Space News

looking back over

July 2019

- a busy month…

Anyway but UP!

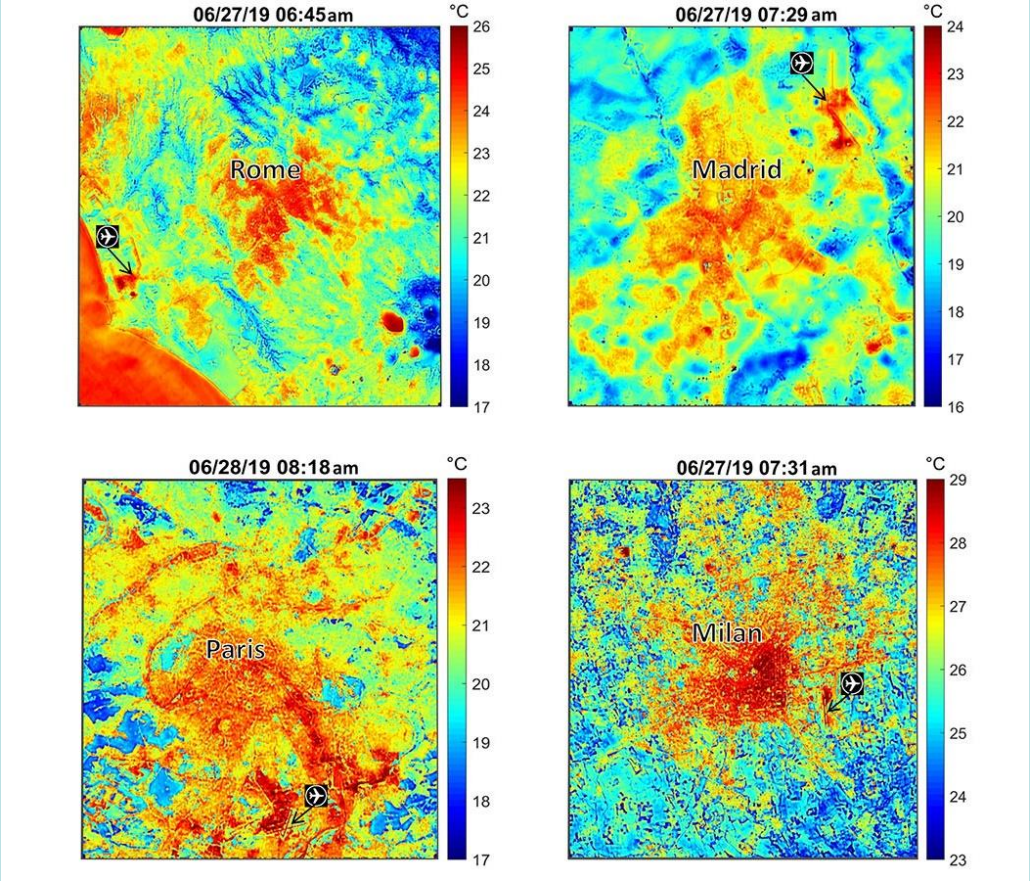
1st July: An unmanned Russian Proton-M rocket was launched from the Baikonur Cosmodrome in Kazakhstan – unsuccessfully! The crash of the 17-story booster destroyed three **GLONASS** navigation satellites, worth almost $200 million. Video of the rocket crash from Russian television shows the vehicle veering off course shortly after lift-off, and then breaking apart in mid-air and exploding in a fiery blaze on the ground. This is the second loss of 3 GLONASS satellites, part of the Russian GPS system. The failure seems to be due to emergency shutdown of the booster engines or guidance system.

Four Partial Eclipses in just One Day

2nd July: Proba-2 is a technology-demonstration satellite that circles planet Earth at an altitude of about 435 to 500 miles in a *sun-synchronous orbit*, which means that it travels along the terminator with a nearly continuous view of the sun. Proba-2 was able to see last month's eclipse on **four** separate occasions because it orbits the Earth about every 100 minutes.

Europe’s Heat-wave monitored from Orbit

Rome



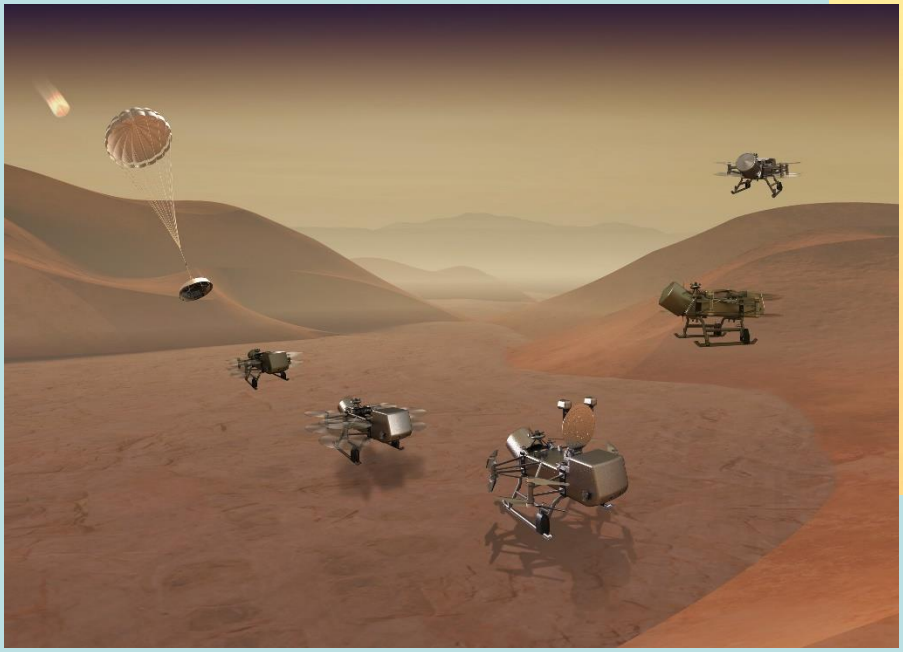
Madrid

Paris

Milan

2nd July: NASA's Ecosystem Spaceborne Thermal Radiometer Experiment on Space Station (**ECOSTRESS**) measures Earth's surface temperature at different times of day. Although its primary objective is to monitor the health of plants, ECOSTRESS can also detect heat events such as the one much of Europe experienced recently. On some days the temperature rarely dropped overnight, so that the next day started hot – and just got hotter.

Helicopter Rides across Titan in ~ 15 Years?



3rd July: Following the design of the Mars 2020 helicopter and the extensive exploration opportunities it allows, a similar machine is proposed for the next step on Titan. **Dragonfly**, a mission to Titan – which has a thick atmosphere and hydrocarbon lakes – has been given the go-ahead. After development, building, testing, and launch, Dragonfly may reach Titan in **2034**.

