



OASI News

The newsletter of Orwell Astronomical Society (Ipswich)



First image from the James Web Space Telescopet

Photo by NASA

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

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

Please use the third gate into the school grounds by the gym.

Areas out of Bounds

Access to the Observatory is only via the black door at the foot of the Observatory tower, which leads to the staircase and thence to the spiral staircase up to the Observatory. If the black door is locked, please phone the observatory mobile during meeting hours. Kindly check/amend the number shown on your 2021 membership card.

Please do NOT explore other routes. When in doubt, ask or call the Observatory mobile.

Remember this is a school and straying into the main part of the school where the pupils reside would cause the society big problems and could see us losing the use of the observatory. Any member found to be anywhere other than the approved access route or the observatory area will face serious sanctions up to and including expulsion from OASI.

Please note that access time for all observatory member nights is after 20:15

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 2022

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 on Friday 2 September at 8:00pm via Zoom.

Welcome to new members

Steafan Cavanagh Steve Shapland (re-joined)

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/ljhs9db7lncki4sojo7092vfv%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 20:15	Martin Cook, Roy Gooding	Observatory open
Saturday 30 July 10– 16:00 Christchurch Mansion Soane St, Ipswich, IP4 2BE	Roy Gooding secretary@oasi.org.uk	Public Solar Event Set-up from 08:30
Monday 8 August 19:30	Martin R-H newbourne@oasi.org.uk	OASI at Newbourne
Friday 12 August 20:00 Zoom	Martin Cook membership@oasi.org.uk	Zoom Talk (Recorded) “Colliding Stellar Winds - observations and theory” with Dr Julian Pittard
Thursday 18 August 20:00	Martin Cook membership@oasi.org.uk	3rd Thursday Zoom meeting
Monday 22 August 19:30 Newbourne Village Hall	Martin R-H newbourne@oasi.org.uk	OASI at Newbourne Sky Notes
Friday 2 Sept 20:00 Zoom	Martin Cook membership@oasi.org.uk	OASI Committee meeting via Zoom
Friday 9 Sept 20:00 Zoom	Martin Cook membership@oasi.org.uk	Zoom Talk (Recorded) “Observing the Satellites of the Giant Planets” with Mike Foulkes
Monday 12 Sept 19:30 Newbourne Village Hall	Martin R-H newbourne@oasi.org.uk	OASI at Newbourne
Thursday 15 Sept 20:00 Zoom	Martin Cook membership@oasi.org.uk	3rd Thursday Zoom meeting
Monday 26 Sept 19:30 Newbourne Village Hall	Martin R-H newbourne@oasi.org.uk	OASI at Newbourne Sky Notes

Meetings via Zoom

To join, please first contact Paul Whiting, treasurer@oasi.org.uk – OASI members only. Be sure to install/update to 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.

As well as for some lectures & talks, we meet via Zoom on the 3rd Thursday of every month at 8pm.

OASI @ Newbourne

Martin Richmond-Hardy
newbourne@oasi.org.uk

We meet at Newbourne Village Hall, Mill Lane, IP12 4NP on the 2nd and 4th Mondays from 19:30.

Visitors are welcome but we do ask you to join the Society after two visits.

<http://www.oasi.org.uk/OASI/Membership.php>

Newbourne dates for 2022

August	8	22 (A)
September	12	26 (A)
October	10	24 (A)
November	14	28 (A)
December	12	

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.

Paul Whiting FRAS will give occasional Astro News briefings.

Astronomy Workshops/Informal talks

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.

Athaneum Astro Society

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

Meetings (<http://www.3a.org.uk/programme.htm>) at Whepstead Community Centre, Bury Road, Whepstead, Bury St Edmunds, IP29 4TA <http://www.3a.org.uk/contact.htm>.

LYRA Lowestoft & Yarmouth Regional Astronomers

For events please see <http://www.lyra-astro.co.uk/events/>

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 <https://www.dash-astro.co.uk/Events>

BAA news & webinars

For full details of all meetings or cancellations, please go to <https://britastro.org/meetings/2022>.

The BAA Radio Astronomy Section

BAA Radio Astronomy Section have been enjoying talks, seminars and tutorials via Zoom and are available on the BAA YouTube channel. <https://www.youtube.com/user/britishastronomical/playlists>

BAA RA Section Autumn programme 2022		
Sep. 2nd. 19:30 BST (18:30 UTC)	Dr Helen Russell School of Physics & Astronomy Nottingham University	'An X-ray view of the Universe'
Oct. 7th. 19:30 BST (18:30 UTC)	Dr Samuel Lander Theoretical astrophysicist. Univ. East Anglia. The main focus of research is neutron stars: the collapsed remnants of a normal star's core following a supernova.	All about Magnetars A magnetar is a type of neutron star with a particularly strong magnetic field. This field powers a range of outburst activity, from X-ray and gamma-ray bursts and flares, to the recently discovered fast radio bursts. This talk will survey the observations and give a picture of how a magnetar releases all this energy.

BAA RA Section Autumn programme 2022		
Nov. 4th. 19:30 GMT (19:30 UTC)	Prof. John Richer The Cavendish Laboratory Cambridge Univ. John Richer is an astrophysicist with expertise in the field of star formation, with a particular interest in radio and submillimetre observations of young stars and protostellar systems.	'On ALMA' Atacama Large Millimetre/submillimetre Array ALMA is a submillimetre interferometer at the Chajnantor site in the Atacama Desert at 5100 metres above sea level. The principle research areas are millimetre and submillimetre imaging and spectroscopic observations of star-forming regions in our own Galaxy, in nearby galaxies, and in the very distant universe. These observations provide an unobscured view of the cold universe.
Dec. 2nd. 19:30 GMT (19:30 UTC)	Dr. Emma Chapman Guest star: JWST Royal Society Dorothy Hodgkin fellow based at the University of Nottingham.	Christmas Lecture 'Exploring the Dark Ages of the Universe by Radio' The first stars ever! 400 million years after the big bang. This era has never been observed and constitutes over a billion-year gap in our knowledge.

