

By Philip Burgert

The list of cooperative research and development joint ventures, like any list of companies looking for innovative ways of doing things, is growing.

- A group of companies, with government backing, gets together as the Institute for New Generation Computer Technology and starts a 10-year effort aimed at claiming a world-leading position in computer development efforts.

- Another group of companies forms a consortium to conduct aerospace industry R&D and captures a quarter of the world's jet aircraft manufacturing market after only a few years.

- A collection of 21 leading computer and high-technology firms forms a for-profit R&D venture by pooling funds and personnel to conduct generic research in fields such as semiconductor packaging and computer-aided design of very large scale integrated circuits.

- A group of more than 50 manufacturing companies from a variety of industries adapts the form of an existing non-profit computer-aided design and manufacturing research organization to protect the results of major R&D efforts in areas including software, hardware, integrated manufacturing and automated inspection.

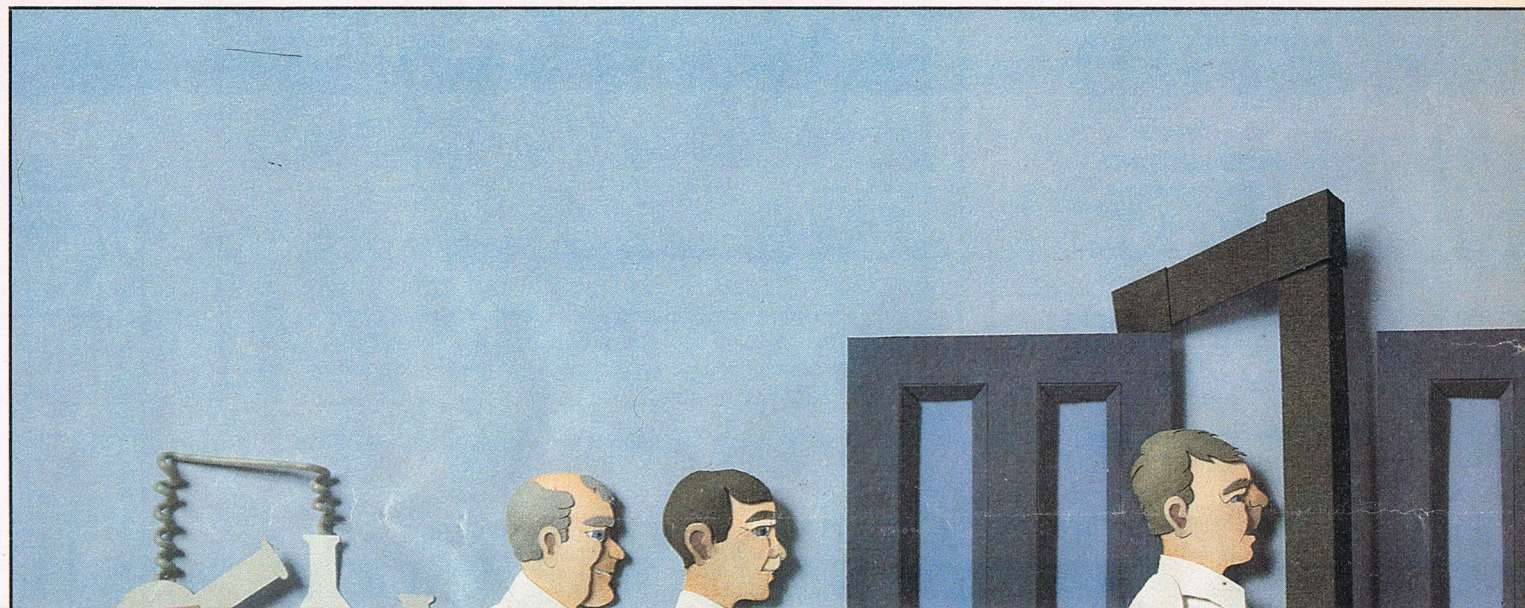
- And, during a six-month period earlier this year, 25 other groups in fields such as steel and aluminum production, motor vehicle manufacturing, truck transmissions and plastics recycling filed notices of joint R&D ventures with the government. Simultaneously, other groups of companies in fields such as advanced ceramics, machine tools, hydraulics, pump manufacturing and foundries were said to be

"It's going to take collaborative efforts...We've got to get together and do it together."

