No. 583 Registered Charity 271313 November 2021

OASI News

The newsletter of Orwell Astronomical Society (Ipswich)

Melotte 15

Photo by John Hughes

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Society Notices

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

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, 07960 083714 during meeting hours.

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, 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 via Zoom at 8pm on Thursday 25 November.

Please Contact Paul Whiting for Zoom connection details.

Message from the Chairman

Dear Members,

After a long eighteen months, we are glad to be resuming our weekly meetings at Orwell Park Observatory. Our meetings at Newbourne also resumed at the end of July: it was good to meet up, in person after such a long time!

As I mentioned in my email, sent out last week to all members, there are still a couple of measures required to ensure the safety of everybody. Please continue to wear face coverings when indoors at Newbourne and Orwell Park Observatory. We encourage observing and use of telescopes at both sites, but due to the risk of transmission of Covid, we insist that there will be no sharing of eyepieces, (except by members of the same household). There are a good number of eyepieces for members to use at Newbourne and Orwell Park, but it may be a good idea for members to bring their own.

Hopefully, if we stick to these few remaining, simple measures, we will be in a position to lift them in the near future.

Thank you and clear skies!

Andy Gibbs, Chairman

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 20:15	Martin Cook, Roy Gooding	OBSERVATORY OPEN AGAIN!
OASI on Zoom	Paul Whiting	Every 3rd Thursday
1 – 8 Nov		Haw Wood Star Party
Monday 8 Nov 19:30 Newbourne Village Hall	Martin R-H newbourne@oasi.org.uk	OASI @ Newbourne 19:30 meeting opens;
Tuesday 9 Nov 19:00	https://ice.org.uk/events/34th-emesp-prestige-lecture-2021-online	34th EMESP Prestige Lecture 2021: Jodrell Bank: Icon of British Engineering, online.
Monday 22 Nov 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.
Thursday 25 November	Roy Gooding secretary@oasi.org.uk	OASI Committee meeting via Zoom.
Friday 26 November 8pm St Augustine's Church Hall, Bucklesham Road Ipswich IP3 8TJ	Pete Richards lectures@oasi.org.uk	Lecture: Steve Hubbard - "Sideways Astronomy". Also available via Zoom

Date, Time & Location	Contact	Event
Wednesday 8 Dec		Following her recent visit to Orwell Park Observatory and lecture at Orwell Park School, Professor Belinda Wilkes, former Director of Chandra X Ray Observatory, has agreed to present a lecture to OASI via Zoom. *NASA's Chandra X-ray Observatory: Leading A revolution In X-ray (And All) Astronomy.*
Monday 13 Dec 19:30 Newbourne Village Hall	Martin R-H newbourne@oasi.org.uk	OASI @ Newbourne 19:30 meeting opens;
Monday 27 Dec 19:30 Newbourne Village Hall	Martin R-H newbourne@oasi.org.uk	OASI @ Newbourne 19:30 meeting opens;
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/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.

With the resumption of Wednesday meetings at the Nacton observatory, we now meet via Zoom on the 3rd Thursday evening every month 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

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.

Wednesday 8 December 8pm	Lecture via Zoom, Dr Belinda Wilkes, Former Director of Chandra X Ray Observatory: *NASA's Chandra X-ray Observatory: Leading A revolution In X-ray (And All) Astronomy.*

Professor Belinda Wilkes, Royal Society Wolfson Visiting Fellow, School of Physics, University of BristolSenior Astrophysicist & Former Director, Chandra X-ray Center, Smithsonian Astrophysical Observatory, Cambridge MA USA

NASA's Chandra X-ray Observatory was launched on 23 July 1999 by the Space Shuttle Columbia. Now in its 22nd year of operations, Chandra continues to be an indispensable tool for expanding the frontiers of knowledge throughout astrophysics. Chandra's uniquely high (sub-arcsec) spatial, and spectral resolution have facilitated the deepest and sharpest images of the X-ray sky and the highest quality X-ray spectra to date. I will review Chandra's launch and unique capabilities, and take us on a tour of some of the most spectacular discoveries across the whole range of celestial sources from the birth and death of stars, super-massive black holes, clusters of galaxies, dark matter, merging neutron stars and more.

Website: chandra.si.edu

On 26 November we hope to be back at St Augustine's Church Hall, Bucklesham Road, Ipswich IP3 8TJ

Friday 26th November 8pm	Steve Hubbard - "Sideways Astronomy".

You can attend at the hall in person. For this first meeting there will be no refreshments provided. Bring your own if you wish to have some.

We also hope to stream this on Zoom – if you want to watch it live on Zoom please contact the society at: lectures@oasi.org.uk. As we'll be streaming from the hall using the WiFi there we can't promise a high quality Zoom connection but we'll do our best to allow remote attendees to enjoy the talk.

If the Covid situation deteriorates significantly the hall will be cancelled and the meeting delivered on Zoom only.

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 Observing Session will be 3rd October 2021, at Darsham Village Hall Playing Field, between 7:30pm and 10:00pm and is not weather dependent, so if it is unsuitable for observing we will be inside the village hall, where we will have general discussions and help for those in need.

Due to Corona Virus, we hope that all meetings will be face to face in the Village Hall. some covid precautions will still be in place and we will let you know as and when we know.

Our normal format is to have a short talk on a variety of Astronomical subjects as well as general chat email dashastro.info@gmail.com for details, and join in.

Haw Wood "Star Parties"	Monday 1st November to Monday 8th November 2021.
	Thursday 21st April to Thursday 28th April 2022.

As usual, these dates will be blocked out online, so people will need to email or telephone to book.

Stour Astro

https://www.stourastro.org.uk

The club, based in Cavendish, West Suffolk, recommenced monthly meetings on Tuesday October 5 2021.

Cavendish Community Hall, Cavendish, Sudbury CO10 8AG

Haw Wood Star Party

The next Star Party, organised by DASH Astro, will be held Monday 1st – 8th Nov 2021

Please book by phone or email with Haw Wood Farm.

http://www.hawwoodfarm.co.uk/events/astronomers-week-spring-2021/

BAA news & webinars

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

2021

The Daylight Fireball of 20th March 2021		https://www.youtube.com/watch?v=BV2UJCAAJ3s
BAA Autumn Webinar		Stellar wind bow shock https://www.youtube.com/watch?v=34pH5tChzkY
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

BAA RAG Zoom Conference Meetings Archive https://britastro.org/node/25798

Oct 16th 10:00 – 17:00 BST	BAA RAG21 day conference. Key note speakers: Prof Ian McHardy, Prof Ian McHardy School of Physics & Astronomy, University of Southamp-

	ton. 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. https://britastro.org/node/26294 The event was recorded and is now available on the BAA YouTube channel https://youtu.be/Rp50ZgPLmN4
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 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'

Extreme Stellar Environments

Simon at Bath Astronomers has sent the following information.

An afternoon of "Extreme Stellar Environments" is yours on the afternoon of Saturday 13th November comprising 4 online talks on this theme from respected astronomy professionals focussing on their specific interests from supernovae, neutron stars, zombie stars to black holes. Guiding us through this journey of cataclysm and atom wrenching adventure is Dr Robert Massey, Deputy Executive Director of the Royal Astronomical Society.

