

The next WAS meeting will be held at 7:30 pm, Wednesday 3rd of August at Carter Observatory, Upland Rd, Kelburn, Wellington

WAS Meeting Talk - Space Academy for Educators

Chris Monigatti



Chris Monigatti recently accompanied five secondary students to the US Space and Rocket Center at Huntsville, Alabama, USA. The students attended International Space Camp for one week, whilst Chris completed an Educators Space Academy course for American and International teachers. Chris will share his experiences of the course, explain the link between Huntsville and Wellington, suggest some ideas for future travellers, and introduce the video: "Missile to Moon" PBS (2012) – Wernher von Braun – his story told <https://www.youtube.com/watch?v=4Ch0OgkkJKI> which will explain why the little-known town of Huntsville became the 'Rocket City' of the world. Sections of this video will be shown as time permits.

Chris Monigatti is currently the WAS Secretary and also runs the WAS Observing Nights at Ta-wa College.

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2015 — 2016 SUBSCRIPTIONS DUE

The new subscription year began in September, so WAS looks forward to receiving your subscription renewal.

Renewal forms can be found on the website, but a summary follows:

Subscription for Newsletter by Email 2015-2016

Adult/Waged: \$ 50.00

Student/Unwaged: \$ 30.00

Family: \$ 70.00

Payment methods:

Cheque - make out to Wellington Astronomical Society Inc, and mail to PO

Box 3181, Wellington 6140

Direct Deposit or Internet Banking - use Acc No: 03-0502-0508656-00, please include reference so WAS knows who is making the payment

Cash - please bring exact amount to meeting

WAS COUNCIL MEMBERS AND CONTACTS

Council Members

The following members were elected to Council at the Nov 2015 AGM

President: Antony Gomez

Vice President: Duncan Hall

Secretary/Telescope custodian: Chris Monigatti

Treasurer: John Homes

Website (joint): John Homes & John Talbot

Councilors

Frank Andrews

Janine Bidmead

Peter Graham

Aline Homes

Murray Forbes

Peter Woods

Newsletter Editor: editor@was.org.nz

Postal Address: Wellington Astronomical Society, PO Box 3181, Wellington 6140, New Zealand

WAS ON FACEBOOK

Our Facebook page Wellington Astronomical Society is now operational. You can search for it on Facebook or click on this link <https://www.facebook.com/WellingtonAstronomicalSociety/>. If you are a Facebook user please use the page to receive up to date notifications of our Society's events and news. This is the easiest way to be informed as to what is going on in the Society as well

as keeping up with astronomical news. You will need to interact occasionally with the page by liking / commenting on postings or indicate whether you are coming to an event. Otherwise Facebook will, after a time, no longer send you the new postings. So keep visiting the page as there are a number of Society events coming up in the next few months.

We also have Facebook group WAS – Wellington Astronomical Society (<https://www.facebook.com/groups/96304353012/>) which is open for anyone to join by request. The public group is open for discussion or postings on astronomical news.

Wellington Astronomical Society August 2016 Events

WAS August Meeting

The talk for the August meeting is Space Academy for Educators by Chris Monigatti.

As detailed on the front page, Chris recently accompanied five secondary students to the US Space and Rocket Center at Huntsville, Alabama, USA. The students attended International Space Camp for one week, whilst Chris completed an Educators Space Academy course for American and International teachers. Chris will share his

experiences of the course, explain the link between Huntsville and Wellington, suggest some ideas for future travellers, and introduce the video: "Missile to Moon" PBS (2012) – Wernher von Braun – his story told <https://www.youtube.com/watch?v=4Ch0OgkkjKI> which will explain why the little-known town of Huntsville became the 'Rocket City' of the world. Sections of this video will be shown as time permits.

Chris Monigatti is currently the WAS Secretary and also runs the WAS Observing Nights at Tawa College.

Date: Wednesday, 3rd August

Time: 7:30 PM

Venue: Space Place, Carter Observatory

WAS Observing Evening

There is a change to the venue for this month's WAS Observing Evening. Instead of Tawa College, it will be held at the Wellington Waterfront, in support of the society's 5 Planets public outreach event (see article below for more details).

Date: Saturday, 13th August

Time: 5:30 PM

Venue: Wellington Waterfront by Frank Kitts Park

Astronomy Club Night

A short presentation and observing the night sky. Anyone is welcome to join in.

Date: Thursday, 11th August

Time: 7:00 PM

Venue: Hutt International Boys School

Lower Hutt War Memorial Library Astronomy Night: "Is there life beyond Earth?" – Hari Mogosanu.

NASA Chief Scientist, Ellen Stofan, says "we're going to have strong indications of life beyond Earth within a decade." Could E.T. really be out there? Come and hear astronomer and astrobiologist, Hari Mogosanu, speak about the possi-

bilities of life on other planets and in our universe.

