



# SCORPIUS

THE JOURNAL OF THE  
MORNINGTON PENINSULA ASTRONOMICAL SOCIETY INC.

Volume XXI, No 6 (November /December)

The Mornington Peninsula Astronomical Society (formerly the Astronomical Society of Frankston) was founded in 1969 with the aim of fostering the study and understanding of Astronomy by amateurs and promoting the hobby of amateur Astronomy to the general community at all levels.

The Society holds a focused general meeting each month for the exchange of ideas and information. Regular public and private observing nights are arranged to observe currently available celestial objects and phenomena. In addition, the society encourages the services of its members for educational presentations and observing nights for schools and community groups.

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### Newsletter Disclaimer

The Scorpius Newsletter is published online, once every two months for its membership, by the Mornington Peninsula Astronomical Society, for Educational Purposes Only

As a newsletter, this publication presents news spanning a spectrum of activities, reports, and publications in order to keep society members abreast of a variety of events and views pertaining to astronomy. While

prudent, reasonable effort has been utilized to verify factual statements made by authors, inclusion in this newsletter does not constitute or imply official MPAS endorsement. All materials (except previously published material, where credited) are subject to copyright protection © 2011, Mornington Peninsula Astronomical Society.

## November / 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1	2 <b>Public Night 8pm</b>	3
4	5	6 Cup Day	7 <b>Last Quarter</b>	8	9	10
11	12	13	14 <b>Solar Eclipse</b> <b>New Moon</b>	15	16	17 Members Night BBQ 6pm <b>Working Bee</b>
18	19	20	21 General Meeting 8pm	22 <b>First Quarter</b>	23	24
25	26	27 Venus & Saturn	28 Committee meeting 8pm	29 <b>Full Moon</b>	30	

### Monthly Events & High Lights. Total Solar eclipse Queensland early morning 14 November 2012

Public night 2<sup>nd</sup> 8pm start – Working Bee & Members Night BBQ 6pm at the Briars 17<sup>th</sup> - General Meeting at 8pm 21<sup>st</sup>  
 Morning – 27<sup>th</sup> Venus & Saturn very close – Jupiter’s moon Io shadow transit at 1:30 am on 28<sup>th</sup>  
 Evening – Mars & a thin Moon 16<sup>th</sup> - **Watch out for Auroras.**

## December / 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30	31			<b>Full Moon</b>		1
2	3	4	5 <b>Last Quarter</b>	6	7 <b>Public Night 8pm</b>	8 Members Night BBQ 6pm <b>Xmas Party</b>
9	10	11	12 <b>Venus Mercury &amp; Moon Dawn</b>	13 <b>New Moon Io transit</b>	14	15
16	17	18	19 <b>No Meeting No Meeting</b>	20	21 <b>First Quarter</b>	22 <b>School Holiday start</b>
23	24	25 <b>Merry Xmas</b>	26 <b>Boxing Day</b>	27	28 <b>Full Moon</b>	29

### Monthly Events & High Lights.

Public night 7<sup>th</sup> 8pm start

No General Meeting in December - **Members Night Xmas Party BBQ 6pm at the Briars 8th**

Dawn – Venus Mercury & thin Moon close 12<sup>th</sup> - Morning - Jupiter’s moon Io shadow transit at 2:35am on 28<sup>th</sup>

Evening – Mars close to a thin Moon 15<sup>th</sup>

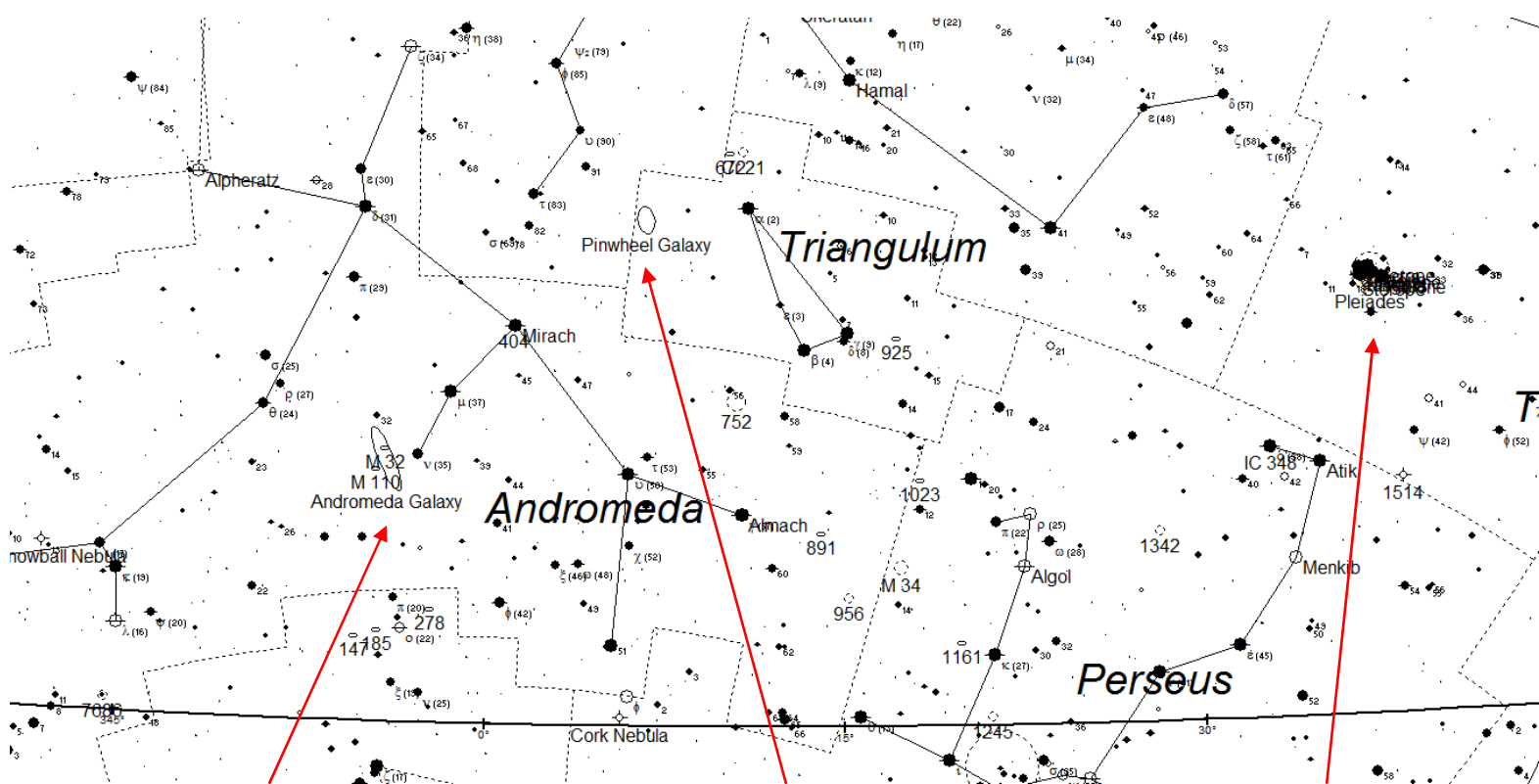
Midnight - **Jupiter’s moon Io shadow transit 13<sup>th</sup>** - **Watch out for Auroras.**

**Note that we still need helpers for weekly Friday public nights over the January Holidays.**



# Sky for the November / December we look north to Andromeda/Triangulum/Taurus

In Andromeda you will find the largest Galaxy in the northern hemisphere M31 which only gets to 9 degree above the horizon at this time of year from the Briars. In Triangulum you will find another large Galaxy the Pinwheel M33. In Taurus you will find the Great Open Cluster Pleiades the seven sisters M45. Now is the best time to view these objects. Produced on Sky Map & Starry Night by G Walton



# SOCIETY NEWS

July meeting **Paul Lasky** gave an excellent talk on gravity waves. Key comments were they are looking for measurements with their detectors 1/100<sup>th</sup> the size of a proton. The gravity wave detector in Western Australia is only used for testing instruments used by the large detectors and its arms are only 80 meters long. There are 4 large detectors in the northern hemisphere with arms more than a kilometre long. Hoping to get the gravity wave detectors working in 2014 and report results around 2016.

August meeting **Paul Albers** gave an informative talk on aurora, how and why they form. Key comments were the different colours are caused by different elements at different heights. More activity every 13 years solar cycle as the sun rotates at different speed at latitudes so magnetic field lines erupted though the surface.

September meeting **Andrew Prentice** talked about formation of the solar system and the Asteroids.

July Member night BBQ was big success with about 30 members turning up, with 4 scopes set up cloudy.

August Member night BBQ saw about 15 members turning up, very cloudy watch movie & played with computers.

September Member night BBQ saw about 13 members turning up under a very cloudy sky. **Paul Curnow** from the Astronomical Society of South Australia gave a talk on New Zealand's Maoris constellations. Also Pearl celebrated her 11th Birthday.

