Science Budget for '77: Boost for Research

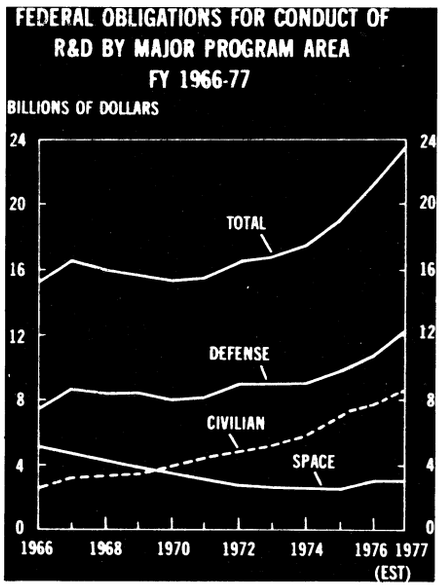
Science fares far better than most activities in the fiscal year 1977 Federal budget issued this week. In an overall Federal budget designated to grow 5.5 percent, proposed Federal obligations for research and development total $24.7 billion, an 11 percent increase over 1976. The 1977 fiscal year starts Oct. 1, 1976.

"I believe the administration has clearly placed a high priority on science and technology," H. Guyford Stever, President Ford's science adviser, said in announcing the R&D budget.

The $24.7 billion figure is composed of $23.5 billion for the conduct of R&D and $1.2 billion for new R&D facilities. Within R&D, basic research gets $2.6 billion (up 11 percent), applied research gets $5.2 billion (up 7 percent) and development gets $15.7 billion (up 11 percent).

Stever pointed out that this is the second consecutive year that the proposed Federal R&D budget will show positive real growth, thus keeping the research dollar ahead of the inflation rate (estimated at 6 percent this year). He expressed pleasure at being back in that situation after several years of shrinking R&D budgets in terms of constant dollars.

The new R&D budget reflects an increased emphasis on energy, defense and basic research, in that order. Energy R&D is slated for a 38 percent increase (see next story), defense R&D, a 13 percent increase and basic research, an 11 percent increase. Basic research obligations are to increase 20 percent at the National Science Foundation, 16 percent at the Defense Department and 12 percent at the Department of Health, Education and Welfare.



Among the major new facilities to receive initial funding in the new budget is a $78 million positron-electron colliding beam unit for basic investigations in high energy physics at the Stanford Linear Accelerator Center. Stever last year had expressed disappointment at the failure to get that facility funded then. The project is scheduled for completion in 1981. Other new facilities are an Aeropropulsion System Test Facility (an aircraft engine test complex) to be built at the Arnold Engineering Development Center in Tullahoma, Tenn., a new transonic wind tunnel at the NASA Langley Research Center and three commercial-scale plants to demonstrate the conversion of coal to gas and liquid fuel.

Federal R&D obligations to colleges and universities are scheduled to rise 9 percent to $2.635 billion, compared with a subinflation rise of only 5 percent in last year's budget.

The top-ranking agency in support of basic research, NSF, is scheduled for a record-high budget of $812 million, 11 percent above the current year. Stever, also director of NSF, said the program "represents a major effort on behalf of the administration to bolster science." One specific aim, he said, is "to counteract the gradual decrease of Federal support for basic research, which has declined about 23 percent in terms of constant dollars since 1968." At NSF, funds for its three main science components (mathematical, physical sciences and engineering; astronomical, atmospheric, earth and ocean sciences; and biological, behavioral and social sciences) are up an aggregate of 18 percent. Included are such increases as 43 percent for astronomy project support, 25 percent for computer sciences and 38 percent for earth sciences project support. Funds for NSF's climate dynamics program are more than doubling, a consequence, as Stever puts it, of "the tremendous amount" of pressure and interest in this field of research.

An $8.7 million drop is suffered by NSF's once-much-ballyhooed RANN (Research Applied to National Needs) program, partly due to a further phase down and shift of responsibility for energy and some environmental research to ERDA.

