



OASI News

The newsletter of the Orwell Astronomical Society



M63

Credit: Andy Gibbs

Trustees:

Mr Roy Adams

Mr Neil Morley

Mr David Payne

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Society Notices

Dear Members,

We have moved to using a Zoom Pro account. If you would like to join in, email Paul Whiting, treasurer@oasi.org.uk

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

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

Andy Gibbs, Chairman

Society Contact details

Email queries: info@oasi.org.uk

Facebook: Orwell Astronomical

Twitter: @OASIPswich

YouTube:
<https://www.youtube.com/channel/UCHgxe3QAeRVWf7vkjKkCI2Q>

Members-only message board

<https://groups.io/g/OASI>

Observatory (meeting nights only)
07960 083714

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

The CLOSING date is the 15th day of the month

Access into the School Grounds and Observatory Tower

The Observatory is closed.

Articles for OASI News

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

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

Text:	txt, rtf, rtf, doc, docx, odt, Pages, pdf
Spreadsheets:	xls, xlsx, OpenOffice/LibreOffice, Numbers
Images: tiff, png, jpg	Please send tables as separate files in one of the above formats.

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

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

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

Reproducing articles from OASI News

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Committee 2021

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

Committee Meeting

This will be held via Zoom at 8pm on Friday 21 May. Please Contact Paul Whiting for Zoom connection details.

Observatory Restoration Update

Dear Members,

I have recently received some good news from Orwell Park School, concerning the Observatory.

The Orwell Park Foundation have been successful in obtaining a grant for £10,000 from the Heritage Lottery Fund. This was from the second round of grants from the Culture Recovery Fund, designed to help out organisations who have been affected by the COVID-19 pandemic.

The money will help to make the Observatory, COVID secure, when we reach the stage that public visits can recommence. Also, funds will be available to carry out the most urgent of repairs, which have further deteriorated since we have been unable to access the Observatory.

I will keep you updated as things progress.

Thank you and clear skies!

Andy Gibbs, Chairman

There's a virtual tour of the Observatory here <https://orwellpark.co.uk> Click on the observatory and use full screen display.

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/ljhs9db7lncki4sojo7092vfvc%40group.calendar.google.com/public/basic.ics>

For other astronomy news and astro pictures try our

Twitter feed <https://twitter.com/OASlpswich>

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

Date, Time & Location	Contact	Event
Weekly, every Wednesday, from 20:00	Martin Cook, Roy Gooding	OBSERVATORY CLOSED Meet via Zoom.
Monday 10 May 19:30-21:00 Zoom	Martin R-H newbourne@oasi.org.uk	"Newbourne" meeting: 19:30 meeting opens; 19:45 Astro News by Paul Whiting, FRAS; 20:00 The Apollo 11 Guidance Computer, recorded talk by Robert Wills.
Fri 21 May 2021, 20:00 Zoom	Andy Gibbs chairman@oasi.org.uk	Committee meeting via Zoom. All members are invited to attend.
Mon 24 May 2021, 19:30-21:00 Zoom	Martin R-H newbourne@oasi.org.uk	"Newbourne" meeting: 19:30 meeting opens; 19:45 Sky Notes by Bill Barton, FRAS; 20:00 Eclipse Chasing - The Dark Side, live, non-astronomical talk by Paul Whiting, FRAS.
Mon 14 Jun 2021, 19:30-21:00 Zoom	Martin R-H newbourne@oasi.org.uk	"Newbourne" meeting: 19:30 meeting opens; 19:45 Astro News by Paul Whiting, FRAS.
Fri 25 Jun 2021, 19:50-21:00 Zoom	Pete Richards lectures@oasi.org.uk	19:50 meeting opens; 20:00 Anglo-Saxon Astronomy, live talk by Martin Lunn, MBE.
Mon 28 Jun 2021, 19:30-21:00 Zoom	Martin R-H newbourne@oasi.org.uk	"Newbourne" meeting: 19:30 meeting opens; 19:45 Sky Notes by Bill Barton, FRAS.

Date, Time & Location	Contact	Event
Saturday 10 July from 13:00 Newbourne Village Hall	Pete Richards lectures@oasi.org.uk	OASI Summer Picnic

Meetings via Zoom

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

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

OASI @ Newbourne (still Zooming)

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). BUT In view of the COVID-19 situation **all meetings at Newbourne are suspended**. If OASI members would like to meet up via Zoom on those evenings, please first contact Paul Whiting with your email address to receive an invitation. Members only, please. Subsequent meetings will be assessed in line with the current Government Guidelines in place at the time. Thank you for your understanding.

May 10 (T) May 24 (A+T) June 14 (A) June 28 (A)
July 10 OASI picnic

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

Stargazer's Guide

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

Astronomy Workshops/Informal talks

Meetings will depend on COVID-19 situation. **Talks will be via Zoom during lock-down.**

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

If you are a new OASI member, or haven't been to one of these informal workshops before, they are a mixture of events of different characters including beginners talks, interactive workshops, films, etc., suitable for all. They are also a chance to chat with other members over a cup of tea and a biscuit, in a venue rather warmer than the observatory dome on a winter's night!

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

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

Lectures – via Zoom

Contact: Peter Richards lectures@oasi.org.uk

We are arranging an exciting and interesting set of online lectures by guest speakers for this year. The start time for all talks will be 8pm and, as usual, the talks will usually be held on a Friday evening. All meetings are currently via Zoom. Contact Paul Whiting if you can't find the details.

Other local astronomy society meetings

Athaneum Astro Society

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

Meetings suspended during the Covid-19 situation.

We normally 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

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

DASH Astro

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

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

Meetings will be assessed in line with the current Government Guidelines in place at the time. BAA news & webinars. For full details of all meetings or cancellations, please go to <https://britastro.org/meetings/2021>.

2021

Wednesday 12 May	19:00	Comet 29P/Schwassmann–Wachmann	Richard Miles
Friday 14 May	19:15	Radio Astronomy Section Zoom 5	
Wednesday 26 May	19:00	George Alcock Memorial Lecture - Webinar	
Friday, 28 May	19:15	Radio Astronomy Section Zoom 6	
Wednesday 9 June	19:00	Sketching Deep Sky Objects	Howard Banich
Friday, 25 June	19:15	Radio Astronomy Section Zoom 7	
Saturday, 26 June	11:00	BAA Summer Webinar	
Wednesday, 27 October		BAA Annual General Meeting and BAA Meeting,	
Saturday, 04 December		BAA Christmas Meeting	

Pete and Paul's Observing Challenges for 2021

Pete Lawrence & Paul Abel <https://britastro.org/node/25889>

List of Challenges

- Venus at dichotomy: finding the date when Venus appears to 50% illuminated in the telescope.
- The Saturn Moon Challenge: How many moons of Saturn can you see? How many can you capture in an image?
- The Moon Against the Spicule Layer: On 2021 June 10 there will be a partial eclipse of the sun. Just before first contact, and just after last contact, you should be able to see/photograph the moon against the spicule layer of the sun.
- A New Twist on M57's Central Star: The Ring Nebula (or M57) in Lyra is a splendid planetary nebula- at its centre is the dead star whose outer atmosphere was blown into space creating the nebula. The challenge is to capture the central star using a Smartphone.
- The Moons of Uranus: The seventh planet from the Sun is well placed in UK skies and comes to opposition on 4th November 2021. This is a good time to look at the satellites of Uranus - how many can you spot?
- Thin Moon Hunting: Just before new moon, and immediately after new moon our satellite has a very small phase known as a 'thin moon'. Catching them can be quite a challenge- Pete managed to get an image some 15h13m after new moon, can you beat that?
- The Rilles of Gassendi: Gassendi crater is a splendid impact crater on the moon. The floor of Gassendi crater is crossed by many rilles, some of them quite fine. How much of the rille system can you see?
- Smartphone NLCs: Soon we will see the return of Noctilucent Clouds- brilliant clouds very high up in the atmosphere. Displays of NLCs can be very bright, and they can be nicely imaged on a Smartphone, see if you can catch a display on your Smartphone this year!
- The Distance to Delta Cephei: Delta Cephei is the proto-type 'Cepheid Variable'. The magnitude of these stars varies, and there is a well-established relationship between their period and their distance. Find the period and absolute magnitude to determine the distance to this star.
- Imaging a Galilean Satellite Eclipse: This year we will be passing through the equatorial plane of Jupiter. As a result, the four largest Galilean satellites: Io, Europa, Ganymede and Callisto will appear to undergo 'mutual phenomena' whereby they will seem to pass in front or behind each other (or their shadows). See if you can capture some of these!

