

President's budget: Rosy outlook for R&D

A naive observer poring over President Bush's proposed research and development budget for 1992 wouldn't guess that the nation had entered a recession or that a congressional act, aimed at slashing the deficit, severely limits increases in many nondefense programs for the next two years. Nor would a casual reader find much evidence of increased selectivity in the funding of big science projects — an action deemed necessary by a 1990 Congressional Research Service report in order to avoid drastic, across-the-board cuts in R&D support (SN: 12/15/90, p.378).

These underlying realities may well haunt Bush's proposal as it moves through Congress. But for now, scientists can bask in the President's rosy-hued funding requests, which he released this week. His proposal for fiscal year 1992, which begins this Oct. 1, calls for a hefty \$8.4 billion rise in R&D spending — an 8.2 percent jump after accounting for an estimated annual inflation rate of 4.3 percent. (All proposed spending changes listed in this article use as their base the funds appropriated by Congress for the current fiscal year.)

Whether as a consequence of the Gulf war or a long-standing effort to maintain up-to-date military technology, defense activities would get the bulk of the R&D increase — about \$5.46 billion. That amount represents more than double the \$2.5 billion increase proposed for civilian activities. In contrast, the proposed defense funding for fiscal year 1991 represented a slight *decrease* after inflation, while civilian R&D increased.

Overall, the proposed 1992 R&D budget of \$75.6 billion represents about 5.2 percent of the President's total budget of

\$1.454 trillion. Significant increases would go to several ongoing projects:

- a \$291 million increase (120 percent), for a total of \$534 million, for the Superconducting Super Collider.

- a \$149 million increase (30 percent), for a total of \$638 million, for developing a high-performance computing and communications network. Software development accounts for 41 percent of the total budget.

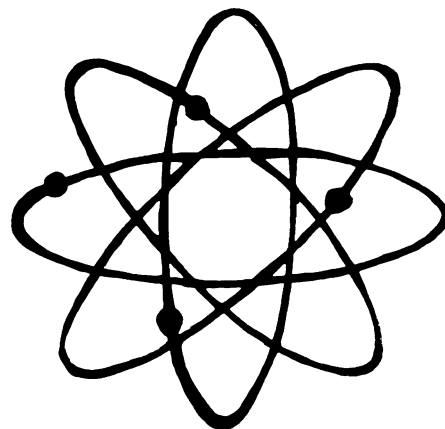
- a \$34 million increase (24 percent) for the Human Genome Program, for a total of \$169 million.

- a \$1.3 billion increase (80 percent) for the Strategic Defense Initiative (SDI), hiking its budget to \$5.2 billion. Motivated by the role of anti-aircraft missiles in the Gulf war, the President seeks to refocus SDI to concentrate on improving protection against limited strikes from nonnuclear missiles.

The proposal divides other large slices of the R&D pie among a variety of old and new programs in several agencies.

National Science Foundation: NSF's proposed \$2.72 billion budget represents an increase of \$406 million (17.5 percent), which would enable the agency to stick to the current goal of doubling its 1987 funding level by 1995. Although basic research commands the largest chunk of NSF funds (\$2.1 billion) and the largest dollar increase (\$284 million), the proposed \$390 million budget for education and human resources development represents NSF's largest relative increase — a jump of 21 percent.

The proposed NSF budget would allow the agency to raise the dollar amount of individual investigator grants in mathematics and physics by 4 to 6 percent after



inflation, providing the first major, real-dollar increase from NSF in several years.

The budget would also provide \$193 million for the NSF-coordinated U.S. Antarctic Program, representing an increase of \$18 million (10.3 percent) over 1991. This includes, among other items, a \$3 million increase for scientific research in fields ranging from astrophysics to ozone depletion, and a \$6 million increase to continue environmental cleanup and related safety efforts in the region.

Other NSF funding would include:

- \$23 million to begin building twin, highly sensitive gravitational-wave detectors. Each of the 4-kilometer-long instruments would use laser interferometry to search for gravitational radiation, a phenomenon never observed but predicted by Einstein's theory of general relativity. Last year, Congress axed a similar request.

- \$16 million to begin constructing the first of two 8-meter optical/infrared telescopes — one for the northern hemisphere and one for the southern — in partnership with the United Kingdom and possibly Canada.

- \$84 million (a 42 percent increase) to study the synthesis of advanced materials and develop new processing methods to use them.

- \$7.45 million (a 60 percent increase) to broaden plant genome research.

- \$118.5 million (a 36 percent increase) for studies of global environmental change.

Agriculture: The USDA would receive \$52.1 million, a \$13.5 million increase, for programs assessing global warming's economic impact on farming. The Agricultural Research Service, which funds about half the USDA's research projects, would enjoy a \$39.1 million increase (6.5 percent), for a total of \$644.8 million. And a grants program designed to attract more academic scientists to agricultural research would jump from \$70 million to \$125 million. While both the Forest Service and the Cooperative State Research Service would suffer small declines, the proposed reductions mainly reflect the elimination of congressionally requested "pork barrel" items, says USDA budget

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USDA

officer Michael L. Young.

Other proposals for USDA include:

- more than a doubling of funds, creating a total budget of about \$2.5 million, for food safety research.

- a \$786,000 increase in the current \$1.13 million program to improve production of ethanol from crops for use as an alternative fuel.

Energy: Prompted by threats to the U.S. oil supply, the President requested \$493.3 million (a 17 percent increase) for research on energy conservation and renewable energy sources such as solar power and biofuels.