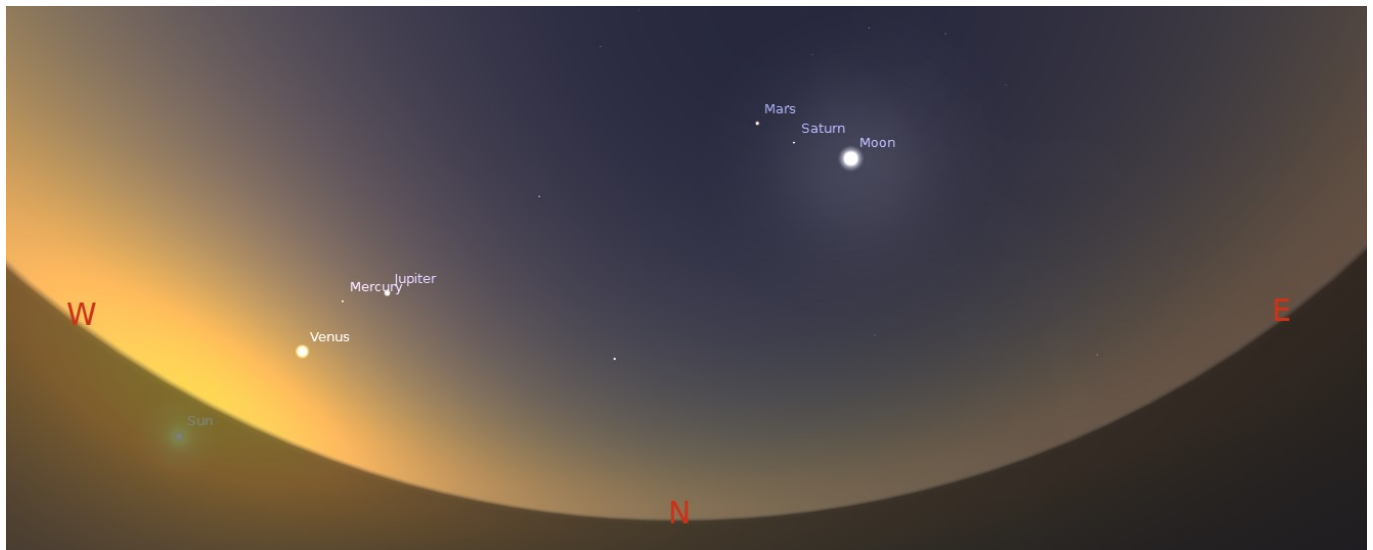
If the sky is clear, we'll go outside after the talk and look at the night sky through telescopes.

Date: Friday, 12th August

Time: 6:30 PM

Venue: Lower Hutt War Memorial Library

WAS Public Outreach Event - Five Planets



5 Planets in August

In August there will be a rare opportunity to see 5 naked eye planets at once in the night sky. In the early evening the planets Venus, Mercury, Jupiter, Mars and Saturn will form a line starting in the west rising up high along the ecliptic towards the east. WAS will be at

the Wellington waterfront with telescopes during these two nights for the general public to observe the planets. Please come along and support this event.

Dates: Saturday, 13th August and Thursday, 18th August

Time: 5:30 PM

Venue: Wellington Waterfront by Frank Kitts Park

Astronomy Club Night

A short presentation and observing the night sky. Anyone is welcome to join in.

Date: Thursday, 25th August

Time: 7:00 PM

Venue: St Bernard's College, Lower Hutt



Venus and Jupiter prepare for their close-up this August

This article is provided by **NASA Space Place**.

With articles, activities, crafts, games, and lesson plans, NASA Space Place encourages everyone to get excited about science and technology.

Visit spaceplace.nasa.gov to explore space and Earth science!

