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Little Vermont Company Makes Big Impact in 21st Century Medicine

Ascension Technology Corporation, located in a suburb of Burlington, Vermont, makes key enabling products for one of the breakthrough advancements in early 21st century medicine -- minimally invasive surgery.

The company's president, Ernest Blood, invented pulsed DC magnetic technology in the late 20th century. It works under the control of an electronic unit to generate magnetic fields in a set of coils that induce quantifiable changes in a set of sensing coils. The fields are similar in size to the earth's magnetic field and present no danger to humans. Each measurement cycle produces as many as 240 sensor position and orientation readings, accurate to within 1.4 millimeters of a true measurement. Early markets for the company's short-range three-dimensional tracking technology included virtual reality games and computer character animation for movies, TV, and video games.



Ascension Technology Corporation makes key enabling sensors for the greatest medical breakthrough of the early 21st century – minimally invasive procedures. As shown here, the company's miniaturized sensors are commonly used with ultrasound equipment to quickly and precisely guide a biopsy needle through the skin to an internal lesion.

By the turn of the century, medical researchers began combining Ascension tracking devices with ultrasound machines to make three-dimensional images of anatomical parts, such as soft organs and even the faces of fetuses. (Moms could thus see a three-dimensional, gray-scale likeness of their baby's face before birth.) Encouraged by early medical successes, the company launched a new generation of magnetic trackers with advanced signal processing and miniaturized sensors (as

small as 0.38 millimeter in diameter) for guiding the tips of medical instruments to targets, such as tumors, within a patient's body. By 2011, the company had advanced the technology sufficiently to enable a whole new generation of medical procedures. As of this writing, some 60 medical procedures in 12 specialties are expected to benefit from the sensor's proficiency to measure, guide, navigate, and localize biopsy needles, catheters, ablation probes, guidewire, and endoscopes.

According to the former director of the National Institutes of Health, Dr. Elias Zerhouni, the sensors are a vital part of three great medical advancements: multi-modality imaging, molecular biology, and image-guided procedures. The later represents a real-time merger of imaging and therapeutic intervention with visualization software to accurately direct instruments to internal lesions in a way that negates open incisions and minimizes patient trauma, recovery and expense. Ultrasound was the first modality to take advantage of these techniques with the addition of sensor-driven navigation modules. Sensors in ultrasound probes, needles, and ablation electrodes help physicians quickly and accurately make volumetric measurement, fuse imaging planes, biopsy tissue, and ablate tumors procedures – all percutaneously.

According to Ascension's vice president, Jack Scully, other imaging modalities and improved procedures will follow ultrasound's lead. "FDA mandates and concerns over unnecessary radiation," he stated, "will ultimately push image-guided procedures to other imagers, such as C-Arms and interventional X-rays. Simultaneously, medical researchers around the world are developing a whole new generation of procedures benefitting from current advances in imaging and instrument tracking."

Ascension employs 40 people at its facility in the Catamount Industrial Park in Milton, Vermont. From its 21,000 square foot facility, the company designs, develops, manufactures and sells its sensor products to major medical device companies including GE Healthcare, Toshiba, Hitachi, and Siemens. It also sells tracking products to a growing number of smaller companies with strategic plans to profit by the transformation of incision-opening operations into minimally invasive procedures.