



A mastectomy patient opts for breast reconstruction. During surgery, the doctor does his best to visualize the size and shape of the new breast. After the surgery, however, the patient realizes that her breasts do not match. Here is a product that gives surgeons a more scientific method of determining volume differences for breast reconstruction.

3D BreastSim™



How It Helps: The 3D BreastSim imaging system and software increases the accuracy and speed of breast reconstruction and augmentation and reduction surgeries. Whether in a pre-operative consultation or during surgery, doctors need a quick, accurate method to determine the volume of an existing breast so that the reconstructed one will closely, if not perfectly, match. Traditionally, laser line scanners have been used to provide the data to generate three-dimensional models, but these devices are slow and have difficulty operating when the object being scanned moves, even slightly. The 3D BreastSim imaging system captures full-frame images in less than a second. More than 440,000 data points are collected for each image. A lightweight, compact design makes the system portable and adaptable to nearly any medical environment.

How It Works: The 3D BreastSim imaging system includes a device that projects white light through a cylindrical lens that fans the beam. This beam passes through a linear variable wavelength filter to produce a continuous color spectrum, much like the rainbow effect from a prism. This rainbow of light illuminates the breast. Reflected light is detected by two color charge-coupled devices (CCDs), which convert these reflections into digital signals. Proprietary software uses this digital data to mathematically compute the x, y, and z locations for each pixel of the image created by the CCDs. Once the locations are known for every pixel in the image, a true three-dimensional model of the breast can be displayed.

How Much It Will Cost: The 3D BreastSim and its associated software can be purchased for about \$5,000.

When It Will Be Ready: This product is available now. The 3D BreastSim has been sold to early technology adopters such as plastic surgeons and university hospitals. The technology is also being evaluated for use in doctor-patient planning and communication before breast augmentation/reduction surgeries.



Who Is Working On It: The innovator is Genex Technologies, Inc. (GTI). GTI develops leading-edge electronic imaging technologies and delivers proprietary hardware/software solutions. The company was ranked #257 in the 2002 Inc. 500, a comprehensive guide to America's fastest-growing private companies published by Inc. magazine. Founded in 1996 by Dr. Jason Geng, GTI employs 15 people and occupies 7,000 square feet of office and laboratory and development space. For more information, contact Dr. Jason Geng of GTI at (301) 962-6565 or geng@genextech.com. The company Web site is www.genextech.com.




MDA Origins

The product's origin can be traced back to research GTI conducted for BMDO. In 1996, BMDO awarded GTI an SBIR Phase I contract to integrate an innovative 3-D camera with a true volumetric display device. Combined, the two technologies would bring a new level of realism to simulation, training, and battlefield management. A sensor platform of 3-D cameras, for example, could help detect and track incoming missiles by feeding trajectory data to a 3-D display system at the command and control center. In 1997, BMDO awarded GTI a follow-on Phase II contract to develop a prototype.

