

develop, and he warned that NCI is now dependent on AIDS funding that may be precarious if the AIDS label is made more accurate. Furthermore, Bishop noted, this trend may have "distracted" NCI from its principal mission of cancer research. The Bishop-Calabresi panel urged NCI to conduct "an expeditious and comprehensive review" of all AIDS research, noting that "a significant reduction may be in order."

■ **Bad vibes.** The panel encountered "broad dissatisfaction" among NCI staffers with the agency's "hierarchical approach" to research management, a style that leads to the "intimidation of individual scientists and the authoritarian use of resources." The problem, said Bishop, was "alarmingly prevalent" and thoroughly documented in more than 100 confidential letters sent to the panel by NCI staffers. In this environment, Bishop said, independence is often suppressed, and "creativity can take a back seat" to obedience to lab chiefs. To improve the ethos, the panel asks NCI to make clear that lab and branch chiefs have a responsibility to educate junior staff, help recruit women and minorities, and encourage subordinates to develop independent careers. All supervisors should undergo "stewardship" reviews, the panel said, in addition to scientific reviews. A negative report would trigger a 1-year period of probation, followed by a second review. After a second adverse review, a person would cease to be a manager, although he or she could continue to do research.

■ **Attracting talent.** To recruit able young scientists to NCI and encourage creativity among those on board, the panel said NCI should adopt an academic tenure system (as NIH is now doing) and experiment with new funding mechanisms. The panel urged NCI to establish an NCI Distinguished Fellows program to fund as many as 10 young investigators per year, for up to 5 years each. And it proposed creating a \$3 million fund to award 30 special grants each year to intramural scientists who come up with excellent proposals in an intramural competition. Winners could use the \$100,000 grants to develop new ideas, without supervision.

■ **Improving peer review.** The panel found the system of intramural peer review lax and lacking in objectivity. "The term 'cronyism' was heard," Bishop said. He pointed out that the budgets of some labs have grown too large, with 55 exceeding the \$1 million mark. The panel suggests that NCI set a trigger for special reviews of large labs. In place of the current system of site visits, which lacks "sufficient rigor," the panel recommended that laboratories undergo regular scrutiny by outside reviewers and that tenured and tenure-track investigators likewise be reviewed once every 4 years. All reviews should continue to be retrospective. The panel would like researchers to be judged not

only on what they have produced, but on how well they have used money and other resources. The report emphasizes that all intramural projects should be subject to review, including those funded by contract.

■ **Restructuring.** Unlike any other institute, NCI mingles intramural and extramural research programs in four research divisions. The Bishop-Calabresi panel urges that this practice stop; it would divide the entire NCI

The report's harsh language is meant to "polish the gem" of NCI.

—Michael Bishop

portfolio into two segments—internal and external—each under a newly created deputy director. In addition, Calabresi noted a pattern in which NCI managers may have tried to placate the demands of prominent researchers by creating whole new branches or sections. This has created a "baroque" organization, Calabresi said. The panel suggests that all intramural research be grouped under two headings—focused on clinical and laboratory work—and that redundancies be eliminated. NCI's huge satellite research facility in Frederick, Maryland, with 2000 employees, should be reorganized and

more closely linked to headquarters operations, the report said. The new drug discovery program at Frederick should be continued, the report says, but should be used and supported by all NIH institutes.

■ **Clinical research.** The NCI intramural program is directly involved in patient care at several loosely coordinated sites—the Clinical Center near NCI headquarters, the Frederick center, and the Naval Medical Center hospital across the highway from headquarters. During its deliberations, Calabresi says, the panel considered asking NCI to drop these direct commitments and "contract out" for clinical research. In the end, the members felt this might lead to a catastrophic loss of public interest in NCI. Instead, the panel asks NCI to put all clinical research under one division.

How soon will NCI be able to act on this long agenda? Edward Sondik, acting NCI director, says NCI staffers could begin to prepare for some changes immediately. But "there's a lot of contextual material to digest," Sondik said. "We need to look at the 'why' that underlies these recommendations," to be discussed in the still-unwritten body of the report. Sondik added that "the new director will have a lot to say" about these decisions, some of which may have to be considered in "10-year increments." One thing is certain, though: the cancer warriors have plenty to think about as they wait for their new commander.

—Eliot Marshall

SPACE

NASA Plans Major Science Overhaul

The sweeping plan laid out last week to streamline the National Aeronautics and Space Administration (NASA) contains a little-noticed blueprint for dramatically changing the way the agency conducts research. NASA Administrator Daniel Goldin wants to create half a dozen institutes run by universities or companies at the agency's sprawling complex of centers. The move will improve the quality of NASA's scientific efforts, he says, although it will not save money.

Goldin's announcement allowed researchers at some NASA labs to breathe a sigh of relief: An internal NASA white paper leaked in February proposed reducing, consolidating, and eliminating science-related work at several centers (*Science*, 3 March, p. 1259). But France Cordova, NASA chief scientist, and other science managers

argued that scientific expertise must be maintained at or near the centers. Their recommendation was ultimately incorporated into the plan, announced last week, that would eliminate almost 4000 jobs at the agency and save \$5 billion without seriously hurting science, according to Goldin. "These

institutes are not going to save a nickel," Goldin said at a press briefing on 19 May. "But they will make for much better science at NASA." Goldin vowed to improve peer review and the quality of science at the agency, which has been criticized by Congress and some researchers. Added Cordova: "We want to be more open, more responsive, and to invite in the community."

Cordova said the proposed new institutes would draw on such models as the Scripps Institution of Oceanography, run by the Univer-



Instituting change. France Cordova promotes a novel structure to improve NASA research.

sity of California, and the Jet Propulsion Laboratory, funded by NASA and operated by the California Institute of Technology. "We're not trying to shape institutes in NASA's image," she says. "We're interested in what resources [prospective operators] can bring to the table."

