No. 557 Registered Charity 271313 **September 2019**

OASI News

The newsletter of the Orwell Astronomical Society

NGC 7000 – North American Nebula

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

Society Contact details

Observatory (meeting nights only) 07960 083714

Email queries: info@oasi.org.uk

Facebook: https://www.facebook.com/groups/445056098989371/

Twitter: @OASIpswich

The OASI Facebook pages are proving very popular. Several non-members are active contributors.

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

news@oasi.org.uk

Other contact details will be issued to members on a separate printed list.

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. Please send them to

news@oasi.org.uk

The CLOSING date is the 15th day of the month

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 now 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 2019

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
	Martin Richmond-Hardy	Newsletter, OASI @ Newbourne
	John Wainwright	Equipment curator
	Mike Whybray	Astronomy Workshops, Child protection officer, Orwell Park School Astronomy Club.
	Andy Wilshere	Librarian

Signing in and out

Please ensure you sign in and out when visiting the Observatory and/or Newbourne. This is for fire safety precautions and also provides an historic record.

Next Committee Meeting

Friday 6 September 2019, 8pm at Horley Spiritualist Church, 345 London Rd, Ipswich IP2 0BG

OASI and BAA Events

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

Subscribe to the OASI Yahoo group by emailing oasi-subscribe@yahoogroups.com

Key:

OASI public events *BAA events* *Other events*

Date, Time & Location	Contact	Event
Weekly, every Wednesday, 20:15–22:00 Orwell Park Observatory	Martin Cook, Roy Gooding	General observation (weather permitting) using a variety of telescopes. Entry via the third gate left. NOT the main gate
Fri 6 Sept		*BAA Autumn Weekend meeting*
Sunday 8 Sept 10:30 – 16:00	Roy Gooding secretary@oasi.org.uk	**Public access event. Solar observing at Bentley Village Families Day. Booking not necessary.** Bentley Village Playing Field. (Case Lane)
Monday 9 Sept from 19:00 Newbourne Village Hall	Martin Richmond-Hardy newbourne@oasi.org.uk	OASI @ Newbourne.
Sat 14 Sept Institute of Astronomy, Cambridge	http://fedastro.org.uk/fas/fas-convention-agm-2019/	FAS Convention & AGM
Fri 20 Sept 20:00 St Augustine's Church Hall	Peter Richards lectures@oasi.org.uk	**Lecture.** "Monsters in the Dark: Searching for the Most Massive Galaxies in the Universe." Dr Matthew Bothwell. University of Cambridge.
Mon 23 Sept from 19:00 Newbourne Village Hall	Martin Richmond-Hardy newbourne@oasi.org.uk	OASI @ Newbourne. 19:30 Sky notes Bookswap

Date, Time & Location	Contact	Event
Fri–Sat 27–28 Sept 19:30 – 22:00 OPS	Andy Gibbs chairman@oasi.org.uk	**Observatory Open Evenings**
28-29th Sept	http://las-skycamp.org	*Kelling Heath Autumn Star Party*
Sat 5 Oct		*BAA Back to Basics workshop*
Sat 12 October		*BAA Observers' Workshop*
Monday 14 Oct from 19:00 Newbourne Village Hall	Martin Richmond-Hardy newbourne@oasi.org.uk	OASI @ Newbourne.
Fri 18 Oct 20:00 St Augustine's Church Hall	Peter Richards lectures@oasi.org.uk	Lecture. "Pulsars and our understanding of the cosmos" Dr Robert Ferdman. University of East Anglia.
October 16 @ 7:00 pm - October 27 @ 7:00 pm The Longshed, Woodbridge	https://www.woodbridgeriversidetrust.org/event/going-with-the-flow-tides-and-the-deben-estuary/	**Going with the flow – tides and the Deben estuary'** "Time and Tide" Paul Whiting, Orwell Astronomical Society Ipswich will talk about gravity and its effects on tides and time, concentrating on the cause and types of tides, moving on to cover gravity tides in the solar system and galaxies, ending up with black holes and gravity waves 19 October 2pm 22 October 2pm for accompanied children 7-11 "How we got a moon and how we can't live without it" Dan Clery, science writer 20 October 2pm
Sun 27 Oct Bawdsey Radar Museum	Paul Whiting, FRAS treasurer@oasi.org.uk	**Bawdsey Astronomy Day**
Monday 28 Oct from 19:00 Newbourne Village Hall	Martin Richmond-Hardy newbourne@oasi.org.uk	OASI @ Newbourne. 19:30 Sky notes 19:45 Workshop: Bill Barton FRAS 'Observing Transits of Mercury' Bookswap
28 Oct–4 Nov		*Haw Wood Autumn Star Party*
Wed 30 Oct		*BAA AGM*
Mon 11 Nov		Transit of Mercury. First contact 12:35 UTC

Date, Time & Location	Contact	Event
Monday 11 Nov from 19:00 Newbourne Village Hall	Martin Richmond-Hardy newbourne@oasi.org.uk	OASI @ Newbourne.
Fri/Sat 15/16 Nov. Stoneleigh Park, Coventry CV8 2LH	https://www.ukastroshow.com	*International Astronomy Show*
Fri 15 Nov 20:00 St Augustine's Church Hall	Peter Richards lectures@oasi.org.uk	Lecture. "Neighbours - An Introduction to the Local Group". Dr Nick Hewitt. British Astronomical Association.
Sun 17 Nov, 05:30 TBC	James Appleton info@oasi.org.uk	Field trip to observe graze of ZC1128. More info.
Monday 25 Nov from 19:00 Newbourne VH	Martin Richmond-Hardy newbourne@oasi.org.uk	OASI @ Newbourne. 19:30 Sky notes Bookswap
Monday 9 Dec from 19:00 Newbourne VH	Martin Richmond-Hardy newbourne@oasi.org.uk	OASI @ Newbourne.
Fri 20 Dec 2019, 04:30	James Appleton info@oasi.org.uk	Field trip to observe graze of ZC1840. More info.
Monday 23 Dec from 19:00 Newbourne VH	Martin Richmond-Hardy newbourne@oasi.org.uk	OASI @ Newbourne. 19:30 Sky notes Bookswap

OASI @ Newbourne

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).

OASI @ Newbourne is a good place to start for beginners. If you are thinking of buying a scope or binoculars, come and try before you buy and talk to owners about the strengths and weaknesses of particular models. If you've already splashed the cash, bring your new scope along to use or for advice on setting-up and adjustment. All welcome, with or without telescopes. We would like visitors to join OASI to enjoy the full benefits of membership.

There are also **Stargazers' Guide (Sky Notes), Astronomy Workshops and the Book Swap.**

OASI@Newbourne Meetings

9 Sept	23 Sept (S+B)	14 Oct	28 Oct (S+B)
11 Nov	25 Nov (S+B)	9 Dec	23 Dec (S+B)

We open up for all meetings at 7pm. Star Guide (S) at 7:30pm and Workshops (W) at 7:45pm. B = Book Swap night (see below).

Stargazer's Guide

On the last meeting each month Bill Barton FRAS will give a short presentation of what can be viewed in the following 4 weeks plus a reminder of OASI events.

Astronomy Workshops/Informal talks

Contact Mike Whybray **Location: Newbourne Village Hall IP12 4NP**

Doors open at 7:00pm. **Workshops start at 7:45pm**

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!

Given a clear night, we can make use of the field for a workshop or continue afterwards with some observing.

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

28 October Bill Barton FRAS, "Observing Transits of Mercury"

Lecture Meetings

Contact: Peter Richards lectures@oasi.org.uk

We have an exciting and interesting set of lectures by guest speakers for the Autumn.

There is a new venue for lectures this year which is:

St Augustine's Church Hall
Bucklesham Road
Ipswich IP3 8TH.

