(Continued from page 524)

1980, it expressed concern that the technology to be developed in this program not fall into the hands of potential adversaries. Thus it specified that the ITAR regulations would apply to this research.

On 12 December, Sumney sent a memo to VHSIC program directors providing guidelines for how the ITAR would apply. First, he said, the directors must distinguish between basic and applied research. Basic research, in general, would not fall under these controls. Applied research would and so could not be presented at open symposia or meetings or disclosed to persons who are not U.S. citizens. Acknowledging that the distinction between basic and applied research is not always easy to make, Sumney suggested that in cases of doubt, the contractors should forward the research results to his office for a decision.

But making distinctions in what Sumney called the "gray area" between basic and applied research is a matter of great concern for the university presidents. In the field of microelectronics, for example, it is becoming increasingly difficult to decide whether such things as the development of techniques for the design and fabrication of circuits and the development of software are basic or applied research. The presidents say in their letter, "There is no such easy separation in any engineering curriculum intended to be relevant to our national needs and problems. Furthermore, producing graduates with no 'hands on' experience in these areas would be of little value to American high technology industries."

Sumney ended his memo with a statement that some administrators found particularly troubling: "In the case of basic research supported by the VHSIC program, although such research and its results are not generally controlled, it is the preference of the Program Office that only U.S. citizens and immigrant aliens who have declared their intention of becoming citizens participate. Where this preference cannot be accommodated, the contractor should be directed to the Program Office for resolution."

Caltech's president Goldberger is appalled by this application of the ITAR. High technology research would be forced out of universities if such controls operated, he says, since university scientists could not work under such conditions. "The only realistic way to contain VHSIC research would be to classify the whole program. It would be catastrophic for them to take that step," he remarks. Sumney, however, notes that the Defense Department could not possibly classify the VHSIC program. "It is not a secret program. It is a general technology development program and it has direct commercial applications as well as military applications," he says.

Mead at Caltech shares Goldberger's concerns but points out that, "The big thing that people need to understand is that it's not just a problem for universities, it's a problem for industry." Industry, he says, is already working on the same technology that is supported by the VHSIC program and is spending 50 times as much money on such research as the Defense Department is. If the ITAR are employed as Sumney's memo indicates they should be, all research on this technology would be subject to controls, no matter who funds it. This means, for example, that industries with foreign subsidiaries would need to get an export license each time they want to discuss this work with their divisions overseas. It also means the industries would need to get a license each time they want to hire a foreign engineer. And, says Mead, "Half of the engineering force in electronics is foreign nationals. Half of our graduate students are foreign nationals."

Hogan, who is director and technical consultant to the president at Fairchild, agrees with Mead. "We are concerned for many reasons," he says. "There is a problem, certainly, in that we want to guard technology that could go to the Russians. But the ITAR regulations hurt, they don't help."

Sumney agrees that the regulations could be burdensome to industries but says, "we must consider the consequences if we don't impose them." George Heilmeier, who is vice president of research development and engineering at Texas Instruments, agrees with Sumney, adding, "we think we can live with these regulations."

At present, matters stand at an impasse. John Crowley of the Association of American Universities, who has been closely following the situation, sums it up by saying, "It is a troubling issue but one with no immediate solution. We're caught in a bind."—GINA BARI KOLATA

The Containment of Research

Why research should not be contained:

It should be recognized that the only realistic way to "contain" VHSIC research is to classify the whole program. In our view this would be a self-defeating effort: the science underlying high technologies cannot be put back into the bottle. Furthermore, most universities have concluded that performance of classified research is incompatible with their essential purposes. University scientists would prefer, for the most part, to change their field of interest rather than have their research and teaching so constrained. Forcing high technology research out of universities would decrease our nation's competitive position, since the research would have to be carried out more slowly and less effectively in a classified atmosphere. Moreover, we would foreclose future research directions that would be otherwise discovered by having a continuous flow of new graduates from the university programs which have been flourishing up to this point. Elimination of such teaching and research from academic laboratories would endanger the future of graduate programs in engineering, computer science, and related fields, and would result in a tremendous loss of potential high technology otherwise available to American industry. The new restrictions represent the worst possible direction: they fail to protect the status quo and virtually guarantee that there will be no future.—*From the 27 February 1981 letter sent to the Administration by the five university presidents.*

Why research should be contained:

"The inherent contradiction of capitalism is that it develops rather than exploits the world. The capitalistic economy plants the seeds of its own destruction in that it diffuses technology and industry, thereby undermining its own position. It raises up against itself foreign competitors which have lower wages and standards of living and can outperform it in world markets."—*A quotation, supplied by the Department of Defense, from the works of V. I. Lenin.*