Radio-astronomy activity

The monthly report from the BAA Radio astronomy section covering solar activity as measured using very low frequency radio, is available from here:

https://britastro.org/section_information_/radio-astronomy-section-overview/current-projects-observations/vlf-archive-reports-2005-2021

The Night Sky in August 2022

Martin RH

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

Times are BST unless otherwise stated.

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		
	31	06:05	19:45		
Moon	1	09:02	22:32		First Quarter 05 August 12:07 Perigee 10 August 18:08 Full Moon 12 August 02:36 Last Quarter 19 August 05:36 Apogee 22 August 22:53 New Moon 27 August 09:17
	31	10:40	21:17		
Mercury	1	06:46	21:23	-0.6	Aphelion 23 August
	31	08:51	20:05	0.4	
Venus	1	03:22	19:36	-3.8	
	31	04:44	19:20	-3.8	
Mars	1	23:54	14:43	0.2	
	31	22:42	14:25	-0.1	
Jupiter	1	22:36	10:58	-2.5	
	31	20:36	08:50	-2.7	
Saturn	1	21:16	06:36	0.4	Opposition 14 August
	31	19:14	04:25	0.3	
Uranus	1	23:45	14:50	5.8	
	31	21:48	12:54	5.7	
Neptune	1	22:12	09:42	7.8	
	31	20:13	07:40	7.8	

Asteroid Vesta reaches opposition on 23 August. Find out how to see it in this observing guide:

<https://www.skyatnightmagazine.com/advice/what-comets-asteroids-in-sky-tonight/>

Occultations during August 2022

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 2022

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
α-Capricornids	July 3 – Aug 15	July 30	20:28 (307°) -9.0°	5	A good proportion of bright, slow-moving colourful meteors. Very favourable
Perseids	July 17 – Aug 24	Aug 13 01:04	03:11 (048°) -21.0°	80+	Rich shower of fast meteors. High proportion of bright events leaving persistent trails. Unfavourable
κ-Cygnids	Aug 3 – 25	Aug 14	18:32 (278°) +53°	5	Slow meteors with occasional bright fireballs. Date of maximum may be as late as August 18. Unfavourable

For radio observation, use reflections from Graves radar on 143.050MHz or the Brams transmitter in Belgium on 49.97MHz and UK GB3MBA on 50.408MHz <https://www.ukmeteorbeacon.org/Home>

See also https://www.popastro.com/main_spa1/meteor/radio-meteor-observing-2020/.

Visible ISS passes ≥15° 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 (mag)	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
25 Aug	-1.6	05:17:20	10°	SSW	05:19:49	19°	SE	05:22:18	10°	E
26 Aug	-1.2	04:29:39	10°	S	04:31:22	13°	SE	04:33:05	10°	ESE
27 Aug	-2.6	05:15:49	10°	SW	05:18:55	35°	SSE	05:22:01	10°	E
28 Aug	-2.2	04:28:43	17°	S	04:30:22	25°	SSE	04:33:13	10°	E
29 Aug	-1.7	03:41:58	18°	SE	03:41:58	18°	SE	03:44:15	10°	E
29 Aug	-3.5	05:14:51	10°	WSW	05:18:08	58°	SSE	05:21:27	10°	E
30 Aug	-3.2	04:28:04	27°	SW	04:29:30	45°	SSE	04:32:43	10°	E
31 Aug	-2.6	03:41:16	32°	SE	03:41:16	32°	SE	03:43:58	10°	E
31 Aug	-3.8	05:14:09	11°	WSW	05:17:24	80°	S	05:20:46	10°	E

Starlink passes

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

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

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>

Images from the James Webb Space Telescope

<https://www.nasa.gov/content/goddard/webb-telescope-image-galleries-from-nasa>



Compare Webb's Mid-Infrared (L) & Near-Infrared (R) views.

The NIRCам view (at right) is Webb's first image released as we begin to [#UnfoldTheUniverse: nasa.gov/webbfirstimages/](https://www.nasa.gov/webbfirstimages/)

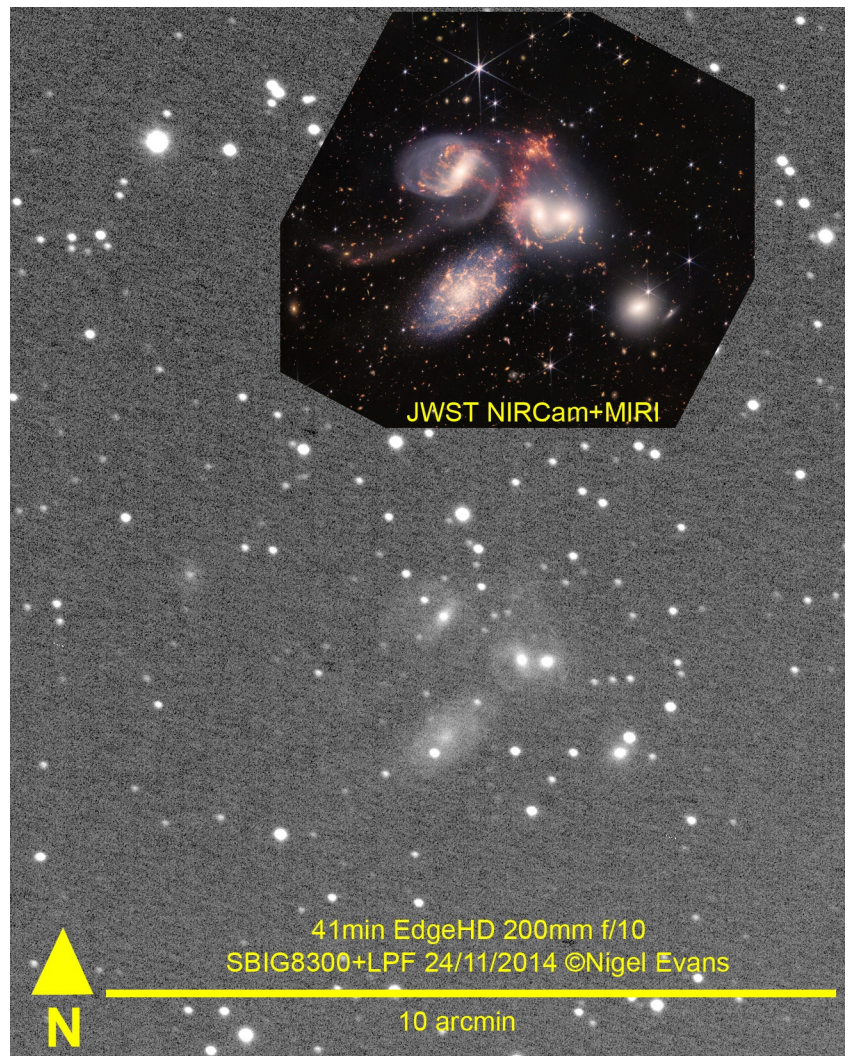
Lens flares? Nope, the spikes you see are when light from bright objects like stars is bent by the edges of the telescope. They're less prominent in mid-infrared.

