



CAS MAG

The official magazine of the Canterbury Astronomical Society

www.cas.org.nz www.facebook.com/CanterburyAstronomicalSociety

Monthly Meeting: **Our Monthly Meetings are held in ER225** **Ernest Rutherford Building**

6.30–7.30pm - CAstronauts & Introduction to Astronomy for Beginner's

7.30 - 8pm - Refreshments

8pm - Meeting Starts

PLEASE REMEMBER TO SIGN THE ATTENDANCE BOOK AS WE STILL NEED TO KEEP A RECORD FOR CONTACT TRACING AS WELL AS USING THE NZ COVID SCAN WE HAVE AVAILABLE.

MAY MEETING: 18th MAY 2021 **Professor Sean Ryan**

Professor of Astrophysics, University of Hertfordshire,
Executive Director, South-East Physics Network (SEPnet)

"The Ins and Outs of the Milky Way"

The Sun is one of a hundred billion stars situated in a galaxy we call the Milky Way. It is just 100 years since the boundaries of the Milky Way were recognised, and the spiral nebulae were shown to lie well beyond our system of stars. But how and when did the Milky Way come to exist? This talk will trace the ongoing development of our understanding of the formation and evolution of the Milky Way. Sean Ryan, a former CAS member who is now Professor of Astrophysics at the University of Hertfordshire, will present his talk via video conference (zoom) to the Ernest Rutherford building, room 225. See page 5 for video link

CAS Membership Subscriptions for 2021

THIS YEARS MEMBERSHIP SUBSCRIPTIONS ARE NOW DUE

Please use your name and member number as a reference when banking, then email membership@cas.org.nz to advise so payments can be matched to you correctly. **PLEASE also include any changes to your details (eg: phone, email, address)**

IT IS VERY IMPORTANT THESE DETAILS ARE KEPT UP TO DATE.

Full details are included on the last page of this newsletter.

You are also welcome to pay by cash at our monthly meetings.

NOTE: We can no longer accept cheques for payments

(If you have joined Cas in the last couple of months your membership is not due till April 2022)

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From Your Editor

This is your Casmag, for YOU our members,
So I welcome any ideas or articles you would like to share with the other members. Please email your Article or favourite photo with details so I can include it in future issues.

Deadline for each issue is 1st of each month

Remember you can have your advert added in the future casmag's,
(see page 26 for details)

Any questions, Ideas or suggestions please email to editor@cas.org.nz

Dale Kershaw

From 7.2.4.6 on page 15 of Constitution of the Society

“Any member wishing to have an article or paper published in CASMAG or other publications of the society shall in the first instance, forward a copy to the editor who may request the approval of the committee before publication.”

COMING UP IN NEXT MONTHS ISSUE

More Puzzles
Library update

CAS Calendar MAY- JULY 2021

MAY 2021

Tuesday 11th	Committee Meeting
Wednesday 12th	New Moon
Tuesday 18th	Castronauts Meeting 6.30-7.30pm
	Members Meeting at University from 7.30pm
Thursday 20th	First Quarter
Saturday 22nd	Members Night at Observatory
Wednesday 26th	Full Moon

JUNE 2021

Wednesday 2nd	Last Quarter
Saturday 5th	New Members Training at Observatory
Monday 7th	Queens Birthday Holiday
Tuesday 8th	Committee Meeting
Thursday 10th	New Moon
Tuesday 15th	Castronauts Meeting 6.30-7.30pm
	Members Meeting at University from 7.30pm
Friday 18th	First Quarter
Saturday 19th	Mid- Winter Bonfire/Members Night at Observatory
Friday 25th	Full Moon

JULY 2021

Friday 2nd	Last Quarter
Saturday 3rd	New members training at Observatory
Saturday 10th	New Moon
	Kidsfest starts,
Tuesday 13th	Committee meeting
Saturday 17th	First Quarter
Tuesday 20th	Castronauts meeting 6.30-7.30pm
	Members Meeting at University from 7.30pm
Saturday 24th	Full Moon
	Members Night at Observatory



PUBLIC OPEN NIGHTS

Our public open night season starts on 9th April this year, and we always welcome your help on these nights.

Open nights this year are set as follows:

May: 14th, 21st, 28th

June: 4th, 11th, 18th, 25th

July: 2nd, 30th (see next page for kidsfest dates)

August: 6th, 13th, 20th, 27th

September: 3rd, 10th, 17th, 24th

Any changes to Open Nights will be published on our Facebook public page and our website



UPCOMING EVENTS: *2021 Calendar:*

KIDSFEST 2021

This year it runs from **Saturday 10th -Saturday 25th July**

Excluding 13th Committee Meeting Night and 20th Members Meeting

As you can see a very busy winter season for us at CAS and we ask all who are able to help out to advise us by using the above website calendar and keep an eye out on the forums

Remember as a Paid member of Cas you are able to attend any of our events free of charge, BUT we would love you to help out as you are able to, Training is always available to you and this works towards accreditation on the equipment.



Changes to our Monthly Observatory Nights for 2021

Some of the observant amongst you may have noticed a change to our CAS calendar, which has been updated for our winter 2021 programme.

This year to accommodate the growing number of new members we have added an additional observatory night to our programme.

Members nights are now tagged in the calendar as Training or General:

Members Nights (Training) – held on the **1st Saturday of each month** -specifically aimed at induction training and members training. We will have accredited members onsite to support training aimed at adult and kids. Session starts earlier to allow the younger members some telescope time before bed! All members are welcome to attend and bring along gear. The intention of this session is to encourage all members to become familiar with observatory scopes and encourage usage of the observatory with a focus on training our new junior members. These sessions start earlier than normal to accommodate this.

Members Nights (General) – held on the Saturday following our Tuesday members meeting 'Free for All' – no specific training planned – All members welcome to bring along gear or use CAS gear if accredited or accredited members are in attendance.

Members nights are a great time to get out and enjoy a night under the stars at the observatory and do a little socialising. Many members bring out their dinner and enjoy that on the terraces before dark. Come out stay a while or stay all night, the observatory is warm and you can dip in and out all night as you like.

Reminder: Our members nights at the observatory go ahead regardless of the weather!

Enquiries regarding members nights can be posted on the CAS Members forum:

<https://cas.org.nz/forums/forum/canterbury-astronomical-society-forums/cas-members>

Changes to UC Members Meetings

(3rd Tuesday each month)

From March onwards there are some changes to the members meetings at the UC to accommodate the new CAStroNauts kids and beginners to astronomy programme:

6.30pm – 7.30pm	CAStroNauts & Introduction to Astronomy for beginner's session.
7.30pm – 8pm	Tea/Coffee Break.
8pm – 9pm	Normal CAS members meeting, general business and talk by Our Guest Speaker

The earlier session is designed for our newcomers to astronomy and our kids CAStroNaut programme and content will be pitched at this level.

More seasoned astronomers are requested to join the 8-9pm session as spaces are limited.

