

FOR ALL
MOONKIND™





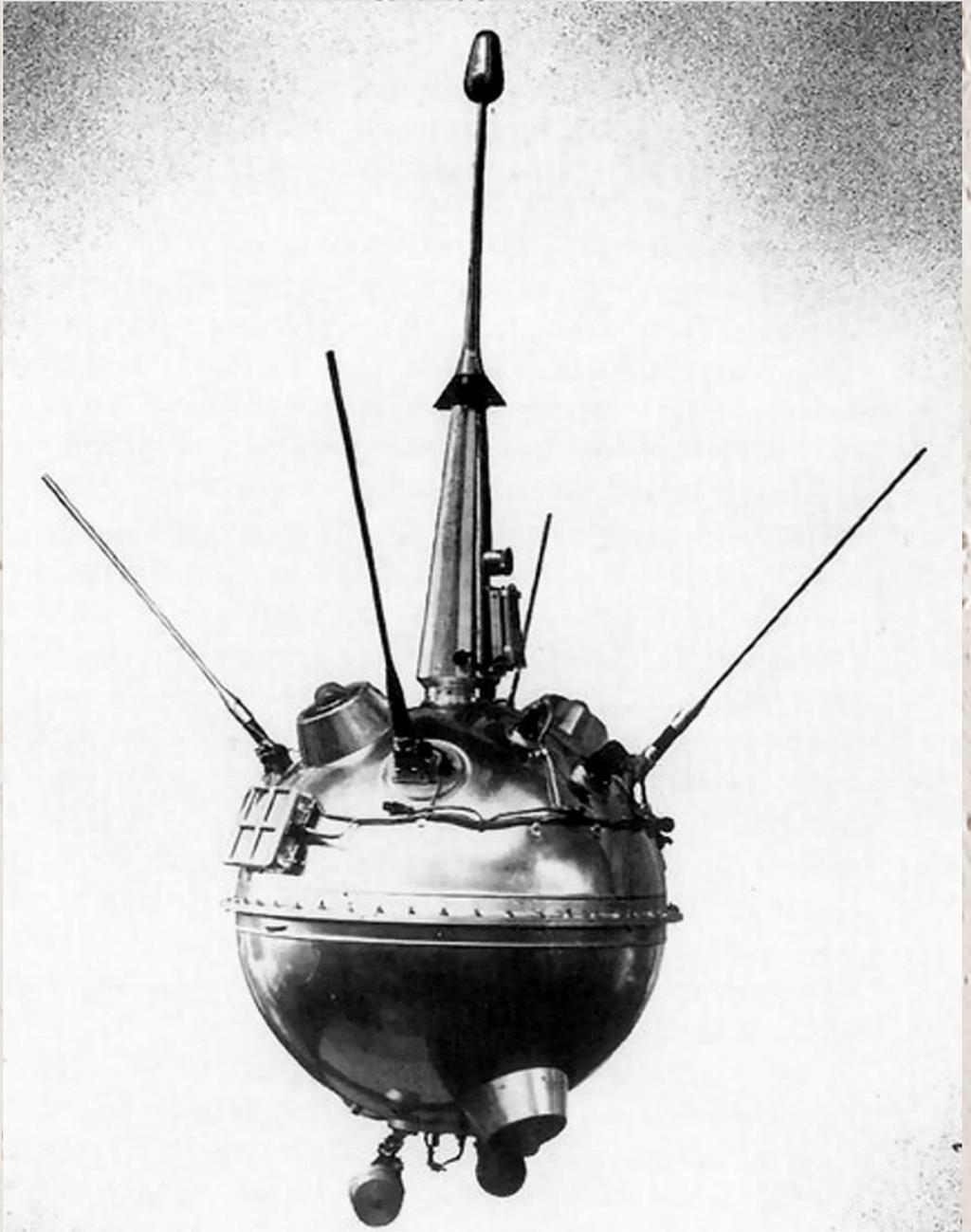
**A Summary
of
Human History
on the Moon**

Only One of These Footprints is Protected

The narrative of human history on the Moon represents the dawn of our evolution into a spacefaring species. The landing sites - hard, soft and crewed - are the ultimate example of universal human heritage; a true memorial to human ingenuity and accomplishment. They mark humankind's greatest technological achievements, and they are the first archaeological sites with human activity that are not on Earth.

We believe our cultural heritage in outer space, including our first Moonprints, deserves to be protected the same way we protect our first bipedal footsteps in Laetoli, Tanzania.





Luna 2 is the first human-made object to impact our Moon.

September 1959: First Human Object Impacts the Moon

On 12 September 1959, a rocket launched from Earth carrying a 390 kg spacecraft headed to the Moon. Luna 2 flew through space for more than 30 hours before releasing a bright orange cloud of sodium gas which both allowed scientists to track the spacecraft and provided data on the behavior of gas in space. On 14 September 1959, Luna 2 crash-landed on the Moon, as did part of the rocket that carried the spacecraft there.

These were the first items humans placed on an extraterrestrial surface. Ever.

