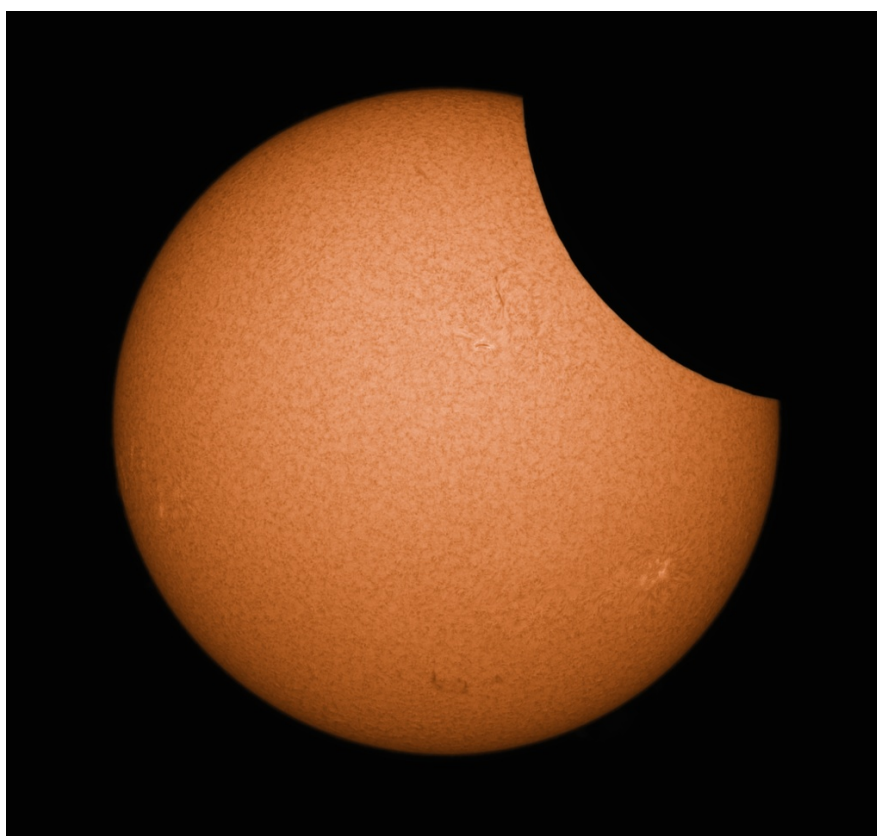




OASI News

The newsletter of the Orwell Astronomical Society



A still shot of the eclipse underway, taken at 09:38 UT at using a Lunt 60mm TH α /B1200CPT

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 have moved to using a Zoom Pro account. If you would like to join in, 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/UCHgxe3QAeRVWf7vkjKkCI2Q>

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, rtf, 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 Wilshire	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/OASlpswich>

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.
Mon 28 June 2021, 19:30-21:00 We're back at Newbourne Village Hall!	Martin R-H newbourne@oasi.org.uk BOOKING ESSENTIAL	Newbourne meeting: 19:30 meeting opens; 19:45 Sky Notes by Bill Barton, FRAS.
Saturday 10 July from 13:00 Newbourne Village Hall	Pete Richards lectures@oasi.org.uk	OASI Summer Picnic
Mon 12 July, 19:30-21:00	Martin R-H newbourne@oasi.org.uk BOOKING ESSENTIAL	Newbourne meeting VH & (hopefully) via Zoom – recorded talk "Understanding God's Thoughts: Practical Progress Towards a Theory of Everything" Dr Don Lincoln, FermiLab
Monday 26 July 26 19:30-21:00 Newbourne Village Hall ¹	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.

¹ If Covid rules change then booking may be essential. Please check the OASI Web diary for updates.

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 (yes, really!)

Martin Richmond-Hardy newbourne@oasi.org.uk

We normally meet at Newbourne Village Hall, Mill Lane, IP12 4NP on the 2nd and 4th Mondays (with a few exceptions). In view of the latest Covid restrictions, we are limited to 30 attenders so please book if you wish to come to the Newbourne meetings.

Newbourne June 28 (A) July 10 OASI picnic

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. During the COVID-19 isolation period 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. They are also a chance to chat with other members over a cup of tea and a biscuit, in a venue rather warmer than the observatory dome on a winter's night!

All meetings are via Zoom. The OASI@Newbourne events are via the usual meeting ID. Contact Paul Whiting if you can't find the details.

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.

BAA news & webinars

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

2021

Wednesday July 14	19:00	Jupiter Rising - Webinar
Wednesday August 11	19:00	Electronically Assisted Astronomy - Webinar
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 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 Python¹

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=JlIMt-nZW0TE>

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>

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 Astropeler Stockert	Wolfgang Herrmann, https://www.youtube.com/watch?v=zB8veXpMdqU
On the tricky question of Pulsars Peter East	OBE FEng https://www.youtube.com/watch?v=vl40lcTvBII
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”.
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
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.”
Dec 3rd 19:30 GMT	‘SARA presents...’ Pablo Lewin “Building a Radio Telescope for HI 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 all the news about the exhibition. <https://www.ipswich.gov.uk/content/keep-touch-ipswich-museums>

From the Interweb

The Journal of the American Association of Variable Star Observers

is available from <https://app.aavso.org/media/jaavso/volumes/v49n1.pdf>

All eyes on the Sun

This year marks a solar centenary. In 1921, three waves of a major geomagnetic event wreaked havoc in different parts of the world. Have advances in science meant that lessons can be learned to avoid catastrophe if history repeats itself?

<https://eandt.theiet.org/content/articles/2021/06/all-eyes-on-the-sun/>

Nova

Spectroscopic classification of TCP J18573095+1653396 as a nova bordering naked-eye brightness

<https://www.astronomerstelegam.org/?read=14704>

Winchcombe meteor spectral analysis

Short video https://m.youtube.com/watch?v=_0VaezyKERw&feature=youtu.be

Supernova SN2021qvv in NGC4442

Type SN Ia. Could reach brightness 11.5?

<https://www.wis-tns.org/object/2021qvv>

Noctilucent Cloud Season

From Sandra Brantingham, BAA Aurora and NLC Section

Just a quick update on the developing NLC situation. AS of 20th June 2021 the AIMS data was showing patches as far south as 52N. I reckoned it could go as far south as 45N or further, and thanks to Rafael Barbera Cordoba who saw it from Valencia in Spain at 39.5N, it went much further. This is turning out to be a great season and I want to thank you all for your reports, and I will be replying to you all. Keep up the good work and good hunting.

RAS: 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>

The Night Sky in July 2021

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	04:40	21:18		
	31	05:16	20:46		
Moon	1	00:49	12:31		Last Q 01 July 22:11 Apogee 5 July New 10 July 02:17 First Q 17 July 11:11 Perigee 21 July Full 24 July 03:37 Last Q 31 July 14:16
	31	23:50	13:46		
Mercury	1	03:43	19:15	1	Max western elongation 4 July
	31	05:03	20:49	-1.9	
Venus	1	06:51	22:42	-3.8	
	31	08:24	21:54	-3.8	
Mars	1	07:35	22:55	1.8	Aphelion 13 July
	31	07:26	21:34	1.8	
Jupiter	1	23:33	09:31	-2.5	
	31	21:31	07:19	-2.7	
Saturn	1	22:51	07:38	0.4	
	31	20:48	05:28	0.2	
Uranus	1	01:39	16:24	5.8	
	31	23:39	14:30	5.8	
Neptune	1	00:14	11:32	7.9	
	31	22:11	09:32	7.8	

Pluto is at opposition on 17 July.

