

The

Volume 124 No. 7

July 2015

Bulletin

*Monthly newsletter of the
Astronomical Society of South Australia Inc*

In this issue:

- ◆ New Horizons spacecraft arrives at Pluto this month
- ◆ More astro-gadgets
- ◆ Report on the May 2015 Alpana AstroCamp
- ◆ Observing the NGC 4261 galaxy group in Virgo

July 1 General Meeting

Don't miss Dr Phiala Shanahan
speak on....

The Hunt for Dark Matter



**ASTRONOMICAL SOCIETY of
SOUTH AUSTRALIA Inc**
GPO Box 199, Adelaide SA 5001

The Society (ASSA) can be contacted by post to the address above, or by e-mail to info@assa.org.au. Membership of the Society is open to all, with the only prerequisite being an interest in Astronomy.

Membership fees are:

Full Member	\$75
Concessional Member	\$60
Subscribe e-Bulletin only; discount	\$20

Concession information and membership brochures can be obtained from the ASSA web site at:

<http://www.assa.org.au>

or by contacting The Secretary (see contacts page).

Member Submissions

Submissions for inclusion in The Bulletin are welcome from all members; submissions may be held over for later editions.

Wherever possible, text submissions should be sent via e-mail or posted on CD-ROM in almost any word processing format and may still be submitted handwritten or typed. Your name may be withheld only if requested at the time of submitting. Images should be high resolution and uncompressed, e.g. TIFF file formats, although high resolution JPEGs are acceptable. Your full name and object designation must be provided with each image and will be published. Equipment/exposure etc details are welcome but optional.

Advertising & Classifieds

Small adverts and classifieds are free for members (space permitting). Commercial advertising is available at a cost of \$50.00 per quarter page per issue.

All enquiries and submissions should be addressed to The Editor and preferably sent by e-mail to: editor@assa.org.au

For large files (e.g. on CD) or hardcopy items, post to:

Joe Grida
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Contributions should reach the Editor no later than the 7th of each month, for publication in the following month's issue of The Bulletin

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Sister Society relationships with:

Orange County Astronomers

www.ocastronomers.org

Colorado Springs Astronomical Society

www.csastro.org

Central Arkansas Astronomical Society

www.caastro.org



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and be prepared for
2015.**

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to place your order.**

Cover photo: M83 Southern Pinwheel Galaxy in Hydra, imaged by **Tom Valencic**, 8 inch Newtonian telescope, Skywatcher HEQ5Pro mount, QHY9 Mono CCD Camera @ 20°C below ambient, LRGB 50:25:25:25mins of 10min and 5min exposures. 20xDarks, 20xFlats/ filter, 50xBias . Software: EQMOD, Capture: Nebulosity, Processing: Pixinsight, Guiding: PHD2



Activities

April 2015 - the month at a glance

General Meeting

Wednesday, 1 July, 2015
@ 8:00pm

Kerr Grant Lecture Theatre
2nd Floor, Physics Bldg
University of Adelaide
North Terrace, Adelaide

Guest Speaker:

Dr Phiala SHanahan
University of Adelaide

(See speaker bios on page 5)



The hunt for dark matter

Evidence suggests that most of the matter in the universe is not at all like the atomic matter that makes up the stars, plants, and the world we interact with every day.

This mysterious matter neither emits nor absorbs light; it is "dark matter."

The nature of dark matter remains one of the most important open problems in science. In this public lecture, Dr Shanahan will review the evidence for

dark matter and summarise the current status of our understanding.

She will explain how dark matter is searched for in direct and indirect detection experiments and at particle colliders, and describe the new Australian effort—involving Adelaide scientists—to contribute to the hunt for dark matter.

Planning on going observing?

Save yourself unnecessary travel and time. If the weather looks doubtful where you are, check with the following people to see if the event is still on (or see www.assa.org.au after 5pm).

Stockport Observatory (DO 3-13)

Observatory 8528 2284

Lyn Grida 8388 5980

Tony Beresford 8338 1231

Heights Observatory (DO 3-34)

Robert Bronca 8266 7504

Black Forest

Greg Weaver 8293 2341

Whyalla

Peter Mayfield 0408 410 895

Tooperang

Jeff Lowrey 0429 690 610

Northern Yorke Peninsula

Tony Henderson 0429 352 382

Riverland

Tim Vivian 0407 800 225

July 2015 Calendar



Day	Time	Activity
Wed 1	7:00pm	Beginners' Meeting
Wed 1	8:00pm	General Meeting
Thu 2	7:30pm	Members' Meeting, Whyalla
Sat 4	7:00pm	Annual Dinner, Belair Country Club
Sat 11	8:00pm	Members' Viewing Night – Stockport
Sat 11	8:00pm	Member's Viewing Night - Riverland
Sat 11	8:00pm	Members' Viewing Night – Tooperang
Fri 17	8:00pm	Public & Members' Viewing – NYP
Sat 18	8:00pm	Members' Viewing Night – Stockport
Fri 24	8:00pm	Public Viewing Night – The Heights
Wed 29	7:30pm	ASSA Council Meeting
Fri 31	7:30pm	Deep Sky Imaging Group

Note: Times shown above and throughout this document are:

5 Oct 2014 to 5 Apr 2015 : South Australia Summer Time (UTC+10:30)

6 Apr 2015 to 3 Oct 2015 : South Australia Standard Time (UTC+ 9:30)

4 Oct 2015 to 3 Apr 2016 : South Australia Summer Time (UTC+10:30)

Astronomy Education - Beginners' Talks

Wednesday, 1 July, 2015 @ 7:00pm
Kerr Grant Lecture Theatre, University of Adelaide
This month - "Digital Astrophotography"



The ability to take stunning digital photographs of the heavens has revolutionised amateur astrophotography.

How do digital cameras work and how are those wonderful images created and processed?





Reports and Notices

Reports on recent ASSA activities, and notices of upcoming events

ASSA Calendar Competition

As part of the fund raising program, the council has decided to produce a calendar for 2016. The images to populate the calendar will come from photographs supplied by members in a competition which will close in September.



This competition will be completely separate from the Astrophotography Awards. The only criteria for the images are that they must be taken by a member and have an astronomical theme. This means they could be planetary, solar, deep sky, wide field or it could even be an image from an ASSA event. They can be old images or ones that have previously been submitted in the imaging awards.

Please submit your entries to me at beginners@assa.org.au or any other media including a title to be included with the image on the calendar.

The winning entries will be decided by David Malin Award winner, Paul Haese, who will not be submitting an image. The 12 successful entrants will each receive a free calendar. Only one image per entrant will be included. This is a great opportunity to get your images out there and help ASSA raise some funds.

