



ASTRONOMICAL SOCIETY OF SOUTHERN AFRICA

# Durban 'nDaba



Monthly Newsletter of the Durban Centre - April 2022

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# Chairman's Chatter

April 2022

Dear ASSA Members,

Our young astronomer's program is now open to schools. We are still wanting to start off with a small group consisting of no more than 10 youths between the ages of 8 and 16 years old. Unfortunately response to this has been slow.. The group will focus on the academic side of Astronomy. Should you know of someone that may fit the criteria, please feel free to contact me at [amith@astronomydurban.co.za](mailto:amith@astronomydurban.co.za) or the initiator of this program, Corinne Gill at the email address [Corinne@astronomydurban.co.za](mailto:Corinne@astronomydurban.co.za)



Following the topic of growing our young astronomers, there is a conference being offered to teachers, advocates of space and astronomy, or anyone wishing to enlighten today's youth. The INCREASING STUDENT INTEREST AND ENGAGEMENT IN SPACE EXPLORATION CONFERENCE; is being held on 27-29 APRIL 2022. This is being offered as either an In-Person or a Virtual attendance conference We have been in contact with the Director of Space Advocate of the Future African Space Explorer's STEM Academy; Sean Jacobs, who is interested in liaising with the individual schools that may be interested in attending the virtual conference. He is offering a reduced rate to schools with 10 free scholar attendees on day 3. Please contact [Corinne@astronomydurban.co.za](mailto:Corinne@astronomydurban.co.za) for further information to pass onto your schools.

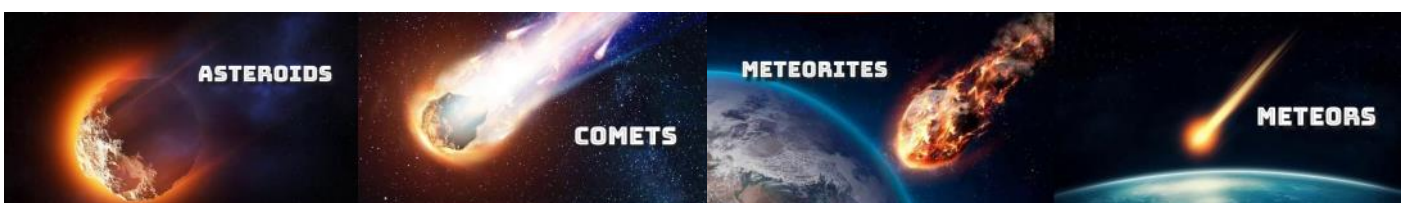
A Star Gazing event will be held jointly with the Monteseel Conservancy on 30<sup>th</sup> April 2022. We would like to request volunteers with telescopes or anyone with knowledge of the night sky to kindly assist. Please contact Sheryl at [Sheryl@astronomydurban.co.za](mailto:Sheryl@astronomydurban.co.za) to volunteer and for further information. The evening begins with Mike Hadlow giving a talk at 6pm, followed by the visitors viewing the Southern Cross, The Jewel Box cluster, Omega Centauri Globular cluster, and other astronomical delights through the equipment made available and placed at different locations. Members are invited to come along and enjoy the evening. Please refer to the poster on page 15 for more information and costs.

With our AGM is rapidly approaching on the 13<sup>th</sup> July, and we have 2 of our long-time dedicated committee members stepping down from their positions of 'nDaba Editor and Treasurer; for which replacements are urgently being sought. We are looking for members willing to take on these portfolios as well as any other members who would like to volunteer to be a committee member, therefore benefitting the society.

Nomination forms will be sent out in due course before the AGM, but you are also more than welcome to contact the committee directly to let us know your availability via email at [committee@astronomdurban.co.za](mailto:committee@astronomdurban.co.za)

As always, stay safe and wishing you all clear skies.

Amith Rajpal.



# Astronomy Delights: Her name is Virgo

By Magda Streicher

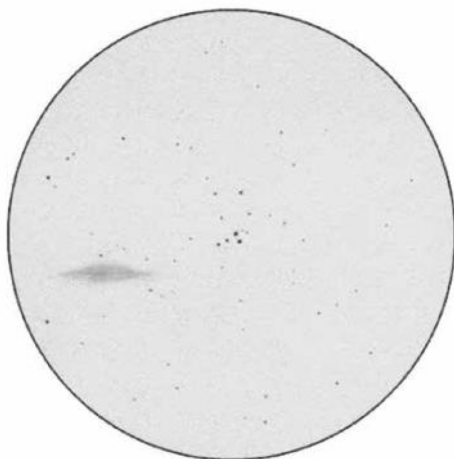
Late southern autumn is the best time to go galaxy-hunting. Not only is the Orion arm down in the west, but the Milky Way is still way down towards the east. The time slot gives us the opportunity for an intense look into the wide universe to observe the faint fuzzies, which are actually entire galaxies. You only need the use of a modest medium to larger telescope and dark starry skies. The constellation Virgo as most would agree, holds something mystical as it is filled with galaxies which are, in turn, also enveloped in a haze of unknown. Well, the truth is that the chaste young girl of the starry skies, so widely loved, was regarded as the virgin daughter of Zeus. In ancient times the importance of harvest time was reflected in the Virgo constellation, which is also referred to as the Maiden of the Harvest. The bright white coloured star alpha Virginis, better known as Spica, is said to represent the germ of the wheat grain. It is also a variable star that changes its light output every 4.1 days.



The constellation was even known as the Virgin Mary, mother of the child Jesus. Nevertheless, whichever name or myth you prefer, she holds in her lap a very rich harvest of galaxies that will keep you busy for quite some time. So, let us fire off with the Sombrero galaxy, **NGC 4594** (Messier 104), which was discovered in May 1781 by the Frenchman Pierre Méchain. M104 is possibly one of the brightest, biggest and versatile galaxies in the Virgo-Coma Super Cluster of Galaxies and is situated virtually on the



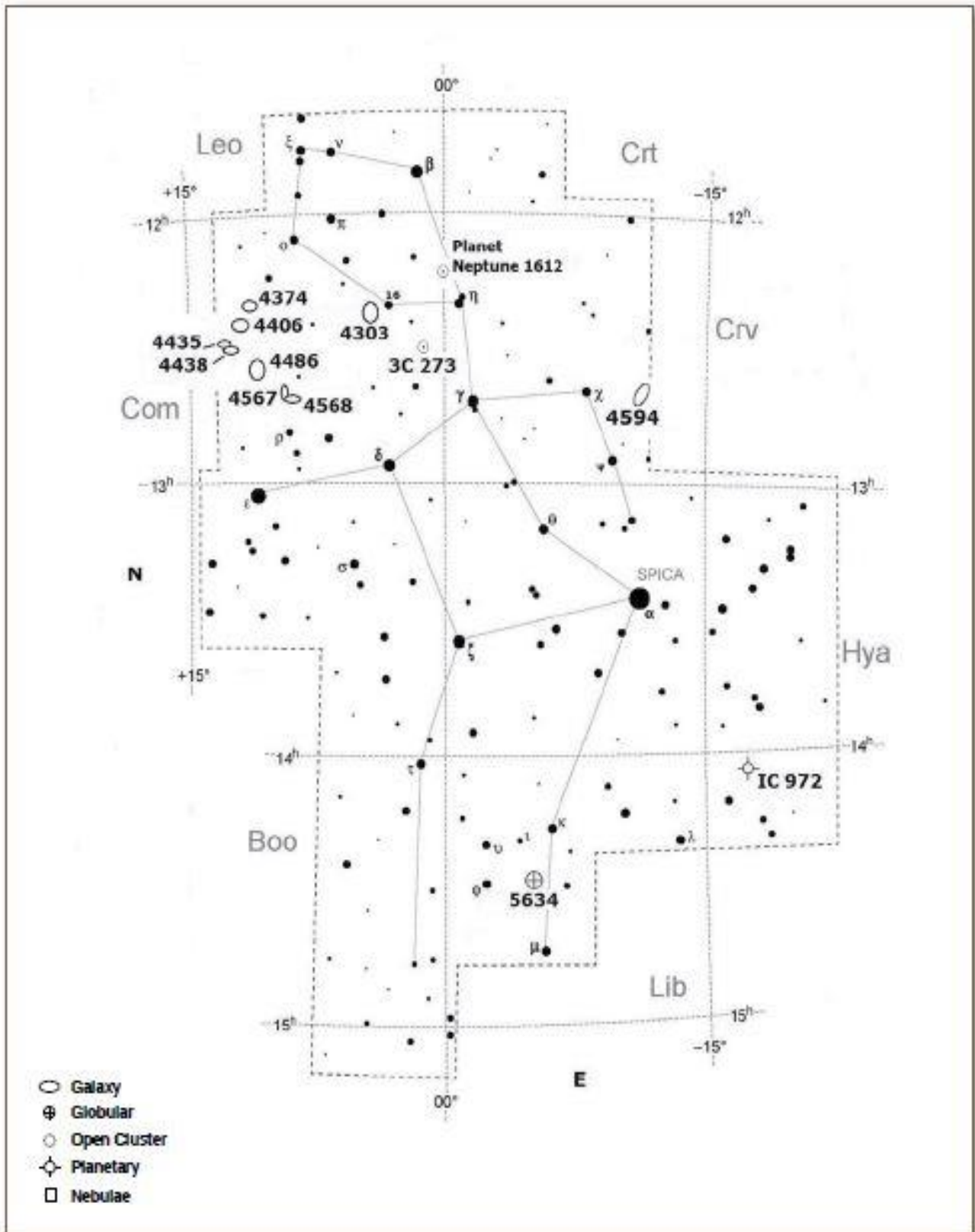
boundary between Virgo and the constellation Corvus. This bright east-west edge-on galaxy with a slight tilt of six degrees towards our point of view displays a prominent dark dust lane running through the major axis with an outstanding bulge and pointed ends. It is approximately 65 million light-years away and 135 000 light-years in diameter.



NGC 4594 - M104 Galaxy

Steve O'Meara, a well-known astronomy friend, notes that the galaxy displays a brilliant core that seems to illuminate the surrounding oval shroud from within, like a distant bonfire seen through thick fog. The sharpness of the tell-tale dark lane reveals the edge of the Mexican hat's brim. He goes on to say that with averted vision the eastern portion of the Sombrero's brim breaks up and flares into a wide brushstroke of light, which shines more brilliantly than the western portion of the brim. Obviously, Steve uses a larger telescope with high magnification in favourable dark skies, but agrees with me that the galaxy could not be described better. A very fascinating asterism nicknamed Jaws accompanies M104 only 25' towards the west.

# ...Virgo



The constellation of Virgo

## ...Virgo



ABOVE: NGC 4406 – M86, NGC 4374 – M84  
Photograph: Dale Liebenberg

Virgo is mostly popular for the Super Cluster of Galaxies situated mainly in the northern part, with the abundance overflowing into the constellation Coma Berenices. The heart of this unique area filled with several galaxies is without doubt the two elliptical star cities **NGC 4406** (Messier 86), and **NGC 4374** (Messier 84), which are only 15' apart.

At first M86 appears to be a twin to M84, with its apparently round shape, but closer scrutiny reveals a slight oval in a north-west to south-east direction with a nearly stellar nucleus. Because M86's light is spread over a larger area, it appears slightly fainter than M84,

but is in fact slightly brighter. This giant galaxy displays a bright small nucleus and a snowy frosted edge. It houses a large population of faint globular clusters orbiting the galaxy which serve as standard candles to determining galactic distances. The galaxy is about 55 000 million light-years distant, perhaps slightly closer to us than M84. Several other galaxies in the area, including M84 and M86, stretch a few degrees from northeast to south-west and have collectively been referred to as Markarian's Chain. The chain was named by the Russian Benjamin Markarian, who first noted this formation.

A very special pair of galaxies is **NGC 4435** and **NGC 4438**, situated barely 20' further east of M86. I remember very well the first time I laid eyes on this unique pair of galaxies during a visit to the Kruger National Park. At the time, listening to all the animal sounds in the dark of night, I imagined the pair to be two eyes staring back at me through the telescope eyepiece, notwithstanding the lion's roars in the distant. The southern member NGC 4438 is slightly larger, with an even surface brightness and a very hazy edge. With higher magnification a broad central concentration can be glimpsed. Although the northern member, NGC 4435, is slightly smaller, it is a tad brighter, with an outstanding stellar nucleus. Both galaxies, nicknamed The Eyes, face in a north to south direction.



ABOVE: **NGC 4435** and **NGC 4438**, Photograph: constellation-guide.com

A much talked about galaxy and one hard to miss is **NGC 4486** (Messier 87), situated another degree further south-east. It is a lovely outstanding elliptical galaxy (also known as Virgo A) with a bright nucleus. Numerous stars fill the north-eastern field of view. It is ranked as one of the largest visible galaxies with a dominant population of old stars. The nucleus contains a super-massive black hole with a strong radio-active source and a curious straight thin stream of matter and dust that contains high-energy particles racing from the galaxy nucleus at close to the speed of light. Obviously, there is no chance even to glimpse this strange ray of light, but Dale Liebenberg's photograph shows it faintly.