In contrast to R&D limited partnerships, where one general partner is usually responsible for directing management and financing of a research project to bring new technologies to market, cooperative or joint venture R&D frequently involves collaboration with competitors. Cooperative R&D is usually performed to develop non-proprietary base technology that becomes a part of the proprietary work of the joint venture member firms' own proprietary work, according to Lansing R. Felker Jr., director of the industrial technology partnerships division in Merrifield's office. In cooperative R&D, he notes, companies group together to fund research while minimizing the cost and risk of each individual company. Then each tailors the

Opening the cooperativ

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computers and metals
compete under relaxed*

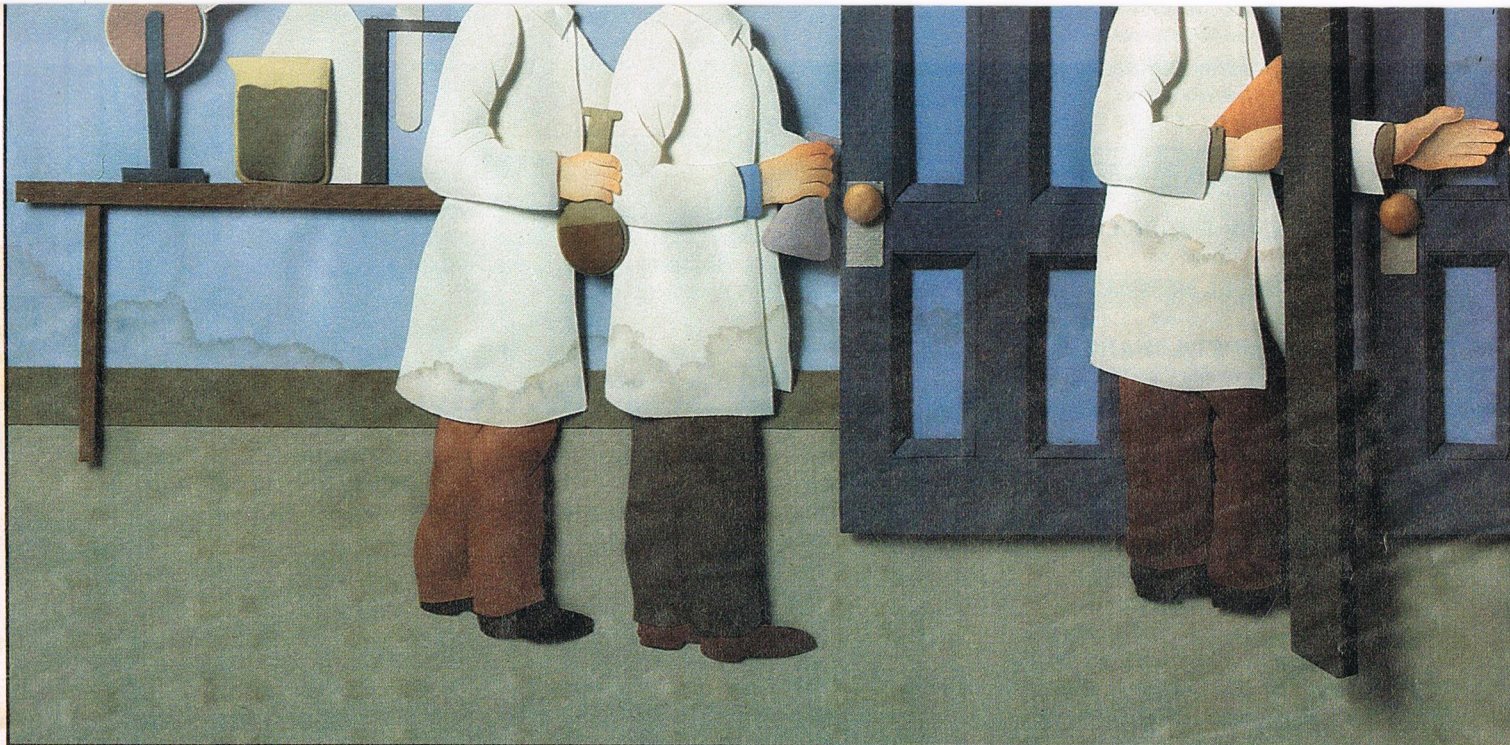


considering cooperative research.