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

OASI Guest Speaker Lectures

20th September	"Monsters in the Dark: Searching for the Most Massive Galaxies in the Universe." Dr Matthew Bothwell. University of Cambridge.
18th October	"Pulsars and our understanding of the cosmos" Dr Robert Ferdman. University of East Anglia.
15th November	"Neighbours - An Introduction to the Local Group". Dr Nick Hewitt. British Astronomical Association.

Other local astronomy society meetings

Athaneum Astro Society

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

We meet fortnightly on Thursdays, from 7.30pm, at our dark-sky site in the Walled Garden at Nowton Park, just outside Bury St Edmunds. If you're planning on joining us for the first time, please contact us in advance, just to make sure the meeting is going ahead. We recommend that you wear warm clothing (even summer nights can be chilly, especially when the skies are clear!) and bring a flask, or insulated mug, for a warm drink. We have tea and coffee-making facilities on-site. Events are listed here http://www.3a.org.uk/events.htm

LYRA Lowestoft & Yarmouth Regional Astronomers

www.lyra-astro.co.uk

LYRA Programme and Local Events 2019 – All talks (unless other wise stated) will commence at 7.30pm in the Coach House Room at Parkhill Hotel, just outside Oulton Village on the B1375 (Oulton Broad to Gt. Yarmouth Road) NR32 5DQ

All Talks £2.50 For Non Members

Sept 10	TBA
Sept 24	LYRA Observing/Practical night at Barn Car Park, Parkhill Hotel from 7:30pm
Oct 8	A Talk "Variable Stars – being a Professional-Amateur" by Michael Poxon
Oct 22	LYRA Observing/Practical night at Barn Car Park, Parkhill Hotel from 7:30pm
Nov 12	TBA
Nov 26	LYRA Observing/Practical night at Barn Car Park, Parkhill Hotel from 7:30pm

DASH Astro

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

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.

Due to building work to Westleton Village Hall, we will be moving to the New Darsham Village Hall, from September 8th until further notice.

Note these meetings are now on Sundays.

Sep 08	Meeting –.Dr. Sonali Shukla, Lecturer in Astronomy, Cambridge Univ.
Sep 21&22	Henham Steam Rally. Solar Observing and Displays
Sept 29	Dash Observing Session (Sunset 18:35 Moonset 19:24 1.1% Moon)
Oct 13	Meeting – Dr. Manda Banerji, Inst. of Astronomy, Cambridge Univ.
Oct 23&24	Family Stargazing Evening at Sutton Hoo N.T. Site 6-9pm
Oct 27	Dash Observing Session (Sunset 16:33, Moonset 16.46, 0.9% Moon)
Nov 10	Meeting – Steve Hubbard, Ian Lomas & David Gwynn, plus "Q & A Panel" Title TBC
Nov 11	DASH Observing. "Transit of Mercury" start 12:35 ends 16:06 (sunset)
Nov 24	Dash Observing Session (Sunset 15:49, Moonset 15.10, 6.7% Moon)
Dec 07(Saturday)	DASH Christmas Social – confirmed. (Members and Guests only)

Haw Wood Star Parties.

David Murton (DASH Astronomical Society)

I am pleased to announce that, on behalf of the DASH Astro Astronomical Society, I have now taken over the organisation of the Haw Wood Star Parties from Andrew Robertson and the Breckland astronomical Society. On behalf of everyone that has attended one of these events; I would like to give a large vote of thanks to both Andrew and Dan Self of Breckland for all their hard work during the last few years in getting them up and running. Andrew would now like to step down and as DASH is based a stones throw from the site in Darsham, they have asked us if we would consider taking over.

The star parties are held twice a year in spring and autumn, at the Haw Wood caravan and camping site at Hinton, near Darsham in North Suffolk, situated between the A12 main road and the coast. This is a really dark site with SQM readings of 21.70 and naked eye visibility of Magnitude 6.0 achieved on very good nights. It is also a listed "Dark Sky Discovery" site. The managers Dan and Georgina go to great lengths to accommodate us, restricting access to those aware of the lighting policy, switching off the site lighting and arranging for a special reduced site fee for participants.

The events last from Monday to Monday although people can stay for as long as they wish. Since they were first held a few years ago they have attracted a loyal following of people, both serious and

casual, visual observers and imagers and great efforts are made to locate them in different areas of the site to avoid any issues with lights.

This year's autumn party is over the period 28th October to 4th November. We intend introducing some new elements to enhance people's enjoyment, especially in the event of inclement weather. These include:

- A communal BBQ on the Saturday afternoon (bring your own food for the barby)
- Talks on astronomical topics suitable for all.
- A "pub quiz"
- Fish and chips supper available on the Friday evening.
- Hearty breakfasts available on the Saturday and Sunday mornings with extended hours for all the late risers after observing all night!
- A guided tour of the night sky on the Saturday evening.

If you haven't been along before, I urge you to do so. These are always friendly events with the added bonus of being on a great site with first class facilities, while the surrounding area comprises the Suffolk Coast and Heaths AONB with Minsmere nearby for the birdwatchers. There is easy access via the A12 and its only 90 minutes from the M25.

Bookings can be made directly to the site by phone or email only, as the normal automated booking system will not be used so as to ensure that everyone is aware of the lighting policy.

Pitches are just £12 per night and booking via 01502 359550 or info@hawwoodfarm.co.uk

www.hawwoodfarm.co.uk www.dash-astro.co.uk

From the Interweb

UK Professor Leads Effort to Develop World's Largest, Most Inclusive 'Stellar Library

By Jenny Wells and Jordan Raddick Jan. 8, 2019

https://uknow.uky.edu/research/uk-professor-leads-effort-develop-world-s-largest-most-inclusive-stellar-library

SEATTLE, Wash. (Jan. 8, 2019) — Want to learn everything there is to know about a subject? Go to the library. Want to learn everything there is to know about stars? Go to the stellar library.

Renbin Yan, an associate professor of physics and astronomy in the UK College of Arts and Sciences, along with a team of astronomers from the Sloan Digital Sky Survey (SDSS), announced today the opening of a new "stellar library" containing spectra of thousands of stars in the Milky Way galaxy. Having access to this library will help astronomers understand not only our own galaxy, but galaxies across the universe.

Saturday courses at the Royal Observatory, Greenwich

Event type: Talks & Courses Date and time: Select Saturdays | 10:30am - 2:30pm

Price: £32 Location: Royal Observatory, Planetarium & Astronomy Centre

Lightning courses are short, one-day courses that allow you to delve deeper on a topic in astronomy, led by a Royal Observatory astronomer.

There are a range of topics covered by these courses, from how to take photos of the night sky to life on alien worlds to understanding Einstein's theories of relativity. The courses offer an introduction into different subjects in astronomy and no prior knowledge of astronomy is needed.

The Lightning Courses (Ages: 16+) run for four hours on a Saturday and alternate every month. Upcoming course topics include:

Alien moons (7 September)

From Newton to Einstein (12 October)

Astrophotography (30 November)

OPS Observatory Open Evening

Orwell Astronomical Society

Charity No. 271313
oasi.org.uk

PUBLIC OPEN EVENINGS

Visit and Use One of the Few Remaining Fully Operational Victorian Observatories
Located at Orwell Park School Nacton off the A1156
Between Ipswich and Felixstowe IP10 0ER

Orwell Park Observatory will be Open to the Public

Come and See the Gas Giants Jupiter and Saturn

Friday 27th September 7:30pm to 10:00pm

Saturday 28th September 7:30pm to 10:00pm

Observations will be made using the 10" Tomline Refactor and a wide selection of other smaller telescopes

All observations are subject to favourable weather conditions

If you have a pair of binoculars we recommend that you bring them with you.
All observations are outside so please bring appropriate clothing

Entrance Donation
Adult £3.00
Child & Concessionary £1.50

Honorary Secretary
Roy Gooding
168 Ashcroft Road
Ipswich
IP1 6AE

The 2019 FAS Convention and AGM,

14th September 2019, Institute of Astronomy, Cambridge

The time has come around again for the FAS' Convention and AGM. This year it's to be held at the Institute of Astronomy, Madingley Road, Cambridge, from 9:45am on 14th September: event details and a link to buy tickets are available online at http://fedastro.org.uk/fas/convention/convention-2019 (members of FAS member societies £8, Non-members £10 and £4 for all under-16s). A limited number of tickets will also be available at the door if there are any left from the online sales – check the website the day before to see how many are left.

