Apparatus for Localization and Relative Positioning of Surgical Instruments (15008)

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Technology description

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In collaboration with Pathfinder Therapeutics, our researchers have developed a method and apparatus for capturing an image depicting at least a portion of a first surgical instrument disposed at a first position with respect to a target tissue, and at least a portion of a second surgical instrument disposed at a second position with respect to the target tissue, the second position different from the first position. The method includes transforming the image to a three-dimensional model so the first position of the portion of the first surgical instrument is rendered with the three-dimensional model, and the second position of the portion of the second surgical instrument is rendered with the three-dimensional model. The method includes calculating distance between the portion of the first surgical instrument and the portion of the second surgical instrument based on the three dimensional model. This technology allows for precise placement of surgical instruments in the body for maximized therapeutic effect.

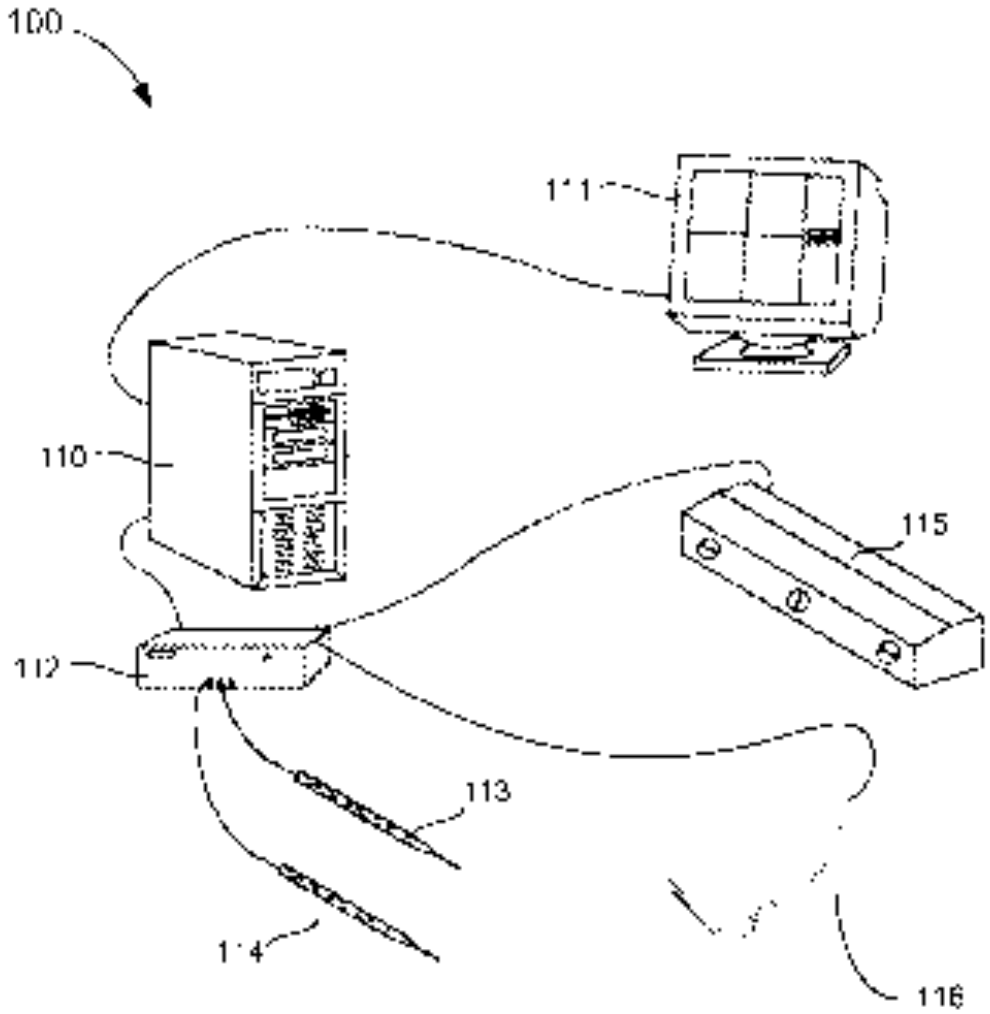

FIG. 1

Markets Addressed

Image-guided therapy (IGT), which is also often referred to as image-guided intervention (IGI), has gained widespread attention and clinical acceptance for use in localizing tumors in abdominal organs. Procedures that utilize IGT include, but are not limited to, tumor biopsy, ablation, and resection. One type of IGT procedure includes Irreversible Electroporation (IRE), in which one or more ablation needles can be positioned within the patient. The ablation needles have to be positioned accurately within the patient's anatomy. Some surgeons rely on two dimensional (2D) ultrasound images to localize the position of the ablation needles and to determine the relative distances between the needles. The lack of dimensionality in 2D ultrasound, however, renders known methods unable to localize more than one needle in a single ultrasound image. Thus, a need exists for systems, apparatus and methods for localizing and/or determining the relative position of surgical instruments, generally, and of ablation needles in particular, for example, in a three-dimensional space and/or with respect to multiple

instruments. A need also exists for a system, apparatus and method for localizing and/or determining when accounting for a relationship between a patient's pre-operative diagnostic images and the physical space in which the ultrasound images are captured.

Application area

All

Advantages

Can be used to map the location of tracked percutaneous ablation instrumentation.
Can provide display the trajectory and device locations relative to targets planned prior to surgery.
Can be used for guidance, which allows for pre-procedural planning and 3D model generation.

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