that, the data we are going to get back from this will be absolutely invaluable. Hats off to every single person who played a part in making this such a success."

Title: Philae: Reflections on a Lander that Could

Author: Dr. Claudia Alexander, US Rosetta Project Scientist

Author bio: Dr. Alexander served on the historic Galileo mission to Jupiter, and served as that missions final project manager. She also served as project staff scientist for the Cassini mission to Saturn. Her research involves the thermophysical properties of comets, the rarefied, surface-bound atmospheres of icy moons, and the collapse of the primordial nebula to form the solar system. She also writes science-learning books for children called Windows to Adventure.

@claudiauthorsci

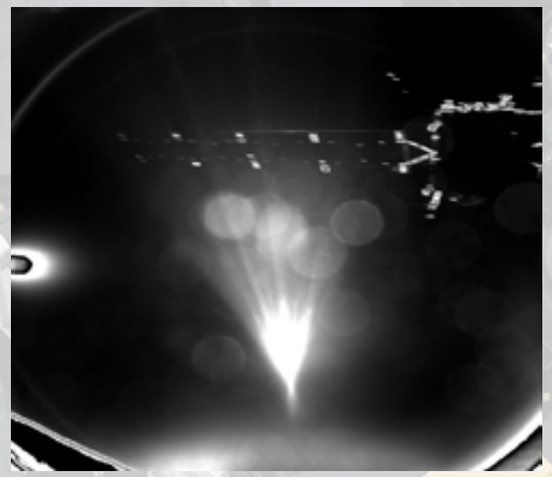
It was my privilege to be present at ESA's historic landing on a comet. My role was to represent the NASA contribution to the mission and to help assure the collaboration was successful. It turned out to be one of the most exciting few hours of my life, and a highlight of my career. And it truly was a drama filled few hours! Quite a few people, around the world, were also glued to their livestreams, following along.

I can tell you almost none of us slept in the hours after the landing, because the last word of the evening was that the lander was potentially in motion, not secured to the comet surface, with worryingly intermittent gaps in telemetry. So rather than going to the bar for a drink, we were on e-mail conferring with each other, trying to ascertain what data was coming in, was telemetry lost, and what situation did we have?

Following the initial descent, a primary question was, did we obtain enough data to complete the top questions we went there to address! CONSERT did a significant part of its tomography experiment on descent. One of the most important things we needed was a high resolution image of the comet surface from very up close. Such an image was obtained by ROLIS, the descent camera. ROLIS may have gotten a significant bonus with up close images of more than one touch-down site! ROMAP, the magnetometer/plasma instrument, obtained good data,

both on descent and afterward, potentially enough to determine if there's a primordial magnetic field. The mass spectrometers, COSAC and Ptolemy, were 'sniffing things' -- we weren't sure exactly what that meant, since the ovens hadn't been activated, to bring them samples from the surface, but if they are able to pick up bits of the ambient surface, that will move the comet community forward in a significant way. CIVA obtained a complete set of panoramic pictures, which helped us understand and properly characterize the crevasse in which the lander came to rest. During that first 24 hours, MUPUS was getting temperature data. Not from deep within the surface, but from scans of sky and ground, and it was enough to help figure out what was going on. Some of you may have heard the acoustic tapes created from one of the detectors on the lander pad's SESAME sensor system (which triggered at touch-down with some hardness data from the surface)

The remaining experiments included the APXS proton X–ray experiment, and the drill/oven system to deliver 'soil' samples to the mass spectrometers. MUPUS completed the thermal probe into the subsurface layers, with the surprising result that in the immediate vicinity of the crevice the wall is very hard, and MUPUS didn't penetrate very far. The drill and ovens worked, though there's some question about how much material was delivered to the ovens. That needs to be sorted out. And APXS successfully 'worked' in that it executed the sequence intended for it, but telemetry is still being examined to ascertain whether it successfully obtained the kind of material it came for. It would be great to know that we might have obtained measurements of the elemental composition of the dusty parts of the comet to compare with that of the Earth and meteorites, which is what APXS came for.



Images: Top Title Farewell Rosetta

Released 12/11/2014 2:50 pm

Copyright ESA/Rosetta/Philae/CIVA

Below: Title Farewell Philae - narrow-angle view

Released 12/11/2014 3:59 pm

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It may be ten for ten, each instrument able to complete a portion of its objectives, but we're still sorting out the completeness of what we got, were the results consistent with other instrument results, and what does it all mean?

