

stituency has grown in the past 2 decades to encompass radio astronomy, infrared astronomy, the moon, and other planets, each with its own slate of missions. "ISAS has grown to include too many groups and too many missions," Kosugi says. He believes the community needs to agree on priorities in order to make the best use of limited resources. But as yet, it is completely unclear how decisions will be made in the new organization.

Yoshihisa Nemoto of the Space Policy Division of the Ministry of Education, Culture, Sports, Science, and Technology, which oversees both ISAS and NASDA, says ministry officials are aware of the need for balance within the new agency. "Japan's space science, in certain areas, is world-class, and it would be a terrible shame if those efforts were not properly supported," he says. "Discussions are going on over how to preserve the bottom-up process for

space scientific research, but there has been no conclusion."

A merger preparation committee was due to release an interim report by the end of December. But no one is expecting it to resolve the fundamental issues. A proposed structure for the new agency is due out in March, with the merger to take place in fall 2003 or later.

—DENNIS NORMILE

With reporting by Andrew Lawler.

SOLAR SYSTEM

EUROPE

Tight Budget Makes for an Uncertain Future

Europe's planetary scientists had grand plans for a series of missions, but politics is getting in the way

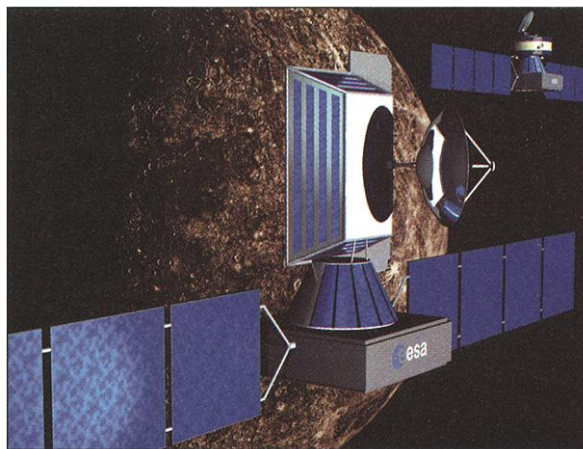
PARIS—While NASA struggles to set its priorities for solar system exploration (see p. 32), European space scientists are grappling with a more fundamental question: Will they continue to be major players in the game? Recent budget cuts threaten both ongoing programs and new missions, and cuts are forcing space agency officials to scale back their grand plans for the future.

The European Space Agency's (ESA's) long-term science program includes robotic missions to Mars, Mercury, and Venus. But last November in Edinburgh, at a meeting to decide the agency's budget for the next 5 years, ESA's 15 member governments dealt the agency a double disappointment. The agency's council of ministers declined to boost the science budget—which has lost 15% in purchasing power since 1996—above inflationary levels. They also gave only grudging support to a new program called Aurora, which will map out a series of missions to search for traces of life in the solar system and to develop technology for human expeditions (*Science*, 23 November 2001, p. 1631).

In response, last month the agency's Science Program Committee imposed a 6-month hold on a number of projects still in the pipeline so it can assess how many missions can be done with the allocated funds. "We are going into a period of reflection and analysis," says physicist David Southwood, ESA's science chief, predicated on the assumption that "our budget is now about as high as it is going to be." Among the projects now in

jeopardy are the BepiColombo mission to Mercury and the Gaia astrometry mission, which will record the brightness and position of 1 billion stars in our galaxy. At a minimum, Southwood says, the agency will have to reduce the scientific scope of one or both missions.

The budget disappointment comes just as Europe's space scientists were hoping to strike a more independent pose vis à vis their international partners, especially the United States. "We cannot sit and wait for others to decide our role in what they decide to do," says Franco Ongaro, program coordinator of Aurora, an umbrella program that researchers hope will take ESA's solar system exploration



Hot trip. One European spacecraft will map Mercury, while a smaller companion will examine the planet's magnetosphere.

to new heights over the next 30 years. One goal, to put a European on Mars by 2025, would require many new technologies, says Ongaro: "We don't today have a credible scenario to put a man or woman on Mars and bring the person back alive."

ESA members aren't required to contribute to Aurora, which is classified as an optional program. In Edinburgh, for example, nine countries dug up only \$12 million for a batch of preparatory studies, some \$24 million short of the total ESA requested. Italy withdrew a \$16 million pledge made by its previous government, and Germany opted out as part of an across-the-board retrenchment.

The funding shortfall angers many planetary scientists. "It shows a lack of commitment," says atmospheric physicist Alan Aylward of University College London. "Europe has the economy to be an equal partner in space with the U.S., but intergovernmental wrangling and national shortsightedness has always held back space development." André Brack, an origins-of-life researcher at the University of Orleans in France, says scaling back Aurora flies in the face of "a huge interest in the search for extraterrestrial life and life-forms" by scientists and the general public.

Scientists hope that Italy will reconsider its decision. Giovanni Bignami, director of space science at the Italian Space Agency (ASI), says that ASI's president, Sergio Vertella, had just assumed the post before the Edinburgh meeting and did not have time to make his own assessment of Aurora's importance. "For the moment," Bignami says, "Italy's role is very much reduced. It can only improve."

In the meantime, Ongaro says that \$12 million is almost enough to fund the first 2 years of the 3-year preparatory period, which will lay down the program's overall strategy and its specific missions. That work, he says, should help to persuade other ESA partners to fund the third and most expensive year, which will focus on development of new technology and specific missions.

The time is running short for ESA to make some definite decisions about current plans. If ambitious missions like BepiColombo or Gaia have to be sacrificed, Southwood says, ESA will "move off the gold standard" of leading space exploration programs. Ongaro agrees that the next step is critical: "We are walking the thin line between having a vision and living an illusion."

—MICHAEL BALTER

CREDIT: ESA