

Storage's new dimension



STUART GARFIELD PHOTO

Staff members at Aprilis include, left to right, Richard Ingerwall, Parag Mehta, John Berg and David Waldman. Kneeling in front is Glenn Horner, holding one of the company's holographic discs.

Aprilis has big plans for holographic discs

BY JEFF MILLER
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When most people think of holograms, they probably imagine R2-D2 projecting Princess Leia or a cheesy trinket in the bottom of a cereal box.

John Berg is different. To him, holography conjures up visions of super dense, super fast data storage.

The company he leads, Maynard-based Aprilis Inc., is developing holographic storage systems that Berg claims will, within a few years, be able not only to store a terabyte of data on a single CD-like disc, but to read 32 gigabytes of data per second.

Current DVD and CD storage tech-

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nologies burn tiny "pits," which are then read by a laser as ones and zeros, into the disc's surface. Holographic storage, however, writes data in three dimensions, using a reference laser and a data beam.

"With normal material," Berg said, "you might be able to put down a page of data. Using holography, for every increase in the angle, you can put another page. It's as if you get a new CD or DVD just by tilting it a little bit."

Today, Berg claims Aprilis can store between 60 and 200Gb on a single 120-mm disc, though in a few years, he expects to store as much as a terabyte.

Today's CDs store 650 Mb and DVDs can store up to 15Gb of data.

In addition to holographic discs, Aprilis is working on 50mm-square cards as a storage medium.

Though 3-year-old Aprilis is not technically a Polaroid spinout, two-thirds of Aprilis' 27 employees hail from the once-great Cambridge imaging company.

For instance, Richard Ingerwall, an Aprilis founder, was one of the engineers that developed the material Polaroid used for the first mass produced volume holograms.

"The plain fact is, Polaroid started working on this way back in the 1970s,"

Berg said:

Aprilis recently broadened its intellectual property portfolio with the purchase of 21 holographic data storage patents from Manhattan Scientifics Inc., a publicly traded research and development company based in New York and New Mexico.

Manhattan Scientifics said in a statement that it sold the patents for an undisclosed amount of cash and stock to focus on fuel cell and software development.

Aprilis has already sold close to \$1 million worth of its holographic media cards and discs to 15 companies, including Sony, Samsung, Daewoo and Pioneer. They intend to use the products in tests to determine whether the technology would be applicable in their consumer products.

"Last week," Berg said, "we sold \$10,000 worth of media cards."

Berg is particularly upbeat about the opportunities for holographic storage in consumer electronics entertainment applications such as video.

Ultimately, however, Aprilis wants to do far more than produce media cards.

"As much as we'd like to hit a home run with the large volume consumer market," Berg said, "there's a lot

beyond our control. We want to do a drive ourselves and take our destiny into our own hands."

Aprilis is working on a prototype for a holographic storage drive. The newly acquired patents from Manhattan Scientifics cover technologies that Berg believes are crucial to the drive's design.

Berg sees applications for the enterprise. For one, because large chunks of holographic data can be read and analyzed all at once, database searches are much faster.

In addition, holographic drives could read data much faster than today, approaching speeds of 32Gbps. So fast,

in fact, that today's network plumbing may not be able to keep up with these data rates.

It's a concern for some venture capitalists, who see the technology as a solution searching for an enterprise problem to solve.

"I haven't heard much from customers about needing faster, cheaper discs," said one Bay

State VC who invests in the storage sector. "What I hear is that storage networks are difficult to set up, maintain and debug."

Berg, however, contends that holographic storage could serve as an alternative to digital tape backup.

"It takes a lot of time to find and retrieve data without having to load the entire tape," Berg said.

Zero Stage Capital in Cambridge, at least, is convinced that Aprilis has a good shot at making it. Along with individual investors, the VC firm has invested \$17 million in Aprilis over two rounds of funding.

Aprilis isn't the only company going after this market, however.

In 2000, Lucent Technologies spun out a holographic storage company called InPhase Technologies, which is based in Longmont, Colo.

Last month, InPhase announced it had won a \$600,000 contract from the National Technology Alliance through the Department of Defense to develop its holographic storage media.

And in Japan, Optwave, another holographic storage company, has received 600 million yen (about \$4.9 million) from a large syndicate of investors that included Intel Capital.