Organised jointly by Bath Astronomers, Bristol Astronomical Society, and Cardiff Astronomical Society, this free Zoom event runs from 1:30pm to 5:30pm and is open to all. It just requires you to register your place in advance to avoid the disappointment of your name not being down. Simply visit https://www.eventbrite.co.uk/e/extreme-stellar-environments-tickets-169977235487 to secure your spot.

The talks are as follows:

Supernovae by Dr Philip Wiseman, Southampton University

Supernovae are the explosive ends to stars' lives and are some of the most powerful and energetic events in the Universe. Despite having been observed by humans at least as long ago as the 11th Century, it is only in the last few decades that we have begun to discover the true diversity of stellar deaths that pervade the night sky. In this talk I will outline the different routes to forming a supernova and how those differences change their appearance. I'll describe the process of observing supernovae on a mass scale, and will highlight how this has led to some of the strangest and unexplained phenomena still puzzling astronomers today.

Stellar Black holes by Dr Vivien Raymond, Cardiff University

Black holes are some of the strangest, most puzzling objects in the Universe. They deform space and time to extremes, and for the longest time could only be observed indirectly via their effect on their environment. However, we are now capable of listening to the very space-time deformation they produce. In this talk I will present how we study those invisible objects with gravitational-wave observatories, and what we can learn from them.

How we study neutron stars by Dr Diego Alamarino, Southampton University

Neutron Stars are the most compact objects in the Universe where we can still see a surface. They are tiny 30km diameter spheres lost in the immense sky. So how is it that astronomers are able to study them? In this talk I will summarize some of the techniques used to study those Neutron Stars that interact with their nearby environments

The extreme physics of zombie stars by Professor Nils Andersson, Southampton University

A neutron star is born when a massive star runs out of nuclear fuel and dies in a supernova explosion. The object that emerges when the dust settles – effectively a zombie star – involves physics at the extremes of our understanding (and beyond). In this talk, I will explain how we are using astrophysical observations (both electromagnetic and through gravitational waves) to explore this physics and make progress on a range of challenging questions.

Martin Baker

Webmaster Federation of Astronomical Societies

From the Interweb

Online lecture about Jodrell Bank

Tuesday 9 November 2021 7:00pm The IET (Institution of Engineering and Technology) and ICE (Institution of Civil Engineers) are running an online lecture about Jodrell Bank:

"This talk will explore the development of the science and engineering at Jodrell Bank, from its early days, through the building of the Lovell Telescope, to the present day. It will describe the unique elements that, in the words of UNESCO, give the site 'Outstanding Universal Value' and justified its inscription, in 2019, as a World Heritage Site."

You don't have to be a member of the above to join this. Follow the links from here:

https://communities.theiet.org/communities/events/item/168/10/27813

A Dunlap Institute astronomer has discovered that our solar system may be surrounded by what she describes as a magnetic tunnel that can be seen in radio waves.

Dr. Jennifer West, Research Associate at the Dunlap Institute for Astronomy and Astrophysics, is making a scientific case that two bright structures that are seen on opposite sides of the sky – previously considered to be separate – are actually connected and are made of rope-like filaments. This connection forms what looks like a tunnel around our solar system.

http://www.dunlap.utoronto.ca/astronomer-discovers-tunnel-like-structure-may-surround-earth/

Radio noises from the sky

https://youtu.be/e-ysQHQu8h8

The Night Sky in November

Martin RH

All event times UTC 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	06:50	16:26		
	30	07:40	15:48		
Moon	1	01:46	15:33		New Moon 04 November 21:15 First quarter 11 November 12:46 Full Moon 19 November 08:58 Last quarter 27 November 12:28
	30	02:02	14:07		
Mercury	1	05:13	16:02	-0.8	Superior conjunction 29 Nov.
	30	07:53	15:36	-1.1	
Venus	1	11:36	18:09	-4.3	
	30	11:11	18:19	-4.5	
Mars	1	06:07	16:07	1.7	
	30	06:07	14:53	1.6	
Jupiter	1	14:12	23:29	-2.3	
	30	12:23	21:51	-2.2	
Saturn	1	13:36	22:01	0.6	
	30	11:46	20:17	0.7	
Uranus	1	16:30	07:15	5.7	Opposition 4 Nov.
	30	14:33	05:14	5.7	
Neptune	1	15:02	02:14	7.8	
	30	13:08	00:18	7.9	

Occultations during November 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 November 2021

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

Shower	Normal limits	Max-imum	Max RA/Dec.°	ZHR at Max	Notes
Orionids	Oct 6 –Nov 7	Oct 22	06:24 (096°) +15.7°	20	Fast meteors, many with persistent trains. Flat maximum, with several sub-peaks.. Good in 2007. Unfavourable.
Northern Taurids	Oct 20 – Dec 10	Nov 12	03:57 (059°) +22.3°	5	Northern branch of the Taurid complex. Slow meteors. Very favourable.
Leonids	Nov 6 – 30	Nov 18	10:17 (154°) +21.4°	15	Very fast meteors, many with persistent trains. Unfavourable
α-Monocerotids	Nov 15 – 25	Nov 21	07:48 (117°) +0.9°	7	Occasional ver short-lived outbursts, most recently in 1995 and possibly 2016. Unfavourable.

For radio observation, use reflections from Graves radar on 143.050MHz or the Brams transmitter in Belgium on 49.97MHz. 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 until 31 Oct.. Predictions are approximate (26 Sept) 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 Nov	-0.7	03:40:21	16°	E	03:40:21	16°	E	03:41:12	10°	E
01 Nov	-3.8	05:13:19	35°	W	05:14:37	85°	S	05:18:00	10°	E
02 Nov	-3.1	04:27:57	55°	E	04:27:57	55°	E	04:30:41	10°	E
02 Nov	-3.3	06:00:55	11°	W	06:04:03	54°	SSW	06:07:20	10°	ESE
03 Nov	-0.7	03:42:34	16°	E	03:42:34	16°	E	03:43:21	10°	E
03 Nov	-3.7	05:15:33	36°	W	05:16:45	66°	SSW	05:20:06	10°	ESE
04 Nov	-3	04:30:11	50°	ESE	04:30:11	50°	ESE	04:32:48	10°	ESE
04 Nov	-2.5	06:03:09	11°	W	06:06:00	31°	SSW	06:09:00	10°	SE
05 Nov	-0.6	03:44:50	15°	E	03:44:50	15°	E	03:45:28	10°	E
05 Nov	-3.1	05:17:49	32°	WSW	05:18:45	41°	SSW	05:21:56	10°	SE
06 Nov	-2.5	04:32:30	36°	SE	04:32:30	36°	SE	04:34:46	10°	ESE
06 Nov	-1.7	06:05:36	10°	WSW	06:07:46	16°	SW	06:09:54	10°	S
07 Nov	-2.2	05:20:14	22°	SW	05:20:35	22°	SSW	05:23:15	10°	SSE
08 Nov	-1.6	04:35:01	19°	SSE	04:35:01	19°	SSE	04:36:20	10°	SE
20 Nov	-1.6	18:14:29	10°	SSW	18:15:57	18°	S	18:15:57	18°	S
21 Nov	-1.7	17:27:43	10°	S	17:29:51	16°	SE	17:30:30	15°	SE
21 Nov	-0.8	19:02:49	10°	WSW	19:03:29	15°	SW	19:03:29	15°	SW

