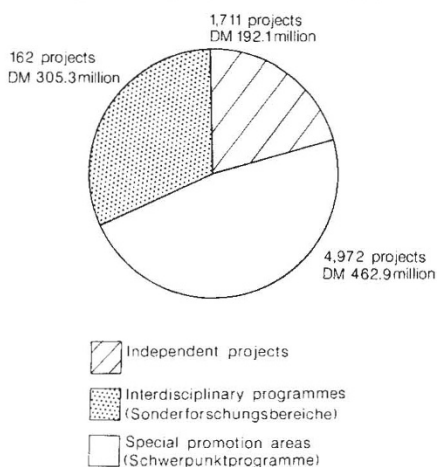


## The deutschmarks that count

Hamburg

THE annual meeting of the Deutsche Forschungsgemeinschaft (DFG), the West German Science Foundation, was held in Bonn last week. DFG's new president, Hubert Markl, pointed out that all DFG's activities were met with a budget of less than DM 1,000 million, just two per cent of the nation's research and development expenditure and, more significantly, only 60 per cent of the amount spent to subsidize the public theatres.

In 1985, DFG spent DM 982.6 million for the support of research and researchers, with 74 per cent going on personnel costs. Most of the money came from the federal government (DM 578.6 million) and the *Länder* (DM 397.4 million); expenditure was divided as below.



Markl rejected criticisms by the Wissenschaftsrat, the senior science advisory board, which had earlier said that doctoral education in West Germany is both too long and ineffective. Some 4,000 doctoral students are supported by DFG. Doctoral research is carried out in well controlled projects of quality, Markl said. He singled out for praise the contribution made by female scientists.

Chancellor Helmut Kohl made a speech in which he said that "quality and performance have reached a higher level", partly due to a retreat from the politicization of science. Despite increasing debate on the dangers of nuclear power and of science in general following the Chernobyl disaster, Kohl demands that politics should be kept out of science.

Hans-Werner Franke, the president of the *Länder* Ministers of Culture, Education and Church Affairs (Kultusministerkonferenz), demanded that the existing university system should be consolidated even with a decreasing student population. That may create a chance to switch some resources to research and to much-needed reforms.

Jürgen Neffe

## US technology

# Making rivals work together

Washington

FROM the outset, the US Microelectronics and Computer Technology Corporation (MCC) was risky business. The plan to bring together arch-competitors in the semiconductor and computer industries in a cooperative research institute had no precedent, and even the Justice Department considered challenging the consortium's formation. After operations began in 1983, MCC president Admiral Bobby Inman struggled for over a year to bring first-rate talent to the facilities in Austin, Texas. Then a long silence ensued.

That silence has only recently been broken. MCC is now drawing cautious sketches of the technology it has transferred to its "shareholders" (the 21 companies that invest in and preside over MCC). Despite the slump in the computer industry, the consortium's membership has now more than doubled, and includes such giants as Honeywell, 3M and Control Data. MCC's budget has reached \$65 million a year and its staff is near capacity with 440 employees.

Seven programmes are under way, focusing on semiconductor packaging, software technology, computer-aided design and advanced computer architecture. Each company pays \$500,000 for a share in MCC, and then foots a portion of the bill for each programme in which it participates.

The shareholders also contribute staff — approximately 35 per cent of MCC's employees are "on loan" from shareholder companies. One representative from each company joins the board of directors and one the technical advisory board. Among developments that have already reached shareholders are a model for building expert systems, an editor to aid graphic design of semiconductor circuitry and an improved process for tape-automated bonding which packs silicon chips tightly together on circuit boards and enables denser interconnections to be made.

The new technology is important, but what excites industry is whether the research structure of MCC can provide a new model. Inman says he and his managerial crew have vowed to minimize bureaucracy — "an everyday battle" — and to nurture the type of environment that encourages creativity. The three-level management hierarchy permits autonomy and quick decision-making within research ranks.

And MCC scientists are freed from the vagaries of market forces. The ability to provide stable funding and support is just part of the "psychic income" that keeps MCC laboratories alive, says vice-president and chief scientist John Pinkston.

MCC has invested heavily in its staff: \$20,000 to \$70,000 each for private computer workstations that in typical laboratories would be shared by up to four people. Although the aim is pre-competitive, collaborative research, the opportunities for collaboration are not unlimited. Because all programme information is considered proprietary unless declared otherwise, informal exchange between different programmes is discouraged.

Similarly, MCC scientists must bear in mind the expectations of their shareholders. Although they acknowledge that its goals are long-term, the shareholder companies are anxious to see MCC pay off. But shareholders have so far been reluctant to provide the brightest of their own staff for MCC.

Inman cites technology transfer as the most pressing problem confronting MCC. "We are delivering technology at a level of complexity that not too many of these companies are used to dealing with," he claims.

To enhance communication, quarterly updates and semi-annual research reviews bring shareholder and MCC scientists together regularly. Project teams throw "coming out parties" for newly-assembled technology packages, attended by all participating shareholders. Seminars and technical meetings take place frequently throughout the year. 3M and DEC have even moved their research and development headquarters to Austin.

Will MCC survive? Several industry consortia that have sprung up in MCC's wake pose no challenge, but the multi-billion-dollar budgets of the research and development teams at IBM and AT&T Bell Laboratories dwarf MCC's allotment. And the extent to which companies will capitalize upon MCC's legacy remains uncertain. Unequal gains could force out some shareholders and cause rancour among those that remain.

Finally, the diversity of interests represented at MCC may curtail its expansion into key programmes that would help fill the gap created by such a shake-out. One example is Inman's drive for a manufacturing technology programme, which "raised a lot of welts" at a technical meeting last spring, according to one person who attended. The proposed programme is both too specific to draw broad support among shareholders, and too close to applied science to prevent competitive urges.

But the adventurous spirit that created MCC may sustain it through the transitions ahead. With its unique position in industry research, the consortium has a rare opportunity to test alternatives.

Karen Wright