CLAIMS

The invention claimed is:

1. A system, comprising:

a plurality of triggers disposed within a first distance of each other; and

a hub separated from the plurality of triggers by at least a second distance that is greater than the first distance, the hub being configured to wirelessly transmit a signal configured for receipt by at least one of the plurality of triggers,

wherein each of the plurality of triggers is configured to receive and re-broadcast the signal.

2. The system of claim 1, wherein:

the plurality of triggers comprising at least one recipient trigger;

the signal transmitted by the hub is configured for receipt by the at least one recipient trigger; and

each of the plurality of triggers is configured to receive and re-broadcast the signal if the respective trigger is not the at least one recipient trigger.

3. The system of claim 1, wherein:

the signal transmitted by the hub comprises a recipient identifier selected from a plurality of identifiers; and

each trigger of the plurality of triggers is associated with a respective one of the plurality of identifiers.

4. The system of claim 3, wherein each trigger processes the signal and re-broadcasts the signal if the recipient identifier is different from the identifier associated with the respective trigger.

5. The system of claim 3, wherein each trigger is communicably coupled to a downhole tool and, upon processing the signal, each trigger activates its corresponding downhole tool to perform an action if the recipient identifier is the same as the identifier associated with the respective trigger.

6. The system of claim 5, wherein the downhole tool is a mechanism comprising at least one of a fluid sampling system or device, a telemetry tool, a packer or other wellbore isolation device, a motor, an inflow control device, a sliding sleeve, an electronic rupture disc, a jarring tool, a subsea tree, a safety valve, and a retainer valve.

7. The system of claim 5, wherein the downhole tool is a sensor comprising at least one of a fluid sensor, reservoir sensor, formation sensor, and tool sensor.

8. The system of claim 3, wherein the triggers that are associated with identifiers that do not match the recipient identifier re-broadcast the signal simultaneously.

9. The system of claim 3, wherein the triggers that are associated with identifiers that do not match the recipient identifier rebroadcast the signal at times that are offset from each other.

10. The system of claim 1, wherein the signal is transmitted via at least one of radio frequency, acoustic telemetry, fluid pulse telemetry, and electromagnetic telemetry.

11. The system of claim 1, wherein the hub is arranged within a borehole and the plurality of triggers are arranged about a tubular extended within the borehole.

12. The system of claim 1, further comprising a downhole tool communicably coupled to a first trigger of the plurality of triggers, the downhole tool being configured to convey information to the first trigger whereupon the first trigger transmits a telemetry signal comprising the information and remaining triggers of the plurality of triggers re-broadcast the telemetry signal.

13. A method comprising:

transmitting a wireless signal directed to at least one of a plurality of triggers with a hub disposed within a borehole, the plurality of triggers being arranged within a first distance of each other and the hub being separated from the plurality of triggers by at least a second distance that is greater than the first distance; and

re-broadcasting the wireless signal with triggers that are not the at least one of the plurality of triggers to which the wireless signal is directed.

14. The method of claim 14, wherein the wireless signal transmitted by the hub comprises a recipient identifier selected from a plurality of identifiers, and each trigger is associated with a respective one of the plurality of identifiers, wherein re-broadcasting the wireless signal comprises processing the wireless signal if the recipient identifier matches the identifier associated with the respective trigger and otherwise re-broadcasting the wireless signal.

15. The method of claim 15, wherein re-broadcasting the wireless signal comprises re-broadcasting the wireless signal simultaneously with triggers that are associated with identifiers that do not match the recipient identifier.

16. The method of claim 15, wherein re-broadcasting the wireless signal comprises re-broadcasting the wireless signal with triggers that are associated with identifiers that do not match the recipient identifier at times that are offset from each other.

17. The method of claim 15, wherein processing the wireless signal comprises:

activating a downhole tool communicably coupled to each trigger whose identifier matches the recipient identifier; and

performing an action with the downhole tool upon being activated by its respective trigger.

18. The method of claim 18, further comprising:

creating a telemetry signal with the trigger communicably coupled to the downhole tool, the telemetry signal comprising information received from the downhole tool;

transmitting the telemetry signal to adjacent triggers of the plurality of triggers; and

transmitting the telemetry signal to the hub with the adjacent triggers.

