

SPACE

Europe plans Moon landing

Space-agency scientists propose piggybacking on two Russian missions.

BY ELIZABETH GIBNEY

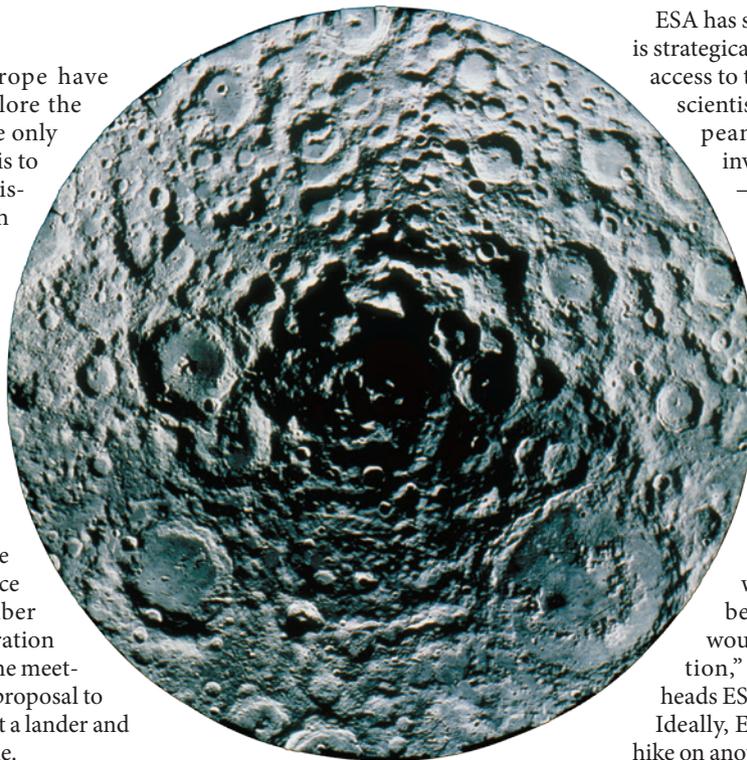
Science ministers in Europe have resurrected plans to explore the Moon's surface — and the only strategy currently on the table is to join two uncrewed Russian missions. The developments, which follow the shelving of a proposed European Space Agency (ESA) Moon lander two years ago, come amid growing political tensions between Russia and Western nations.

On 2 December, at a meeting in Luxembourg to determine ESA's policy, the space agency got the go-ahead and funding to investigate "participation in robotic missions for the exploration of the Moon". Science ministers from the ESA member states did not approve collaboration with Russia specifically, but at the meeting, ESA scientists presented a proposal to join Russia on its missions to put a lander and a rover on the Moon's south pole.

Money for lunar exploration will come from a pot of €800 million (US\$980 million) contributed by ESA's member states and dedicated to international space exploration; the pot will primarily pay for activities on the International Space Station and the development of a propulsion module for NASA's Orion spacecraft, which is eventually designed to carry astronauts to deep space, and was tested on 5 December in an uncrewed space flight (see page 148).

In the 45 years since astronauts first walked on the Moon, no European country or space agency has launched a mission to the Moon's surface. And no lander or astronaut has been to the lunar south pole, a region thought to contain ice and thus deemed a probable spot for any future permanent lunar base. A 12-kilometre-deep crater there might provide access to material from the Moon's interior, also making it attractive for scientific study, says Ian Crawford, a lunar scientist at Birkbeck, University of London. The ancient material could reveal details of the collision between a Mars-sized planet and early Earth that is thought to have produced the Moon. "The idea

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The Moon's south pole is unexplored territory.

that we've 'been there and done that' did last for a long time, but that's gone away now," says Crawford. "The Moon still has a lot to tell us."

A Moon lander proposed by ESA failed to gather enough support at a similar meeting of ministers in 2012. That left European scientists and industry mobilized to go — but without a mission. A group of ESA scientists has been discussing a partnership with the Russian space agency, Roscosmos, ever since.

The group's proposal, aired for the first time at the Luxembourg meeting, is that ESA contribute to Roscosmos's Luna-Resource Lander, also known as Luna 27, which is scheduled for launch in 2019, as well as the Lunar Sample Return, planned for the early 2020s. The first will study the lunar soil and atmosphere at the south pole; the second would bring samples back to Earth. ESA would provide precision landing and communications equipment, as well as drill and analysis instruments.

The ministerial decision, in principle, means that ESA can start to fund efforts to incorporate these technologies into the mission — although whether it will do so has still to be agreed. The preliminary phase is estimated to cost up to €50 million. The total price would be much higher, perhaps in the hundreds of millions.

ESA has said that pursuing lunar missions is strategically important, not only to secure access to the Moon's surface for European scientists, but also to ensure that European expertise and technology is involved in future lunar exploration — including, ultimately, international crewed missions and even a permanent lunar base. NASA currently has no plans to land on the Moon (Orion will be designed to take astronauts into lunar orbit), but Russia, China, Japan and several private companies are making plans to put rovers on the body. Representatives from these nations have more than hinted that permanent Moon bases and human exploration would be the next steps. "It would be crazy that an agency like ESA would not be part of lunar exploration," says Bérengère Houdou, who heads ESA's Lunar Exploration Office.

Ideally, Europe would not need to hitchhike on another agency's mission to get to the Moon, but the potential Russian collaboration is "a very welcome plan B", says Crawford. "We're primed for a lunar mission, so it's absolutely timely."

It is not clear whether the sour relationship between Russian and Western leadership will affect the proposal's chances of success. Crawford calls it "a potential worry" but stresses that so far, geopolitical problems have not affected space cooperation. ESA officials say that cooperation is continuing normally on existing missions that involve European-Russian collaboration, such as the International Space Station and ExoMars, which will put a demonstration lander on the red planet in 2016 to test technologies for a rover that will land in 2018 to search for signs of past life. The ExoMars rover received the funding it needs to stay on track for 2018 at the 2 December meeting.

In the longer term, Crawford believes that Europe should be looking beyond collaboration with Roscosmos. He adds that China's space agency, which last year became the first since the 1970s to put a lander on the Moon, is the only one that has working scientists and engineers who have Moon-landing experience. "There must be a case," he says, "for ESA broadening its collaboration with other potential space-faring nations." ■

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