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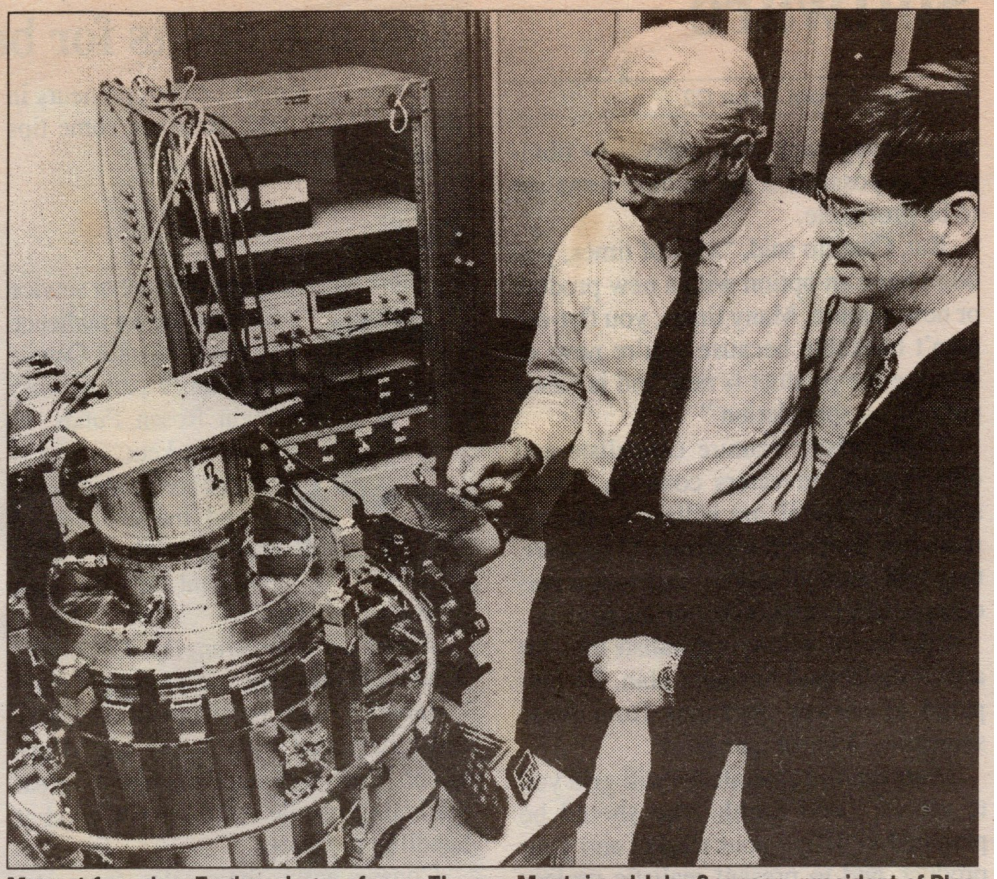

Magnet for sales: Engineering professor Thomas Mantei and John Spencer, president of PlasmaQuest, expect big things from Mantei's permanent magnet device.

# License expected to spark high-tech firm's expansion

By **LAURA STADLER** Correspondent

RICHARDSON — PlasmaQuest Inc., a semiconductor equipment manufacturer, is planning a major expansion after licensing a new technology used to make hard-disk drives, optical data transmission devices and computer memory chips.

The Richardson-based firm, which employs 38, licensed the advanced technology recently from the University of Cincinnati.

The advance involves something called a "permanent magnet," which was patented in 1993 by Thomas Mantei, an engineering professor at the university. The magnet is a key component in high-tech machines that PlasmaQuest sells. Mantei and John Spencer, president of PlasmaQuest, have worked together since the late 1980s.

In 1996, PlasmaQuest sold 16 of the machines, or reactors, that contain Mantei's permanent magnet. The company expects to bring in more than $12 million in revenue this year, up from $8 million last year. More than half the 1996 revenue came from international sales, most in the Pacific Rim.

PlasmaQuest's niche in the semiconductor equipment market is "plasma-enhanced processing" techniques. The company has built processing equipment for companies including Texas Instruments, Motorola, Intel and Samsung, and has representatives in seven countries.

In January, the company's representative in Japan, Gunze Sangyo Inc., pumped $1 million into the company to help PlasmaQuest finance an expansion project. The company plans "a major expansion" in the Dallas area, Spencer said, to meet increased demand for some of its machines. Those machines etch circuits on magneto-resistive heads, or "thin film heads," for disk drives. PlasmaQuest hopes to boost annual sales in the thin-film-head category to $10 million in two years.

"With the (permanent magnet) plasma source as a signature product of PlasmaQuest, it has put the company in an excellent position to be a leader in areas

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# Expansion

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where well-established process technologies don't perform satisfactorily," said Spencer.

Electron cyclotron resonance (or ECR) plasma, which is used to manufacture the likes of computer chips, is traditionally generated by electromagnetics. "The permanent magnet structure does not furnish power. (Rather,) it provides a magnetic field, which enhances the transfer of microwave power to the process plasma," said Mantei. "As a comparison, the magnetic field of this magnet is about 10,000 times stronger that the magnetic field of the earth at Dallas."

The permanent magnet is more powerful, does not require a magnet power supply and is a proven method of processing materials such as large ceramic wafers that are difficult to process under current methodology. "It simply performs somewhat better than previous older designs, and greatly reduces the cost of ownership," Mantei said.

As electronic device dimensions continue to shrink, ECR plasma-etching technology for building integrated circuits has shown many advantages and is growing in popularity. The specialty business generates $500,000 to $1 million in revenue per machine for PlasmaQuest, depending on customer specifications.

"Our strategy is to help companies in their (production processes)," said Spencer. "We work with the technology in the pre-production, or R&D phase, and follow the customer's developments to the production phase, providing the necessary tools and testing environment along the way to manufacturing the final product."

The actual processes in the manufacture of microchips include a series of production cycles and involve depositing chemicals and ionized gases on materials like steel, silicon (wafers) and glass. These procedures take place within the process chamber of a reactor and go through several stages of being etched, stripped and cleaned before they are ready to be cut into individual chips or semiconductors — the "brains" of an electronic device.

The magnetic power in the process chamber is joined with microwave power — the same energy used in microwave ovens — and the energy heats up the different gases and forms ions that are used to process "substrate" materials for use in electronic products.

The University of Cincinnati recently filed another patent application which includes modifications to the magnet source, and a third patent involving both PlasmaQuest and the university is in the works.

"It is the same story for every technology company," Spencer said. "You have to continue to work towards decreasing costs and improving processes. Working with the University of Cincinnati puts us on a path of continued growth, and our strategy is to position the company for a public offering."

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