Luna 2 carried a sphere, like the one pictured here, covered with medallions stamped with the emblem of the Soviet Union and the year. When Luna 2 impacted the Moon, the sphere was ejected and the medallions

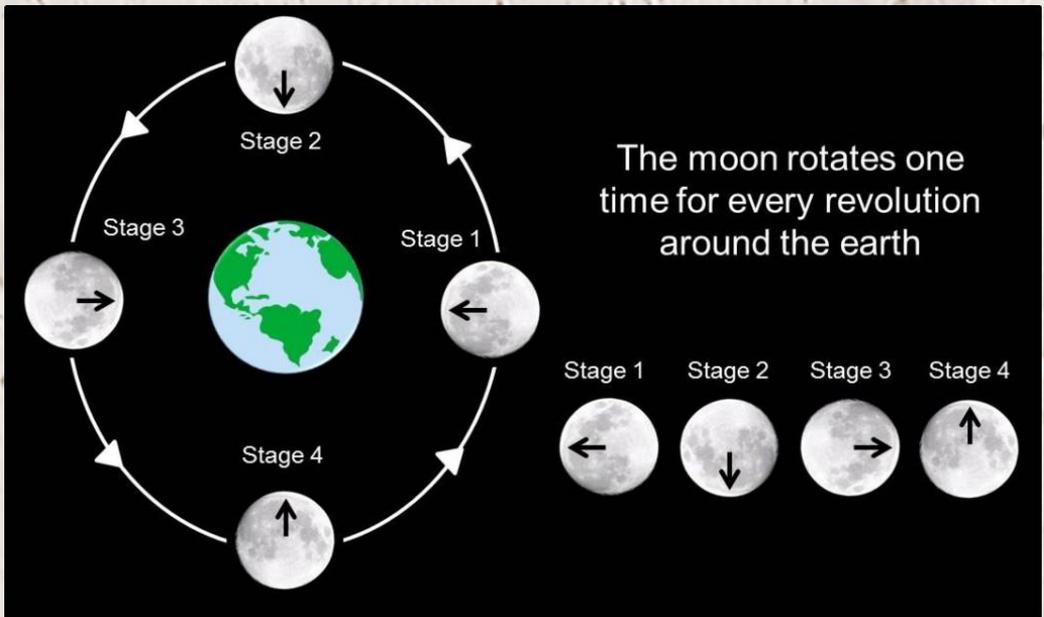


Credit: Patrick Pelletier

were scattered across the lunar surface where they remain, undisturbed, to this day.

The Far Side of the Moon Isn't Dark

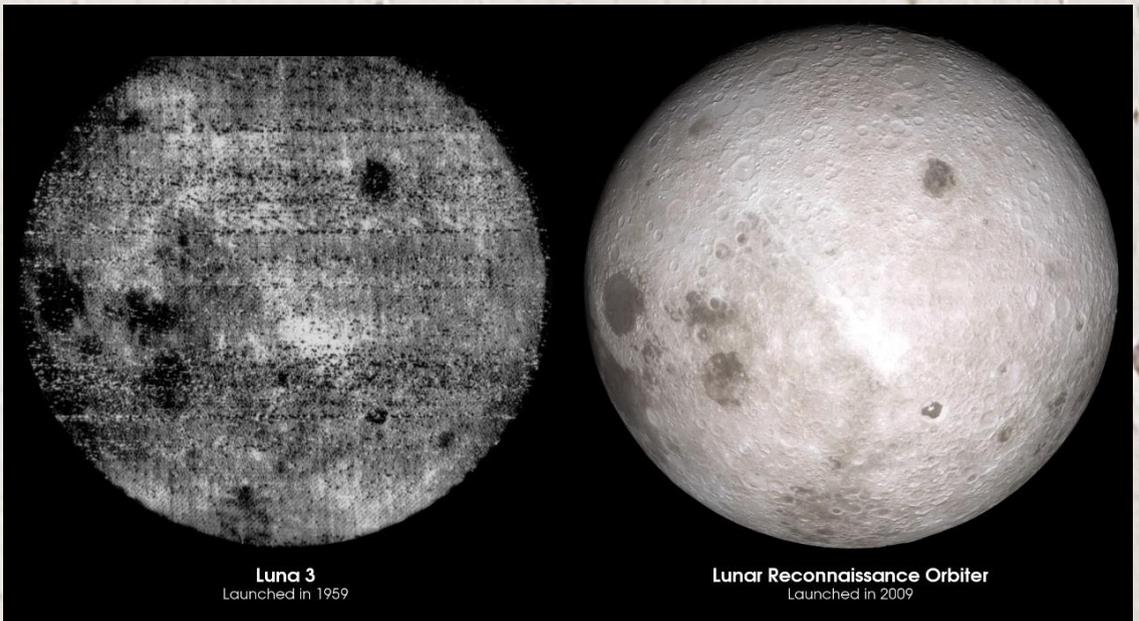
There isn't really a dark side of the Moon. The Moon is tidally locked to Earth. This means it rotates on its axis at the same rate (i.e. once per month) that it orbits the Earth. The result is that the same side of the Moon is always turned toward Earth, so we only see one face. The face we don't see, the backside, spends half the time in sunlight, just like Earth.



Humans obtained their very first view of the far side in 1959 when Luna 3, a replica of which is pictured above right, was sent around the Moon with a camera. The images obtained were not very clear, but once enhanced we learned that the far side has a more mountainous terrain than the side we see. After rounding the Moon, Luna 3 returned to Earth where it eventually burned up in Earth's atmosphere.