Jodrell Bank becomes a UNESCO World Heritage Site

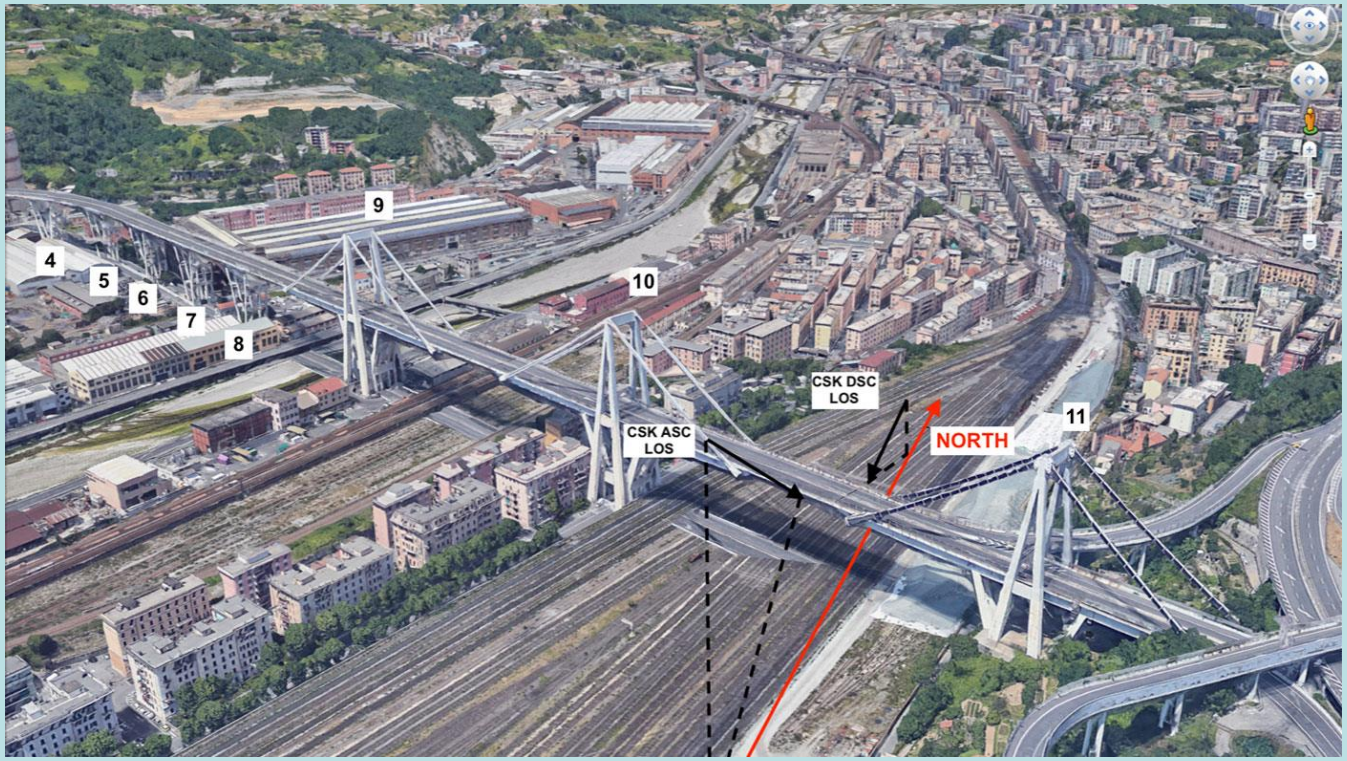
Sir Bernard Lovell meets cosmonaut Valery Bykovsky in 1967 by the dish of the radio telescope named after him.

5th July: Jodrell Bank Observatory has been declared a UNESCO World Heritage Site. At the forefront of astronomical research since 1945, it was able to track US and Russian missions during the space race with the Lovell Telescope above. It joins the ancient Iraqi city of Babylon, India's Jaipur and other locations world-wide.

Oldest Explorers keep going - without Zimmers

12th July: With careful planning and dashes of creativity, engineers have been able to keep NASA's **Voyager 1 and 2 spacecraft** flying for nearly **42 years** - longer than any other spacecraft in history. One key issue is that the Voyagers, launched in 1977, have less power available over time to run their science instruments and the heaters that keep them warm in the coldness of space. Engineers have had to decide what parts get power and what parts have to be turned off – for example the Cosmic Ray Detector system…

SAR detects minute changes to Structures on Earth



9th July: Synthetic Aperture Radar has been used from orbit to measure changes on Earth, such as land movements after earthquakes. Now teams of scientists are using SAR to detect mm-sized changes in structures such as the Morandi Bridge in Genoa, which collapsed last year. Historical data has revealed evidence of movements in the structure which would not have been detected by 'normal' methods. Unfortunately SAR coverage of the whole Earth from orbit will not be possible until more satellites are launched.

Barbie and ESA aim to get more girls in Space

10th July: Mattel, makers of ‘Barbie’ have created a special astronaut version based on **Samantha Cristoforetti**, ESA’s only female astronaut. The astronaut hopes her collaboration with Barbie "will help young girls and boys to dream about their future without limits.“

42-year-old Cristoforetti is a pilot, engineer, astronaut and is the first Italian female crew member of the European Space Agency. She is known for being first person to *brew an espresso coffee* in space. She has been in space for a total of 199 days 16 hours and 42 minutes.

Japanese Spacecraft makes final touchdown on Asteroid

11th July: A second successful contact with the **Ryugu** asteroid was met with relief and cheering in the control room at Japan's space agency, **JAXA**.

The robotic **Hayabusa-2** spacecraft had grabbed some surface rocks from the asteroid in February. Now after blasting a crater into Ryugu, it has returned to pick up fresh rubble from *within* the asteroid, which will have had reduced exposure to the environment of space. When returned to Earth in 2020, these samples will hopefully provide more data on the origins of the Solar System .

ESA's Vega rocket lost minutes after lift-off

11th July: A European Vega rocket was lost shortly after blast off, the first time in 15 launches that a Vega rocket has failed.

The rocket had been carrying a military satellite for the United Arab Emirates when it took off from the European spaceport in French Guiana.

