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## Ascension Sensors Key to Improving Intracardiac Intervention and Image Fusion



### Siemens Papers Tout Role of Sensors at Premier Medical Imaging Conference: MICCAI 2007

**BURLINGTON, VERMONT; November 20, 2007:** Biomedical imaging researchers from Siemens Research and Medical Solutions groups presented two groundbreaking papers in medical imaging at the 10<sup>th</sup> International Conference on **Medical Image Computing and Computer Assisted Intervention** (MICCAI) Conference earlier this month in Brisbane, Australia. In each presentation, Ascension's *microBIRD/3D Guidance* sensors were employed to provide the vital navigation link between imaging modalities and anatomical structures.

In the first paper, **Image Guidance of Intracardiac Ultrasound with Fusion of Pre-operative Images**, Yiyong Sun and co-authors presented a method for registering 3D intracardiac echocardiography (ICE) to pre-operative images. In the research protocol, a 1.3 mm pulsed DC magnetic sensor from Ascension Technology embedded in the distal tip of Siemens' *AcuNav* ICE catheter provided real-time navigation and localization of cardiac anatomies. The goal of the work is to help electrophysiologists treat complicated atrial fibrillation (AFib) cases by increasing ablation accuracy and reducing procedure time.

According to the authors, ICE catheters are routinely used for "transeptal catheterization and left atrial procedures" because they help "visualize anatomy and hemodynamics while providing real-time feedback of the location of other catheters deployed in the heart." The Siemens' approach widens the narrow field of view of the ICE ultrasound by fusing sensor-tracked ICE images with pre-operative

images, such as CT, C-arm CT or MRI to improve procedural vision. Siemens' image-based registration improves the procedure by not requiring user segmentation of images or mapping of heart chambers. Unlike other methods, the Ascension *microBIRD* sensor in the catheter tip and a second sensor on the patient's chest simultaneously correct both cardiac and respiratory gating. In the next stage of the research, the Siemens teams will make the registration process "simpler and faster," and validate the technique with physicians.

In the second paper, **Simulation and Fully Automatic Multimodal Registration of Medical Ultrasound**, Wolfgang Wein and co-authors presented new methods to align a single freehand ultrasound sweep and CT imagery without manual interaction. The researchers used an Ascension 1.8 mm sensor affixed to the scanhead of a *Sequoia* ultrasound machine to align freehand ultrasound planes with oblique CT images. Researchers expect their technique, which simplifies workflow and tightens registration, to improve user acceptance of multimodal fusion for a number of clinical applications.

Researchers conducted a diagnostic fusion study of liver and kidney pathologies to validate the new technique and compare manual and automated registration techniques. According to the authors, automatic registration converged correctly for all patients with an execution time of approximately 20 seconds. The study confirmed that manual CT-ultrasound registration is error prone and does not guarantee a correct match of planes in 3D. Siemens' automated registration results in precise registration and correct 3D alignments. Further clinical studies of CT-ultrasound fusion using automated registration are underway.

Wolfgang Wein won the MICCAI Young Scientist Award 2007 for the above paper in the category of Visualization and Interaction. Both Siemens papers were judged by peers to be in the top 10 of all presentations. Copies of the papers are available at [www.miccai2007.org](http://www.miccai2007.org) or from Ascension.

Ascension Technology Corporation, based in Burlington, Vermont, USA, is a world leader in magnetic guidance and localization solutions for medical navigation. See [www.ascension-tech.com](http://www.ascension-tech.com) or contact Trish Scott at 802-893-6657, ext 34 for copies of papers and more information.

*Biomedical references and procedures described herein are examples of what can be accomplished with tracking and imaging technology once end users and/or systems integrators have complied with all pertinent FDA/CE/IRB directives.*

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