

What is claimed is:

1. A device, comprising:
at least one processor programmed or configured to:
receive one or more messages from a device, wherein when receiving the one or more messages, the at least one processor is programmed or configured to :
receive a first message at a first power level that was transmitted by the device, the first message comprising data associated with a power level at which the first message was transmitted by the device, and
receive a second message at a second power level that was transmitted by the device, the second message comprising data associated with a power level at which the second message was transmitted by the device;
determine an indication of alignment with the device that transmitted the first message and the second message based on the first message and the second message;
and
output data associated with the indication of alignment with the device that transmitted the first message and the second message.
2. The device of claim 1, wherein, when receiving one or more messages from the device, the at least one processor is programmed or configured to:
receive, via at least one directional antenna, the first message and the second message, and
wherein the at least one processor is further programmed or configured to:
determine the first power level at which the first message was received based on data associated with the first message, and
determine the second power level at which the second message was received based on data associated with the second message.
3. The device of claim 1, wherein, when the indication of alignment with the device that transmitted the first message and the second message based on the first message and the second message, the at least one processor is programmed or configured to:

determine the indication of alignment with the device that transmitted the first message and the second message based on one or more of:

- the first power level at which the first message was received,
- the power level at which the first message was transmitted by the device,
- the second power level at which the second message was received, and
- the power level at which the second message was transmitted by the device.

4. The device of claim 1, wherein, when determining the indication of alignment with the device that transmitted the first message and the second message based on the first message and the second message, the at least one processor is programmed or configured to:

- multiply the first power level at which the first message was received by a first scaling factor to generate a first alignment value, the first scaling factor corresponding to the power level at which the first message was transmitted by the device;

- multiply the second power level at which the second message was received by a first scaling factor to generate a second alignment value, the second scaling factor corresponding to the power level at which the second message was transmitted by the device; and

- determine a direction toward the device based on the first alignment value and the second alignment value.

5. The device of claim 1, wherein the at least one processor is further programmed or configured to:

- determine that a third message was not received; and

- wherein, when determining the indication of alignment with the device that transmitted the first message and the second message based on the first message and the second message, the at least one processor is further programmed or configured to:

- determine the indication of alignment with the device that transmitted the first message and the second message based on determining that the third message was not received.

6. The device of claim 5, wherein the power level at which the second message was transmitted by the device is different from the first power level at which the first message was transmitted by the device.

7. The device of claim 1, wherein the at least one processor is further programmed or configured to:

receive a third message at a third power level, the third message comprising data associated with a power level at which the third message was transmitted by the device;

determine that the power level at which the third message was transmitted by the device corresponds to the power level at which the first message was transmitted by the device or the power level at which the second message was transmitted by the device, and

determine that the third message is a duplicate message that corresponds to the first message or the second message,

wherein, when the indication of alignment with the device that transmitted the first message and the second message based on the first message and the second message, the at least one processor is programmed or configured to:

forego determining the indication of alignment with the device that transmitted the first message and the second message based on the third message.

8. A computer program product comprising at least one non-transitory computer-readable medium comprising one or more instructions that, when executed by at least one processor, cause the at least one processor to:

receive one or more messages from a device, wherein when receiving the one or more messages, the one or more instructions cause the at least one processor to:

receive a first message at a first power level that was transmitted by the device, the first message comprising data associated with a power level at which the first message was transmitted by the device, and

receive a second message at a second power level that was transmitted by the device, the second message comprising data associated with a power level at which the second message was transmitted by the device;

determine an indication of alignment with the device that transmitted the first message and the second message based on the first message and the second message; and

output data associated with the indication of alignment with the device that transmitted the first message and the second message.

9. The computer program product of claim 8, wherein the one or more instructions that cause the at least one processor to receive the one or more messages from the device cause the at least one processor to:

receive, via at least one directional antenna, the first message and the second message, and

wherein the at least one processor is further programmed or configured to:

determine the first power level at which the first message was received based on data associated with the first message, and

determine the second power level at which the second message was received based on data associated with the second message.

10. The computer program product of claim 8, wherein the one or more instructions that cause the at least one processor to determine the indication of alignment with the device that transmitted the first message and the second message based on the first message and the second message cause the at least one processor to:

determine an indication of alignment with the device that transmitted the first message and the second message based on one or more of:

the first power level at which the first message was received,

the power level at which the first message was transmitted by the device,

the second power level at which the second message was received, and

the power level at which the second message was transmitted by the device.

11. The computer program product of claim 8, wherein the one or more instructions that cause the at least one processor to determine the indication of alignment with the device that transmitted the first message and the second message based on the first message and the second message cause the at least one processor to:

multiply the first power level at which the first message was received by a first scaling factor to generate a first alignment value, the first scaling factor corresponding to the power level at which the first message was transmitted by the device;

multiply the second power level at which the second message was received by a first scaling factor to generate a second alignment value, the second scaling factor corresponding to the power level at which the second message was transmitted by the device; and

determine the indication of alignment with the device that transmitted the first message and the second message based on the first alignment value and the second alignment value.

12. The computer program product of claim 8, wherein the one or more instructions further cause the at least one processor to:

determine that a third message was not received; and

wherein, when determining the indication of alignment with the device that transmitted the first message and the second message based on the first message and the second message, the at least one processor is further programmed or configured to:

determine the indication of alignment with the device that transmitted the first message and the second message based on determining that the third message was not received.

13. The computer program product of claim 12, wherein the power level at which the second message was transmitted by the device is different from the first power level at which the first message was transmitted by the device.

14. The computer program product of claim 8, wherein the one or more instructions further cause the at least one processor to:

receive a third message at a third power level, the third message comprising data associated with a power level at which the third message was transmitted by the device;

determine that the power level at which the third message was transmitted by the device corresponds to the power level at which the first message was transmitted by the device or the power level at which the second message was transmitted by the device, and

determine that the third message is a duplicate message that corresponds to the first message or the second message,

wherein, when determining the indication of alignment with the device that transmitted the first message and the second message based on the first message and the second message, the at least one processor is programmed or configured to:

forego determining the indication of alignment with the device that transmitted the first message and the second message based on the third message.

