

Civilian R&D Sees Only Modest Increases as FY 2004 Funding Flows to Defense, Homeland Security

Doubling the NSF budget in five years remains just a hope. Efforts by the science community to boost funding for the US Department of Energy's Office of Science generated enthusiasm, but little money.

Defeating terrorism and "protecting the homeland" continue to be the focus of the federal budget in fiscal year 2004, with Congress essentially approving a Bush administration budget that is heavily weighted toward defense and security. While the budget includes \$127 billion in research and development funding—a \$10 billion increase over last year and a record for federal R&D spending—it doesn't change the stagnant state of government funding for much of civilian science.

About 93% of the federal R&D funding increase is going to only three agencies: the Department of Defense, the Department of Homeland Security, and the National Institutes of Health. And of that 93%, some 80% is going to the DOD, primarily to fund the development of new weapons systems. The NIH increase is mainly for biodefense research.

There is a caveat to the budget numbers, however; Congress has failed for the second year in a row to complete the federal budget by the 1 October beginning of the fiscal year. The final vote on the FY 2004 budget wasn't expected until late January, when the Senate was to vote on an omnibus bill that contains seven appropriations bills. Six other appropriations bills have already been signed into law, but the omnibus budget bill would implement a cut in all non-DOD funding of 0.59%. The R&D numbers cited in this story, based on an American Association for the Advancement of Science analysis, come from the omnibus bill and the six bills already passed.

Although defense and security R&D do well in the FY 2004 budget, funding for nondefense science programs gets modest increases at best. Excluding the increases that doubled the NIH budget over the past five years, AAAS budget analysts conclude that "all other nondefense R&D funding agencies collectively have seen their budgets remain flat for

more than a decade, even as the US economy, the federal budget, and the US population have boomed. . . . Recent increases in nondefense R&D have served only to recover the lost ground of the mid-1990s when discretionary spending declined in the push to balance the federal budget."

On 4 February, just a week or so after the expected passage of the FY 2004 budget, President Bush is to announce the FY 2005 budget. White House budget officials have indicated that, given the projected \$450 billion federal deficit this year, the FY 2005 budget will sharply curtail domestic spending.

Details on FY 2005 science spending are not yet available, but officials said they will keep NIH funding increases to less than 3% and will reduce biomedical spending. At the same time, the administration is formulating plans to begin an intense and expensive R&D effort aimed at establishing a permanent settlement on the Moon and eventually sending humans to Mars. But before the Moon and Mars proposals reach Capitol Hill, the Senate will complete the more down-to-Earth FY 2004 budget, with the following agency highlights.

National Science Foundation. The NSF budget will increase 5%, or about \$270 million, for FY 2004. That is more than the 3.2% the administration requested in its FY 2004 budget proposal, but well short of the amount needed to meet the recommendation in an NSF authorization bill signed by Bush in December 2002. That bill authorized a total NSF budget of \$6.6 billion—a billion more than the \$5.6 billion in the final 2004 budget. The goal of the authorization bill was to double the NSF budget by 2007 through 15%-a-year increases.

Department of Homeland Security. DHS, the new player in science R&D funding, is bringing a lot of money to the table. The DHS R&D funding will increase by a whopping 56%, or \$375 million, to \$1 billion. The

new Directorate of Science and Technology will have \$869 million for R&D, a 67% increase over last year. Of that amount, some \$70 million is for university research programs and \$60 million is for R&D on antimissile systems for commercial aircraft. About \$126 million of the S&T budget is designated for nuclear and radiological countermeasures, but some \$7 million of that is for management and administration costs.

Congress also approved \$5.6 billion in DHS spending over 10 years for Project Bioshield, a non-R&D program to procure defense systems against biological attacks. About \$890 million in bioshield funding is in the FY 2004 budget.

Department of Energy. DOE has an R&D budget of \$8.7 billion, a \$506 million, or 6.1%, increase over the last fiscal year. DOE's Office of Science will receive \$3.2 billion for R&D, an increase of 3.8%, or \$116 million. The administration had requested a cut in funds for the office. The increase includes funding added by Congress as earmarks, or designated money, for high-performance computing research, domestic fusion research, and more than 90 other projects.

The Office of Science recently unveiled a 20-year priority list for developing 28 major research facilities, a plan that requires a 60% increase in the office's budget over the next five years (see PHYSICS TODAY, January 2004, page 23). The FY 2006 budget is expected to be the gauge of the administration's commitment to that plan.

Congressional awareness of the DOE's Office of Science has grown in recent years, thanks in part to an ongoing educational effort on Capitol Hill by the American Physical Society and several other scientific organizations. At an October meeting of a DOE advisory committee, Office of Science Director Ray Orbach said the attitude toward his office has never been more positive and that "there was a real understanding of science at all levels" of government. That understanding, however, hasn't yet translated into significant funding increases for his office.

