



ASTRO

NEWSLETTER

Volume 12, Issue 10

July 18, 2019

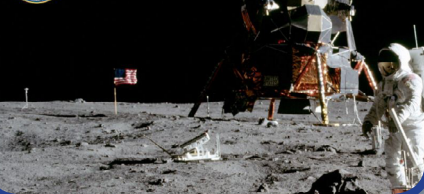
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APOLLO 11 IN REAL TIME

A real-time journey through the first landing on the moon. This website consists entirely of original, historical mission material.



Relive the Apollo 11 Moon Landing Mission in Real Time!

Fifty years ago, humans from Earth first walked on the moon and you can relive NASA's historic Apollo 11 mission as it happened with two amazing livestreams this month courtesy of ApolloInRealTime.org's Ben Feist and Space.com partner Simulation Curriculum, creator of the night sky software Starry Night and SkySafari 6.

With ApolloInRealTime.org, Feist and archivist Stephen Slater has created an immersive experience that stitches together vast amounts of Apollo 11 mission audio, images, video and transcripts to give viewers a full accounting of the historic mission that sent astronauts Neil Armstrong, Buzz Aldrin and Michael Collins to the moon. While Space.com is simulcasting ApolloInRealTime.org's live stream above, for the best experience you'll want to visit the website itself, which features a number of multimedia experiences and options not possible in the YouTube Feed.

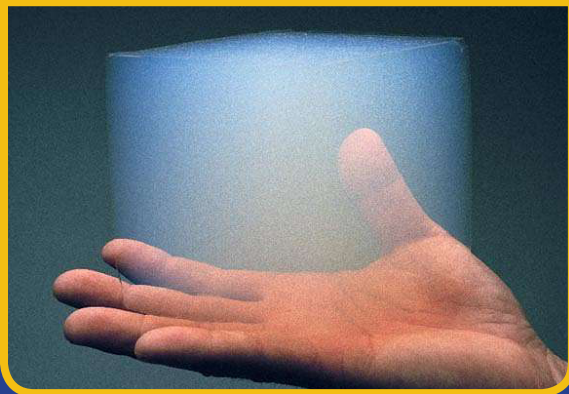
Apolloinrealtime.org

Apollo 11 Flight Log, July 17, 1969: Course Correction to Reach the Moon

This summer marks the 50th anniversary of NASA's Apollo 11 mission. Fifty years ago July 17, the Apollo 11 astronauts were well on their way to landing on the moon, which was planned for July 20. The crew filmed a color television broadcast from the spacecraft, bringing the rest of the world along with them on their remarkable journey. Here's how it happened. Following a flawless launch the day before, the Apollo 11 crew continued their historic journey to the moon on July 17, 1969. Landing at the Sea of Tranquility was scheduled for July 20.

At 12:17 p.m., Armstrong and his crew fired the engines on Columbia for three seconds to make a brief course correction. The procedure was also supposed to test how well the engines were working, an important milestone given that Columbia needed to use them to get into and out of lunar orbit.

Space.com



Aerogel Could Be a Key Building Material for Mars

Raising crops on Mars is far easier in science fiction than it will be in real life: The Red Planet is an inhospitable world. Among other challenges, subzero temperatures mean water can persist on the surface only as ice, and the planet's atmosphere offers little protection to plants (or people) from the Sun's radiation. Of course, NASA has plans to eventually put humans on Mars, using lessons it will learn from its Artemis lunar explorations. And those humans will need to eat. Being able to produce food on Mars would help reduce the quantity of supplies consuming valuable space and fuel on crewed missions to the Red Planet.

In a new paper in *Nature Astronomy*, researchers propose that a material called aerogel might help humans one day build greenhouses and other habitats at Mars' mid-latitudes, where near-surface water ice has been identified. The study was funded by Harvard University's Faculty of Arts and Sciences. Aerogel is a Styrofoam-like solid that is 99% air, making it extremely light. It's adept at preventing the transfer of heat as well, making it an excellent insulator; in fact, it's been used for that purpose on all of NASA's Mars rovers. Moreover, aerogel is translucent, allowing visible light to pass through while blocking ultraviolet light's harmful radiation. Most aerogel is made from silica, the same material found in glass.