Colin Hill, Beginner's Councillor

Guest Speaker Biography July 2015 General Meeting



Dr Phiala Shanahan

Phiala Shanahan completed her PhD in theoretical particle physics at The University of Adelaide earlier this year. Her work has focussed on revealing the structure of particles like the proton and neutron, as well as the fluctuating quantum vacuum, in terms of more fundamental constituents.

She has worked within both the Centre for the Subatomic Structure of Matter and the Centre of Excellence for Particle Physics at the Terascale (CoEPP), which is affiliated with CERN.

She is currently a postdoctoral research associate with CoEPP until August, when she will take up a postdoctoral fellowship at MIT in Boston, U.S.A.

Gala event of the year

The ASSA Annual Dinner is on soon!!

Saturday, July 4, 2015 @ 7:00pm
Put it in you diary now.

**Join other members and partners of ASSA
for a fun filled evening of great food, quiz,
and guest speakers.**

Bookings close June 30.
Don't miss out!

Book online at:
<https://www.assa.org.au/dinner>

It's almost ASSA Awards time again. Calling for nominations..

As many of you are aware, the Society delivers a number of awards each year, and now is the time for you to start thinking about who to nominate. Awards include:

- ◆ *Bill Bradfield Astronomy Award*
- ◆ *Craig Richardson Memorial Image Award*
- ◆ *Astrophotography Award*
- ◆ *Annual Service Award*

Full details: <https://www.assa.org.au/membership/awards/>



Temperature and Relative Humidity Measurement

Besides the cold, one of the greatest challenges for both visual observers and astro-photographers during the winter months would have to be dew.

Just when the clouds have cleared, your equipment is set up and you are starting to enjoy your observing or imaging session, you find that your gear is quickly being covered in moisture.

Those of who are keen enough to fight the battle against moisture will be well prepared with dew shields and heaters, while some of us would just like enough notice to pack up and successfully retreat to a warmer and dryer location instead of spending the rest of the evening ensuring that the rescued equipment has been suitably dried before being packed away.

Dew is formed when the temperature drops to a point where the water vapour in the air condenses into small droplets. This temperature is called the *dew point* and can be approximated, from knowing the *relative humidity* and the *temperature* at your observing location, using the Magnus formula. If you want to quickly calculate the dew point there is a nifty online calculator at <http://www.dpcalc.org/>.

For those who just want to avoid the dew and know when it is time to call it a night, I have found a reasonably reliable gadget, which can be purchased for as little as \$2.25.

The unit is a digital Hygrometer/Thermometer which runs off a pair of small button cell batteries (supplied), for more than 2 years. The primary part of the meter displays the Relative Humidity as a percentage and the smaller part of the meter displays the current temperature in degrees Celsius. Two features that this unit has are, firstly it fits perfectly into one of the 2" eyepiece holder holes in my HEQ5 mount and secondly, it is available with either internal sensors or with a remote sensor on a 1.5m cable so that you can locate the probe where you require your measurements to be taken. See images on the left. Image at bottom right shows two units mounted on the mirror box of a 16" Dobsonian telescope. The unit on the left measures the outside temperature and humidity, whilst the one on the right has the sensor mounted inside the box, right next to the mirror.

Having used this unit for more than 2 years it has been quite reliable in indicating how close the observing environment is to reaching the dew point. In winter, I have found that in most instances, dew starts to form on the equipment once the RH approaches the 90% reading, so in most situations, unless I am planning to fight the oncoming dew, once the RH gets to 85% I can start to pack up and call it a night.

There are units available that will calculate and display the dew point temperature but they tend to be much more expensive and bulky than this compact unit.

As the unit also measures temperature and with the probe having a reasonable length lead, it is possible to locate the sensor close to a mirror cell. In this case a second unit can be located externally for measuring the ambient temperature, allowing the user to monitor the difference in temperature inside and outside the telescope tube.

Not a bad investment for under \$5!





The May 2015 Alpana AstroCamp

Jeff Lusher reports on another successful astrocamp

These days I am fortunate to have the freedom to arrange life around the timing of my favourite astronomical events. No, I'm not referring to eclipses, transits, or comets. I am referring to astrocamps.

As detailed on the ASSA website, there are 6 astrocamps slated for 2015, with VicSouth in Nhill, Victoria, in October and the remaining 5 camps split between The Springs, at Orroroo and Alpana Station near Blinman, in the Northern Flinders Ranges.

The South Australian locations both offer basic 2 person share room sleeping arrangements, large kitchen and dining facilities and most importantly, dark skies. Camping facilities, with power, are available at both locations with 4 caravan private ensuite sites at Alpana. Being able to attend all of the camps during the year, I now choose to take my A-Van caravan for my accommodation. This gives me the flexibility to arrive early, or stay a few days later, if camping sites are available.

For May's Alpana astrocamp, I had planned to split up the 7 to 8 hour trip to Blinman over 2 days so I could take it easy on the way up there. I had included in my itinerary to take a longer route and stop for morning tea at Burra with one of the other regular astrocampers, Gerry Velaitis, who was participating in the Bike SA Outback Odyssey, spending 16 days bicycling the Mawson Trail from Adelaide to Blinman, so although Gerry was on his way to Blinman, he would not be attending this camp, as he wouldn't arrive until after we had long gone.

To my surprise, for this time of the year, the roads were clear of traffic and the weather was mild and clear, so after stopping at Hawker for a coffee at 4pm, I decided that I would take advantage of the remaining daylight and clear weather by continuing up to Alpana Station before dark. I would advise that anyone planning to attend a camp at Alpana Station avoids driving after sunset between Hawker and Blinman due to the abundance of wildlife on the roads.

Arriving at Alpana just on sunset, I set up camp near another regular astrocamper and A-Van owner, Paul Rogers. One

benefit of arriving a day or two early is having the opportunity to spend a bit more time unpacking and setting up the equipment.

As my primary interest is astrophotography, I have found the extra time spent aligning and balancing my equatorial mount is essential to obtaining good images. Good luck was on my side that evening, as I had my gear set up and running by 8:30pm and with clear skies, I continued imaging until about 1:00am, when some high altitude clouds started to move in.

Thursday afternoon saw the arrival of one more earlybird, Peter Maunder. With my gear already set and tested I recommenced imaging that evening at 7:00pm, but by 9:00pm, the high altitude cloud moved in once again, so after reviewing the evening's imaging effort, I decided on an early night.