In the aftermath of the landing, I've been asked plenty of questions, such as, with reports of organic molecules being detected, what are these organics and are any of them big surprises? What does the finding of a hard layer of material, probably ice, below 10-20 cm of dust mean for understanding how the comet is structured? How is the data coming in starting to change the way scientists think of comets? Answers to these questions require much more time for careful analysis, and for confirmation of concepts with data from multiple instruments. The question about how the comet is structured is a perfect example. Interpretation requires looking at data from CONSERT (the tomography experiment with its use of the dielectric constant, which draws on how the comet is structured), MIRO (the orbiter microwave experiment which maps quantities related to thermal inertia, which also draws on how the comet is structured), and MUPUS (a thermal probe which took 'ground truth' data from the surface itself on thermal conductivity, which is related to how the comet is structured).

So it's an exciting time! We will be busy 'till Christmas, and beyond! And meanwhile, the orbiter mission continues to monitor the comet, and its changes, as it moves closer toward the Sun.

Nick Howes, who formerly worked for the European Space Agency in Science Communction, reflects on a 10 year mission to land on a comet and the explosive excitement of the day itself.

@NickAstronomer

Ever since its inception, the Rosetta mission has been one that I have closely followed. Studying astrophysics many years ago, I grew up in the shadow of great missions such as Viking, Voyager, Giotto and more. With Giotto, the ESA had proven their mettle more than at any other time in their then, 20 something year history, with an audacious flyby of comet Halley. With Huygens, around a decade ago, they had again shown, that they could “dare mighty things”, which, after the calamity that struck the Beagle 2 mission to Mars, was a positive way to recover. Now, in Rosetta, a 4 billion mile journey, involving multiple fly by approaches to change trajectory and gain speed, combined with the fact that it wasn’t even the original target comet, and that they were planning two asteroid flybys as well, meant this was quite literally Europe’s answer to Voyager, but with one important difference. This would be no “fleeting passing of strangers in the night”, this was a long duration orbit, and then, with no fear, a landing of a 90 something kilogram fridge sized lander, for the first time in human history, on the surface of a comet.

But why do this?

We’ve had several flybys of comets before, which have given us some insight in to their structure, composition and glimpses in beyond the shroud that is the coma, to the inner sanctum that is the nucleus. With Comet 67P, the Rosetta mission target, nobody could have imagined just how convoluted a shape it would be, and the challenges that would in itself present, but also, with this mission, in true “Bruce Willis” style, they would actually be able to firstly harpoon on to the surface, fixing ice screws to lock the craft in position, then drill down and sample the comet surface and subsurface, gaining an insight in to the building blocks of possibly life itself, water and the formation of our very solar system.

Comets are believed, during a period known as the late heavy bombardment, to have peppered our planet with water, and complex organic molecules. Present for over 4.5 billion years, these really are the building blocks left over from the start of the formation of the planets and everything within our Sun’s domain, which in itself extends out over a light year, to the swarm of comets known as the Oort cloud. 67P itself is believed to have originated a lot closer, in the so called Trans Neptunian region, also known as the Kuiper Belt (or Edgeworth Kuiper Belt to give it it’s proper title), where all of the short period (with orbits less than 200 years) comets are believed to exist.

When Rosetta arrived at 67P/Churyumov–Gerasimenko, named after its Russian discoverers, what greeted the mission scientists was something at first likened to a “rubber duck”, but then quickly became apparent to be a true nightmare

in terms of shape and characteristics to land on. Those scientists poured over data for months, but still , in scientific terms had to act fast, the mission timeline and the comet were drawing on, and the comet coming ever closer to a point where real activity would kick in. The comet had shown a burst of activity in the months before the arrival of Rosetta, proving again the theory purported by David Levy that “comets are like cats”, and as such, there was no time to lose.

A series of sites were chosen, non optimal, but some with less risk, until the informally named “Site J” was selected, later given the name Agilkia, in keeping with the Rosetta/Philae Egyptian theme.

On landing day, tension was high. A series of go-nogo points were passed, and the lander, pushed away for the first time in ten years from the mothership, to begin the unpowered 7 hour descent to the surface. With a 28 minute plus light travel time, nervous operations and flight team members at ESA watched monitor screens, until at around 16:00 UT on the 12th November (a date pushed back one day due to the Armistace) the lander “touched down”… or did it?

