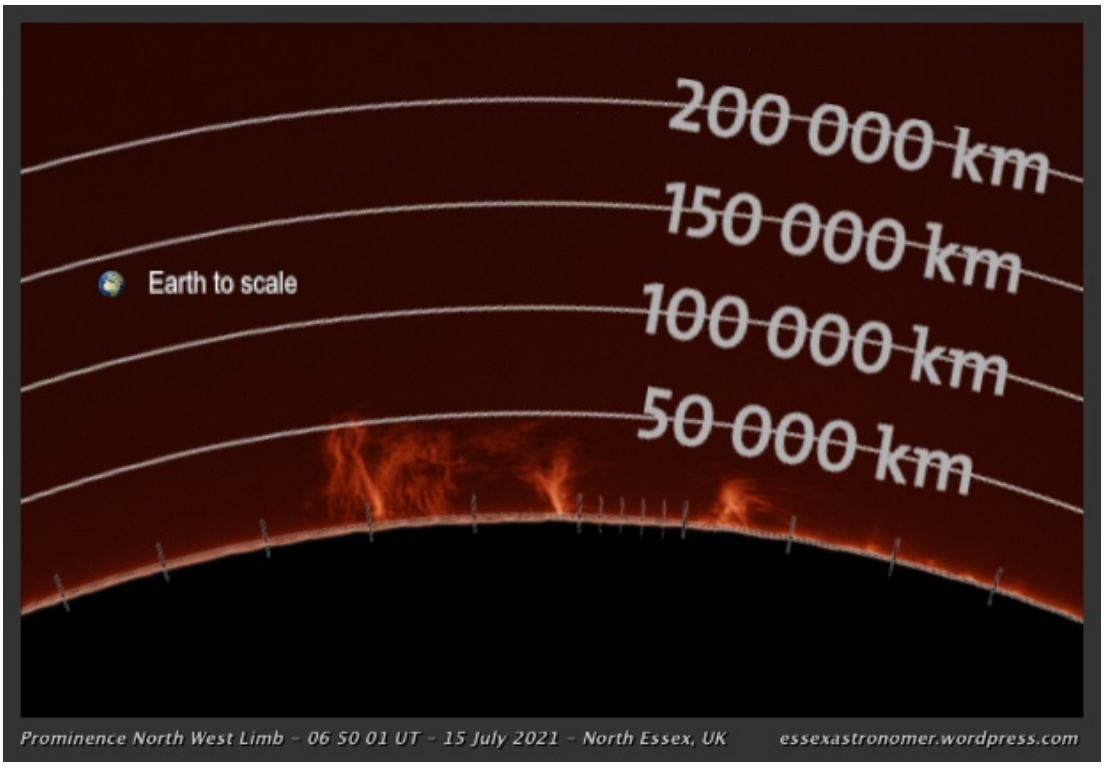
OASI News

The newsletter of the Orwell Astronomical Society



A selection of prominences on the North West limb with an estimation of their height, with Earth shown to scale.

Photo by: John Hughes

Trustees: Mr Roy Adams Mr Neil Morley Mr David Payne

Honorary President: Dr Allan Chapman D.Phil MA FRAS

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Society Notices

Dear Members,

We use a Zoom Pro account for online meetings. If you would like to join in, please email Paul Whiting, treasurer@oasi.org.uk

In the coming months, we will be guided by advice from the Government and Public Health England, as to when we can resume some of our activities. These are likely to be very limited at first, the Committee will decide what could be done, with the health and safety of everybody being the highest priority.

I would like to wish everybody clear skies, stay safe and I hope to see you soon.

Andy Gibbs, Chairman

Society Contact details

Email queries: info@oasi.org.uk

Facebook: Orwell Astronomical

Twitter: @OASIpswich

YouTube: https://www.youtube.com/channel/UCHgxe3QAeRVWf7vkjKkCl2Q

Members-only message board

https://groups.io/g/OASI

Observatory (meeting nights only)
07960 083714

Please send material for the OASI web site and newsletter e.g. observations, notices of events, general interest articles, to news@oasi.org.uk

The CLOSING date is the 15th day of the month

Access into the School Grounds and Observatory Tower

The Observatory is closed.

Articles for OASI News

News, pictures and articles for this newsletter are always welcome. Details above.

Please submit your articles in any of the following formats:–

Text:	txt, rtf, rtfd, doc, docx, odt, Pages, pdf
Spreadsheets:	xls, xlsx, OpenOffice/LibreOffice, Numbers
Images:	tiff, png, jpg

Please send tables as separate files in one of the above formats.

If you don't feel up to writing a major article, perhaps you might write a short note for OASI News along the lines of "This month I have mostly been observing/constructing/mending/reading/etc."?

Newsletter archive www.oasi.org.uk/NL/NL_form.shtml

Authors, please note that your articles will be publicly available worldwide!

Reproducing articles from OASI News

If you plan to reproduce an article exactly as per OASI News then please contact the Editor – otherwise, as a matter of courtesy, please seek permission from and credit the original source/author. You may not reproduce articles for profit or other commercial purpose.

Committee 2021

Chairman	Andy Gibbs	Set overall agenda for OASI, Chair committee meetings, Press and publicity,
Secretary	Roy Gooding	Outreach meetings (jointly with Chairman), observatory decoration.
Treasurer	Paul Whiting FRAS	Finance, Supervision of applications for grants. Visits by outside groups, Observatory tours, Public appreciation of astronomy, Outreach activities.
Committee	James Appleton	Committee meeting minutes, Web site
	Martin Cook	Membership, Tomline refractor maintenance & user testing
	Matt Leeks	Safety & security
	Peter Richards	Lecture meetings, Email distribution lists
	John Wainwright	Equipment curator
	Mike Whybray	Astronomy Workshops, Child protection officer, Orwell Park School Astronomy Club.
	Andy Wilshere	Librarian
	Avtar Nagra	OASI @ Newbourne
Assistants	Martin Richmond-Hardy	Newsletter, OASI @ Newbourne

Committee Meeting

The next Committee Meeting will be held at 8pm on Friday 3 September.

Please Contact Paul Whiting for Zoom connection details.

OASI and BAA Events

Please note that the listed events may change depending on the progress of the pandemic. For the latest event details, please see www.oasi.org.uk/Events/Events.php

There's a Google Calendar on the OASI web site with the latest dates (and corrections!). If you want to easily add OASI Events to your own computer/phone/tablet calendar application click this button on the website Events page (bottom right of the calendar) or use this address to access this calendar from other calendar applications.

https://calendar.google.com/calendar/ical/1jhs9db71ncki4sojo7092vfvc%40group.calendar.google.com/public/basic.ics

For other astronomy news and astro pictures try our

Twitter feed https://twitter.com/OASIpswich

Facebook page https://www.facebook.com/pages/Orwell-Astronomical/158256464287623

Date, Time & Location	Contact	Event
Weekly, every Wednesday, from 20:00	Martin Cook, Roy Gooding	OBSERVATORY CLOSED Meet via Zoom.
Monday 9 August 19:30 Newbourne Village Hall	Martin R-H newbourne@oasi.org.uk	OASI @ Newbourne
Wednesday 11August 19:00		BAA webinar: Electronically Assisted Astronomy
Monday 23 August 19:30 Newbourne Village Hall	Martin R-H newbourne@oasi.org.uk	OASI @ Newbourne 19:30 meeting opens; 19:45 Sky Notes by Bill Barton, FRAS.
Monday 13 Sept 19:30 Newbourne Village Hall	Martin R-H newbourne@oasi.org.uk	OASI @ Newbourne
Monday 27 Sept 19:30 Newbourne Village Hall	Martin R-H newbourne@oasi.org.uk	OASI @ Newbourne 19:30 meeting opens; 19:45 Sky Notes by Bill Barton, FRAS.
2022		
Friday 28th January 2022	Pete Richards lectures@oasi.org.uk	Dame Jocelyn Bell Burnell will deliver a talk to OASI live on Zoom.