Date	Bright –ness (mag)	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
22 Nov	-2.6	18:15:29	10°	SW	18:17:58	35°	S	18:17:58	35°	S
23 Nov	-2.5	17:28:15	10°	SSW	17:31:15	30°	SSE	17:32:24	24°	ESE
23 Nov	-0.9	19:04:25	10°	WSW	19:05:21	17°	WSW	19:05:21	17°	WSW
24 Nov	-2	16:41:11	10°	SSW	16:43:52	22°	SE	16:46:33	10°	E
24 Nov	-3.2	18:16:55	10°	WSW	18:19:44	54°	SW	18:19:44	54°	SW
25 Nov	-3.4	17:29:28	10°	WSW	17:32:47	52°	SSE	17:34:05	31°	E
25 Nov	-0.8	19:06:07	10°	W	19:07:02	17°	W	19:07:02	17°	W
26 Nov	-2.9	16:42:06	10°	SW	16:45:18	40°	SSE	16:48:24	11°	E
26 Nov	-3.2	18:18:33	10°	W	18:21:21	58°	WSW	18:21:21	58°	WSW
27 Nov	-3.7	17:30:59	10°	WSW	17:34:23	77°	S	17:35:39	35°	E
27 Nov	-0.7	19:07:47	10°	W	19:08:36	16°	W	19:08:36	16°	W
28 Nov	-3.5	16:43:28	10°	WSW	16:46:49	65°	SSE	16:49:57	12°	E
28 Nov	-3	18:20:12	10°	W	18:22:54	53°	W	18:22:54	53°	W
29 Nov	-3.8	17:32:36	10°	W	17:36:00	87°	S	17:37:12	38°	E
29 Nov	-0.6	19:09:25	10°	W	19:10:09	15°	W	19:10:09	15°	W
30 Nov	-3.7	16:45:01	10°	W	16:48:24	84°	S	16:51:31	12°	E
30 Nov	-2.9	18:21:49	10°	W	18:24:29	49°	WSW	18:24:29	49°	WSW

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.

8P Tuttle Brightness 9.0 but angular separation from the Sun reducing during the 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

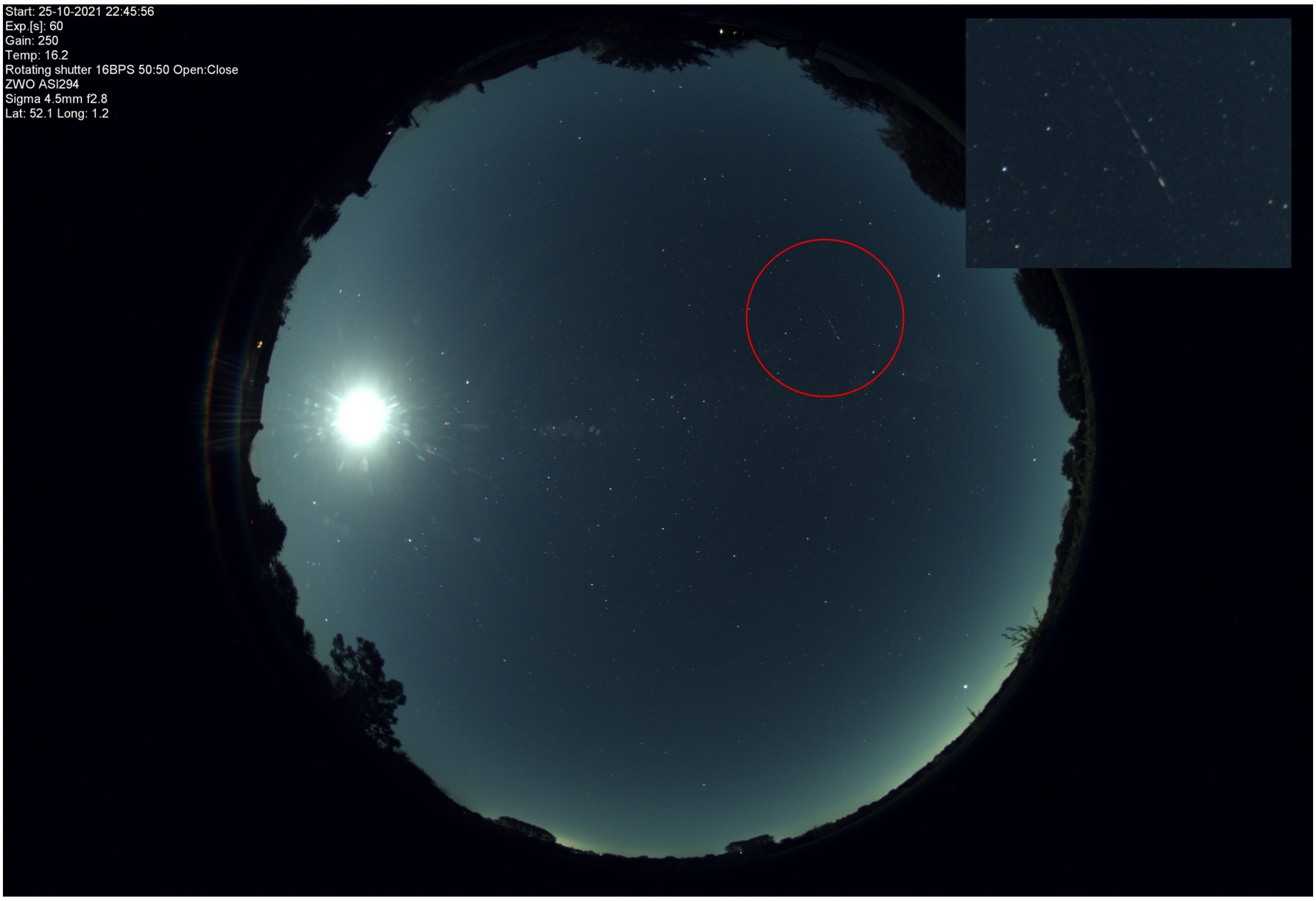
All-Sky camera reports

Alan Smith, James Appleton, Chris Albins and MartinRH

Fireball 25 Oct 22:45

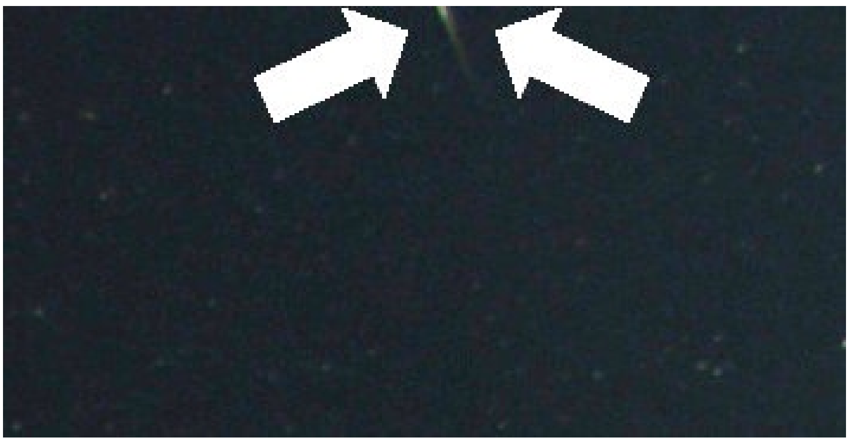
Alan Smith

Got this faint one on the allsky and just caught it on my new, north facing video camera. Also imaged by UKMON at Blakeney (Norfolk) and Searby (Lincs).