Friday afternoon saw the arrival of most of the remaining campers, except for Joe and Lyn who had been delayed by other events and would be arriving on Saturday. With an expected total of 23 people, including 3 or 4 new faces, it was the largest number for all of the Flinders camps that I've attended. I was concerned that the facilities would be stressed, but there were no issues and the facilities coped well with this large group.

There's always a wide range of telescopes at these events and in recent years, the appearance of the ever popular Celestron and Meade Schmidt-Cassegrain, has been overtaken by the large automated Truss-Dobsonian scope. It was no exception this time, with a total of 3 individual 18" scopes and a 16" present in the visual observing area.

With, Terry Redman and Steve West, who were also attending for some astroimaging, we decided to locate away to the western side of the camping area, away from the visual observers. This also had the advantage of a clear view of the western sky, where Comet Masters C/2015 G2 was starting to emerge from the evening twilight. Once again, the high altitude cloud moved at about 8:30pm, driving us indoors to the warmth of the dining room's open fire, to share wine, cheese and good conversation for the remainder of the evening.



Saturday afternoon saw the arrival of Joe and Lyn,



The May 2015 Alpana AstroCamp

Jeff Lusher reports on another successful astrocamp

bringing the final number to 23 members. It has become an Alpana camp tradition to spend Saturday's sunset at the Sunset Lookout, on the far western side of the station, for drinks and snacks as the sun sets, but with a number of people in the group being keen on viewing and imaging Comet Masters, the Sunset Drinks were moved to the observing area this time. (See the group photo by Simon Naylor on the previous page). This was a good idea as I managed to get an early start with a good run of 43 x 60sec exposures, which integrated well revealing the comet's narrow, well defined tail structure. (See the image below).

Saturday evening was to be the best viewing night for the weekend with clear, dark skies until 1:00am, but it was occasionally hampered with some light winds throughout the night. At one point during the evening, Simon Naylor demonstrated a brilliant concept, using a large flat mirror placed on a low table, by which a group of observers could view the sky above by looking downwards. Unfortunately I arrived late to the demonstration, but I hope that Simon will detail this interesting setup in a future issue of The Bulletin.

Another Alpana Camp tradition is dinner at the Blinman Hotel. Although a party of 23 on a Sunday night was probably more than they expected, as usual, the food was good. That evening also happened to be my birthday, so the timing for this was perfect. After the meal, we returned again to clear, dark skies, but by 11:00pm the clouds returned and called an end to the weekend observing and imaging.

All of the attendees were up early on the Monday morning, with their gear packed and ready to depart back to Adelaide by 9:30am. I'm looking forward to the next Alpana camp in August.

This email from 2 new attendees, Anne-Maree Taranto & Jennifer King really summarises what these camps are all about!

"To all the Alpana astronomy crew,

please accept my and Anne-Maree's humble and heartfelt gratitude for welcoming us so openly to your astronomy weekend. It is our absolute pleasure to have spent time amidst such august company! How wonderful to find fellowship among deeply thoughtful and inquiring minds and to share in the simple exquisite pleasure of observing the heavens. We are touched by the generosity you each gave in your knowledge and experience both on observational and technical levels, taking the time and patience to answer our many many questions and welcoming us into your community. Thank you.

A couple of highlights for us include Fraser's tour through the geological annals of Brachina Gorge - in particular the very awesome discovery of the 'Golden Spike'.

Simon's paradigm shifting installation - a simple yet deeply compelling and poetic mirror observatorium that leaves us still to this moment breathless with wonder and inspiration.

Sporadic moments with the "imagers" who's formidable technical facility was outshone only by their truly artistic accomplishments in capturing the elegance of the heavens.

And on the final evening, Anne-Maree and I watched silently from the periphery of the arena of the hooded black giants, swinging to and fro in unison, beeping and whirring like some arcane ceremony, as the night's viewing got underway.

It also must be said, that each individual we encountered at star camp offered something insightful, meaningful, thought provoking, challenging, educational, poetic, creative and wonderful to the both of us in ways that bring a sense of communion and connection in a common delight. We hope to see you all again soon!"





What Will New Horizons See — and When?



After almost 10 years of travel, the New Horizons spacecraft will arrive at Pluto this month.

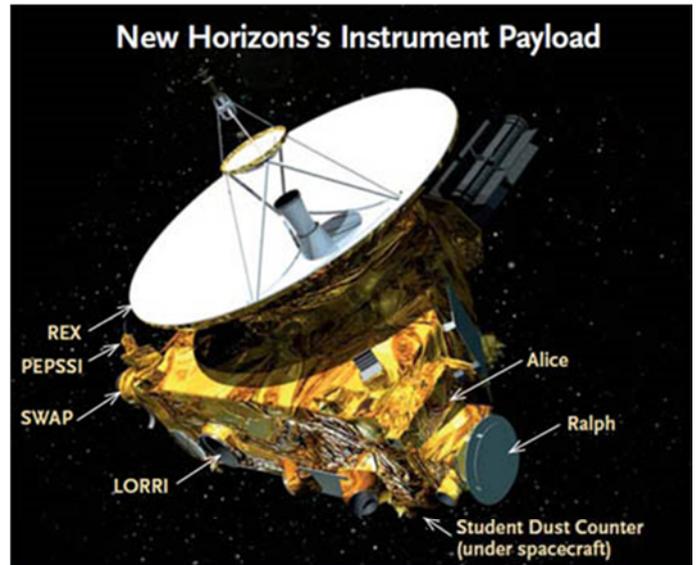
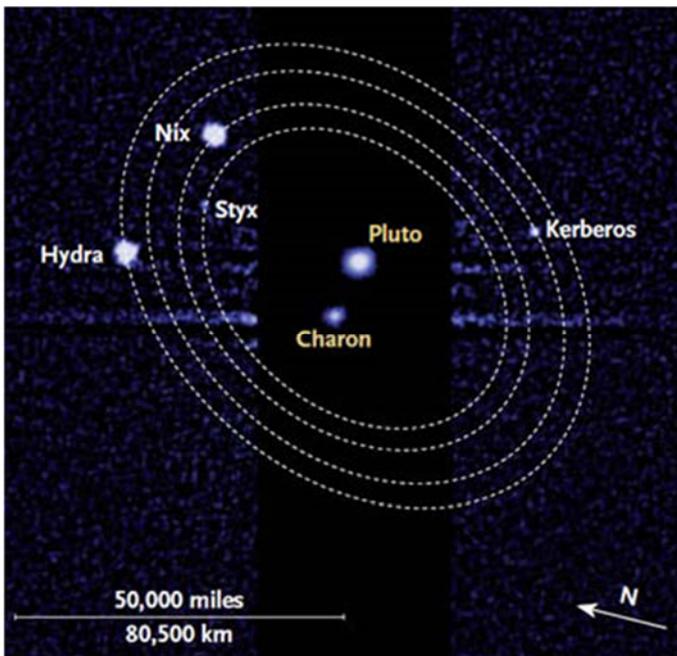
Planetary scientist S. Alan Stern (Southwest Research Institute) is the Principal Investigator of NASA's New Horizons mission. He is writing a series of blogs for *Sky & Telescope* before and during the spacecraft's historic encounter with Pluto. In this third "insider blog" about the New Horizons mission, Alan Stern offers a look at the timetable for getting results from the historic flyby.