Defense R&D, the biggest slice of the R&D pie (51 percent), will direct major funding to the start of advanced development of both the air-launched and sea-launched low-flying cruise missiles. It also includes continuation of a number of major programs for the improvement of ballistic missile warheads and systems.□

CONDUCT OF R&D (MILLIONS)

DEPARTMENT OR AGENCY	OBLIGATIONS 1976 estimate	OBLIGATIONS 1977 estimate
Defense—Military functions	9,879	11,198
National Aeronautics and Space Administration	3,473	3,573
Energy Research and Development Administration	2,812	3,282
Health, Education and Welfare	2,369	2,570
National Science Foundation	628	726
Agriculture	483	507
Transportation	340	319
Interior	332	316
Environmental Protection Agency	305	241
Commerce	247	243
Veterans Administration	108	106
Nuclear Regulatory Commission	97	109
Housing and Urban Development	62	70
Justice	65	41
All other	138	164
Total	**21,338**	**23,465**
Total, conduct of research	**7,150**	**7,782**
Total, conduct of development	**14,188**	**15,683**

Energy: Receiving the lion's share

Among the major civilian research and development programs, the highest priority in next year's budget will be energy—rising a whopping 38 percent in direct funding authority, from $1.9 billion in fiscal year 1976 to $2.6 billion in 1977. Following more than a year of program shifting among Government agencies, 90 percent of the total energy budget authority now resides in the Energy Research and Development Administration (ERDA).

The Government's proposed priorities are clear: By far the largest item in the energy R&D budget is fission power, with $1.25 billion. Of this, fully $655 million will go to the breeder reactor, an increase of some 35 percent. This increase reflects, in part, the escalating costs of the demonstration breeder to be built at Clinch River, Tenn. (SN: 1/17/76, p. 44). ERDA officials told a press briefing this week that

FEDERAL DIRECT ENERGY R&D ACTIVITIES FOR 1977 (MILLIONS)

	BUDGET AUTHORITY 1976	BUDGET AUTHORITY 1977
Direct Energy R&D:	1897	2610
Non-Nuclear R&D;	791	968
Fossil	468	542
Solar	120	160
Geothermal	34	50
Conservation	82	120
Environmental control	87	96
Nuclear R&D:	1106	1642
Fission	856	1250
Fusion	250	392
Supporting R&D:	584	624
Environmental effects	250	257
Basic research	334	367

the plant is now expected to cost $1.9 billion (up another 12 percent) and that the earliest it can be completed is 1983.

Substantial increases are also planned for improving nuclear waste management, fuel reprocessing and safeguards (up 73 percent overall), and for energy conservation (up 46 percent). A revised estimate of what will be needed to achieve energy independence by 1985 is being prepared by ERDA, and conservation is expected to substantially lower the energy demand projections. The administration is still pressing for creation of an Energy Independence Authority to loan money to private industry to commercialize experimentally developed products that might help achieve energy independence (SN: 10/18/75, p. 244).

Congress is expected to react somewhat skeptically to this proposal, as well as to the relatively modest increase in solar energy funding, up 34 percent to $160 million. Solar funding doubled entering the present fiscal year and many Congressmen are reported ready to increase it substantially again, making it more on a par with other projects.

The largest nonnuclear R&D program involves making coal more environmentally acceptable. Some $409 million is being authorized for coal research, including $107 million for building demonstration plants—more than double last year's funding. Research on exploiting fossil fuels in-situ is scheduled to rise nearly 50 percent, to $31 million.

In fusion research, rapid acceleration of magnetic reactor projects accounts for the largest share of a 56 percent increase to $392 million. Laser fusion shares $101 million of that total. The Tokamak Fusion Test Reactor began construction during the present fiscal year.

In his State of the Union message, President Ford emphasized the importance of energy research, conservation and development of domestic resources. Foreign oil, he said, is costing each American $125 a year, and he tied conservation of energy to revitalization of the nation's railroads and urban transportation. □

Biomedical: New change in emphasis

In view of President Ford's emphasis on holding down Federal spending in fiscal 1977, "the National Institutes of Health has done relatively well," declares Donald S. Frederickson, director of NIH. If what he says is correct, then the nation's biomedical research will do relatively well, because the overwhelming bulk of it is financed by NIH.

The FY 1977 Federal budget requests $2.165 billion for NIH, an $185 million increase over the President's revised authorization for fiscal 1976, which was $1.980 billion.