Occultations during July 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 July 2021

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

Shower	Normal limits	Maximum	Max RA/Dec.°	ZHR at Max	Notes
Daytime Arietids	May 22 – July 2	June 7	02:56 (044°) +24°	30?	Most active of the daytime showers. Good for radio observers. ZHR and radiant location uncertain.
Daytime ζ-Perseids	May 20 – July 5	June 9	04:16(064°) +27°	20?	Peak overlaps with that of Daytime Arietids. Good for radio observers. ZHR and radiant location uncertain.
June Boötids	Jun 22 – Jul 2	June 27	14:52 (223°) +48°	?	Unexpected outburst with ZHR ~100 on 1998 June 27 after a quiescent period of several decades. Quite favourable.
α-Capricornids	Jul 3 – Aug 15	July 30	20:28 (307°) -9°	4	A good proportion of bright, slow-moving colourful meteors. Rather unfavourable.
Perseids	Jul 17 – Aug 24	Aug 12 19h	03:11 (048°) +58°	80+	Rich shower of fast meteors. High proportion of bright events leaving persistent trails. Very favourable

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

Visible ISS passes ≥15° max altitude

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

Times are BST. Predictions are approximate (29 Apr) due to craft adjustments. Check the day before.

Date	Bright-ness (mag)	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
01 Jul	-1.7	03:16:38	10°	S	03:18:48	16°	SE	03:20:57	10°	ESE
03 Jul	-2.7	03:17:51	13°	SSW	03:20:20	31°	SSE	03:23:21	10°	E
04 Jul	-2.3	02:31:56	19°	S	02:33:00	22°	SSE	02:35:43	10°	E
05 Jul	-1.8	01:45:58	16°	SE	01:45:58	16°	SE	01:47:53	10°	ESE
05 Jul	-3.5	03:18:54	11°	WSW	03:22:01	53°	SSE	03:25:19	10°	E
06 Jul	-3.2	02:32:54	22°	SSW	02:34:36	41°	SSE	02:37:49	10°	E
07 Jul	-2.9	01:46:50	30°	SSE	01:47:14	31°	SSE	01:50:16	10°	E
07 Jul	-3.8	03:20:24	10°	WSW	03:23:48	78°	S	03:27:10	10°	E
08 Jul	-2.1	01:00:43	21°	SE	01:00:43	21°	SE	01:02:37	10°	E
08 Jul	-3.8	02:33:38	15°	WSW	02:36:20	67°	SSE	02:39:42	10°	E

Date	Bright-ness (mag)	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
09 Jul	-3.7	01:47:26	28°	SW	01:48:54	54°	SSE	01:52:13	10°	E
09 Jul	-3.8	03:22:14	10°	W	03:25:38	87°	S	03:29:01	10°	E
10 Jul	-3.4	01:01:07	39°	S	01:01:29	41°	SSE	01:04:42	10°	E
10 Jul	-3.8	02:34:45	10°	W	02:38:09	85°	S	02:41:33	10°	E
11 Jul	-2.8	00:14:35	29°	SE	00:14:35	29°	SE	00:17:08	10°	E
11 Jul	-3.9	01:47:28	11°	WSW	01:50:40	78°	S	01:54:03	10°	E
11 Jul	-3.8	03:24:05	10°	W	03:27:28	76°	S	03:30:50	10°	ESE
11 Jul	-2.3	23:27:33	21°	SE	23:27:33	21°	SE	23:29:29	10°	E
12 Jul	-3.9	01:00:22	14°	WSW	01:03:12	67°	SSE	01:06:34	10°	E
12 Jul	-3.8	02:36:35	10°	W	02:39:59	84°	S	02:43:22	10°	E
12 Jul	-2.1	22:37:16	10°	S	22:39:27	16°	SE	22:41:39	10°	ESE
13 Jul	-3.7	00:12:27	10°	WSW	00:15:45	54°	SSE	00:19:04	10°	E
13 Jul	-3.9	01:49:06	10°	W	01:52:29	87°	S	01:55:53	10°	E
13 Jul	-3.6	03:25:55	10°	W	03:29:13	51°	SSW	03:32:30	10°	SE
13 Jul	-3.4	23:25:07	10°	SW	23:28:20	41°	SSE	23:31:33	10°	E
14 Jul	-3.9	01:01:36	10°	W	01:05:00	85°	S	01:08:24	10°	E
14 Jul	-3.8	02:38:24	10°	W	02:41:46	64°	SSW	02:45:07	10°	ESE
14 Jul	-3	22:37:54	10°	SW	22:40:56	31°	SSE	22:43:59	10°	E
15 Jul	-3.9	00:14:07	10°	WSW	00:17:31	78°	S	00:20:54	10°	E
15 Jul	-3.9	01:50:55	10°	W	01:54:18	76°	SSW	01:57:41	10°	ESE
15 Jul	-2.9	03:27:52	10°	W	03:30:50	29°	SSW	03:33:48	10°	SSE
15 Jul	-2.5	21:50:52	10°	SSW	21:53:35	23°	SSE	21:56:19	10°	E
15 Jul	-3.9	23:26:40	10°	WSW	23:30:02	67°	SSE	23:33:24	10°	E
16 Jul	-3.9	01:03:25	10°	W	01:06:49	83°	S	01:10:12	10°	E
16 Jul	-3.3	02:40:17	10°	W	02:43:27	39°	SSW	02:46:38	10°	SE
16 Jul	-3.7	22:39:16	10°	WSW	22:42:35	54°	SSE	22:45:54	10°	E
17 Jul	-3.9	00:15:55	10°	W	00:19:19	87°	S	00:22:43	10°	E
17 Jul	-3.7	01:52:45	10°	W	01:56:02	51°	SSW	01:59:19	10°	SE
17 Jul	-2.1	03:30:17	10°	WSW	03:32:18	15°	SW	03:34:19	10°	S
17 Jul	-3.3	21:51:56	10°	SW	21:55:09	41°	SSE	21:58:22	10°	E
17 Jul	-3.9	23:28:25	10°	W	23:31:49	85°	S	23:35:13	10°	E
18 Jul	-3.9	01:05:14	10°	W	01:08:35	64°	SSW	01:10:07	29°	ESE
18 Jul	-3.8	22:40:55	10°	WSW	22:44:19	78°	S	22:47:42	10°	E
19 Jul	-3.9	00:17:44	10°	W	00:21:07	76°	S	00:23:03	23°	ESE
19 Jul	-1.9	01:54:40	10°	W	01:55:56	18°	WSW	01:55:56	18°	WSW
19 Jul	-3.8	21:53:28	10°	WSW	21:56:50	67°	SSE	22:00:12	10°	E
19 Jul	-3.9	23:30:13	10°	W	23:33:37	83°	S	23:36:29	14°	E
20 Jul	-2.8	01:07:05	10°	W	01:09:24	32°	WSW	01:09:24	32°	WSW
20 Jul	-3.8	22:42:43	10°	W	22:46:07	87°	S	22:49:30	10°	E
21 Jul	-3.6	00:19:32	10°	W	00:22:50	51°	SSW	00:23:03	50°	S

Date	Bright -ness (mag)	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
21 Jul	-3.8	21:55:12	10°	W	21:58:36	85°	S	22:02:00	10°	E
21 Jul	-3.8	23:32:00	10°	W	23:35:22	64°	SSW	23:36:49	30°	SE
22 Jul	-3.8	22:44:30	10°	W	22:47:53	75°	S	22:50:38	15°	ESE
23 Jul	-2.3	00:21:27	10°	W	00:23:34	25°	WSW	00:23:34	25°	WSW
23 Jul	-3.8	21:56:59	10°	W	22:00:23	83°	S	22:03:47	10°	E
23 Jul	-3.2	23:33:51	10°	W	23:37:02	39°	SSW	23:37:28	36°	S
24 Jul	-3.5	22:46:18	10°	W	22:49:36	51°	SSW	22:51:24	23°	SE
25 Jul	-3.7	21:58:46	10°	W	22:02:08	64°	SSW	22:05:22	11°	ESE
25 Jul	-2.1	23:35:54	10°	W	23:38:18	21°	SW	23:38:18	21°	SW
26 Jul	-2.6	22:48:12	10°	W	22:51:10	29°	SSW	22:52:19	23°	S
27 Jul	-3	22:00:35	10°	W	22:03:46	38°	SSW	22:06:22	14°	SE
28 Jul	-1.6	22:50:35	10°	WSW	22:52:35	15°	SW	22:53:24	14°	SSW
29 Jul	-2	22:02:38	10°	W	22:05:16	21°	SW	22:07:32	12°	SSE

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	Date of last reported observation	Angular separation from Sun	Altitude	Azimuth	Constellation
None this month						

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>

Double Asteroid Redirection Test D.A.R.T.

