

FY '88 Budget: Scant Details on Proposed Increases

President Reagan sent his first trillion-dollar budget proposal to Capitol Hill this week. It not only proposes big increases for a number of existing research and development (R&D) programs, but also requests money for several new initiatives — including the creation of five to 10 interdisciplinary basic-science and technology centers, the startup of a \$10 million program to apply cellular- and molecular-biology research techniques to plants, and the development of a five-year, \$410 million Civil Space Technology Initiative. This NASA program would focus on aerobraking technologies, in-space transportation technologies and automated space operations.

In contrast to previous years, however, details about these and many other programs in the fiscal year (FY) 1988 budget are hard to come by. Part of the problem is that because the budget was unveiled almost a month earlier than usual — as mandated by the new Gramm-Rudman-Hollings deficit reduction act (SN: 7/12/86, p.22) — many details about how the administration would spend its money have not yet been determined, according to William R. Graham, the President's new

science adviser.

Adding to the confusion was the decision by several agencies not to share what budget details they did have. The Commerce Department, for example, directed the National Bureau of Standards (NBS) not to release any budget numbers it had other than NBS's total budget request of \$138.6 million — an increase of 13.6 percent over FY '87. At a briefing on the overall federal R&D budget proposal, an aide to Graham happened to mention that for the first time in the last four years, the administration was not proposing to abolish NBS's fire research and building research centers. These programs were being consolidated, he said, and would be funded at \$5 million under the FY '88 proposal. Ironically, because of the directive handed down to NBS employees, no one at NBS could confirm that figure at press time.

NSF: The National Science Foundation is an R&D agency slated for one of the biggest increases. The \$1.89 billion budget being proposed for it in FY '88 would increase its spending 16.7 percent over FY '87. NSF's programs in engineering would increase by 26 percent, those in computer

and information science by 23 percent, those in mathematics and physical sciences by 11 percent and those in the geosciences, biology, behavioral studies and social sciences by 16 percent. Moreover, said NSF Director Erich Bloch, NSF will be attempting to increase the average dollar award of its grants.

A major centerpiece of its FY '88 budget is the creation of regional multidisciplinary science-and-technology centers — most likely in areas involving materials science, computer science, social and behavior sciences and biology and biotechnology. Modeled after NSF's engineering research centers, they are intended to promote collaboration between industry and universities in their funding and research.

Defense: As Department of Defense (DOD) programs continue to dominate federal R&D spending, the more than 14 percent increase proposed for the agency in FY '88 would increase the agency's share of the federal R&D pie by 3.8 percent, to 67.3 percent. Overall, DOD's basic research would not fare as well, increasing by less than the rate of inflation experienced last year — and at a rate only about half that slated for civilian basic research.

The biggest research program continues to be the Strategic Defense Initiative, or "Star Wars" program, aimed at developing a ballistic missile defense system. The President has proposed giving it a \$1.49 billion (39.7 percent) increase in FY '88, to \$5.23 billion. Several other major DOD research programs have been slated for even more substantial percentage increases, although the dollar values involved are much smaller. For example, the Short Range Attack Missile II, an improved nuclear air-to-surface missile for use against hardened (massively shielded) and mobile targets, would receive a 231.4 percent increase, to \$220.4 million.

Geosciences: NASA is proposing \$25 million for a new Global Geospace Science Mission, which would enable the United States to participate in the International Solar Terrestrial Physics Program with the European Space Agency and Japan. A series of spacecraft — with launches beginning in 1992 and operating throughout the decade — would examine how incoming solar energy is distributed, stored and released.

NSF's spending on global geosciences, a program of interrelated research, would climb 80 percent, to \$60 million. A new addition to the program in FY '88 would be initial studies of upper-atmosphere physics.