15. A computer-implemented method, comprising:

receiving, with at least one processor, one or more messages from a device , wherein receiving the one or more messages comprises:

receiving a first message at a first power level that was transmitted by the device, the first message comprising data associated with a power level at which the first message was transmitted by the device, and

receiving a second message at a second power level that was transmitted by the device, the second message comprising data associated with a power level at which the second message was transmitted by the device;

determining, with at least one processor, an indication of alignment with the device that transmitted the first message and the second message based on the first message and the second message; and

outputting, with at least one processor, data associated with the indication of alignment toward the device that transmitted the first message and the second message.

16. The computer-implemented method of claim 15, wherein receiving the one or more messages from the device comprises:

receiving, via at least one directional antenna, the first message and the second message, and

the method further comprising:

determining the first power level at which the first message was received based on data associated with the first message, and

determining the second power level at which the second message was received based on data associated with the second message.

17. The computer-implemented method of claim 15, wherein determining the indication of alignment toward the device that transmitted the first message and the second message based on the first message and the second message comprises:

determining the indication of alignment toward the device that transmitted the first message and the second message based on one or more of:

the first power level at which the first message was received,
the power level at which the first message was transmitted by the device,
the second power level at which the second message was received, and
the power level at which the second message was transmitted by the device.

18. The computer-implemented method claim 15, wherein determining the indication of alignment toward the device that transmitted the first message and the second message based on the first message and the second message comprises:

multiplying the first power level at which the first message was received by a first scaling factor to generate a first alignment value, the first scaling factor corresponding to the power level at which the first message was transmitted by the device;

multiplying the second power level at which the second message was received by a first scaling factor to generate a second alignment value, the second scaling factor corresponding to the power level at which the second message was transmitted by the device; and

determining a direction toward the device based on the first heading value and the second heading value.

19. The computer-implemented method of claim 15, further comprising:

determining that a third message was not received; and

wherein determining the indication of alignment toward the device that transmitted the first message and the second message based on the first message and the second message comprises:

determining the indication of the heading toward the device based on determining that the third message was not received.

20. The computer-implemented method of claim 19, wherein the power level at which the second message was transmitted by the device is different from the first power level at which the first message was transmitted by the device.

21. The computer-implemented method of claim 15, further comprising:
receiving a third message at a third power level, the third message comprising data associated with a power level at which the third message was transmitted by the device;
determining that the power level at which the third message was transmitted by the device corresponds to the power level at which the first message was transmitted by the device or the power level at which the second message was transmitted by the device, and
determining that the third message is a duplicate message that corresponds to the first message or the second message,
wherein determining the indication of alignment toward the device that transmitted the first message and the second message based on the first message and the second message comprises:
foregoing determining the heading toward the device based on the third message.

22. A device, comprising:
at least one processor programmed or configured to:
receive data associated with a location of a device generated by a global position system (GPS) receiver and data associated with the location of the device generated by an inertial measurement unit (IMU) of the device;
determine an absolute location of the device based on the data associated with the location of the device generated by the GPS receiver and the IMU of the device;
receive data associated with movement of the device from the absolute location to a relative location generated by the IMU;

determine the relative location of the device based on the absolute location of the device and the movement of the device to the relative location;

receive data associated with an indication that a safety device is in a transmit state; and

transmit data associated with the relative location of the device.

23. The device of claim 22, wherein, when receiving data associated with the indication that the safety device is in the transmit state, the at least one processor is programmed or configured to:

receive the data associated with the indication that the safety device is in the transmit state from the safety device that is in the transmit state.

24. The device of claim 22, wherein, when receiving data associated with the indication that the safety device is in the transmit state, the at least one processor is programmed or configured to:

receive the data associated with the indication that the safety device is in the transmit state from a local monitoring device,

wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state or a beacon device configured to be in communication with the safety device that is in the transmit state.

25. The device of claim 22, wherein, when receiving data associated with the indication that the safety device is in the transmit state, the at least one processor is programmed or configured to:

receive the data associated with the indication that the safety device is in the transmit state from a central server.

26. The device of claim 22, wherein, when transmitting the data associated with the relative location of the device, the at least one processor is programmed or configured to:

transmit the data associated with the relative location of the device to the safety device that is in the transmit state.

27. The device of claim 22, wherein, when transmitting the data associated with the relative location of the device, the at least one processor is programmed or configured to:

transmit the data associated with the relative location of the device to a local monitoring device,

wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state or a beacon device configured to be in communication with the safety device that is in the transmit state.

28. The device of claim 22, wherein, when transmitting the data associated with the relative location of the device, the at least one processor is programmed or configured to:

transmit the data associated with the relative location of the device to the safety device that is in the transmit state to a central server.

29. The device of claim 22, wherein the device is the safety device in the transmit state, and

wherein, when transmitting the data associated with the relative location of the device, the at least one processor is programmed or configured to:

transmit a plurality of messages, wherein a message of the plurality of messages comprises: data associated with a power level at which the at least one message was transmitted and the data associated with the relative location of the device.

30. The device of claim 22, wherein the at least one processor is further programmed or configured to:

receive one or more messages of a plurality of messages from the device in the transmit state via a short-range wireless communication connection; and

transmit data associated with the one or more messages received from the device in the transmit state to a local monitoring device via the short-range wireless communication connection,

wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state or a beacon device configured to be in communication with the safety device that is in the transmit state.

31. The device of claim 22, wherein the at least one processor is further programmed or configured to:

receive one or more messages of a plurality of messages from the device in the transmit state via a short-range wireless communication connection; and

transmit data associated with one or more messages received from the device in the transmit state to a central server via a communication network.

32. The device of claim 22, wherein the safety device in the transmit state is a first safety device, and

wherein the at least one processor is further programmed or configured to:

receive data associated with a location of a second safety device,

receive, via a ranging antenna, data associated with a first distance from a location of the device to a location of the first safety device,

determine a second distance between the location of the second safety device and the location of the first safety device, and

determine that the location of the device is closer to the location of the first safety device than the location second safety device based on:

comparing the first distance to the second distance, and

determining that the location of the device is closer to the location of the first safety device than the location of the second safety device, and

transition to a search state based on determining that the location of the device is closer to the location of first safety device than the location of the second safety device.

