

THE BOLTON ASTRONOMER

The monthly journal of the Bolton Astronomical Society

ISSUE No. 8 October 2011

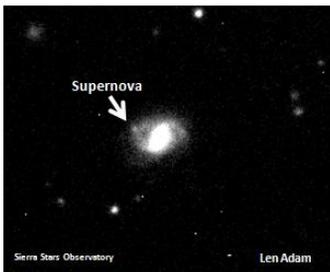
Next Meeting

Yuri Gagarin in
Manchester
4th October 2011

A packed issue
with spectacular
images from
members of BAS

In this Issue

Remote Imaging
Len Adam gets frustrated
with the recent weather.



Comet Garradd
still around

Have you seen it yet?

FROM THE ARCHIVES

Jean Brandwood
taking us back in
Astronomical History



John Herschel

Featured Constellation
HERCULES



**A home made barn door
mount**
Ross Wilkinson



Images from BAS Members
Images from Dean Kos,
Ross Wilkinson,
and Carl Stone

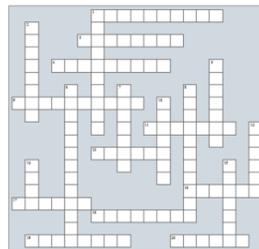


October Objects of Interest
Jupiter's Moons and Uranus

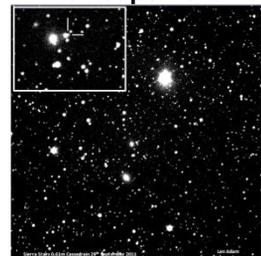


Crossword Number 8

BAS Crossword 8



**British Amateur discovers his
26th Supernova**



**Please send magazine articles &
contributions to the Editor
Len Adam.**

lenadam@sky.com

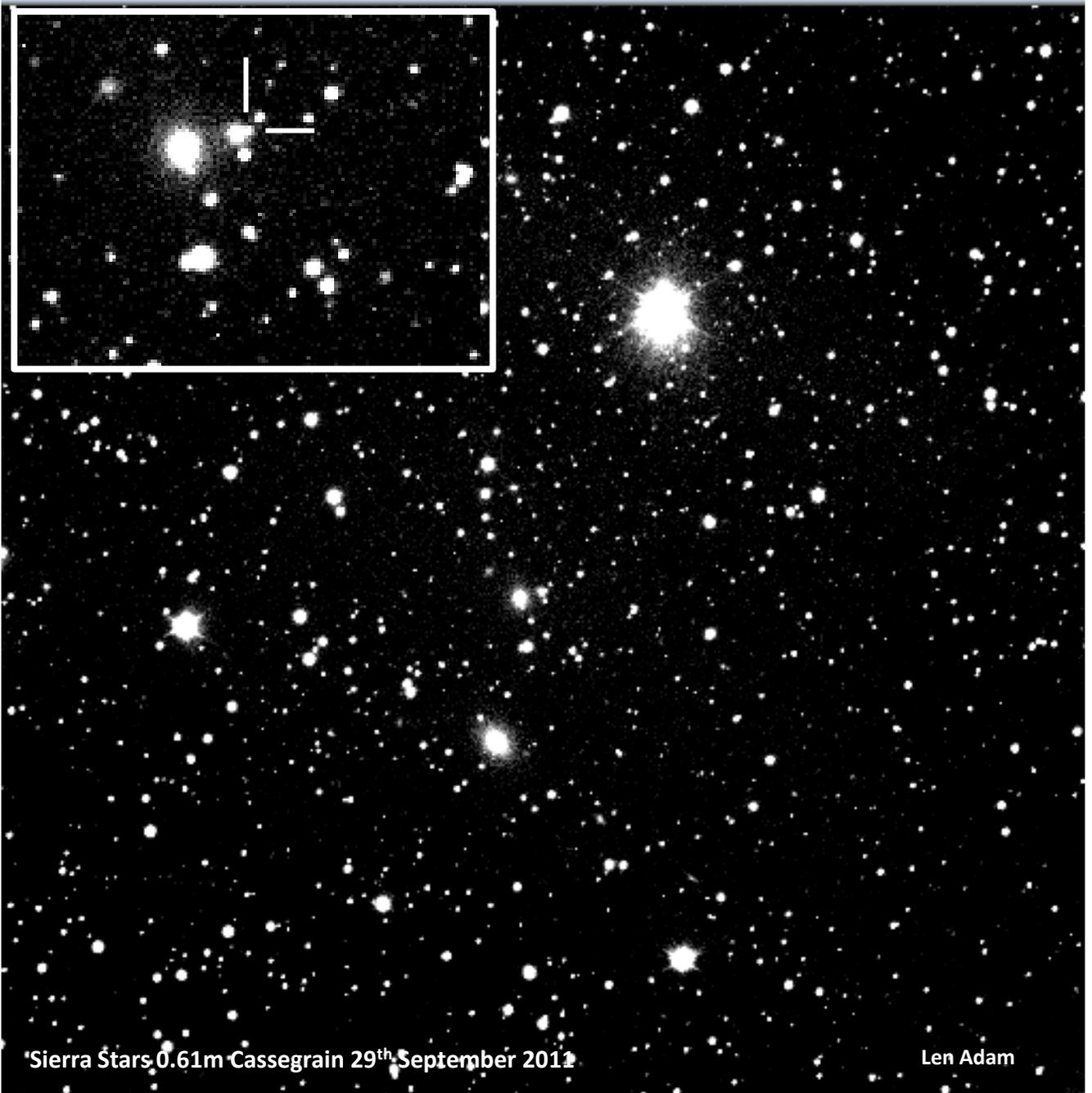
MEETINGS: Ladybridge Community Centre Beaumont Drive Bolton BL3 4RZ

Non-members invited to drop in to meetings which are held every other Tuesday evening at 7.30 p.m. £2 charge per meeting or £20 annual membership.

Go to <http://www.boltonastro.org/calendar> to find the next meeting. There are plenty of parking spaces at the centre.

Ron Arbour discovers faint supernova

British Amateur Ron Arbour has discovered his 26th Supernova in PGC 2159464. I took this image using a 0.61m Cassegrain Telescope at Sierra Stars observatory in California (see article) on 28/29th September 2011 and found it very difficult to spot on the main image below - and Ron found it on a Celestron 14! I have magnified a section of the image to make it clearer. Congratulations to Ron!



FROM THE ARCHIVES

A look back into astronomical history by searching newspaper and magazine archives

From

Jean Brandwood



THE LATE SIR JOHN HERSCHEL.

THE LATE SIR JOHN HERSCHEL

SIR JOHN FREDERICK WILLIAM HERSCHEL, F.R.S., was the son of that eminent astronomer Sir William Herschel, who, just ninety years ago, discovered the Georgium Sidus or Uranus, as it was called at first, but afterwards appro-

priately renamed Herschel. The subject of our present memoir was born at Slough, in Buckinghamshire, in 1792, was educated privately by a Scotch mathematician, and then proceeded to Cambridge, where he came out as Senior Wrangler and First Smith's Prizeman. He became a Fellow of his College, St. John's, and continued his mathematical career by writing on the differential calculus and other similar subjects. He next published papers on various points of physical science, but the real work of his life began when in conjunction with Mr. South, afterwards Sir James South, he deliberately set to work to map out the whole of the known stars. Double stars, nebulae, and finally the stars of the Southern hemisphere were alike

catalogued and placed by him. These enormous labours carry us down to the year 1838, when Sir John, who had been knighted by William IV., and who was made a baronet at the coronation of the present Queen, returned from the Cape of Good Hope, where he had resided four years at his own expense for the purpose of completing his catalogue. Every honour that a scientific man can desire fell to his lot. He had awarded to him the Astronomical Society's gold medal; Oxford made him a D.C.L.; he was a Fellow of the Royal Society, and of all kinds of British and Foreign societies and academies; and, had he chosen to accept the office, he might no doubt have been President of the Royal Society.

He still continued his work, but henceforward it was

of a more varied character. His mind had imbibed from his father a metaphysical turn, and he had, earlier in life, published his "Preliminary Discourse on the Study of Natural Science," a work which contributed more than anything else to the popular recognition of his acquirements. Like many others, he translated Homer, and in the *Cornhill* he published a poetical version of part of Dante's "Inferno."

His other works were numerous, but of late years his principal contributions to literature were either articles in the *Quarterlies* or papers in *Good Words*, intended to explain in popular language such subjects as volcanoes, comets, the sun, light, and the outlines of mathematical problems of astronomy.

Few philosophers of an age which has produced a Faraday and a Brewster have attained distinction equal to that of Sir John Herschel. His mathematical acquirements and his discoveries in astronomy, in optics, in chemistry, and in photography, were all of a very high order, and, being aided by an admirable style, secured for him the widest reputation among men of science both at home and abroad.

Sir John Herschel married in 1829 Margaret Brodie, daughter of the Rev. Dr. Alexander Stewart, by whom he had a family of nine daughters and three sons. He is succeeded in the title by his son, Mr. William J. Herschel, of the Bengal Civil Service.

This article was published in The Graphic (London) May 27th, 1871, 2 weeks after the death of Sir John Herschel, son of Sir William Herschel (Sir Friedrich Wilhelm Herschel). During his 4 years in South Africa John added 1,754 items he discovered in the Southern Hemisphere to his father's catalogue of observations and discoveries in the Northern Hemisphere. He published a catalogue of all his and his father's observations in 1864, plus 11 discoveries made by his Aunt Caroline. This was named the "General Catalogue of Nebulae and Clusters." It was later edited and supplemented with discoveries by many other 19th Century astronomers and published in 1888 as the "New General Catalogue" of over 6,200 deep sky objects. The NGC numbering is still the most commonly used system of identifying deep sky objects.

Using a remote observatory for imaging

Len Adam

Well – that was it – I had had enough of the Lancashire Weather after weeks of cloudy skies so I had to travel to a different part of the world to do some astronomy.

The gallery on the BAS web side had also dried up so at the time I had no image content to put into the newsletter which was imminent. Famous last words of course - I must admit I did think that Kelling Heath and Lancashire would be clouded out but they were not so we had a record number of images on the web site since then!! See later pages! I booked my flight on Virtual Airways (not the Richard Branson one) and ended up in sunny California! Some time ago I had registered at **Sierra Skies Observatory** as a user but had never tried it out! On Friday 23rd September I finally took the plunge and took an image using their 0.61m telescope located in Alpine County California.

First of all I had to buy some points – if you think \$1ish per minute of exposure you will get the idea – it isn't quite as simple as that depending upon the telescope that you are using – but near enough for the moment. I invested the minimum \$50 from my PayPal account, which had some funds from selling off some of my old astronomy bits and pieces on eBay, and was awarded my points. There was a choice of telescopes to use. I chose the 0.61m Cassegrain telescope which is "located in the south end of the Carson Valley in Alpine County California about two miles from the Nevada state line." The CCD camera is a Finger Lakes Instrumentation ProLine instrument.