August Public night at the Briars, 99 visitor saw the Moon and Saturn under a mostly cloudy sky. Shed and field were packed, [see the picture on first page](#).

September Public night at the Briars, 30 visitor heard Trevor Hand's talk while a storm raged out side. There was very Limited viewing.

Rosebud High School Night at Briars on 24 July 24 students got to see the Moon and Saturn.

Toorak Collage 6 September, year 3 students listened to Trevor Hand's talk while a storm raged out side. No viewing

St Augustine primary 13 September, all got to see Saturn, Omega Centaurs and then Peter Lowe gave the talk.



Due to the Queensland solar eclipse on 14<sup>th</sup> November, the Annual General Meeting Elections will be held on Wednesday, 16 of January 2013. See the next edition of Scorpius for more information and the Nomination form.

Treasurer Marty Rudd has decided to hang up his calculator. So we need a new Treasurer, please see a committee member if you can help. Many thanks Marty for your many years of tireless work as treasurer.

**Watch out for snakes at the Briars site.**

### 2012 Subscriptions Due

A number of members have not renewed their 2012 subscriptions which always come due in January.

Subscriptions can be paid in a number of ways:

- Direct Cash payments to an committee member
  - Send a cheque or mail order to the society mail box
  - Make a direct electronic payment into the society working bank account.
- The account details are BSB 033-272 Account 162207. Remember to add your name and details to the transfer so we can identify the payment in the bank records.

If you have any concerns please talk to a committee member.

### NEW MEMBERS

## Welcome

Grant Levey & Family

Astronomy 2013-year books have been ordered. @ \$23 for members

### A word from the Scorpius editing team.

Members please write a story about your astronomy experiences and add some pictures.

Send them to:  
Brett Bajada  
Peter Lowe  
Greg Walton  
Committee member

Recent public viewing nights and school viewing nights have continue to be very well received by the attendees. It is no coincidence that this is due to the efforts put in by the members that help out at these events. To everyone that has helped out over the past few months, a very big thank-you goes to you all. Your efforts are very much appreciated, and are being very well received.

# THANK YOU

## PUBLIC NIGHT THANK-YOU

The ticking over of the new year also means that society fees are now due to be paid. The society has worked hard to ensure that 2012 fees are still the same as last years prices. So to assist the society in maintaining the facilities and services we provide, we appreciate your prompt payment for the 2012 year ahead.

As a reminder, the follwing structure of the fees are: **\$50** - Full Member

**\$45** - Pensioner Member

**\$65** - Family Membership

**\$60** - Family Pensioner Membership

## SOCIETY FEES

As an alternative, multi-year memberships are available upon request, and can save you some money over the long term. Please see a committee member about these options.

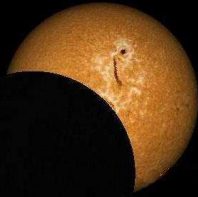


# Total Solar eclipse Queensland 14 November 2012

Melbourne 8:05am EDT

Townsville 6:45am EST

Cairns 6:41am EST



23 degrees above Horizon



17 degrees above Horizon



14.5 degrees above Horizon

Many MPAS members are travelling north to see the Total Solar eclipse, around Cairns looks like the place to be as Townsville will not be total. Being low on the horizon and the start of the rainy season, this may cause a few problems with clouds but the clouds usually form in the afternoon. It would be best to get there a few days in advance to check out the weather conditions and testing your camera gear, try to automate the camera before hand so you can sit back and enjoy the spectacle. In past eclipse some people have taken excellent photos of the back of there lens caps. Note from Cairns you should be able to see or photograph 3 Planets Venus Saturn and Mercury, though you will properly want to spend your time looking at the eclipse.



From Melbourne the Moon will only cut half way into the disc of the Sun or cover about a third of the Sun. But you can still get some excellent photos like this image I took from Bonbeach in 4 Dec 2002

The sun can play interesting tricks like casting crescent shape shallows on the ground under trees or on walls.

*By Greg Walton*

Images produced with Starry Night  
 EDT = East Day Light Saving Time  
 EST = East Standard Time Queensland



Solar eclipses 4 Dec 2002 8:00pm Pentax SLR 300mm Lens ISO400 film F16 1/125sec  
 By Greg Walton Bon Beach scan from print 300dpi

# ASTRO NEWS

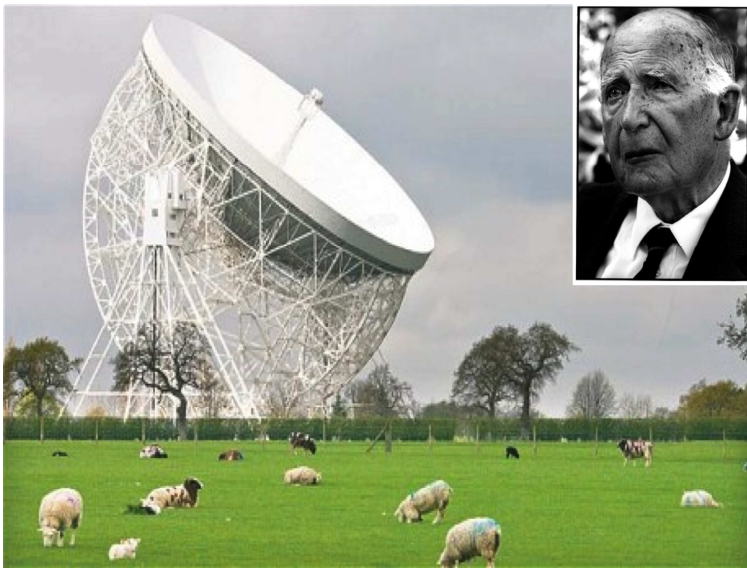
By Peter Lowe

## Sally Ride Dies at 61

Sally Ride, the first American woman astronaut, has passed away at the age of 61. Ride was a physicist who at the age of 32, blazed a trail for female astronauts and became the then-youngest American astronaut when she blasted off on the Space Shuttle Challenger in 1983. She flew again in 1984, and served on the panel that investigated the Challenger disaster. After retiring from NASA in 1989 Sally used her high profile to champion a cause she believed in passionately--inspiring young people, especially girls, to stick with their interest in science, to become scientifically literate, and to consider pursuing careers in science and engineering.

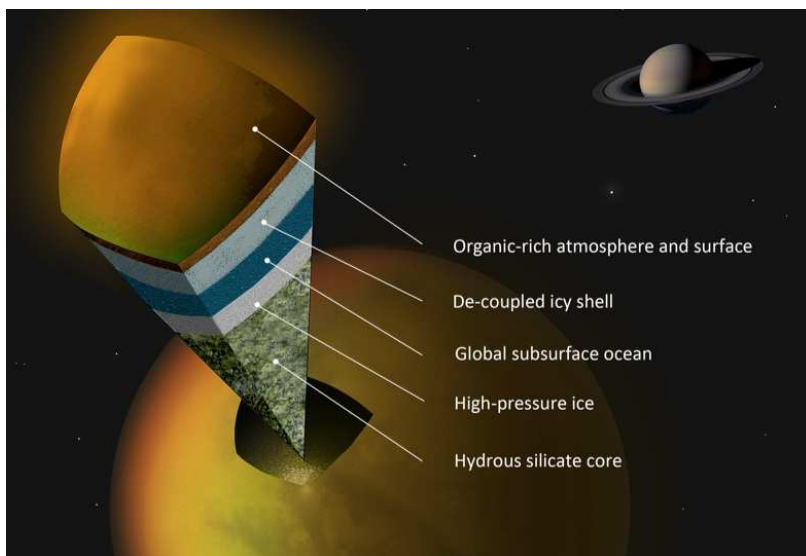


## Sir Bernard Lovell dies at 98



In 1976 I was driving through the English countryside when to my left the weirdest shape appeared in the fields. A quick check showed it was the Jodrell Bank observatory with its famous radio telescope. No amateur astronomer could possibly resist that and I spent the rest of the day exploring this wonderful telescope straight out of science fiction. The creator of the telescope and arguably the father of radio astronomy Sir Bernard Lovell die this month at the age of 98. Lovell was an electronic engineer working on aircraft radar during the war and later founded the radio observatory to continue his interests in cosmic rays, then a complete mystery from space. The Lovell Telescope, named in his honour was the first steerable dish radio telescope and was a pioneering instrument in radio astronomical science.

