a way that was more protective to the patient?' " says Lurie, an M.D. who studies ways to slow HIV's spread with behavioral interventions. Lurie adds that "I don't think the intrapartum treatment made any sense from the get go." He contends that these drugs take several days to build up to levels high enough to have an impact, so giving them just hours before delivery and not treating the baby would not be expected to work.

Lynne Mofenson, a pediatrician at the National Institute of Child Health and Human Development who has been involved with many of these transmission studies, scoffs at this. "He doesn't know what he's talking about," says Mofenson. Studies have shown that AZT is quickly transmitted from a pregnant mother to her infant, she says, and although it may take a few days to reach "peak" levels of drug in the blood, that does not prevent it from working right away. "There was good reason to think that the intrapartum regimen might be effective," says Mofenson. "Many of us were very sorry to see it didn't work."

These results are not the last word from the PETRA study. About 70% of the mothers enrolled in the study breast-feed—another route of HIV transmission—so the researchers will analyze transmission rates again when the babies are 18 months old.

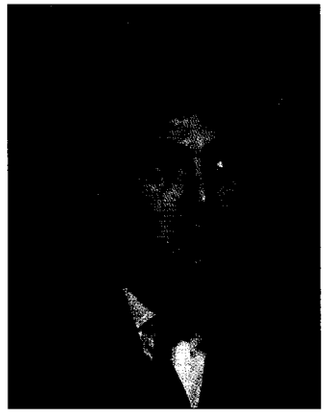
–JON COHEN

NUCLEAR PHYSICS

MIT's Bates Lab Gets Sudden Reprieve

Massachusetts Institute of Technology (MIT) officials say they were "shocked" last Monday to learn that the Department of Energy (DOE) planned to end its support of the university's Bates Linear Accelerator Center. Although they knew the facility, part of the school's nuclear science laboratory, would be vulnerable in a tight budget, they were optimistic that money would be found to keep it running. But there was no mistaking the message: The shutdown was mentioned several times in the president's budget request, released on 1 February.

Shock quickly turned to elation, however. Within minutes of the budget's formal release, Energy Secretary Bill Richardson was on the phone to MIT President Charles Vest explaining that the department had changed its mind. The proposed budget for fiscal year 2000 would be amended to continue support for the 30-year-old facility, the secretary told Vest, including funds for a new detector to study the magnetic properties of atomic nuclei. Instead of spending $2.5 million next year to decommission the accelerator, DOE now plans to request $14.5 million for the Bates Large Acceptance Spectrometer Torrid (BLAST) and for other experiments that will keep the lab running until 2004 or 2005. It is not clear, however, where DOE will find the additional money in a budget that holds funding for high-energy and nuclear physics essentially steady. And congressional appropriators still get the last word.



Bates and switch. Energy Secretary Richardson quickly rewrote last week's budget request to fund MIT's Bates lab.

By all accounts, Richardson, a former Democratic congressman from New Mexico and good friend of the president, made a unilateral decision. The original plan to close Bates followed a recommendation from DOE's Nuclear Science Advisory Committee (*Science*, 16 October 1998, p. 389) that other facilities should receive priority in a tight budget. Department R&D managers had accepted the advice and decided to concentrate scarce resources at the department's new flagship nuclear physics facility, the Thomas Jefferson National Accelerator Facility in Newport News, Virginia. White House budget officials had even mailed letters, in response to inquiries from concerned scientists, saying that the budget would contain money only to decommission the lab. "Bates will cease operations at the end of FY 1999," notes DOE's FY 2000 budget document, "and fabrication of the BLAST detector is discontinued."

But even as those words were being readied for publication, says Martha Krebs, head of DOE's Office of Science, Richardson was reviewing the decision to close Bates. Krebs says she learned about the reversal for the first time on Tuesday morning—1 day after she had briefed the media on a research agenda that did not include Bates. Several factors were working in the lab's favor, she noted: "They're doing good science, they train a lot of students, and MIT is managing the facility effectively. In addition, it's the only university-based accelerator that DOE supports." In the end, Krebs says, "the Secretary decided that [flat funding] should not be a limiting factor in whether or not to operate Bates."

Richardson's phone call meant a last-minute wardrobe change for MIT's dean of science, Robert Birgeneau, who was scheduled to be the bearer of bad tidings during a visit to the lab Tuesday afternoon. "I had picked out a black tie to reflect the somber message I would be conveying," he says. "After President Vest called, I decided to switch to a pink shirt and brightly colored tie."

