



# Astro Flyer

MAY 2018



## Club News

Hi there everybody,

The AGM draws closer and everyone interested should think about whether they want to continue with their offices or let others have a go. We still have over two months till the July AGM.

I would like to see the younger members add to the meeting by doing a little research and reading a prepared one to two minute story on an astronomical topic. I am sure I could help if they wanted to show a picture or two on the big screen as they read their report. Think about it you young ones. I can provide topics which would be easily researched on the internet. Remember only a maximum of two minutes reading time allowed. What if I told you that those interested could meet at the Tidbinbilla Radio Telescope and have a look see at the science centre and then the Questicon in downtown Canberra some Saturday or Sunday in the next few months. I sure would want to go. What about you?

President Frank Gross

**Next monthly meeting will be held at the Shoalhaven Campus of the Uni of W'Gong, George Evans Road off Yawal Road, West Nowra, May 18th, 6.30 for 7.00 start. See you there.**

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### MOON PHASES



**New Moon** **First Quarter** **Full Moon** **Last Quarter**  
**15 May** **22 May** **29 May** **7 June**

### Viewing Nights

Club viewing nights are selected to provide viewers with the best possible conditions for good viewing. They are held on specific Saturdays at different locations around Nowra.

The next club viewing night will be on **Saturday 16 June (back-up night Sun 17 June)** at **Woncur Road**, South Nowra.

Head South down The Princes Highway, turn right at BTU Road, Woncur Road is the first street on the left).

More viewing nights  
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## **OUT THERE**

### **Bob Turnbull OBSERVATION OFFICER**

#### **OUT THERE JUNE-JULY 2018**

##### **VESTA**

###### **HAVE YOU EVER SEEN THIS MINOR PLANET?**

It will be closest to Earth at the 19<sup>th</sup> of JUNE at opposition of magnitude 5.4. This should provide the closest position to Earth between 1996 and 2033.

So, if we use magnitude 6.0 as the faintest non star like object visible by a dark adjusted eye, then Vesta is well within our eyes to get a good view of this asteroid. Put this fine object on your must see list as a precursor to the MARS spectacle to follow. Refer to pages 40- 41 (Map) of your Astronomy 2018. Tracking it on Star maps 6 and 8. Between M23 and M24. This is roughly between -18h20m and 17h and 50m.

##### **JUPITER**

Although this planet will have reached Opposition (Closest to Earth) by MAY 9<sup>th</sup> it still continues to impress by its sheer size and variety of things to see. (Refer Out There May June 2018)

##### **MARS**

As already in the last Out There, This Planet will beat its closest to Earth with the focus on 27<sup>th</sup> of JULY at opposition diameter of 22.2". See evening sky charts page 44 and Appearance of Planets on page 45 of Astronomy 2018. **===== DON'T MISS THIS ONE !** Don't forget about Phobos and Deimos which are this planet's moons and since they are so close, should be visible. Look on page 115 of Astronomy 2018 for further details.

##### **SATURN**

Look for this on the 25<sup>th</sup> of July after Sun set near the gibbous Moon and during this month look for the Saturnian moons, Titan being the brightest and is the second largest moon in the Solar system, after Jupiter's Ganymede, and the only one with a substantial atmosphere.

##### **URANUS**

In Aries is visible in the morning sky and rising about 1am midmonth.

##### **NEPTUNE**

Moving through Aquarius in July and rising in mid evening.

##### **COMETS**

P/2013 CU129 (PANSTARRS) begins in July, low in the western sky in Hydra, ending at 11<sup>th</sup> Mag. (see page 48)

COMET C/2016 M1 (PANSTARRS) which fades during July from 9<sup>th</sup> to 10<sup>th</sup> magnitude during July.

Happy viewing and clear skies  
Bob Turnbull



### A Search for Southern Doubles

#### *Episode 15: Leo, the Lion*

Leo is one of the earliest identified constellations noted in historical records. The Sumerians named the constellation in 3000 BC. While different cultures gave the constellation different names in their language, they all translate as 'lion' in English.