A short article from the library.

Andy Willshire

We read on a regular basis about how close some of the foreign bodies that zoom around Earth have presented themselves. NASA, with the aid of the Applied Physics Laboratory (APL) and supported by many others including the Jet Propulsion Laboratory (JPL) and the Goddard Space Flight Centre (GSFC) has formulated a mission idea to prevent lurking asteroids from impacting on Earth. In 2018 the National Science and Technology Council's subcommittee conceived a strategy and action plan to counteract any near earth object collision threat. They then requested that any specific outcome that would effectively fit into the strategic aims be considered. The idea behind this group was to be able to establish mechanisms that would be put into operation if a Near Earth Object (NEO) was identified and that there was a chance that it would impact on Earth.

A 25-30 m Earth collision object would have an estimated damage liability of minor damage with a fireball, air-burst or shockwave culminating from it.

A 140 m Earth collision object would have an estimated damage liability of devastation on either regional or perhaps national proportion.

A 300-500 m Earth collision object would have an estimated damage liability of continental destruction.

How severe the asteroid collision is, can be defined as a function of its inbound energy, which is directly proportional to its mass. From this data, asteroid impact data is generated.

A second problem to these colliding asteroids is if they crash into seas and oceans. It has been noted by earlier analysis of this phenomena that even small events could generate tsunamis that carry surprisingly large amounts of energy and cause destruction of coastal towns and cities.

DART or Double Asteroid Redirection Test is a test protocol set up for averting an impact of Earth by a NEO. The idea of DART is to show that by impacting an asteroid with a rocket in motion, it will change its course in space. This mission is managed under NASA's Solar System Exploration Program at the Marshall Space Flight Centre.

Objects that are projected to pass within 36,000 km of Earth are notified by NASA directly to the U.S. Government. Data is obtained from worldwide observatories and projected orbits are continuously re-calculated. Asteroid size and composition are also collected on a similar basis.

They established an action plan that in part took account of specific data that allowed them to make decisions, considering all types of responses. It was to include the probability of impact with degrees of damage as well as date and time of impact. From this paradigm, an operation could be set in motion to either destroy the NEO, or disturb its trajectory.

In order to interpret the physical characteristics of any NEO, systems of monitoring needed to be put into place. These include photometry, spectroscopy and radar using both visible and near infrared spectra. This is necessary for the design of the action plan.

NASA's Survey and Alert Process

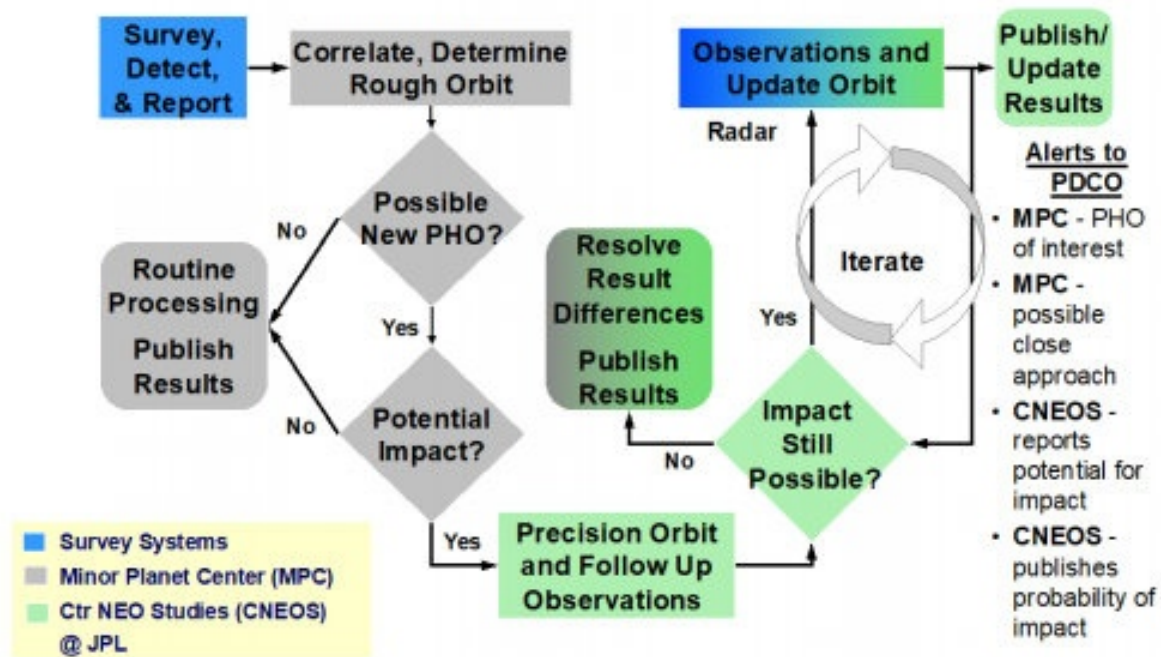


Diagram and data from: **NASA Action 5.2 REPORT ON NEAR-EARTH OBJECT IMPACT THREAT EMERGENCY PROTOCOLS** ([archives.gov](https://www.archives.gov))

The nine member Committee on Near Earth Object Observations in infrared and visible wavelengths was presented with a myriad of ideas to combat NEO's both from the Earth, as ground based and from space based. After much consultation they decided that the best idea was using a space based thermal infrared telescope, which was the ideal weight and size for the mission. This was because :

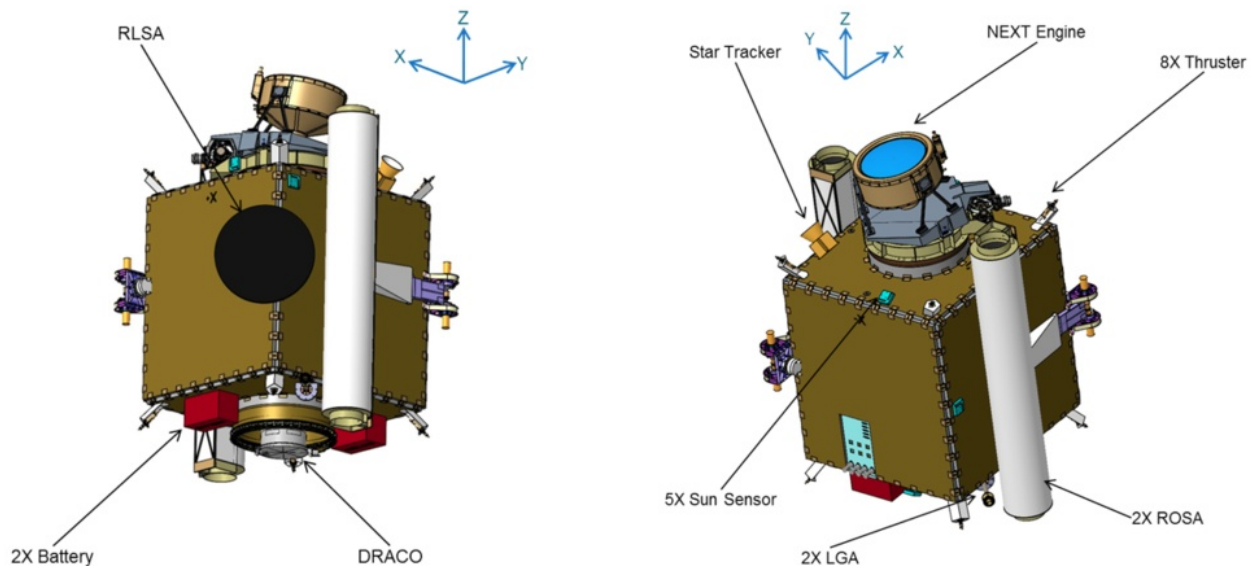
- The use of thermal infrared equipment will provide asteroid measurements, especially diameter from which mass estimation can be achieved.
- It was adjudged that optical surveys would not be able to provide this data with a similar sense of accuracy and speed.
- Ground based equipment was discarded as an idea due to Earth's day/ night cycle and its weather.