The first two examples of cooperative R&D come from abroad and are the widely noted Japanese "fifth-generation" computer effort and the European Airbus Industrie consortium. But the other efforts, including Microelectronics and Computer Technology Corp. (MCC), Computer Aided Manufacturing-International (CAM-I), a Bethlehem Steel Corp. and United States Steel Corp. joint venture in continuous casting, the Motor Vehicle Manufacturers Association, a cooperative project of Eaton Corp. and Fiat SpA involving medium range truck transmissions, and the Plastics Recycling Foundation, are among groups that have filed joint R&D notices in the past year.

Only in that year has such research been possible under the National Cooperative Research Act of 1984. The federal legislation, signed last October, was stimulated by legal questions about the status of early United States cooperative research and development efforts such as MCC as well as the competitive consortiums such as Airbus that were found in other countries.

"We're now going after Section 7 of the Clayton (antitrust) Act," D. Bruce Merrifield, Commerce Department assistant secretary for productivity, technology and innovation, recently told an International Machine Tool Research Forum where he was urging machine tool builders to join together in R&D to increase U.S. competitiveness.



results to its own products.

In the past, the policies of the Justice Department have limited the extent to which such ventures were possible under antitrust laws. But department statements late last year, following passage of the cooperative research act, eased the concern of some. In one speech, J. Paul McGrath, assistant attorney general in the department's Antitrust division spelled out the new position: "In sum, the Justice Department will not be concerned with R&D

joint ventures unless they result in highly concentrated markets for research," he was quoted as saying.

Though groups of companies planning to do joint research must file notice with the Justice Department and Federal Trade Commission, the process of forming a cooperative R&D venture, at least in theory, is fairly simple. According to Commerce Department officials, who monitor the filings and provide assistance with the process, the new laws have eliminated the need for Justice Department business review letters and eased the threat of treble damage penalties in legal actions that might be sought under antitrust laws.

In practice, however, the process is still far from easy, according to officials of organizations that have formed cooperative efforts or are still considering them. Government officials acknowledge that several of the 25 companies that had filed R&D venture notices by June had been preparing their ventures for a year or more before the filing.

Merrifield says the continued existence of the Clayton Act's Section 7 creates "a downstream perception that can stop collaboration before it gets started. Most people are very skittish about any kind of cooperation." The official told the machine tool forum that his office spends about 75 percent of its

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producing public domain research for more than 10 years before changing its by-laws to use the eased anti-trust guidelines. The changes, primarily allow CAM-I to use provisions allowing cooperative ventures to carry research through to the prototype stage and protect that research for sponsor commercialization.

MCC is organized as a shareholder-owned corporation. Each of the 21 company shareholders own one share of stock, each valued currently at \$1 million. The stock was originally priced at \$150,000 a share and has increased in value four times since the venture began formal operation in early 1983.

"The main thing, of course, is that you really need a group of dedicated companies that want to do something," William A. Carter, president, says. In the case of CAM-I, the push was on to automate. Companies CAM-I works