We have five excellent speakers during the day:

- Dr Mark Clilverd – "Solar storm effects on ground-based infrastructure"
  British Antarctic Survey, Winner of the RAS 2019 James Dungey Lectureship
- Dr Richard Ghail – "New insights from our closest Earth-sized exoplanet: Venus"
  Royal Holloway College, London
- Jenny Lister – "Astronomy for all: its place in education"
  Primary School Teacher, Winner of the RAS 2018 Patrick Moore Medal for Education
- Dr Floor van Leeuwen – "Details of the HR diagram as revealed by the second Gaia data release"
  Institute of Astronomy, Cambridge
- Prof Carlos Frenk – "Everything from nothing: how our universe was made"
  Director of the Institute for Computational Cosmology, Durham University,
  Winner of the RAS 2014 Gold Medal for Astronomy

Also:

- Lunchtime tours of the Northumberland and Thorrowgood telescopes
- Lunchtime tours of the Cavendish Museum
- Trade stands
- Lots of free car parking at the IoA
- Free tea/coffee/biscuits throughout the day

Immediately following lunch there's a (thankfully!) brief AGM meeting for members of fully paid-up FAS societies only. At the AGM there will be my President's report on the year past, the Treasurer's report and you'll be able to stand for and vote for elections to the FAS Council. Each society should nominate just one of their members attending to vote on the AGM agenda items and in the elections, i.e. one vote per society.

As is common with committees, there have been some departures from Council during the year due to ill-health and personal circumstances. Election nominees from fully paid-up member societies can be accepted for any of the Council posts but the positions of Treasurer, PLI Secretary, Newsletter Editor and Publications particularly need to be filled.

If you'd like to stand for election to Council it would be helpful if your proposer and seconder let the Secretary know before the meeting but candidates may also be proposed and seconded at any time up until and including the AGM itself. Also, if you have any urgent items you'd like to add to the agenda please let the FAS Secretary (secretary@fedastro.org.uk) know as soon as possible.

Best wishes and hoping to see you there!

Dr Paul A Daniels, FRAS
President, Federation of Astronomical Societies
Vice President (Astronomy), Royal Astronomical Society

Going with the Flow - Tides and the Deben Estuary

"Seas the Power" Talk by William Thomson Founder of Tidal Compass and author/illustrator of the World of Tides and the Book of Tides Tickets £6

16 October 7pm John Gibbins Gallery in the Longshed

EXHIBITION AND ACTIVITIES FOR ALL AGES

19 October - 27 October 10am - 4pm in the Longshed free entry

Astronomy, Tidal Energy, Birds of the Deben, Nautical Corner "All at Sea, and what's the tide doing?", the Changing Deben Estuary, Historical access and Access Now, What happens when the tide comes in , How far can you row?

Talks in the Longshed - reserve free tickets

"Time and Tide" Paul Whiting, Orwell Astronomical Society Ipswich

19 October 2pm

22 October 2pm for accompanied children 7-11

"How we got a moon and howwe can't live without it" Dan Clery, science writer

20 October 2pm

"Working with the tide" Meredith Scanlon, hydrographer Harwich Haven Authority

21 October 2pm

"Tidal Tales" Justine de Mierre, storyteller

23 October 11am for accompanied children under 5

23 October 2pm for accompanied children 5-11

24 October 11am for accompanied children 5-11

"Why the Deben is special for birds" Paul Hetherington RSPB

25 October 2pm

"Imagining and managing the Deben Estuary into the Future"

27 October 7pm in the Woodbridge Community Hall

Expert speakers, Q&A with panel. Tickets £6 including refreshments

TICKETS FOR ALL EVENTS AVAILABLE FROM 1 SEPTEMBER
Book online www/woodbridgeriversidetrust.org/event or 'phone 07596 870150

The Night Sky in September

Martin RH

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

Moon

Source: http://heavens-above.com/moon.aspx

New Moon	1st Quarter	Full Moon	Last Quarter
	06 Sept 04:11	14 Sept 05:33	22 Sept 03:41

28 Sept 19:26 (Supermoon)

Sun, Moon and planets

Source: http://heavens-above.com/PlanetSummary.aspx

Object	Date	Rise	Set	Mag.	Notes
Sun	1	06:06	19:43		Autumn Equinox Sep 23, 08:50
	30	06:54	18:36		
Moon	1	08:30	21:05		Apogee 13 Sept 14:33 Perigee 28 Sept 03:24
	30	08:49	19:50		
Mercury	1	05:48	19:45	-1.7	
	30	08:48	18:56	-0.2	
Venus	1	06:34	19:55	-3.8	
	30	08:07	18:57	-3.8	
Mars	1	06:09	19:44	1.7	Superior conjunction 2019-Sep-02
	30	06:01	18:21	1.8	
Jupiter	1	15:14	23:00	-2.1	
	30	13:35	21:16	-1.9	
Saturn	1	17:21	01:08	0.3	
	30	15:27	23:09	0.5	
Uranus	1	21:19	11:39	5.7	
	30	19:24	09:41	5.7	
Neptune	1	19:58	06:59	7.8	Opposition 2019-Sep-10
	30	18:03	05:00	7.8	

Paul's Astronomy Podcast for September

Paul Whiting FRAS Podcast, August 2019 www.oasi.org.uk/2019_09_pod.mp3

Occultations during September 2019

James Appleton

The table lists occultations during the month under favourable circumstances. The data relates to Orwell Park Observatory, but will be similar at nearby locations.

The events should be readily visible in small telescopes or binoculars. The first two columns list the date and time (UT) of the occultation. Column three gives the phenomenon: 'D' denotes a disappearance and 'R' a reappearance. The table lists circumstances of disappearances and reappearances as dictated by the visibility of each phenomenon (determined by altitude, lunar phase, etc). Column four details the lunar phase ('+' for waxing and '-' for waning). Columns five and six give the altitude of the Sun and the star, both in degrees. (A negative solar altitude means that the Sun is below the horizon.) Columns seven and eight provide the star's magnitude and catalogue number.

The data relates to Orwell Park Observatory, but will be similar at nearby locations.

Please note that **times are shown in UTC**.

Date	Time (UT)	D/R	Lunar Phase	Sun Alt(°)	Star Alt(°)	Mag	Star
11 Sep	00:08:48	D	0.91+	-33	11	4.8	22 Cap, η Cap
22 Sep	23:51:11	D	0.40-	-38	10	6.8	H32571
	23:57:00	R		-38	11		

Meteor showers

Source: BAA Handbook 2019 p100-101

Shower	Maximum	Normal limits	ZHR at Max	Notes
α-Aurigids	Sep 1	Aug 28 – Sep 5	5	Short-lived outbursts in activity in 1994 and more recently in 2007. Favourable.
September ϵ-Perseids	Sep 10	Sep 5 – 21	5	Stronger than usual display in 2013. Unfavourable.

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

Visible ISS passes ≥15º max altitude

Martin RH

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

Times are UTC. Predictions are approximate (27 Aug) due to craft adjustments. Check the day before.