A dimmer view of the reversal comes from Claus-Konrad Gelbke of Michigan State University in East Lansing, chair of the Nuclear Science Advisory Committee. "The operation of Bates would be impossible at the president's budget request [for nuclear physics]," he says. "I just hope that they aren't planning to solve the problem by taking the money from Peter to pay Paul."

And although the new plan may be good news for the lab's 85 staff members and collaborators, even its supporters say that Richardson's sudden change of heart reflects poorly on the department's decision-making process in setting scientific priorities. "I've never seen anything like that in my 28 years here," says one science lobbyist. "In the end, I think they did the right thing. But it makes DOE look pretty bad."

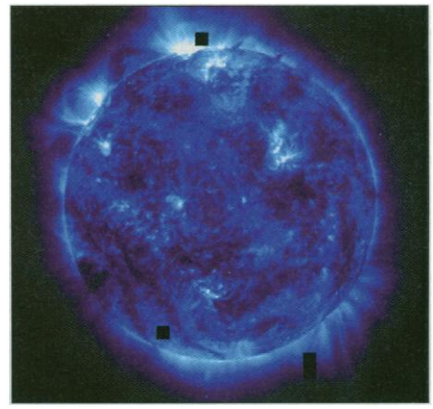
–JEFFREY MERVIS

SOLAR PHYSICS

SOHO Learns the Cruder Arts of Navigation

Like an explorer forced to rely on landmarks after losing his compass, the Solar and Heliospheric Observatory (SOHO) is now taking its cues from the sun thanks to an innovative solution to an equipment failure that had threatened to end the spacecraft's mission. SOHO's latest problem began on 21 December, when the last of its three gyroscopes failed (*Science*, 8 January, p. 155). But last week, ground controllers at NASA's Goddard Space Flight Center in Greenbelt, Maryland, beamed aboard SOHO a jury-rigged software program that has reoriented the spacecraft. By relying on a sun sensor instead of the gyroscopes, engineers say, the craft should be able to keep its bearings for at least four more years.

After the gyroscope failure, the craft started spinning slowly and tripped into a safety



Steady eye on the sun. Image from SOHO probe.

CREDITS: (TOP) SAM KITTNER; (BOTTOM) SOHO/EIT

mode that aimed to keep its solar panels pointed at the sun. But this holding pattern was perturbed after a sensor triggered the brief firing of a hydrazine thruster to correct the spacecraft's position. It overshot, then fired again to compensate. This thrust-counterthrust duet kept repeating. "We were [wobbling from] a thruster pulse about every 7 minutes or so, rapidly depleting the hydrazine fuel," recalls Bernhard Fleck, European Space Agency project scientist for SOHO. "It was a race against time."

But taking the craft out of safehold mode, as it's called, required input from the gyroscopes—all of which were broken. Instead, the engineers wrote software that allowed the spacecraft to ignore the gyroscopes. Next, they fired the thrusters to stabilize SOHO and fine-tuned its orientation by a subtle braking and accelerating of flywheels. The craft has been working normally since 2 February. "The operation was well planned and conceived," says Alan Gabriel of France's Institute of Space Astrophysics near Paris. "It brought the spacecraft back from death."

One hitch remains: Although SOHO is pointed at the sun, the images it sends back are rotated 69 degrees, which interferes with some measurements. This roll position is normally controlled by a star tracker—but that instrument is pointed away from its beacon. Engineers will attempt to fix this particularly thorny problem without gyroscopes early next month, says Fleck.

Astronomers are now geared up to start scrutinizing the sun again as it approaches a peak of activity around 2001. They lost about 6 weeks of observation, but consider it a small price for having the spacecraft back online. **–ALEXANDER HELLEMANS**

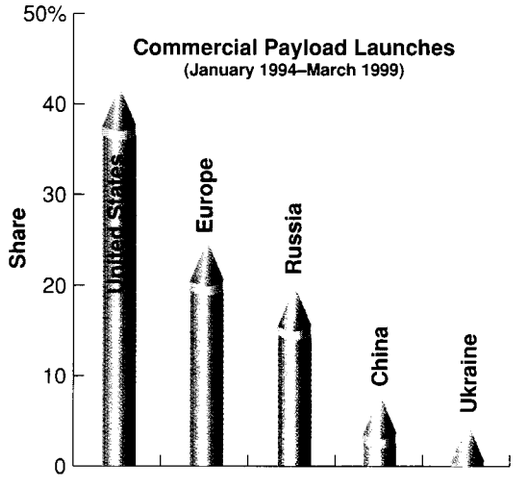
Alexander Hellemans is a science writer in Naples, Italy.