Source: <https://www.flickr.com/photos/nasawebbtelescope/52212012595/>

Stephan's Quintet

Nigel Evans

We will have now seen the first pictures taken with the JWST. One of the targets was Stephan's Quintet, something I recorded a few years ago. When put side-by-side they don't really compare.



Meteor Reports

Fireball over Hungary

<https://www.meteornews.net/2022/07/16/that-was-close-without-surviving-material/>

At 1:14 a.m. (UT) on July 13, 2022, a fireball rivaling the brightness of the full moon tore through the Hungarian sky. Many people saw the phenomenon despite the early time, as its light cast a shadow in the dark night. In addition to the usual meteorological cameras, Bence Gucsik was lucky enough to catch our guest from space with a video camera. <https://www.youtube.com/watch?v=2yl2ZUxQOec>

Local reports

Martin R-H

July report for my station UK0056 is here:

<https://archive.ukmeteornetwork.co.uk/reports/2022/stations/Kirton/07/index.html>

The brightest meteor recorded this period was an upsilon Andromedid on 8 July at 22:34UT, coming in over Middlesbrough. Estimated mass 0.445g.

The cherry tree on the left has now been pruned!



https://archive.ukmeteornetwork.co.uk/reports/2022/orbits/202207/20220708/20220708_223446.295_UK/index.html

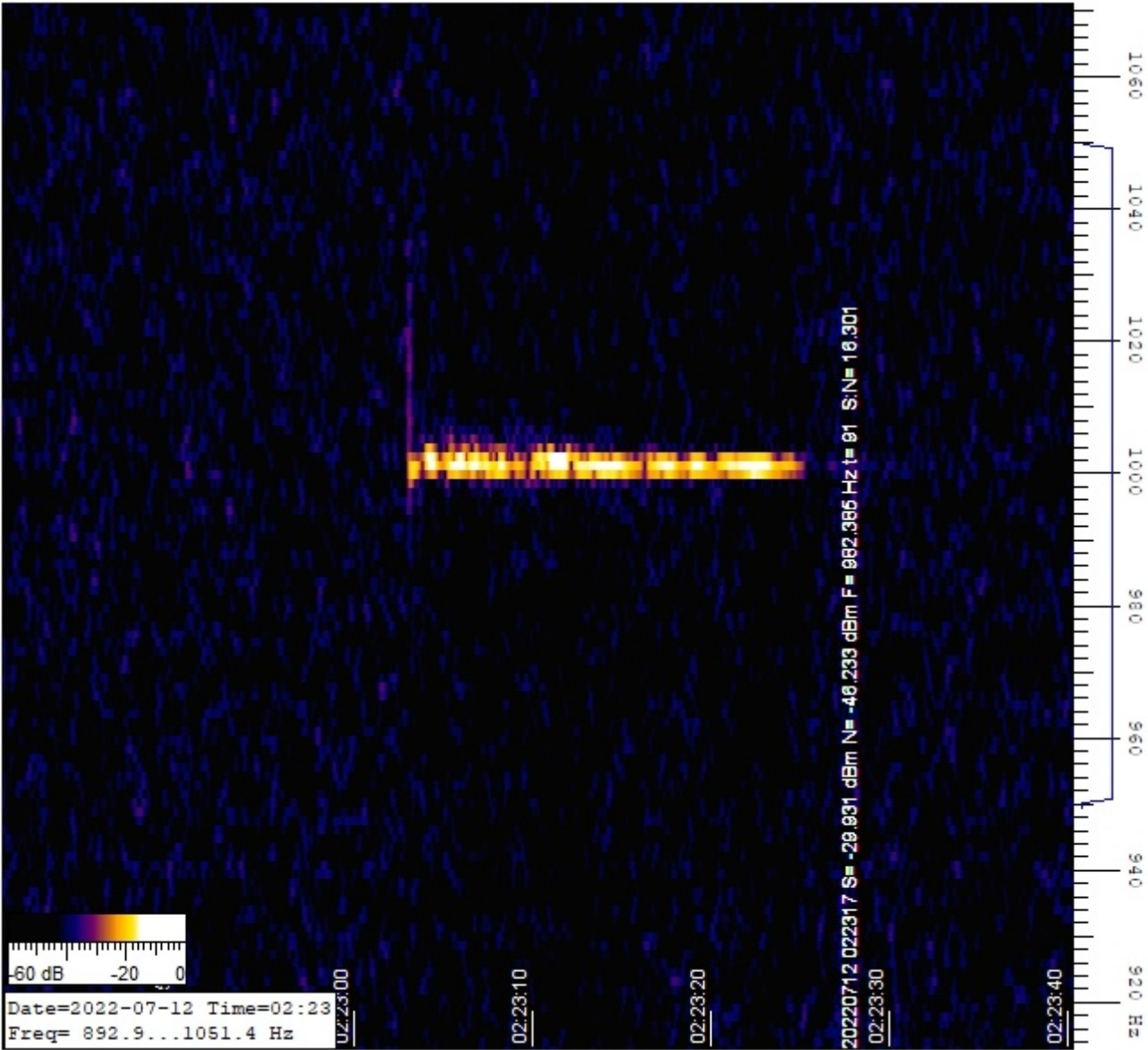
Only one Perseid detected so far in July. My first Perseid on the morning of 26 July.