Meetings via Zoom

Paul Whiting has set up an OASI account on Zoom Pro which allows us to accommodate more participants.. To join, please first contact Paul, treasurer@oasi.org.uk – OASI members only. Be sure to install the latest version of Zoom – there's no need to set up an account. Go to https://zoom.us/join and enter the meeting ID or personal link name. You will have received a link from the meeting organiser.

We meet on Wednesday evenings from 20:00 and on Newbourne evenings (see below) from 19:30.

OASI @ Newbourne

Martin Richmond-Hardy newbourne@oasi.org.uk

We have now resumed meetings at Newbourne Village Hall, Mill Lane, IP12 4NP on the 2nd and 4th Mondays. 12 of us (including two new members) met on Monday 26 July for Bill's Sky Notes and a demo of Hydrogen line (H1) detection by Paul Whiting FRAS.

In view of the ongoing Covid situation, we kindly request that attenders wear masks in the village hall to protect others and themselves. Hand gel is available.

Newbourne dates for 2021

9 Aug	23 Aug (A)	13 Sep	27 Sep (A)
11 Oct	25 Oct (A)	8 Nov	22 Nov (A)
13 Dec	27 Dec		

We open up for all meetings at 7:30pm. Astro News/Star Guide (A) at 7:45pm followed by any Talks (T), Workshops (W) and the occasional Quiz (Q).

Stargazer's Guide

On the last meeting each month, at 19:45, Bill Barton FRAS will give a short presentation of what can be viewed in the following 4 weeks plus a reminder of OASI events. These will be available on our website.

Astronomy Workshops/Informal talks

Meetings will depend on COVID-19 situation.

Contact Mike Whybray Monday meetings start at 7:30pm. Workshops / Talks start at 8pm

If you are a new OASI member, or haven't been to one of these informal workshops before, they are a mixture of events of different characters including beginners talks, interactive workshops, films, etc., suitable for all.

Do you have a subject you could workshop/talk? You could do a short one, or share the effort with a partner. Drop Mike Whybray a line! workshops@oasi.org.uk

Lectures – via Zoom

Contact: Peter Richards lectures@oasi.org.uk

The start time for all talks will be 8pm and, as usual, the talks will usually be held on a Friday evening.

All meetings are currently via Zoom. Contact Paul Whiting if you can't find the details.

Friday 28th January 2022	Dame Jocelyn Bell Burnell will deliver a talk to OASI live on Zoom. The talk title will be confirmed at a later date.

Other local astronomy society meetings

Athaneum Astro Society

www.3a.org.uk/index.htm

Meetings suspended during the Covid-19 situation.

LYRA Lowestoft & Yarmouth Regional Astronomers

www.lyra-astro.co.uk

Due to current Corona Virus outbreak all LYRA meetings are cancelled until further notice.

DASH Astro

Darsham And Surrounding Hamlets http://dash-astro.co.uk

Meetings are normally held at New Darsham Village Hall and all DASH Astro observing sessions will take place at Westleton Common. ASOG observing sessions and locations may be arranged at the time of observation. Unless stated all group meetings will take place from 7:30 pm. on Sundays.

Meetings will be assessed in line with the current Government Guidelines in place at the time.

Our next Solar Observing Session will be 8th Aug 2021, Venue To be Confirmed, between 11:00am to 2:00pm and is weather dependent, so we may need to revert to a 7:00pm evening get together and chat.

We are now on our normal Summer break so, our Next Sunday Meeting will be 26th Sept 2021, at 7:00pm BST Due to Corona Virus, we are hoping this may be a Face to Face meeting at Darsham Village Hall, but may revert to a Virtual meeting Via the Zoom Platform.

The talk is by Ema Curtis of the JWT entitled " An Eye on Distant Worlds " The meeting will open with a general Meet & Greet chat followed by the talk at 7:30pm. Hopefully there will be time for a Q & A session with the speaker following his talk.

BAA news & webinars

For full details of all meetings or cancellations, please go to https://britastro.org/meetings/2021.

2021

Wednesday August 11	19:00	Electronically Assisted Astronomy – Webinar Callum Potter, Director of the BAA Deep Sky Section.
Friday, 3 September	19:30	BAA Autumn Weekend Meeting, Leeds
to Sunday, 5 September	13:00	School of Music, University of Leeds, Leeds LS2 9JT
Wednesday, 27 October		BAA Annual General Meeting and BAA Meeting,
Saturday, 4 December	14:00	BAA Christmas Meeting

The BAA Radio Astronomy Section

Thanks to an initiative by Paul Hearn, the BAA Radio Astronomy Section have been enjoying talks, seminars and tutorials via Zoom.

These are/will be available on the BAA YouTube channel.
https://www.youtube.com/user/britishastronomical/playlists

Radio Astronomy Python[1]	Rupert Powell 1 https://www.youtube.com/watch?v=3m87wpPATjc 2 https://www.youtube.com/watch?v=aBzePb9OG4g 3 https://www.youtube.com/watch?v=FKCHQzCEMLg
RA Python Part II - SDR and GPS	Rupert Powell https://www.youtube.com/watch?v=JIMt-nZW0TE
Hydrogen Line Observing	Brian Coleman G4NNS https://www.youtube.com/watch?v=uzcvbGzKp8E
SpectrumLab workshop	Paul Hyde G4CSD https://www.youtube.com/watch?v=x0PnyxEzmZ0
Current Observations from Astropeiler Stockert	Wolfgang Herrmann, https://www.youtube.com/watch?v=zB8veXpMdqU
On the tricky question of Pulsars	Peter East OBE FREng https://www.youtube.com/watch?v=vl401cTvBII
July 23rd. 19:15 BST (18:15 UTC)	e-Callisto; a Radio eye for Solar Activity, Christian Monstein
Sep 3rd. 19:30 BST (18:30 UTC)	Whit Reeve HAARP High-Frequency Active Auroral Research. Exploring the obscurities of the upper atmosphere.
Sep 18th 15:00 – 18:00 BST (14:00 – 17:00 UTC)	GNU Training Seminar Marcus Leech, Science Radio Laboratories, Inc. "Unpacking the mysteries of GNU Radio" A complement to our 'Python for Radio Astronomers' course.
Oct 1st 19:30 BST (18:30 UTC)	Dr. Gemma Richardson, Space Weather scientist in the British Geological Survey geomagnetism team. "The changing environmental conditions in near-Earth space". **https://britastro.org/node/25990**
Oct 16th 10:00 – 17:00 BST	BAA day conference. Key note speakers: Prof Ian McHardy, Prof Ian McHardy School of Physics & Astronomy, University of Southampton. The mysteries of X-ray Cosmology. Dr Spencer Axani MIT CosmicWatch – the counting of muons. Other speakers to be announced – watch this space. Conference organiser – Paul Hyde
October 16th.	BAA RAG21 day conference. Key note speakers: Prof Ian McHardy, Prof Ian (09:00 – 16:00 UTC) McHardy School of Physics & Astronomy, University of Southampton. The mysteries of X-ray Cosmology. Dr Spencer Axani MIT CosmicWatch – the counting of muons. Other speakers to be announced – watch this space. Conference organiser – Paul Hyde
Nov 5th 19:30 GMT	Prof Lyndsay Fletcher Glasgow University School of Physics and Astronomy "The Physics, Analysis and Imaging of Solar flares. A perspective for Radio Astronomers."

1 There is a really good free Python course from the OU on Openlearn, *Learn to code for Data Analysis*, https://www.open.edu/openlearn/science-maths-technology/learn-code-data-analysis/content-section-overview?active-tab=content-tab

Dec 3rd 19:30 GMT	'SARA presents…' Pablo Lewin "Building a Radio Telescope for H1 observations" Dr Richard Russell Deep Space Exploration Society (DSES) 'Pulsars for Galactic Navigation'
Dec 10th 19:30 GMT	Christmas Lecture Prof. Anna Scaife. Professor of Radio Astronomy at the University of Manchester and Head of the Jodrell Bank Centre for Astrophysics 'Jodrell Bank, the cold war and the space race'

The Moon: Meet our nearest neighbour

Ipswich Art Gallery

31 July – 10 October

Ipswich Art Gallery is re-opening this summer.

