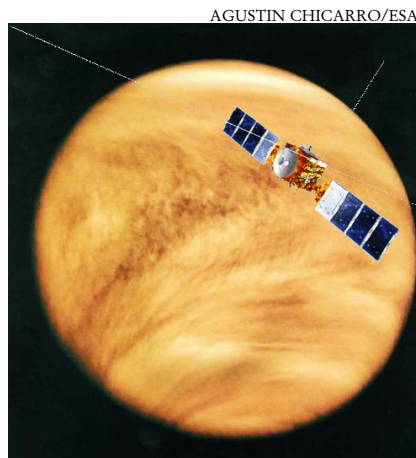


volved until mid-October to pay for the payload. Says SPC chair Andersen, "If, by then, the payload situation is not resolved, the mission dies."

New ways of interacting

Venus Express's brush with death is a warning that other missions will be canceled if the national agencies don't commit early to providing payloads. "It's clear that ESA member states have a money problem," says Andersen. "But it's not just that. They're providing payloads to NASA. It's their prerogative, but it undermines Europe as a whole."

Participating in various space programs creates a dilemma, admits David Hall, the British National Space Centre's director of science. "The problem is that if there are gaps in a particular discipline [at ESA], it's very attractive to go to other space programs." The UK, Hall adds, "keeps about 15–20% [of its space science funding] aside for participating in programs of other major agencies.



Most countries have that." In the past, adds Hall's counterpart in Germany, Gernot Hartmann, "we had more money. Now the priority on supporting ESA missions remains, but the potential for [other] international cooperation has diminished."

The new ESA strategy will lead to new ways of interacting, says Michael Grewing, director of the Grenoble-

A TRIP TO VENUS remains in ESA's plans—for now. The planet is shown here with an artist's rendering of Mars Express, which will form the basis for the Venus Express spacecraft.

based IRAM (Institute for Radio Astronomy at Millimeter Wavelengths) and chair of ESA's space science advisory committee. "The crucial element—it's not really a change, but it will have to be more tightly controlled—is the harmonization of time scales. It's a managerial and financial matter, and it means that national budgets have to be adjusted accordingly." But, he adds, "the last thing we want is to discourage scientists from taking initiative and looking for opportunities for their science. We should not lose this readiness to show interest, even though it will unavoidably lead to overbooking and frustration from time to time."

TONI FEDER

New Criteria for Determining Interagency R&D Budgets

After more than a year of internal discussions about how to better control federal R&D spending, the Bush administration has set out specific priorities and guidelines it expects federal R&D agencies to follow in developing their upcoming fiscal year 2004 budget proposals. In a memorandum to agency heads, Office of Science and Technology Policy Director John Marburger and Office of Management and Budget Director Mitchell Daniels spelled out priority research areas and specific "investment criteria" to determine which R&D programs deserve funding.

The memo, "FY 2004 Interagency Research and Development Priorities," covers all federal research—both basic and applied—that involves funding from more than one agency. According to a cover letter from Marburger and Daniels, the memo "provides guidance on the types of R&D programs the administration will favor when making fiscal year 2004 investment decisions, identifies priority activities requiring significant interagency coordination, and sets forth R&D investment criteria that departments and agencies should observe and implement."

"This document is really two documents," Marburger said in an inter-

Since the early days of the Bush administration, OMB officials have warned that tighter rules for funding interagency R&D programs were on the way. The rules have arrived, and they cover applied and basic research.

view. "The first one is the priorities message from me and Mitch Daniels. The second one is the OMB document that we've been working on, the one that includes the performance criteria. That is the embodiment of the president's management agenda for research." The priorities message says, "We encourage agencies to fund new, high-priority activities by reallocating resources from lower-priority or recently completed activities. Requests for funding above guidance levels will require a compelling rationale that the activity is important, that the agency is the best one to conduct the activity, and that funds from lower priority or recently completed programs cannot be substituted within the agency's guidance level."

The memo lists the administration's six priority areas.

Homeland security and anti-terrorism R&D. "Agency R&D efforts in this high-priority area

should dramatically reduce the nation's vulnerability to terrorism," the memo says. "These include enhancing our capabilities for (a) early detection of catastrophic terrorist threats and any subsequent exposures, (b) rapid response to them and mitigation of their effects, and (c) physical decontamination techniques and prophylactic and treatment measures." Research, the memo continues, should focus on "areas with the potential to dramatically enhance our capabilities for detecting the presence of, and responding to, nuclear, biological, chemical, radiological, and conventional explosive threats. . . ."

Networking and information technology R&D. The administration has pushed hard to improve computational and networking capacity, and will continue to do so in the FY 2004 budget. Sophisticated data networks "directly affect research across the scientific disciplines," the memo says.

National nanotechnology initiative. Another of the president's favorite programs, the "nanoscale R&D agenda includes a balance of basic and applied research," the memo says. Of particular importance is research on "nanostructures that more effectively collect and deliver samples

to sophisticated sensors (chemical, biological, radiological, electromagnetic, photonic, acoustic, or magnetic)."