James Appleton

I only just caught that one: if you zoom into the frame between the annotation arrows, you can just see the end of the trail!



2021-10-25 224650 UT

Usual parameters:

- Filename is end time of frame, UT.
- Location: 52.05371°N, 1.21210°E, 42m above MSL.
- ZWO ASI178mc.
- Fujinon fish-eye lens, CF2.7HA-L1, 1:1.8, 2.7mm.
- 30s exposure.
- Gain 100 (possibly turned down a little too low by the new automatic gain control system – I shall revise the parameters).

Chris Albins captured a nice video of this meteor trail.

Martin Richmond-Hardy

My Allsky system[1] managed to capture a good view of this meteor in spite of the bright Moon.

- Location: 52:00:36N 1:19:20E, 20m above MSL.
- ZWO ASI120MM (monochrome).
- Wide angle lens 2.1mm focal length
- 19.04s exposure.
- Gain 50

James is planning on doing the triangulation calculations on these three images to locate the meteor path on a map.

1 OASI News June 2021 page 22.

2021-10-25 22:46:51 UT

I also captured some star trails on 13 Oct.

Grace Cook Primary School

Bill Barton FRAS

The school, to be named after local astronomer, Alice Grace Cook, is on Fuller Way in Stowmarket and is due to open in September 2022.

For notes on Alice Grace Cook (1877-1958) see http://www.oasi.org.uk/History/Cook/Cook.php

Radio Aurorae

Dr Geoffrey H. Grayer (geoffgrayer@gmail.com), Deputy Director, BAA Aurora Section

I have been given the responsibility of collecting radio observations of aurorae for the BAA. This has not been a significant part of the Aurora Section up to now, so I will outline why it is significant, and how to make such observations.

Auroral displays occur because of high energy electrons ionising the atmosphere down to around 100 km, which we recognise as the E-region (formerly the Kennelly-Heaviside layer). This is the region from which radio reflections take place, because of the peak in ionisation at this level.

Because these reflections can be detected during daylight and when the night sky is cloudy, they have the advantage of giving us a much more complete picture of auroral activity. In addition, those in the south of Britain, who rarely see a visible aurora, can contribute, as aurorae can be detected by radio as far north as the Faroe Islands. As they can be observed before visual observation is possible, this can also give an alert for visual aurorae.

There are also questions to be answered. Reports have been made of Radio Aurorae without visual observations, and vice versa. It would be nice to understand if and why these occur.

So how to make these observations. You will need a radio receiver covering the appropriate frequencies (SSB/CW mode, not FM), and a suitable antenna (directional, typically a multi-element yagi), pointing north, as high and as clear as possible. Auroral reflections are strongest from 30 to 150 MHz (10m to 2m), and have been detected up to 900 MHz, but very weak. My suggestion is to use one of the amateur radio bands, because the receiving equipment is plentiful and relatively cheap, the antennas also easily obtainable, and there are reliable beacons on those bands to monitor. The reflections are strongest on the 50 and 70 MHz bands (6m and 4m), but most of my observations have been on the 144 MHz (2m) band. This has the advantage of smaller and hence higher gain antennas, and is perhaps less subject to the interference from computers and suchlike, which is a real problem these days.

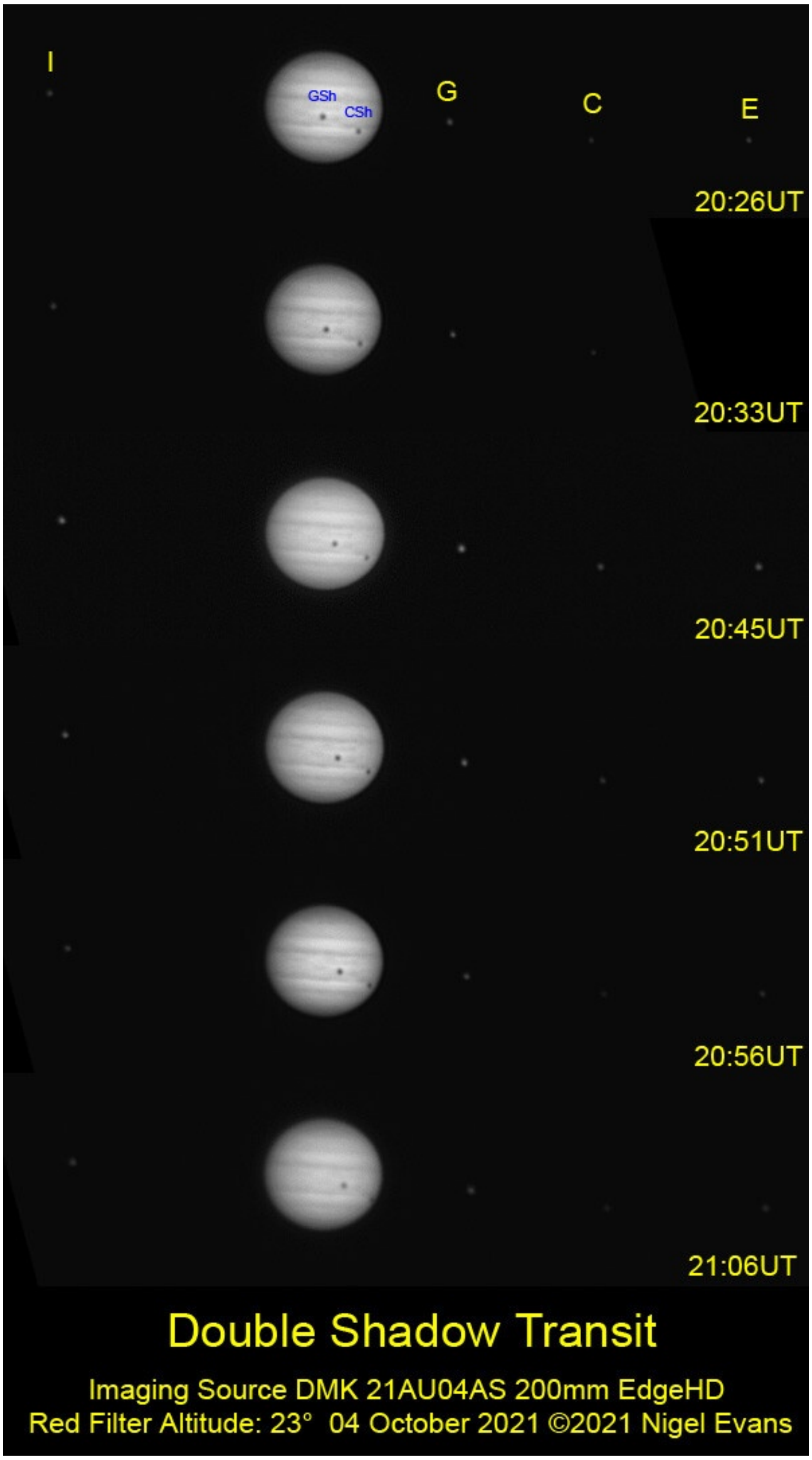
You will need to tune to a beacon to the north, such as GM3ANG (Angus); lists are available on-line. These generally emit an unmodulated keyed signal, so you need to listen in CW or SSB mode. An aurora will result in a significant increase in signal strength, but this is not the only indication. The signal will sound like a hiss, quite unmistakable from other causes of increase. This is due to Doppler shift from the rapidly moving electrons. Now record the time, and immediately email the Director of the Aurora Section, through whom all reports should be channelled.

