

Society News

AGM Nominations

Please see page 11 for a nomination form.

Good news though, as it seems everyone currently on the committee is happy to stand again. Anyone who can't has already sought and found a replacement. Please come along, this AGM should be a formality and over quite quickly. We can then all enjoy a "bring your own" barbecue and social get together.

VAS will provide soft drinks, bread rolls, sauces etc.

Garlic Festival 2019

Committee have decided that VAS will probably not have a stand/tent at this year's Garlic Festival but we will certainly be providing marshals for the event.

Instead of relying on the financial vagaries of a telescope raffle, marshalling allows us to be sure of raising funds.

If you can help at any of the four sessions across the am and pm of 17-18 August, please contact Richard Flux.

Come on, wearing a hi-viz jacket for the day makes you feel important, and you really only need to know where the toilets, first aid and lost children's tents are!

Wolverton Manor

The Wolverton weekend (31st Aug-1st Sept) is a lot more relaxed than the Garlic Festival. For a start VAS share a large tent with AONB and others which means we only have to supply people, a table or two and some enthusiasm.

Any member who fancies a day out knowing that VAS will benefit should contact a member of the committee.

*Brian Curd
Observatory Director and NZ Editor*

VAS Website: wightastronomy.org

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

**The Editor, New Zenith
Carpenter's Cottage
Dennett Road
Bembridge
Isle of Wight PO35 5XF**

Tel: **01983 872875** or email: editor@wightastronomy.org

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

Monday, 19.30hrs	Members Only and by arrangement Telescope and night sky training. Please contact Martyn Weaver 07855 116490
Thursday	Members (19.30hrs) and Public (20.00hrs). Informal meeting and observing

VAS Website: wightastronomy.org

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2019 Monthly Meetings

Date	Subject	Speaker
Check http://www.wightastronomy.org/meetings/ for the latest information		
Sat 27 July	"Young Astro & Science Fest" Young Astronomers' Event	
23 Aug	AGM and Barbecue	
27 Sept	A transportable/deployable radio telescope for hydrogen line observation	Alan and Martin Thompson
25 Oct	Dark Skies Event	
22 Nov	TBA	TBA

Observatory Visits Booked

No bookings so far

***Please phone me for the current situation
(number on the front page)***

It would be appreciated if members could avoid using the observatory at these times.

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.

This applies to all information held but is especially important for email and physical addresses.

VAS Contacts 2018/19

President	Barry Bates president@wightastronomy.org
Chairman	Bryn Davis chairman@wightastronomy.org
Secretary	Richard Flux secretary@wightastronomy.org
Treasurer	Simon Plumley treasurer@wightastronomy.org
Observatory Director	Brian Curd director@wightastronomy.org
Programme Organiser	Vacant Position progorg@wightastronomy.org
Astro Photography	Simon Plumley ap@wightastronomy.org
Outreach	Elaine Spear outreach@wightastronomy.org
NZ Editor	Brian Curd editor@wightastronomy.org
Membership Secretary	Norman Osborn members@wightastronomy.org
NZ Distribution	Graham Osborne distribution@wightastronomy.org
Others	Mark Williams, Nigel Lee, Stewart Chambers