It sounds like science fiction, but it's not: NASA's New Horizons spacecraft is on final approach to the Pluto system! After 113 months in flight, the fastest spacecraft ever launched is now barely 30 days from its destination. Closest approach of the flyby occurs on July 14th at 11:50 Universal Time.

As background to that, I should explain first that New Horizons was built to be very, very effective at taking and storing large amounts of data as it zips past Pluto and its five moons at 13.8 km (8.6 miles) per second.

This was accomplished by providing the capability for up to five of the seven science instruments to be operating at any one time, and by providing two large recorders for data storage during encounter. As a result of these and other design features, New Horizons will take about 100 times as much data during the flyby as it can send back on a typical day.

Below: A composite of 2012 Hubble images shows Pluto's five known moons. Their highly inclined orbits create a "bull's eye" pattern as seen from the Earth-Sun perspective. (The brightness of Pluto and Charon has been reduced by a mask; faint horizontal stripes are imaging artifacts.) NASA / ESA / M. Buie



Ralph MVIC (Multicolor Visible Imaging Camera): Combines medium-resolution panchromatic imager and moderate-resolution color imaging through blue, red, methane, and near-infrared filters.

Ralph LEISA (Linear Etalon Imaging Spectral Array): Near-infrared imaging and spectroscopy; will provide composition and thermal maps.

Alice: Ultraviolet imaging spectrometer; will analyze composition, structure, and escape rate of Pluto's atmosphere and will look for an atmosphere around Charon.

REX (Radio Science Experiment): Uses radio transmissions passing near limbs of Pluto and Charon to measure atmospheric pressure and temperature; also serves as a passive radiometer for studies of surface properties. Careful tracking of Doppler shifts during radio transmissions will refine the masses of Pluto and Charon.

LORRI (Long Range Reconnaissance Imager): Telescopic panchromatic camera with 2.63-m focal length; will obtain images at long distances, search for rings and moonlets, record Pluto's farside, and provide high-resolution geologic data on the hemisphere in sunlight.

SWAP (Solar Wind Around Pluto): Solar wind and plasma spectrometer; will measure the escape rate of atmospheric gases and observe Pluto's interaction with the solar wind.

PEPSSI (Pluto Energetic Particle Spectrometer Science Investigation): Hockey-puck-size time-of-flight mass spectrometer; will measure the composition and density of ions escaping from Pluto's atmosphere.

SDC (Venetia Burney Student Dust Counter): Built and operated by students at University of Colorado; measures interplanetary dust that strikes New Horizons during its long voyage.



Astro News

Interesting news stories sourced around the world



Above: With the blue Atlantic Ocean as backdrop, smoke and steam fill the launch pad, at right, as NASA's New Horizons spacecraft roars into the sky aboard an Atlas V rocket, on the 9th of January 2006.

Given this, and given that we have to share NASA's Deep Space Network of communications stations with other missions, getting all of the Pluto system observations back on Earth will take the rest of 2015 and most of 2016.

That in turn means that New Horizons, long after it's passed by Pluto, will continue to return new data and discoveries — to you — and to our science team, for a very long time — almost as if it were still at the planet, gathering data.

But even though we'll be receiving a steady stream of images, spectra, and other data for some 16 months after July's flyby, many images and other observations will be returned during the close-approach operations spanning July 4th to July 20th.

Keep in mind that Pluto's diameter is almost 2,400 km (1,500 miles), so for example, a 40-km/pixel image should put about 3,000 pixels on Pluto's disk and a 10 km/pixel image would put about 45,000 pixels on its disk.

Also keep in mind that as Pluto and its satellites rotate as we approach, we'll not only be getting higher and higher resolution, but we'll also be seeing new terrains coming into view.

As you can see, there's a wide variety of data coming down in July to reveal many kinds of details about Pluto, Charon, and Pluto's small satellites.

We'll also be searching for rings, mapping surface compositions, studying Pluto's atmosphere, and measuring its surface temperature and radar reflectivity.

By the time July is over, we'll have a pretty good sampling of the many kinds of data New Horizons obtained when close to the Pluto system. But the real deluge that fills in the details — and which comprises the other 99% of the data taken — will have to wait for the long downlink that begins after the flyby.

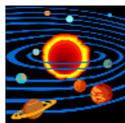
For a full transcript of this article, see:

http://www.skyandtelescope.com/astronomy-news/what-new-horizons-will-see-and-when-06022015/?et_mid=757679&rid=246418797

For more information on the New Horizons mission, see:

http://www.nasa.gov/mission_pages/newhorizons/main/index.html





Solar System Highlights

The major planets during July 2015

by Joe Grida

Early during July, **Mercury** is visible in the eastern dawn sky. It then heads for superior conjunction on July 23rd, before reappearing in the sunset sky early next month.

I hope you've been keeping an eye on **Venus** and Jupiter as they close the gap between them. On the 1st of July, they will be only 0.4° apart. This is a fantastic month for lovers of nightscapes. The Moon, Venus, Jupiter and the star Regulus put on quite a show in July. The 2-day old Moon forms a triangle with Venus and Jupiter on the 18th of July. The Venus-Moon separation is 5.7°, whilst the Jupiter-Moon separation is 5.2°. Bear in mind that this is the apparent separation in the sky, the real distance to Venus is 58.5 million kilometres, whilst you'll need to make a huge leap to reach Jupiter at 936 million kilometres distant.

The night after, on the 19th of July, we find the crescent Moon 3.5° above Venus, with 1.3 magnitude Alpha Leonis (Regulus), only 2.5° NE of Venus. All three will fit in the field of view of 7x50 binoculars. Look carefully, and you may be able to pick up the crescent of Venus as well as that of the Moon. See the chart, from Stellarium, at right. Note Comet C/2014 Q1 PANSTARRS, 6.6° NW of Jupiter.

Mars passed conjunction on the 15th of last month, and

still remains to close to the Sun for observation.

