

## Society News

### The Observatory is still Closed and All Monthly Meetings are Cancelled Until Further Notice

We are still unable to hold meetings during the current Covid-19 virus pandemic.

The VAS Observatory is closed and all meetings are currently cancelled.

## Important Latest News

The current COVID 19 restrictions regarding both normal and monthly meetings mean we still have no sensible choice but to remain closed to both members and the general public.

As you know all monthly meetings for this year were postponed back in March. There are some efforts being made to re-open the Pavilion but these are not yet completed and, more importantly to VAS, will seriously impact the number allowed into that building.

In addition, the current thinking would place all responsibility for Pavilion cleaning with the last user of the facility. This is something that would place a great responsibility on those attending/organising and is not something the VAS committee feel at all comfortable with.

**Unless things change dramatically there will be no monthly meetings for the remainder of 2020.**

Many members really look forward to our monthly meetings and I'm sure have been missing them. Many may consider these to be a major reason for membership. Please be sure that the Committee is very aware that 2020 has been a difficult time for everyone and we will be doing our best to repay each member's loyalty to the Society in the near future.

We are, fortunately, in good financial health and look forward to a steady and suitable end to this worldwide problem.

*Stay safe and well.*

*Brian Curd  
Observatory Director and NZ Editor*

## VAS Website: [wightastronomy.org](http://wightastronomy.org)

Submissions or letters to New Zenith are always welcome and should be sent to:

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Material for the next issue by the 6th of the month please.

The Vectis Astronomical Society and the Editor of the New Zenith accept no responsibility for advice, information or opinion expressed by contributors.

**Registered Charity No 1046091**

## Observatory Diary

**The diary is currently empty!**

## VAS Website: [wightastronomy.org](http://wightastronomy.org)

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## 2020 Monthly Meetings

Check <http://www.wightastronomy.org/meetings/> for the latest information

### All Monthly Meetings are Cancelled Until Further Notice

We are unable to hold meetings during the current Covid-19 virus pandemic.

All meetings are currently cancelled and the VAS Observatory is closed. The government will let us know when the situation changes and, of course, we will contact members both here and via the website and social media when that situation changes.

I hope we can resume normal activities soon but we find ourselves affected by a very serious situation.

*Stay safe and well and let's hope we're back to normal soon.*

*Please read the latest news on the front page.*

## Observatory Visits Booked

### All Observatory Visits are Cancelled Until Further Notice

Please see the important information above this.

## IMPORTANT

Could all VAS members please ensure they notify the Membership Secretary of any change of address. To ensure our compliance with GDPR rules, we must maintain accurate membership records.