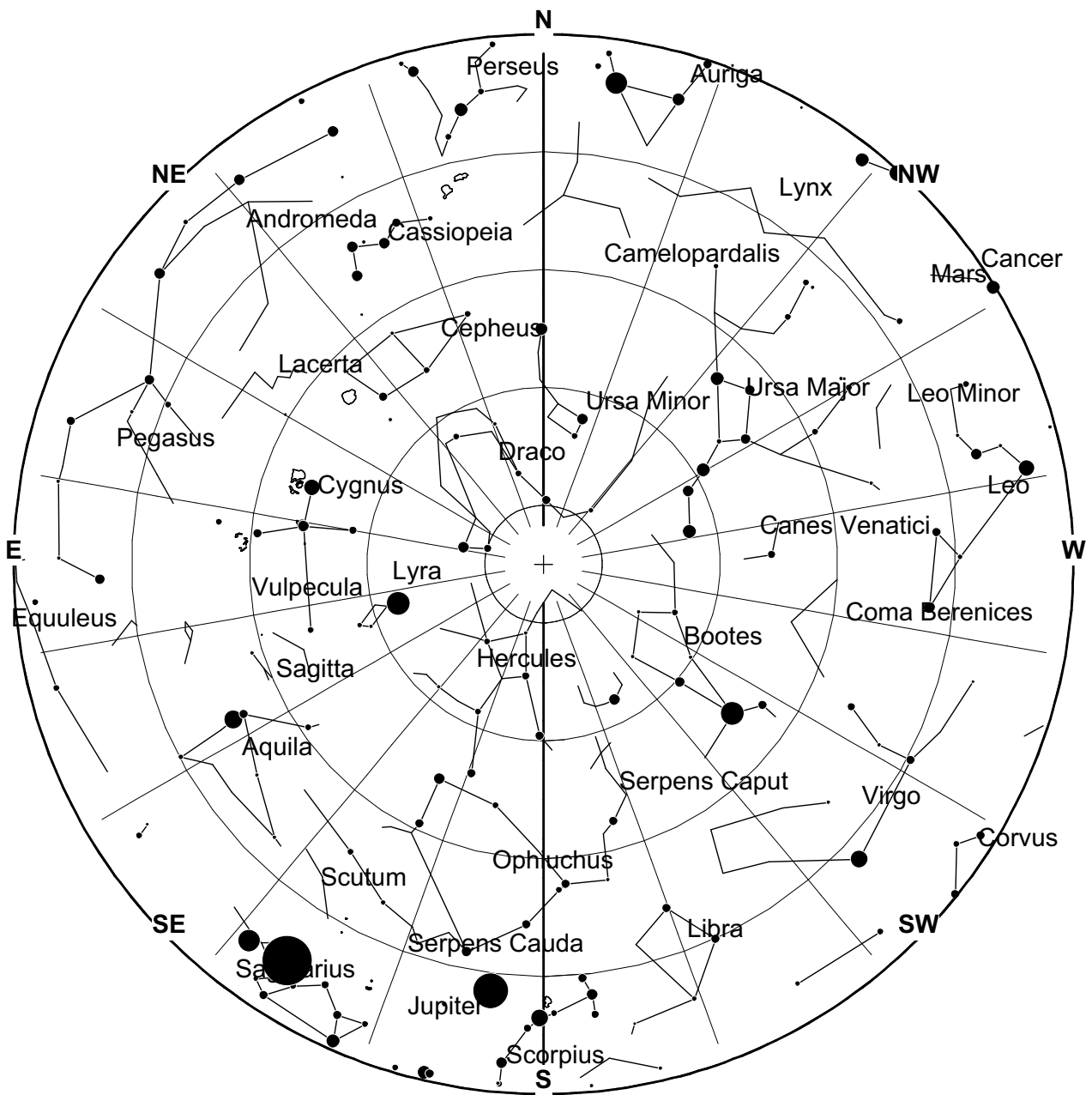
Important

Members using the observatory **MUST** enter a line or two in the Observatory Log Book.

On several occasions, lights, heaters and the Meade LX200 have been left on!

When leaving, please ensure all is secure and all lights, heaters and telescopes are **TURNT OFF**.

July 2019 Sky Map



View from Newchurch Isle of Wight UK - 2200hrs - 15 July 2019







Cassiopeia is a constellation in the northern sky, named after the vain queen Cassiopeia in Greek mythology, who boasted about her unrivalled beauty. Cassiopeia was one of the 48 constellations listed by the 2nd-century Greek astronomer Ptolemy, and it remains one of the 88 modern constellations today.

It is easily recognizable due to its distinctive 'W' shape, formed by five bright stars. It is opposite Ursa Major. In northern locations above latitude 34°N it is visible year-round and in the (sub)tropics it can be seen at its clearest from September to early November. Even in low southern latitudes below 25°S it can be seen low in the North.

This article is licensed under the [GNU Free Documentation License](https://www.gnu.org/licenses/fdl.html). It uses material from the Wikipedia article "Cassiopeia".

July 2019 Night Sky

Moon Phases

New	First Qtr	Full	Last Qtr
			
2nd	9th	16th	25th

Planets

Mercury

Mercury is on the far side of the Sun this month; it reappears in the morning sky during August

Venus

For the first fortnight of the month Venus may be glimpsed low in the east just before sunrise. It then gets too close to the Sun to be visible.

