CLAIMS

1. A system for monitoring the orientation and position of components in an oil well, the system comprising:

   a first well component;

   a second well component movable relative to the first well component;

   a transducer attached to the first well component, for generating a pulse;

   a transceiver attached to the second well component for measuring parameters of the pulse generated by the transducer, the parameters corresponding to a distance between the first well component and the second well component; and

   a processor in communication with the transceiver that receives information about the parameters of the pulse as measured by the transceiver, calculates the position of the transceiver relative to the transducer, and determines a position of the second well component relative to the first well component based on the parameters of the pulse.

2. The system of claim 1, wherein the first well component is a stationary well component and the second well component is a moveable well component.

3. The system of claim 1, wherein the first well component is a moveable well component and the second well component is a stationary well component.

4. The system of claim 1, further comprising:

   a plurality of transceivers positioned in discrete locations on the second well component, each receiver for measuring the parameters of the pulse generated by the transducer.

5. The system of claim 4, wherein the processor calculates the position of each of the plurality of transceivers relative to the transducer, and then uses the calculated position to determine the position of the second well component relative to the first well component or vice versa.

6. A system for monitoring the orientation and position of components in an oil well, the system comprising:

a well head member attached to the top of the well;

a well head sensor attached to the well head member;

a hanger for insertion into the well head;

a hanger sensor attached to the hanger, at least one of the well head sensor and the hanger sensor having a sensitivity calibrated to detect presence of the other within a predetermined range and emitting at least one signal when the well head sensor and the hanger sensor are within the predetermined range of one another to indicate that the hanger is properly positioned within the well head member; and

a receiver for receiving the at least one signal from, and in communication with, the hanger sensor, the well head sensor, or both the hanger sensor and the well head sensor.

7. The system of claim 6, further comprising:

a controller in communication with the receiver for conveying data about the sensors from the receiver to an operator.

8. The system of claim 6, further comprising:

a repeater attached to the well head member to retransmit the at least one signal from the sensor to the receiver.

9. The system of claim 6, wherein the components of the oil well comprise:

a running tool assembly for setting the hanger in the well head member,

wherein a repeater is attached to the running tool assembly to retransmit the at least one signal from the sensors to the receiver.

10. The system of claim 6, further comprising:

an annular seal between the hanger and the well head member;

wherein an outer diameter of a portion of the hanger has ridges to help seal an interface between the hanger and the annular seal when the hanger is set in the well head member.

11. The system of claim 10, wherein the hanger is fully set in the well head member when a predetermined length of the ridges of the hanger engage the annular seal, and the well head sensor and hanger sensor are calibrated to emit the at least one signal when the predetermined length of the ridges engage the annular seal.

12. The system of claim 11, wherein the predetermined length is one inch.

13. A method of determining well component location, the method comprising:

a) moving a moveable component of the well head assembly relative to a stationary component of the well head assembly, the moveable component having a transceiver attached thereto and the stationary component having a transducer attached thereto;

b) emitting a pulse from the transducer;

c) receiving the pulse by the transceiver;

d) determining the position of the transceiver relative to the transducer based on the time of flight of the pulse between the transducer and the transceiver, or the strength of the pulse when received by the transceiver; and

d) determining the position of the moveable component of the well head assembly relative to the stationary component of the wellhead assembly based on the position of the transceiver relative to the transducer.

14. The method of claim 13, further comprising:

receiving the pulse by a plurality of transceivers;

determining the position of each of the plurality of transceivers relative to the transducer based on the time of flight of the pulse between the transducer and each of the plurality of transceivers, or the strength of the pulse when received by each of the plurality of transceivers; and

determining the position of the moveable component of the well head assembly relative to the stationary component of the wellhead assembly based on the positions of the plurality of transceivers relative to the transducer.

15. The method of claim 13, wherein the transducer comprises an acoustic transmitter.

16. The method of claim 13, wherein the moveable component is a hanger.

17. The method of claim 13, wherein the moveable component is a running tool.

18. The method of claim 1, wherein the second well component is a running tool.

19. The system of claim 1, wherein the parameters comprise a strength, time delay, or both, of the pulse.

20. The system of claim 6, wherein the well head sensor and the hanger sensor emit at least one signal when aligned with each other.