Southern Skies

ASSA Observing Section Quarterly

March 2022 (3rd Edition)

Summer observations (The "Comet" edition) – welcome to the 3rd Edition of the ASSA Observing Section Quarterly

The third edition of the Southern Skies Quarterly was made possible with observations and images submitted during the last 3-4 month period.

Despite volatile weather, several observations for this period have been showcased including a number of sections dedicated to Comet Leonard C/2021 A1. There is also a review on the Celestron NexYZ Smartphone adapter included in this edition.

Comet Leonard C/2021 A1 captured from South Africa by Oleg Toumilovitch (Johannesburg South Africa) on the 23 Dec 2021.

Oleg shared his experience with us, "At 17:37 UT, I aimed my telescope at the comet and noticed that it appeared to be much brighter and larger than I was expecting it to be. For a moment I thought something was wrong with the focussing, but after the first image was taken, I realised that the comet was experiencing quite a dramatic outburst, which had probably started just a couple of

hours if not minutes earlier. This outburst apparently wasn't reported by other observers before the time I've acquired the image. I alerted two friends about it, but unfortunately, they weren't observing on that evening."

Have a look at additional images captured by Oleg under the Gauteng section of this Newsletter.

A reminder on the approach and how to contribute

Every 3 months the Quarterly will be published on the ASSA website and shared on various social media platforms. Members of ASSA and the general public can submit written observations, images, stories and questions by sending them to: **Observing@assa.saao.ac.za** They may then appear in future editions of this publication. There will also be fun competitions from time to time, reviews on telescopes (and other astronomy gear) and public events.

Please visit the ASSA website https://assa.saao.ac.za/ to learn more about the society. More specifically, pay a visit to the observing section https://assa.saao.ac.za/how-to-observe/ to discover how to observe the various wonders in our skies.

We decided to refer to this edition as the "Comet edition" given how many astronomers made the effort to observe and image Comet Leonard C/2021 A1 in between clouds and haze. In the end, several visual observations were made accompanied by some beautiful images of this amazing visitor. Tim Cooper has provided an informative article which is included as our opening feature below:

National News: Comet Leonard C/2021 A1, Comet C/2017 K2 (PanSTARRS) and the upcoming Eta Aquariids Meteor Shower (by Tim Cooper)

Firstly a short tutorial about the nomenclature of comets. Long period comets, with periods longer than 200 years, have a designation followed by their name in parentheses. So with comet C/2021 A1 (Leonard) the designation is C/2021 A1, and the name of the comet is Leonard. The name is that of the discoverer, in this case Greg Leonard. When describing a comet always use the designation and name together, never just Comet Leonard. Why? Because Greg Leonard has already discovered several comets, and this was his 13th Comet Leonard. Sometimes comets are discovered by automated search instruments, such as LINEAR, NEAT, ATLAS, ISON or PanSTARRS. In that case the name is that of the instrument, which is capitalised as shown. So the comet which will be visible in the coming months will be C/2017 PanSTARRS. Short period comets, with periods less than 200 years, are designated with a number followed by P, and the name of the comet. So Comet Halley should always be referred to as comet 1P/Halley, and comet 191P/McNaught should never be referred to simply as comet McNaught, as Rob McNaught has so far discovered 82 comet McNaughts!

Comet C/2021 A1 (Leonard)
This comet put on a fine show during December 2021 and into the New Year. It was expected to reach about magnitude 5 or slightly brighter, visible in binoculars and perhaps to the naked eye under dark skies. In the event it outperformed expectations, and near perihelion it underwent several outbursts in activity. At its peak it reached magnitude 3.5, was visible to the naked eye, and sported a fine tail, the ion tail sometimes showing several knots and kinks, as well as a disconnection event, when the ion tail breaks away from the head, and subsequently reforms.

There were also many images taken showing a characteristic blue coma, particularly on the sun-facing side. This colour is caused mainly by fluorescence of the molecule C_2 (diatomic carbon) which

is formed from dissociation of simple organic compounds under the influence of solar radiation when the comet is near the sun.

After perihelion the comet faded quickly, and will soon be ejected from the solar system, never to return. Note: If you missed comet C/2021 A1 (Leonard), there is another comet coming which might become visible in binoculars in the next period. Comet C/2017 K2 (PanSTARRS) should become visible around June, and remain visible well into 2023, giving us several months to observe. We'll talk about this comet in more detail in the next issue of Southern Skies.