Date	Mag	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
01 Sep	-2.2	04:34	18°	SSW	04:36	26°	SSE	04:39	10°	E
02 Sep	-1.8	03:48	19°	SE	03:48	19°	SE	03:50	10°	E
02 Sep	-3.5	05:21	10°	WSW	05:24	60°	SSE	05:27	10°	E
03 Sep	-3.2	04:34	28°	SW	04:35	46°	SSE	04:38	10°	E
04 Sep	-2.6	03:47	32°	SE	03:47	32°	SE	03:49	10°	E
04 Sep	-3.8	05:20	11°	W	05:23	81°	S	05:26	10°	E
05 Sep	-3.8	04:33	34°	WSW	04:34	70°	SSE	04:37	10°	E
06 Sep	-3.1	03:46	48°	ESE	03:46	48°	ESE	03:48	10°	E
06 Sep	-3.8	05:19	11°	W	05:22	86°	S	05:25	10°	E
07 Sep	-1.1	02:59	15°	E	02:59	15°	E	03:00	10°	E
07 Sep	-3.9	04:32	35°	W	04:33	85°	S	04:36	10°	E
08 Sep	-3.2	03:45	53°	E	03:45	53°	E	03:47	10°	E
08 Sep	-3.8	05:18	11°	W	05:21	74°	SSW	05:24	10°	ESE
09 Sep	-1.0	02:58	15°	E	02:58	15°	E	02:59	10°	E
09 Sep	-3.9	04:31	38°	W	04:32	83°	S	04:35	10°	E
10 Sep	-2.8	03:44	44°	E	03:44	44°	E	03:46	10°	E
10 Sep	-3.5	05:17	13°	W	05:20	50°	SSW	05:23	10°	SE
11 Sep	-3.8	04:30	49°	WSW	04:31	64°	SSW	04:34	10°	ESE
12 Sep	-2.1	03:43	28°	ESE	03:43	28°	ESE	03:45	10°	ESE
12 Sep	-2.8	05:16	17°	W	05:18	29°	SSW	05:21	10°	SSE
13 Sep	-3.1	04:30	37°	S	04:30	37°	S	04:33	10°	SE
14 Sep	-2.0	05:17	16°	SW	05:17	16°	SW	05:19	10°	S
20 Sep	-2.1	20:19	10°	S	20:21	18°	SSE	20:21	18°	SSE
21 Sep	-2.4	21:06	10°	SW	21:08	29°	SSW	21:08	29°	SSW
22 Sep	-3.0	20:17	10°	SW	20:20	33°	SSE	20:21	28°	ESE
23 Sep	-2.4	19:28	10°	SSW	19:31	24°	SSE	19:34	10°	E
23 Sep	-3.2	21:04	10°	WSW	21:07	50°	SW	21:07	50°	SW
24 Sep	-3.6	20:15	10°	WSW	20:18	55°	SSE	20:20	31°	E
24 Sep	-1.0	21:52	10°	W	21:53	17°	W	21:53	17°	W

Date	Mag	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
25 Sep	-3.2	19:26	10°	SW	19:29	42°	SSE	19:33	10°	E
25 Sep	-3.3	21:03	10°	W	21:05	59°	WSW	21:05	59°	WSW
26 Sep	-3.9	20:14	10°	WSW	20:17	78°	S	20:18	33°	E
26 Sep	-1.0	21:50	10°	W	21:51	16°	W	21:51	16°	W
27 Sep	-3.7	19:25	10°	WSW	19:28	66°	SSE	19:31	11°	E
27 Sep	-3.2	21:01	10°	W	21:04	54°	W	21:04	54°	W
28 Sep	-3.9	20:12	10°	W	20:15	87°	S	20:17	37°	E
28 Sep	-0.8	21:49	10°	W	21:49	15°	W	21:49	15°	W
29 Sep	-3.8	19:23	10°	W	19:26	84°	S	19:29	12°	E
29 Sep	-2.8	21:00	10°	W	21:02	45°	WSW	21:02	45°	WSW
30 Sep	-3.8	20:10	10°	W	20:14	77°	S	20:15	42°	ESE

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, 1.40pm on the Lesley Dolphin show on BBC Radio Suffolk – now digital (channel 10c) and FM 103.9 (Ipswich), 104.6 (west Suffolk), 95.5 (Lowestoft), 95.9 (Aldeburgh) and the internet. https://www.bbc.co.uk/radiosuffolk

BAA news

BAA meetings in September & October

Friday, 06 September	BAA weekend Meeting, Armagh, Northern Ireland
Sunday, 29 September	Asteroids & Remote Planets Section Meeting
Saturday, 12 October	Observers' Workshop - Solar, Aurora & NLC, and Deep Sky
Saturday, 26 October	Back to Basics Workshop, Rickmansworth

Tutorial: An introduction to variable star observing

By Roger Pickard **https://britastro.org/node/18890**

At the turn of the 19th century there were very few variable stars known, certainly less than a few dozen. Nowadays, the "Bible" for all types of variable star (the General Catalogue of Variable Stars) lists nearly 90,000! Even simple observation of these stars can yield information about their mass, radius, luminosity and evolution. And what's more it can be done with the simplest of equipment.

We usually observe variable stars by watching (measuring or estimating) their variations over time, be it hours, days, weeks, months or even years. These variations take the form of changes in brightness (magnitude) and are viewed pictorially by means of graphs termed light curves where the magnitude (y axis) is plotted against time on the x axis. *See web link for more information.*

Two variable objects in Cepheus

Mike Harlow

Observations of two very different variable objects are presented. A short update on recent activity in Gyulbudaghian's variable nebula is discussed in section 1. Section 2 covers observations of the eclipsing binary U Cephei using both imaging and spectroscopy.

Section 1: Gyulbudaghian's variable nebula

(RA 20h 45m, Dec +67d 56m (J2000)).

The nebula continues to fade in 2019 with gradual changes to its shape and brightness. The latest images, taken on 1st and 26th August 2019, show a thin irregular bar of nebulosity to the north-east of the star PV Cephei which illuminates the nebula.

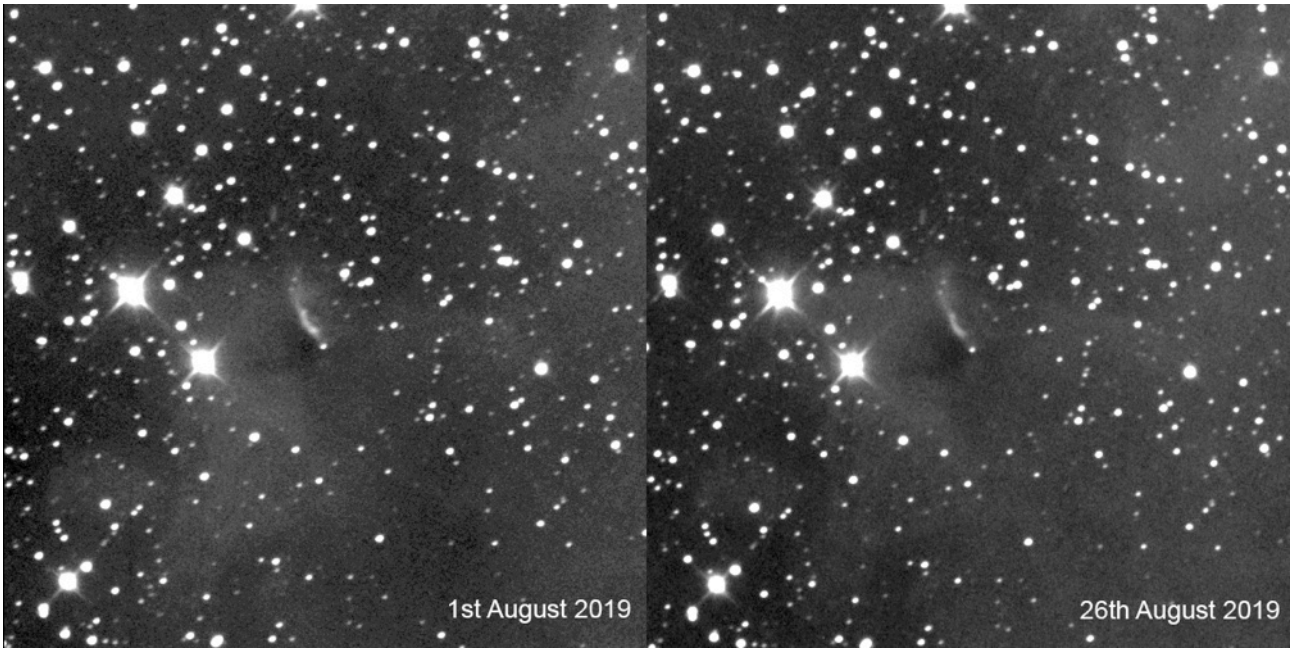


Figure 1. Images of Gyulbudaghian's nebula in August 2019.