## Titans Possible Hidden Ocean



One of the weirder findings studying the Jovian moons was a subsurface ocean on Europa and possibly other moons. Studies into the likely internal structure of Saturn's largest moon Titan, suggest a possible global subsurface ocean beneath an icy outer shell. Nothing like it has been seen before beyond our own planet: large tides detected on Titan point to a liquid ocean - most likely water - swirling around below the surface. On Earth, we are familiar with the combined gravitational effects of the Moon and Sun creating the twice-daily tidal rise and fall of our oceans. Less obvious are the tides of a few tens of centimetres in our planet's crust and underlying mantle, which floats on a liquid core. Saturn creates large tides in its Titan's surface. Large tides suggest a highly deformable layer inside Titan, very likely water, able to distort Titan's surface by

more than 10 metres. If the moon were rigid all the way through, then tides of only one metre would be expected. The tides were discovered by carefully tracking Cassini's path as the probe made six close flybys of Saturn's largest moon between 2006 and 2011. An implied structure is shown in the diagram above.

Although the measurements do not tell anything about the depth of the ocean, models suggest that it may be up to 250 km deep beneath an ice shell some 50 km thick."



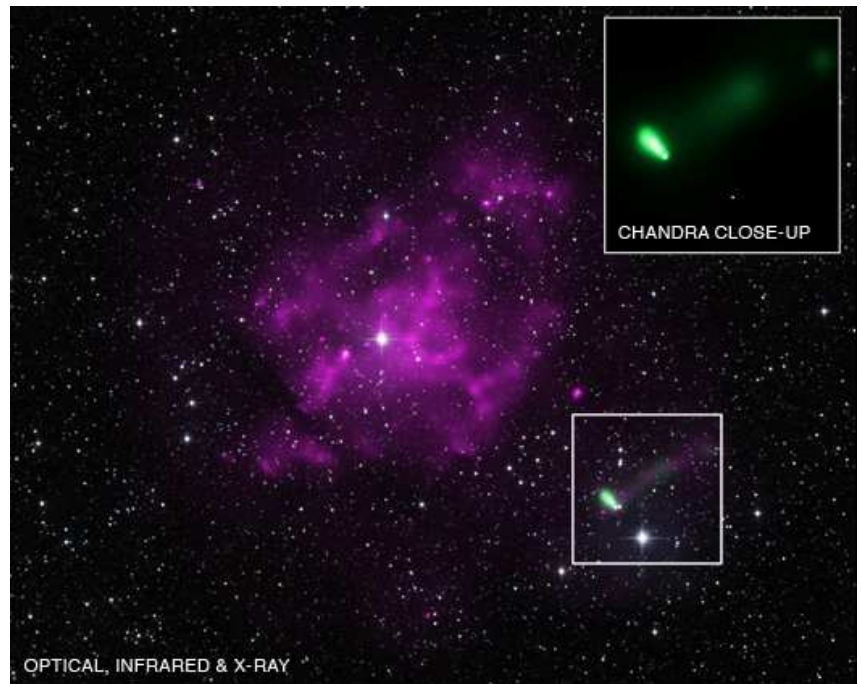
### Oldest Meteorite Crater Found in Greenland

When a large object such as an asteroid hits the Earth it punches a large hole through the crust into the underlying upper core material. This underlying material contains significant nickel rich minerals. While the actual physical crater is soon eroded and effectively disappears due to Earth's plate tectonic activity, the nickel rich mineral surface structure remains as a marker to a possible old crater. Many of the largest craters on Earth are associated with these mineral signatures. Until recently, the 2.02 billion years old and 300 km wide Vredefort crater in South Africa was considered to be both the oldest and largest impact structure on Earth. It is estimated that the impacting meteorite had a diameter of about 15 km. An even larger and much older impact structure has been found near Maniitsoq in Greenland. While the structure was discovered in 2009, it has taken several years of additional surveying and computer modelling to confirm the impact hypothesis. Since the original impact some 3 billion years ago the surface had been eroded down 25kms from the original surface level exposing the underlying mineral structures but leaving no visible surface traces. Computer modelling suggests the impacting object was about 100kms in diameter and at that size would not have produced a giant crater but rather would punch a clean hole through the crust depositing itself deep into the Earth's mantle.

### Has the Speediest Pulsar Been Found?

Researchers using three different telescopes - NASA's Chandra X-ray Observatory and ESA's XMM-Newton in space, and the Parkes radio telescope in Australia - may have found the fastest moving pulsar ever seen. Pulsars are extremely dense, spinning neutron stars created during supernova explosions. If the supernova explosion is not symmetrical the resulting neutron star can be ejected at high speed. The highly ionised and diffuse gas in the surrounding debris field can provide a marker for the passage on the neutron star. Much like a bullet leaving a visible trail travelling through mist so a pulsar can leave detectable X-ray trail in the supernova debris gases. A Chandra X-ray image of supernova remnant PSR B1957+20 reveals a comet-shaped X-ray source well outside the boundary of the supernova remnant. This source consists

of a point-like object with a long tail trailing behind it for about 3 light years suggesting the object is moving away from the centre of the supernova remnant at a speed between 5.4 million and 6.5 million miles per hour. Astronomers estimate remnant is approximately 15,000 years, and lies at a distance of about 30,000 light years away from Earth.



### Curiosity Makes a Perfect Landing on Mars

NASA's latest Mars rover Curiosity made an exciting and perfect landing on the Martian surface on Aug 5<sup>th</sup>. Since the landing technicians have been slowly activating the various instruments and testing systems. It has now been given a clean health and taken its test first drive of 4.5 metres. Scientists are currently surveying the surrounding terrain deciding upon its first exploration run. The other operating rover Opportunity has revived from the last Martian winter and is also on the move again. The exploration of Mars continues to be an exciting time of discovery.





## Neil Armstrong dies at 82: Where To From Here?



Astronaut Neil Armstrong the first man to step onto the Moon has died at the age of 82. During the Apollo program some 26 people went to the Moon with 4 going twice. Twelve were privileged to explore its surface. Neil Armstrong and fellow astronaut Buzz Aldrin became the first men on the Moon in July 1969. The Apollo program was a magnificent triumph in technology, science and human adventure. Apollo 11 being its crowning achievement. After Apollo 11 public enthusiasm for space travel waned and the program slowly ran down eventually being cut short with Apollo 17 seeing out the end of the series.

Armstrong's death marks the end of manned space travel's

preamble phase. We often talk about manned space exploration but so far robotic vehicles have done the only true exploration of the solar system. The manned space program, a product of World War Two generated an enormous leap forward in technical innovation transforming and creating the world we know today. Ignoring the military applications, fundamentally the manned space program has been about creating the technology necessary for longer-term human habitation. This technology is not yet perfected. Even the ISS is incapable of sustained human presence without constant supply from Earth. The next stage in taking humans out to the planets requires technology for very long-term habitation and people who are prepared to commit a significant proportion of their lifetime living in space. A trip to Mars or a nearby asteroid requires several years and the outer planets several decades.

Commercially Earth orbital habitation seems to be developing on the basis of tourism. Space based industrial processes have not been forthcoming even after decades of orbital research. There does not appear to be a non-political reason for permanent human presence in space. Additionally at present, apart from curiosity there is no reason to send humans into the outer solar system. Exploration using robotic probes provides a remote human presence with all the abilities to search, explore and examine without the dangers of space travel. This can only improve as probe sophistication advances.

**So where to from here?** Human beings are naturally curious and no matter how many automated probes we send there will always be people who want to see it for themselves. Scientifically, automated probes seem the way to go. Industrially we have yet to discovered a process or product that requires the conditions found off planet. I suspect the only reasons to go will be tourists' curiosity and as long as we have that then free enterprise will find a way. The future of human space travel beyond the Earth is cloudy but I think human history would be poorer if we didn't go. If in the future humans do stand on the Martian surface or reach the outer planets, I hope they look back on the lives of Neil Armstrong and all the other astronauts, in the same way we look back at polar explorers Amundsen, Mawson and Hillary pushing the boundaries of human presence. Why did they climb that mountain? Because it was there.

MPAS member Alex Cherney with Neil Armstrong at Starmus conference in July 2011 Canary Islands. Alex was picking up his astrophotography award.

The Mornington Peninsula Astronomical Society was founded in Frankston in July 1969, inspired directly by Neil's historic first manned lunar landing.





## Border Stargaze 2012, by Dave Rolfe

The 6<sup>th</sup> annual border stargaze was run again on the new moon weekend in August to coincide with national science week. This event is hosted by the Albury Wodonga astronomy society and Charles Sturt University. The border stargaze (Star Party) is held at the Wymah Valley holiday park about 20km north of Albury. This holiday park is well suited to the event as they have plenty of activities for the kids, comfortable accommodation and areas large enough for group events.

Early in the week they secured Australian Brian Schmidt as a guest speaker (Accelerating Expansion of the Universe 2011 Nobel Prize winner in Physics). During the star party they exceeded that triumph again with guest speakers of the calibre of Anthony Wesley (Mr Jupiter), John Sarkissian and our own Alex Cherney.

Alex's talk (the only one I actually saw) was very well presented with stunning images and loads of information about night-scapes and time-lapse photography. The slides he used are available from his website at [www.terrastro.com](http://www.terrastro.com)

In typical BSG tradition (last year excluded) the Friday public night was cancelled due to bad weather. Saturday night was more hopefully and for visual astronomy did provide some decent viewing later on in the night and into early morning.