Thus the Committee decided that the space based option was the best and it was no more expensive than visible wavelength telescopes also set in space. The latter has a cost pressure brought by telescope apertures. Another feature considered by the committee was that the infrared space-based equipment would instantly provide a mass uncertainty of the asteroid within a factor of 4, whereas the ground-based visible observatory would only be able to give a preliminary mass uncertainty of within a factor of 20.

The group have decided that 65803 Didymos is a provisional target for DART. Didymos is a sub-kilometre asteroid with a secondary moonlet Diamorphos only 160 metres in size. The two are in a synchronous binary system and are observed by telescopes on Earth, currently, in order for all calculations to be at hand when awaiting the DART arrival. This mini system was discovered in 1996 by the spacewatch survey at Kitt Peak. This is an ideal contender for Earth's first attempt at asteroid defence, and as it is not on a path to strike Earth, it will not present a problem. The timing of DART to impact is September 2022. The impulse generated by DART to the asteroid system will be low and will crash into Diamorphos at approximately 6.6km/sec, changing its speed around Didymos by <1% which will cause a change of several minutes to its orbit time.

The DART spacecraft is predominantly low-cost with its main box like structure only 1.2*1.3*1.3 meters in dimension. It has two large solar arrays which when fully opened are 8.5 meters long, which will provide up to three

times more power than is presently available. It is powered by solar electric propulsion. This system is called NASA's NEXT-C (Evolutionary Xenon Thruster-Commercial), an ion propulsion system. This is a gridded ion turbine supplying drive by electrostatic acceleration of ions obtained from the Xenon propellant. This system offers a much higher performance than those used on both the Dawn and Deep Space I missions. In order for it to identify which of the asteroids to target, algorithms have been written to provide assistance. This is called "Smart Nav". The craft also has high gain antennae allowing for high effective communication. It is due to launch on the 24th November 2021 on a two stage reusable Falcon 9 rocket from Vandenberg AFB United States. Commissioned from SpaceX.



Double Asteroid Redirection Test (DART) Mission | NASA
DRACO- Optical navigation Camera. ROSA- Roll out solar array.

Image credit: <https://www.nasa.gov/planetarydefense/dart>

The expensive craft will fly itself to the required asteroid, at this point its next job is to achieve the correct kinetic impact. This will be made easier by an onboard camera system called "DRACO" and some very impressive navigation software. It is calculated that this strike will alter the speed of the smaller asteroid, as has been stated earlier, by a fraction of 1%, changing its orbital period. The analysis of this information will be used for further missions.

References:

REPORT ON NEAR-EARTH OBJECT IMPACT THREAT EMERGENCY PROTOCOLS (archives.gov)

<https://www.nasa.gov/planetarydefense/dart>

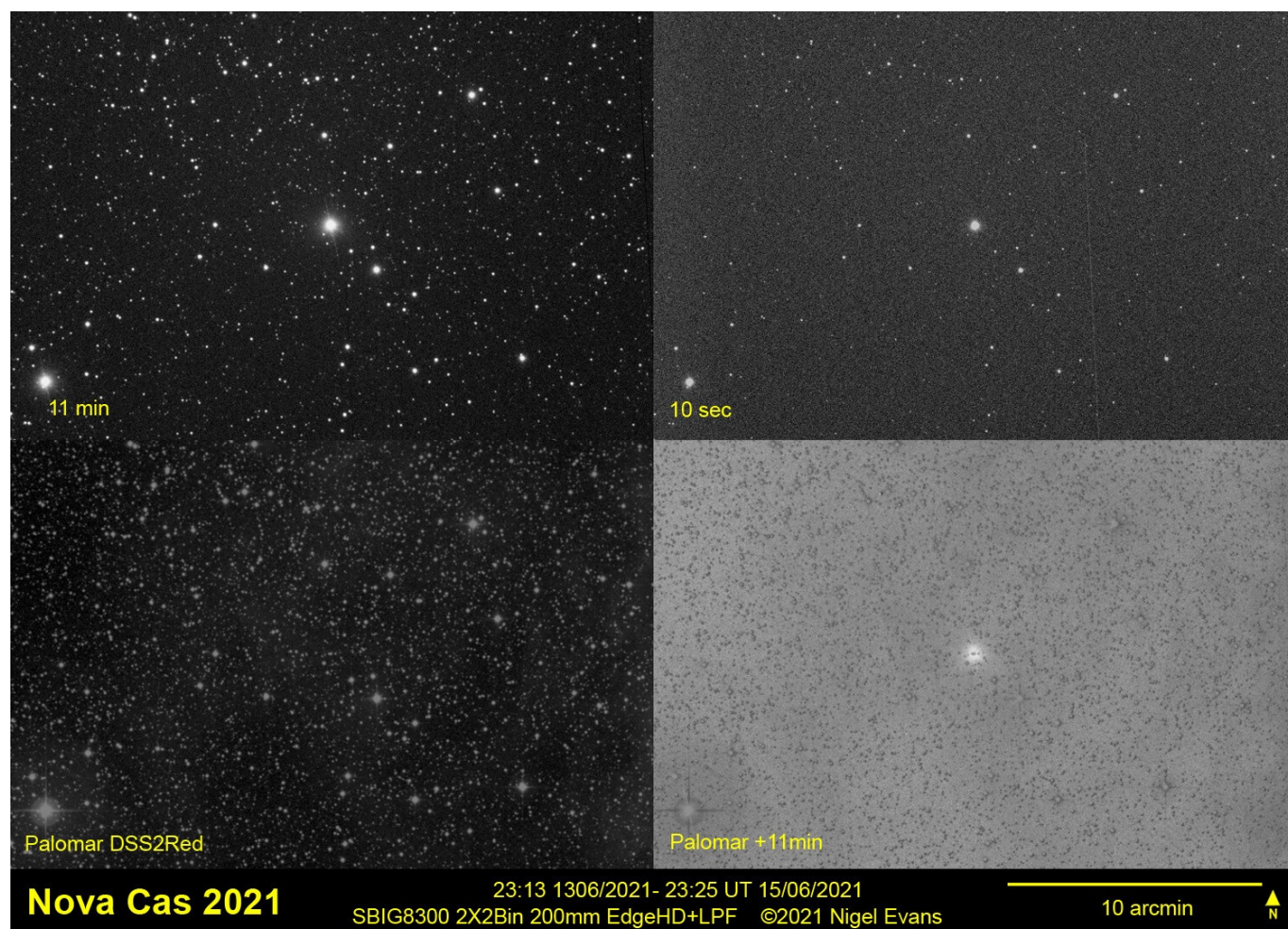
NASA'S First Asteroid Deflection Mission Enters Next Design Phase | NASA

Double Asteroid Redirection Test (DART) Mission - Albatross Eye View

Nova Cas 2021

Nigel Evans

Last [night 15 June] I finally got round to recording Nova Cas 2021 in my observatory scope, nearly 3 months after it appeared. Before it was either too low down in the north, then it was blocked the neighbour's [tree](#).



Even a short exposure picked it up clearly.

The Partial Solar Eclipse and solar activity

John Hughes

Please find attached my visual summary of the partial eclipse that took place on Thursday 10 June 2021.