The first test of the plan will be the creation of a life sciences institute at the Johnson Space Center in Houston that will draw on the biomedical expertise in the area. Civil servants would retain control of astronaut health and training matters, while the remainder of the life sciences effort would be transferred to an institution like the private Texas Medical Center. Goldin also envisions creating an industrial park, located at nearby Ellington Field, that could work closely with the institute.

Houston already is home to the Lunar and Planetary Institute, which conducts planetary research for NASA but is operated by the Universities Space Research Association. The agency is considering giving the institute control of the lunar samples now held at the center, and Cordova anticipates an eventual merger of the planetary and biomedical organizations.

The institute concept was a lifesaver for science at the Ames Research Center in California and at Marshall Space Flight Center in Huntsville, Alabama, says Cordova. NASA is discussing an astrobiology institute at Ames that might be run by the University of California or Stanford University, while several Alabama universities are interested in running an institute that would focus on materials science and hydrology now done at Marshall.

NASA also wants a university or non-profit consortium to take over the Goddard Institute for Space Studies in New York, now operated by Goddard Space Flight Center in Maryland, as well as to create an atmospheric institute at the Langley Research Center in Hampton, Virginia, and a microgravity and space power institute at Lewis Research Center in Cleveland.

Goldin and Cordova say the initial response to the institute concept from universities and industry has been enthusiastic. "I have a portfolio a couple of inches thick with letters" from interested organizations, Cordova said. University officials and congressional staffers wondered, however, if financially strapped universities would volunteer to take on the burden of operating such institutes. "Someone will still have to pay the overhead," said one staffer.

Goldin's reorganization scheme must still pass muster in Congress, and he was quick to tell reporters that "what you're seeing are preliminary recommendations." Representative Robert Walker (R-PA), Science Committee chair, and the ranking minority member, Representative George Brown

(D-CA), said they would review Goldin's proposal. Representative Norm Mineta (D-CA), however, who represents the area near Ames, vowed to fight it. "Under the current proposal, NASA Ames will remain a NASA center in name only," he said last week. "What was once a 500-pound gorilla is now a 200-pound gorilla—and that's not

gorilla enough for me."

In Goldin's view, however, the biggest obstacle to the plan is not outright opposition but proposed additional cuts to NASA's budget. Without sufficient funding, he warned, centers would have to be closed and programs eliminated.

—Andrew Lawler

PHYSICS

Academy Panel Favors Gravity Probe-B

A costly and controversial space experiment to test Einstein's general relativity theory won a qualified endorsement last week from a panel of the National Academy of Sciences. The vote of confidence in Gravity Probe-B (GPB) is expected to spur National Aeronautics and Space Administration (NASA) managers to find the \$250 million needed to finish the \$500 million project, first funded in 1985.

"GPB is well worth its remaining cost to completion," declares a report released on 16 May by a 12-member panel led by Nobel physics laureate Val Fitch. But the panel didn't mask its concern about spending half a billion dollars to test a theory—that a massive rotating body pulls space and time along with it—that is almost universally accepted by the scientific community. "Along with most physicists, this task group believes that a deviation from general relativity's prediction for frame dragging is highly unlikely," the report says. And even if the probe's data appear to disprove the theory, "the scientific world would almost certainly not be prepared to accept them until confirmed by a repeat mission."

NASA Administrator Daniel Goldin asked the academy for a study last fall in response to persistent questions about the scientific and technical validity of the project. He then put on hold a request for \$50 million in NASA's 1996 budget for the project, infuriating congressional supporters. With the support of NASA Chief Scientist France Cordova, Goldin pledged to cancel the project if the committee signaled thumbs down.

Although the committee found no technological showstoppers, the probe's complexity—including sophisticated gyroscopes and a suite of instruments—left some members uneasy. "This minority believes it likely that some as-yet-unknown disturbance may prevent GPB from performing as required," the study states. Even so, the panel decided there was a "reasonably high probability"

that the mission would prove a success. There was no minority report, but concerns of unidentified members were included in the review.

The Fitch panel also struggled with the question of whether the money could be better spent elsewhere by NASA. "A significant minority judge that the purpose of the mission is too narrow in comparison with mis-

sions that explore wide-open scientific issues and have a high probability of making new discoveries," it states. But most members felt the remote chance of discovering something truly revolutionary made the experiment worth pursuing.

The report is good news for the project's principal investigator, Stanford physicist Francis Everitt. "It seems to have done the trick," he says. A tenacious advocate with a deft political touch (*Science*, 24 March, p. 1756), Everitt

also applauded the panel's work: "Fitch has done a heroic effort."

Although Goldin declined to say last week what he plans to do next, other NASA officials made it clear that the remaining roadblocks are now outside the agency. "It's a go," said one senior agency official, adding that Goldin could announce his support for the effort as early as this week. "That is, unless we get clobbered by Congress."

California lawmakers on both sides of the aisle will be watching Goldin closely to make sure he does not get cold feet. And with NASA's budget on the decline, some members of the space science community will also be following the situation with interest. Astrophysicists fear the probe's need for cash will eat away at their own projects—such as the Stratospheric Observatory for Infrared Astronomy (SOFIA) and the Space Infrared Telescope Facility. And it hasn't gone unnoticed that the \$50 million GPB needs to stay on track for a launch in 2000 is almost exactly the sum NASA has requested in 1996 to start work on SOFIA.

—Andrew Lawler



Smooth sailing? Yet another review finds Gravity Probe-B to be "well worth the cost."

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