Shrinking and fading of the nebula are partly due to the fade of PV Cephei, the star at the southern tip of the nebula. David Boyd of the BAA reports that the star is as faint as he has seen it in the last 10 years.

Images of the nebula going back to 2008 can be found on the OASI web site **[1]** and monitoring will continue every month to see how it develops.

Section 2: The eclipsing binary U Cephei

(RA 01h 02m 18s, Dec +81d 52m 32s(J2000)).

U Cephei is an Algol type eclipsing binary which shines steadily at magnitude 6.8 for most of the time but periodically dips to magnitude 9.2 when one star is totally eclipsed by the other. At almost 82 degrees north declination it is visible all year round.

The two stars are very different and are approximately 10 million kilometres apart. A giant G type star eclipses a smaller but much hotter B type star **[2]** with a period of 2 days 11 hours and 50 minutes between eclipses. Two orbits are just short of 5 days so that, at 5 day intervals, eclipses happen at almost the same time of the night. Although the B type star is smaller than its giant companion, it is much brighter resulting in a drop of 2.4 magnitudes or 9 times in brightness during eclipse.

The first opportunity to observe came on 10th February when I took images every 30 minutes from totality through the partial phase to maximum light. Figure 2 shows the changes in brightness over 5 hours from 19:30UT to 00:30UT on 11th February.

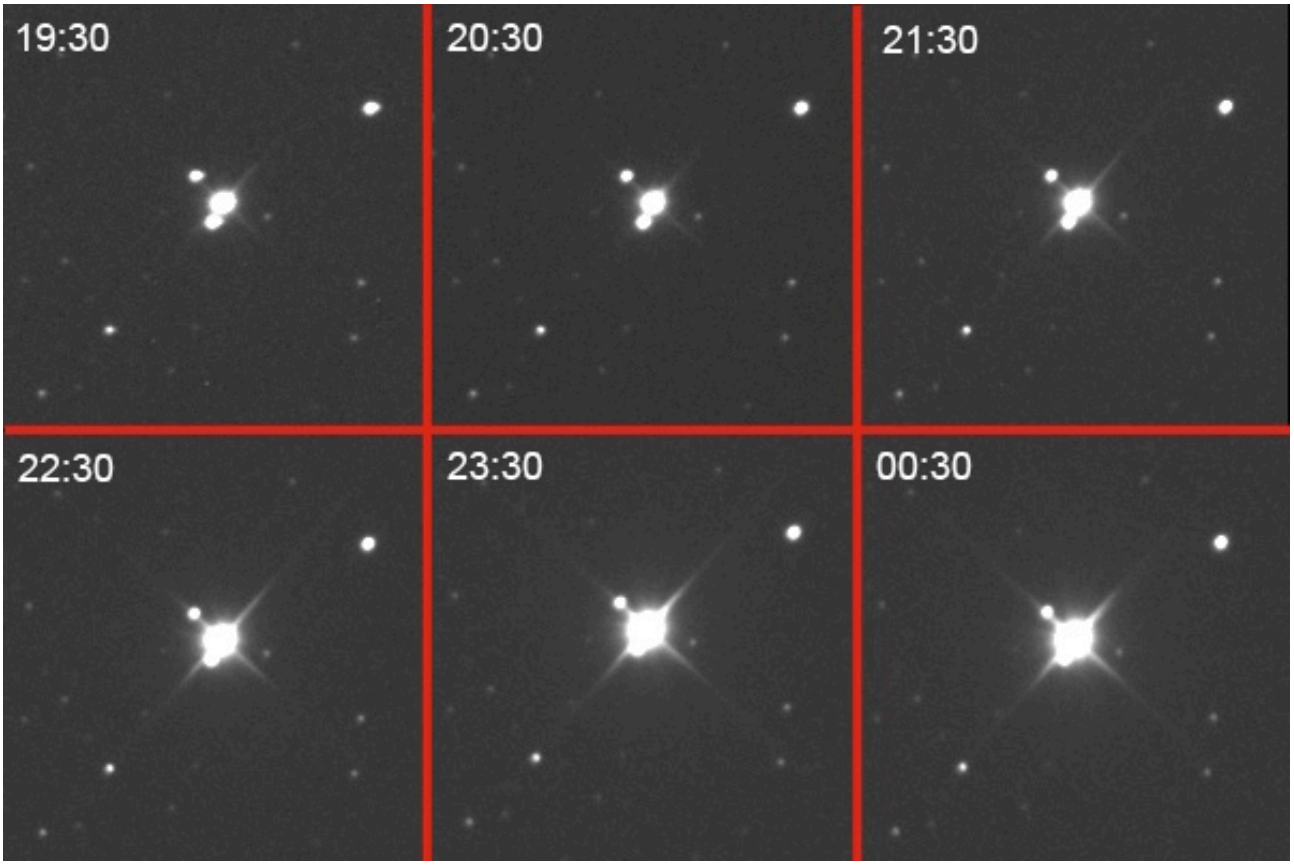


Figure 2. Changes in brightness of U Cephei from total eclipse to the end of the partial phase. 12 inch F/3.6 astrograph, 10th-11th February 2019 with times in UT.

The next opportunity to observe came on 25th February (six orbits on from 10th February) when spectroscopy was attempted. A 22cm diameter,12 degree angle objective prism [3] on the front of the telescope was used to produce spectra of all objects in the field of view. Figure 3 shows the full field used for imaging and the same field imaged through the prism.

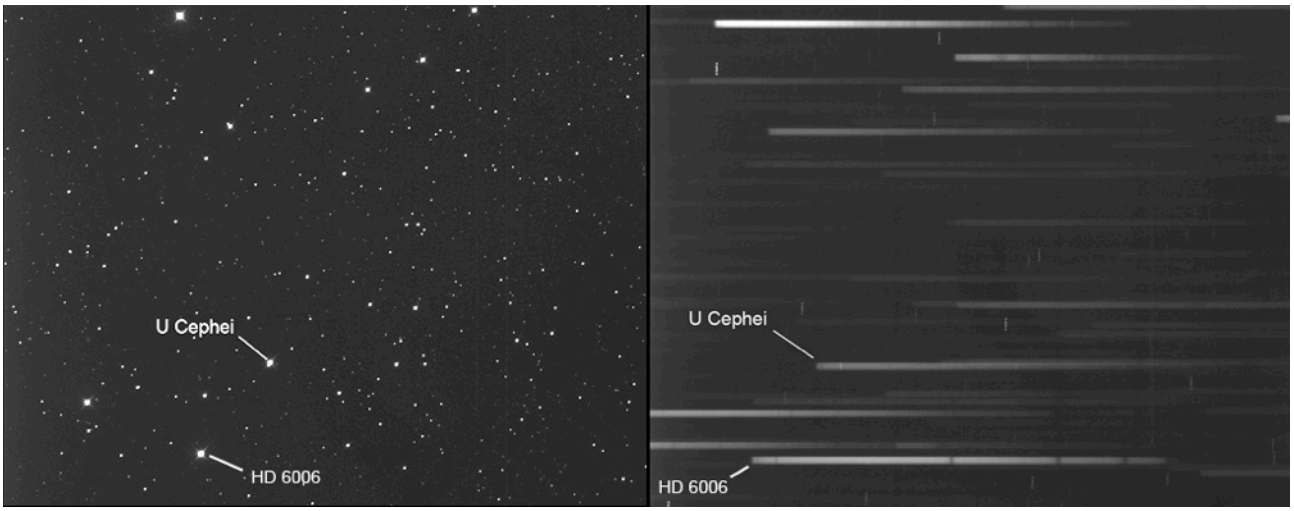


Figure 3. Image of the 48 x 40 arc minute field containing U Cephei and the same field through the objective prism showing spectra of the stars.