As already mentioned, we have a merry dance of the planets in the western sunset sky this month, and **Jupiter** plays one of the starring roles. It's heading for solar conjunction next month, so get your last glimpses of this solar system behemoth through your telescopes this month. It doesn't return to the evening sky until the start of 2016.

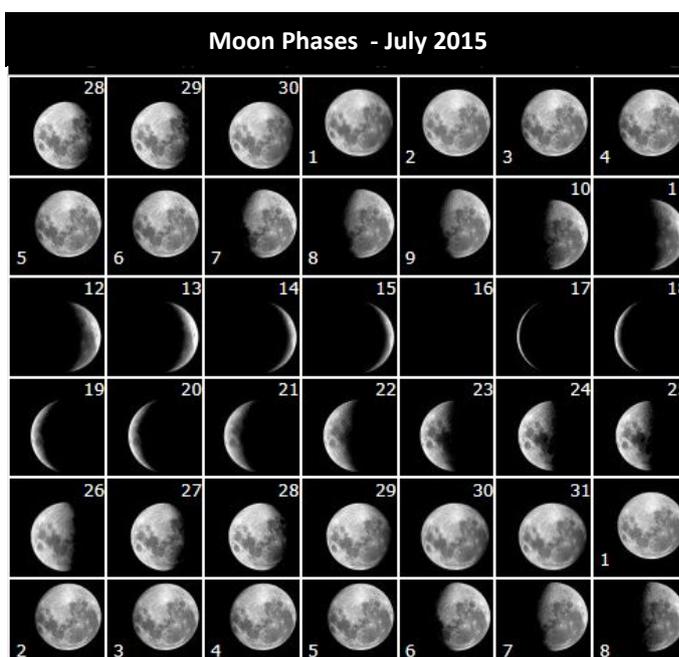
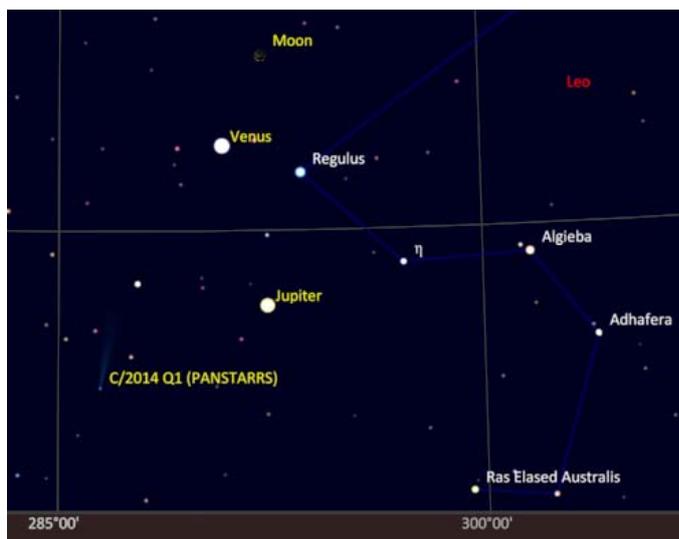
Of the naked eye planets, Saturn is the one to seriously observe through a telescope this month, as it is visible for most of the night. In mid-July, the planet shows a 17.8 arc-second disk, at mag +0.3. The magnificent rings are wide open, displaying a 24° tilt.

Uranus, in Pisces, rises after midnight at the start of July, and by 11:30pm by month's end.

Neptune, in Aquarius, rises by 9:00pm in mid-July.

Dairy of phenomena July 2015

d	h(UT)	Event
1	6	Moon furthest South (-18.4°)
1	9	Venus 0.4°S of Jupiter
2	2	FULL MOON
5	19	Moon at perigee
6	6	Neptune 2.9°S of Moon
6	13	Earth at aphelion
8	20	LAST QUARTER
9	3	Uranus 0.7°N of Moon
14	4	Moon furthest North (18.4°)
16	1	NEW MOON
16	4	Mercury 0.1°S of Mars
18	14	Jupiter 4.0°N of Moon
19	0	Regulus 3.2°N of Moon
19	0	Venus 0.4°N of Moon
19	7	Venus 2.9°S of Regulus
21	10	Moon at apogee
23	5	Venus stationary
23	19	Mercury superior conjunction
24	3	FIRST QUARTER
26	9	Saturn 2.2°S of Moon
28	17	Moon furthest South (-18.4°)
29	18	Pluto 3.0°S of Moon
31	6	Venus 5.5°S of Regulus
31	10	FULL MOON





A bright binocular comet for mid-July!

C/2014 Q1 PANSTARRS

With a perihelion distance of 0.31AU on 2015 July 6, this comet has the potential to reach magnitude 4 to 5. Unfortunately at this time, it will be at very low solar elongation.

By mid-July, the comet moves sufficiently far enough away from twilight to be visible, low in the western evening sky in Cancer, fading from magnitude 5.5

Although the apparition is unfavourable, the big plus with C/2014 Q1 is that it is a returning visitor, with an orbital period of 38,000 years.

The comet has been baked by the Sun on previous encounters. If this is the case, the currently inactive comet may switch on as it arrives at perihelion. Be prepared for outbursts.

I managed to follow this comet's development during April and May, post Solar conjunction, when the solar elongation was a mere 22-25 degrees and the comets altitude a mere 5 degrees. Very few worldwide observations of this comet were being reported since the observing circumstances were very poor, slightly favouring southerners. Such is the

advantage of the amateur observer that can reach low altitudes.

My photometric estimates were magnitude 12.5 on April 30, 11.5 on May 16 and 10.7 on May 26.

