

A Second Entry in the Mars Sweepstakes

LONDON—More than 100 European scientists met last week in Birmingham, U.K., to define Aurora, a solar system exploration venture that faces a critical decision this year. The workshop on 6 to 7 April began with one certainty: Europe wants its own Mars program. The scientists endorsed a one-way robotic trip to Mars in 2011 and hashed out the types of instruments they want onboard to search for signs of life and study geology. They also backed a follow-on sample-return mission. But big issues remain to be settled, such as whether governments will pay, and how they will coordinate the work with an ambitious U.S. Mars program.

Aurora's head at the European Space Agency (ESA), Bruno Gardini, said at a press conference here that he was pleased with the workshop's outcome. "It has given us a very focused target," he said. Doug McCuistion, director of NASA's Mars Exploration Program, an observer at the workshop, agrees: "It's very important that they were able to narrow their options so they can go forward."



Long haul. Europe's vision for space exploration calls for sending first robots, then humans, to Mars.

Three proposals were on the table at the outset. The scientists recommended plucking out elements of each and rolling them

into one mission, as yet unnamed. One piece of heavy equipment made it onto their consensus wish list: a drill to take samples at a depth of up to 2 meters below Mars's oxidized surface. NASA does not have a drill on

its agenda, McCuistion says. The scientists also recommended including a rover with sensors to look at ratios of isotopes for traces of past or present life, modeled after those on Beagle 2, the United Kingdom's ill-fated robot that went missing in December 2003 during its descent to Mars. The scientists also want to include a seismograph to detect possible "marsquakes" that could show that the planet is geologically active.

Before the plans get much more specific, ESA needs some of its member countries to pony up for the mission, which carries a price tag of €500 million (\$650 million). ESA members make voluntary contributions to Aurora, described at its launch in 2001 as a search for signs of life beyond Earth and a start to crewed exploration of the solar system.

By June, Aurora's staff will put together a more detailed plan for a complete funding review, in which countries will choose whether to pledge support to carry the 2011 project through to completion. The total ▶

JAPAN

Space Vision Backs Peer-Reviewed Science

TOKYO—Space scientists here are reacting favorably to a new strategic plan from the Japan Aerospace Exploration Agency (JAXA) that endorses a bottoms-up approach to scientific exploration (*Science*, 1 April, p. 33). Many had feared the worst when Japan's space science agency was merged with two commercially oriented government organizations in 2003 to form JAXA. But "a number of former NASDA [National Space Development Agency] people are now listening to what space scientists say and realizing that there is a different approach to [scientific] missions," says Kazuo Makishima, an astrophysicist at the University of Tokyo.

The Long Term Vision report, issued last week, looks ahead for 20 years. It calls for

strengthening efforts in basic space science, with the missions to be determined using the same grassroots approach to proposals adopted by the Institute for Space and Astro-

nomical Science (ISAS), now a component of JAXA. The report discusses the possibility of crewed missions and a lunar base, but only after an additional 10 years of research and study. The plan also cites the need for satellites that could monitor natural disasters, facilitate rescue efforts, and provide a closer look at ongoing environmental problems, as well as for better launch technologies, a private-sector space industry, and supersonic aircraft. "For space science, we have to work with the scientific community, including university-based scientists," says Keiji Tachikawa, JAXA president.

Tachikawa says that JAXA hopes to use the report to develop more detailed operational plans, to motivate employees, and to build public support for

space exploration. The report recommends postponing any decision to pursue crewed flight until halfway through the 20-year cycle. "We believe that what can be accomplished with robotics is not sufficient to realize the potential of using space," says Tachikawa, noting Japan's participation in the international space station. The delay also puts off the need for an immediate ramp up in funding, however, with the report calling instead for a modest rise in annual spending from the current \$2 billion to \$2.6 billion over the next decade. Crewed activities will require more money, Tachikawa says, and "a good proposal [that would] gain the consent of Japanese citizens."

Scientists say they would welcome any new efforts by JAXA to build public support for space activities. "We've not been good at advertising the activities and accomplishments of Japan's space science," says Kozo Fujii, an astronautical engineer who headed a delegation to the vision committee from ISAS. A larger JAXA budget built upon growing public support for space, he predicts, would also be a boon for science.

—DENNIS NORMILE



Teamwork. JAXA's Keiji Tachikawa wants scientists to help chart a course for space exploration.

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Dennis Normile

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