Star Wars Plan Gets a Green Light

A White House policy group, acting on the advice of two scientific panels, has recommended a major missile defense program

President Reagan is expected in a few weeks to announce the start of a focused military effort to develop weapons theoretically capable of defending the American public against a nuclear attack by the Soviet Union. The effort, which will cost tens of billions of dollars and take at least 20 years, was recently endorsed by a senior White House policy group, which acted in turn on the recommendations of two military advisory committees.

The committees were established in the wake of the President's "Star Wars" speech last March, in which he called on weapons researchers to define a long-term program to "counter the awesome Soviet missile threat with measures that are defensive," and capable of protecting cities, not just missile silos. The idea attracted vehement criticism from scientists outside the government, who said it was either impossible or dangerous, and generated considerable uneasiness at the Pentagon, where none of the resident experts had been consulted and many were privately unenthusiastic.

Within a month or so, however, the White House put together a Defensive Technologies Study group and a Future Security Strategy group to suggest a serious way of addressing the President's concern. They recommended that $18 billion to $27 billion be allocated for missile defense efforts between now and the end of the decade, a modest increase over the amount that the Pentagon was planning to spend before the President's speech. The largest amount will be used to attack the problem of surveillance, tracking, and acquisition—the need to detect, monitor, and target simultaneously about a thousand Soviet ballistic missiles, each carrying about ten warheads. This is probably the most challenging aspect of a defensive system, and one about which there is a great deal of scientific skepticism.

Additional funds will be lavished on weapons capable of generating laser and particle beams, which could theoretically destroy Soviet missiles from space well before they reached U.S. territory. Excimer short-wavelength lasers, free electron lasers, chemical infrared lasers, neutral particle beams, nuclear-pumped x-ray lasers—none will be spared the potentially enlivening effects of additional cash. A large appropriation will go to the development of small missiles, which can theoretically collide at high speed with warheads that sneak past the lasers and particle beams. Smaller sums will be allocated to communications, survivability, and systems design.

None of this represents a sharp departure from previous Pentagon plans. As Richard DeLauer, the Defense under secretary for research and engineering, noted recently, "the major recommendations are pretty much what we've been focusing on in the past 10 to 15 years." The significance of the two reports is said instead to lie in the fact that the authors failed to detect any invincible technical obstacles that could prevent attainment of the President's goal. "I think truly the most important thing that happened in the reports is that a bunch of people from very different perspectives concluded at the end of it that just what the President said, his objective, was feasible," presidential science adviser George A. Keyworth, II, told *Science*. "I would say a lot of people went in with some skepticism, and they came out with some optimism. I'm not trying to say that everybody came out the door saying let me into my laboratory and I'll have this solved in a week. I'm just saying that everybody I've talked to that was associated with the reports came out with a very optimistic attitude. I've heard remarks like 'I really think we can do this. It may take us a while, and I don't know how much it's going to cost, but I really think we can do this.' "

James Fletcher

His panel recommended a program costing $18 billion to $27 billion over 6 years.

Most of the scientists who reached this conclusion work either for the Pentagon or for one of its principal contractors. One panel was chaired by James Fletcher, a former administrator of the National Aeronautics and Space Administration who now teaches at the University of Pittsburgh. The vice chairman was Harold Agnew, a former director of the Los Alamos nuclear weapons lab who is now president of General Atomic Co. The deputy chairmen were John Toomay, a consultant to BDM Corporation, and Alexander Flax, the director of the Institute for Defense Analyses. The executive secretary was the Pentagon's present director of defensive systems, John Gardner.

Members of the subcommittee on directed energy weapons, for example, were drawn exclusively from the Los Alamos, Livermore, and Sandia laboratories, where the bulk of the government's directed energy work is now being conducted. The final product was reviewed, for the most part, by current and former Defense Science Board members and consultants, including Edward Frieman, Solomon Buchsbaum, David Packard, William Nierenberg, Daniel Fink, and Michael May, as well as several former generals and Bobby Inman, a former admiral who served as director of the National Security Agency.

Only a handful of the participants were drawn from the academic community, where much of the initial criticism of the President's plan was generated. An effort was made to involve more academics, particularly those from the field of high energy physics, by asking the National Academy of Sciences to identify some potential participants, Keyworth says. But it never got off the ground because the Academy declined any formal involvement. "As you might imag-

ine, members of the National Research Council panels as well as members of the academies [of Science and Engineering] have varying persuasions concerning the President's proposal," Philip Smith, the Academy's executive officer, told the Pentagon in a letter last June. "Thus we are unable to identify those who might be interested in participating in the assessment." Officials in the White House science office were angered by the Academy's response, but Smith writes this off as "the kind of reaction you get from government officials who are swept up in a particular program."