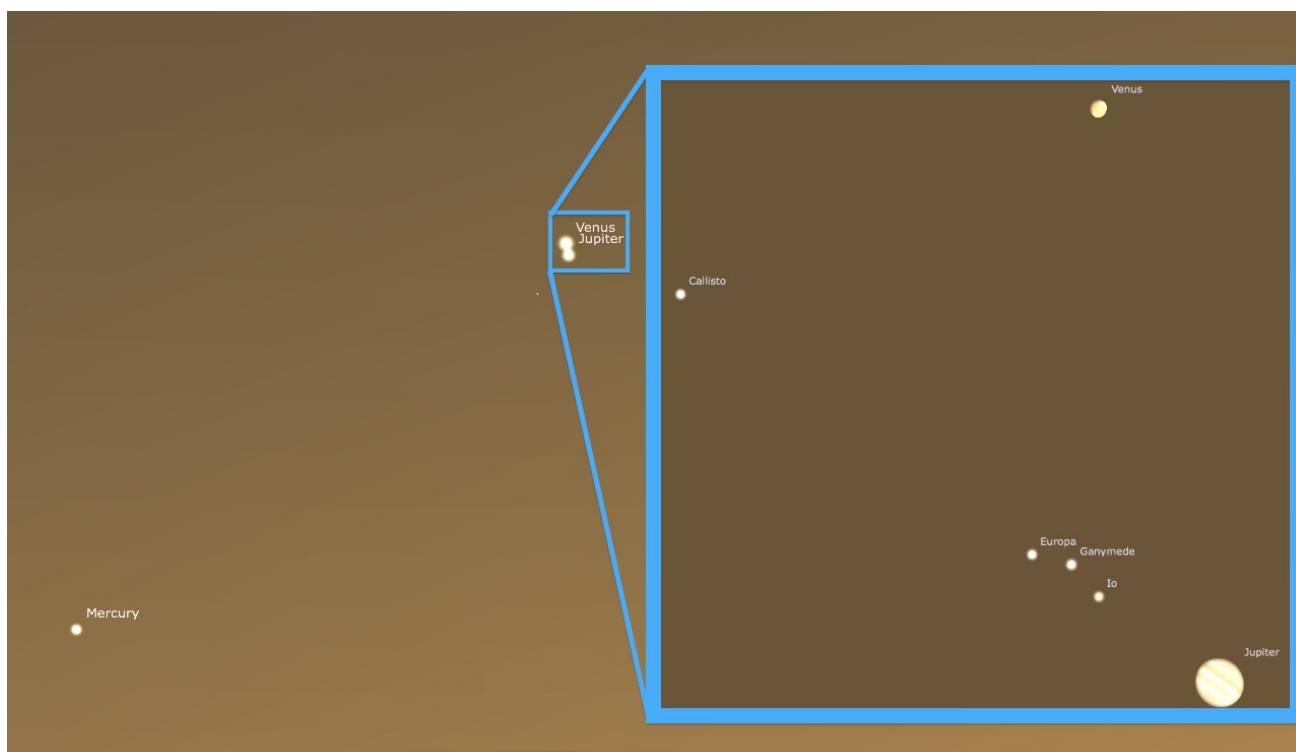


Image credit: E. Siegel, created with Stellarium, of a small section of the western skies as they will appear this August 27th just after sunset from the United States, with Venus and Jupiter separated by less than 6 arc-minutes as shown. Inset shows Venus and Jupiter as they'll appear through a very good amateur telescope, in the same field of view

As Earth speeds along in its annual journey around the Sun, it consistently overtakes the slower-orbiting outer planets, while the inner worlds catch up to and pass Earth periodically. Sometime after an outer world—particularly a slow-moving gas giant—gets passed by Earth, it appears to migrate closer and closer to the Sun, eventually appearing to slip behind it from our perspective. If you've been watching Jupiter this year, it's been doing exactly that, moving consistently from east to west and closer to the Sun ever since May 9th.

On the other hand, the inner worlds pass by Earth. They speed away from us, then slip behind the Sun from west to east, re-emerging in Earth's evening skies to the east of the Sun. Of all the

planets visible from Earth, the two brightest are Venus and Jupiter, which experience a conjunction from our perspective only about once per year. Normally, Venus and Jupiter will appear separated by approximately 0.5° to 3° at closest approach. This is due to the fact that the Solar System's planets don't all orbit in the same perfect, two-dimensional plane.

But this summer, as Venus emerges from behind the Sun and begins catching up to Earth, Jupiter falls back toward the Sun, from Earth's perspective, at the same time. On August 27th, all three planets—Earth, Venus and Jupiter—will make nearly a perfectly straight line.

As a result, Venus and Jupiter, at 9:48 PM Universal time, will appear separated by only 4 arc-minutes, the closest conjunction of naked eye planets since the Venus/Saturn conjunction in 2006. Seen right next to one another, it's startling how much brighter Venus appears than Jupiter; at magnitude -3.80 , Venus appears some eight times brighter than Jupiter, which is at magnitude -1.53 .

Look to the western skies immediately after sunset on August 27th, and the two brightest planets of all—brighter than all the stars—will make a dazzling duo in the twilight sky. As soon as the sun is below the horizon, the pair will be about two fists (at arm's length) to the left of the sun's disappearance and about one fist above a flat horizon. You

may need binoculars to find them initially and to separate them. Through a telescope, a large, gibbous Venus will appear no more distant from Jupiter than Callisto, its farthest Galilean satellite.

As a bonus, Mercury is nearby as well. At just 5° below and left of the Venus/Jupiter pair, Mercury achieved a distant conjunction with Venus less than 24 hours prior. In 2065, Venus will actually

occult Jupiter, passing in front of the planet's disk. Until then, the only comparably close conjunctions between these two worlds occur in 2039 and 2056, meaning this one is worth some special effort—including traveling to get clear skies and a good horizon—to see!

To teach kids more about Venus and Jupiter, visit the NASA Space Place webpages titled “All About Ve-

nus” [<http://spaceplace.nasa.gov/all-about-venus/en/>] and “All About Jupiter” [<http://spaceplace.nasa.gov/all-about-jupiter/en/>].

Ethan Siegel

Juno Update – Learn More About the Mission Through Nasa’s Eyes!

There’s been a lot of excitement about the Juno spacecraft and its arrival at Jupiter on 4th July this year. It’s taken 5 years to get there, and will be able to tell us so much about what is really going on with the gas giant and also help us to get a better understanding of how our solar system formed.

If you want to keep track of Juno in real-time or see a visualization of exactly how it inserted itself into Jupiter’s orbit, Nasa has made a handy app you can download called “Nasa’s Eyes”. Using Eyes on the Solar System and simulated data from the Juno flight team you can ride onboard the spacecraft using “Eyes on Juno” on your Mac or PC.

In this interactive visualization, you can ride along with the Juno spacecraft in real-time at any time during the entire mission. For example, you can re-watch the arrival at Jupiter on the 4th of July, 2016, see Juno use Earth’s gravity as a slingshot to pick up speed, or just learn about the science of Jupiter and about the spacecraft itself and check out where it is right now. You can even turn on and off the magnetic field, aurorae, and the radiation belt, all in 3D!

I found the app easy to download, install and use. Being able to watch the video of the orbit insertion helped me to see exactly what happened 588 million kilometers away. I thoroughly recommend

it for anyone who wants to understand the mission more and feel as if you were there.

To download the app, go to <http://eyes.jpl.nasa.gov/eyes-on-juno.html>.

