



Tues. May 15, 2001

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## Mars Explorers to Benefit from Australian Research

By Michael Paine  
Special to SPACE.com

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At the annual Australian Mars Exploration Conference (AMEC) in Melbourne last weekend, Australian researchers outlined some exciting projects designed to help with the [exploration of Mars](#) in coming decades, as part of National Science Week

The conference, organized by the [Mars Society](#) of Australia, brought together specialists in geology, [astrobiology](#), microbiology, robotics, vehicle design and Antarctic research to discuss exploration of Mars with space enthusiasts.

Although Australia is not planning any missions to Mars, its researchers are keen to help other countries with the design of their missions. The conference came just days after NASA chief Dan Goldin announced that a [human mission to Mars](#) was likely within 20 years.

### Life on Mars

Professor Malcolm Walter of the Australian Centre for Astrobiology Institute, explained that the most likely place to find evidence of life on Mars was around hydrothermal vents similar to those found in Yellowstone National Park. Hydrothermal vents are cracks of fissures in the ocean floor through which hot water and minerals are ejected.

Walter said that although there might not be any active hydrothermal vents on Mars, ancient or dormant ones could have [fossil evidence of life](#). He is currently studying a region of the Flinders mountain range in South Australia that used to be a huge hydrothermal system. His techniques for searching for fossil evidence of life could well be repeated on Mars within a few decades.

Walter was enthusiastic about a new Australian invention, the PIMA spectrometer, for determining the mineral content of rocks -- a very important clue to their history. He said this was a great breakthrough for planetary exploration because the instrument was far superior to the one fitted to the Sojourner rover that landed with the [Mars Pathfinder](#) spacecraft in 1997.

During a panel discussion Malcolm Walter was asked at what stage would he be prepared to declare Mars dead. He said that if we go to Mars and find an ancient, active hydrothermal system and there were no signs of life then the chances of finding life on Mars would be "pretty bleak."

Dr. Philippa Uwins from Queensland University gave a gripping

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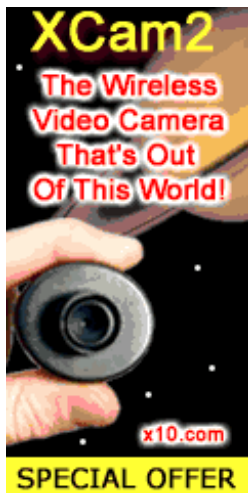
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### Water on Mars?

On June 20, 2001 SPACE.com reported that NASA had found evidence of water on Mars. The tremendous discovery has fueled hope for microbial life on the Red Planet. It also makes a human mission to Mars more practical. For SPACE.com's special report, [CLICK HERE](#).



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update on her pioneering work on [nanobes](#). Four years ago she reported that she had found tiny organisms within a rock sample drilled from 3 miles (4.8 kilometers) underground. Many scientists thought that "life" could not be so small but the latest research has strengthened her claim that nanobes are alive. Snapshots of nanobes pushing apart layers of mineral crystals and a video of larger versions of the nanobes in motion fascinated the audience at the conference.

Uwins' work may support claims by some U.S. scientists that the controversial features [in Martian meteorite ALH84001](#) are fossilized life forms. Those claims can no longer be dismissed on the basis that the objects are too small to have been alive.

It seems that searchers for life on Mars will need to be equipped with devices that can detect organisms as small as nanobes.

### Robotic exploration of Mars

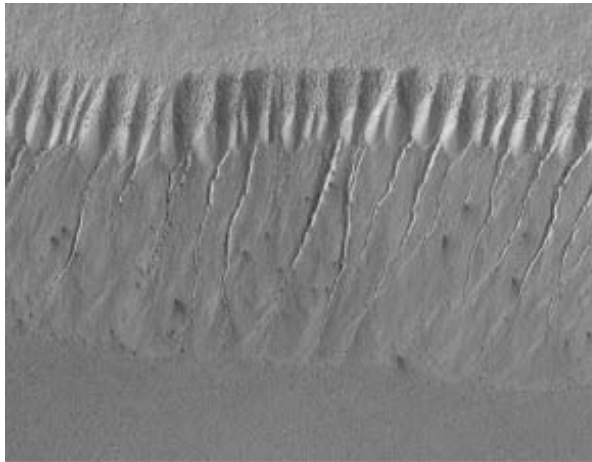
Professor Ray Jarvis from the Intelligent Robotic Research Centre of Monash University described his experiments with a Russian-built miniature Marsokod rover using simulated Mars terrain.

The center is applying recent advances in computer science to control the rover, which is a proven robust mechanical design. Despite the [great progress with robotics](#) in recent years.

Jarvis said that it would be useful to send robots to Mars for scouting purposes but "in the end we have to go. Robots are no substitute for a human on Mars."

### Lessons from Antarctica

Environmental geologist Dr. John Webb, of Latrobe University spoke of his experiences in Antarctica. He showed photographs of gullies caused by the melting of permafrost in Antarctica that look [like gullies on Mars](#).



Gullies on Mars, thought to be carved by water.

Webb cautioned about the psychological stresses on people living in harsh, remote environments. People start out as friends but often tensions build up after weeks of isolation. He pointed out that scientists typically "don't respond well to orders and do not mix well with military types."

There may be social lessons for Mars mission planners from experience at [Antarctica research](#) bases.

### At odds with NASA

Dr. Nick Hoffman, also from Latrobe University added to the controversy in a "gloves-off" talk. He described his "White Mars" theory, where many of the geological features seen on Mars can be attributed to carbon dioxide and not water.

Furthermore, he said this went against the official NASA line that

there [are signs of recent water flow on Mars](#). Hoffman said that carbon dioxide exists as a liquid some 80 yards (73 meters) beneath the surface of Mars and that if it comes into contact with the thin atmosphere it explodes and causes a massive flow of dust, rocks and gas.

Hoffman has modeled the effects of these outbursts and finds they produce [gullies and canyons](#) similar to those seen on Mars. He also warns that explorers drilling for water from the surface of Mars had better be prepared for the explosive effects of striking liquid carbon dioxide instead of water.

Hoffman also stunned the audience with the suggestion that maybe [human missions to Mars](#) should be one-way trips. He said that the resources needed for the return trip would be better spent on establishing a permanent base.

On the topic of space tourism, Hoffman said "Dennis Tito has probably done more for space exploration than NASA has in the last 20 years" and that "Bill Gates could buy a seat to Mars".

### **Mars Society activities**

Jason Hoogland from the Mars Society of Australia described the Society's research projects. These draw on the expertise and unique conditions available in Australia.

Society volunteers are building a Human Operations Prototype (HOP) rover that will be used in Mars-like terrain in the "Red Center" of Australia. Based on the chassis and engine of a four-wheel-drive passenger van, the HOP will be fitted out as a fully self-contained habitat, like a small motor home. Two people will drive the vehicle into remote areas. They will simulate the operational difficulties of rover expeditions on Mars.

A "Mars Skin" suit is also being developed to simulate the difficulties of using a spacesuit on Mars. The "Red Center" of Australia could also be used for a Mars habitat research station, similar to the research program that the Mars Society is currently operating on the uninhabited Devon Island, located in the Arctic Circle.

A telephone conference with the Mars Society in the U.S. confirmed that Australia was a likely location for a second habitat station.

The Mars Society of Australia is also participating in a Mars rover design project and a series of radio communications experiments in remote areas.

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### FUTURE SPACE

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