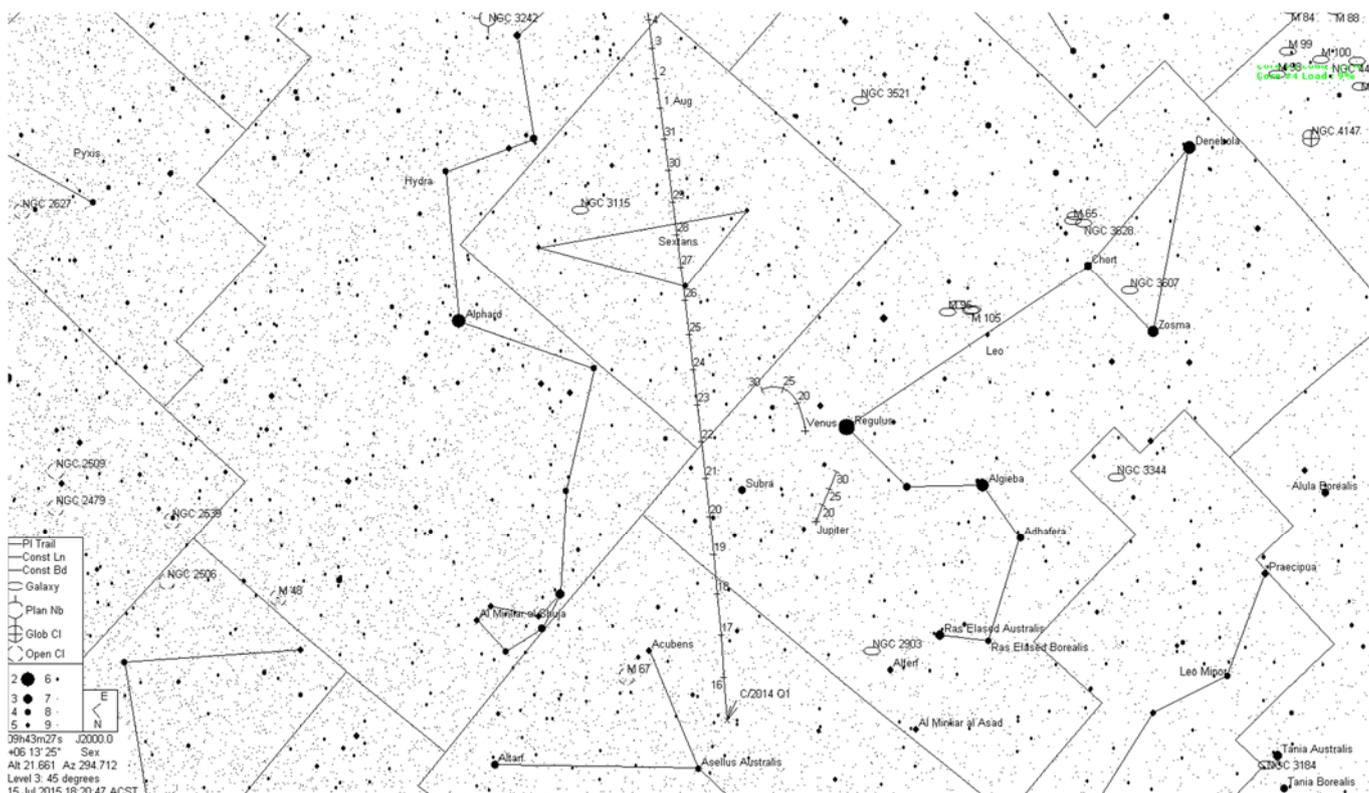
The comet appeared to have been running a full magnitude behind prediction and there is a possibility that it may not survive perihelion.

First observations should occur around the evening of July 15th, when the comet is at 5 degrees altitude at 620pm in a twilight affected sky.

You need a very good horizon to see it. Jupiter and Venus are marked on the chart to aid in finding the comet. On the evening of the 18th, the crescent moon will be 2.5 degrees above the now magnitude 6.0 comet.

The comet crosses into Leo on the 19th, and then into Sextans on the 22nd.

On this date, the comet is 16 degrees above the horizon at 620pm and likely to have faded to magnitude 7. By July 31st, the now magnitude 8 comet will be at 18 degrees altitude at 7pm, but with moonlight interfering.





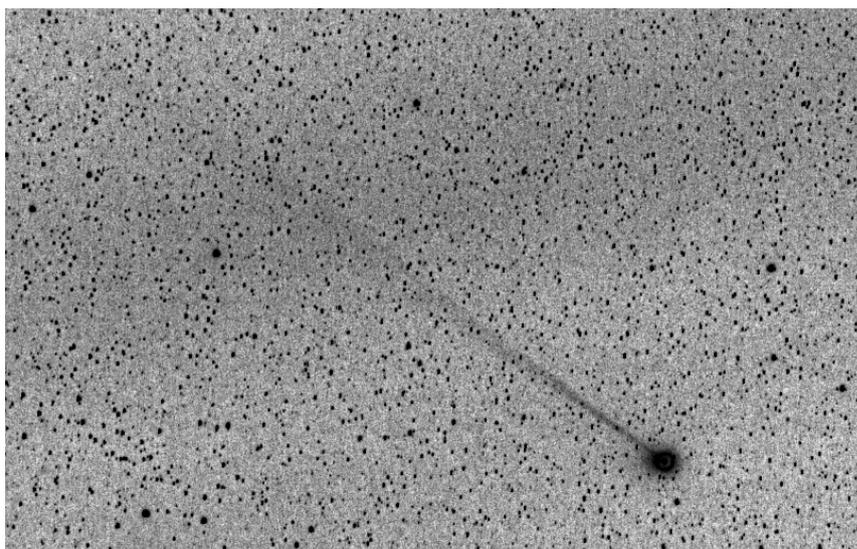
C/2015 G2 MASTER wrapup

Discovered on April 7th of this year, comet MASTER arrived at perihelion on May 23 at a distance of 0.77AU from the Sun.

Prior to this, it had a close Earth encounter on May 13 at a distance of 0.47AU. The comet brightened rapidly after discovery, as it approached Earth and Sun. I estimated it at magnitude 9.7 on April 8th, 8.5 on April 19th, and 7.1 on May 1st.

Peak brightness of magnitude 6.0 occurred just after closest approach around May 15th, just in time for the Alpana astrocamp, where several attendees imaged the comet.

Although the ion tail was quite faint visually, I managed to photograph a tail 6 degrees in length, (*See attached photo taken with a Canon 60Da + Sigma 200mm lens. 5 minute exposure inverted*) The comets orbit indicated that it is a first timer, not a returning visitor, so prospects for a brighter show were dampened.



The comet faded rapidly after perihelion as it receded from Earth and Sun, shining at magnitude 7.4 on June 1.

As usual, check my Southern Comets website for latest updates

<http://members.westnet.com.au/mmatti/sc.htm>





Nova Sagittarii 2015 No. 2 continues its apparent gradual saw-tooth decline, currently at around magnitude 7. I've been following R Carinae toward its impending date with minimum around magnitude 10, and have almost completed R Car DSLR photometry for June 5.