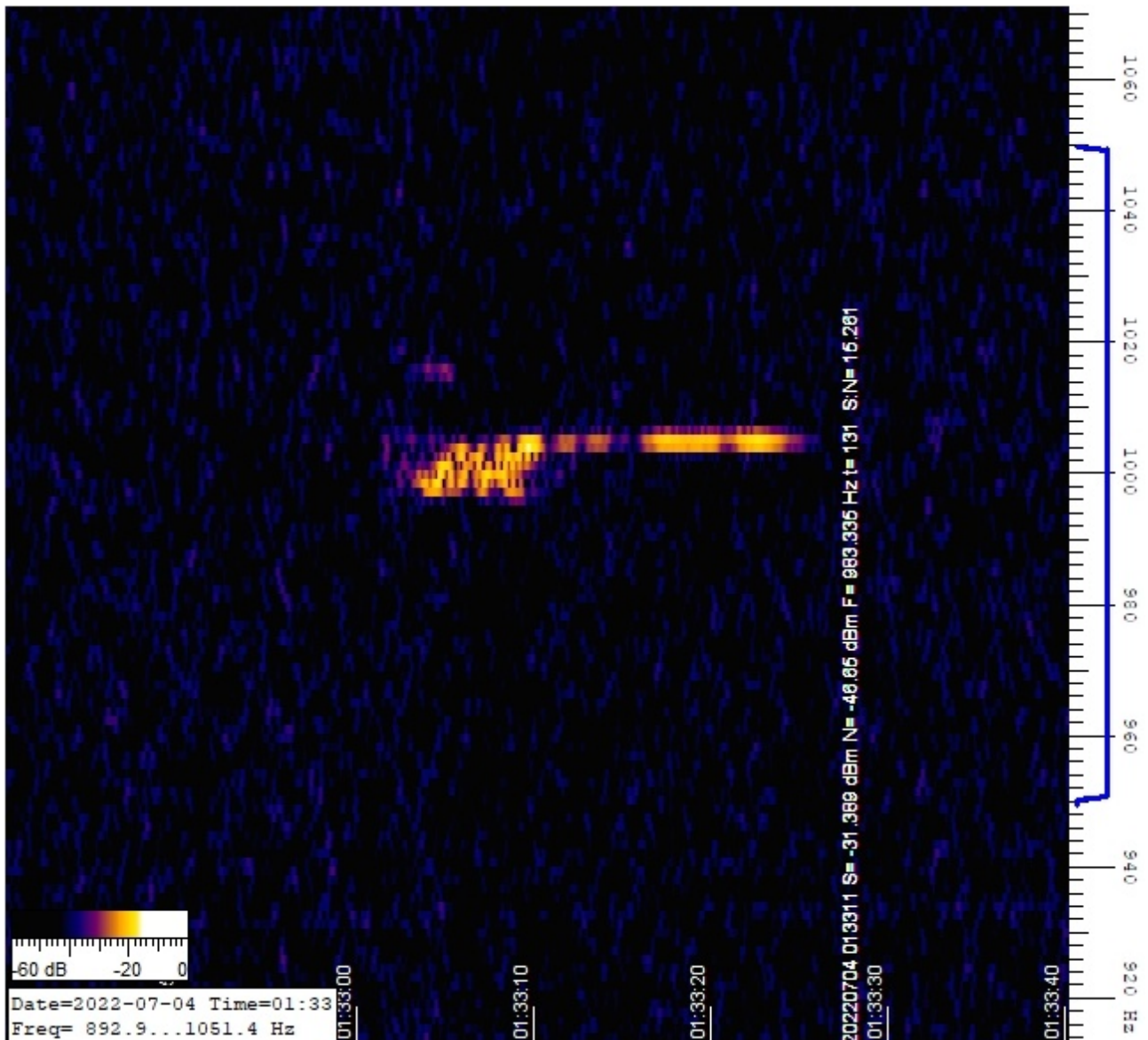
https://archive.ukmeteornetwork.co.uk/reports/2022/orbits/202207/20220726/20220726_004158.153_UK/index.html

August looks more promising with the Perseids and other showers.

Chris Albins

Radio capture on the morning 20220712_022302





One from 4th July

What makes the pings go ping?

Meanwhile you may be interested in an RSGB Convention lecture 2015. [What makes the pings go ping.](#)

Dr John C Worsnop, G4BAO gives his audience a deeper understanding of meteor scatter, including the myths and system issues involved.