33. The device of claim 22, wherein the at least one processor is further programmed or configured to:

transition the device to a search state based on the data associated with the indication that a safety device is in a transmit state,

wherein, when the device is in the search state, the at least one processor is programmed or configured to:

broadcast one or more messages including data associated with at least one of: the location of the safety device in the transmit state and data associated with a location of a second safety device.

34. The device of claim 22, wherein the at least one processor is further programmed or configured to:

- receive data associated with a location of the safety device in the transmit state;
- receive data associated with a location of a local monitoring device; and
- determine an area in which the safety device in the transmit state is located based on the location of the safety device in the transmit state, the relative location of the device, and the location of the local monitoring device,

wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state.

35. The device of claim 22, wherein the at least one processor is further programmed or configured to:

- receive data associated with a location of the safety device in the transmit state;
- receive data associated with a location of a local monitoring device; and
- determine an area in which the safety device in the transmit state is located based on the location of the safety device in the transmit state, the relative location of the device, and the location of the local monitoring device,

wherein the local monitoring device comprises a beacon device configured to be in communication with the safety device in the transmit state and the device.

36. The device of claim 34, wherein the at least one processor is further programmed or configured to:

- receive data associated with a location of the safety device in the transmit state;
- receive data associated with a location of a local monitoring device; and
- determine an area in which the safety device in the transmit state is not located based on the location of the safety device in the transmit state and the location of the local monitoring device,

wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state or a beacon device configured to be in communication with the safety device that is in the transmit state.

37. The device of claim 22, wherein the at least one processor is further programmed or configured to:

- receive data associated with a location of the safety device in the transmit state;
- receive data associated with a location of a local monitoring device; and
- generate a map based on one or more of the location of the device in the transmit state, the location of the local monitoring device, and the relative location of the device.

38. A computer program product comprising at least one non-transitory computer-readable medium comprising one or more instructions that, when executed by at least one processor, cause the at least one processor to:

- receive data associated with a location of a device generated by a global position system (GPS) receiver and data associated with the location of the device generated by an inertial measurement unit (IMU) of the device;

- determine an absolute location of the device based on the data associated with the location of the device generated by the GPS receiver and the IMU of the device;

- receive data associated with movement of the device from the absolute location to a relative location generated by the IMU;

- determine the relative location of the device based on the absolute location of the device and the movement of the device to the relative location;

- receive data associated with an indication that a safety device is in a transmit state;
- and

- transmit data associated with the relative location of the device.

39. The computer program product of claim 38, wherein the one or more instructions that cause the at least one processor to receive data associated with the indication that the safety device is in the transmit state cause the at least one processor to:

receive the data associated with the indication that the safety device is in the transmit state from the safety device that is in the transmit state.

40. The computer program product of claim 38, wherein, when receiving data associated with the indication that the safety device is in the transmit state, the at least one processor is programmed or configured to:

receive the data associated with the indication that the safety device is in the transmit state from a local monitoring device,

wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state or a beacon device configured to be in communication with the safety device that is in the transmit state.

41. The computer program product of claim 38, wherein, when receiving data associated with the indication that the safety device is in the transmit state, the at least one processor is programmed or configured to:

receive the data associated with the indication that the safety device is in the transmit state from a central server.

42. The computer program product of claim 38, wherein, when transmitting the data associated with the relative location of the device, the at least one processor is programmed or configured to:

transmit the data associated with the relative location of the device to the safety device that is in the transmit state.

43. The computer program product of claim 38, wherein, when transmitting the data associated with the relative location of the device, the at least one processor is programmed or configured to:

transmit the data associated with the relative location of the device to a local monitoring device,

wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state or a beacon device configured to be in communication with the safety device that is in the transmit state.

44. The computer program product of claim 38, wherein, when transmitting the data associated with the relative location of the device, the at least one processor is programmed or configured to:

transmit the data associated with the relative location of the device to the safety device that is in the transmit state to a central server.

45. The computer program product of claim 38, wherein the device is the safety device in the transmit state, and

wherein, when transmitting the data associated with the relative location of the device, the at least one processor is programmed or configured to:

transmit a plurality of messages, wherein each message of the plurality of messages comprises: data associated with a power level at which the message was transmitted and the data associated with the relative location of the device.

46. The computer program product of claim 38, wherein the at least one processor is further programmed or configured to:

receive one or more messages of a plurality of messages from the device in the transmit state via a short-range wireless communication connection; and

transmit data associated with the one or more messages received from the device in the transmit state to a local monitoring device via the short-range wireless communication connection,

wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state or a beacon device configured to be in communication with the safety device that is in the transmit state.

47. The computer program product of claim 38, wherein the at least one processor is further programmed or configured to:

receive one or more messages of a plurality of messages from the device in the transmit state via a short-range wireless communication connection; and

transmit data associated with one or more messages received from the device in the transmit state to a central server via a communication network.

48. The computer program product of claim 39, wherein the safety device in the transmit state is a first safety device, and

wherein the at least one processor is further programmed or configured to:

receive data associated with a location of a second safety device,

receive, via a ranging antenna, data associated with a first distance from a location of the device to a location of the first safety device,

determine a second distance between the location of the second safety device and the location of the first safety device,

determine that the location of the device is closer to the location of the first safety device than the location second safety device based on:

comparing the first distance to the second distance, and

determining that the location of the device is closer to the location of the first safety device than the location of the second safety device, and

transition to a search state based on determining that the location of the device is closer to the location of first safety device than the location of the second safety device.

49. The computer program product of claim 38, wherein the at least one processor is further programmed or configured to:

transition the device to a search state based on the data associated with the indication that a safety device is in a transmit state,

wherein, when the device is in the search state, the at least one processor is programmed or configured to:

broadcast one or more messages including data associated with at least one of: the location of the safety device in the transmit state and data associated with a location of a second safety device.