Mars

Mars is now completely lost in the evening twilight, it will return to the morning sky towards the end of the year.

Jupiter

As soon as the sky is dark enough Jupiter is available for observation low down in the southern sky. It is bright enough that it can be seen easily before the sky is fully dark; this can be the best time to observe as the contrast between the planet and sky is not too high. Binoculars will easily show the four Galilean moons, and a telescope will reveal the cloud bands and, if it is facing us, the Great Red Spot.

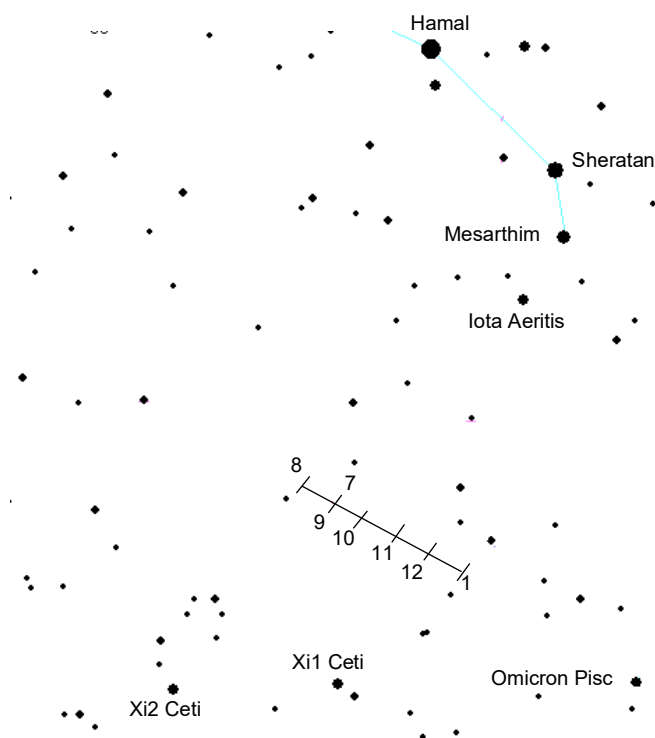
Saturn

Saturn can be found some way to the east of Jupiter on the other side of the Milky Way. It is not so bright but being the brightest object in this part of the sky is easily spotted. Although it is not very well placed in our sky for observation it is only just past its best for the year so if you can observe it through a telescope you will still get a good view of the rings.

Uranus

Uranus is in the constellation of Aries close to the border with Pisces. It is a difficult object this month, being visible for only a short time during the early morning before the sky starts to brighten too much, The finder chart shows its position on the first of every month from July

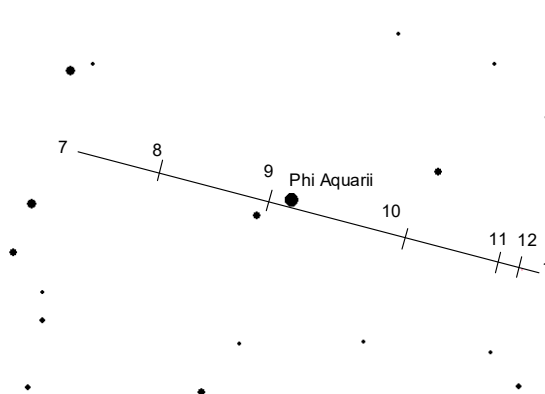
until January next year. Between now and September it makes a little loop against the stars, moving east to start then returning to westward motion during August and arriving almost where it is now in September. It is in a region of the sky where there are no nearby bright stars to help in its location. The stars shown are down to magnitude 7, about a magnitude fainter than the planet.



Finder Chart For Uranus – July '19 to January '20

Neptune

Neptune is about 1° east of the fourth magnitude star Phi Aquarii. It rises at around midnight and can be seen when it is clear enough of the horizon and while the sky is dark enough. Like Uranus it will be a challenging object for observation this month. The finder chart shows its location on the first of each month until January. Stars are shown to magnitude 9 with Neptune being about magnitude 8.