Image by Tiaan Niemand on 28 December 2021 showing the filamentary ion tail and blue coma.

Image by Angus Burns on 29 December 2021 showing the comet with a fine tail and central spike

Image by Kos Coronaios on 4 January 2022 showing the appearance of the comet as seen without optical aid from a dark sky.

Eta Aquariids meteor shower

Meteors are the debris left behind as comets round the sun. They are the dust particles released from the nucleus of the comet as ices sublimate under the effects of the sun's radiation. If the earth crosses the debris stream of a comet then a shower of meteors may occur if the comet was active in that part of its orbit. The eta Aquariid meteor shower in May is one of two meteor showers for which comet 1P/Halley is the parent, the other being the Orionids in October.

The eta Aquariids are the most active of the southern meteor showers; in fact the radiant is virtually on the celestial equator. They produce good rates of fast meteors (entry speed 66 km/sec) during the first week or so in May, with maximum generally occurring around May 5 or 6. The Zenithal Hourly Rate (ZHR), which is the number of meteors you could expect to see with the radiant at the zenith and under skies where magnitude 6.5 stars are discernible, is generally around 50-60 meteors per hour. Where the radiant is lower, or under poorer skies, the observed rate will be lower. In some years, where Earth crosses a rich filament of particles, rates may be much higher, as was the case in 2013 when the ZHR exceeded 100 per hour.

The radiant is only really high enough in the last two hours before dawn, when it reaches an altitude of about 45 degrees before twilight interferes. Observe on the mornings of May 4-8 to give yourself the best chance of witnessing activity at its peak. The radiant is close to the Water Jar asterism in Aquarius. Finding the radiant this year will be made easier due to the proximity of Saturn, Mars, Jupiter and Venus in the East, and to the right of the radiant. The moon will not interfere at all this year, so observing the eta Aquariids in 2022 is about as good as it gets. Let's hope for a good show!

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A map showing the location of the eta Aquariids during May 2022 – something to look out for! (map prepared using Stellarium version 20.1)

A huge thank you to Tim Cooper for this fascinating submission and a heads up to our readers that a detailed account of Comet Leonards visit has been submitted to MNASSA and will appear in this esteemed publication shortly.

MNASSA is a registered, peer-reviewed journal, with an ISSN number, and is referenced by and searchable in various academic databases. It is an excellent place for publishing ASSA's work, which can then be properly cited in subsequent publications.

The link on the ASSA website is https://assa.saao.ac.za/about/publications/mnassa/ and provides more info about back copies and where to send contributions to

Please also note that ASSA has revitalized the Comet, Asteroid and Meteor (CAM) Section with Tim Cooper as the very capable lead in this space. Please visit the newly updated page and section notes at:

https://assa.saao.ac.za/sections/comet-asteroid-meteor-section/

https://assa.saao.ac.za/about/publications/cam-notes/

From The Free State

Lafras Smit from Heilbron sent us this image of Comet Leonard. He observed and photographed the Comet on a static tripod (200 x 2 second exposures with a Canon 90 D and 200mm lens f/2.8) over December 2021