Let Paul Abel know how you get on by emailing him at paul.abel@yahoo.co.uk with your observations. You can also send them to the relevant Section Director who will be pleased to receive them, and you can upload them to your BAA Album on the website. From the interweb

From the Interweb

In a First, Astronomers Capture Full View of Venus's Orbital Dust Ring

<https://gizmodo.com/in-a-scientific-first-astronomers-capture-a-complete-v-1846712924>

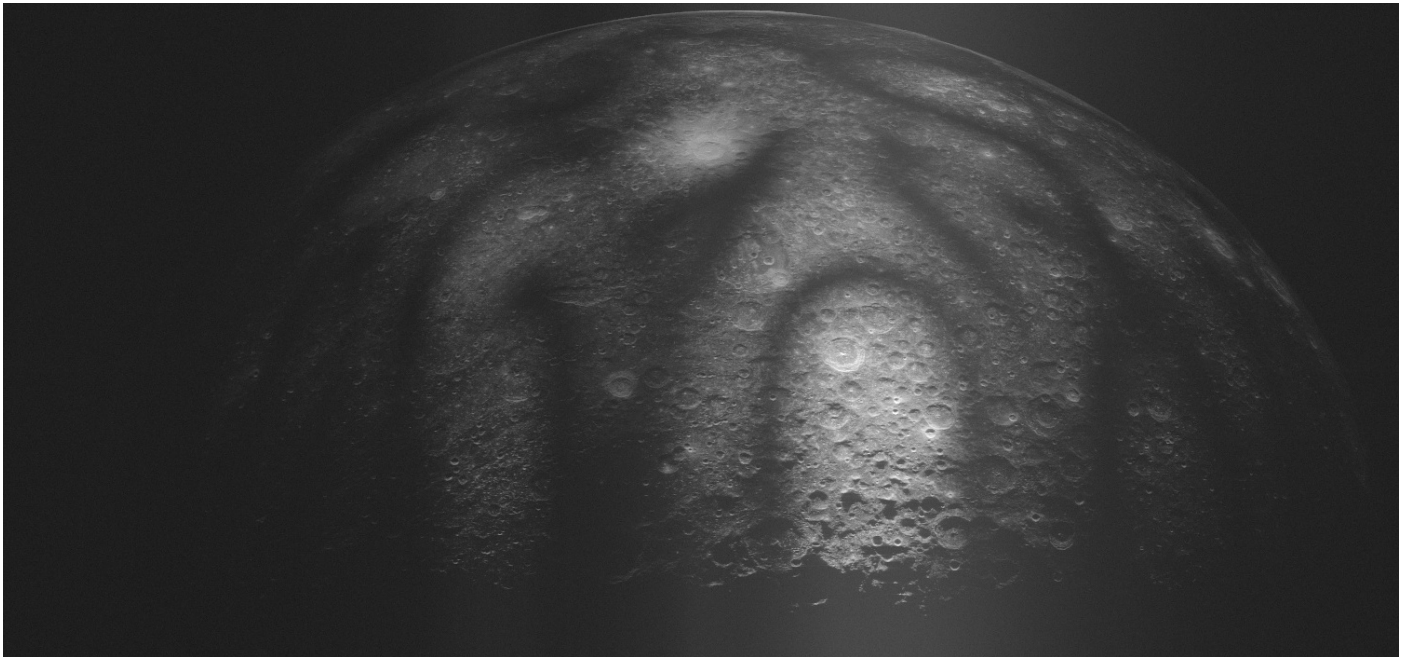
A band of dust that follows Venus along its entire orbital path has finally been viewed in full, thanks to a series of fortuitous maneuvers involving NASA's Parker Solar Probe.

Astronomers suspected it was there, but now we know it's real: a band of particles distributed along Venus's orbital path around the Sun.

Arecibo beam pattern

<https://twitter.com/jeanlucmargot/status/1384248631549579267?s=21>

This radar image shows the beam pattern of the Arecibo telescope painted on the surface of the Moon.



The data-taking system is described in the current issue of the Journal of Astronomical Instrumentation.

<https://worldscientific.com/doi/10.1142/S225117172150001X>

A Data-Taking System for Planetary Radar Applications

Journal of Astronomical Instrumentation **Jean-Luc Margot**

Most planetary radar applications require recording of complex voltages at sampling rates of up to 20MHz. The paper describes the design and implementation of a sampling system that has been installed at the Arecibo Observatory, Goldstone Solar System Radar, and Green Bank Telescope. After many years of operation, these data-taking systems have enabled the acquisition of hundreds of datasets, many of which still await publication.

Study of Close Stellar Encounters with the Solar System Based on Data from the Gaia EDR3 Catalogue

<https://arxiv.org/abs/2104.10487>

Vadim V. Bobylev, Anisa T. Bajkova

We have studied stellar candidates for close (within 1 pc) encounters with the Solar system. For all of the stars under consideration the kinematic characteristics have been taken from the Gaia EDR3 catalogue. The parameters of the encounters of these stars with the Solar system have been calculated using three methods: (1) the linear one, (2) by integrating the orbits in an axisymmetric potential, and (3) by integrating the orbits in a potential with a spiral density wave. All three methods are shown to yield similar results. We have selected five stars that are good candidates for reaching the boundaries of the Oort cloud and passing through it. Based on the second method, in good agreement with the other two methods, we have obtained the following estimates of the encounter parameters for the star GJ 710: $t_{\min}=1.320\pm0.028$ Myr and $d_{\min}=0.020\pm0.007$ pc. It is also interesting to note the star Gaia EDR3 510911618569239040 with parameters $t_{\min}=-2.863\pm0.046$ Myr and $d_{\min}=0.057\pm0.079$ pc.

[Meanwhile nearer stuff is a problem <https://astriagraph.spacetechn-ibm.com> Ed.]

Hubble Celebrates Its 31st Birthday with Incredible Image of AG Carinae

<http://www.sci-news.com/astronomy/hubble-image-ag-carinae-09587.html>



This Hubble image shows AG Carinae, a luminous blue variable star some 20,000 light-years away in the constellation of Carinae. The color image was made from separate exposures taken in the visible and ultraviolet regions of the spectrum with Hubble's Wide Field Camera 3 (WFC3) instrument. Four filters were used to sample various wavelengths. The color results from assigning different hues to each monochromatic image associated with an individual filter. Image credit: NASA / ESA / STScI.

Extremely bright pulse from FRB20201124A observed with the 25m Stockert Radio Telescope

<https://www.astronomerstelegam.org/?read=14556>

We report on the observation of an extremely bright pulse from FRB20201124A observed in L-band with the Stockert 25-m Radio Telescope. Following the report of enhanced activity by the CHIME/FRB collaboration (ATel #14497) observations with this instrument began on 2021 March 31. Until April 15, a total of approx. 90 hours of observation time had been accumulated distributed over 12 days. Observations were carried out with 100 MHz bandwidth at a center frequency of 1380 MHz with 218.4 microseconds time resolution and 583 MHz spectral resolution. Data was analyzed for single pulses using PRESTO with an S/N threshold of 6. Candidates were subsequently inspected visually.

