

Space Scientists Get the Jitters

Researchers are nervous about NASA administrator Daniel Goldin's move to break up the space science office and his support for a Pluto mission that hadn't been blessed by the system

National Aeronautics and Space Administration (NASA) employees aren't the only people feeling nervous these days about how things are changing under the agency's new boss, Daniel Goldin. Space scientists are so jumpy that they shot a flare over Congress in early November signaling their "profound concern" about the fate of basic research at NASA. The warning came in the form of a note distributed to key congressional staffers

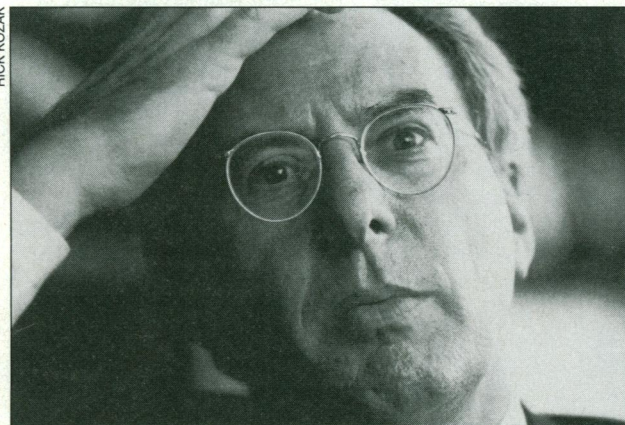
scientist, so far, without portfolio.

If that were not worrisome enough, Goldin has upset many in the space science community by promoting a sketchy project called the "Pluto fast flyby," a robotic survey of the sun's darkest planet. Because Pluto has never been inspected by a spacecraft before, Goldin hopes the idea will excite the public and the scientific community. But skeptics are agitated because it seems to have zoomed to the top of the agenda with no scientific review. At a time when budgets are flat, as at present, support for a new project like this necessarily implies less support for something else. Space scientists wonder what's to be sacrificed, and they worry that Goldin's endorsement of the mission will upset a delicately balanced 5-year plan hammered out by

As an example of what is wrong with NASA's traditional approach to space science, Goldin singles out one of those projects: Cassini, an overburdened "battleship Galactica," as he described it to *Science* earlier this fall. Originally designed as a double-headed mission (CRAF-Cassini) to rendezvous with a comet and make a detailed survey of Saturn at a cost of \$1.6 billion (not counting the \$350 million launch), it has now shrunk to a Saturn-only mission, with fewer instruments—for the same price. Worse, Cassini is so massive it cannot fly directly to Saturn, but must take a 7-year, looping path around other planets to pick up momentum. During that time, NASA will have to finance Cassini's operational crew and scientific cohort at an additional cost at least equal to the price of the machine. NASA staffers began trimming Cassini even before Goldin's arrival, but further cuts would require going back to square one—which Goldin has not proposed.

The Pluto flyby, in contrast, is an exemplar of Goldin's proposed new order. It's supposed to cost less and travel faster than anything of its kind on NASA's drawing boards. But skeptics wonder whether it will live up to those hopes and prove scientifically effective—and say they have no way to judge. At a meeting in early November of an independent NASA consultative group that advises Fisk—the Space Science and Applications Advisory Committee (SSAAC)—one scientist said the only reason he knew about the mission at all was because he'd seen it mentioned in the press. Another, asking not to be quoted by name, said: "All my information comes from the rumor mill."

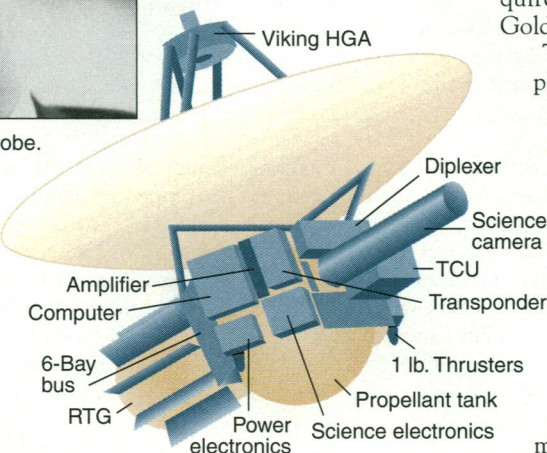
The skeptics would not be reassured to learn that the Pluto mission got its leg up in a decidedly nonscientific setting—at a special Motion Picture Academy Awards event in Los Angeles last May. According to an engineer working on the Pluto flyby, Stacy Weinstein of the JPL, another JPL engineer, Robert Staehle, ran into Goldin at the ceremony. Staehle had been involved in NASA's long-term planning for a trip to Pluto. NASA was thinking of building a Cassini-like craft that wouldn't get to Pluto until after 2015. Impatient to get there sooner, Staehle had obtained internal JPL funding to put together an alternate design—a light spacecraft with