Whether all of the $2.165 billion, or more or less, ends up in scientists' pockets remains to be seen, though Congress, for example, insisted on spending more on NIH research in fiscal 1976 than the President wanted to—specifically $2.240 billion. However, President Ford was recalcitrant about not draining the Federal till and vetoed the appropriation. On Jan. 27 the House will try to override this veto. In short, how much of the President's original NIH budget request for fiscal 1976 will ultimately be spent has still not been decided. So it's far too early to know whether the more generous amount he has earmarked for fiscal 1977 will be endorsed by Congress, upped or slashed. And then, there is the ever-pressing nemesis of inflation. It's undoubtedly going to erode away at whatever research funds are appropriated.

Probably the more intriguing aspect of the fiscal 1977 NIH budget is not the amount of money authorized, but the shift in emphasis on what area of research is to get what amount. Whereas the National Cancer Institute was earmarked for a $5 million increase in fiscal 1976 over fiscal 1975, it has been designated only $1 million more in fiscal 1977 over fiscal 1976. In contrast, the National Heart and Lung Institute will get $38 million more in fiscal 1977 over fiscal 1976, compared to a $20 million increase in fiscal 1976. Equally striking, the other research institutes will be allocated $120 million more in fiscal 1977 than in fiscal 1976, compared with an $89 million increase the previous year. Even though NCI's increase is not as much as before, though, it is still receiving considerably more than the other institutes—e.g., $685 million versus $343 million for NHLI.

Specifically, the administration is attempting to increase funding for research on not just specific diseases such as heart and cardiovascular disease, arthritis, diabetes and neurological disorders, but also on the cellular and molecular bases of disease. It is also attempting to give more emphasis to the fields of immunology, aging and environmental health, and to a more effective evaluation of the long-term benefits of basic research to applied research.

Health care programs the President is stressing include health manpower legislation that shifts emphasis from increasing supply to the more urgent problem of improving distribution of health resources. He is also continuing support of the Health Maintenance Organizations, which consist of multispecialty group medical practices, and Professional Standard Review Organizations. The PSRO's consist of groups of physicians around the United States who set standards for health care used to reimburse physicians who treat Medicare and Medicaid patients (SN: 7/20/74, p. 38). □

Space: Oh, for those old-time dollars

If the fattest budget in the history of the National Aeronautics and Space Administration, the one from the peak Apollo year of fiscal 1966, were measured in the shrunken dollars available for FY 1977, it would have amounted to a towering $11.4 billion. In FY 1977 itself, NASA finds itself planning to spend only 3.676 billion of those same shrunken dollars, based on a budget calling for $3.697 billion in new money from Congress.

"We had hoped," says NASA Administrator James C. Fletcher, "and fully expected, to present a much more aggressive space and aeronautics program for FY 1977," but it was not to be. There's not a single cent even for energy research, leaving such work at NASA installations such as Langley Research Center in Virginia to that performed for, and funded by, other agencies. The space agency has had to postpone the beginnings of a variety of projects, including a combination orbiter-and-atmospheric-probe of Jupiter (devoutly sought by Pioneer 10 and 11 scientists, some of whom feel that another mere orbiter is not even worth building); a larger, Mariner-class, two-planet mission that would visit both Jupiter and Uranus (one of the Mariner Jupiter-Saturn spacecraft scheduled for launch in 1977 may be upgraded and sent to Jupiter and Uranus instead); and the embattled Large Space Telescope. The space shuttle is still aimed at a first orbital flight late in 1979, but later steps, including the purchase of a third "orbiter" section—the airplane-like spacecraft itself—have also been forestalled nearly a year.

Yet NASA has managed to fit the beginnings of three new programs into its spending plan, one of which could make as much of a difference in the cost of future satellites as the shuttle is hoped to represent for the launch business. Called the Solar Maximum Mission, it would use one of the earliest shuttle flights to launch a probe for the study of the sun during a peak acitivity period in 1979-80. More important, the satellite is to be the first built using a modular, reusable structure that can be retrieved (again by the shuttle) and refurnished with completely different instruments for other missions. Once this multipurpose spacecraft comes into regular use, says E.Z. Gray, NASA assistant administrator for industry affairs, "we expect to save about $20 million every time we use it."

Also getting underway in FY 1977 will be Magsat, planned to chart the earth's magnetic field to high accuracy and hunt anomalies which could represent subterranean mineral deposits, and a "Thematic Mapper"—a high-resolution earth-resources probe with up to seven channels (compared to the Landsats' four). □