Janine Bidmead

The Occultation by Ornamenta on Monday 11th July

Those of you who attended the Research Group's section of our meeting last month may remember the prediction I described of the minor planet (350) Ornamenta occulting the star TYC 5024-00451-1 at 10:16 pm on Monday 11th July. Figure 1 shows where the path that the shadow cast by Ornamenta from the star would travel across

New Zealand. The edges of the shadow are shown by the two solid lines, and travels over the Kapiti Coast, Wellington and Blenheim – all places where WAS occultation observers live. However, due to uncertainty in our knowledge of the exact orbit of the minor planet and the position of the star, the prediction may be slightly 'off'.

The two dashed lines reflect this uncertainty – there is a 68% probability (one standard deviation aka '1-sigma') that the centre of the shadow will lie somewhere between the dashed lines.

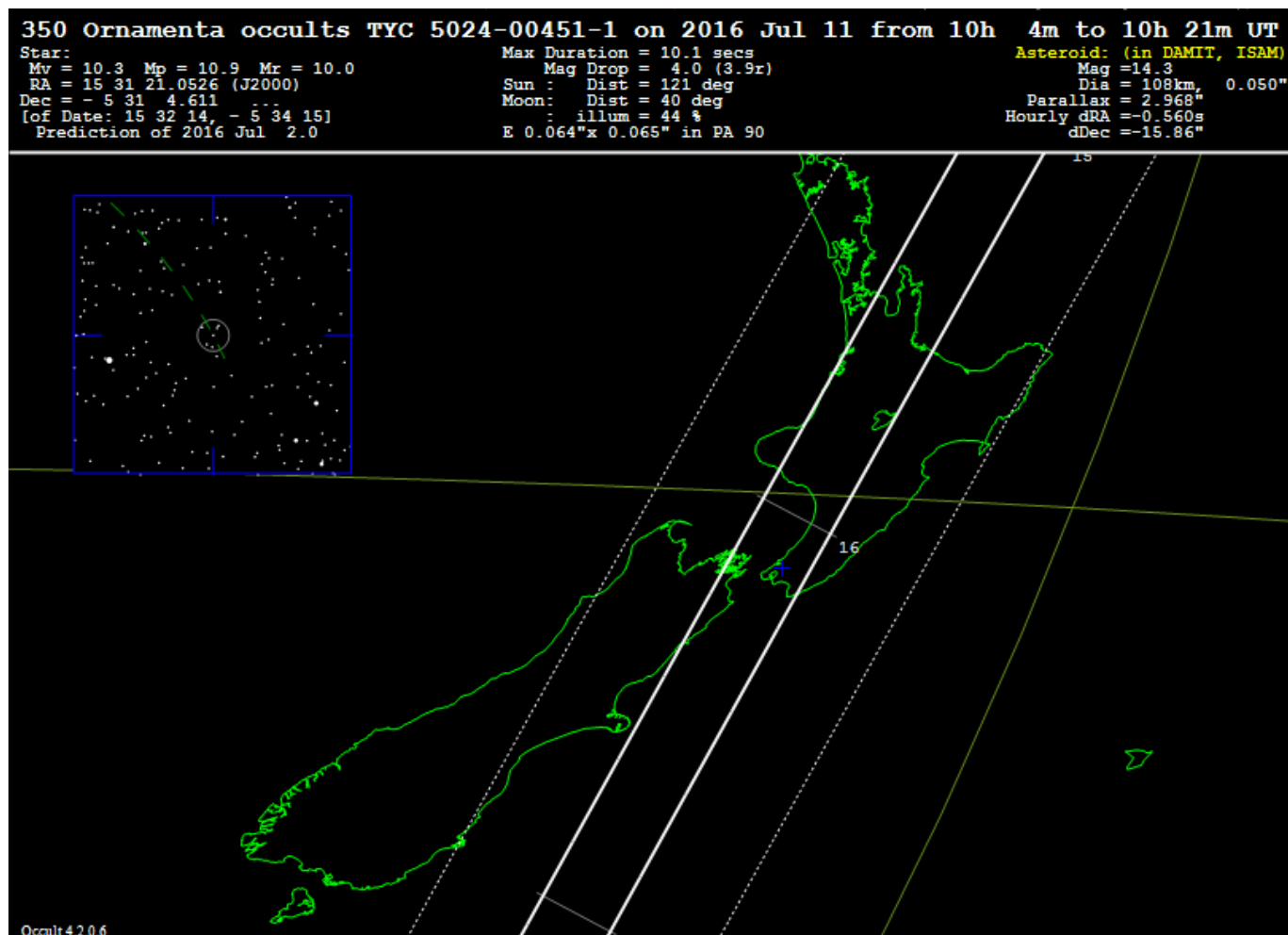


Figure 1: Ornamenta Prediction

Along with various other observers, I attempted to measure this occultation. For once everything went right – the weather was clear and calm, nothing went wrong with the equipment (or observer) and, by using a pre-point star, I found TYC 5024-00451-1 well before

the scheduled time of the event. Figure 2 shows two images from my video camera. The image on the left hand side shows the star field prior to the predicted occultation time, with TYC 5024-00451-1 indicated by the red lines. The image on the right hand side is taken 10

seconds later – and TYC 5024-00451-1 is gone. It's been nearly two years since I last saw an occultation!