Enquires about the CAStroNaut and beginner's session should be sent to the CAS Vice President, Simon Lewis, at vice-president@cas.org.nz

General information on our UC members nights and lecture topic will be posted in the CASMAG and on our CAS website

MONTHLY MEETINGS:

Meeting Venue:

**Room ER 225 in the Ernest Rutherford Building, University of Canterbury,
(1 building over from the east building we used last year)
Entrance to the building will be via the north side entrance,
Then using the lift or stairs up to level 2**

**Carol McAlavey is asking you, our members to make suggestions or offer
to give a talk at our monthly meetings.**

**PLEASE CONTACT CAROL WITH YOUR SUGGESTIONS OR IF YOU CAN GIVE
A TALK via member2@cas.org.nz**

Upcoming Members Meetings

**May: (via Zoom) Professor Sean Ryan,
Professor of Astrophysics University of Hertfordshire
Video link <https://canterbury.zoom.us/j/92561102283>**

June: Cameron McEwing, Topic to be confirmed

July: Tbc

August: Tbc

September: Tbc

October: Tbc

November: Tbc

(correct as at 1st May 2021, Subject to change as required)

**Many thanks go to Sharlene Wilson and Orlon Petterson from the School of
Physical and Chemical Sciences, University of Canterbury for arranging the
meeting room for CAS this year.**

**Also Thanks to Associate Professor Karen Pollard for organising the
Lecture theatres for our public talks**

**PLEASE Remember we are only able to hold our meetings at the
University at Covid-19 Level 1**

**We will update the website if there are any changes and will host
meetings via ZOOM if possible:**

CAS YOUTUBE CHANNEL

Have a look at our new you tube channel

<https://www.youtube.com/channel/UChLhFm7yaLUTlgH3IjvA11g>

WELCOME TO OUR NEW MEMBERS:

A warm welcome to our new members, We look forward to meeting you at our meetings and/or events,
Please make yourselves known to others.

We like to welcome our new members here after the membership is accepted by the committee at the meeting following memberships are received.

From the May Committee Meeting
Welcome to:



Chester Hall-Fernandez
Sarah Lucchese
Alana Srubar-Veron
Rebecca Garrity

It is always great to see our new members coming along to our Members Meetings, Members Nights and Events.

CASMAG PUZZLE PAGE

Mercury

1. _____ is the only [ex]planet smaller than Mercury
2. The Sun moves through Mercury's sky in the _____ direction than here on Earth
3. Jupiter's moon _____ is larger than Mercury
4. Mercury is the _____ planet to the Sun
5. Mercury is one of the four _____ planets
6. In spite of it's high surface temperature, scientists have found evidence of ___ on its surface
7. The many _____ on Mercury's surface tell us about its violent past
8. Mercury is made up mostly of _____
9. _____ in Greek mythology is equivalent to Mercury in Roman mythology
10. Mercury is _____ smallest planet
11. Saturn's moon _____ is larger than Mercury
12. Mercury's orbit is an _____

Mercury

Q	X	H	C	L	O	S	E	S	T
G	G	R	E	A	B	B	A	O	Y
B	I	A	O	R	B	Q	T	P	K
E	C	C	N	C	M	U	L	P	P
L	R	U	E	Y	K	E	Q	O	L
L	A	H	H	T	M	Y	S	S	U
I	T	I	T	A	N	E	B	I	T
P	E	T	A	C	I	E	D	T	O
S	R	W	V	I	R	O	N	E	M
E	S	J	F	S	E	C	O	N	D

NOTES FROM YOUR COMMITTEE

SIGNING IN WHEN YOU ARE AT THE OBSERVATORY

Please remember to sign in the book on the table in the Lodge whenever you are out at the observatory, This helps give us an idea of who has been using the equipment etc, even if you are out there to do gardening or the like PLEASE SIGN THE BOOK and add what you have been doing,

Also please note and issues that have happened or that need fixing, and its good to follow that up with a email or phone call to Terry or the committee

CAS COFFEE MUGS & PENS

With our new logo we have had Coffee Mugs printed and also Pens which we have for sale to our members,

Coffee Mugs are \$15.00 each

Pens are also available to members

Waterproof Stickers with our new logo are also available

Payment can be cash or bank deposit

They are available from Editor (Dale),
contact via editor @cas.org.nz
or 0272426376



OBSERVATORY NEWS IMPORTANT INFORMATION

DOOR CODE & ALARM AT THE OBSERVATORY

The door code and Alarm code have been changed since our AGM and fully operational, Ask a committee member for the password.

INTERNET WI-FI:

Ask a committee member for the password

LASER POINTERS:

There is a legal requirement when importing them, and information is on our website and at the observatory, CAS has a drafted a set of guidelines which we were presented at our AGM and were voted and added to our By-Laws,

If you need a letter confirming your membership for your application, please contact either membership secretary or secretary, (This letter will state you are a current financial member of our society)

ACCREDITATION

A reminder that unless you have full accreditation on the equipment you are not to use the equipment unless there is an accredited person with you.

CLIVE ROWE DOME REPAIRS

The repairs to the dome are now completed, Thanks to those who assisted the build team with this big job,



OBSERVATORY NEWS **IMPORTANT INFORMATION**

New Security System in Lodge

We are trialling a new security system in the Lodge. This takes the form of an intrusion sensor outside, and a Wifi cam inside the lodge in the back corner at the car park end. The intention is to add another camera outside the lodge overlooking the car park area. The advantage of these is that they will trigger on intrusion alert and can be viewed remotely in real time or reviewed within 2 weeks. These are not for the purpose of watching people, but rather to check that entry to the lodge is by legitimate members. Given the assets we have on site, this is necessary for any insurance claims. Access to these cameras is limited to Webmaster, Vice President and Observatory director only. We already have a surveillance network installed (several years ago) which records to a hard drive but cannot be remotely viewed in real time.

If anybody needs to know more please feel free to email me
observatory.director@cas.org.nz

Terry Richardson

SECURITY FOR OBSERVATORY KEYS- Accredited Members

Committee have decided that we need improved security for access to the observatory equipment. From now all keys are stored in a lock box in the library. Any accredited member will be given the combination (just ask me). This includes the key to the equipment room and for the dobs.

Although the dobs do not require formal accreditation, they are precision instruments that can be damaged if not used correctly.

A member accredited on any of the scopes can open these for you.

Members still have free access to the lodge and its facilities, but any other access will require an accredited person to be present.

Any accredited member can get access to the keys, but of course can only use (or supervise) the instrument they are accredited for.

This sounds a bit restrictive, but has become necessary due to recent misuse and possible damage to some instruments.

Any questions please email me
observatory.director@cas.org.nz

Terry Richardson



2021 AGM REPORT

Presidents Report: Rob Glassey

Rob stated that 2020/21 was a challenging year. The committee moved to holding meetings online via Zoom, during the lockdown.

Finances have come out well, thanks to a huge surge in new members and creating CAstronauts, and we have run successful induction meetings.

We are looking forward to a fairly positive year and hopefully there won't be too many interruptions.

Thank-you to the volunteers and our speakers. Staveley was three nights this year with lots of good speakers and I really enjoyed it. Thanks to Euan Mason, Carol McAlavey and Dale Kershaw.

