

The moon's far side has a thick, old crust and is pockmarked by many deep craters.

The impact may have brought material from the moon's upper mantle to the surface, a scenario that data from a visible and near-infrared imaging spectrometer might be able to verify. The imaging spectrometer will also explore the geochemical composition of far-side soil, which is likely to differ from the near side because of the same processes that produced the difference in crust thickness.

The rover's ground-penetrating radar—similar to that on Chang'e-3—will provide another look down to about 100 meters beneath the surface, probing the depth of the regolith and looking for subsurface structures. Combining the radar data with surface images from cameras on the lander and rover might advance scientists' understanding of the cratering process.

Going to the far side also opens “a totally new window for radio astronomy,” says Ping Jinsong, a NAOC radio astronomer. On Earth, and even in near-Earth space, natural and humanmade interference hampers low-frequency radio observations. The moon blocks this noise. So the mission carries a trio of low-frequency receivers: one on the lander, one—a collaboration with the Netherlands—on Queqiao, and a third on a microsatellite released from Queqiao into a lunar orbit. (Contact with a second microsatellite carrying a fourth receiver has been lost.) The receivers will listen for solar radio bursts, signals from aurorae on other planets, and the faint signals from the primordial clouds of hydrogen gas that coalesced into the universe's first stars (*Science*, 18 May, p. 698).

China's ambitious lunar program will continue with Chang'e-5, a sample return mission, due for launch next year. It will retrieve up to 2 kilograms of soil and rock from the Oceanus Procellarum, a vast lunar mare on the near side untouched by previous landings, and one of the moon's youngest volcanic flows. “It's a great objective and will potentially yield some fantastic science,” says Bradley Jolliff, a planetary scientist at Washington University in St. Louis, Missouri, who has urged the United States to launch its own lunar sample return mission.

If China continues its tradition of developing moon missions in pairs, a second sample return mission, Chang'e-6, might follow. Head notes that NASA, ESA, Japan, Russia, and India have all taken a renewed interest in our planet's companion, which holds clues to Earth's own history. “Chang'e-4 and 5 are a major part of this renaissance,” Head says, “and in many ways are the current vanguard.” ■

## PUBLISHING

## European funders detail their open-access plan

Plan S will allow researchers to publish in hybrid journals that commit to flip to full open access

By **Tania Rabesandratana**

**P**lan S, the contentious program that a group of European science funders hopes will end scholarly journals' paywalls, has fleshed out its rules—and softened its tone a bit. In seven pages of implementation guidance released this week, the funders explain how grantees can abide by Plan S. But some critics say the document—which is up for public discussion for 2 months—remains too restrictive.

Debate about Plan S has often been acrimonious since it was unveiled (*Science*, 7 September, p. 957), but both sides were hamstrung by a lack of detail. Robert-Jan Smits, the European Commission's open-access (OA) envoy and one of the creators of Plan S, admitted at a news briefing in London to a “lack of clear communication” about the plan.

Now, the guidance outlines three ways researchers can comply with Plan S, which is backed by national funding agencies of countries including the United Kingdom, France, and Austria, as well as private funders including the Bill & Melinda Gates Foundation. They can publish in an OA journal or platform. They can also publish in a subscription journal, provided they make a final peer-reviewed version or accepted manuscript immediately available in an OA repository. Finally, contrary to earlier indications, grantees can publish in hybrid journals, which charge subscriptions and also offer authors a paid OA option, but only if the journal commits to flip to full OA.

The guidance should quell fears about Plan S's restrictiveness, Smits said. This month, an open letter, now signed by about 1400 researchers, slammed Plan S for its impact on hybrid journals published by scientific societies, saying it would block access to their “valuable and rigorous peer-review system.” The guidance now leaves room for hybrid journals, as long as they sign agreements by the end of 2021 pledging to shift to full OA within 3 years.

The architects also addressed criticism of the plan's commitment that funders

would pick up the bill for reasonable article-processing charges (APCs), the fees that some journals charge authors to publish OA papers. The letter's authors saw the promise as a needless concession to for-profit OA publications. But John-Arne Røttingen, chief executive of The Research Council of Norway in Oslo, who co-led the group that developed the guidance, denies this: “Plan S is not about one particular business model,” he said. “We are neutral and want a plurality of actors,” including fee-free OA journals.

“I am glad to see that ... feedback from the community has been listened to,” says Niamh O'Connor, chair-elect of the Association of Learned and Professional Society Publishers in Watford, U.K. Society publishers will need to find strategies “to adapt and thrive under Plan S,” she says. But a spokesperson for AAAS, *Science*'s publisher, says

the guidance is only a modest improvement, and Plan S “still jeopardizes” its journals.

Structural biologist Lynn Kamerlin, who co-wrote the open letter, says the guidance still limits researchers' freedom to publish. “It's a step in right direction,” she says. Still, funders and publishers should negotiate the specifics, “rather than putting researchers in the crosshairs,” adds Kamerlin, who works at Uppsala University in Sweden.

Røttingen said the funders will commission an analysis to find out which disciplines need more OA outlets, and then offer financial incentives to create new journals or flip existing ones to OA. Another study will focus on APCs, which Plan S pledges to standardize and cap.

The guidance document does not say exactly how compliance will be monitored. Røttingen said funding agencies probably won't complete payment of research grants to scientists who don't comply.

The note gives funders some leeway with the implementation timeline. When the rules take effect in 2020, they could apply to existing grants, to newly awarded grants, or “at the very least,” to new calls for research proposals. ■

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**Niamh O'Connor,**

Association of Learned and Professional Society Publishers

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*Science* **362** (6418), 983.

DOI: 10.1126/science.362.6418.983

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