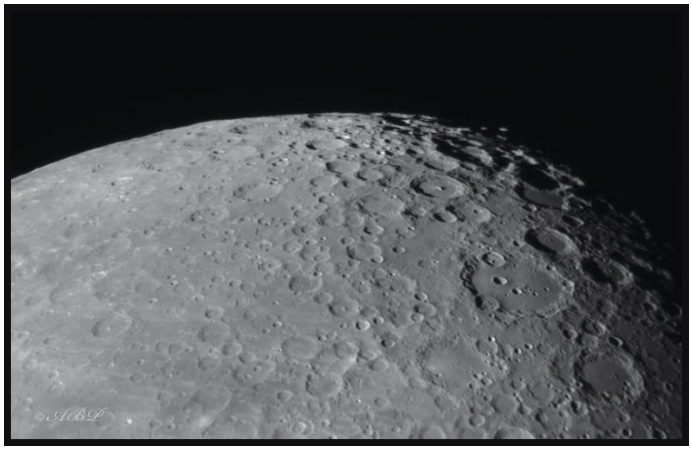
From KZN

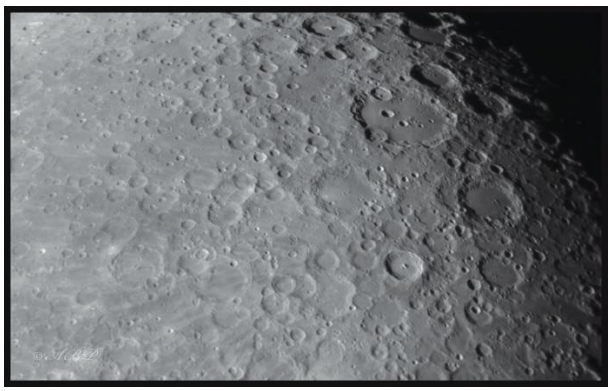
A typical scene from Northern KZN over the last few months – volatile weather made observing and imaging a challenge on many levels (image captured by Angus Burns from Newcastle KZN)




Despite the weather challenges, Angus Burns observed and imaged the Horsehead and Flame Nebulae (IC 434 and NGC 2024), Rosette Nebula (NGC 2237), Pleiades (M45) and Orion Nebula (M42) in between clouds over the months January to February 2022. He used a Redcat51 telescope and ZWO294mc pro camera mounted on a Skywatcher EQ6 Pro mount to produce these images.

Whilst observing Comet Leonard C/2022 A1 over December 2021, Angus Burns captured these images using a ZWO 294mc Pro Camera and Redcat51 telescope on a Skywatcher NEQ6 Pro mount.




Various observations and images taken of the moon by Angus Burns during January and February 2022 from Newcastle KZN using a Canon 60Da and ZWO290mc planetary camera through a Celestron SE8 Telescope.

A monochrome image of the Dolphin Nebula submitted by Gerald De Beer from Eshowe KZN. Gerald had the following to say about this image: "The Dolphin Nebula or Sh2-308 also designated as Sharpless 308 is an H II region located near the center of the constellation Canis Major, composed of ionised hydrogen. The nebula is bubble-like surrounding a Wolf–Rayet star named EZ Canis Majoris.

Unfortunately, our KZN east coast has experienced months of clouds and I have only been able to capture the OIII emission images. The nebula is rapidly getting too low in the west and the colour version will be a 2023 project.

This monochrome image is comprised of 30 x 240 second OIII narrowband exposures captured with a ZWO ASI294MM Pro cooled camera binned 2x2 using a AT127EDT triplet refractor on a CGEM I mount. The images were captured on the 3rd and 7th of March."

Thank you to Gerald for this beautiful image and accompanying information.

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From Mpumalanga

Hendrik Le Roux observed and captured this striking image of the HorseHead and Flame Nebulae over March 2022. (Captured in HOO using Astronomik NB Filters with a Skywatcher 72ED & ASI1600MM mounted on a Celestron AVX Mount and using an AsiAir+)

Hendrik also captured this beautiful image the Orion and Running man nebula during March 2022. Captured in HOO using Astronomik NB Filters with a Skywatcher 72ED & ASI1600MM mounted on a Celestron AVX Mount and using an AsiAir+)

From the Western Cape

Richard Ford sent us this image of Comet Leonard C/2021 A1 that he observed and imaged on the 1st January 2022 from Perdeberg in the Western Cape. He used a 12-inch Dobsonian Motorized Telescope/F 4.8 to produce this image.

Richard had the following to say about the comet," On the 1st January 2022 at 9pm at Perdeberg, in the Western Cape I managed to track down the comet using my 12-inch Newtonian reflector without the use of binoculars. I imaged the comet using my Canon 800DSLR camera mounted on my telescope and captured its bright long tail in moderately dark skies."

Richard also captured these images of the Crab and Eta Carina Nebula. He observed and imaged these well-known celestial objects over the 1st and 2nd of January 2022 in the Perdeberg (Western Cape) using a 12-inch Dobsonian Motorized Telescope/F 4.8.

Richard reflected on his evening of observing and imaging," On the 1st January 2022, as I was working behind my 12-inch motorized dobby, I did some deep-sky imaging and decided to capture the Crab Nebula using my Canon 800DSLR Camera at prime focus through my telescope.

The M1(Crab Nebula) is a supernova remnant and pulsar wind nebula in the constellation of Taurus. The common name comes from William Parsons, 3rd Earl of Rosse who observed the object in 1842, using a 36-inch telescope and produced a drawing that looked somewhat like a Crab.

The nebula was discovered by English astronomer John Bevis in 1731 and corresponds with a bright supernova recorded by Chinese astronomers in 1054AD."

