

US budget

Basic science still to grow, but less quickly

Washington

SCIENCE has emerged largely unscathed in President Reagan's proposed budget for fiscal year 1986. Although once again the major increases have been reserved for military research and development (see below), the federal programmes that support the bulk of scientific research, particularly basic research at universities, seem to have been granted a special dispensation from the draconian measures applied elsewhere in the non-military portions of the budget.

The large increases slated for the Department of Defense and the administration's refusal to consider a tax increase made it a foregone conclusion that this year's budget would not embody much improvement in the record federal deficit. The 1986 deficit is projected officially at \$180,000 million; even by 1988, the last year of Reagan's term, the deficit will be down only to \$144,000 million.

This is in spite of a series of severe cost-cutting measures: a 5 per cent pay cut for all federal civilian employees; a cut-off of government-subsidized student loans to families earning more than \$32,500 a year,

Losers for 1986

Washington

THE major losers in this year's science budget are not the major grant-making agencies. The Sea Grant programme of the National Oceanic and Atmospheric Administration (NOAA), disliked by science adviser George Keyworth, is due for elimination. NOAA's Great Lakes Environmental Laboratory would be shut down, as would the undersea research programme and the Coastal Zone Management grants. The National Bureau of Standards (NBS), like NOAA a part of the Department of Commerce, is also earmarked for cuts. The administration will try once again to terminate NBS's fire research and building research programmes; NBS would lose about \$17 million in operating funds overall, out of roughly \$120 million. Overall, the Commerce Department research and development budget is to fall by \$110 million, to \$271 million.

The US Geological Survey, part of the Department of the Interior, is due for a 2 per cent cut, to \$588 million in total obligations. Other losers are the Department of Transportation, the Veterans Administration and the Nuclear Regulatory Commission all of which face cuts of a few per cent in various small research programmes.

Stephen Budiansky

a cut-off for student grants at \$25,000 a year and a provision that no student can receive more than \$4,000 a year from public sources, loans or other subventions; a freeze on payments to physicians and hospitals under Medicare (which covers those eligible for social security retirement or disability payments) and a freeze on the number of persons covered by Medicaid (which is for those eligible for welfare payments); and a freeze on pensions for federal employees.

As always, the final shape of the budget for the financial year beginning on 1 October 1985, will be determined only after the details have been scrutinized by the responsible congressional committees and after Congress as a whole has had its say on the issues raised by the budget. The proposed cutbacks in social programmes and the increase of defence spending will be two major issues, the size of the deficit another.

Science has, however, taken its medicine (see below). While federal research and development is to increase by 12 per cent overall, the non-defence portion of that is actually due for a 4 per cent cut. Basic research is to receive a 1 per cent overall increase, behind the inflation rate. But researchers who rely upon the major federal grant-givers, the National Science Foundation (NSF) and the National Institutes of Health (NIH), have little to worry about. The 4 per cent cut is coming out of the technology-development programmes that the Reagan administration has never liked. And while there are to be no new construction projects beginning in 1986, neither will there be any cancellations of projects already under way.

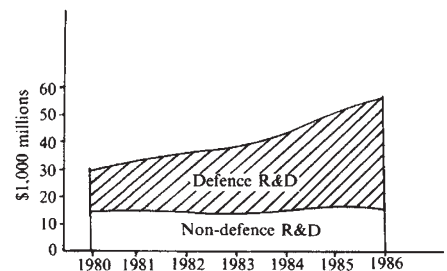
National Science Foundation

After two years of healthy increases in the NSF budget, this year's single-digit growth of 7 per cent may seem small. But that is still well ahead of inflation. NSF's engineering programme will receive the greatest percentage gain, 13 per cent; the founda-

tions's new engineer director, Erich Bloch, is pushing to expand the Engineering Research Centers programme at universities.

Mathematical and physical sciences are slated for an 8 per cent increase, as are biological sciences; earth sciences would get a 6 per cent rise. After initially resisting congressional enthusiasm and a National Science Board recommendation, the administration this year is proposing a major programme not only to improve access to supercomputers but actually to purchase machines and create supercomputer centres around the country at a cost of \$46 million.

Science education, which, along with all federal education programmes had been on the administration's hit-list until the



The growth in defence research and development during the Reagan years.

deteriorating state of the nation's schools became a campaign issue for President Reagan, will remain at the present level of \$83 million. Graduate fellowships will also remain at the present level (\$27 million within that total).

National Institutes of Health

Word leaked out last month about the administration's plans for dealing with the ever-expanding NIH budget, so there are no surprises in the official budget. Congress invariably tries to one-up the administration when it comes to NIH support; last year, Congress voted to give NIH extra money to increase new research grants each year from 5,000 to 6,500.

The administration, determined to hold the line, has ordered NIH to award only 5,000 this year, disposing of the excess funds by committing them to the future years of a portion of the three-year grants awarded now. The 5,000-grant limit would remain for 1986. The move would prevent annual increases of about \$300 million in

US research and development budget (\$ million)

	1984 actual	1985 estimated	1986 proposed
Defence-related	\$26,408	32,318	39,426
Health and Human Services (NIH)	4,836	5,472	5,159
Energy	(4,252)	(4,835)	(4,561)
NASA	4,642	4,805	4,712
NSF	2,877	3,506	3,730
NSF	1,203	1,354	1,447
Agriculture	868	940	882
EPA	261	312	327
All others	2,104	2,248	1,915
R&D facilities	1,853	2,237	2,075
Total	45,052	53,195	59,673

NIH's budget. A major fight in Congress can be expected.

