

Electrotechnology-Related Research in the FY 2001 Budget

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HIGHLIGHTS

- The National Science Foundation (NSF) research budget would increase by 19.3 percent over FY 2000 to \$3.5 billion. The proposed increase is primarily targeted at information and nanotechnology research activities.
- The Department of Energy (DOE) budget would total \$18.9 billion in FY 2001. DOE would direct a total of \$765 million for energy supply research programs. The Office of Energy Efficiency and Renewable Energy's budget would increase by 32 percent to \$409.5 million for programs to address electric grid reliability technologies and support the Climate Change Technology Initiative.
- National Aeronautics and Space Administration (NASA) R&D programs would increase 2.7 percent over FY 2000 to \$10.0 billion in FY 2001. For the first time in several years, the Aero-Space Technology program would increase by 6.1 percent to \$1.2 billion with a significant boost for development work on the reusable launch vehicle.
- Department of Defense (DOD) Research, Development, Testing, and Evaluation (RDT&E) would decline by 1.3 percent to \$37.9 billion for FY 2001. The sharpest cuts are proposed in "6.1" and "6.2" funding for a total reduction of \$210 million. However, DOD would provide over \$1 billion for RDT&E,

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Operations and Maintenance, and Procurement activities to counter cyber threats and information systems.

INTRODUCTION

This chapter represents a broad survey of the President's FY2001 budget request for electrotechnology-related research and development. The federal government invests in a wide range of R&D activities including electric power, electronics, energy efficiency, communication and information technologies, aerospace, intelligent highway systems, information technology, tele-medicine, and medical devices.

This chapter has been prepared primarily on the basis of the budget figures provided by the federal departments and agencies on or after the release of the President's budget on February 7. Due to time and space constraints, the summary focuses on the Administration's proposed FY 2001 funding levels for notable electrotechnology R&D programs at the Departments of Defense (DOD), Energy (DOE), Commerce (DOC), Transportation (DOT), the National Science Foundation (NSF), and the National Aeronautics and Space Administration (NASA).

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 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, 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.

DOD has stated its concern on providing sufficient resources for ongoing operations and military compensation in addition to maintaining a high

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degree of readiness, and this concern is reflected in the budget proposal for FY 2001. DOD has proposed a slight decrease in total R&D for FY 2001, and its five-year plan projects decreased funding through FY 2005. In FY 2001, total DOD R&D funding would be \$37.9 billion. Funding for basic research in the "6.1" account would increase by \$56 million over FY 2000. However, severe cuts are proposed in the "6.2" applied research activities (down \$266 million) and "6.3" advanced development activities (down \$644 million; see Table II-2).

The Next Generation Internet program would be reduced by over 50 percent to \$15 million, while Computing Systems and Communications Technology would increase by \$56 million. However, Advanced Electronics Technologies would be reduced by \$61 million. High Performance Computing Modernization would stay flat and C3 would be reduced approximately 15 percent from FY 2000 to \$128 million.

The Department of the Army would reduce funding for overall Science and Technology programs by \$385 million. Electronics and Electronic Devices would be funded at \$24 million, a decrease of 33 percent from FY 2000. C3 Advanced Technology applied research would be reduced 16 percent to \$22 million while C3 Technology basic research activities would increase and Advanced Tactical Computer Science and Sensor Technology would be reduced by 46 percent. Sensors and Electronic Survivability activities would decrease by 15 percent.

The Department of the Navy would decrease its total S&T activity by \$287 million. While its basic research funding would increase by \$23 million, "6.2" and "6.3" activities would decrease a total of \$310 million. C3IS would be reduced by \$11 million, or a 12 percent reduction. Materials, Electronics, and Computer Technology Activity would be reduced by 26 percent to \$68 million and Electronic Warfare Technology would be reduced by 30.5 percent to \$26 million. The Surface Ship and Submarine Hull, Mechanical and Electric program would be reduced 51 percent to \$37 million for activities including the development of an electromagnetic propulsion system and advanced electrical systems.

The Department of the Air Force's overall S&T funding would decrease by \$97 million from FY 2000. A new line item for Directed Energy Technology would be funded at \$32 million and the C3 program would be

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increased by 51.5 percent to \$79 million. Electronic Combat technology would be reduced to \$26 million from \$32 million. Also, a rather popular program last year, the Space-Based Laser, would see its budget reduced by \$10 million.

NATIONAL SCIENCE FOUNDATION (NSF)

NSF would receive its largest increase in history with a proposed budget 17.3 percent greater than FY 2000. The total request for \$4.6 billion would be primarily directed to achieving breakthroughs in the areas of nanotechnology and information technology research. The proposed increase appears to be an effort by the administration to achieve a more balanced federal research portfolio. The R&D portion of NSF's budget would increase nearly 20 percent.