## ...Virgo



ABOVE: NGC 4486 – M87 and NGC 4478 (bottom right) Photograph: Dale Liebenberg

The nucleus black hole was imaged using data collected in 2017 by the Event Horizon Telescope, with a final, processed image released in 2019. In the immediate field of view many galaxies can be spotted that indicate, more or less, the center of the Virgo Super Cluster.

This is only the tip of the proverbial iceberg, yet even this leaves a stunning expression on the observer. Sometimes people shy away from observing galaxies, but careful map work and summaries of brightness will make observation considerably easier.



ABOVE: NGC 4567 and NGC 4568 Photograph: Dale Liebenberg

However, still on your way, another 2 degrees further south-east, the very interesting merging galaxies **NGC 4567** and **NGC 4568**, also known as the Siamese Twins, portray the vastness of the universe in a very special way. The American deep sky author Leland S. Copeland dubbed it as such in 1955. NGC 4568 the eastern and larger member appears to be surrounded by a hazy envelope and faces north-south. It gets gradually brighter towards a relatively large nucleus. NGC 4567, the slightly smaller galaxy in comparison, has a dense bright pin-point nucleus. The interacting spiral pair are gently joined at their north-eastern tips. Barely 10' towards the north is another companion member NGC 4564.

**NGC 4303** (Messier 61) is one of the largest spirals, and is situated a degree north of 16 Virginis and 5 degrees of magnitude 3.8 eta Virginis. The galaxy displays a barred face-on in a slightly north-east to south-west direction with a stellar core and hints of mottling on the surface. With even higher magnification and a relatively larger telescope try to glimpse the dark streaks between the arm sections and the nucleus. The galaxy is situated about 50 million light-years distant and to me is one of the most outstanding deep sky objects.



ABOVE: NGC 4303 – M61 – NGC 4301 (top left) and NGC 4292 (top right) Photograph: Dale Liebenberg

According to astronomers it is not known why the central bar in some spiral galaxies rotates around the disc at speeds different from that of individual stars.

## ...Virgo

A very peculiar object is the quasar **3C 273**, the brightest example of its kind and situated about halfway between eta and gamma (Porrina) Virginis in a triangle towards north. The quasar is just 8' south of a pair of magnitude 10 and 11 stars and just 40' west of the galaxy IC 3474. The slightly bluish object appears brighter and hazier than the accompanying stars in the field of view. 3C 273 is a very luminous object with an enormous red shift discovered by Halton Arp in 1966. With a magnitude of 13 it is not easy to detect through ordinary telescopes.

In the midst of the galaxy domain we find **IC 972**, a lonely planetary nebula in the far south-eastern corner of Virgo. IC 972 could well be a very faint galaxy by the looks of it, not at all easy to glimpse and probably, with a magnitude of 14, out of observational reach for most star gazers. Larger telescopes, however, and high magnification will reveal a slight hazy edge around an out of focus star. IC 972 is the 37th entry in George Abell's catalogue with a nebulous structure.

Another surprise to be found is the globular cluster **NGC 5634** taking shelter at Virgo's feet half way between mu and kappa Virginis. This globular cluster is relatively easy to observe and displays a hazy glow that grows gradually brighter towards a very compressed, unresolved broad center. Faint star outliers, barely seen on the northern and southern edges, spiral out into the field of view. A spaced triangle of faint stars can be seen towards the western edge with a magnitude 8 orange coloured star that dominates the eastern periphery.

RIGHT: NGC 4486 – M87 and NGC 4478  
(bottom right) Photograph: Dale Liebenberg



ABOVE: NGC 4486 – M87 and NGC 4478 (bottom right)  
Photograph: Dale Liebenberg



On the night of 22 May 2002, I took part in an occultation of the star HIP 75185, in the constellation Libra, by the asteroid (5) Astraea done by Albert Brakel, from Australasia, and myself from South Africa. It was successful and the asteroid diameter came to 162 km × 96 km. I laid eyes on (5) Astraea again on the night of 7 May 2008 when this main-belt asteroid was drifting through Virgo about a degree west of the lovely yellow gamma Virginis. The asteroid (5) Astraea was accidentally discovered by Karl Hencke in December 1845 while he was searching for the asteroid Vesta.

LEFT: (5) Astraea compared to the largest asteroid Ceres  
Photograph: Wikimedia Commons



## ...Virgo



The planet Neptune was seen in Virgo about 20' east of the magnitude 6-star HD 105374, and 2 degrees west of eta Virginis by Galileo Galilei in December 1612. He also detected the motion, but probably could not believe it was a new planet. J.G. Galle of Berlin Observatory actually found and confirmed such a planet in the constellation Aquarius on 23 September

LEFT: Neptune – Photograph: Wikipedia  
1846.

*Dress up snugly and warmly, make yourself a flask of coffee and sit down with the lady Virgo to seek out those faint, misty clouds that are, in fact – almost unbelievably – entire galaxies.*

OBJECT	TYPE	RA	DEC	MAG	SIZE
NGC 4303 Messier 61	Galaxy	12h21m.9	+04°28'.4	9.7	6.5'×5.8'
NGC 4374 Messier 84	Galaxy	12h25m.1	+12°53'.2	10	6.5'×5.6'
NGC 4406 Messier 86	Galaxy	12h26m.2	+12°56'.7	9.7	8.9'×5.8'
NGC 4435	Galaxy	12h27m.7	+13°01'.0	10.8	3.2'×2'
NGC 4438	Galaxy	12h27m.8	+13°01'.0	10.2	8.9'×3.6'
3C 273	Quasar	12h29m.1	+02°03'.1	13	15" +/-
NGC 4486 Messier 87	Galaxy	12h30m.8	+12°23'.4	9.5	8.3'×6.6'
NGC 4567	Galaxy	12h36m.5	+11°15'.1	11.3	3.1'×2.3'
NGC 4568	Galaxy	12h36m.6	+11°14'.3	10.8	4.6'×2.2'
NGC 4594 Messier 104	Galaxy	12h39m.8	-11°37'.4	9.2	7.1'×4.4'
IC 972	Planetary Nebula	14h04m.4	-17°14'.7	14	43"
NGC 5634	Globular Cluster	14h29m.6	-05°58'.6	9.4	4.9'



# At the Eyepiece

April 2022 by Ray Field

The Moon is New on the 1<sup>st</sup>, First quarter on the 9<sup>th</sup>, Full on the 16<sup>th</sup>, Last quarter on the 23<sup>rd</sup> and New again on the 30<sup>th</sup>. On the 18<sup>th</sup> the Moon occults the bright star Zubenelgenubi ( $\alpha$  Librae ahead of Scorpius) and on the 22<sup>nd</sup> the Moon is near the bright star Nunki ( $\sigma$  Sgr) On the 25<sup>th</sup> the Moon is near Saturn.

Mercury is visible on the 29<sup>th</sup> as a bright “evening star” low over the Western horizon in the twilight.

Venus, the brightest planet, is the brilliant morning “star” this month, rising well before the Sun over the East. It is near Jupiter on the 30<sup>th</sup>. Venus can be seen near the Moon in the daylight on the 26<sup>th</sup> and 27<sup>th</sup> with the naked eye. (refer page 20 of Sky Guide 2022).

Mars, the “Red” planet, starts the year as a rather dim “star-like” object in the morning sky. The Moon is near Mars on the 26<sup>th</sup>.

Jupiter, a bright planet, is near Venus at the end of the month in the morning sky.

Saturn is visible in the morning sky and rises a few hours before the Sun. It looks like a bright “star” to the naked eye.

Meteors:

April Lyrids make a poor appearance with a maximum on the 22<sup>nd</sup>.

$\Pi$  Puppids, a southern shower, make a favourable appearance between the 15<sup>th</sup> and 28<sup>th</sup>, with a maximum on the 23<sup>rd</sup>.

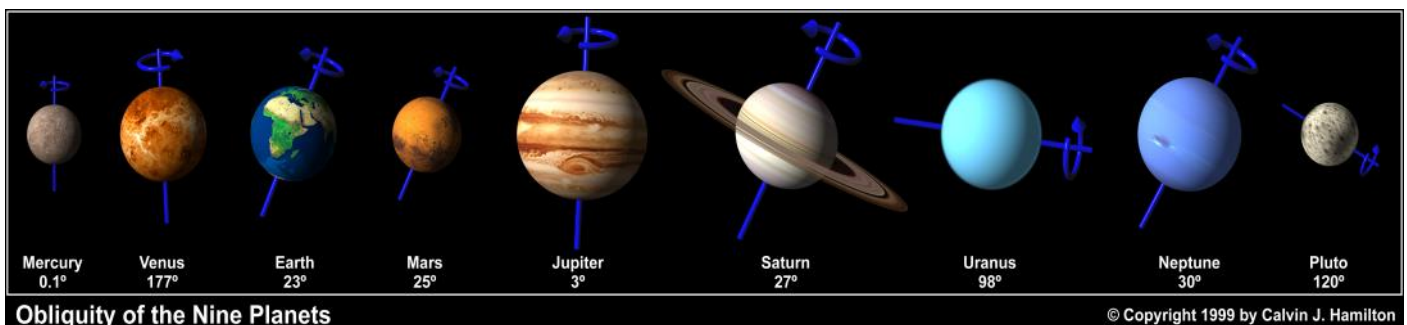
The  $\eta$  Aquarids start on the 21<sup>st</sup> April and have a maximum on the 5<sup>th</sup> May. This is a good shower to watch. It is active between 03:30 and 05:30.

Comets:

There are no bright comets expected this month, although new comets can appear at any time.

The Southern Cross is rising over the South-east and Scorpius is just appearing over the South-eastern horizon in the early evening. Orion is starting to set over the West. The rich starry area of the “3 crosses” region is well placed over the South. The bright star Canopus is high over the South-west and the bright star Achernar is about to set over the South. Over the North, Leo, the lion, is fairly low, with its one bright star, Regulus. Above and to the right of Leo, is the bright star Spica in Virgo.

References include ASSA Sky Guide 2022, Philips’ Planisphere for 35°S and Nortons Star Atlas.



# Touring the Small Magellanic Cloud

By Joe Bergeron



The Magellanic Clouds low over the horizon as seen from Paranal Observatory in the Chilean Andes. Image credit: ESO/Yuri Beletsky.

The best way for an amateur astronomer to literally expand his or her horizons is to venture to the hemisphere opposite your home, to take in the starry wonders hidden from view by the pesky curvature of our globe. This is especially true for natives of the Northern Hemisphere, because the southern circumpolar sky offers some of the most spectacular sights available to any observer. Fine as the Big Dipper and the Double Cluster may be, they struggle to compete with the Magellanic Clouds and the southernmost parts of the Milky Way.

This is the philosophy that led to my three visits to New Zealand. I'm writing this from the Bay of Islands on the North Island, at 35° south latitude. I'll share some of my observations in this inaugural edition of my observing column, *Eyes on the Deep Sky*.

Without a telescope I'd be limited to gawking at these star-spangled skies with only my very portable eyeballs. Fortunately, I also have an airline-portable telescope which has accompanied me on all my visits to Aotearoa, an Astro-Physics Stowaway, a short 92mm apochromatic refractor. A small telescope indeed, but not lacking in quality and versatility.

In the late months of southern-hemisphere summer, the Small Magellanic Cloud (SMC) in the constellation Tucana sinks a little lower night by night, so I decided to concentrate on this nearby galaxy for my first observations before it gets too low for good viewing. Seen from a dark site like my location at the Bay of Islands, the SMC looks like an amorphous mist three or four degrees across, about half the size of the nearby Large Magellanic Cloud (LMC), and it's less prominent.

## ...Touring the SMC

Lying relatively nearby at about 200,000 light-years, the two Magellanic Clouds are the only external galaxies close enough to permit detailed examination with small telescopes. Both clouds are easy naked eye sights that have no real equivalent in the North. The SMC is also cataloged as NGC 292.