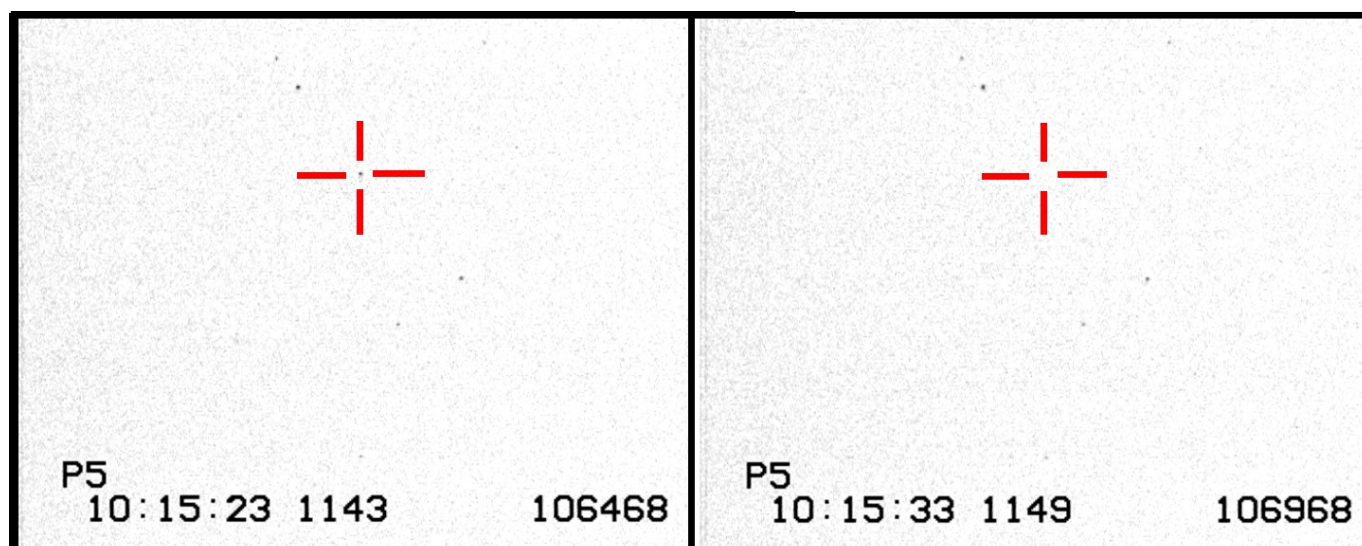


Figure 2: Camera Images

I then used the Tangra program (written by Hristo Pavlov) to analyse my video recording, with the results shown in Figure 3. The blue data is the brightness of the occulted star (TYC 5024-00451-I) for each video frame. The other (yellow, green and white) light curves are three other stars also visible in my camera's field of view. These are includ-

ed for comparison purposes; to show the drop in brightness of TYC 5024-00451-I is actually due to an occultation rather than, say, a passing cloud. As TYC 5024-00451-I is quite a faint star (10th magnitude), I had to set my video camera to take longer to make each measurement than usual, to get a good signal. In this case, I had to integrate

over four video frames for each measurement. The camera then outputs the last measurement it made four times, in order to keep frames appearing as the usual rate required for a video signal. This is why the light curves all have the data points bunched up in groups of four.

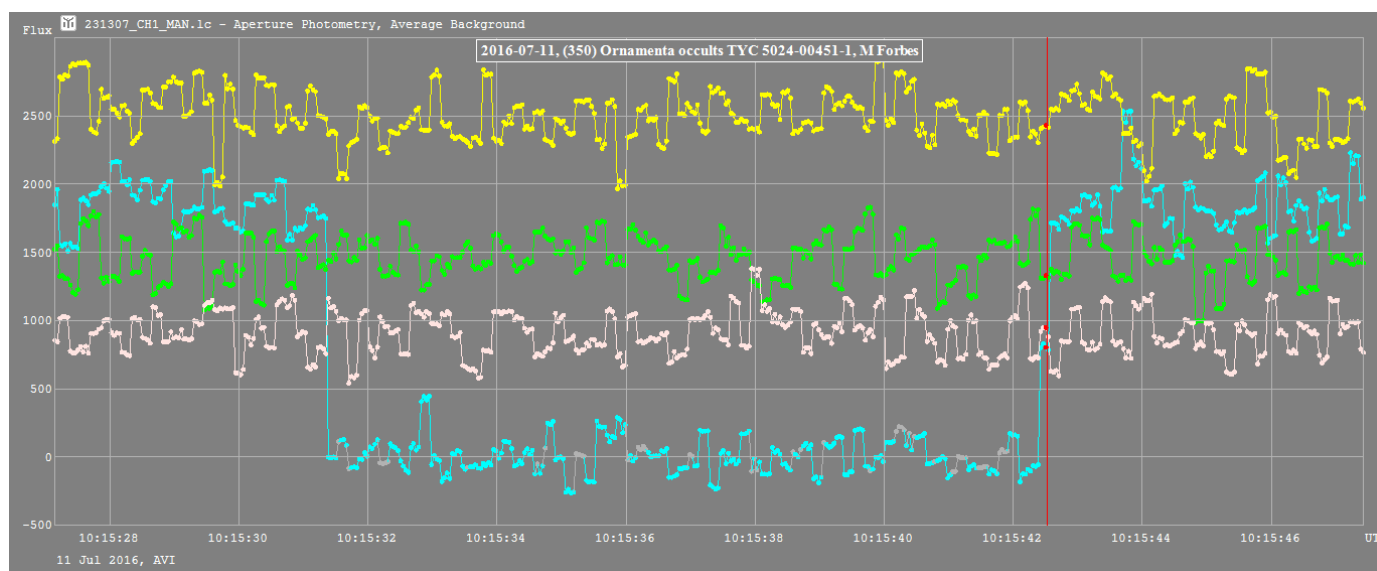


Figure 3: Light Curves

As I said earlier, there were a number of other observers who attempted to observe this event. Their preliminary results (as reported in OccultWatcher) are given below, with the observers listed from east to west across the shadow path;

