

Seeing a future without 3-D glasses

January 24 2011, By Peter St. Onge

This month, technology lovers from around the world descended on Las Vegas for the 2011 Consumer Electronics Show, an annual gathering of geekdom that features the latest in personal gadgetry.

Among the stars of the show were 3-D televisions - not only the sets that are populating your local electronics store, but newer [prototypes](#) that answer the cry of consumers everywhere who don't want to wear those dorky 3-D glasses.

More than 2,200 miles away, Ken Conley sat at his desk in a small office park in Indian Trail, 15 minutes south of Charlotte. Unlike last year, he decided not to make the flight to Vegas for the show. "Now," he said, "I wish I had."

On display in Vegas were glasses-free 3-D TVs from companies that included Sony and Toshiba. They're the next potential big thing in visual displays - made possible, in part, in the warehouse over Conley's shoulder.

For the past quarter-century, the North Carolina State graduate has been a pioneer in the production and use of lenticular sheets, a plastic that is placed over images to give them a three-dimensional effect. Until recently, the technology has been used for still images, like the portrait behind Conley's desk of a firefighter emerging from a burning building or the 3-D poster promoting the movie blockbuster "Avatar."

But now, Conley's product and ideas are being used for moving images,

including those on laptops and portable Blu-ray players that also had bloggers buzzing in Vegas.

"It's even more intense this year," said Conley, "which makes us very happy."

Engineers from 3-D manufacturers send their units to Conley for customized lenticular sheets, or they fly to Charlotte and drive down to Indian Trail, where they are greeted at the front desk of a nondescript office by Conley's wife of 50 years, Mary Ellen.

The Conleys founded Micro Lens 14 years ago in the basement of their Matthews home. And if a basement seems a cliched kind of place for a technological advance to be born, well, it's about the only thing typical about Ken Conley.

He is 77 years old, a Shelby native. He doesn't look much like a techie - more, perhaps, like a techie's dad. And at an age he says might put him "down at Myrtle Beach," he instead finds himself at the edge of new technology.

And he's there for a very old reason: He's never quite satisfied with his work.

"You want a tour of the place?" Conley asks.

It's a small operation - nine employees, including their daughter, who brings the Conleys' grandkids on weekdays to play in an office/toy room.

The tour begins in a conference room lined with striking 3-D images. A NASA astronaut leaps off a wall portrait. A crisp black-and-white head

shot of Queen Elizabeth changes as you walk past.

Micro Lens is the world's leading producer of the lenticular sheets that cover images like these, which means that if you see a 3-D poster at a bus stop in, say, Dallas - odds are the plastic that created the 3-D effect came from North Carolina.

So how did Conley become an industry leader? A brief history of 3-D:

The origin of autostereoscopic displays, or 3-D imagery, began in the 17th century, when French painter G.A. Bois-Clair composed paintings that broke two images down into stripes and placed them behind a grid of vertical bars. The resulting effect was that if you walked by the paintings, one image would turn into another.

More than a century later, in the mid-1800s, English and Scottish inventors developed the stereoscope, a device that used lenses or mirrors to combine two photos of the same object into one 3-D image. By the early 20th century, film pioneers were doing the same with moving pictures.

The 3-D technology enjoyed its first heyday in the 1950s, with several movies employing the effect, and it has seen a recent resurgence that began in the 1990s with several documentaries using IMAX 3-D technology. The effect also was popular in advertising, thanks in part to lenticular technology, which began to boom in the 1940s and was used for products that included baseball cards and, of course, Cracker Jack prizes.

In the 1980s, a small Matthews company called Rexham supplied lenticular materials for manufacturers that had introduced multi-lens cameras. Ken Conley was an engineer on the project.

In the mid-1990s, he started his own company, Micro Lens, which sold lenticular products and the means to produce them to companies that wanted to make 3-D images. His timing was perfect. A new wave of technological advances was bringing computers and high-quality ink jet printers to small businesses, allowing Conley to offer lenticular sheets for 3-D products in smaller quantities. The use of 3-D in advertising again boomed.

In the late 1990s, a friend sent Conley a computer program that allowed users to place one picture on top of another and print it - perfect for 3-D photos. To make that process simpler, Conley created a lenticular sheet to go on a computer monitor, so artists could see their images in 3-D.