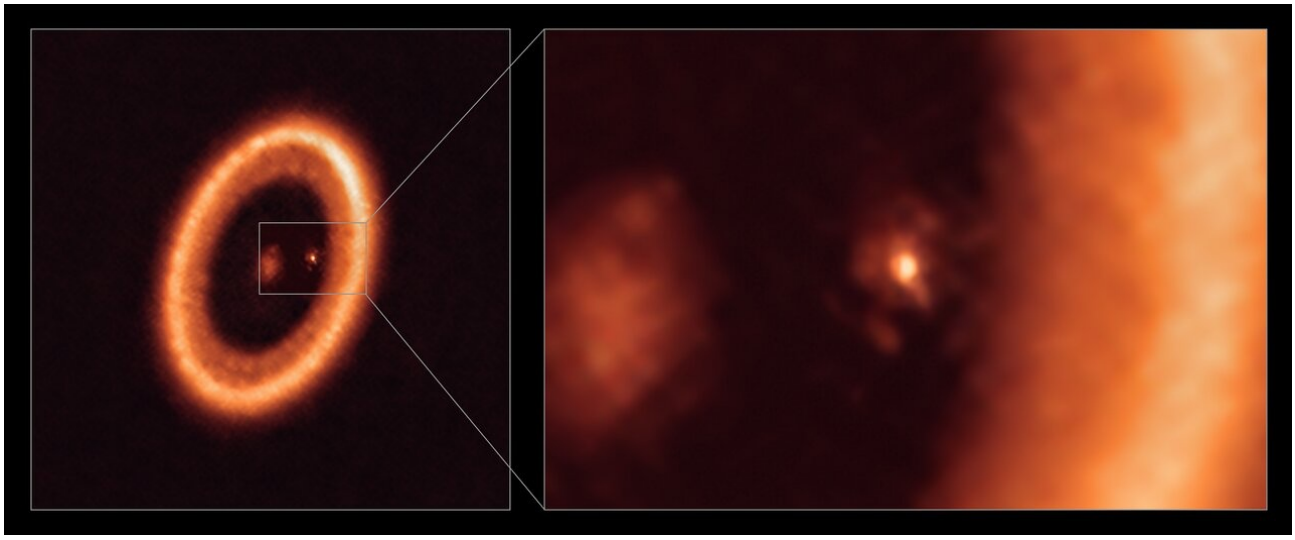
The Moon: Meet our nearest neighbour is a touring exhibition and features fascinating objects such as a large inflatable Moon, scientific instruments, and actual Moon rock on loan from Bespoke Scientific, giving you the chance to discover what the Moon is made of, how it has influenced our history, culture and natural world, and how we have explored it from ancient times to the present and future.

Subscribe to the Ipswich Museum's mailing list to keep up to date with al the news about the exhibition.
https://www.ipswich.gov.uk/content/keep-touch-ipswich-museums

From the Interweb

Astronomers make first clear detection of a moon-forming disc around an exoplanet

https://www.eso.org/public/news/eso2111/



Using the Atacama Large Millimetre/submillimeter Array (ALMA), in which the European Southern Observatory (ESO) is a partner, astronomers have unambiguously detected the presence of a disc around a planet outside our Solar System for the first time. The observations will shed new light on how moons and planets form in young stellar systems.

Radio receiver opens wider window to exploring universe

https://eandt.theiet.org/content/articles/2021/07/radio-receiver-opens-wider-window-to-exploring-universe/

Researchers have developed a new radio receiver that can detect radio waves emitted by many types of molecules in our universe at once.

The receiver, created by a team of researchers at Osaka Prefecture University (OPU) and the National Astronomical Observatory of Japan (NAOJ), can capture radio waves at frequencies over a range several times wider than conventional ones. It is also expected to enable significant signs of progress in studying the evolution of the Universe and the mechanisms of star and planet formation.

New observations of the most distant galaxies close in on cosmic dawn

https://ras.ac.uk/news-and-press/research-highlights/new-observations-most-distant-galaxies-close-cosmic-dawn

New observations of six of the most distant galaxies currently known have helped to pinpoint the moment of first light in the Universe, known as 'cosmic dawn'. The new work is published in *Monthly Notices of the Royal Astronomical Society*, and puts a new spotlight on what could be among the first galaxies formed in the Universe.

Glitch event in the Vela pulsar (PSR J0835-4510) observed at HawkRAO

ATel #14808; Steve Olney (Hawkesbury Radio Astronomy Observatory)on 26 Jul 2021; 08:08 UT

Hawkesbury Radio Astronomy observatory (HawkRAO) is an amateur facility near Sydney, Australia carrying out observations of the Vela pulsar with daily cadence extending over more than 4 years. Observations are at a central frequency of 436 MHz and with a bandwidth of 2.4 MHz. The antenna is a fixed transit mode array of four 42-element Yagis.

The Night Sky in August

Martin RH

All event times (BST) are for the location of Orwell Park Observatory 52.0096°N, 1.2305°E.

Sun, Moon and planets

Sources:
http://heavens-above.com/PlanetSummary.asp http://heavens-above.com/moon.aspx

Object	Date	Rise	Set	Mag.	Notes
Sun	1	05:17	20:45		Declination decreasing, equinox September 22
	31	06:05	19:44		
Moon	1	31/7 23:50	14:56		Apogee 02 August 08:36 New 08 August 14:50 First Q 15 August 16:20 Perigee 17 August 10:16 Full 22 August 13:02 Last Q 30 August 08:13 Apogee 30 August 03:23
	31	23:31	16:07		
Mercury	1	13:01	05:11	0	Superior conjunction 01 Aug
	31	08:25	20:13	0	
Venus	1	15:10	08:27	0	
	31	09:57	20:43	-3.9	
Mars	1	14:29	07:26	0	
	31	07:18	20:05	1.8	
Jupiter	1	02:23	21:27	0	Opposition 20 Aug
	31	19:22	04:54	-2.7	
Saturn	1	01:06	20:44	0	Opposition 02 Aug
	31	18:42	03:14	0.3	
Uranus	1	07:03	23:35	0	
	31	21:38	12:29	5.7	
Neptune	1	03:50	22:07	0	
	31	20:08	07:26	7.8	

Occultations during August 2021

https://iota-es.de/moon/grazing_descrx101.html and http://www.lunar-occultations.com/iota/bstar/bstar.htm

Observers are encouraged to download and install the Occult software program [Windows only] to generate predictions for their own particular site coordinates.

Meteor showers during August 2021

Source: BAA Handbook 2021 p26-27 and https://in-the-sky.org//newsindex.php?feed=meteors

Shower	Normal limits	Maxi-mum	Max RA/Dec.º	ZHR at Max	Notes
α-Capricornids	Jul 3 – Aug 15	July 30	20:28 (307º) -9º	4	A good proportion of bright, slow-moving colourful meteors. Rather unfavourable.
Perseids	Jul 17 – Aug 24	Aug 12 19h	03:11 (048º) +58º	80+	Rich shower of fast meteors. High proportion of bright events leaving persistent trails. Very favourable
κ-Cygnids	Aug 3 – 25	Aug 13	18:32 (278º) +53º	5	Slow meteors with occasional bright fireballs. Date of max may be as late as 18 Aug. Very favourable
α-Aurigids	Aug 28 – Sep 5	Aug 31	06:04 (091º) +39º	5	Short-lived outbursts in activity on 1994 and more recently in 2007. Moonlight interferes.

For radio observation, use reflections from Graves radar on 143.050MHz or the Brams transmitter in Belgium on 49.97MHz.