Thanks to Malcolm Carr for providing the tea and biscuits for the monthly meeting.

Rob thanked the committee members for their work.

Terry Richardson for keeping us honest at the observatory.

Marc Bunyan for his work as webmaster and membership secretary in tandem with Simon Lewis. There have been some significant improvements to the website.

Thanks also to David Hill as secretary,

Dave Brian our treasurer for keeping our finances in order,

Sasha Crawford as librarian,

Dale Kershaw as editor,

and to our other committee members

Carol McAlavey, Raewyn Marles and Kieren Eden.

Orlon Petterson and Sharlene Wilson from the Physics department were thanked for their ongoing support in arranging the meeting room.



STARDATE SI 2021

This year's event was held over Waitangi weekend giving us 3 nights, of which we had 2 great nights for viewing,
This yr was very well attended with about 40-50 attending (some were day visitors or only 1 night)

Our fantastic speakers this year included the following:

Dr Karen Pollard

Andrew Buckingham

Euan Mason

John Pickering

Rob Glassey

Simon Lewis

Preetha also held a Kids Cake Event on Saturday afternoon, They all looked like they were enjoying themselves and then we had the results included for dessert at the Pot Luck Dinner.

Photos: Dale.K



Next year's Stardate is set for Waitangi Weekend starting Friday 4th and finishing Monday 7th Feb

On behalf of the Stardate SI Organising committee a huge thank you to all who attended and contributed to the weekend, we look forward to seeing you next year.

Dale Kershaw

Stardate Camp Mother

The following selection of Photos sent to editor from Ashley Marles



Attendees at Stardate SI 2021



MORE PHOTOS FROM STARDATE SI 2021



MORE PHOTOS FROM STARDATE SI 2021



A Beginners Guide to Astrophotography – Part 1

Simon Lewis – CAS Vice President

Introduction

Astrophotography has seen a huge upturn in interest over the last couple of years as more people see pictures of our amazing night skies on websites and social media. There is a never-ending stream of wonderful images published online and it's not surprising that interest in this area of the hobby is growing. With the spread of remote observatories online offering data and a vast range of suppliers offering equipment for your own astrophotography rig, this rush on the hobby is not surprising.

But one of the things I see on a regular basis is a lack of understanding of the technical side of astrophotography. Sure, you can just pick up a DSLR and find a tripod and take a few single frame shots of the Milky Way and that's a great place to start, but very quickly you need to learn some technical aspects about cameras and imaging to improve your photos. This series of articles will help you understand the basics of cameras, imaging and processing and we will follow these through with some practical training at the observatory on training and members nights. We will also cover off what equipment CAS owns and how to use this for your own imaging.



Astrophotography isn't an instant gratification hobby but armed with some simple knowledge and understanding, you can really create some wonderful images worthy of mounting on the wall.

Remember that a successful astro photograph is an image that you are happy with. Astro imaging is pretty much a form of art and a short look

around any website or Facebook page will reveal a range of images from very natural looking to the downright gaudy! But beauty is in the eye of the beholder and what you find pleasing might not be my cup of tea and likewise you might look at my images and wonder how I could have brought such a monstrosity into the world!

So, never worry about the final image, it's what pleases you and what gives you the most pleasure capturing and creating it.

"There are no secrets to success. It is the result of preparation, hard work, and learning from failure." -Colin Powell

Cont next page

[A Beginners Guide to Astrophotography – Part 1 \(cont\)](#)

Through this series we will look at both ends of the spectrum, from simple imaging, all the way through to more complex projects. Your imaging could be as straightforward as snapping a picture with your phone through an eyepiece of a CAS scope or imaging with the family camera on a fence post in the yard, but you might want to move into more complex planetary or deep sky photography later.

Just remember it can be as simple or involved and complicated as you want to make it. You define the path, the speed you progress at and the budget you want to spend and there is plenty of help available from CAS members who are active in astro imaging.

Imaging Basics

One aspect that defines all types of digital astrophotography is the relationship between the light from the object you are imaging and the pixels on your camera, through to processing the captured data into a final image.

To develop your imaging techniques, it's worthwhile getting an understanding about what is happening on a pixel-by-pixel basis in your equipment during imaging, through post processing and the effects on your image based on what happens to those pixels during their life, from light falling onto a sensor, to final processing and display on your screen.

To get light from astronomical objects through to an image requires a few basic components and every imaging system will contain similar components and these only vary in terms of complexity and cost!

A modern digital camera is a good example of the integration of components into an imaging system and will contain pretty much all elements needed for imaging.

These components generally are:

A sensor – this is the component and associated electronics that turns light into the data we use. They vary in type, size, shape and price!

An optical lens – the bit of glass that focuses the light from the sky onto the sensor. This could be as simple as the lens on the back of your phone or the lens on the front of your family camera, through to telescopes of all shapes and sizes.

Digital storage – this component can be the storage memory on your phone, an SD Card in the camera through to disc storage in your laptop or home computer. Again, very varied depending on how your system is designed.



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[A Beginners Guide to Astrophotography – Part 1 \(cont\)](#)

All these components get mounted into a stable mechanical construction and are operated by an interface that allows the user to focus, choose the exposure lengths, take an image and save to storage for display or use on other devices.

CAS owns a couple of digital cameras and you might already own one yourself too. Digital Single Lens Reflex (DSLR) and mirrorless cameras are quite popular and easily accessible as a consumer product and are an excellent entry into astro imaging when combined with a stable tripod.

Most include timer or manual shutter release for longer exposures or can be fitted with an accessory to extend their exposure times further.

These cameras all use a similar type of sensor which converts light into data, and these are at the very core of how we image the night sky.

Sensor Basics

A modern camera sensor is a wafer of silicon covered in tiny electronic components known as photo diodes. These are the very building blocks that convert photons of light into a signal we can use digitally. These small photodiodes are grouped into elements known as *pixels*. These pixels can be thought of as a ‘bucket’ that collect photons when the sensor is exposed to the sky. At the end of the exposure the light collected by each pixel is converted into a digital signal by an Analog Digital Converter (ADC) and sent to storage for display or for use on other devices. Every digital photography sensor is composed of an array of millions of pixels that gather incoming light and convert the information into an image.

To get a detailed understanding of what happens during an image capture, it is useful to zoom in and look at an individual pixel.

As described above, it can also be useful to think of a pixel like a bucket (often called a “well” in many other resources and discussions), but instead of gathering sand, water, or bricks, a pixel gathers electrons.

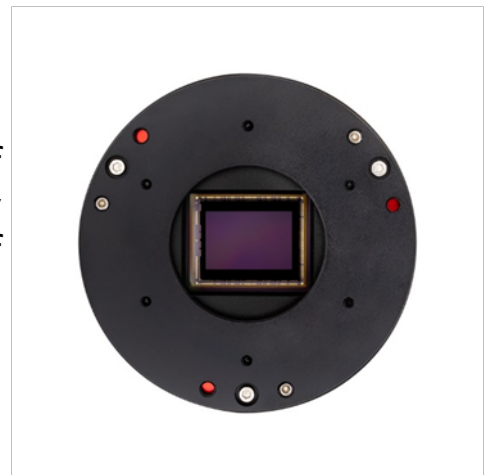
Imagine you left a bucket outside overnight during a typical Canterbury winter rain. Over time the

bucket would gather individual rain-

drops and start to fill up. In our case the raindrops are photons, and the bucket is each of the pixels on our camera. This analogy and other

relationships between your pixels and a bucket can carry us quite far in understanding what is going on with your pixels in astrophotography.