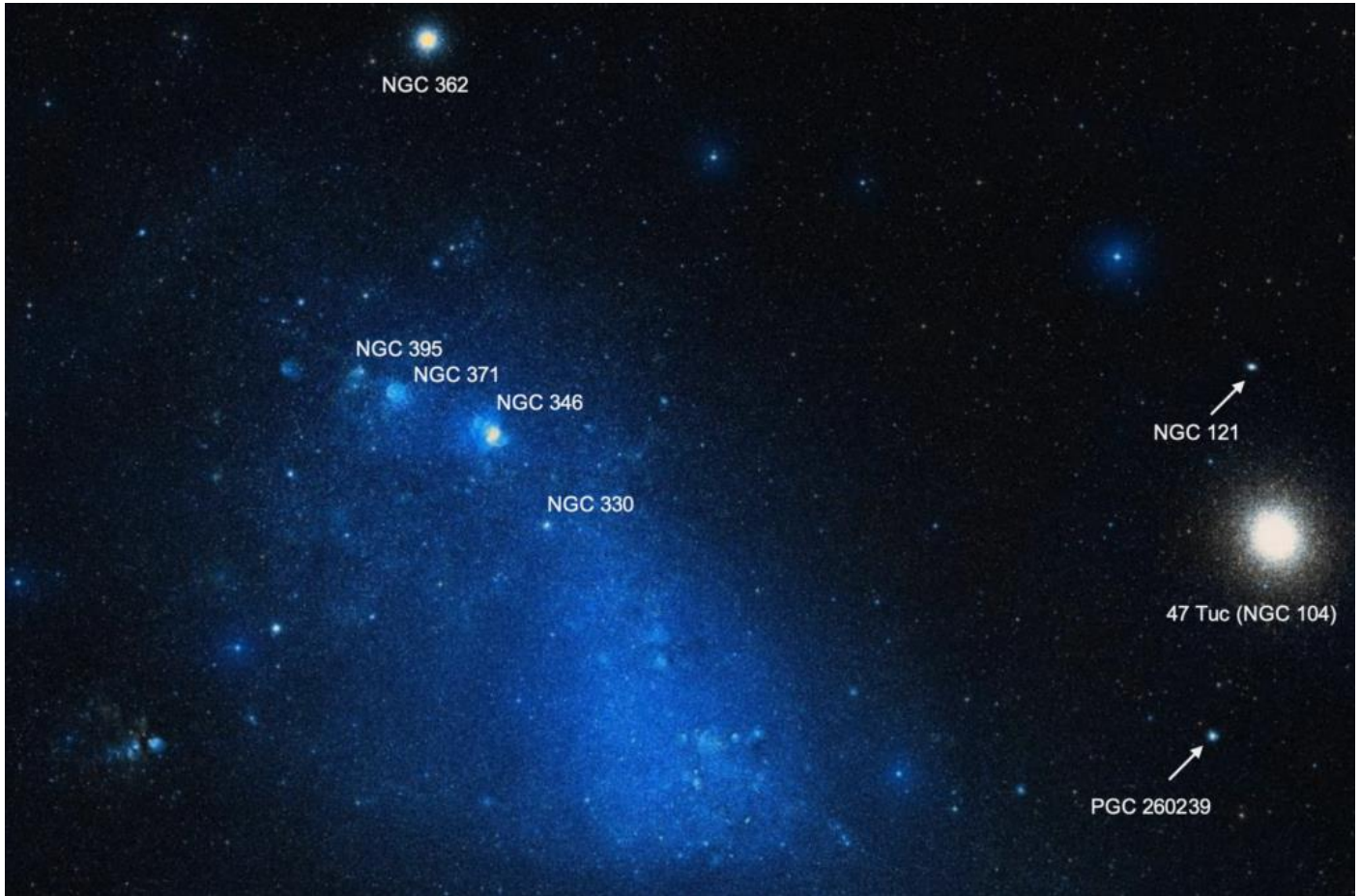


The Small Magellanic Cloud and the globular clusters 47 Tucanae, lower left, and NGC 362, lower right. Image courtesy of Sky-Map.org. South is up in this image.

A first glance at the SMC at a low magnification of 27x reveals so many smudges and sprinkles that settling on a few of them is almost bewildering. One good starting point is the globular cluster NGC 362. This relatively little-known cluster is a foreground object, located a scant 28,000 light-years away. Seen from there, the SMC itself would appear only a little bigger and brighter. Overpowered as it is by its flashier neighbor, the globular cluster 47 Tucanae, NGC 362 still competes with any Messier globular cluster available to northern observers. Shining at 6th magnitude, my little telescope at 86X shows it as a smallish, very condensed object, very bright at the core. Its halo, which spans about 10 arc minutes in my eyepiece, is peppered with about twenty faint stars.

A low-powered view of NGC 362 reveals an intriguing field. About a degree and a half south, deep within the glow of the SMC itself, is a conspicuous line of three bright clusters or nebulae. All three look approximately circular at 50x. The brightest member is NGC 346. Described as a nebulous cluster, which fits its visual appearance, this object is associated with the SMC and it span about 100-200 light-years, making it at least four times larger than the Milky Way's famous Orion Nebula. It has a central, brighter region that is clearly elongated, and shows hints of a more complex structure, but teasing out those exact shapes would take a bigger telescope than mine, or a better observer.

## ...Touring the SMC



The objects mentioned in this tour of the Small Magellanic Cloud (SMC), also known aggregately as NGC 292. Image credit: Sky-Maps.org/Sloan Digital Sky Survey.

The next object in this line is NGC 371. Another nebulous cluster, it's not quite as big and bright as NGC 346, but it's still very distinct. A round glow with a definite border, the telescope also shows a mass of faint stars in this area. Faint as they may appear, seeing individual stars in another galaxy with a small telescope is noteworthy. Of course, given that they are 200,000 light years away, those stars are anything but faint in reality.

The final object in this row is NGC 395, the smallest, faintest, and most irregular of the three. It is nevertheless distinctly visible in this small telescope under good conditions.

If you're using Sky Safari Pro to navigate these stars, as I was, you'll find it doesn't plot 371 or 395 as such. It does show many of the stars that make up these objects, but to show them plotted and labeled by name you have to perform a search for them. This creates visual confusion, as these objects are far more prominent than the tiny clusters which are plotted in this area, and which I never noticed.

A tiny cluster which I did notice lies a little off the line established by the previous three objects, and is of a very different visual character. NGC 330 is listed as an open cluster by Sky Safari, but other sources call it a globular. Based on its appearance in images and through the eyepiece, I think its identification as a globular is more likely. It spans only about one arc minute in my telescope, and consists mainly of a tiny, elongated bright core which may consist of as few as two brighter stars. I couldn't quite make out the true nature of this minute glow with my small aperture. A few nearby faint stars may be associated with this cluster, but that's about all there is to this remote object.

## ...Touring the SMC

Now we move on to the primary superstar of this whole area of the sky, the magnificent globular cluster 47 Tucanae. Easily visible to the naked eye as a 4th magnitude star lying just west of the SMC, this cluster has no rival in the north, and puts up a good fight against Omega Centauri for the title of Greatest Globular Cluster. Both objects received star designations before their true, non-stellar nature was discovered. 47 Tuc is more formally known as NGC 104.



This bright cluster of stars is 47 Tucanae (NGC 104), shown here in an image taken by ESO's VISTA (Visible and Infrared Survey Telescope for Astronomy) from the Paranal Observatory in Chile. Image credit: ESO/M.-R. Cioni/VISTA Magellanic Cloud survey

## ...Touring the SMC

Seen in my itty-bitty refractor, 47 Tuc utterly dominates its field at 50x, or indeed at any other power. It's strongly concentrated toward the center, which is a solid blaze of creamy light. Its expansive halo, which appears at least thirty arc minutes across, is powdered with a hundred or so tiny, perfect star-flecks, though Tui, my friend and host here in New Zealand, could not make out any of the individual stars. This cluster lies about 13,000 light-years away, making it one of the nearest globulars, which partially accounts for its grandeur for those lucky enough to see it.

While I was in the neighborhood, I decided to check out a pair of nearby objects which are hugely overshadowed by its justly famous neighbor. The first is NGC 121, another globular cluster, but sharing the same apparent relationship to 47 Tuc as a flea does to a dog. It's 200,000 light-years away, and associated with the SMC! That means it's fifteen times farther away than 47 Tuc, which explains why it looks so small and inconspicuous in my refractor. I estimated its brightness as magnitude 11, which is backed up by other sources. It's just a tiny glimmer, maybe one arc minute across, lurking inconspicuously and rarely noticed.

Finally, I decided to try for something I didn't expect to see at all. Lying roughly opposite of 47 Tuc from NGC 121, PGC 260239 is a little-known galaxy, easily located due to its involvement with a short line of three stars of magnitudes 10-12. These stars were obvious in my telescope at 50x, and the galaxy itself was surprisingly apparent, a fair-sized if vague elliptical glow with some central condensation. Sky Safari calls it magnitude 13, but I think it must be brighter than that to be visible in my telescope, especially given its substantial angular size.

After ferreting out a few deep sky objects ranging from the glaringly obvious to the faint and obscure, it's refreshing to lean back from the eyepiece and take in the stunning sights of the looming Large Magellanic Cloud, and the swath of brilliant Milky Way that holds so many wonderful and legendary objects.



## STAR GAZING EVENT

The Monteseel Conservancy  
and  
The Astronomical Society of Southern Africa,  
Durban Centre

will host a Star gazing event on

**Saturday 30th April 2022 from 5pm**

Monteseel Park, Corner Grand Boulevard and  
Magdalene Avenue Monteseel  
29°44'18.7"S 30°40'49.9"E

There will be a short talk at about 6pm and telescopes  
will be available for viewing

No Dogs allowed

Covid restrictions apply

**WEATHER PERMITTING**

**R20 per person  
or R50 per family**

Dress warmly  
especially feet, neck  
and head. Bring your  
own binoculars and  
telescopes if you have.  
Food and drinks will be  
for sale.

So bring a blanket or  
chairs and come and  
enjoy an evening under  
the stars!

**For more information contact Debbie on 072 280 1949 or Anne on 082 703 6255**

# The Cover Image - Dolphin Nebula

Processed by Gerald de Beer

Sh2-308 is more commonly known as the Dolphin Nebula as it strongly resembles a dolphin that is about to pass you on your left. I particularly relate to this as I was fortunate to have a pod of dolphin swim past me while I was scuba diving at about 22m depth.

Sh2-308 is an H II region located near the center of the constellation Canis Major, composed of ionised hydrogen. It is about 8 degrees south of Sirius, the brightest star in the night sky. The nebula is bubble-like and surrounds a Wolf–Rayet star named EZ Canis Majoris. This star is in the brief, pre-supernova phase of its stellar evolution. The nebula is about 4,530 light-years (1,389 parsecs) away from Earth but some sources indicate that both the star and the nebula are up to 5,870 light years away. Yet others indicate the nebula is as close as 1,875 light years from Earth.



With the arrival of a new Skywatcher EQ6R-Pro with its superb tracking I decided to image the Dolphin Nebula in narrow band and RGB exposures.

This is my first process of a target captured in narrowband and using RGB for the stars. The SII had no image data so I created an artificial G by combining 50% of each of Ha and OIII.

After calibration and stacking I removed the stars from all the channels. The narrowband was then processed and combined to an RGB in a starless state.

I then created the colour stars from the star masks of the G and B broadband and the Ha star mask for the Red. The stars added back in as the final process

Capture details:

30 x Ha @ Gain 120 for 240 sec with Offset 30 and Temp - 10° C  
 30 x OIII @ Gain 120 for 240 sec with Offset 30 and Temp - 10° C  
 30 each of R, G, B @ Gain 120 for 30 sec with Offset 30 and Temp - 10° C  
 30 each of Darks, Flats and Dark-flats per filter

Imaging: ZWO ASI294MM Pro Cooled  
 Telescope: Astro-Tech 127EDT  
 Mount: Celestron CGEM Mk I and  
 Skywatcher EQ6R-Pro  
 Guide Scope: Orion 60mm  
 Guide Camera: ZWO ASI290m mini  
 Power: Pegasus Power Box Mini  
 Focusers: Sesto Senso 2 Robotic Focuser  
 ZWO EFW 7 x 36mm  
 Software: N.I.N.A Image Capture  
 PHD2 Guiding  
 PixInsight Processing





# Clyde's Spot - Update

By Clyde Foster

As some of you are aware, I was credited with the discovery of a new storm outbreak on Jupiter on 31 May 2020 which quickly became known informally as “Clyde’s Spot” amongst both amateurs and professionals in the planetary community. What was notable was the relatively rare occurrence of such outbreaks that have been observed in this region, Jupiter’s South Temperate Belt, and even more so the fact that the NASA Juno spacecraft would sweep over the storm two days later, capturing amazing images of the outbreak. Thanks to the resulting NASA press releases (“Clyde’s Spot on Jupiter” and “Juno returns to Clyde’s Spot”), “Clyde’s Spot” attracted quite extensive media and public interest. As much as my primary focus is on enjoying my planetary imaging, and contributing to the Planetary Science community, this was certainly some nice recognition of what I am doing.



Left:: Clyde Fosters' image of the spot. Middle and Right: NASA/JPL-Caltech/SwRI/MSSS/Kevin M. Gill

In the nearly two years since, headed by members of the Planetary Science group at the University of the Basque in Spain, Clyde’s Spot has become extensively researched. This has been thanks to the amazing results produced from the NASA Juno PJ27, PJ33 and PJ34 flybys, Hubble Space Telescope imaging, NASA IRTF imaging, images from other professional facilities, and, not least of all extensive amateur high resolution imaging. Needless to say, I have tracked and imaged the development of Clyde’s Spot on every/ possible opportunity over this period.

Dr Ricardo Hueso and Peio Inurrigarro (Clyde’s Spot has been the primary focus of his PhD studies) have been the key drivers for the research in Spain.

I am delighted to say that the research has been captured in an extensive paper (+-50 pages, with an additional +-12 pages of supplementary information), and I received notification on 21 March, that the paper, following extensive peer review, has been accepted for publication in the respected Icarus journal. I am honoured to be included as a co-author for the paper, alongside some highly esteemed professional planetary scientists, and proud to have ASSA as my primary affiliation.