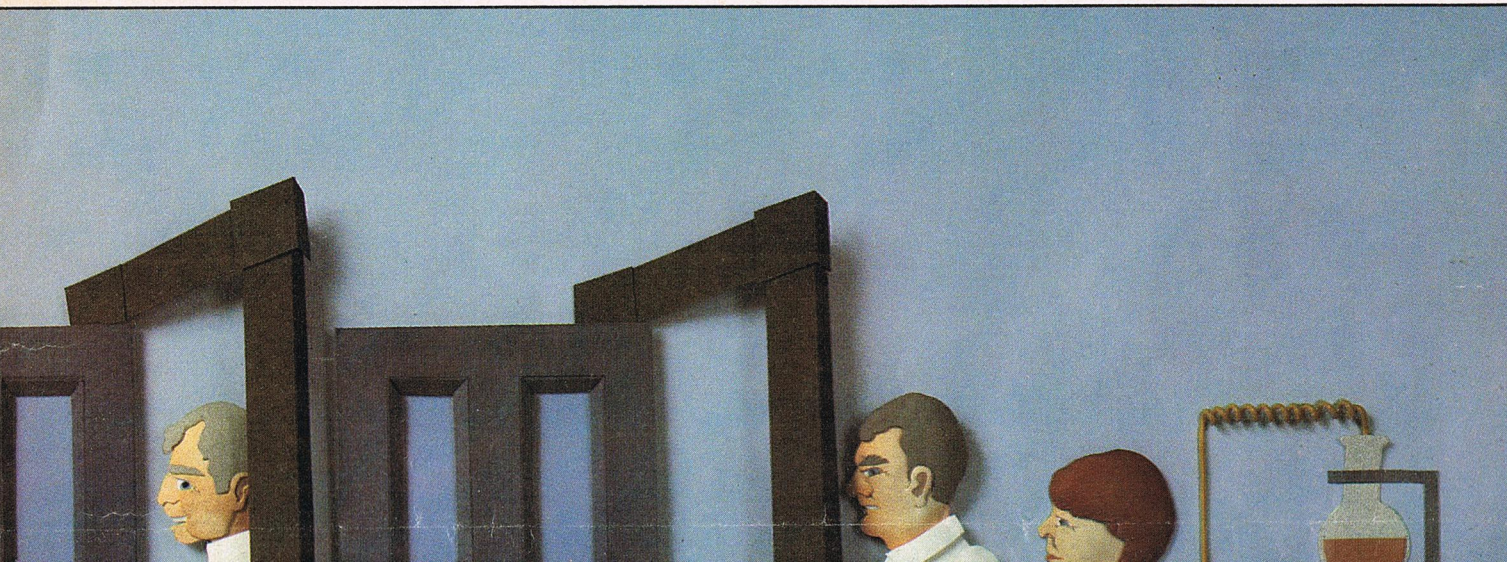
machines are in place, the need to integrate the machines and make them communicate with other machines and other phases of the manufacturing and management operations becomes apparent. "There are no companies that can really solve those kinds of problems by themselves," Carter says. He notes that, though companies may be developing partial solutions, no generic solutions have been found.

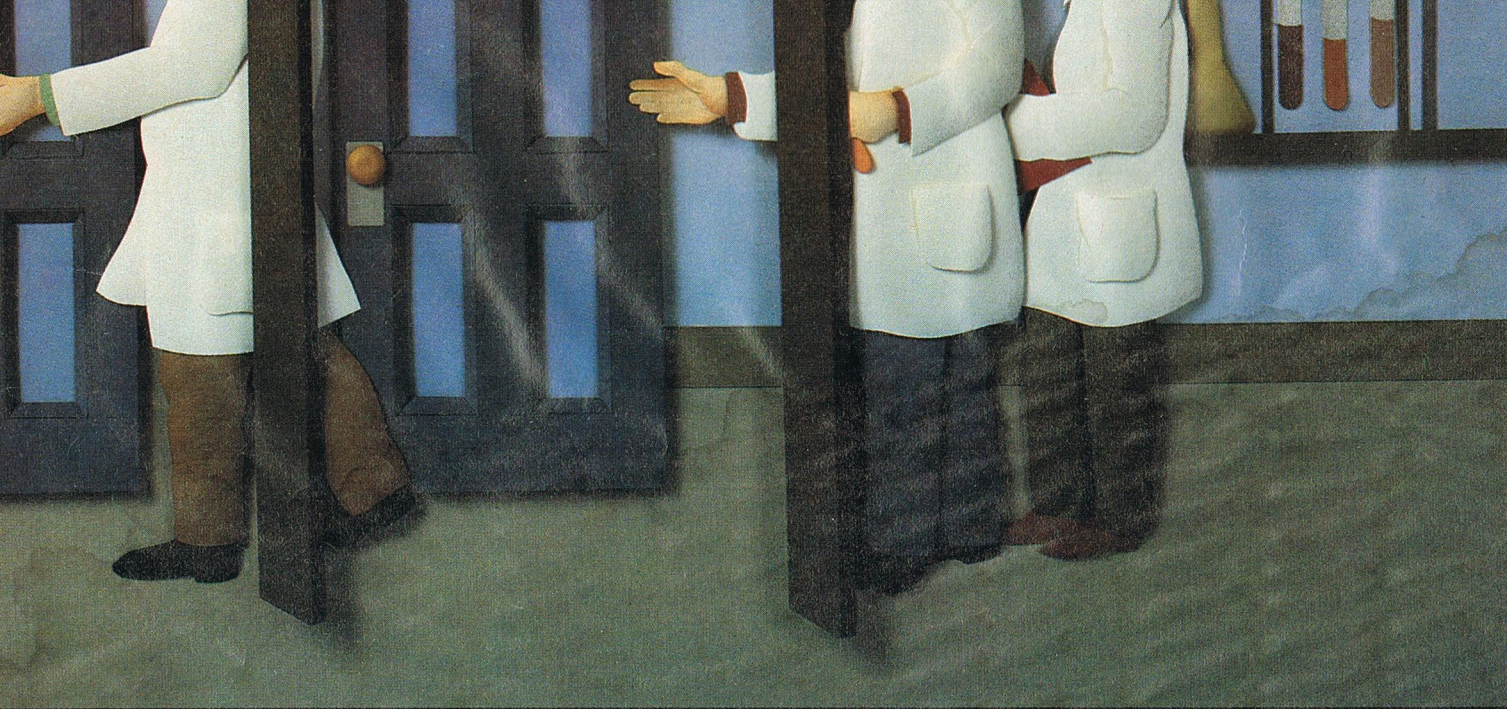
MCC, on the other hand, was formed following a proposal by William C. Norris, chief executive officer of Control Data Corp., to a group of 15 other CEOs in early 1982 as a direct response to the 1981 announcement of the Japanese fifth-generation computer project. According to William D. Stotesbery, director of government and public affairs for the consortium, MCC officials have stressed since the formation that the research being done is "pro-competitive" and not anti-competitive.