Though the National Oceanic and At-

Corn borers, beware the chips

Life and death imitate art at the University of Illinois at Urbana-Champaign, where researchers have developed computer models of unicellular protozoa attacking moth larvae, which in turn are attacking corn. The intricate graphics — which model the spread through a cornfield of moth larvae called corn borers, and their parasites called microsporidia — are based on 700,000 numbers and 68 years of literature in insect pathology. Because microsporidia attack, weaken and sometimes kill the larvae, which are currently treated with chemicals, scientists hope to use them to control the borers.

In the latest three-dimensional graphics, representing a field of 800 corn plants, the red segments show the microsporidia-infected borer population per plant, while the green indicates uninfected larva populations; yellow signifies large concentrations of both sick and healthy larvae. At present, the height of the lines also represents larva density, but those developing the model are modifying the program so height represents spore density per plant.

"The model is more complex than most others ever made," says David Onstad, an entomologist on the Illinois team. "No one in the past has looked at [this type of biological system] using a model."



But Onstad, art professor Donna Cox and computer specialist Ray Idaszak aren't just making pretty pictures. Corn borers are a serious threat to cultivated crops, causing income losses totaling millions of dollars each year.

Turning "a mountain of data" into computer simulations of the daily changes in corn borer infestation over the 140 days of a growing season requires the use of a supercomputer at the university's National Center for Supercomputing Applications. It still takes a 6.7-minute run (more than 1 billion calculations) to compute the model, according to Onstad. Adding to the complexity of the model are factors such as the 40 life stages of healthy corn borers, movement from plant to plant, the size of the larvae when attacked by the parasite, and different modes of transmission.

— D.D. Edwards

mospheric Administration's funding request would rise only an estimated 2.6 percent in FY '88 – to \$1.07 billion – the agency is planning to initiate a program to modernize and restructure the National Weather Service. The proposed U.S. Geological Survey budget, at \$420 million, is \$1 million less than its estimated FY '87 funding, and its programs would be cut by \$32 million (7.8 percent). The largest cuts would come in the agency's mapping, water resources and geologic programs.

Biomedicine: The National Institutes of Health (NIH), which receives and distributes the bulk of federal health-research dollars, is assigned to go from \$5.85 billion in FY '87 to \$5.87 billion in FY '88. This proposal, which covers both R&D and non-R&D spending, also calls for budget commitments for multiyear grants to eliminate grantees' "annual uncertainties."

But the apparent NIH increase is actually a decrease. The FY '87 budget had been \$6.18 billion (SN: 11/8/86, p.302); now, the administration proposes to move \$334 million from FY '87 into FY '88, retroactively reducing the '87 figure. It would also reduce the number of new NIH grants in FY '87 from 6,354 to 5,654.

In 1985, the administration tried moving funds already granted to NIH into the next fiscal year, but the legality of the move was questioned and Congress passed another bill ordering that the money be spent as intended.

To transfer the money this time, the Department of Health and Human Services is planning to ask Congress to pass legislation allowing it. But such action by Congress is not considered likely. If Congress keeps the FY '87 allotment intact, the administration's proposed FY '88 NIH expenditure would total \$5.53 billion, a \$650 million drop.

Not surprisingly, the research community is expressing distress about the decrease and the forward-funding plans. Says David Baime, a legislative analyst with the Association of American Medical Colleges (AAMC), about the forward funding: "We're worried that, as in 1985, they will make NIH assume the proposal will be adopted. In the meantime grants won't be awarded, and awarded grants will be down-negotiated, contrary to Congress's intent." And several organizations that represent researchers and that had early news of the budget, including the American Society for Microbiology, the Federation of American Societies for Experimental Biology and the AAMC, sent a letter of protest to Reagan on Dec. 24. The "reduced national commitment," they say, "will be unsettling to present and future research."