During the (lengthy and intense!) peer-review process, I always had a concern that there would be pressure applied to replace the term “Clyde’s Spot” with a more “scientific” term, based on classical Jovian notation. I am delighted to say that the term was readily accepted by the reviewers, and in doing so, I am proud to say that “Clyde’s Spot” has now been accepted into formal Jovian scientific literature. As an amateur astronomer, I am not sure if it gets much better than that!



# NASA Update: Crew Returns to Earth with NASA Record Breaking Astronaut



ABOVE: The Soyuz MS-19 crew ship carrying NASA astronaut Mark Vande Hei and two cosmonauts pictured moments before landing under the clear, blue skies of Kazakhstan, on Wednesday 30 March.

breaking the previous record held by retired NASA astronaut Scott Kelly by 15 days. Mark's mission is not only record breaking, but also paving the way for future human explorers on the Moon, Mars, and beyond," said NASA Administrator Bill Nelson. "Our astronauts make incredible sacrifices in the name of science, exploration, and cutting-edge technology development, not least among them time away from loved ones. NASA and the nation are proud to welcome Mark home and grateful for his incredible contributions throughout his year-long stay on the International Space Station."

During his 355 days aboard the station, Vande Hei experienced:

- Approximately 5,680 orbits of Earth
- Approximately 150,619,530 statute miles traveled (equivalent of approximately 312 round trips to the Moon and back)
- Fifteen spacecraft or modules visited the International Space Station, including three Russian Progress cargo ships, two Northrop Grumman Cygnus cargo craft, three Russian Soyuz, two SpaceX crew Dragons, three SpaceX cargo Dragons, and the two new Russian modules (the Nauka Multipurpose Laboratory Module and the Prichal Node Module).

Expedition 67 formally began aboard the station after undocking, with NASA'S Tom Marshburn, taking over as the new station commander with NASA astronauts Raja Chari and Kayla Barron, ESA (European Space Agency) astronaut Matthias Maurer, and Roscosmos cosmonauts Oleg Artemyev, Denis Matveev, and Sergey Korsakov.

The Soyuz MS-19 crew will now split up, as per standard crew return practice, with Vande Hei returning to his home in Houston, while the cosmonauts fly back to their training base in Star City, Russia.

<https://blogs.nasa.gov/spacestation/2022/03/30/crew-returns-to-earth-with-nasa-record-breaking-astronaut/>

NASA astronaut Mark Vande Hei ended his record-breaking time of 355 days on the International Space Station on Wednesday, March 30, 2022. Vande Hei, along with Roscosmos cosmonauts Anton Shkaplerov and Pyotr Dubrov, began the journey back to Earth in the early morning hours on the Soyuz MS-19 spacecraft; making a safe parachute-assisted landing southeast of the remote town of Dzhezkazgan, in Kazakhstan, at 7:28 a.m. EDT.

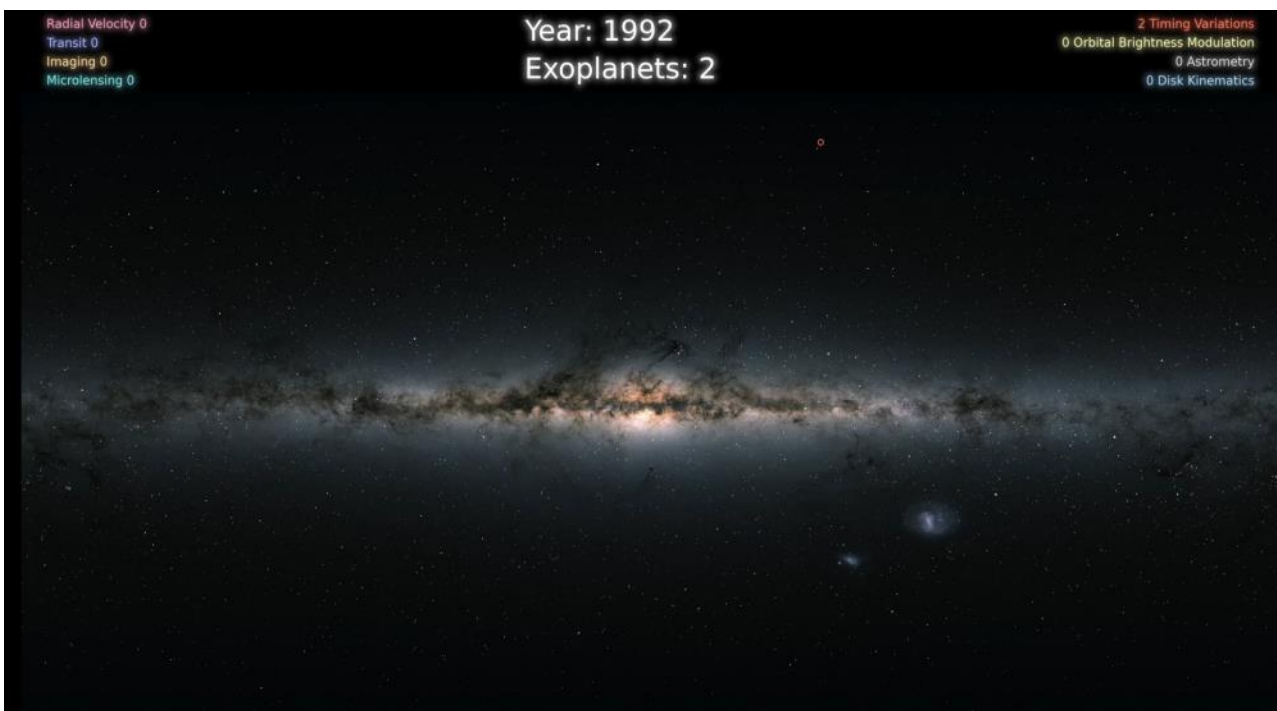
Mark Vande Hei arrived at the ISS on April 9, 2021, spending 355 days in low-Earth orbit,



# NASA Confirms Found 5,000 Worlds Outside The Solar System



In January 1992, two cosmic objects forever changed our galaxy. For the first time, NASA had concrete evidence of extrasolar planets, or exoplanets, orbiting an alien star: two rocky worlds, whirling around a star 2,300 light-years away.



Now, just over 30 years later, that number has exploded. March 21 marked the hugely significant milestone of over 5,000 exoplanets confirmed. To be precise, 5,005 exoplanets are now documented in the NASA exoplanet archive, every one with its own unique characteristics.

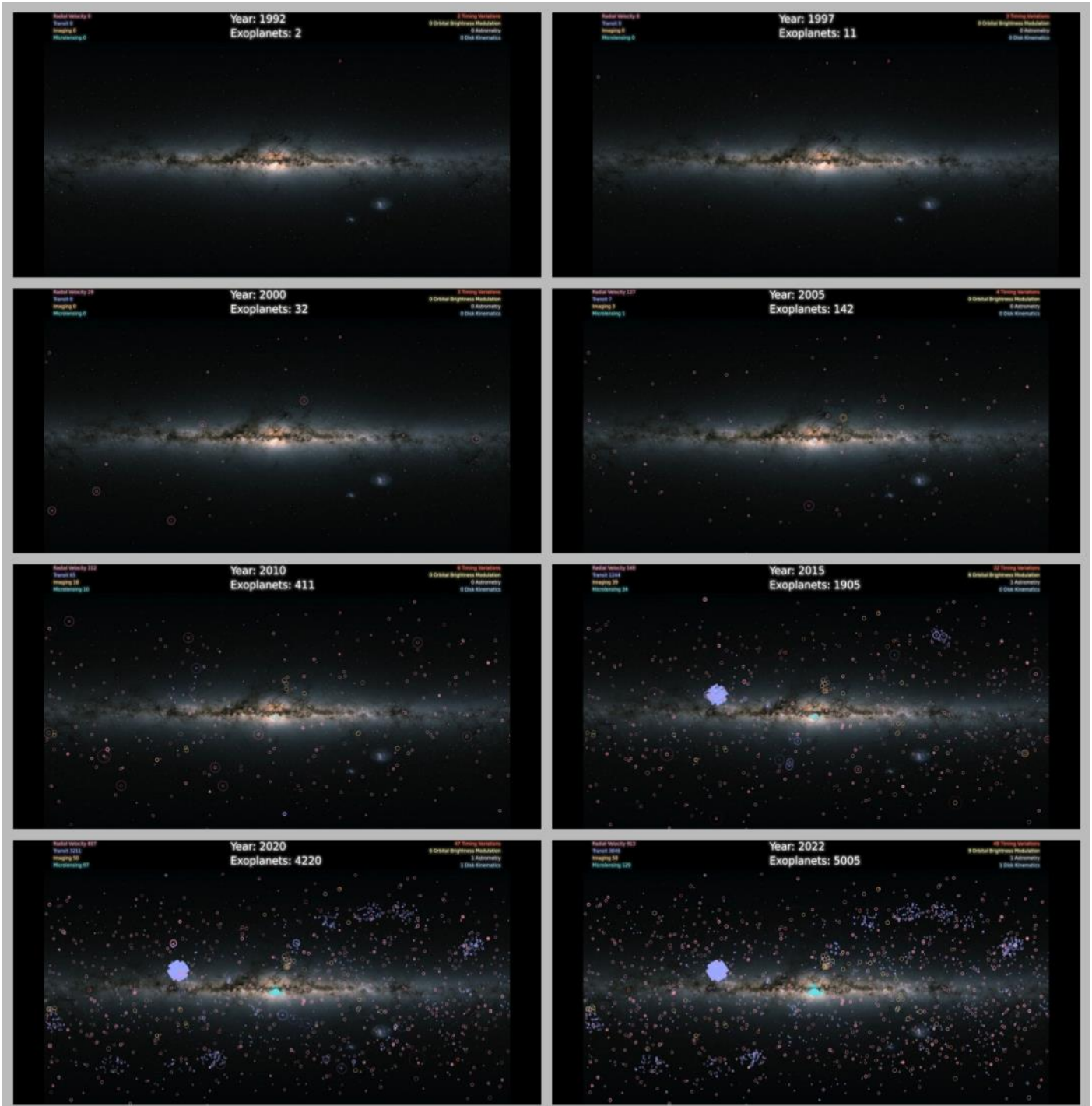
Each and every one of these exoplanets has appeared in peer-reviewed research, and been observed using multiple detection techniques or methods of analysis.

The pickings are rich for follow-up study to learn more about these worlds with new instruments, such as the recently launched James Webb Space Telescope, and upcoming Nancy Grace Roman Space Telescope.

"It's not just a number," says astronomer Jessie Christiansen of the NASA Exoplanet Science Institute at Caltech. "Each one of them is a new world, a brand-new planet. I get excited about every one because we don't know anything about them."

# ...5,000 Worlds Outside The Solar System

Watch: <https://youtu.be/yv4DbU1CWAY>



The first two worlds ever confirmed in 1992, discovered by astronomers Alexander Wolszczan and Dale Frail, were exoplanets 4.3 and 3.9 times the mass of Earth, whirling around a dead star known as a millisecond pulsar, which sends out 'beats' or pulses of radio waves on millisecond timescales.

A third exoplanet, much smaller at 0.02 times the mass of Earth, was discovered orbiting the star, since named Lich, in 1994. The exoplanets were named Poltergeist, Phobetor, and Draugr, respectively.

The discovery suggested that the galaxy had to be teeming with the things. Pulsars are a type of neutron star: the dead cores of massive stars that have ejected most of their mass, then collapsed under their own gravity. Their formation process is pretty extreme, often involving colossal explosions.

# ...5,000 Worlds Outside The Solar System

"If you can find planets around a neutron star, planets have to be basically everywhere," Wolszczan said. "The planet production process has to be very robust."

But there was a catch. The technique used to identify these exoplanets was based on the very regular timing of pulses from the star, which are altered very slightly by the gravitational influence of the orbiting bodies. Alas, this technique is restricted to pulsars; it's unsuitable for main-sequence stars that don't have regular millisecond pulsations.

However, when astronomer William Borucki of NASA pioneered the transit method, which observes faint, regular dips in starlight as an exoplanet passes between us and the host star, exoplanet science exploded.

The Kepler Space Telescope, launched in 2009, contributed over 3,000 confirmed exoplanets to the list, with another 3,000 candidates waiting in the wings. Watch <https://youtu.be/2qDg5uHk-4c>

In addition to the transit method, astronomers can study the gravitational effect exoplanets exert on their host stars. As the objects orbit a mutual center of gravity, a star appears to 'wobble' slightly on the spot, altering the wavelengths of its light.

If the mass of the star is known, you can study how much it wobbles to infer the mass of the exoplanet; and, if you know how intrinsically bright a star is, you can infer the size of the exoplanet.

This is how they know that there are exoplanets out there in the Universe very, very different from those we have in our own home system.

Hot Jupiters are enormous gas giants on incredibly close orbits around their stars, the proximity resulting in exoplanet temperatures that can be even hotter than some stars. They're not just intensely hot, but also likely warped by gravitational forces.

Mini Neptunes inhabit the size and mass regime between Earth and Neptune, and could potentially be habitable, just 124 light-years from Earth could be teeming with life even. There are also super Earths, which are rocky like Earth, but up to a few times the mass.