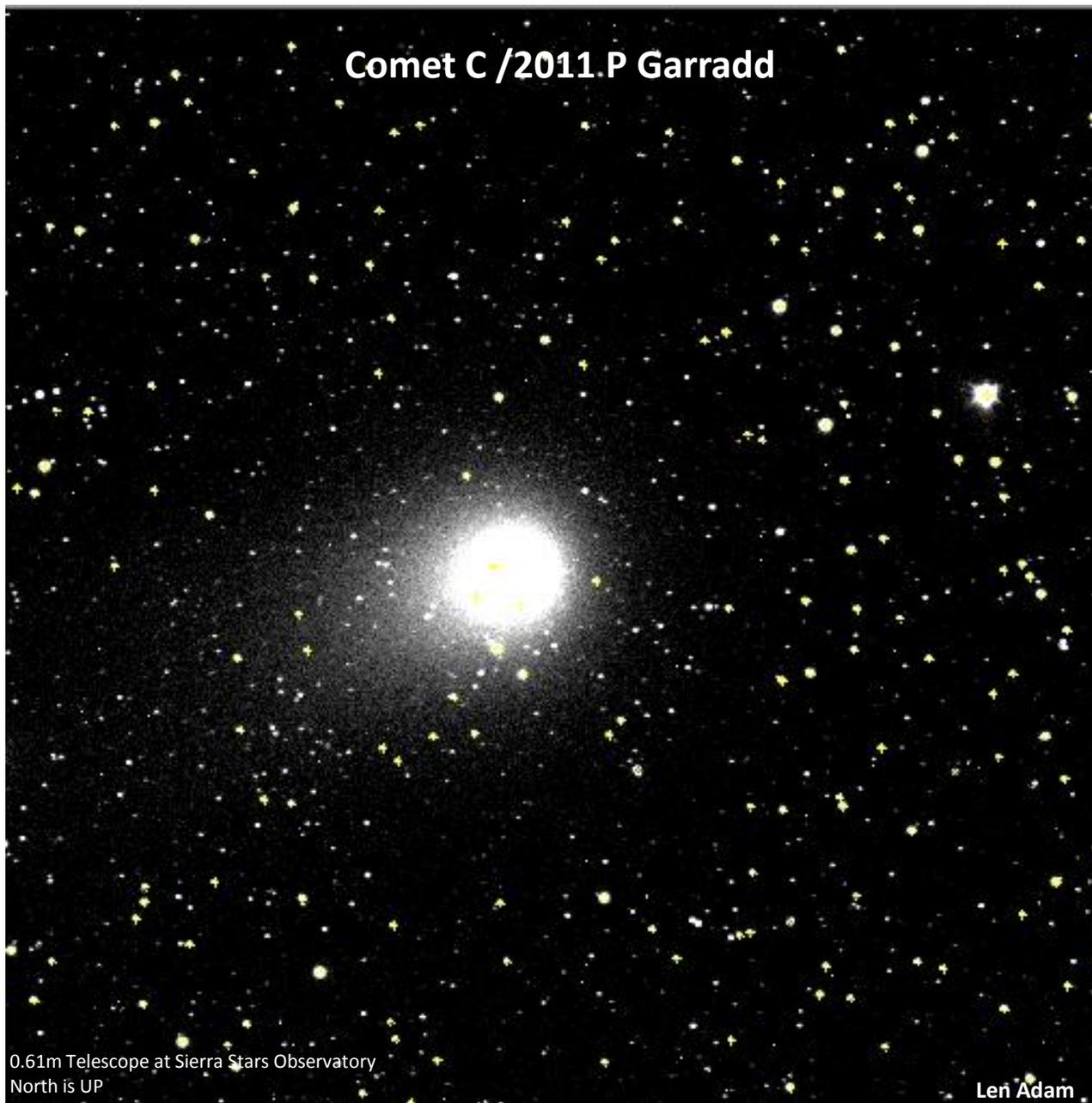
The 0.61m Cassegrain Telescope at Sierra Stars is shown above.

On the right you can see Rich Williams who runs the Sierra Stars Observatory and developed the automated telescope system.



The ProLine Instrument is shown on the left. It has 3056 X 3056 pixels . The image scale is 0.4 arcseconds per pixel resulting from a field of view of about 21 minutes of arc. Each pixel is 12 microns so with 3056 of these each side of the CCD chip is 36.67 mm .

For my first attempt I decided to take an unfiltered image of Comet Garradd as that is what I would have been imaging if clouds had not intervened in Lancashire. I set a 180s exposure time and submitted the request to the automated observatory on Friday night. Of course California is 8 hours behind the UK so I had to wait for the Earth to do one third of a rotation before it was dark enough to take the image. This is very approximate of course and the time the image is taken depends upon the number of requests being received and local conditions. However some time on late Saturday afternoon (here) my job had been completed and I downloaded the compressed image from my allocated area using an FTP program. The 21' X 21' image (with 2X2 binning) is shown below.



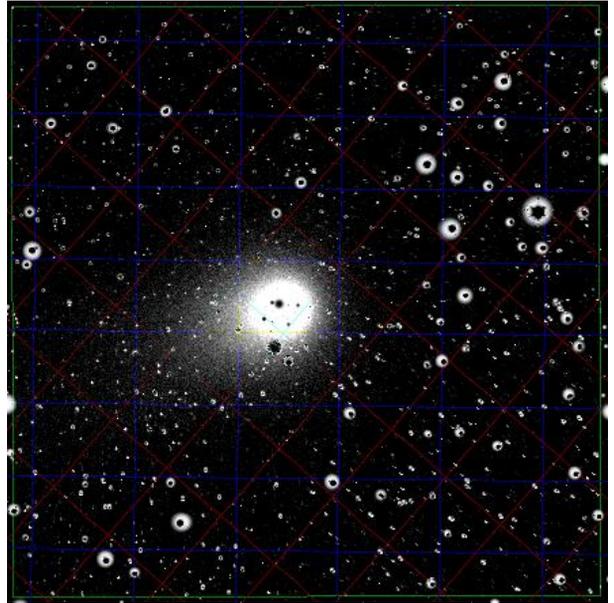
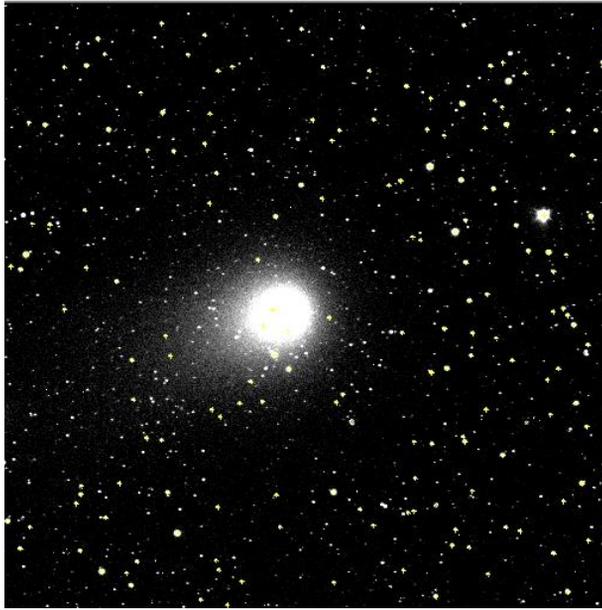
Of course as this is a FITS image it comes with the FITS data file which confirmed the position of the centre of the image as shown.

OBJRA 18:22:36.7
OBJDEC 19:40:12.5

The FITS file also includes the precise(local) time the image was taken and other data as shown below

Date (CCYY-MM-DD): 2011-09-24
Time (HH:MM:SS.SSS): 03:15:40.610
Instrument: FLI ProLine PL09000 Rev 1.17
Observer: Len Adam
Telescope: OMI 0.61-meter F/10 Cassegrain
Object: C/2009 P1 (Ga)
Origin: Sierra Stars Observatory
Comment: Trial Image 1

Knowing the image scale I was able to carry out a plate solution on the image to allow me to identify the precise location of the comet against the background stars. The original image is on the left below opened in CCDSoft and the solved plate is on the right which superimposes the image (black stars) on the corresponding star chart from "The Sky" software by matching the star patterns. If you are trying to identify the orbit of a moving object in the solar system such as a comet or asteroid you need to be precise. Once you have a plate solution the position of the matched stars are recorded into the FITS file and CCDSoft (for example) can be used to click on any point in the image to give exact RA and DEC values. So if you discover a new asteroid, for example, you can solve the plate, click on the asteroid, and send its position to the Minor Planet Centre to claim the discovery!



The solution provided 56 matched stars with an RMS error of only 0.06 which is fine. The first few results are shown in the partial table below. I have the UCAC2 Catalogue of Stars which I downloaded into The Sky software. Only stars that are within the required error tolerance (that you specify) are used in the solution giving high precision results.

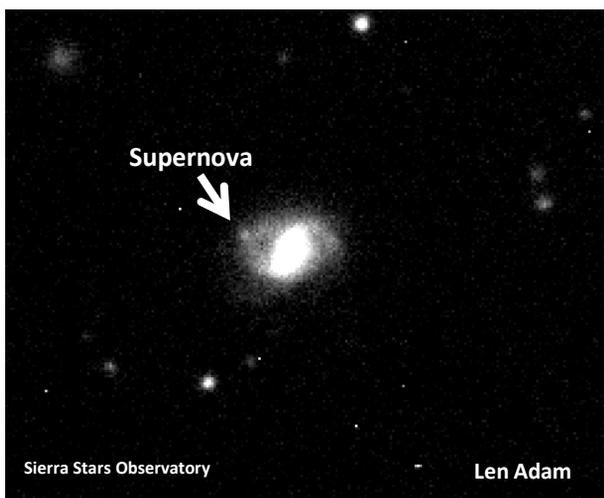
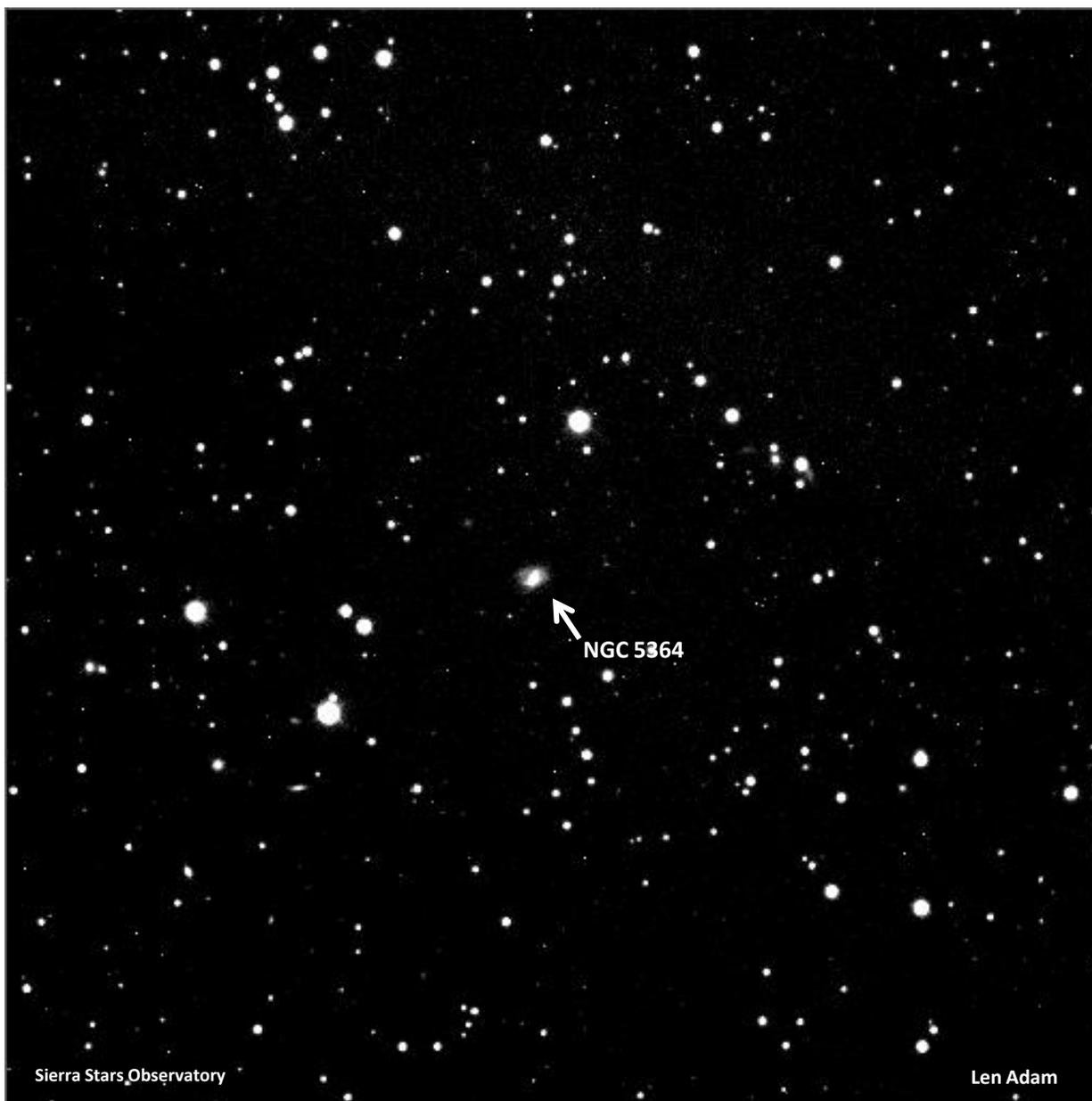
Astrometry for Amended C2009 P Garradd Image

