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Clinton Sends His 1998 R&D Budget to Capitol Hill Expecting Bipartisan Support, but All Is Not Rosy

To hear him say it, President Clinton has proclaimed himself a champion of research and technology. In his State of the Union address to Congress on 4 February, he declared that science and technology provided an economic stimulus, and, "to prepare America for the 21st century, we must harness the powerful forces of science and technology to benefit all Americans." Two weeks earlier, on 20 January, after being sworn in for his second term, Clinton had even referred to "physicists" (a first in any of the nation's 52 inaugural ceremonies), saying that the now-omnipresent Internet was specially created by them as a research tool. He topped such remarks in a statement at the front of the four-volume set of his fiscal 1998 budget proposals sent to Capitol Hill on 6 February. In it, Clinton mentioned science or research eight times.

Indeed, out of a budget request for \$1.69 trillion in outlays for fiscal 1998, Clinton would devote \$75.5 billion to R&D—a 2% increase over this year's estimated expenditures of \$73.8 billion. At a budget briefing for the news media, John H. Gibbons, the President's science adviser, put a rosy political spin on the numbers. Gibbons observed that the President was proposing an increase in R&D funding for the fifth year in a row, "at the same time that he has cut the budget deficit and has put our country on track for a balanced budget."

Then came the details. Clinton's R&D budget for next year would increase funding for basic research to \$15.3 billion, a boost of \$418 million or 3% over this year. Funding of basic research at universities would rise by 2%, to a total of \$13.3 billion. The research budget at the National Science Foundation would go up by 3%, the same as at the National Institutes of Health, to just keep ahead of last year's inflation rate. At the Department of Energy, research programs would rise by more than 4%, mainly because of increases in the general science account for US participation in CERN's planned Large Hadron Collider and support for the science-based nuclear stockpile stewardship program (see page 63).

When Clinton submitted his first

budget in 1993, he said his goal was to bring civilian R&D in line with defense R&D, but he has been unable to do that. Accordingly, the R&D budget proposed for 1998 shows defense accounts with \$40.5 billion while civilian programs would get just under \$35 billion—continuing the traditional imbalance, with defense at 54% and non-defense R&D at 46%.

It might have been worse for non-defense R&D. After some of the science agencies, including NSF, DOE and NASA, submitted their budget plans to the White House Office of Management and Budget last September, they were told they would receive no more than last year or take some sharp cuts. All appealed OMB's actions to the White House. Clinton and Vice President Al Gore came to the rescue. In the end, though, NASA was hit for a 1.5% reduction from last year's appropriation.

NASA Administrator Daniel Goldin took his lumps stoically. "The President had his own challenge of balancing a smaller budget with relevant programs," Goldin wailed at his budget briefing. "NASA was one of the places he had to look at carefully. He saw NASA had taken its cuts and still produced world-class science." Goldin conceded that he was grateful for the budget he got and for the President's promise of stable funding of about \$13.5 billion through the year 2002—a

major reconsideration of last year's OMB projection that NASA would be clobbered down to \$11.6 billion in fiscal 2000. NASA's fiscal 1998 budget seeks to maintain funding for the international space station at \$2.1 billion and proposes for the first time that Congress provide full funding of \$9 billion for the years 1999 to 2003 to complete the \$17.4 billion station—an OMB strategy that has been traditionally practiced at the Pentagon for long-term procurements of aircraft carriers, fighter planes and weapons systems. The budget document also calls on Congress to allocate the full cost of building the Space Infrared Telescope Facility (SIRTF), the last of four major space observatories, which would be launched in 2001 to examine the formation of galaxies, stars and planetary systems. SIRTF would be integral to NASA's planned Origins Program to investigate the formation of chemical elements and the creation of the universe.

Similarly, the Clinton Administration is asking Congress for \$394 million for an eight-year commitment to fund the Energy Department's contribution to CERN's \$2 billion Large Hadron Collider, which is scheduled to be running by 2005 (see PHYSICS TODAY, February, page 58). "Selling Congress on multiyear funding for an exotic project being built in a foreign land and without any congressional oversight is go-

Winners and Losers in Clinton's R&D Budget for Fiscal 1998

	1997 enacted (millions of dollars)	1998 request	Percent change
National Science Foundation	3270	3367	3%
Research and related activities	2432	2514.7	3.4%
Education and human resources	619	625.5	1.1%
Major research equipment	80	85	6.3%
Department of Energy	16,216	16,637	2.6%
General science and research	831	876	5.4%
Basic energy sciences	649.7	668.3	2.9%
Fusion energy science	232.5	225	-3.2%
Defense programs	3,907	5,079	30%
Large Hadron Collider project (at CERN)	15	35	133%
National Aeronautics and Space Administration	13,709	13,500	-1.5%
International Space Station	2149	2121	-1.3%
Mission to Planet Earth	1362	1417	4%
Space science	1971	2044	3.7%
Department of Commerce	3,900	4,600	17.9%
National Institute of Standards and Technology	572	692.5	21%
Advanced Technology Program	225	275.6	22.5%
Manufacturing Extension Partnerships	95	123.4	29.9%
National Oceanic and Atmospheric Administration	1,911	1,990	4.1%

ing to be very hard," says an OMB official. "We're going to put on a full-court press."