Visible ISS passes ≥15º max altitude

Source: http://heavens-above.com/PassSummary.aspx?satid=25544

Times are BST. Predictions are approximate (23 July) due to craft adjustments. Check the day before.

Date	Bright-ness	Start			Highest point			End		
	(mag)	Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
01 Aug	-1.2	21:26:45	10°	WSW	21:28:23	13°	SW	21:30:02	10°	SSW
26 Aug	-1.2	04:55:10	10°	S	04:56:55	14°	SE	04:58:40	10°	ESE
28 Aug	-2.2	04:55:29	11°	SSW	04:58:14	26°	SSE	05:01:07	10°	E
29 Aug	-1.8	04:09:52	17°	SSE	04:10:50	19°	SE	04:13:19	10°	E
30 Aug	-1.2	03:24:12	13°	SE	03:24:12	13°	SE	03:25:12	10°	ESE
30 Aug	-3.2	04:57:09	15°	SW	04:59:40	47°	SSE	05:02:56	10°	E
31 Aug	-2.8	04:11:27	31°	S	04:12:11	36°	SSE	04:15:18	10°	E

Starlink passes

https://heavens-above.com/AllPassesFromLaunch.aspx

For a dynamic 3-D display, see https://heavens-above.com/StarLink.aspx

Comets with magnitude brighter than magnitude 10

Source: https://heavens-above.com/Comets.aspx and BAA Handbook p95.

Comet	Brightness	Peak	Angular separation from Sun	Altitude	Azimuth	Constellation
C/2020 T2 Palomar	9.6		94°	37°	151°	Virgo
8P/Tuttle	9.3	31 Aug				

Astronomy on the radio

Bill Barton's Radio Broadcast

ICRFM (Ipswich Community Radio) 105.7 MHz at about 08:25 in the morning of the first Wednesday of each month. I aim to cover what there is to see in the sky and then a little bit on something topical. ICRFM is also available to listen to over the Internet and there is a listen again option on their website. http://www.icrfm.com

David Murton's Radio Broadcast

On 1st Tuesday of the month, 2.40pm on the Lesley Dolphin show on BBC Radio Suffolk and the internet. https://www.bbc.co.uk/radiosuffolk

The Cinema Code

From Paul Whiting (auditioning for the post of Mr Grumpy II ?)

1. Please remember to speak loudly so that the whole audience can hear.
2. Extra loud sweet wrappings can be obtained from the foyer.
3. Do not forget to check your emails regularly with your mobile phone during the show (don't forget to have the backlight on full).
4. Film commentaries are welcome throughout the movie.
5. Ladies are requested not to remove their hats.
6. Frequent lavatory users should only sit in the middle sections of rows.
7. It is mandatory that elderly ladies, with bottomless handbags, pack and unpack the entire contents at regular intervals throughout the film, as noisily as possible.
8. Please remember that if you have to cough, pay a visit or otherwise need to cause a disturbance, please wait for the most crucial part of plot narrative, so as to spoil the film for as many people as possible.

Thank you for your cooperation and inconsideration for other cinema viewers.

Davinci and Veritas: Two new NASA missions.

A short article from the library.

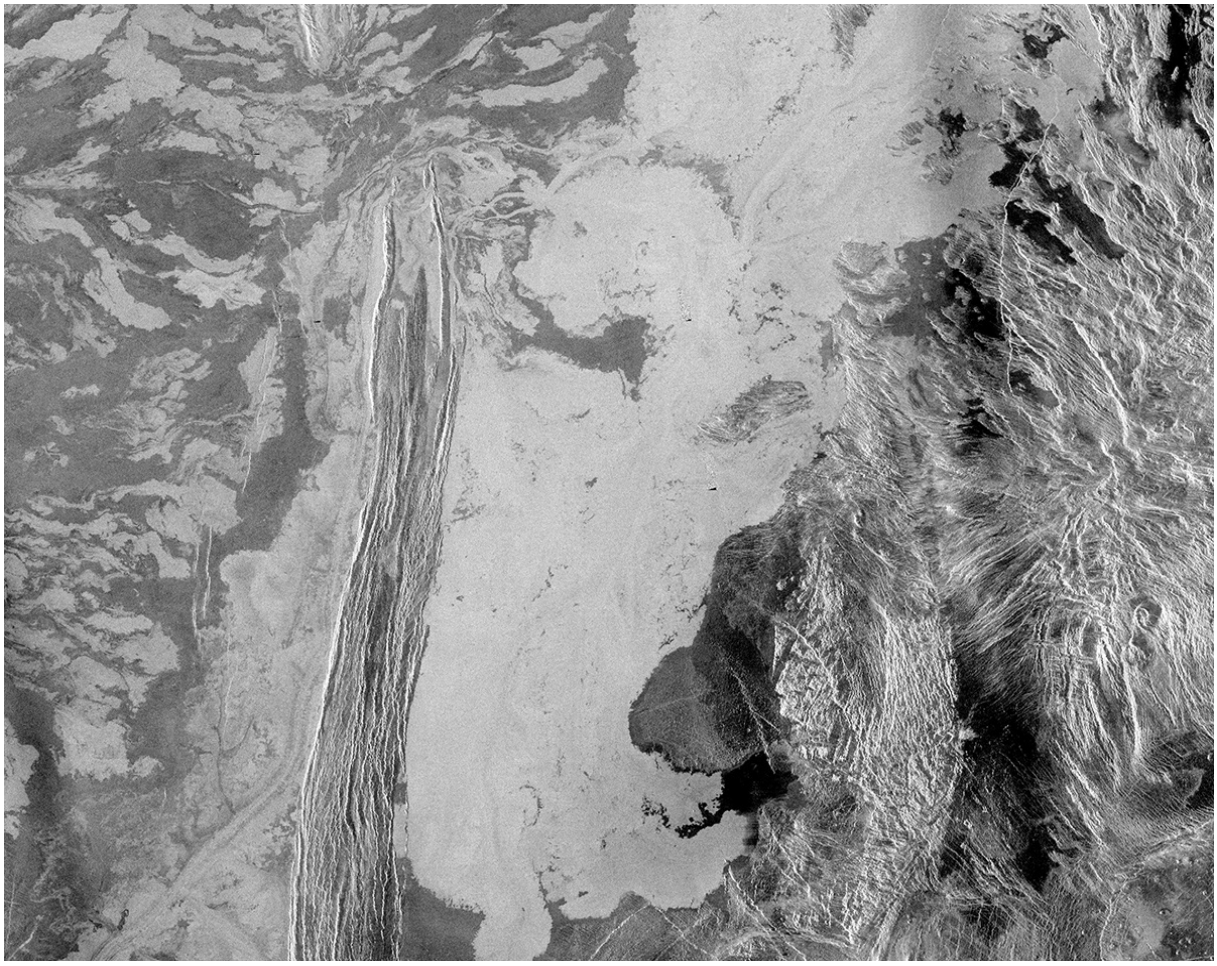
Venus has been selected by NASA to be the recipient of two new scientific missions. The first is to be known as Davinci and the second as Veritas (truth). The basic aim of the expedition is to interpret the history of Venus, which has a group of comparable features to Earth, even though today it has the hottest surface of any planet in our Solar System. Perhaps in its past it was able to support life with water and Earth-like weather.

These two new missions are part of NASA's Discovery Program, and were selected from the final short list of four. This Discovery Program is designed so that scientists and engineers may group together and produce new planetary science projects that will increase our understanding about where we fit into our Solar System. It is also a method of providing compact operations with reduced development time and support. Each of these missions will receive about $500 million for development. Personnel involved with Davinci and Veritas are now tasked with producing their prerequisites for equipment, designs and progress plans.

Both missions are scheduled to be launched between the years 2026 and 2030.