[MarsDaily.com](https://marsdaily.com)



Japan's Hayabusa2 Probe Makes 'Perfect' Touchdown on Asteroid

Japan's Hayabusa2 probe made a "perfect" touchdown July 11 Thursday on a distant asteroid, collecting samples from beneath the surface in an unprecedented mission that could shed light on the origins of the solar system. "We've collected a part of the solar system's history," project manager Yuichi Tsuda said at a jubilant press conference hours after the successful landing was confirmed.

"We have never gathered sub-surface material from a celestial body further away than the Moon," he added. "We did it and we succeeded in a world first." The fridge-sized probe made its second landing on the asteroid around 10:30am (01:30 GMT), with officials from the Japan Aerospace Exploration Agency (JAXA) breaking into applause and cheers as initial data suggested the touchdown had been a success. Confirmation of the landing came only after Hayabusa2 lifted back up from the asteroid and resumed communications with the control room. Research director Takashi Kubota told reporters that the touchdown operation was "more than perfect." And Tsuda, with a grin, said he rated it "1000 points out of 100."

"The probe moved perfectly and

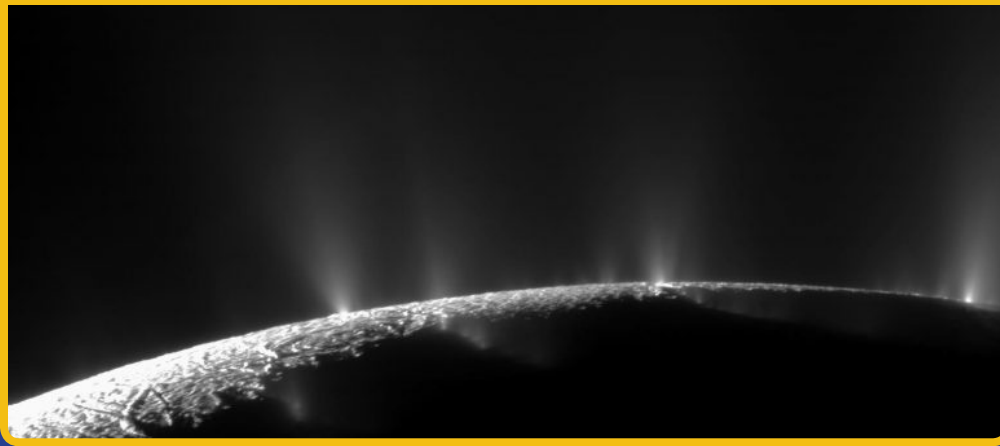
the team's preparation work was perfect," he said. The brief landing Thursday is the second time Hayabusa2 has touched down on the desolate asteroid Ryugu, some 300 million kilometres (185 million miles) from Earth. Ryugu, which means "Dragon Palace" in Japanese, refers to a castle at the bottom of the ocean in an ancient Japanese tale. The complex multi-year Hayabusa2 mission has also involved sending rovers and robots down to the surface. Thursday's touchdown was intended to collect pristine materials from beneath the surface of the asteroid that could provide insights into what the solar system was like at its birth, some 4.6 billion years ago.

To get at those crucial materials, in April an "impactor" was fired from Hayabusa2 towards Ryugu in a risky process that created a crater on the asteroid's surface and stirred up material that had not previously been exposed to the atmosphere.

What is next for Hayabusa2?

With the latest landing, Hayabusa2 has completed the key tasks of its complex mission. It will continue to take images and readings while it remains around Ryugu but it is expected to head back to Earth next year.

[SpaceDaily.com](https://spacedaily.com)



Enceladus' Ocean Right Age to Support Life

Could there be life on Saturn's moon Enceladus? The moon may be small, but it has a global water ocean beneath its icy surface, and scientists have speculated on whether there is anything alive in that deep, dark abyss. The Cassini spacecraft found that it is salty like oceans on Earth, contains abundant organic molecules, and that there is likely hydrothermal activity on the ocean bottom.