In its own way, NSF put pressure on the White House to get an increase in its fiscal 1998 budget. The agency had been told by OMB examiners in November to expect a virtually flat budget. After it appealed that decision, NSF received a 3% increase, to \$3.37 billion—an increase of \$97 million above this year's appropriation. While the research account would get an overall 3.4% increase, physics research would go up by only 2%, astronomy by 2.2% and materials science by 1.2%.

"I feel good about this budget, given the restraints on discretionary spending," said Neal Lane, NSF's director. "I worry about balancing the budget in future years if the money comes out of discretionary programs that support science and technology. Nothing has happened that makes me happy about future budgets for the agency."

Support from an unexpected source

Lane's pessimism about future R&D funding appeared to fly in the face of a bill (S. 124) introduced on 21 January, the Senate's first full day of the 105th Congress, by three Republicans—Phil Gramm of Texas and his cosponsors, Connie Mack of Florida and Kay Bailey Hutchison of Texas. The bill, the National Research Investment Act, would double Federal funding for basic science and biomedical research in the next decade. Though the goal is unlikely to be achieved, the effort is viewed in science lobbying circles in Washington as a sign that Republicans in Congress may increase the government's investment in science, even as they grapple to balance the Federal budget. If passed, the legislation would benefit NSF, NASA, DOE's civilian research programs and other agencies that use peer review procedures. But it doesn't specify how such a large pie would be divvied up, except to designate funding for NIH, which would double to \$25.5 billion in 2007, and to forbid any of the money to be used for "commercialization" of technologies developed in whole or part by the science agencies.

Meanwhile, Senator Trent Lott of Mississippi, who took over as Republican majority leader when Bob Dole retired to run for President, has told his colleagues that Congress needs to find ways of enlarging research funding. Lott, the most powerful Republican in Congress, also sent a letter to Senator Ted Stevens of Alaska, who heads the body's appropriations committee, urging him to raise the allocations for basic research, particularly for DOD, which Lott claimed had

dropped by \$350 million in the past five years. "This is not a single member issue," wrote Lott. "Basic research is largely invested in academic research all across our great nation. I know that university presidents in your state are genuinely concerned about the stability of our research program. A particularly disturbing symptom of the eroding commitment by DOD is the fall off in physical and engineering science research. American universities have been characterized as our greatest national treasure, our idea generators, and our brain trust. They create the technologies on which DOD and its industrial base must rely to ensure that scientific advances transition to affordable military technologies. I believe that we must responsibly address this problem now, before it is too late."

Upon close examination of the budget tables, Representative George E. Brown Jr of California, the senior Democrat on the House science committee, agreed with much of Lott's assessment and put Clinton on notice that he intended to do something about the situation. In a statement to committee members, Brown wrote: "The President's budget indicates that investments for physical capital, research and development, and education and training have fallen to an all-time low of 2.7% of the GDP, with the civilian portion of this falling to an all-time low of 1.6% of the GDP. In order to ensure that our national efforts to balance the budget leave us with the capability to sustain a growing economy after the year 2002, a fundamentally different approach must be taken to bolster the public investments that help drive productivity increases."

Brown argued that R&D will continue to decline in "real" terms over the next five years under Clinton's proposed budget projections. His statement was more or less validated by tables in the budget books. These indicate in inflation-adjusted data that the general science account rose swiftly in the 1950s and 1960s, fell in the early 1970s, climbed again in the 1980s, and flattened in the 1990s, but would fall again if the projections were right for the years 2001 and 2002. As a share of GDP, according to the data, Federal funding of R&D has been virtually flat since President Reagan left office, and is now declining slightly. Brown's statistics are correct, according to the tables. Nondefense funding would hit 1.6% of GDP in fiscal 1998, less than at any time in the past 35 years.

