

Scanned CT Imaging System Aids Surgeons During Delicate Procedures

Dartmouth College



In the late 1980s researchers at Dartmouth College, led by David W. Roberts, M.D., a neurosurgeon at Dartmouth’s Hitchcock Medical Center, invented a reference display system that receives information from an imaging system, such as a computerized tomography (CT) scanner, and converts the three-dimensional anatomical or pathological images into digitized signals, which are then recreated in the focal plane of an operating microscope. The “Reference Display System for Superimposing a Tomographic Image onto the Focal Plane of an Operating Microscope” was patented in 1988.

Conventional CT scans are oriented transversely to the body axis and the operative approach is rarely along this axis. Dartmouth’s reference display system reconstructs a scanned image to match the surgical perspective and superimposes the reconstructed image over the field of view of the operating microscope.

“ In order to create the image within the microscope, digitized data from a scanning procedure is sent to a computer that reformats the data into a coded electrical signal.

That signal is then processed through an imaging system, which reformats the data into an image with an orientation matching the surgical perspective, and the image is projected by an optical display system onto the focal plane of the operating microscope.

This allows the surgeon to see, for example, the outline of a tumor (reconstructed by a computer) and to use the superimposed image as a map to accurately guide operative procedures with greater precision than was previously possible.

This story was originally published in 2007.

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