A Transatlantic Mexican Standoff

Research consortia in Europe and the United States are excluding foreign-owned firms, raising barriers to U.S.–European cooperation in some areas of industrial technology

EARLIER THIS YEAR, IBM's European subsidiary put out some feelers to see whether it would be accepted into Europe's latest cooperative high-tech program, the recently approved $4-billion Joint European Submicron Silicon Initiative (JESSI). IBM's rationale for making the approach was that its European subsidiary is just like any European-owned company, and it therefore should be treated like one. The Europeans weren't buying; they gave the U.S. computer leader a polite brush-off.

IBM was told that its scientists will be welcome in JESSI—but only when U.S. subsidiaries of European semiconductor companies are accepted into Sematech, the Texas-based consortium of U.S. electronics companies. So far, Sematech has closed its doors to all foreign companies. Signetics, the U.S.–based chip-making subsidiary of the Dutch electronics company Philips, found that out last year when it inquired about joining. North American Philips made the same argument for participation in Sematech as IBM's subsidiary did for joining JESSI, noting that its U.S. operations extend from R&D through manufacturing. It was turned down with what one company official calls a terse letter. "It looks like a Mexican standoff," says Ken Guy of the Science Policy Research Unit at Britain's University of Sussex.

The standoff is the latest example of what some see as a rising tide of technological protectionism on both sides of the Atlantic—a tide that many scientists on both continents view as antithetical not only to scientific progress but, in a more selfish vein, to competitive strength vis-à-vis Japan. As government-industrial research consortia like JESSI and Sematech are established in critical areas of technology, U.S. companies in Europe, and their European counterparts in the United States, are finding themselves on the outside looking in.

And the issue of who is eligible for membership is likely to grow as more and more consortia are established. In just the past few weeks, for example, seven U.S. electronics companies announced their intention to form a $1-billion consortium, U.S. Memories Inc., to manufacture state-of-the-art computer chips, and the American Electronics Association unveiled a proposal to form a U.S. consortium to develop high-definition television systems.

The Europeans, likewise, have formed numerous joint research projects in the past few years under such names as EUREKA (an umbrella program for the development of industrial technologies), ESPRIT (a $300-million-per-year information technology program), and BRITE (Basic Research in Industrial Technology). They are coordinated by the commission of the European Economic Community and are aimed at pooling the talents of European companies in critical areas of high technology.

Because many of these efforts have been sold to tight-fisted European governments as a means of achieving political as well as economic independence from the United States, there is considerable ambivalence about whether companies that are European-based but U.S.–owned should get the same treatment as those which are fully European.

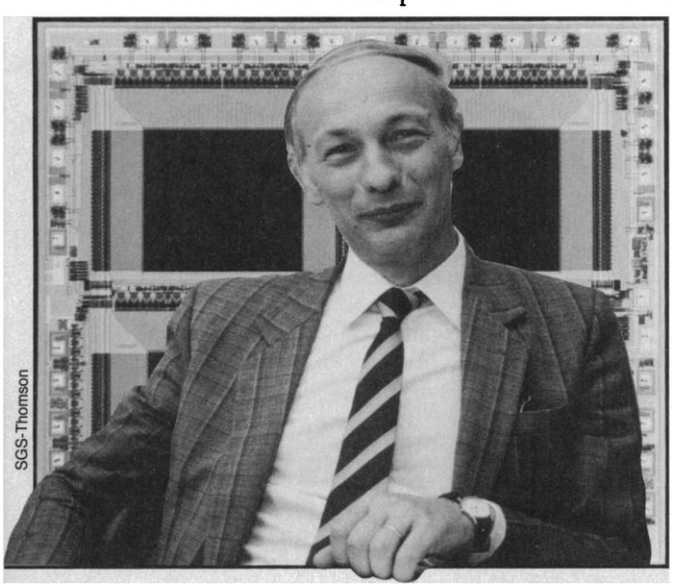
Hubert Curien, France's Minister of Technology, voiced this ambivalence in an interview with *Science* last week. Although declaring himself a strong supporter of scientific cooperation with the United States, he said "EUREKA is a creation of industry [and] it is up to the industrialists to decide who they accept." He added: "The principal thing to me is to have in Europe the industrial strength that will allow us to be a proper partner with the United States."