All in all, Border stargaze is a very social event regardless of the weather. The evening quiz run by Miles is always a laugh in fact the Saturday night quiz (unplanned) was on topics covered by the guest speakers. There were several technical questions from Alex's talk that stood out including one asking what's Alex's web address. Not many actually got that right!



The numbers were down a little on last year partly due to the weather forecast and possibly Cairns later in the year. Next year's event will be run at the end of August 2013, it is always worth the trip.

## FKWAS Astronomy Society

Following the failed Border Stargaze I invited Rolland and Anna to become members of my dark sky astronomical base camp in the Victorian high country. The location is so secret only invited people get directions – this is also depicted in the name in Greg Code! I am unsure if Rolland is willing to attend in the future after a failed attempt at one of the hills (now called Mt Buggery) on the way to the site. After a winning recovery we made it and still enjoyed some camping, curry rabbit for dinner (courtesy of Browney the chef from BSG – and also my neighbour at the secret site) and a brief telescope viewing at 3AM. The trip home on Monday was nowhere near as fun as the way in.





## Snake Valley Star Party

Those not attending the eclipse, there is a star party in Vic that you can attend. This would be the Snake Valley Star Party. Snake Valley is about ½ an hour past Ballarat and has reasonably dark skies (similar to those found at Border Stargaze). The event runs from 16-19<sup>th</sup> of November. This is a very informal and social star party enjoyed by all.

There are only camping spots left but there is full amenities including a fully appointed communal kitchen. I will be coming back from Carnes and heading there on the Friday, so if any one wants to come along, just let me know or register on the iceinspace.com.au website where there is a forum for SV registrations.

## November Solar Eclipse

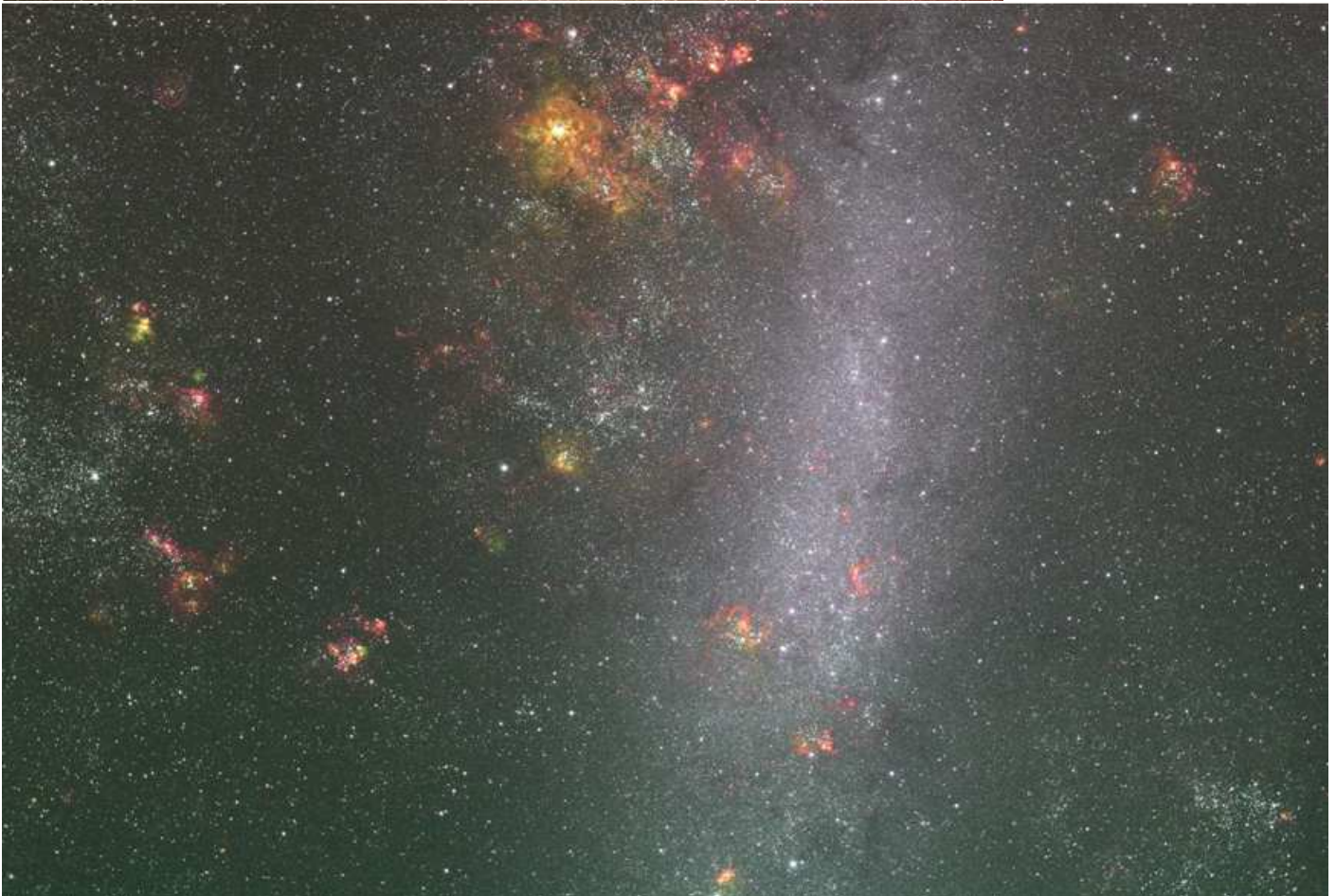
Those attending the eclipse from MPAS are more than welcome to contact myself to organize a common meeting place among the masses for the event and possible a lunch afterwards (near Port Douglas). Just drop me a message via the MPAS Yahoo group E-Scorpius. New members who do not know how to access the MPAS group (our fastest way to contact members with all the breaking news) please contact a committee member for an emailed invitation and log-in instructions.



Dave Having a swim above

Antares Region  
FSQ85 / SBIG STL11k  
By Dave Rolfe  
Left

Small Magellanic Cloud  
FSQ85 / SBIG STL11k  
By Dave Rolfe  
Below





## MPAS at the ASV Galactic Centre Star Party, by Greg Walton 15 sep2012

MPAS at the ASV Galactic Centre Star Party, which is held at Heathcote LMDSS in September each year. Kevin Rossitter and myself arrived on the Friday and setup camp under a cloudy skies, when night fell the site became very black with no star light to illuminate the ground. About a dozen ASV members also arrived on the Friday and installed a radio in the bunk house so they could listen to the ASV's own radio program which is on Friday at 10pm lower sideband VK3EKH -3.543MHz. With not much happening we had an early night and slept in the cars with the sound of rain on the roof.



Saturday seen patchy clouds but we were about to setup an array of impressive solar telescopes, we watch prominence's changing shape in really time. Big Dave Rolfe arrived with another 60 members and visitor, it was most likely the smell of ham burgers cooking by the Heathcote Lions Club that brought them in. The skies cleared so every body setup there telescopes, I counted about 30 scopes of all shape and sizes, from 25inch Dobsonian's to a 6inch home made Maksutov. The ASV have recently installed a 3.5 metre Sirius dome with a telescope, as the scope move to different objects the dome rotated automatically at the same time, which is powered batteries charged by solar panels, see photo below.



The sky stayed clear till 2am and then thin clouds started to move in. Kevin entertained the visitors showing them many objects including Saturn, while Dave did some imaging and I also imaged NGC7293 and some Caldwell objects with my 8inch AG. I also had the 10mm fish-eye lens and camera recording the whole night, see photo below with green laser coming out of the dome.



NGC7293 LMDSS 8" Newton AG CC1 EQ6 Pentax Kr 30x30sec iso12800 By Greg Walton MPAS/ASV 15sep12



Everybody had a great time with many good memories.  
Many thanks to the ASV organizers who work so hard on the day.