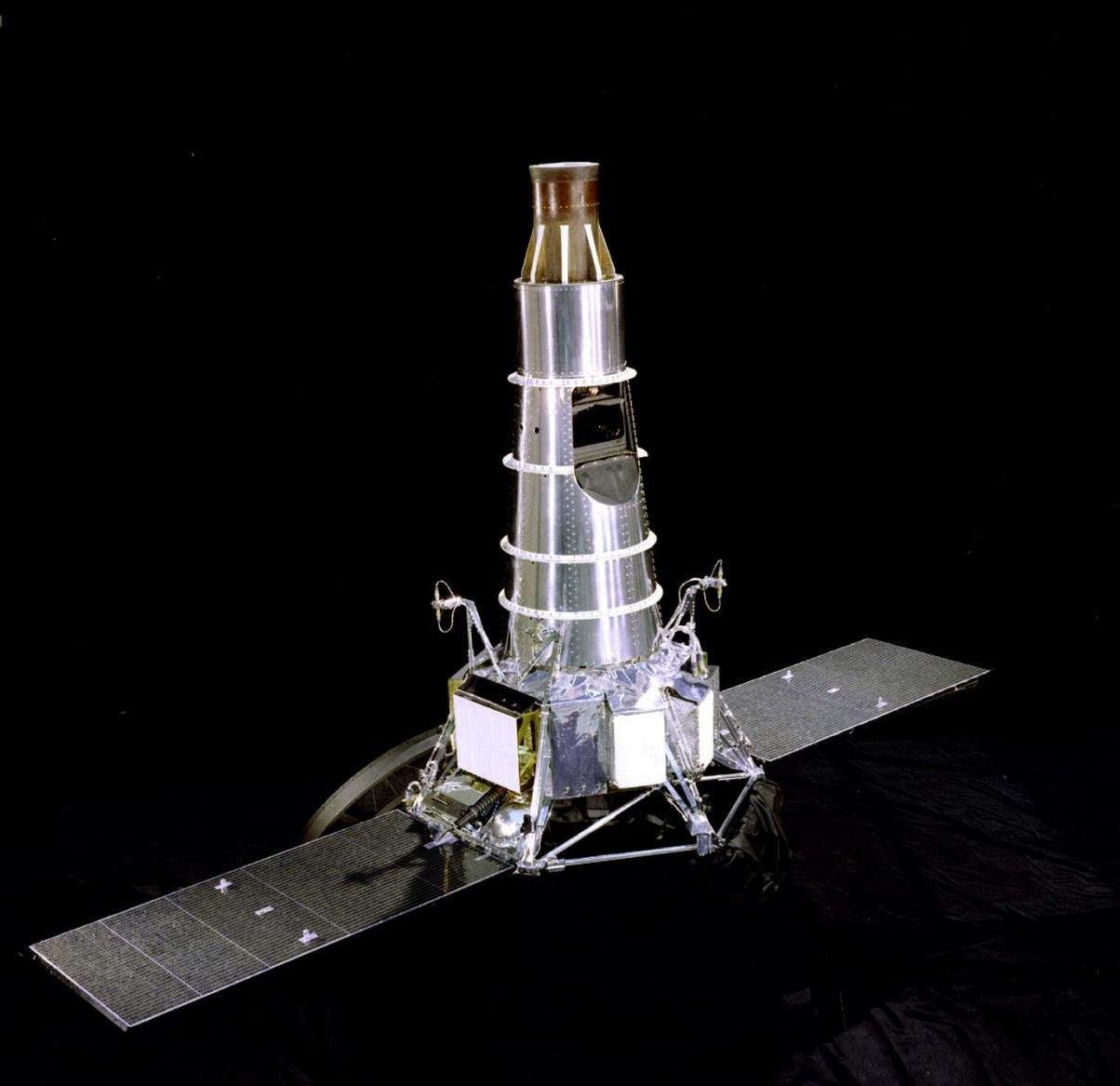


The left-hand image, below, shows the very first human view of the far side of the Moon, captured by Luna 3 in 1959. The same view was recreated fifty years later with the help of the NASA Lunar Reconnaissance Orbiter, a robotic spacecraft currently in orbit around the Moon.