Image center: 18h 22m 33.70s +19d 40m 28.85s RMS: 0.06 Stars used in solution: 56
 Image scale (arcsecs/pixel): 0.80 RMS X: 0.05
 Position angle (° from North): 359.37 RMS Y: 0.04

	Use In Solution	Star Catalog ID	Star Catalog Error (arcsec)	Star Equatorial Coordinates	Image X	Image Y	Residuals (arcsec)
1	NO	UCAC2	0.000	18h 21m 59.78s +19d 43m 38.24s	1388.10	533.68	0.00
2	YES	UCAC2	0.000	18h 22m 12.43s +19d 43m 02.20s	1141.98	576.38	0.09
3	NO	UCAC2	0.000	18h 22m 16.16s +19d 45m 13.08s	1077.72	411.90	0.00
4	NO	UCAC2	0.000	18h 22m 51.83s +19d 32m 48.49s	437.07	1335.93	0.00
5	NO	UCAC2	0.000	18h 23m 13.96s +19d 42m 06.46s	54.28	633.43	0.00
6	NO	UCAC2	0.000	18h 22m 05.04s +19d 48m 06.46s	1276.58	197.02	0.00

Open... Save As... Print... Setup... Close

On Saturday 24th September I took more images with the Sierra Stars 0.61m telescope. I knew that Tom Boles had discovered yet another supernova in PGC 5364 and I took an unfiltered image of this. This shows how you have to be really tuned in to spot these faint supernova!



On the left is an expanded image of the galaxy from my original image above and now the supernova can be spotted.

On Wednesday 28th September I set up a job (as they call it) to image Ron Arbour's new supernova discovery which arrived successfully on Thursday afternoon. (See earlier article)

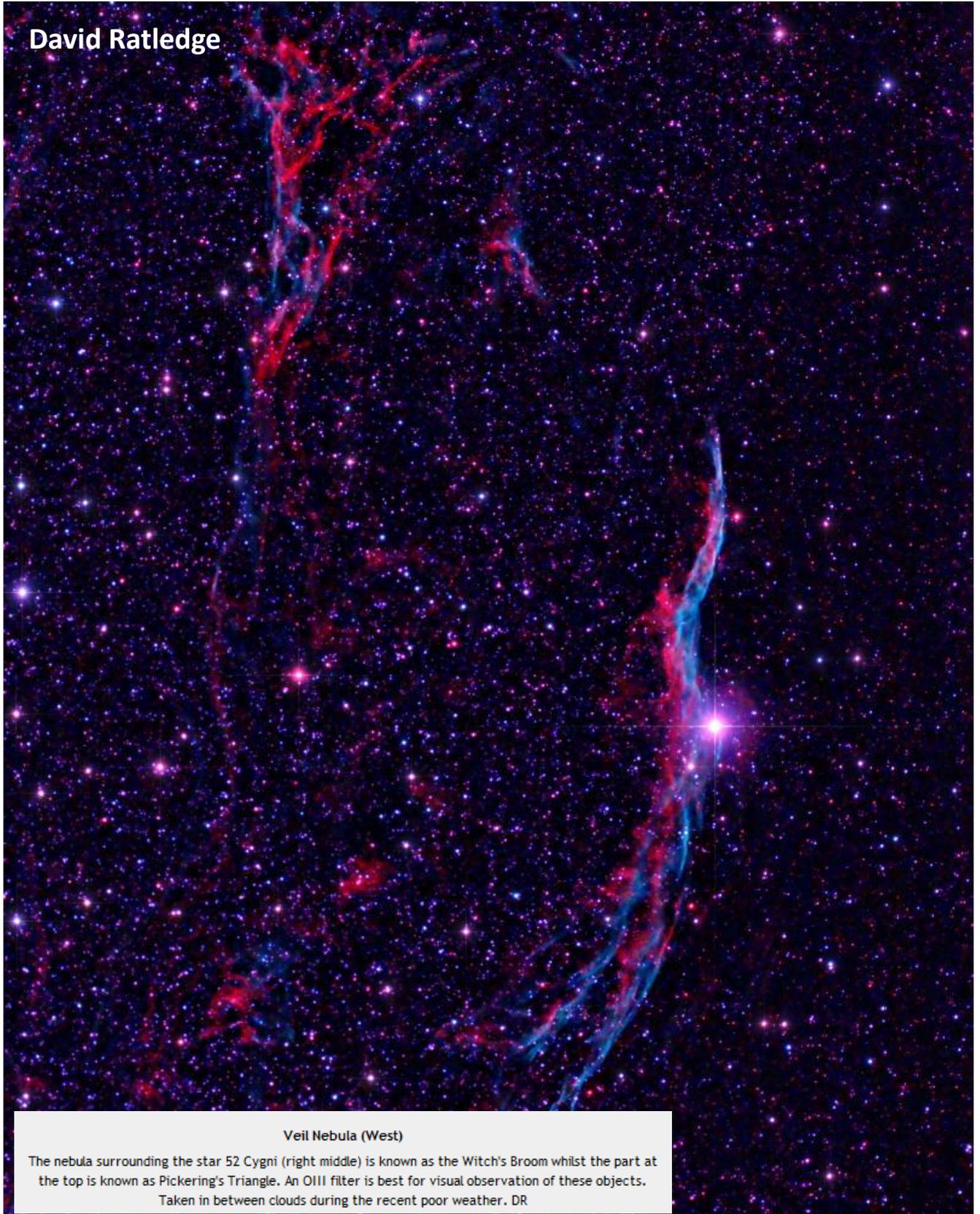
This is a great way to avoid the clouds – now what else can I sell to get some more points?

I intend to apply to the BAA to see if I can establish a project using Sierra Stars telescopes – the BAA will pay 50% sponsorship to their members for approved projects using Sierra Stars. LA

IMAGES FROM BAS MEMBERS

Including Kelling Heath

David Ratledge



Veil Nebula (West)

The nebula surrounding the star 52 Cygni (right middle) is known as the Witch's Broom whilst the part at the top is known as Pickering's Triangle. An OIII filter is best for visual observation of these objects.
Taken in between clouds during the recent poor weather. DR

Ross Wilkinson

C/2009 P1 Garradd on 22-Sep

Taken from Kelling Heath. This image is formed from the same exposures as the animation, but this time aligned to keep the comet stationary.

Ross Wilkinson

Jupiter from Kelling Heath

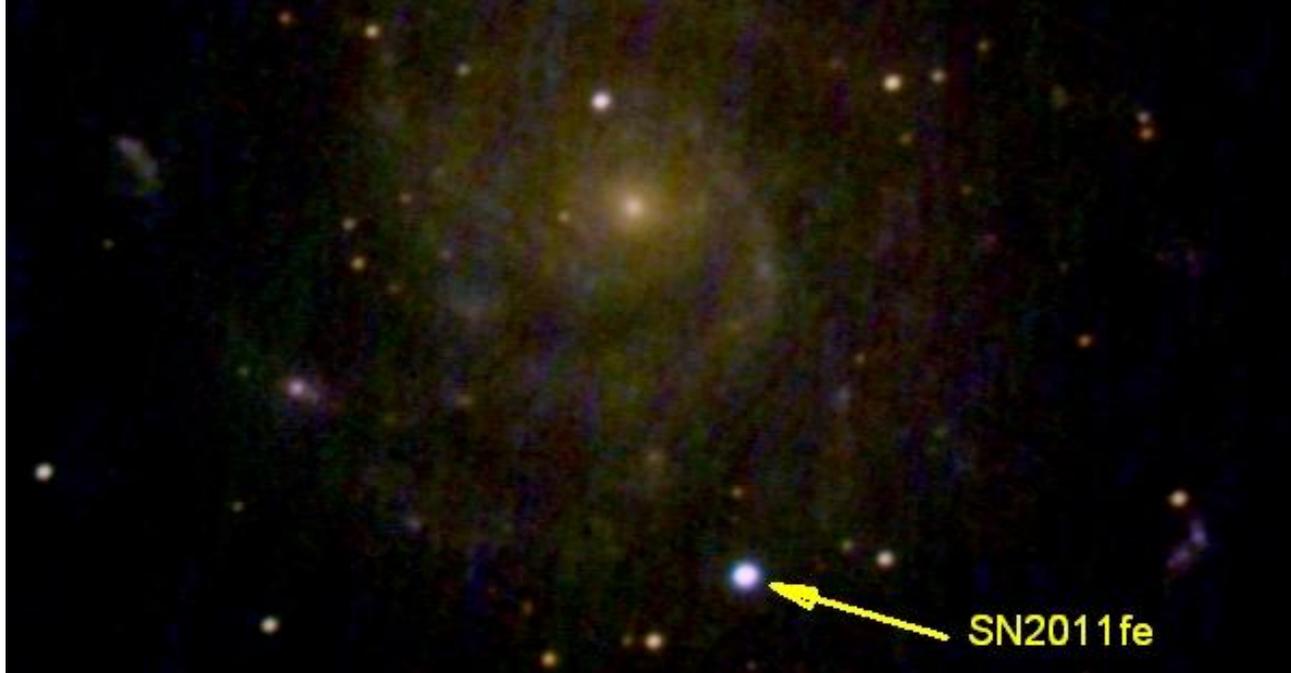
On the Friday night we were making use of the gaps in the clouds, and there was about half an hour when Jupiter was quite clear. But I'd not managed to do a polar alignment, so I had to chase it across the screen whilst running the captures!