Finder Chart For Neptune - July '19 to January '20

Deep Sky

Melotte 186 Open Cluster **RA 18h 38m Dec 2° 56' mag 4**

This is a large cluster about 3 degrees in diameter centred on the magnitude 4 star 67 Ophiuchi. It is visible to the unaided eye but best appreciated using binoculars. Its brightest members form a tick mark and with stars that do not form part of the cluster form an equilateral triangle. Look for it about 5 degrees to the east of the star Cebalrai.

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

Probably the densest mass of stars you will ever see is contained within this 2 x 1 degree patch of sky towards the centre of our galaxy. A slight thinning in the density of gas and dust allows us a small peek towards the galactic core. This is an object for all instruments from a small pair of binoculars to a large telescope.

M14 Globular Cluster **RA 17h 38m Dec -3° 15' mag 7.6**

Despite its magnitude this is quite a difficult binocular object, it is quite large but does not have a particularly well condensed core. This means that the available light is spread out rather thinly. Larger aperture telescopes are needed to resolve some of the cluster stars.

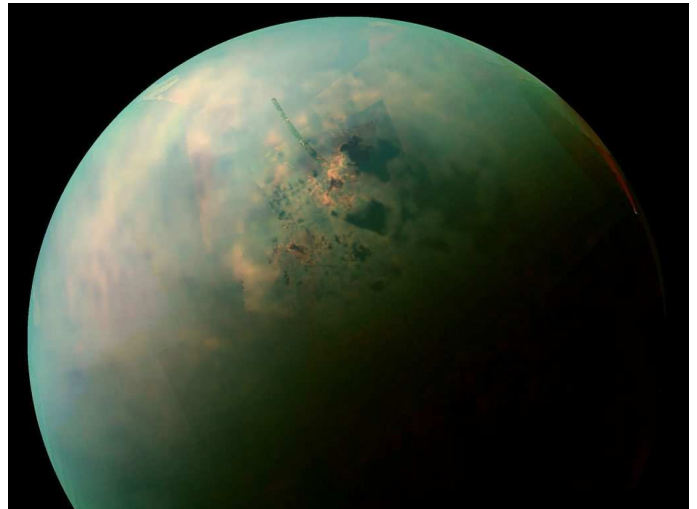
Peter Burgess

“Bathtub Rings” Around Titan’s Lakes Might be Made of Alien Crystals

The frigid lakeshores of Saturn’s moon Titan might be encrusted with strange, unearthly minerals, according to new research being presented here.

Scientists re-creating Titan-esque conditions in their laboratory have discovered new compounds and minerals not found on Earth, including a co-crystal made of solid acetylene and butane. The frigid lakeshores of Saturn’s moon Titan might be encrusted with strange, unearthly minerals, according to new research being presented here.

Scientists re-creating Titan-esque conditions in their laboratory have discovered new compounds and minerals not found on Earth, including a co-crystal made of solid acetylene and butane.



Acetylene and butane exist on Earth as gases and are commonly used for welding and camp stove fuel. On Titan, with its extremely cold temperatures, acetylene and butane are solid and combine to form crystals, the new research found.

The new mineral might be responsible for the bathtub rings that are suspected to exist around Titan’s hydrocarbon lakes, according to Morgan Cable of NASA’s Jet Propulsion Laboratory at the California Institute of Technology, who will present the new research Monday at the 2019 Astrobiology Science Conference.

Titan’s lakes are filled with liquid hydrocarbons. Previous research using images and data gathered during the Cassini mission has shown that lakes in the moon’s dry regions near the equator contain signs of evaporated material left behind, like rings on a bathtub.

To create Titan-like conditions in the laboratory, the researchers started with a custom-built cryostat, an apparatus to keep things cold. They filled the cryostat with liquid nitrogen to bring the temperature down. They then warmed the chamber slightly, so the nitrogen turned to gas, which is mostly what Titan’s atmosphere contains. Next, they threw in what abounds on Titan, methane and ethane, as well as other carbon-containing molecules, and looked for what formed.

The first things to drop out of their Titan hydrocarbon soup were benzene crystals. Benzene is perhaps best known as a component of gasoline and is a snowflake-shaped molecule made out of a hexagonal ring of carbon atoms. But Titan benzene held a surprise: The molecules rearranged themselves and allowed ethane molecules inside, creating a co-crystal.

More info and links at: <https://news.agu.org/>

NASA Puts up Deep-Space Atomic Clock



NASA has put a miniaturised atomic clock in orbit that it believes can revolutionise deep-space navigation.

