

Peter DaSilva for The New York Times

LiveScribe puts a computer inside a plump ballpoint pen.

# Take Note: Computing Takes Up Pen, Again

By MIGUEL HELFT

SAN FRANCISCO, May 29 — For more than two decades, the dream of controlling a computer with a pen has seduced and, more often than not, frustrated some of the biggest luminaries in the technology pantheon, including Bill Gates and Steve Jobs.

Now Jim Marggraff, an entrepreneur with a long string of successful innovations, say he thinks he has figured out the secret of pen computing — and he has done it by playing with toys.

Mr. Marggraff, a longtime executive at the toy maker LeapFrog, is the inventor behind a string of talking books,

smart pens and other educational toys that have made their way into millions of American homes.

His new company, LiveScribe, which he plans to introduce today at the D: All Things Digital technology conference in Carlsbad, Calif., has taken some of those technologies several steps further. It has created an ambitious new type of pen-based computer system that, if successful, could bridge the gap between paper and the digital world and perhaps even change the way millions of people interact with the Internet.

"I think there is tremendous potential," said Rodney Brooks, director of the Computer Science and Artificial In-

telligence Laboratory at M.I.T. Mr. Brooks is not affiliated with LiveScribe but said he might become a consultant for the company. "The challenge, like with all technologies, is to package it in a way that people will want to use," he said.

History suggests that the challenge will not be easily overcome. The promise of computing with a pen has led to some of the best-known failures in Silicon Valley's history, including Apple's hand-held Newton, and the Go Corporation. Go was a pioneering pen computer company that attracted some of the

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# Take Note: Computing Is Taking Up the Pen, Again

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technology industry's most famous executives, spent \$75 million of the investors' money and ended up with little to show for it.

And while pen computing has finally gained a degree of acceptance with consumers through devices like the Palm line of personal digital assistants and tablet PCs, those remain niche products, not the general-purpose machines that some pen computer pioneers envisioned.

Mr. Gates, for instance, predicted five years ago that 2007 would be the year when tablet PCs became the most popular form of PC sold in America, yet they still represent less than 1 percent of the market, according to the NPD Group, a market research firm.

Mr. Margraff is familiar with this history, and that, in part, is why he has turned the very notion of pen computing on its head.

Instead of forcing users to write with a stylus on a computer's slippery display, LiveScribe put the computer inside a plump ballpoint pen that is used on paper imprinted with nearly invisible miniature dots. As a user writes, a tiny camera near the pen's tip watches those dots go by, recording what is being written.

Mr. Margraff said calling it pen computing is a misnomer. "We are creating paper-based computing," he said.

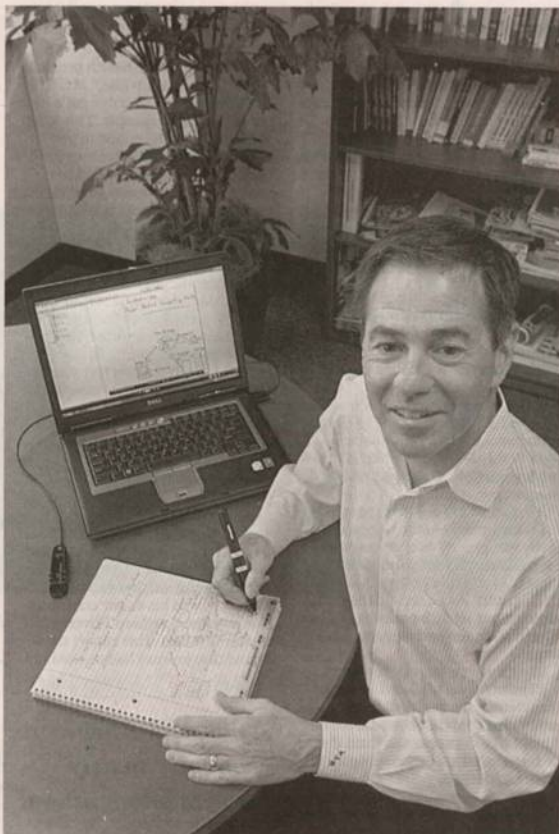
In addition to the camera, the pen, which is about the size and weight of a fat Montblanc pen, has two microphones to record sound, a speaker for playback, a small display that Mr. Margraff calls a pixel bar, and, of course, a hidden computer chip and other sophisticated electronics. It fits into a docking station, where it can upload or download programs and data files to and from a PC.

The LiveScribe pen is a more advanced version of the LeapFrog Fly Pentapad Computer, which itself has some impressive abilities, even if it is intended for children. Fly users can draw a calculator on paper and make it work by tapping the keys with the pen; a speaker in the pen plays back the results. Users can also draw a piano keyboard on a piece of paper and play a tune on it.