Thursday morning started with a clear sky so I was up early to set my gear up and capture some of the early morning events on the Sun. The forecast was for clouds and I just hoped that it would stay clear enough so I could watch the partial eclipse unfold. As many of you experienced, that was not to be the case. So here is a selection of images which captures the day for me;

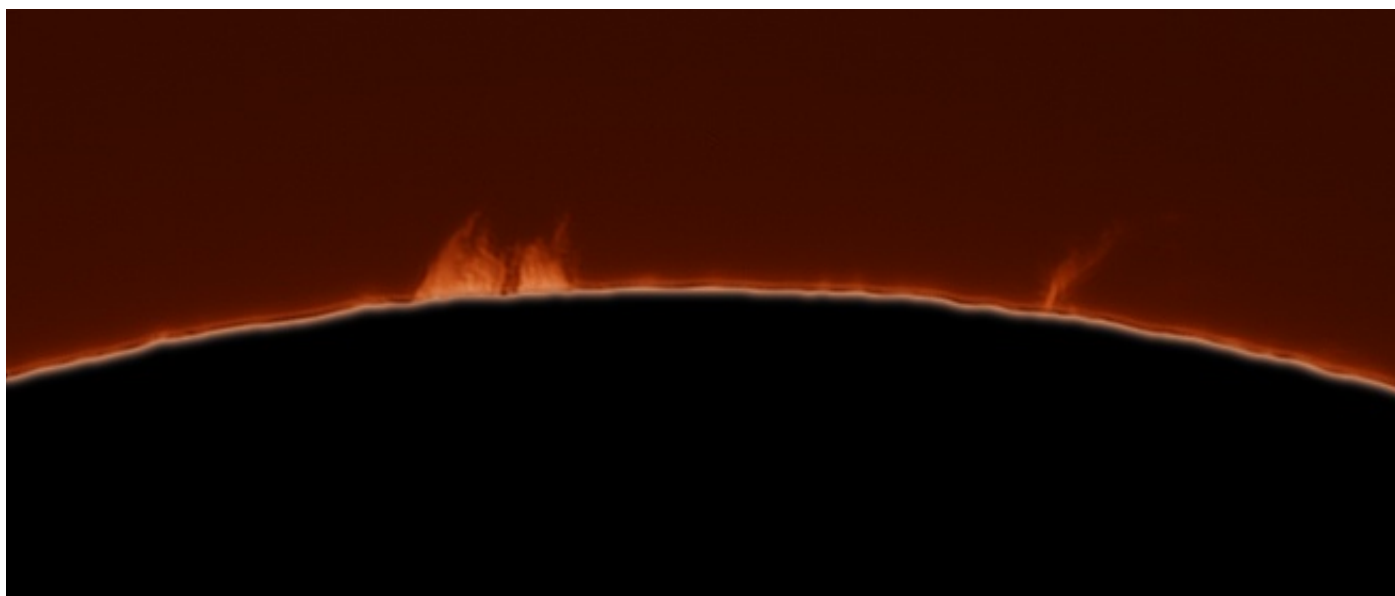


Image 1-

Small prominence on the north west limb. Exposure 18 ms, Gain = 210. 600 frames captures, best 25% stacked.