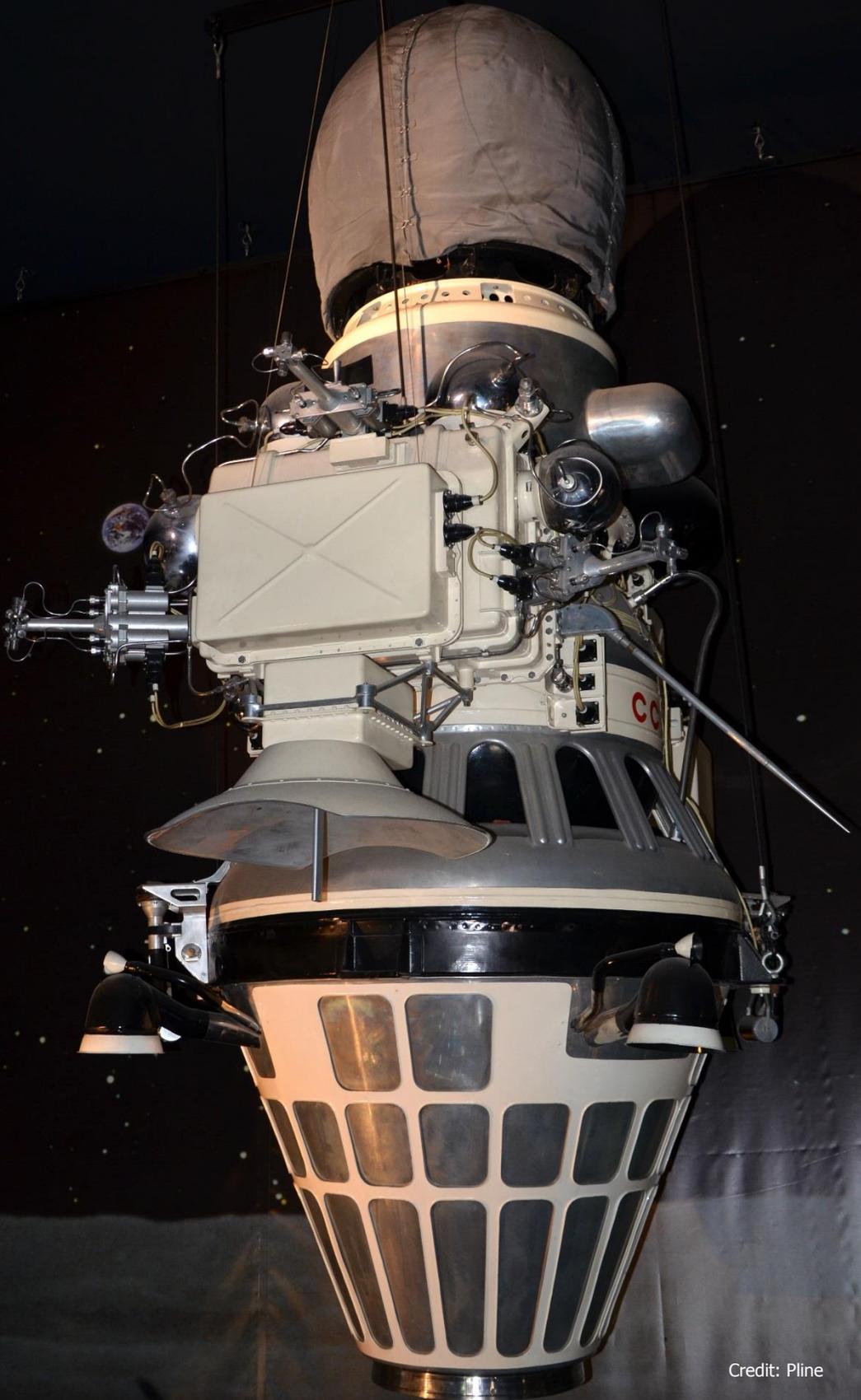
Luna 3
Launched in 1959

Lunar Reconnaissance Orbiter
Launched in 2009



Between 1959 and 1965 eight more human-made spacecraft impacted the Moon. The Ranger fleet of spacecraft, pictured above, provided live television transmissions of the Moon from lunar orbit for the first time. Ranger 4 was the first human instrument to impact the far side of the Moon. Luna 5, Luna 7 and Luna 8 also impacted the Moon in failed attempts to achieve an elusive first soft landing.

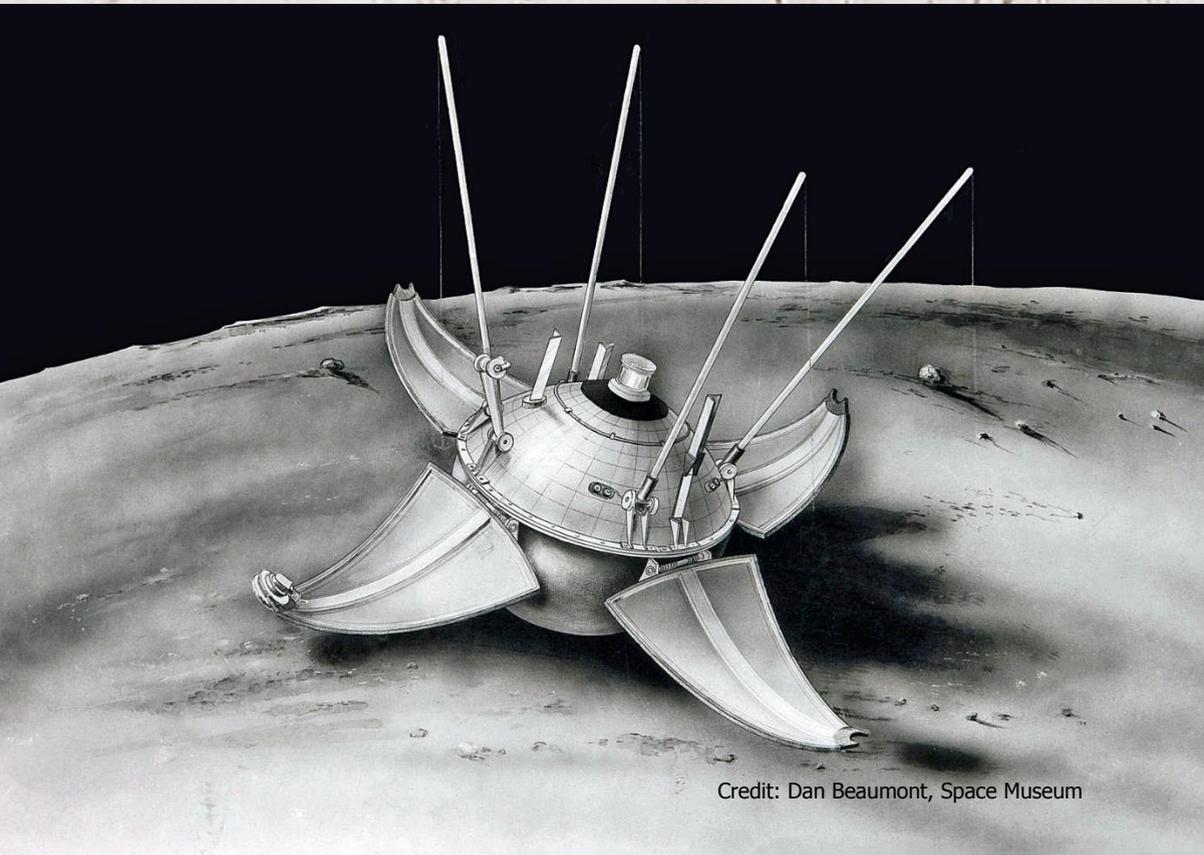




February 1966: First Soft Landing on the Moon Achieved

Launched on 31 January 1966, Luna 9 was the first spacecraft to achieve a soft landing on the Moon. Having taken three days to reach its destination, the spacecraft used four outrigger engines to slow its descent to the Moon's surface. Upon landing, on 3 February, four petals from the top shell opened to stabilize the spacecraft.

Among many other things, Luna 9 demonstrated that objects would not sink into the Moon's dust - that the lunar surface is capable of supporting the weight of a lander. It also marked the first time that photos were ever taken from the surface of the Moon.