About the size of a toaster, the device is said to have 50 times the stability of existing space clocks, such as those flown in GPS satellites.

If the technology proves itself over the next year, Nasa will install the clock in future planetary probes.

The timepiece was one of 24 separate deployments from a Falcon Heavy rocket that launched from Florida on Tuesday.

The other passengers on the flight were largely also demonstrators. They included a small spacecraft to test a new type of “green” rocket fuel, and another platform that aims to propel itself via the pressure of sunlight caught in a large membrane; what’s often called a “lightsail”.

But it is the mercury-ion atomic clock, developed at NASA’s Jet Propulsion Laboratory (JPL), which has had most attention.

Today, deep-space probes are tracked across the Solar System via radio signals.

These signals are sent from Earth and are immediately returned by the spacecraft. The very precise time taken for the speed-of-light messages to echo back enables navigators to work out the mission’s exact position and to command the necessary course corrections.

But if probes carried their own atomic clocks, this two-way system could be reduced to one-way, and the missions’ onboard computers would then make all the necessary navigational calculations.

The atomic clocks currently used on Earth for deep-space navigation are refrigerator-sized. JPL’s engineers have shrunk this down to something that can easily be accommodated on a spacecraft.

Deputy principal investigator Jill Seubert said “self-driving spacecraft” were one of the top technologies needed to put humans on Mars.



“Autonomous onboard navigation means that a spacecraft can perform its own navigation in real-time without waiting for directions to be sent from navigators back here on Earth. And with this capability, a human-crewed spacecraft can be delivered safely to a landing site with less uncertainty in their path,” she told reporters.

Don Cornwell, from Nasa’s Space Communications and Navigation Program, added: “Of course, for a spacecraft travelling well beyond Earth orbit, the smallest clock inaccuracies can lead to large navigational errors. But [the new clock] has a high degree of clock stability, meaning it can maintain its accuracy over many years.”

“The deep space atomic clock’s design should gain or lose less than 2 nanoseconds per day, or an error of one second in nine million years.”

The development of the spacecraft chassis, or bus, that is carrying the clock was begun by the British manufacturer Surrey Satellite Technology Limited at its US division, which was then later sold to the American General Atomics company.

Surrey itself had an interest in six other spacecraft launched on Monday’s Falcon Heavy.

The UK firm assembled this sextet of platforms to be part of a constellation known as FORMOSAT-7. It is a joint US-Taiwanese initiative to monitor the weather by interrogating the way radio signals from GPS satellites are affected as they pass through the atmosphere.

More at: <https://www.bbc.co.uk/news/>

Curiosity Rover Finds Gas Levels on Mars Hinting at Possibility of Life

Methane suggests there might be recent organic activity



It's easy to get jaded about potential signs of life on Mars, but a recent discovery might raise eyebrows. The New York Times has learned that NASA's Curiosity rover has detected “startlingly high” levels of methane -- the gas typically produced by life as we know it. The quantities are still tiny at 21 parts per billion, but that's three times the amount Curiosity spotted during a surge in 2013. The rover's operators were reportedly surprised enough to pause regularly scheduled studies to obtain follow-up data, with the additional findings slated to arrive on June 24th.

Just what would produce the methane isn't clear. It could represent recent or even current microbial life (possibly underground), but it could also geothermal reactions or ages-old methane finally escaping to the surface. The one certainty is that any gas will have appeared relatively recently -- reactions with sunlight and chemicals would split the molecules within centuries.

If scientists can confirm the presence of methane, the greater challenge is finding ways to study it in more detail. The Mars 2020 rover and other upcoming vehicles are meant to look for the ingredients of life, but not to verify the possibility of existing life. It could be a long time before there's a definitive pronouncement on what the gas represents.

More with links at: <https://www.engadget.com/>

Watch Scientists Melt a Satellite Part to Save us from Space Junk

- Earth's space is getting more crowded by the day.
- The more satellites and space junk we put into orbit, the greater a risk of a collision.
- Not all materials burn up during reentry; that's why scientists stress test satellite parts to ensure that they won't become deadly falling objects.

