Canada Eyes Front-Row Seat in Mars Program

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BOSTON—Canada's space efforts over the past 2 decades have focused largely on radar satellites and a robotic arm for the international space station. Now Canadian space officials are asking scientists to help them plan a Mars mission so outstanding that it can overcome tight budgets and leapfrog other research priorities to win government funding.

As a first step in that campaign, some 120 researchers met late last month in Montreal to kick around ideas ranging from drilling beneath the martian surface to returning samples from one of its moons.

"We look at this as the next major space program for Canada," says Marc Garneau, recently named executive vice president of the Canadian Space Agency. "We want to be involved with Mars in more than peripheral ways."

Garneau thinks the timing is right to pump new funds into space science, which receives about 15% of the agency's $234 million annual budget. Spending is winding down on the $600 million robotic arm, which was installed on the space station this spring but is suffering from technical troubles. But even so, the estimated cost of a Mars mission—likely to top $300 million even with the help of international partners—would require a bigger overall budget, says Garneau, who is hoping for an increase in the fiscal year that begins 1 April 2002.

The agency intends in the months ahead to develop a set of possible missions for 2007 or 2009 that draw on Canadian technological and scientific expertise, complement existing international efforts, and appeal to the public's sense of adventure. This summer the space agency will prime the pump by funding a series of separate space science projects at Canadian universities focusing on planetary geology, atmospheres, terrestrial analogs, and astrobiology.

Canada already has one instrument headed to Mars. It's a thermal plasma analyzer from the University of Calgary, designed to gather data on the origin and composition of the martian atmosphere, that is due to arrive in late 2003 on board the Japanese Nozomi spacecraft. Other technologies now in use around Earth, such as Canada's highly successful synthetic aperture radar, could provide detailed maps of Mars from a high-flying orbiter. And the nation's experience with robotics could be used on a sophisticated rover on the martian surface. The space agency and Canadian industry already are working on a prototype small arm for a lander. In addition, researchers from the Arctic research station on Axel Heiberg Island hope to apply to Mars their expertise in searching for life in extreme environments.

One promising technology is a special drill, adapted to the planet's dry conditions, that could penetrate as deep as 10 meters. Hojatollah Vali, a biomineralogist at McGill University in Montreal who helped organize the May workshop, says that a group of geologists and astrobiologists at the meeting suggested putting such a drill on a martian lander. Another workshop group has proposed an orbiter with instruments to study the martian atmosphere, and a third team recommended a sample return from Phobos or Deimos. Neither moon has been explored, notes Alan Hildebrand, a geologist at the University of Calgary who participated in the workshop.

Canadian officials hope to integrate their plans with efforts already under way by NASA, the European Space Agency, and the Japanese National Space Development Agency. "We want to fill a void and not duplicate," says Alain Berinstain, chief scientist for the Canadian Space Agency's space exploration
program. "We'd be delighted and overjoyed to have major Canadian participation," says James Garvin, chief scientist for NASA's Mars planning. He says the U.S. agency already is planning its own 2007 lander but might welcome a subsurface drill or robotic arm for that mission or a synthetic aperture radar on a 2009 martian orbiter.

Time is short and funding uncertain. But Canadian space and planetary scientists are hoping that their blue-sky thinking won't be too late to secure a visit to the Red Planet.