So here is our basic pixel bucket:

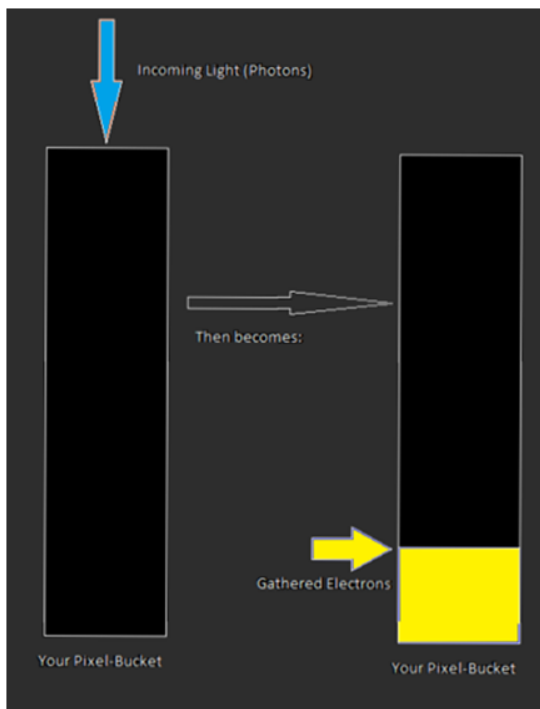


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[A Beginners Guide to Astrophotography – Part 1 \(cont\)](#)

The astute reader that you are will have noticed a switch in terms above. We are concerned with gathering light (photons) in astrophotography, yet the pixel itself is collecting electrons.

How does this work? On the camera's sensor, incoming photons (our raindrops) from the object you are imaging hit the photo-receptive area on the sensor and get converted to electrons via the photodiode. As more photons hit the photodiodes, your bucket starts to fill with electrons.



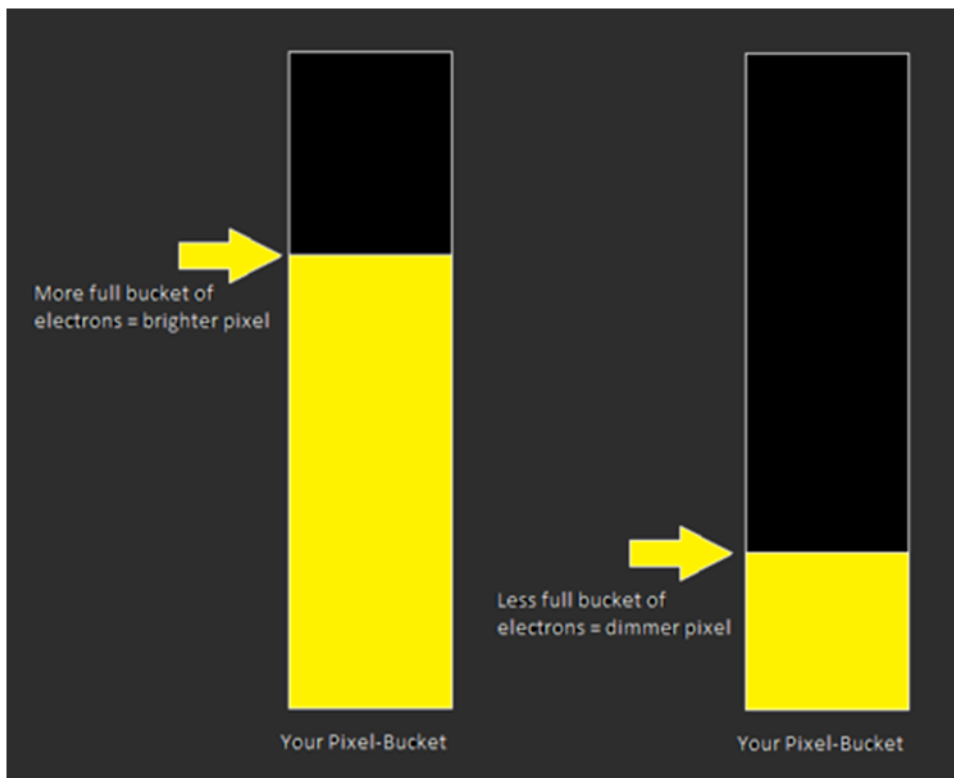
After a given amount of time, which is the camera's shutter speed you set, the camera reads the number of electrons in each bucket and drains the bucket so it is ready for the next frame.

The number of electrons drained determines the intensity or brightness value of that pixel. The more electrons that are drained the brighter the value for that pixel.

The gathered electrons create a voltage differential in the bucket which is an analog signal. Once the camera drains the bucket, this gets converted into a digital signal through the on-board Analog-Digital-Converter (ADC).

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[A Beginners Guide to Astrophotography – Part 1 \(cont\)](#)



Once all of the 'buckets' are drained and their values are recorded in a digital signal, the result is a single frame of information.

This process and the general theory behind it are common across all digital cameras and devices whether they are used for astrophotography or just general photography.

We will take a more in-depth look at sensor details later but for now this should give you an idea of how light is converted into a digital signal.

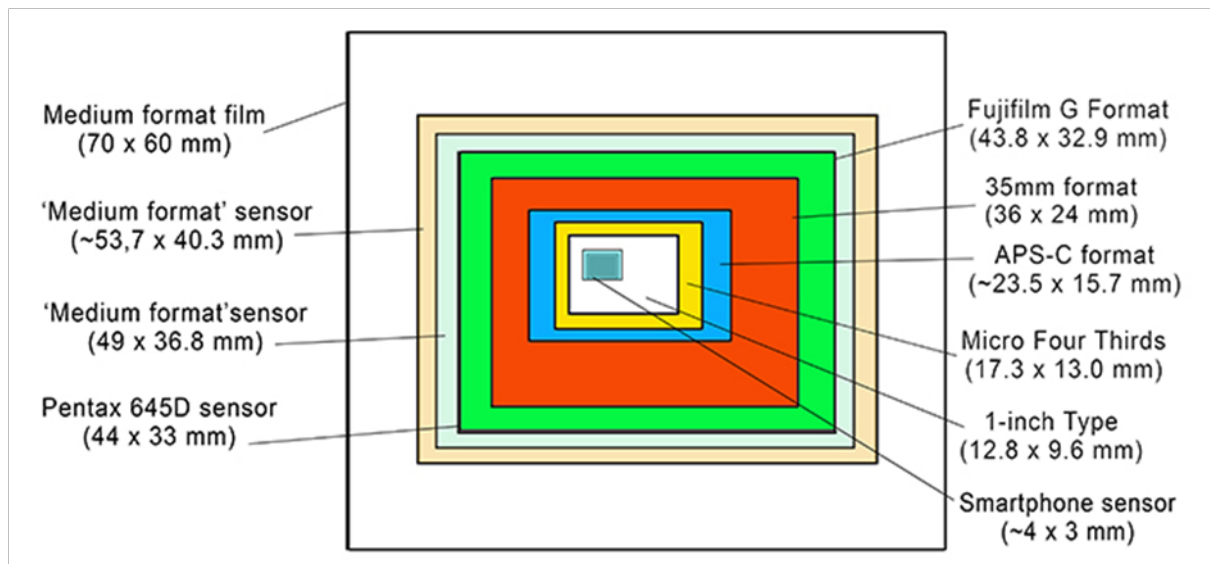
Sensors come in varying shapes and sizes and if you are browsing the pages of any astrophotography magazine you will see a maze of information and specifications. Let's look at some basics:

