



# THE MISSIONS MAKING A RETURN TO THE MOON

Artemis I and the 9 other lunar launches planned this year



#203 APRIL 2022

# Sky at Night

THE UK'S BEST SELLING ASTRONOMY MAGAZINE

## FROM CITY LIGHTS TO DEEP SPACE

Discover the deep-sky objects you can observe from urban skies this season

### WALES'S DARK HEART

Stargazing holidays in the nation with more dark skies than any other

**LOOK OUT FOR LYRIDS**

Catch spring's big meteor shower this month!

### SOLITARY SINGULARITY

Have astronomers found a wandering black hole?

### APOLLO 16 REMEMBERED

The penultimate landing recalled, 50 years on

### A PLANETARY PAIRING

Capture Venus and Jupiter together in the dawn sky



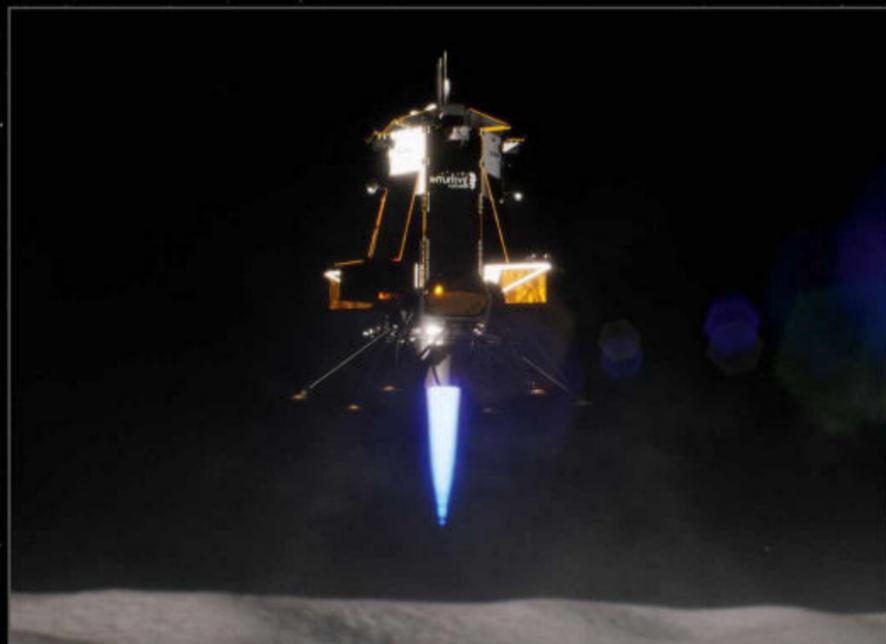
# Return to the Moon



The Moon is about to get busy, both in orbit and on the surface

2022 is going to be a bumper year for lunar missions. Orbiters are set to begin hunting for potential resources, while landers plan on alighting at the lunar south pole for the first time, and a fleet of rovers are set to scuttle across the surface.

Several of these missions are participating in NASA's Commercial Lunar Payload Services (CLPS) project, which pays commercial spaceflight enterprises to carry payloads to the Moon's surface in preparation for the upcoming Artemis landings (see page 60). Elsewhere in the world, spacecraft from national space agencies and commercial companies based in India, Japan, Russia and South Korea are readying to make the trip. Lunar rush hour is about to begin.



## **Nova-C IM-1, Intuitive Machines**

A lunar lander due to launch as part of NASA's CLPS scheme in early 2022, Nova-C IM-1 will carry five NASA payloads, CubeSats and a mini-rover from UK-led company Spacebit.

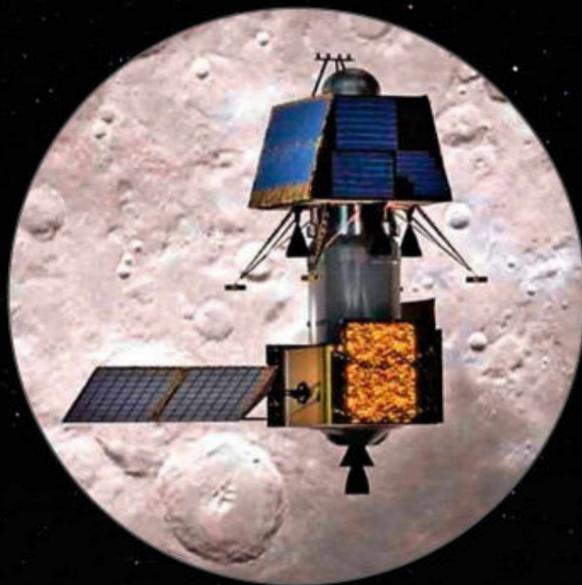
## **CAPSTONE, NASA**

A small CubeSat helping to test the gravitational stability of the orbit for NASA's Gateway lunar space station. CAPSTONE is due to launch on 19 March for a nine-month mission.