<https://www.youtube.com/watch?app=desktop&v=F6lsYaFxJHc>

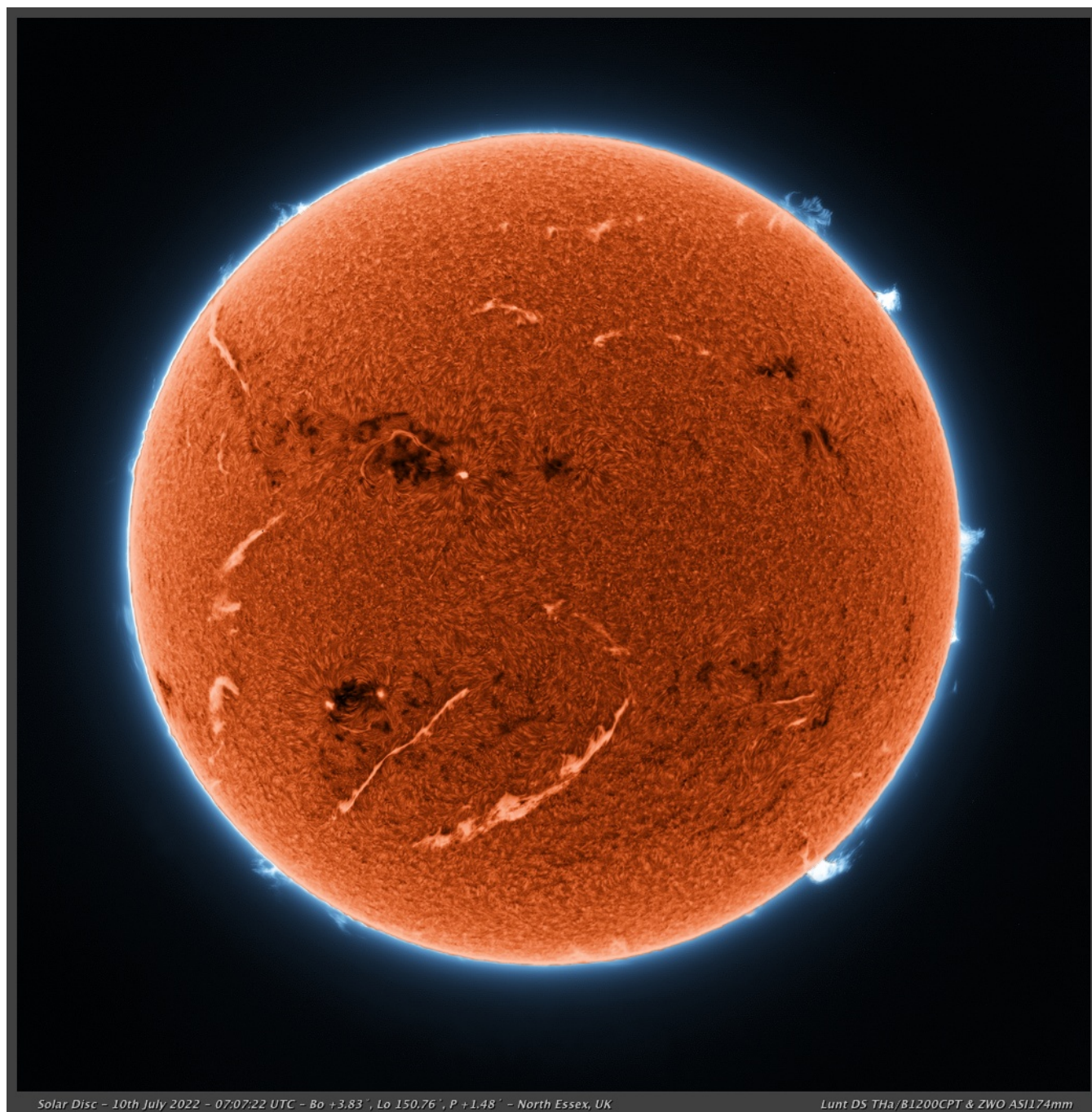
His slides are available here http://www.bravoao.co.uk/g4bao/Files/RSGB2015_G4BAO.pdf

Solar images

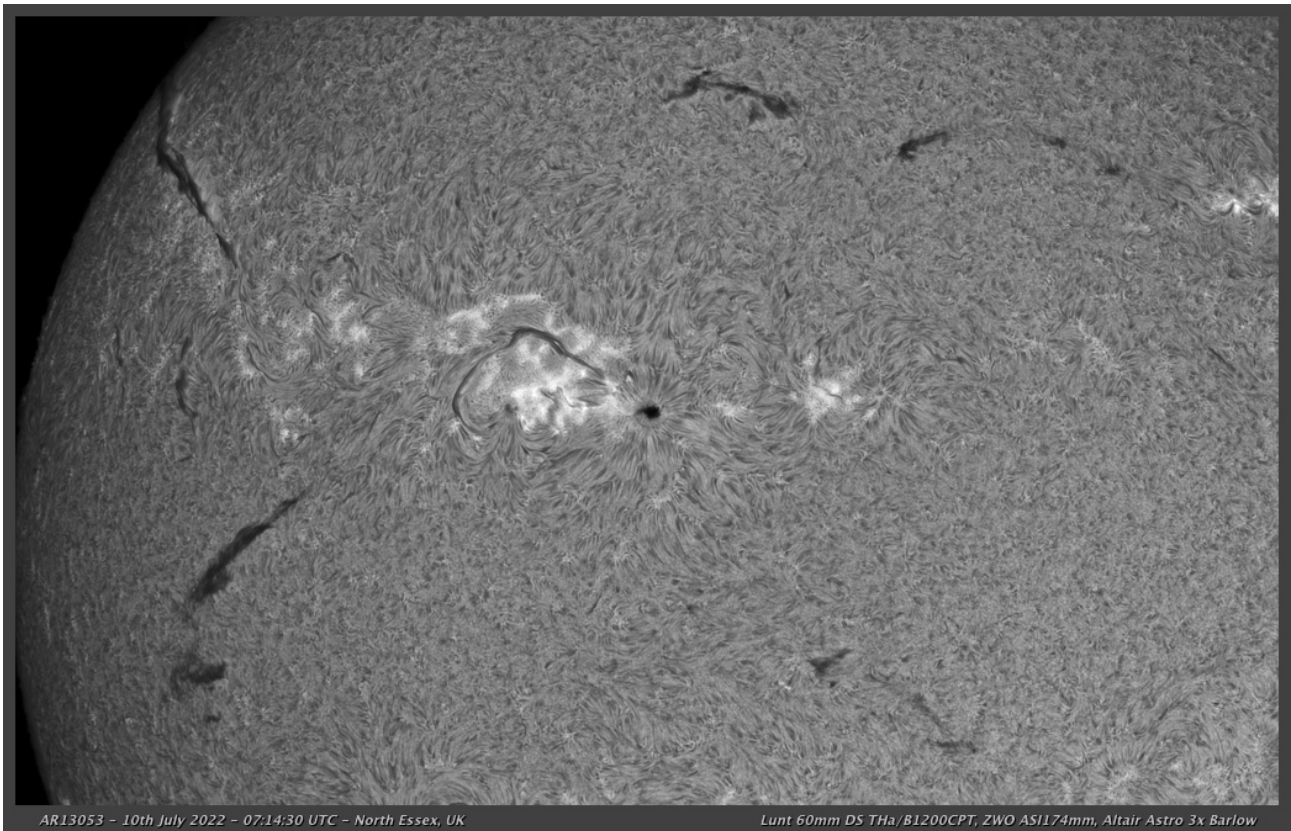
John Hughes

Just a couple of images captured on 10th July.

