struments should be put up for bids. "We see such competition as desirable and valuable," says Pounds, who was also on the committee.

The report predicts that demand for new instruments will decline over the next 4 years as the Gemini project is completed, resources are transferred from ground-based to space-based astronomy, and overall budgets are squeezed. "The predicted size of the U.K. base makes the sustained existence of two separate support organizations at best questionable," the report says. Astronomer Matt Griffin of London's Queen Mary and Westfield College agrees. "I think the research community recognizes the need to do the same jobs for lower cost if budgets are to be used effectively," he says.

The observatories will be free to compete for the work they currently carry out, but if they lose out, their future would be highly uncertain. Observatory staff fear that the newly formed Central Laboratory of the Research Councils near Oxford, which already plays a key role in the development of instruments for space-based astronomy, may outcompete the observatories. "Our worry is that instruments are science-driven, not technology-driven, and that our approach may be lost," says ROE's head, Stuart Pitt. "The best people to build these instruments are already working in the observatories. I can't see where the private interest will come from," says one astronomer.

The report also recommends changes in management at the Royal Observatories' two overseas sites to strengthen their independence from the U.K. observatories. Noting that Britain is only a 25% partner in Gemini, which will be managed in Hawaii by the JAC, and Spain is planning a new telescope of its own at Las Palmas, the report argues that U.K. interests will best be served by a strong local presence, rather than management by distant officials. It suggests that the U.S. management approach used for some of its telescopes, organized by a consortium of U.S. universities, is a potential model. Indeed, it even raises the idea that a U.S. team could run the British telescopes on the island. At Las Palmas, the report suggests that a team made up of local RGO managers, split from the U.K. base, may be effective.

In anticipation of these recommendations, the two Royal Observatories are already seeking means to secure their future. The report points out that the observatory names and the core skills of staff are valuable assets. ROE is considering a management bid to buy the observatory or encouraging a private university to bid—it shares a site outside Edinburgh with Edinburgh University's astronomy department. The RGO is also neighbor to Cambridge University's Institute of Astronomy and is exploring a bid from a consortium of universities to take over the running of the observatory. "We have to see this as an opportunity to develop a leaner and more effective organization," says the RGO's head, Jasper Wall.

Observatory staff will not know their fate for at least a year. PPARC has set up an evaluation panel to establish the criteria for putting the work up for bids and set a timetable for the new mechanisms to be running in 1997. "We're still living with uncertainty. The report has hit staff ... [but] we've got to do our best to influence the outcome," says Pitt.

–Nigel Williams

EUROPEAN SPACE SCIENCE

Cosmologists Beat Out Mars Explorers

Europe's cosmologists were the winners last week in the competition for the next slot in the European Space Agency's (ESA's) space science program. Following a 3-day meeting at ESA headquarters in Paris, the agency's Space Science Advisory Committee backed COBRAS/SAMBA, a mission to map the cosmic microwave background, a radiation echo of the universe from shortly after the big bang. The decision may, however, spell the end for European scientists' efforts to join international plans to explore Mars.

The meeting to pick the third medium-sized mission in ESA's Horizon 2000 space science program weighed proposals for a trip to the moon, a mission to study stellar evolution, and one to test the equivalence principle (the assertion that different bodies accelerate at the same rate under gravity). But the two favorites were COBRAS/SAMBA and Intermarsnet, a joint ESA/NASA mission to Mars. "It was a difficult decision," says physicist David Southwood of London's Imperial College, a committee member who also chairs ESA's Science Program Committee, which is expected to endorse the decision in June.

Much of the debate centered on the balance within ESA's program between astronomy and solar system exploration. Southwood says the committee picked COBRAS/SAMBA because "it's a wonderful mission." It will pick up where NASA's pioneering COBE spacecraft left off, giving scientists a map of the cosmic background showing spatial structure as a function of frequency with a precision far closer to the fundamental astrophysical limits. But Southwood acknowledges that the Intermarsnet team may see its project as a victim of the agency's budget crisis.

Last November, ministers from ESA's 14 member states froze the science budget. As a result the science directorate has agreed to make the new medium mission a pilot project to try cheaper management methods, for example by streamlining the prototyping and testing phases. Working this out is expected to delay the launch for this mission by a year to 2004—beyond the launch window for Intermarsnet. Also, because Intermarsnet was a joint venture, it would have been hard for ESA to experiment with its management. "Programmatically, COBRAS/SAMBA fits better," says Giacomo Cavallo, head of planning and coordination in ESA's science directorate.

"COBRAS/SAMBA seems to have more impact outside its own community."

—Giacomo Cavallo

ESA staff cite other problems with Intermarsnet. Cavallo says that it would have been difficult to bring the Mars mission's cost below ESA's ceiling of about $240 million for a medium mission. But even if the costs had been the same, "COBRAS/SAMBA seems to have more impact outside its own community," he says. Its data will aid theories of fundamental physics at energies that cannot be tested by accelerators.

Heinrich Wänke, director of the Max Planck Institute for Chemistry in Mainz, Germany, and chair of the International Mars Exploration Working Group, acknowledges the broad international appeal of COBRAS/SAMBA, but argues that the decision is a poor one. First, he says, the cryogenic detector technology of the chosen mission is similar to that for the Far Infrared Space Telescope, one of ESA's four large missions, to be launched in about 2006. "That community will be overcommitted," says Wänke. Moreover, NASA is planning a mission for 2001 to measure anisotropies in the cosmic microwave background, called MAP, although with a lower resolution than COBRAS/SAMBA.

Now that their mission has been picked, researchers principally from Italy, France, Britain, and Denmark will be busy during the next 18 months on plans for the cryogenic coolers and detectors. In the meantime, the International Mars Exploration Working Group meets this week. It will give European planetary scientists a chance to take stock and to assess how they will now fit into international plans for Mars exploration.

–Helen Gavaghan

Helen Gavaghan is a science writer in Hebden Bridge, U.K.