According to mythology, Leo is the lion that Hercules vanquished as one of his 12 tasks.

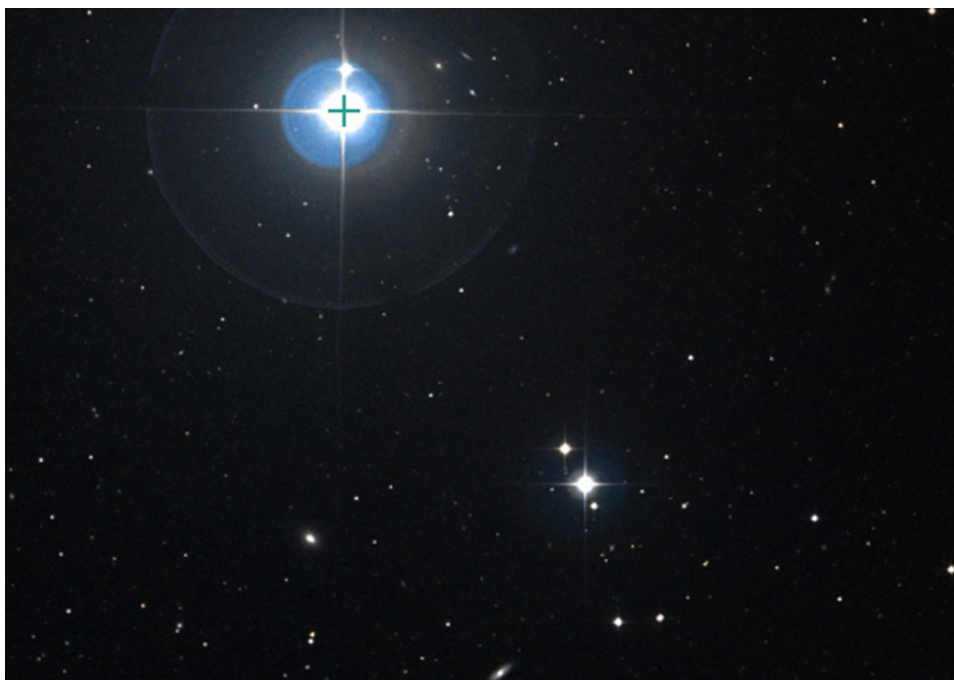


Although Leo, as viewed from the southern hemisphere may not seem as impressive as the crouching or leaping lion as seen from the north, its shape is easily identified; it contains many bright deep sky objects for moderate telescopes and it is peppered with some very fine double stars. I will select five that - with the exception of Algieba - are easy to split in small to moderate scopes. At least 20 more can be discovered in this rich constellation.

1.  $\alpha$  Leo, Regulus. RA 10h 8m; Dec +11°58'; mag 1.4/7.7/13.2; Sep 179"/2.5". This is the most prominent star in the group and the main sun in a multiple star system. In the finderscope Regulus is a blue/white main sequence eclipsing binary star. The orbit takes 40 days. A third companion, b, is a wide blueish/pinkish star(!) of magnitude 8.8 which with a separation of 175" is clearly seen in the finderscope or binoculars. It is another binary with a separation of 2.5" from companion c and with a period of 600 years. Regulus lies close to the ecliptic and is therefore occulted by objects in our solar system. (The last occultation of Regulus by a planet was on July 7, 1959, by Venus. The next will occur on October 1, 2044!)