Agriculture

Hopes for a \$100 million competitive grants programme have evaporated. Last year, the Reagan administration managed against all odds to secure almost the full authorized level of \$50 million for this programme, the only alternative to the automatic formula-funding to the land-grant colleges and the agency's in-house Agricultural Research Service (ARS). With the farm bill up for renewal this year, there was talk of pressing an expanded programme that would become the major mechanism for supporting agricultural research. Instead, the administration is proposing to hold the programme at its present level of \$46 million. ARS is to be cut by 2 per cent, to \$485 million; formula funds will be held at last year's level of \$258 million.

Aeronautics and Space

The space station continues to dominate NASA's research and development programme, jumping to \$220 million from the present \$140 million. Physics and astronomy are due for a 10 per cent cut, planetary exploration for an 18 per cent increase. But these changes appear to reflect an overall decision to maintain previous commitments while not starting anything substantially new. Galileo and the Space Telescope are due for launch in 1986; work will continue as planned on the Venus Radar Mapper, the Mars Geoscience/Climatology Orbiter, the Gamma-Ray Obser-

vatory, the Explorer series of satellites and the Upper Atmosphere Research Satellite. Efforts to promote space commercialization will be boosted more than threefold, to \$40 million.

Energy

An overall 2 per cent cut is planned for the Department of Energy; following the well-worn Reagan Administration path, these cuts will come in magnetic fusion, solar and fossil programmes. But this time cuts are due in fission research as well, and even in basic research. The high-energy physics budget is to fall by \$35 million, to \$510 million; nuclear physics is to fall by 4 per cent, to \$173 million.

No new major facilities will be started in 1986, although there is a small request for funds to support research into future accelerator designs. The capital equipment request will provide "only the highest priority needs" for instrumentation at the Stanford Linear Collider and the Fermilab Tevatron accelerators now nearing completion. Preparatory work on the Continuous Electron Beam Accelerator Facility at Newport News, Virginia, is to continue.

Magnetic fusion is to take a major cut, however, from \$434 million to \$390 million. Fission research, which includes breeder reactor technology, will fall by 8 per cent. And alternative energy programmes are due for the annual Reagan attempt at virtual elimination.

Stephen Budiansky & Tim Beardsley

More for star wars

Washington

TRUE to its avowed policy of strengthening national defence, the administration's budget request for the Department of Defense is up by \$29,000 million, to \$323,000 million. The defence proposals can be expected to have a rough passage through Congress, however, and the department's 1986 budget plan might look rather different by the start of the fiscal year next October.

The administration is looking for a 22 per cent increase in defence-related research and development, bringing the total to \$39,400 million, or 50 per cent above the 1984 level (see graph). If the administration gets its way, the Defense Department will account for 65 per cent of total federal expenditure on research and development, estimated at \$60,000 million.

Basic research will be increased by 16 per cent to \$962 million, and there will be an "increased emphasis" on the development of a ballistic missile defence system — the Strategic Defense Initiative (SDI), better known as "Star Wars". Total proposed support for SDI in 1986 is £3,700 million; topics listed include space surveillance and target acquisition, directed energy and kinetic energy weapons battle management systems and system survivability.

Other major research and development projects are mentioned: the Small Intercontinental Ballistic Missile or Midgetman, with its hardened mobile launcher; the Trident II strategic missile; the MX missile, deployment of which is counted "essential"; and the Advanced Tactical Bomber.

Tim Beardsley

Expenditure on Strategic Defence Initiative (\$ million)

	1985	1986
Surveillance, acquisition, tracking and kill assessment	546	1,386
Directed-energy weapons	376	965
Kinetic-energy weapons*	256	860
Systems concepts and battle management	99	243
Survivability, lethality and support	112	258
Total	1,389	3,712

*This includes rail guns and new technology, as well as incorporating the high-velocity rocket programmes that had been part of the Army's old ABM programme for defending ICBM sites.

National Science Foundation

Board plans more active role

Washington

THE US National Science Board, the policymaking body of the National Science Foundation (NSF), last week took steps to increase its effectiveness in strategic planning. The hope is that, by wasting less time rubber-stamping grants that have already been approved in principle, the 24-member board will spend more time on identifying future scientific needs.

Constitutionally, the relationship between the board and NSF is anomalous, one that does not function well within the US government. In title supervisory, the board is composed of part-time people who cannot hope to keep on top of the full-timers at NSF and who cannot pretend to give them directions without causing trouble. Only rarely in the past three decades have the board chairman and the NSF director been eager for a symbiotic relationship, with the board functioning as a high-level lobbyist. But that the time may have come.

The science board, hitherto widely regarded as having been rather ineffectual, is required by law to approve all NSF programmes entailing a new commitment of \$2 million or more, or the spending of more than \$500,000 in one year. Despite inflation in science as elsewhere, these dollar amounts have not changed since 1968, so much time is now spent reviewing individual grants in the high-spending areas. In future, however, the board will delegate routine renewals to NSF director Erich Bloch; Congress will be asked to remove legal obstacles standing in the way.

The new initiative, which also involves a thorough shake-up of the science board's committee structure, has been instigated jointly by Bloch and Dr Roland Schmitt, chairman of the science board. Both men have brought big-business experience to their positions and the organizational changes are seen as a reflection of this. While the changes will not immediately affect most active scientists, prudent heads of research institutes will want to pay close attention to science board plans to give special support to deserving subject areas, according to Leonard Redecke, executive secretary to the NSF programmes council. A new committee of the science board will give increased prominence to the interests of minority groups.

There could yet be some troublesome legal obstacles, however. The NSF reauthorization bill would be the obvious way for Congress to make the changes to the National Science Foundation Act that NSF is now requesting but, because of a jurisdictional dispute between two Senate committees, NSF has not been reauthorized for the past four years. No early solution of that dispute is in prospect. □