Richard went on to say:" After midnight at 1am Sunday morning on the 2nd January 2022, as the wind completely dropped at Perdeberg, I decided to image the Eta Carina Nebula through my 12-inch motorized Newtonian reflector and used my Canon 800DSLR camera mounted on my scope for prime focus photography. Seeing conditions were extremely good that evening despite the mosquitoes flying around and bugging me that evening.

NGC 3372, known as the Great Nebula in Carina, is a large complex area of bright and dark nebulosity in the constellation Carina, and it is located in the Carina-Sagittarius arm.

The nebula is approximately 8,500 light-years away from Earth."

Thank you to Richard for this submission and information about your experiences at Perdeberg whilst pursuing your astronomy interests!

Carol Botha submitted this beautiful image produced from her efforts using online access to Slooh.

She had had the following to say about her image and approach, “As you know I do deep sky observing using Slooh - old ladies have permission to work online :-)

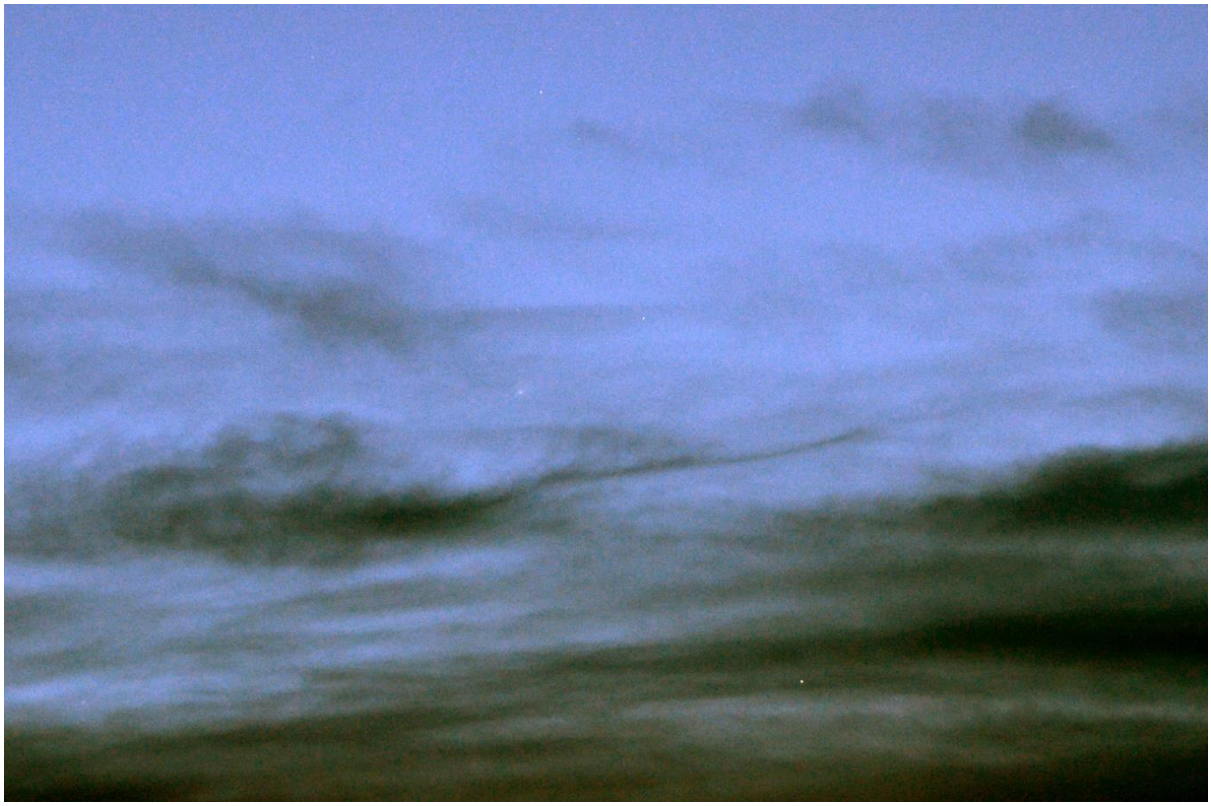
The Southern Pleiades (NGC 2602) has always been one of my favourite open clusters and is a spectacular sight through binoculars. When observed through a telescope, the brightest stars could be squeezed into the field of view of a wide angle eyepiece. To appreciate the full glory of this cluster, I feel it must be seen against the field of faint stars surrounding it. I decided to do a mosaic. I set up missions imaging different sections of the sky. The nicest surprise was when I discovered Melotte 101 in one of my 11 panels.