Nuclear energy research would rise by \$202 million (88 percent), and "hot" fusion research would get a 23 percent hike, to \$337.1 million. But several traditional research areas would suffer. Overall, fossil-energy funding would plummet by 36 percent, to \$540 million. In particular, funding for a program seeking ways to burn coal more cleanly and efficiently would decline by \$76 million (20 percent), and a Nevada facility that assesses the impact of liquid-gas fuel spills would receive no increase in fiscal 1992.

Physics and materials: The National Institute of Standards and Technology would enjoy an increase of \$33 million (15 percent), for a total budget of \$248 million. This includes a 58 percent increase, to \$33.6 million, for electronics and engineering research, geared toward making U.S. industry more competitive in the international market. The budget would also provide a \$22 million increase for several new in-house research projects at NIST, including programs to improve computer security, to rapidly develop measurement techniques and standards for high-temperature superconductors, and to collect data needed to develop alternatives to chlorofluorocarbon refrigerants.

Substantial increases for physics would also go to the Energy Department. High-energy physics research would gain a 13 percent increase, for a total of \$666.4 million. Of that amount, \$78.8 million would fund construction projects, including \$6.2 million to finish upgrading the linear accelerator at Fermilab in Batavia, Ill. The Energy Department's nuclear physics budget would increase by 9.3 percent, to \$342.4 million.

Biomedicine: The President's budget blueprint for the National Institutes of Health includes \$110 million (a 26 percent increase) to expand efforts to map the human genome, and another \$209 million earmarked for studies of Alzheimer's disease. About \$4.9 billion would fund a range of research grants, reflecting an increase of 8.8 percent. The proposal allows for 5,785 new and competing research grants, the same number funded last year.

The Alcohol, Drug Abuse and Mental

FY 1992 Federal R&D Funding Budget Authority* (in millions)				
Department or Agency	1990 Actual	1991 Actual	1992 Proposed	Percent Change
Conduct of R&D:				
Defense-military	37,226	35,176	40,479	+15
Health and Human Services (NIH)	8,506 (7,576)	9,273 (8,277)	9,836 (8,775)	+ 6 (+ 6)
Energy	6,023	6,149	6,410	+ 4
NASA	5,246	7,271	8,602	+18
National Science Foundation	1,766	1,828	2,112	+16
Agriculture	1,117.7	1,224	1,261	+ 3
Interior	503	584	562	- 4
Environmental Protection Agency	426	433	491	+13
Other Agencies	2,897	2,173	2,325	+ 7
Subtotal, Conduct of R&D	63,711	64,111	72,078	+12
R&D facilities	3,023	3,082	3,545	+15
Total	66,734	67,193	75,623	+13

Derived from OMB data; all figures reflect rounding

Health Administration's total budget would rise to nearly \$3.1 billion, representing a slight decline after accounting for inflation. That amount includes a 3.7 percent real increase, or \$1.5 billion, for drug abuse research, prevention and treatment activities.

The President's proposal includes nearly \$2 billion for AIDS research, prevention and related activities, distributed among various federal agencies, including NIH. After inflation, that amount represents a small decline.

Environment: The EPA's budget for Superfund research would suffer a 7 percent decline, to \$68.6 million, due to a shifting of funds into clean-up projects. And radon research would decrease by 1.5 percent, to \$2 million. Global climate research would emerge as a big winner, with an increase of 29 percent, to \$26 million.

Under the 1990 Clean Air Act Amendments — which call for new studies of ozone loss, toxic air pollutants and acid rain — the President seeks a 27 percent increase in funding, or \$20.5 million, for these areas in 1992. Research on the ecology of the Great Lakes would rise \$5.1 million, to \$6.8 million. Funding for new programs includes \$1 million to begin monitoring pollution levels in the Arctic and \$2 million for a study of ground- and surface-water quality in agricultural areas.

Earth science: As international negotiators met in Chantilly, Va., to begin the lengthy process of drawing up a global climate treaty, Bush proposed a healthy increase to fund research on global change, for distribution among nine federal agencies. His \$1.18 billion request represents an increase of \$231 million (24 percent) over last year's spending and a near-doubling of the 1990 funding level on global-change research.

Most of that increase would boost investigations in several critical areas: climate predictions, understanding the carbon, water and energy cycles, and global warming's effects on ecosystems.

Among the recipient agencies, NASA would get the largest share of global-change money, about 65 percent. The space agency plans to pump up its spending on the development of the Earth Observing System (EOS), a series of Earth-orbiting platforms designed to monitor climate changes over a period of 15 years. In response to criticism of the EOS satellites, NASA will examine alternative ways of designing the program.

Space science: NASA's proposed budget includes the largest sum yet for Space Station Freedom — \$2.03 billion, reflecting a \$29 million boost. NASA simplified the structure's design after Congress directed the agency last year to cut the station's cost.

In next year's budget, NASA and the Defense Department would each receive half of a proposed \$350 million to develop a powerful, nonshuttle rocket as a less expensive way of putting large pieces of the station into orbit. The budget proposal also earmarks \$122 million for NASA to begin a program aimed at making the shuttle as reliable as the expendable rockets routinely used by industry and the military.

The new budget would also provide \$15 million for Lifesat, an Earth-orbiting craft that will study biological samples to assess radiation safety requirements for crews aboard the space station and other long-term missions.

NASA Administrator Richard H. Truly spoke this week in favor of lunar missions, but the new budget proposal includes no funds for a moon-orbiting research spacecraft.

— R. Cowen with staff reports