Molecular-level understanding of life processes. This encourages coupling "modern computational power to our ability to manipulate biological systems at the molecular level" in a quest to "unravel the complexity of life at the molecular, cellular, and organismal levels."

Climate change science and technology. This priority calls for "investment in R&D that will address major climate policy decisions and provide a framework for understanding and addressing long-term climate change."

Education research. This priority calls for continuing support for strengthening math, science, and reading education as well as advancing the use of education technology.

"This is not a comprehensive list of all administration science and technology priorities," Marburger said. "It does not include priorities that fall within the purview of a single agency, things like particle physics, or health research, or chemistry, that are pretty well focused in a traditional department such as DOE or NSF. The priorities we have spelled out explicitly involve cross-cutting areas in research."

Much of the memo lays out the R&D investment criteria in the form of three "tests" that program managers at federal agencies are expected to use to set their funding proposals for FY 2004. "The focus for policy officials and program managers should not be on how much we are spending, but rather on what we are getting for our investment," the document says.

All program managers, the memo says, "should be able to show the extent to which their programs meet the following three tests."

► **Relevance:** "Programs must have well-conceived plans that identify program goals and priorities and identify linkages to national and 'customer' needs." Basic research gets some leeway in meeting the relevance test because, as the memo states, "OMB and OSTP recognize the difficulty in predicting the outcomes of basic research."

► **Quality:** R&D programs must justify how funds will be allocated to ensure quality R&D. NSF's merit-based, competitive process in awarding grants is cited as an example of how funding should work in other agencies.

► **Performance:** Agencies must develop measurement criteria and milestones that will allow for an

"independent determination" of performance. Although "identifiable results" are important, according to the memo, "the intent of the . . . criteria is not to drive basic research programs to pursue less risky research that has a greater chance of success."

Marburger described the three tests as "commonsensical," noting that "relevance, quality, and performance are things that every proposal already embodies in some way." He

also emphasized that the new criteria were for federal agencies, not individual researchers. "It's the agencies that are being held responsible for spending the money properly. We're not interested in adding to the burden of individual investigators."

This fall, officials from OSTP and OMB will meet with agencies to measure the budget requests against the new criteria.

JIM DAWSON

Recipe for LHC Success: Subtract Other Science, Add Accountability

Detailed spending records, revamped managerial responsibilities, redeployment of workers, contingencies for unexpected costs, and better communication. That's the prescription of an external review committee (ERC) set up to investigate the ills at CERN after the Geneva-based laboratory revealed last fall that the Large Hadron Collider, a proton accelerator awaited by particle physicists everywhere, will exceed its budget by 850 million Swiss francs (roughly \$574 million).

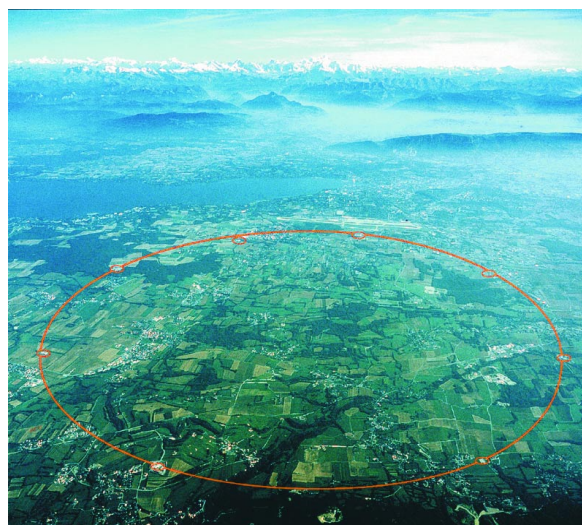
While placing blame for CERN's current financial predicament squarely on the lab's managers, the ERC praised the staff as "competent and dedicated" and underscored its confidence in the technical soundness of the LHC. Curtailing other scientific activities to focus on the LHC, the committee's report says, "is the price to pay for the future possession of this powerful tool."

CERN will take the medicine. Indeed, the committee's recommendations, which were presented in June, are in tune with proposals developed by CERN management and five internal task forces for getting the LHC back on track. "The ERC made its report, and I am quite satisfied," says CERN Director General Luciano Maiani. By the end of the year, Maiani says, "we will reshape the structure of reporting lines of the LHC." CERN will also revisit

► CERN has begun implementing accounting and organizational changes and is slashing programs that do not directly support the Large Hadron Collider.

the LHC's tight construction and costing schedules.

Among the measures already being implemented are the inclusion, for the first time, of staff salaries in cost calculations. Excluding those salaries introduces a bias when weighing whether to do a job in-house or to outsource it, says Robert Aymar, who



LUCIANO MAIANI, CERN's director general, and the lab's governing council have agreed on a strategy for dealing with the financial crisis bedeviling the Large Hadron Collider (top), under construction beneath the French-Swiss border.