The same technology, which is licensed by Anoto, a Swedish company, has made its way into pens that can be used to write notes and upload them onto a PC, but not much else, and hence has failed to become popular.

But Mr. Margraff, who left LeapFrog to form LiveScribe when the Fly hit store shelves during the 2005 holiday shopping season, has taken the technology several steps further. He also plans to open up the technology to others, in hopes that LiveScribe will attract content creators and third-party programmers who will develop many new uses for it, including some not yet envisioned by LiveScribe's team of about 45 employees.

For now, Mr. Margraff plans to market the pen, which will be avail-



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Jim Margraff, chief of LiveScribe, was an executive at the toy maker LeapFrog, where he was behind a string of innovations.

## ONLINE: THE PEN IN ACTION

An animated video demonstrating the LiveScribe pen computer's ability to synchronize written notes with voice recordings is at: [nytimes.com/business](http://nytimes.com/business)

able in the fall for less than \$200, to college students, and he has some very specific ideas for how they will use it.

The pen, he said, will revolutionize the way millions of students take notes. To demonstrate, Mr. Margraff jots down some notes while talking with a visitor. As he speaks, the digital recorder inside the pen captures his voice. Once done, he taps the pen on a word he scribbled halfway down the page. The pen immediately begins to replay the conversation, starting from the point in time when Mr. Margraff had written that word. He then skips back and forth in the audio simply by tapping the pen on different places on the page.

Finally, he docks the pen, and

uploads the notes and the audio to his laptop computer. From there, Mr. Margraff said, he can organize the notes, search through them, play them back and send them to others. Additional software can translate the written notes into text.

Mr. Margraff said these features could also be useful to professionals like journalists, doctors, job interviewers or lawyers who want to share with associates notes of a business negotiation.

"Anyone that is writing notes on paper, wants to capture the information, they want to access the information," Mr. Margraff said. "We are giving a way for people to essentially forget about forgetting."

Mr. Margraff said the pen could also provide a powerful new way for people to upload words, pictures and audio to their Web sites, blogs or social networking pages.

To generate excitement about the future potential of the LiveScribe technology, Mr. Margraff performs a nifty stunt: he reaches into his pocket, pulls out his business card and hands it to someone saying that if the person jots down a note on the back of it with a LiveScribe pen, the

note could soon land in Mr. Margraff's e-mail in-box.

"It's the first interactive business card printed on self-addressing paper," Mr. Margraff said.

By the end of the year, he said, similar paper with unique dot patterns associated with particular e-mail addresses will be available. Once notes written on such paper are uploaded to a PC, they will automatically forward to the address, opening many business applications. A drug company, for example, could use the technology to gather data from patients during late-phase clinical trials.

For Mr. Margraff, this is as close as he has been to fulfilling a 10-year quest to make paper interactive.

It began even before he joined LeapFrog in the late 1990s, when his company, Explore, built a globe, which at the touch of a stylus, would call out capitals. After LeapFrog bought Explore, Mr. Margraff helped create the LeapPad, a touch-sensitive plastic surface that with the help of a stylus, turns paper books into talking books that can help kids learn to read and write. The LeapPad became the best-selling toy in America in 2000 and 2001, a first for an educational toy.

After a series of other hits, Mr. Margraff helped conceive the Fly. LeapFrog will not say how many Flies it has sold, but Mr. Margraff said it had been the company's best-selling product. Mr. Margraff, who said he was about to get \$22 million in financing from a group of venture capitalists led by Vantage Point Venture Partners, has even bigger plans for LiveScribe, based in Oakland, Calif. He will not talk about them in detail now. But in the past, Mr. Margraff has described a vision for what he calls "the paper Internet." In it, many of the things currently done on a computer, say, buying a book or sending an e-mail message, could be done with LiveScribe's pen. Write the words "shop," "Amazon.com" and the name of a book on a piece of paper, then dock the pen, and the computer would take care of the rest.

Few people have seen the LiveScribe so far, but veterans of the pen computing world say that while the technology sounds impressive, success is far from guaranteed.

"I hope the product matches the hype," said Jerrold Kaplan, a co-founder of the pen computing pioneer Go in 1987. "It has to work really well. It's such a new concept, and often the execution of new concepts requires several iterations before the quality is acceptable."

Another challenge is that LiveScribe is being introduced into a world where young people are spending more time typing text messages on cellphone keypads and writing less in longhand.

Paul Saffo, a longtime technology forecaster who teaches at Stanford's School of Engineering, said, "Ironically, the big behavior change may be to get this younger generation to pick up this unfamiliar instrument called the pen."