The Southern Pleiades is one of the BIG 5 of the African Sky - all the more reason to go out and observe this cluster.”

A big thank you to Carol for this submission! It is hoped that her mention of the BIG 5 inspires others to observe the Southern Pleiades and send us their experiences for the future editions.

From Gauteng

Oleg Toumilovitch captured one of the first South African (Southern Hemisphere) images of Comet Leonard C/2021 A1 from Johannesburg on the 16thDecember 2021 from the roof top parking of Victory Park shopping centre using a Nikon D7000 with Onyx-80 F/6.25 on a tripod (ISO-800 2/5s)



An additional image captured by Oleg Toumilovitch of Comet Leonard C/2021 A1 from Johannesburg on the 16th December 2021 from the roof top parking of Victory Park shopping centre using a Nikon D7000 with Onyx-80 F/6.25 on a tripod (ISO-800 2/5s)

Oleg captured this additional image of the comet on the 23rd Dec 2021 from his home observatory in Johannesburg.

Olegs final submission is this image he captured of Comet Leonard C/2021 A1 from his home observatory in Johannesburg using an 8”SCT and a stack of 30 images on the 24th December 2021

Clyde Foster who is ASSA’s planetary expert has been successfully observing and imaging the planets that are currently visible in the morning.

These images were captured from his observatory in Centurion and Clyde shared the following with us, “Although still a bit low in the east for optimum imaging, three of the bright planets, Mars, Venus and Saturn have been forming a lovely asterism before dawn for the last month. This will continue over the next month with Jupiter also joining in shortly, although Venus will move closer to the Sun. Mars is still very small at about 5 arc-seconds, but is already showing some of its familiar albedo features and also the extensive southern polar cap. At this size, the well-known, and rather unpleasant, Mars Edge rind effect is very noticeable, particularly at longer wave lengths (R and IR)”

