

# Science + Technology

## IN CONGRESS

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SPECIAL UPDATE

### FY 2001 R&D: NIH and DOD Up, Other Agencies in Limbo

As Congress returns from its month-long August recess, much work remains to be done on fiscal year (FY) 2001 appropriations before the October 1 start of the fiscal year. Congressional Republicans have passed spending bills that adhere to discretionary spending levels well below what President Clinton has proposed, and which have been roundly criticized by the White House. Negotiations on the last of the appropriations bills will likely run into early October with the threat of another omnibus bill on the horizon. Federal research and development (R&D) funding, meanwhile, has seen mixed results thus far.

The Department of Defense (DOD) is the only major R&D funding agency to receive its final appropriations, and FY 2001 will be a banner year for defense R&D. The DOD appropriations bill, signed into law on August 9, raises the total defense R&D budget to \$41.9 billion, a 6.8 percent increase (8.7 percent above the president's request). This appropriation includes a 13 percent increase in DOD's support of basic research and an 8 percent increase in applied research. Also in line for a hefty increase is the National Institutes of Health (NIH). Just before the recess, the House and Senate came to a provisional agreement that would raise the NIH R&D budget \$2.7 billion (15 percent) to \$19.7 billion.

The fate of the other major R&D funding agencies, however, is uncertain. Because Congress is working with discretionary spending ceilings for nondefense programs far below the President's request, and even below FY 2000 funding levels, the House would fall short of the Administration's request for nearly all non-NIH, nondefense R&D programs and would cut many programs below FY 2000 (see table on page 3). The Senate would pro-

vide more generous funding, but at the cost of siphoning funds from a major appropriations bill it has not yet drafted—the Department of Veterans Affairs and Housing and Urban Development, and Independent Agencies bill, which funds R&D in the National Aeronautics and Space Administration (NASA), the National Science Foundation (NSF), and the Environmental Protection Agency (EPA).

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### Presidential Candidates on S&T

With the post-convention Presidential campaigns in full swing, it is time to step back and look at where the two candidates stand on science and technology policy issues. The following summary is based on the issue agendas found on the candidates' websites.

Overall, both candidates include supportive statements for science and technology in general and research and development (R&D) specifically. Governor Bush's platform, however, focuses mostly on research in support of military and industrial needs, while Vice President Gore's statement essentially mirrors priorities in the current Administration's R&D budget request.

Gov. Bush makes a statement in support of medical research including "responsible" biotechnology research and advocates doubling the R&D budget for the National Institutes of Health. He does not specify how many years the doubling should take.

V.P. Gore also recommends doubling medical research funding, especially for cancer. He also proposes creating 20 centers of excellence in biomedical computing at universities. An important note to Gore's platform is that he recognizes the need to maintain a balanced research portfolio and states that biomedical advances are dependent on research in other fields.

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*"We look forward to working with you to fund key priorities of importance to the American people."*

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Nonetheless, the outlook for non-NIH, nondefense R&D is not as grim as it first appears. Congressional leaders are likely to face enormous pressure to meet the president's funding demands, and R&D agencies may find themselves with more funding at the end of the appropriations process than Congress has approved so far.

The Senate would offer significant increases to most R&D funding agencies. For the agencies whose appropriations the Senate has drafted, total R&D would increase by nearly 8.7 percent (\$6 billion). Aside from DOD and NIH, other agencies slated for large R&D increases in the Sen-

tough choices unless they allocate more money for appropriations by then.

The House would provide less funding for nondefense R&D than the Senate and would cut funding for many agencies. Total nondefense R&D, excluding NIH, would decline 1.3 percent in the House appropriations bills. Although the House would award NSF R&D a small 3.9 percent increase to \$3.0 billion, this would be far short of the 19.8 percent increase requested by the President. The House would cut NASA R&D by 1.0 percent, mostly by eliminating

the Reusable Launch Vehicle program. Commerce R&D would fall by nearly a quarter because the House would eliminate ATP and slash NOAA R&D. USDA R&D would decline 2.0 percent because the House would prevent a mandatory competitive grants program from spending any money in FY 2001 and would cut other competitive research grants, while boosting funding for congressionally designated research projects. While DOE R&D would edge up slightly by 0.7 percent, the House would

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ate include the Department of Energy (DOE, up 6.1 percent to \$7.6 billion), the U.S. Department of Agriculture (USDA, up 7.0 percent to \$1.9 billion), and the Department of Transportation (up 13.1 percent to \$686 million).

A few agencies would see their R&D budgets decline in the Senate bills, mostly because of tight constraints on domestic discretionary spending. Department of the Interior R&D would decline slightly to \$571 million, in contrast to a requested increase to \$590 million. R&D in the Department of Commerce would fall 2.7 percent to \$1.0 billion. Although most Commerce programs would receive significant increases, including an 8.1 percent boost for the National Institute of Standards and Technology (NIST) intramural R&D programs and a 12.8 percent boost for the Advanced Technology Program (ATP), these would be offset with a requested cut to NIST's Construction of Research Facilities account. R&D in the National Oceanic and Atmospheric Administration (NOAA) in Commerce would rise 2.5 percent to \$606 million. Within DOE, funding for physics and fusion research would decline.