50. The computer program product of claim 38, wherein the at least one processor is further programmed or configured to:

- receive data associated with a location of the safety device in the transmit state;
- receive data associated with a location of a local monitoring device; and
- determine an area in which the safety device in the transmit state is located based on the location of the safety device in the transmit state, the relative location of the device, and the location of the local monitoring device,

wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state.

51. The computer program product of claim 38, wherein the at least one processor is further programmed or configured to:

- receive data associated with a location of the safety device in the transmit state;
- receive data associated with a location of a local monitoring device; and
- determine an area in which the safety device in the transmit state is located based on the location of the safety device in the transmit state, the relative location of the device, and the location of the local monitoring device,

wherein the local monitoring device comprises a beacon device configured to be in communication with the safety device in the transmit state and the device.

52. The computer program product of claim 38, wherein the at least one processor is further programmed or configured to:

- receive data associated with a location of the safety device in the transmit state;
- receive data associated with a location of a local monitoring device; and
- determine an area in which the safety device in the transmit state is not located based on the location of the safety device in the transmit state and the location of the local monitoring device,

wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state or a beacon device configured to be in communication with the safety device that is in the transmit state.

53. The computer program product of claim 38, wherein the at least one processor is further programmed or configured to:

- receive data associated with a location of the safety device in the transmit state;
- receive data associated with a location of a local monitoring device; and
- generate a map based on one or more of the location of the device in the transmit state, the location of the local monitoring device, and the relative location of the device.

54. A computer-implemented method, comprising:

- receiving data associated with a location of a device generated by a global position system (GPS) receiver and data associated with the location of the device generated by an inertial measurement unit (IMU) of the device;

- determining an absolute location of the device based on the data associated with the location of the device generated by the GPS receiver and the IMU of the device;

- receiving data associated with movement of the device from the absolute location to a relative location generated by the IMU;

- determining the relative location of the device based on the absolute location of the device and the movement of the device to the relative location;

- receiving data associated with an indication that a safety device is in a transmit state; and

- transmitting data associated with the relative location of the device.

55. The computer-implemented method of claim 54, wherein receiving data associated with the indication that the safety device is in the transmit state comprises:

- receiving the data associated with the indication that the safety device is in the transmit state from the safety device that is in the transmit state.

56. The computer-implemented method of claim 54, wherein receiving data associated with the indication that the safety device is in the transmit state comprises:

- receiving the data associated with the indication that the safety device is in the transmit state from a local monitoring device, and

wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state or a beacon device configured to be in communication with the safety device that is in the transmit state.

57. The computer-implemented method of claim 54, wherein receiving data associated with the indication that the safety device is in the transmit state comprises:

receiving the data associated with the indication that the safety device is in the transmit state from a central server.

58. The computer-implemented method of claim 54, wherein transmitting the data associated with the relative location of the device comprises:

transmitting the data associated with the relative location of the device to the safety device that is in the transmit state.

59. The computer-implemented method of claim 54, wherein transmitting the data associated with the relative location of the device comprises:

transmitting the data associated with the relative location of the device to a local monitoring device,

wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state or a beacon device configured to be in communication with the safety device that is in the transmit state.

60. The computer-implemented method of claim 54, wherein transmitting the data associated with the relative location of the device comprises:

transmitting the data associated with the relative location of the device to the safety device that is in the transmit state to a central server.

61. The computer-implemented method of claim 54, wherein the device is the safety device in the transmit state, and

wherein transmitting the data associated with the relative location of the device comprises:

transmitting a plurality of messages, wherein a message of the plurality of messages comprises: data associated with a power level at which each message was transmitted and the data associated with the relative location of the device.

62. The computer-implemented method of claim 54, further comprising:
receiving one or more messages of a plurality of messages from the device in the transmit state via a short-range wireless communication connection; and
transmitting data associated with the one or more messages received from the device in the transmit state to a local monitoring device via the short-range wireless communication connection,
wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state or a beacon device configured to be in communication with the safety device that is in the transmit state.

63. The computer-implemented method of claim 54, further comprising:
receiving one or more messages of a plurality of messages from the device in the transmit state via a short-range wireless communication connection; and
transmitting data associated with one or more messages received from the device in the transmit state to a central server via a communication network.

64. The computer-implemented method of claim 54, wherein the safety device in the transmit state is a first safety device, the computer-implemented method further comprising:
receiving data associated with a location of a second safety device,
receiving, via a ranging antenna, data associated with a first distance from a location of the device to a location of the first safety device,
determining a second distance between the location of the second safety device and the location of the first safety device,
determining that the location of the device is closer to the location of the first safety device than the location second safety device based on:
comparing the first distance to the second distance, and

determining that the location of the device is closer to the location of the first safety device than the location of the second safety device, and
transitioning to a search state based on determining that the location of the device is closer to the location of first safety device than the location of the second safety device.

65. The computer-implemented method of claim 54, further comprising:
transitioning the device to a search state based on the data associated with the indication that a safety device is in a transmit state; and
broadcasting one or more messages including data associated with at least one of: the location of the safety device in the transmit state and data associated with a location of a second safety device.

66. The computer-implemented method of claim 54, further comprising:
receiving data associated with a location of the safety device in the transmit state;
receiving data associated with a location of a local monitoring device; and
determining an area in which the safety device in the transmit state is located based on the location of the safety device in the transmit state, the relative location of the device, and the location of the local monitoring device,
wherein the local monitoring device comprises a safety device configured to be in communication with the safety device in the transmit state.

67. The computer-implemented method of claim 54, further comprising:
receiving data associated with a location of the safety device in the transmit state;
receiving data associated with a location of a local monitoring device; and
determining an area in which the safety device in the transmit state is located based on the location of the safety device in the transmit state, the relative location of the device, and the location of the local monitoring device,
wherein the local monitoring device comprises a beacon device configured to be in communication with the safety device in the transmit state and the device.