A field star near U Cephei, HD6006, produced a rather nice type A0 reference spectrum which is very similar to the B8 spectrum of B type star **[2]**.

Spectra were taken during totality and shortly afterwards early in the partial phase. At totality, only the giant orange star is visible and the spectrum is G type, as shown in figure 4A. The spectrum is faint with some absorption lines visible in the original image. Also visible in this

spectrum are hydrogen emission lines which are caused by the hot blue star exciting tenuous gas either high in the atmosphere of the giant star or, more likely due to their intensity, from gas flowing between the two stars.

As totality ends, the hot blue star appears over the limb of the giant star and starts to contribute to the spectrum. This dramatically changes the appearance of the spectrum, as shown in figure 4B. Deep hydrogen absorption lines have appeared and the spectrum itself is brighter.

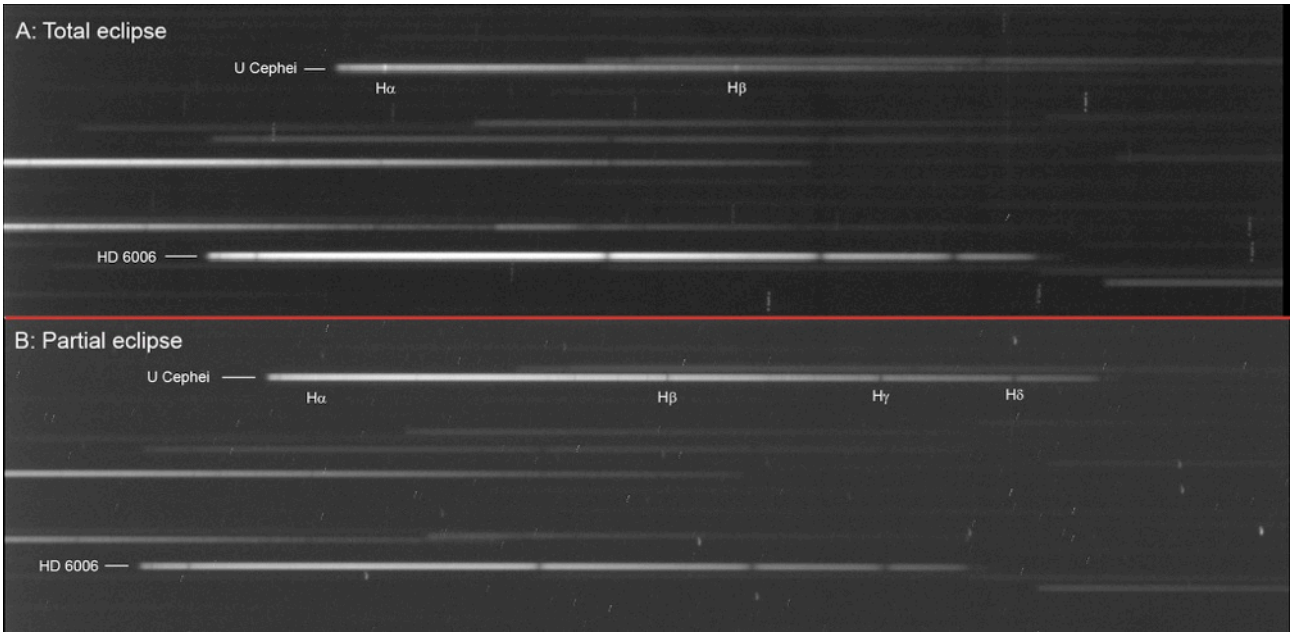


Figure 4. Dramatic change in the spectrum of U Cephei between the total phase and the start of partial eclipse. A) total eclipse, B) partial eclipse.

Interestingly, the hydrogen alpha absorption line isn't clearly visible during the partial phase as it is 'filled in' by the emission at the same wavelength.

Also worth noting is that the G type absorption lines are now more clearly seen as the spectrum is brighter. This illustrates an important point about stellar spectra. Stars are dense spheres of hot plasma and are essentially 'black bodies' which produce a continuous spectrum. The absorption lines are only produced when this continuum shines through the thin outer atmosphere of the star, which may only be a few hundreds or thousands of kilometres thick. In the partial phase of the U Cephei eclipse the hot blue star is shining through the thin atmosphere of the G star making its spectral absorption lines more prominent. Observing the spectrum as the two stars separate would be very interesting as at some point the G type absorption lines should fade away as the outer atmosphere of star G becomes ever thinner.

One to watch...

Another interesting eclipsing binary is zeta Aurigae. This is one of the three 'kids' in the constellation Auriga forming an elongated triangle below Capella (alpha Aurigae). Unlike U Cephei, it has a period of over two and a half *years* not two and a half *days*! And rather than eclipses lasting 2 hours, totality lasts for 38 days.

The system is on a much bigger scale than U Cephei with the stars separated by 500 million kilometres. It has a very large, red K type star, and a much smaller but hotter blue, B type star. This blue star is next due to go into eclipse in October 2019 and will be an interesting object to follow this autumn both before and during the total eclipse when the spectrum of the blue star will completely disappear. As with U Cephei, the hotter B star can be used to probe the atmosphere of the giant star and, for a month before and a month after the total phase, the B type star is known to pass behind the vast extended atmosphere of its giant companion.

A report on observations will appear later in the year.

Notes and References

1. OASI variable nebula page: http://www.oasi.org.uk/Obsvns/20190801_VN/20190801_VN.php
2. The spectral types of stars follow the sequence O-B-A-F-G-K-M with further sub-divisions denoted by numbers. In U Cephei the hot blue star is type B8 and the cooler giant star is type G8. Note that types B8 and A0 are very close in the sequence and spectra are almost identical with the objective prism system used.
3. Photo of the objective prism set-up is on the OASI web site: http://www.oasi.org.uk/Obsvns/novae+SN/20130906_obj_prism.jpg

OSIRIS - Rex

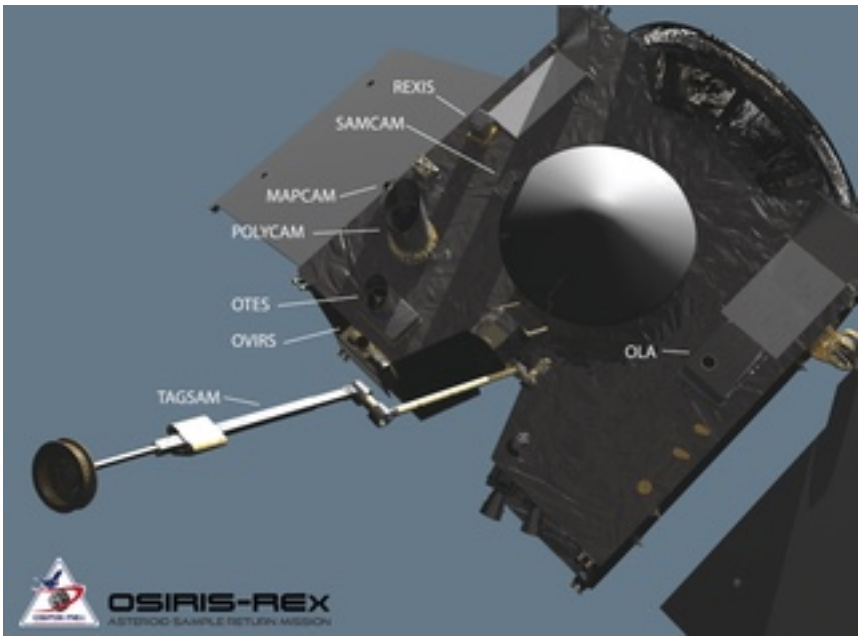
Library Update.