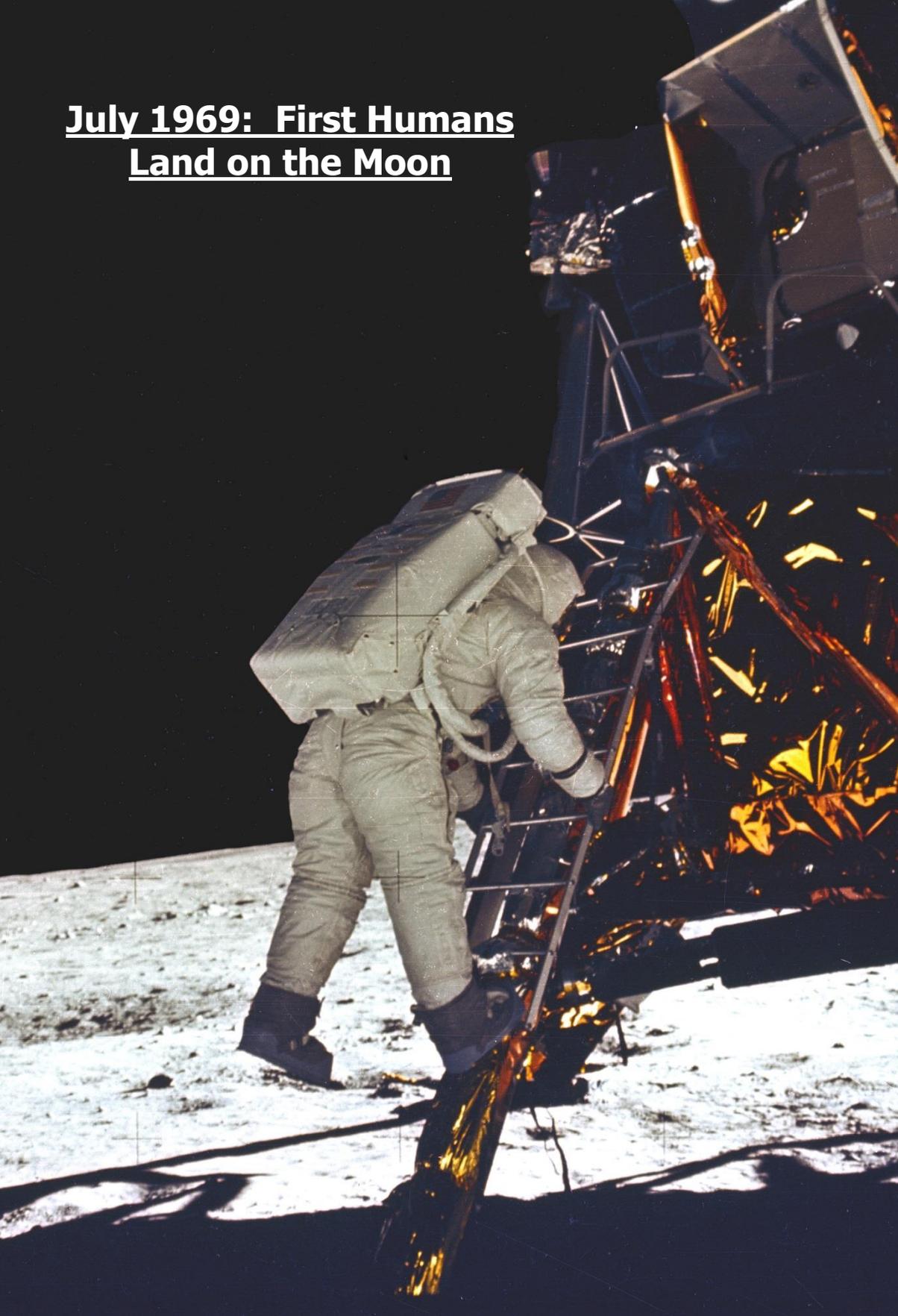


Fascination with our Moon grew after these early successes, and humans raced each other to unlock its secrets.

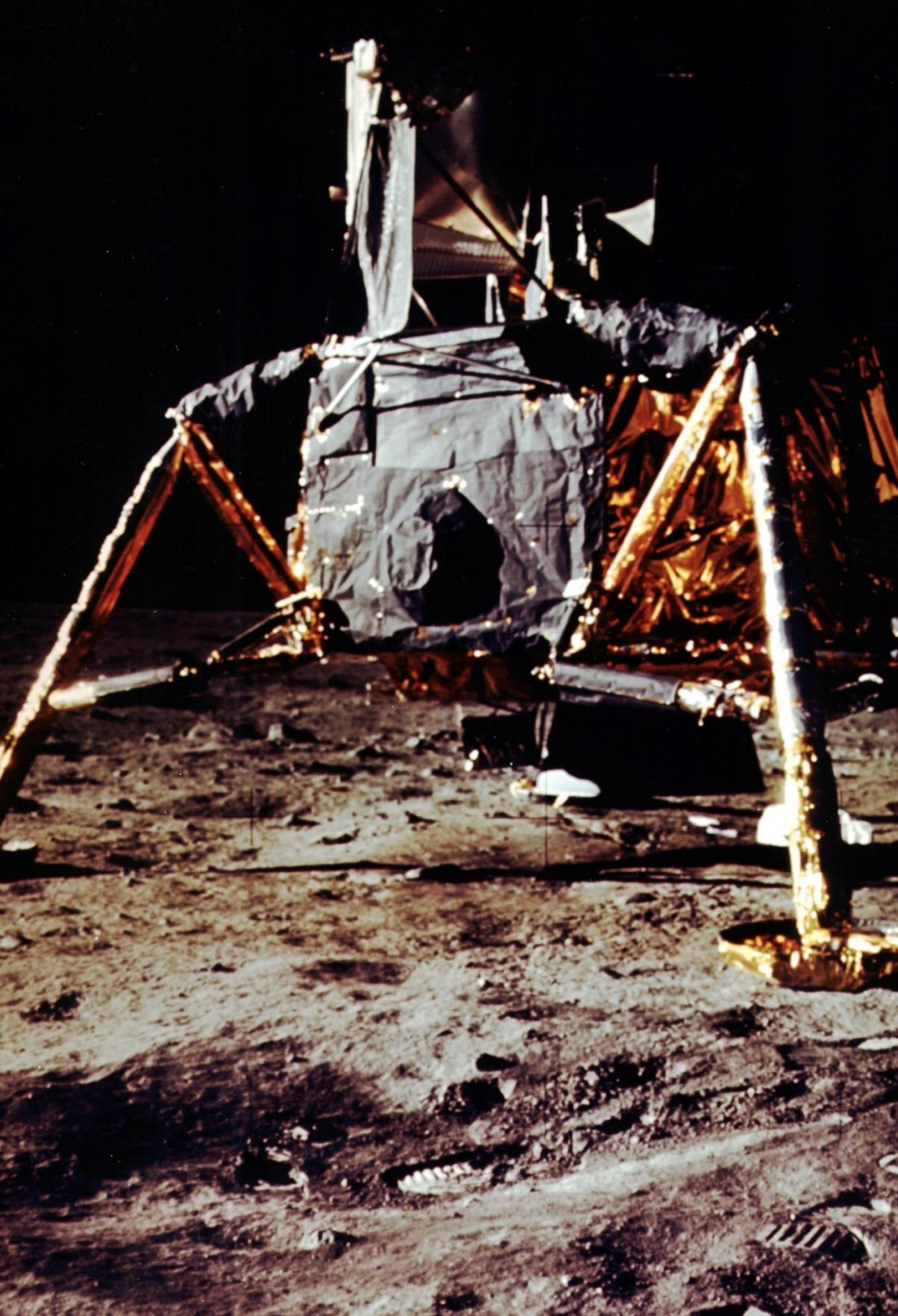
Surveyor 1, whose shadow on the Moon is pictured to the right, touched down on the surface on 2 June 1966, becoming the second spacecraft to land successfully. Surveyor 1 transmitted video data to Earth for nearly one month.