Sensor Size

Sensors come in a variety of sizes and types and will very much depend on the brand and style of camera and it will come as no surprise that the larger the sensor, the bigger the associated dollar value! They also vary depending on application as planetary cameras generally have smaller sensors with faster speeds than sensors designed for deep space imaging. Common deep sky astro imaging cameras use larger sensors known as APS-C or Full Frame. These relate to the size of a 35mm film equivalent.

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[A Beginners Guide to Astrophotography – Part 1 \(cont\)](#)



APS-C sensors for example have a physical size of 28.7mm x 19mm whereas a Full Frame sensor is 36 x 24mm. Planetary cameras will have much smaller sensors as they are only interested in capturing light from a planet over a much smaller illuminated area from a telescope and can measure much smaller in size.

Resolution and Pixel Size

You will also see terms used like MPX and pixel size. A Megapixel or (MPX) equates to one million pixels and the resolution of digital cameras are often measured this way. For example, a 24-megapixel camera can produce images with 24 million pixels. That's a lot of very small pixels crammed into a small sliver of silicon!

One specification of interest to astro imagers is pixel size. For now, it's worth to note that if you have an APS-C sensor and a 24 MPX camera then that's a lot of pixels to cram into something that measures 28 x 19mm. This means that each pixel is only 3.9 microns (3.9 millionths of a metre) in size.

There is some interesting relationships between the characteristics of a telescope, the pixel and sensor size. We will cover these off in future chapters of this guide.

Lens Basics

To focus the light from our object onto that small sensor area we need an optical system in front of it. Most modern cameras use a proprietary system specific to that brand and are not usually interchangeable between brands. It's also worth noting that for some cameras like mirrorless ones, lenses can also be specific to the type of sensor too! It's a very confusing world and quite an expensive one too! Good glass for astro imaging does cost. But don't despair, as a newcomer you can use the lens supplied with the camera or buy a cheap add-on lense to start with.

We will cover off more about lenses in future sections of these guides but for now we will suggest that for Milky Way images that cover wide areas of the sky then a wide-angle lens is a good option.

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[A Beginners Guide to Astrophotography – Part 1 \(cont\)](#)

You can start with the kit lens but usually a lens of around 12-14mm focal length is a good option for wide angle astrophotography but as stated above you can start with what you have.



You will also notice that a camera lens will be identify by an f number. This is the focal ratio number and the ratio of focal length to the diameter of the clear aperture.

I say clear because remember that a photography lens has a set of blades that forms a small hole almost circular in shape – this dictates the aperture, and these can open and close to let more or less light onto the sensor. This is an important concept as you will often hear terrestrial photographers talking about ‘stopping down’ (close) or ‘open up’ (widen) their aperture.

Lenses and telescopes are always identified by their optical ‘speed’ – faster lenses and telescopes gather more light than slower ones but generally have a wider field of view (how much sky it can cover)

whereas longer focal lengths are in general slower optically but cover a much narrower area of sky. We will cover this off in more detail later.

Lenses are usually marked with this f number and is in indication of how much light the lens will focus on the sensor given the field of view. Smaller f numbers indicate wide and faster optics than those with larger f numbers.

Of course, a telescope is a form of lens and there is a similar relationship to a camera lens and we will cover this off too in future chapters of this guide.

Storage Basics

Most modern cameras will store their images on some form of memory this can be internal or on a card that you can insert into the camera. Internal memory can be quite cumbersome as you will find it difficult to transfer images for further processing on a PC unless you connected the camera via Wi-Fi or cable. So, having a removable memory is a much easier option for data transfer. There are a couple of main memory card standards in use, these are: SD Card or CompactFlash.

Both these are widely available with SD Card being the more common format for consumer grade devices. They are relatively cheap as well-meaning you can buy a few of them for different projects and most cameras allow the storage of settings on the card too. Quite handy if you share the camera with the family!

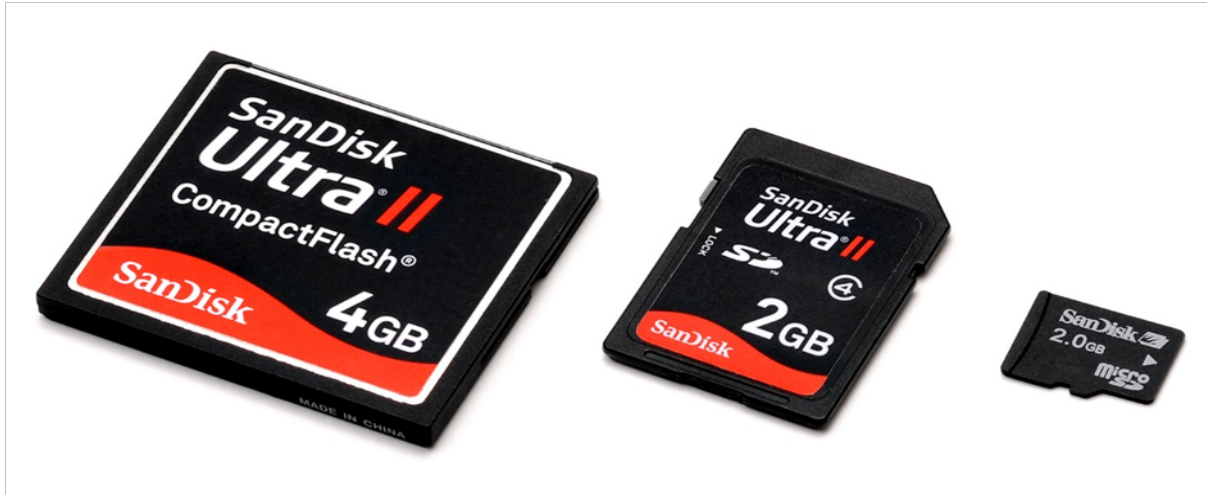
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[A Beginners Guide to Astrophotography – Part 1 \(cont\)](#)

Some PCs' have an SD Card slot that you can directly insert the card into, and some card vendors include an adapter in the box with the card.

It's worth checking as an SD Card to USB adapter is very handy!

Purchase a good brand of card and one with a reasonable capacity. Taking 100's of images over a night doing deep sky photography with a larger resolution camera can really eat into card space!