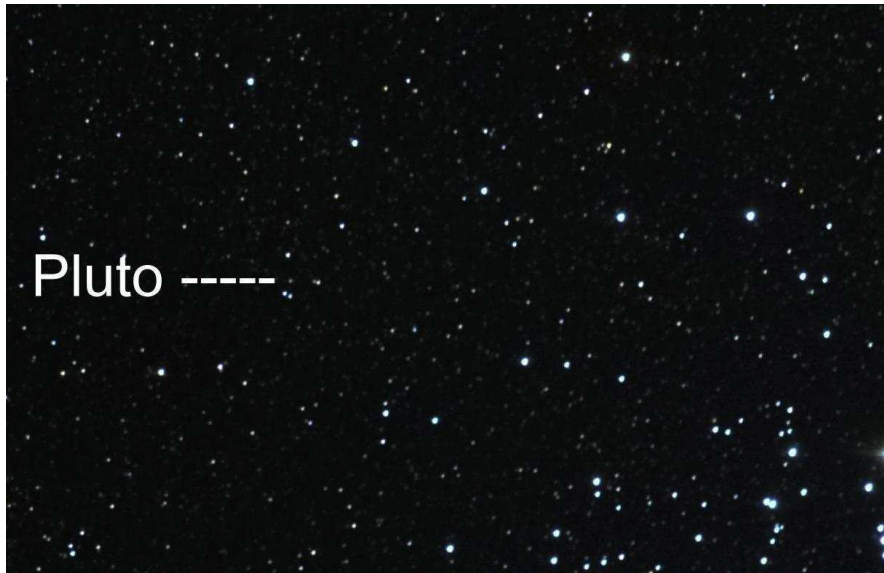


## Finding Pluto by *Greg Walton*

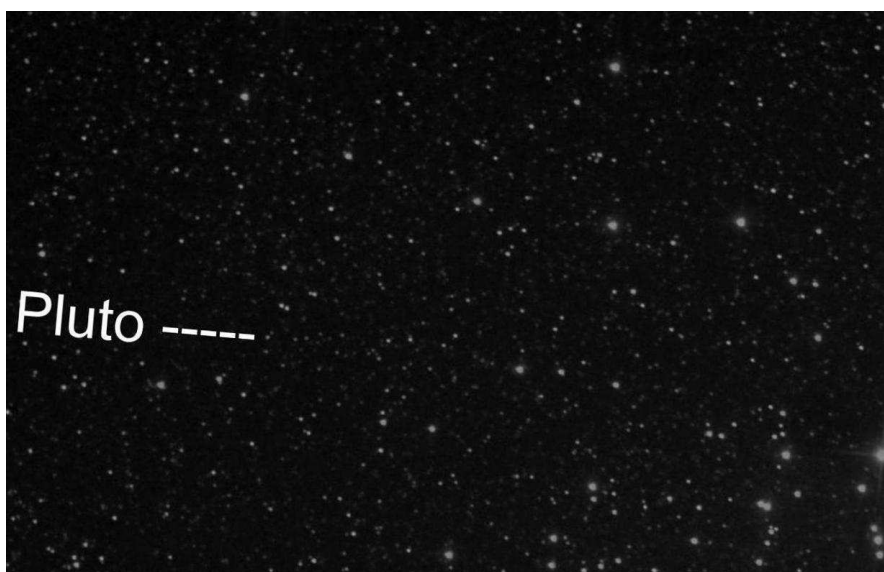
After I built my first telescope, I decided to find all the planets in the solar system. I soon found them all except for Pluto which is only 14<sup>th</sup> magnitude. I knew the telescope was pointing at Pluto but it was hiding in the background stars, even with the finder chart I could not be sure that I had seen Pluto. Then came along the DSLR camera, so I should be able to photograph the same patch of sky for 2 nights, then it should be easy to see which point of light has moved. Only then will I be sure that I have found Pluto as Clyde Tombaugh (1906-1997) did when he discovered Pluto on 18 January 1930. I used my 8" Newton AG on an EQ6 mount as this imaged an area of sky 1 by 1.5 degrees. On the 20 July 2012 Pluto would be passing M25 a bright open star cluster in Sagittarius, I already had an image of M25 taken with the same telescope 2 years earlier. So I would only need 1 image. As Pluto is so small the focusing would need to be perfect, I took 60 shots over 1 hour, but this was not enough time to see any movement.

Both images at right have been cropped to 0.6 x 0.4 degree.

Pluto & M25 Briars 8" Newton AG CC1 EQ6  
Pentax-Kr 30x30sec iso12800 By Greg Walton  
21 & 22 July 2012



Pluto taken on 21 July 2012 by G Walton



Pluto taken on 22 July 2012 by G Walton

*Below: These two photographs of Pluto were taken on January 23 and 29 in 1930. The arrows indicate Pluto's position and show how the small planet moves against the background of the stars.*



**HISTORY OF DISCOVERY**  
Pluto was discovered by Clyde W Tombaugh of Lowell Observatory in Flagstaff, Arizona. Tombaugh's find, on February 18, 1930, ended a series of searches for this planet that were first undertaken by Lowell's late founder, Percival Lowell, in 1905. Pluto is named after the mythological god of the underworld, and its name also has Percival Lowell's initials as its first two letters.



# Guiding with Astrophotography

By Paul Albers

Over time it becomes obvious the combination of collecting good data and processing skills is the right equation for obtaining a good final image. “Autoguiding” is one method that will improve your results immensely.

Simply put, Autoguiding is an automated, computer based, closed feedback loop that allows a mount to track an object very precisely for long exposure imaging.

You can read any good book on astrophotography and the same messages are apparent.

Noise generated by the CCD/CMOS chip of your camera is the biggest problem that faces many astrophotographers. And good “Signal to Noise ratio” (S/N) is paramount when collecting good data for your images.

In this article I will discuss the benefits of “Auto guiding” when imaging. Not only will it improve the signal to noise ratio, it will allow you to image a greater range of deep sky objects. Also there are links to follow for further reading and basic programs you can access to get you started ☺.

Good “Signal to Noise” ratio is when the data collected by the camera gathers more signal (*good data*), than noise (*bad data*) over time. The longer the exposure the better the “signal to noise” ratio!

In other words, if you take a 30 second Sub (*exposure*) you will have collected an even amount of signal compared to noise. Let us say you now take a 5 minute sub, the ratio will increase dramatically in favour of the signal collected compared to the noise. Guiding allows you to take longer Subs and as a result improves the S/N ratio and by taking longer exposures allows you to gather more light from those deep sky objects normally harder to image.



As with all electrical devices, these components heat up over time, CCD and CMOS cameras are no exception. “Thermal Noise” and “Amp Noise” are all expressed by “hot pixels” on your image, leaving a green, blue and red spotted result. There are many ways astrophotographers can remedy this problem either taking many Subs and randomly mixing the noise, use a “Master dark” to subtract the “hot pixels” and finally process the noise out with a Photoshop filter called “Reduce Noise”. The Photoshop addin “Noise Ninja” can later be used to smooth your data. All do a good job, but one can argue obtaining a good image to start with solves half your problems.

*Hot pixels*

One fundamental component for astrophotography is the Equatorial Mount. These mounts range from the basic to the more advanced. These mounts all suffer from what we call “Periodic Error” or “PE” for short. “PE” is when the drives, gearing and meshing of the mounts components aren’t perfect. The result being the mount’s tracking is compromised by slipping and jumping because of the mechanical impurities. The “PE” of a given mount limits the amount of time allowed to take a single sub. The star will become elongated and lose its spherical shape from this issue over time. Even with excellent polar alignment, you may be restricted to a maximum exposure time of 2 minutes. Not good when you want to achieve a good signal to noise ratio! Autoguiding will help solve this problem and the manufacturers of these Equatorial mounts have added a very important computerised interface to assist us.

*This interface is included on most modern equatorial mounts*



## The Basics

There are three methods used when “Autoguiding”.

1. Using a CCD with a built in guider. —————→
2. Applying an “Off Axis Guider” along the optical train.



3. The employment of a second telescope with a guide camera.

The third option shown here is the most taxing on your mount. The second telescope and guider (using either a side saddle plate or mounting the second telescope on top of the imaging telescope) creates extra weight that requires a heavy duty equatorial mount. The illustration to the left is of the NEQ6pro, which is a capable mount; however in this case, the payload places it almost at its limit. So before you consider purchasing a setup for imaging think about the equipment you may need, and most importantly, the equatorial mounts capabilities.



## How Autoguiding works



A CCD auto guider constantly makes short exposures to take a picture of the star. With the aid of a program like “PHD” [Push Here Dummy, by Craig Stark], the auto guider calculates the stars position, monitors its movement, calculates the necessary correction to bring the guide star back to its original location, and then issues commands to the equatorial mount to make the correction. The camera can be a simple monochrome CCD like the Orion “Star Shoot” or a complete package like a “SBIG” which has a guider and CCD in one unit.

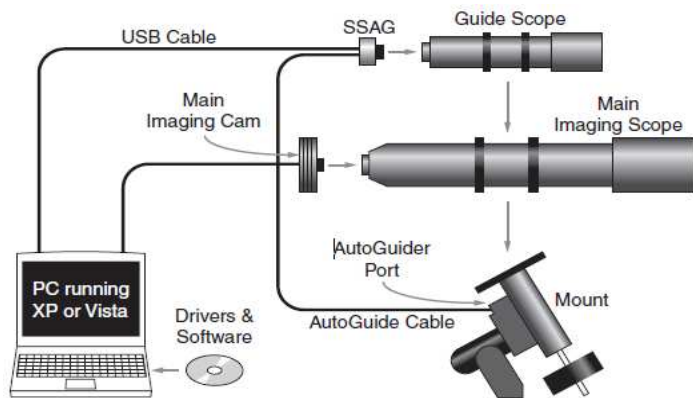


There are many programs available but nothing is simpler to use than “PHD”. Free to download from this site <http://www.stark-labs.com/phdguiding.html>

PHD is an all in one package. Easy to install and connect to the camera, it comes with drivers for the guide cameras available today. Once PHD is operational it is advised to download the “PDF” file listed below. This file will help you setup and connect your camera correctly and get you started. <http://www.stark-labs.com/craig/articles/assets/AutoGuiding%20Craig%20Stark.pdf>



# A Basic Guiding Setup



Here is a good example of a diagram illustrating how to connect the auto guider using a second telescope. With off axis guiding the “Starshoot AutoGuider” (SSAG) is connected before the imaging camera and connected in the same method.