International News

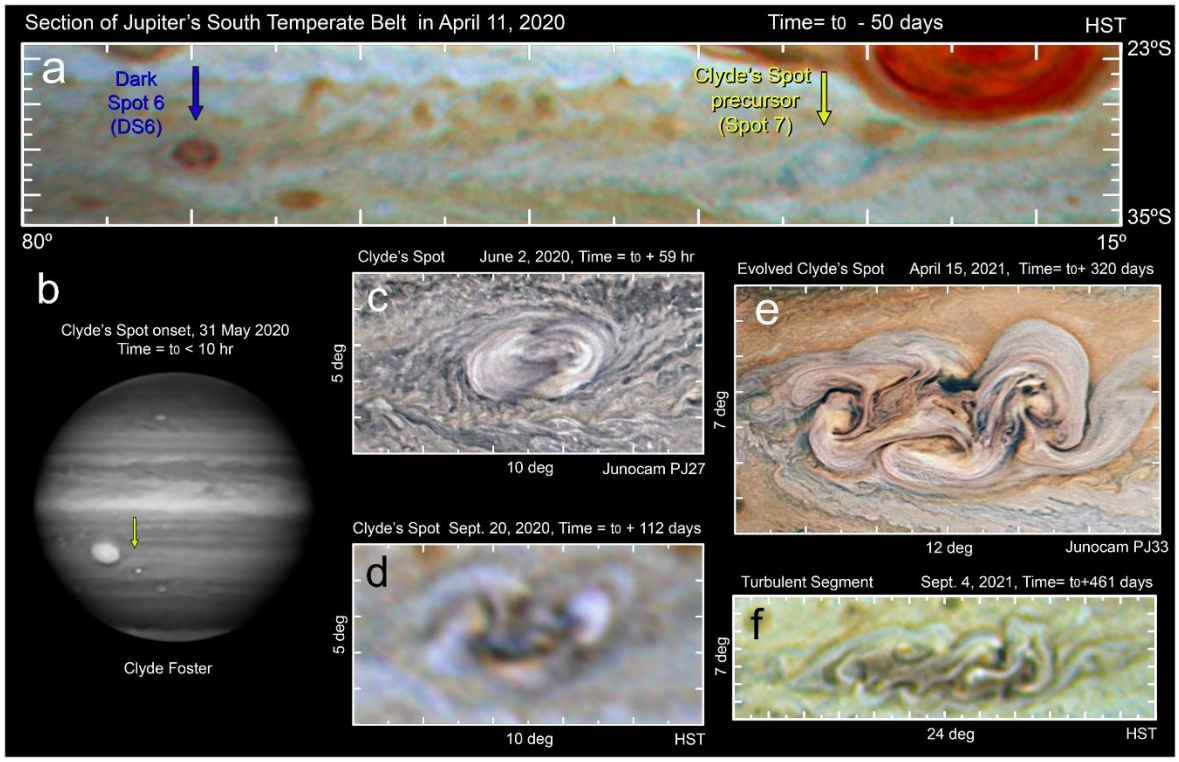


Image Credit: Convective storms in closed cyclones in Jupiter's South Temperate Belt: (I) observations, R Hueso et al, Icarus Vol 380, 1 July 2022 114994

<u>Clyde's Spot on Jupiter now recognised in formal Jovian scientific literature!</u>

Our planetary expert Clyde Foster had the following to share about this fantastic achievement:

"On Monday 21 March, I was delighted to receive confirmation that the research paper, in which I am honoured to be a co-author, heavily focused on the Clyde's Spot storm had been accepted for publication in the respected Icarus planetary science journal. The paper can be accessed openly at: Convective storms in closed cyclones in Jupiter's South Temperate Belt: (I) observations - ScienceDirect

For the best part of 2 years, Dr Ricardo Hueso and his PhD student, Peio IÑURRIGARRO, of the Planetary Science group of the University of the Basque in Bilbao, Spain, have headed research into the convective storm that I was fortunate to "discover" on Jupiter on the night of 31 May 2020, and which became generally known as "Clyde's Spot". The NASA Juno spacecraft, in orbit around Jupiter, would capture amazing images of the storm, which would attract quite broad media attention thanks to two NASA press releases ("Clyde's Spot on Jupiter" and "Juno returns to Clyde's Spot"). These Juno images would be invaluable in Ricardo's and Peio's research, but were supplemented by further images and data from Hubble Space Telescope, NASA IRTF on Hawaii and Calar Alta Observatory in Spain. And off course, the research would also make extensive use of the wonderful database of images produced by the amateur planetary imaging community. This research would result in the paper (which is pretty lengthy) that has been accepted for publication.

So many storm outbreaks on Jupiter are often short lived, and what has been remarkable is the continuous development of Clyde's Spot. We are all waiting to see the status, 2 years after the

outbreak, when Jupiter becomes observable after solar conjunction in the next few months. Before solar conjunction the last images showed the remnant of Clyde's Spot slipping below the Great Red Spot, so there may well have been some level of interaction.

Whereas I have certainly appreciated the media coverage given to Clyde's Spot, the publication of this paper has significantly more meaning to me, elevating Clyde's Spot from an informal, general interest feature on Jupiter to a storm system recognised and recorded for posterity in formal Jovian (Jupiter) scientific literature.

As an amateur, the whole experience borders on the unimaginable and I am not sure it can get much better than this!

I have to express my sincere appreciation to Dr Ricardo Hueso and the Planetary Science group of the University of the Basque, Dr Glenn Orton and the NASA Juno mission team, Dr John Rogers of the BAA Jupiter section, and the wonderful community of planetary imagers that react to, and support, any new planetary detections."

Congratulations to Clyde for this historic and amazing achievement!

You may have noticed that besides visual observations, many readers have made photographic or astrophotography submissions to the quarterly. If this interests you, please visit the astrophotography section of the ASSA website: https://assa.saao.ac.za/sections/astrophotography/

In addition, please visit https://assa.saao.ac.za/sections/deep-sky/nightfall/ to read ASSAs Nightfall publications – this detailed and professional resource provides a wealth of information.