Andy Willshere

Several month ago I wrote a short piece about OSIRIS-Rex simply describing the functionality of the space craft, and the project. The mission has been proceeding as planned, and on the 31st December 2018, it arrived in the vicinity of the asteroid 101955 Bennu, whose mean diameter is approximately 492m. Since then it has been in orbit around the asteroid mainly to confirm the asteroids specific characteristics and to try to find a convenient area to land. Upon landing the craft will, by using the touch and go sample acquisition mechanism (TAGSAM), collect regolith particles smaller than 2 cm which will be blown into the sampler head by a blast of nitrogen gas. This is planned for July 2020. By using OSIRIS-Rex's visible to near infrared and thermal infrared spectrometers the composition of Bennu has been ascertained. The asteroid is a high carbon, carbonaceous chondrite type.

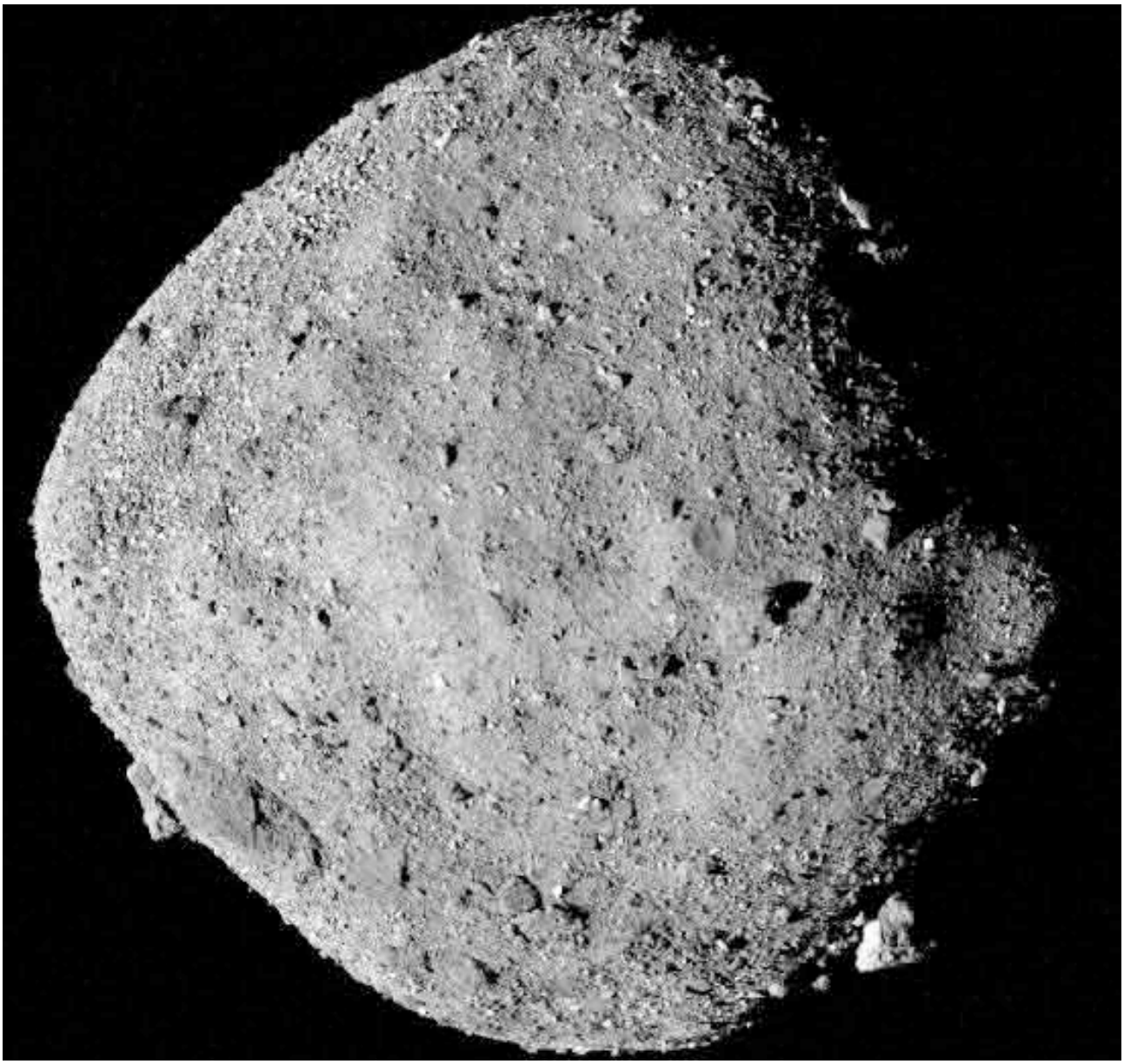
However several small problems have been noted since arrival at the site. The optical navigation images (OpNav), taken by the craft's NavCam 1 imager have perceived many glittering, point source objects near Bennu. These are considered to be a groups of tiny particles that have been ejected by Bennu into space. This has been seen to happen at least ten times, and although remain stationed around the asteroid once ejected, no damage to the spacecraft has been noted. At this point OSIRIS-Rex was orbiting between 1 and 1.3 miles circling Bennu. The scientific team will however monitor these occurrences.

Picture credit:
NASA/University of Arizona



Prior to arrival at the asteroid, Earth based telescopes using both thermal and radar imaging implied that its surface was fairly smooth. However since the arrival of the spacecraft, this has been found to be far from the truth.

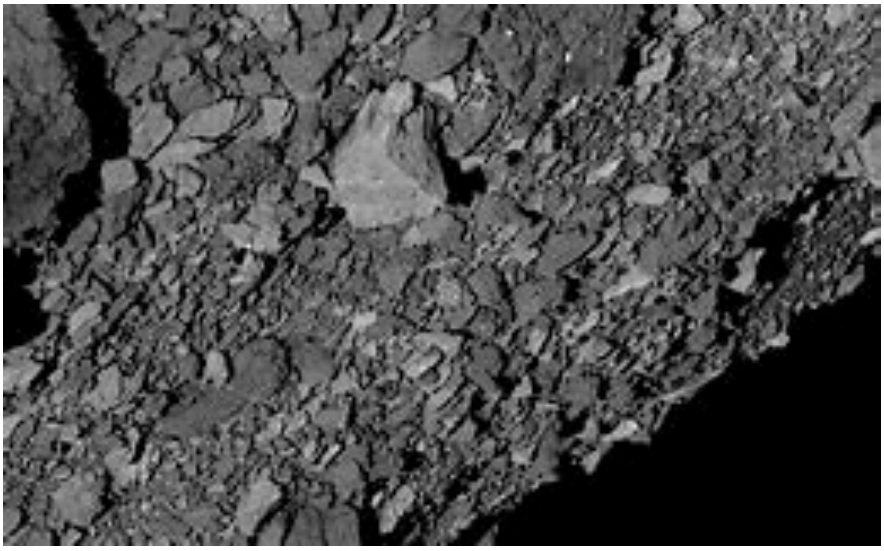
Its surface is cluttered with small rocks and boulders as well as many impact craters, making it extremely unstable to land. Of these boulders some 200 appear to be about 10m across, with many others not quite these dimensions, but still large enough to cause landing problems. The science team on Earth have until the summer of 2020 to find landing places, all of which will have to be smaller than first considered. OSIRIS-REx will also have to be kept erect whilst the sample collection is ongoing due to the position of the sampling arm. This means that any tilt of the spacecraft will cause regolith collection problems. The science team will have to study the navigation and spacecraft capabilities to ascertain that the landing sites for collection can be achieved. It is also very dark on the asteroid, with little reflection of sunlight falling on it.



Picture of Bennu formed by 12 PolyCam images from OSIRIS-Rex at a range of 24km, showing small rocks and boulders.

Picture credit (NASA/University of Arizona).