One area of biomedical research is earmarked for significant increases in FY '88: AIDS research is singled out to go up \$118 million, to \$534 million. According to the proposal, money for AIDS is to go to

Agency	Basic Research				Total R&D			
	FY'86	FY'87	FY'88	% change '87 to '88	FY'86	FY'87	FY'88	% change '87 to '88
DEFENSE	994	976	1,000	+ 2.5	33,646	36,613	42,000	+14.7
TOTAL NON-DEFENSE*	7,151	8,324	8,700	+ 4.5	18,415	21,081	20,400	- 3.2
NIH	3,134	3,800	3,550	- 6.6	4,977	6,034	5,500	- 8.8
NSF	1,256	1,350	1,600	+18.5	1,334	1,428	1,694	+18.6
DOE	946	1,067	1,149	+ 7.7	4,692	4,975	4,679	- 6.0
NASA	850	1,092	1,260	+15.4	3,478	3,842	4,700	+22.3

*including some agencies not listed

NIH, the Centers for Disease Control (whose total budget is pegged to go from \$539 million to \$553 million) and four other government divisions.

Proposed research budgets for the three institutes at the Alcohol, Drug Abuse and Mental Health Administration are about the same as those approved for FY '87 by Congress. The administration is requesting \$232.5 million for research at the National Institute of Mental Health, \$106.4 million for the National Institute on Drug Abuse and \$68.9 million for the National Institute on Alcohol Abuse and Alcoholism.

Energy: Particle physics is one of the big winners in the FY '88 budget proposed for the Department of Energy (DOE). Funding for R&D at Fermilab in Batavia, Ill., the Stanford Linear Accelerator and other accelerator sites would increase from \$719 million to \$814 million. The total includes additional money to keep construction of the Continuous Electron Beam Accelerator Facility in Newport News, Va., on schedule (SN: 8/9/86, p.90).

Less certain is the future of the Superconducting Super Collider, a particle accelerator that would be the world's most energetic (SN: 1/5/85, p.5). A DOE official said a decision on whether to go ahead and build it should be made by February, and that if a go-ahead is given, his agency would find at least \$60 million in the new budget to start it.

DOE's biological and environmental research would grow significantly. In particular, funding for research on the source and health effects of radon gas would go from about \$4 million to \$14 million (SN: 11/22/86, p.325). DOE would also provide \$12 million for the government's "human genome" project, which involves mapping the location and identity of genes on human chromosomal strands.

In contrast, DOE is looking to more than halve the research budgets for fossil energy, energy conservation, solar and other renewable forms of energy. Moreover, DOE is proposing that \$75 million already appropriated for these programs in FY '87 be rescinded to match the lower amounts requested in the new budget.

DOE would expand the clean-coal technology program by \$350 million over the next five years. This program is aimed at developing technologies for burning coal cleanly and for extending the potential uses of coal (SN: 3/1/86, p.132). About \$400 million has already been appropriated, and nine demonstration projects have been selected so far. Along with more than \$200 million in other coal research programs, the clean-coal technology program represents the administration's effort to satisfy recommendations in the Joint Report of the Special Envoys on Acid Rain (SN: 1/18/86, p.37).

In the area of uranium enrichment, DOE has decided to stop funding research on the atomic-vapor laser-isotope-separation process and is continuing to study the possibility of turning over its uranium enrichment facilities to private enterprise (SN: 6/15/85, p.375).

Environment: The proposed \$2.7 billion budget for the Environmental Protection Agency (EPA) represents a 4 percent increase over what EPA is estimated to spend in FY '87. Its biggest increase – 40 percent – would go to support the Superfund program (SN: 10/25/86, p.264). With previously appropriated funds, Superfund spending would swell to \$1.6 billion – more than half EPA's total budget and more than what had been spent on the toxic-waste cleanup program during the past five years.

EPA's proposed R&D spending would not be nearly so robust. At \$354 million, it would rise only 3 percent over FY '87. A significantly expanded Superfund research program is slated to account for 17 percent of that R&D budget. Though stable at \$55 million, EPA's acid rain research program is still "very strong" and "aggressive," according to the agency's administrator, Lee M. Thomas.

While funding for the Interior Department's research and monitoring of the effects of contaminants on fish and wildlife resources would remain constant at \$21.5 million, funding of its endangered-species program would drop 25 percent, through the elimination of \$4.3 million in grants to help states.

– J. Raloff and staff reports