What is claimed is:

1. A method for controlling a wireless, resonant circuit sensor, the sensor including a variable inductance coil that changes resonant frequency in response to a change in a monitored physical parameter and produces a ring-back signal at a frequency correlated to the physical parameter when energized, the method comprising:

outputting at least one excitation frequency sweep comprising a preestablished number of transmit pulses at pre-defined frequencies over a range of expected implant resonant frequencies;

receiving the ring-back signals for each of the sequentially output transmit pulses;

transmitting at least one initial transmit pulse for a predetermined initial period, wherein the at least one initial transmit pulse comprises one of –

a pulse frequency corresponding to the highest amplitude ring-back signal received from the at least one frequency sweep; or

plural said excitation frequency sweeps;

receiving plural test ring-back signals in response to at least one initial transmit pulse transmitted over the initial period;

identifying an initial ring-back signal corresponding to a preferred excitation pulse frequency; and

selecting said preferred excitation pulse frequency as a measurement transmit pulse frequency;

outputting measurement transmit pulses at the measurement transmit pulse frequency for a subsequent measurement period.

2. The method of claim 1, further comprising:

receiving measurement ring-back signals generated by the sensor in response to the measurement transmit pulses during the measurement period; and

analyzing the measurement ring-back signals to determine a characteristic of the monitored physical parameter.

3. The method of claim 1 or claim 2, wherein:

said transmitting the at least one initial transmit pulse for the initial period comprises –

identifying the ring-back signal with a highest amplitude;

selecting the transmit pulse frequency corresponding to the highest amplitude ring-back signal as the initial transmit pulse frequency; and

transmitting plural initial pulses at the initial pulse frequency; and

said receiving plural initial ring-back signals and said identifying an initial ring-back signal comprise –

exciting the sensor resonant circuit at the initial transmit pulse frequency for the initial period;

receiving the initial ring-back signals from the sensor during the initial period; and

selecting the initial transmit pulse frequency generating the initial ring-back signal with the highest frequency as the measurement transmit pulse frequency.

4. The method of claim 1 or claim 2, wherein:

said transmitting the at least one initial transmit pulse for the initial period comprises outputting repeated excitation frequency sweeps during the initial period; and

said identifying a initial ring-back signal comprises identifying as the preferred excitation pulse frequency the highest observed ring-back signal frequency generated by the repeated excitation frequency sweeps.

5. The method of any of claims 1-4, wherein the predetermined initial period comprises a sufficiently long time to encompass at least one respiration cycle.

6. The method of any of claims 1-5, further comprising dynamically adjusting the frequency of transmit pulses during acquisition of corresponding ring-back signals.

7. The method of claim 6, wherein said dynamically adjusting comprises:

monitoring at least one of the amplitude or signal-to-noise ratio of the corresponding ring-back signal; and

in response to detection of a ring-back signal amplitude below a pre-defined threshold, outputting a new excitation frequency sweep to identify a new measurement transmit pulse frequency.

8. The method of any of claims 2-7, further comprising computing a new measurement pulse signal for each measurement transmit pulse after receiving a measurement ring-back signal during the measurement period.

9. The method of any of claims 1-8, further comprising adjusting transmit pulse output power as a function of transmit pulse output frequency.

10. The method of claim 9, wherein said adjusting comprises monotonically reducing transmit pulse output power as transmit pulse frequency decreases.

11. The method of any of claims 1-8, further comprising:

monitoring ring-back signals produced by the sensor; and

dynamically adjusting transmit pulse output to achieve a substantially constant ring-back signal amplitude based on the monitored ring-back signals.

12. The method of any of claims 1-11, further comprising:

transmitting a known fixed frequency and fixed amplitude signal;

capturing the said known signal as a portion of a captured ring-back signal;

validating signal processing by comparing the captured known signal portion with the transmitted known signal.

13. The method of claim 12, wherein said transmitting and capturing a known signal comprises allowing signal leakage through a transmit/receive switch of a signal generating and receiving control system.

14. The method of any of claims 1-13, further comprising assessing electromagnetic background noise prior to outputting the at least one excitation frequency sweep and adjusting signal processing based on a computed background noise signal level.

15. The method of claim 14, wherein said assessing electromagnetic background noise, comprises:

transmitting predetermined a test pulse at a test frequency, wherein said test frequency is selected to be sufficiently distant from an expected sensor excitation frequency so as to not energize the sensor;

receiving a test signal with a sensor ring-back signal receiver, wherein the received test signal is made up of the test pulse and background electromagnetic noise;

defining the background electromagnetic noise based on the received test signal; and

modulating signal processing of the received measurement ring-back signal to eliminate or reduce effects of the defined background electromagnetic noise.