What's up for the next 3 months

A few observing highlights to look out for over the next 3 months include:

April 2022

- 1st April 2022 - New Moon at 08h24 (a great time to observe the heavens if the sky is clear)
- 5th April 2022 - Mars will be near Saturn
- 16th April 2022 – Full Moon at 20h54

May 2022

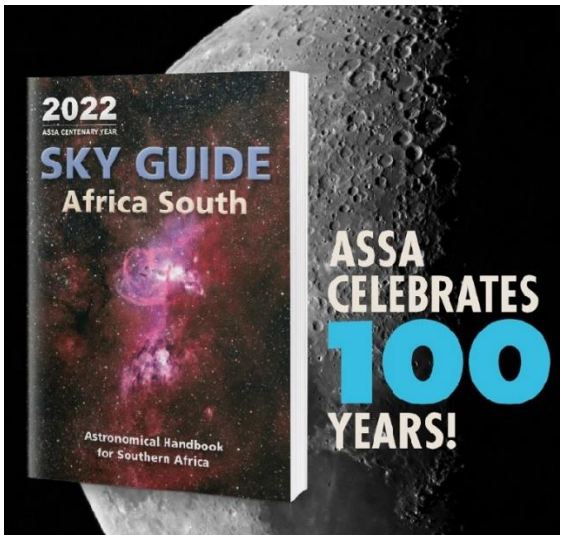
- 4-8th May 2022 – eta Aquariids meteor shower (observe in the early mornings)
- 16th May 2022 – Full Moon at 06h14
- 30th May 2022 - New Moon at 13h30 (a great time to observe the heavens if the sky is clear)

June 2022

- Look out for Comet C/2017 K2 (PanSTARRS) should become visible around June, and remain visible well into 2023, giving us several months to observe
- 14th June 2022 – Full Moon at 13h51
- 29th June 2022 - New Moon at 04h52 (a great time to observe the heavens if the sky is clear)

Now that we are into the Autumn months, the constellations Canis Major and Canis Minor are situated prominently above us shortly after dark with Orion and the Pleaides setting earlier in the evening. Scorpius also makes an earlier appearance each month as we move closer to Winter.

Please consider purchasing a SKY GUIDE 2022 which is now available! The 2022 Sky Guide is an ASSA centenary edition and is packed with useful information for astronomers.



Visit https://assa.saao.ac.za/about/publications/sky-guide/ to learn more about this indispensable publication.

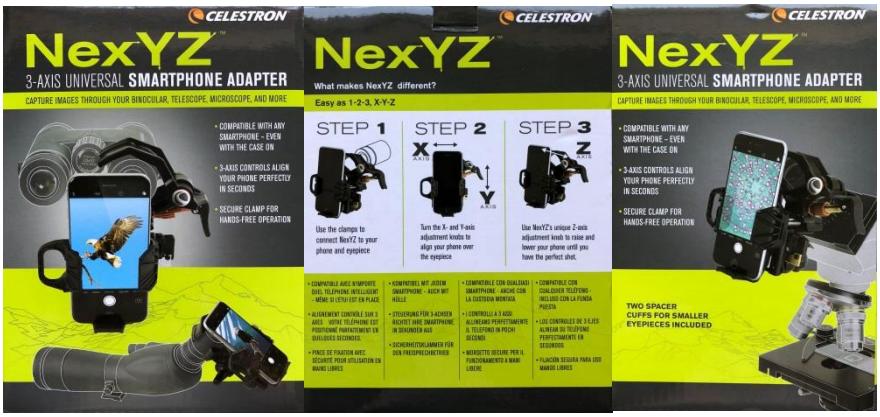
Celestron NexYZ 3-AXIS universal smartphone adapter review

If any reader would like to submit a review on a particular astronomy related product, please do contact us with your review for inclusion in the next Quarterly. Below is a detailed review of the Celestron NexYZ 3-AXIS universal smartphone adapter by Angus Burns.

I was delighted to review the new Celestron NexYZ smartphone adapter and put it through its paces under varying conditions and contexts. My approach was to consider the smartphone adapter from its packaging, instructions and construction through to its performance on a couple of telescopes with photos to illustrate what can be achieved with the adapter and a decent smartphone. I did the review over a few nights in October and November 2018

Packaging, Instructions and Construction

The NexYZ arrived in a colourful box with everything I needed to know about it captured in sufficient detail on the exterior of the box. The presentation of the device was appealing and I couldn't wait to unpack the adapter and start using it. There are additional instructions inside but the adapter is so simple to use one can figure it out within minutes of unpacking it. That being said it is worth noting that the adapter can also be used on microscopes essentially turning them into an instant digital device (thereby making it incredibly useful in the school/research context). In this regard the NexYZ is equipped with additional pieces in the box to fit it to any optical microscope.