It's a simple fact that where there are humans, there's trash. Earth's orbit is no exception. The Space Surveillance Network keeps track of 22,300 bits of space junk orbiting the Earth, but there's almost certainly more than this. Statistical models estimate that there are 34,000 objects larger than 10 centimeters; 900,000 from 1cm to 10cm; and 128,000,000 objects between 1mm and 1cm in space.

If some of this space debris strikes a satellite, it could destroy that satellite, creating more bits of space debris that may strike other satellites in a chain reaction of catastrophe called the Kessler syndrome. To avoid this, it's important that we design satellites so that they can fall back to Earth and burn up in the atmosphere. This represents part of the mission of the European Space Agency's (ESA's) CleanSat initiative. This initiative is focused on keeping our use of space sustainable so that we can continue to enjoy the benefits of GPS, weather modeling and other satellite-based services.

It's also the reason why researchers blasted a magnetotorquer, a piece of satellite technology, in a plasma wind tunnel, heating it to several thousands of degrees Celsius within the hypersonic plasma until it was mostly vaporized. You can watch it happen in the video above. And here's a picture of the aftermath.

“Satellite reentry is not a single event but rather a process,” explains Tiago Soares of CleanSat. “From observations, we see the main body break apart typically at 70–80 km altitude, after which the insides are scattered. The kind of objects that can survive down to the surface are propellant tanks made from materials with high melting points, such as titanium or stainless steel, along with dense items such as optical instruments and large mechanisms.”

One such dense item is a magnetotorquer. This device helps satellites interact with Earth's magnetic field to orient the satellite, and it's made of some sturdy stuff. The outside is composed of a carbon fiber–reinforced polymer, while the inside is made of copper coils and an iron-cobalt core.

<https://bigthink.com/>

Largest Data Set in SETI History Released to the Public



Breakthrough Listen - the astronomical program searching for signs of intelligent life in the Universe - has submitted two publications to leading astrophysics journals, describing the analysis of its first three years of radio observations and the availability of a petabyte of radio and optical telescope data. This represents the largest release of SETI data in the history of its field.

Listen is performing detailed observations of a sample of 1702 nearby stars (within about 160 light years from Earth) using the Green Bank Radio Telescope (GBT) in West Virginia and CSIRO's Parkes Radio Telescope in Australia. In addition, exploration of a wide swath of our Galaxy's disk is underway at Parkes, observations of a one-million-star sample will soon commence at the MeerKAT telescope in South Africa, Lick Observatory's Automated Planet Finder is being used to search for optical signals, and collaborations continue to grow with a number of partner facilities across the globe.

The Breakthrough Listen science team at the University of California, Berkeley's SETI Research Center (BSRC) has developed a number of techniques to search the data for "technosignatures" - evidence of technology (such as transmitters or propulsion devices) built by civilizations beyond Earth. These techniques include searches for powerful signals occupying a narrow range of radio frequencies, and scans for bright lasers used for communication or propulsion, as well as new algorithms built on machine learning techniques that are being used to study unexplained astrophysical phenomena in addition to the technosignature search.

Building on the results presented by the team in 2017 that reported on the analysis of 692 stars observed with GBT, Breakthrough Listen has now submitted a more wide-ranging and detailed analysis of 1327 nearby stars (almost 80% of Listen's nearby star sample), observed over the last three years as part of a joint program between GBT

and Parkes. With these new results, Breakthrough Listen has completed the most comprehensive and sensitive radio search for extraterrestrial intelligence (SETI) in history. Additionally, the experience gained during the first three years of the program means that Listen is poised soon to extend these results to higher frequencies, more signal types and (with the MeerKAT program) thousands of times more stars.

Searching for a Needle in a Haystack

The search "pipeline" scans through billions of radio channels, looking for signals that are too narrow and well-defined to result from natural processes. The vast majority of the detected radio signals are from our own human technology, but the team applies two techniques to filter out these interfering signals in search of potential "needle in a haystack" signatures of extraterrestrial intelligence. The first filter selects only narrow-band signals that are drifting in frequency, rejecting many interferers that arise in the vicinity of the telescopes, while preserving signals with a Doppler drift (change in frequency with time due to their motion relative to the telescope). The second filter removes signals that do not appear to originate from a fixed point on the sky. By performing comparison scans of regions of sky near to the star being targeted, signals not coming from the direction of the target star can be removed.