## **Luna 25, Roscosmos**

The Russians are returning to the Moon after 46 years, this time heading to the south pole to investigate the composition of the lunar soil. The mission is due to launch on 22 July.



## **Chandrayaan-3, Indian Space Research Organisation**

India's third lunar mission will be a second attempt at landing, after crashing in 2019. ISRO hopes to launch the new lander in the second half of 2022.



## **Peregrine, Astrobotic**

Another CLPS mission, this time from US company Astrobotic, the Peregrine lander is due to launch in mid 2022. It'll carry NASA payloads and rovers from the UK, Chile, Japan, Mexico and Hungary.



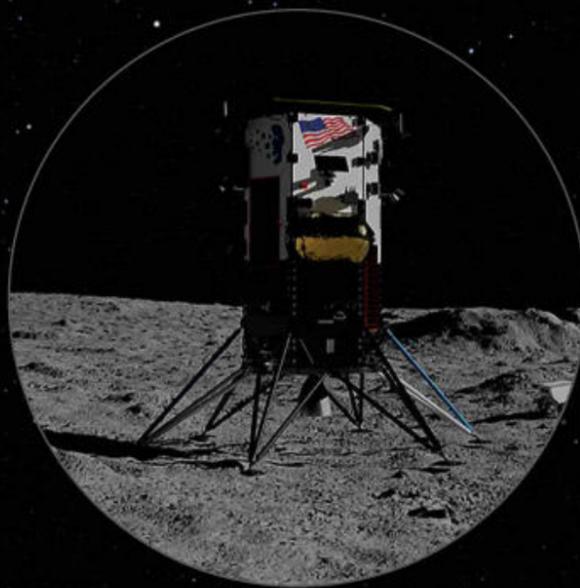
### **Korea Pathfinder Lunar Orbiter, Korea Aerospace Research Institute**

Marking South Korea's first foray into planetary exploration, this orbiter is largely a technology demonstration, but will also survey resources such as water ice and aluminium. It's due to launch on 1 August.



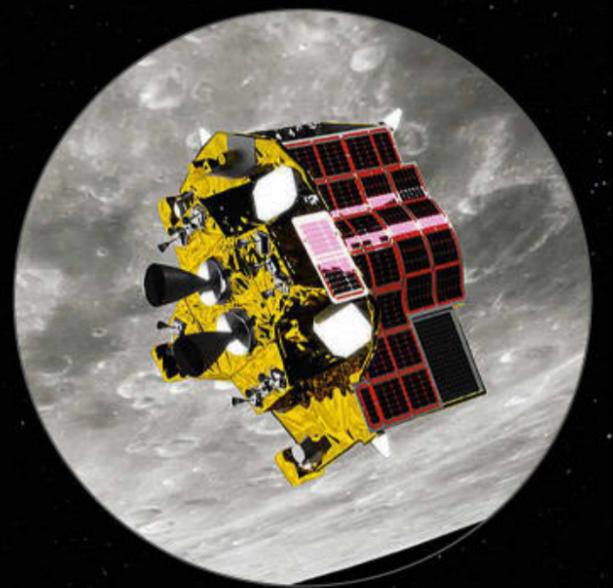
### **HAKUTO-R, ispace**

Originally a contestant in the Google Lunar X Prize, Japanese spaceflight company ispace will land a commercial payload on the Moon in October 2022, though they have a future contract with ESA to extract lunar water.



### **Nova-C IM-2, Intuitive Machines**

Intuitive Machines will attempt its second landing on the Moon in late 2022, less than 12 months after its first attempt. This time it'll be heading to the lunar south pole, with the aim of drilling 1m into the surface to look for water ice.



### **Smart Lander for Investigating the Moon (SLIM), JAXA**

Using software developed from facial recognition technology to identify lunar craters, this trial mission from the Japanese space agency will attempt to land with high-precision accuracy. 🌕

## Coming in 2023

**Xelene, Masten Space Systems:** CLPS mission

**Blue Ghost, Firefly Aerospace:** CLPS mission

**Alina, Planetary Transportation Systems:** Former Google Lunar X Prize contestant

**Volatiles Investigating Polar Exploration Rover (VIPER), NASA:** Lunar prospector

**Lunar Zebra, Delft University:** Student-built rover

**Seven Sisters, Space Industry Association of Australia:** Nanosats to support the Artemis programme

Xelene will take NASA and commercial payloads to the Moon's Haworth Crater

