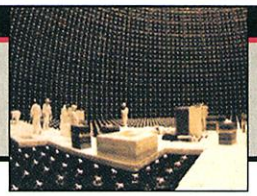

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U.S. BUDGET

NSF Research Bounces Back; Congress Funds New Facilities

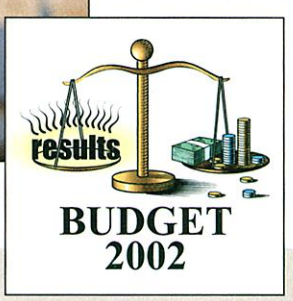
Congress last week pulled the 2002 budget for the National Science Foundation (NSF) back from the brink of fiscal calamity. By providing a 7.7% increase for NSF's $3.6 billion research account, legislators more than wiped out a 0.5% cut proposed by President George W. Bush in April (*Science*, 13 April, p. 182) and gave a green light to several NSF initiatives. At the same time, lawmakers accepted with minor tinkering the president's plans for NSF's education programs, boosting them 11% to $875 million.

"I'm really, really pleased with our numbers for 2002," said the visibly relieved NSF director Rita Colwell, whose campaign to double the agency's budget, to $8 billion, took a sharp hit from the incoming Bush Administration. "Given where we started, we didn't do so badly," added a senior NSF official. NSF also largely avoided the earmarks—pet projects of individual legislators—that are spread liberally across the rest of a $113 billion bill covering housing, veterans affairs, NASA (see sidebar), and dozens of other agencies.

Within the research programs, the foundation's cross-disciplinary initiatives fared well, with information technology and nanotechnology each getting $25 million more than the request, to $297 million and $198 million, respectively. The increases for individual directorates varied from nearly 9% for the geosciences and engineering to only 3% for the social and behavioral sciences. Although Congress declined to specify a number, it told NSF to give "a high priority" to a much-touted mathematics initiative for which the agency had requested $20 million.

The spending bill also overrode the Administration's desire to block any major new research facilities (*Science*, 27 July, p. 586). In addition to approving requests for terascale computing and an earthquake engineering simulation network, legislators added $15 million to start a 1-square-kilometer neutrino array under the South Pole, $12.5 million to begin the Atacama Large Millimeter Array in Chile, and $35 million to continue building a high-altitude plane to carry out atmospheric studies.

Winning numbers. Director Rita Colwell likes the boost in NSF's 2002 budget.



Showing their traditional support for education, legislators told NSF to by 1 December is expected to choose a contractor to build the craft. Second, the mission requires a radioisotope electrical generator, but the only two on tap are penciled in for a 2008 mission to Jupiter's moon Europa. Building a third generator would be expensive, Weiler adds.

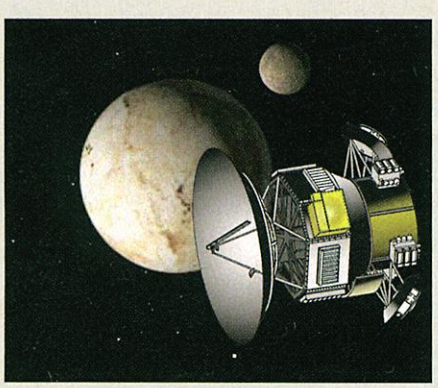
Congress also capped the Europa mission at $1 billion, a figure that leaves little room for the cost of shielding the craft against harsh radiation. But it agreed to let the Jet Propulsion Laboratory in Pasadena, California, run the mission, after some had wanted an open competition. Lawmakers also provided an extra $10 million for the Living With a Star program to study the sun, and funds for advanced propulsion research to benefit future planetary missions.

–ANDREW LAWLER

Pluto and Pork Win Out at NASA

At first glance, NASA's $14.8 billion budget for 2002 appears to mark a modest victory for an agency struggling with cost overruns and a leadership vacuum. Some of the 3.8% boost approved last week by Congress, for example, will kick off a long-awaited mission to Pluto, and additional money goes to boosting support for a nascent effort to study the sun.

But hidden in the fine print is $532 million for 136 projects put forward by individual legislators—nearly double last year's total and the largest amount of earmarks in the agency's history. That smorgasbord of pork leaves NASA with an increase of a scant $8 million and little flexibility to cope with a $75 million cut in the space station budget. Although this year's science programs won't be affected directly, agency managers say that overseeing the 2002 budget could be a fiscal nightmare for the successor to NASA Administrator Dan Goldin, who steps down this week.



Long journey. Pluto mission needs outyear funding before it can fly.

The $30 million payment for a 2006 Pluto mission comes after more than a year of lobbying by enthusiasts and scientists. "The people let Congress know that they want NASA to explore Pluto, ... and Congress responded," says Louis Friedman, executive director of the Pasadena, California–based Planetary Society.