The first of these missions is DAVINCI+ (Deep Atmosphere Venus Investigation of Noble gases, Chemistry, and Imaging). Investigations of the formation and development of the atmosphere around Venus will be its main function as well as deciding if an ocean ever occurred on the planet. In order to elucidate the types of gas found in its atmosphere, a descent sphere will be dropped, and as it falls, it will analyse its constituents. The temperature found on Venus is due to its very dense atmosphere that allows sunlight to pass through it, but not to reverse the procedure. This means that the heat becomes ensnared and the temperature becomes increasingly hotter (up-to 462° Celsius). This is Venus' greenhouse effect. A secondary experiment will be executed whereby high-resolution pictures, the first from Venus, will be taken of Venus' tesserae (floor tiles). These are regions of heavily deformed terrain, which house the majority of the tectonically misshapen territory on the surface of Venus. There is a likelihood that they are a result of basaltic lava flows, which have constructed large plains. They also correspond to the oldest matter at any location, considered to be750 million years old. It is not clear at present if this is due to lithospheric stresses causing the mantle to buckle or if they were formed at different times. These tesserae cover approximately 7.3%, which is nearly 33.2 * 10^6 km, and occur mainly within 0° E and 150° E. Today consideration is being given to the thought that mantle downdwelling and pulsating continents may be the cause of this misshapen structure. However, delamination of the whole of the mantle via a massive subduction event, is difficult to confirm, nor does it clarify the crustal plateau position of the tessera. Another model considered was that of impact causing the thin lithosphere to form a lava lake; however, it is not considered viable, as it does not clarify how convection forces could cause deformation through several kilometres of fragile rock.

Venus is also in possession of rifts, which is generally described as a functional linear area due to lithospheric strains and stresses. A typical rift shows a downfaulted hollow, many hundreds of metres wide and possibly as long as 1,000km. They are connected with raised volcanic domes in the highland areas. A prime example is Beta Regio region where the lithosphere has been pushed up from below and has fractured the surface. These were spotted by the Magellan spacecraft in 1992 using SAR (Synthetic Aperture Radar) mapping down to 120-300 m. Beta Regio exists within an area on Venus at 25° – 50° North latitude and 270° – 300° East latitude, which has been formed mainly by volcanism and tectonic processes.



Magellan radar image mosaic in the Lada region. Lava flows and ridge belt.

***Image credits:** Source: NASA/JPL*

The second mission is Veritas (truth).(Venus Emissivity, Radio Science, inSAR, Topography, and Spectroscopy). It will provide high-resolution images of Venus's surface, (X band radar). Using near infrared spectroscopy, topography and radar image information, a history will be formulated about how and when the mantle was formed and how the impact and tectonic activity occurred. It will also give information about its geochemistry. This information will provide data to be studied assessing whether the geology occurred over time; did it ever have surface water; and what type of geologic activity is at present functioning. It will carry two scientific instruments, VEM (Venus Emissivity Mapper) and VISAR (Venus Interferometry Synthetic Aperture Radar). VISAR with 15m to 30m resolution will construct an active exterior deformation chart. A scientific gravity experiment to analyse Venus' gravitational field fluctuations using the crafts own communication system, will also add to the data collection.

References:

Overview | Venus – NASA Solar System Exploration

Venus - Wikipedia

https://solarsystem.nasa.gov/planets/venus/galleries/

VERITAS (spacecraft) – Wikipedia

Solar observing

John Hughes

Below are a selection of images capturing the activity on the solar disc during the morning of the 15th July. These images are captured in Hα and show specifically the Chromosphere layer of the Sun.