The second telescope used for guiding doesn’t need to be optically advanced. An 80mm refractor is large enough, with a focal length of about 400mm. I use a Saxon ED80 and have had no problems finding a guide star. Bintel sells a Guide scope package for \$519 complete with telescope, dovetail plate and rings plus the Orion SSAG.

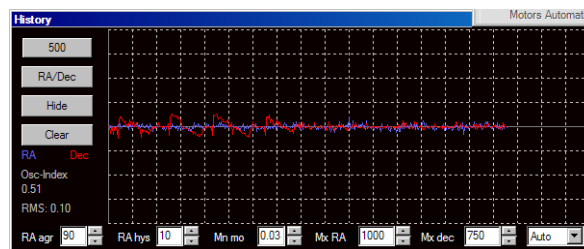
<http://www.bintel.com.au/Astrophotography/Guidescopes/Orion-Awesome--br-Autoguider-Package/780/productview.aspx>



The guiding program “PHD” runs in the background while you control your camera.

There are adjustments you can make to prevent over correcting and to “Tweak” the accuracy of the guiding being preformed.

*Guide star*



You can monitor the corrections made by the program too.

## Some alternatives



Orion has developed and modified their “Finder scope” so to accept the SSAG through the eyepiece. This is a way to avoid the use of a second telescope and the mounting, but you sacrifice the ability to find a good guide star due to its 50mm lens.

Skywatcher and Celestron have released a stand alone system which only requires a guide scope. The computer is internal and connects directly an equatorial mount.



## A simple Comparison



The image to the left was taken unguided. 40 x 30 second subs, a total of 20 minutes of data using the ISO setting @ 6400.

Notice the lack of detail compared to the image underneath which was taken with longer individual sub exposures. Remember the longer the exposure the better the data you collect and the less noise is evident within the image.

The image to the right was taken with the same setup but with guiding. Due to the long Sub of 300 seconds the ISO was set at 800. This image is a total of an hours worth of data. Because the ISO can be set low the hot pixel noise generated is far less compared to an ISO of 6400. That's another advantage over unguided imaging! You can gather enough data with a low ISO setting with longer exposures without the noise.



## Some inherent problems with auto guiding and their solutions

When using an "off axis guide port" Focus can be hard to achieve: Spacers can remedy this problem. The "OAGP" may physically interfere with the optical train too.


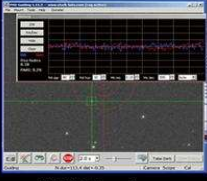
When using a "Side Saddle Plate" Flexure occurs when the guide scope and main scope move slightly relative to one another; the amount of movement needed to ruin an image is very slight. Using a short focal length telescopes and keeping the exposures between 3 ~ 10 minutes solves this problem.

Cable management is also important. Once you enter the realm of astrophotography you will be surprised to see how cables tend to accumulate and tangle, just ask Steve Mohr ☺

Cable management is vital to the prevention of damage to both cable and equipment.

### Guiding.

Guiding is the employment of a second Telescope with a "guide camera".

Using a computer the guide camera finds a star and the computer program (PHD) Locks on to it. Exposure time increases from 2 minutes to even 10 hours.

Overall the benefits guiding out weigh the disadvantages! The results are staggering and you will be surprised how easy it is to get going.

Most people who do astrophotography also guide so there are plenty of people willing to help and advise you.

The costs do vary; used quality equipment can be a good second-hand option. But look around before you consider your purchase and ask plenty of questions ☺

*Regards Paul Albers*



A Quick Guide to astrophotography editing software by *Greg Walton*

Software	Uses	Likes & Dislikes	Cost
VLC *****	Best Media Player there is DVDs, Mpegs, AVI, etc also can re record or snap imagers from videos Can convert to different formats	Like the very fast start up Dislike format converter has some glitches	Free Down load
Window media player ***	This Media Player is only good for standard DVDs, CD & Pod casts This can be fixed with Windows Live movie maker	Dislikes cannot play more complex videos with fast frame rates	Comes with window
Fotosizer ****	Batch resizing of imager also will flip, rotate & convert to Black & White See page 14 Astro-Imager Plus	Like that it is fast & easy to use. Dislike its limited Image editing eg no colour levels	Free Down load
Fast Stone *****	Batch renaming & resizing of imager also will adjust brightness and colour levels Newer version has more features	Fast but more complex, best for renaming for Sony Vegas	Free Down load donation
Virtual Dub *****	Convert a series of imagers into video avi or mpeg with your choice of sound and effects. Can change frame rate also can add filters to adjust brightness or resize. Best for making time lapse movies	Like that it's very fast, very easy to use and handle very large numbers of frames. See page 14 Astro-Imager Plus	Free Down load
Windows movie maker **	Convert a series of imagers into video with your choice of sound and effects. Best for making small and simple slide show movies	Dislikes very very slow and bombs out when files are to big	Comes with window
Windows Live movie maker *****	Same as above but can make large movies or DVDs also Excellent for resizing the Virtual Dub movies	Big improvement Easy to use high quality out put	Window 7
Muvee ***	Convert a series of imagers into video avi with your choice of sound. Best for making time lapse movies with easy to use effects	Like that its very fast and very easy to use	Free Trial limited to 30 frames
Sony Vegas ****	For modifying and reformatting videos or changing the speed for different parts of a video also can add many different sound tracks	Very good tutorial to get you started but can still lose many days learning how it works	\$50 to 500
Art soft Media Converter **	Resizing videos, Jpegs and sound files See page 15 Astro-Imager Plus	Easy to use, but poor quality	Some are Free
KB Piano ****	Excellent for making your own music with more than a 100 instrument even sounds of planes or braking glass Can record up to 12 different instrument on 1 track	Easy to use, but out put files need converting to mp3	\$20 Down load
Deep Sky Stacker ****	For merging or overlaying multi able images into 1 single image it will align star automatically or can make star trails images or track comets	Easy to use, very slow needs a powerful computer to run See page 10 Astro-Imager Plus	Free Down load
Photoshop ****	For advanced image editing and adjusting, best fetcher is that it can batch process a lot of images with its action key stroke recording then apply these to all images. Can save images in many different formats including PDF See page 16 Astro-Imager Plus	Dislikes very slow to start up & slow to use also too costly. Difficulty to use for beginners. Like add on noise ninja	\$150 to 500
GIMP ***	Very much like Photoshop without the batch processing For advanced image editing and adjusting. Can save images in many different formats	Dislikes slow to start up & slow to use, also need to down load the uses manual	Free Down load
iphoto Plus 4 *****	For very fast editing and adjusting of images with a very simple lay out but very powerful can overlay writing with paste from a word documents also can capture imager from web camera	Starts instantly, very fast and very easy to use Will run on windows 95 to windows 7	Old hard to find a copy
iphoto Plus 10 ***	Same as above but with very different appearance looks more like photo shop	Do not like new appearance Buy photo shop instead	Buy on line \$60
Windows Paint ***	Only has basic image editing functions but best for paste many imagers together also can save images in many different formats. New version has more features	Like zoom 25% to 500% and can make back ground larger and very easy to use	Comes with window
MP viewer ***	Can save images in many different formats very quickly just drop your photo on the MP icon and it start instantly	Like that its very fast and very easy to use	Comes with a cannon printer
Regi-staks 5 & 6 *****	For converting a video into a single image also aligns all images in the video XP use 5 - Vista & Windows 7 use 6	A bit complex & difficulty to use. Does not work on all windows?	Free Down load

Most will run on XP, Vista or Windows 7

Ratings by Greg Walton – Best \*\*\*\*\* Excellent \*\*\*\* Good \*\*\* Poor \*\* Bad \*

Hello at All

Im an astronomer from Iserlohn (germany)

I located your side on the way over the APOD " Dawn of the Dish"

So i read some things and i find the side with the Kitchen Timer Barndoor.

I have build some little Teleskopes( 4,5,6,8 and 10") by my self, including grind the mirrors, but this little nice Thing must i build directly.

So what can i say, it is wonderfull easy and works fine.

I added only a little Tool to hold the balance .

A little time for practise und ich have made some nice Pictures.

The pictures are made with focal lenth of 16, 50 and 135mm.

