

tions—we were deluged,” says Sher. He adds that about 60% of the awards went to projects in basic research. The awards are all given to teams of scientists with members from both the US and FSU, but at least 80% of the funds go to the FSU side of the collaborations.

The CRDF also runs several smaller programs. One provides FSU labs with experimental equipment (mostly nuclear magnetic resonance spectrometers). Another, run in conjunction with the ISTC, helps nuclear physicists who worked at the nuclear weapons centers Arzamas-16 and Chelyabinsk-70 to convert to civilian science. There is also a travel grant program—the only CRDF program for which new applications are currently being accepted—that funds visits to American laboratories by scientists and engineers from FSU countries (except Russia). In addition, the CRDF manages and distributes funds in the FSU for other agencies. For example, it's administering \$1.5 million for the National Institutes of Health. Says Sher, “We can act as a grant-giving organization, or as a contractor, or both. We make sure that the money gets to the third party tax-free, and in a secure manner.”

Financial lows

But the CRDF has nearly exhausted its money—the last \$1.5 million of DOD's one-time-only \$10 million appropriation must be matched by the end of this month, or the foundation will be left with only the \$1 million it already has in hand.

The CRDF is not under any agency's aegis, so no agency has a particular stake in its continued existence. Sher and colleagues hope to get money from the State Department's assistance program, with which “we are holding ongoing discussions. But we are not in their budget request for 1998,” says Sher. A State Department official says the CRDF “has been developing a good strong track record. But we don't know at what level our budget will be approved, and then we'll have to assess our priorities—and there are lots of claimants.”

For now, the CRDF has—and has to have—contingency plans. “If we don't get the DOD money, we'll have to ramp our staff down from seven to two this fall,” says Charles T. Owens, the CRDF's associate director. He adds that “if we hunkered down to last long enough to demonstrate that we are good—and hoped for more funding,” the CRDF could last until about the spring of 1999 with existing funds.

The next step

But in April the foundation's advisory board decided to take a more aggressive approach: The CRDF will use its

last \$1 million to launch a new program, called Next Step to Market. Meanwhile, says Sher, “we think we are close to meeting the target of matching the remaining DOD money,” most of which would also go to the new program.

As its name implies, the new program would support projects with market potential. “We will go back to some of our grantees [from the Cooperative Grants Program] and say, We want to help you take the next step,” says Owens. “We'll try to select those with some potential—at least a gleam in someone's eye.” Giving support to projects that have already gone through rigorous peer review, and to people who have already developed contacts, “should give us a good pipeline,” says Sher. Adds Owens, “Hopefully, we'll be able through this kind of activity to

attract more industry money to our programs, so that the CRDF, industry and the labs in the FSU benefit.”

And, if all goes well, the Next Step to Market program could be a step toward the CRDF becoming self-sustaining: Backed business ventures that become profitable would eventually give money back to CRDF, which could then reinvest it. “The strength of this kind of a program is that it's very integrated, and we could support basic as well as applied research,” says Sher. “Remaining independent and having money would be the best of all possible worlds.” With \$15–20 million a year, “we could hold a major competition every year or 18 months, as well as some smaller, more carefully targeted competitions,” Sher says. But at the moment, “our main concern is to stay in business.”

TONI FEDER

Swedish Research Faces Budget Cuts

Spread cuts across research organizations, says the commission charged with advising Sweden's Ministry of Science and Education on how to reduce annual spending on large-scale research facilities. If the commission's recommendations, which were submitted to the ministry at the end of April, are approved by Sweden's parliament this fall, nearly half of the required savings would come from paring down contributions to CERN and other international collaborations, as Carl Tham, Sweden's science and education minister, had called for. Some national research programs would also suffer.

The cuts are being sought as part of a broader campaign to reduce Sweden's budget deficit—made more urgent by the eligibility requirements for joining the European common currency union in 1999. The current round of proposed cuts in research funding, by 150 million Swedish crowns (about \$19.5 million) beginning in 1998, would come on top of cuts to Sweden's national research councils this year averaging 14% (to save about SEK 240 million). Public spending on R&D in Sweden this year will total about SEK 19 billion.

Physics to bear the brunt

Many disciplines would suffer, but the bulk of the proposed cuts are in physics, “because that's where the largest projects are,” says Torbjörn Fagerström, a theoretical ecologist at Lund University, who served as secretary and main science adviser to parliament member Susanne Eberstein, Tham's one-woman commission for seeking ways to make the required cuts.

The commission recommends re-

In Sweden, as in many other countries, politicians and scientists are wrestling over proposed cuts in research funding.

ducing membership payments to CERN, the European Space Agency (ESA) and the Joint European Torus (JET) by a total of SEK 51 million, or about one-sixth of the ministry's total budget for international science, by 2002. The Swedish scientific community is relieved that the commission rejected the idea of wholesale withdrawal from these organizations, but many question how realistic it would be to chip away at their already tight budgets. (Until the recommendations came out, fears that Sweden might pull out of CERN were fueled by the close match of the total required savings and Sweden's CERN membership fee. Later, in a statement issued on 5 June, science and education minister Tham promised that Sweden wouldn't cancel its membership in CERN, but he again stressed that spending for it must go down.)