SPACE SCIENCE

Red Tape Entangles Small Satellite

Last summer, astronomer Mark Hurwitz won a coveted NASA grant to build one of the first members of a new generation of small, bargain-priced science satellites. But there was a catch: The University of California, Berkeley, researcher had to find a way to launch his payload, called the Cosmic Hot Interstellar Plasma Spectrometer (CHIPS). So Hurwitz designed his 25-kilogram instrument as a mechanical parasite that would hitch onto a U.S.–built communications satellite to be launched by a Russian rocket in 2001 or 2002.

End of story? Hardly. Instead of being a solution, that arrangement was only the beginning of Hurwitz's problems. His $9.8 million, 1-year mission—an extreme-ultraviolet spectrograph that will study a hot gas cloud that surrounds the solar system—has become imperiled by a U.S. policy that prohibits launching taxpayer-funded payloads aboard foreign rockets. And he's not alone. The 5-year-old policy has exacerbated a decade-long shortage of U.S.–made rockets that has discouraged researchers from planning small missions. Even the Air Force is scrambling to find overseas rockets for its experimental satellites. "It's a tangled and potentially sad tale," says Jim Barrowman of NASA's Goddard Space Flight Center in Greenbelt, Maryland.



Global adventure. Other countries have room for U.S. scientific payloads—if they win government permission.

Hurwitz's misadventure began in 1997. That's when NASA set up a competition for academic scientists with instruments that cost less than $13 million, a pittance in a field where missions routinely run $50 million or more. In designing the University-class Explorers (UNEX) program, however, NASA officials butted up against the problem of finding an economical way to launch the small payloads. Most U.S. rocket companies had little interest in building smaller, low-cost launchers, and the space agency's own Bantam minirocket program had yet to take off. NASA officials had also endured a logistical nightmare trying to find commercial and military launchers willing to carry small instruments funded under an earlier program.

The solution, says one UNEX planner, was "to unleash the creativity of the U.S. science community." For Hurwitz, that meant hooking up with Final Analysis Inc. of Lanham, Maryland, which hopes to launch some 40 communications satellites over the next several years. Last summer's other winner, astrophysicist John Wygant of the University of Minnesota, Twin Cities, made arrangements with the Air Force to launch his $13 million Inner Magnetosphere Explorer to study the response of Earth's Van Allen radiation belts to the solar wind.

Soon after NASA announced the winners, however, space agency officials learned that what appeared to be a minor complication in the CHIPS plan was a potential showstopper. Although U.S. space policy allows private companies to buy rides on foreign rockets (and many have), government payloads can't fly foreign. The 1994 rule is designed to protect the $1.2 billion U.S. launch industry from competitors and to prevent foreign nations from stealing U.S. technology. Only the president can issue an exemption.

Initially, NASA officials figured CHIPS didn't need an exemption because it wasn't an independent satellite. But they ran into stiff opposition from other U.S. agencies, in particular the Federal Aviation Administration, which is a vocal booster of U.S. rocketmakers. Another obstacle was the increasingly tense political climate created by last year's revelations that China may have stolen high-tech secrets from U.S. satellites launched there, and that Iran may have bought missile technology from Russia. Last December, partly in response to congressional accusations of lax security, the Administration clamped tighter controls on the use of Russian rockets to launch U.S.-owned geostationary satellites.

Although CHIPS doesn't need a geostationary orbit, the controversy cast a shadow over all U.S. users of Russian rockets. The dustups also strengthened the hand of exemption opponents—forcing NASA to ask the White House Office of Science and Technology Policy if CHIPS needed a waiver. That request, which "seemed very routine in August, has become not at all routine," says Hurwitz. Indeed, NASA "probably had a much [more receptive] audience last fall than we do today," adds NASA's Karen Poniatowski, who is drafting the document.

Administration sources familiar with CHIPS's predicament hope that the instrument's size and scientific merit will carry the day when the issue is brought before the White House. Policy-makers "probably didn't envision a science instrument the size of a watermelon that hitches a ride on a larger satellite" when they drafted the prohibition, one source said. But others predict a long and fractious debate.

NASA officials are cautiously optimistic, knowing that CHIPS's fate could set a precedent for other NASA projects. Hurwitz says he's "prudently exploring alternatives" but so far has drawn little interest from U.S. companies. Still, the uncertainty hasn't idled him. "We're moving ahead," he says confidently. "You can't sit on your hands forever."

–DAVID MALAKOFF

SOURCE: U.S. DEPARTMENT OF TRANSPORTATION