CLAIMS

1. Apparatus for determining alignment between a source device and a target device, the apparatus comprising the source device, the target device, and a processing system, the source device comprising a first spatially variant field generator for generating a first spatially variant electric field, and a second spatially variant field generator for generating a second spatially variant electric field, in which the second spatially variant electric field is angularly offset with respect to the first spatially variant electric field, the target device comprising at least one sensor configured to detect a first signal from the first spatially variant electric field and a second signal from the second spatially variant electric field, in which the processing system determines alignment between the first source device and the target device based on the first and second signals from the first and second spatially variant electric fields detected by the target device.

2. An apparatus according to Claim 1, in which each of the first spatially variant field and the second spatially variant field has a known angular dependence.

3. An apparatus according to Claim 1 or 2, in which the first spatially variant electric field is angularly offset from the second spatially variant electric field by a preset angle.

4. An apparatus according to Claim 3, in which the preset angle is 90°.

5. An apparatus according to any preceding claim, in which the first spatially variant field generator and the second spatially variant field generator are each at least one electrode.

6. An apparatus according to Claim 5, in which the at least one electrode of the first spatially variant field generator is arranged to produce the first spatially variant electric field with angular and/or spatial dependence; and in which the at least one electrode of the second spatially variant field generator is arranged to produce the second spatially variant electric field with angular and/or spatial dependence.

7. An apparatus according to Claim 6, in which the first spatially variant electric field and the second spatially variant electric field with angular and/or spatial dependence are fields independently selected from the group comprising: dipole; quadrupole; and octopole.

8. An apparatus according to Claim 5, 6 or 7, in which the at least one electrode of the first spatially variant field generator and the at least one electrode second spatially variant field generator are each separately arranged to produce a dipole field.

9. An apparatus according to any preceding claim, in which the processing system is capable of operating the source device in at least a first mode and a second mode, in which in the first mode, the first spatially variant field generator generates the first spatially variant electric field, and in which in the second mode, the second spatially variant field generator generates the second spatially variant field.

10. An apparatus according to Claim 9, in which the processing system further comprises a first switching system connected to the first spatially variant field generator and the second spatially variant field generator on the source device, the first switching system configured to switch the source device between the first mode and the second mode.

11. An apparatus according to Claim 10, in which the switching system operates the source device sequentially in the first mode and the second mode.

12. An apparatus according to Claim 11, in which the source device is operated in the first mode until coarse alignment is achieved, and then the source device is operated in the second mode to achieve fine alignment, in which coarse alignment has a lower degree of accuracy in the angle of alignment of the source device in comparison to fine alignment.

13. An apparatus according to any of Claims 9 to 12, in which the first switching system toggles between the first mode and second mode so that a signal can be detected from both the first spatially variant field and the second spatially variant field simultaneously.

14. An apparatus according to Claim 9 or 10, in which the first switching system operates the source device concurrently in the first mode and the second mode.

15. An apparatus according to Claim 14, in which the first spatially variant electric field and the second spatially variant electric field are distinguishable by the sensor on the target device.

16. An apparatus according to Claim 15, in which the first spatially variant electric field and the second spatially variant electric field are distinguishable by the sensor on the target device due to the first spatially variant electric field and the second spatially variant electric field having a different carrier frequency.

17. An apparatus according to any of Claims 9 to 16, in which the sensor on the target device is connected to the processing system via a second switching system, in which the second switching system diverts the detected spatially variant signal detected at the sensor to one of two memory locations, in which the second switching system diverts a detected signal to a first memory location of the two memory locations when the first switching system is operating in the first mode, and the second switching system diverts the detected signal to a second memory location of the two memory locations when the first switching system is operating in the second mode.

18. An apparatus according to Claim 17, in which the second switching system is of a type selected from the group consisting of: hardware and software.

19. A processing system for use in an apparatus according to any preceding claim.

20. An apparatus according to any of Claims 1 to 18 or a processing system according to Claim 19, further comprising a display.