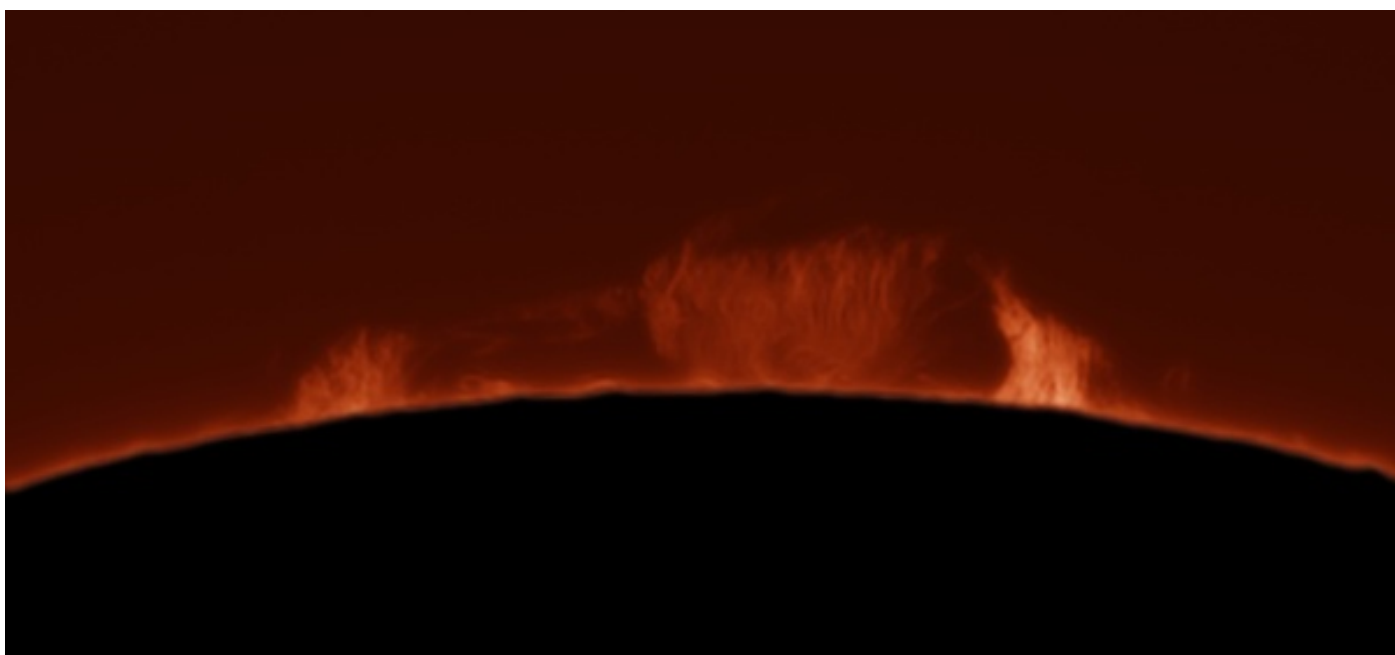
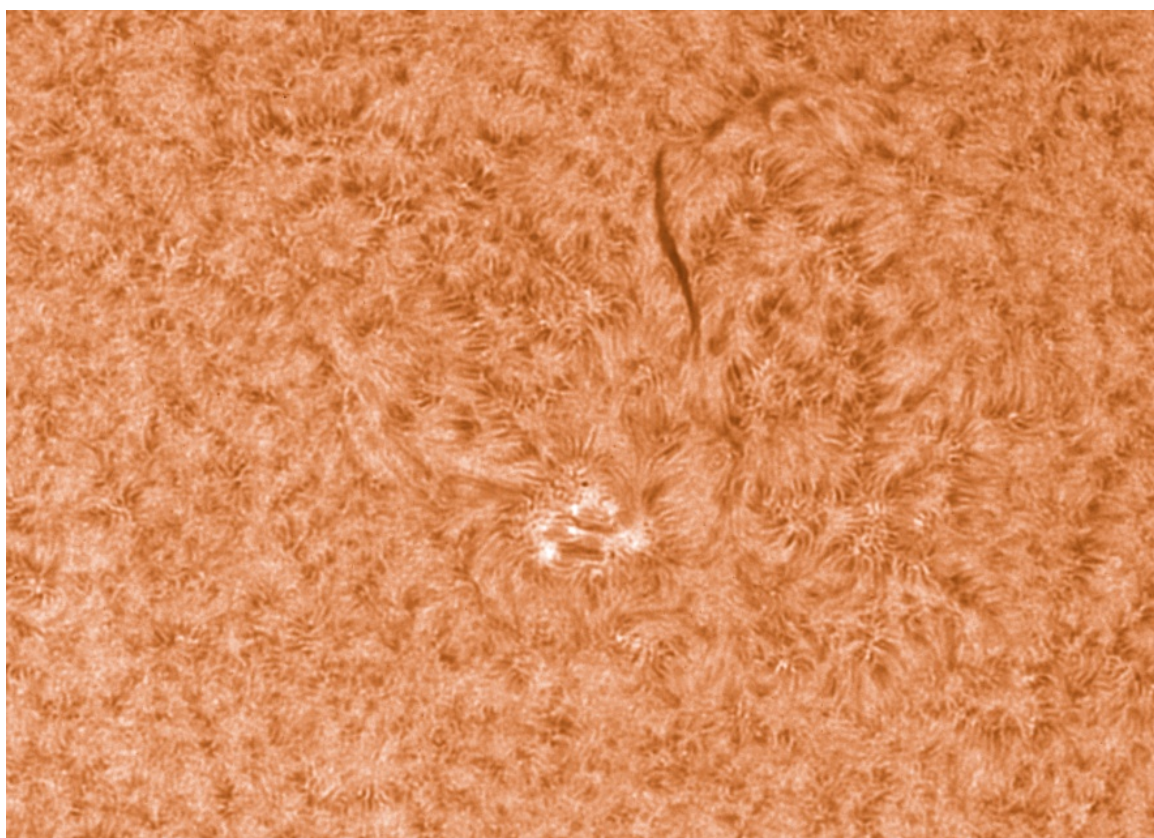
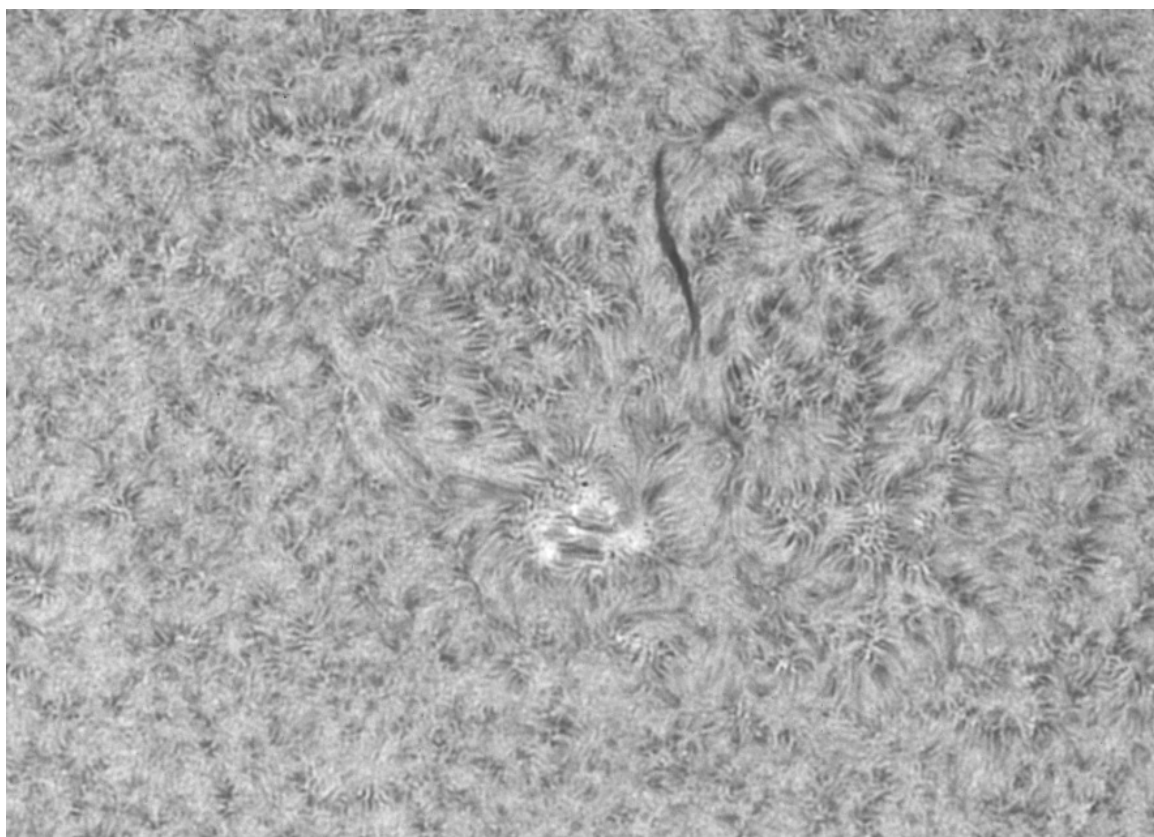
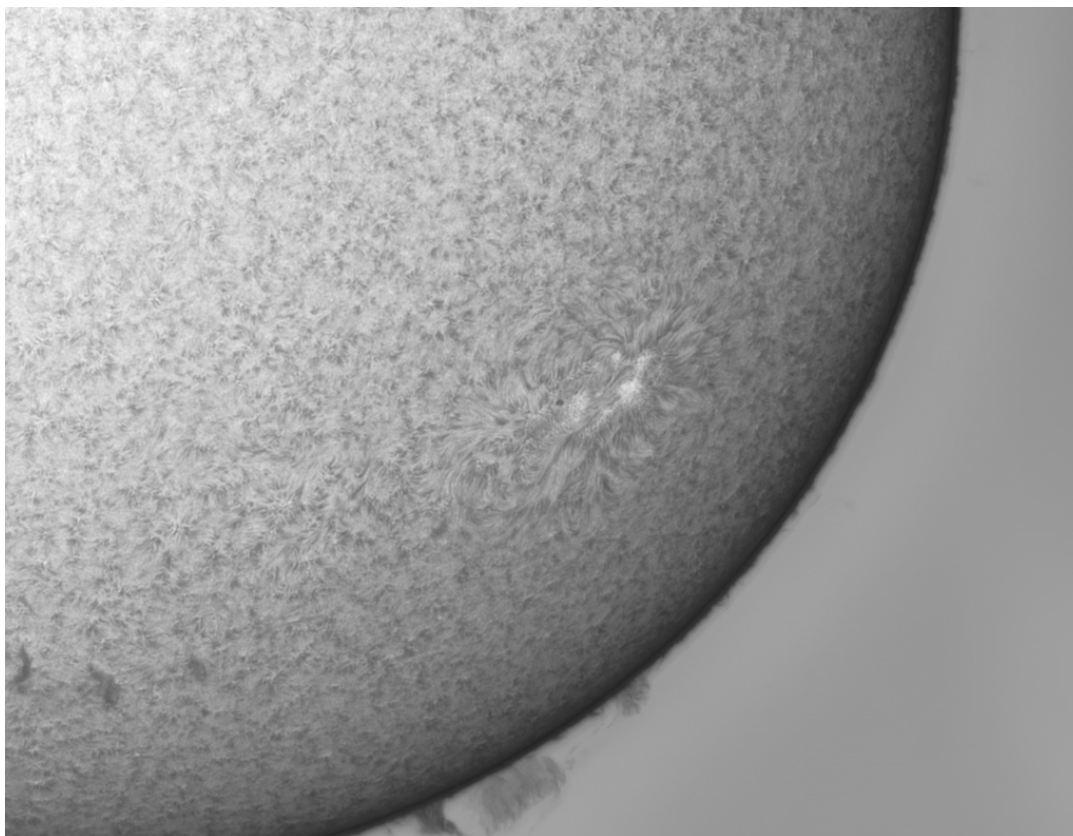


Image 2 -

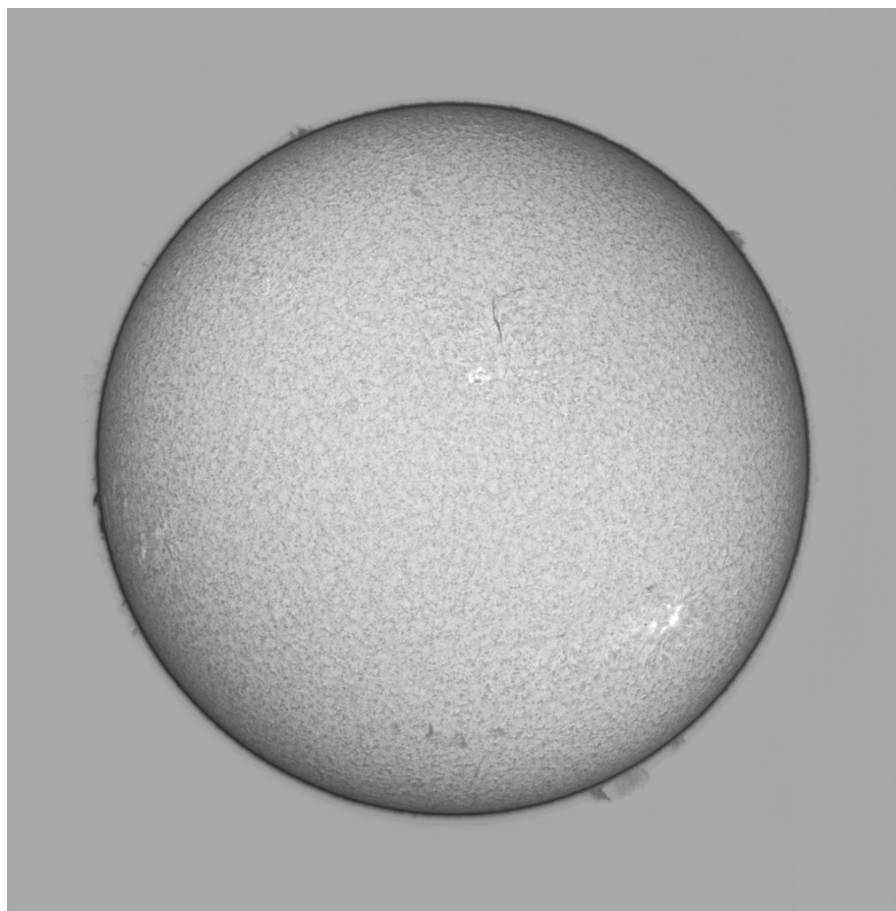
Impressive prominence on the south west limb. Capture details are the same as Image 1.