Kassiopeia is made with 50mm, 15 pictures with 40sek ISO800

The M31 is made with 135mm 8Pictures with 40sek ISO800

and the MilkyWay Picture is a combine of two pictures wiht 16mm and 7x70sek

Ok...

On this way i will thank you, *Greg Walton*, for this nice design.

Who ever reads this, please tell him my words.

with best regards

Andreas Mark

Please not smile about my cruel english..

my schooltime is closed 30years ago 😊

I was very pleased to receive this e-mail about the Kitchen Timer Tracker, which is in the book I wrote the Astro-Imager-Plus V1.1 on the MPAS web site under Tips & Tricks. Hopefully more people will make and use them.

Greg Walton

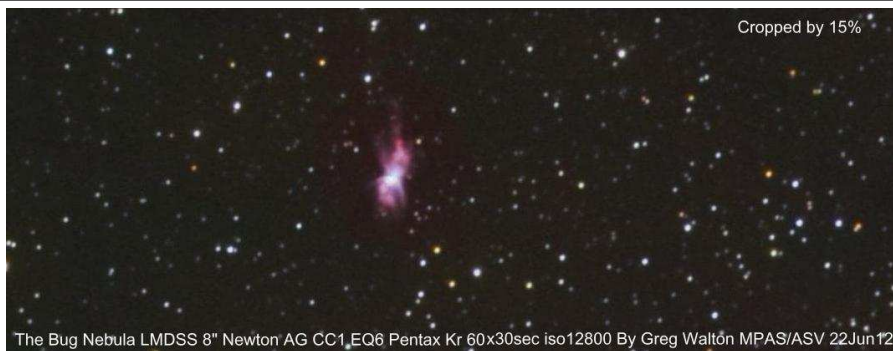
All Photos below by Andreas Mark, Good work.





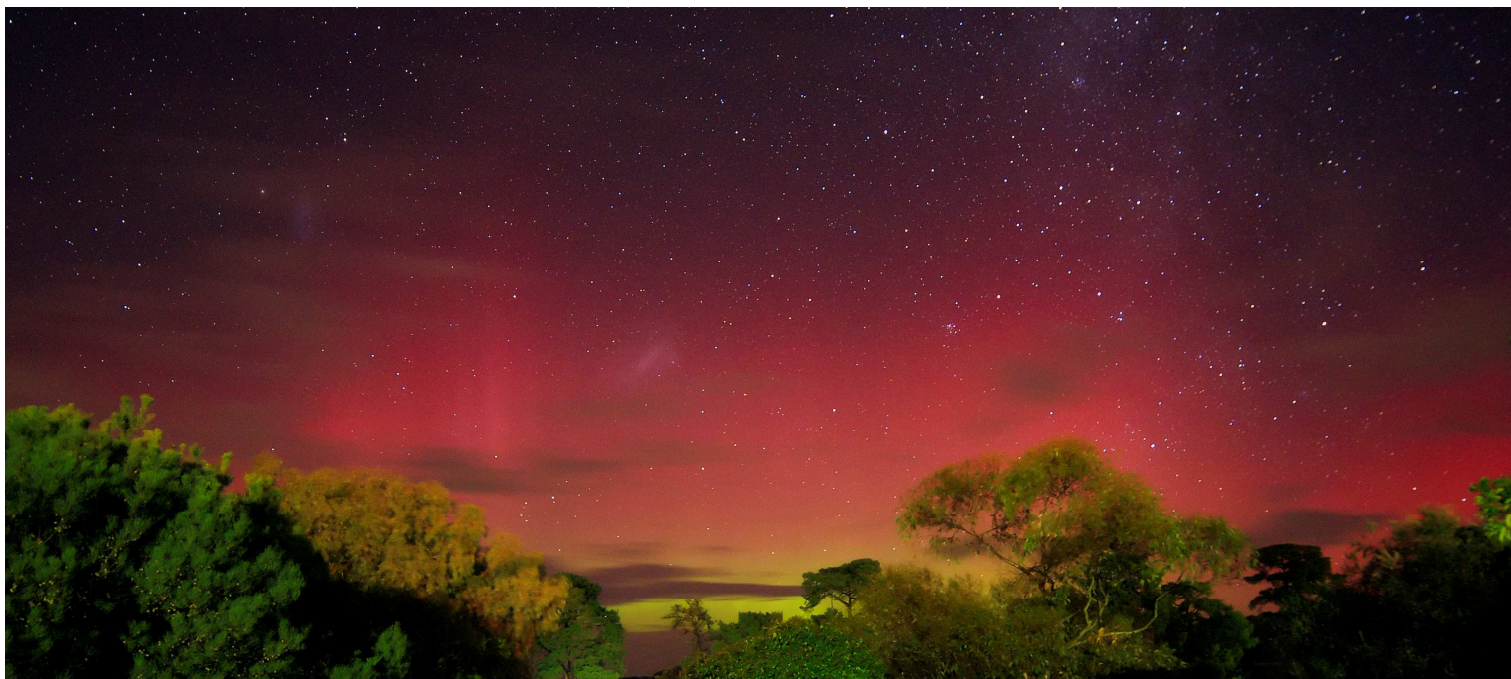
## The Members Gallery

The Bug Nebula C69 NGC6302 at Right  
 From Heathcote LMDSS on 22June2012  
 Taken with 8" Newton AG CC1 EQ6  
 Pentax-Kr 60x30sec iso12800  
 By *Greg Walton*  
 Cropped to 15%



The Bug Nebula LMDSS 8" Newton AG CC1 EQ6 Pentax Kr 60x30sec iso12800 By Greg Walton MPAS/ASV 22Jun12