Michael Collins

Source: [https://en.wikipedia.org/wiki/Michael_Collins_\(astronaut\)](https://en.wikipedia.org/wiki/Michael_Collins_(astronaut))

Michael Collins (October 31, 1930 – April 28, 2021) was an American astronaut who flew the Apollo 11 command module Columbia around the Moon in 1969 while his crewmates, Neil Armstrong and Buzz Aldrin, made the first crewed landing on the surface. He was also a test pilot and major general in the U.S. Air Force Reserves.

Collins graduated from the United States Military Academy with the Class of 1952.[1] He joined the United States Air Force, and flew F-86 Sabre fighters at Chambley-Bussières Air Base, France. He was accepted into the U.S. Air Force Experimental Flight Test Pilot School at Edwards Air Force Base in 1960, also graduating from the Aerospace Research Pilot School (Class III).

Selected as part of NASA's third group of 14 astronauts in 1963, Collins flew in space twice. His first spaceflight was on Gemini 10 in 1966, in which he and Command Pilot John Young performed orbital rendezvous with two spacecraft and undertook two extravehicular activities (EVAs, also known as spacewalks). On the 1969 Apollo 11 mission he became one of 24 people to fly to the Moon, which he orbited thirty times. He was the fourth person (and third American) to perform a spacewalk, the first person to have performed more than one spacewalk, and, after Young, who flew the command module on Apollo 10, the second person to orbit the Moon alone.

After retiring from NASA in 1970, Collins took a job in the Department of State as Assistant Secretary of State for Public Affairs. A year later, he became the director of the National Air and Space Museum, and held this position until 1978, when he stepped down to become undersecretary of the Smithsonian Institution. In 1980, he took a job as vice president of LTV Aerospace. He resigned in 1985 to start his own consulting firm. Along with his Apollo 11 crewmates, Collins was awarded the Presidential Medal of Freedom in 1969 and the Congressional Gold Medal in 2011.



The crew of Apollo 11: from left to right, Neil Armstrong, Michael Collins and Buzz Aldrin.

The Night Sky in May 2021

Martin RH

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

Sun, Moon and planets

Sources: <http://heavens-above.com/PlanetSummary.aspx>

<http://heavens-above.com/moon.aspx>

Times BST



Object	Date	Rise	Set	Mag.	Notes
Sun	1	05:25	20:20		
	31	04:42	21:05		
Moon	1	01:11	08:25		Last quarter 03 May 20:50 New moon 11 May 20:00 Apogee 406,512 km 11 May 22:54 First quarter 19 May 20:13 Full moon 26 May 12:14 Perigee 357,311 km 26 May 02:51
	31	01:26	09:45		
Mercury	1	05:51	21:42	-1.1	Max. eastern elongation May-17
	31	05:42	22:03	2.7	
Venus	1	05:54	21:05	-3.8	
	31	05:45	22:28	-3.8	
Mars	1	08:12	01:02	1.6	On 15/16 May Mars will be close to the crescent Moon in Gemini.
	31	07:48	00:10	1.7	
Jupiter	1	03:28	13:11	-2.1	
	31	01:37	11:31	-2.3	
Saturn	1	02:55	11:43	0.7	
	31	00:59	09:47	0.6	
Uranus	1	05:33	20:06	5.9	
	31	03:38	18:17	5.9	
Neptune	1	04:12	15:28	7.9	
	31	02:15	13:33	7.9	

Occultations during May 2021

If you would like to know more about lunar occultations, please see:-

https://iota-es.de/moon/grazing_descr101.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 May 2021

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

Shower	Normal limits	Maximum	Max RA/Dec.°	ZHR at Max	Notes
η-Aquarids	Apr 19 – May 28	May 6	22:32 (338°) -0.8°	40	Fine southern shower, poorly seen from UK. Fast meteors, many with persistent trains. Good in 2013
Daytime Arietids	May 22 – July 2	June 7	02:56 (044°) +24°	30?	Most active of the daytime showers. Good for radio observers. ZHR and radiant location uncertain.
Daytime ζ-Perseids	May 20 – July 5	June 9	04:16(064°0 +27°	20?	Peak overlaps with that of Daytime Arietids. Good for radio observers. ZHR and radiant location uncertain.

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

Visible ISS passes ≥15° max altitude

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

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

Date	Bright-ness (mag)	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
01/05/21	-2.4	04:04:28	15°	SSW	04:06:34	28°	SSE	04:09:32	10°	E
02/05/21	-2	03:18:42	19°	SSE	03:19:18	20°	SE	03:21:53	10°	E
03/05/21	-3.3	04:05:51	16°	SW	04:08:19	49°	SSE	04:11:37	10°	E
04/05/21	-3	03:20:01	30°	SSW	03:20:57	37°	SSE	03:24:08	10°	E
05/05/21	-2.4	02:34:07	27°	SE	02:34:07	27°	SE	02:36:34	10°	E
05/05/21	-3.8	04:07:04	12°	WSW	04:10:09	74°	SSE	04:13:33	10°	E
06/05/21	-3.7	03:21:09	28°	WSW	03:22:44	63°	SSE	03:26:06	10°	E
07/05/21	-3.5	02:35:12	49°	SSE	02:35:19	49°	SSE	02:38:37	10°	E
07/05/21	-3.8	04:08:39	10°	W	04:12:02	87°	S	04:15:26	10°	E
08/05/21	-2.3	01:49:13	26°	ESE	01:49:13	26°	ESE	01:51:06	10°	E
08/05/21	-3.8	03:22:09	18°	W	03:24:34	83°	S	03:27:58	10°	E
09/05/21	-3.9	02:36:08	43°	WSW	02:37:07	75°	SSE	02:40:29	10°	E
09/05/21	-3.8	04:10:31	10°	W	04:13:54	79°	S	04:17:17	10°	ESE