- Diana Watson - miss
- Peter Graham - positive (4.2 second occultation)
- Terry Butt - no observation, dome jammed (immovable)
- Murray Forbes - positive (11.4 second occultation)
- Gordon Hudson - positive (13 second occultation)
- Roland Idaczyk - no observation - (thin cloud, target too faint)
- Graeme McKay - positive (8.2 second occultation)

- Larry Field - no observation (couldn't find the star)
- Bill Allen - positive (7 second occultation)
- Alan Yates - miss
- Stuart Parker - ?
- Brian Loader - miss
- Ash Pennell - miss

Hopefully by next month, they will have finished analysing their results and reported them so we can put them all together to estimate the size and shape of the minor planet.

Murray Forbes.

Distro Astro – a Linux distribution specially for Astronomers

I was recently poking round on the web looking for astronomical software for the Linux operating system and found a newly released distribution (Distro in LinuxSpeak) aimed specifically at astronomers. I introduced this briefly to the research group at the July meeting and was asked to put a notice in the newsletter to reach a wider audience.

What is a distro? It's a software package comprising the operating system and a bundle of applications software. There are quite a lot of them available, most aimed at general users, but some geared to specific interest groups. All of the software included in a distro is free and generally very good, better in some cases than commercial products.

So what about Distro Astro? It's a complete Linux distro and comes complete with web browser (Firefox), e-mail client (Mozilla Thunderbird), the LibreOffice productivity suite, graphics programs for processing and managing images, media player and a variety of other accessories, in addition to the specialist astronomical applications. There are a host

of these, too many to list in a brief article, but they range from planetarium programs and educational simulations to astronomical image processors and ephemeris calculators. In some cases a choice is offered as some of the programs are easier to use than others.

A couple of surprise inclusions are REGISTAX and IRIS. These are Windows-based packages and do not appear to be ports. Distro Astro uses a clever piece of software called WINE to run them. This is not an emulator, so there is no appreciable loss of performance, and unlike virtual machine software doesn't require you to have Windows on your computer. The implementation is slick, just click the program icon and it starts without you having to call WINE first. The only thing in IRIS that doesn't work is the ability to drag and drop files from Internet Explorer, you have to use a script.

What's missing? The biggest omission is occultation software, possibly because the distro was originally developed by professional astronomers for their own

use and has only recently been released for wider use. Hristo Pavlof has recently produced a Linux version of Tangra that you could download and install but other software might need some experimentation – or you could contact the developers with suggestions.

Getting Distro Astro

Distro Astro is available for download directly from www.distroastro.org or indirectly from www.linux.softpedia.com, though at the time of writing the site appeared to be affected by server problems. If these persist, I have the software on disc. The download comes as an ISO which can be burned to a DVD to create a live disc. This means you can try it out without installing. Just put the disc in your DVD drive and restart your computer holding down the esc key.

Aline Homes

2017 Total Solar Eclipse Tour

WAS has received the following:

“Dear Astronomical Society,

We thought your members might be interested in an eclipse tour departing Sydney, Australia for the 2017 total solar eclipse in North America.

We will be based in Portland, Oregon for the eclipse and plan to view from either Madras or Salem but it will depend on the weather

conditions on the day as to where we watch the eclipse.

Highlights Include:

- Mt Wilson tour and night viewing on the 60-inch and 100-inch telescopes
- Meteor Crater including rim tour
- Lowell Observatory tour
- Kennedy Space Centre
- Smithsonian Museum

Details and the itinerary can be download-

ed from our website

www.spacetime travellers.com.au

Kind Regards

Mel

SpaceTime Travellers”

Astronomy Tours to India

WAS has received the following:

“Dear Wellington Astronomical Society,

New Zealand,

Greetings from Bangalore, India – and from one of the most devoted amateurs you'll ever find in this side of the world! Getting to know more amateur astronomers and collaborating with them in some way had been my childhood passion.

I've been active in quite a few areas of amateur astronomy for the last decade and half, since high school days. About myself is given in the content material that I'm linking within this email, so I would choose not to introduce myself; you could read it on the last page of the brochures. Just one piece of introduction should suffice for now, and I take immense honour in letting you know that last year the veteran comet hunter-discoverer David Levy chose to name his asteroid after me as “380607 Sharma”!

I am happy to let you know that recently I've started an Astronomy Tourism venture here. I consider myself the pioneer of Astronomy Tourism here in India, for the depth of my vision towards the domain. While my astronomy tourism initiative has its focus on making an Indian explore the world's countries for the beautiful facilities

available there, I recently thought why not give foreigners a chance to come over to India – a name favoured by many travellers and tourists; many for whom India is on their wishlist. We have a great land for its culture, history, diversity, Nature, and what-not, as you all must know.