19. The method of claim 19, wherein transmitting the telemetry signal to the hub comprises transmitting the telemetry signal simultaneously with the adjacent triggers.

20. The method of claim 19, wherein transmitting the telemetry signal to the hub comprises transmitting the telemetry signal at times that are offset from each other with the adjacent triggers.

21. A system, comprising:

a plurality of triggers disposed within a first distance of each other; and

a hub separated from the plurality of triggers by at least a second distance that is greater than the first distance, the hub being configured to wirelessly receive a signal transmitted by any of the plurality of triggers,

wherein each of the plurality of triggers is configured to receive and

re-broadcast a signal transmitted by another of the plurality of triggers.

22. The system of claim 21, wherein the triggers that re-broadcast the signal do so simultaneously.

23. The system of claim 21, wherein the triggers that re-broadcast the signal do so at times that are offset from each other.

24. A repeater, comprising a plurality of triggers arranged within a borehole at a first axial location and being configured to receive and re-transmit a wireless signal to a second axial location.

25. The repeater of claim 24, wherein the plurality of triggers are each configured to re-broadcast the wireless signal to adjacent triggers and then re-transmit the wireless signal to the second axial location.

26. The repeater of claim 24, wherein the plurality of triggers re-transmit the wireless signal to the second axial location simultaneously.

27. The repeater of claim 24, wherein the plurality of triggers re-transmit the wireless signal to the second axial location at slightly offset times from each other.

28. A method comprising:

receiving a wireless signal with at least one trigger of a plurality of triggers arranged within a borehole at a first axial location; and

re-transmitting the wireless signal to a second axial location with the at least one trigger.

29. The method of claim 28, wherein receiving the wireless signal with the at least one trigger further comprises re-broadcasting the wireless signal with the at least one trigger to adjacent triggers of the plurality of triggers.

30. The method of claim 28, wherein re-transmitting the wireless signal to the second axial location comprises re-transmitting the wireless signal simultaneously with each of the plurality of triggers that received either the wireless signal or the re-broadcast signal.

31. The repeater of claim 28, wherein re-transmitting the wireless signal to the second axial location comprises re-transmitting the wireless signal with each of the plurality of triggers that received either the wireless signal or the re-broadcast signal at times that are offset from each other.

CLAIMS

1. A system, comprising:

a plurality of triggers disposed in a borehole and within a first distance of each other, the plurality of triggers comprising at least one recipient trigger; and

a hub disposed in the borehole and separated from the plurality of triggers by at least a second distance that is greater than the first distance,

wherein the hub includes a directional transceiver that wirelessly transmits a signal simultaneously to each trigger of the plurality of triggers, and the signal being intended for the at least one recipient trigger, and

wherein each trigger other than the at least one recipient trigger receives the signal from the hub and re-broadcasts the signal to the at least one recipient trigger.

2. The system of claim 1, wherein:

each trigger other than the at least one recipient trigger is configured to receive and re-broadcast the signal if the respective trigger is not the at least one recipient trigger.

3. The system of claim 1, wherein:

the signal transmitted by the hub comprises a recipient identifier selected from a plurality of identifiers; and

each trigger of the plurality of triggers is associated with a respective one of the plurality of identifiers.

4. The system of claim 3, wherein each trigger processes the signal and re-broadcasts the signal if the recipient identifier is different from the identifier associated with the respective trigger.

5. The system of claim 3, wherein each trigger is communicably coupled to a downhole tool and, upon processing the signal, each trigger activates its

corresponding downhole tool to perform an action if the recipient identifier is the same as the identifier associated with the respective trigger.

6. The system of claim 5, wherein the downhole tool is a mechanism comprising at least one of a fluid sampling system or device, a telemetry tool, a packer or other wellbore isolation device, a motor, an inflow control device, a sliding sleeve, an electronic rupture disc, a jarring tool, a subsea tree, a safety valve, a sensor and a retainer valve.

7. The system of claim 3, wherein the triggers that are associated with identifiers that do not match the recipient identifier re-broadcast the signal simultaneously.

8. The system of claim 3, wherein the triggers that are associated with identifiers that do not match the recipient identifier rebroadcast the signal at times that are offset from each other.