68. The computer-implemented method of claim 54, further comprising:

receiving data associated with a location of the safety device in the transmit state;
receiving data associated with a location of a local monitoring device; and
determining an area in which the safety device in the transmit state is not located
based on the location of the safety device in the transmit state and the location of the local
monitoring device,

wherein the local monitoring device comprises a safety device configured to be in
communication with the safety device in the transmit state or a beacon device configured to be in
communication with the safety device that is in the transmit state.

69. The computer-implemented method of claim 54, further comprising:
receiving data associated with a location of the safety device in the transmit state;
receiving data associated with a location of a local monitoring device; and
generating a map based on one or more of the location of the device in the transmit
state, the location of the local monitoring device, and the relative location of the device.

70. A system, comprising:
at least one processor programmed or configured to:
transmit one or more messages including an indication that a device is in a
transmit state;
receive a first location message from a first safety device in a search state,
the first location message comprising:
data associated with a location of the first safety device, and
transmit a coordination message to a second safety device based on
receiving the first location message from the first safety device in the search state, the
coordination message comprising:
data associated with the location of the first safety device relative to
the device in the transmit state.

71. The system of claim 70, wherein the at least one processor is further
programmed or configured to:

receive a second location message comprising data associated with a location of the second safety device;

determine a first distance from the first safety device in the search state to the device in the transmit state;

determine a second distance from the second safety device in the search state to the device in the transmit state; and

determine whether the first safety device or the second safety device is closer to the device in the transmit state based on comparing the first distance to the second distance.

72. The system of claim 71, wherein, when transmitting the coordination message to the second safety device, the at least one processor is further programmed or configured to:

transmit the coordination message comprising:

the data associated with the location of the first safety device relative to the safety device in the transmit state; and

data associated with an indication that the second safety device should transition to a search state based on determining that the second safety device is closer to the device in the transmit state.

73. The system of claim 70, wherein the location of the first safety device is an absolute location of the first safety device, and

wherein the at least one processor is further programmed or configured to:

receive data associated with a distance between the device in the transmit state and the first safety device, and

determine an absolute location of the device in the transmit state based on the absolute location of the first safety device, the distance between the device in the transmit state and the first safety device, and a relative location of the device in the transmit state.

74. The system of claim 72, wherein, when transmitting the coordination message to the second safety device, the at least one processor is further programmed or configured to:

transmit the coordination message comprising:

data associated with the absolute location of the first safety device,

wherein the coordination message causes a display device of the second safety device to display the absolute location of the first safety device relative to a relative location of the second safety device or an absolute location of the second safety device.

75. The system of claim 70, wherein the location of the first safety device is an absolute location of the first safety device, and

wherein the at least one processor is further programmed or configured to:

receive data associated with a first distance between the device in the transmit state and the first safety device;

receive data associated with a second distance between the device in the transmit state and the second safety device;

receive a second location message comprising data associated with a location of the second safety device, the location of the second safety device comprising a relative location of the second safety device or an absolute location of the second safety device; and

determine an absolute location of the device in the transmit state based on the absolute location of the first safety device, the distance between the device in the transmit state and the first safety device, and the location of the second safety device.

76. The system of claim 75, wherein the at least one processor is further programmed or configured to:

transmit data associated with a prompt to transition to a search state based on the location of the first safety device, the location of the second safety device, and the absolute location of the device in the transmit state.

77. A computer program product comprising at least one non-transitory computer-readable medium comprising one or more instructions that, when executed by at least one processor, cause the at least one processor to:

transmit one or more messages including an indication that a device is in a transmit state,

receive a first location message from a first safety device in a search state, the first location message comprising:

data associated with a location of the first safety device, and

transmit a coordination message to a second safety device based on receiving the first location message from the first safety device in the search state, the coordination message comprising:

data associated with the location of the first safety device relative to the device in the transmit state.

78. The computer program product of claim 77, wherein the one or more instructions further cause the at least one processor to:

receive a second location message comprising data associated with a location of the second safety device;

determine a first distance from the first safety device in the search state to the device in the transmit state;

determine a second distance from the second safety device in the search state to the device in the transmit state; and

determine whether the first safety device or the second safety device is closer to the device in the transmit state based on comparing the first distance to the second distance.

79. The computer program product of claim 78, wherein the one or more instructions that cause the at least one processor to transmit the coordination message to the second safety device cause the at least one processor to:

transmit the coordination message comprising:

the data associated with the location of the first safety device relative to the safety device in the transmit state; and

data associated with an indication that the second safety device should transition to a search state based on determining that the second safety device is closer to the device in the transmit state.

80. The computer program product of claim 77, wherein the location of the first safety device is an absolute location of the first safety device, and

wherein the one or more instructions further cause the at least one processor to:

receive data associated with a distance between the device in the transmit state and the first safety device, and

determine an absolute location of the device in the transmit state based on the absolute location of the first safety device, the distance between the device in the transmit state and the first safety device, and a relative location of the device in the transmit state.

81. The computer program product of claim 80, wherein the one or more instructions that cause the at least one processor to transmit the coordination message to the second safety device cause the at least one processor to:

transmit the coordination message comprising:

data associated with the absolute location of the first safety device,

wherein the coordination message causes a display device of the second safety device to display the absolute location of the first safety device relative to a relative location of the second safety device or an absolute location of the second safety device.

82. The computer program product of claim 77, wherein the location of the first safety device is an absolute location of the first safety device, and

wherein the one or more instructions further cause the at least one processor to:

receive data associated with a first distance between the device in the transmit state and the first safety device;

receive data associated with a second distance between the device in the transmit state and the second safety device;

receive a second location message comprising data associated with a location of the second safety device, the location of the second safety device comprising a relative location of the second safety device or an absolute location of the second safety device; and

determine an absolute location of the device in the transmit state based on the absolute location of the first safety device, the distance between the device in the transmit state and the first safety device, and the location of the second safety device.

83. The computer program product of claim 82, wherein the one or more instructions further cause the at least one processor to:

transmit data associated with a prompt to transition to a search state based on the location of the first safety device, the location of the second safety device, and the absolute location of the device in the transmit state.

