

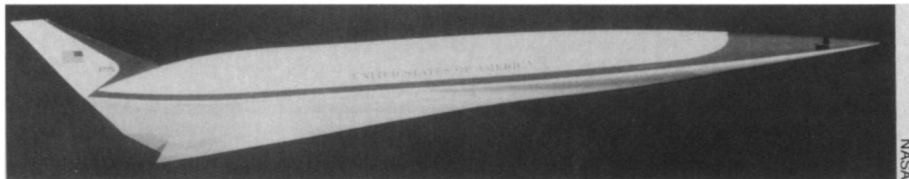
SCIENCE NEWS of the week

Most Budget Increases Go to Defense

If the President has his way, federal spending for research and development (R&D) would increase 16 percent – or almost \$9 billion – in fiscal year (FY) 1987. In any year, that would be a healthy increase. In this year, dominated by budget parings to comply with the Balanced Budget and Emergency Deficit Control Act (known for its authors, Gramm, Rudman and Hollings), the President's proposed R&D increase appears bountiful. Not only would it provide money for a number of new initiatives, but it also would substantially increase spending on a number of existing programs. However, what administration officials don't mention in their briefings on the proposed budget, unveiled last week, is that 95 percent of the FY '87 R&D increase would go to programs funded by the Department of Defense (DOD) – 23 percent of it just for increases on the Strategic Defense Initiative (SDI), or "Star Wars" program.

For the most part, these gains in military R&D would not come at the expense of nondefense R&D projects. With the notable exception of the National Institutes of Health (NIH), the President's proposal would increase or maintain most R&D funding in nondefense areas.

Defense: SDI remains the highlight of the DOD R&D budget. For FY '87, the President proposes increasing program spending by 74 percent – to \$4.8 billion. The focus will be development of sensors, laser weapons (SN: 2/15/86, p. 106), high-speed missiles, battle-management computers and systems design, according to John P. McTague, the President's acting science adviser.



Space plane would take you anywhere in three hours or less.

Though far more modest in scale, funding for the aerospace plane is also slated to skyrocket. The President has asked Congress to more than triple spending on the joint DOD/NASA venture – to \$200 million in 1987 – in the hope of having a research vehicle by the mid 1990s that can not only fly at up to 25 times the speed of sound but also attain low-earth orbit. Besides carrying troops to any point on the globe within three hours, the plane might serve as an inexpensive alternative to the space shuttle for ferrying payloads into space, McTague says.

Physics and engineering: Again this year, a number of notable increases are

Department or Agency	Proposed R&D Obligations (\$ millions)			
	1985 actual	1986 estimate*	1987 estimate	% change from '86
Defense (military programs)	31,099	33,485	41,823	+ 24.90
Energy	4,901	4,785	4,886	+ 2.11
National Institutes of Health	4,824	4,905	4,672	- 4.75
NASA	3,235	3,594	4,051	+ 12.72
National Science Foundation	1,346	1,334	1,508	+ 13.04
Agriculture	941	922	907	- 1.63
Interior	389	381	345	- 9.45
Environmental Protection Agency	320	334	310	- 7.19
Commerce	399	380	297	- 21.84
Transportation	430	364	277	- 23.90
All other	1,607	1,540	1,727	+ 12.14
Total	49,491	52,024	60,803	+ 16.87

Adapted from OMB data (■ = funding increase)

*1986 numbers reflect mandated reductions under Gramm-Rudman-Hollings

proposed for physical sciences and engineering disciplines. For example, the Energy Department would be allowed to begin construction of two new facilities – the continuous electron-beam accelerator at Newport News, Va., and the 1-2 giga-electron-volt synchrotron at Lawrence Berkeley (Calif.) Laboratory. At the National Bureau of Standards (NBS) in Gaithersburg, Md., construction would begin on a facility to conduct materials science experiments using "cold" (slow) neutrons. And NASA would begin instrument development for the International Solar-Terrestrial Physics program.