Cont...2

2.  $\gamma$  Leo, Algiebo. RA 10h 20m; Dec. +19°51'; mag. 2.2/3.5; Sep. 4.4". Gamma Leonis is a striking and somewhat challenging binary star, which demands good seeing and X150. I failed to split it in 10" in early March this year but several nights later it easily popped in good seeing. The colours are impressive, with the primary a golden yellow and the marginally fainter companion a burnished gold. It has been reported that b is greenish! Those with brand new eye lenses might test this elvish colour!
3. 54 Leo. (STF 1487). RA 11h 55m; Dec. +24°45'; mag 4.5/6.3; Sep 6.5" This double is found by extending the imaginary line connecting Beta and Delta Leo for a distance of approx. 6° in a NW direction. This white and golden yellow pair make an attractive contrast and are impressive. The main star is a spectroscopic triple.
4. 88 Leo. RA 11h 31'; Dec. +14°24'; mag 6.3/9.1; sep. 15". While we are in the area of Denebola or Beta Leo, look for the wide double 88 Leo. (See map below) Easy separation of a yellowish white and rose pair. The fainter star is hard in smaller instruments.
5. 93 Leo. RA 11h.48'; Dec. +20°13'; mag 4.6/9; sep. 75". 93 forms the apex of an equilateral triangle of which Delta and Beta Leo for the base (see map below. This stunning pair of light gold and salmon colour have a duplicate white and blue pair in a moderate field. [my Wikisky picture below does not do this double double credit]. My favourite Leo field!