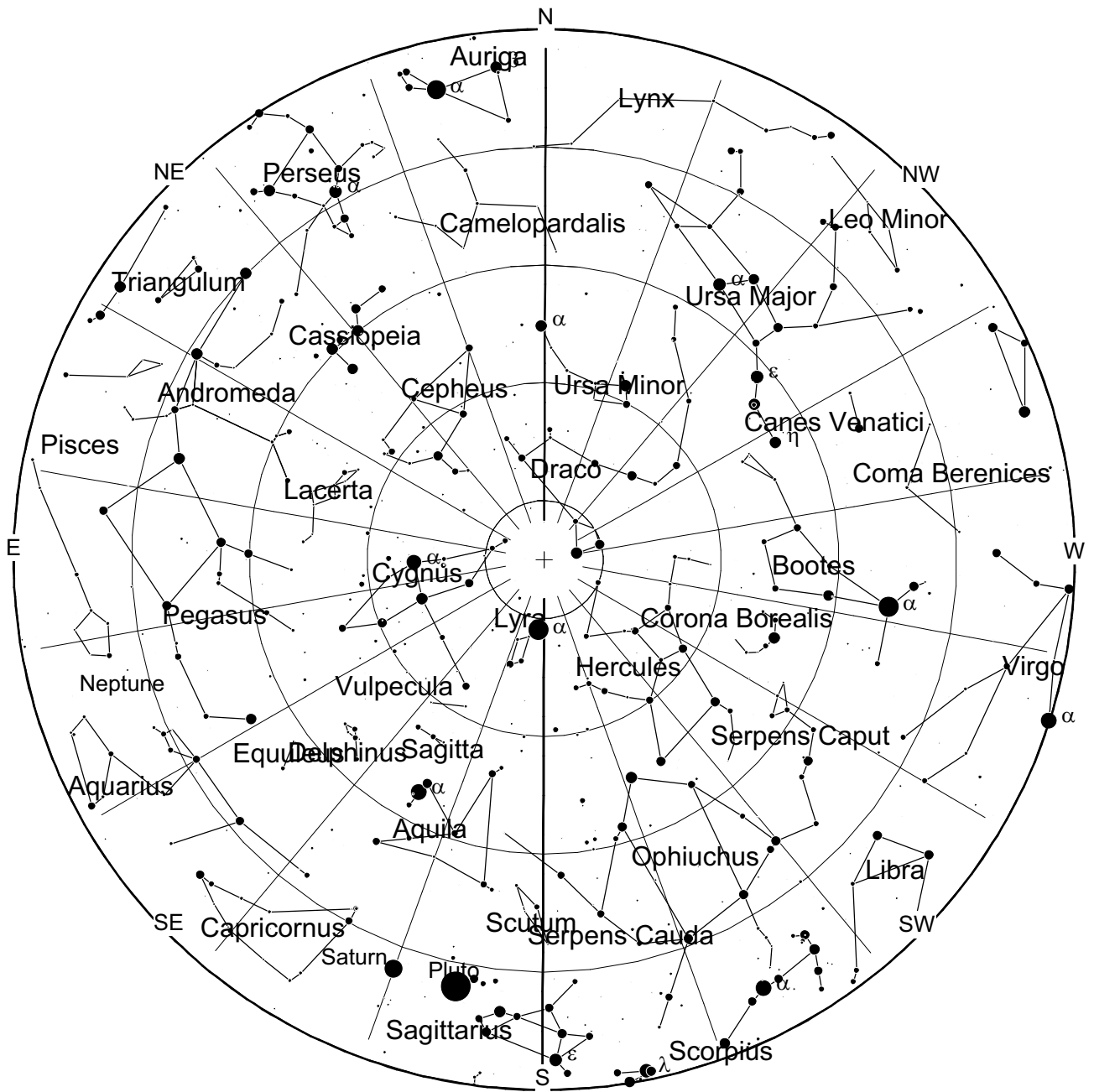
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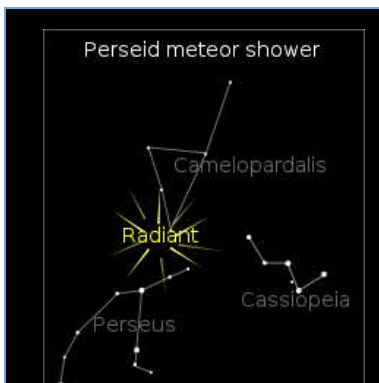
## Important

**Sorry, but the Observatory is still closed to all members and visitors until further notice**

# August 2020 Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 August 2020



The **Perseids** are a prolific meteor shower associated with the comet Swift - Tuttle. The meteors are called the Perseids because the point from which they appear to hail (called the radiant) lies in the constellation Perseus.





The stream of debris is called the Perseid cloud and stretches along the orbit of the comet Swift - Tuttle. The cloud consists of particles ejected by the comet as it travels on its 133-year orbit. Most of the particles have been part of the cloud for around a 1000 years. However, there is also a relatively young filament of dust in the stream that was pulled off the comet in 1865, which can give an early mini-peak the day before the maximum shower. The dimensions of the cloud in the vicinity of the Earth are estimated to be approximately 0.1 astronomical units across and 0.8 AU along the latter's orbit, spread out by annual interactions with the Earth's gravity

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It uses material from the Wikipedia article "Perseids".

## August 2020 Night Sky

### Moon Phases

New	First Qtr	Full	Last Qtr
			
19th	25th	3rd	11th

### Planets

#### Mercury

Mercury continues its morning apparition becoming a difficult object as it gets closer to the Sun during towards the beginning of the second week.

Mercury Azimuth and Altitude at 05:15		
Date	Azimuth	Altitude
2nd	67	9
4th	65	7
6th	64	6
8th	63	4
10th	62	3

#### Venus

Venus holds its position in the east as the Morning Star this month. Rising at about 3AM and visible until sunrise or if it is clear beyond, if observed at the same time every day Venus appears in the same position in the sky.

#### Mars

In the constellation of Pisces, rising at about midnight, at magnitude -1.0 Mars is the brightest object in that part of the sky. It shines with a distinct red hue and through a telescope shows some surface features. Over the coming month its size will increase noticeably.

