

SPACE EXPLORATION

Israeli spacecraft crash-lands on Moon

Attempt to put first privately funded lander on the Moon fails.

BY ELIZABETH GIBNEY

The Israeli spacecraft Beresheet crash-landed on the Moon on 11 April after experiencing apparent engine trouble moments before it was scheduled to touch down. The mishap ended the mission's goal of becoming the first privately funded craft to make a controlled landing on the Moon.

"Well, we didn't make it. But we definitely tried," said Morris Kahn, the president of SpaceIL, the non-profit company that built Beresheet, speaking from mission control in Yehud, Israel. SpaceIL is still investigating what led to the crash, which dashed Israel's dreams of becoming the fourth country to put a spacecraft on the Moon — alongside China, Russia and the United States. But Opher Doron, general manager of the space division at Israel Aerospace Industries, which partnered with SpaceIL on the mission, noted that Israel is now the seventh country to orbit the Moon successfully.

"Navigating a complex trajectory to lunar orbit, and then attempting a soft landing on the



A last image captured by the lost Beresheet.

Moon with an autonomous robotic spacecraft, is a tremendous achievement regardless of the final outcome," says Bob Richards, founder and chief executive of Moon Express, a company in

Cape Canaveral, Florida, that is building its own lunar lander.

Beresheet — which means 'in the beginning' in Hebrew — was the size of a small car. It was set to undertake a two-day study of lunar rocks in a bid to understand the Moon's magnetic past. At US\$100 million, the craft was relatively cheap for a Moon lander, and its reported lack of back-up systems could have meant that it was vulnerable to even small failures.

Tel Aviv-based SpaceIL raised the cash largely through philanthropic donations. The aerospace and satellite firm Israel Aerospace Industries, in Lod, assembled the craft, and Israel's space agency contributed about \$2 million.

Beresheet launched on 21 February but suffered glitches from the start. Its computer system reset, and it had problems with its star-tracking navigation system, which struggled to deal with bright sunlight. But the team successfully manoeuvred Beresheet into orbit around the Moon in preparation for its landing.

From there, Beresheet fired rockets to reduce its speed and altitude, but about half-way through its descent a malfunction caused its main engine, which was slowing the craft, to shut down. Beresheet then careered towards the Moon's surface at speed. It lost contact with mission control when just 150 metres above the surface, still moving at 500 kilometres per hour.

But it seems the mission won't be SpaceIL's last. Kahn said on 13 April that he was planning a follow-up mission, currently known as Beresheet 2. "We're going to complete the mission," he said on Twitter. ■

SPACEIL VIA REUTERS

POLITICS

Indonesian election to set fate of science mega-agency

President Joko Widodo wants to create a single agency that controls most research.

BY DYNA ROCHMYANINGSIH

This week's Indonesian national election pits two old rivals against each other. The stakes are high for science: President Joko Widodo says that if he is re-elected, he will overhaul how the majority of the country's research is organized and funded. The main opposition candidate, Prabowo Subianto, has been silent on science so far.

Widodo first ran against Subianto, a nationalist and a former military general, in 2014. In this year's rematch on 17 April — which was getting started as *Nature* went to press — the politically more moderate Widodo looks set to win again: national polls suggest he could receive about

20% more of the votes than Subianto.

Widodo has introduced several policies unpopular with scientists. If he gains a second term, he is unlikely to win back their favour. He wants to create a National Research Agency (NRA) that would absorb most government research centres and control the 26-trillion-Indonesian-rupiah (US\$1.8-billion) annual research budget.

"We are going to improve research by coordinating all budget allocations," said Widodo's vice-presidential running mate, Muslim cleric Ma'ruf Amin, during a televised election debate on 17 March.

Some scientists are concerned that the national agency will take over almost all of

the decision-making power and funding for science. Currently, Indonesia's research budget is divided between 81 research centres managed by several ministries — including those for research, agriculture, health and forestry — along with several other bodies, such as the Indonesian Institute of Sciences (LIPI).

If the NRA decides not to support an area of research, scientists say, there will be few other sources of government funding for those projects. "The NRA will be an institution without checks and balances," says Satryo Brodjonegoro, president of the Indonesian Academy of Sciences (AIPI) in Jakarta, which provides science advice to the government and the public. Although it is not a research centre,