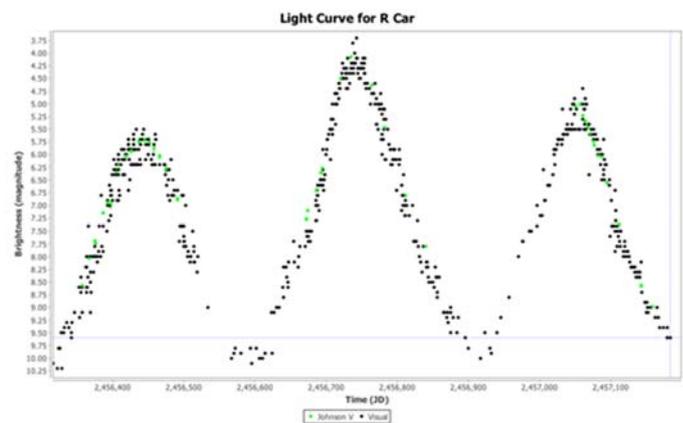
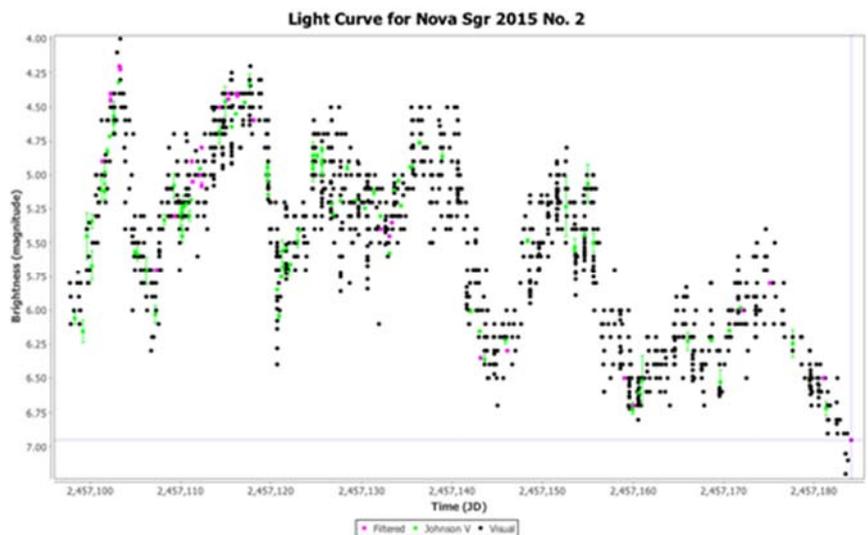
Tom Richards (tomprettyhill@gmail.com) from Variable Stars South has kindly consented, courtesy of Robert Jenkins, to having a recent article "CCD Targets for June and July" reproduced in The Bulletin. If you are keen to try your hand at CCD photometry of some faint targets in July, Tom's article, which forms the remainder of this month's instalment, will be of particular interest to you. Note that the southern eclipsing binaries project Tom refers to below also has numerous targets suitable for DSLR photometry. Over to you Tom!

The EB and EW types of eclipsing binaries have very short periods, guaranteeing easily discernible magnitude changes, and usually eclipses, most nights. If you have a CCD-equipped telescope, we seek from you all-night imaging runs on one of the targets below – stick with it for as many nights as you can. Here's what's wanted:

Simplest –HJD/Mag data table from your nightly observations. The magnitudes should be unfiltered, or filtered but un-transformed. Email that to me as a CSV file. Then if you can, use Peranso (<http://www.peranso.com/>) or Bob Nelson's Minima freeware (<http://members.shaw.ca/bob.nelson/software1.htm>) to find the HJD times of any observed minima and email them to me at the same time. This information will allow us to update and improve on existing light elements, as well as look for period change using O-C diagrams.

More advanced, if you have your transformation coefficients – obtain nightly time series in V and B or Ic filters or all three, transform the resulting HJD/Mag data tables, and email me the results. This may enable us to develop an astrophysical model of the system.

If you want to do this work, please contact me and I'll send you an invitation to share the VSS EB-EW Dropbox folders. There you will find project information, useful papers, and

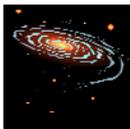


our data for each target under observation. Yours will be added, and you will be a co-author when we publish.

Also if you're unsure about how to do any of this work, email me and we'll discuss it. But first, as a background, do read the pages about the EB-EW Binaries Project on our website (<http://www.variablestarsouth.org/projects/projects/eb-and-ew-binaries-project>). You will also find the pages on the EA Binaries Project useful.

At the bottom of the page is the list of targets for June and July, culled from Pribulla, T. *et al*, 2003CoSka__33__38P and a southern subset of their (much more detailed) catalogue, filtered for CCD mags (Vmax≥10). The paper, full catalogue and southern catalogue are in the project's Dropbox folder. Go to Papers\Pribulla Targets. You can find out a lot more about each target at the AAVSO's VSX portal, www.aavso.org

Star	HJD0-2400000	Period in days	Sp Type	RA 2000	DEC 2000	Vmax	Vmin
LT Pav	45991.67	0.39367177	F8V	19 48 36	-71 01 30	11.4	12.2
HY Pav	47023.8115	0.3516555	K1V	20 23 47	-73 42 12	11.42	12.16
ST Ind	44843.7159	0.40191649	F5V	20 35 24	-48 19 20	11.3	11.79
RW PsA	46675.6954	0.36045074	G6V	22 09 47	-27 04 02	11.05	11.76
BC Gru	48479.9266	0.30735686	G8V	22 44 45	-48 09 50	10.6	10.94



Alone in the dark

A guide to observing faint fuzzies in our night sky

by Joe Grida



Exploring the NGC 4261 galaxy group in Virgo

In these “Alone in the dark” series of articles, I always strive to find targets for you that are a little off the beaten path. They are also designed to test your observing skills and the optics of your telescope.

I don’t think your telescope will have much trouble with this group; all, bar 1 of the 15 galaxies I’ve labelled on the image below, have NGC designations, which means they are reasonably bright. Of course, the rider on all this is that you must be observing from a dark sky. A suburban backyard just will not do! With similar redshifts, the group is approximately 115 million light years away, about twice as far as the Virgo Cluster of galaxies. A recent study showed that there is X-Ray gas diffused around the whole group, making up 20-30% of the mass of the group of galaxies.

I was fortunate to view this group through an 18” telescope under dark skies recently. It’s breathtaking to see so many galaxies in the field of view, I could count 7 centred around NGC 4273. But I digress.

Let’s start our tour with the group leader, the giant elliptical NGC 4261. At magnitude 10.4, and a size of 3.6 x 4.1 arc-minutes, it’s the largest and brightest of the galaxies in this group. This galaxy is also the strong radio source 3C 270, and is believed to contain a massive black hole at its centre.

In the eyepiece it looked fairly bright and slightly elongated,

with a stellar core. The 12.8 mag NGC 4264 lies 3.4 arc-minutes to the NE of NGC 4261. This tiny 1.0 x 0.8 arc-minute round galaxy appeared fairly faint.

As we head 7.1 arc-minutes SW of NGC 4261, we run across the rather dim 14.0 magnitude edge-on galaxy NGC 4257.