#### Jupiter

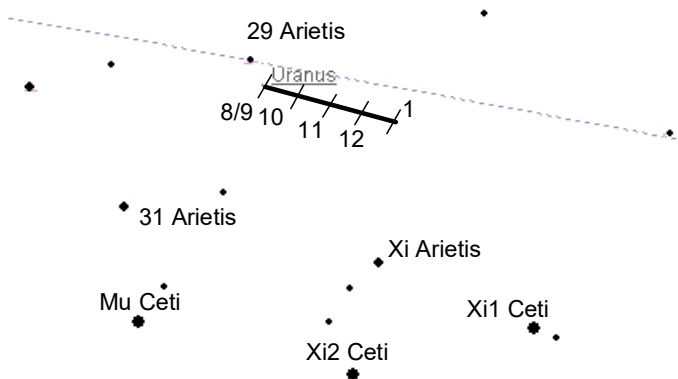
Jupiter is visible in the southern sky from just after sunset until the planet sets at about 3AM. The best time for observation is an hour or so either side of midnight when the sky is dark enough and the planet is clear of the horizon. It does not get very high in the sky so the available time for clear views is limited.

#### Saturn

Saturn is almost three magnitudes fainter than Jupiter, a very noticeable difference. It is about 7 degrees to the east of Jupiter so observation times are very similar.

### Uranus

Look about 5 degrees above the fourth magnitude star Mu Ceti to find Uranus. Although Uranus is in the constellation of Aries the nearest bright star is in Cetus. See the finder chart for the position of Uranus until January next year, it shows stars to about 1 magnitude fainter than Uranus. During August it hardly moves against the star background, and only starts moving during September.



*Uranus Finder Chart - August 1 to January 1 2021*

### Neptune

Neptune can be found 3 degrees to the east of the fourth magnitude star Phi Aquarii. At magnitude 8 Neptune needs to be well above the horizon to be observable; it can be observed from about 1AM onwards.

### Perseids Meteor Shower

The maximum of the Perseids meteor shower is expected on the night of the 12/13th, but look for Perseid meteors on the nights of the 11th to 13th as well; there are still plenty of meteors to be seen a few nights either side of the maximum. Unlike last year the shower is not hampered too much by bright moonlight. The last quarter moon rises just after midnight, so only early morning viewing will be impaired. The best direction to look for the longest meteors is between 45 and 90 degrees away from the shower radiant point which is actually in Cassiopeia close to the border with Camelopardalis and Perseus.

### Deep Sky

#### **M27 The Dumbbell Nebula** RA 19h 59m Dec 22° 44' mag 7.5

The summer sky's show piece planetary nebula can easily be seen as a rectangular patch of light bluish grey nebulosity with 10x50 binoculars. It is quite a large object; almost half the diameter of the full moon. A small telescope will show some detail, and some users of large telescopes even claim to be able to see traces of colour. The nebula consists of multiple gas shells moving away from the central star some moving at speeds of 30km/s.

**M24 Sagittarius Star Cloud**  
**RA 18h 16m Dec -18° 43'**



This object is big! Eight times the area of the full moon. It is an object full of objects, open clusters, dark nebulae and even a planetary nebula. Use any optical aid you have, binoculars for wide field views and a telescope for closer examination. This is one of, if not the best star fields in the galaxy; don't miss it.

**Stock 1 Open Cluster**  
**RA 19h 36m Dec 25° 13' mag 5.3**



A little over a fingers width east of Alpha Vulpeculae lays a large misty patch of the Milky Way. This is Stock 1, a rich open cluster where the brighter stars are rather spread out floating over a misty haze of the dimmer cluster members and background Milky Way. Although this cluster is a nice sight in binoculars it does not give its best; a small telescope using magnification up to about 60 gives a much better view. The brighter stars tend to form angular patterns rather than the more 'normal' curved chains.

*Peter Burgess*

**Get Pictures from the ISS, Learn about Radio Communication!**



Would you like to receive pictures directly from the International Space Station (ISS) and become a radio communication pro? Then watch this instructional video, prepared for you by the ESA Education team with several of its ESERO Offices and other international partners, such as ARISS and the Goonhilly Earth Station.

You'll find out how to use a software-defined radio receiver accessible from a web browser to collect the ISS pictures. A range of step-by-step tutorials will show you how to set up the required software, test it and then obtain the pictures the ISS is sending on your computer or smartphone. There are seven tutorials in total covering Windows 7, Windows 10, Mac OS, Raspberry Pi, Ubuntu, iOS/iPhone and Android.

Please note that we are expecting the ISS to transmit pictures in the next weeks for the 45th anniversary of the Apollo-Soyuz test project. A perfect opportunity to try this activity for real yourself!