These two techniques reduce the size of the "haystack" from tens of millions of signals down to just a handful. The few remaining technosignature candidates were carefully examined, and determined to be outlying examples of human-generated radio frequency interference that survived the two cuts. Despite the lack of true technosignature detections, however, the scientific paper describing the analysis places the most stringent limits to date on the prevalence of radio-transmitting extraterrestrial civilizations in our Galactic neighborhood.

The results of this analysis are presented in a paper submitted for publication in the *Astrophysical Journal*, led by Breakthrough Listen Project Scientist for Parkes, Dr. Danny Price. A preprint, and associated background information and links to analysis software, are also available.

"This data release is a tremendous milestone for the Breakthrough Listen team," said Dr. Price. "We scoured thousands of hours of observations of nearby stars, across billions of frequency channels. We found no evidence of artificial signals from beyond Earth, but this doesn't mean there isn't intelligent life out there: we may just not have looked in the right place yet, or peered deep enough to detect faint signals."

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

July 20, 1969: One Giant Leap For Mankind



July 1969. It's a little over eight years since the flights of Gagarin and Shepard, followed quickly by President Kennedy's challenge to put a man on the moon before the decade is out.

It is only seven months since NASA's made a bold decision to send Apollo 8 all the way to the moon on the first manned flight of the massive Saturn V rocket.

Now, on the morning of July 16, Apollo 11 astronauts Neil Armstrong, Buzz Aldrin and Michael Collins sit atop another Saturn V at Launch Complex 39A at the Kennedy Space Center. The three-stage 363-foot rocket will use its 7.5 million pounds of thrust to propel them into space and into history.

At 9:32 a.m. EDT, the engines fire and Apollo 11 clears the tower. About 12 minutes later, the crew is in Earth orbit.

After one and a half orbits, Apollo 11 gets a "go" for what mission controllers call "Translunar Injection" - in other words, it's time to head for the moon. Three days later the crew is in lunar orbit. A day after that, Armstrong and Aldrin climb into the lunar module Eagle and begin the

descent, while Collins orbits in the command module Columbia.

Collins later writes that Eagle is "the weirdest looking contraption I have ever seen in the sky," but it will prove its worth.

When it comes time to set Eagle down in the Sea of Tranquility, Armstrong improvises, manually piloting the ship past an area littered with boulders. During the final seconds of descent, Eagle's computer is sounding alarms.

It turns out to be a simple case of the computer trying to do too many things at once, but as Aldrin will later point out, "unfortunately it came up when we did not want to be trying to solve these particular problems."

When the lunar module lands at 4:18 p.m. EDT, only 30 seconds of fuel remain. Armstrong radios "Houston, Tranquility Base here. The Eagle has landed." Mission control erupts in celebration as the tension breaks, and a controller tells the crew "You got a bunch of guys about to turn blue, we're breathing again."



Armstrong will later confirm that landing was his biggest concern, saying "the unknowns were rampant," and "there were just a thousand things to worry about."

At 10:56 p.m. EDT Armstrong is ready to plant the first human foot on another world. With more than half a billion people watching on television, he climbs down the ladder and proclaims: "That's one small step for a man, one giant leap for mankind."

Aldrin joins him shortly, and offers a simple but powerful description of the lunar surface: "magnificent

desolation." They explore the surface for two and a half hours, collecting samples and taking photographs.

They leave behind an American flag, a patch honoring the fallen Apollo 1 crew, and a plaque on one of Eagle's legs. It reads, "Here men from the planet Earth first set foot upon the moon. July 1969 A.D. We came in peace for all mankind."

Armstrong and Aldrin blast off and dock with Collins in Columbia. Collins later says that "for the first time," he "really felt that we were going to carry this thing off."

The crew splashes down off Hawaii on July 24. Kennedy's challenge has been met. Men from Earth have walked on the moon and returned safely home.

In an interview years later, Armstrong praises the "hundreds of thousands" of people behind the project. "Every guy that's setting up the tests, cranking the torque wrench, and so on, is saying, man or woman, 'If anything goes wrong here, it's not going to be my fault.'"

In a post-flight press conference, Armstrong calls the flight "a beginning of a new age," while Collins talks about future journeys to Mars.