It is believed to have crashed into the Atlantic Ocean north of the space centre. It may be that the solid-fuel second stage simply failed to ignite…

The Future of Living on the Moon

See: https://www.bbc.co.uk/news/extra/nkzysaP3pB/to-the-moon-and-beyond

12th July: This could be a Moonbase in **2050**.
In her lab at the **OU**, PhD student *Hannah Sargeant* is working on a way to live like this, using a mineral called **ilmenite** that's abundant on the Moon. Inside an oven, the ilmenite is heated to extract oxygen, which is combined with hydrogen to get water. "There are 20-plus ways of getting water from rocks on the Moon. Ilmenite was of interest because it's quite common there and the reaction that you need uses relatively little energy," she explains.

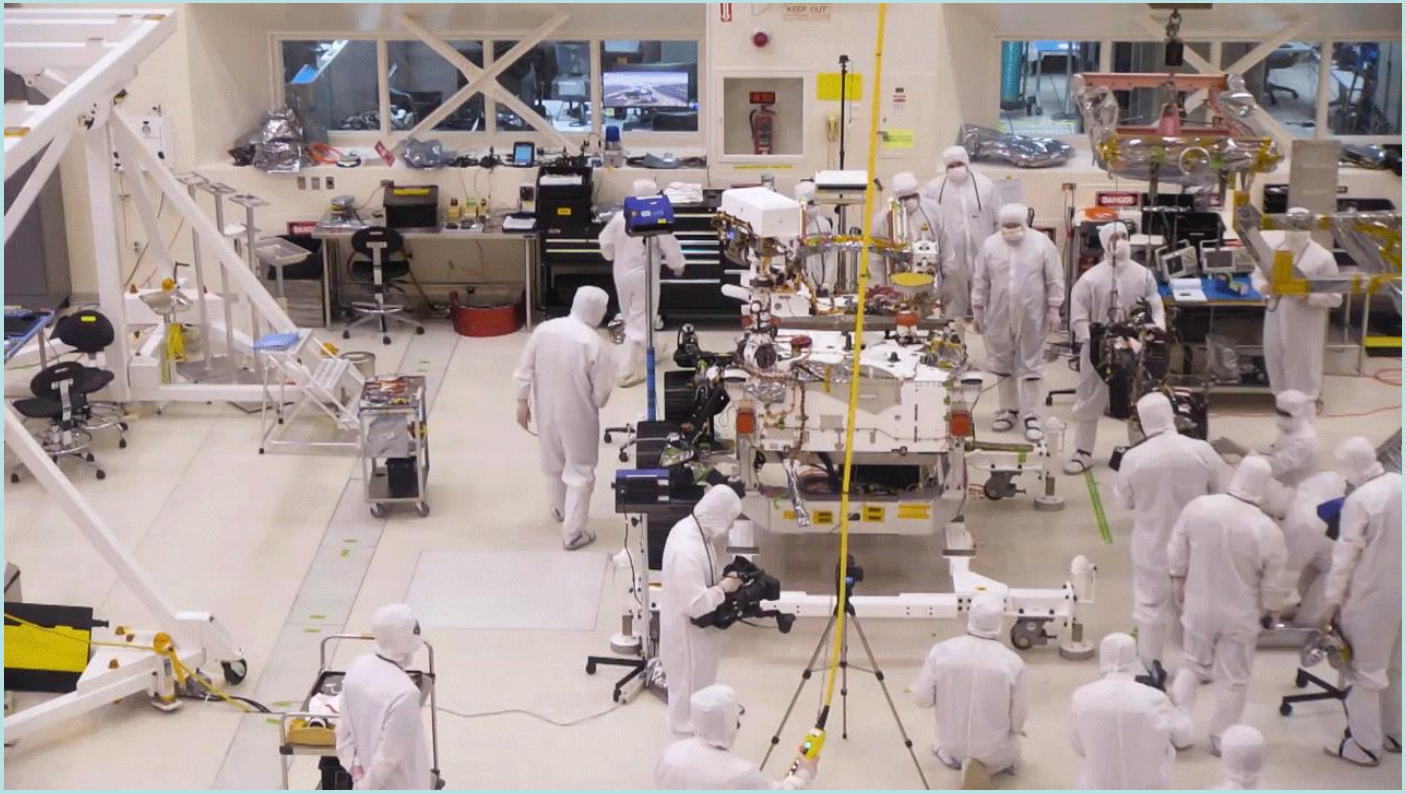
U.S. First Space Station – Died 40 years ago

“Geronimo!...aaaah!!”

11th July: In **1979**, the abandoned U.S. space station **Skylab** made a spectacular return to Earth as it burned up in the atmosphere, showering debris over the Indian Ocean and Western Australia. Abandoned in 1974, Skylab actually fell back to Earth a little sooner than NASA anticipated. Strong solar storms were blamed for this premature plunge, because solar activity had warmed up Earth's atmosphere.

As pieces of Skylab broke up in the atmosphere, residents and pilots in the area saw dozens of colourful firework-like flares.

Mars 2020 Rover Pit-Crew in Action!