I realise this must leave many questions to be answered; it is only intended as an introduction. I will try and answer as many questions as I can, but please first do a little reading yourself. I recommend you refer to the *VHF/UHF DX* Book (ed. I.F. White), now free to download. My Chapter 2 contains a section on Auroral Propagation, and you will also find a lot of information about radio equipment and antennas, written in the 1990s, but much still applicable. If you wish to know yet more, I refer you to *Radio Auroras* by C. Newton, published by and available from the RSGB.

Double shadow transit involving Callisto and Ganymede

Nigel Evans

Last night a fairly rare event occurred - a double shadow transit involving Callisto and Ganymede (as highlighted in 'Sky at Night' mag Oct 2021)



The shadow of Callisto was already on Jupiter when that of Ganymede joined at Callisto 18:53UT. Unfortunately it was cloudy. I also had an appointment elsewhere which meant I could not look again until around 20:15UT. By now it was much clearer, but there was still banks of cloud around in the south. I was able to follow the motion of both satellites until Callisto's shadow was not obviously on the disk. I finished at around 21:06UT even though predictions gave an end time of 21:22UT

Jupiter was around 46 arcsec across and 23 degrees high the whole time. My scope does not clear the lower edge of the observatory slit – not normally an issue as I do not usually look so low down. My planetary camera is also rather ancient with a resolution of around 0.5 arcsec (reviewed in 2008) but I don't think that it was big problem as the seeing could be best described as 'wobbly'.

Well, I am pleased with the result – I have some way to go before I knock Damian Peach off his perch!

Melotte 15

John Hughes

Melotte 15 is an open star cluster located in the heart of the Heart Nebula (IC1805).

It is relatively 'new' being some 1.5 million years young and the stellar wind from its stars have sculpted the dust clouds seen in this image.

Melotte 15 is approximately 7,500 light years away located in the constellation, Cassiopeia.

This image was captured in narrowband using Hydrogen alpha, Oxygen 3 and Sulphur 2 filters from the iTelescope remote observatory in Nerpio, Spain.

I have been subscribing now to iTelescope for just over a year and use the service when the skies here are poor and I need an 'imaging fix' as well as to capture pictures of deep sky objects with equipment that I can only dream about.

Despite Nerpio being a dark sky site and noted for its clear nights, I wasn't so lucky with the weather on this occasion. Initially I set an imaging sequence to run from one night in early October but each time the weather was so poor the sequence was automatically rescheduled for the next available night. This continued night after night as we headed towards a full Moon. Thankfully the weather finally broke and I was able to gather 2 hours of data for each channel.

As for the equipment used, I have listed this below. Whilst Mel 15 is observable from my garden in Manningtree, I wanted a closer view which my 4 inch refractor and 8 inch RCT cannot provide;

Equipment

12" Planewave Corrected Dall-Kirkham Astrograph.

SBIG-STXL-6303E camera

Paramount PME mount.

iTelescope provide the sub-frames already calibrated with darks, flats and bias frames, however, this data needed a lot of help as the camera sensor had significant column defects which the calibration did not remove. Fortunately, PixInsight has two great scripts for identifying, locating and removing these defects and a bit of clone stamp finished the job.

Processing

Below is a summary of my workflow for this image;

- First, I needed to deal with the column defects arising from the camera sensor. I used ImageIntegration to stack each channel to create a single linear image. The idea here is to ensure the defects are aligned so that they can easily be detected in the next process. Usually, you would align the stars then stack but this would actually move the defects around which we want to avoid.
- The script LinearDefectDetection is then run on each stacked image and this generates a text file with the X and Y co-ordinates of the defects.
- Next LinearPatternSubtraction is used. The text file generated above is loaded into this script and applied to all the subs. This removes the defects.
- CosmeticCorrection was applied to all the subs to remove hot and cold pixels.
- SubframeSelector is then run on all the subs to identify the 'best' sub from each channel. I use a formula that works this out based on FWHM, SNR and Eccentricity.
- All the subs are then registered to each other using StarAlignment. The best sub frame from the Ha channel is used as the reference image.
- The registered files from each channel are then stacked using ImageIntegration and referenced against the best image from each channel. At this point I now have a master Ha, O3 and S2 images.
- DynamicCrop is applied to remove stacking artifacts around the edges of each master.
- The masters were relatively gradient free so I just applied AutomaticBackgroundExtraction as a quick and easy way to subtract any residual gradients.
- StarAlignment – applied again to align the O3 and S2 masters with the Ha master.
- LinearFit – applied to O3 and S2 masters and referenced against the Ha master which is the brighter of the three images.
- A clone of the Ha master was made to create a 'Luminance' master.
- Deconvolution was then applied to the Luminance master.
- RangeSelection was used to generate a mask to protect the background of the Luminance master whilst contrast was introduced into the gaseous region using HDRMultiscaleTransform. The mask was then removed and the script DarkStructureEnhance was applied to bring out the darker areas.
- TGVDenoise was applied to the Luminance master. To protect the gaseous areas a mask was created by generating a clone of the Luminance image using HistogramTransformation it was stretched applying a 15% clip to the black point and raising the brightness by adjusting the mid-tones.
- Once denoised the Luminance master was stretched using HistogramTransformation without clipping the black point.
- Finally, the Luminance channel was sharpened using MultiscaleLinearTransform.
- Back to the Ha, O3 and S2 channels. TGVDenoise was applied as described above.
- Each master was then stretched using HistrogramTransformation.
- The three masters were then combined using Pixelmath. In the Red channel I used 80% S2 + 20% Ha, Green channel was 100% Ha and for Blue I used 90% O3 and 10% Ha. This generated a RGB colour image.
- A clone of the RGB image was generated and using HistogramTransformation I clipped the black point again and raised the mid-tones to brighten the nebulous regions.
- Using the ColourMask script I then generated Green, Red and Cyan colour masks from the brightened clone RGB image. Doing it this way helps ensure that the colour masks capture as much detail as possible.
- Using StarNet, I removed the stars from the RGB master and ensured I selected 'Create Star Mask' so I could add the stars back later. This produced a starless image.

