

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

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The significance of the two reports is said to lie in the fact that the authors failed to detect any invincible technical obstacles that could prevent attainment of the President's goal.

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untuned. 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."

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 anti-satellite 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 anti-satellite 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

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## Cambridge Voters Turn Down Weapons Ban

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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

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## Businessmen Urge Major Cuts in Federal R & D

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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