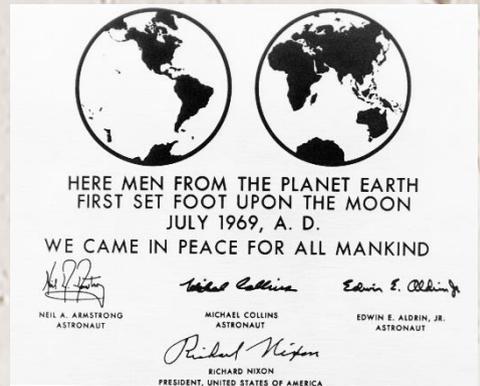
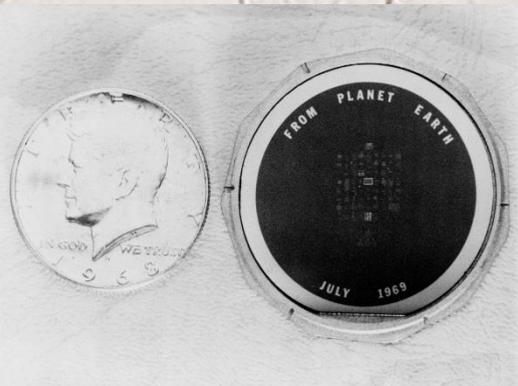
Luna 13 and four more Surveyor missions would dot the Moon's landscape from 1966 to 1969, leaving behind instruments and spacecraft that represented the height of technological achievement for that era.

July 1969: First Humans
Land on the Moon









Apollo 11 launched on 16 July 1969. Once on a trajectory toward the Moon, the Apollo Command Service Module separated from the rocket, spun around and extracted the Lunar Module (pictured left) before commencing an orbit around the Moon.

On 20 July, the Lunar Module separated from the Command Module and descended to the Moon. The first two humans to set foot on the Moon – Neil Armstrong and Edwin "Buzz" Aldrin – stayed on the lunar surface for about 21.5 hours before using the upper stage of the Lunar Module to return to the Command Module, and eventually back to Earth.

In addition to the Lunar Module, the astronauts left behind a silicon disc, pictured above left, with messages of peace from the leaders of 74 nations, a plaque, pictured above right, with a unifying message of peace, and a long list of objects they had to jettison in order to assure their safe return. All of these items, and the first human footprints, remain undisturbed on the Moon.

Six Apollo missions followed Apollo 11 – five landed on the Moon.*

Apollo 12 reached the Moon on 19 November 1969. It was the first mission to retrieve human-made material from the Moon. Pictured to the right is astronaut Charles Conrad examining Surveyor 3 which had landed on the Moon two years before.

The Apollo 14 mission, which landed on 5 February 1971, collected 94 pounds of rocks for scientific teams in 14 countries. Also on this mission, Astronaut Alan Shepard became the first, and so far only, human to hit a golf ball on the Moon.

With a landing on 30 July 1971, Apollo 15 was the first to give humans the ability to drive on the Moon.

Apollo 16, which reached the Moon on 21 April 1972, was the first crewed mission to land in the Lunar highlands and significantly improved our understanding of lunar geologic structure and processes.