16. The method of any of claims 1-15, further comprising:

determining physical parameter versus frequency data for at least one said sensor prior to placement in a patient;

creating a characterization curve for the at least one sensor through curve fitting or interpolation;

taking a measurement with the sensor; and

translating the sensor measurement into a value for the physical parameter using said characterization curve.

17. The method of claim 16, wherein the at least one sensor comprises a sensor batch and the frequency data comprises batch specific parameter-frequency data.

18. The method of claim 16 or claim 17, further comprising minimizing physical parameter measurement error arising from sensor manufacturing variability through use of sensor or sensor batch specific characterization curves.

19. The method of any preceding claim, wherein the resonant circuit sensor is configured for placement in a patient's vasculature and the physical parameter is a vascular dimension.

20. The method of claim 19, wherein said sensor is specifically configured for placement in a vena cava and the vascular dimension is the area or diameter of the vena cava.

21. The method of claim 20, further comprising correlating the measured area or diameter of the vena cava to patient fluid status.

22. A control system for a wireless, resonant circuit sensor, the sensor including a variable inductance coil that changes resonant frequency in response to a change in a monitored physical parameter and produces a ring-back signal at a frequency correlated to the physical parameter when energized, the control system comprising a transmit/receive switch configured to control signal transmission to and signal receiving from an antenna, a signal generation module configured to generate excitation signals wherein the transmit receive switch controls transmission of the generated signal to the antenna, and a receiver-amplifier module configured to receive and process ring-back-signals received by the antenna and communicated to the receiver-amplifier module by the transmit/receive switch communicating with a processor configured to execute program instructions, *characterized in that* the system is configured to:

output at least one excitation frequency sweep comprising a preestablished number of transmit pulses at pre-defined frequencies over a range of expected implant resonant frequencies;

receive the ring-back signals for each of the sequentially output transmit pulses;

transmit at least one initial transmit pulse for a predetermined initial period, wherein the at least one initial transmit pulse comprises one of –

a pulse frequency corresponding to the highest amplitude ring-back signal received from the at least one frequency sweep; or

plural said excitation frequency sweeps;

receive plural test ring-back signals in response to at least one initial transmit pulse transmitted over the initial period;

identify an initial ring-back signal corresponding to a preferred excitation pulse frequency;

select the preferred excitation pulse frequency as a measurement transmit pulse frequency; and

output measurement transmit pulses at the measurement transmit pulse frequency for a subsequent measurement period.

23. The control system of claim 22, *further characterized in that* the system is configured to receive measurement ring-back signals generated by the sensor in response to the measurement transmit pulses during the measurement period, and analyze the measurement ring-back signals to determine a characteristic of the monitored physical parameter.

24. The control system of claim 22 or claim 23, *further characterized in that* the system is configured to:

identify the ring-back signal from the at least one frequency sweep with a highest amplitude and select the transmit pulse frequency corresponding to the highest amplitude ring-back signal as the initial transmit pulse frequency;

transmit an excitation signal at the initial transmit pulse frequency for the initial period;

receive the initial ring-back signals from the sensor during the initial period; and

select the initial transmit pulse frequency that generates the initial ring-back signal with the highest frequency as the measurement transmit pulse frequency.

25. The control system of claim 22 or claim 23, *further characterized in that* the system is configured to transmit the at least one initial transmit pulse for the initial period by outputting repeated excitation frequency sweeps during the initial period; and

identify an initial ring-back signal by identifying as the preferred excitation pulse frequency the highest observed ring-back signal frequency generated by the repeated excitation frequency sweeps.

26. The control system of any of claims 22-25, *further characterized in that* the system is configured to dynamically adjust the frequency of transmit pulses during acquisition of corresponding ring-back signals by monitoring at least one of the amplitude or signal-to-noise ratio of the corresponding ring-back signal, and, in response to detection of a ring-back signal amplitude

below a pre-defined threshold, outputting a new excitation frequency sweep to identify a new measurement transmit pulse frequency.

27. The control system of any of claims 22-26, *further characterized in that* the system is configured to adjust the transmit pulse output power as a function of transmit pulse output frequency by monotonically reducing transmit pulse output power as transmit pulse frequency decreases.

28. The control system of any of claims 22-27, *further characterized in that* the system is configured to monitor ring-back signals produced by the sensor, and dynamically adjust the transmit pulse output to achieve a substantially constant ring-back signal amplitude based on the monitored ring-back signals.