All of those are positive signs for habitability and now scientists have found another one: the ocean appears to be just the right age for optimal life-supporting conditions. The finding was announced by Marc Neveu, a research scientist at NASA's Goddard Space Flight Center, on June 24, 2019, during a talk at the 2019 Astrobiology Science Conference (AbSciCon2019). The peer-reviewed results had also been previously published April 1, 2019, in the journal *Nature Astronomy*. Enceladus' ocean is now estimated to be 1 billion years old. This is an ideal age, in terms of life starting and evolving. If the ocean were too young, there wouldn't have been enough time for different elements needed to mix together, but if it were too old, those chemical processes

may have stopped already. The moon would've then reached a state of equilibrium, meaning that the reactions to sustain life wouldn't take place any longer. So how did Neveu and his team come to this conclusion? Using data from the Cassini mission, which ended in late 2017, they created 50 different simulations of conditions in Enceladus' ocean. These included details of Saturn's moons' orbits and the radioactivity of the rocks on Enceladus, as well as their own estimates as to the age of the moon and how it formed. There was one simulation that best recreated the known conditions of the ocean, the one where the ocean is 1 billion years old. Neveu is cautious, though, because the simulation matched most of the conditions, but not all of them:

For example, if you took the present day, the ocean would be refrozen in that simulation which is not what we're seeing. So the age of the ocean, should be taken with a grain of salt.

As a next step, the researchers want to improve the simulation models, so the ocean can be dated more precisely. As Neveu said: We want to know this before we go back to search for life.



Lunar Reconnaissance Orbiter Camera Simulates View from Lunar Module

The only visual record of the historic Apollo 11 landing is from a 16mm time-lapse (6 frames per second) movie camera mounted in Buzz Aldrin's window (right side of Lunar Module Eagle or LM). Due to the small size of the LM windows and the angle at which the movie camera was mounted, what mission commander Neil Armstrong saw as he flew and landed the LM was not recorded. The Lunar Reconnaissance Orbiter Camera (LROC) team reconstructed the last three minutes of the landing trajectory (latitude, longitude, orientation, velocity, altitude) using landmark navigation and altitude call outs from the voice recording.

From this trajectory information, and high resolution LROC Narrow Angle Camera (LROC NAC) images and topography, we simulated what Armstrong saw in those final minutes as he guided the LM down to the surface of the Moon. As the video begins, Armstrong could see the aim point was on the rocky northeastern flank of West crater (190 meters diameter), causing him to take manual control and fly horizontally, searching for a safe landing spot. At the time, only Armstrong saw the hazard; he was too busy flying the LM to discuss the situation with mission control.

E-Pal Week Has Ended!