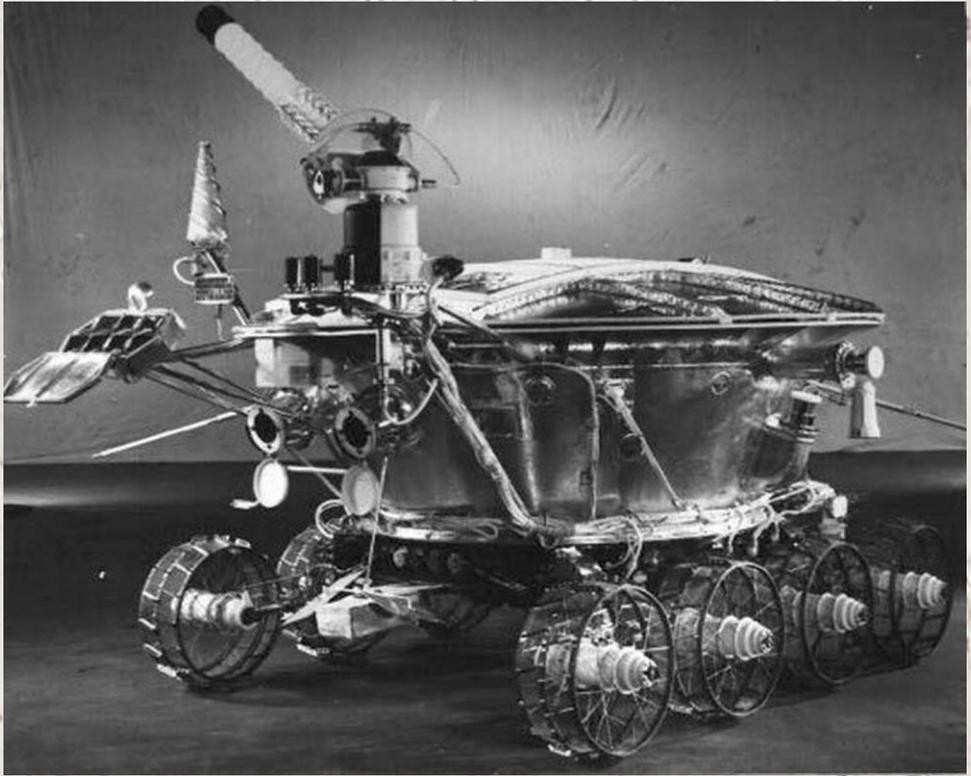
And Apollo 17 was the final mission of the enterprise. Landing on the Moon on 11 December 1972, Apollo 17 boasts the first scientist in space, geologist Harrison Schmitt. It also marks the last time humans traveled beyond Low Earth Orbit.

* Apollo 13, which launched on 11 April 1970, was intended to be the third spacecraft to carry humans to the Moon. However, one of the oxygen tanks on the Service Module exploded after liftoff, forcing the crew to abort the mission. The crew returned safely to Earth on 17 April 1970.

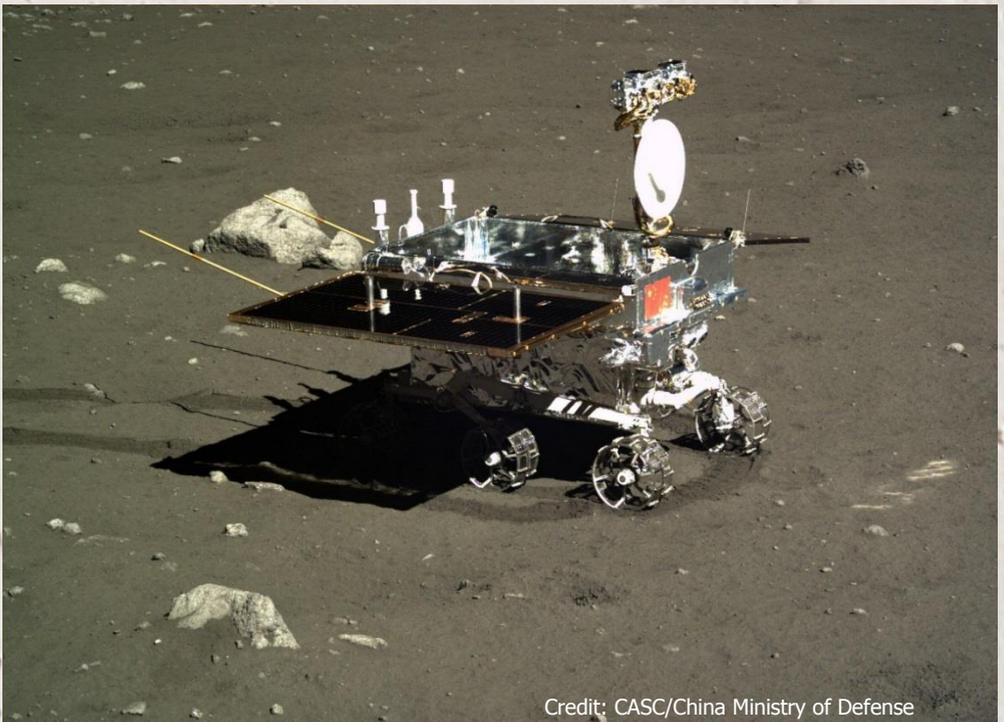




More than 140 kilometers have been driven on the Moon. Ninety kilometers were driven by humans in vehicles like the Lunar Roving Vehicle pictured above. The other 50 kilometers were driven by humans remotely. Lunokhod 1, pictured above right, was the first successful rover to explore another world - and the first to make wheel marks on the Moon. The Luna missions also successfully returned lunar samples to Earth in 1970, 1972 and 1976. Chang'e 3, pictured bottom right, landed on the Moon in 2013 and was also maneuvered remotely. All these vehicles remain on the Moon.



Moon Rovers



Credit: CASC/China Ministry of Defense

Spacecraft Deliberately Crashed on the Lunar Surface

Over the years, the Moon has endured many additional impacts from human objects, mostly lunar orbiters commanded to crash on the lunar surface when their scientific missions were complete. A nonexhaustive list includes:

Lunar Prospector – after successfully detecting the presence of “water-ice” on Moon, the orbiter was deliberately crashed into a crater near the lunar south pole on 31 July 1999.

SMART-1 – created a crater visible from Earth with ground telescopes when it impacted the Moon on 3 September 2006.