Keyworth says his own role in the study was largely to "keep reminding people what the President's objective was in his speech. Our primary concern was to make sure that all corners of the technical community were identified for contributions, to see that no stones were unturned. But our secondary concern was to see that the sentiment behind and the words of the President's speech were kept up front as a goal, because it is so easy for people to forget they are responding to a presidential initiative. I guess I spent a good part of the past 7 months reminding people of paragraphs and handing out copies of the original speech."

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Keyworth believes that one of the most important results of the study is the development of an integrated defensive weapons program to replace a somewhat haphazard collection of lesser efforts. "Before we didn't have a mission, really. We didn't know whether we wanted to do hard-site missile defense, we didn't know whether we wanted to do antisatellite weapons, we didn't know if we wanted to do the antiballistic missile mission, or what phase of intercept we wanted." All this has now been changed. "The President stated the objective in his speech, and he called for a program to meet that objective." And a program is what he will have.

Keyworth emphasizes the study's conclusion that there is no antiballistic missile technology "that you know so much about that you can either dismiss it or move it to the top." But he asserts that several of the technologies—such as a ground-based excimer laser capable of serving in its initial form as an antisatellite weapon—can be demonstrated by the end of the decade. "Now, such a demonstration would *not* demonstrate a workable ABM system. But, quite frankly, if I were a Soviet planner, I would quickly put two and two together and realize that an important part of the technology for an ABM system was well in hand and that development was more a matter of time than breakthroughs at that point. Such a demonstration would pressure the Soviets to take our arms reduction proposals much more seriously than they do now."

At a minimum, the report indicates, the development of a feasible antiballistic missile system may require construction of an enormous new rocket capable of lifting heavy objects into space, as well as a continuous manned presence in space. More than 100 new satellites would ultimately have to be deployed, as well as thousands of ground-based missile interceptors. The research program will be organized so that a decision on early demonstrations can be made in 1987 or 1988.

Like others in the Administration, Keyworth is skeptical about the wisdom of studying or developing a defensive weapons system jointly with the Soviets. (A proposal along these lines was recently made by Edward Teller and Eugenij Velikhov, a high-ranking member of the Soviet Academy of Sciences.) "I'm very skeptical about our ability to ensure that it's a mutually beneficial cooperative venture. Would they be taking all and giving nothing? I believe that the United States could—if we possess the resolve to do this—do it before the Soviets, in a meaningful way."

It remains to be seen, however, whether the Administration can persuade Congress and the public that such an unequal achievement is a desirable goal. It would require forgoing, at the least, any substantive outer space arms control, and it would eventually necessitate renegotiation of the U.S.–U.S.S.R. treaty banning elaborate antiballistic missile systems. Administration officials insist that deployment of such a system—which may, as Keyworth suggests, give the United States nuclear superiority—need not be feared by the Soviets. But they will doubtless have a tough time getting the Soviets to go along.

—R. JEFFREY SMITH

Cambridge Voters Turn Down Weapons Ban

By a margin of almost three to two, voters in Cambridge, Massachusetts, have turned down a proposal that would have made it a crime to work on nuclear weapons within the city limits. The proposal was put to a vote on 8 November.

The size of the defeat was something of a surprise. Opinion polls taken 2 months ago indicated the measure would pass easily, but opponents turned public sentiment around with a hard-hitting campaign financed largely by contributions from corporations and the Draper Lab, which would have been forced to close or move out of Cambridge if the proposition were approved. Senior officials and several academics from Harvard and MIT also weighed in with statements opposing the ban (*Science*, 7 October, p. 28). Backers of the resolution have said that the opponents misrepresented the proposed ban, and they have promised to be back next year with a new proposal.—COLIN NORMAN

Businessmen Urge Major Cuts in Federal R & D

A group of businessmen has told the Reagan Administration that $45 billion could be saved over 3 years in outlays on research and development, if only the federal government were to run its R & D enterprise more like a private corporation. Total federal expenditure on R & D is now about $48 billion a year.

The group, a task force composed mostly of middle-level executives from the American Hospital Supply Corporation, General Foods, Beckman Instruments, Hewlett-Packard, and Honeywell, has sent a sheaf of recommendations to the President's Private Sector Survey on Cost Control, a business group headed by J. Peter Grace that is attempting to pinpoint government waste and overspending. The Grace commission is expected to forward the recommendations on R & D to the White House.

Many of the task force's proposed savings—such as elimination of federal funding for the Clinch River Breeder