Ross Wilkinson

M101 with supernova!

The M101 "Pinwheel" galaxy was fainter than I expected (well, it was low in the sky), so the supernova seemed very bright in comparison.

And this is my first supernova image - so thanks to Len for bringing it to our attention.



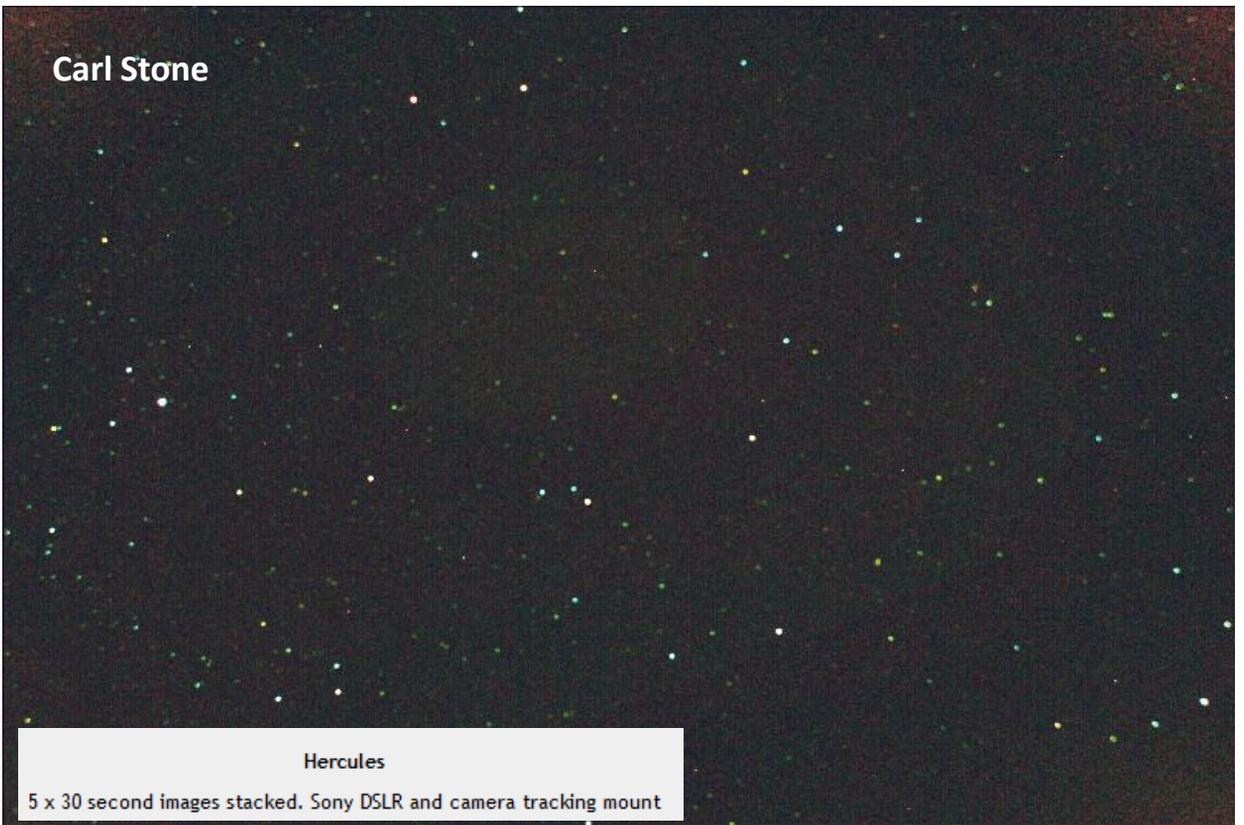
Ross Wilkinson



M27 from Kelling Heath

One of the most striking deep-sky objects, and the colours come out particularly well with a webcam.

