

Electrotechnology-Related Research in the FY 2002 Budget

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HIGHLIGHTS

- After a 12 percent increase in FY 2001, Department of Energy (DOE) R&D programs would decrease 4.5 percent to a level of \$7.4 billion (see Table II-11).
- The National Science Foundation (NSF) budget would increase by 1.3 percent or \$56 million over FY 2001 to \$4.5 billion (see Table II-7).
- National Aeronautics and Space Administration (NASA) R&D would increase by a slight 0.4 percent to \$10 billion (see Table II-12).
- The Department of Commerce R&D budget of \$1.1 billion would zero out the Advanced Technology Program (see Table II-14).

INTRODUCTION

The following chapter presents a broad survey of the President's FY 2002 budget request for electrotechnology-related research and development. Electrotechnology-related engineering research involves expanding human understanding of the physical laws that govern electric energy and applying that knowledge to meet social needs, through a wide range of technologies in related fields such as power generation and energy transmission, communications, sensors and controls, lasers and electro-optics, electronics, medical devices, remote sensing, neural

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networks, information technology, computing, and new and emerging fields such as nanotechnology and neural networks.

The federal government supports research and development of electrical, electronics and computing technologies spanning a range of fields including electrical generation and energy efficiency, communication and information technologies, aerospace and satellites, intelligent highway systems, electronic warfare, telemedicine and medical devices.

Due to space constraints, this chapter focuses on the Administration's proposed FY 2002 funding levels for notable electrotechnology R&D programs at the National Science Foundation (NSF), the National Aeronautics and Space Administration (NASA), and the Departments of Commerce, Energy and Defense. The budget figures contained in this analysis are expressed in current dollars and are based on data provided by the federal agencies at the release of the Administration's FY 2002 budget.

DEPARTMENT OF DEFENSE (DOD)

DOD is a major source of funding for electrotechnology-related research, particularly in the areas of command, control, and communications (C3); high-performance computing and networking; avionics and guidance systems; and advanced weapons-related technologies. DOD relies on advanced technologies to provide superior intelligence and force multipliers necessary to ensure rapid military victories with minimal casualties. Electrotechnology research in areas such as cyberterrorism, lasers, fiber optics, satellites, navigation systems, remote sensing, space launch vehicles, and telemedicine has a high degree of commercial relevance to the civilian sector as well. Defense Technology Base funding (*i.e.*, basic and applied research) is also a major source of support for university research and education programs, particularly in electrical engineering, mathematics, and computer sciences.

Note: DOD did not submit a full FY 2002 budget; as of the time of this writing, the DOD is conducting a comprehensive review of defense budget priorities. It is expected to submit a full budget in May or June. Most of the DOD numbers submitted represent a placeholder figure assuming FY 2001 budget figures plus inflation. However, President Bush

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has requested an extra \$2.6 billion of unallocated funding for DOD development, much of which is expected to go towards national missile defense development by the Ballistic Missile Defense Organization (BMDO). (For more information on DOD, please see Chapter 6.)

NATIONAL SCIENCE FOUNDATION (NSF)

After receiving the largest dollar increase in the agency's history (\$529 million, 13.6 percent) in FY 2001, the NSF would receive a substantially smaller increase in the proposed FY 2002 budget, although there is an implied indication of a larger increase in FY 2003. The total request of \$4.5 billion is an increase of \$56.1 million, or 1.3 percent (see Table II-7). FY 2002 funding level for Research and Related Activities (R&RA) is \$3.3 billion, which is 0.5 percent or \$16 million below the FY 2001 level.

Funding in FY 2002 for the Engineering (ENG) Directorate would increase by \$210,000 to a level of \$431 million. ENG supports research in areas including information technology, biotechnology, and microelectronics.

The Mathematical and Physical Sciences (MPS) activity would increase by 1.5 percent to a level of \$863.6 million. This Directorate supports education and research in the physical and mathematical sciences.

The Computer and Information Science and Engineering (CISE) Directorate budget would decrease 1.6 percent to \$470 million, \$155.5 million of which will go to NSF's Information Technology Research priority area. The IT Research work is directed at seeking ways to improve methods of gathering, storing, analyzing, sharing, and displaying information.

The FY 2002 funding level for Major Research Equipment (MRE) would decrease by \$25.0 million (20.8 percent) to a level of \$96.3 million. The NSF maintains that this reduction is due to the fact that funding for many projects is completed and that no new starts are planned.

The budget proposal reports that the Bush Administration will establish a Blue Ribbon Panel to study the idea of transferring NSF's astronomy responsibilities to the National Aeronautics and Space Administration

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(NASA), as part of the Administration's effort to make the government more "results oriented." Currently, NSF funds ground-based astronomy and NASA funds space-based astronomy. (For more information on NSF, please see Chapter 7.)