84. A computer-implemented method, comprising:

transmitting one or more messages including an indication that a device is in a transmit state,

receiving a first location message from a first safety device in a search state, the first location message comprising:

data associated with a location of the first safety device, and

transmitting a coordination message to a second safety device based on receiving the first location message from the first safety device in the search state, the coordination message comprising:

data associated with the location of the first safety device relative to the device in the transmit state.

85. The computer-implemented method of claim 84, further comprising:

receiving a second location message comprising data associated with a location of the second safety device;

determining a first distance from the first safety device in the search state to the device in the transmit state;

determining a second distance from the second safety device in the search state to the device in the transmit state; and

determining whether the first safety device or the second safety device is closer to the device in the transmit state based on comparing the first distance to the second distance.

86. The computer-implemented method of claim 84, wherein transmitting the coordination message to the second safety device comprises:

transmitting the coordination message comprising:

the data associated with the location of the first safety device relative to the safety device in the transmit state; and

data associated with an indication that the second safety device should transition to a search state based on determining that the second safety device is closer to the device in the transmit state.

87. The computer-implemented method of claim 84, wherein the location of the first safety device is an absolute location of the first safety device, the computer-implemented method further comprising:

receiving data associated with a distance between the device in the transmit state and the first safety device, and

determining an absolute location of the device in the transmit state based on the absolute location of the first safety device, the distance between the device in the transmit state and the first safety device, and a relative location of the device in the transmit state.

88. The computer-implemented method of claim 87, wherein transmitting the coordination message to the second safety device comprises:

transmitting the coordination message, wherein the coordination message comprises data associated with the absolute location of the first safety device, and

wherein the coordination message causes a display device of the second safety device to display the absolute location of the first safety device relative to a relative location of the second safety device or an absolute location of the second safety device.

89. The computer-implemented method of claim 82, wherein the location of the first safety device is an absolute location of the first safety device, the computer-implemented method further comprising

receiving data associated with a first distance between the device in the transmit state and the first safety device,

receiving data associated with a second distance between the device in the transmit state and the second safety device;

receiving a second location message comprising data associated with a location of the second safety device, the location of the second safety device comprising a relative location of the second safety device or an absolute location of the second safety device; and

determining an absolute location of the device in the transmit state based on the absolute location of the first safety device, the distance between the device in the transmit state and the first safety device, and the location of the second safety device.

90. The computer-implemented method of claim 87, further comprising:

transmitting data associated with an prompt to transition to a search state based on the location of the first safety device, the location of the second safety device, and the absolute location of the device in the transmit state.

91. A system for generating an image to be output by a device, the system comprising:

at least one processor programmed or configured to:

receive data associated with infrared light detected by a thermal imager included in a safety device, the data associated with the infrared light representing an image;

determine one or more edges included in the image, the one or more edges corresponding to one or more edges of one or more objects in a field of view of the thermal imager;

generate a colorized image based on the data associated with the infrared light;

overlay the one or more edges onto the colorized image; and

output data associated with the colorized image that includes the one or more edges overlaid onto the colorized image.

92. The system of claim 91, wherein, when determining the one or more edges included in the image, the at least one processor is programmed or configured to:

identify the one or more edges in the image corresponding to the one or more edges of one or more objects in the field of view of the thermal imager using an edge detection algorithm.

93. The system of claim 92, wherein, when determining the one or more edges included in the image, the at least one processor is programmed or configured to:

identify one or more straight edges corresponding to the one or more edges of one or more objects in the field of view of the thermal imager using a straight line detection algorithm and the one or more edges that were identified in the image using the edge detection algorithm, and

wherein, when overlaying the one or more edges onto the colorized image, the at least one processor is programmed or configured to:

overlay the one or more straight edges corresponding to the one or more edges of one or more objects in a field of view of the thermal imager onto the colorized image after colorizing the image to generate the colorized image.

94. The system of claim 92, wherein, when determining the one or more edges included in the image, the at least one processor is programmed or configured to:

identify one or more sets of straight edges corresponding to the one or more edges of one or more objects in a field of view of the thermal imager using a straight line detection algorithm and the one or more edges that were identified using the image and the edge detection algorithm, and

wherein, when overlaying the one or more edges onto the colorized image, the at least one processor is programmed or configured to:

overlay the one or more sets of straight edges corresponding to the one or more edges of one or more objects in a field of view of the thermal imager onto the colorized image after colorizing the image to generate the colorized image.

95. The system of claim 92, wherein, when overlaying the one or more edges onto the colorized image, the at least one processor is programmed or configured to:

overlay one or more non-linear edges of the one or more edges that were identified in the image using the edge detection algorithm onto the colorized image after colorizing the image to generate the colorized image.

96. The system of claim 93, wherein, when overlaying the one or more edges onto the colorized image, the at least one processor is programmed or configured to:

overlay one or more straight edges in a first color onto the colorized image; and
overlay one or more non-linear edges in a second color onto the colorized image,
wherein the first color is different from the second color.

97. The system of claim 93, wherein, when identifying the one or more straight edges, the at least one processor is programmed or configured to:

identify the one or more straight edges corresponding to the one or more edges of one or more objects in a field of view of the thermal imager based on performing a Hough transformation on data associated with the one or more edges that were identified using the edge detection algorithm.

98. A computer program product comprising at least one non-transitory computer-readable medium comprising one or more instructions that, when executed by at least one processor, cause the at least one processor to:

receive data associated with infrared light detected by a thermal imager included in a safety device, the data associated with the infrared light representing an image;

determine one or more edges included in the image, the one or more edges corresponding to one or more edges of one or more objects in a field of view of the thermal imager;

generate a colorized image based on the data associated with the infrared light;

overlay the one or more edges onto the colorized image; and

output data associated with the colorized image that includes the one or more edges overlaid onto the colorized image.

99. The computer program product of claim 98, wherein the one or more instructions that cause the at least one processor to determine the one or more edges included in the image cause the at least one processor to:

identify the one or more edges in the image corresponding to the one or more edges of one or more objects in the field of view of the thermal imager using an edge detection algorithm.

