

initially will number "in the tens," but the total number of people working on the project will eventually reach more than 100, split among the three partners. In addition about 500 IBM staff members are needed to run the Fishkill facility.

According to Hans Queisser, a director of the Max Planck Institute for Solid-State Research in Stuttgart, who serves as an adviser to Siemens, the German company currently has about 60 people working with IBM on the 64-megabit DRAM, and Toshiba presumably will match this number.

Contrary to earlier expectations, manufacture of the 256-megabit DRAM will *not* involve x-ray lithography, at least initially. Horn and Queisser agree that researchers will concentrate on a number of new optical lithography techniques involving ultraviolet light and phase-shifted masks (see *PHYSICS TODAY*, October 1991, page 17). They expect such techniques to yield a resolution as fine as .25 micron, the scale needed for the 256-megabit chip.

Queisser, who had just visited the Fishkill facility when he dropped in on *PHYSICS TODAY* in early August, expressed considerable admiration for the manufacturing and test equipment that IBM has installed—some of which was developed with the aid of Sematech, the chip-equipment-testing consortium that IBM has strongly supported. Manufacture of 64-megabit memories at Fishkill, and possibly fabrication of the 256-megabit chip as well, will depend especially heavily on a new lithography system called Mirascan II, a scanning deep-ultraviolet optical tool developed by Silicon Valley Group Lithography Systems Inc, partly with the help of Sematech.

Separately from the agreement to develop the most advanced DRAM, several major international alliances have been forged this year concerning the development of flash memories—chips that retain information after power is turned off, giving them the potential to replace hard drives. These have included agreements between Sharp and Intel, IBM and Toshiba, and Advanced Micro Devices and Fujitsu.

In flash memories information is stored by electrons charging a floating or insulated gate either by tunneling through or being excited above the insulating barrier. Static random access memories, which depend mainly on transistors linked in bistable (flip-flop) circuits, retain information as long as power is running but not—in contrast to flash memories—when power is off. In DRAMs the key components are capacitors, and conse-

quently their contents must be replenished periodically while power is on by means of supplementary circuits.

On average, Queisser explained, SRAMs require about four times as much "real estate per bit" as DRAMs, and for a given number of bits per chip, the development of the SRAM

usually lags a generation behind the DRAM. As a result, following the research and production logic pioneered by Intel, the usual procedure is to convert a DRAM production facility, once it has achieved high yields and completed a full production cycle, for production of the follow-on SRAM.

—WILLIAM SWEET

## G7 SUMMIT YIELDS LITTLE IN WAY OF AID FOR STATES OF FORMER USSR

Munich (München): in the tourist's lexicon, one of the world's most pleasant and interesting cities. In the physicist's reference frame, home of the world-famous Deutsches Museum and, after Paris, the greatest concentration of scientific talent in Europe. In the framework of politics and international affairs, a name that connotes Hitler's Beer Hall Putsch, Chamberlain's appeasement policy and the 1972 Olympics tragedy.

Seen in the context of international politics, the summit meeting of the seven leading industrial nations that took place in Munich in early July was not quite the disaster that the name and place might seem to imply. But the anticlimactic results certainly were not something to write home about—and few correspondents did. The major agenda item was to be aid for the states of the former Soviet Union, and the yield was near zero.

In addition to firming up a \$24-billion stabilization program for the FSU, the G7 leaders had been expected to discuss establishment of an international foundation for FSU science with an initial endowment of about \$100 million (*PHYSICS TODAY*, June, page 67), and several newspapers had confidently predicted they also would adopt a multibillion-dollar program to enhance the safety of nuclear reactors throughout the former Eastern Bloc. In fact none of that occurred.

Despite a cameo appearance by Russian President Boris Yeltsin at a summit dinner, leaders left Munich less confident than when they arrived as to whether the International Monetary Fund would end up disbursing the monies authorized. This is because Yeltsin's radical economic reforms have run into snags amid growing fear that Russia may be headed for total economic catastrophe.

The proposal for an international foundation that would make peer-reviewed grants to FSU scientists in response to proposals (the so-called Okun-Voloshin proposal), failed to

win the support of the US and Japan. Instead a smaller grants-making organization is being established under the aegis of the European Commission with support mainly from France and Germany. Its funding initially will be at a level of \$4–\$5 million per year, and it is being managed, at least provisionally, by Paolo Fasella, the head of the EC's noninformation technology directorate.

CERN's Robert Klapisch, who has worked diligently on the Rubbia proposal for close to a year, says that he believes the foundation still will "snowball somehow" into a much more substantial program. But it remains to be seen whether he is right.

As for the program to upgrade Soviet-made reactors, it too ran up against the opposition of the US and Japan. "The American President said that this problem would not be solved by creating a new bureaucracy," a spokesman for the German government said during the summit. The US and Japan argued at Munich that the problem of reactor safety should be addressed by means of bilateral projects. As a result, a program to upgrade nuclear power plants in the states of the FSU and East Central Europe also has been shunted to the European Commission in Brussels, where it is in the hands of Laurens-Jan Brinkhorst, the EC director general for the environment, nuclear safety and civil protection.

The International Atomic Energy Agency has an ongoing program of inspection and evaluation of the Soviet-built RBMK (Chernobyl-type) and VVER (pressurized-water) reactors. (The Russian acronym RBMK stands for high-power channel-type reactor, VVER for water-water power reactor.) But a spokesman for the IAEA, expressing his own opinion, has complained that the FSU states already are suffering a confusion of advisers. What the FSU needs, he suggested, is a single, coherent program of international aid.

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