**Note for the teachers**

This activity is focused on strengthening the learning of curricular topics, such as the electromagnetic spectrum and radio waves behaviour and propagation, through amateur radio communication techniques.

The practical activity presented will be in future complemented by additional classroom resources that include simple additional experiments.

More at: <https://www.esa.int/Education/>

## Alaskan Seismometers Record the Northern Lights



*Aurora near Poker Flats, Alaska.*

*Credit: Aaron Lojewski, Fairbanks Aurora Tours*

Aaron Lojewski, who leads aurora sightseeing tours in Alaska, was lucky enough to photograph a “eruption” of brilliant pink light in the night skies one night in February.

The same perturbations of the Earth's magnetic field that lit up the sky for Lojewski's camera were also captured by seismometers on the ground, a team of researchers reports in the journal *Seismological Research Letters*.

By comparing data collected by all-sky cameras, magnetometers, and seismometers during three aurora events in 2019, University of Alaska Fairbanks seismologist Carl Tape and colleagues show that it's possible to match the striking display of lights with seismic signals, to observe the same phenomenon in different ways.

Researchers have known for a while that seismometers are sensitive to magnetic fluctuations--and have worked hard to find ways to shield their instruments against magnetic influence or to remove these unwanted signals from their seismic data. But the aurora study offers an example of how seismometers could be paired with other instruments to study these fluctuations.

“It can be hard to be definitive that these seismometer recordings are originating from the same influence as what's going on 120 kilometers up in the sky,” Tape said. “It helps to have a simultaneous view of the sky, to given

you more confidence about what you're seeing from the signals at ground level.”

The aurora borealis, or northern lights, occurs when solar winds--plasma ejected from the Sun's surface--meet the protective magnetic field that surrounds the Earth. The collision of particles produces colourful lights in the sky and creates fluctuations in the magnetic field that are sometimes called solar or space “storms.” Magnetometers deployed on the Earth's surface are the primary instrument used to detect these fluctuations, which can significantly impact electrical grids, GPS systems and other crucial infrastructure. The aurora is commonly visible in wintertime in high-latitude regions such as Alaska.

The seismometers in the study are part of the USArray Transportable Array, a network of temporary seismometers placed across North America as part of the EarthScope project. The array in Alaska and western Canada was completed in the fall of 2017. The aurora paper is one of several included in an upcoming SRL focus section about EarthScope in Alaska and Canada.

These temporary seismic stations are not shielded from magnetic fields, unlike more permanent stations that are often cloaked in mu-metal, a nickel-iron alloy that directs magnetic fields around the instrument's sensors. As a result, “I was blown away by how well you can record magnetic storms across the array,” said U.S. Geological Survey seismologist Adam Ringler, a co-author on the SRL paper.

Last month, Ringler and his colleagues published a paper demonstrating how the array's 200-plus seismometers in Alaska can be used to record space weather, potentially augmenting the 13 magnetometers in operation in the state.

Along with the all-sky camera data, seismic array data can help make sense of the strong variations in the magnetic field that occur in a magnetic east-west direction, adding a second dimension to typical north-south directional studies of the aurora and other magnetic storms, Tape and colleagues suggest.

The researchers noted in their paper that the link between the aurora borealis and magnetic perturbations was first discovered in Sweden in 1741, and that a seismometer in Germany detected an atmosphere-generated magnetic event for the first time during a strong solar storm in 1994.

“People have been making these connections for 250 years,” Tape said. “This shows that we can still make discoveries, in this case with seismometers, to understand the aurora.”

*From: <https://www.eurekaalert.org/>*

## Antarctic Ice Dome May Offer the Clearest Views of the Night Sky



*Antarctica offers some pretty spectacular views of the night sky, like this image of the Milky Way taken on the Antarctic Peninsula. Now, researchers have found that a high-altitude site in East Antarctica may offer the world's clearest views of the celestial sphere.*

*Credit: Goinyk/istock/Getty Images Plus*

An observatory in the heart of Antarctica could have the world's clearest views of the night sky.

If an optical telescope were built on a tower a few stories tall in the middle of the Antarctic Plateau, it could discern celestial features about half the size of those typically visible to other observatories, researchers report online July 29 in *Nature*. The observatory would achieve such sharp vision by peering above the atmosphere's lowermost layer, known as the boundary layer, responsible for much of the undulating air that muddles telescope images.