Date	Bright-ness (mag)	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
10/05/21	-3.5	01:50:05	55°	ESE	01:50:05	55°	ESE	01:53:00	10°	E
10/05/21	-3.8	03:23:01	10°	W	03:26:26	85°	S	03:29:49	10°	E
11/05/21	-2	01:04:01	23°	E	01:04:01	23°	E	01:05:31	10°	E
11/05/21	-3.9	02:36:56	23°	W	02:38:56	87°	S	02:42:20	10°	E
11/05/21	-3.6	04:12:21	10°	W	04:15:41	55°	SSW	04:19:00	10°	ESE
12/05/21	-3.9	01:50:48	55°	WSW	01:51:27	83°	S	01:54:50	10°	E
12/05/21	-3.8	03:24:51	10°	W	03:28:13	68°	SSW	03:31:36	10°	ESE
13/05/21	-3.5	01:04:34	55°	ESE	01:04:34	55°	ESE	01:07:20	10°	E
13/05/21	-3.9	02:37:29	11°	W	02:40:45	79°	S	02:44:07	10°	ESE
13/05/21	-3	04:14:16	10°	W	04:17:19	32°	SSW	04:20:22	10°	SE
14/05/21	-2.3	00:18:07	27°	E	00:18:07	27°	E	00:19:50	10°	E
14/05/21	-3.9	01:51:00	20°	W	01:53:14	85°	S	01:56:38	10°	E
14/05/21	-3.4	03:26:41	10°	W	03:29:54	42°	SSW	03:33:08	10°	SE
14/05/21	-2	21:50:49	10°	S	21:52:46	15°	SE	21:54:42	10°	ESE
14/05/21	-3.7	23:25:44	10°	SW	23:29:00	50°	SSE	23:32:18	10°	E
15/05/21	-3.9	01:02:20	10°	W	01:05:43	87°	S	01:09:07	10°	E
15/05/21	-3.7	02:39:09	10°	W	02:42:28	55°	SSW	02:45:47	10°	ESE
15/05/21	-2.1	04:16:32	10°	W	04:18:47	17°	SW	04:21:01	10°	S
15/05/21	-3.3	22:38:25	10°	SW	22:41:35	38°	SSE	22:44:44	10°	E
16/05/21	-3.9	00:14:49	10°	W	00:18:12	83°	S	00:21:36	10°	E
16/05/21	-3.9	01:51:37	10°	W	01:54:59	68°	SSW	01:58:21	10°	ESE
16/05/21	-2.6	03:28:41	10°	W	03:31:26	23°	SSW	03:34:11	10°	SSE
16/05/21	-2.8	21:51:13	10°	SSW	21:54:10	28°	SSE	21:57:07	10°	E
16/05/21	-3.9	23:27:19	10°	WSW	23:30:41	75°	S	23:34:04	10°	E
17/05/21	-3.9	01:04:06	10°	W	01:07:29	78°	S	01:10:52	10°	ESE
17/05/21	-2.9	02:41:00	10°	W	02:44:35	30°	S	02:47:05	10°	SE
17/05/21	-3.8	22:39:51	10°	WSW	22:43:11	63°	SSE	22:46:32	10°	E
18/05/21	-3.9	00:16:34	10°	W	00:19:57	85°	S	00:22:05	21°	E
18/05/21	-2.2	01:53:24	10°	W	01:54:58	23°	W	01:54:58	23°	W
18/05/21	-3.6	21:52:26	10°	SW	21:55:41	50°	SSE	21:58:59	10°	E
18/05/21	-3.9	23:29:01	10°	W	23:32:24	87°	S	23:35:35	11°	E
19/05/21	-3.3	01:05:50	10°	W	01:08:30	45°	WSW	01:08:30	45°	WSW
19/05/21	-3.9	22:41:29	10°	W	22:44:52	83°	S	22:48:15	10°	E
20/05/21	-3.9	00:18:16	10°	W	00:21:38	68°	SSW	00:22:15	53°	SE

Date	Bright-ness (mag)	Start			Highest point			End		
		Time	Alt.	Az.	Time	Alt.	Az.	Time	Alt.	Az.
20/05/21	-3.8	21:53:57	10°	WSW	21:57:19	75°	SSE	22:00:42	10°	E
20/05/21	-3.9	23:30:44	10°	W	23:34:06	78°	S	23:36:04	23°	ESE
21/05/21	-1.9	01:07:38	10°	W	01:09:00	20°	WSW	01:09:00	20°	WSW
21/05/21	-3.8	22:43	10°	W	22:46:33	85°	S	22:49:56	10°	E
22/05/21	-3.2	00:20	10°	W	00:22:52	40°	SW	00:22:52	40°	SW
22/05/21	-3.8	21:55	10°	W	21:58:59	87°	S	22:02:22	10°	E
22/05/21	-3.7	23:32	10°	W	23:35:43	55°	SSW	23:36:46	36°	SE
23/05/21	-3.8	22:44	10°	W	22:48:12	68°	SSW	22:50:41	17°	ESE
24/05/21	-2	00:21	10°	W	00:23:36	20°	WSW	00:23:36	20°	WSW
24/05/21	-3.8	21:57	10°	W	22:00:38	78°	S	22:04:00	10°	ESE
24/05/21	-2.9	23:34	10°	W	23:37:12	32°	SSW	23:37:33	31°	SSW
25/05/21	-3.2	22:46	10°	W	22:49:43	42°	SSW	22:51:31	22°	SE
26/05/21	-3.5	21:58	10°	W	22:02:11	55°	SSW	22:05:30	10°	ESE
26/05/21	-1.8	23:36	10°	W	23:38:26	17°	SW	23:38:26	17°	SW
27/05/21	-2.3	22:48:20	10°	W	22:51:04	23°	SSW	22:52:27	18°	S
28/05/21	-2.7	22:00:34	10°	W	22:03:37	32°	SSW	22:06:29	11°	SE
30/05/21	-1.7	22:02:36	10°	W	22:04:51	17°	SW	22:07:05	10°	S

Starlink passes

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

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

Comets with magnitude brighter than magnitude 10

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

Comet	Brightness	Date of last reported observation	Angular separation from Sun	Altitude	Azimuth	Constellation
C/2020 R4 ATLAS	8.6	2021-Apr-27	132°	-3.6°	334° (NNW)	Boötes

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>

William Herschel – Discoverer of the Deep Sky

Simon from Bath Astronomers has sent in the following notice.

On Saturday 19th June 2021 at 7:30pm, an online Zoom talk by Dr. Wolfgang Steinicke has been organised by Wells and Mendip Astronomers supported by Bath Astronomers.

The talk is entitled ***“William Herschel – Discoverer of the Deep Sky - The epochal work of the greatest visual observer and his talented sister Caroline”***.

The lecture by Dr. Steinicke describes the epochal work of William and Caroline Herschel. It focuses on deep-sky objects, visually observed between 1774 and 1817 with various telescopes. Most of these were discovered in the monumental campaign (1783-1802), aided by his talented sister. 2500 nebulae and star clusters were published in three catalogs. William's exploration of the skies from southern England also covered binary stars and objects in the solar system – with the height of the Uranus discovery in 1781. However, the man of German descent was far more than just an observer. He constructed large telescopes, developed new methods, and pondered the nature and evolution of cosmic objects, resulting in a revolutionary view of the structure of the Milky Way.

If you'd like to attend the free online event, you can reserve your place on the numbers limited Zoom session using Wells and Mendip's [Billetto ticketing page](#):

Bath Astronomers website <https://bathastronomers.org.uk/about-us/>

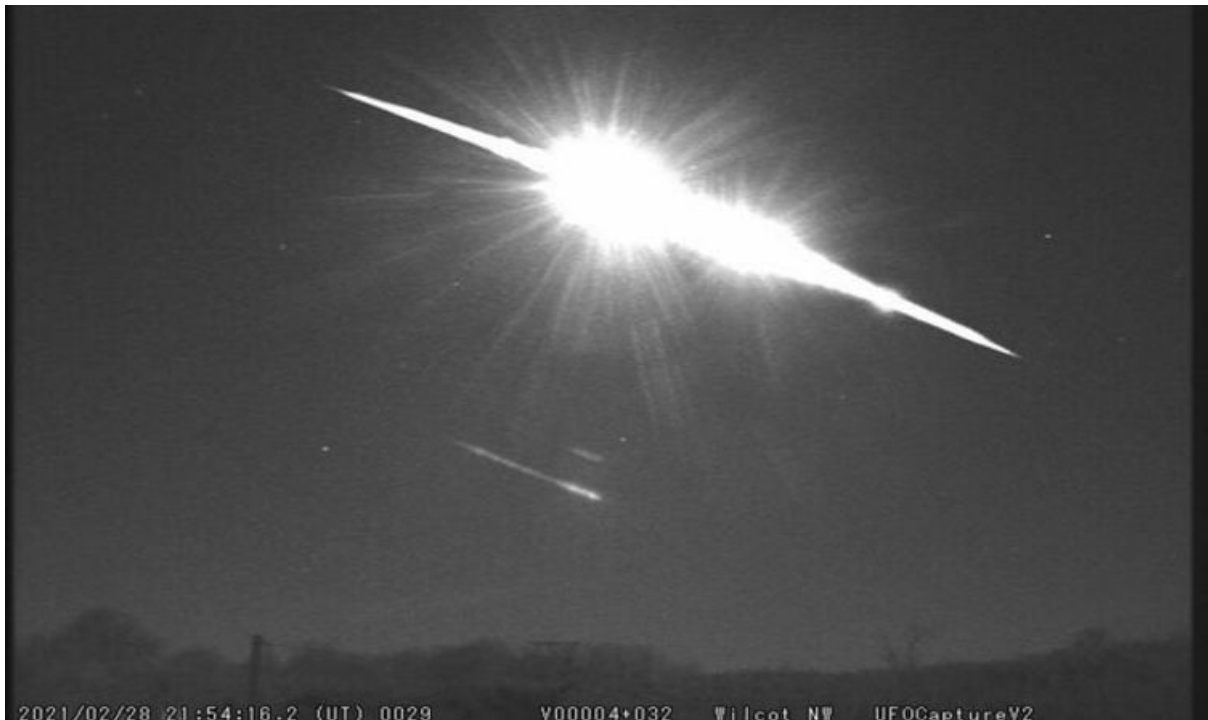
The great meteorite fall at Winchcombe on the 28 Feb 2021