- Each mask was applied in turn to the starless image and using CurvesTransformation I reduced the Green channel and raised the Red and Blue to produce the golden hue. Saturation was also applied. A curves adjustment was also made to brighten the gaseous areas and reduce the background brightness.
- The stars were then put back into the starless RGB image using Pixelmath.
- Convolution was then used to slightly blur the RGB image. This also helped denoise it as well.
- Using LRGBCombination the Luminance channel was added to the RGB image to bring out the detail.
- The LRGB image still had a slight Magenta hue in the stars. To remove this, I inverted the image which caused the inverted stars to turn Green. SCNR was then applied to remove the Green colour and the image inverted back to its normal LRGB state.
- Noise reduction was then applied using MultiscaleLinearTransform with a RangeSelection mask applied to protect the gaseous region, then a few tweaks using CurveTransformation were made.
- Finally, the Resample process was used to reduce the image size and CloneStamp applied to remove any remaining signs of the sensor defects. Using the Crop process allowed me to add a border and then a description was added on to the border using Annotation.
- A beer or two followed.

To Boldly Go with BepiColombo (Updated)

We have arrived at Mercury

Article from the Library: Andy Willshere

On the 20th October 2018 at 0145 hrs UTC (Coordinated Universal Time) , Ariane Flight VA245 was launched from the Guiana Space Centre (launch complex 3), taking with it BepiColombo, a space mission to Mercury, with a total payload mass of 4241 kilograms, which included the payload adapter. The Ariane 5 Rocket is a two stage dispensable system that has a height of 50.5 m and a diameter of 5.4m. It has two solid rocket boosters with two alternatives, one that can carry a payload over 10 metric tons to a geostationary transfer orbit (GTO) and one that can carry a payload of over 20 metric tons to low Earth orbit.

This is a joint mission involving the European Space Agency and the Japanese Aerospace Exploration agency. The Mission was named after Giuseppe Columbo (1920-1984) who was a polymath at the University of Padua in Italy. He came up with the idea of interplanetary gravity assist manoeuvres which were used in the Mariner 10 mission with great effect, and are now in common usage. He also discovered that the axial rotation period of Mercury is equal to 2/3 of its revolution time around the sun.

Separation occurred 26 minutes and 47 seconds after launch putting the probe into a Mercury transfer orbit. It left Earth at 3.475 km/sec and will be expected to be seized by Mercury and proceed into orbiting on the 5th December 2025. This will be the culmination of seven years travel which will include flybys of both Earth in 2020 and Venus in 2020 and 2021. In total there will be nine gravity assists, the last six being past mercury between 2021 and 2025. The Earth flyby has performed a gravity assist manoeuvre for the probe, and guided it towards Venus. This method can either increase or decrease speed and if necessary change direction. To increase speed the craft operates with the motion of the planet, and in doing so gains a small portion of the planet's orbital energy. The converse is necessary if the craft is required to reduce speed, meaning that it will have to fly against the planet's motion, allocating a small portion of its orbital energy to the planet. The flybys at Venus reduce the perihelion distance to almost that of Mercury and the six Mercury flybys reduce the relative velocity to 1.76 km/s. The craft will be situated in a similar orbit to Mercury after the fourth flyby and remain co-linked. When finally approaching Mercury, there will be separation of the transfer module, which will be seized by Mercury's gravity so that it will continue in polar orbit around the planet. Thrusters will be manipulated until the required polar orbit has been established, and an operating distance of between 590km at perihelion and 11640km at aphelion, above Mercury's surface has been achieved. At this point the MPO will be separated and again using thrusters be stabilized to its own orbit between 480 to 1500 km. Manipulation and tuning will occur for a further three months and if all well, the experiments can begin.

So where are we now? As I write, on the 2nd October 2021, last evening at approximately 11:34 UTC BepiColombo made its first of six flybys of Mercury. (see Flight schedule}. This was at a height of 199km from Mercury's surface with basic photography being recorded. Although BepiColombo has high resolution science cameras on board, these cannot be used as they are stowed away in the spacecraft tower. The cameras that recorded this event were monitoring cameras situated on the exterior of the ship. Although with reduced quality, the black and white pictures will be good enough for scientists to view well known surface aspects. They are also hoping to put some of these photo's together to form a little video. It will not be until December of 2025 that the craft will go into orbit around Mercury. It may be of interest that this craft is only the third to visit Mercury. Mariner 10, a NASA project, flew by Mercury three times and the NASA MESSENGER orbited the planet for just over 4 years. It was launched on August 3 2004 and entered orbit on March 11 2011. It continued with its scientific projects until April 30 2015, when it plunged into the planet having used up all of its propellant. One of its finest images was the mosaic of our own solar system minus Uranus and Neptune.

The main objectives of the mission are:

(I) Investigate the origin and evolution of Mercury, especially as its parent star is close by.

(ii) Investigate the geological formation both internally and externally, and its exosphere.

(iii) Study its magnetosphere in all aspects and the source of its magnetic field.

(iv) Measure several limitations of the parameterized post-Newtonian formalism. This is a method of calculating Einstein's gravity equations in expressions of the lowest-order divergence from Newton's law of universal gravitation, and enabling approximations in the case of weak fields to Einstein's equations.

Artist's impression of BepiColombo fairing release. *Credit: ESA/ATG medialab*

BepiColombo is made up of three segments that during the launch and flight to mercury will stay fixed to each other. These segments are known as the MTM or Mercury Transfer Model, the MPO or Mercury Planetary Orbiter and the MMO(Mio), which is the Mercury Magnetospheric Orbiter. The latter when released into Mercury orbit will be controlled by Usuda Deep Space Center which is situated in Nagano, Japan. The dimensions of the MPO are 2.4*2.2*1.7m and the MMO(Mio) is 1.8*1.1m. The 5th December 2025 will be the point at which the Mio and MPO satellites will disconnect and will independently monitor Mercury for a year, with a possibility of a further year. During this time the scientific instruments will be gathering information.

The Mercury Transfer Module (MTM) can be found at the base of the three segmented pile. It is designed to carry the two other modules to Mercury and then continue to back them up during the project. Its main propulsion is solar electric, which is a combination of solar cells and ion drive. This system allows for a high precise impetus, and has four QinetiQ T6 ion thrusters.

The MPO is multi-functional, and will be able to chart Mercury's topography, as well as obtaining data concerning the construction of the surface and its make-up. It may also be able to obtain a sense of the interior of the planet.

