CLAIMS

What is claimed is:

1. A low energy electronic device for communicating identifying information to a nearby portable electronic device, the low energy electronic device comprising:
   a transceiver operable to transmit and receive signals;
   a processing unit in communication with the transceiver, the processing unit being operable to:
      switch the transceiver into a one-way communication mode, wherein the transceiver transmits a generic wake-up signal comprising a universal unique identifier (UUID) and a generic wake-up identifier for a first time period, and transmits a user identifier signal comprising the UUID and a user identifier associated with a user or object for a second time period after the first time period has elapsed;
      switch the transceiver into a two-way communication mode after the second time period has elapsed to facilitate receipt of an incoming confirmation signal.

2. The low energy electronic device of claim 1, wherein the low energy electronic device comprises a portable self-contained unit having a housing in support of the transceiver, the processing unit and a user interface.

3. The low energy electronic device of claim 2, wherein the user interface comprises one of a mechanical user interface, a biometric user interface, an electronic user interface, or an electromechanical user interface.

4. The low energy electronic device of claim 1, wherein the one-way communication mode utilizes a wireless low energy beacon communication protocol to transmit the

generic wake-up signal and the user identifier signal to one or more nearby portable electronic devices.

5. The low energy electronic device of claim 1, wherein the UUID comprises a 16 byte source identifier, and wherein the generic wake-up identifier comprises a 32 bit generic wake up identifier from supplemental values.

6. The low energy electronic device of claim 1, wherein the UUID comprises a 16 byte source identifier, and wherein the user identifier comprises a 32 bit user identifier from supplemental values.

7. The low energy electronic device of claim 1, wherein the two-way communication mode uses a wireless low energy close proximity communication protocol to send data to and receive data from one or more nearby portable electronic devices.

8. The low energy electronic device of claim 1, wherein the first time period comprises a pre-determined duration of time between 1 and 5 seconds.

9. The low energy electronic device of claim 1, wherein the second time period comprises a pre-determined duration of time between 1 and 5 seconds.

10. The low energy electronic device of claim 1, wherein the user identifier comprises a 32 bit value that is pre-established to be associated with a low energy electronic device of the at least one low energy electronic device associated with the user or the object, or wherein the user identifier associated with the object comprises a VIN number or an inventory tracking number.

11. The low energy electronic device of claim 1, wherein the at least one low energy electronic device is operable within a system, the system comprising:
    a plurality of low energy electronic devices, each low energy electronic device comprising a transceiver and a processing unit, wherein each low energy electronic device in the plurality of low energy electronic devices is operable to transmit the same generic wake-up identifier in response to being activated.

12. The low energy electronic device of claim 11, wherein each low energy electronic device in the plurality of low energy electronic devices comprises the same UUID.

13. The low energy electronic device of claim 11, wherein each one of the plurality of low energy electronic devices is matched to a respective specific portable electronic device.

14. The low energy electronic device of claim 1, wherein the low energy electronic device comprises is an integrated component operable within an existing electronics system.

15. The low energy electronic device of claim 1, wherein the processing unit is further operable to, in response to receiving a confirmation signal, switch the transceiver into sleep mode.

16. The low energy electronic device of claim 1, wherein the processing unit is further operable to remain in two-way communication mode for a third period of time and, after the third period of time has elapsed, returning to the one-way communication mode.

17. The low energy electronic device of claim 1, wherein the processing unit is further operable to:

cause the low energy electronic device to enter a repeat broadcast mode, and

while in the repeat broadcast mode, continuously loop between the first, second, and third time periods and broadcast the associated generic wake-up and user identifier signals over time to a plurality of portable electronic devices having an application associated with the generic wake-up identifier, wherein the repeat broadcast mode facilitates the transmission of multiple respective locations of the plurality of portable electronic devices and the user identifier to the server system by the plurality of portable electronic devices, and generation of a path of the user or object associated with the low energy electronic device based on each location transmitted by the plurality of portable electronic devices.

18. A portable electronic device comprising:

one or more processors;

a transceiver configured to receive signals from paired and non-paired low energy electronic devices;

a location determination module operable to facilitate determination of a location of the portable electronic device;

a computer-readable memory storing computer-executable instructions that, when executed by one or more hardware processors, configure the portable electronic device to perform a plurality of operations, the operations comprising:

receiving, during a first time period and from at least one of the paired or non-paired low energy electronic devices in a one-way communication mode, a generic wake-up signal having a UUID and a generic wake-up identifier;

in response to receiving the generic wake-up signal, activating an application installed on the portable electronic device associated with the generic wake-up identifier;

receiving, during a second time period and from the at least one paired or non-paired low energy electronic device in the one-way communication mode, a user identifier signal having the UUID and a user identifier associated with a user or object;

determining, based on the user identifier, whether the at least one paired or non-paired low energy electronic device is paired with the portable electronic device; and

performing at least one of a background function or a foreground function in response to the determination of whether the at least one paired or non-paired low energy electronic device is paired with the portable electronic device.