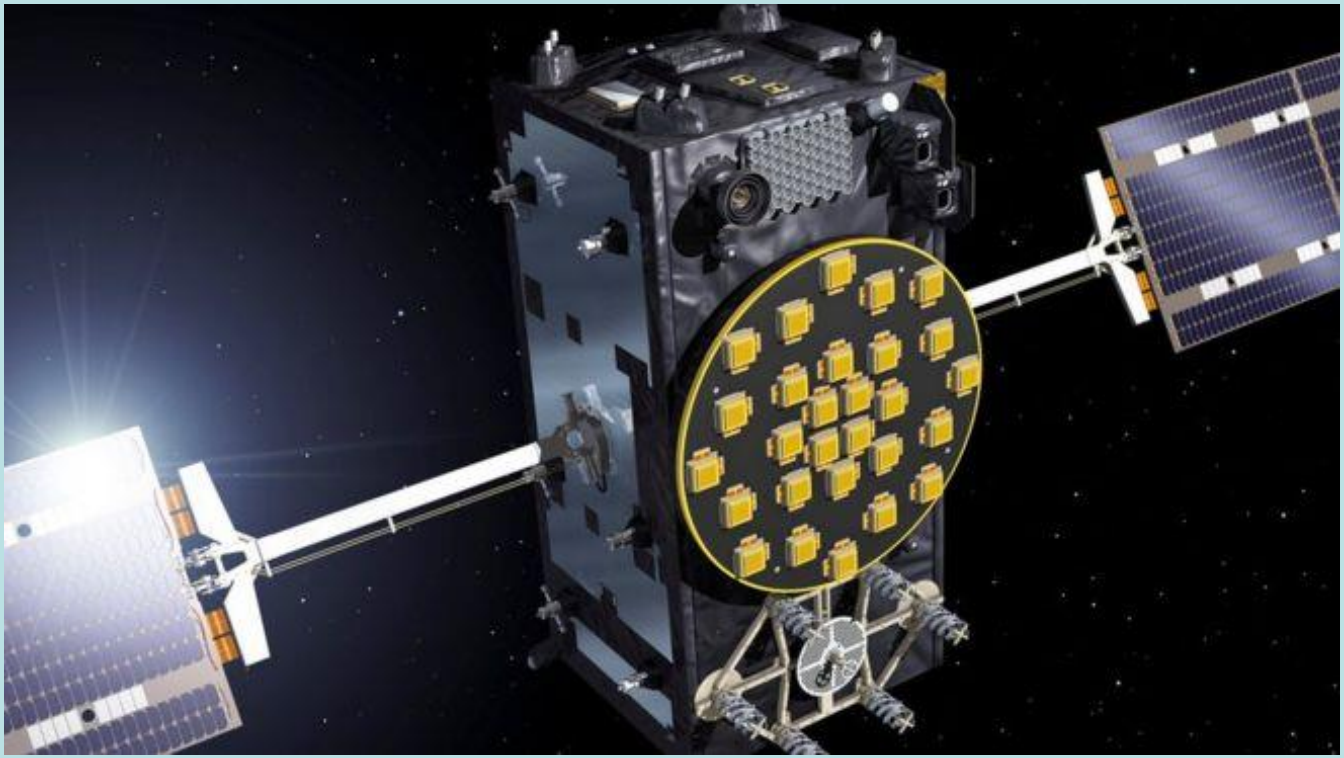


12th July: Actually the Mars 2020 team take things slow and steady, making sure everything is assembled very carefully in the Clean-Room.
Here they are putting the legs and wheels on – hence the 'pit-crew'.

This accelerated time-lapse was taken in mid-June.

Watch anytime: https://mars.nasa.gov/mars2020/mission/where-is-the-rover/

Where am I, Mr ESA?



15th July: The European **Galileo** navigation system was offline for about a week, service being ‘restored’ on the 22nd. Although 24 satellites are in orbit the full system is still in the ‘testing services’ phase and so whilst it may be embarrassing, it is not surprising that it is not yet fully robust. The original budget of €3bn has already **trebled**. Receivers will have to rely on the American ‘GPS’, the Russian ‘Glonass’ or Chinese ‘Beidou’ signals for positioning data until Galileo is fully ‘live’.

Michael Collins returns to Apollo 11 Launch Site

16th July: Michael Collins, 88, visited the Kennedy Space Centre. He marked the precise time - 13:32 GMT - when their Saturn V rocket took off.

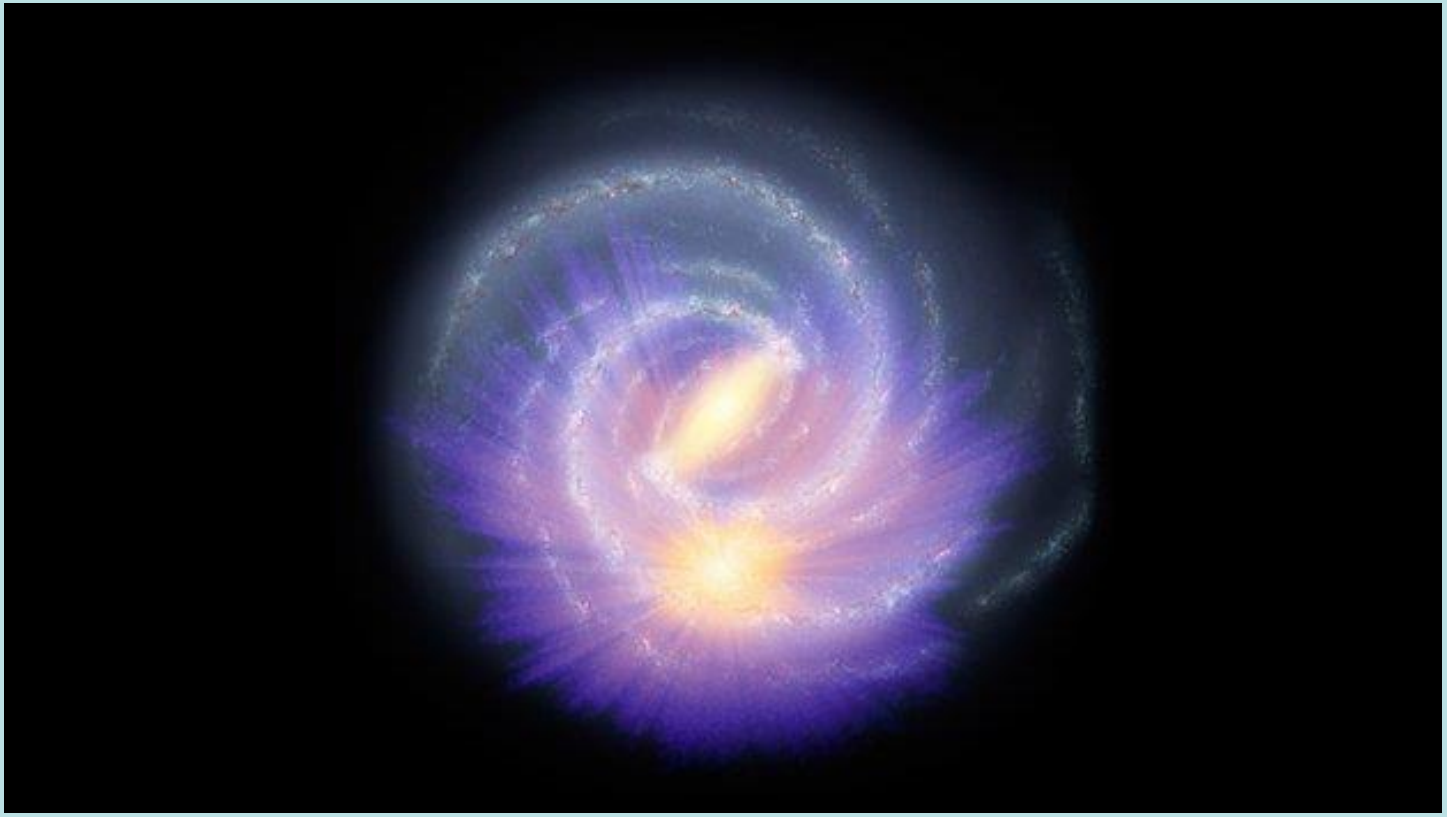
"The shockwave from the rocket power hits you," he told Nasa TV. "Your whole body is shaking. This gives you an entirely... different concept of what power really means. You're suspended in the cockpit... as you lift off," he continued. "From then on it's a quieter, more rational, silent ride all the way to the moon."