R&D funding in NASA, NSF, and EPA, however, is uncertain. Senate appropriators will not draft spending bills for these agencies until mid-September and will face

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## Presidential Candidates

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Both candidates advocate the permanent extension of the Research and Experimentation (R&E) tax credit to assist industry R&D, although Gore expands that position to include facilitating its use by small businesses.

In the area of information technology (IT), Gov. Bush recognizes its importance to the "new economy" and supports policies to encourage entrepreneurs though he does not outline the federal role in IT R&D. He recommends "dramatically" increasing H-1B visas to high-skilled foreign workers but does not specify any caps to the total number. In addition, he does not indicate that visa increases should be directly linked to programs to improve U.S. workforce skills. Gov. Bush does state, however, that the long-term solution is better schools and higher standards and he outlines a plan for education reform.

Gov. Bush's technology agenda also includes a list of proposals for the Internet including a \$3 billion flexible fund to use toward integrating technology into classrooms and libraries, and \$400 million to "boost student achievement."

V.P. Gore advocates doubling the federal IT research budget over five years and fully implementing the recommendations outlined in the President's Information Technology Advisory Committee report. He also proposes increasing the number of H-1B visas from 115,000 annually to 200,000, with the stipulation that the associated fees be increased and used for education programs.

In the defense arena, not surprisingly, the candidates take somewhat different tactics. Gov. Bush endorses accelerating research and deployment of both a national and theater missile defense system. He also proposes that the Anti-Ballistic Missile (ABM) treaty be amended (and abandoned if need be) to afford the United States the flexibility to meet its national security needs. Bush also supports investing in technology that would "skip a generation" and proposes increasing defense R&D by \$20 million over five years.

V.P. Gore supports a limited national missile defense plan that is technically feasible and cost-effective, and that abides by the ABM treaty. He too endorses investing in revolutionary defense technologies but also supports integrating defense and commercial technologies in order to take advantage of private-sector capabilities. V.P. Gore also proposes increasing the budget for the Defense Advanced Research Projects Agency (DARPA), especially in the area of information technology.

Finally, in the field of agriculture, both candidates are supportive of research into ethanol and other biofuels. They also both advocate research into genetically modified organisms (GMOs) and ensuring an open foreign trade market. Gore, however, states that GMO research should be conducted in parallel with a science-based regulatory review system to protect against adverse impacts to the environment and public health. ●●●

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### FOR MORE INFORMATION:

[www.georgewbush.com](http://www.georgewbush.com)

[www.algore2000.com](http://www.algore2000.com)

## FY 2001 R&D...

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balance increases for DOE's defense R&D activities with sharp cuts in nondefense energy-related R&D activities and stagnant funding for science activities.

President Clinton has threatened to veto nearly all of the domestic appropriations bills in either the House or Senate form, or both, and appears ready to wield his veto pen unless Congress brings funding closer to his requested levels. In an August 21 letter to Speaker of the House J. Dennis Hastert (R-IL), White House Chief of Staff John Podesta challenged Congress to pro-

vide more funding for domestic programs. "We look forward to working with you to fund key priorities of importance to the American people," he wrote, "including initiatives to fight crime, protect the environment, improve health care, enhance medical and scientific research, and strengthen public education."

With new budget projections calling for ever-higher budget surpluses in the years ahead and a strong desire to complete appropriations in time to adjourn well before the November elections, it will be hard for

Congress to resist giving the president everything he wants. It seems possible, then, that FY 2001 could be a good year not only for DOD and NIH, but for the broad portfolio of federal R&D programs. ●●●

*Kei Koizumi, director of the AAAS R&D Budget and Policy Program, contributed to this article.*

### FOR MORE INFORMATION:

AAAS R&D Website:

[www.aaas.org/spp/R&D](http://www.aaas.org/spp/R&D)