The adapter itself is well constructed and engineered taking less than 30 seconds to attach it to the eyepiece of a telescope. I used the adapter on my Celestron SE8 optical tube assembly (mounted on a CGEM) and my Celestron Mak 90SLT goto telescope. Within minutes of setting the telescopes up I was attempting my first astrophotography session with the adaptor and my Iphone X.

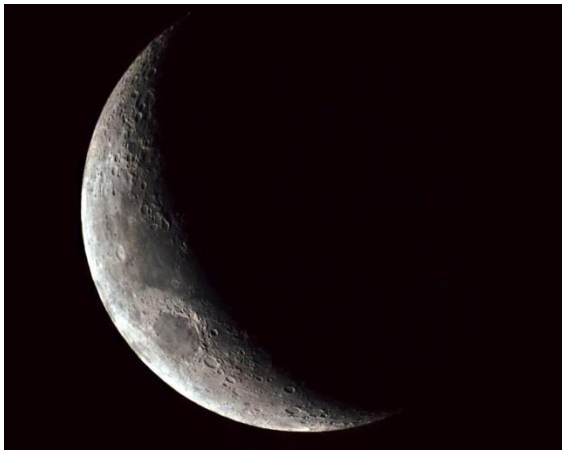
Performance of NexYZ adapter

I quite ambitiously decided to attempt a planetary imaging session as my first effort to test the adapter with my smartphone and telescope combination. Noting that the seeing conditions on the night in question were very poor due to haze and clouds, I still managed to capture a relatively clear video of Saturn through my 9mm eyepiece and SE8 OTA. After putting the video through Registax, FITS liberator and finally CC2017, I arrived at a decent image of Saturn.

Throughout the data capture the NexYZ was easy to use, made locating the planet through the eyepiece simple and there was no movement or slippage of the adapter. The entire process of videoing the planet took me less than 10 minutes from locating it with the CGEM, to positioning the smartphone correctly over the eyepiece with the NexYZ and finally recording a few minutes of data. The processing of the data afterwards took me about 20 minutes.

I then proceeded over the course of a few nights to capture a few moon images using my little Celestron Mak90 (3.5”) goto scope. In total it took me 10 minutes per setup to start tracking the moon with the telescope and then capturing images using the NexYZ adapter and my smartphone. Note: I used different eyepieces and the zoom feature on my smartphone to capture the images.

I was duly impressed with the performance of the adapter and how it makes astrophotography so incredibly simple and *accessible* to everyone with even the most basic telescope. Admittedly I only focused my efforts on planetary and lunar objects but with some practice I have no doubt that some of the brighter deep sky objects such as Eta Carina and the Orion Nebula will be able to be photographed using this adapter and a smartphone with a good photographic app on it.



As a side note I witnessed the NexYZ adapter being applied practically at a school function where various Celestron telescopes were being used to show learners the wonders of our moon and other celestial objects. The look on their faces when they were able to attach their smartphone to the telescope using the NexYZ and then produce a good image of the moon was priceless. The inspirational, learning and enrichment value of an adapter such as the NexYZ is thus beyond question.

Conclusion

The NexYZ smartphone adapter is a cleverly engineered, highly adaptable accessory that is, in my opinion essential for anyone wanting to share what they see through the eyepiece of their telescope (or microscope) with others. It is durably constructed, easy to use and has wide application for those wanting to embark on astrophotography with a smartphone as a starting point. It can accommodate any smartphone and telescope eyepiece from 1.25”-2” and can, as already mentioned fit onto any optical microscope eyepiece. Another factor to consider is that the adaptor is very well priced and affordable. My advice? Get one now and start sharing your experiences of our solar system and universe (or micro-verse) far and wide!

Note: Celestron has also produced 2 new Celestron Smartphone adapters, the NexGoDX (which is a smaller version of the NexYZ and includes a Bluetooth Shutter Release) and the NexYZ Dx (which is the same as the adapter in this review but includes a Bluetooth Shutter Release).

Until the next edition….

We hope you enjoyed the 3rd edition of the Southern Skies Quarterly. We wish all readers a productive time observing our amazing night skies as we head from Autumn into the Winter months!

Angus Burns

Director observing section (Deep and Shallow Sky)

The rising Harvest full moon (captured by Angus Burns in March 2022 – composite of 2 images combined into one). To learn why this is called the Harvest Moon and more about other heritage full moons, please visit: https://cfah.org.za/fullmoon/harvest-moon/ / https://cfah.org.za/fullmoon/