

## TODAY IN SCIENCE: 1ST FOOTSTEPS ON MOON

Today is the 49th anniversary of humanity's historic first steps on the Moon. The story in pictures, here.

**The world watched on television as Neil Armstrong took the first steps on the moon's surface on July 20, 1969. It was the first time humans walked another world. As he stepped onto the lunar surface, Armstrong said, "That is one small step for man, one giant leap for mankind."**

Apollo 11 astronauts **Buzz Aldrin** and **Neil Armstrong** landed their moon module on a broad dark lunar lava flow, called the Sea of Tranquility. Six hours later, Neil Armstrong became the first human being to walk on the surface of a world beyond Earth.

Armstrong and Aldrin spent 21 1/2 hours on the Moon's surface. They collected 21.5 kg of moon rocks for return to Earth (see below). Then they blasted off from the lunar surface to meet up with Michael Collins in the command module orbiting overhead.

They returned safely to Earth and landed in the Pacific Ocean on July 24, 1969 (see below).

The Apollo command module's position atop the Saturn V, at launch. The lunar module – the craft that descended to the moon's surface – is positioned just below the command module, the yellow dot.

Columbia stayed in lunar orbit with Michael Collins aboard during Eagle's descent and landing.

We all remember the excitement in Armstrong's voice at the successful landing of Eagle on the moon's surface as he says: "Tranquility Base here. The Eagle has landed."

Apollo 11 officials relax in the Launch Control Centre following the successful liftoff. The famous German rocket engineer Wernher von Braun is second from left (with binoculars).

An early concern of space engineers had been that the lunar regolith, the fine soil covering the moon, would be soft like quicksand. There was some fear that the Eagle lunar module would sink after landing. Hence Armstrong's comment about the depth of the footpads in the lunar soil as he descended before stepping onto the moon. But there was no problem.

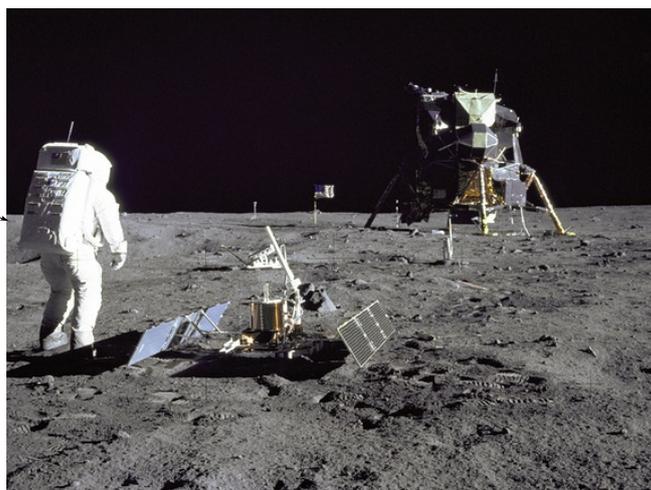
Armstrong and Aldrin at work on the moon. They deployed a U.S. flag and several science experiments, and collected moon rocks. Here is Buzz Aldrin, who piloted the lunar module Eagle to the moon's surface, with the LR-3, a reflecting array designed to bounce laser beams fired from Earth back to Earth. This experiment, which helped refine our knowledge of the moon's distance and the shape of its orbit around Earth, is still returning data from the moon. The lunar module Eagle is seen at the back.



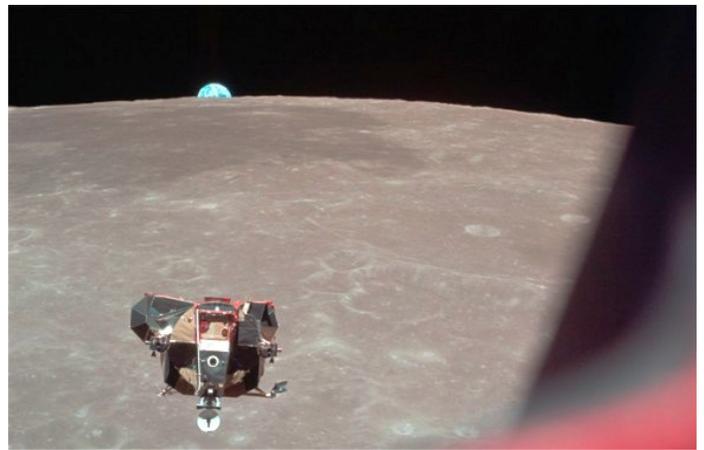
Buzz Aldrin descends the steps of the lunar module ladder and becomes the second human to walk on the moon.



Apollo 11 left Earth via a type of rocket now no longer used, called a Saturn V. The rocket was 111 metres tall, about the height of a 36-story-tall building.



Michael Collins caught this photo of the lunar module with Armstrong and Aldrin inside – and with Earth in the distance – as the module ascended from the Moon’s surface to rejoin the command module. The lunar module docked with the orbiting command module, and, shortly afterwards, the astronauts began their journey back to Earth.



There were no runway landings in those days. Splashdown for the three astronauts was in the Pacific Ocean. Here, they await pickup by a helicopter from the USS Hornet.



The Apollo program, also known as Project Apollo, was the third United States human spaceflight program carried out by the National Aeronautics and Space Administration. Next year will be the 50<sup>th</sup> anniversary of the Apollo 11 Moon Landing, and there are already commemorative badges available to celebrate the event

IS COLONIZATION FEASIBLE ON THE MOON?  
As the United States inches closer to the 50th Anniversary of the first Moon landing, NASA’s effort to resume space exploration and settle on the uninhabited planets may actually become a reality, according to Apollo 17 astronaut **Harrison Schmitt**. He said:

*“Settlements are certainly feasible on the Moon and I suspect that’s going to happen sooner or later”.*

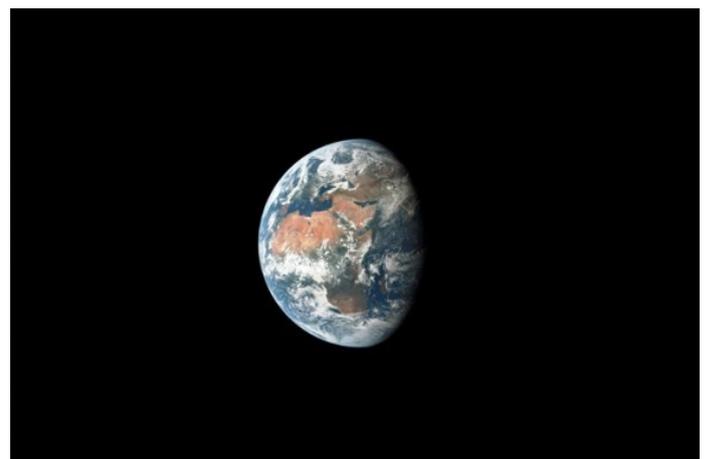
Schmitt was one of the last people to set foot on the Moon during the final mission of NASA’s Apollo program. He said there is an abundance of natural resources on the Moon, including water, oxygen and power that could even support very large settlements.



Under new direction from the Trump administration, NASA is in the process of working on new technology that can safely transport astronauts to and from outer space. But Schmitt is also putting the onus on the private sector:

*“NASA needs to get the infrastructure put together,” he said, “but the private sector can be there as well.”*

He added that the United States is in a geopolitical race to settle space, and not only with China.



AK, with EarthSky and Wikipedia Notes

Earth as seen by the Apollo 11 cosmonauts on their way to and from the Moon.