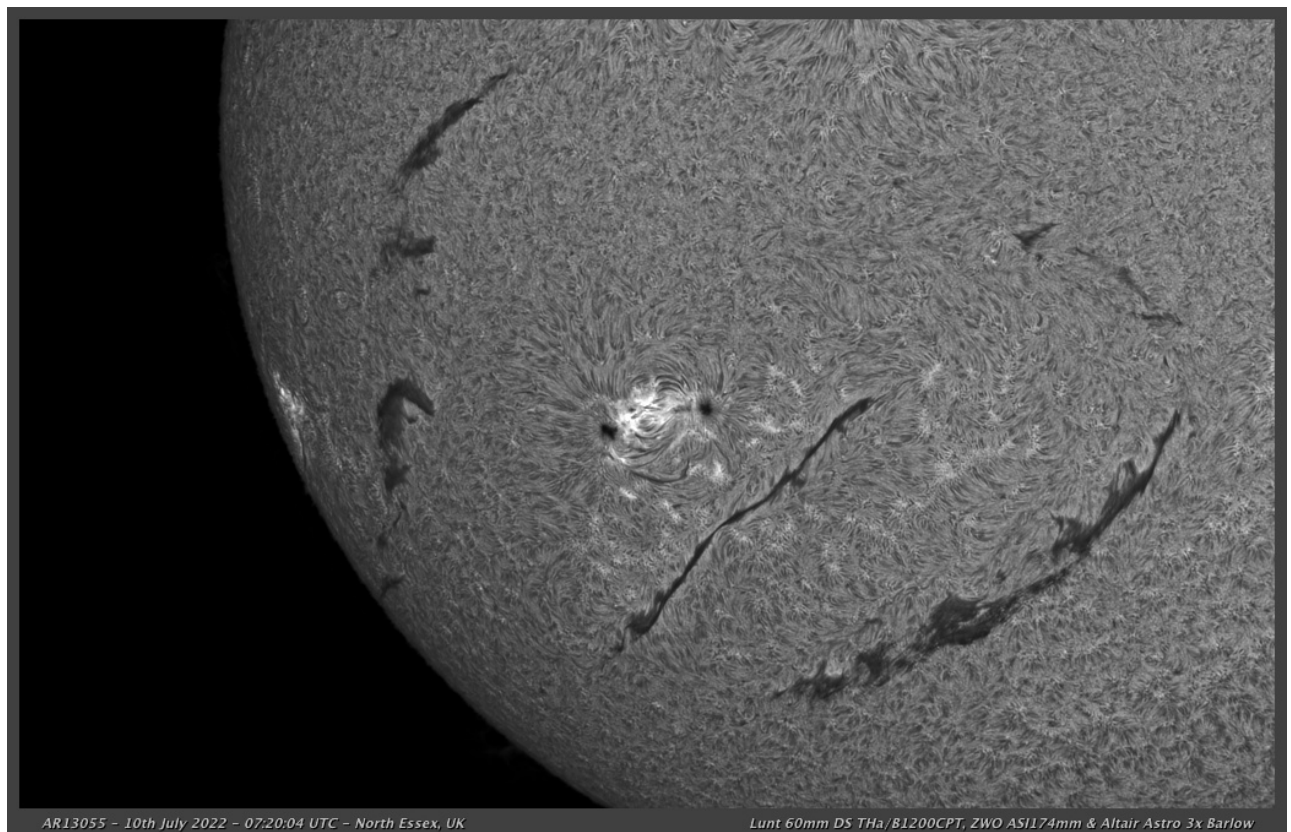
First is the full disc. I am playing around with introducing some colour into my images as will have seen from the last solar disc. The image here is made up of two parts. The first is a 2.5 ms exposure at Gain 100 to capture the detail on the Chromosphere. This image was then inverted using ImPPG and then coloured in Affinity Photo before copying it on to a second over exposed image that captured the proms (and coloured blue). Equipment used was the Lunt 60mm Double Stacked TH α /B1200CPT scope, ZWO ASI174mm with tilt adapter and a Hutech Solar Guider.



The next two images used the above equipment and incorporated the Altair Astro 3x Barlow.
First up is AR13053 on the eastern side of the northern hemisphere.



Next is AR13055 located on the eastern side of the southern hemisphere.



From Earth to Gateway and Beyond

A brief overview from the library.

Andy Willshire

Since December 2017, the United States have embarked upon their Artemis space agenda, which they termed “an international human spaceflight programme.” If all goes well, it will be the first lunar landing since Apollo 17 on 7/12/ 1972 to have a crew on board. This was in fact the last of the Apollo lunar missions. NASA has been working with many partnerships in U.S. Industry to develop deep space living ability and lunar landing techniques. They are also well ahead with plans for ‘Gateway’, a small lunar orbiting space station that will provide communications, habitation for astronauts, storage for robotic equipment and in time maybe a stepping off point for Mars exploration. The elements that will connect together forming the Gateway will be the Power and Propulsion Element (PPE), the Habitation and Logistics Outpost (HALO) and a logistic module. PPE is a sophisticated high power spacecraft with a 60-kilowatt solar electric power unit, that will provide all necessary logistics as well as transfer potential for the Gateway whilst in orbit. HALO will initially be used as the accommodation module by arriving astronauts, as it will afford basic life support, energy provision, control and data handling, as well as thermal management. It also has several docking ports.

The Artemis project, inclusive of the partially reusable Orion spacecraft will be implemented primarily by NASA and U.S. commercial spaceflight contractors, as well as in association with the European Space Agency, which incorporates 22 member states. It will be organised around Space Launch System (SLS) assignments, which will become more complex as the missions continue and are scheduled to be at least a year apart.

This programme is a daring venture into the future, which requires a great deal of support from all members of the enterprise, after all it has been nearly a half century since the last human walked on the surface of the moon. From this point, it has been robotics and A.I. that have wandered around deep space and the odd planet. The design is to firstly land humans on the Moon by at least 2024, which is the earliest date possible to achieve this goal and secondly to maintain continuous lunar exploration in the latter half of the 2020's. In showing that the human race can sustain and expand growth on the lunar surface, it will open the whole enterprise to commercial companies, as well as international associates for further exploration. Care will be required to control this.