Given the extensive opportunities for tourism, and the few options that can be made available for astronomy [the limitations at my end are no astronomy farms, no large light buckets, no star parties, but we do have NELM mag. 6 / Bortle 3 or 2 even 1 skies in few places], I have created 3 tour programs to India to 3 destinations only for non-Indians. These 3 locations offer different aspects and features. We have immense greenery and mountains and wildlife, a large desert and plenty of historic monuments, even a large meteorite crater larger than Barringer. All accommodations are at luxury hotels. Details are given through few keywords in this link. There are also links to the program brochures in the webpage, which one can download.

<http://www.astronamartours.com/indian-tours-plus-astronomy/>

Who are those who can attend these? Normal tourists with little keen-ness towards astronomy or beginners with main interest

in touring to India, as well as advanced amateurs & experts who would like to also get their own equipment to keep themselves busy. So typically it will be 11-12 days or so of touring Indian destinations, with 3 nights of astronomy – 2 packages offer Bortle 2-3 skies while one may not give as dark skies instead it has the crater as the highlight. The plus point is you get what you do not get down south: UMa and northern galaxies, even the northern Milky Way regions of Cassiopeia and Perseus (which are pretty high in our sky), because I live at +13°N latitude.

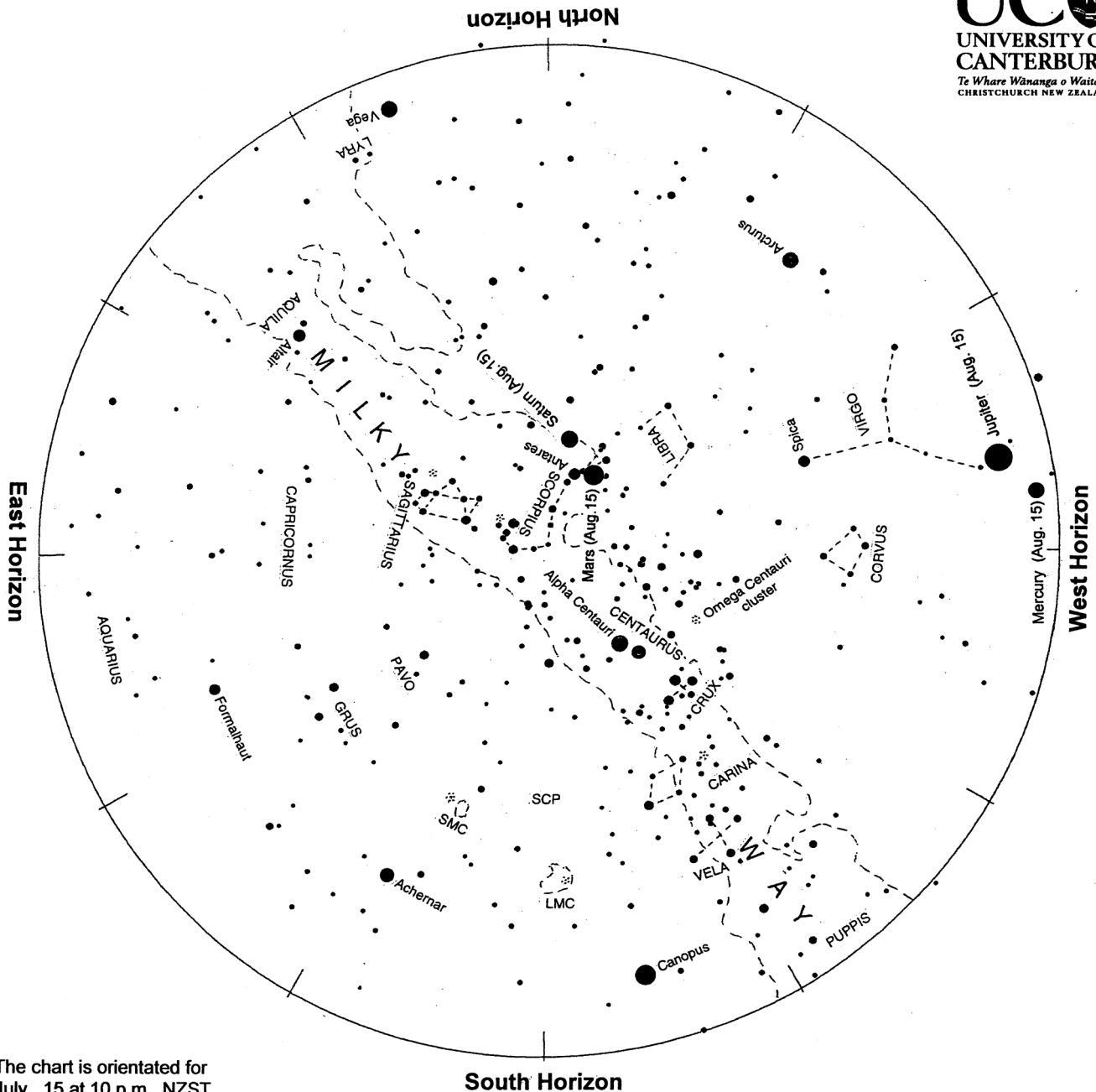
I extend my invitation to your club or society to let me show you India's different features and we get to work on astronomy together. Please kindly spread this email to your members database and forum. We have space for 20x3 people to fill in all groups. I will consider myself lucky to have your members here for the tours and discuss future plans for some kind of joint amateur astronomy activities.

