

Congress Reins in, Redirects SDI

After a period of remarkable growth, the funding for President Reagan's Strategic Defense Initiative (SDI) is about to level off. In late June, a House-Senate conference committee agreed on a budget of \$3.99 billion for SDI in fiscal year 1989, which begins on 1 October. This is virtually the same amount as the program is getting this year.

In previous years, Congress cut the Administration's budget requests for SDI but still permitted the program to grow rapidly. As a result, spending on ballistic missile defense, which was running at about \$1 billion a year when President Reagan delivered his famous "Star Wars" speech in March 1983, has grown by a factor of 4 in 5 years. The rapid expansion now seems to be over.

Congress, moreover, is not just reining in the SDI budget. The conference committee has also reordered priorities within the program by cutting funds for some activities and requiring that others be given large increases. Part of the rationale is to prevent the Pentagon from moving toward early deployment of space-based weapons.

In particular, the conference committee directed that no more than \$85 million be spent next year on the development of small space-based interceptors. The Defense Department initially planned to spend almost four times that amount to develop the weapons as the centerpiece of a controversial "phase 1" SDI system that would be a candidate for deployment in the late 1990s.

The phase 1 "architecture"—which would consist of thousands of space-based interceptors on orbiting battle stations, ground-based rockets, and an array of sensors—was approved for further development last fall by the Defense Acquisition Board, a high-level Pentagon body, but it is now being reevaluated within the Defense Department (*Science*, 17 June, p. 1608). The conference committee's action in slashing the space-based interceptor program is likely to be the final straw for the phase 1 plan.

The committee directed the Pentagon instead to increase spending on efforts to develop ground-based rockets that would intercept warheads in late stages of their flight, just before or after they reenter the atmosphere. It requires that at least \$350 million be spent on these efforts next year.

This shift of priorities is in line with a recent recommendation of the Defense Science Board that the first candidates for deployment be ground-based rockets in a

system that would be permitted by the 1972 Antiballistic Missile Treaty. Senator Sam Nunn (D-GA) also suggested earlier this year that deployment of up to 100 ground-based rockets be considered as a way of providing limited protection against an accidental launch. Nunn is chairman of the Senate Armed Services Committee, and was a key member of the conference committee.

The committee also reduced funding for SDI work supported by the Department of Energy, from \$279 million this year to \$262 million in 1989. Much of this funding supports development of x-ray laser technology.

The conference committee also directed the Pentagon to spend at least \$225 million next year on a project to develop the free-electron laser. This was largely the work of Senator Jeff Bingaman (D-NM). Much of the work will be carried out at White Sands Missile Range in Bingaman's state.

The conference committee which authorizes budget levels for defense programs, does not have the final word on the SDI budget. Congress has yet to pass an appropriations bill. Last week the Senate Appropriations Committee approved the same total amount for the program, but earmarked \$105 million to develop neutral particle beam technology, \$200 million for an advanced launcher, \$175 million for a sensor satellite, and some \$46 million for sundry other programs. These would be in addition to the earmarks in the conference report.

■ COLIN NORMAN

Weapons Legacy: A \$110-Billion Mess?

Cleanup costs for 17 Department of Energy (DOE) facilities contaminated by radioactive materials and other wastes connected with the building of nuclear weapons might reach a staggering \$110 billion by the year 2045. The estimate was disclosed in a report* sent to the Senate Armed Services Committee and the Senate Committee on Governmental Affairs on 30 June.

Prepared at the request of the committees, the report says that DOE could hold costs to \$66 billion and complete the task by 2025. This assumes, however, that unforeseen problems do not arise and that safety and environmental standards do not undergo major changes. Even if the government chooses not to pursue a full-fledged program, the department says it will have to spend \$26 billion to \$40 billion over the next 55 years for a minimal or "base" envi-

*Environment, Safety, and Health Report for the Department of Energy Defense Complex (U.S. Department of Energy, Washington, D.C., 1 July 1988).

ronment, safety, and health program.

The cost projections cover cleaning up air emissions, water pollution, solid waste, and contaminated soils at retired plants and operating weapons complexes. The scope of DOE's actions at these facilities also includes upgrading ongoing operations to meet higher safety and environmental standards as well as remedial actions to remove wastes or prevent further contamination at the sites. DOE has begun planning for massive cleanups at its weapons facilities in response to congressional pressure, legislation, and agreements negotiated with the Environmental Protection Agency.

Of the 17 sites included in DOE's study, the Hanford facility in Richland, Washington, poses the worst problem (*Science*, 26 June 1987, p. 1616). Since the mid-1940s it has produced plutonium for nuclear weapons and significant amounts of waste have been pumped, dumped, or allowed to leak into the ground. Hanford has "up to 15 times the volume of waste to be addressed . . . at the Savannah River plant," says DOE.

Corrective action there for nuclear operations and related cleanups will cost \$2.4 billion between 1988 and 1995. But subsequent costs at the Richland complex are estimated to be \$27 billion and perhaps as much as \$46 billion. Mopping up the contaminated site could take 30 to 50 years, DOE projects.

The Savannah River plant in South Carolina, where DOE has produced plutonium, tritium, and reprocessed nuclear fuel, is likely to be the second most costly site for DOE to clean up. The department may have to spend \$5 billion to \$13 billion between now and 2045.

Reacting to the estimate, Senator John Glenn (D-OH), chairman of the Governmental Affairs Committee, predicted that DOE's upper estimate of \$110 billion is likely to represent the minimum cost of addressing environmental, health, and safety issues at government nuclear weapons facilities. Indeed, DOE repeatedly cautions readers of its report that its "projections are only illustrative of the magnitude that could be required to accomplish the cleanup and compliance activities. . . ."

Not included in DOE's cost projections are estimates for the decontamination and disposal of inactive plants. The department is expected to report on these facilities in December and in later disclosures. At that time, DOE will provide the Armed Services Committee with estimates for the cost of modernizing nuclear weapons operations. This report also will contain cleanup costs for other weapons facilities that were not addressed in the 1 July report.

■ MARK CRAWFORD