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technology opportunity

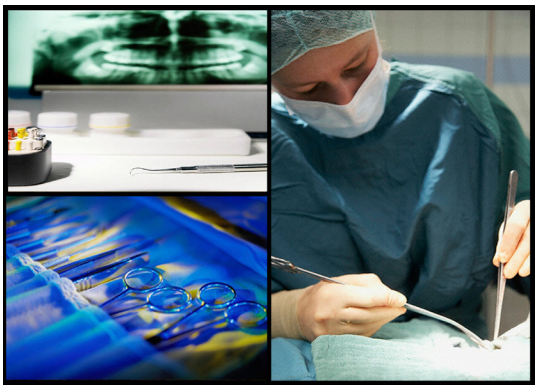
Advanced Robotic Imaging System for Image-Guided Surgery

The University of Florida is seeking companies interested in commercializing a breakthrough in image-guided surgery. In 2005, the image-guided surgery (IGS) market in the U.S., which encompasses systems used for neurosurgery, otolaryngology, spine, and orthopedic procedures, was valued at more than $115 million, according to the Millennium Research Group. The use of IGS technology has increased dramatically in the past decade, due in large part to technological advancements. However, existing IGS techniques still have many flaws, including high exposure to radiation for the health-care practitioner and problems with imaging accuracy and precision. Researchers at the University of Florida have developed a comprehensive IGS system that utilizes robotic arms to effectively target all existing technological problems and provide a safer, more accurate and precise system.

Applications

An innovative system of robotic arms to enhance the accuracy and efficiency of image-guided surgery

Advantages



- Highly advanced robotic imaging system, greatly increases ease of use and reduces operation time
- Robotic arms introduce and retract surgical tools from operative field, eliminating many sterile field issues
- All types of images are automatically registered in the same coordinate space, significantly enhancing accuracy and improving surgical efficiency
- Surgeon does not have to be in imaging field to capture X-rays, greatly increasing safety by reducing exposure to radiation
- Imaging system allows for non-equatorial scan trajectories, providing greatly increased flexibility and graphic reconstruction abilities

Technology

This unique imaging system includes a robotic imaging and tool-holding system that increases operational accuracy and precision, thereby providing higher-quality imaging while reducing operation time. The design includes three integrated robots, two for imaging and one for tool-holding. The imaging robots are capable of advanced two-dimensional and three-dimensional image acquisition and reconstruction and automated image space calibration and registration.

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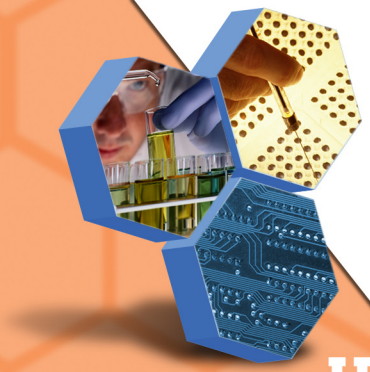
Technology (cont.)

The tool-holding robot can be used for universal, on-the-fly tool calibration and advanced tool guidance. Overall, this novel robotic system is crafted to overcome all of the problems associated with existing IGS techniques.

The Inventors

Scott A. Banks, Ph.D., is an assistant professor of Orthopedics and Rehabilitation, as well as an assistant professor of Aerospace and Mechanical Engineering at the University of Florida. His primary areas of research include human biomechanics, skeletal implant design, imaging and instrumentation. In 2003, Banks received the Hap Paul Award for research characterizing the function of various knee replacement designs. He is the co-inventor on four patents and a co-designer of a knee replacement system used in North America, Europe, Asia and the Middle East. Banks earned a B.S. and a M.S. in Biomedical Engineering at Case Western Reserve University, in Cleveland, Ohio and then a Ph.D. in Mechanical Engineering at the Massachusetts Institute of Technology in 1992.

Frank J. Bova, Ph.D., is a professor of Neurosurgery at the University of Florida and director of the Radiosurgery and Biology Laboratory at the University of Florida's McKnight Brain Institute. His work with Dr. William Friedman has resulted in eight patents dealing with both mechanical and computer system associated with radiosurgery and image guided procedures. In 2001, Bova received the ISRS Fabricant Award for Outstanding Contribution to the Field of Stereotactic Radiosurgery. Bova earned a B.S. and M.S. in Biomedical Engineering from Rensselaer Polytechnic Institute. He earned a Ph.D. in Nuclear Engineering Sciences with a specialization in Medical Physics from the University of Florida in 1977.



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