

New Scientist

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NASA/KIM SHIFLETT

Space exploration

NASA's moon craft splashes down

The successful landing of the uncrewed Orion capsule sets up return trips that could see astronauts exploring the lunar surface once more, says **Leah Crane**

STEP one of NASA's return to the moon is complete. On 11 December, the uncrewed Orion capsule splashed down in the Pacific Ocean off the coast of California, completing its 26-day journey to the moon and back as part of the Artemis I mission.

The return was unlike those of other lunar spacecraft. It began as it hurtled into the atmosphere, with its heat shield reaching temperatures of around 2760°C.

But instead of continuing to plunge towards the sea, the capsule performed what engineers call a skip entry because of its similarity to a stone skipped across a pond. Once it reached an altitude of about 61 kilometres,

it flipped upside down to quickly change its centre of gravity, popping it back upwards by about 30 kilometres, nearly all the way back into space, before making its final descent.

There are three reasons for this manoeuvre: it allowed operators to target the landing site more precisely; it lowered the strain on the heat shield; and it reduced the maximum g-forces on the ship by more than 40 per cent, which will make future Orion landings easier and safer for astronauts.

"The splashdown of the Orion capsule was the ultimate test before we put astronauts on board"

Everything appeared to go well with the splashdown, which NASA administrator Bill Nelson called "the ultimate test before we put astronauts on board". The next step is for spacecraft engineers at NASA to go through the data from the landing to make sure the capsule – especially the heat shield – held up well enough to be confident that astronauts on the Artemis II mission will be as safe as possible.

That roughly 10-day mission, scheduled for 2024, will carry four astronauts around the moon and back, to perform a final test of the capsule's life support systems before Artemis III. This flagship mission, planned for 2025, will

The Orion capsule being recovered after its ocean landing

carry two astronauts to the moon's surface for just over six days, including the first woman ever to walk on the moon, while two others remain in lunar orbit. In total, that trip is intended to last about 30 days.

If it goes ahead, Artemis III will be the first time anyone has set foot on the moon since Apollo 17 in 1972. It will set the scene for NASA's intensive plans for lunar exploration, which include a space station orbiting the moon along with a permanent lunar base. ■