Or as NOT seen from station EN911 at Ipswich (UK)

Alan Smith

On the evening of Sunday, 28th February 2021, my Canon 1100d 'fireball' camera was erected and running as usual from 1830hrs UT. Perfect clear sky but with the moon rising by early evening the images were bound to be somewhat compromised. By 2035hrs fog had begun to roll in and the rising moon was covered, and at 2117hrs with the moon completely invisible, I decided that the night was going to be a washout so I recovered the by now soaking wet camera: even the dew heaters had been overcome.

Only 37 minutes later, at 2154hrs UT, 'Millie', a casual observer watched a spectacular yellow-green fireball streak across the sky. She was only a few km away from me and under clear skies. At the same time, hundreds of other people saw the same event, some hearing sonic booms as the bolide fragmented over Gloucestershire.



Composite of 6 seconds of video courtesy of UKMON

A family in Winchcombe heard a dull thud outside their home, but after looking out through a window could see no obvious reason.

Nick James, director of the British Astronomical Association Comet section, picked the event up on his 'NEMATODE' video camera, again under clear skies.

It was immediately obvious that this event was likely to have dropped a meteorite and by the morning of Monday, 1st March, there were over 750 reports on the IMO database. After only 18 hours, a press release by the UKFall Alliance (www.ukfall.org.uk) during the mid morning of Monday noted that the object was travelling at 30000mph, (way too fast to be a piece of space junk), and that by using multiple video captures an orbit had been determined which suggested that the object was likely to have been asteroidal in origin and would probably have resulted in a meteorite fall. The trajectory of the object was shown, and a likely strewn field published.



Image courtesy of UKfall.

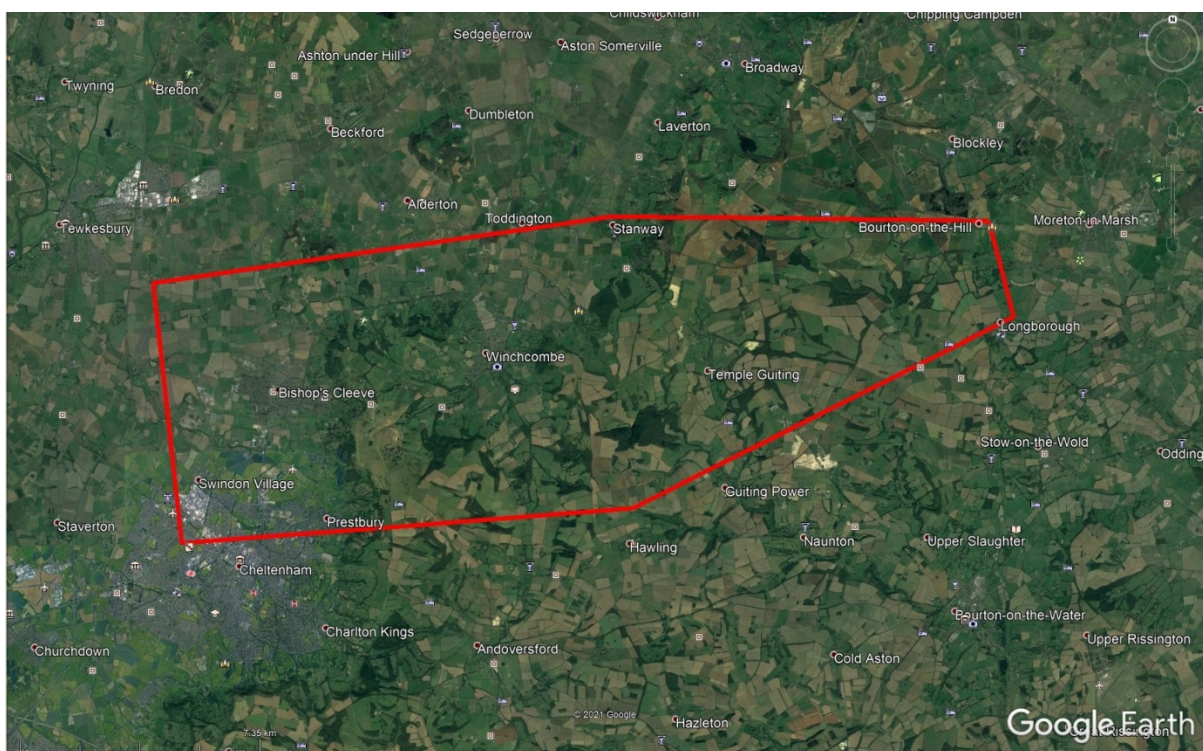


Image courtesy of UKfall.

Owing to Covid restrictions, the public were asked not to travel to the area, but if anyone living in the area found anything 'interesting' they should photograph it situ, and pick it up with a plastic bag or piece of aluminium foil.

The UKfall alliance was only formed a few months previously, towards the end of 2020, by Dr. Jim Rowe, with the express aim of trying to co-ordinate the various groups of video camera meteor watchers. Indeed, a BAA 'webinar' in early January 2021, focused on that exact scenario.

To watch this somewhat prescient webinar please see: <https://www.youtube.com/watch?v=HbQi8pIeXYA>

UKFALL has more than thirty cameras in the UK continually monitoring the sky for meteors and fireballs, and this event was picked up on six of them, at Cardiff, Manchester, Honiton, Lincoln, Cambridge and Welwyn Garden City. It was also picked up by the [NEMETODE](#) meteor network in Chelmsford. Working with Australia's Desert Fireball Network and France's [FRIPON](#) network, UKFALL analysed the meteor's path through the sky, and refined the likely exact location of meteorite falls.

According to Jim Rowe, all six of the UK meteor camera networks contributed data, as did 3 other international teams who analysed the data and predicted where fragments would land to within 400 metres.

The trajectory of the object was very steep, and with very light surface winds the predicted strewn field was fairly compact.

In practice, a meteorite had already been found! The family in Winchcombe who had heard the 'dull thud', woke up to find a pile of 'discarded BBQ' dumped on their drive. Fortunately having heard the news they realised that the 'rubbish' was probably a meteorite! The remains were collected within 12hrs of the fall with no contamination by rain so are an extremely valuable, virtually pristine scientific resource.

The debris looked like a very dark black coal, only much softer, and probably contains soft clay minerals suggesting that it once contained frozen water ice.



Image courtesy of UKMON

Dr. Richard Greenwood of the Open University was sent to examine the fragments and confirmed that the find was that of a Carbonaceous Chondrite. These objects are extremely rare, very fragile and usually fail to survive the journey through the earth's atmosphere. Formed when the planets themselves were being formed, they can contain elements that show what the planets are made of.

Given the Covid lockdown in force throughout the UK, there was no legitimate way of involving public searchers and that if more fragments were to be recovered, planetary scientists would have used the fact that this was an historic event to gain essential business travel permits. Local police were aware of the event and all researchers carried Covid related authorisations.