Because studying exoplanets directly is very hard – they are small, very dim, very far away, and often very close to a bright star whose light drowns out anything the exoplanet might reflect – there's still a lot we don't know. There are also still a lot of worlds out there beyond our current detection thresholds.

But in the years ahead, those thresholds will retreat against the advance of technology and new analysis techniques, and we may find a variety of worlds beyond our wackiest dreams. Maybe they will even find traces of life outside the Solar System.

"I get a real feeling of satisfaction, and really of awe at what's out there," Borucki said "None of us expected this enormous variety of planetary systems and stars. It's just amazing."

<https://www.sciencealert.com/it-s-official-we-have-now-confirmed-over-5-000-worlds-outside-the-solar-system>



# Day of Discovery: 7 Earth-Size Planets

Five years ago, astronomers revealed a spectacular collection of other worlds: the TRAPPIST-1 solar system. A solar system is identical to that of our own and is nicknamed as 'sister solar system' because of the seven rocky planets that have sustainable surface temperature that could potentially harbour liquid water. Astronomers have named them the planets TRAPPIST-1a, TRAPPIST-1b, and so forth.



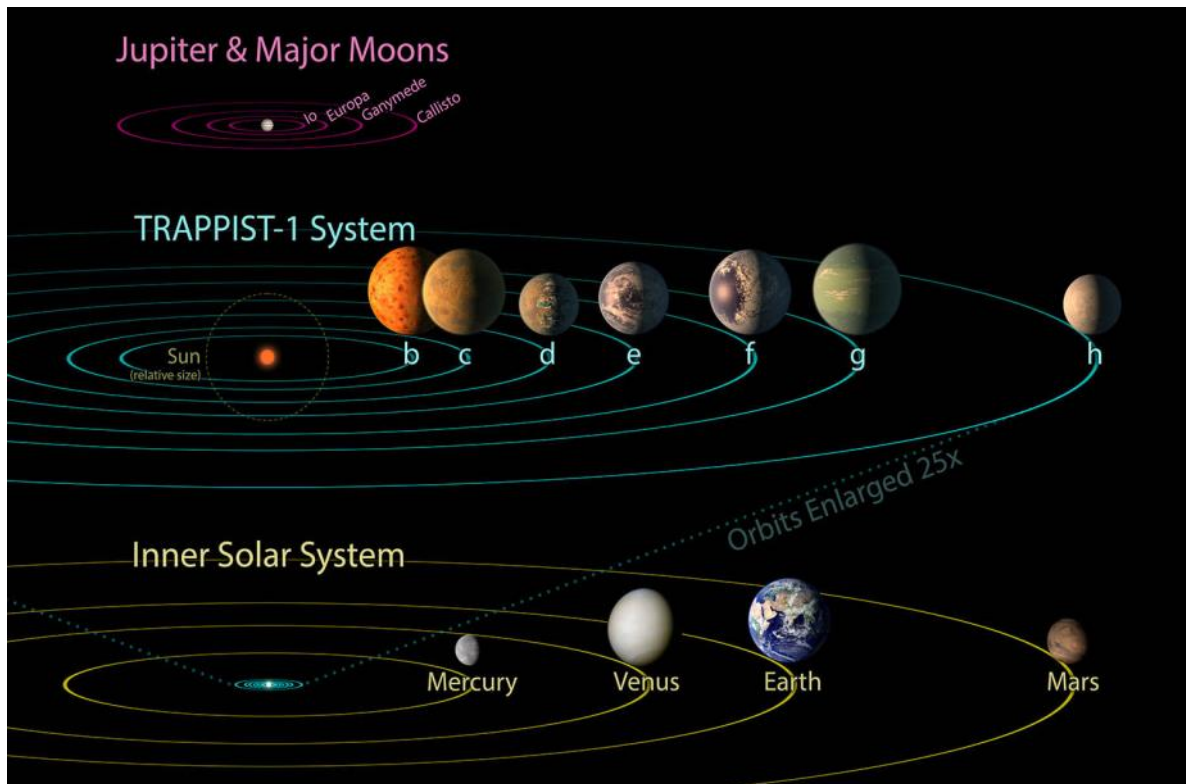
## Exoplanet discovery

The most studied planetary system, aside from our own solar system, lies about 40 light-years away. We've looked at the seven rocky exoplanets orbiting the TRAPPIST-1 star with ground and space telescopes like Spitzer, Kepler, Hubble, and soon, the James Webb Space Telescope. In a press release on February 22, 2017, NASA announced the discovery of the most Earth-sized planets found in the habitable zone of a single star, called TRAPPIST-1. In February 2018, closer study of the seven planets suggested that some could harbor far more water than the oceans of Earth, in the form of atmospheric water vapor for the planets closest to their star, liquid water for others, and ice for those farthest away. A 2021 study revealed more about TRAPPIST-1 planets. They are likely made of similar material, but they are different to Earth. That could mean they all contain about the same ratio of materials thought to compose most rocky planets, like iron, oxygen, magnesium, and silicon. But if this is the case, that ratio must be notably different than Earth's: The TRAPPIST-1 planets are about 8% less dense than they would be if they had the same makeup as our home planet.

One of the unusual features of TRAPPIST-1 planets is how close they are to each other -- so close that other planets could be visible in the sky from the surface of each one. Five years later, the planets are still enigmatic. Since the first announcement, subsequent studies have revealed that the TRAPPIST-1 planets are rocky, that they could be almost twice as old as our solar system, and that they are located 41 light-years from Earth.

TRAPPIST-1 is anywhere between 3 and 8 billion years old. In comparison, the Sun is 4.6 billion years old and has a temperature of 5778 K. The star is metal-rich, with a metallicity ( $[Fe/H]$ ) of 0.04, or 109% the solar amount. This is particularly odd as such low-mass stars near the boundary between brown dwarfs and hydrogen-fusing stars should be expected to have considerably less metal content than the Sun. Its luminosity is 0.0522% of that of the Sun.

## ...7 Earth-Size Planets



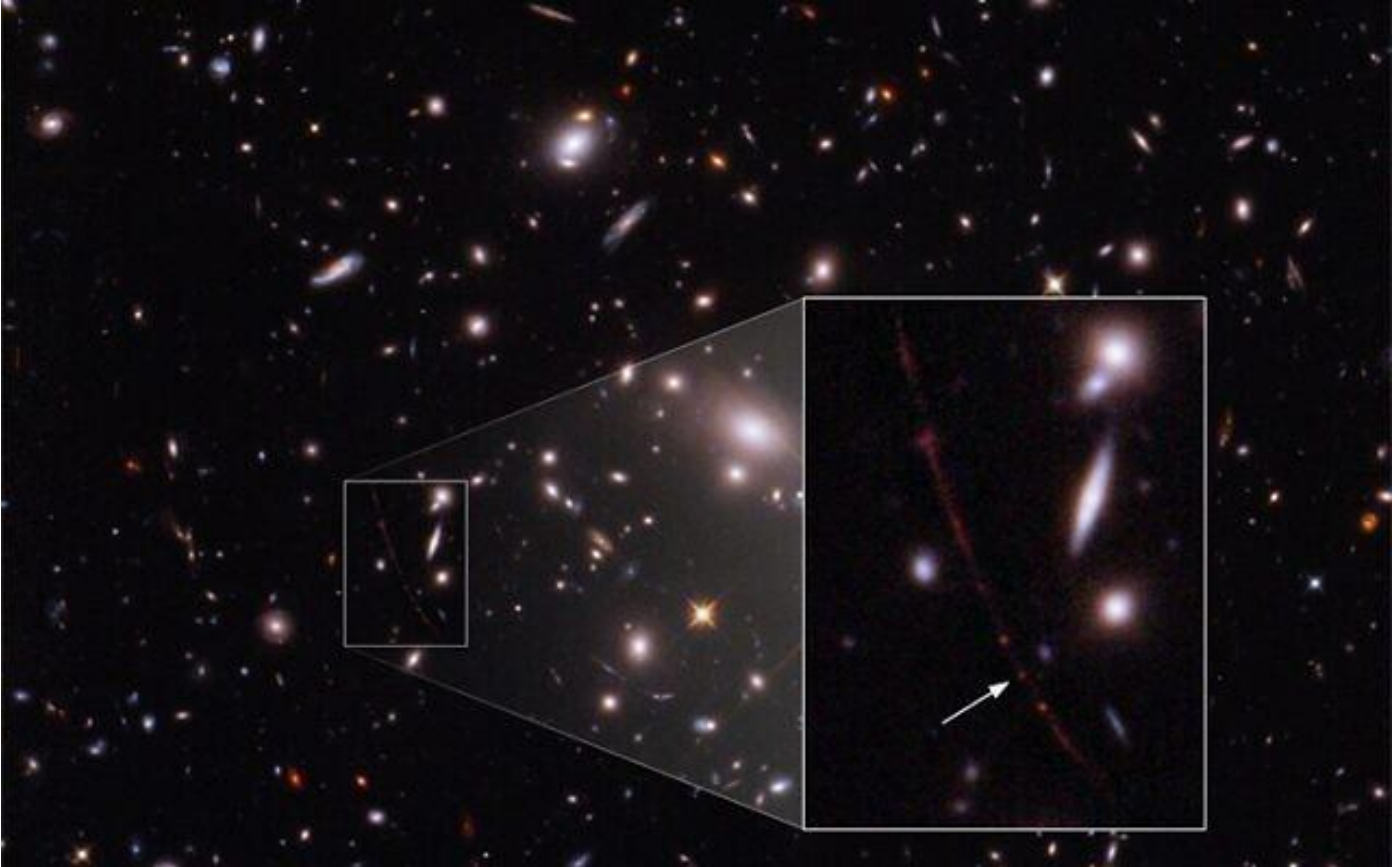
But a real game-changer is the recently launched James Webb Space Telescope. Larger and more powerful than any previous space telescope, Webb will look for signs of atmospheres on the TRAPPIST-1 planets which have not been fully identified as yet.

TRAPPIST-1 is unusual both for its number of small rocky planets and the number in the habitable zone. Several of the artist's illustrations portray possible water or ice in the system - the proximity of the planets to their red dwarf star may include that any of them could have water on their surface. TRAPPIST-1e is the most similar to Earth's mass, radius, density, gravity, temperature, and stellar flux. It is also confirmed to not have a cloud-free hydrogen-dominated atmosphere, meaning it is more likely to have a compact atmosphere like the terrestrial planets in our solar system.

TRAPPIST-1 System							Solar System Rocky Planets				
	b	c	d	e	f	g	h	Mercury	Venus	Earth	Mars
Orbital Period <i>days</i>	1.51	2.42	4.05	6.10	9.21	12.35	~20	87.97	224.70	365.26	686.98
Distance to Star <i>Astronomical Units (AU)</i>	0.011	0.015	0.021	0.028	0.037	0.045	~0.06	0.387	0.723	1.000	1.524
Planet Radius <i>relative to Earth</i>	1.09 $R_{\text{earth}}$	1.06 $R_{\text{earth}}$	0.77 $R_{\text{earth}}$	0.92 $R_{\text{earth}}$	1.04 $R_{\text{earth}}$	1.13 $R_{\text{earth}}$	0.76 $R_{\text{earth}}$	0.38 $R_{\text{earth}}$	0.95 $R_{\text{earth}}$	1.00 $R_{\text{earth}}$	0.53 $R_{\text{earth}}$
Planet Mass <i>relative to Earth</i>	0.85 $M_{\text{earth}}$	1.38 $M_{\text{earth}}$	0.41 $M_{\text{earth}}$	0.62 $M_{\text{earth}}$	0.68 $M_{\text{earth}}$	1.34 $M_{\text{earth}}$	—	0.06 $M_{\text{earth}}$	0.82 $M_{\text{earth}}$	1.00 $M_{\text{earth}}$	0.11 $M_{\text{earth}}$



# Oldest Star Recorded <sup>24</sup> 13 Billion Light years away



ABOVE: A highly magnified image of the star Earendel. The collection of yellow-looking galaxies form the massive galaxy-cluster lens that magnifies background objects lying behind it. The inset shows the highly magnified red galaxy, host to Earendel, stretched into an arc due to lensing, and the highly magnified star is marked with a white arrow. (NASA, ESA, Brian Welch, Dan Coe)

American and Israeli scientists have captured and documented images from the Hubble space telescope showing the most distant star ever seen, in a finding they say “opens a door to learn about stars in the early universe.”

The scientists nicknamed the star "Earendel," from an Old English word meaning "morning star" or "rising light. Earendel, whose technical designation is WHL0137-LS, is at least 50 times the mass of the Sun and millions of times as bright. The light they saw from the star - had traveled 12.9 billion years to reach Earth, appearing as it did when the universe was just 7 % of its current age. Given that the previous record was 9 billion years, they say it is a major leap.

Prof. Adi Zitrin of Ben-Gurion University in Beersheba was part of the US-led study, newly peer-reviewed and published in Nature. He told The Times of Israel that he was “excited and amazed” by the finding, and said it succeeded because the stars were, quite literally, aligned.

