

# IMG-97-001 - ULTRASOUND - Transducer Mounting Assembly for 3-D Ultrasound Imaging

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## Technology description

### Description

This invention concerns the design of an ultrasound transducer mounting assembly incorporating a novel tracking device. 3-D ultrasound imaging requires acquiring a series of two-dimensional (2-D) images in which the spatial relationship between them is established. The precise spatial relationship between 2-D images is best achieved when the position of the ultrasound transducer is controlled using a motorized assembly. However, the bulkiness of these devices has hindered their use in the scanning of larger structures. In response, more compact free-hand scanners including magnetic field sensors have been developed for use in tracking the spatial relationship between successive 2-D images. However, magnetic field sensors have been sensitive to electromagnetic noise and errors from sources such as monitors, AC power cables, and the ultrasound transducers themselves. The mounting assembly of this invention overcomes the disadvantages of the prior art. It consists of an ultrasound transducer, wheels that engage the surface to be scanned and a tracking system in continuous communication with the wheels to determine the spatial relationship between successive 2-D scans. Sensors within the mounting assembly provide real-time output concerning the relative movement and angular orientation of the ultrasound transducer in relation to the surface of the target being scanned. As a result, free-hand scanning with the ultrasound transducer assembly of this invention can be used to obtain 3-D ultrasound images of larger structures.

The worldwide market for diagnostic imaging is growing at an average annual growth rate of 5.9% and is expected to reach \$5.4 billion dollars by 2004. Within the United States, the use of 3D imaging modalities generated revenues of \$400 million in 2002. These revenues are projected to reach 1.15 billion by 2009. Given its availability, low cost, and safety, as compared to x-ray, magnetic resonance imaging (MRI), or computed tomography (CT), the market for ultrasound is expected to continue to grow. The cost of operating ultrasound equipment can be as much as one-tenth that of MRI and CT. There are currently over 150,000 ultrasound instruments installed worldwide performing more than 135 million scans per annum. 3-D ultrasound imaging is being increasingly used for diagnoses previously made using 2-D ultrasound or other imaging modalities. Continued market growth is anticipated as 3D ultrasound is implemented in broader diagnostic imaging applications.

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