

R&D Budget Watchers Urge Caution Over Optimistic FY99 Proposal

On paper, the Clinton Administration's proposed FY 1999 budget appears to be the strongest in years regarding federally supported research and development (R&D), and, if enacted, the nondefense portion of \$37.8 billion will be the biggest in history. The proposal requests increased funding across a broad spectrum of programs, and backs several new projects.

The National Science Foundation proposes an additional \$13.4 million, or 7.2%,

over last year's proposal for its materials research programs. This figure includes \$9.12 million more, or 10.2%, for the agency's Materials Research Support Project; \$1.98 million more, or 5.1%, for its National Facilities and Instrumentation programs; and \$2.33 million more, or 4.0%, for Materials Research Science and Engineering Centers. The latter amount actually represents a larger increase, according to Thomas Weber, the agency's Division Director for Materials Research, because NSF will be phasing out several of its Science and Technology Centers next year.

Other increases in NSF funding with materials impact include \$78 million more for the knowledge and distributed intelligence initiative, an agency-wide effort, part of which will provide tools for remotely accessing information, for extracting knowledge from major databases, and for computer simulations of material; and \$88 million more for Life and Earth's Environment, part of which will support efforts to create new and more environmentally benign materials.

The Department of Energy FY 1999 proposed budget includes \$135 million in new funding to begin construction of the Spallation Neutron Source. The amount will cover the beginning of the detailed design phase. Otherwise, the department plans to maintain current funding levels at all its advanced research facilities.

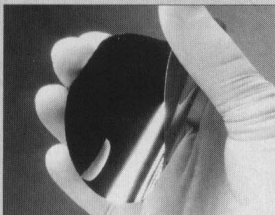
A great deal of the government's proposed nondefense research effort resides in the newly conceived Research Fund for America, proposed at \$31 billion for FY 1999 and growing to \$38 billion by FY 2003. Many well-established R&D efforts are lumped under the RFA, including all National Institute of Standards and Technology programs. The NIST request for next year is \$715 million, up \$32 million from FY 1998. Funding for the agency's Advanced Technology Program would be \$260 million next year, up \$67 million from FY 1998. Its Manufacturing Extension Partnership would decline by about \$8 million, to \$107 million, reflecting a lower federal share of the operating costs of MEP centers. NIST's Measurement and Standards Laboratories funding would increase by \$17 million, to \$286 million.

Other budget items with potential materials impact include the Department of Defense's Dual Use Applications Program, up \$38 million in FY 1999, to \$158 million and DoD's Advanced Concept Technology Demonstrations, up \$39 million, to \$116 million; the interagency Partnership for a New Generation of Vehicles, up \$50 million, to \$277 million; and the National Institutes of Health's National Human Genome Research Institute, which is slated for a \$22-million increase in FY 1999, to \$240 million.

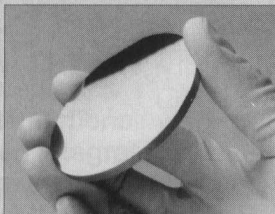
While these figures are high considering that the administration is operating under tight fiscal reins in an attempt to achieve the first balanced budget in 30 years, R&D budget watchers urge caution and noncomplacency. Some of the funding requests must be covered by new revenues, such as with moneys collected from a prospective legal settlement between the federal government and the tobacco companies. The problem is that no such settlement has been approved by

"But still try—for who knows what is possible?"

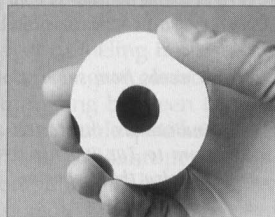
— Michael Faraday



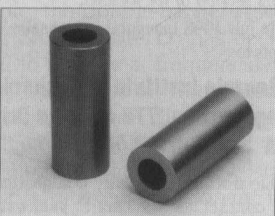
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Congress. According to the American Association for the Advancement of Science budget analyst Kei Koizumi, while adjusting spending caps or cutting expenditures elsewhere—or both—are possible, the new R&D budget seems most closely tied to the tobacco settlement, “which raises questions about whether the money really will be there.”

Jack Crowley of the Washington office of the Massachusetts Institute of Technology said, “This isn’t like four or five years ago, where we were looking at one dark projection after another. The challenge is to avoid the tendency to relax just because we have some good numbers. None of [the funding increases] is written in stone.”

PHIL BERARDELLI

NRC Report Recommends Key Technologies to Support Future Space Missions

A committee of the National Research Council has issued a report, *Space Technology for the New Century*, which states that the National Aeronautics and Space Administration (NASA) should devote funds toward technologies that have the potential to bring many long-term benefits with a relatively small investment. The committee identified six technological areas for which additional research and development, to be conducted through private companies and universities, should be prioritized. According to the report, significant advances could be made in each of these fields with investments of \$3-5 million a year for up to five years.

■ *Tools for Mining Resources from the Moon, Mars, or Other Planets.* Using resources from space would provide an alternative to launching supplies from Earth. For example, oxygen extracted from the moon’s surface could be used to make rocket propellant, which could dramatically cut costs of long-duration missions.

■ *High-Frequency, Wideband Interplanetary Communications Systems.* Systems that use microwave or optical transmissions based on laser technologies would quickly transfer much more data over greater distances than possible with radio frequencies. Robots traveling on other planets could transmit live, high-definition pictures to Earth. While much of the basic technology already exists, more research is needed on reducing weight and power requirements, improving performance over extremely long distances, and developing low-cost, Earth- and space-based receivers.

■ *Microelectromechanical Systems (MEMS).* NASA should pursue MEMS technology for use in spacecraft sensor, communica-

tions, navigation, power, and propulsion systems. These technologies could eventually be adapted to create miniature spacecraft.

■ *Nuclear Power Systems.* Many deep space missions unable to rely on solar power could use advanced nuclear reactors. Work in this area should focus on improving energy-conversion efficiency and developing safer nuclear power sources through new materials and designs.

■ *Radiation-Resistant Computer Memories and Electronics.* To combat the problem of radiation in space that damages sensitive

computers and disrupts signals, research should be conducted for lightweight shielding, protective materials, and data-recovery methods.

■ *Precisely Controlled Antennas, Mirrors, and Other Structures.* These types of large, lightweight structures difficult to control in weightless space environments require giant space radars and telescopes to measure and control the exact positions of these instruments.

To obtain a copy of the report, contact the National Academy Press, 2101 Constitution Ave., NW, Washington, DC 20418; 202-334-3313 or 1-800-624-6242. □

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Merton C. Flemings (Massachusetts Institute of Technology), Chair

The meeting will feed into the U.S. House Science Committee review of national science policy, chaired by Representative Vern Ehlers (R-MI).

Information and registration materials are available from Betsy Houston, FMS Executive Director, at 202-296-9282; fax 202-833-3014; or e-mail betsyhou@ix.netcom.com.

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