Since membership fees for CERN and other international organizations must be agreed upon by consensus of the member countries, implementing such cuts would be complicated. “I can imagine years of frustrating negotiations with the other member countries,” says Örjan Skeppstedt, Sweden's scientific delegate to the CERN council and a member of the Swedish Natural Science Research Council. Referring to the hard-won agreement reached last December after Germany insisted on reducing its payments to CERN, Skeppstedt adds, “I don't think

it would be possible to cut CERN's budget further and still build the LHC [Large Hadron Collider] on schedule." (See PHYSICS TODAY, February, page 58.) JET is scheduled to be shut down at the end of 1999, so it is of somewhat less concern than CERN and ESA, to which Sweden's contributions are also much larger.

A broad scope

At the national level, the polar, environmental, space and fusion research programs would be hit the hardest, if the commission's recommendations are followed.

"We are still licking our wounds" from the 14% already cut this year, says Kerstin Fredga, director of the Swedish National Space Board, whose agency's national research budget could be slashed by another 26% (SEK 10 million) as of next year. "I can't say now how we would distribute these cuts. I still hope they won't occur." Fredga worries most about the impact on Sweden's instrument building and satellite program. And since some instruments are built for ESA satellites, cuts in Sweden's national program could also affect international space research.

Fusion research could lose 20% of its budget, in addition to any reduction in Sweden's contribution to JET. That "would drastically affect research within universities in Sweden, and Swedish activity at JET and for ITER [the planned International Thermonuclear Experimental Reactor]," says James Drake, who heads the Swedish fusion research program. The commission was "very specific in saying that only the applied part [of fusion research] should go," says commission secretary Fagerström, adding that this recommendation was made because "the government has to make up its mind" about what type of energy to pursue. "We cannot be a jack-of-all-trades in a decreasing economy."

Backup funding?

Fagerström also says that in many cases the proposed cuts seem worse than they are. "Most areas have backup sources of funding," he says. This backup would come mainly from several private foundations recently established by the government to fund strategic research "that has a clear connection with stimulation of the economy and industry in Sweden," says Skeppstedt. That's why many worry that basic research stands to suffer most.

"I would not rule the foundations out at all, but I would not pin my hopes on them, either," says the space board's Fredga. The foundations made up for about half of this year's cuts in research. And they will probably spend

about SEK 1.5 billion annually on research in the coming years, says Björn Brandt, the ministry of science and education's deputy head of science policy. But Ingvar Lindgren, director of the Foundation for Strategic Research, the largest of the new foundations, says, "The foundations have done much of what they can do. We will be able to cover very little [of the additional proposed cuts]." And since fees for membership in international organizations are the government's responsibility, the foundations can't pick up the slack there, either.

"You cannot save this amount of money without hurting and harming," says Fagerström. In fact, the commission came up SEK 10 million short of

its target. "From the very beginning it was obvious that this is not a rational way to save money," says Fagerström. "The internationally oriented research is always high quality. If the task had been to save SEK 150 million from the Swedish research system in general, our recommendations would have been different."

Now the commission's recommendations, along with comments from Swedish universities and scientific agencies, are being considered by the government, which will announce its decisions in September. Says Gunnar Leman, head of planning for the Swedish Natural Science Research Council, "I still think there will be deviations from the recommendations." **TONI FEDER**

US Policy toward Cuba Undermines Scientific Exchanges

The freedom of scientists to associate and travel is considered essential to the conduct of science. Science organizations such as the International Union of Pure and Applied Physics (IUPAP) uphold the free circulation of scientists by sponsoring meetings only in countries where the participation of all scientists is assured.

And so in February, when a group of Cuban scientists was denied US visas to participate in scientific meetings here, those involved hoped that the matter was merely a bureaucratic oversight. It wasn't.

As inquiries from the American Physical Society revealed, the Cuban quantum chemists—who included the University of Havana's Luis Montero Cabrera and four members of his research group—were denied entry to the US because, as university faculty, they are also employees of the Cuban government—a qualification that applies to most, if not all, of the scientists in that country. As such, they can be granted visas only by exception, if the US State Department deems it in the national interest to do so.

Reversion of policy

APS leaders and other physicists moved quickly to protest the decision. "The visa denials are not only disappointing to meeting organizers and applicants alike, but also are detrimental to American science," wrote APS president Allan Bromley in a letter to Secretary of State Madeleine Albright. "Free exchange of information is essential to the health and vitality of our domestic and international scientific enterprise."

Seeking clarification, members of

By barring the entry of Cuban scientists, the US government is jeopardizing American institutions' bids to host international science meetings in the states—a grim prospect for scientists here and abroad.

several scientific groups, including APS, the New York Academy of Sciences (NYAS), the American Association for the Advancement of Science and the American Chemical Society, met with State Department officials in May. According to Irving Lerch, international affairs director of APS, what they learned is that the visa policy is a holdover from the Reagan Administration, and that an executive order issued by President Clinton in October 1995, which sought to ease academic exchanges between the US and Cuba, had been "nullified" amidst the political furor that followed Cuba's February 1996 shootdown of two American planes (see PHYSICS TODAY, April 1996, page 53).

Exceptions to the visa rule are made by the State Department on a case-by-case basis. "Certain types of researchers are considered nonthreatening—medical doctors, AIDS researchers," Lerch says. Physical scientists, on the other hand, are thought to pose a greater national security risk and therefore more likely to have their visa applications rejected. "From our perspective, no one in the State Department is qualified to make such a judgment," says Lerch. Another criterion used by the State Department is that of "bragging rights"—whether an applicant's visit is likely to advance the foreign policy of Fidel Castro's regime.