The thickness of Earth's boundary layer varies across the globe. Near the equator, it can be hundreds of meters thick, limiting the vision of premier optical telescopes in places like the Canary Islands and Hawaii. Those telescopes usually cannot pick out celestial features smaller than 0.6 to 0.8 arc seconds — the apparent width of a human hair from about 20 meters away.

“But in Antarctica, the boundary layer is really thin,” says Bin Ma, an astronomer at the Chinese Academy of Sciences in Beijing, “so it is possible to put a telescope above.”

Ma and colleagues took the first-ever measurements of nighttime atmospheric blur from the highest point in East Antarctica, called Dome A. From April to August 2019, instruments on an 8-meter-tall tower at China's Kunlun research station tracked how Earth's atmospheric turbulence distorted incoming starlight. A nearby weather station also monitored atmospheric conditions, such as temperature and wind speed. Using these observations,

researchers characterized the boundary layer at Dome A and its effect on telescope observations.

The boundary layer was, on average, about 14 meters thick; as a result, the light sensors at the top of the 8-meter tower were completely free of boundary layer blur only about one-third of the time. But when these instruments were above the layer, atmospheric interference was so low that a telescope could pick out details on the sky 0.31 arc seconds across, on average. The best recorded atmospheric conditions would let a telescope see features as small as 0.13 arc seconds.



*From April to August 2019, instruments atop an 8-meter-tall tower at China's Kunlun research station in East Antarctica observed how the local atmosphere distorted light from celestial objects. Credit Zhaohui Shang*

“One-tenth of an arc second is extremely good,” says Marc Sarazin, an applied physicist at the European Southern Observatory in Munich who was not involved in the work. This is “really something you rarely achieve in Chile or on Mauna Kea” in Hawaii.

Researchers have found similarly excellent visibility above the boundary layer at another spot on the Antarctic Plateau, known as Dome C. But the boundary layer there is around 30 meters thick — making it more difficult to build an observatory above it. An optical telescope planned for construction on a 15-meter tower at Kunlun could take advantage of Dome A's stellar views above the boundary layer, Ma says. Such crisp telescope images could help astronomers study a range of celestial objects, from solar system bodies to distant galaxies.

*From: <https://www.sciencenews.org/>*

## Scientists Unveil Largest Ever 3D Map of the Universe



*This map shows 11 billion years of the universe's history, with galaxies closest to Earth appearing in purple and blue, and distant galaxies in yellow and red.*

*Image: © EPFL*

After five years of peering into the deepest reaches of space, researchers have released what they call the “largest three-dimensional map of the universe” ever. No, you cannot see your house.

The mind-boggling map is the result of an ongoing project called the Sloan Digital Sky Survey (SDSS) - an ambitious, international quest to map the expansion of the observable universe, and hopefully solve a few cosmic conundrums in the process. With this newest update, the project has mapped and measured more than 2 million galaxies, stretching from our Milky Way to ancient objects more than 11 billion light-years away.

The detailed new map will help astronomers piece together a murky period of the universe's expansion known as “the gap.”

“We know both the ancient history of the universe and its recent expansion history fairly well, but there's a troublesome gap in the middle 11 billion years,” Kyle Dawson, a cosmologist at the University of Utah and lead researcher of the project, said in a statement. “For five years, we have worked to fill in that gap.”

The gap begins a few billion years after the Big Bang. Scientists are able to measure the rate of the universe's expansion before this thanks to the cosmic microwave background - ancient radiation left over from the infancy of the universe that researchers can still detect; and they can calculate recent expansion by measuring how the distance between Earth and nearby galaxies increases over time. But expansion in the middle period has been little studied because the light of galaxies more than a few

hundred million light-years away can be incredibly faint. To fill in the gap, a team of more than 100 scientists from around the world looked at not just distant galaxies, but also bright-burning quasars (extremely luminous objects powered by the hungriest black holes in the cosmos).

Key to this survey is a phenomenon called redshift - a process by which light from the most ancient, distant galaxies is literally stretched by the expansion of the universe, increasing its wavelength and shifting it toward the redder end of the spectrum. As a result of this cosmic color-change, distant light sources appear redder, while those nearer to Earth look bluer.

To calculate the rate of cosmic expansion 11 billion years ago, the team measured the redshift of millions of distant objects along with their velocities - a measurement that shows how much a galaxy is being tugged by the gravity of other matter around it. The team's results, which are described in 23 new studies released on July 20, show that the universe began expanding at an increased rate about 6 billion years ago, following a period of deceleration.