Detection systems on Earth aren't generally powerful enough to see such light, but a large galaxy cluster called WHL0138-08 has such a large gravitational pull that light bends around it, and ends up being magnified by a factor of thousands.

Zitrin is one of the top experts on this kind of magnification, and is part of an international research group that hunts for galaxies and stars that are visible as a result of it. So when the lead author, Brian Welch of Johns Hopkins University, thought he had seen an ancient star, Zitrin's skills were called in to verify it. “I built a model that mimics the way that the galaxy cluster between Earendel and Earth acted as a ‘gravitational magnifying lens,’” Zitrin said. “This model, subsequently tweaked by Brian, was used to assess whether the light we were seeing looked as light from a very old star would appear.”

When Welch emailed to say his model indicated that it was, indeed, 12.9 billion-year-old light from a star, “I was very excited,” he said. “Newly discovering this star opens a door to learn about stars in the early universe, as we have hardly any information on stars from so long ago. This finding has given a whole new insight, which will lead to far more research.”





# NASA Extends Ingenuity Helicopter Mission



ABOVE: The Ingenuity Mars Helicopter's carbon fiber blades can be seen in this image taken by the Mastcam-Z instrument aboard NASA's Perseverance Mars rover on the 48th Martian day, or sol, of the mission. Credit: NASA/JPL-Caltech/ASU

**With its recent 21st flight complete, the Red Planet rotorcraft is on its way to setting more records during its second year of operations.**

NASA has extended flight operations of the Ingenuity Mars Helicopter through September. In the months ahead, history's first aircraft to operate from the surface of another world will support the Perseverance rover's upcoming science campaign exploring the ancient river delta of Jezero Crater. Along the way, it will continue testing its own capabilities to support the design of future Mars air vehicles.

The announcement comes on the heels of the rotorcraft's 21st successful flight, the first of at

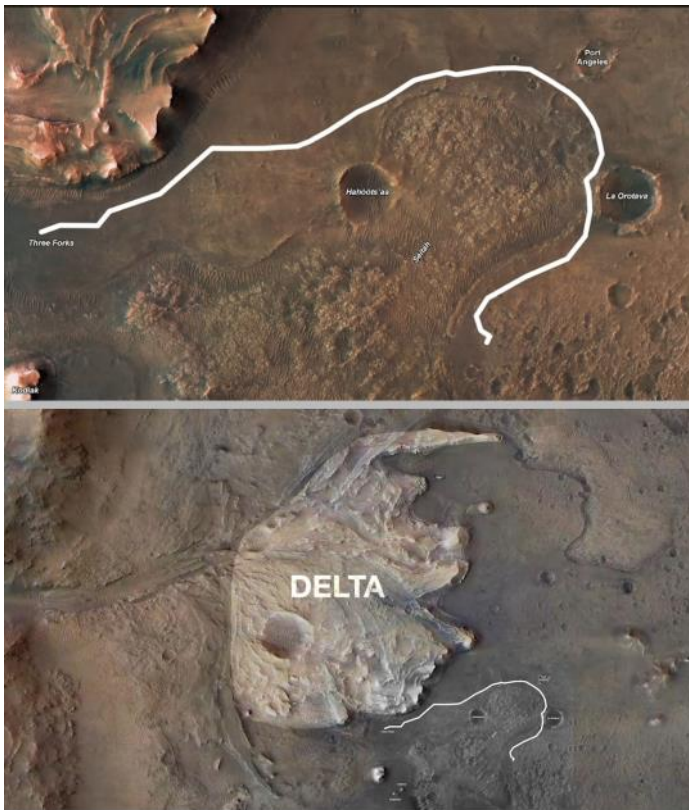
least three needed for the helicopter to cross the northwest portion of a region known as "Séítah" and reach its next staging area.

"Less than a year ago we didn't even know if powered, controlled flight of an aircraft at Mars was possible," said Thomas Zurbuchen, the associate administrator of NASA's Science Mission Directorate. "Now, we are looking forward to Ingenuity's involvement in Perseverance's second science campaign. Such a transformation of mindset in such a short period is simply amazing, and one of the most historic in the annals of air and space exploration."



ABOVE: Shows the remains of an ancient delta in Mars' Jezero Crater, as seen by ESA's Mars Express Orbiter,

## ...Ingenuity Helicopter Mission



Ingenuity's new area of operations is entirely different from the modest, relatively flat terrain it has been flying over since its first flight last April. Several miles wide and formed by an ancient river, the fan-shaped delta rises more than 130 feet (40 meters) above the crater floor. Filled with jagged cliffs, angled surfaces, projecting boulders, and sand-filled pockets that could stop a rover in its tracks (or upend a helicopter upon landing), the delta promises to hold numerous geologic revelations – perhaps even the proof necessary to determine that microscopic life once existed on Mars billions of years ago.

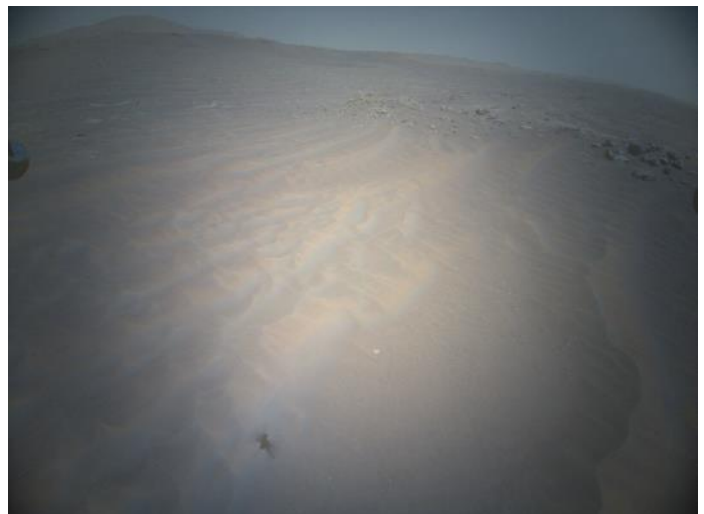
Upon reaching the delta, Ingenuity's first orders will be to help determine which of two dry river channels Perseverance should take when it's time to climb to the top of the delta. Along with routing assistance, data provided

by the helicopter will help the Perseverance team assess potential science targets. Ingenuity may even be called upon to image geologic features too far afield (or outside of the rover's traversable zone), or perhaps scout landing zones and caching sites for the Mars Sample Return program.

"The Jezero river delta campaign will be the biggest challenge the Ingenuity team faces since first flight at Mars," said Teddy Tzanetos, Ingenuity team lead at NASA's Jet Propulsion Laboratory in Southern California. "To enhance our chances of success, we have increased the size of our team and are making upgrades to our flight software geared toward improving operational flexibility and flight safety."

### Higher Flights

Several of these upgrades have led to reduced navigation errors during flight, which increases both flight and landing safety. A recent software change already on the rotorcraft frees Ingenuity from its previously programmed maximum altitude of 50 feet (15 meters). The altitude gains could result in incremental increases in both air speed and range. A second upgrade allows Ingenuity to change airspeed as it flies. Another enables it to better understand and adjust to changes in terrain texture during flight. Future software upgrades may include adding terrain elevation maps into the navigation filter and a landing-hazard-avoidance capability.



ABOVE: The Ingenuity Helicopter acquired this image in the northwest portion of a region known as "Séítah" on its 20th flight on 25 Feb. 2022. Credit: NASA/JPL-Caltech

## ...Ingenuity Helicopter Mission



ABOVE: This annotated image depicts the multiple flights – and two different routes – NASA’s Ingenuity Mars Helicopter could take on its trip to Jezero Crater’s delta. Image Credit: NASA/JPL-Caltech/ University of Arizona/USGS

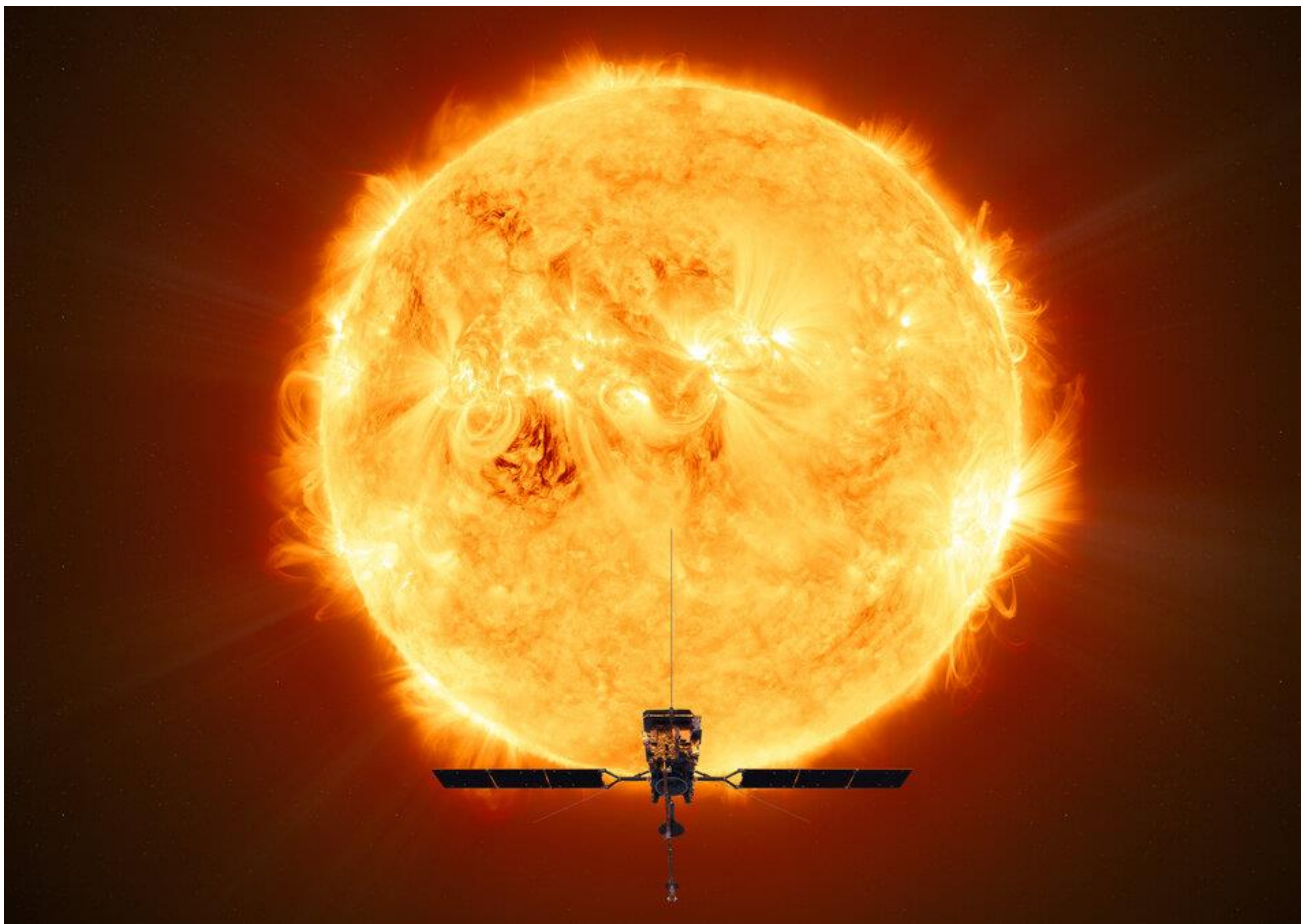
Before aerial reconnaissance of the delta can begin, Ingenuity has to complete its journey to the area. Scheduled for no earlier than March 19, Ingenuity’s next flight will be a complex journey, about 1,150 feet (350 meters) in length, that includes a sharp bend in its course to avoid a large hill. After that, the team will determine whether two or three more flights will be required to complete the crossing of northwest Séítah.

The first experimental flight on another world took place on April 19, 2021, and lasted 39.1 seconds. After another four flights, six more minutes in the air, and traveling a total distance of 1,637 feet (499 meters), NASA transitioned Ingenuity into an operations demonstration phase, testing its ability to provide an aerial dimension to the Perseverance mission. With the completion of Flight 21, the rotorcraft has logged over 38 minutes aloft and traveled 2.9 miles (4.64 kilometers). As Ingenuity pushes farther into uncharted territory, these numbers will inevitably go up, and previous flight records will more than likely fall.

“This upcoming flight will be my 22nd entry in our logbook,” said Ingenuity chief pilot Håvard Grip of JPL. “I remember thinking when this all started, we’d be lucky to have three entries and immensely fortunate to get five. Now, at the rate we’re going, I’m going to need a second book.”