The look on the live feed was obvious, something was not right, but journalists were told “the lander is down, everything is great”… however, it was clear very quickly that this was not the case. Intermittent telemetry between craft ad lander initially made mission team managers scratch their heads, then, one of the instruments on Philae, designed to look at magnetic fields beamed back its results. The lander had bounced off the incredibly low gravity surface of the comet, partially due to the fact that the thrusters to push it down had not fired, but partly also due to the fact that the harpoons had also not deployed, meaning the craft had no way to anchor itself.

Then came the huge revelation that the bounce had been spectacular. Up to 1km from the surface (anywhere between 455m and 1km were the estimates at time of writing) and for two hours, it just drifted above the comet, spinning slightly before coming down again, and bouncing off again, this time for a much shorter few minutes, before finally coming to rest, it is believed (again at time of writing, nobody knows exactly where) close to site B, a very “non optimal” location. The first images from the surface of a comet however, were still spectacular, with a “cliff face” around 1m away from the cameras, the spacecraft still upright, but clinging on for dear life, with no anchors (for fear that firing the harpoons could in fact catapult the spacecraft off the comet altogether).

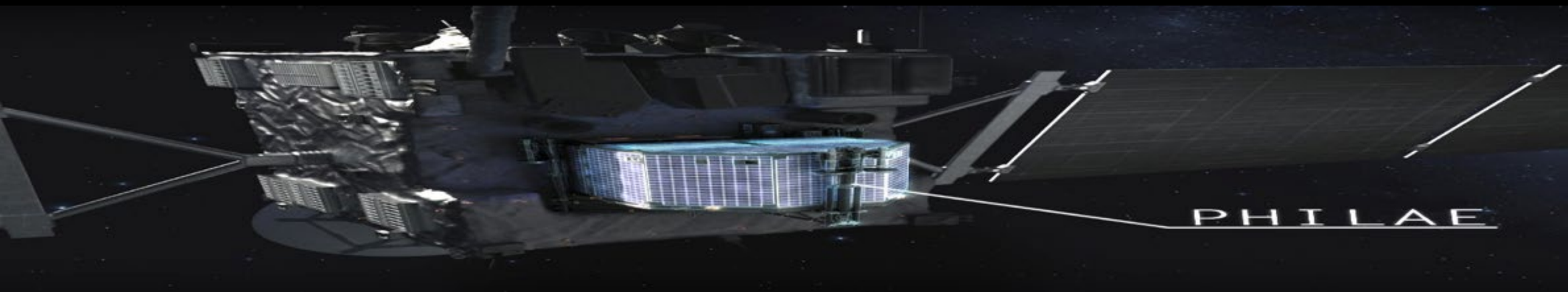
Images came back of the lander descent from Rosetta, and some amazing, but still not perfectly clear panoramic views, and over the next few days, we’ll doubtless get more and more from Rosetta and Philae, with hopefully a pinpoint location, which will allow the scientists to determine if drilling and or the harpoon attempt can be made again. But they did it, to quote Woody in Toy Story “Falling with Style”. Europe proved once more that they can deliver science at a level that rivals anyone. Sure, the lack of images is frustrating (down to contracts signed decades earlier) and the cartoons and communications possibly not up to NASA standards, but they delivered a mission, and that’s what’s important here. Science scored a major victory, one which is and will always be a first.

What they find will keep scientists busy for lifetimes, what they have done is re-written the history books, and changed what we know about comets, and possibly the foundations of us forever.