Thank you. Regards, Amar.

Amar A. Sharma

Founder-Astronomer

<http://www.astronamartours.com/>”



The chart is orientated for
 July 15 at 10 p.m. NZST
 Aug. 1 at 9 p.m. "
 Aug. 15 at 8 p.m. "
 Sep. 1 at 7 p.m. "

Evening sky in August 2016

To use the chart, hold it up to the sky. Turn the chart so the direction you are looking is at the bottom of the chart. If you are looking to the south then have 'South horizon' at the lower edge. As the earth turns the sky appears to rotate clockwise around the south celestial pole (SCP on the chart). Stars rise in the east and set in the west, just like the sun. The sky makes a small extra clockwise rotation each night as we orbit the sun.

Venus, the brilliant silver 'evening star', appears in the west at dusk. It sets before 8pm so isn't on the chart. Above it is Jupiter, for most of the month. Near them, but fainter, is Mercury. Mars and Saturn are north of the zenith. Orange Arcturus in the northwest often twinkles red and green. The Pointers and Crux, the Southern Cross, are midway down the southwest sky. Canopus is low in the south. The Milky Way spans the sky from northeast to southwest with its broad centre overhead. The Scorpion's tail curls around the zenith. Vega crosses the northern sky, staying low.

The Night Sky in August

All five naked-eye planets are visible in the early evening sky. Mercury, Venus and Jupiter are low in the west and shuffle around through the month. Mars and Saturn are north of overhead near Antares. Bright stars are widely scattered. Vega on the north skyline is balanced by Canopus low in the south. Orange Arcturus is in the northwest. The Southern Cross, Crux, and the Pointers are midway down the southwest sky. The Milky Way spans the sky from northeast to southwest.

Venus, the brilliant silver 'evening star' sets in the west an hour after the sun at the beginning of the month, extending to nearly two hours by the end. Jupiter, higher in the west and golden-coloured, sets steadily earlier through the month: at 9 pm at the start of August and before 8 pm at the end. Mercury makes its best evening sky appearance of the year. It is roughly midway between Jupiter and Venus at the beginning of the month. Around the 20th Mercury will be left of Jupiter but much fainter. It begins to sink back into the twilight at the end of the month. On August 27-28 Jupiter and Venus will be close together, easily included in the same view in a telescope.

At the beginning of August Mars, Saturn and Antares make an isosceles triangle north of the zenith. Mars is the brightest of the three and the same colour as Antares. Saturn is cream-coloured. Saturn stays put against the background stars. Mars moves steadily eastward. On the 25th Mars will be two degrees, four full-moon diameters, from Antares making a striking pairing of orange 'stars'. The planet groupings are line-of-sight effects, of course. On the 25th, when the planets are in groups, Mercury is 118 million km away, Venus 233 million, Mars is 128 million, Jupiter 951 million and Saturn 1475 million km.

Canopus, the second brightest star, is near the south skyline at dusk. It swings upward into the southeast sky through the morning hours. On the opposite horizon is Vega, one of the brightest northern stars. It is due north in mid-evening and sets around midnight.

Midway down the southwest sky are 'The Pointers', Beta and Alpha Centauri. They point down and rightward to Crux the Southern Cross. Alpha Centauri is the third brightest star and the closest of the naked eye stars, 4.3 light years* away. Beta Centauri, like most of the stars in Crux, is a blue-giant star hundreds of light years away and thousands of times brighter than the sun.

Arcturus, in the northwest at dusk, is the fourth brightest star and the brightest in the northern hemisphere. It is 120 times the sun's brightness and 37 light years away. When low in the sky Arcturus twinkles red and green as the air splits up its orange light. It sets in the northwest around 10 pm.

Antares marks the heart of the Scorpion. The Scorpion's tail hooks around the zenith like a back-to-front question mark. Antares and the tail make the 'fish-hook of Maui' in Maori star lore. Antares is a red giant star: 600 light years away and 19 000 times brighter than the sun. Below or right of the Scorpion's tail is 'the teapot' made by the brightest stars of Sagittarius. It is upside down in our southern hemisphere view.

The Milky Way is brightest and broadest overhead in Scorpius and Sagittarius. In a dark sky it can be traced down past the Pointers and Crux into the southwest. To the northeast it passes Altair, meeting the skyline right of Vega. The Milky Way is our edgewise

view of the galaxy, the pancake of billions of stars of which the sun is just one. The thick hub of the galaxy, 30 000 light years away, is in Sagittarius. The actual centre is hidden by dust clouds in space. The nearer dust clouds appear as gaps and slots in the Milky Way. Binoculars show many clusters of stars and some glowing gas clouds in the Milky Way.

The Large and Small Clouds of Magellan LMC and SMC look like two misty patches of light low in the south, easily seen by eye on a dark moonless night. They are galaxies like our Milky Way but much smaller. The LMC is about 160 000 light years away; the SMC about 200 000 light years away.

*A light year (l.y.) is the distance that light travels in one year: nearly 10 million million km or 10¹³ km. Sunlight takes eight minutes to get here; moonlight about one second. Sunlight reaches Neptune, the outermost major planet, in four hours. It takes four years to reach the nearest star, Alpha Centauri.

Notes by Alan Gilmore, University of Canterbury's Mt John Observatory, P.O. Box 56, Lake Tekapo 7945, New Zealand.

www.canterbury.ac.nz