19. The portable electronic device of claim 18, the operations further comprising, in accordance with a determination that the at least one paired or non-paired low energy electronic device is paired with the portable electronic device and comprises a paired low energy electronic device:

performing a foreground function of activating at least one of a camera or a microphone of the portable electronic device to record at least one of image data or audio data, respectively; and

transmitting the user identifier, any recorded image data and audio data, and the location of the portable electronic device to the server system.

20. The portable electronic device of claim 18, the operations further comprising, in accordance with a determination that the at least one paired or non-paired low energy electronic device is not paired with the portable electronic device and comprises a non-paired low energy electronic device:

performing a background function of transmitting the user identifier and the location of the portable electronic device to the server system.

21. The portable electronic device of claim 18, the operations further comprising

prior to receiving the generic wakeup signal, receiving a device registration request from a low energy electronic device of the at least one paired or non-paired low energy device associated with the user or the object;

receiving a user identifier associated with the low energy electronic device to be paired with the portable electronic device; and

storing the user identifier associated with the low energy electronic device.

22. The portable electronic device of claim 21, wherein receiving the user identifier associated with the low energy electronic device to be paired with the portable electronic device further comprises:

transferring the device registration request to the server system, and

receiving from the server system the user identifier, as generated by the server system, for the low energy electronic device.

23. The portable electronic device of claim 18, wherein the determining comprises

accessing a user identifier stored at the portable electronic device,

comparing the user identifier stored at the portable electronic device with the received user identifier associated with the at least one paired or non-paired low energy electronic device to determine if they match; and

in accordance with a determination that the user identifier stored on the portable electronic device and the received user identifier associated with the at least one paired or non-paired low energy electronic device match, determining that the at least one paired or non-paired low energy electronic device is a paired low energy electronic device.

24. The portable electronic device of claim 18, wherein the operations further comprise receiving, at the same or different times, a plurality of generic wake-up signals from a plurality of low energy electronic devices, each of the generic wake-up signals comprising the same supplemental values for the generic wake-up identifier, and each of the plurality of low energy electronic devices comprising different user identifiers and one of a paired or a non-paired low energy electronic device.

25. The portable electronic device of claim 18, wherein the determining comprises:
transmitting the received user identifier and a device identifier for the portable electronic device to a server system; and
receiving from the server system a determination concerning whether the low energy electronic device and the portable electronic device are paired based on information stored in a user profile associated with the received user identifier.

26. A portable electronic device comprising:
one or more processors;
a transceiver configured to receive signals from a first low energy electronic device;
a location determination module operable to facilitate determination of a location of the portable electronic device;
a computer-readable memory storing computer-executable instructions that, when executed by one or more hardware processors, configure the portable electronic device to perform a plurality of operations, the operations comprising:
receiving, during a first time period and from the first low energy electronic device in a one-way communication mode, a generic wake-up signal having a UUID and a generic wake-up identifier,
in response to receiving the generic wake-up signal, activating an application installed on the portable electronic device associated with the generic wake-up identifier;

receiving, during a second time period and from the first low energy electronic device in the one-way communication mode, a user identifier signal having the UUID and a user identifier associated with a user or object from the first low energy electronic device;

determining, based on the user identifier, whether the first low energy electronic device is paired with the portable electronic device; and

in accordance with a determination that the first low energy electronic device is not paired with the portable electronic device:

transmitting the user identifier and the location of the portable electronic device to a server system.

27. The portable electronic device of claim 26, the operations further comprising transmitting, using a two-way communication mode, a non-paired confirmation signal to the first low energy electronic device during a third time period following the lapse of the second time period.

28. The portable electronic device of claim 27, wherein the non-paired confirmation signal causes the first low energy electronic device to switch into one of a sleep mode, the one-way communication mode, or a repeat broadcast mode.

29. The portable electronic device of claim 26, the operations further comprising:

receiving a generic wake-up signal from a second low energy electronic device, either prior to or after the receipt of the generic wake-up signal from the first low energy electronic device, the generic wake-up signal from the second low energy electronic device comprising the generic-wake-up identifier;

in response to receiving the generic wake-up signal and the generic wake-up identifier from the second low energy electronic device, activating the application;

receiving a user identifier from the second low energy electronic device;

determining, based on the user identifier of the second low energy electronic device, whether the second low energy electronic device is paired with the portable electronic device;

in accordance with a determination that second low energy electronic device is paired with the portable electronic device, such that the first low energy electronic device comprises a paired low energy electronic device:

performing a foreground function of activating at least one of a camera or a microphone to record at least one of image data or audio data, respectively; and

transmitting the user identifier, any recorded image data and audio data, and the location of the portable electronic device to the server system.

30. The portable electronic device of claim 29, in accordance with the determination that the second low energy electronic device is paired with the portable electronic device, transmitting, using a two-way communication mode, a paired confirmation signal to the second low energy electronic device during a third time period following the lapse of the second time period.