Carl Stone



Hercules

5 x 30 second images stacked. Sony DSLR and camera tracking mount

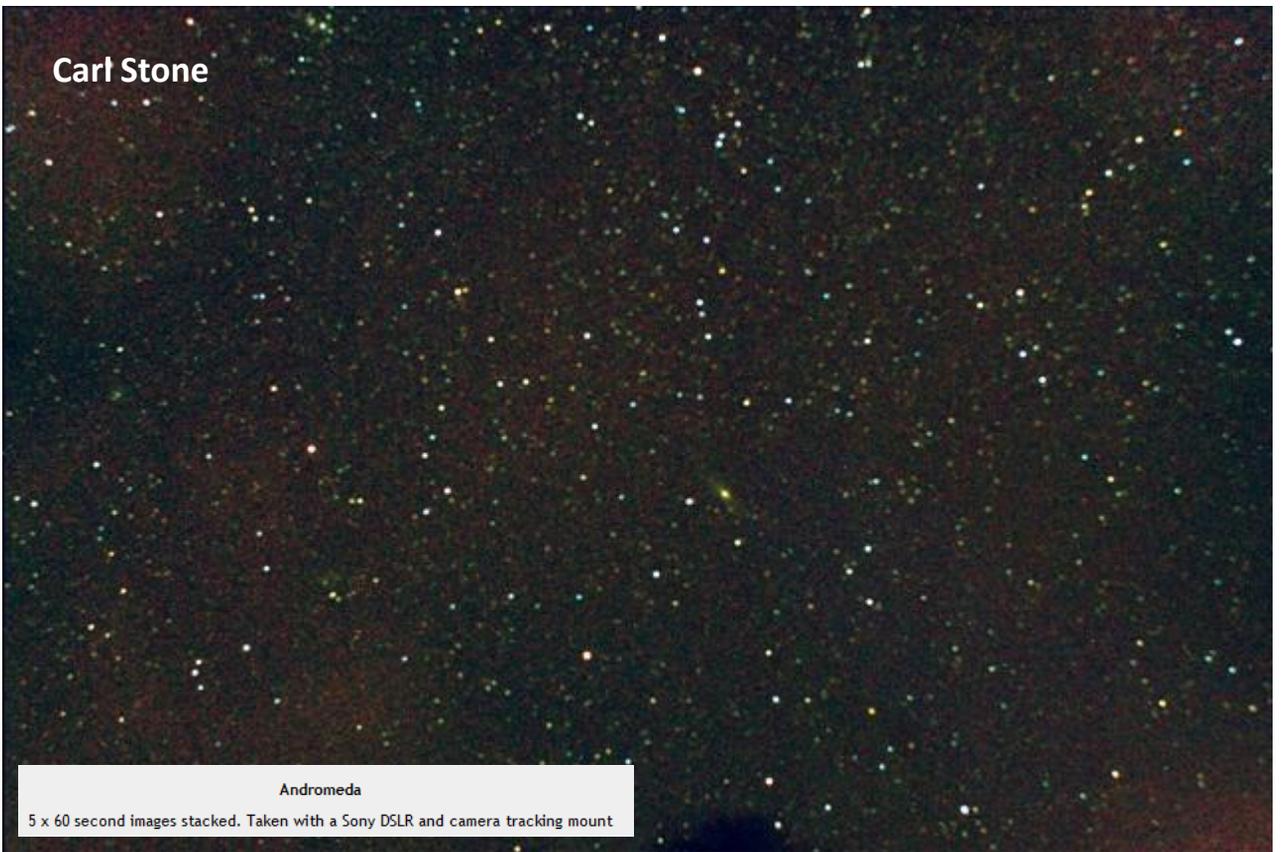
Carl Stone



Ursa Major

5 x 30 second frames stacked using a Sony DSLR and camera tracker mount

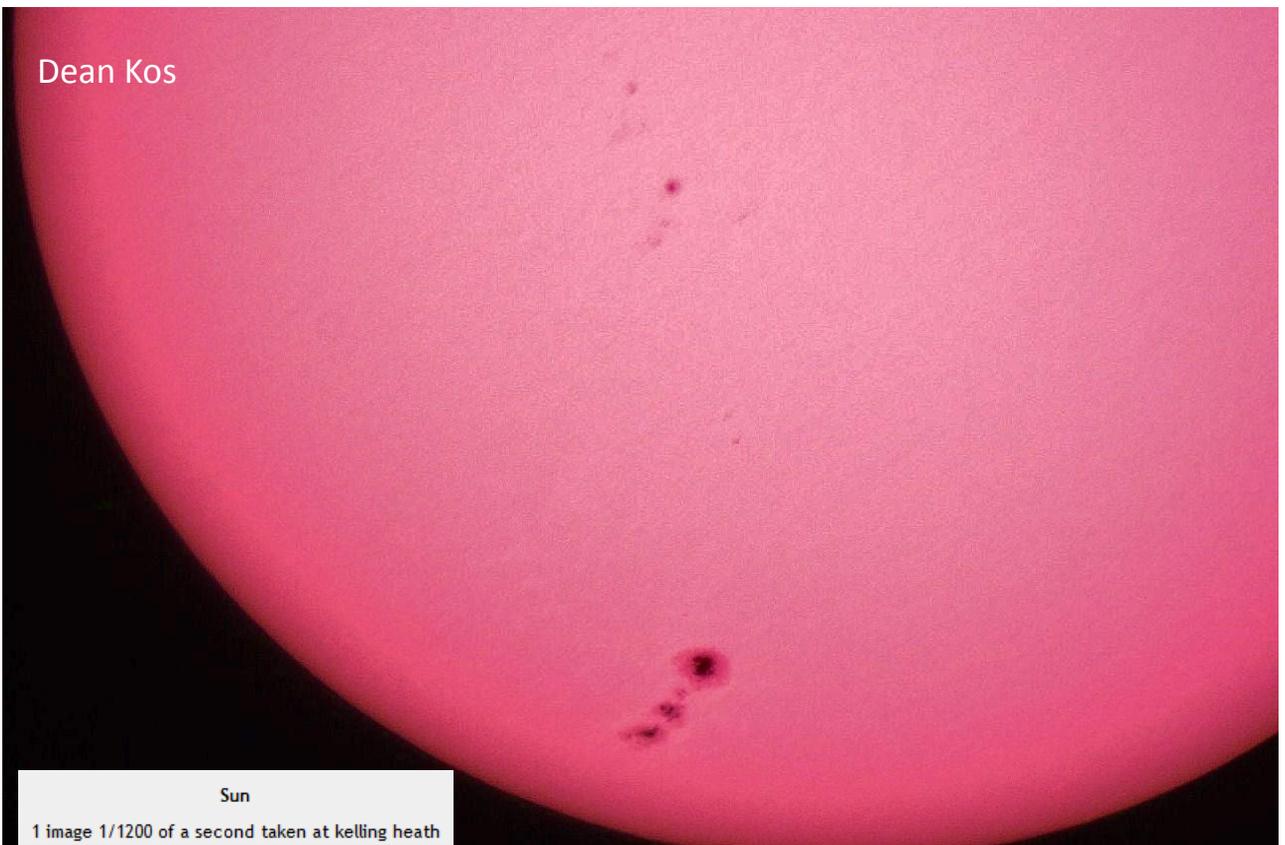
Carl Stone



Andromeda

5 x 60 second images stacked. Taken with a Sony DSLR and camera tracking mount

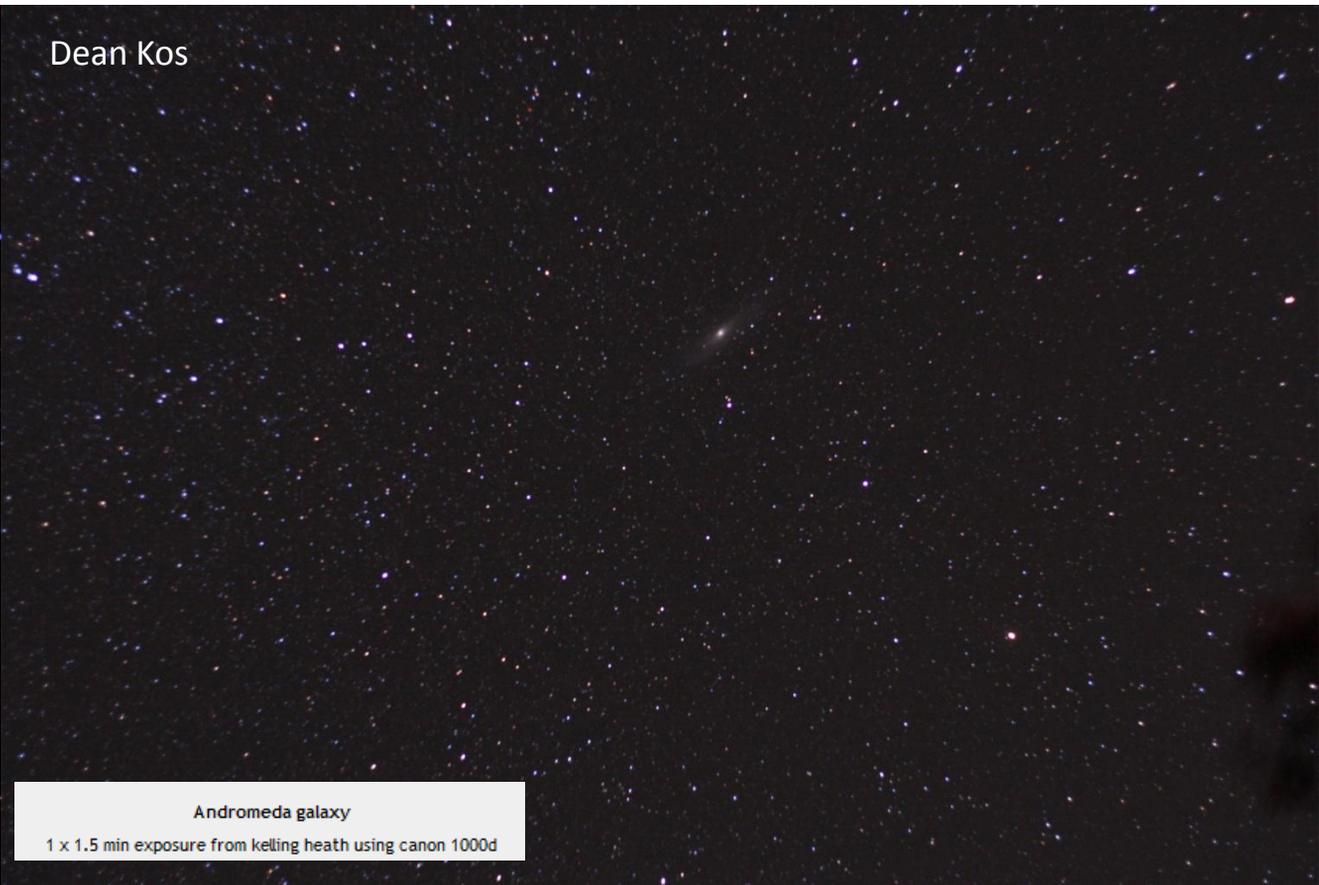
Dean Kos



Sun

1 image 1/1200 of a second taken at Kelling Heath

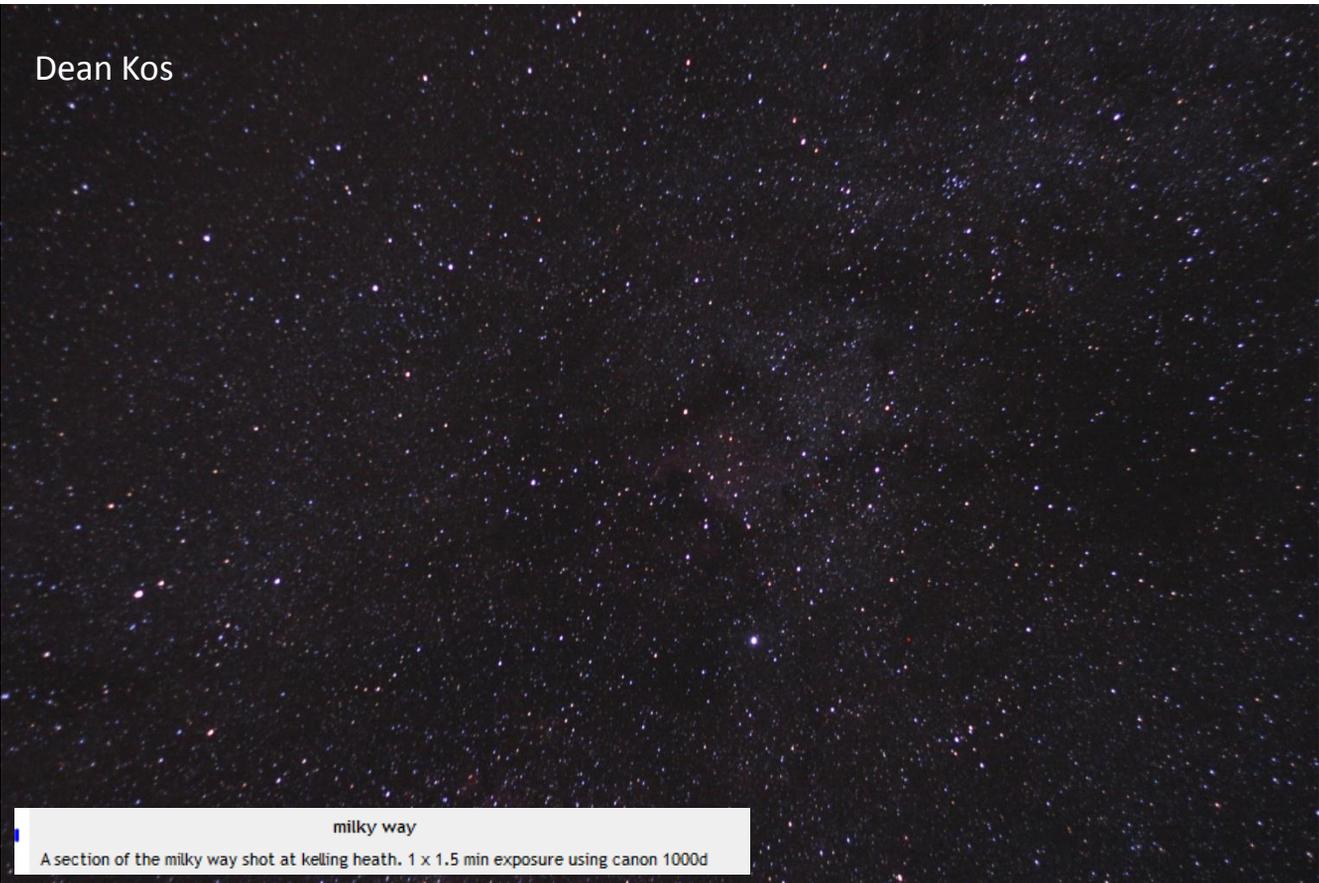
Dean Kos



Andromeda galaxy

1 x 1.5 min exposure from kelling heath using canon 1000d

Dean Kos



milky way

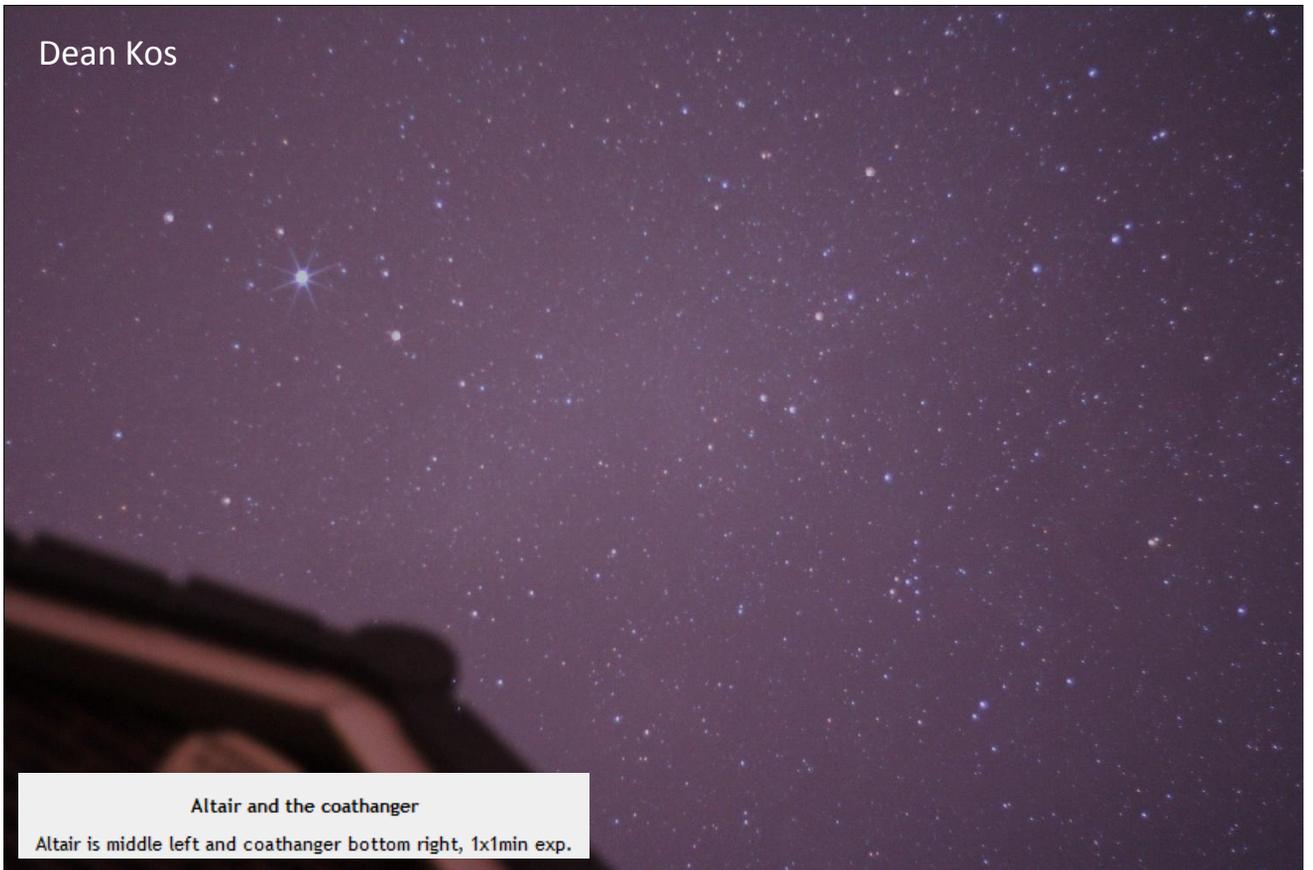
A section of the milky way shot at kelling heath. 1 x 1.5 min exposure using canon 1000d