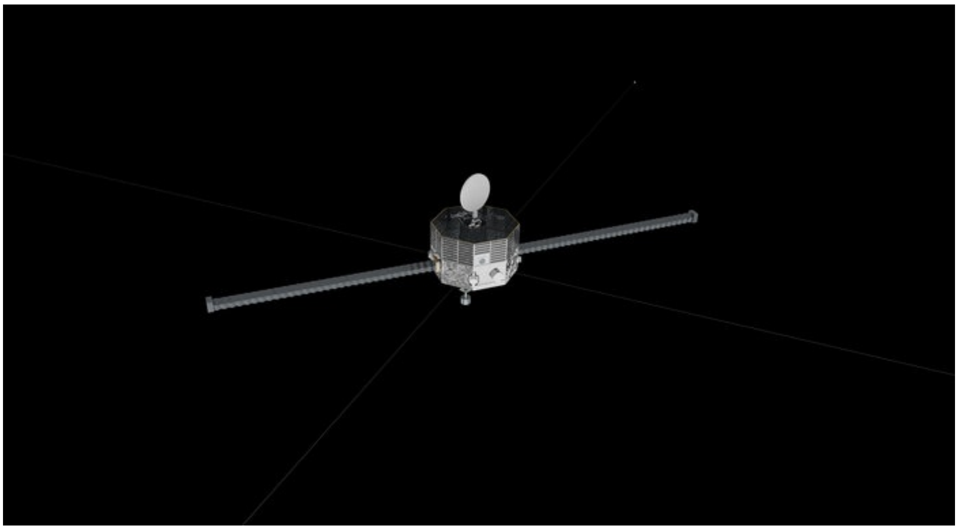
The Mercury Planetary Orbiter(MPO) has a mass of 1,150kg. It is capable of generating 1000 watts using its solar array. It carries with it 11 instruments:

BELA	Laser altimeter
ISA	Italian spring accelerometer
MPO-MAG	Magnetic field Investigation
MERTIS	Mercury radiometer/thermal imaging spectrometer
MGNS	Mercury Gamma-ray and neutron spectrometer
MIXS	Mercury Imaging X-ray Spectrometer
MORE	Mercury Orbiter Radio science Experiment
PHEBUS	Probing of Hermean Exosphere by Ultraviolet Spectroscopy
SERENA	Search for Exosphere Refilling and Emitted Neutral Abundances
SIMBIO_SYS	Spectrometers and Imagers for MPO BepiColombo Integrated Observatory
SIXS	Solar Intensity X-ray and particle Spectrometer

MIXS will be able to study Mercury's elemental surface constituents, which will fundamentally change our knowledge of the planet's surface.

The Mercury Magnetosphere Orbiter (MIO) is shaped like a prism with eight sides. It has a total mass of 330 Kg which includes its scientific payload. This is a group of five science instruments. It is a spin stabilized module at 15 r.p.m. as well as a spin axis vertical to the equator of Mercury. The five science instruments are:

Mercury Magnetometer (MMO-MAG)	Provide scientific detail of Mercury's magnetosphere.
Mercury Plasma Particle Experiment (MPPE)	7 sensors study energetic particles and plasma in the magnetosphere. Also solar wind investigation.
Mercury Plasma Wave Instrument (PWI)	Analysis of electric fields as well as plasma and radio waves.
Mercury Sodium Atmosphere Spectral Imager (MSASI)	Sodium analysis in the exosphere.
Mercury Dust Monitor (MDM)	Analysis of interplanetary dust around Mercury.



Picture credit:
https://www.esa.int/spaceinimages/Images/2017/04/Mercury_Magnetospheric_Orbiter_top_view
MIO is set up to study Mercury's exterior, down to its core as well as its magnetic field.

Flight schedule for BepiColombo which will take 7.2 years.

20/10/2018	Earth launch
06/o4/2020	Earth flyby
12/10/2020	First Venus flyby
11/08/2021	Second Venus flyby
02/10/2021	First Mercury flyby
23/06/2022	Second Mercury flyby
20/06/2023	Third Mercury flyby
05/09/2024	Fourth Mercury flyby
02/12/2024	Fifth Mercury flyby
09/01/2025	Sixth Mercury flyby
05/12/2025	Mercury Orbit
14/03/2026	MPO in final science orbit
01/05/2026	Mission completed
01/05/2027	Completed if extended

Data obtained from: https://en.wikipedia.org/wiki/BepiColombo

Point of interest:

In the planning phase of the project, a Mercury Surface Element (MSE) was proposed. This entailed a 44kg disc shaped landing vehicle operating for approximately one week on the surface of the planet assessing data. Carrying a spectrometer, magnetometer and a seismometer as well as facility to dig into the surface, this would have been a really exciting project. However due to financial constraints this part of the project was cancelled in 2003.

References:

https://danspace77.com/2018/10/18/ariane-5-to-launch-bepicolombo-to-mercury/

https://simple.wikipedia.org/wiki/NASA

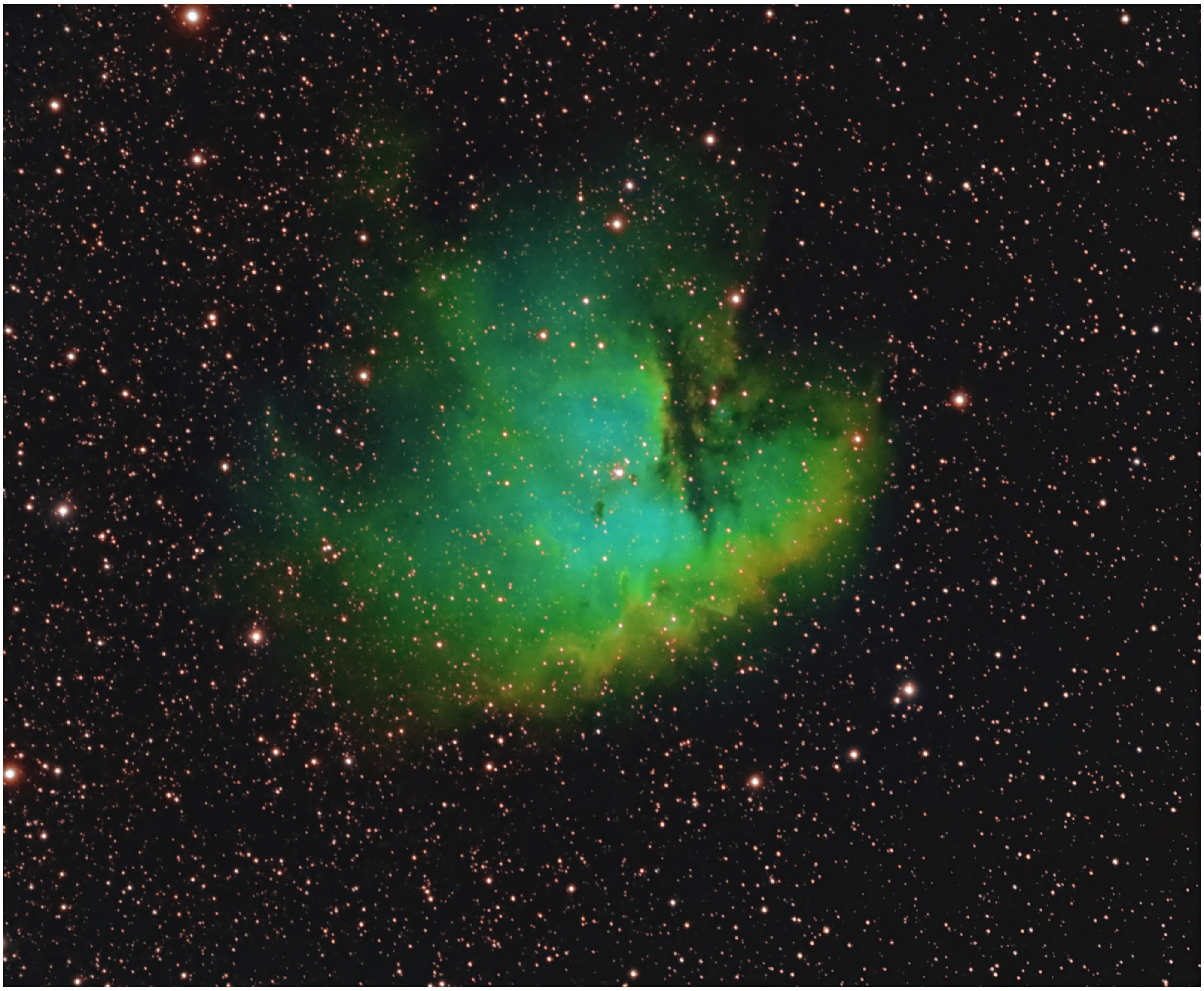
https://en.wikipedia.org/wiki/BepiColombo