100. The computer program product of claim 99, wherein the one or more instructions that cause the at least one processor to determine the one or more edges included in the image cause the at least one processor to:

identify one or more straight edges corresponding to the one or more edges of one or more objects in the field of view of the thermal imager using a straight line detection algorithm and the one or more edges that were identified in the image using the edge detection algorithm, and

wherein the one or more instructions that cause the at least one processor to overlay the one or more edges onto the colorized image cause the at least one processor to:

overlay the one or more straight edges corresponding to the one or more edges of one or more objects in a field of view of the thermal imager onto the colorized image after colorizing the image to generate the colorized image.

101. The computer program product of claim 99, wherein the one or more instructions that cause the at least one processor to determine the one or more edges included in the image cause the at least one processor to:

identify one or more sets of straight edges corresponding to the one or more edges of one or more objects in a field of view of the thermal imager using a straight line detection algorithm and the one or more edges that were identified using the image and the edge detection algorithm, and

wherein the one or more instructions that cause the at least one processor to overlay the one or more edges onto the colorized image cause the at least one processor to:

overlay the one or more sets of straight edges corresponding to the one or more edges of one or more objects in a field of view of the thermal imager onto the colorized image after colorizing the image to generate the colorized image.

102. The computer program product of claim 99, wherein the one or more instructions that cause the at least one processor to overlay the one or more edges onto the colorized image cause the at least one processor to:

overlay one or more non-linear edges of the one or more edges that were identified in the image using the edge detection algorithm onto the colorized image after colorizing the image to generate the colorized image.

103. The computer program product of claim 101, wherein the one or more instructions that cause the at least one processor to overlay the one or more edges onto the colorized image cause the at least one processor to:

overlay one or more straight edges in a first color onto the colorized image; and
overlay one or more non-linear edges in a second color onto the colorized image,
wherein the first color is different from the second color.

104. The computer program product of claim 100, wherein the one or more instructions that cause the at least one processor to identify the one or more straight edges cause the at least one processor to:

identify the one or more straight edges corresponding to the one or more edges of one or more objects in a field of view of the thermal imager based on performing a Hough transformation on data associated with the one or more edges that were identified using the edge detection algorithm.

105. A computer-implemented method, comprising:

receiving data associated with infrared light detected by a thermal imager included in a safety device, the data associated with the infrared light representing an image;

determining one or more edges included in the image, the one or more edges corresponding to one or more edges of one or more objects in a field of view of the thermal imager;
generating a colorized image based on the data associated with the infrared light;

overlaying the one or more edges onto the colorized image; and
outputting data associated with the colorized image that includes the one or more edges overlaid onto the colorized image.

106. The computer-implemented method of claim 105, wherein determining the one or more edges included in the image comprises:

identifying the one or more edges in the image corresponding to the one or more edges of one or more objects in the field of view of the thermal imager using an edge detection algorithm.

107. The computer-implemented method of claim 106, wherein determining the one or more edges included in the image comprises:

identifying one or more straight edges corresponding to the one or more edges of one or more objects in the field of view of the thermal imager using a straight line detection algorithm and the one or more edges that were identified in the image using the edge detection algorithm, and

wherein overlaying the one or more edges onto the colorized image comprises:

overlaying the one or more straight edges corresponding to the one or more edges of one or more objects in a field of view of the thermal imager onto the colorized image after colorizing the image to generate the colorized image.

108. The computer-implemented method of claim 106, wherein determining the one or more edges included in the image comprises:

identifying one or more sets of straight edges corresponding to the one or more edges of one or more objects in a field of view of the thermal imager using a straight line detection algorithm and the one or more edges that were identified using the image and the edge detection algorithm, and

wherein overlaying the one or more edges onto the colorized image comprises:

overlaying the one or more sets of straight edges corresponding to the one or more edges of one or more objects in a field of view of the thermal imager onto the colorized image after colorizing the image to generate the colorized image.

109. The computer-implemented method of claim 106, wherein overlaying the one or more edges onto the colorized image comprises:

overlaying one or more non-linear edges of the one or more edges that were identified in the image using the edge detection algorithm onto the colorized image after colorizing the image to generate the colorized image.

110. The computer-implemented method of claim 108, wherein overlaying the one or more edges onto the colorized image comprises:

overlaying one or more straight edges in a first color onto the colorized image; and
overlaying one or more non-linear edges in a second color onto the colorized image,
wherein the first color is different from the second color.

111. The computer-implemented method of claim 107, wherein identifying the one or more straight edges comprises:

identifying the one or more straight edges corresponding to the one or more edges of one or more objects in a field of view of the thermal imager based on performing a Hough transformation on data associated with the one or more edges that were identified using the edge detection algorithm.

112. A safety device, comprising:

a thermal imager configured to detect infrared light;

one or more directional antennae, and

one or more processors programmed or configured to:

receive one or more messages via the one or more directional antennae,

determine one or more radio frequency (RF) signal parameters associated with the one or more messages, and

output data associated with an indication of an alignment with a device in a transmit state based on the one or more RF signal parameters associated with the one or more messages,

wherein the thermal imager is aligned with the one or more directional antennae such that an optical axis of the thermal imager is aligned with a boresight of the one or more directional antennae.

113. The safety device of claim 112, further comprising:
one or more omnidirectional antennae configured to transmit one or more messages at one or more power levels, the one or more messages including one or more of:
data associated with a device identifier,
data associated with a transmit period,
data associated with a state of one or more devices in communication with the safety device, and
data associated with one or more safety devices that are in a search state.

114. The safety device of claim 113, wherein the one or more omnidirectional antennae comprises:
a first omnidirectional antenna associated with a first radiation field; and
a second omnidirectional antenna associated with a second radiation field, and
wherein the first omnidirectional antenna and the second omnidirectional antenna are positioned about the safety device such that the first radiation field does not correspond to the second radiation field.

