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NASA cancels March launch to Mars

Leak in French-built seismometer cannot be repaired in time.

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NASA will not launch its InSight spacecraft to Mars in March as originally planned, because of a leak in a French-built seismometer that is the spacecraft's main scientific instrument.

Technicians at the French space agency CNES have worked for months to repair a leak in a vacuum seal on the seismometer. But on 22 December, NASA announced that it would suspend the launch. The delay means that InSight will not lift off in 2016, and will instead have to wait 26 months until the Earth–Mars orbital geometry is once again favourable for a mission to the Red Planet.

InSight's goal is to probe the structure of the Martian interior by listening to how marsquakes ring through the planet. The mission was designed to determine the size, composition and state of the planet's core, mantle and crust, which no previous Mars mission has done.

"Trying to do something new, something truly exploratory, is difficult," says Lindy Elkins-Tanton, a planetary scientist at Arizona State University in Tempe. "The team is also contending with bringing together people in different countries, who have not previously met, to build a new instrument."

Launch preparations

The spacecraft would have launched from the Vandenberg Air Force Base in California. Its builder, Lockheed Martin Space Systems of Denver, Colorado, shipped the probe to Vandenberg last week with one of its two instruments: a German-built heat-flow probe that would penetrate the Martian soil to a depth of up to 5 metres. The seismometer remained in France for testing. It was supposed to have arrived at Lockheed this spring for integration, says Tim Priser, InSight's deputy programme manager at Lockheed Martin.

At a briefing held a few hours after the announcement of the decision, John Grunsfeld, associate administrator for the NASA science mission directorate, said that launching InSight without addressing the vacuum problem would have completely prevented the seismometer from collecting data once it reached Mars. He expressed confidence that it could be fixed before the next launch opportunity in 2018. "At least we're not on our way to Mars and discovering a leak," he said. "At least we're able to look at it and solve it here on Earth."

NASA chose InSight — which stands for Interior Exploration using Seismic Investigations, Geodesy and Heat Transport — over two other finalists in the Discovery-class programme, a competition of planetary-mission proposals that each costs no more than US$425 million. The other two were for a boat that would sail on the lakes of Saturn's moon Titan, and a probe that would hop repeatedly across the surface of a comet's nucleus.

InSight's delay may change the scheduling of other NASA missions, says Elkins-Tanton. She is leading a proposal for a mission to the metallic asteroid Psyche, one of five Discovery-class proposals vying for a chance to launch after InSight. NASA has considered choosing two of the five finalists in that round of competition, but the InSight delay is likely to require extra money that may chew into the Discovery programme's budget. "Having an unscheduled hold will suck up money, but exactly what that means is all speculation at this point," says Barbara Cohen, a planetary scientist at NASA's Marshall Space Flight Center in Huntsville, Alabama.

Meanwhile, the European Space Agency plans its own March launch to Mars, the ExoMars Trace Gas Orbiter.

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