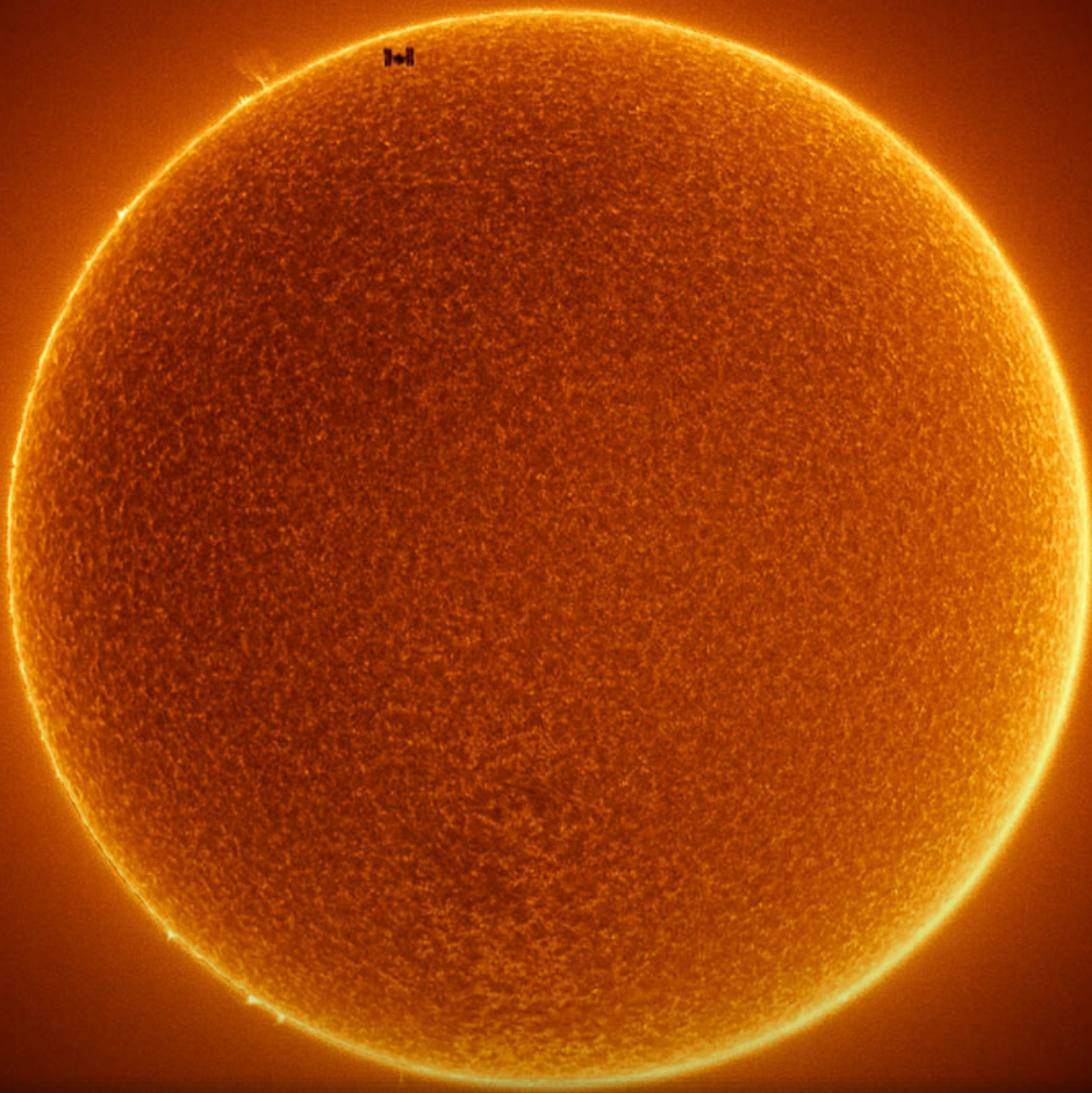
The E-Pal Week took place on June 30 - July 6, 2019. All the campers had a wonderful time during the week and they learned a lot about space! We had participants from Bulgaria, England, Greece, Lithuania, Poland; USA, and different provinces of Turkey! You can check out some of the photos taken throughout this special week down below!



E-Pal Week Has Ended!



#E-Pal2019



Astronomy Picture of the Day

The Space Station Crosses a Spotless Sun

Image Credit & Copyright: *Rainee Colacurcio*

That's no sunspot. It's the International Space Station (ISS) caught passing in front of the Sun. Sunspots, individually, have a dark central umbra, a lighter surrounding penumbra, and no solar panels. By contrast, the ISS is a complex and multi-spined mechanism, one of the largest and most sophisticated machines ever created by humanity. Also, sunspots occur on the Sun, whereas the ISS orbits the Earth. Transiting the Sun is not very unusual for the ISS, which orbits the Earth about every 90 minutes, but getting one's timing and equipment just right for a great image is rare. Strangely, besides that fake spot, in this recent two-image composite, the Sun lacked any real sunspots. The featured picture combines two images -- one capturing the space station transiting the Sun -- and another taken consecutively capturing details of the Sun's surface. Sunspots have been rare on the Sun since the dawn of the current Solar Minimum, a period of low solar activity. For reasons not yet fully understood, the number of sunspots occurring during both the previous and current solar minima have been unusually low.

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