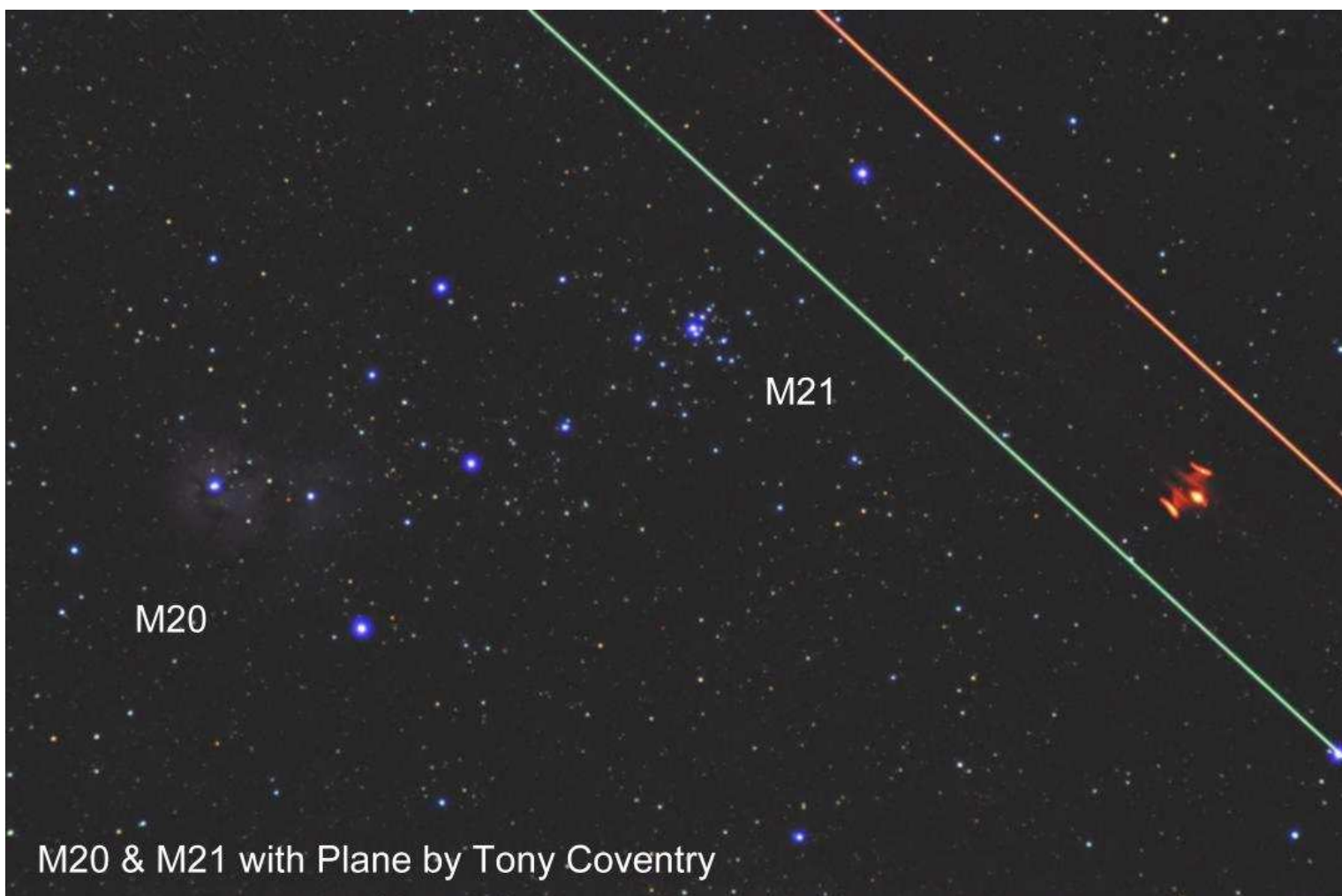
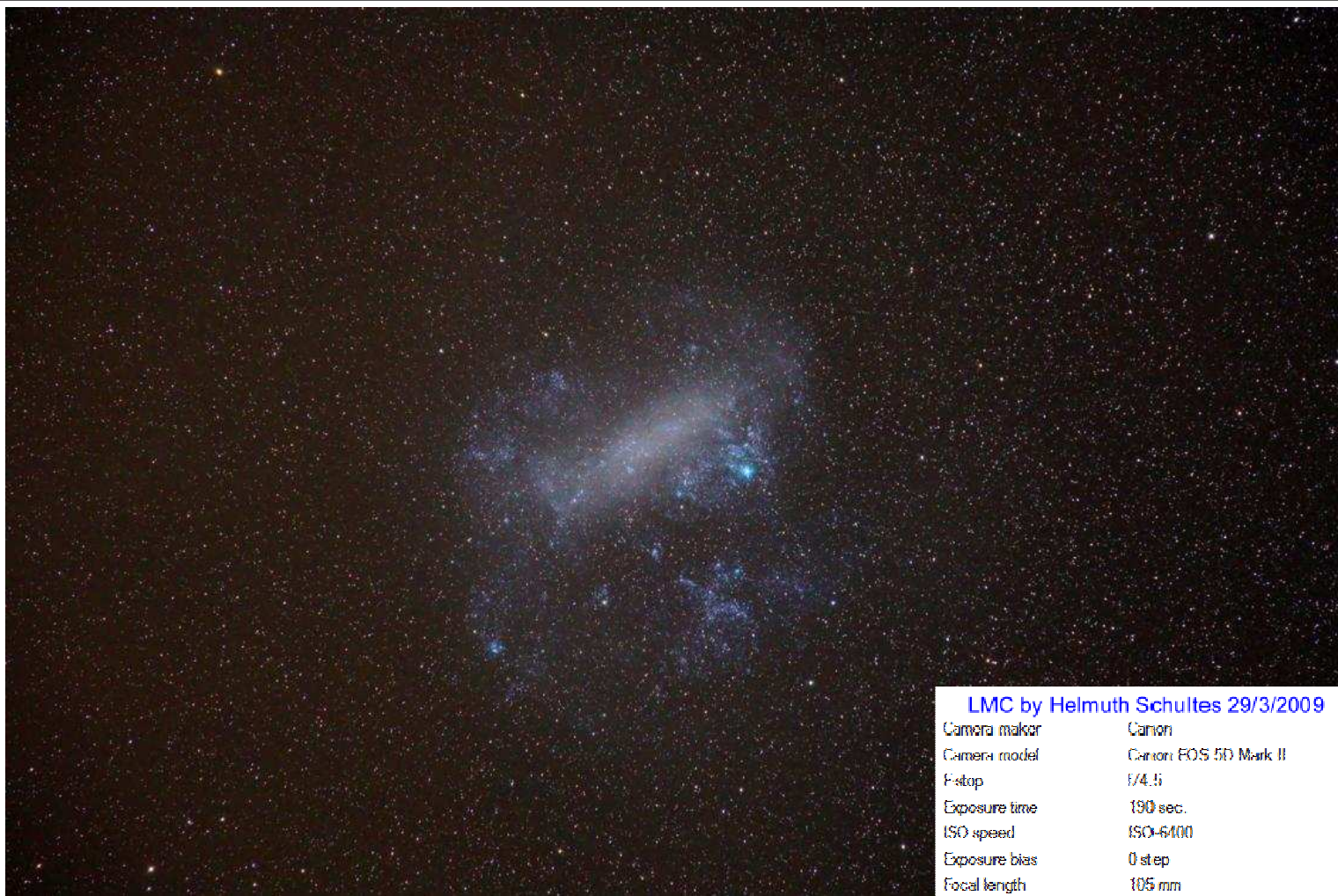
Bright Aurora below taken by *Paul Albers* from his home at Balnarring on the 16 July 2012 one of the best this solar cycle.



Carbon Tax at work installing new lights

Fake Aurora above taken by *Greg Walton* from his back yard at Bonbeach on a foggy night, light is from new lights installed in park.





A rare catch by Tony Coventry M20 & M21 with a plane, well done.



SOCIETY INFORMATION



Peter Lowe



Brett Bajada



Peter Skilton



Marty Rudd



Trevor Hand



Ian Sullivan



Dave Rolfe



Greg Walton

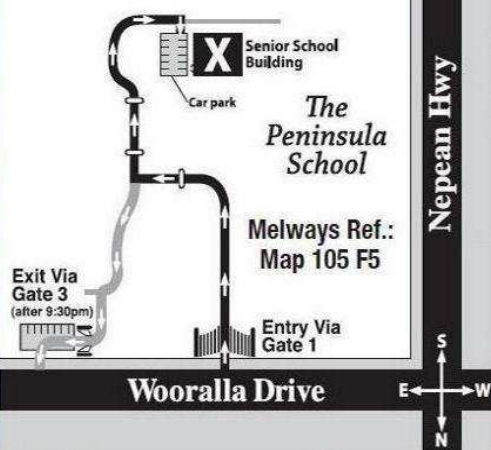
OFFICE BEARERS OF THE MORNINGTON PENINSULA ASTRONOMICAL SOCIETY

**President:** Peter Lowe  
**Vice President:** Brett Bajada  
**Committee:** Ian Sullivan, Trevor Hand, David Rolfe, Tony Coventry, Fiona Murray, Greg Walton.  
**Phone Contact:** Peter Skilton - 0419 253 252

**Secretary:** Peter Skilton  
**Treasurer:** Marty Rudd  
**Public Officer:** Rhonda Sawosz  
**Web Master:** Steven Mohr  
**Scorpius Editor:** Brett Bajada

GENERAL MEETINGS

**Meeting Venue:** The Peninsula School, Wooralla Drive, Mt. Eliza, (Melways ref. 105/F5) in the Senior School at 8pm, on the 3rd Wednesday of each month (except December).  
 Entry is via the main gates or Gate 3, off Wooralla Drive. Exit is via Gate 3 Only after 9:30pm (see map).



**For additional details:**  
**Internet:** <http://www.mpas.asn.au>  
**email:** [welcome@mpas.asn.au](mailto:welcome@mpas.asn.au)  
**Phone:** 0419 253 252  
**Mail:** P.O. Box 596, Frankston 3199, Victoria, Australia.

LIBRARY

The Society also has books and videos for loan from it's library, made available on most members nights at The Briars site, contact Fiona Murray.



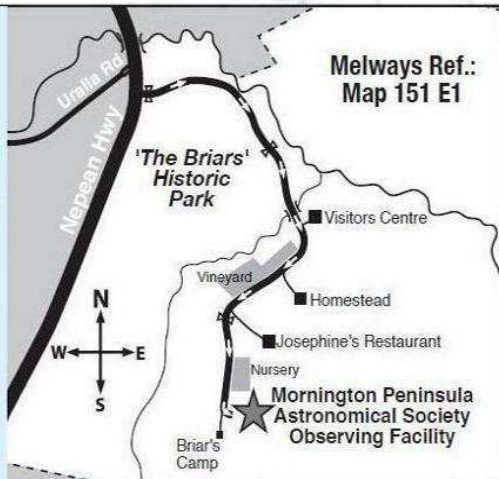
Fiona Murray

E-SCORPIUS NEWSGROUP

M.P.A.S. main line of communication is the online newsgroup called E-Scorpius. Here you will be kept up to date with the latest M.P.A.S. news and event information as well as being able to join in discussions and ask questions with other members.  
 To join, go to: <http://groups.yahoo.com/group/e-scorpius> and sign up to Yahoo groups - You require to sign up to Yahoo groups to join E-Scorpius. Once you have signed up at Yahoo groups, email [welcome@mpas.asn.au](mailto:welcome@mpas.asn.au) saying that you want to join E-Scorpius and you will be added to the E-Scorpius list.

VIEWING NIGHTS - MEMBERS ONLY

Any night, at The Briars, Nepean Hwy, Mt. Martha, starting at dusk.  
 Members visiting The Briars for the first time must contact Greg Walton on either 9773 0098 or 0415 172 503 if they need help in getting to the site. Upon arrival at the site, remember to sign the attendance book in the observatory building.



**For additional details:**  
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**email:** [welcome@mpas.asn.au](mailto:welcome@mpas.asn.au)  
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