**Image 3 & 4 - Close up of AR12832, a small active area north of the disc centre.
Exposure 11 ms, Gain = 45. 1,000 frames captured, best 25% stacked.**



**Image 5 - AR12829 now close to the south west limb.
Exposure 13 ms, Gain 30. 1,000 frames captured, best 25% stacked.**



**Image 6 - Full disc of the Sun
taken at 08:34 UT.
Exposure 2.5ms, Gain = 0. 1,000
frames, best 25% stacked.**

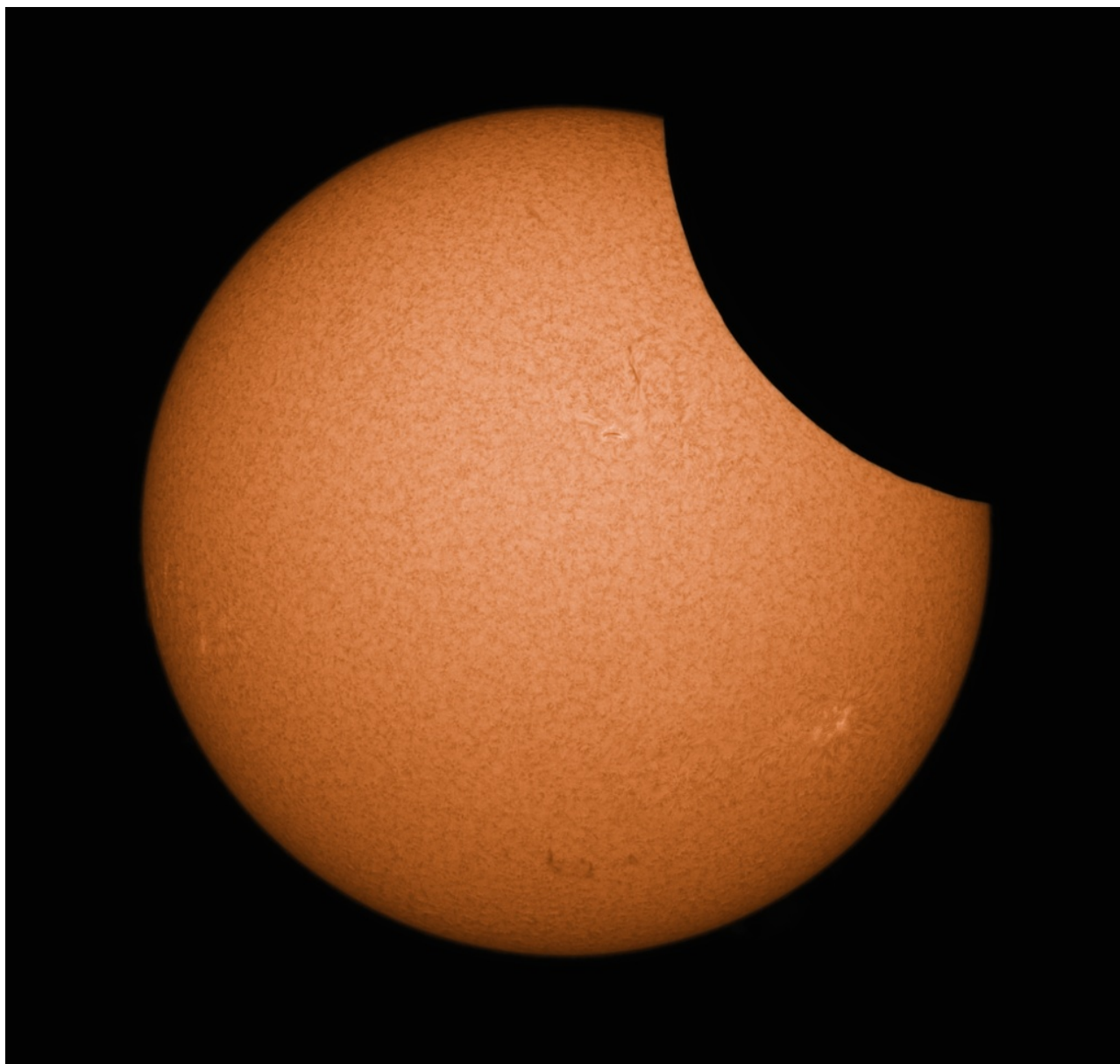


Image 7 - A still shot of the eclipse underway, taken at 09:38 UT.

Exposure 2ms, Gain = 0. 500 frames, best 25% stacked.

On the OASI website there is also a gif image of the partial eclipse itself. 62 frames taken between 09:10 and 10:04 UT with a 30 s gap between each. Some frames have been removed as cloud started to move in.

Equipment used

Lunt 60mm TH α /BI200CPT

ZWO ASI174mm

SkyWatcher EQR6-Pro

Altair Astro 3x barlow for images 1 through to 5.

Observing the Solar Eclipse at Newbourne

Martin Richmond-Hardy



Yes, sunshine! L-R Mike Whybray, Joe Startin, Mike O'Mahoney, Nicky Richards, Pete Richards (seated), John Wainwright and Andy Gibbs. Also present Jen, & Martin R-H (behind the camera).

My own scope (200mm Skywatcher Newtonian fitted with Bader film white light filter) on a Dobsonian mount captured this image. Canon EOS500D. ISO200 1/320s, tweaked in Affinity Photo.



Mike Whybray set up a projection system [which produced this nice image](#)



He also captured some images on his Newtonian scope.

Answers to Astro3 crossword

Andy Willshire

Across:

3: Aerosol. 5: Wimp. 6: Tully. 8: Frequency. 9: Elliptical. 13 :Annihilation. 16: Cluster. 17: Bulge. 18: Deuteron. 19: Halo. 20: Isotropic 21: Disc.