Improved physics instruments and facilities would also be emphasized at the National Science Foundation (NSF). Its budget calls for planning a gravitational-wave detector system, for improving the Cornell (University) Electron Storage

At NASA, the Ocean Topography Experiment (TOPEX) would begin a three-year survey of ocean-surface topography from space, looking for clues to general-circulation patterns. Elsewhere in the proposed budget, geosciences would fare less well. At the U.S. Geological Survey, for instance, substantial cuts are proposed for the earthquake-hazards reduction program, the landslide-hazards assessment and studies program, and the investigation of the deep magma-hydrothermal system. Moreover, a survey of the Gorda Ridge (off the California coast) would be deferred, two of the 11 geomagnetic observatories would be shut down and the number of planned magnetic resurveys halved. And the Interior Department would eliminate its mineral institutes to save \$8 million.

Biosciences: In recent years, funding of federally sponsored biomedical research at NIH has climbed steadily. Not this year. McTague describes the \$233 million cut requested for NIH – the largest single-agency R&D reduction – as a "leveling off" in its budget. In fact, McTague notes, the NIH figure is somewhat misleading in that it represents in part "the fact that AIDS research [formerly in the NIH budget] has been put under the Department of Health and Human Services [HHS] for administration." If AIDS money were put back into NIH, he says, the agency's budget would show little decline in 1987.

But the Federation of American Societies for Experimental Biology (FASEB) in Bethesda, Md., disagrees. The Reagan administration is really proposing reductions of more than \$500 million, it says, if one takes into account that Congress authorized \$5.49 billion for NIH's FY '86 R&D. The new budget documents list only \$4.9 billion for FY '86 – a figure that represents the projected effects of

Ring and for constructing the Indiana University Cooler Ring and Michigan State University Superconducting Cyclotron. In addition, the proposed NSF budget would increase funding for mathematics by 16 percent, chemistry by 13 percent, computer science by 11 percent and physics and materials science by 7 percent each. The agency's engineering directorate would increase spending 14 percent, with the largest increase – 31 percent – for cross-disciplinary programs.

Geosciences: NSF plans to double its spending on global geosciences through a series of interrelated research projects.

Gramm-Rudman-Hollings reductions and an additional budget cut (a rescission) being requested by the administration.

"Ouch!" was the initial reaction of Thomas J. Kennedy, a physician and analyst with the Association of American Medical Colleges in Washington, D.C., when asked about the proposed budget cut. He notes that the 6,100 grants available to researchers outside of NIH, known as "competing grants," would be reduced to 5,104 in FY '87. "That's a lot of good investigators out of business," he says. FASEB agrees. In an official statement, the 28,000-member association of mainly university researchers says: "The NIH budget as it stands is unacceptable."

Funding for AIDS, designated HHS's highest public-health priority, would increase \$20 million in FY '87, to \$213 million, the new budget documents say. However, that's assuming that both the Gramm-Rudman-Hollings cut of \$10 million and administration rescission of another \$41 million go through for FY '86. If not, the proposed FY '87 figure would actually represent a drop in AIDS funding of \$31 million.

Social science increases of 5 percent at NSF would restore funding that would be lost in the 4.3 percent across-the-board Gramm-Rudman-Hollings cuts due to occur on March 1, 1986. The agency's behavioral science funding would climb 7 percent, and biological programs about 9 percent.

Energy and environment: Major reductions would occur in most established nondefense R&D areas within the Energy Department. For example, support for magnetic fusion research would fall 8.9 percent, nuclear energy 11.8 per-

cent, solar and renewable-energy research 47.1 percent, fossil-fuel programs 56.2 percent and energy conservation 58.3 percent. Funding for the Environmental Protection Agency's acid rain program would increase 13 percent (to \$55 million) under the new budget, and support for its radon studies would climb 65 percent (to \$6.6 million). At the same time, engineering programs to evaluate pollution-control technologies would suffer an \$11 million (19 percent) drop. And EPA would extract further savings by shutting down several small research labs.

