

# Trackerless Image-Guidance Using a Surgical Microscope

## Summary

Researchers at Vanderbilt have developed a new image-guided, trackerless surgical microscope system to be used in soft tissue surgeries. The current method is to use a surgical microscope along with an image-guided system. This new design eliminates the need for a separate image-guidance system; the entire guidance environment can be realized within the microscope environment.

## Addressed Need

As of now, special coordination is required to ensure that all surgical tools are seen by the camera as well as the scope. This approach simplifies the surgical imaging process by conducting all surgical guidance through the surgical microscope environment. This includes image-to-physical registration, measurements of brain deformations, correction for deformations, and successful image guidance through the surgical environment.

## Unique Features

- ◇ Ability to conduct registration and deformation correction without a tracker
- ◇ Eliminates need for coordination between image guidance system and microscope system.

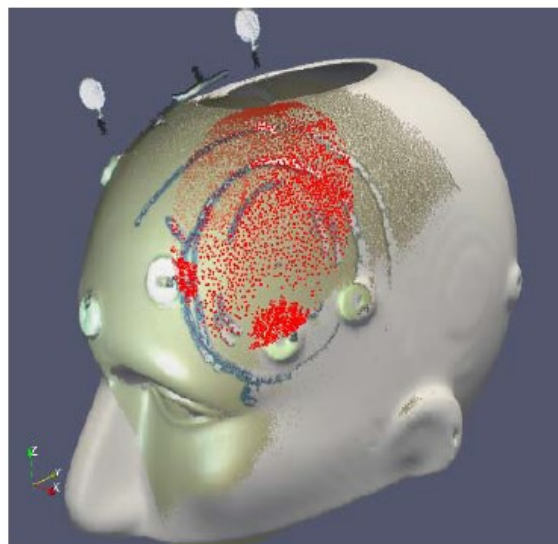
## Technology Development Status

Several of the design components have been tested and the stereo-pair textured surfaces have been generated. The image to physical registration using the patient head and cortical surface and the non-rigid deformation correction based on cortical surface data have both been achieved. Furthermore, texture point cloud driven methods for deformation measurement have been developed and tested.

## Intellectual Property Status

Issued US patent: [10,743,941](#)

## 3D TPC & MR Fused Rendering



This is a 3D rendering of the image that this new device can produce. It includes both a Textured Point Cloud (TPC) and MR map.

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