or many years microelectronics has been one of the top discussion items of European managers, politicians, and scientists. In this issue we continue the dialogue with five articles from five different companies that describe the major European industrial activities in the various areas of microelectronics.

To describe the importance and the weakness of microelectronics in Europe, I will use the statements from JESSI's (the Joint European Submicron Silicon Initiative) 1990 Strategy Document.

- In the past Europe's microelectronics industry has succeeded in achieving a basic technological level matching that of the United States and Japan by means of extremely high efforts in research and development. However, Europe has hardly improved its market position. European-owned companies supply only about 40 percent of the European market for integrated circuits.

- Only in areas such as entertainment electronics or automotive electronics, in which close relations between IC manufacturers and users exist, could the potential of European-produced microelectronics in realizing competitive advantages be sufficiently exploited.

- The supply industry for equipment and materials needed for microelectronics production maintains only a very weak position in the market, despite the presence of many companies with considerable initiative and performance capabilities.

For Europe and the European industry at large, microelectronics is of vital importance. It is the most important base technology, and for a growing number of industrial branches its application determines the future innovation and competition potentials.

The electronics industry in Europe has reached the size of the automotive industry with a total value of about 70 billion ECU's (European counting units). The electronics industry is expected to grow at least twice as much as that of the average industry, making electronics in the year 2000 by far the biggest industry for Europe, with a size of about 150 billion ECU's.

Consequently, the availability and capability of a European microelectronics industry are essential for the technological infrastructure of the whole industry. The industry must perform two main functions

1) secure a reliable supply of electronic components, and
2) use to the full extent its potential for product and process innovation as well as for cost reduction.

In view of the fast technological progress of
microelectronics, the industry must participate in the most modern semiconductor technologies and rapidly convert them into advantages of product-performance and competitiveness in electronic equipment and systems.

The European microelectronics industry is subject to three basic problems:

- **Insufficient economy of scale.** The size of the individual microelectronics producers in Europe is insufficient to bear the expenditures for technological development and manufacturing investments, and the associated risks, which are required to keep up with the speed of technological innovation of their much larger competitors.

- **Insufficient vertical integration.** The layers of the electronics industry chain are heavily interdependent and long-term strategic advantages can only be achieved when all layers are available and provide state-of-the-art products. Increasing foreign penetration into the European industry chain, accomplished for instance by offering instant profits, decreases its strengths and creates undesirable dependencies.

- **Limited exploitation of available strengths.** Europe in general has strong capabilities in the different layers of the microelectronics industry but a weakness in exploitation. The traditional strength of the European industry in machine tools and precision mechanics should, for instance, be a healthy basis for semiconductor manufacturing equipment. Excellent capabilities exist in basic research at institutes and universities, but Europeans have achieved only limited impact on the industrial progress.

Because of the importance of the electronics industry, it is imperative that a strong electronics competence be retained in Europe. Therefore the European industry developed the JESSI strategy. Built around submicron silicon IC technology, in which many categories of the European electronics industry and academic play a part, JESSI aims to strengthen the total capability. The European industry is characterized by a structure in which medium-size electronics companies have a relatively high share in value adding and innovation. All initiatives will therefore take the specific requirements of this industrial structure into consideration. JESSI's mission is to

- strengthen the whole European electronics industry chain of the electronic systems, microelectronic components, and semiconductor production equipment and materials industries, and secure, also in the future, its worldwide competitiveness;

- secure the availability of European resources for the design, manufacturing, and application of microelectronic components, and stimulate the (vertical) relations between these resources, and

- stimulate the growth and market pull of the European markets for electronic systems, microelectronic components, and semiconductor production equipment and materials.

The five contributions in this issue describe a part of the work established under JESSI and ESPRIT (European Strategic Programme for Research in Information Technology) funding and give a good picture of today's work in Europe.