The Special Launch system (SLS) is described as a super heavy lift launch vehicle that will be a foundation for the Artemis project. This means that only the SLS is capable of lifting Orion as well as crews and equipment up to the moon, in a single operation. The system has been designed to enable it to be used for further diverse tasks. This will include both human and robotic missions to the Moon and Mars as well as utilising robotic knowledge to visit locations such as the Moon, Mars, Saturn and Jupiter. Thrust for the SLS core stage is with four RS-25 engines, which were used as the Space Shuttle's main engine. It is liquid helium/oxygen fuelled, producing 8.8×10^6 pounds of thrust at liftoff. Supplementary thrust of 85% at liftoff and for a further two minutes will be provided by two solid rocket boosters, which will be fitted to Artemis I & II and possibly to systems beyond.

The first launch is scheduled for the first half of 2022, but this will depend upon its Wet Dress Rehearsal (WDR). During this test, liquid propellants are loaded into the rocket, but at this point, the engines are not ignited. The launch and ground facilities of NASA's Kennedy Space Centre will be used, hopefully once a year by these SLS systems, and in this will replace both Ares I and V as launch vehicles. At present, the Artemis missions have been designed to run from Artemis I to Artemis IV. After Artemis II, it will depend upon other commercial business corporations to support other operations and thus allow the Artemis project to continue.

Block 1 - Initial SLS Configuration

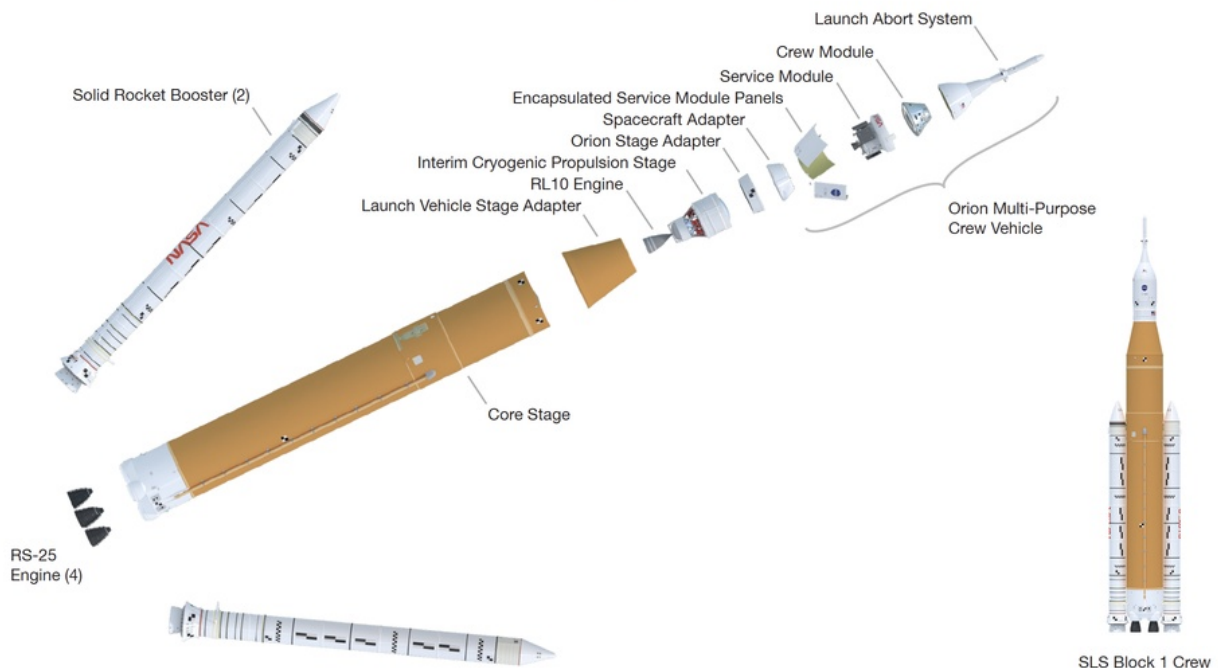


Image credit: [Space Launch System](#) | [NASA](#)

The following is an overview of the future missions:

Artemis I, was initially scheduled for March, but is now to be mid May of 2022, and will be a test without crew. The idea is for Orion to be placed into a lunar orbit and then returned, using the ICPS second stage. Orion will separate from its service module and perform aero braking as it enters the Earth's atmosphere and then parachute down into water.

Artemis II, scheduled for May 2024, will be the first crewed test flight, taking four astronauts, who will be tasked with performing many tests. Orion will be launched by the SLS rocket and execute two orbits circumnavigating Earth and then heading to the Moon. Initially Orion will reach an elliptical orbit of 184 * 2800 km for 90 minutes at which point the rocket's ICPS will thrust the spacecraft into a high-Earth orbit, and the crew will carry out many necessary procedures. A final nudge will push the spacecraft on a track towards the Moon with a lunar free trajectory. Re-entry speed is about 32,000 Km/h and reaching temperatures of 2,200°C.

Artemis III, scheduled for 2025, will put two of the crew onto the lunar surface. This will only occur, if one of the support missions, the Human Landing System (HLS), is in orbit. Orion will dock with the HLS and transfer two crew members. At this point, the HLS will descend to the lunar surface and with the crew will spend 6.5 days in situ. One of these two crew will be the first female to land on the Moon. They will perform at least two surface EVA's in this time, before ascending back into orbit and reunite with Orion, and return to Earth.

Artemis IV, scheduled for March 2026, will send the crew to the Lunar Gateway, using an SLS block 1B. Again, this will only occur if a support mission has delivered the first two Gateway modules to Near rectilinear halo orbit. (NRHO). The Gateway will provide a regular journey stopover for both human and robotic moon expeditions. Because Gateway is in continuous orbit, it will provide a mechanism to increase length of missions as well as practising moving up and down to the lunar surface. This will be invaluable experience for Mars operations. Artemis V is booked for 2027.