June 13th 2019 brought about a new phase known as 'Orbital B', where the spacecraft executed a navigation deployment that brought it into an orbit of 680m above Bennu's surface. From the information obtained from this close proximity to Bennu, four sites will be chosen for sampling which will be rigorously evaluated, some of which may be considered for the final sample collection.



High resolution image. PolyCam camera on OSIRIS-REx on March 7 from 5.km. Large paler rock in centre is approx. 7.4 m wide.

Picture credits: NASA/ Goddard/University of Arizona/Lockheed Martin.

The overall mission, systems engineering and safety is controlled by NASA Goddard

Details about 101955 Bennu.

Equatorial Diameter	~ 500m
Polar diameter	~ 510m
Average speed:	63,000mph
Rotational Period:	4.3 hrs
Orbital Period:	1.2 yrs
Orbital Inclination	6 degrees.

Closest to Earth every 6 years.

References:

4. www.parabolicarc.com/2019/01/15/latest-updates-nasa-osirisrexs-mission-asteroid-bennu/
5. https://www.nasa.gov/osiris-rexhttps://core.ac.uk/download/pdf/80071177.pdf · PDF file
6. https://www.sciencemag.org/news/2019/03/mysterious-asteroid-activity-complicates-nasa-s-sampling-attempts
7. https://astronomynow.com/2019/05

NGC 7000 – North American Nebula

John Hughes

The North American Nebula is situated in the constellation Cygnus close to the star, Deneb. It represents a large area of ionised Hydrogen gas which is comprised of both this object and the Pelican Nebula. Being a Hydrogen emission nebula, it is an attractive photography target especially using a Hydrogen filter and is ideally placed being close to the Zenith.

It is not known what star is causing the Hydrogen to ionise, however if it is Deneb then this object is c1,800 Light Years away. The dark area representing the 'Gulf of Mexico' is actually an interstellar dust cloud located between the observer and NGC 7000 which is blocking out the light of the nebula. This gives the object the distinctive 'North American Continent' shape.

Moving along to 'Mexico' we can see an area along the 'west coast' where the gas has started to consolidate into a star forming region.

The following image was taken on 2 August 2019 between 00.44 BST and 02.33 BST. It is comprised of 35 two minute exposures and calibrated with 25 dark, flat and dark flat images. These were stacked and processed using PixInsight.

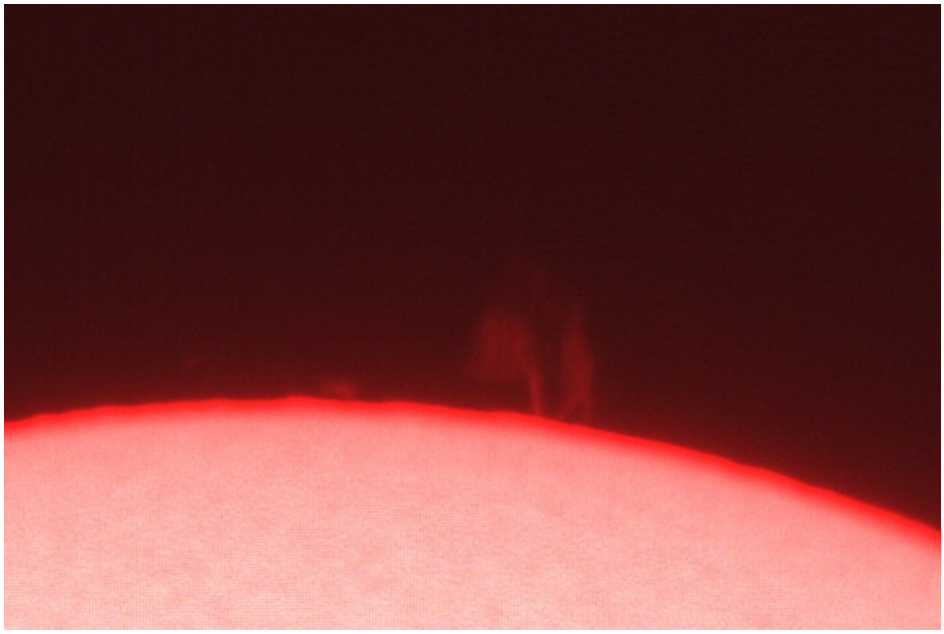
Equipment used; William Optics Z61; 2" Astronomik Ha 12nm filter; ZWO ASI 1600mm Pro Cooled camera set at Unity Gain and sensor temperature of -15c. Mounted on an HEQ6R-Pro. Guiding with PHD2 and image captured using Astrophotography Tool (APT).

NGC 7000 – North American Nebula

Solar prominences

Martin Cook

25 August – Large prom on the Sun today seen with a Ha scope

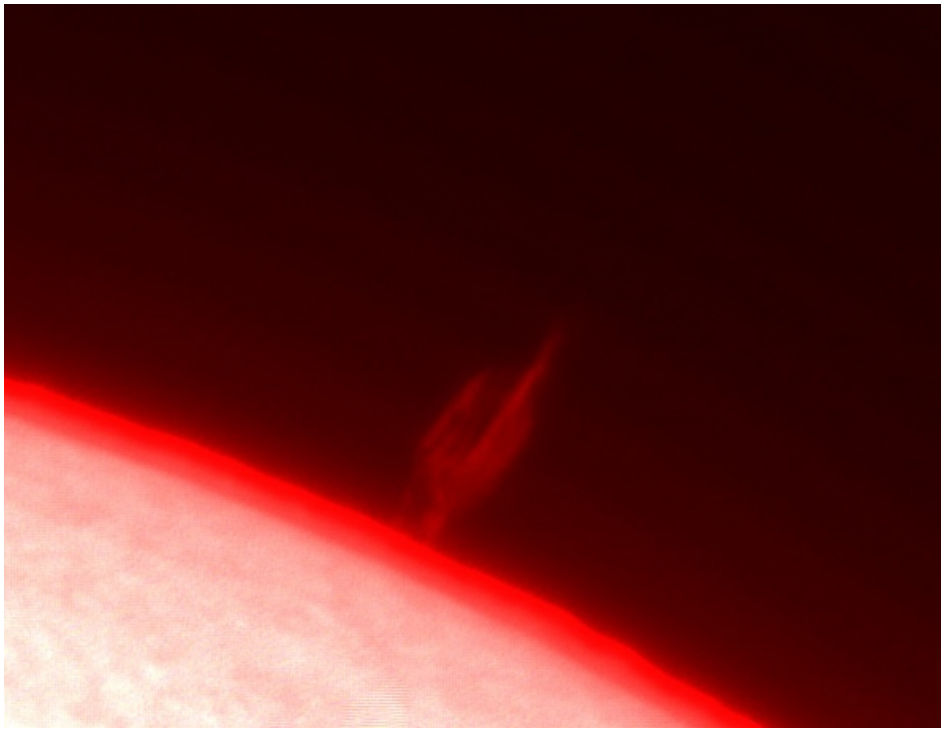


25 8 2019 11:51 BST (10:51 UT). Lunt LS60THa/B1200.

QHY5P-II Colour camera at 40 fps

Looks like a person running from a geyser.

26 August – Today at the proms!



The Sun through a H-alpha scope at 15:20 (14:20 UT) showing a cactus shaped prominence coming of the surface.

Lunt LS60THa/B1200

x2 Barlow

QHY5P-II Colour camera at 42 fps

Best 20% of 2000 images stacked in RegiStax 6

Astronomy Event at Ipswich Museum

On Tuesday 30th of July and Wednesday 31st of July there was an inflatable planetarium at Ipswich Museum. The event was part of *A Summer of Science* at the Ipswich museums (Ipswich Museum – on High Street, Christchurch Mansion and Ipswich Art Gallery) during the Summer school holidays.. OASI also attended, with solar viewing on the first day and displays inside the museum on the second day (cloudy). We estimated a footfall of about 500. There was quite a bit of interest from parents with telescopes needing help with setting up and use.

Can you spot a Camelopardalis? ***Photos by MartinRH***