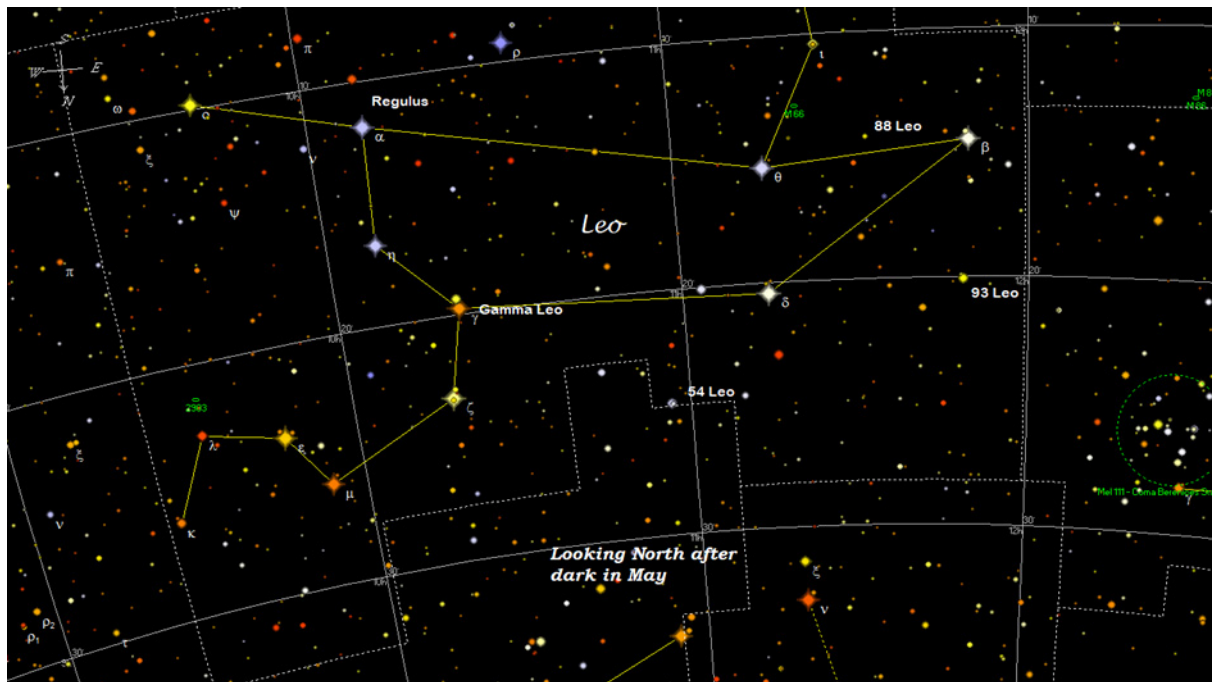


*Above: 93 Leo and double in field.*

# Sky Objects By Eugene O'Connor

Cont...3

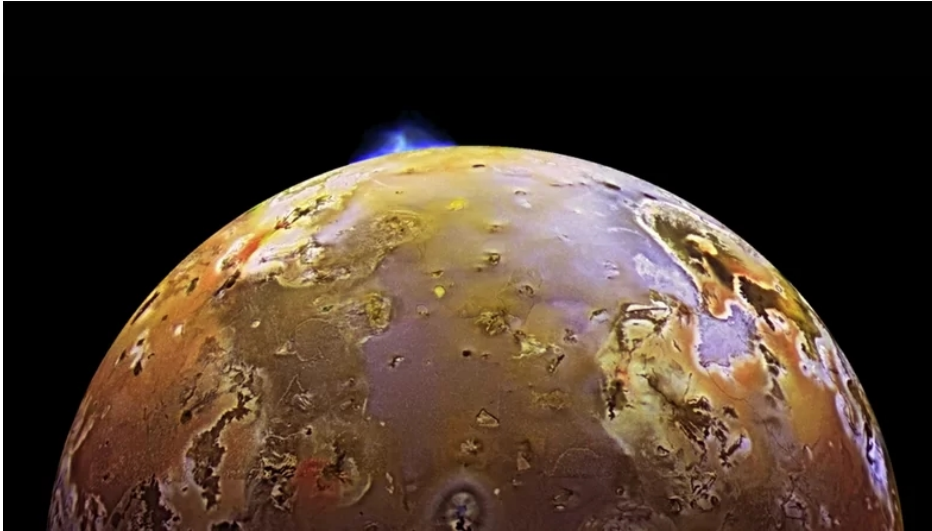
*Below: map of Leo with all doubles listed. Good atlases show many more double stars.*





### Solar System Facts

#### 1. Jupiter's moon Io has towering volcanic eruptions



For those of us used to Earth's relatively inactive moon, Io's chaotic landscape may come as a huge surprise. The Jovian moon has hundreds of volcanoes and is considered the most active moon in the solar system, sending plumes up to 250 miles into its atmosphere.

Some spacecraft have caught the moon erupting; the Pluto-bound New Horizons craft caught a glimpse of Io bursting when it passed by in 2007.

Io's eruptions come from the immense gravity the moon is exposed to, being nestled in Jupiter's gravitational well. The moon's insides tense up and relax as it orbits closer to, and farther from, the planet, generating enough energy for volcanic activity. Scientists are still trying to figure out how heat spreads through Io's interior, though, making it difficult to predict where the volcanoes exist using scientific models alone.

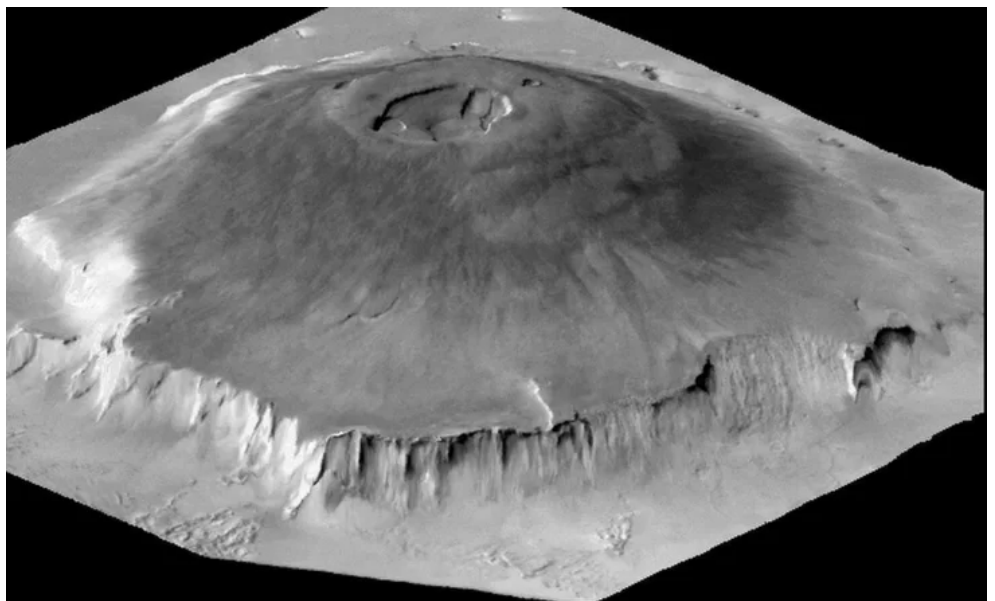
#### 2. Mars has the biggest volcano (that we know of)

While Mars seems quiet now, we know that in the past something caused gigantic volcanoes to form and erupt.