Further assignments are under consideration, and will be brought on line when all former Artemis missions have been successful. Habitats, scientific equipment and rovers are only a few of the considerations. Under the Commercial Lunar Payload Services (CLPS), robotic rovers and scientific instruments will be transferred to the moon surface after Artemis I. The Rovers will be designated for the lunar South Pole, mainly to look for commercial products. The CLPS assistance will be an ongoing service for the completion of the Artemis project. Power and Propulsion Element (PPE) and Habitation and Logistics Outpost (HALO) will be the first two gateway modules to be delivered into a Near Rectilinear Halo Orbit (NRHO) using a Falcon Heavy launch vehicle. Both these modules will be carried together.

A section of the Artemis mission is to use Orion, a partially reusable spacecraft, which is effective to support a crew of six further than low Earth orbit. Amongst its equipment, it has an automated docking system, solar panels and reaction control system engines, as well as being designed to fit at the top end of the SLS systems.

In 2029, it is proposed to replace the initial Shuttle derived boosters, with bigger and better, which can be found on the SLS Block II, which is also capable of gaining Low Earth Orbit (LEO). It is also designated for use to send crewed craft to Mars. This is the basic premise of NASA and its partners that after Artemis III, they will be developing protracted lunar missions, and concentrating on missions to Mars. All data obtained from the previous missions will be used to provide answers for future assignments, especially for the safety aspects. This means that the Gateway project will be expanded in both size and capabilities. One aspect of the science being investigated is called LunaNet, a navigation and transmission system. Astronauts/robots being able to talk, issue commands, as well as receive information about their environment in all aspects of lunar investigations will provide the foundations for communications on a Mars trip. Each communication link will be connected to a hub, which will disseminate necessary information back to the links. Gateway will also play a crucial function in simulations at the Moon for Mars missions. Changing lunar operations, by increasing mission times, both in space and on the moon's surface, will simulate astronaut application for the first human excursion to Mars.

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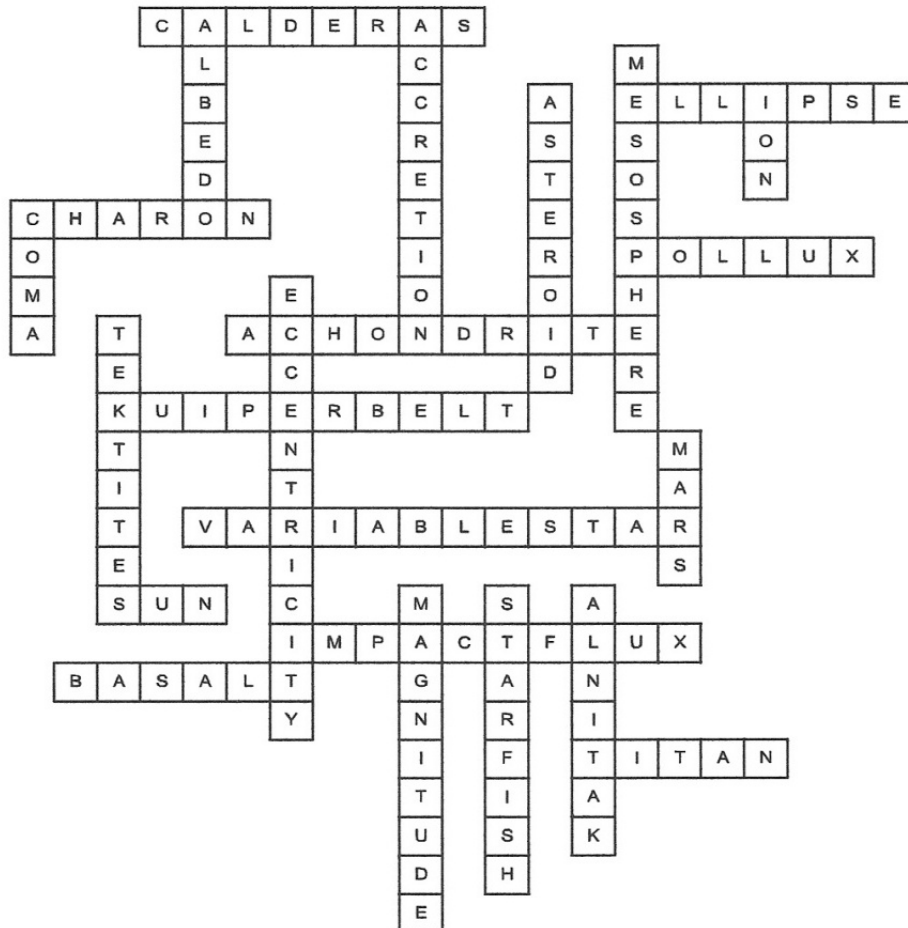
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<https://www.nasa.gov/specials/artemis>

Answers to the Summer Crossword

Astro54

CROSSWORD



Across

- 1 Volcanic craters larger than 1km in diameter.
- 6 Geometric shape that orbits follow.
- 8 Boatman of the dead in Greek mythology
- 9 Brightest star in the constellation of Gemini.
- 12 meteorites that do not contain chondrules.
- 13 Region of the solar system beyond the orbit of Neptune containing many icy bodies.6,4
- 15 Star whose brightness alternates.8,4
- 16 To see this you need a PST.
- 20 Rate at which large planetary bodies are hit by solid objects to cause impact craters.6,4
- 21 A fine grained extrusive igneous rock rich in magnesium and iron.
- 22 Largest of the moons of Saturn.

Down

- 2 Amount of incident light or radiation reflected by a surface.
- 3 Cohesion of matter under the influence of gravity to form larger bodies.
- 4 Layer of earth's atmosphere between the stratosphere and thermosphere.
- 5 Small rocky, metallic body orbiting the Sun.
- 7 Particle, atom or molecule found with a net electric charge.
- 8 Nebulous envelop surrounding a comet's nucleus.
- 10 Deviation of a curve or orbit from circularity.
- 11 Little glassy droplets found at terrestrial impact sites.
- 14 Planet of Phobos and Deimos.
- 17 Degree of brightness of a star.
- 18 Messier 38cluster.
- 19 Zeta Orionis's other name.

The OASI Summer Picnic, July 2022

Photos by Martin Cook

I would like to thank everyone who attended this afternoon's Summer picnic. We were blessed with glorious weather and we enjoyed views of an active Sun through the Solar telescopes.

A big thank you to Pete and Nicky for organising the event.

Andy Gibbs