Other major budget proposals include:

- a request of \$4 million for NSF to develop new Minority Centers of Excellence — a program aimed at increasing the participation of minorities in science and engineering

- a 23 percent (\$106.5 million) increase in NSF support for biotechnology research, in part to fund the creation of two multidisciplinary research centers and 10 to 15 mini-centers

- a 47 percent increase in NSF funding for computational science, a program that encourages scientists in all disciplines to make greater and better use of computers

- renewed plans to try to eliminate the Commerce Department's Sea Grant program, and its fire-research and building-science research at NBS

- a nearly 24 percent drop in the Department of Transportation's R&D budget, attributable mainly to reductions in just one project — a long-range program to largely automate the civilian air-traffic control system.

— J. Raloff with J. Silberner

New directions in AIDS transmission

For now, stemming the spread of the AIDS virus relies on understanding who gets infected and how. Recent reports on the mode of transmission are alternately:

- disturbing — the first known instance of a mother infected by her child

- reassuring — a confirmation of previous work showing that casual contact with AIDS patients is not a risk

- curious — a possible link between clitoridectomy and heterosexual transmission in Africa.

In the child-to-mother transmission, the boy was born with a digestive disorder that required numerous medical procedures, including a blood transfusion (done before the AIDS blood screen was available) that exposed him to the virus. The mother, a former paramedic, performed some of the procedures.

Blood samples from both mother and son have repeatedly shown the presence of AIDS antibodies, though virus cultures on both have come up negative. Neither shows overt signs of the syndrome.

Since the mother did not recall ever having stuck herself with a needle, the researchers at the Centers for Disease Control (CDC) who describe the case in the Feb. 7 MORBIDITY AND MORTALITY WEEKLY REPORT suggest she got the infection through exposure to blood and body secretions and excretions. She did not wear gloves and often did not wash her hands immediately after exposure; adherence to guidelines for health care workers could have prevented transmission, the CDC researchers contend.

Previous reports have described only three health care workers infected with the AIDS virus, and nonsexual family contact has not been found to spread it (SN: 10/5/85, p. 213). The data on AIDS victims' families are backed up by a report in the Feb. 6 NEW ENGLAND JOURNAL OF MEDICINE from several U.S. institutions. Of 101 people in nonsexual household contact with 39 AIDS patients, only one had evidence of the infection — a child presumably infected around the time of birth.

But as nonsexual transmission of the virus comes to light, the heterosexual transmission of AIDS seen in Africa remains an enigma. Anthropologist Uli Linke of the University of California at Berkeley suggests in the Jan. 17 SCIENCE that the practice of clitoridectomy may provide an explanation. Areas in Africa where part of the female genitalia is ritually removed correspond to the areas of the epidemic, she says. After some types of clitoridectomy, vaginal intercourse can cause bleeding, and anal intercourse is often substituted. Either practice, notes Linke, could encourage spread of the virus. — J. Silberner

In tragedy's wake, NASA budget uncertain

The administration's fiscal year (FY) 1987 budget plan for the National Aeronautics and Space Administration, announced just days after the tragedy of the shuttlecraft Challenger, was actually prepared before it, and thus could change appreciably. Some of those changes could be far-reaching.

The announced budget, which represents a modest increase over FY 1986, includes, for example, \$410 million toward the administration's hoped-for U.S. space station, \$150 million of which is to begin actual systems development. But even if plans for the facility continue to evolve, its timetable could be affected by the amount of funding that must be diverted in the wake of the accident, such as to construct a replacement for Challenger, whose loss reduced the shuttle fleet from four vehicles to three.

This week, NASA officials announced that the next three shuttle flights formerly on the schedule have been "postponed indefinitely," rather than leaving open the possibility that the shuttle's uncertainties might be resolved quickly. The first of them, to observe Comet Halley in March, would almost surely have been unsavable anyway. But the next two, for launching the European Ulysses mission over the sun's poles and the U.S. Galileo orbiter and probe of Jupiter, had formerly been targeted for May "launch windows" that could extend into early June, conceivably allowing for the slim possibility that the shuttle accident investigators could complete their work in time. Instead, both missions could be launched in June 1987, but only one shuttlecraft, Atlantis, at present is equipped to carry the Centaur upper-stage booster required by both spacecraft, and the 1987 window is too short to allow launching Atlantis twice. A second shuttle could be equipped to handle the job, or one of the two missions could be delayed another 13 months.

Eleven other 1986 missions also face uncertainties.

— J. Eberhart