Obviously, a complete news blackout of the find was in force whilst 'scientists on their hands and knees crawled around with tweezers' looking for further fragments. Around 300gms of material were recovered.



Image courtesy of Glasgow University.

The find was finally revealed to the world via a press release from UKfall on Monday 8th March 2021, just 1 week after the event.

This is the first recorded meteorite fall in the UK for 30years, and possibly the first imaged carbonaceous chondrite fall anywhere.

Over a thousand reports were eventually received by the IMO, with many 'doorbell' type cameras also recording the event (IMO event I202-2021) [Fireball event \(imo.net\)](https://www.imo.net/)

The fragments found in the driveway at Winchcombe have been donated to the Natural History Museum (London) and will no doubt to be subject to much scrutiny over the coming years.

As one of my colleagues at the Orwell Astronomical Society (Ipswich) said somewhat wryly:

“NASA have spent millions of dollars and several years of spacecraft time going to asteroid Bennu and back, the Japanese spacecraft Hayabusa2 spent 6 years travelling to near earth asteroid Ryugu and back to deliver a few

grams of carbonaceous material. The Brits just went outside with a dustpan and brush and collected best part of ½ a kilo of the same stuff!”

One thing is a bit disappointing: I have been unable to find any DSLR images of the event. It seems that most people in the field are using relatively low spatial resolution video. On this occasion there were many recordings from many different angles and the strewn field prediction was spot on.

Next time.... ?

Alan Smith

Fireball

Alan Smith

This was captured by both of the fireball cameras run by society members, and shows a light green fireball way over to the west of the country. It was reported by at least 4 other people from as far away as County Clare, Ireland. IMO report [Fireball event \(imo.net\)](http://imo.net).

Given that it was so far west, it is unlikely that any of the Dutch based cameras will have caught it, so I'll report any updates as and when!

Event time between 011832 and 01902hrs UT 6/4/21.



Image by James Appleton:

- ZWO ASI178mc.
- Fujinon fish-eye lens, CF2.7HA-L1, 1:1.8, 2.7mm.
- 30s images.
- Gain 200.
- 42m altitude

Canon 1100D,
Sigma 4.5mm, f4.0
ISO800, 60 secs
20210406
01:18:41 - 01:19:41 hrs UT
No LC shutter
52:06:50.725N, 01:14:29.258E 37m altitude
EN911. GRUNDISBURGH, UK



Image by Alan Smith

Canon 1100D,
Sigma 4.5mm, f4.0
ISO800, 60 secs

Date: 20210406
Time: 01:18:41 - 01:19:41 hrs UT
No LC shutter

37m altitude
GRUNDISBURGH, UK
Note the exceptionally clear skies!

FOR SALE

email: dawnrose [at] btinternet.com

HOME CINEMA – A fully working home cinema set-up was dismantled due to a significant change in personal circumstances. The following components are for sale. Open to sensible offers.

- EPSON EH-TW480 HOME PROJECTOR with manual & disc, controller, ceiling mount and cable.
- CELEXON TM SCREEN 180cm diameter (casing 190cm diameter)- was chained to a beam.
- PANASONIC DVD DMP BDT130 BLU RAY with HDMI and mains cables, controller and manual.

BRAND NEW AEG DOUBLE AEG OVEN DUK731110M - £550

- It was a mistake buy, never installed.
- Has over 4 years left on warranty.
- Designed for under counter.
- AEG would not take it back during the pandemic.

Neutral Hydrogen (HI) Line Astronomy – The Next Step

Paul Whiting FRAS

Following on from the earlier experiments designed to receive and identify neutral hydrogen (HI) emissions at 21cm, the next stage was to utilise the larger antennas at Area 51^{3/4} at Newbourne, Suffolk. Specifically one of the 3m parabolic dishes there (figure 1).



Figure 1: The 3m dish at Area 51^{3/4}.

As before, the receiver comprised a narrow-band HI line low-noise pre-amplifier and an RTL-SDR Blog V3 USB receiver. The amplifier and receiver are shown in figure 2.



Figure 2: The HI line pre-amplifier and RTL-SDR Blog V3 USB Receiver.

The antenna beam width or the resolution for this antenna, using the following simple formula ($\lambda=21\text{cm}$, $D=300\text{cm}$), was calculated to be 4.9 degrees:

$$\theta = 1.22 \frac{\lambda}{D} \frac{180}{\pi}$$

The software used to capture data initially makes a dummy run to record the system background response with a 50 Ω dummy load connected in place of the antenna, which it then automatically subtracts from the received signal.

The initial results looked very promising, but it was disappointing to note the presence of nine permanent interference spikes of constant frequency throughout the experiment (figure 3b). Earlier experiments using the smaller, 1m dish (the “Mark 2”), four permanent noise spikes were extant (figure 3a).

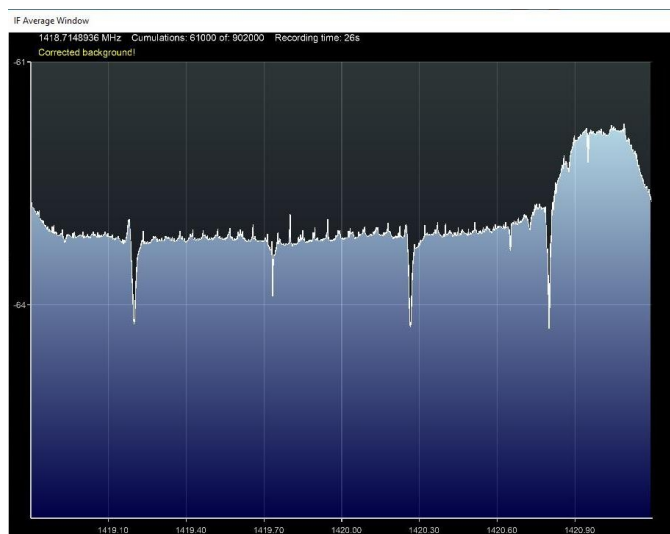


Table 3a: 1m dish noise spikes.

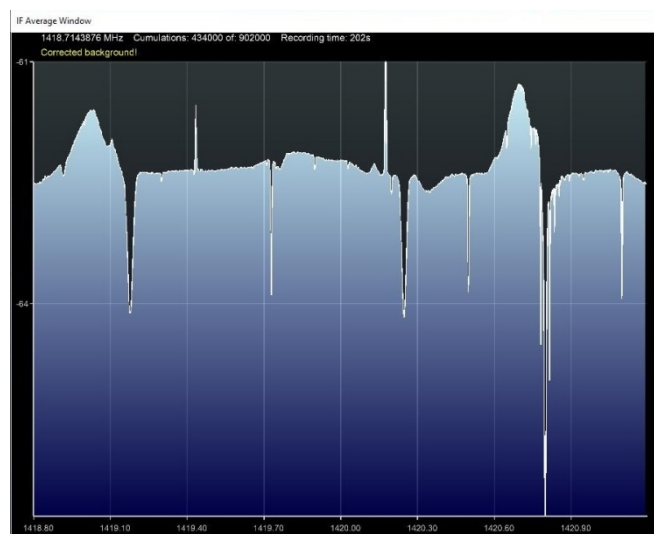


Table 3b: 3m dish noise spikes.

After some investigation it was shown that this noise was either being injected into the system by the laptop being used to control the SDR¹ and record the results, or as a result of poor design of the SDR dongle itself.

Ignoring this noise, the four hour run with the dish pointing almost directly upwards² towards the Milky Way, did produce some obvious traces that wandered between 1419.5 and 1420.5 MHz as would be expected. A detailed analysis of these results follows.