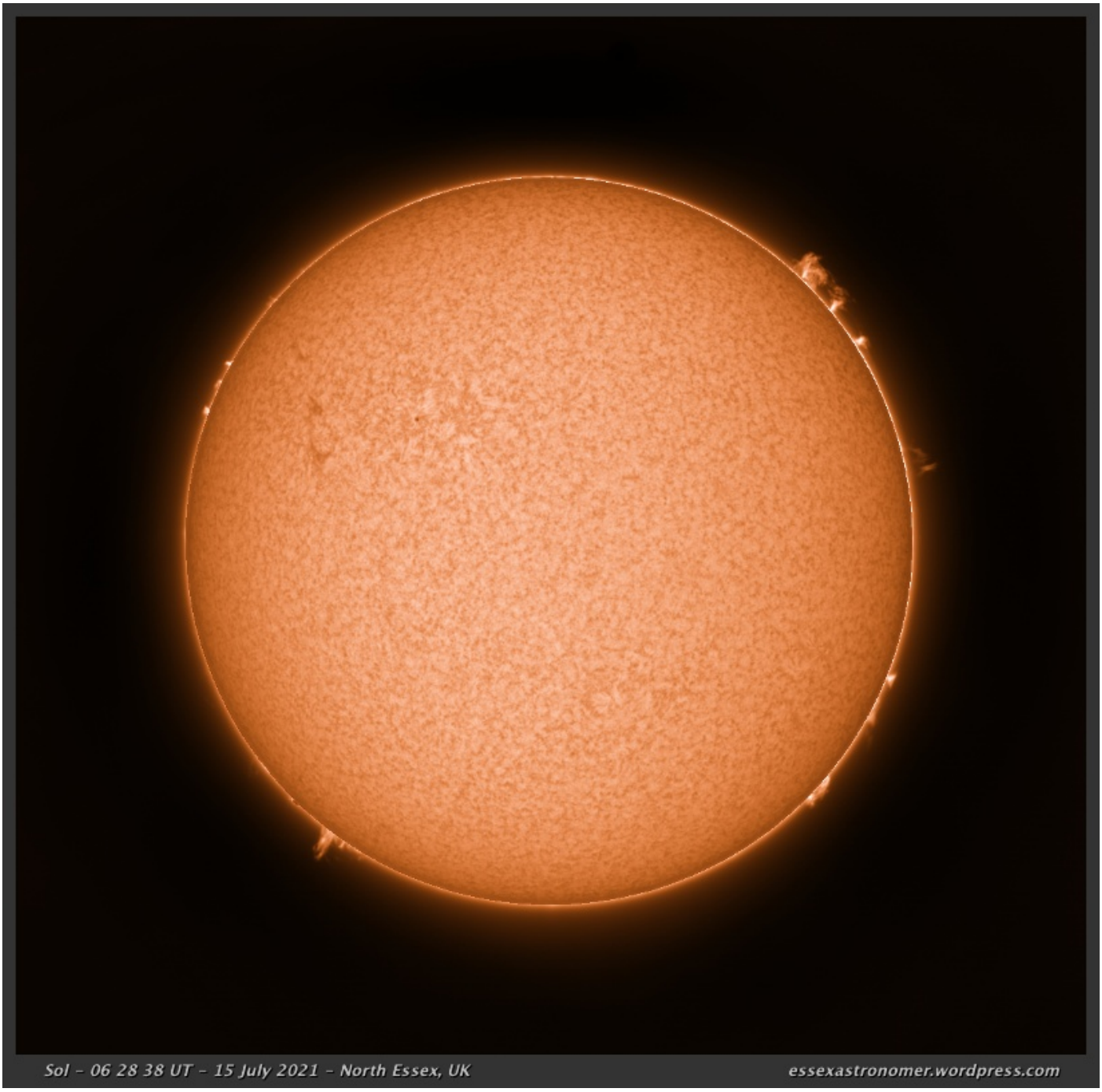
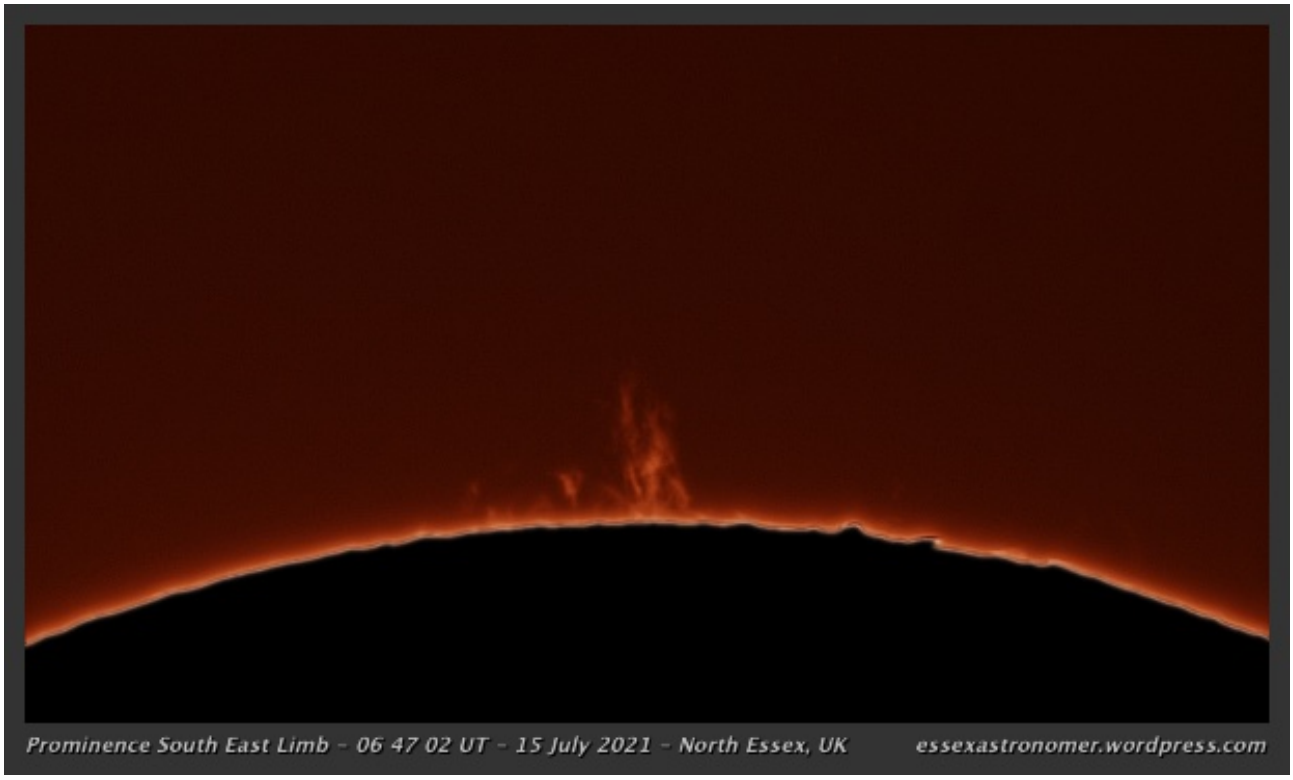
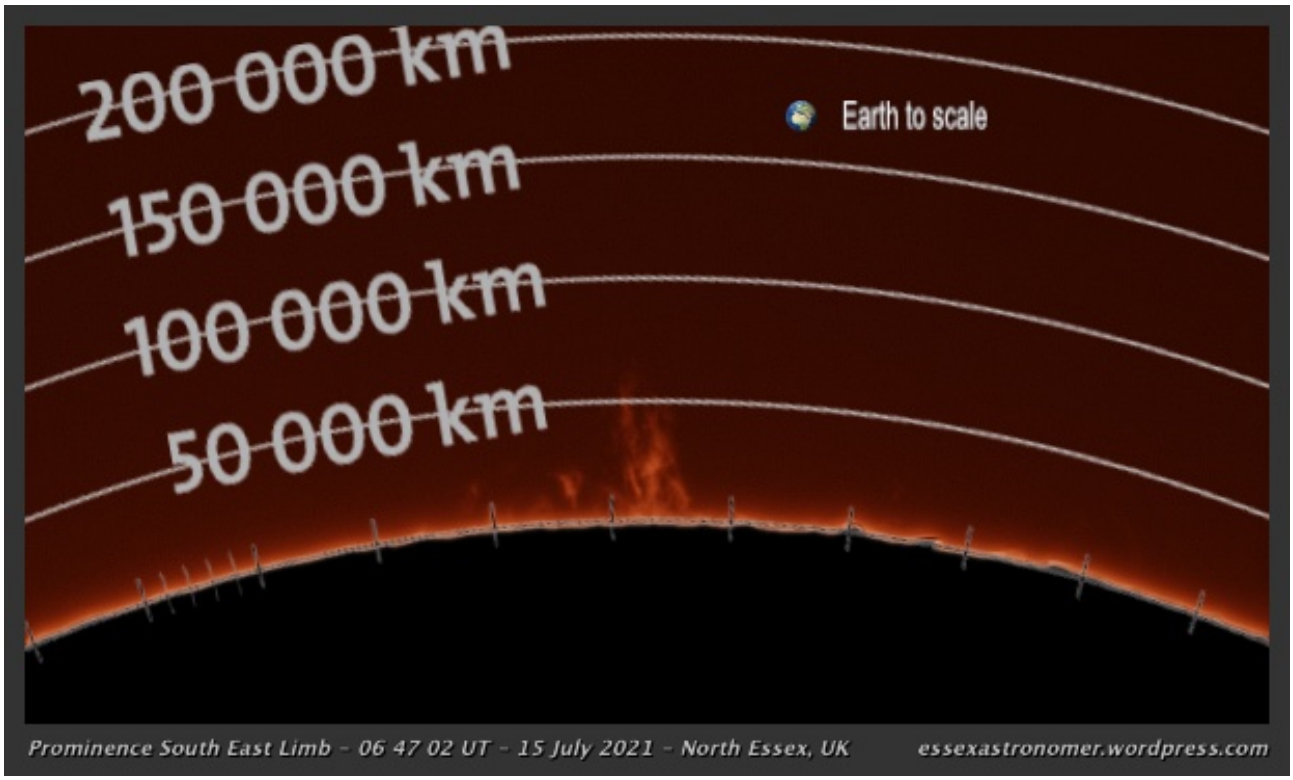


Image 1 - An overview of the solar disc showing an active region, filaments and prominences. 25% of 1,000 frames stacked in AutoStakkert 3. Exposure time 2.4 ms, Gain = 0.