We will cover off the needs for planetary and solar imaging later, but these are usually stored on a PC fixed storage disk due to the speed in which they are recorded and the size of the files.

Practical Lesson 1

Use your home digital camera to take a picture of the night sky

In the first of our practical lessons, we will look at how we will take a single shot of the night sky using your digital camera and a basic lens.

To get started I recommend you download and read my user guide:

Introduction to Astrophotography with a DSLR

<https://cas.org.nz/downloads/download-info/introduction-to-astrophotography-with-a-dslr>

You can download this from the CAS website (you have registered, haven't you?

Look under the **CAS Resources**



menu tab and the **Document Library** drop down menu for the file area and download it. It's in PDF form so works on phones, tablets and PC.

The guide will help understand what settings you need for your camera for night-time photography and some basics of getting out under the night sky to image.

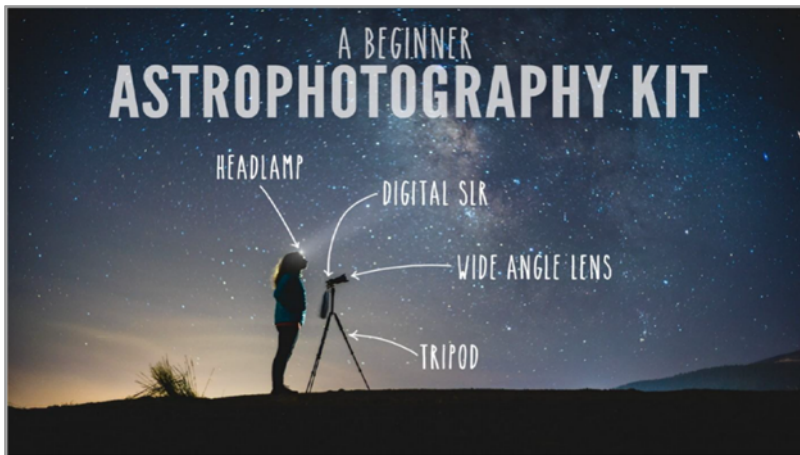
Do your setup in the daytime and prepare for your imaging session under the stars, making a note about tips for safety and comfort before leaving home if you need to find a dark place to image from.

Cont next page

[A Beginners Guide to Astrophotography – Part 1 \(cont\)](#)

Choose a clear night, preferably with little or no moon to ensure best results and find your dark sky spot to image from (the CAS terraces are a great place!).

If you have a tripod, then it's recommended to use that to mount your camera on or find a stable surface such as a fence post. Even the top of the car with a bean bag is good, but don't try drive that up the observatory terraces!



With the camera pointing south and elevated so you can 'see' the Milky Way, take a 30 second exposure of the night sky. You can try different ISO settings and exposure lengths, but the aim is to keep things simple. Don't worry about multiple images or post processing at this stage!

We will cover this off in a future practical session at CAS. Get used to operating your camera in the dark, focusing for example can be quite a challenge, so read the guide and practise in the daytime first.

Competition Time

During this winter season we invite you to get out and take your first astro images. At the end of the season in October we will judge the entries and award some prizes for best adult and junior member's image. This competition is only for newcomers not yet imaging or only just starting imaging.

Images may be submitted by logging into the website. Follow the My Gallery menu drop down found on the My Account tab. Use the Post Image button and choose Competition as the gallery type.

CAS Calendar Image Submission

For the old hands our calendar submission is already open for entries. You can go to the CAS site and submit your entries. We will select the best images in August and the top 12 will appear as image of the month on next year's calendar. Lucky winners will each receive a calendar as a prize.

Images may be submitted by logging into the website. Follow the My Gallery menu drop down found on the My Account tab. Use the Post Image button and choose Calendar 2021 as the gallery type.

New Zealand Astrophotography Competition From RASNZ enewsletter

The 2021 New Zealand Astrophotography Competition is now open for entries.

This year's competition will be judged by Robert Gendler, Robert is arguably one of the top deep sky astrophotographers in the world, he specializes in images of deep sky objects with very long exposure times.

For more information on our judge please take a look at his work on his website at <http://www.robgendlerastropics.com/>

The competition has three main categories deep sky, nightscape and solar system, last year we introduced a new time-lapse category but this year we have decided to tweak the rules of this new category so make sure you read over the rules and conditions of entry before submitting your entries. See below.

As in previous years the competition is sponsored by the Australian Sky & Telescope magazine, with a free 12 month subscription to their fine magazine to the winners of the nightscape and deep sky categories, as well as having their images printed in the magazine.

We are also lucky to be sponsored by Celestron Australia who are providing a \$500 Celestron Australia Voucher to be spent on the Celestron Australia Website for the winner of the Deep Sky Category.

And sponsorship from Sky-Watcher Australia who are sponsoring the overall winner of the competition with a \$500 NZD Sky-Watcher Australia Voucher to be spent on the Sky-Watcher Australia Website.

Astronz are sponsoring the Solar System category with a \$300 Astronz gift voucher, Astronz is easily New Zealand's best known and most trusted supplier of Astronomical equipment.

The Auckland Astronomical Society will also provide a cash prize for each category winner.

The competition cutoff date is the 21st of September and the competition awards will be announced at the annual Burbidge dinner which is the Auckland Astronomical Society's premier annual event, keep an eye out on the society website for details on the forthcoming Burbidge dinner.

Conditions of entry and entry forms can be downloaded from the Auckland Astronomical Society website here at <https://www.astronomy.org.nz/announcing-the-2021-new-zealand-astrophotography-competition-for-the-harry-williams-trophy/> "

-- From Jonathan Green, Director of the RASNZ Astrophotography Section, for the Auckland Astronomical Society.

TABLE OF SOUTHERN METEOR SHOWERS 2021

Shower	Dates		Moon	Peak Rate	RA	Dec	Near Star
	Active	Peak	2021				
Centaurids	Jan 28 - Feb 21	Feb 8	3 days after Last quarter	5 (-25)	14.1	-59	β Cen
gamma-Normids	Feb 25 - Mar 22	Mar 13	New moon	8	16.6	-51	γ Nor
pi-Puppids	Apr 15 - Apr 28	Apr 23	3 days after First quarter	var to 40	7.3	-45	σ Pup
eta-Aquariads	Apr 19 - May 28	May 5	1 day after Last quarter	60	22.5	-1	η Aqr
Pisces Austrinids	Jul 15 - Aug 10	Jul 27	3 days after Full moon	5	22.7	-30	α PsA
alpha-Capricornids	Jul 3 - Aug 15	Jul 30	2 days before Last quarter	4	20.5	-10	α Cap
Southern delta-Aquarids	Jul 15 - Aug 25	Jul 27	5 days before Last quarter	20	22.6	-16	δ Aqr
Southern iota-Aquarids	Jul 25 - Aug 15	Aug 4	3 days after Last quarter	2	22.3	-15	ι Aqr
Northern delta-Aquarids	Jul 15 - Aug 25	Aug 13	3 days before First quarter	4	22.3	-5	θ Aqr
Northern iota-Aquarids	Aug 11 - Aug 31	Aug 19	3 days after First quarter	3	21.8	-6	β Aqr
Piscids	Sep 1 - Sep 30	Sep 19	2 days before Full moon	3	0.3	-1	λ Psc
Orionids	Oct 2 - Nov 7	Oct 21	Full moon	20	6.3	+16	γ Gem
Leonids	Nov 14 - Nov 21	Nov 17	2 days before Full moon	100+	10.2	+22	γ Leo
alpha-Monocerotids	Nov 15 - Nov 25	Nov 22	3 days after Full moon	var to 5	7.9	+1	δ Mon
Pheonids	Nov 28 - Dec 9	Dec 6	2 days after New moon	var	1.2	+53	Achernar
Geminids	Dec 7 - Dec 14	Dec 14	3 days after First quarter	120	7.3	+33	Castor