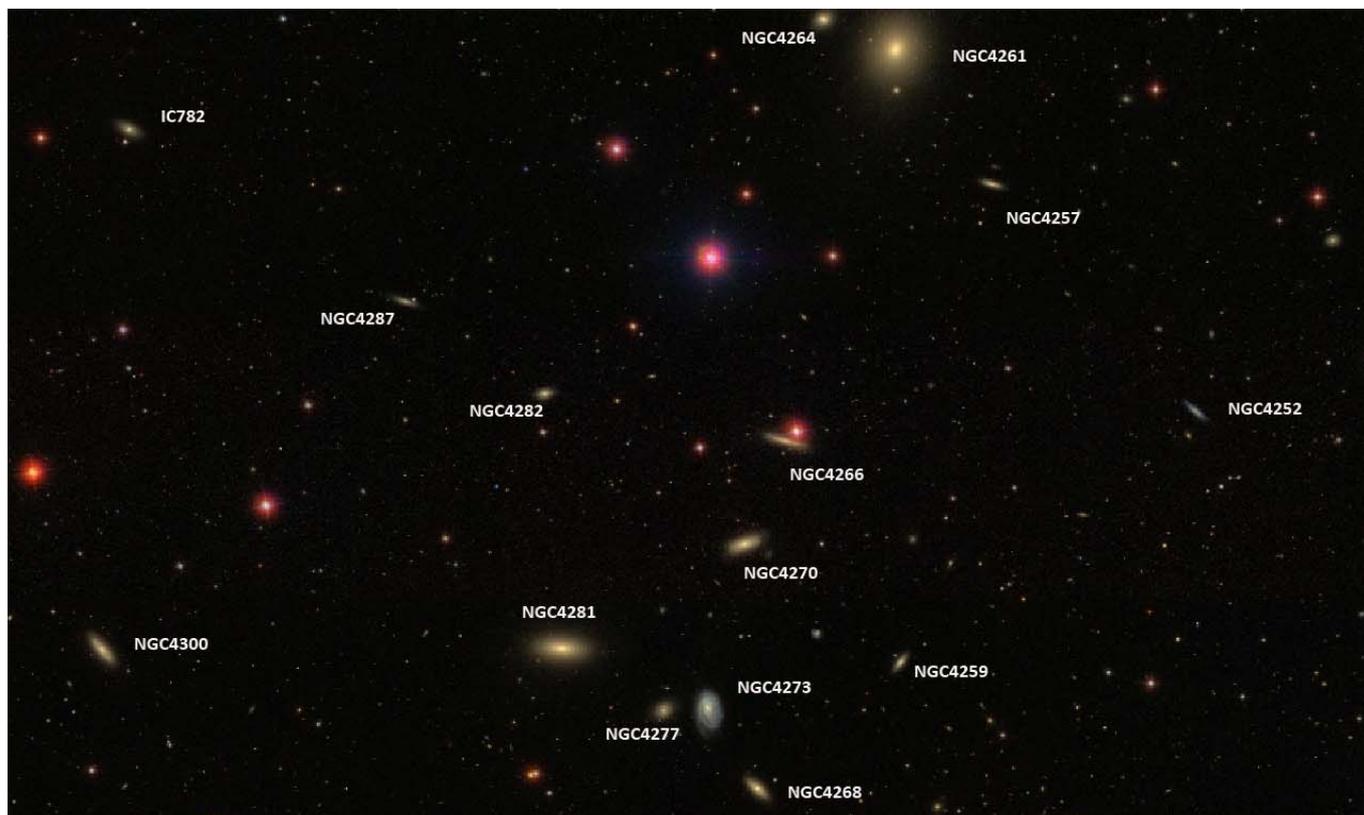
It’s now time to leave NGC 4261 and move our field of view 17.7 arc-minutes SSE, until we reach NGC 4266. The view of this 13.7 mag edge-on galaxy, 2.0 x 0.4 arc-minutes in size, is obstructed by the mag 8.5 G5 star SAO119331.

A further 4.8 arc-minutes to the south, and we land on NGC 4270, a fairly bright (mag 12.2) elongated galaxy, 2.0 x 0.9 arc-minutes in size. Displays quite a bright core.

Head south again for 7.4 arc-minutes, and find NGC 4273. This mag 11.9 barred spiral galaxy is almost face-on to us. Professional studies indicate some disturbance, probably due to some tidal interaction with another group member (NGC 4277?).

Let’s head 7 arc-minutes ENE of NGC 4273, and locate NGC 4281. This 11.3 mag spiral galaxy, 3.0 x 1.5 arc-minutes in size, is the second brightest member of the group, and appears elongated with a bright core.

I’ll leave it to you learn about the others in the group!



Above: Sloan Deep Sky Survey image from Aladin Lite. North is at the top. Field is 30 arc-minutes high.



Contact information

Here's how to contact various members of Council, Regional Co-ordinators and SIG's

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Note: To address all members of the ASSA Council, send email to: council@assa.org.au

REGIONAL GROUPS

Whyalla

The group meets on the first Thursday of the month.

Coordinator: Peter Mayfield

Ph: 0408 410 895

Email: whyalla@assa.org.au

Northern Yorke Peninsula

The NYP'pers hold combined members' and public viewing nights monthly.

Coordinator: Tony Henderson

Ph: 0429 352 382

Email: nyp@assa.org.au

Riverland

The Riverland group hold combined members' and public viewing nights monthly.

Co-ordinator: Tim Vivian

Ph: 0417 800 225

Email: riverland@assa.org.au

SPECIAL INTEREST GROUPS

Deep Sky Imaging Neil Walter 0418 805 182

Variable Stars David Benn 0407 261163

Radio Astronomy Peter Gray 0418 829 632

Light Pollution Martin Lewicki 0413 494 366

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Comets & Meteors Michael Mattiazzo 0420 959 664

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stockport-dome@assa.org.au

South Australia Telescope (36") sat@assa.org.au



Members' Gallery

Highlighting members' astrophotos



Above: The Lochiel "Monster" taken by **Jarrold Koh**, at Lake Bumbunga, near Lochiel, SA on 30 March 2015 @ 0330 hrs. It is a panorama of 12 photos. Taken with a Nikon D4, 14-24 f/2.8 @ 14mm. ISO 3200, 25 second exposure.

Below: The Emu, imaged by **Simon Naylor** during the Alpana AstroCamp, May 2015. Canon EOS 6D, EF17-40mm f/4L USM Lens @ 17mm, Exposure 362.0 sec; f/4.0; ISO 1600. Dark frame subtraction applied, Processing in CS6

