

Ascension Technology Corporation

Success Stories: COMPASS International Inc.

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Flock of BIRDS® – Playing a Crucial Role in Next Generation Image-guided Neurosurgery

COMPASS History:

COMPASS International Inc. (CII), headquartered in Rochester, Minnesota, is a pioneer manufacturer of image-guided neurosurgery equipment and instrumentation. Established in 1986, COMPASS' original product, the COMPASS Stereotactic System, was the first computer-assisted neurosurgical image-guided system, enabling surgeons to view tumors in three dimensions. The original technology was developed by Patrick J. Kelly, MD, FACS, now Chairman of the Department of Neurological Surgery at New York University. Dr. Kelly remains the Medical Director of CII and continues to further new technology while practicing at one of the world's busiest neurology centers.

COMPASS Today:

COMPASS systems are used in hospitals throughout the U.S. and world to interactively perform intracranial neurosurgery. Utilizing CT and/or MRI scans to produce 3-D rendered images, COMPASS systems offer surgeons a computer-assisted method for performing a wide range of procedures -- from surgeries for Parkinson's or epilepsy, to removing brain tumors.

COMPASS' latest generation system is the *CYGNUS-PFS* (Portable Frameless System) image guided system. A remarkable evolution from earlier frame-based models and years of clinical trials and development, this free-hand interactive device runs on a lap-top computer and tracks various surgical instruments in relationship to diagnostic radiological images on an interactive image display workstation. The system provides a surgeon with intra-operative feedback in areas such as locating bone flaps, targeting

and acquiring biopsy samples, placing catheters and epilepsy grids, etc.

Partnership with Ascension:

COMPASS has employed Ascension's DC magnetic technology since the early 1990's. As with COMPASS' earlier systems, the *CYGNUS-PFS* uses Ascension's ***Flock of Birds*** tracker as a digitizing unit for intra-operative navigation.

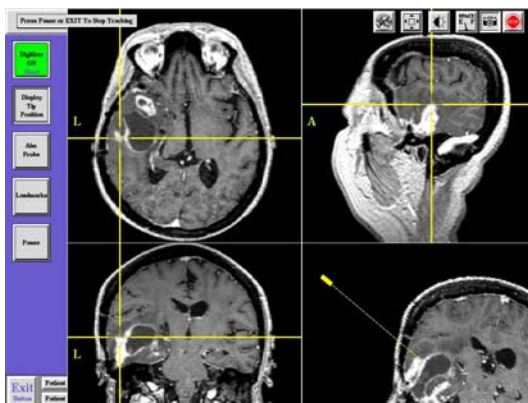
As shown below, a standard Bird transmitter is affixed to the patient's 3-point head clamp assembly, rigidly attached to the OR table.



Magnetic tracking facilitates image guidance of an instrument tip to an internal anatomical target. In the picture, a Bird transmitter (box at left) is mounted on the patient's head clamp, providing a reference frame for tracking the 3D location of a probe, shown with a Bird sensor on its proximal end.

The Bird's magnetic field moves with the patient's head when the table is rotated or adjusted. This overcomes the issue of continuously tracking a secondary fixed point on the patient to maintain alignment

between an instrument tip and the digitizer source or Bird's transmitter. An added benefit is that the transmitter can be located beneath sterile drapes because a clear line of sight does not need to be maintained between the transmitter and its instrument-mounted sensor. Once set up, *CYGNUS* registration software is employed to establish a matrix between the image space defined in pre-operative images and the actual patient space. Once this relationship is set, the surgeon can place his instrument inside the patient space and the system correlates its tip locations to the pre-operative images.



Four cross correlated viewports (Transverse, Sagittal, Coronal, and Oblique) are updated simultaneously to show 3D location of a probe tip in this virtual image of the patient's anatomy. The software can also display reference points, tumor targets, plan trajectories, tissue segmentation, clipping, coloring of tissue and much more.

From this point on, the procedure is performed using image-guidance. Every movement of the instrument's tip is projected as a 3D cursor on the CT and/or MR image data base. This greatly enhances the surgeon's vision and reduces procedural time while improving the likelihood of a complete resection.

Why FLOCK OF BIRDS:

While there are numerous forms of digitizers used for frameless image guided systems, COMPASS uses Ascension's *Flock of Birds* tracker for a number reasons:

1. Easy set up
2. No Line of Sight (LOS) issues
3. High Accuracy
4. No Dynamic Reference Frame (DRF) requirement

5. Any distortion in instruments, head clamp, or table is easily manageable
6. Economical cost.

Surgeons using the COMPASS system have successfully performed thousands of cases around the world using Ascension tracking for image guidance.

Jon S. Rousu, General Manager of COMPASS, states: **“We have been very pleased with the intra-operative results achieved with Ascension’s digitizer technology.”**

FOR MORE INFORMATION:

Ascension Technology Corporation at www.ascension-tech.com or 802-893-6657

COMPASS International Inc. at www.compass.com or 507-281-2143

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