Over the next three and a half years, 10 astronauts will follow in their footsteps. Gene Cernan, commander of the last Apollo mission leaves the lunar surface with these words: "We leave as we came and, God willing, as we shall return, with peace, and hope for all mankind."

Links and Video at: <https://www.nasa.gov/>

Editors Note

Well this anniversary makes me feel very old. I remember, all too clearly, being woken by my parents to witness the moon landing live on TV.

Not only was that amazing but, just the day before, the family had taken delivery of a fully transistorized Hitachi colour TV. Looking back, the landing wasn't a great reason to buy a new TV as, apart from the American flag and a few logos, pretty much all of the broadcast was grey and white. It didn't matter though, I remember the event in full colour.

That very TV still works (with a digibox of course). OK, I replaced a few slider controls (popular back then) but other than that it's not been touched. Weird watching a CRT tube so curved it really doesn't look like a modern TV, but there it is still working after 50 years.

Thanks Apollo, you were a big part of my life



VAS Officers and Committee Nominations 2019/20

For those wishing to stand for election at the AGM of the Society to be held on Friday 23rd August 2019 at 7.00pm.

Name and Address of Nominee:

Standing for

- Chairman
- Treasurer.....
- Secretary.....
- Observatory Director.....
- Membership Secretary.....
- Programme Organiser.....
- Committee

Proposed by:

Seconded by:

Signature of Nominee:.....

Notes

- The Committee meets once each month usually on a Thursday evening at 18.30 before the usual club night.
- No person can be elected to more than one position.
- Only adult fully paid-up members may stand for election (or propose or second).
- All completed nomination forms to be received by the Secretary at least 14 days before the AGM.

THE BACK PAGE

LINKS, COMMENTS AND OBSERVATIONS

More Stuff!

This Stunning Video Shows Sun's Pulsing 'Skin' in Incredible Detail

A paper based on the research was published in the journal *Astronomy & Astrophysics* last year, led by Jorrit Leenaarts, director of Stockholm University's Institute for Solar Physics.

A new video shows a view of the sun that's so strange you'd think it came from a science fiction horror film. The "skin" of the sun — also known as the photosphere — pulses and morphs in an active region of solar granules imaged by a Swedish telescope.

<https://www.space.com/animation-shows-sun-photosphere-pulsing.html>

Galaxy Zoo Volunteers Help Re-Tune 'Hubble Tuning Fork'

Galaxies are important building blocks of the Universe. Some are simple, while others are very complex in structure. In 1927, as one of the first steps towards a coherent theory of galaxy evolution, the American astronomer Edwin Hubble developed a model to classify galaxies by type and shape. Known as the 'Hubble tuning fork' due to its shape, the model took account of two main features: the size of the galaxy's bulge and how tightly wound any spiral arms are. Now, citizen scientists from the Galaxy Zoo project have helped to overturn this classification. The study has used classifications of over 6,000 galaxies to reveal that 'well known' correlations between these features are not found in this large sample.

<http://www.sci-news.com/astronomy/hubble-tuning-fork-07280.html>

NASA Celebrates 50th Anniversary of Historic Moon Landing with Live TV Broadcast, Events



Celebrating Historic Apollo Moon Landing's 50th Anniversary With Live TV Broadcast

NASA will celebrate the 50th anniversary of the historic Apollo 11 Moon mission and look to the future of exploration on the Moon and Mars with a live, two-hour television broadcast Friday, July 19, and partner-led events taking place across the country from July 16 through July 20.

<https://www.nasa.gov/press-release/nasa-celebrates-50th-anniversary-of-historic-moon-landing-with-live-tv-broadcast>

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 (if you need the combination to the lock, please contact a member of the committee)

Articles Needed

NZ needs letters, articles, reviews or pictures related to astronomy.

"The fact that we live at the bottom of a deep gravity well, on the surface of a gas-covered planet going around a nuclear fireball 90 million miles away and think this to be normal is obviously some indication of how skewed our perspective tends to be"

Douglas Adams

"There is a theory which states that if ever anyone discovers exactly what the Universe is for and why it is here, it will instantly disappear and be replaced by something even more bizarre and inexplicable. There is another theory which states that this has already happened."

Douglas Adams

"Nothing travels faster than the speed of light, with the possible exception of bad news, which obeys its own special laws"

Douglas Adams