Over the past five years, the nation's budget deficit has been chopped from about 5% of GDP to a little more than 1%. This has been achieved mainly by

restraining discretionary spending—the parts of the budget that Congress appropriates each year, including defense expenditures and scientific research and excluding such entitlements as Medicare and Social Security. The budget volumes contain a plethora of charts and estimates revealing that the Clinton Administration projects that discretionary outlays will fall in real terms between now and fiscal 2002, when the squeeze on R&D will be severe and Clinton will no longer be in the White House.

Different approach by the Academy

According to an analysis conducted by a panel of the National Academy of Sciences, Federal spending on R&D has fallen by 5% since 1994, considerably more than the 2% acknowledged by the Clinton Administration. But the loss has been concealed in official statistics, which include nonresearch items such as the testing and evaluation of weapons systems. By excluding such expenditures, chiefly at the Defense Department, the panel claims it has come up with a more accurate measure of R&D spending. The panel's chairman, Frank Press, a former president of the academy and President Jimmy Carter's science adviser, doesn't say that DOD's inclusion of tests for weapons systems is not important, but he contends it is not research in the sense that the academy had outlined in a 1995 report. In that study, also directed by Press, the academy proposed that a true measure of Federal science and technology would exclude the Pentagon's test and evaluation accounts, as well as large amounts for mainly engineering projects at DOE, such as work on particle accelerators, and at NASA, where the space station shows up in the R&D budget. Using its own measures, the academy calculated that research funding has increased, taking inflation into account, in only two agencies since 1994—the National Institutes of Health, which went up by 8.1%, and NSF, which grew by 1.8%. The panel found that real R&D spending was down 11.1% at DOD, 13.8% at DOE and 7.3% at NASA.

With the nation at peace and the economy expanding, Clinton has scaled back his initiatives and targeted them at some of the country's most popular causes, such as teaching children to read and figure and protecting their health. As *Washington Post* columnist Richard Cohen put it after the inauguration, Clinton "is cursed to be president in swell times."

While Republicans accuse Clinton of returning to a big-government mindset that dominated the early years of

his Administration, they also concede that this budget contains a more modest and focused approach. Clinton's budget for 1998 has few big ticket items, in contrast to his early initiatives, which included the huge economic stimulus and health care packages that bombed in Congress in 1993 and 1994. But it also contrasts with the minimalist approach he took in 1995 after Republicans captured Congress.

Last November he declared his top priority was balancing the Federal budget by 2002. But in his State of the Union address on 4 February, he declared that his No. 1 priority is a "national crusade" to improve educational standards and performance, with the Federal government pitching in to help with everything from tutors to computers and a little brick and mortar to shore up dilapidated schoolhouses. He also

proposed \$51 million more for Pell grants and tax breaks "to open the doors of college education wider than ever before."

The President's budget is his opening gambit in the fiscal 1998 budget cycle. It will frame the policy debate, and with both sides pledging bipartisanship, the proposals are being taken seriously this year.

IRWIN GOODWIN

Without Explosions to Test the Aging Nuclear Arsenal, Bomb Builders Turn to Inertial Fusion and Supercomputers

With the end of the cold war, the nuclear arms race has run its course. And with it has come the end of test explosions. The Comprehensive Test Ban Treaty (CTBT) signed by President Clinton and leaders of more than 100 other nations last September (but still awaiting ratification by Congress and the other nuclear powers) has left nuclear weapons designers out in the cold. In fact, US tests ended in September 1992 when President Bush signed a bill funding the Superconducting Super Collider and containing an amendment by Senator Mark Hatfield, the Oregon Republican, to impose a nine-month moratorium on underground tests. After Clinton entered the White House in January 1993, he ex-

tended the ban year by year.

The US stopped making nuclear warheads in 1989 and its weapons stockpile has been aging ever since. In making his decision to stop testing, Clinton was under pressure from the Defense Department and its Joint Chiefs of Staff, as well as the Energy Department and scientists at its three nuclear weapons laboratories—Los Alamos, Lawrence Livermore and Sandia—to allow small subcritical underground tests. They argued that tests were the best way to know whether the weapons arsenal remained safe, stable and reliable. They also sought to conduct as many as 15 full-scale tests by 1996 and to extend low-level tests as much as ten years

into the future. The special pleaders, all of them with budgets and careers at stake, proposed to limit the explosive yield to 1 kiloton or even to 0.5 kiloton.

But yield was not the main issue. Continued testing, opponents of testing warned, would raise questions among the nuclear have-nots and wanna-bes that the US and perhaps other members of the nuclear club haven't really stopped developing nuclear arms to use when some threat arises.

True, banning tests can't guarantee that proliferation will be prevented. After all, Pakistan developed nuclear weapons without any test explosions—though suspicions linger that it conducted a test in China. And other countries, especially Iraq, Iran and North