As Command Module pilot, Collins had to remain in lunar orbit and never got to walk on the surface of the Moon.

Leaky Component caused explosion of Capsule

16th July: A “Crew Dragon” capsule built by SpaceX was totally destroyed in April when a leaking component allowed a small amount of nitrogen tetroxide used as a liquid oxidiser in spacecraft engines entered high pressure tubes only meant for helium. Nasa is planning to hand over the transport of astronauts to and from the ISS to Elon Musk's SpaceX and Boeing (with their Starliner shown above left). The astronauts pictured here will be on the first test flights of these new US-based spacecraft.

Gaia begins mapping the Galactic Bar



16th July: The second release of the Gaia catalogue, published in 2018, has been revolutionising many areas of astronomy. The first direct measurement of the bar-shaped collection of stars deep in the centre of our Milky Way galaxy has now been made by combining data from Gaia with complementary infrared and optical observations from ground- and space-based telescopes.

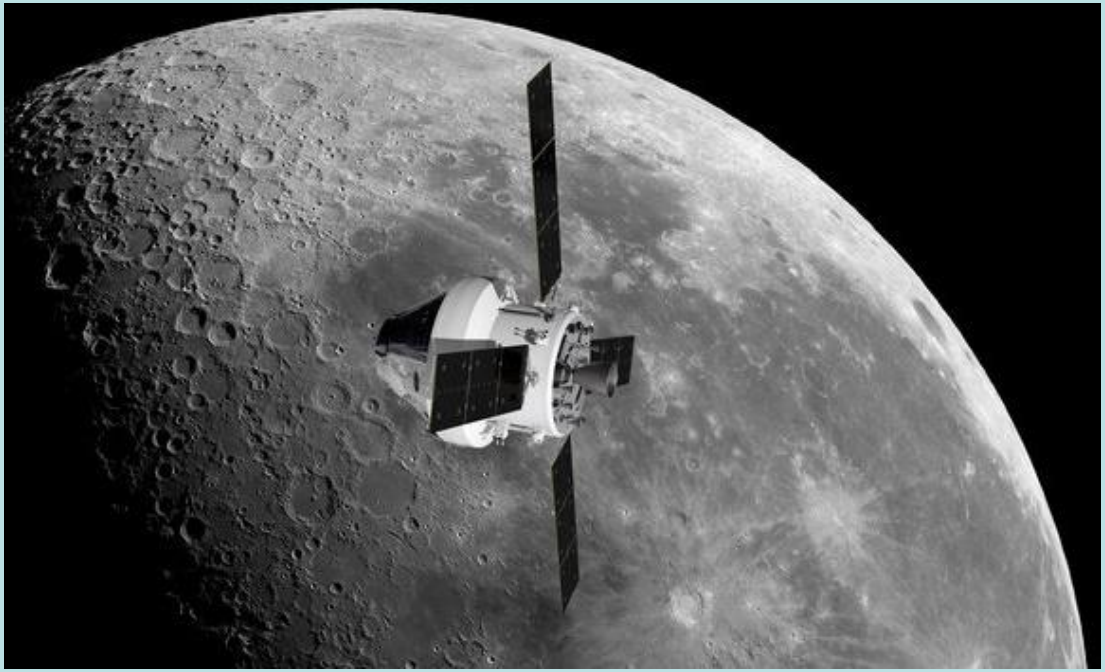
Only Woman in a 1960's "Mans World"

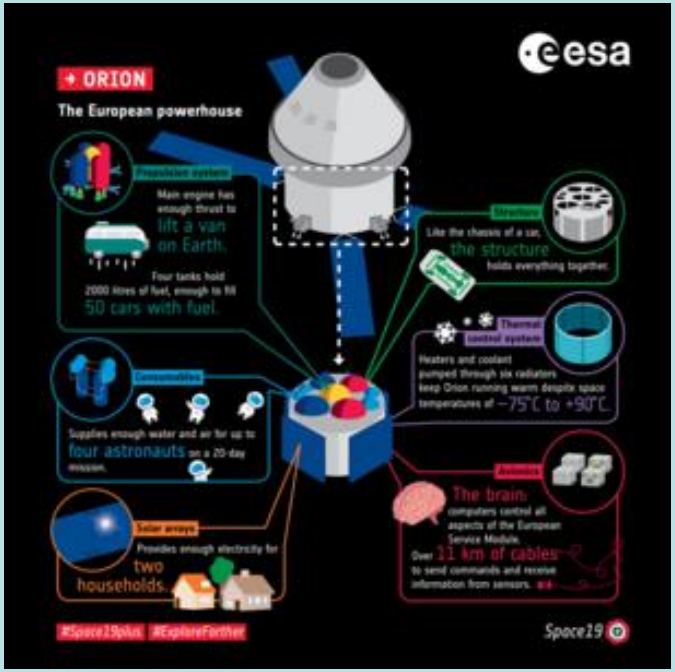
July 1969: 28 year old JoAnn Morgan was the *only woman* in the control room for the launch of Apollo 11 mission 50 years ago.
Engineer JoAnn was the **instrumentation controller** - responsible for 21 channels of communications and the health and welfare of all the monitoring systems for the **Saturn 5** rocket that lifted the Apollo spacecraft into space.

Moon also ‘remembers’ the Apollo 11 Mission

16th July: In a very timely way, our Moon gave its own nod towards the 50th anniversary of the Apollo 11 mission by providing a picturesque partial eclipse on the 50th anniversary of the launch date – 16/07/1969. In accordance with the general rule for eclipses, this one occurred 2 weeks *after* the total solar eclipse of 2nd July (*other lunar eclipses may occur 2 weeks before*).

ESA/NASA Agree Joint “Artemis” Moon Mission





17th July: The next manned mission to the Moon is planned for 2024. NASA’s Orion crew module will hold 4 astronauts and it will be supported on the journey by ESA’s ‘Service Module’ (see right), providing everything the astronauts need to live and arrive safely in lunar orbit including air, water, electricity, propulsion, temperature control and structural stability. On arrival at the ‘Lunar Gateway’, sent ahead and in Lunar orbit, 2 astronauts will descend in a Lander to explore the South Pole for signs of water ice. The Service modules are being ordered from the Airbus factory in Bremen, Germany.

Going to the Moon Together (on Earth)

18th July: This team of 4 Russians and 2 Americans have just spent 4 months on a virtual trip to the Moon.