NSF serves as the lead agency for the federal government on the Information Technology R&D initiative. The work is being directed at creating advances in software, high-end computing, wireless computing and remote sensing. The proposed increase for these activities would be 159 percent above the FY 2000 request. (For more information on IT R&D, please see Chapter 24.) The NSF budget would also provide an increase of 122 percent for activities in the nanotechnology science and engineering fields.

The FY 2001 request for NSF Engineering activities totals \$456.5 million, a 19.6 percent increase over FY 2000 (see Table II-7). The Engineering Directorate supports research in areas including information technology, nanotechnology, biotechnology, and microelectronics.

DEPARTMENT OF ENERGY (DOE)

DOE non-defense activities would receive an 11 percent increase over FY 2000. The request for Basic Energy Sciences programs would increase 30 percent to \$1 billion, but almost 25 percent of this request would be directed toward construction activities of the Spallation Neutron Source. DOE would also direct substantial resources totaling \$182 million for Advanced Scientific Computing Research.

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Magnetic Fusion activities, primarily carried out at Princeton Plasma Physics Lab, would receive \$247 million to support research at the Spherical Torus Experiment. \$36 million would be directed to a public-private partnership to develop policies and technologies to help protect and improve reliability of the electric grid system as the industry and markets move towards restructuring.

The Office of Energy Efficiency and Renewable Energy programs would receive \$1.3 billion for programs that include the Partnership for a New Generation of Vehicles, Building Research, and Standards. The Office of Energy Supply research on Electric Energy Systems and Storage technologies would increase by 27 percent to \$48 million. Total nuclear energy R&D would receive a slight increase to \$92 million.

NATIONAL AERONAUTICS AND SPACE ADMINISTRATION (NASA)

NASA's R&D budget would increase 2.7 percent to \$10.0 billion (see Table II-12). NASA would focus a large portion of its resources on similar areas as other agencies' portfolios, including biotechnology, nanotechnology, and information technology. Overall Science, Aeronautics and Technology funding would increase 6.2 percent with notable changes to the Life and Microgravity Sciences and Applications, which would increase by 10.1 percent to \$302 million. Space Science would also increase almost 10 percent to a funding level of \$2.4 billion. However, Earth Science would be reduced by 2.6 percent. The Engineering and Technical Base (ETB) within the Office of Space Flight would receive \$73 million. ETB funds would be used to: maintain the Centers' technical competence and ability to perform research; perform analysis and testing tasks; solve present problems; and reduce costs in developing programs, technologies, and materials.

The President's budget would support two major initiatives in Space Science. The first would be an enhanced Solar System Exploration program to establish a sustained presence at multiple locations on and around Mars and other potential research targets. The second would be the "Living With a Star" Initiative to develop better solar weather forecasting capabilities and to better protect high-tech infrastructure from dangerous events like solar flares (see Chapter 16 for more information on this initiative).

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DEPARTMENT OF COMMERCE (DOC)

In FY 2001, the National Institute of Standards and Technology (NIST) R&D activities would receive a 9.4 percent increase to \$501 million. DOC would focus its attention and resources on: establishing the Institute for Information Infrastructure Protection (IIIP) with \$50 million to support research and technology to protect the IT infrastructure from attack; expediting the transition to electronic commerce with \$14 million in new funds; expanding the technology horizon by exploiting the use of nanotechnology; increasing funding for the Advanced Technology Program (ATP) and several other initiatives with total funding of \$46.6 million; and strengthening the science and technology infrastructure with \$15.9 million.

The NIST request would provide \$332 million for the Measurement and Standards Laboratories for a 20 percent increase over the FY 2000 level. It would also provide \$290 million for outreach programs conducted by the ATP and the Manufacturing Extension Partnership Program that would represent an 18 percent increase over FY 2000.

DEPARTMENT OF TRANSPORTATION (DOT)

DOT would increase its funding for R&D activities by 28.3 percent to \$778 million (see Table II-15). However, much of the increase would be based on congressional approval of a diversion of transportation tax revenues, which the Congress rejected last year. The request would provide \$338 million for their Intelligent Transportation Systems initiative that would reflect an increase of 83 percent above FY 2000. This line would include \$238 million to accelerate rural, regional and commercial motor vehicle deployment; and \$100 million for ITS standards, research, operational tests, and development.

The Federal Aviation Administration's Research, Engineering, and Development programs would receive a total of \$184 million or an 18 percent increase over FY 2000. \$49 million would be directed at research in aircraft structure and materials and \$49 million would go to explosive detection and other security research.