Similarly, in the United States, there is strong pressure to keep U.S. consortia all-American. Part of the pressure to exclude foreign companies from Sematech, for example, is said to be coming from the U.S. Congress, which is providing $200 million to the venture. And there was an outcry in Congress earlier this year when it was revealed that the Department of Defense was entertaining proposals from foreign companies for a joint government-industry program to develop high-resolution displays.

Yet the case for transatlantic cooperation in many of these programs is, on the surface, straightforward. JESSI and Sematech, for example, share many of the same goals. In particular, both are committed to promoting the long-term basic research needed to underpin the development of a new generation of "submicron" chips—those whose critical dimensions are 0.5 micron or less.

Given the broad range of common interests, some scientists involved in the JESSI program argue that close collaboration with Sematech would be beneficial. "Personally, I feel that it would be a good idea to have cooperation between [scientists working for] European and American companies in this field, because it would improve the chances of both of them of fighting against Japan," says Anton Heuberger of the Fraunhofer Institute for Microstructure Technology in Berlin. Heuberger chaired the team that produced the blueprint for JESSI.

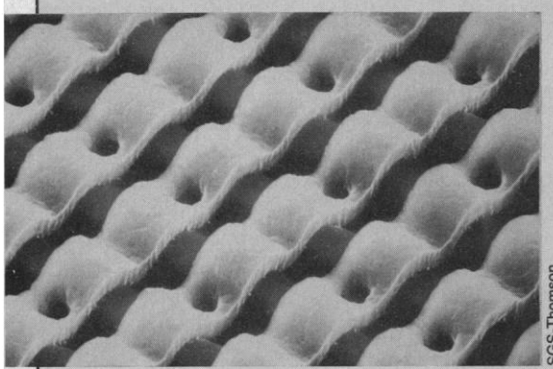
This feeling is shared by some of the major corporate participants in the venture. (So far the participants are Philips, the French-Italian company SGS-Thomson, and the West German firm Siemens.) Some appear motivated primarily by a desire to



Megaprojects. *SGS-Thomson official Enrico Villa argues for reciprocal membership in electronics consortia. Background: a four-megabit chip, one of the targets of the consortia.*

Can Europe Survive on Chips?

In the early 1980s, two of Europe's largest semiconductor manufacturers, Philips of Holland and Siemens of West Germany, decided to join forces to develop a one-megabit computer memory chip. The so-called "mega-project" was a mega-flop. Soon after it started, Siemens decided it would be cheaper to buy the chips off the shelf from Japan. But the collaboration became the crucible for a much more ambitious project: the 8-year, $4-billion Joint European Submicron Silicon Initiative (JESSI), which was approved last month by the 12 member states of the European Economic Community (EEC). It is perhaps Europe's most ambitious joint research and development project, and it is expected eventually to involve almost 100 private corporations and public research groups.



SGS-Thomson

Key link in the electronics food chain. *Submicron technology for the next-generation chip.*

Like the U.S. consortium Sematech, one of the key goals of JESSI will be to develop the technology required for a new generation of 64-megabit chips. But JESSI will do more than develop the chips themselves and the technology needed to produce them. It will also work on some applications of the technology. "If you look at the situation in Europe, we have problems not just with the basic technology, but with the entire 'food chain' in microelectronics," says Enrico Villa, director of external coordination for the French-Italian semiconductor manufacturer SGS-Thomson. Last year, SGS-Thomson became the third major partner in JESSI.