9. The system of claim 1, wherein the plurality of triggers are arranged about a tubular extended within the borehole.

10. A method, comprising:

transmitting a wireless signal simultaneously to each trigger of a plurality of triggers disposed within a borehole with a hub disposed within the borehole, wherein the hub includes a directional transceiver, the plurality of triggers include at least one recipient trigger, the wireless signal is intended for the at least one recipient trigger, and the plurality of triggers are arranged within a first distance of each other and the hub is separated from the plurality of triggers by at least a second distance that is greater than the first distance; and

receiving the wireless signal with plurality of triggers other than the at least one recipient trigger and re-broadcasting the wireless signal with the plurality of triggers to the at least one recipient trigger.

11. The method of claim 10, wherein the wireless signal transmitted by the hub comprises a recipient identifier selected from a plurality of identifiers, and each trigger is associated with a respective one of the plurality of identifiers, wherein re-broadcasting the wireless signal comprises processing the wireless signal if the recipient identifier matches the identifier associated with the respective trigger and otherwise re-broadcasting the wireless signal.

12. The method of claim 11, wherein re-broadcasting the wireless signal comprises re-broadcasting the wireless signal simultaneously with triggers that are associated with identifiers that do not match the recipient identifier.

13. The method of claim 11, wherein re-broadcasting the wireless signal comprises re-broadcasting the wireless signal with triggers that are associated with identifiers that do not match the recipient identifier at times that are offset from each other.

14. The method of claim 11, wherein processing the wireless signal comprises:

activating a downhole tool communicably coupled to each trigger whose identifier matches the recipient identifier; and

performing an action with the downhole tool upon being activated by its respective trigger.

15. The method of claim 14, further comprising:

creating a telemetry signal with the trigger communicably coupled to the downhole tool, the telemetry signal comprising information received from the downhole tool;

transmitting the telemetry signal to adjacent triggers of the plurality of triggers; and

transmitting the telemetry signal to the hub with the adjacent triggers.

16. The method of claim 15, wherein transmitting the telemetry signal to the hub comprises transmitting the telemetry signal simultaneously with the adjacent triggers.

17. The method of claim 15, wherein transmitting the telemetry signal to the hub comprises transmitting the telemetry signal at times that are offset from each other with the adjacent triggers.

18. A system, comprising:

a plurality of triggers disposed in a borehole and within a first distance of each other; and

a hub disposed in the borehole and separated from the plurality of triggers by at least a second distance that is greater than the first distance,

wherein the hub includes a directional transceiver that wirelessly receives a signal transmitted by any of the plurality of triggers, and

wherein at least one trigger of the plurality of triggers transmits the wireless signal intended for the hub simultaneously to each of the other triggers of the plurality of triggers and each of the other triggers receives and re-broadcasts the received wireless signal to the hub.

19. The system of claim 18, wherein the triggers that re-broadcast the signal do so simultaneously.

20. The system of claim 18, wherein the triggers that re-broadcast the signal do so at times that are offset from each other.

21. A repeater, comprising a plurality of triggers arranged within a borehole at a first axial location, wherein at least one trigger of the plurality of triggers broadcasts a wireless signal simultaneously to each of the other triggers, and each of the other triggers then re-transmits the wireless signal to a hub arranged within the borehole at a second axial location, the hub including a directional transceiver that receives the re-transmitted wireless signal.

22. The repeater of claim 21, wherein the plurality of triggers re-transmit the wireless signal to the hub simultaneously.

23. The repeater of claim 21, wherein the plurality of triggers re-transmit the wireless signal to the hub at slightly offset times from each other.

24. A method comprising:

broadcasting a wireless signal with at least one trigger of a plurality of triggers simultaneously to each of the other triggers of the plurality of triggers arranged within a borehole at a first axial location; and

re-transmitting the received wireless signal using each of the other triggers to a hub arranged within the borehole at a second axial location, the hub including a directional transceiver that receives the re-transmitted wireless signal.

25. The method of claim 24, wherein re-transmitting the wireless signal to the hub comprises re-transmitting the wireless signal simultaneously with each of the other triggers of the plurality of triggers that received the broadcasted signal.

26. The repeater of claim 24, wherein re-transmitting the wireless signal to the hub comprises re-transmitting the wireless signal with each of the other triggers of the plurality of triggers that received the broadcasted signal at times that are offset from each other.