Coincidentally, M31 the Andromeda Galaxy crossed the path of the beam between 11:44 to 13:00.

Table 1 shows the extracted data from the recorded image set of the HI peaks with time and corresponding galactic longitude. For each identified peak, having first removed the offending noise peaks, the centre frequency is recorded. The noise spike removal and peak frequency identification was achieved using bespoke software written for the purpose.

		galactic longitude degrees	M31 in beam	centre frequency			
#	time			peak 1	peak 2	peak 3	peak 4
				ν_c	ν_c	ν_c	ν_c
				MHz			
1	11:44	117	yes	1419.15	1420.15	1420.55	
2	12:04	120	yes	1418.95	1420.05	1420.25	1420.50
3	12:34	127	yes	1420.07	1420.45	1420.85	
4	13:04	131	no	1418.95	1419.70	1420.10	1420.65
5	13:34	137	no	1419.08	1419.95	1420.75	
6	14:04	141	no	1419.05	1419.20	1420.25	1420.85
7	14:34	145	no	1419.05	1419.15	1420.00	1420.72
8	15:04	149	no	1419.20	1420.04	1420.20	1420.85

Table 1: Peak frequencies extracted from acquired image data.

1 Software Defined Radio. A radio in a dongle.

2 Hardware limitations meant the dish was actually pointing at approximately 80° elevation, due south.

The galactic longitude was derived from Starry Night (figure 4). The antenna field of view is also shown.

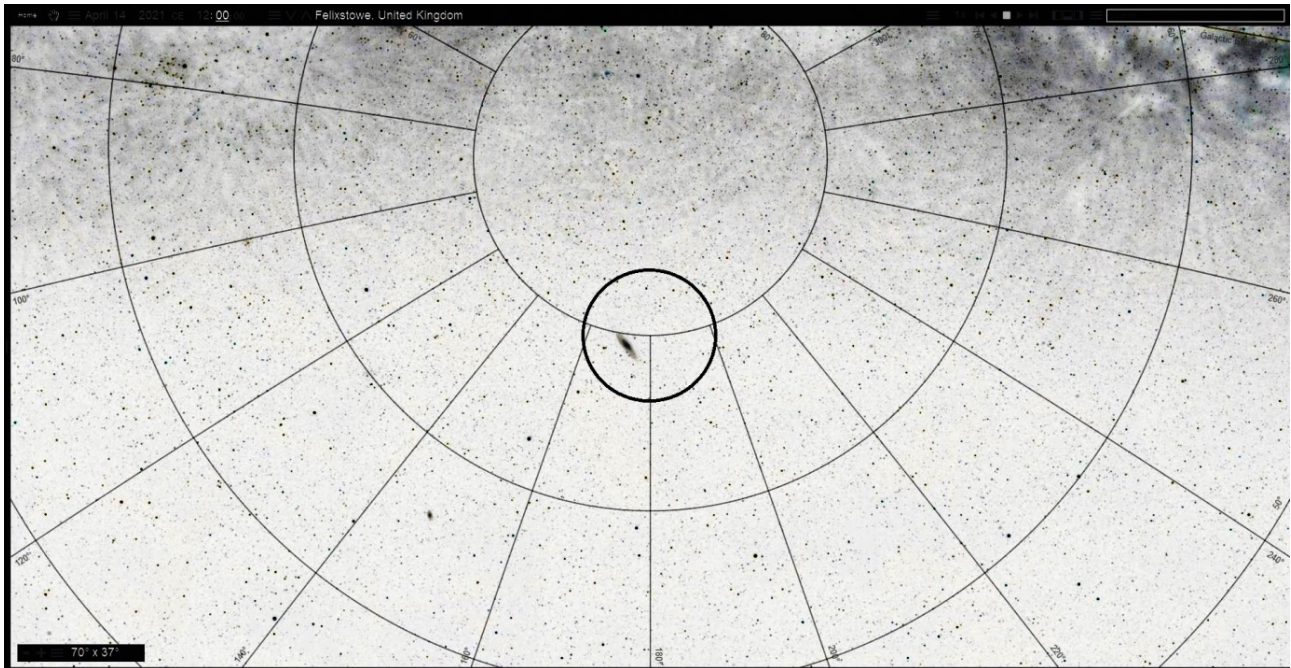


Figure 4: Starry night image, the black circle is the antenna beam field of view. Note M31 in sight.

	A	B	C	D	E	F	G	H
11:44			1419.15		1420.15		1420.55	
12:04	1418.95				1420.05	1420.25	1420.50	
12:34					1420.07		1420.45	1420.85
13:04	1418.95			1419.70	1420.10		1420.65	
13:34		1419.08		1419.95				1420.75
14:04		1419.05	1419.20			1420.25		1420.85
14:34		1419.05	1419.15		1420.00			1420.72
15:04			1419.20		1420.04	1420.20		1420.85

Table 2: Peak frequency data divided into frequency groups. Shaded column shows local emission.

Table 2 shows the same peak frequency data, this time divided into groups of similar frequency. Assuming that the frequency shifts (red or blue) are as a result of relative co-rotational motion of HI line emission in the Milky Way galaxy, we can convert these shifts to radial velocities (see part I of this set of articles). As mentioned above for part of the reception period the M31 galaxy was in view. Any shifted HI emission observed from this source would be a result of the relative radial velocity of M31 towards the Milky Way – approximately -110 km s^{-1} (negative means blue shifted, or heading towards us).

Taking the average frequency in each peak grouping and converting this to a radial velocity, we can construct the graph in figure 5, showing radial velocity of HI gas clouds against time and in figure 6, against galactic longitude.

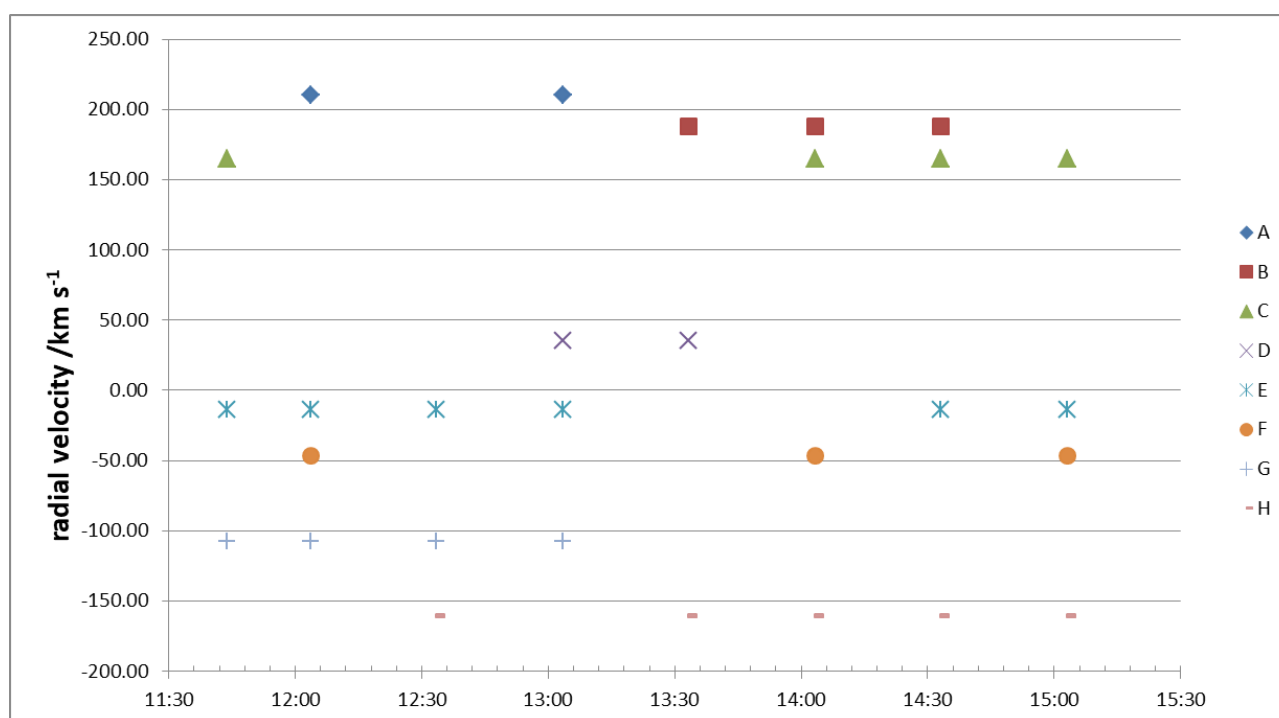


Figure 5: HI cloud distribution observed. Peak frequency groupings (A-H) as shown.