"The existence of JESSI is a minimal precondition for the survival of the semiconductor industry in Europe," says Anton Heuberger of the Fraunhofer Institute for Microstructure Technology in Berlin, who chaired the team that produced the blueprint for JESSI. Heuberger points out that, even when added together, the turnover of Philips, Siemens, and SGS-Thomson, Europe's largest three chip-makers, still is smaller than that of each of the top three Japanese companies.

Not all EEC member states see eye to eye on the need to provide large public subsidies to their semiconductor industries. Britain, for one, has been lukewarm. In contrast, JESSI has received enthusiastic support—and an immediate pledge of $22 million—from the West German government, which argues that such subsidies are justified by the current weak market position of European chip manufacturers. And last month, the European Commission agreed to provide substantial support—perhaps as much as 25% of the eventual costs. The Dutch, French, and Italian governments have also voted extra funds for JESSI research projects.

Despite the substantial public funding, priorities and strategy will remain firmly in the hands of the corporate participants. But, with $4 billion at stake, this has not made JESSI immune to pork barrel politics. The planning group for the venture is based in the town of Itsehoe in North Germany, partly because of financial backing from the state of Schleswig-Holstein (which is keen to attract high-technology industries to the area), but also because a keen supporter is the local member of the federal parliament, Dietrich Austermann, who happens to be chairman of the parliamentary committee responsible for the Research Ministry's budget.

Eventually, JESSI is likely to be run from Munich, Germany's semiconductor capital in the south. But Itsehoe could become the location of an equally sought-after prize: a $500-million experimental facility for R&D work on new chip production and assembly technologies.

University research groups are expected to play a significant role in JESSI projects, particularly those that fall into a category described as "basic and long-term research." Says Giuseppe Zocchi, director of central R&D for SGS-Thomson, "while the technology development will be following an evolutionary pattern, this basic research should concentrate on the feasibility of alternative approaches [to chip design] and the possibility of major breakthroughs." ■ D.D.

reduce research costs; others by a feeling that research collaboration offers an access route to foreign markets. "We have to modify [this] situation," says SGS-Thomson director of external coordination Enrico Villa. "It should be possible for a U.S. company with both manufacturing and research facilities located in Europe to participate in JESSI and for European companies to take part in Sematech projects. But to do that we have to change the rules; and that will not be easy."

In theory, U.S. companies are not excluded from EEC joint projects, but they often face subtle barriers to entry. In fact, EEC officials say they know of only two U.S. companies—IBM and Ford—that have been accepted into any European program. And for both of them, it was an uphill task to get in. IBM is reported to have made 12 separate applications to participate in ESPRIT before the first one was accepted. Similarly, U.K.–based Ford executive Andrew Napier says that his company met with considerable opposition, requiring some delicate behind-the-scenes negotiation, before being accepted into BRITE.

Some companies that lack the political clout of an IBM or a Ford have been put off by the detailed wording in the EEC's research contracts. These place strict controls on the extent to which a subsidiary of a U.S. company can pass information generated in an EEC-sponsored research project back to its parent company in the United States. "There is not formal prohibition on U.S. companies participating [in our research programs], but it is the small print in the contracts which tends to put some people off," admits one EEC official.

Says an official of the U.S. Chamber of Commerce in Brussels, "American companies feel that they would have a lot to contribute to European R&D efforts. But the fine print effectively makes it difficult in certain areas. The commission does certainly not make it easy. There is all this talk about being prepared to accept non-EEC–owned companies, but in effect it is very difficult for them to take part."

Is there a way out of the impasse? Some are pointing to the proposed U.S. high-definition television consortium as a potential model. In essence, foreign-owned companies would be permitted to join only if they conduct full-scale R&D and manufacturing in the United States and if they obtain their computer chips for HDTV systems from U.S.–based companies. In other words, if they act like American companies, they would be treated like American companies. Philips and IBM are asking that this standard be applied universally on both sides of the Atlantic. ■ DAVID DICKSON