31. The portable electronic device of claim 30, wherein the paired confirmation signal causes the second low energy electronic device to switch into sleep mode.

32. A server system for enabling communication between a plurality of portable electronic devices with a particular application, the server system comprising:

one or more processors;

a computer-readable memory storing computer-executable instructions that, when executed by one or more hardware processors, configure the one or more processors to perform a plurality of operations, the operations comprising:

receiving situation data from a portable electronic device, the situation data comprising a user identifier associated with a user or object and a location of the portable electronic device;

identifying, based on the user identifier, a group of users associated with the user identifier;

determining whether the situation data further comprises recorded image data and audio data;

in accordance with a determination that the situation data further comprises recorded image data and audio data:

sending a user identifier, a location of the portable electronic device, and recorded audio data and visual data to the group of users; and

in accordance with a determination that the situation data does not further comprise recorded image data and audio data:

sending a user identifier and a location of the portable electronic device to the group of users.

33. The server system of claim 32, wherein the operations further comprise:

prior to receiving a user identifier and location from a portable electronic device, receiving a device registration request from the portable electronic device;

generating a user identifier for the low energy electronic device, and

sending the generated user identifier to the low energy electronic device.

34. The server system of claim 33, wherein the operations further comprise associating the user identifier with a particular user profile.

35. The server system of claim 34, wherein the receive situation data comprises the locations of two or more portable electronic device, and the operations further comprise:

generating an estimated location for a low energy electronic device based on the range of the low energy electronic device and the locations of the two or more portable electronic devices; and

transmitting an estimated location of the low energy electronic device to the group of users.

36. The portable electronic device of claim 18, the operations further comprising:

receiving a generic wake-up signal from at least one other low energy electronic device, either prior to or after the receipt of the generic wake-up signal from the at least one of a paired or non-paired low energy electronic device, the generic wake-up signal from the at least one other low energy electronic device comprising the generic-wake-up identifier;

in response to receiving the generic wake-up signal and the generic wake-up identifier from the at least one other low energy electronic device, activating the application;

receiving a user identifier from the at least one other low energy electronic device;

determining, based on the user identifier of the at least one other low energy electronic device, whether the at least one other low energy electronic device is paired with the portable electronic device; and

performing at least one of a background function or a foreground function in response to the determination of whether the at least one other low energy electronic device is paired with the portable electronic device.

37. The portable electronic device of claim 18, wherein the portable electronic device is operable within a server-client system, the server-client system comprising:

a server system comprising one or more processors and a computer-readable memory storing computer-executable instructions that, when executed by

one or more processors, configure the one or more processors to perform a plurality of operations;

a low energy electronic device comprising:

a transceiver operable to transmit and receive signals;

a processing unit in communication with the transceiver, the processing unit, in response to being activated by user input, being operable to:

switch the transceiver into a one-way communication mode, wherein the transceiver transmits, using a beacon communication protocol, a generic wake-up signal comprising a universal unique identifier (UUID) and a generic wake-up identifier for a first time period, and transmits, using the beacon communication protocol, a user identifier signal comprising the UUID and a user identifier associated with a user or an object for a second time period after the first time period as has elapsed; and

switch the transceiver into a two-way communication mode after the second time period has elapsed to facilitate receipt of an incoming confirmation signal; and

a plurality of portable electronic devices, including the portable electronic device, configured to be in communication with the server system via a communications network, each having an application stored thereon associated with the low energy electronic device, each being configured, when in range, to receive the generic wake-up identifier and user identifier signals as transmitted by the low energy electronic device, and to transmit the confirmation signal to the low energy electronic device, and each being associated with a specific user identifier, at least one of the portable electronic devices being associated with the user identifier of the low energy electronic device,

wherein the plurality of portable electronic devices are configured to transmit the user identifier, a device identifier, and a respective location of the at least some of the plurality of portable electronic devices to the server system upon

receiving the generic wake-up and user identifier signals from the low energy electronic device.

38. The system of claim 37, wherein different sets of portable electronic devices of the plurality of portable electronic devices receive the generic wake-up and user identifier signals from the low energy electronic device at different locations and at different time intervals, wherein each portable electronic device in each different set transmits the user identifier and its respective location to the server system during the different time intervals resulting in multiple locations, and wherein the server system receives the multiple locations and tracks the user or object associated with the low energy electronic device over time based on a last location of the multiple locations.

39. The system of claim 38, wherein the server system further comprises a location estimation module operable to generate an estimated location of the low energy electronic device based on the range of the low energy electronic device and the multiple locations.

40. The system of claim 39, wherein the estimated location of the low energy electronic device is based on at least on of an average of the multiple positions, an estimated range within which the different sets of portable electronic devices would receive the generic wake-up and user identifier signals from the low energy electronic device and an overlapping region, and a received signal strength indicator (RSSI) for the received generic wake-up and user identifier signals.