New directions. Goldin and the cut-price Pluto probe.

by the Space Scientists Working Group, a subset of the Association of American Universities (AAU), chaired by physicist Glenn Mason of the University of Maryland. Their chief complaint, which was echoed at a recent meeting of NASA's top science advisory committee: Recent moves by Goldin "may pit one part of the science program against another, to the detriment of all."

The working group was reacting in particular to Goldin's split-up of the NASA office that runs the space probes, telescopes, and fundamental scientific research—the Office of Space Science and Applications (OSSA). Led for 6 years by Lennard Fisk, a politically adept physicist from the University of New Hampshire, OSSA has never functioned more smoothly, many scientists say. In 1992, for example, NASA launched more successful scientific missions than in any year of the past two decades. But on 15 October, Goldin decreed that Fisk's office and title are to disappear. Space science will no longer be concentrated under a single, powerful assistant administrator, but will be distributed in several offices with less clout. In about 60 days Fisk himself will move upstairs to become the agency's chief



Fisk and a slew of scientific advisers.

These changes—and many others now taking place at NASA—are part of a broad reform being executed by Goldin. Throwing caution to the winds, the NASA chief has said repeatedly that he wants to get rid of an "old culture" that fostered delay and giantism and to create a new ethic that encourages risk-taking and cheaper missions (*Science*, 2 October, p. 20). Some scientists, like former Jet Propulsion Laboratory (JPL) director Bruce Murray, like what they see. "I think [Goldin's] doing exactly the right thing," says Murray. He predicts the demise of the old system will unleash a flood of new, low-cost ideas for planetary exploration. But others involved in ongoing projects have special cause for alarm.

SOURCE: NASA ILLUSTRATION: C. FABER SMITH

Europeans Agree Not to Go It Alone

Europe's space ministers last week finally laid to rest their once-grandiose plans to establish an independent European manned space capability. Meeting in Granada, Spain, on 9 and 10 November, they approved a strategy that will link Europe's space program more closely to those of both the U.S. National Aeronautics and Space Administration (NASA) and the new Russian Space Agency.

The space ministers, as expected, effectively abandoned plans to build the \$7.6 billion Hermes spaceplane, officially putting to an end months of trying to shrink the project enough to fit into the European Space Agency's (ESA) tight budget. Instead, they endorsed a proposal from ESA's director-general, Jean-Marie Luton, to study the feasibility of building a similar reusable space vehicle in collaboration with the Russian Space Agency (*Science*, 18 September, p. 1617). A final decision on whether to go ahead with the project will be made in 1995.

The agency's 13 member states also gave the go-ahead for ESA's other large manned space project: a laboratory called the Attached Pressurized Module (APM) that will be bolted to the U.S.-led Space Station Freedom. But to win the unanimous approval of the assembled ministers, Luton had to agree to reduce APM's estimated \$3.2 billion cost by 5%. "Most of the savings will result from

more stringent contracts with industry," says Jean-Jacques Dordain, one of Luton's close aides. The long-awaited green light for APM—which was delayed because the ESA members wouldn't approve the agency's long-term plans until the fate of Hermes was decided—means that the lab should be ready on schedule in 1999.

One question surrounding ESA's involvement in Freedom has yet to be settled, however. The ESA member states want NASA to agree to keep Europe's contribution to the station's running costs below a fixed ceiling. Dordain suggests that ESA should not spend more than about \$380 million a year on Freedom once the station is in orbit. But NASA is unlikely to respond any time soon. "It's premature to get into any figures," says Jim Higgins, chief of NASA's international policy branch.

