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NEWS

Published online: 7 September 2005; | doi:10.1038/news050905-10

Martian methane probe in trouble

Device may be unable to settle debate over indications of life

[Mark Peplow](#)

One of the best chances for solving Mars's methane mystery may have been lost. The Planetary Fourier Spectrometer (PFS) on board the Mars Express orbiter seems to be broken, perhaps for good.

The instrument's failure would be a blow for scientists who want to find out how the red planet is producing the methane that has been detected in recent years.

Almost all the methane on Earth comes from some sort of biological source. As a methane molecule typically survives for only a few hundred years in the martian atmosphere, something must have been spewing it out recently, scientists reason. And this has fuelled hopes for discovering life on Mars.

But scientists have recorded very different methane levels with different techniques. In 2004, the PFS found that methane averaged about 10 parts per billion in Mars's atmosphere, suggesting that more than 100 tonnes of the gas is released from the surface each year. That same year, Mike Mumma of NASA's Goddard Space Flight Centre in Maryland spotted levels of 250 parts per billion using a telescope in Hawaii. This week he told an American Astronomical Society meeting in Cambridge that he had spotted levels of 44-63 parts per billion



Mars Express may not get the chance to collect more methane data.

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from a different part of the planet.

Source searching

To pin down the source of the gas, these disagreements need to be sorted out. One explanation might be that methane is venting intermittently from specific points on the surface. To check, researchers hope to take simultaneous readings of exactly the same place using both orbiting and earth-based instruments.

But the chance to do this may now be lost, says Thérèse Encrenaz, of the Paris Observatory in France, who is part of the PFS team. She says that the spectrometer has been in trouble for two months, and various attempts to fix it have proven fruitless.

"There's still a chance it could be fixed," she told *news@nature.com* at the Cambridge meeting. "But if it cannot be fixed then the experiment will be stopped."

Ludmilla Zasova of the Space Research Institute in Moscow, says the instrument stopped working some time in July. "It's a problem with the vibration of the spacecraft," says Zasova, who leads the Russian contingent of scientists working with the PFS. These vibrations have shown up in PFS data for the duration of the mission, although scientists have been able to filter out the effects to generate clean results. Zasova thinks the vibrations are affecting a pendulum inside the instrument that helps to control the way it collects light.

But team members are unclear about the severity of the problem. Vittorio Formisano of the Institute of Physics and Interplanetary Science in Rome, Italy, would not confirm that it is broken. Formisano is in charge of the instrument and says he is being kept busy working on it.

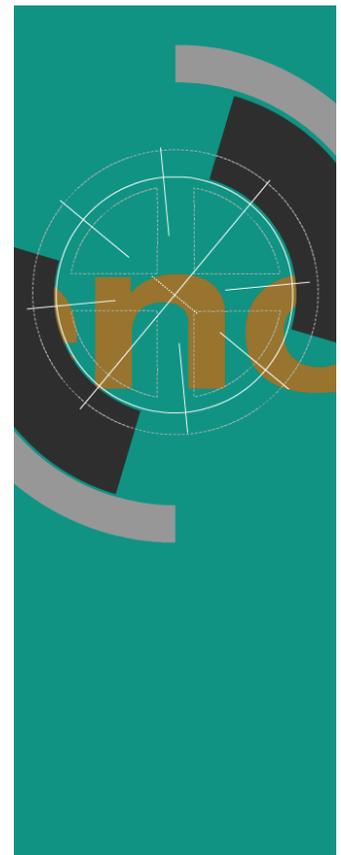
Troubled interpretations

This isn't the first trouble that Mars Express has had. The European Space Agency's craft had difficulty opening some radar booms needed for its water detection experiment in May, although these are now working well (see '[Mars Express radar on hold](#)').

And there have been controversies surrounding interpretation of data from the spectrometer. In February of this year, Formisano said that the PFS had found large quantities of formaldehyde around Mars (see '[Formaldehyde claim inflames martian debate](#)'). This implied that millions of tonnes of methane were being released by the planet each year: much, much more than thought. Encrenaz says most scientists now agree that these claims about formaldehyde were incorrect.

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the methane numbers, it will be hard for all scientists to agree on a source for the gas. For now, many say it is probably due to heating of water and carbon dioxide with a mineral called olivine, rather than life, says Sushil Atreya, a member of the PFS team from the University of Michigan in Ann Arbor.



If the Mars Express methane instrument fails to provide further data, the next opportunity will be NASA's Mars Science Laboratory, due to blast off in 2009. This will not only measure trace levels of methane, but also check its isotopic make-up for signs of biological activity.

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