Dean Kos

Vega and lyra

The view above my house last night, very clear, 1x1min exp at iso 800

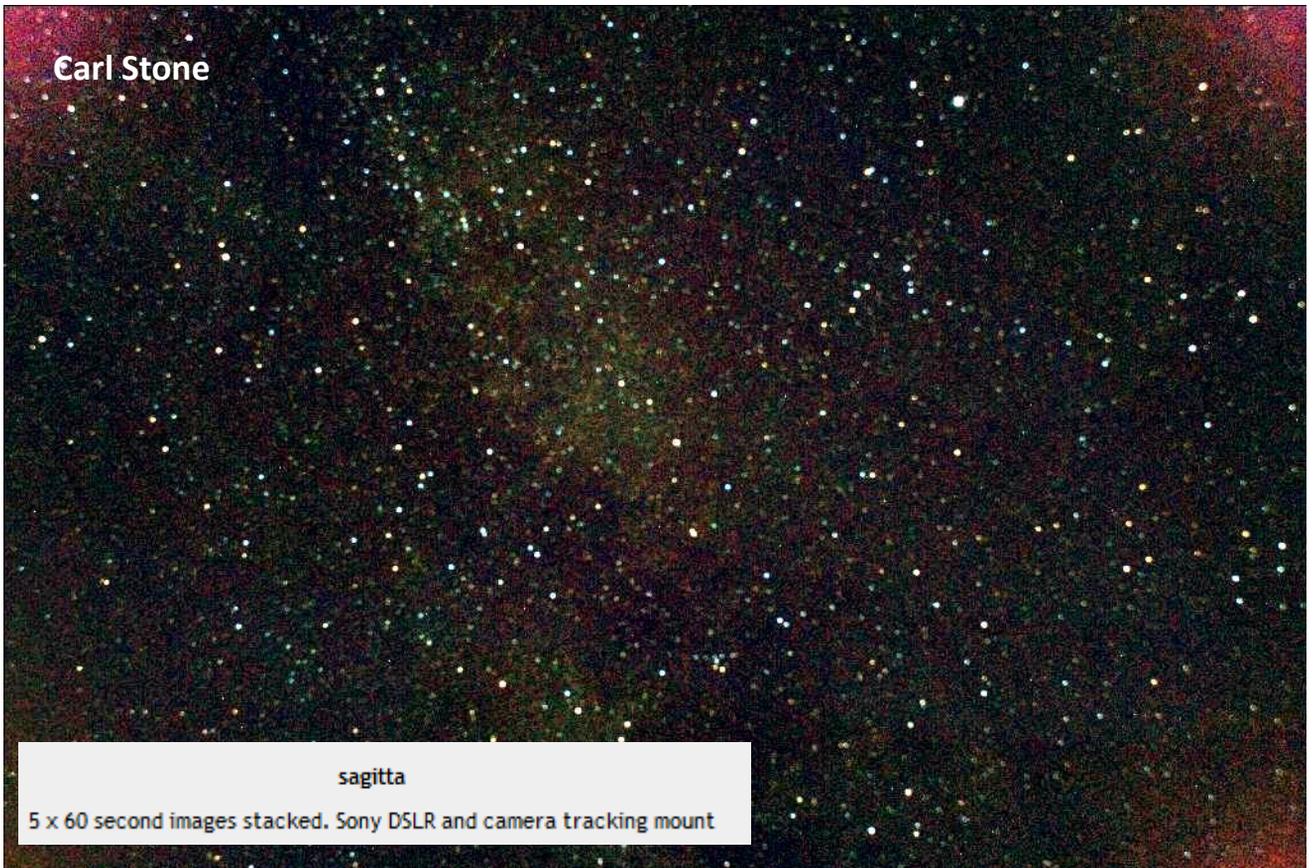
Dean Kos



Altair and the coathanger

Altair is middle left and coathanger bottom right, 1x1min exp.

Carl Stone



sagitta

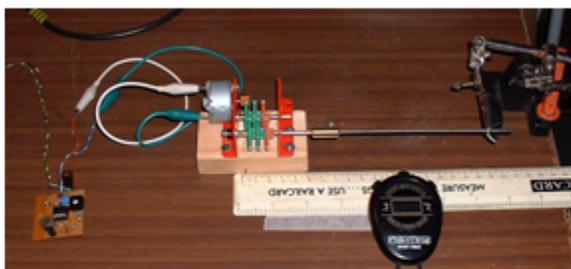
5 x 60 second images stacked. Sony DSLR and camera tracking mount

A home-made "barn-door" mount

Ross Wilkinson

Having mentioned the humble "Scotch mount" in another article for this *Newsletter* and saying how easy they were to build, I thought that I'd better try one myself...

First I got one of the little MFA motor and gearbox kits whose output shaft rotates at around 1 RPM when running off 8V (I made a simple regulator circuit to derive this from a 12V battery). Then I attached an M3 threaded rod to the shaft, and measured its extension over a few tens of minutes. A quick bit of trigonometry determined that this should be located around 4 inches from the pivot in order to open the hinge at the required rate of 1 degree every four minutes.



Measuring the thread extension rate

For my first lash-up prototype I used some sections of plastic sheet for the flaps, but as soon as I mounted the camera it was immediately apparent that these were too flexible (or "whackery", as Gerald would say!). And from my star-test I found that although the *average* tracking rate was right, I had a large *periodic error* - an oscillation about this mean position as the threaded bar turned through one revolution. *This periodic error can simply be measured by offsetting the polar axis well off the celestial pole: the stars will then trace an ideally diagonal line across the image. Any deviation from a straight line is a measure of the error, and its periodic nature can be seen by observing the trace over several rotations of the thread.*



Mk2 prototype

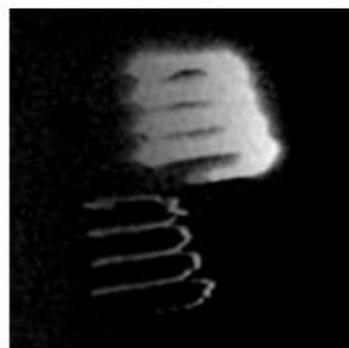


Final Mk3 version

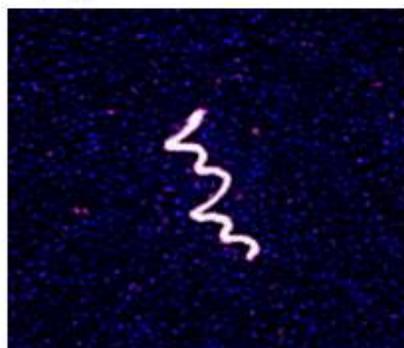
So my improved Mk2 prototype used a more substantial wooden board for the flaps, and a chunky M8 thread much further from the pivot. This was certainly an improvement, but I could still see a residual periodic error. Now in these first two designs I'd tried to keep the thread perpendicular to the hinge (and to allow the whole assembly to fold up neatly) by mounting the motor and nut on their own separate hinges, but it was clear that these were causing some undesirable

- flexing as the shaft rotated.

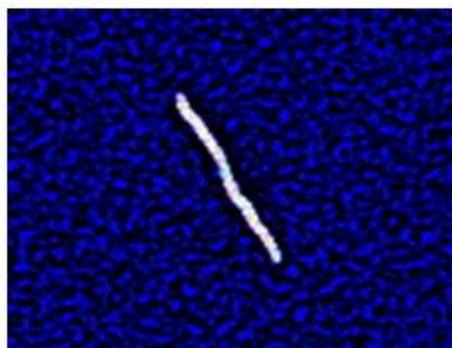
In my final Mk3 version I removed these hinges, fixing the motor assembly to the base-flap and allowing the extension nut to slide within a box-section secured to the upper flap. This cured the problem, as can be seen from these traces produced by imaging *Arcturus* with a 135mm lens and the polar axis aimed East



Mk1 periodic error (5 turns)



Improved Mk2 version (2 turns)

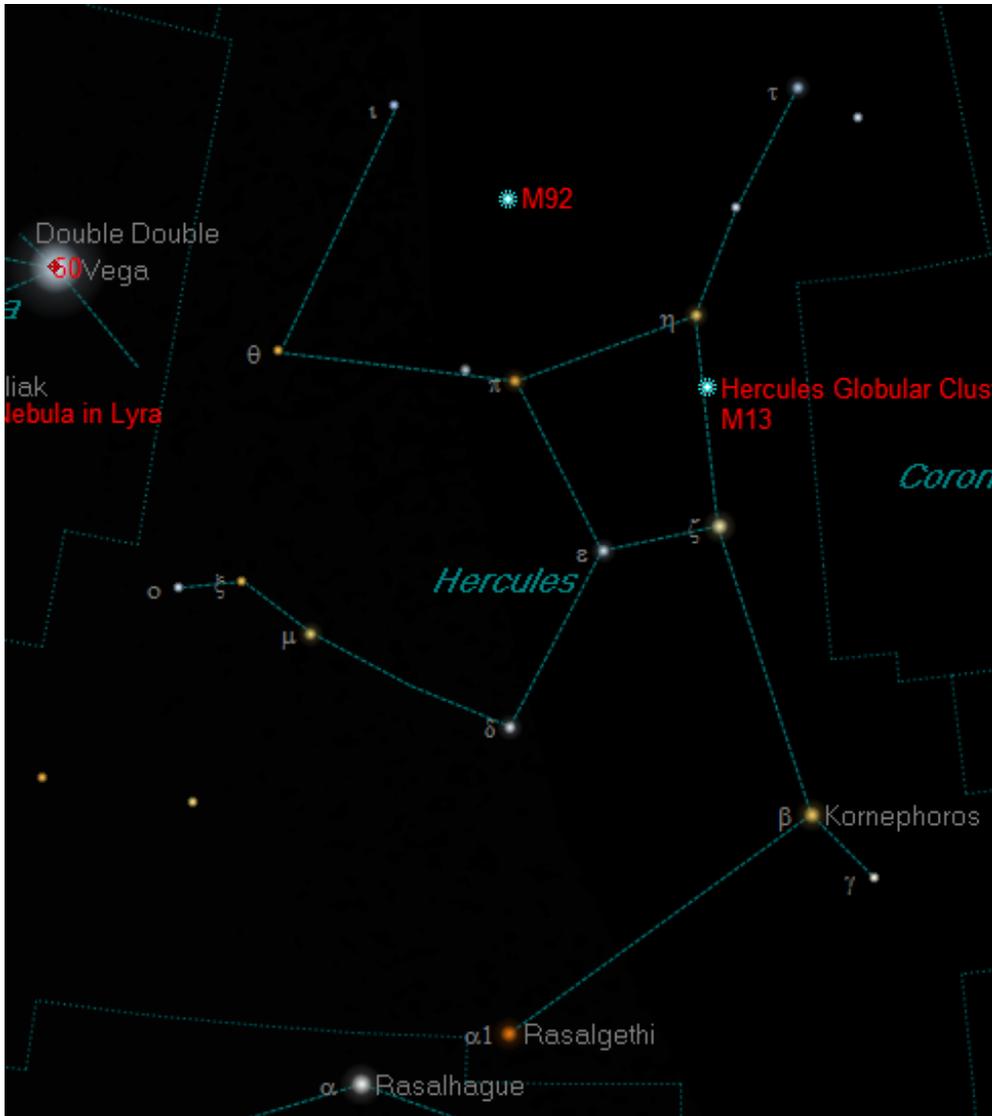


Final Mk3 solution (2 turns)