115. The safety device of claim 112, further comprising:
a display device;
wherein, when receiving the one or more messages via the one or more directional antennae, the one or more processors are programmed or configured to receive data associated with an indication of a heading toward a device in a transmit state, and
wherein the one or more processors are further programmed or configured to:
receive data associated with infrared light detected by the thermal imager,
and
output data associated with an image based on the indication of the heading toward the device in the transmit state and the infrared light detected by the thermal imager,

the data associated with the image configured to cause the display device to display the image.

116. The safety device of claim 112, further comprising:
a display device;
a digital camera configured to receive one or more digital images; and
wherein, when receiving the one or more messages via the one or more directional antennae, the one or more processors are programmed or configured to receive data associated with an indication of a heading toward a device in aa transmit state, and
wherein the one or more processors are further programmed or configured to:
receive, from the thermal imager, data associated with infrared light detected by the thermal imager,
receive, from the digital camera, data associated with one or more digital images received by the digital camera, and
output data associated with an image based on the indication of the heading toward the device in the transmit state, the infrared light detected by the thermal imager, and the one or more digital images received by the digital camera, the data associated with the image configured to cause the display device to display the image.

117. The safety device of claim 112, further comprising:
a housing;
a display device extending along a first plane; and
a circuit board disposed in the housing, the circuit board including the thermal imager and the one or more directional antennae disposed thereon, the circuit board extending along a second plane that is associated with a common plane,
wherein the first plane is parallel to or intersects the second plane at an angle of $\pm\Theta^\circ$ from the first plane to the second plane, wherein Θ is in a range of about 0 to 90.

118. The safety device of claim 117, wherein the one or more directional antennae are included on the circuit board extending along the second plane, and wherein the boresight of the one or more directional antennae is substantially orthogonal to the second plane.

119. The safety device of claim 117, further comprising:

a signal-absorbing material included in the housing, the signal-absorbing material configured to absorb signals directed toward the one or more directional antennae in a direction that the one or more directional antennae are not configured to receive the signals from.

120. A safety device, comprising:

a thermal imager configured to detect infrared light;

one or more directional antennae, and

one or more processors programmed or configured to:

receive one or more messages via the one or more directional antennae,

determine data associated with one or more parameters at which the one or more messages were received, and

output data associated with an indication of a heading toward a device in a transmit state based on values of the one or more parameters at which the one or more messages were received,

wherein an optical axis of the thermal imager is aligned with a boresight of the one or more directional antennae.

121. The safety device of claim 120, further comprising:

one or more omnidirectional antennae configured to transmit one or more messages at one or more power levels, the one or more messages including one or more of:

data associated with a device identifier,

data associated with a transmit period,

data associated with a state of one or more devices in communication with the safety device, and

data associated with one or more safety devices that are in a search state.

122. The safety device of claim 121, wherein the one or more omnidirectional antennae comprises:

a first omnidirectional antenna associated with a first radiation field; and

a second omnidirectional antenna associated with a second radiation field, and
wherein the first omnidirectional antenna and the second omnidirectional antenna are positioned about the safety device such that the first radiation field does not correspond to the second radiation field.

123. The safety device of claim 121, wherein the one or more omnidirectional antennae comprises:

a first omnidirectional antenna associated with a first polarization; and
a second omnidirectional antenna associated with a second polarization,
wherein the first omnidirectional antenna is positioned in the safety device relative to the second omnidirectional antenna such that the first polarization is at least partially unaligned with the second polarization.

124. The safety device of claim 120, further comprising:

a display device;

wherein, when receiving the one or more messages via the one or more directional antennae, the one or more processors are programmed or configured to receive data associated with an indication of a heading toward a device in a transmit state, and

wherein the one or more processors are further programmed or configured to:

receive data associated with infrared light detected by the thermal imager,

and

output data associated with an image based on the indication of the heading toward the device in the transmit state and the infrared light detected by the thermal imager, the data associated with the image configured to cause the display device to display the image.

125. The safety device of claim 120, further comprising:

a housing including a display device extending along a first plane; and

a circuit board disposed in the housing, the circuit board including the thermal imager and a digital camera disposed thereon, the circuit board extending along a second plane,

wherein the first plane is parallel to or intersects the second plane at an angle of $\pm\Theta^\circ$ from the first plane to the second plane, wherein Θ is in a range of about 0 to 90.

126. The safety device of claim 125, wherein the one or more directional antennae are included on the circuit board extending along the second plane, and wherein the boresight of the one or more directional antennae is substantially orthogonal to the second plane.

127. A safety device, comprising:

a thermal imager configured to detect infrared light;

one or more directional antennae, and

one or more processors programmed or configured to:

receive one or more messages via the one or more directional antennae,

determine one or more power levels at which the one or more messages were received, and

output data associated with an indication of a heading toward a device in a transmit state based on the one or more power levels at which the one or more messages were received,

wherein an optical axis of the thermal imager is aligned with a boresight of the one or more directional antennae.

128. The safety device of claim 127, wherein the optical axis of the thermal imager is aligned with the boresight of the one or more directional antennae such that a center portion of a field of view associated with the thermal imager intersects the boresight of the one or more directional antennae.

129. The safety device of claim 127, further comprising:

a radio frequency (RF) ranging sensor; and

a display device; and

wherein the one or more processors are further programmed or configured to:

receive, via the RF ranging sensor, data associated with a distance between a first location of the safety device and a second location of a device that is in a transmit state;

receive data associated with infrared light detected by the thermal imager;
and

output data associated with an image based on the indication of the heading toward the device in the transmit state, the distance between the first location of the safety device and the second location of the device that is in the transmit state, and the infrared light detected by the thermal imager, the data associated with the image configured to cause the display device to display the image.

130. The safety device of claim 127, further comprising:
a housing;
a display device extending along a first plane; and
a circuit board disposed in the housing, the circuit board including the thermal imager and a digital camera disposed thereon, the circuit board extending along a second plane,
wherein the first plane is parallel to or intersects the second plane at an angle of $\pm\Theta^\circ$ from the first plane to the second plane, wherein Θ is in a range of about 0 to 90.

131. The safety device of claim 130, wherein the one or more directional antennae are included on the circuit board, and wherein the boresight of the one or more directional antennae is orthogonal to the second plane.