R&D Budget Collides With the Deficit

Congress cut the budget requests for most science agencies for the fiscal year that began on 1 October, but it preserved big science projects from the ax

The 102nd Congress plowed through a massive stack of legislation in the final hours before the elected representatives dashed out of Washington on 6 October to face the voters. In the cloud of dust that trailed behind them, they left some important, though mixed, decisions for science. The good news is that basic research was not completely trampled, though it was bruised here and there. It could have been worse, considering the pressure on Congress this fall to deliver short-term economic band-aids. The bad news, however, is that Congress focused its generosity mainly on big, glossy research projects, leaving small science to fend for itself. The result: Investigator-initiated research, which some regard as the heart and soul of U.S. science, will be eroded by inflation in the next year.

To make matters worse for basic researchers, Congress also seemed intent on steering research toward goals that are more "applied" than "basic," as an aid to economic competitiveness. And, in spite of the pressure to cut budgets, Congress showed no sign of curbing its taste for pork-barrel projects (*Science*, 2 October, p. 22).

Most of these trends were evident in the budget for the National Science Foundation (NSF). NSF, after winning significant funding increases for the past few years, was singled out for one of the largest increases of any agency in the Administration's fiscal year 1993 budget request—a whopping 18%. But after Congress was through, NSF emerged with $2.733 billion, only about 6% more than last year. Within this total, the amount for research and related activities is $1.859 billion—$13 million *less* than last year, and $338 million less than the Administration sought—while the share set aside for education went up by 5% to $488 million. Joel Widder of NSF's congressional office says it isn't clear yet which programs will feel the pain, but NSF will make sacrifices.

Some NSF projects are protected from cuts, however, by order of Congress. These include: $43 million for the Laser Interferometry Gravitational Wave Observatory (LIGO), $17 million for two 8-meter Gemini telescopes in Hawaii and Chile, and $13 million for the national magnetic laboratory in Florida. Congress also set aside $37.5 million for new academic research facilities and $12.5 million for equipment.

At the same time, the legislators gave NSF some detailed planning requirements. For example, the Senate appropriations subcommittee, chaired by Barbara Mikulski (D–MD), sought to establish new applied science programs focused on manufacturing, high-speed computing, and interdisciplinary environmental science, with funding "floors" under each. Leaders of the American Physical Society, among others, objected that this would limit NSF's flexibility and run counter to the agency's charter—supporting fundamental science.

In the end, Congress relented a bit. The final report accompanying the NSF bill says that Congress "reluctantly agreed to suspend" the requirements on applied science, pending further review. The appropriations subcommittee is waiting to hear from the new Commission on the Future of the NSF, whose work should be done "by the end of November." But it wants NSF to think about "reallocating" resources in favor of "process research and development," engineering research, emerging and precompetitive technologies, and "fundamental research with ties to future industrial interests."

Another sea change appeared in the NIH appropriation bill. For the first time in memory, Congress didn't add substantially to the president's request for basic biomedical science. While the agency's overall budget continued to grow in 1993, NIH suffered a blow when Congress awarded it a mere 2.9% budget increase, up from $10.1 billion to $10.4 billion. (These figures include the three institutes of the Alcohol, Drug Abuse, and Mental Health Administration that merged with NIH earlier this year.) Matters were made worse when members of a House-Senate conference were forced to trim the NIH budget across the board by 0.8%—an $84 million cut—in order to meet congressional spending limits. The result is a budget that doesn't even keep pace with inflation.

This grim bottom line will almost certainly reduce the number of new and competing grants next year, although NIH officials don't yet know by how much. Other new NIH programs, such as the women's and minorities' health initiatives, will be under severe pressure, since the funding available for them grew by only $46.8 million, instead of the $61.3 million requested by the Administration. The only bright spot for the agency: Senator Tom Harkin (D–IA) succeeded in a budgetary gambit that makes the Department of Defense pay $200 million for breast cancer research.

NSF and NIH aren't the only agencies

SELECTED APPROPRIATIONS

Project	1992	1993 req.	1993 approp.	change %
		($ millions)		
National Institutes of Health	10072	10580	10363	3
National Science Foundation	2571	3027	2733	6
NSF research and related activities	1872	2212	1859	-1
DOE R&D	2977	3070	2896	-3
DOE basic research	2437	2553	2377	-2
EPA R&D	497	526	510	3
EPA extramural research	323	339	323	-
NASA R&D (including station)	6581	7731	7893	19
Space Science and Applications	2729	2985	2855	5
NIST	247	311	384	55
NOAA	1455	1578	1521	5
U.S. Geological Survey	583	540	577	-1
USDA research (ARS-CSRS)	1094	1103	1094	-

facing an uncertain future this fall. The National Aeronautics and Space Administration (NASA) is finding that many of its programs are about to run into a fiscal wall, too. Congress approved a total budget for NASA of $14.3 billion—"virtually a hard freeze," according to Senator Mikulski. This is just $26,000 more than NASA got last year, and $677 million less than the Administration wanted.