It was 2002, and a new thought came to him: If his lenticular sheet could make a monitor show a still image in 3-D, why couldn't he do the same for moving images?

"That's pretty much how I got started in 3-D TV," he says.

How does 3-D work?

The simple answer: In real life, your brain takes the separate images your left and right eyes see and gives them depth. 3-D technologies essentially do the same. Says Conley: "Your brain is being tricked."

For 3-D movies, that trickery is performed by 3-D glasses, which separate the left and right images for your brain. For most of the 3-D TVs now hitting the market, motorized spectacles called "active shutter glasses" switch the image from one eye to another at a rate of many frames per second, fast enough to create one smooth, merged image.

But those same glasses may be holding 3-D TVs back from mass-market acceptance. Yes, the Dork Factor. People don't want to wear glasses - or

look across the room and see their spouse wearing glasses - while they watch TV every night.

"I've never worked with glasses," Conley says. "They're a faddish thing."

TV manufacturers have apparently shared his concerns. About four years ago, even before today's 3-D TVs with glasses hit the U.S. market, companies were exploring how they could do 3-D without glasses. One of the people they approached was Ken Conley.

Now, his offices are strewn with monitors from those companies, and Conley is charged with making lenticular sheets that match the pitch and pixel arrangements of each TV.

"It's fun," he says, "and it's frustrating."

The frustrating part: There are still obstacles to overcome before they're ready for market. The biggest such challenge is the "sweet spot." Viewers of 3-D TV without glasses have to sit in designated places to get the full effect of the technology. Move from those spots and the 3-D effect diminishes.

"It's still not quite easy to watch," said Andrew Eisner of the electronics website Retrovo.com, who saw the displays at the Consumer Electronics Show this year. "It seems as if it won't be practical for another four or five years."

Another possibility: A different technology will emerge that makes 3-D without glasses work. Already, Conley's lenticular sheets have competition: parallax barrier technology, which uses a fine grating of liquid crystals on TV screens to help create a 3-D effect.

Conley is optimistic. He keeps an eye on where research and

development dollars are spent, and he sees a continued emphasis on 3-D without glasses. Companies also are pursuing 3-D on portable DVD players and gaming units, where the 3-D sweet spot isn't as much of an issue, and the technology has a logical future with the flourishing tablet market, as well.

All of which would be good for business at Micro Lens. "It would be way bigger than it is now," Conley says, finishing his tour in a warehouse full of lenticular screens and images.

There are Disney posters and several large prints of dinosaurs popping menacingly off their 3-D display. It's a visual treat that begs for a second or third look, and Conley waits patiently, smiling. He is humble about his place in the 3-D world - and his role in 3-D TV. "I'm not the father of anything," he says. "I just created something that people can use."

Is he still wowed by it? Not really. He looks at the images he helps create, and he wonders how he can give them more pop, more crispness. New technology. Old school.

"I think, 'I can make this better,' " he says. "I just ain't satisfied with it."

3-D TV: FUTURE OR FAD?

Sales of 3-D televisions disappointed major manufacturers in 2010. About 3.2 million 3-D TVs were sold worldwide, according to market researcher DisplaySearch. Samsung alone had expected to sell 3 million to 4 million by year's end.

What's the problem? A survey by Deloitte, an international consulting firm, found that consumers aren't convinced the technology is valuable

enough to prompt a new shopping trip. In a 2010 survey, 83 percent said that 3-D wasn't enough to make them want to buy a new TV.

Another issue, of course, is the glasses. The firm said 30 percent of viewers reported that they didn't like wearing 3-D glasses.

3-D TV also suffers from the same obstacles that confronted HDTV early on. The TVs are expensive, with most in the \$2,000 to \$3,000 range this holiday season, not including \$100-plus for the active shutter glasses necessary to get the 3-D effect. Also, there's still not enough content in 3-D to justify the purchase.

As with HDTV, industry observers expect prices to come down. (Already, some manufacturers are shifting to less expensive passive glasses, similar to those used in 3-D movies.) Also, content providers are starting to offer more 3-D programming - most notably ESPN, which launched ESPN 3D last year, a network that will show live and archived 3-D events 24/7 in 2011.

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