GEOFF NOTKIN

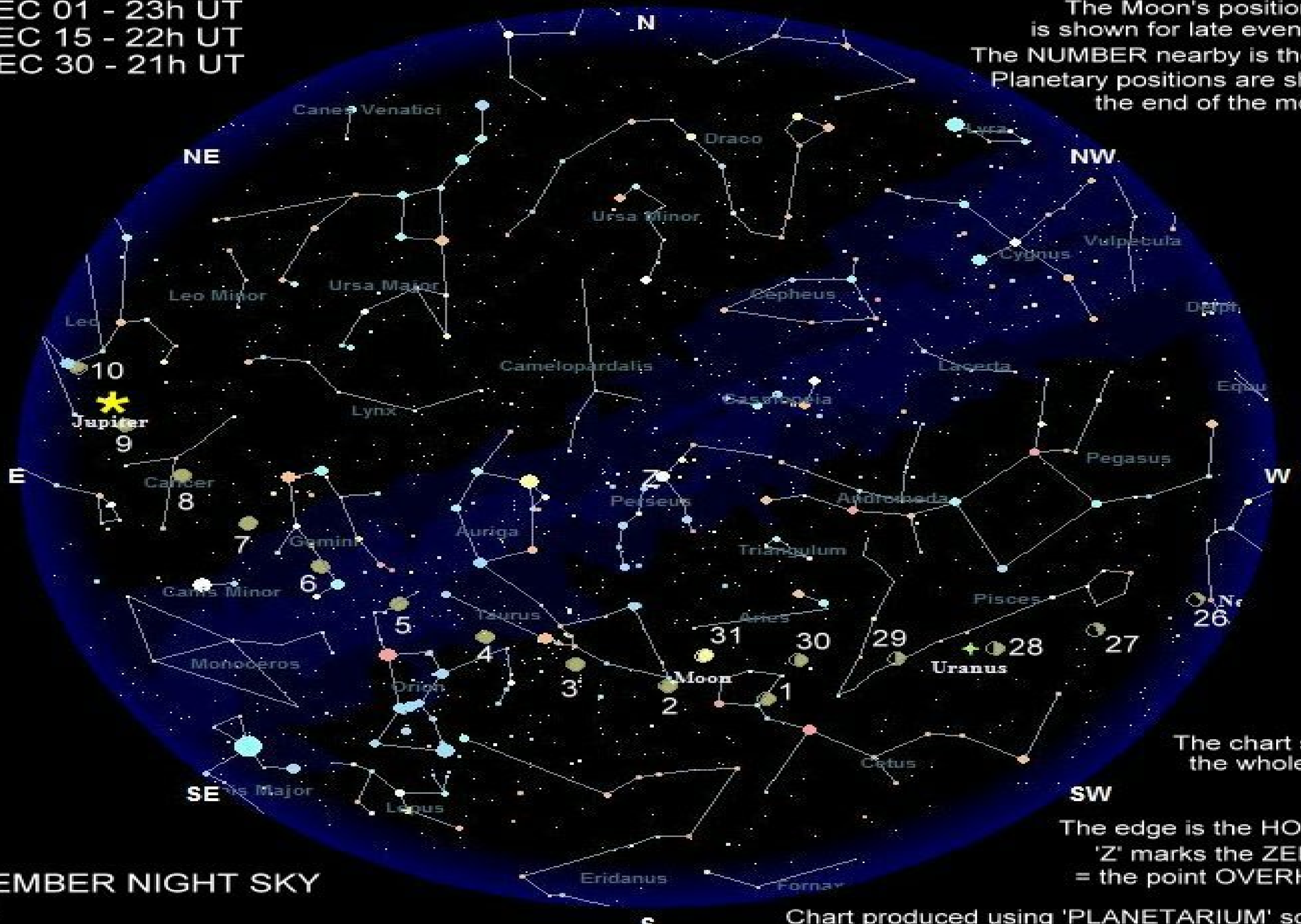
Emmy Award-winning host @STEMJournals & @Meteoritemen | Author | Adventurer | SpaceTweep | Board Member @Astrosociology @GoDeepSpace | @Libbylegs is my penguin

"What impresses me most about this spectacular expedition is, not only that it appears to have flown straight from the pages from a Larry Niven science fiction novel, but that 18 countries labored together for over two decades to make the landing possible. The Philae/Rosetta mission is the best possible poster child for international collaboration in space exploration. The Meteorite Men send their most sincere congratulations to all involved in this, literally, stellar achievement."



DEC 01 - 23h UT
DEC 15 - 22h UT
DEC 30 - 21h UT

The Moon's position
is shown for late evening
The NUMBER nearby is the DATE
Planetary positions are shown for
the end of the month.



The chart shows
the whole sky.

The edge is the HORIZON
'Z' marks the ZENITH,
= the point OVERHEAD

DECEMBER NIGHT SKY 2014

Chart produced using 'PLANETARIUM' software

TELESCOPES FOR BEGINNERS

We know how confusing buying your first telescope can be so in this section you will find a dozen of our most popular choices for beginners.

