

Another well established research consortium in the United States is the National Centre for Manufacturing Sciences (NCMS) with headquarters in Ann Arbor, Michigan. Membership consists largely of machine tool companies in the U.S., many of which are small in size. The consortium receives government funding, including approximately \$5 million per year from the U.S. Airforce. The consortium operates by participating in research projects led by member companies, supporting research that is of interest to the consortium.

In recent years, ARPA has increased funding for other precompetitive technology consortia. In fiscal year 1991, at a cost of US \$50 million, these included The Ceramic Fiber Consortium, officially called IHPTET, the Advanced Composites Technology Consortium, the Optical Network Technology Consortium, the Optoelectronics Technology Consortium, the Advanced Static Random Access Memory, the Linguistic Data Consortium, the Scalable Computing Systems Consortium and the Superconducting Electronics Consortium. In fiscal year 1992, at a cost of US \$60 million, they included DRAM Capacitor Materials Consortium, the Data Storage Consortium, the Electro-Magnetic Code Consortium, the Micromagnetic Components Consortium, the Precision Investment Casting Consortium and the Ultra-Fast All-Optical Communication Systems Consortium. Additionally, 1993 Title IV Defense Conversion appropriations will fund initiatives in Advanced Materials Synthesis and Processing, and Agile Manufacturing and Enterprise Integration.

B. Europe

According to one European research director: "In America, science is business. In Europe it is still seen as culture."⁵⁵ Europe's multi-year funding of research and technological development (RTD) under the EC Framework Programs (FPs)⁵⁶ has been criticised for being inadequate to the task of improving the international competitiveness of European industry. It has even been suggested that international

⁵⁵ Carlo Rubbia, head of CERN, a multinational particle-physics laboratory near Geneva. Cited in "Europe's Technology Policy: How Not to Catch Up", *The Economist*, January 9th, 1993, p. 19.

⁵⁶ The Framework Programs support "precompetitive stages of research involving at least two mutually independent companies from different member states". There have been three FPs to date as follows:

<u>Framework Programs</u>	<u>Interval</u>	<u>Budget*</u>
First	1984-87	3.8
Second	1987-91	5.4
Third	1990-94	5.7
Fourth (proposed)	1994-98	14.7

* In Billions of ECUs where 1 ECU = \$1.60 Cdn. It is estimated that almost US\$2 billion was spent in 1991 (although this represents only 4% of total civilian R&D expenditures in Europe).