This includes Olympus Mons, the biggest volcano ever discovered in the solar system. At 374 miles (602 km) across, the volcano is comparable to the size of Arizona. It's 16 miles (25 kilometers) high, or triple the height of Mount Everest, the tallest mountain on Earth.

Volcanoes on Mars can grow to such immense size because gravity is much weaker on the Red Planet than it is on Earth.

But how those volcanoes came to be in the first place is not well known. There is a debate as to whether Mars has a global plate tectonic system and whether it is active.



## Astro Events from Frank Gross

Cont...2

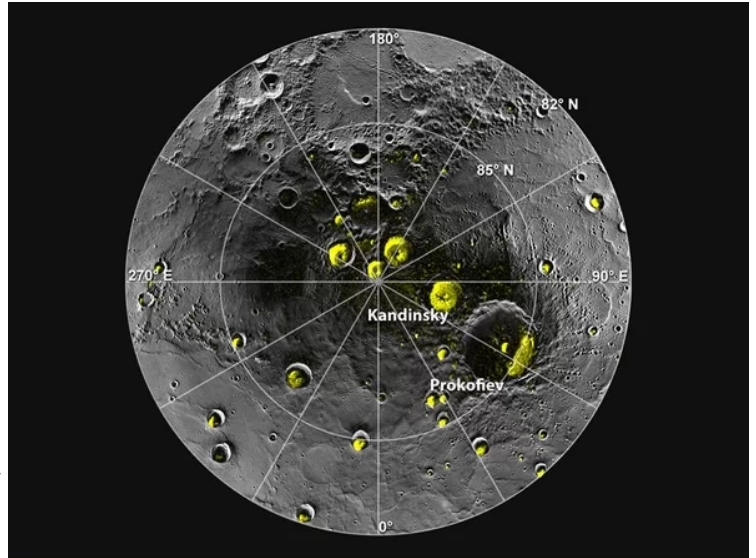
### 3. There is water ice everywhere

Water ice was once considered a rare substance in space, but now we know we just weren't looking for it in the right places. In fact, water ice exists all over the solar system. Ice is a common component of comets and asteroids, for example. But we know that not all ice is the same.

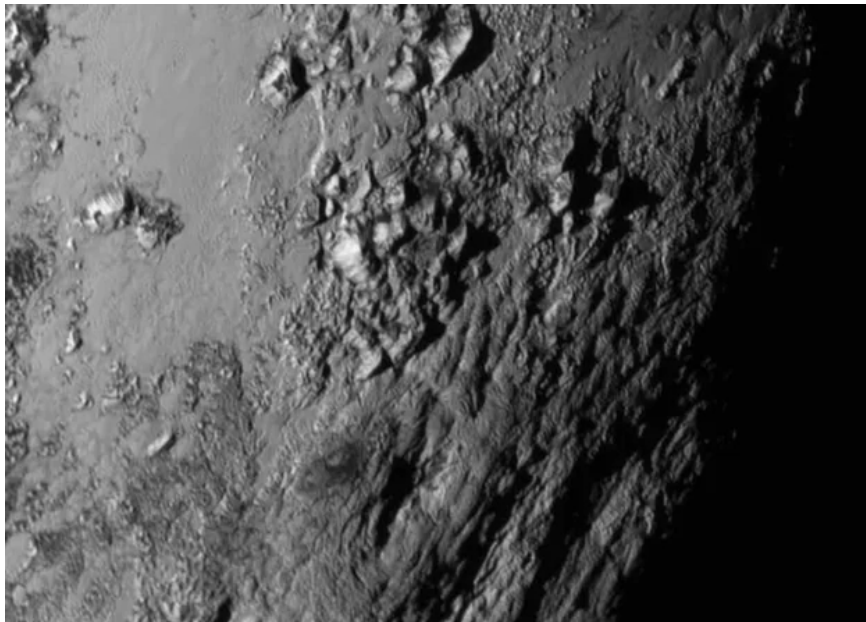
Close-up examination of Comet 67P/Churyumov–Gerasimenko by the European Space Agency's Rosetta spacecraft, for example, revealed a different kind of water ice than what is found on Earth.