The Austin-based company is organized to keep stockholder companies directly involved with the R&D programs by maintaining a current staff of 360 employees with 65 percent employed directly, 17 percent assigned to full-time work at MCC by stockholder companies and the rest being liaison employees that spend part of their time at each company.

MCC holds the intellectual property rights to the results of its research. After three years of commercial development by the shareholders, it may license those results to outside parties, retaining the license fees as income. The company expects to begin delivering licensable technology next year.

CAM-I and its member companies had been working with various types of





time “trying to badger Justice and Treasury into understanding what’s going on.” Officials of the National Machine Tool Builders Association said following Merrifield’s remarks that they would review the possibility of a cooperative R&D program at a meeting later this year.

Government officials and executives of groups that have so far moved to expand their participation in cooperative R&D say that the organizational examples of such groups as MCC and CAM-I, which began their preparations for joint research long before the cooperative research act was passed, still

provide perhaps the best instruction for other groups considering joint R&D.

Both organizations, MCC in Austin and CAM-I in Arlington, are based in Texas and both are involved with computers, but that is about where their similarities end. More than half of the first 25 cooperative research act filings were in the computer, microelectronics and telecommunications fields. Observers and participants suggested this is related to the aggressive technology development efforts of those industries and the willingness of executives in those fields to innovate.

CAM-I had been in operation as a not-for-profit membership organization

with believe the computer—the “all-pervasive tool” of generic research—is essential to factory automation, according to Carter.

Despite the rapid penetration of computers into manufacturing, many manufacturers are still uncomfortable with their lack of reference points for integrating the new machines into their operations. Joint research through groups such as CAM-I helps provide a forum for exchange of ideas and reference points for in-company development work. “People are really coming together to integrate,” Carter says.

The first step, he notes, is to install basic automation. But after the initial

combined with the need to produce better research results, or “deliverables,” tempted the group to revise its operating structure.

The new structure, submitted for Justice Department review before the cooperative research act’s passage last year and approved by the federal law enforcement arm in June, provides specific guidelines for CAM-I to carry through research to actually produce prototypes, rather than documentation, as deliverables. The structure also lets CAM-I project sponsors retain commercial rights to results for three years, research hardware as well as software, charge licensing fees to non-sponsors, and organize national rather than international projects.

An initial goal of the reorganization was to help launch an ambitious \$25 million R&D effort with the Air Force to create interfaces and standards allowing the use of existing solid modeling systems, artificial intelligence techniques and numerically controlled (n/c) tools to automatically reproduce complex form features. That project has since been postponed by Air Force budget cuts, but other cooperative projects are planned or underway in areas such as automated communications links between computer-aided design and automated inspection as well as cost management systems for flexible manufacturing.

Cooperative R&D is “not something you can rush into without giving a great deal of thought,” MCC’s Stotesbery said. “It is very difficult to create a venture like this. There are no rules, no manuals.... We do know now, though, that competitors can cooperate.” **AMM**