Scientists attribute the universe's expansion to a mysterious force called dark energy, though no one is entirely sure what it is or where it exists. Surveys like this one help scientists better constrain the properties of dark energy, the researchers said, though it remains far from understood. The solution to that conundrum will have to wait for another day ... hopefully one not too many billions of years away.

*Video and links: <https://www.livescience.com/largest-3d-universe-map.html>*

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## NASA Wants to Protect Moon and Mars from Human Contamination

**It has updated its policies to make sure humans don't contaminate the new worlds we're exploring.**

NASA wants to make sure we don't unknowingly take organisms or other contaminants from Earth to other worlds (and vice-versa) when humans start exploring space beyond Low Earth Orbit. In a tweet, NASA Administrator Jim Brindestine has announced that the agency has updated its policies to reflect that commitment ahead of the upcoming Artemis missions. “We will protect scientific discoveries and the Earth's environment, while enabling dynamic human exploration and commercial innovation on the Moon and Mars,” he wrote.



While the space agency has been sending rovers and other unmanned spacecraft to the Moon and Mars, it's concerned about the biological contaminants associated with human presence. If we unknowingly take contaminants to other worlds when we start human exploration, we risk compromising the search for extraterrestrial life. At the same time, NASA wants to ensure its crewed missions don't cause adverse changes to Earth's environment with the introduction of contaminants from outer space.

The agency has issued two Interim Directives to update its policies, with the first one focusing on robotic and crewed missions traveling to and from the Earth's Moon. NASA Science Mission Directorate Thomas Zurbuchen explained: "We are enabling our important goal of sustainable exploration of the Moon while simultaneously safeguarding future science in the permanently shadowed regions. These sites have immense scientific value in shaping our understanding of the history of our planet, the Moon and the solar system."

Meanwhile, the second directive focuses on biological contamination for Earth-Moon to Mars missions. The agency says it will use data and experience gained via ground-based tests to conjure guidelines and develop capabilities to monitor biological processes associated with human presence in space exploration. It also aims to develop technologies to mitigate contamination, such as more effective waste disposal tools and techniques. In addition, the agency wants to have a better understanding of Martian environmental processes in order to figure how to properly sterilize terrestrial organisms released by human activity.

NASA is hoping to send the next man and the first woman to the Moon by 2024 and to establish a sustainable human presence there.

From: <https://www.engadget.com/>

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## New Scope to Study Solar Flares

Fortunately, the ways in which we can peer into the mists of the void are increasing, and now include Kyoto University's 3.8 meter Seimei telescope.

Using this new instrument - located on a hilltop in Okayama to the west of Kyoto - astronomers from Kyoto University's Graduate School of Science and the National Astronomical Observatory of Japan have succeeded in detecting 12 stellar flare phenomena on AD Leonis, a red dwarf 16 light years away. In particular, one of these flares was 20 times larger than those emitted by our own sun.

"Solar flares are sudden explosions that emanate from the surfaces of stars, including our own sun," explains first author Kosuke Namekata.



"On rare occasions, an extremely large superflare will occur. These result in massive magnetic storms, which when emitted from our sun can significantly effect the earth's technological infrastructure."

Hence understanding the properties of superflares can be vital, but their rareness means that data from our sun is difficult to gather. This has led researchers to look for exoplanets similar to earth, and to examine the stars they orbit.

Writing in the Publications of the Astronomical Society of Japan, the team reports on a long week of setting the sights of Seimei - along with other observational facilities - to AD Leonis.

This M-type red dwarf has temperatures lower than that of our sun, resulting in a high incidence of flares. The team expected a number of these to be large, and were astounded to then detect a superflare on their very first night of observations.

Light from excited hydrogen atoms of the superflare exhibited an amount of high-energy electrons roughly one order of magnitude greater than typical flares from our sun.

"It's the first time this phenomenon has been reported, and it's thanks to the high precision of the Seimei Telescope," says Namekata.

The team also observed flares where light from excited hydrogen atoms increased, but did not correspond with an increase in brightness across of the rest of the visible spectrum.

"This was new for us as well, because typical flare studies have observed the continuum of the light spectrum - the broad range of wavelengths - rather than energy coming from specific atoms," continues Namekata.

The high-quality of these data was thanks to the new telescope, which the team hopes will open doors to new revelations regarding extreme space events.

<https://phys.org/news/>

## The Euclid Space Telescope is Coming Together



*VIS and NISP instruments on Euclid's payload module.  
Credit: Airbus*

ESA's Euclid mission has reached another milestone on its journey towards launch. Its two instruments are now built and fully tested. These have been delivered to Airbus Defence and Space in Toulouse, France, where they are now being integrated with the telescope to form the mission's payload module.