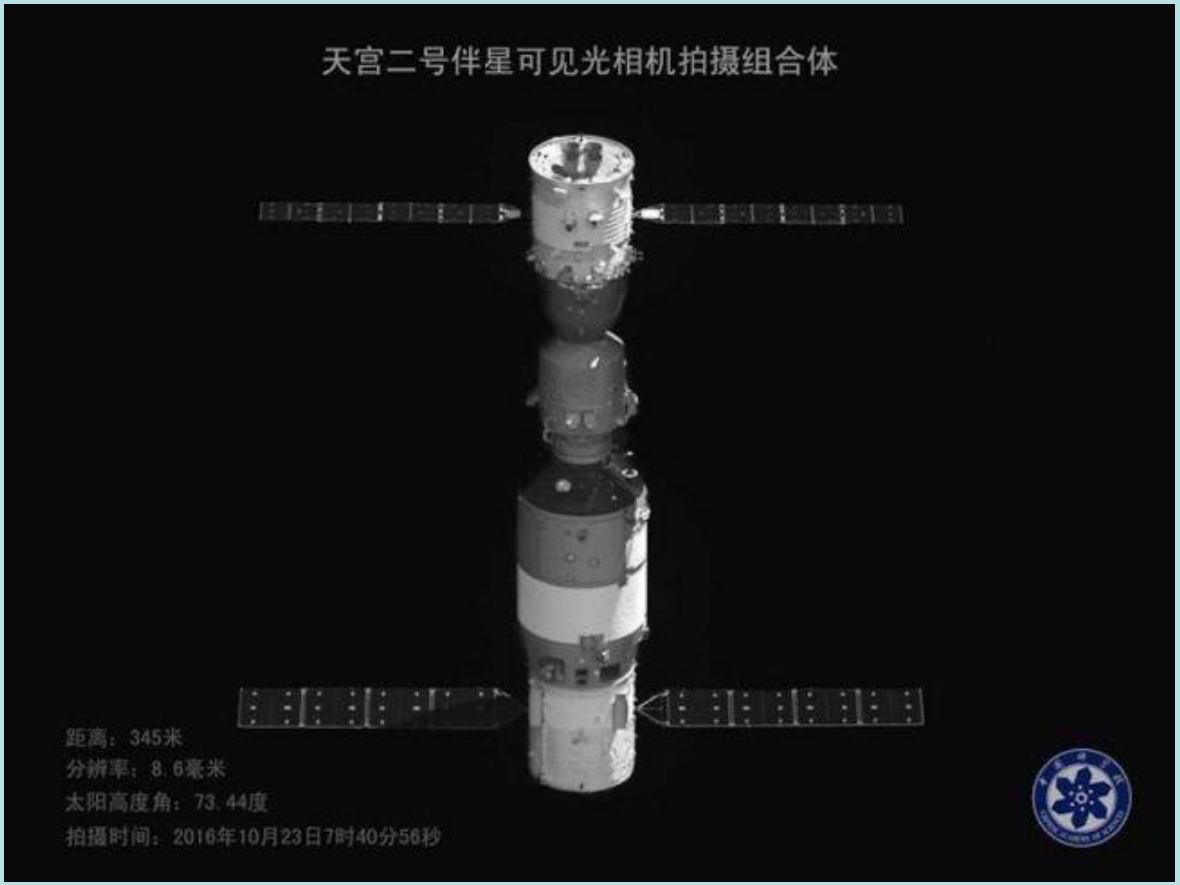
Sealed in their mocked-up spacecraft (Sirius-19), they had to deal with the restrictions and pressures of living together in the confirmed space. They had realistic exercises to perform, such as growing food, performing various experiments, keeping fit and landing on the lunar surface in a virtual lander.

“I really do need a steak!” was one comment on their release.

Shaun completes astronaut training with ESA

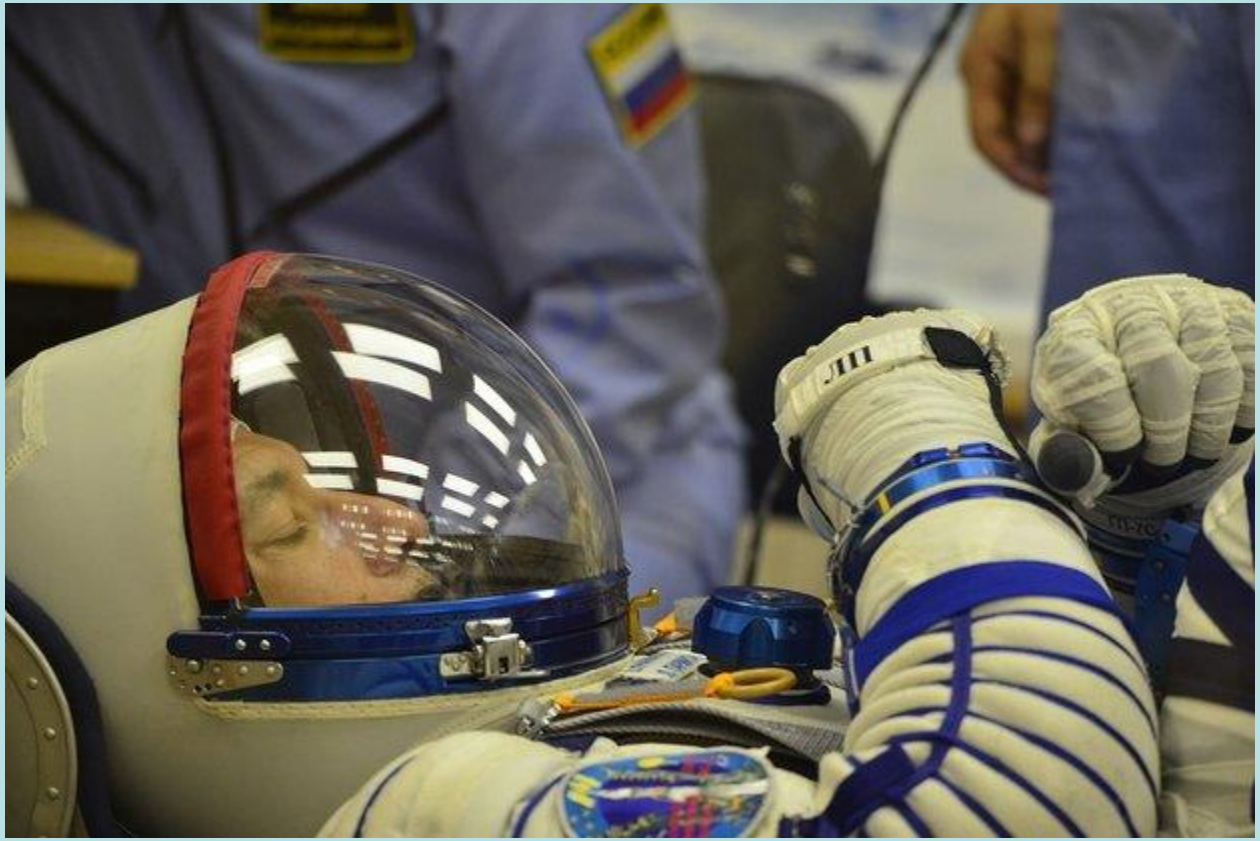
19th July: Following a ‘micro-gravity’ trip in ESAs special Airbus A310 aircraft, **Shaun the Sheep** is ready for his new starring role as a space traveller in “Farmageddon”, due for release in October in UK. The plot features an alien called Lu-La who crash-lands near Shaun’s home at Mossy Bottom Farm. Shaun and the gang then help the alien to get home. ESA partnered with Aardman Studios and StudioCanal to prepare Shaun for his first space mission.