Most ESA members are putting a brave face on the abandonment of their dream to develop an autonomous manned space program. But UK space minister Edward Leigh—whose government never signed on to the Hermes project—is delighted. Closer cooperation between ESA, the Russian Space Agency, and NASA "could in time contribute to the evolution of a global space agency," he said at the close of last week's meeting.

—Peter Aldhous

minimal scientific instrumentation to be launched at extra high speed on a powerful rocket. Staehle took some vu-graphs along to the Academy Awards, showed them to Goldin, and ever since, Goldin has been a fan.

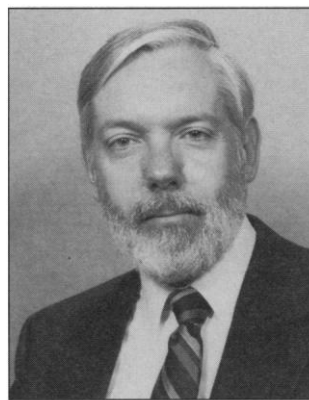
Whatever the merits of the Pluto mission, scientists worry that it could upset the hard-won 5-year plan, hammered out by space scientists in 1991. Anticipating a funding crunch, representatives of each discipline got together with Fisk at Woods Hole, Massachusetts, and worked out a peace treaty, of sorts, stating which projects should take precedence. They agreed that a big mission to Pluto and Neptune should be slated for development in the late 1990s, but only after NASA had begun a high-energy solar physics project and a large infrared telescope. Goldin now appears to have scrapped that plan, along with Fisk's office.

Scientists have sounded their alarm in two public notes. The AAU group issued theirs on 3 November, arguing that a breakup of the science office threatens the "basis of success" by dismantling the one forum in which NASA was able to make "difficult trade-offs and prioritizations." Multidisciplinary missions, the panel said, will now become much harder to manage. When Goldin learned that the message had gone out, he met with the authors in the hope of getting it revised or retracted. According to panel chairman Mason, the members came away "mollified," feeling that Goldin's "heart was in the right place" but not ready to retract what they had said.

Meanwhile, the SSAAC advisory panel picked up the theme, saying its members were "deeply concerned about the substance and

timing of the recent...reorganization of OSSA." They "applaud" Goldin's "vision" but urge him to keep science planning under one individual with "line authority" for setting budgets. The institutional framework is vital, they say, even though Goldin has promised to develop a coherent research strategy for the agency. The panel notes, "We cannot ignore the possibility that the new president will appoint a new administrator," who may not work to achieve a consensus on the scientific program.

Goldin gave the scientists his rationale at what may have been the final meeting of Fisk's advisory group at NASA headquarters on 5 November. He said he decided to reorganize NASA without consultation because some actions cannot be widely debated. The earth sciences programs are being set up on their own, Goldin said, to reflect their growing importance, Congress's keen interest in them, and the rapidly increasing budget of the Earth Observing System. Aeronautics is also being elevated because it was badly neglected in the past. Some functions—space materials research and life sciences—have been made "homeless" by the reorganization, but Goldin promised to get them settled in a niche by "the end of December." And to worries that NASA will not be able to forge a consensus for its scientific agenda, Goldin promised to seek outside advice at the highest level, through the chief scientist.



Moved upstairs. NASA's new chief scientist, Lennard Fisk.

But the SSAAC group warned that the consensus Fisk created was "fragile" and would be hard to rebuild if shattered. Goldin responded by saying he sensed the scientists were opting for a "bunker mentality," "circling the wagons," and "holding onto the past." It is a weak strategy, he said. A future NASA administrator might come along, Goldin warned, and "with a wink and a nod"

eliminate a big project like Cassini, in one stroke wiping out the planetary program. A better plan in tough fiscal times, Goldin said, would be to drop some entire programs and "start planting some small to moderate seeds" that would lead to numerous but less expensive projects in the future. Spreading science throughout the agency rather than concentrating it in a self-centered workshop, he argued, will improve the quality of work in other offices and broaden the support for science.

It remains to be seen whether this vision will work as Goldin intends, and whether Goldin himself will be asked to stay on at NASA to continue the revolution he has begun. But no one denies that he is moving boldly in a new direction and that the changes he's started are substantial. As Goldin himself told the scientific advisers on 5 November, "My job is not to be loved. My job is to cause everybody to think about getting to their discomfort zones. And I will do just that."

—Eliot Marshall