any material known in the art including nitinol hypotube, metal alloys, composite materials, plastics, braided polyimide, polyethylene, peek braids, stainless steel, or other superelastic materials.

The length of the guidewire **500** may vary depending on the application. In a preferred embodiment, the length of the guidewire **500** is between 30 cm and 300 cm. A catheter (not shown) may be configured to use several different diameters of guidewires **500**. For example, the guidewire **500** may have a diameter of 0.010, 0.014, 0.018, or 0.035 inches. Typically, the diameter of the guidewire **500** is uniform.

A proximal portion **510** of the guidewire **500** may be adapted to connect to circuitry (not shown) that processes imaging signals from the imaging transducer and/or circuitry (not shown) that processes navigational signals from the sensor **320**., such circuits being well known.

In the foregoing specification, the invention has been described with reference to specific embodiments thereof. It will, however, be evident that various modifications and changes may be made thereto without departing from the broader spirit and scope of the invention. For example, the reader is to understand that the specific ordering and combination of process actions described herein is merely illustrative, and the invention can be performed using different or additional process actions, or a different combination or ordering of process actions. For example, this invention is particularly suited for applications involving medical imaging devices, but can be used on any design involving imaging devices in general. As a further example, each feature of one embodiment can be mixed and matched with other features shown in other embodiments. Additionally and obviously, features may be added or subtracted as desired. Accordingly, the invention is not to be restricted except in light of the attached claims and their equivalents.

What is claimed is:

1. An imaging apparatus for use within the lumen of a blood vessel comprising:

a catheter having a lumen, said catheter comprising, within the lumen:

a non-conductive epoxy layer surrounding a cable;

a drive shaft, having distal and proximal ends, surrounding a substantial portion of the non-conductive epoxy layer;

an imaging device coupled to the distal end of the drive shaft; and

a sensor coil wound around a distal portion of the drive shaft, wherein the sensor coil is configured to communicate with a medical positioning system by transmitting or receiving electromagnetic signals to or from the medical positioning system and is electrically isolated from the lumen of the catheter.

2. The imaging apparatus of claim **1**, wherein the sensor coil is electrically coupled to the imaging device in parallel.

3. The imaging apparatus of claim **1**, wherein the sensor coil is electrically coupled to the imaging transducer in series.

4. The imaging apparatus of claim **1**, further comprising a coaxial cable, surrounded by the non-conductive epoxy.

5. The imaging apparatus of claim **1**, further comprising a tri-axial cable, surrounded by the non-conductive epoxy.

6. The imaging apparatus of claim **1**, wherein the imaging device is an imaging transducer.

7. The imaging apparatus of claim **6**, wherein the imaging transducer assembly comprises an acoustic lens coupled with a piezoelectric crystal layer, and the piezoelectric crystal layer is coupled with a backing material.

8. The imaging apparatus of claim **7**, wherein the backing material comprises tungsten.

9. The imaging apparatus of claim **1**, further comprising a shrink tube surrounding the imaging device and the sensor coil.

10. The imaging apparatus of claim **1**, wherein the sensor coil is adapted to communicate with a medical positioning system.

11. The imaging apparatus of claim **10**, wherein the sensor coil is configured to transmit electro-magnetic signals.

12. The imaging apparatus of claim **10**, wherein the sensor coil is configured to receive electro-magnetic signals.

13. An imaging apparatus for use within the lumen of a blood vessel comprising:

a catheter having a lumen, said catheter comprising, within the lumen:

a non-conductive epoxy layer surrounding a cable;

a drive shaft, having distal and proximal ends, surrounding a substantial portion of the non-conductive epoxy layer;

an imaging device coupled to the distal end of the drive shaft; and

a sensor coil coupled to a distal portion of the drive shaft, wherein the sensor coil is configured to communicate with a medical positioning system by transmitting or receiving electromagnetic signals to or from the medical positioning system and is electrically isolated from the lumen of the catheter, and wherein the sensor coil is configured to be a tuning circuit for the imaging transducer.

14. An imaging apparatus for use within the lumen of a blood vessel comprising:

a catheter having a lumen, said catheter comprising, within the lumen:

a non-conductive epoxy layer surrounding a cable;

a drive shaft, having distal and proximal ends, surrounding a substantial portion of the non-conductive epoxy layer;

an imaging device coupled to the distal end of the drive shaft;

a sensor coil coupled to a distal portion of the drive shaft, wherein the sensor coil is configured to communicate with a medical positioning system by transmitting or receiving electromagnetic signals to or from the medical positioning system and is electrically isolated from the lumen of the catheter; and

a matching circuit coupled with the sensor coil.

15. The imaging apparatus of claim **14**, wherein the matching circuit comprises a pi network.

16. A medical imaging system comprising:

a medical positioning system; and

an imaging device adapted to be inserted into a lumen of a body, the imaging device including:

a catheter having distal and proximal ends and a lumen;

a drive shaft, having proximal and distal ends, within the lumen; and

an imaging transducer assembly, including:

an imaging transducer coupled to the distal end of the drive shaft; and

a coil of a sensor wound around a distal portion of the drive shaft, the sensor adapted to communicate with the medical positioning system, wherein the sensor is electrically isolated from the lumen of the catheter.

17. The medical imaging system of claim **16**, wherein the imaging transducer comprises an acoustic lens coupled with a layer of piezoelectric crystal, the piezoelectric crystal being coupled with a backing material.