# Zooming into the Sun with Solar Orbiter



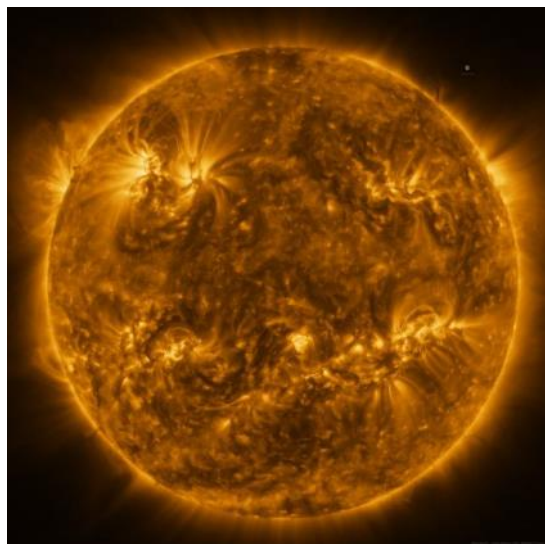
ABOVE: The European Space Agency's Solar Orbiter snapped an amazing image, en route to its first close pass near the Sun.

The images were snapped on March 7<sup>th</sup>, as Solar Orbiter passed directly between the Earth and the Sun. There was an explicit reason for this, as the science team wanted to calibrate and compare the images with Earth-based and missions in Earth orbit, to include the Inouye solar observatory, NASA's Solar Dynamics Observatory and the joint ESA/NASA Solar Heliospheric Observatory (SOHO), located at the Lagrange (L1) Sun-Earth point.

"From this point on-wards, we are 'entering the unknown,' as far as Solar Orbiter's observations of the Sun are concerned," says Solar Orbiter Project Scientist Daniel Müller in a recent press release.

The instruments used aboard the spacecraft included the Extreme Ultraviolet Imager (EUI) and the Spectral Imaging of the Coronal Environment (SPICE) imager. The EUI image alone represents the highest full disk resolution image of the Sun, looking right down through and capturing the corona and outer solar atmosphere.

The full disk SPICE image captures the Sun at the Lyman-beta wavelength in the ultraviolet, and represents one of the first images of its kind taken in 50 years, since the solar observation experiments aboard Skylab.



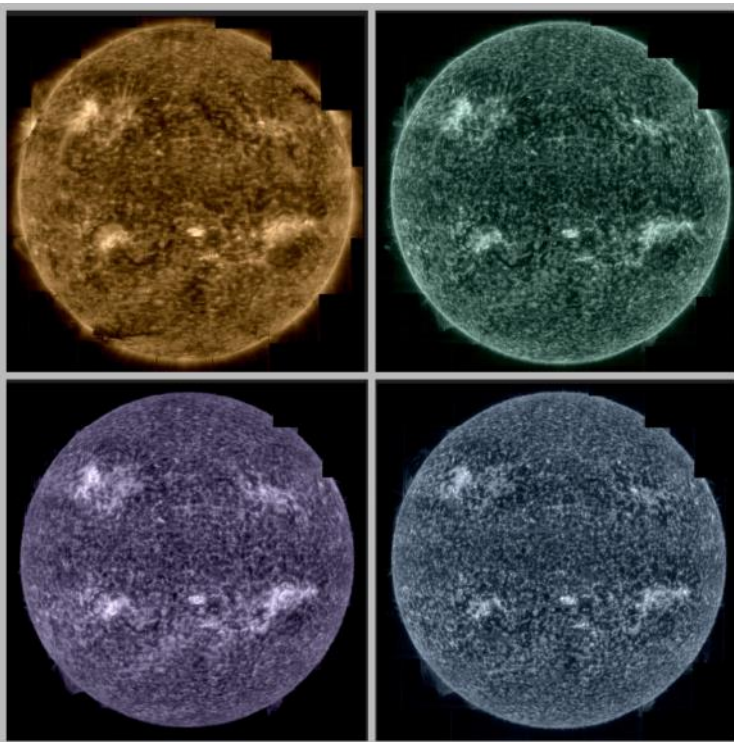
RIGHT: EUI full disc image of the Sun. Credit: ESA/Solar Orbiter

## ...Zooming into the Sun

Solar Orbiter snapped these images over a 4-hour session, while the probe was 75 million kilometers from the Sun, interior to the orbit of Venus. The Sun was large enough (two degrees across) from that distance that EUI needed a mosaic of 25 images to cover the entire disc of the Sun. The final result is laid out in a 9148 by 9112 grid of 83 million pixels, with a resolution 10 times better than your 4K TV screen.

The image includes filaments, nano-flares and spicules seen across the roiling surface of the Sun. Solar Orbiter observations will address the key question of how eruptions are born on the surface of the Sun, by characterizing the temperature of the Sun seen through successive layers.

You'd think that the Sun gets cooler, out through successive layers farther out... but the reverse is actually the case, as the outer corona reaches a million degrees versus the surface of the photosphere, at a relatively cool 5,000 degrees Celsius.



The SPICE sequence in particular shows temperature layers in color versus elemental composition: yellow (neon) at 630,000 degrees Celsius, green (oxygen) at 320,000 degrees Celsius, blue (carbon) 32,000 degrees Celsius, and purple (hydrogen) at a 'cool' 10,000 degrees Celsius.

LEFT: SPICE's temperature view of the Sun: one layer at a time. Credit: ESA

BELOW: The United Launch Alliance Atlas V rocket that carried the Solar into space. Credit: NASA

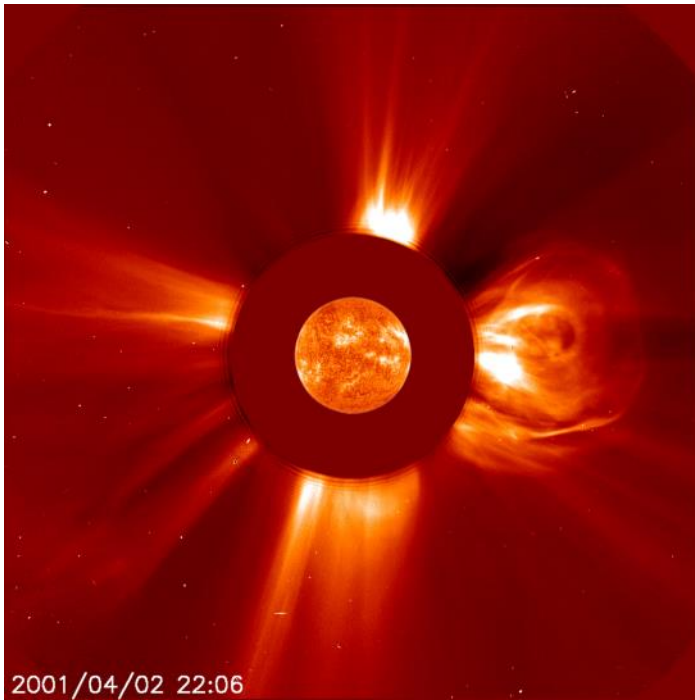
Launched on February 10<sup>th</sup>, 2020 atop an Atlas V rocket from Cape Canaveral Space Force (at the time, Air Force) Station, Solar Orbiter has a primary seven year mission to study the Sun. The mission comes at an auspicious time, as Solar Cycle 25 gets underway in earnest this year, en route to its peak around 2025, which may be one of the most powerful in decades.

Solar Orbiter just reached its closest perihelion yet on the 26 March 2022, passing 50 million kilometers from the Sun interior to the orbit of Mercury. Passages near Venus will gradually change the inclination of Solar Orbiter's path, gradually giving us views of the elusive polar regions of the Sun. Watch: <https://youtu.be/Lmo1y7ntwBs>

<https://www.universetoday.com/155178/esas-solar-orbiter-takes-a-ludicrously-high-resolution-image-of-the-sun/>



# Biggest Solar Flare ever Recorded



ABOVE: Largest ever recorded solar flare recorded by the SOO satellite : Image: NASA

At 4:51 p.m. EDT, on Monday, April 2, 2001, the sun unleashed the biggest solar flare ever recorded, as observed by the Solar and Heliospheric Observatory (SOHO) satellite. The flare was definitely more powerful than the famous solar flare on March 6, 1989, which was related to the disruption of power grids in Canada. This recent explosion from the active region near the sun's northwest limb hurled a coronal mass ejection into space at a whopping speed of roughly 7.2 million kilometers per hour. Luckily, the flare was not aimed directly towards Earth.

However, the burst was powerful enough to cause a short-wave radio blackout in some areas. Some airplane pilots, boat captains, and ham radio operators noticed the disturbance. Nasa classified the event as an X-class flare. More powerful solar flares can pose dangers to satellites, power lines, and even astronauts in space.

Solar flares, among the solar system's mightiest eruptions, are tremendous explosions in the atmosphere of the Sun capable of releasing as much energy as a billion megatons of TNT. Caused by the sudden release of magnetic energy, in just a few seconds flares can accelerate solar particles to very high velocities, almost to the speed of light, and heat solar material to tens of millions of degrees.

Solar ejections are often associated with flares and sometimes occur shortly after the flare explosion. Coronal mass ejections are clouds of electrified, magnetic gas weighing billions of tons ejected from the Sun and hurled into space with speeds ranging from 12 to 1,250 miles per second. Depending on the orientation of the magnetic fields carried by the ejection cloud, Earth-directed coronal mass ejections cause magnetic storms by interacting with the Earth's magnetic field, distorting its shape, and accelerating electrically charged particles (electrons and atomic nuclei) trapped within.

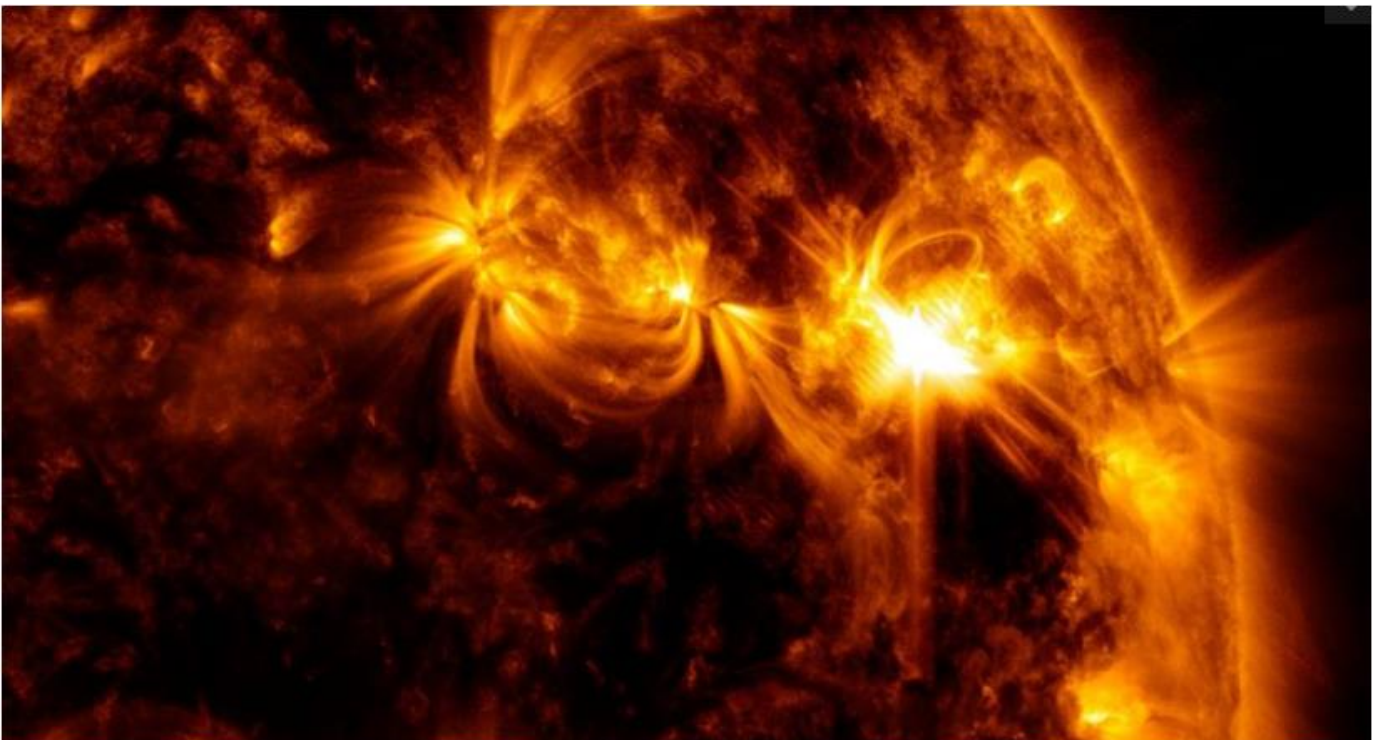


ABOVE: An illustration of the sun and sun flare with a planet to give scale to the size of the flare. Image: solarseven/iStoc

# ...Biggest Solar Flare ever Recorded

Severe solar weather is often heralded by dramatic auroral displays, northern and southern lights, and magnetic storms that occasionally affect satellites, radio communications and power systems. The flare and solar ejection has also generated a storm of high-velocity particles, and the number of particles with ten million electron-volts of energy in the space near Earth is now 10,000 times greater than normal. The increase of particles at this energy level still poses no appreciable hazard to air travelers, astronauts or satellites, and the NOAA SEC rates this radiation storm as a moderate S2 to S3, on a scale that goes to S5 .