sci.esa.int/bepicolombo/

www.esa.int/Our_Activities/Space_Science/BepiColombo/Mercury_Planetary_Orbiter

NGC281

Andy Gibbs



The weather gods have played ball over the last week, we have mainly cloudy days, but clear nights! This enabled me to image NGC281 on the evenings of 28 and 29 October.

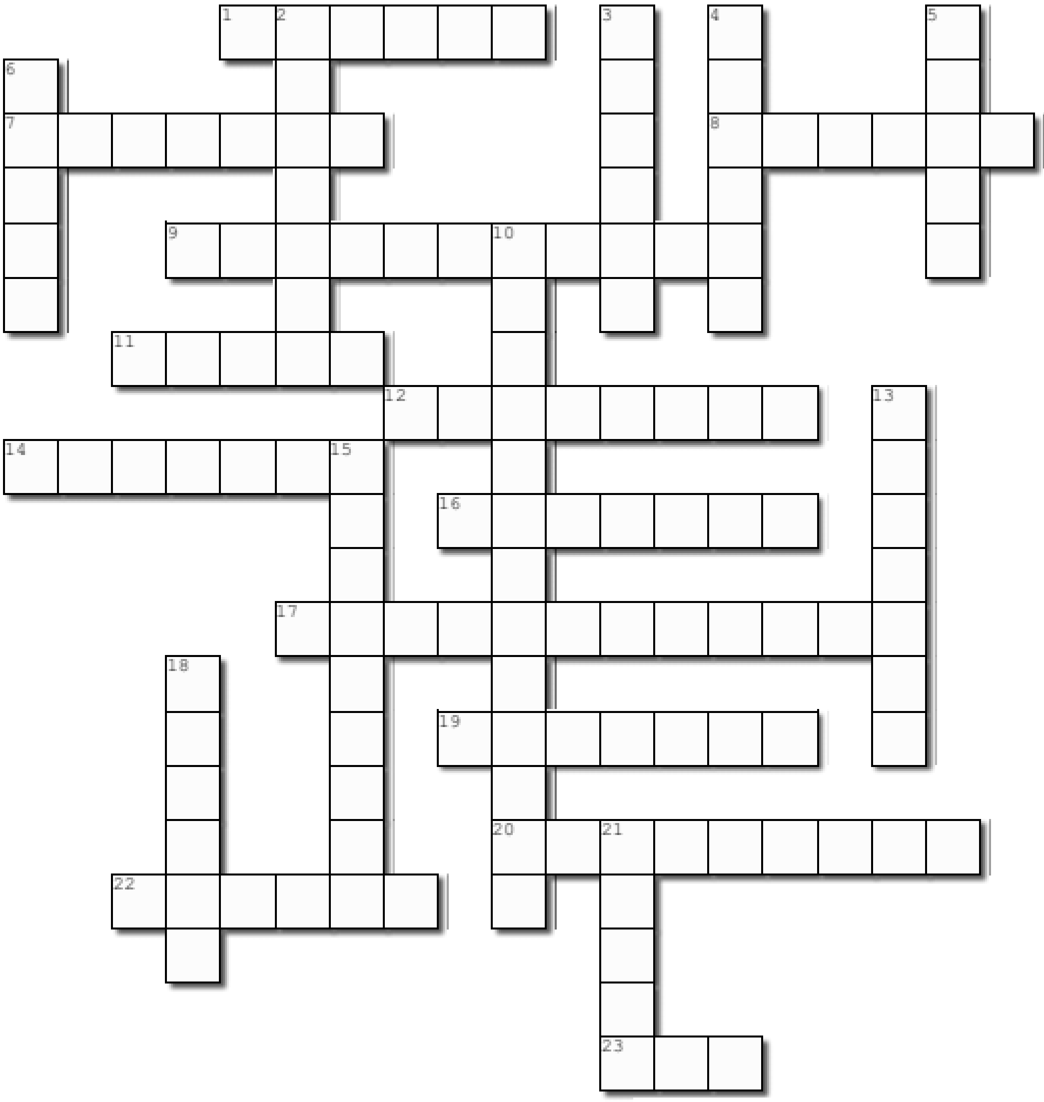
I captured 12x 480 second frames in Hydrogen alpha, Sulphur II and Oxygen III, plus dark, flat and bias frames. I used the Hubble palette when processing the final image.

Equipment used: Atik One 6.0 camera, Explore Scientific ED80 CF refractor, HEQ5 Mount. Controlled by a PrimaluceLab Eagle 3.

Software used: Sequence Generator Pro and Affinity Photo.

Crossword

Complete the crossword puzzle below



Created using the Crossword Maker on TheTeachersCorner.net

Across

1. Telescopic support vane
7. discovered the rings of Saturn
8. rapidly rotating magnetized neutron star
9. Visible 'surface'of the sun
11. One of Saturns moons
12. Jupiter's moon named after a Trojan prince
14. George ....Airy. Seventh Astronomer Royal
16. Your weight on this planet is 38% of weight on Earth
17. Angular velocity of a star across the sky (6-6)
19. Eye piece crosshairs
20. Saturn moon that may hold an ocean of liquid water
22. Outer solar atmosphere
23. Closest star to earth

Down

2. One of the Shepherd moons
3. discovered Ariel, satellite of Uranus
4. best known for his laws on planetary motion
5. Lunar stage cycle
6. hypothetical protoplanet that struck earth to form Moon
10. first craft to flyby Saturn (7-6)
13. fairy queen of Uranus
15. Wobbling motion of our moon
18. retrograde moon of Neptune
21. largest asteroid in Solar system (dwarf planet)