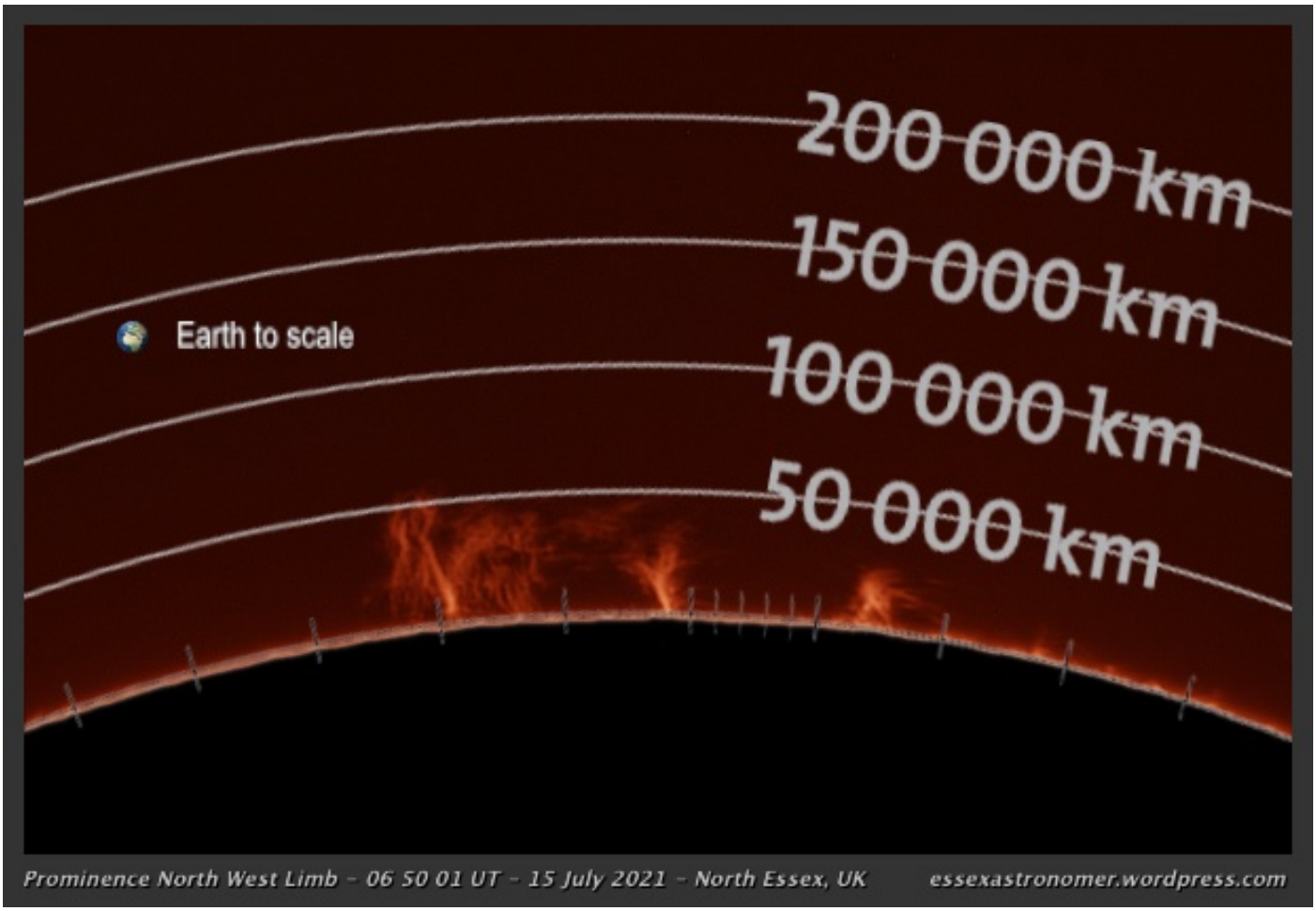
Image 2 - Active region AR12842 (Classification Hsx). 25% of 1,000 frames stacked. Exposure time 14 ms, Gain = 50.



Images 3 & 4 - A prominence located on the South East limb and an estimation of its height with Earth shown to scale. 100 out of 500 frames stacked. Exposure time 25 ms, Gain = 200.



Images 5 & 6 - A selection of prominences on the North West limb an estimation of their height with Earth shown to scale. 25% out of 500 frames stacked. Exposure time 35 ms, Gain = 150.



On the website is Image 7 - A time-lapse of the prominences showing in image 5. 100 x 500 frames stacked with a 30 second gap between each image file. Sharpened, contrast and colour added in PixInsight. Aligned using the free software ImPPG and brought together as a GIF using another free piece of software, PIPP.

Equipment used;

- •Lunt 60mm THα/B1200CPT telescope.
- •ZWO ASI174mm camera with tilt adapter.
- •SkyWatcher EQ6R-Pro mount.
- •Altair Astro 3x Barlow used in images 2 through to 7.
- •Images acquired using SharpCap Pro.
- •Images processed using AutoStakkert 3, ImPPG, PIPP, Affinity Photo and PixInsight.

I always capture my images of the Sun in SER file format and Mono 8. Mono 16 offers a better dynamic range but whilst the ZWO ASI174mm will allow images to be captured in Mono 16, this comes at a cost of having a lower frame rate per second. As the Chromosphere of the Sun is so dynamic, it is important to capture SER files as quickly as possible so having the higher frame rate is beneficial. If the frame rate is a lot slower the SER file will take longer to capture during which time the Chromosphere will have 'moved' - in effect the image becomes blurred.

As seeing conditions will vary, I always capture three SER files for each area of activity on the Sun and hope that one of them is of good quality. Typically I like to stack frames with a quality ranging from 75% or better hence the stacked images above quote '25%' or '100 out of 500 frames' - that is just me looking to get a minimum quality of 75%. Care has to be taken though to check these frames as passing clouds can actually trick AutoStakkert into thinking it is a good frame. This can be done easily as once AutoStakkert has analysed the SER file it will re-order the frames from best quality to worst. So it is simply a case of playing back this rearranged SER file to check no clouds, birds or planes have passed through the scopes field of view.

When starting out imaging the Sun the first thing I like to do is get the orientation of the Sun correct on my laptop screen. It is difficult to see the Sun on a computer screen so I keep it in a plastic box and well, I then cover myself with a black sheet! SharpCap allows you to overlap a range of reticules on the screen and I use one which has horizontal and vertical lines. I then move the scope so the bottom of the disc is on the horizontal line then move the mount slowly West. The Sun will either move above or below the horizontal line and it's then a matter of rotating the camera in the diagonal until the bottom of the disc follows the horizontal line without dipping below or rising above it. A quick visit to the National Solar Observatory website (Gong H-alpha) will show me nearly live images of the Sun and I check the surface detail shown on the website with what I can actually see. Sometimes it may be necessary to 'flip' the image horizontally or vertically in SharpCap especially if you are imaging as the Sun crosses the Meridian to get the same view shown in Gong H-alpha.

I have an imaging workflow of sorts and what I will do is first capture the full disc of the Sun. Then I look for active regions, sun spots, plages and filaments on the surface of the Chromosphere and capture these using a 3x Barlow and some times a 5x Barlow but this really is pushing the limit of the scope and seeing conditions have to be really good for the larger magnification. i then raise the camera Gain and go looking around the edge of the solar disc for interesting prominences which I will then capture using the 3x Barlow. If it looks like sky is going to be clear for a sometime I will also capture footage for a time-lapse of any interesting prominences available.

Once I have captured three SER files I will then take flat calibration frames. To take flats I move my scope so it is pointing at the centre of the Sun and at the same focus point. I then grab a very high tech piece of equipment……. an unused sandwich bag which I have scrunched up and an elastic band! Incidentally, Daystar who make the Quark for solar imaging/observing are now selling a 'Daystar Flat Cap Imaging Diffuser' which costs £68 - £76 depending on the aperture of your scope. I am proud to say that my sandwich bag has provided 2 years of reliable service though I have gone through several elastic bands (it's not quite Triggers Broom!). The bag goes over the front of the scope and is secured in place with the elastic band. This provides the same effect as the Daystar Diffuser and all I then do is raise the gain and adjust the camera exposure anywhere between 1 - 4 seconds until the histogram shown in SharpCap Pro is at the 50% mark. I then capture a SER file of 25 frames and stack this in AutoStakkert to produce the 'Flat' calibration frame. This Flat calibration frame is then included when I stack my files in AutoStakkert and has the benefit of removing uneven illumination and also dust motes. If I then use a 3x Barlow I will then capture fresh flats for these images in exactly the same way. What does this mean in reality? Well, everytime I change something in the optical train i.e. add a Barlow or change the rotation of the camera sensor I will take fresh flats.

Finally, when we have all our data captured we can move on to processing it and that is a topic for another time.

Kirton All-Sky camera report

Martin RH

As reported in the June edition of this newsletter (page 22), I have built an all-sky camera system.

Now that I have internet linked to the observatory shed and fixed the dewing problem (well, not quite), I can report a meteor siting and some star trail pictures.