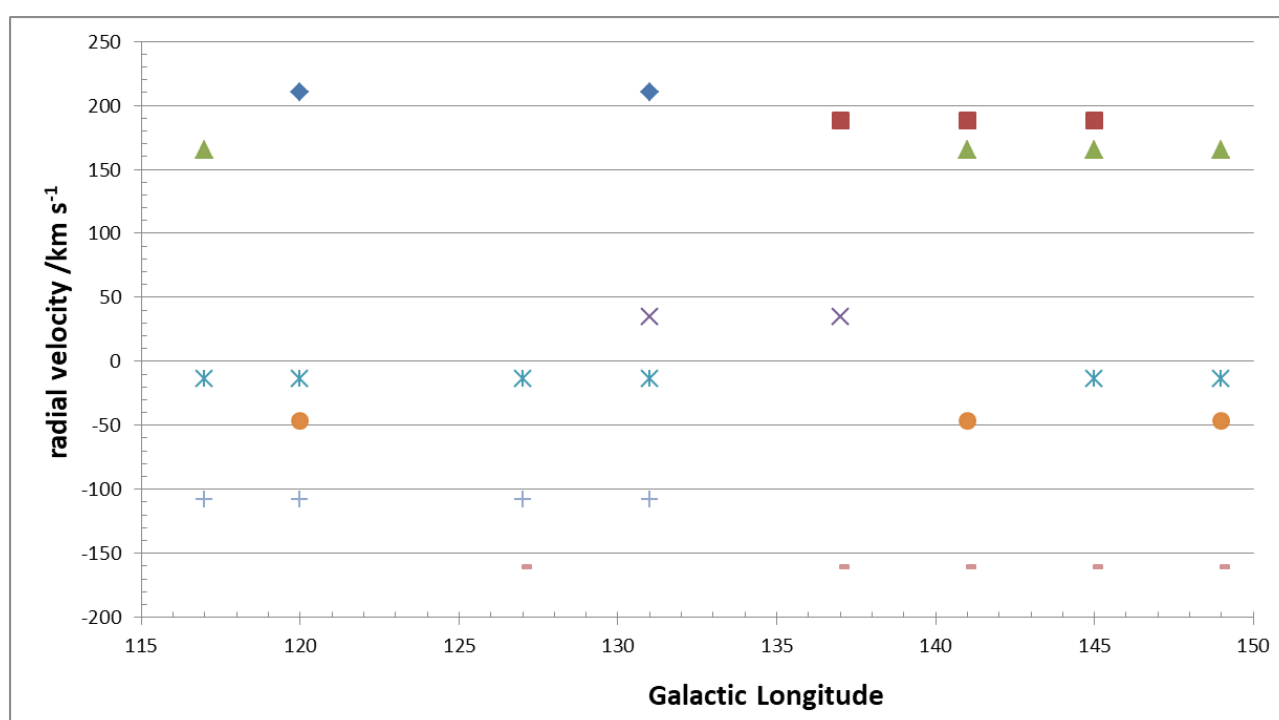


Figure 6: The same data against Galactic Longitude.

Note the result for radial velocity -110 km s^{-1} (group G – “+” symbol) seen between $11:30$ and $13:00$ and galactic longitude $115^\circ - 130^\circ$, as would be expected from M31.

To complete the analysis, we can use the mathematical transformation shown in part I of this paper to generate the distance from the Earth for each HI cloud. Table 3 shows the results of these transformations. Note that the local emission values (group E in table 2) have been omitted.

	radial velocities (kms ⁻¹)				corresponding distance (kpc)			
117	165		-108		21.3		35.3	
120	210		-47	-108	14.5		84.2	33.9
127		-108	-161			30.1	18.1	
131	210	35		-108	10.9	98.1		27.7
137	188	35	-161		10.7	87.5	13.7	
141	188	165	-47	-161	9.0	11.4	57.9	11.9
145	188	165		-161	7.4	9.5		9.9
149	165		-47	-161	7.5		45.6	7.9

Table 3:

For galactic longitudes shown, the radial velocities observed and corresponding calculated distances.

We can now plot these distances on a map of the Milky Way galaxy. Only the quadrant of interest is shown, together with the three galactic arms there present (figure 7).

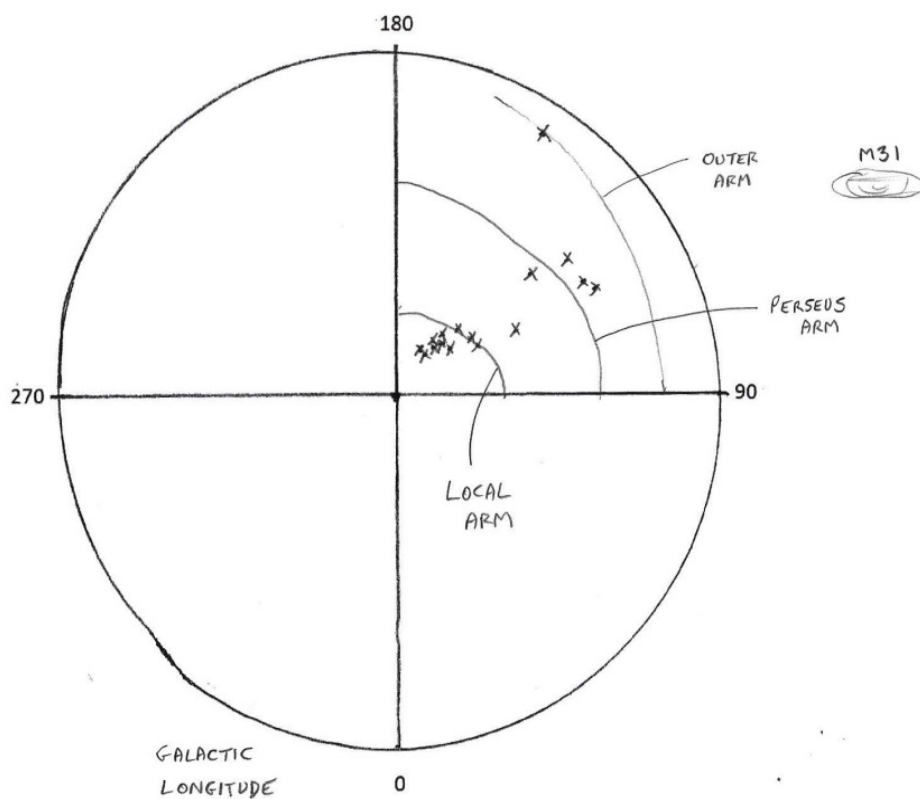


Figure 7: Quadrant map of the Milky Way with observed HI clouds

As we can see there is a good correlation between the observed hydrogen clouds and the positions of the spiral arms of the Milky Way. The “rogue” results in the direction of M31 equate quite nicely with the emission that would be expected from the Andromeda Galaxy.

Not bad for a bit of backyard radio astronomy.