But there are two catches: First, Congress approved funding for only a single year, with no commitment beyond 2002. "It doesn't take a rocket scientist to see the problem there," says space science chief Ed Weiler, who

CREDITS: (TOP TO BOTTOM) SAM KITTNER; JPL/NASA

hike annual stipends for three graduate research and teaching fellowship programs from $18,000 to $21,500. That's $1000 above the agency's request and in line with Colwell's goal of making them more competitive (*Science*, 30 March, p. 2535).

Appropriators also took the rare step of committing hard cash—$5 million apiece—for two proposals to bolster undergraduate science and engineering that are still working their way through Congress. One, for scholarships to undergraduates who agree to be science teachers, is described in a bill (H.R. 1858) by Representative Sherwood Boehlert (R–NY), chair of the House Science Committee; the other (S. 1549), championed by Senator Joe Lieberman (D–CT), would reward universities that promise to produce more science and engineering majors. The Administration's new science and math partnerships program to link universities and local public schools was funded at $160 million rather than the $200 million requested.

–JEFFREY MERVIS

SPACE STATION

Partners Protest U.S. Plans to Shrink Crew

A U.S. plan to scale back the international space station has triggered a revolt among the project's foreign partners, who fear the cuts would ruin their research programs. Led by Canada, the partners are demanding a meeting with U.S. officials to try to reverse cost-saving moves that could leave the station with half its planned six-member crew.

A scaled-back station "would virtually eliminate the partners' collective ability to use" the station, declares a diplomatic note sent on 1 November by Canada to the U.S. State Department. A three-person crew would limit Canada to "30 minutes per week—which is not enough time to conduct any meaningful science," according to notes accompanying the message.

The outcry came as key lawmakers and a senior White House official tacitly agreed at a 6 November congressional hearing to support—at least temporarily—a less capable station with half the planned crew. The idea was put forward earlier this month by a panel led by retired aerospace executive Thomas Young (*Science*, 9 November, p. 1264). Meanwhile, lawmakers last week also approved a 2002 space station budget that cuts $75 million from the station's $2 billion annual budget and leaves little room for additions to reach its planned design (see previous page).

The partners, whose allocation of research time is based on the size of their investment in the station, say that the idea for a less capable version was hatched without their participation. In its note, Canada proposes a meeting of all the station participants to express their concern. That meeting, which has the backing of European and Japanese officials, likely won't take place until January.

The timing of the Young report is particularly awkward for the European Space Agency (ESA). Ministers from 15 states—including 11 that are members of the station effort—are meeting this week in Edinburgh to approve a $900 million research program for the station from 2002 through 2006. ESA's Columbus laboratory is slated to be launched at the end of 2004. But with routine maintenance and operations taking up more than 80% of the time of a three-member crew, there will be little opportunity for research. That's why the original plan to have six or seven astronauts on board is "an essential requirement," says Hebert Diehl, chair of the European partners' coordinating committee, in a 2 November letter to a senior State Department official.

Japanese officials were working on a similar statement. Japan is preparing to launch a laboratory module that will require a significant crew to conduct experiments in a wide range of materials and life sciences areas.

U.S. officials testifying last week assured Congress that the cuts need not affect the station's ultimate role as a research platform. The Young plan is "a good course of action" that the Bush Administration could endorse, says Sean O'Keefe, deputy director of the Office of Management and Budget. If NASA comes up with a credible way to complete the original version in the next 2 years, he added, "then there will be no diminution" of the space station's capability. House Science Committee Chair Sherwood Boehlert (R–NY) also expressed cautious support for the Young panel's suggestions, noting later that Congress was "in no mood" to boost spending on the station until NASA demonstrates better management oversight.

–ANDREW LAWLER

CREDIT: D. DUCROS/ESA

Goodbye Columbus? European scientists hope that U.S. cuts won't cramp their use of the Columbus lab module.

PALEOCLIMATE

A Variable Sun Paces Millennial Climate

Most scientists have long assumed that the sun shone steadily, its unvarying brightness the one constant in a climate system that seemed to lurch willy-nilly from one extreme to another over the millennia. From time to time, a few brave souls would suggest that the sun actually waxes and wanes with a steady beat, driving earthly weather or climate in predictable cycles. But the proposed correlations between sun and climate would usually collapse under closer scrutiny. Now, prospects are brightening for the putative connection between a varying sun and climate change on the scale of millennia.

In a paper published online this week by *Science* (www.sciencexpress.org), paleoceanographer Gerard Bond of the Lamont-Doherty Earth Observatory in Palisades, New York, and his colleagues report that the climate of the northern North Atlantic has warmed and cooled nine times in the past 12,000 years in step with the waxing and waning of the sun. "It really looks like the sun has mattered to climate," says glaciologist Richard Alley of Pennsylvania State University, University Park. "The Bond *et al.* data are sufficiently convincing that [solar variability] is now the leading hypothesis" to explain the roughly 1500-year oscillation of climate seen since the last ice age, including the Little Ice Age of the 17th century, says Alley. The sun could also add to the greenhouse warming of the next few centuries.

The new sun-climate correlation rests on a rare combination of long, continuous, and