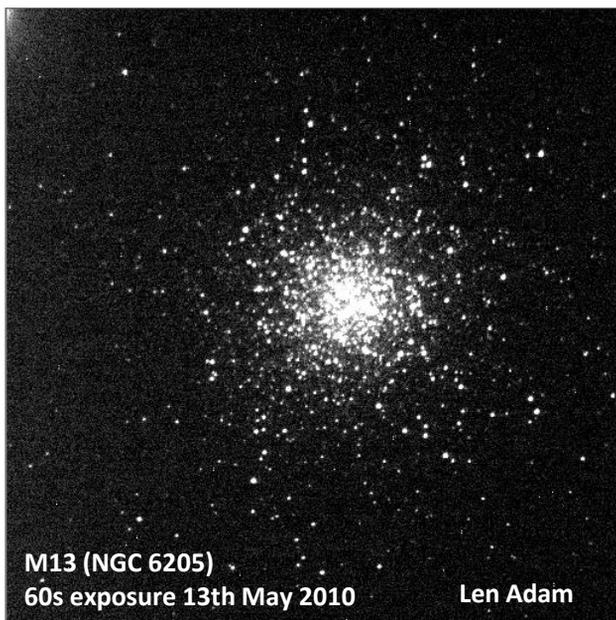
So for the outlay of a few pounds (plus some bits of junk from the back of the shed!), I have an astro-tracking camera platform for use with the *LX-modified* webcam and old SLR lenses to take exposures of tens of seconds without trailing. And this is independent of my telescope and mount, so once its set up I can leave it to take a series of images whilst I get on with some other observations.

If you'd like to have a go at making your own, have a chat with me about the design at one of our meetings, but this Mk3 version has been added to the list of equipment available for loan to BAS Members - so see Dean or Ian if you'd like to borrow it to try for yourself.

Featured Constellation HERCULES



The Constellation of Hercules is adjacent to Lyra and can be found by locating the Summer Triangle and then Vega and then looking to the right. The brightest stars are Alpha, Rasalgethi, a red supergiant and Beta, Kornephoros. The constellation is not particularly conspicuous and its most important objects are the globular clusters M13 and M92. Theoretically M13 can be seen with the naked eye. M13 at magnitude 5.7, spans 20 X 20 minutes of arc and is not much smaller than the width of the full Moon with its 30 minute diameter. M13 is one of the most spectacular sights through a telescope on a clear night with hundreds of pinpoint stars visible. Definitely a "must see"! M92 is slightly fainter at 6.1 magnitude.



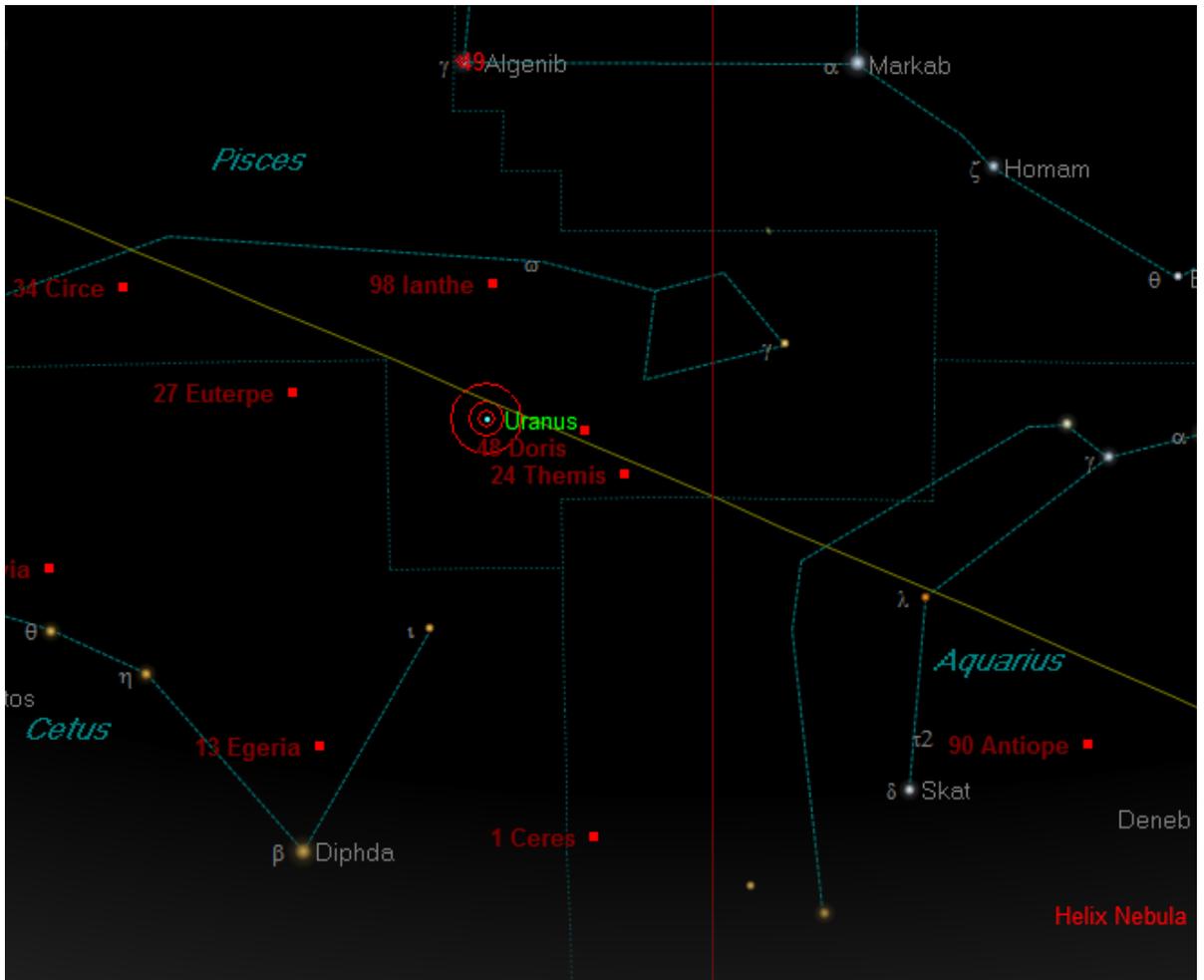


October Objects of Interest

Two observations that you can make this month
Uranus and Jupiter
Len Adam



Can anyone observe the planet Uranus this month to provide an image for next months issue? Here it is on October 1st, due South almost, around midnight (see time and details below) Magnitude 5.7 and an altitude about 36 degrees according to "The Sky" software.



Object Information

General | Multimedia | Utility | Telescope

Object (1 of 1): Uranus

Item	Value
Object name	Uranus
Magnitude	5.7
Apparent magnit...	5.7
Equatorial	RA: 00h 09m 49s Dec: +00°13'24"(current)
Equatorial 2000	RA: 00h 09m 10s Dec: +00°09'14"
Horizon	Azim: 167°50'28" Alt: +35°55'19"
Apparent angula...	00°00'04"
Visibility	Rise 18:35, Set 06:47
Transit time	00:39 Set: 6:47 AM on 01/10/2011 Rise: 6:35 PM on 01/10/2011 Transit: 12:30 AM

Time

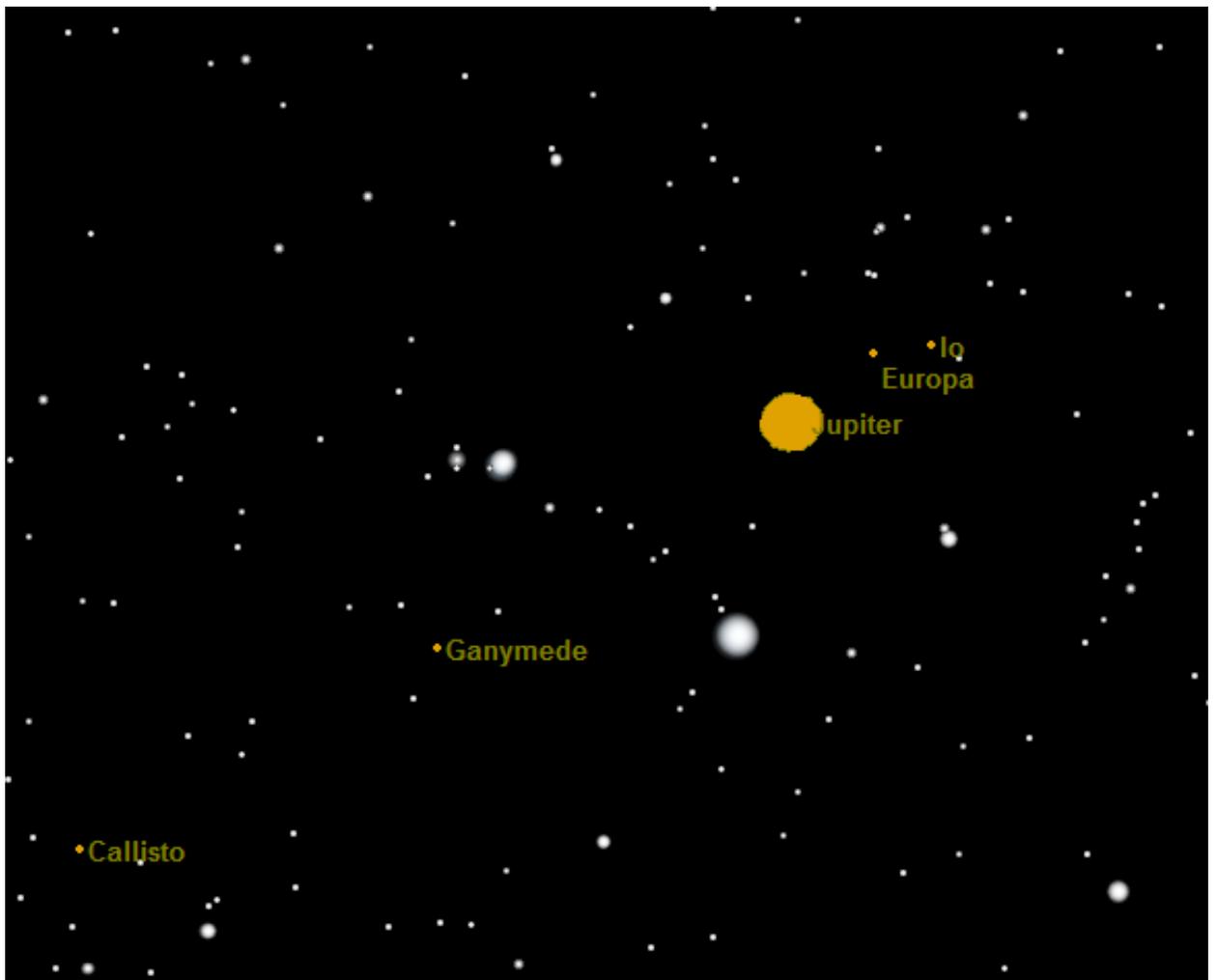
Oct 1 2011 23:59:59

Su	Mo	Tu	We	Th	Fr	Sa
25	26	27	28	29	30	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

LST: 23:30:32
UT: 22:59:59
Julian day: 2455836.4583

1 second

Moons of Jupiter – what about imaging the 4 main Moons of Jupiter in a sequence as they move in their orbits during October ready to be published in next month’s issue? The chart below is for 1st October just before midnight.