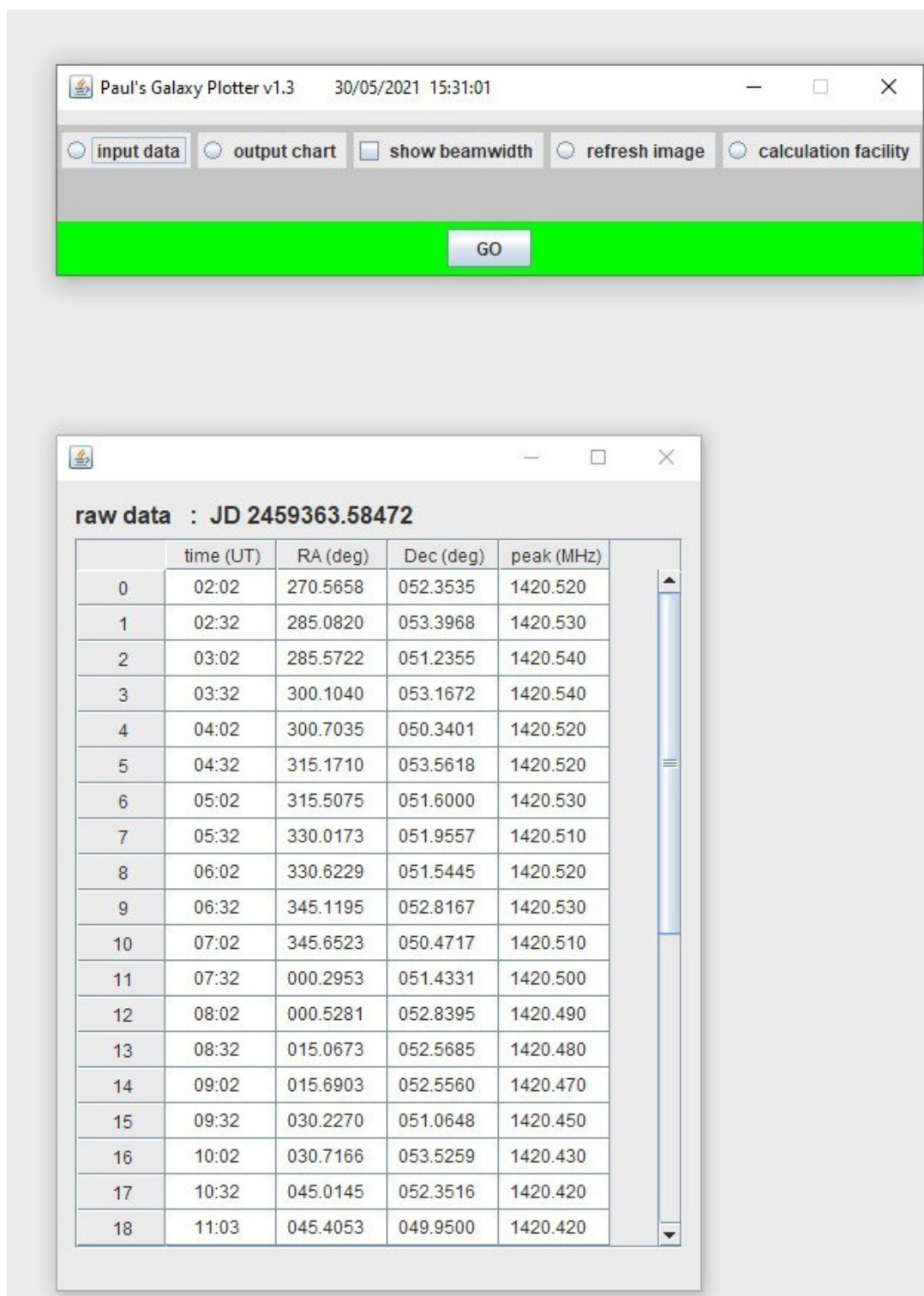
Down:

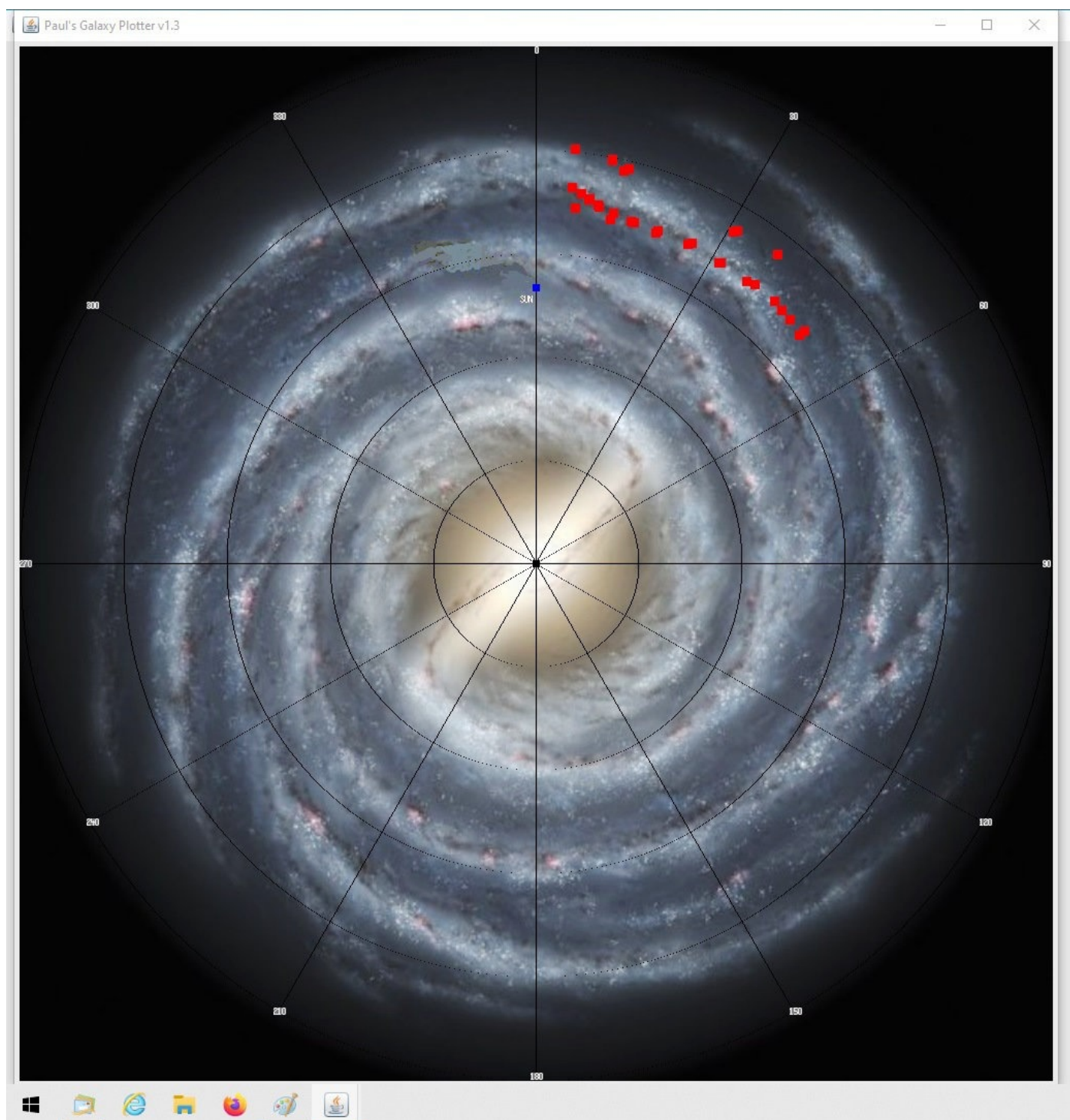
1: Galaxy. 2: Inflation. 3: Aphelion. 4: Lyman. 7: Cepheid. 10: Parsec. 11: Anisotropies. 12: Dust. 14: Albedo. 15: Redbeds. 17: Baryon.

Area 51.75 Report

H1 data plotting

Paul Whiting has been plotting his results from H1 measurements taken at Newbourne. These have been overlaid on an artist's impression of the Milky Way.





H1 Data plotted on galaxy image.

Pulsars, etc.

We had another outing to Laurence's Lab to attempt to detect the pulsar in the Crab Nebula, but picked the one day when the weather broke so had to retreat to shelter due to the heavy rain.

The Crab is now behind the Sun so experiments are postponed to the end of July.

Today's (30 June) outing is to detect Schumann resonance. https://en.wikipedia.org/wiki/Schumann_resonances

And it's raining again.

Noctilucent clouds

Nigel Evans

On 22 June 2021 the BAA Alert service advised of widespread NLC displays - unfortunately Suffolk was under cloud. That night was clear but nothing was seen. Nevertheless it signalled that the NLC season was here.

Last night was promised clear weather and even before it was dark there were signs of NLC activity, not only on the northern horizon but quite high up in the sky as well. Upstairs windows give me a better vantage point for the horizon, but fisheye lenses don't really work well through a window. It was better to set up in the front garden to capture the whole spectacle but then live with the usual urban hazards - the neighbouring houses and the streetlights. A second camera was then employed upstairs, with a narrower Field of View but a better view of the horizon. The resultant collection of stills were then strung together as a pair of videos

Both cameras give pictures with huge number of pixels, about 4200 by 2800. Here I chose to make two different editions of the video, (a) resample the full image down to 1620 x 1080 (b) crop a 1620 x 1080 section of the full frame. The two are then strung together

The smaller file was taken with the 50mm lens. The larger file was sent to our website.

Here is a frame extracted from the video.



Paul Whiting FRAS



NLC 23 June 2021