2021 Conference and RASNZ Centenary

NEW DATES SET FOR 2021 CONFERENCE

After the 2020 planned RASNZ Conference was postponed then changed to an online presentation due to Covid-19 restrictions,

RASNZ has announced

Planning is underway to hold our AGM and Conference over the weekend of 9 to 11 of July 2021 in Wellington.

Please send your suggestions to the SCC at conference@rasnz.org.nz.

Conference registrations and more information at www.rasnz.org.nz

The Evening Sky in June 2021

Venus is the brilliant 'evening star' appearing low in the northwest soon after sunset. It sets an hour after the Sun at the beginning of the month; two hours after the Sun at the end. (It sets before 8 pm so isn't shown on the chart.) In a telescope Venus is a small white disk. It is on the far side of the Sun from us, 230 million km away, slowly catching up. The Moon will be near Venus on the 12th.

Mars is in the northwest at dusk. It is a little fainter than the brightest stars around it so its reddish colour might not be obvious. It sets soon after 8 pm. It is 350 million km away mid-month, so tiny in a telescope.

Saturn rises in the southeast in the later evening, around 10 pm at the beginning of the month; around 8 at the end. It is the only bright 'star' in that empty region of sky. It is followed by **Jupiter** less than two hours later (so not on the chart). Jupiter is much brighter than Saturn and shines with a steady golden light. It is the brightest 'star' in night sky. By dawn Jupiter and Saturn are northwest of the zenith. The Moon will be near Jupiter on the night of June 1-2. At the end of the month the Moon is near Saturn on the 27-28th and near Jupiter on the morning of the 29th.

Sirius, the brightest true star, appears in the west soon after sunset. It sets in the southwest around 9 pm, mid-month, twinkling like a diamond. Sirius appears bright both because it is 20 times brighter than the sun, and because it is relatively close at nine light years*. **Canopus**, the second brightest star, is in the southwest. It is a truly bright star, 310 light years away and 13,000 times brighter than the sun. Canopus is a 'circumpolar' star: it circles the South Celestial Pole (SCP on the chart) clockwise but never sets from Aotearoa/NZ.

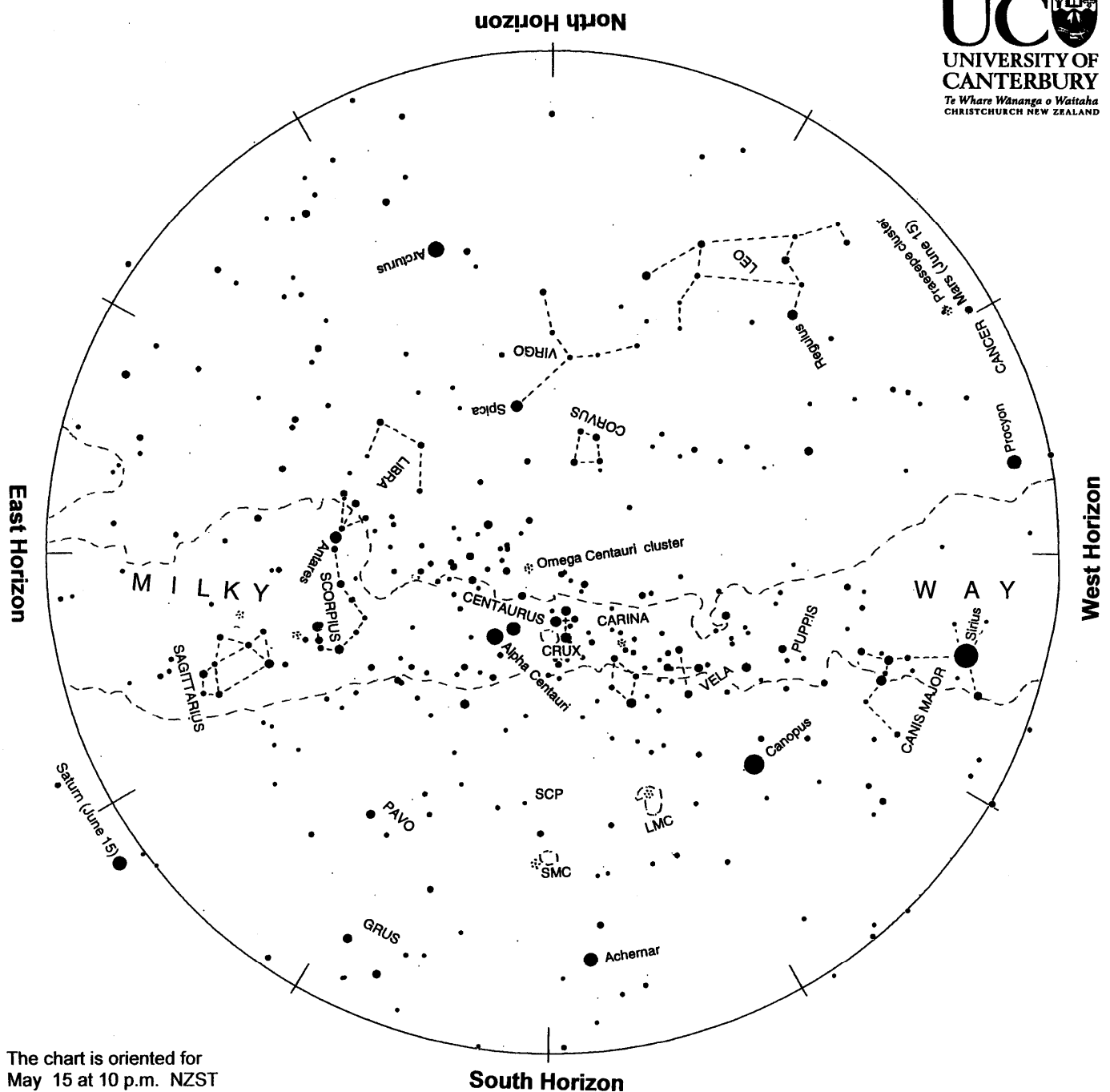
Arcturus is the brightest star in the north sky. Its orange light is often split into red and green when it is low in the sky. Arcturus is relatively close at 37 light-years from the Sun. It appears bright because it is 170 times brighter than the Sun. It is the same mass or weight as the Sun but is much older, around 7.1 billion years old. The Sun is 4.5 billion years old. Arcturus has used up the hydrogen fuel in its core and is now converting helium into heavier elements. The hotter core has made the star expand into a red giant, 25 times wider than the Sun. The Sun will evolve in the same way in about three billion years.