CLAIMS

1. Apparatus for determining angular alignment between a source device and a target device, the apparatus comprising a source device, a target device, and a processing system, the source device comprising a first spatially variant field generator for generating a first spatially variant electric field, and a second spatially variant field generator for generating a second spatially variant electric field, in which the second spatially variant electric field is angularly offset around a shared or common axis with respect to the first spatially variant electric field, the target device comprising at least one sensor configured to detect a first signal from the first spatially variant electric field and a second signal from the second spatially variant electric field, in which the processing system determines angular alignment between the first source device and the target device based on the first and second signals from the first and second spatially variant electric fields detected by the target device.

2. An apparatus according to Claim 1, in which each of the first spatially variant field and the second spatially variant field has a known angular dependence around a shared or common axis.

3. An apparatus according to Claim 1 or 2, in which the first spatially variant electric field is angularly offset around a shared or common axis from the second spatially variant electric field by a preset angle.

4. An apparatus according to Claim 3, in which the preset angle is 90°.

5. An apparatus according to any preceding claim, in which the first spatially variant field generator and the second spatially variant field generator are each at least one electrode.

6. An apparatus according to Claim 5, in which the at least one electrode of the first spatially variant field generator produces the first spatially variant electric field with angular and/or spatial dependence; and in which the at least one electrode of the second spatially variant field generator produces the second spatially variant electric field with angular and/or spatial dependence.

7. An apparatus according to Claim 6, in which the first spatially variant electric field and the second spatially variant electric field with angular and/or spatial dependence are fields independently selected from the group comprising: dipole; quadrupole; and octopole.

8. An apparatus according to Claim 7, in which the at least one electrode of the first spatially variant field generator and the at least one electrode second spatially variant field generator each produce a dipole field.

9. An apparatus according to any preceding claim, in which the processing system is capable of operating the source device in at least a first mode and a second mode, in which in the first mode, the first spatially variant field generator generates the first spatially variant electric field, and in which in the second mode, the second spatially variant field generator generates the second spatially variant field.

10. An apparatus according to Claim 9, in which the processing system further comprises a first switching system connected to the first spatially variant field generator and the second spatially variant field generator on the source device, the first switching system configured to switch the source device between the first mode and the second mode.

11. An apparatus according to Claim 10, in which the switching system operates the source device sequentially in the first mode and the second mode.

12. An apparatus according to Claim 11, in which the source device is operated in the first mode until coarse angular alignment is achieved, and then the source device is operated in the second mode to achieve fine angular alignment, in which coarse angular alignment has a lower degree of accuracy in the angle of angular alignment of the source device in comparison to fine angular alignment.

13. An apparatus according to Claim 10, 11 or 12, in which the first switching system toggles between the first mode and second mode so that a signal can be detected from both the first spatially variant field and the second spatially variant field.

14. An apparatus according to Claim 10, in which the first switching system operates the source device concurrently in the first mode and the second mode.

15. An apparatus according to Claim 14, in which the first spatially variant electric field and the second spatially variant electric field are distinguishable by the sensor on the target device.

16. An apparatus according to Claim 15, in which the first spatially variant electric field and the second spatially variant electric field are distinguishable by the sensor on the target device

due to the first spatially variant electric field and the second spatially variant electric field having a different carrier frequency.

17. An apparatus according to any of Claims 9 to 16, in which the sensor on the target device is connected to the processing system via a second switching system, in which the second switching system diverts the detected spatially variant signal detected at the sensor to one of two memory locations, in which the second switching system diverts a detected signal to a first memory location of the two memory locations when the first switching system is operating in the first mode, and the second switching system diverts the detected signal to a second memory location of the two memory locations when the first switching system is operating in the second mode.

18. An apparatus according to Claim 17, in which the second switching system is of a type selected from the group consisting of: hardware and software.

19. A processing system for use in an apparatus according to any preceding claim.

20. An apparatus according to any of Claims 1 to 18 or a processing system according to Claim 19, further comprising a display.