China's second Space-Lab has a controlled death



19th July: Unlike its predecessor, China's '**Tiangong-2**' space laboratory had a controlled re-entry over the South-Pacific after nearly 3 years in orbit. The 8.6 ton, 10.4m long object used its own propulsion to ensure it would avoid any inhabited areas. Both Tiangongs were part of a plan to put a Chinese Space Station into orbit in the future, but they do not have a suitable and reliable large launch vehicle to do this.

Italian's second trip to ISS in Expedition 60



20th July: On the anniversary of Apollo 11's arrival on the Moon, a new crew of three were launched to the ISS to start 'Expedition 60'. ESA astronaut Luca Parmitano along with NASA astronaut Andrew Morgan and Russian cosmonaut Alexander Skvortsov arrived in the Russian Soyuz MS-13 spacecraft. Luca will stay in orbit for six months, taking command for the last half of his mission.

First Flag on the Moon ??

21st July 1969: The flag-like Solar Wind Composition Experiment was the *first experiment* set up by the Apollo 11 astronauts on the lunar surface. Manufactured by the University of Bern and the Swiss National Science Foundation, this experiment was both simple and of great scientific value.

Carried on every Apollo trip, it collected Solar wind particles during their time on the surface, and was brought back to Earth for analysis.

So was the first flag US or European?

India launches its 2nd Moon Mission

22nd July: India's **Chandrayaan-2** was launched at 09:13 GMT from the Sriharikota space station on the east coast. India's space agency hopes that the £116m mission will be the first to land on the Moon's *south pole*.

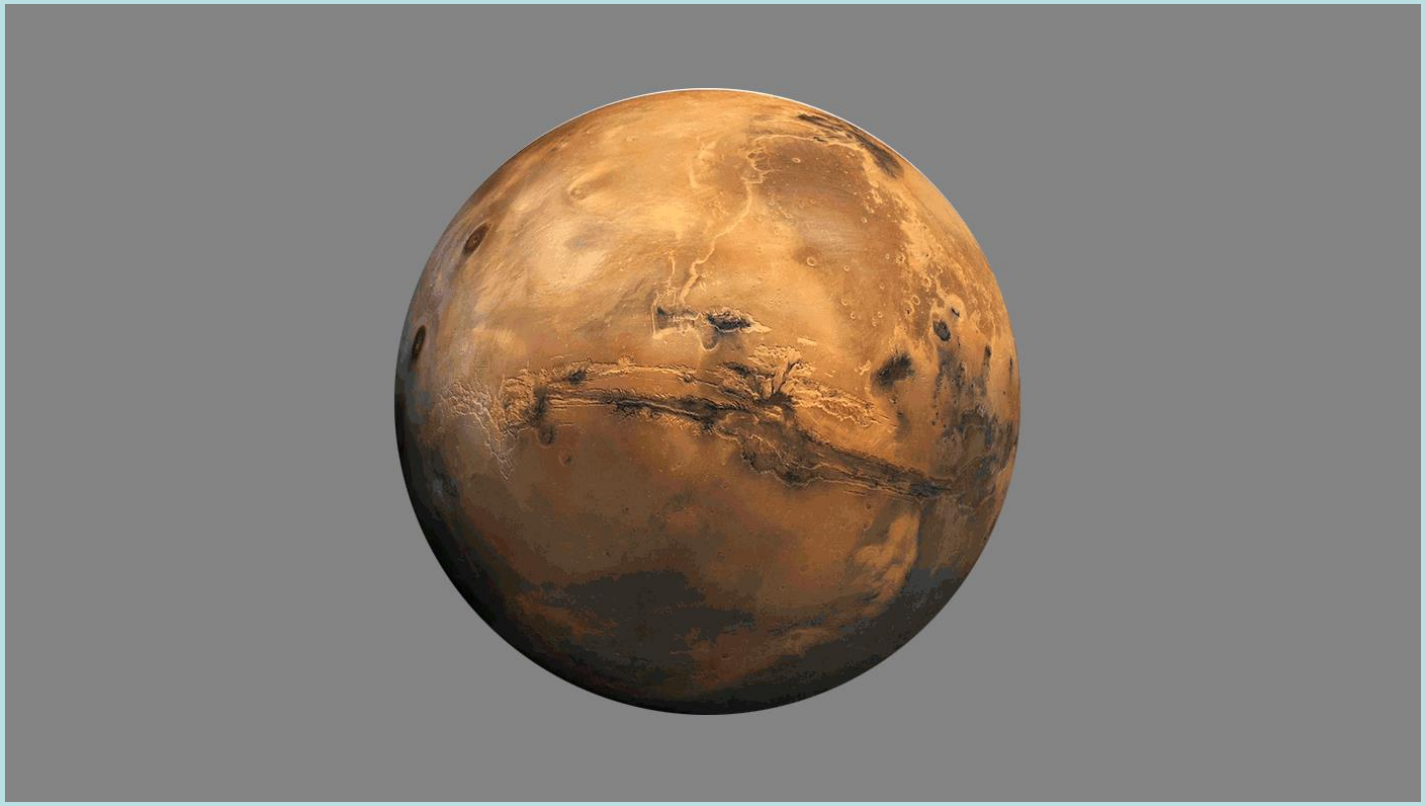
The spacecraft has entered the Earth's orbit, where it will stay until early August when it will begin a series of manoeuvres that will send it into lunar orbit.