Euclid consists of a 1.2-meter mirror telescope that is designed to work at both visible and near-infrared wavelengths - the latter being just longer than the red light humans can see. The telescope will collect light from distant cosmic objects and feed it into two instruments.

The Visible instrument (VIS) and the Near Infrared Spectrometer and Photometer (NISP) will run in parallel, recording data simultaneously from whatever portion of the sky the telescope is pointed at.

Euclid's mission is to measure the shapes of more than a billion galaxies, and the accurate redshifts of tens of millions of galaxies across more than one third of the sky. The redshift is an effect caused by the expansion of the Universe. It stretches the wavelength of light emitted by distant galaxies; the further away the galaxy, the more extreme its redshift. The galaxies in Euclid's survey will span 10 billion years of cosmic history, and allow scientists to investigate the mysterious dark matter and dark energy that are thought to dominate the Universe.

The VIS instrument will handle the precise measurement of galaxy shapes by taking the very best images of distant galaxies that it possibly can. To do this, the instrument uses a mosaic of 36 CCDs, each of which contains 4000 pixels by 4000 pixels. This gives the detector a total of about 600 megapixels.

“The design, development, manufacturing, testing and calibration of the VIS instrument over a dozen years to a stringent specification has been a challenge,” says Mark Cropper, VIS instrument Lead and Professor at the UCL Mullard Space Science Laboratory, UK.

“We are immensely proud of what the VIS Team has achieved to bring this project to its culmination. That the final performance exceeds our expectations is a tribute to their expertise, dedication and professionalism.”

Not only is the number of pixels impressive, the instrument will also deliver the best low-light sensitivity over a broad range of wavelengths at long integration times.

“These are very special CCDs, they've been developed specifically for Euclid over many years,” says Alex Short, ESA's VIS payload engineer.

The other instrument, NISP, is dedicated to making spectroscopic measurements of galaxies, which involves splitting their light into individual wavelengths. This allows the redshifts to be deduced. This property allows cosmologists to estimate the distance to the galaxy in question, and will allow Euclid's data to be turned into the largest, most accurate 3-D survey of the Universe ever conducted.

“The international NISP team and supporting industries made an incredible job to design, develop and test this challenging instrument,” says Thierry Maciaszek, NISP instrument project manager, from CNES and Laboratoire d'Astrophysique de Marseille, France.

“This is, however, not the end of the story for us as many major activities have to be completed with NISP at satellite level. We are waiting impatiently for the first light in flight demonstrating the excellent global performances.”

The NISP detector will feature the largest field of view ever flown in space for an infrared instrument.

“The quality of the optics is just amazing,” says Tobias Boenke, Mission System & NISP Instrument Engineer at ESA.

*Much more at: <https://phys.org/news/2020-07-euclid-space-telescope.html>*

## Coastal Cities Leave up to 75% of Seafloor Exposed to Harmful Light Pollution

The global expansion of coastal cities could leave more than three quarters of their neighbouring seafloor exposed to potentially harmful levels of light pollution.

A study led by the University of Plymouth (UK) showed that under both cloudy and clear skies, quantities of light used in everyday street lighting permeated all areas of the water column.

This could pose a significant threat to coastal species, with recent research showing the presence of artificial skyglow can disrupt the lunar compass species use when covering long distances.

However, the current study found that the colour of the wavelengths shone at the surface had a marked difference on how much biologically important light pollution reached the seafloor.

Many of the white LEDs now being used to illuminate the world's towns and cities use a mixture of green, blue and red wavelengths to generate their brightness.

Green and blue wavelengths left up to 76% and 70% of the three-dimensional seafloor area exposed to light pollution respectively, while the presence of red light was less than 1%.

The research - which also involved Bangor University, the University of Strathclyde and Plymouth Marine Laboratory - is published in *Scientific Reports*, an online journal from the publishers of Nature.

It is the first study in the world to quantify the extent to which biologically important artificial light is prevalent on the seafloor and could, in turn, be having a detrimental effect on marine species.

Dr Thomas Davies, Lecturer in Marine Conservation at the University of Plymouth and the paper's lead author, said: "The areas exposed here are not trivial. Our results focused on a busy marine area and demonstrate the light from coastal urban centres is widespread across the sea surface, sub surface and seafloor of adjacent marine habitats. But Plymouth is still just one coastal city with a population of 240,000 people.