That said, we've spotted water ice all over the solar system. It's in permanently shadowed craters on Mercury and the moon, although we don't know if there's enough to support colonies in those places.

Mars also has ice at its poles, in frost and likely below the surface dust. Even smaller bodies in the solar system have ice – Jupiter's moon Europa, Saturn's moon Enceladus, and the dwarf planet Ceres, among others.



### 4. There are mountains on Pluto



Pluto is a tiny world at the edge of the solar system, so at first it was thought that the dwarf planet would have a fairly uniform environment. That changed when NASA's New Horizons spacecraft flew by there in 2015, sending back pictures that altered our view of Pluto forever. [Destination Pluto: NASA's New Horizons Mission in Pictures] Among the astounding discoveries were icy mountains that are 11,000 feet (3,300 meters) high, indicating that Pluto must have been geologically active as little as 100 million years ago. But geological activity requires energy, and the source of that energy inside Pluto is a mystery. The sun is too far away from Pluto to generate enough heat for geological activity, and there are no large planets nearby that could have caused such disruption with gravity.

## Astro Events from Frank Gross

Cont...3

### 5. There may be a huge planet at the edge of the solar system



In January 2015, California Institute of Technology astronomers Konstantin Batygin and Mike Brown announced – based on mathematical calculations and on simulations – that there could be a giant planet lurking far beyond Neptune. Several teams are now on the search for this theoretical "Planet Nine," which could take decades to find (if it's actually out there.)

This large object, if it exists, could help explain the movements of some objects in the Kuiper Belt, an icy collection of objects beyond Neptune's orbit. Brown has already discovered several large objects in that area that in some cases rivaled or exceeded the size of Pluto. (His discoveries were one of the catalysts for changing Pluto's status from planet to dwarf planet in 2006.)

### NASA's First Mission to Study the Interior of Mars Awaits May 5 Launch

An artist's impression of the InSight lander on Mars

This artist's concept shows the In-Sight lander, its sensors, cameras and instruments.

The early-morning liftoff on Saturday of the Mars InSight lander will mark the first time in history an interplanetary launch will originate from the West Coast.

InSight will launch from the U.S. Air Force Vandenberg Air Force Base Space Launch Complex 3E. The two-hour launch window will open on May 5 at 4:05 a.m. PDT (7:05 a.m. EDT).





## Astro Events from Frank Gross

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InSight, for Interior Exploration using Seismic Investigations, Geodesy and Heat Transport, will launch aboard a United Launch Alliance (ULA) Atlas V rocket. InSight will study the deep interior of Mars to learn how all rocky planets formed, including Earth and its Moon. The lander's instruments include a seismometer to detect marsquakes, and a probe that will monitor the flow of heat from the planet's interior.

The ULA rocket will carry the spacecraft over the Channel Islands just off the California Coast and continue climbing out over the Pacific, shadowing the coastline south beyond Baja California. InSight's Atlas will reach orbit about 13 minutes after launch, when the rocket is about 1,200 miles (1,900 kilometers) northwest of Isabella Island, Ecuador. "For those Southern Californians who are interested in rockets or space exploration, or have insomnia, we hope to put on a great show this Saturday," said Tom Hoffman, InSight project manager from NASA's Jet Propulsion Laboratory in Pasadena, California. "But for those who want to sleep in on Saturday, there will be another opportunity to engage with this historic mission. We will be landing on Mars in the western Elysium Planitia region on Monday, Nov. 26, around noon Pacific time. You will be able to watch a live stream of this landing while working on your holiday shopping."