Crux, the Southern Cross, is south of the zenith. Beside it, and brighter, are Beta and **Alpha Centauri**, often called 'The Pointers' because they point at Crux. Alpha Centauri is the closest naked-eye star, 4.3 light years away. Beta Centauri and many of the stars in Crux are hot, extremely bright blue-giant stars hundreds of light years away.

Orange **Antares**, high in the eastern sky, marks the body of Scorpius the scorpion. It is a red giant star: 600 light years away and 19 000 times brighter than the sun. The scorpion's tail, upside down, curves off to the right. Below Scorpius is **Sagittarius**, its brighter stars making 'the teapot'. The **Milky Way** is brightest and broadest in the southeast toward Scorpius and Sagittarius. It remains bright but narrower through Crux and Carina then fades in the western sky. 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. A scan along the Milky Way with binoculars will find many clusters of stars and some glowing gas clouds. Relatively nearby dark clouds of dust and gas look like holes and slots in the Milky Way. The dust, more like smoke, comes from old red-giant stars like Antares. These clouds eventually coalesce into new stars.

The Clouds of Magellan, **LMC** and **SMC**, in the lower southern sky, are luminous patches easily seen by eye in a dark sky. They are two small galaxies about 160 000 and 200 000 light years away. The Large Cloud is about 5% of the mass of the Milky Way; the Small Cloud is about 3%.

*A **light year (l.y.)** is the distance that light travels in one year: nearly 10 million million km or 10^{13} km. Sunlight takes eight minutes to get here; moonlight about one second. Sunlight reaches Neptune, the outermost major planet, in four hours. It takes sunlight four years to reach the nearest star, Alpha Centauri.



The chart is oriented for
May 15 at 10 p.m. NZST
June 1 at 9 p.m. "
June 15 at 8 p.m. "
July 1 at 7 p.m. "

Evening sky in June 2021

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 westward shift each night as we orbit the sun.

Brilliant Venus appears low in the northwest soon after sunset but sets before 8 pm so isn't on the chart. Mars is low in the northwest but faint. It sets soon after 8. Sirius, the brightest true star, twinkles colourfully in the west. Canopus is in the southwest. South of overhead are the Pointers, Alpha and Beta Centauri, with the Southern Cross (Crux) to their right. Orange Arcturus, is low in the north, often twinkling red and green. Saturn appears in the empty sky in the southeast. It rises before 10 at the beginning of June; before 8 at the end. It is followed by Jupiter, much brighter.

CAS COMMITTEE AND OFFICERS 2021/2022

Public Nights and Group Bookings		bookings.liaison@cas.org.nz
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Vice President:	Simon Lewis	vice.president@cas.org.nz
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	Kerien Edan	member4@cas.org.nz

For more specialized information please see the contact information page on www.cas.org.nz

CAS Contact Information

Canterbury Astronomical Society Inc.

PO Box 25-137

City East

Christchurch 8141

Web: www.cas.org.nz

Canterbury Astronomical Society Facebook Group:

www.facebook.com/groups/CanterburyAstronomicalSociety

West Melton Observatory: 43° 29' 55.5" S, 172° 20' 59.0" E 218 Bells Road, West Melton

CAS Members Meetings:

The *CAS monthly members* meetings are currently held from 7.30pm onwards every third Tuesday of the month (except December and January) at the University of Canterbury, Room ER225 Ernest Rutherford Building (2nd floor)

CAStronauts Meeting's are 6.30-7.30, in the same venue on the same night (3rd Tuesday of the month)

Any member of the public who is considering in joining the society are most welcome to attend the meetings.

Members Nights at the Observatory are detailed on our website

Observatory Members Nights:

Cas holds these nights as follows

Members Nights (Training) on the 1st Saturday of the month

Members Nights (General) on the 3rd Saturday of the month after the Tuesday Members meeting at UC, (be aware some months it is the 4th Saturday, depending on the start of the month) check the website for details

CAS on Facebook:

Cas has a Facebook presence, Useful to keep up to date with events, interesting articles, asking for advice, For members please use the website forums for more detailed information etc

CAS Membership:

Subscriptions are due 1st April each year

Fees for current members shown on the membership form included on the back page of your Casmag,

Full details are included on our website.

Contributions to CASMAG:

Member contributions to CASMAG are always most welcome (letters, observing notes, articles, news)

Please submit articles by email to editor@cas.org.nz

The deadline for each issue is the 1st of each month

Small personal advertisements are free to financial members, (less than 8 lines in a column)

Charges for larger items range from \$5 to \$40, email the editor for more details.

The Constitution of The Canterbury Astronomical Society Inc:

This is available on request, Please ask for a copy if required

DISCLAIMER:

This newsletter is for general information purposes only. The views expressed herein are not necessarily those of the Canterbury Astronomical Society Inc (CAS)

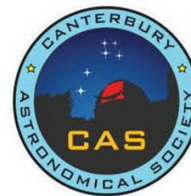
CAS has taken all reasonable measures to ensure that the material contained herein is correct, but gives no warranty for, and accepts no responsibility for its accuracy or completeness.

Readers are advised not to rely solely on this information, and should seek independent advice before making any decision, CAS reserves the right to make changes at any time, as deemed necessary.

Canterbury Astronomical Society Inc

APPLICATION FOR MEMBERSHIP

To: Membership Secretary
Canterbury Astronomical Society Inc.
P.O.Box 25-137
City East
Christchurch 8141



Applicants Name in Full _____

Address: (Note a P.O.Box is NOT a legal address) _____

Home Phone: _____ Cell Phone: _____

Email: _____ Date of Birth: (if under 18) _____

Membership Category (tick, subscripton must accompany application)**Online Banking Details (Please identify your payment):** 03 0802 0098273 00

<input type="checkbox"/>	Adult (any person 18years of age or over who is not eligible for any other category)	\$70
<input type="checkbox"/>	Family (two or more persons living at the same address)	\$105
<input type="checkbox"/>	Junior (under 18 years of age on 1st April in the current year)	\$35
<input type="checkbox"/>	Senior (over 65 Years)	\$35
<input type="checkbox"/>	Community Services Card Holder	\$35
<input type="checkbox"/>	Student (any person studying full-time at a tertiary instition, must reapply annually)	\$35
<input type="checkbox"/>	Corporate (members have voting rights of one member, but cannot take office)	\$210

Name:	Date of Birth(if Under 18yrs)	Signature

All CAS members receive CASMAG a monthly newsletter, Would you prefer to receive this (please tick)
☐ by email as a PDF attatchment ? ☐ or by post as a hard copy?

Do you have access to a telescope? What type and size? _____

I the undersigned declare that the information given herein is true.

Signature: _____ Date: _____

By signing this application the applicant agrees to comply with the Constitution and By-Laws
of the Canterbury Astronomical Society Inc.

Date Approved: _____