An R4 blackout, rated by the NOAA SEC, is second to the most severe R5 classification. The classification measures the disruption in radio communications. X-ray and ultraviolet light from the flare changed the structure of the Earth's electrically charged upper atmosphere (ionosphere). This affected radio communication frequencies that either pass through the ionosphere to satellites or are reflected by it to traverse the globe.



ABOVE: This colorized image captured by NASA's Solar Dynamics Observatory space telescope shows a powerful solar flare blasting from the sun on March 31, 2022. Image credit :NASA)

NASA's orbiting Solar Dynamics Observatory captured yet another solar flare blasting from the same overactive sunspot that triggered radio blackouts and stunning aurora displays on Earth earlier this week.

The spacecraft, which watches Earth's parent star from 22,000 miles (36,000 kilometers) above the planet's surface, captured the flare, classified as a medium-strength type M, on Thursday (March 31) at 2:35 p.m. EDT (1835 GMT).

The Solar Dynamics Observatory images the sun's entire disk across a range of wavelengths every ten seconds, providing pictures with a resolution 10 times higher than that of high-definition television, according to NASA. This colorized image in particular shows the flare in the extreme ultraviolet part of the spectrum that highlights its high temperature.

Earth was hit before by separate geomagnetic storms on Monday and Tuesday, 13th & 14th March, according to government weather agencies in the U.S. and the U.K. Though the geomagnetic storms likely didn't cause any harm, according to a LiveScience report, they bring into focus the potential harm that could come from more powerful storms in the future.



# ASSA Durban Minutes of General Meeting

9 March 2022 - 19:30 via Jitsi (JHB) and Zoom (DBN)



## Attendees:

<b>Speaker:</b>	Clifford de Wit	
<b>Present</b>	ASSA – DBN members	ASSA – JHB members
<b>Apologies:</b>	Multiple apologies received due to load shedding	

### 1. Welcome (Johannesburg meeting)

- x The JHB Chairperson welcomed all attendees and visitors.

### 2. Guest Speaker

- x Clifford de Wit presented a talk on the fundamentals of Astro-photography

### 3. Durban Meeting

- x Durban members adjourned from JHB meeting.
- x Amith Rajpal welcomed the members into the Durban meeting.

### 4. Present and Apologies

- x see above

### 5. Previous meeting minutes

- X Minutes proposed by Piet Strauss and seconded by Mike Hadlow
- x There were no matters arising from previous minutes

### 6. Finance:

- 6.1 The Chairman presented the Treasurer's financial report received.

## ASSA DURBAN FINANCIALS 2022/03/09

Financials Meeting	Month	Current	Investment	Petty Cash
General Meeting	2022-03-09	R 22 497,22	R 61 362,58	R 1 000,00

## ASSA DURBAN - MEMBERS

Date	No off	Paid Members	Honoury	Removed
2022-03-09	128	128	4	0

### 6.2 Sky Guides:

- x All Sky Guides delivered, except 1 remaining to be collected.



# ...Minutes of the Meeting

## 7. Youth Project

- x Amith noted that members' children between ages 8 and 15 are encouraged to join
- x Once some member children have joined, we will reach out to other

## 8. Events

### 8.1 Monteseel

- x Monteseel 30 April.
- x Sheryl Venter is coordinator for Monteseel
- x A big event is expected so many telescopes and operators are needed
- x Some assistants will also help keep queues entertained
- x Mike Hadlow will coordinate stargazing, weather permitting
- x Since no planets will be in view, the focus will be on BIG 5
- x Monteseel shares their gate takings, so this is a fundraiser for ASSA

### 8.2 Viewing evenings

- x Next viewing 1 April, Maryanne & Brian Finch to host.
- x Further dates 29 April & 3 June.

### 8.3 Sutherland Trip

- x Mango flights not available but we might get a part of deposit returned
- x Accommodation venues are willing to refund deposits, except one venue that can no longer be reached.
- x Some members paid direct and will need to try and arrange their own refunds

## 9. General

- x Don thanked the ASSA members for being an inspiration. He will attempt to contact a local astronomy group in Finland.
- x The next General Meeting will be held on **13th April 2022**
- x Times and venue details will be sent via email and WhatsApp

## 10. Meeting closed

- x The Chairman closed the meeting at 21:40

## **ASSA DURBAN ZOOM MEETING DETAILS**

Meeting ID: **88037701479**

Passcode: **297674**



# Public Viewing Roster ASSA Durban



Dome Master	Phone	Assistant	Telescope Volunteer	New Moon	Public Viewing
Mike Hadlow	083 326 4085	Alan Marnitz		30 April 2022	29 April 2022
				30 May 2022	03 June 2022

## PUBLIC VIEWING RESUMED:

Public viewing is allowed back on site at the school in the dome and around the pool; due to revised lockdown level. This may change according to any revised lockdown conditions.

Please note there is a roster with a booking system. Once the number of telescopes are confirmed, Individuals will be contacted to confirm dates and times. Please book your place !

Kindly note, everyone will be required to adhere to the Covid & social distancing regulations of 1.5m and all will need to sign the attached mandatory questionnaire. Temperatures will also be taken on site.

## NOTIFY OBSERVATORY MANAGER:

Members interested in attending the above viewing evenings and/or becoming involved in assisting with the viewing evenings, please send your names to Mike Hadlow at the following address:  
[mike@astronomydurban.co.za](mailto:mike@astronomydurban.co.za)

Volunteers to please identify which role you are willing to assist with, Dome Master, Viewing Assistant or a Telescope Volunteer.

After which, attendance will be confirmed and viewing dates will be announced.

## VOLUNTEERS REQUIRED:

**Dome Master** - Taking responsibility for the viewing evenings and learning how to set up, manage and use the new telescope.

**Viewing Assistant** - Learning about the new telescope, assisting with the viewing evenings, assisting viewing members as required.

**Telescope Volunteers** - Members willing to bring their telescopes to the viewing evenings to set up around the pool for public viewing. **VOLUNTEERS REQUIRED:**

Viewing Contacts:	Phone	Email
Mike Hadlow	083 326 4085	<a href="mailto:mike@astronomydurban.co.za">mike@astronomydurban.co.za</a>
Alan Marnitz		<a href="mailto:alan@astronomydurban.co.za">alan@astronomydurban.co.za</a>
John Gill		<a href="mailto:john@astronomydurban.co.za">john@astronomydurban.co.za</a>

# Notice Board

## MEETINGS:

- GENERAL MEETING: to be held on **13th April 2022**
- PUBLIC VIEWING MEETINGS - please refer to website under the tab "Viewing and Events" for any updates with regards dates & public viewing under the current Covid restrictions; or click here: <https://astronomydurban.co.za/events-viewing/>

## MNASSA:

- Monthly Notes of the Astronomical Society of Southern Africa.
- Available at [www.mnassa.org.za](http://www.mnassa.org.za) to download your free monthly copy.

## NIGHTFALL:

- Fantastic astronomy magazine. Check it out.
- Available from the ASSA website [assa.saao.ac.za/about/publications/nightfall/](http://assa.saao.ac.za/about/publications/nightfall/)

## MEMBERSHIP FEES & BANKING:

- Many thanks to all the members who have paid their Membership fees for the 2021-07-01 to 2022-06-30 financial year.

Membership fees are indicated below:

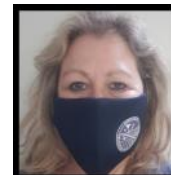
- Single Members: **R 170:00**
- Family Membership: **R 200:00** for parents
- Under 18 members: **Free**
- Cash/Cheques: **Please note: NO cheques or cash will be accepted**
- Account Name: **ASSA Natal Centre**
- Bank: **Nedbank**
- Account No. **1352 027 674**
- Branch: **Nedbank Durban North**
- Code: **135 226**
- Reference: **SUBS - SURNAME and FIRST NAME**
- Proof of Payment: [treasurer@astronomydurban.co.za](mailto:treasurer@astronomydurban.co.za)



## SKY GUIDE 2022 and ASSA MASKS - Limited number available !!!

- SKY GUIDES **SOLD OUT**
- MASKS: **R 50:00** each with payment reference: MK - SURNAME and FIRST NAME

Please ensure proof of payment is sent to [treasurer@astronomydurban.co.za](mailto:treasurer@astronomydurban.co.za)



## RESIGNATIONS from ASSA:

Please send an email immediately notifying the Secretary of your wish to resign from the society to : [secretary@astronomydurban.co.za](mailto:secretary@astronomydurban.co.za)

## NEW COMMITTEE POSITIONS & CONTACTS:

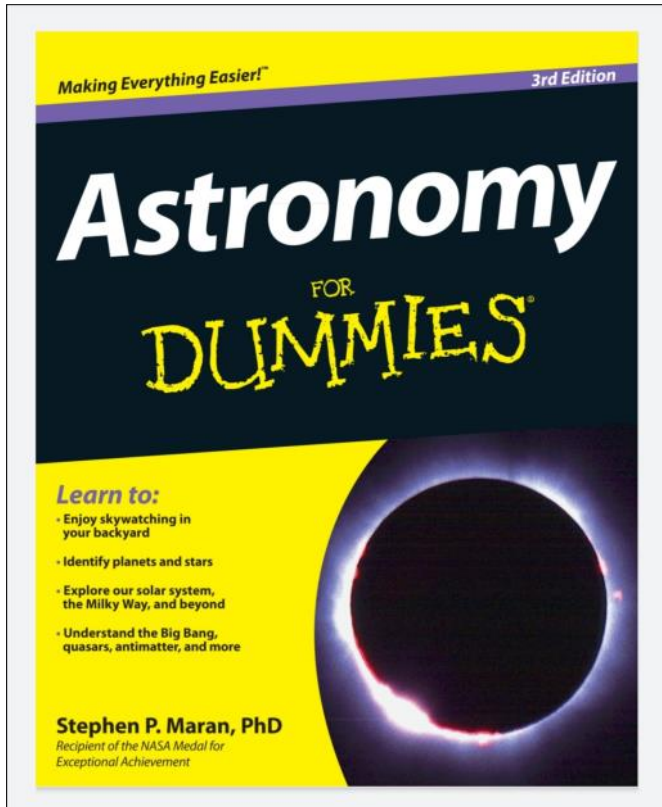
• Chairman	Amith Rajpal	Amith@astronomydurban.co.za	
• Vice Chair	Debbie Abel	Debbie@astronomydurban.co.za	
• Secretary	Francois Zinserling	Secretary@astronomydurban.co.za	
• Treasurer	Corinne Gill	Treasurer@astronomydurban.co.za	
• Guest Speaker Liaison	Piet Strauss	Piet@astronomydurban.co.za	
• Observatory & Equipment	Mike Hadlow	Mike@astronomydurban.co.za	083 326 4085
• Observatory Assistant	Alan Marnitz	Alan@astronomydurban.co.za	
• Publicity & Librarian	Claire Odhav	Claire@astronomydurban.co.za	083 395 5160
• Out-Reach - Public	Sheryl Venter	Sheryl@astronomydurban.co.za	082 202 2874
• Out-Reach - Schools	Sihle Kunene	Sihle@astronomydurban.co.za	
• St. Henry's Marist College Liaison	Moya O'Donoghue	Moya@astronomydurban.co.za	
• 'nDaba Editor, Website & Facebook	John Gill	John@astronomydurban.co.za	083 378 8797

## ELECTRONIC DETAILS:

- Website: [www.astronomydurban.co.za](http://www.astronomydurban.co.za)
- Emails : [AstronomyDurban@gmail.com](mailto:AstronomyDurban@gmail.com)
- Instagram: <https://www.instagram.com/astronomydurban/>
- Facebook: <https://www.facebook.com/groups/376497599210326>

# Librarian's Book Review / For Sale:

## Astronomy for Dummies (3rd Edition)



## Contents at a Glance

<i>Introduction</i> .....	<b>1</b>
<i>Part I: Stalking the Cosmos</i> .....	<b>5</b>
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This book will soon be available as an Epub in our online library. If you would like a copy emailed to you, contact the librarian directly.

Do you know the difference between a red giant and a white dwarf? From asteroids to black holes, this easy-to-understand guide takes you on a grand tour of the universe. Astronomy For Dummies provides an easy-to-follow introduction to the night sky. Plus, this new edition also gives you the latest theories, explanations, and insights into the basic workings of the universe. Collects new websites, lists of telescope motels, sky-watching guides, and suggestions for beginner's telescopes and suppliers. Whether you're an amateur astronomer, space enthusiast, or enrolled in a first year astronomy course, Astronomy For Dummies has you covered. Stephen P. Maran, PhD, is a 36-year veteran of the space program who has worked on numerous NASA projects, including the Hubble Space Telescope. He is the press officer of the American Astronomical Society.

## BOOKS For Sale:

- R 125 - Listopia : Space
- R 60 - Space Exploration
- R 45 - Sun, Moon, Stars
- R 65 - Discover Space
- R 105 - Quantum Fuzz
- R 65 - Spot 50 Space
- R 40 - Smart kids - Space
- R 50 - Inside Space Machines
- R 70 - Astronomy

Contact Claire:

[Claire@astronomydurban.co.za](mailto:Claire@astronomydurban.co.za)