BIG SCIENCE PROJECTS

Project	1992	1993 req.	1993 approp.	change %
	($ millions)			
Space Station	2029	2250	2100	3
Superconducting Super Collider	484	650	517	7
Human Genome Project (NIH only)	105	110	106	1
Strategic Defense Initiative	3916	5312	3800	-3

One NASA program that Congress protected—the space station—will get $2.1 billion, a small increase over 1992 and about $150 million less than NASA requested. The Office of Space Science and Applications, which runs NASA's basic research, will receive $2.86 billion, 5% more than last year. However, in order to make room for the station's growth, many programs will have to reduce their ambitions. Congress killed NASA's 1993 request for the national aerospace plane and scuttled a $32 million darling of the White House Space Council called the "space exploration initiative," an attempt to plan trips to the moon and Mars. Congress also trimmed NASA's search for extraterrestrial intelligence and cut back a new rocket development program called the "national launch system." The three largest science programs, the big x-ray satellite (AXAF), the Earth Observing System, and the Cassini probe to Saturn, will all continue at a steady pace, however.

Budgetary supercollision. The Department of Energy (DOE) has taken substantial hits in all of its science programs, with one exception—the controversial $8.25 billion Superconducting Super Collider (SSC). Congress whacked $15 million out of the high-energy physics base program budget and then another $15 million from a proposed $30 million for a new injector at Fermilab's Tevatron accelerator. DOE's "small science" programs in materials, chemistry, and computing also suffered a $7 million cut from last year's level. And despite DOE promises to increase the fusion budget by 5% a year for the next 5 years, Congress cut $20 million from last year's appropriation.

In striking contrast to this bloodbath, the SSC was handily rescued from political oblivion with an appropriation of $517 million. This is $133 million less than the Administration requested, but substantially more than the $33.7 million the House offered last June, when it voted to cancel the project. Congress also gave the endangered Los Alamos Meson Physics Facility (LAMPF) a new lease on life by transferring the $64.5 million program to DOE's military budget. But DOE's contribution to the Human Genome Project is still in doubt, thanks to a last-minute, $28 million "general reduction" ordered for DOE's biological sciences budget (which still managed to eke out a slim 1%, $3.4 million increase). The agency has not yet apportioned the pain among its various projects.

Funding at other research agencies followed a similar pattern: None received big increases and many took small hits. Congress was working on the defense budget as *Science* went to press, but appeared ready to cut the Strategic Defense Initiative 3% while giving both in-house and extramural research a small boost. Funding of extramural science at the Environmental Protection Agency remained flat, as did the total approved for both internal and cooperative research at the U.S. Department of Agriculture. There will be a modest increase in funding for the National Oceanographic and Atmospheric Administration (5%) but a slight decline at the U.S. Geological Survey (-1%).

As bad as this picture may seem, things could be worse next time around. Much of this year's pain resulted from the tight spending caps on domestic discretionary programs in the 1990 budget agreement, which led legislators like Harkin to push as much spending as possible into the defense budget. Next year, the "fire wall" that separates defense and domestic spending will come down. But so will the spending caps, forcing additional cuts of up to $70 bil-lion. None of the champions of fiscal reform seems willing to take that entire amount out of the military budget alone. So, absent a new budget agreement, pressure on domestic programs—including civilian research—is likely to grow.

–Eliot Marshall and David P. Hamilton

GENE PATENTING

Top HHS Lawyer Seeks to Block NIH

A civil war that has been going on in the Department of Health and Human Services (HHS) over attempts by the National Institutes of Health to patent gene fragments of unknown function erupted into the open last week. HHS general counsel Michael Astrue told *Science* that he will force the National Institutes of Health (NIH) to abandon its patent application, but NIH Director Bernadine Healy promptly responded that she has no intention of dropping the matter. Although Astrue is the department's top legal official, it's not clear who will prevail. For one thing, Astrue is leaving HHS on 6 November to go into private practice, and for another, his boss, HHS Secretary Louis Sullivan, has not yet signed off on the issue.

Saying no. HHS's Michael Astrue is trying to stop the patent.

This power struggle between Healy and Astrue further complicates an already confused situation surrounding NIH's patent application. On 20 August, the U.S. Patent and Trademark Office issued a preliminary rejection of NIH's patent claim, a rejection that Healy has characterized as routine and easily overcome. (NIH has 6 months to respond.) But Astrue and others have described it as a devastating blow. Independent observers have been unable to determine who is correct, because NIH has declined to make the patent office's report public. *Science* has obtained a copy, however (see box on next page), and the handful of patent attorneys who agreed to read it on short notice tended to come down in the middle, saying the decision is slightly more than routine—but definitely short of devastating. The ultimate outcome is of broad concern, as several patent attorneys told *Science*, that NIH's is not the only gene fragment application before the patent office.

Astrue argues that the patent office's rejection confirms what he has long argued within the department: That the application never should have been filed in the first place. Sequencing of the gene fragments, done by former NIH researcher Craig Venter, does not constitute an invention, he insists, but is basic science "that does not meet the threshold requirements for a patent." And Astrue insists that he has the authority to block NIH from responding to the patent office's rejection. "I have to approve it, and I won't because I don't think they have a legitimate base for