**Better Image Guidance with 3D Ultrasound-CT/MR Fusion**

**The Problem**

Understanding the correspondence between pre-operative CT or MR and intra-operative ultrasound imagery is difficult, particularly in the context of an interventional procedure. Problems when using both during surgery (Fig. 1) include:

**Poor Workflow Ergonomics:** The PACS workstation, on which the CT/MR scans are viewed, is outside the sterile-field, far from the surgeon and the ultrasound;

**Lack of Access to Annotations:** CT/MR annotations are only viewable on the PACS.

**Complex Spatial Relationships between U/S and CT:** It is difficult to determine the anatomical correspondence between the U/S and CT/MR image.

These problems can lead to lengthy procedures, patient injury, and incomplete or ineffective interventions. Better visualization of CT and U/S would improve the efficacy of image-guided procedures.

**InnerOptic’s Solution**

*InnerOptic’s SPOTLIGHT™ software* (Fig. 2) allows the surgeon or interventional radiologist to *simultaneously* view CT (or MRI) and ultrasound, spatially fused together on a single display. This approach solves the spatial correspondence problem inherent in image-guided interventions.

SPOTLIGHT continually monitors the position of the ultrasound transducer and fuses the live ultrasound slice onto the corresponding anatomical feature in the CT or MR scan. This intuitive visualization (Fig. 2) is displayed in *real-time* on a 3D stereoscopic monitor.

Furthermore, SPOTLIGHT is the first technology to enable the surgeon to make intra-op annotations to the CT or MR and the ultrasound (Fig. 3), rather than having to rely only on pre-op CT/MR markings.

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*Figure 1.* Surgeons use conventional pre-op CT and intra-op Ultrasound in an operating room.

*Figure 2.* SPOTLIGHT fuses CT (or MRI) and U/S images in real time onto a single 3D monitor, and allows the user to make intra-op annotations.
Supported Interventions

InnerOptic’s SPOTLIGHT fusion software supports any image-guided intervention that uses CT (or MRI) with ultrasound, including tumor ablations and biopsies. SPOTLIGHT supports open, percutaneous and laparoscopic interventions.

Figure 3. SPOTLIGHT allows the surgeon to make intra-op annotations to both ultrasound and CT/MR.

**SPOTLIGHT’s Specifications:**

**Status:**  *Not approved for sale.* Available for IRB-approved trials.

**Display:**  Stereoscopic 3D monitor

**Guidance:**
- Fused pre-op CT/MR and intra-op ultrasound
- Needle trajectory and intersection
- Intra-operative annotations can be made

**Supported Ultrasound Systems***:
- BK Medical: Pro Focus UltraView, Flex Focus 700
- Aloka: SSD-4000, Alpha 7
- SonoSite S-Series

**Supported CT / MR Format:**
- DICOM

**Supported Interventional Needles***:
- Covidien Evident™ microwave and CoolTip™ RFA electrode
- Microsulis microwave antenna
- HALT Tulip RFA electrode
- RITA/AngioDynamics StarBurst XL
- Bard Biopsy Probe
- Any other 18-22 gauge needle upon request

*Other devices can be supported upon request.

**SPOTLIGHT’s Benefits:**

- Easier, faster, more precise CT/MR and US-guided interventions
- Real-time fusion of CT/MR data aligned with ultrasound imagery
- Fusion of CT/MR annotations with Ultrasound
- Creation of Intra-Operative 3D annotations
- Lower error and injury rates for image-guided interventions.
- High reimbursements with an existing CPT code
- Single-screen 3D stereo display
- Intuitive “freehand” device placement
- 3D interface restores hand-eye coordination
- Flexible software that can be easily integrated into existing imaging systems
- Covered by multiple patents
- Improved patient outcomes

**About InnerOptic**

InnerOptic Technology develops 3D visualization and guidance software that makes image-guided procedures simpler and safer to perform. InnerOptic Technology was launched to commercialize breakthrough medical visualization technology developed at the University of North Carolina at Chapel Hill. InnerOptic has an exclusive license to UNC’s patents in medical visualization and image-guided surgery. With grants from the NSF and the NIH, InnerOptic has extended this technology with over 14 patented innovations. Located near Research Triangle Park, NC, InnerOptic has close relationships with industry pioneers at UNC and Carolinas Medical Center, and access to their state-of-the-art medical facilities.

**For More Information**

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