Getting a Mars mission flying requires a great many milestones. Among those still to come are the official start of the countdown to launch -- which comes on Friday, May 4 at 10:14 a.m. PDT (Saturday, May 5, 1:14 a.m. EDT). A little over an hour later, at about 11:30 p.m. PDT (May 5, 2:30 a.m. EDT), the 260-foot-tall (80-meter) Mobile Service Tower -- a structure that has been protecting the Atlas V launch vehicle and its InSight payload during their vertical assembly -- will begin a 20-minute long, 250-foot (about 80-meter) roll away from the Atlas. Four hours and 25 minutes later, the launch window will open.

"I've been to several rocket launches, but it is a whole different vibe when there is something you've been working on for years sitting in the nose cone waiting to get hurled beyond our atmosphere," said Bruce Banerdt, InSight principal investigator at JPL. "But as exciting as launch day will be, it's just a first step in a journey that should tell us not only why Mars formed the way it did, but how planets take shape in general."

InSight's launch period is May 5 through June 8, 2018, with multiple launch opportunities over windows of approximately two hours each date. Launch opportunities are set five minutes apart during each date's window. Whichever date the launch occurs, InSight's landing on Mars is planned for Nov. 26, 2018, around noon PST (3 p.m. EST).

JPL manages InSight for NASA's Science Mission Directorate. InSight is part of NASA's Discovery Program, managed by the agency's Marshall Space Flight Center in Huntsville, Alabama. The InSight spacecraft, including cruise stage and lander, was built and tested by Lockheed Martin Space in Denver. NASA's Launch Services Program at the agency's Kennedy Space Center in Florida provides launch management. United Launch Alliance of Centennial, Colorado, is NASA's launch service provider of the Atlas 5 rocket. A number of European partners, including France's Centre National d'Études Spatiales (CNES) and the German Aerospace Center (DLR), are supporting the InSight mission. In particular, CNES provided the Seismic Experiment for Interior Structure (SEIS) instrument, with significant contributions from the Max Planck Institute for Solar Systems Research (MPS). DLR provided the Heat Flow and Physical Properties Package (HP3) instrument.

## More Club News continued from page 1

Club/Social Viewing Nights are on Saturday evenings "just" Before Sunset. Viewing nights are for members and invited guests. The contingency plan for poor weather on the proposed viewing night is to meet the next night (a Sunday night) but consult Jack first on Landline: 44232255, Mobile:0407 018 982

**Woncun Road**, South Nowra (Head South down The Princes Highway, turn right at BTU Road, Woncun Road is the street first on the left).

### Dates for Club/Social Viewing Nights for 2018 On Saturday Nights As Follows:

Jun-16, Jul-14, Aug-11, Sep-8, Oct-6, Nov-10, Dec-8

## More Monthly Meeting Information

**The AGM was held at the July 2017 monthly meeting. Elected officials for 2017 - 2018**

President: Frank Gross

Vice President: John Gould

Secretary/Treasurer: Tracey Newcombe

Public Officer: Frank Gross

Observation Officer: Robert Turnbull

Editor: Kaye Johnston

Librarian: Chris O'Hanlon

The Committee: Robert Turnbull, Rudolf Henssen, Robert Spruyt, Jack Apfelbaum, Chris O'Hanlon, John Gould

Check out the Astro Flyer on the web site: [www.shoalhavenastronomers.asn.au](http://www.shoalhavenastronomers.asn.au)

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The deadline for Articles for the Astro Flyer is The First Friday of the Month.

Editor Kaye Johnston

## Club Video Projector Rental

The Video Projector is available for club members for a small rental fee. If a club member would like to project a football game, cricket game onto a wall for a party this is the way to go. You will get up to a 100 inch diagonal picture on a light coloured wall with the Epson video projector. The projector has an inbuilt speaker but you can add your own speaker units if necessary. The unit is very easy to use and instruction would be given before the borrowing (2 days) occurs. The rental price is set at present at \$15 for two days.