Object Information

General Multimedia Utility Telescope

Object (1 of 2): Jupiter

Item	Value
Object name	Jupiter
Magnitude	-2.9
Apparent magnit...	-2.9
Equatorial	RA: 02h 26m 59s Dec: +12°59'15"(current)
Equatorial 2000	RA: 02h 26m 19s Dec: +12°55'56"
Horizon	Azim: 122°24'32" Alt: +36°32'27"
Apparent angula...	00°00'48"
Visibility	Rise 19:40, Set 10:16
Transit time	03:00 Transit: 2:59 AM on 01/10/2011 Set: 10:16 AM on 01/10/2011 Rise: 7:30 PM on 01/10/2011

Time

Oct 1 2011 23:59:59

Su	Mo	Tu	We	Th	Fr	Sa
25	26	27	28	29	30	1
2	3	4	5	6	7	8
9	10	11	12	13	14	15
16	17	18	19	20	21	22
23	24	25	26	27	28	29
30	31	1	2	3	4	5

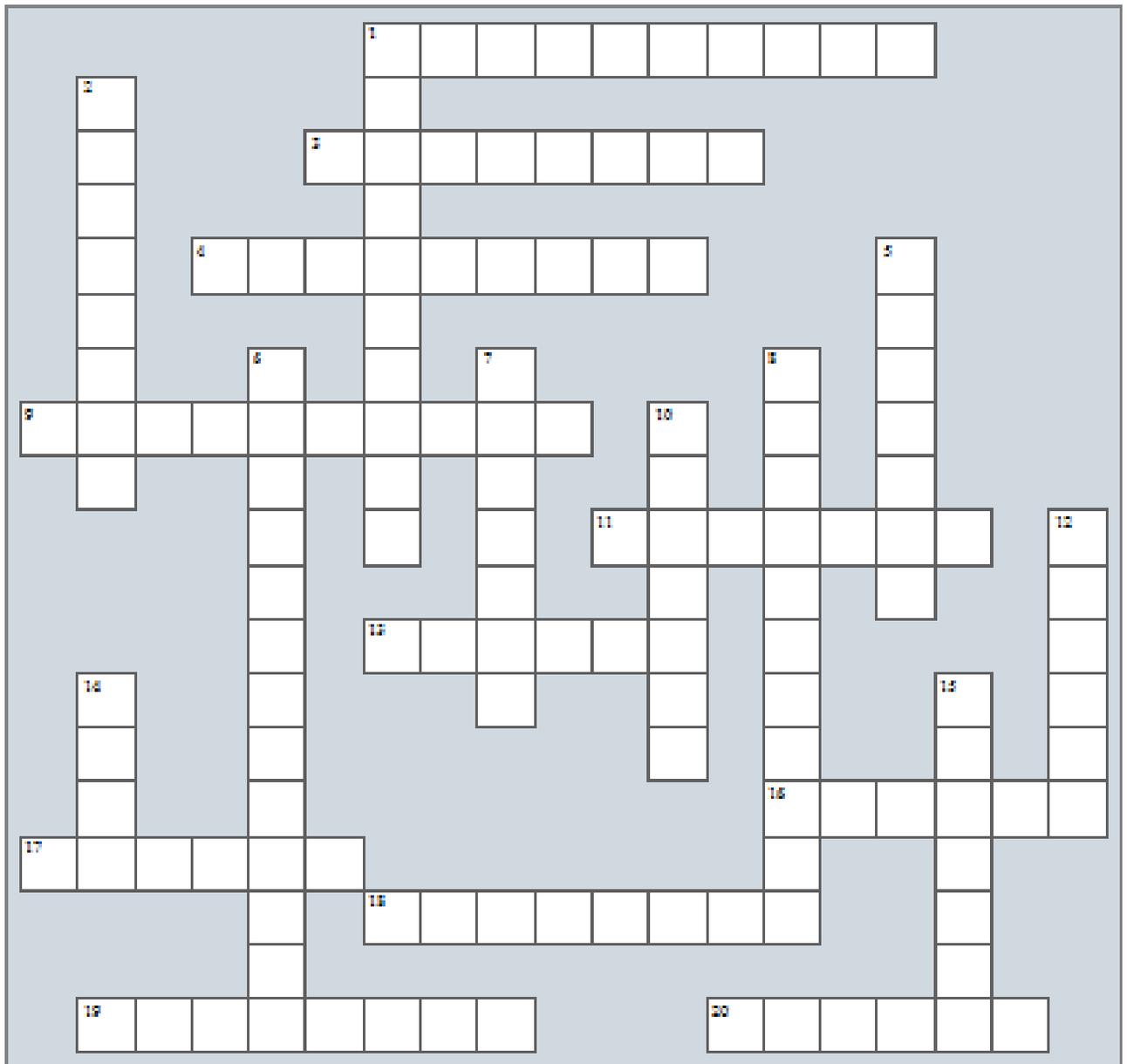
LST: 23:30:32
UT: 22:59:59
Julian day: 2455836.4583

1 second

BAS CROSSWORD 8

All about famous
astronomers

BAS Crossword 8



CROSSWORD CLUES

Across

1. This man gave his name to the dark lines in the solar spectrum (10)
3. Sister of William Herschel (8)
4. First Astronomer Royal (9)
9. This Canon promoted the heliocentric theory. (10)
11. Saturn's ring division man (7)
13. Great comet of 1858 discoverer (6)
16. Famous comet bears name of this man that Patrick Moore believes everyone pronounces incorrectly! (6)
17. Tycho's assistant (6)
18. This local man was the first to observe a transit of Venus (8)
19. First man to observe a transit of Mercury (8)
20. Annie Jump classified stellar spectra.- good job she was never fired! (6)

Down

1. Camille founded the French equivalent of the BAA (10)
2. Asteroid gap man. (8)
5. This Dutch man discovered Titan in 1685. (7)
6. Alexandria Librarian measured the Earth. (13)
7. He discovered the link between stellar radial movement and their doppler shift in Tulse Hill in London (7)
8. This Greek astronomer believed that the Earth moved around the Sun over 2000 years ago! (11)
10. Henrietta was significant in the discovery of the period luminosity law. (7)
12. Fritz predicted the existence of neutron stars. (6)
14. 1897 Director of Yerkes observatory gave his name to a great telescope. (4)
15. First person to see the satellites of Jupiter (7)

Meetings Schedule October 2011 to December 2011

Meetings are held each month on Tuesday evenings, commencing at 7:30pm and concluding around 9pm.

Our main meeting programme runs from September to May, and features a mixture of formal lectures and informal "Activity Nights". Admission is free to members, and visitors are welcome at £2 per visit.

Over the summer we also get together on the first Tuesdays of June, July and August.

The programme of our future meetings is shown below, but may occasionally be subject to late changes, so *if you're travelling from some distance, please contact the BAS Committee by email to boltonastro@gmail.com to confirm before making your journey.*

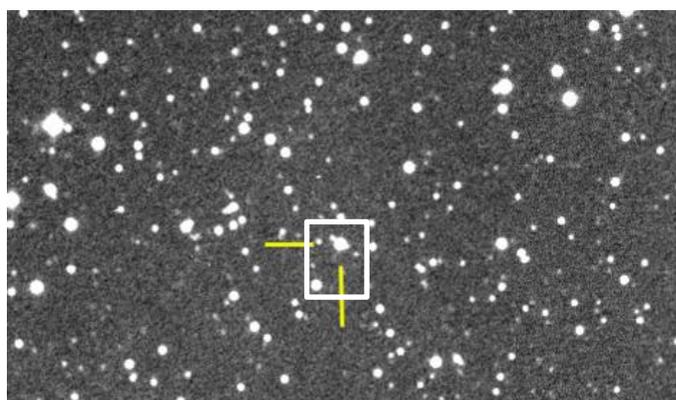
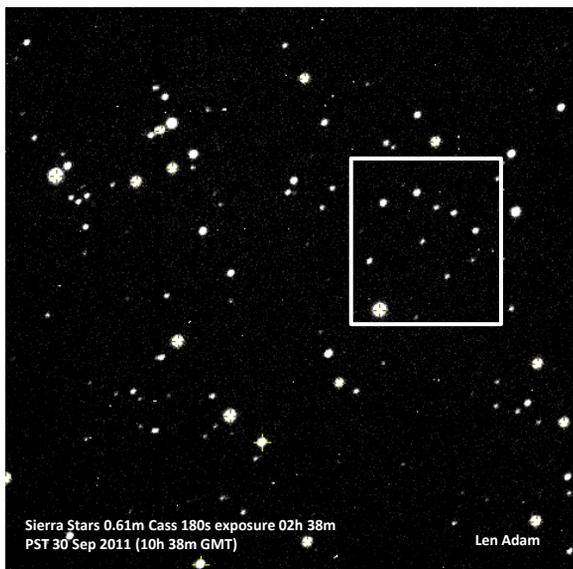
There are 9 issues of the Society Newsletter per annum with a summer break in June, July and August

The Newsletter is an online PDF that can be downloaded and printed if required.

Date	Subject	Presented by
4th Oct 2011	Guest speaker: "Yuri Gagarin in Manchester" Memories of the first Cosmonaut's visit to the city in July 1961	Gurbir Singh Blogger/podcaster
18th Oct 2011	Member's talk: "The constellations, part one" Our Chairman takes us on an illustrated tour	Dave Ratledge Bolton AS
1st Nov 2011	Activity night: "Finding your way around the sky" An interactive session on where to look and what to see in the autumn sky	Ross Wilkinson et al. Bolton AS
15th Nov 2011	Guest speaker: "GCSE Astronomy and the SpacedOut project" Hear about the world's largest scale model of the Solar System, based here in the North-West (with the Sun at Jodrell Bank)	Dr. Nigel Marshall SpacedOut Project
6th Dec 2011	Activity night: "Setting up your telescope" An interactive "show & tell, bring & ask" session	BAS Committee
20th Dec 2011	Christmas Party A social evening (please bring some food & drink) including Roy's famous <i>Astro-Scrabble</i> team game	BAS Members

STOP PRESS

Last night (29 Sep 2011) I received an Electronic Circular advising me that a Cataclysmic Variable had erupted in Draco. A link was provided to the image on the right together with the coordinates so I set up a job at Sierra Stars to image the area centred on those coordinates. The image on the left duly arrived. It was actually taken at 11:38 am our time 30 Sep 2011. I have drawn white boxes to try to match the same area. Clearly the CV has faded since the image on the right was taken on September 6th. The yellow lines were on the original image.



2011 09 06.4879

I (**T. Yusa**) confirmed this PNV using 0.30-m f/7.0 Cassegrain + unfiltered CCD (SBIG STL-1001E). Mag.= 11.9 U, Position end figures 28s.03 and 41".5. Position and magnitude are measured on an image composed from 6-frames which were taken by each 60-seconds exposure under the limiting magnitude = 18.5. Position and magnitude was measured using USNO-B1.0 T. Yusa, Osaki Lifelong Learning Center, Japan.