DEPARTMENT OF ENERGY (DOE)

After a 12 percent increase in FY 2001, DOE's FY 2002 R&D budget would decrease by 4.5 percent to \$7.4 billion (see Table II-11). DOE R&D would take a big hit in the proposed Bush Administration budget. Research in each of the Offices would decrease, with the exception of Atomic Energy Defense, which would increase by a slight 1.2 percent.

Energy Supply R&D would decrease by a substantial 30.5 percent to a level of \$284 million. R&D in the Renewable Energy Resources account would decrease by 30.8 percent to a level of \$227 million, and R&D in Nuclear Energy would be cut 29.4 percent to \$57 million.

Funding for R&D in the Office of Science account would decrease slightly (0.8 percent) to a level of \$2.9 billion. Within the account, High-Energy Physics would get a slight increase of 0.6 percent to a level of \$706 million. Included in this account is the Large Hadron Collider, which would be cut by 16.8 percent to \$49 million. Nuclear Physics would remain level at \$355 million; Fusion Energy Sciences would remain constant at \$245 million; Basic Energy Sciences (BES) would increase by a slight 1.3 percent to \$997 million. Advanced Scientific Computing Research (ASCR) would decrease by 1.6 percent to \$163 million, while Biological and Environmental Research (BER) would be cut 8.2 percent, to \$442 million.

R&D in the Fossil Energy account would be cut by 25.3 percent to a level of \$296 million. A new program added to the Fossil Energy R&D account this year is the Clean Coal Power Initiative, for which \$150 million has been requested.

Energy Conservation R&D would decrease by 28.3 percent to a level of \$316 million. R&D in Atomic Energy Defense Activities would increase by 1.2 percent, to \$3.5 billion, and Radioactive Waste Management R&D

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would fall by 29.9 percent, to \$31 million. (For more information on DOE, please see Chapter 9.)

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

NASA's R&D budget would increase by 0.4 percent, or \$41 million, to \$10.0 billion in FY 2002 in the Bush Administration budget proposal (see Table II-12). In an effort to begin the transition to a full-cost budget, beginning with the FY 2002 budget request NASA will implement a two-appropriation budget (excluding the Inspector General account) which will be divided into the Human Space Flight (HSF) and Science, Aeronautics & Technology (SAT) accounts. The Mission Support account will be eliminated and an "Institutional Support" budget line will be added to each Enterprise separately. The Space Operations Enterprise will be transferred from the SAT account to the HSF account.

The FY 2002 budget request includes \$5.6 billion for Human Space Flight, a \$133 million increase over FY 2001. With \$1.7 billion added on for Institutional Support and other functions from the Mission Support and SAT accounts, the total funding request for HSF is \$7.3 billion. Science, Aeronautics and Technology would decrease by \$14.4 million under the old account structure. With Institutional Support and other functions added on, the total request for SAT is \$7.2 billion (up 1.8 percent). \$23.7 million is requested for the Inspector General account.

Within the Human Space Flight account, the International Space Station would decline by 1.2 percent to \$2.1 billion; the Space Shuttle program would see a \$164.5 million increase to \$3.3 billion. Total R&D within the HSF account would be cut by 2.6 percent, to \$2.8 billion.

In SAT, the Biological and Physical Research programs, which focus on basic and applied research, would decline by 4.7 percent to \$361 million. Aerospace Technology would increase by 7.3 percent to \$2.4 billion. Space Science would increase by 6.2 percent to \$2.8 billion.

The Aero-Space Technology budget would also establish five university-based Research, Education, and Training Institutes (RETIs) designed to strengthen NASA's ties to the academic community. (For more information on NASA, please see Chapter 10.)

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DEPARTMENT OF COMMERCE (DOC)

The FY 2002 Department of Commerce R&D budget request in the Bush Administration proposal would decline by 7.6 percent, or \$91 million, to \$1.1 billion (see Table II-14).

R&D in the National Institute of Standards and Technology (NIST) would undergo a 25.7 percent decrease of \$108 million to a level of \$313 million. Within that account is the Scientific and Technical Research and Services (STRS), which includes research in Electronics and Electrical Engineering, Chemical Science & Technology, Physics, Materials, and Computer Science, among other disciplines. STRS R&D would increase by 8.9 percent, or \$24 million, to \$292 million.

The NIST account also includes the Advanced Technology Program (ATP), which would be zeroed out in the Bush Administration budget until a study can be completed that will determine the future of the program. (For more information on NIST, please see Chapter 12.)

DOC's FY 2002 budget request also includes \$772 million for research and development at the National Oceanic and Atmospheric Administration (NOAA), a \$47 million increase. (For more information on NOAA, please see Chapters 15 and 16.)