Chandrayaan-1 – deployed a Moon Impact Probe which impacted the south pole of the Moon on 14 November 2008. The orbiter itself was lost in 2009 and then discovered in 2017, still circling the Moon at 200 kilometers from the surface.

SELENE – orbited the Moon for a year and eight months and helped improve lunar topography maps before being instructed to impact the lunar surface on 10 June 2009.

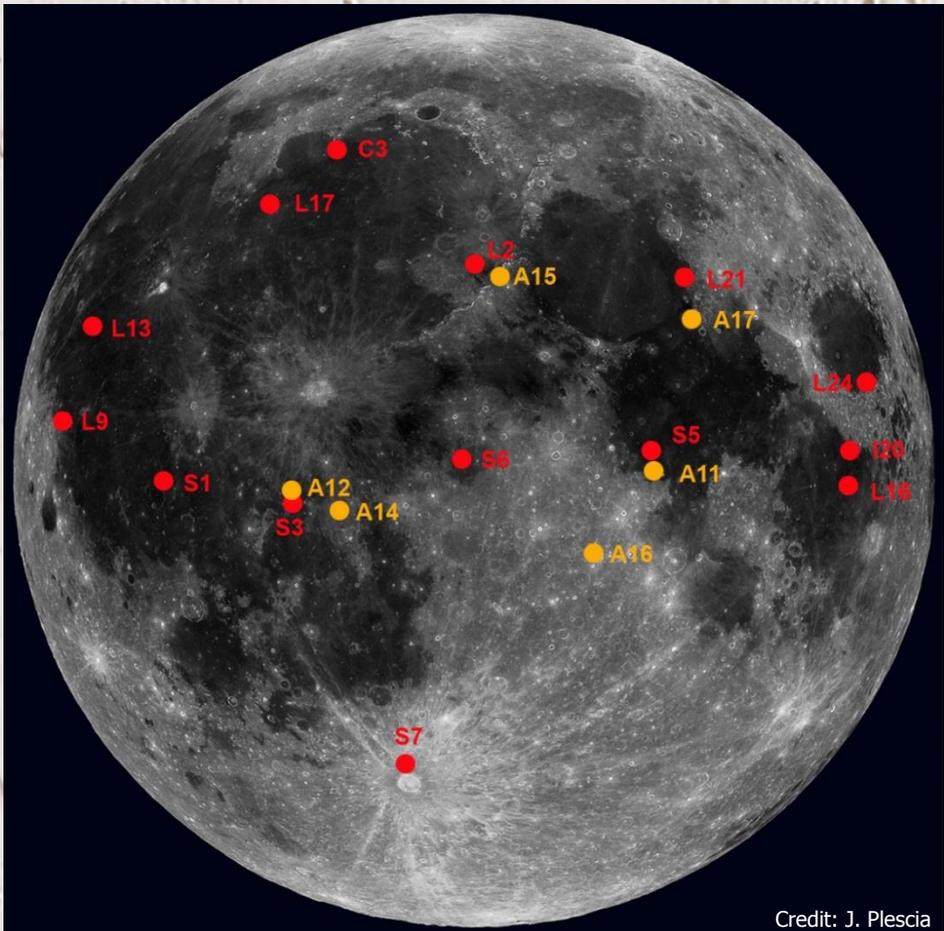
LADEE – pictured right, was designed to conduct tests on the lunar atmosphere and dust environment. Launched in 2013, it was intentionally crashed into the far side of the Moon on 18 April 2014.

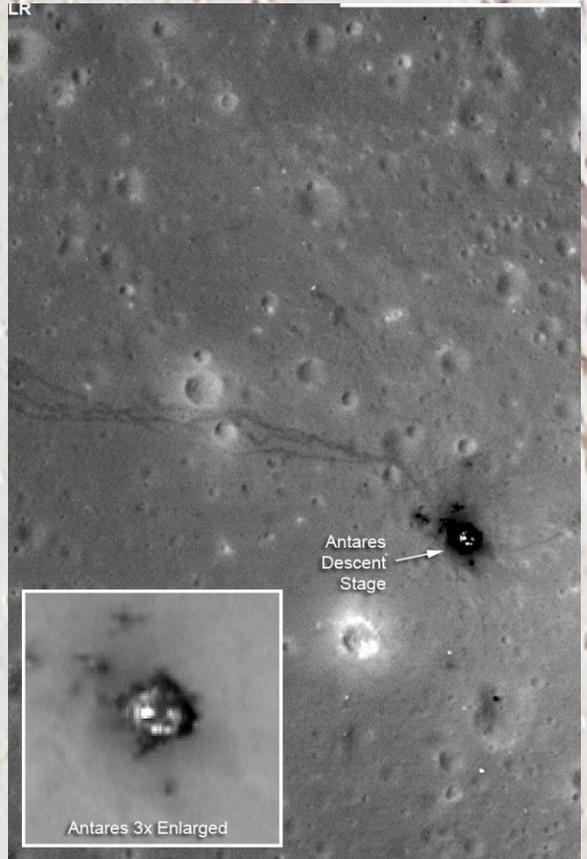


Our Heritage on the Moon

It is estimated there are more than 80 potential human heritage sites on the Moon. All of these sites bear witness to humanity's first steps off Earth.

Many of the sites have been positively identified and photographed from lunar orbit. The map below shows all the crewed landing sites - the Apollo (A) missions - some of the Luna (L) missions, five of the Surveyor (S) missions and the most recent mission, Chang'e 3 (C).





The images above are actual photos of the Luna 17 site (left) and the Apollo 14 site, (right) taken by a camera on the NASA Lunar Reconnaissance Orbiter.

These truly otherworldly images are breathtaking. Together, all the crewed and robotic, soft and hard landing sites on the Moon chronicle the beginning of a great and still-unfolding chapter in human history: the realization of our quest to explore the heavens.

Help us Preserve Our History

Acknowledgment

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Credits

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