"Seventy-five per cent of the world's megacities are now located in coastal regions and coastal populations are projected to more than double by 2060. So unless we take action now it is clear that biologically important light pollution on the seafloor is likely to be globally

widespread, increasing in intensity and extent, and putting marine habitats at risk."

The study focussed on Plymouth Sound and the Tamar Estuary which together form a busy waterway and are home to the largest naval port in Western Europe.

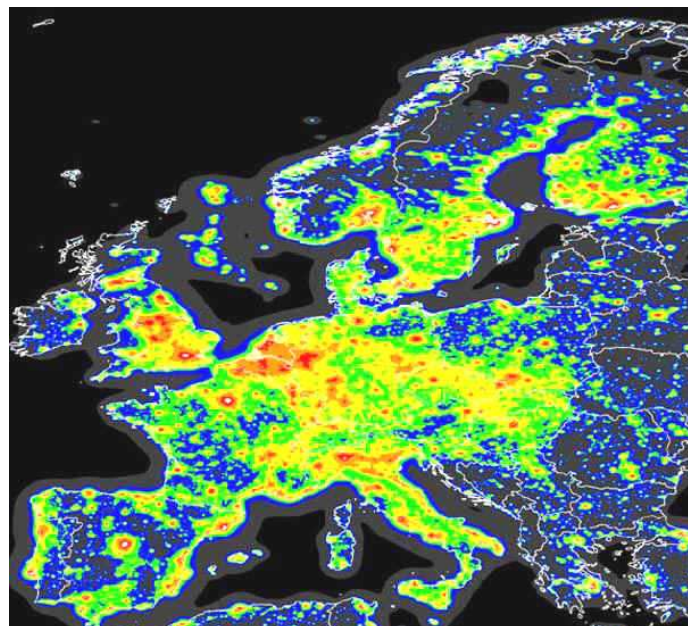
It was conducted over four nights in 2018, when there was little or no moonlight, and blue, green, and red artificial light was shone at the sea surface during both clear and cloudy conditions, and at low and high tide.

A combination of mapping and radiative transfer modelling tools were then used to measure exposure at the surface, beneath the surface, and at the seafloor.

The researchers are now calling for a more comprehensive review of the full impacts of coastal light pollution, to try and mitigate against the most harmful effects as coastal cities grow globally.

Dr Tim Smyth, Head of Science of Marine Biogeochemistry and Ocean Observations at Plymouth Marine Laboratory, said: "Light pollution from coastal cities is likely having deleterious impacts on seafloor ecosystems which provide vital ecosystem services. We investigated this by visiting the Tamar, Plym and Plymouth Sound for four successive nights in September 2018. The time-lapse video of our trips really highlights how bright our shorelines are at night. During the fieldwork we measured the above water light field and in-water optics as well as running in-water light modelling simulations, in order for us to map the light field across the whole of the Tamar Estuary network."

From: [https://www.eurekalert.org/pub\\_releases/2020-07/uop-ccl073020.php](https://www.eurekalert.org/pub_releases/2020-07/uop-ccl073020.php)



## THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

### Noctilucent Clouds Over the IoW



Photograph taken by VAS member Bert Paice at 03.30 am 11th July 2020.

### Important Members' Information

The Observatory door lock will be changed soon. If you are a key holder and would like a replacement key, please contact me (details on the front page).

**New keys will not be issued until we are, once again, "open for business".**

### Engineers Solving a Problem

A man goes on a trip with 3 Friends; an electrical engineer, a physics engineer and an IT specialist. Few hours into the trip the car breaks down.

The electrical engineer says: "Well I know this issue, there must be some problems with the electronics of this car".

The physics engineer says "Of course not! There was a problem with the pressure, I could hear that miles away".

The IT specialist calms them down and says "come on guys, lets just all get out of the car, get in again and see if that solves the problem."

### At The Observatory

For your own safety, please bring a torch.

Make sure you close and lock the car park gate if you are the last to leave.

### Articles Needed

NZ needs letters, articles, reviews or pictures related to astronomy. Contact details on page 1.

*"Nothing happens until something moves"*  
**Albert Einstein**

*"Photons have mass? I didn't even know they were Catholic"*  
**Woody Allen**

*"Physics is really nothing more than a search for ultimate simplicity, but so far all we have is a kind of elegant messiness"*  
**Bill Bryson**

*"If you see an antimatter version of yourself running towards you, think twice before embracing"*  
**J Richard Gott**

*"Entropy is not what it used to be"*  
**Anon**

*"As I hurtled through space, one thought kept crossing my mind - every part of this rocket was supplied by the lowest bidder"*  
**John Glenn**