Print yourself a ‘Moon-Base’ Research

22nd July: ESA is researching technologies based on **3D printing** to see how materials found on the lunar surface could be made into products to build a permanent base on the Moon, protected from radiation. Dusty powdered rock found on the Moon’s surface could be made into construction materials, explains the ESA’s James Carpenter in this BBC video:

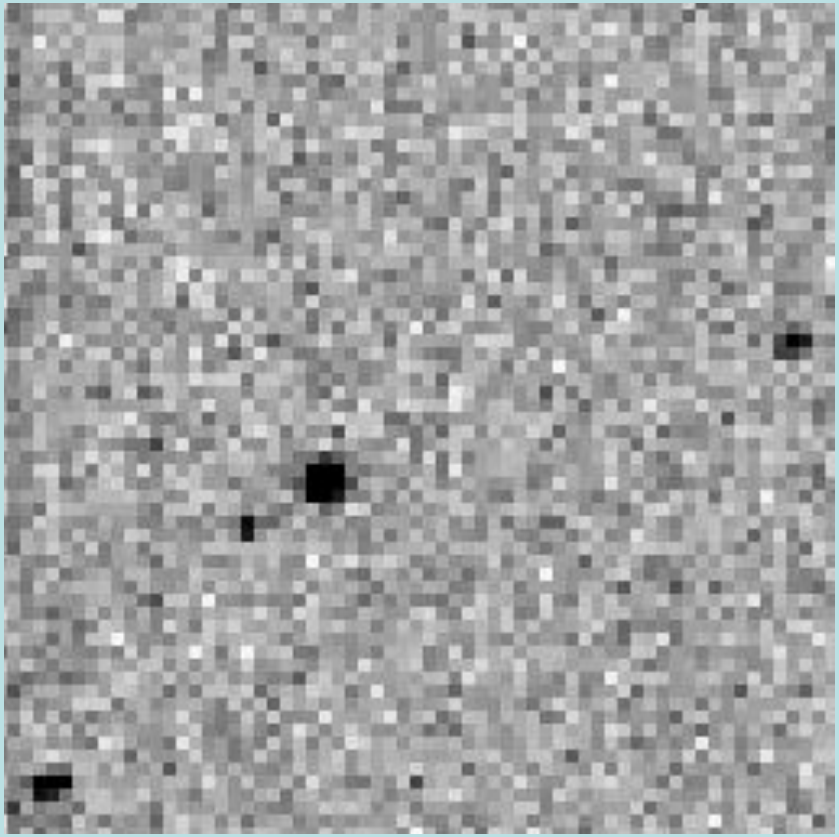
https://www.bbc.co.uk/news/av/technology-48845755/why-3d-printing-could-be-key-to-a-moon-base

Don’t worry – it’s only a tiny Marsquake!



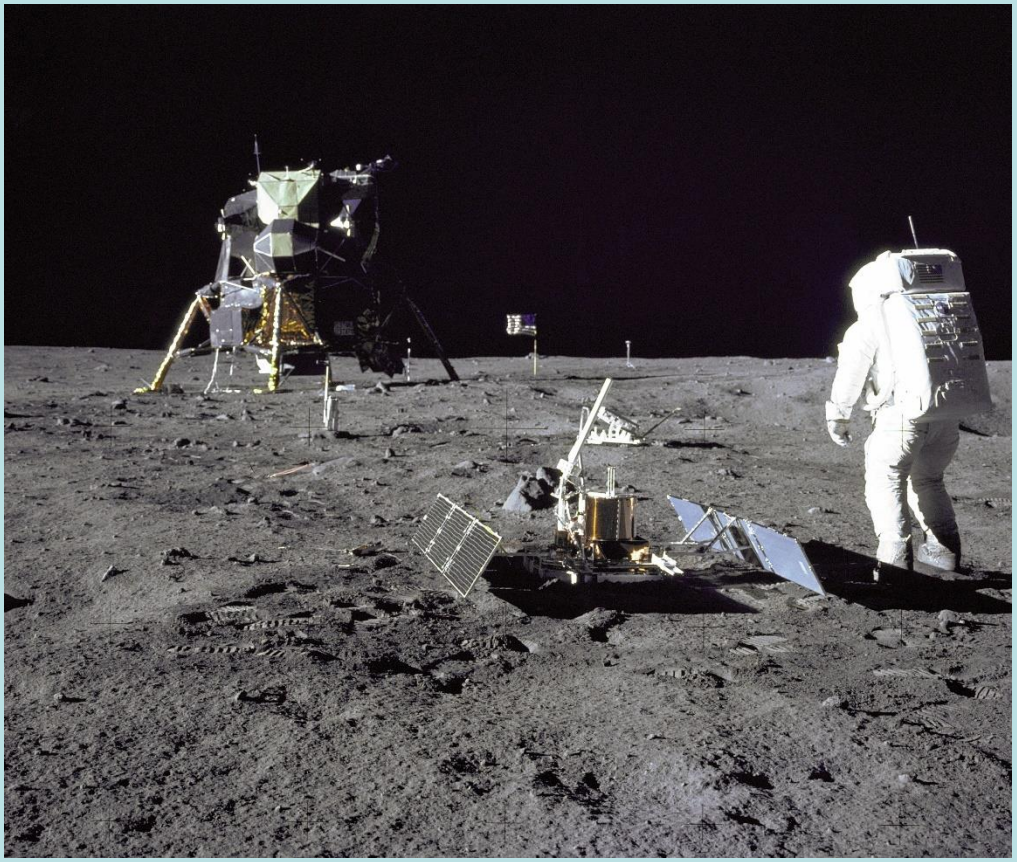
22nd July: The InSight lander took a seismometer to Mars and it detected its first ‘marsquake’ in April 6, 2019. The InSight mission's Marsquake Service is led by Swiss research university ETH Zurich. Although much gentler than our earthquakes (by 10 million times), the data is sufficient to help define the structure of the interior of Mars. The animation here is an example of what the final analysis might reveal…

Do worry – it’s passing Very Close!!



25th July: An asteroid the size of a *football field* flew by Earth, coming within 65000 km of our planet’s surface during its closest approach – about *one fifth* of the distance to the Moon. The 100 m-wide asteroid (2019 OK) was detected just days before it passed Earth, although archival records from sky surveys show it had previously been observed but wasn't recognised as a near-Earth asteroid (NEA). This illustrates the need for even more eyes on the sky.

The Apollo Experiment that keeps on Giving



← Laser Reflector

← Seismometer

July 1969: One experiment of the Apollo missions continues to return fresh data even today: arrays of **prisms** that reflect light back toward its source, providing plentiful insights. Along with the Apollo 11 astronauts, Apollo 14 and 15 left similar arrays on the Moon. Telescopes in New Mexico, France, Italy and Germany fire lasers at them, measuring the time that it takes for the pulses to bounce off the reflectors and thus provide the lunar distance accurately.

Send anything interesting you spot during August to:

michael@held.org.uk

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Space Launch Calendar 2019*: Sky Events, Missions & More*
https://www.space.com/32286-space-calendar.html