### House and Senate Action on R&D in the FY 2001 Budget (as of August 1, 2000; budget authority in millions of dollars)

	FY 2000 Estimate	Action by House			Action by Senate		
		FY 2001 House	Chg. from FY 2000 Amount	Percent	FY 2001 Senate	Chg. from FY 2000 Amount	Percent
Defense (military) *	39,282	<b>41,936</b>	2,654	6.8%	<b>41,936</b>	2,654	6.8%
("S&T" 6.1,6.2,6.3 + Medical) *	8,667	<b>9,383</b>	716	8.3%	<b>9,383</b>	716	8.3%
(All Other DOD R&D) *	30,615	<b>32,553</b>	1,938	6.3%	<b>32,553</b>	1,938	6.3%
National Aeronautics & Space Admin.**	9,777	<b>9,680</b>	-97	-1.0%			
Energy	7,117	<b>7,168</b>	51	0.7%	<b>7,554</b>	437	6.1%
Health and Human Services	18,082	<b>19,153</b>	1,071	5.9%	<b>20,777</b>	2,695	14.9%
(National Institutes of Health)	17,102	<b>18,152</b>	1,050	6.1%	<b>19,729</b>	2,627	15.4%
National Science Foundation **	2,863	<b>2,974</b>	111	3.9%			
Agriculture	1,763	<b>1,727</b>	-36	-2.0%	<b>1,886</b>	123	7.0%
Interior	573	<b>549</b>	-23	-4.1%	<b>571</b>	-2	-0.3%
Transportation	606	<b>694</b>	87	14.4%	<b>686</b>	79	13.1%
Environmental Protection Agency **	647	<b>649</b>	3	0.4%			
Commerce	1,073	<b>816</b>	-257	-24.0%	<b>1,044</b>	-29	-2.7%
(NOAA)	591	<b>522</b>	-69	-11.8%	<b>606</b>	15	2.5%
(NIST)	458	<b>270</b>	-188	-41.0%	<b>414</b>	-44	-9.6%
Education	233	<b>235</b>	2	1.1%	<b>257</b>	24	10.4%
Agency for Int'l Development	122	<b>130</b>	8	6.7%	<b>144</b>	22	18.0%
Department of Veterans Affairs **	655	<b>685</b>	30	4.6%			
Nuclear Regulatory Commission	53	<b>53</b>	0	0.0%	<b>53</b>	0	0.0%
Smithsonian	113	<b>116</b>	3	2.7%	<b>119</b>	6	5.7%
All Other	376	<b>325</b>	-51	-13.7%	<b>327</b>	-49	-13.1%
<b>Total R&amp;D **</b>	83,334	<b>86,890</b>	3,555	4.3%			
Defense R&D	42,583	<b>45,395</b>	2,812	6.6%	<b>45,527</b>	2,944	6.9%
Nondefense R&D **	40,751	<b>41,495</b>	743	1.8%			
Nondefense R&D minus NIH**	23,650	<b>23,343</b>	-306	-1.3%			

AAAS estimates of R&D in FY 2001 appropriations bills. Includes conduct of R&D and R&D facilities. All figures are rounded to the nearest million. All appropriations (except DOD) are subject to change on the Senate floor or in House-Senate conference.

\* FY 2001 House and Senate figures are based on the Defense House-Senate conference report, and are final.

\*\* The Senate has not drafted appropriations for NSF, NASA, EPA, and VA. Totals excluded from Senate column.

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## Heard off the Hill

**Noisy Wrappers** • Ever try to open a candy wrapper quietly? According to one scientist, it's impossible. New research on crumpled sheets of thin plastic has shown

that those disruptive crackling sounds are composed of many very brief clicks lasting just a few thousandths of a second each. Clicks are caused by microscopic shifts around ridges in the plastic—a little like miniature earthquakes. If the plastic is uncrumpled slowly, the clicks slow down, but they never go away, making it impossible to unfold a wrapper noiselessly. The new finding may help materials scientists develop a non-crackling wrapper.

---> *Nature Science Update, May 26, 2000*

**Lima Beans** • The age-old complaint about being forced to eat lima beans gives kids something in common with, of all things, the two-spotted spider mite. Lima bean leaves repel such mites by releasing several chemical compounds that produce an unpleasant odor. Remarkably, the plants only release the chemicals when mites attack, and their release induces neighboring plants to do likewise, thus arming themselves in advance. Now, scientists have identified these chemicals and have figured out how fellow plants respond to them. They hope to use this knowledge to gain new insights into plant defense mechanisms and eventually to create vaccines or pesticides.

---> *The Washington Post, August 3, 2000*

**Sweet Dreams** • Feeling forgetful lately? Can't remember how to use that new computer program? Perhaps you're not getting enough sleep. New research shows that dreams are not just expressions of subconscious desires—they also help our memories. Sleep deprivation is known to cause memory problems in both humans and other animals, and now a team of Belgian scientists has taken this research a step further. They examined the brain activity of seven subjects while learning a new computerized task and then while sleeping, and found similar patterns. This indicates that sleeping reinforced the lessons learned. The body, in other words, puts a great deal of energy into learning, even while asleep.

---> *Science, July 28, 2000*

**Microbubbles** • Thanks to modern medicine, a fit of blood-boiling rage is no longer required to introduce bubbles into the bloodstream. Tiny microbubbles are injected into the blood in order to enhance the quality of ultrasound images of the heart. Such images are formed by analyzing sound waves bounced off the heart, and bubbles reflect sound very well. However, scientists at the University of Arizona have discovered a new application of microbubbles: dissolving blood clots. By injecting bubbles into a rabbit's blood vessel and aiming ultrasound at it, researchers caused the bubbles to pop and carry away a clot bit by bit. Also on the horizon are techniques for using microbubbles to deliver drugs or genes.

---> *American Institute of Physics, June 2, 2000*