Celestron NexStar 130 SLT
Computerized hand control gives you the ability to automatically slew to any of its 4,000+ objects,

More Details Here (click below)
Tring Astronomy Centre

To start with we have focussed mainly on the simplest to use types of mount - Alt AZ or dobsonian. This means the telescope moves up and down and left to right making it intuitive to use, and there is no complicated polar alignment to worry about either. An Equatorial mount is needed for long exposure Deep Sky Photograph but adds some extra complexibility for some beginners. You can still have alot of fun taking shots of the moon or webcam imaging planets with all the Alt-AZ computerised scopes listed here.

That said we have included some basic beginner scopes with an EQ mount in this section because they offer good value for money, and the traditional tripod is useful if you don't have a flat surface to use a dobsonian on. When thinking about these scopes you need to consider the following. The advantage of the equatorial mount is that if you align the RA axis with the centre of the earths rotation you can track objects as they move more easily by only having to move one control to do so. The disadvantage is that if you dont align it, you still have to use both controls! and secondly, because each axis is on an angle it will take a little while to get used to how the telescope moves.

In the right conditions these telescopes will be able to see objects such as the Moon, Planets, The Orion Nebula and The Andromeda Galaxy. The larger the aperture the more you will see, but you have to find your own balance based on your budget, acceptable weight and storage space. A smaller scope that is used often is much better than a large heavy one that gathers dust! and if you suffer with alot of light pollution then sometimes a smaller scope is best.

Computerise GO-TO or Manual Mount?

A Manual Dobsonian Telescope will give you the best optical performance per £ spent. Its simple design means most of your budget is spent on the optics, and its easy and intuative to use. The drawback is that you will have to find sky objects yourselves, and when you do find them you will need

Celestron Astromaster LT 70 AZ
Perfect planetary scope for beginners at a great price! Only while stocks last!

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to constantly nudge your scope to keep them in the field of view. On the positive side you will need to find sky objects yourselves and when you do find them you will need to constantly nudge your scope to keep them in the field of view!! This really does help you learn the night sky and they don't need power either, so no batteries of power packs are needed.

On the other hand Computerised or so called Go-To mounts are what Sat-Navs are to Maps. They can be a huge benefit to beginners helping them quickly find objects that they would not otherwise see. They also track objects adding the possibilty of some basic Astro-Photography. If your viewing time is limited then these can be a great time saver.

All Go-To mounts do need an element of setting up. Typically they require you to input Time, Date and Location as well as pointing it at two or three Alignment Stars. The Sky-Watcher System requires you to know the names of the 'Alignment Stars' used during the set up, Celestrons Sky-Align system allows you to use any bright objects withiout having to know any names, and for ultimate ease of setup Celestron's Starsense technology included on the SkyProdigy Series aligns itself using its onboard camera!

So what else do I need?

All these telescopes have everything you need (except batteries for the powered models) to be up and running out of the box. That said, there are a few accessories that can enhance your viewing experience and make life a little easier for you.

Eyepieces - You telescope will include one or two eyepieces (depending on model) that will enable you to use your telescope straight away. These are perfectly fit for purpose, but just like you can extend a DSLR Camera's flexibility by adding different 'length' lenses like telephotos or wide angle the same is true for your telescope. Adding some different focal length eyepieces will give you a wider choice of magnifications to work with, and investing in higher quality eyepieces can improve you viewing experience.

If your going to buy a computerised mount then you are going to need batteries, and lots of them! so an alternative supply like a PowerTank or 240V to 12V Power Adapter should be high on your list.

To attach a DSLR you will need a T-Ring and in some cases also a T-Adapter, or for planetary imaging a Webcam that you can slot into the eyepiece holder is a great option.

To find your way around the Night Sky a Planisphere or a good book like 'Turn Left at Orion' is a great option and a Red Light Torch will help you read them in the dark without destroying your night vision.

We are always very happy to listen to you and help you find the right telescope, so please do not hesitate to contact us if you have any questions. You can contact us via email or chat online, by telephone or by visiting our showroom where you can see and try a range of products.

In the meantime you may also find this video from our friends at the Sky at Night Magazine quite useful. It contains some good explanation and tips.

http://www.tringastro.co.uk/

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