

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.

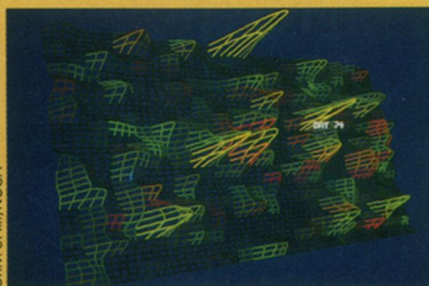
Though the National Oceanic and At-

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