Meteor

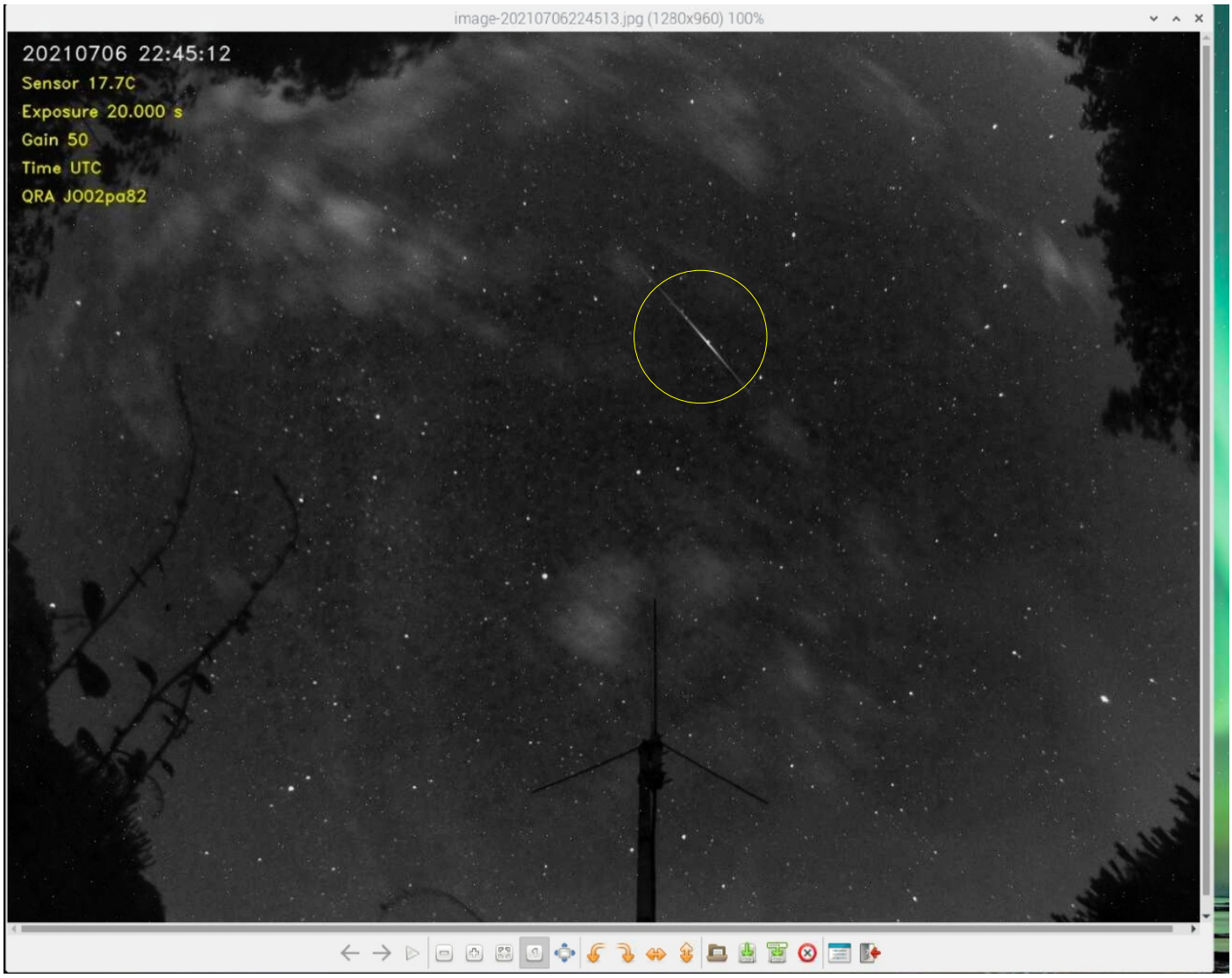


Fig.1 Meteor spotted 14 July

Star trails

Getting the star trail facility working required a tweak to the parameter which determines which frames to use.

Edit the file config.sh and change BRIGHTNESS_THRESHOLD=0.2 (the default is 0.1, which resulted in a single frame, so no trails). See Fig. 4.

Here are the two recent results (West is on the right):

Fig.2 Star trails July 13–14

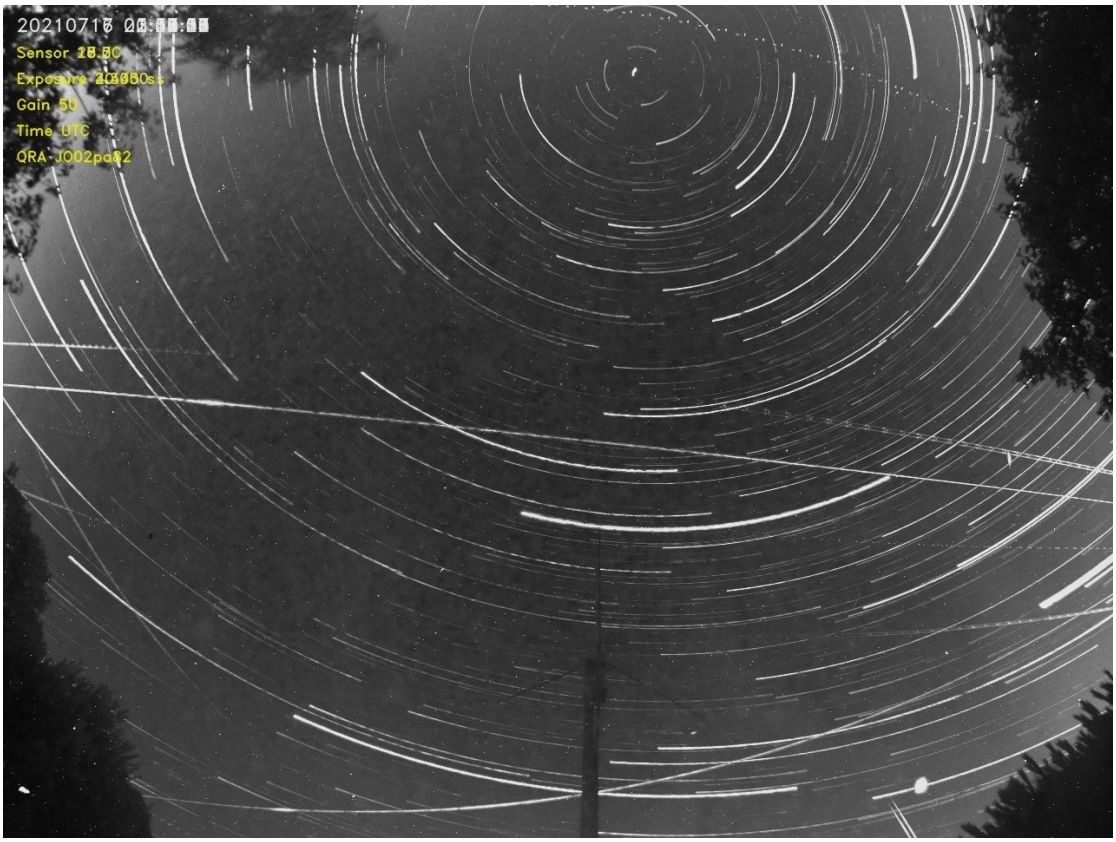


Fig.3 Star trails July 16–17 with some ISS passes

Fig. 4 config.sh settings for startrails.

Easy Astronomy quiz.

Each question has a one-word answer. Take the first letter of each answer. Unscramble these 8 letters to give a final word, using the clues "stationary and static".

Question

- Horizontal direction expressed as the angular distance between the direction of a fixed point (for example: observer's heading) and the direction of the object.
- Sub atomic particle with no electrical charge and an almost zero mass.
- Type of crater on Earth's moon.
- Lowest layer of the Earth's atmosphere.
- NASA's space flight centre in Greenbelt, Maryland. U.S.A.
- Large cloud of dust and gas occupying the space between stars.
- A change in frequency of a wave in relation to an observer who is moving relative to the wave source.
- First United States of America's Space station.

The OASI Picnic

Pictures by Pete Richards

The rain held off, just a little drizzle, so no need to adjourn to the hall.

Present:

Pete & Nicky Richards, Paul Whiting, Martin Richmond-Hardy, Andy & Mandy Gibbs, Bill Barton, John Wainwright, Mike & Pat O'Mahoney, Martin & Judith Cook, Neil & Lynne Morley, Dawn Rose, Dave & Barbara Robinson, Alan Smith, Roy Gooding

Thanks to Pete & Nicky for organising. [Ed.]