FY 2004 Federal R&D Programs

	FY 2003 estimate	FY 2004 request (millions of dollars)*	FY 2004 conference	Percent gain (loss)
National Science Foundation				
Total R&D	3927	4035	4113	4.7
Total research and related activities (R&RA)	4056	4106	4251	4.8
Mathematical and physical sciences	1035	1061	1093	5.7
Engineering	531	537	558	5.1
Biological science	571	562	589	3.0
Geosciences	684	688	715	4.4
Computer and information science and engineering	579	584	606	4.7
Social, behavioral, and economic sciences	191	212	204	6.7
US polar programs	319	330	343	7.4
Integrated activities	147	132	144	-1.9
Major research equipment	149	202	155	4.3
Education and human resources programs	136	137	137	0.6
(Less non-R&D funding in R&RA)†	-415	-411	-431	3.9
Department of Homeland Security				
Total R&D	669	907	1044	56.0
Science and technology	521	803	869	66.8
Biological countermeasures	—	365	197	—
Nuclear and radiological countermeasures	—	137	126	—
Chemical countermeasures	—	55	52	—
High explosives countermeasures	—	10	9	—
Threat and vulnerability assessments	—	90	93	—
Conventional missions	—	55	34	—
Rapid prototyping	—	30	75	—
Standards: state and local	—	25	39	—
Emerging threats	—	22	21	—
Critical infrastructure protection	—	5	66	—
University programs	—	10	70	—
Countermeasures center‡	—	0	87	—
Department of Energy				
Total R&D	8225	8535	8731	6.1
Total science	3075	3066	3190	3.8
High-energy physics	722	738	734	1.6
Nuclear physics	382	389	390	2.0
Fusion energy sciences	248	257	263	5.7
Basic energy sciences	1023	1009	1011	-1.2
Spallation Neutron Source	225	143	142	-36.8
Advanced scientific computing research	172	173	204	19.1
Biological and environmental research	527	500	590	12.0
Energy research analyses	1	0	0	-100.0
National Nuclear Security Administration (NNSA) R&D	3752	4084	4031	7.5
Weapons activities	2922	3256	3183	8.9
Stockpile R&D	467	433	410	-12.2
Science campaigns	255	270	249	-2.5
Advanced simulation and computing	704	751	721	2.4
Inertial confinement fusion	504	467	514	2.0
National Ignition Facility construction	214	150	149	-30.3
All other weapons activities R&D	777	1186	1139	46.7
Nonproliferation and verification R&D	212	196	223	5.2
NASA				
Total R&D	10 999	11 025	10 958	-0.4
Total science, aeronautics, and exploration (SAE)	7455	7661	7883	5.7
Space science	3557	4007	3973	11.7
Earth science	1689	1552	1607	-4.9
Biological and physical research	935	973	990	5.9
Aerospace technology	1049	959	1085	3.5
Academic programs	226	170	227	0.8
International Space Station	1841	1707	1497	-18.7
Department of Defense				
Total basic research (6.1)	1417	1309	1404	-0.9
Total applied research (6.2)	4289	3670	4445	3.6
Total R&D Test and Evaluation (RDT&E)	57 536	61 827	64 909	12.8
Army	7516	9123	10 310	37.2
Navy	13 597	14 107	14 969	10.1
Air Force	18 763	20 336	20 366	8.5
Defense agencies	17 424	17 974	18 961	8.8
Defense Advanced Research Projects Agency (DARPA)	2690	2954	2834	5.4
Missile Defense Agency	6682	7729	7630	14.2
Chemical and Biological Defense Program	634	599	684	7.9
Defense Threat Reduction Agency	406	382	412	1.4
Other	7012	6311	7402	5.6
Director of operational test and evaluation	237	287	303	28.0
Department of Commerce				
Total NOAA R&D	684	675	724	5.8
Total NIST R&D	527	410	506	-3.9
Scientific and technical research	308	330	291	-5.7
Advanced Technology Program R&D	153	10	152	-0.9
Construction	66	70	64	-2.7

*The omnibus bill hadn't passed when PHYSICS TODAY went to press. Numbers are AAAS estimates based on Congressional conference reports.

†Non-R&D funding figures within R&RA based on VA-HUD appropriations bill report language.

‡Construction costs for the National Biodefense Analysis and Countermeasures Center in Fort Detrick, MD.

NASA. The budget for the space agency remains flat, at \$15.4 billion, the same as in FY 2003. With recovery from the space shuttle Columbia disaster still NASA's top priority, the agency's R&D funding will decline 0.4%. But much of that drop is due to a 19% decline, to \$1.5 billion, in funding for the International Space Station. Once the shuttle is flying again, space station funding is expected to increase.

NASA's unmanned space flight R&D programs in the science, aeronautics, and exploration division will increase 5.7% over FY 2003, to \$7.9 billion. Space science programs will go up to \$4 billion, a 12% increase, while biological and physical research will increase by 6% to \$990 million. Space agency observers have expressed concern that a few hundred million dollars NASA had requested were cut and replaced with earmarked projects favored by legislators. NASA had asked for the monies to support the space station, the development of a next-generation spacecraft, and a nuclear propulsion system for spacecraft.

Department of Defense. R&D programs in the DOD will receive a 13%, or \$7.6 billion, increase over last year. Although overall R&D is up, funding for basic research, called "6.1," will decline 0.9%, or \$13 million, to \$1.4 billion. Applied research, "6.2," will increase 3.6% to \$4.4 billion.

The big money will go to missile defense development, with a 19% increase to \$8.2 billion, and a 27% increase to \$4.3 billion for the Joint Strike Fighter project. The DOD budget is exempt from the across-the-board 0.59% cut imposed by Congress on all other FY 2004 funding.

Department of Commerce. The R&D budget at NIST will fall 3.9% to \$506 million. NIST's Advanced Technology Program, which has been under siege by Republicans for years, survived attempts to eliminate its funding and will receive \$152 million, just 0.9% less than last year. A non-R&D NIST program that helps small technology companies was not as fortunate: The Manufacturing Extension Partnership had its funds cut 63% to \$39 million, which puts the future of the program in doubt.

The National Oceanic and Atmospheric Administration will see its R&D budget increase 5.8% to \$724 million. The increases came at the insistence of Senate conferees after House members and the administration proposed significant cuts at NOAA.

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