LUMINAIRE COMMUNICATION, DETECTION AND/OR LOCATION APPARATUS AND SYSTEM

FIELD OF THE INVENTION

The present invention relates to luminaires configured to enable communications, detection and/or positioning/location functionalities, and a system such luminaires.

BACKGROUND OF THE INVENTION

Loss of power and lighting can occur in buildings putting occupants at risk, especially when they cannot communicate and/or cannot be found. This can occur, for example, in emergency situations. Such emergency situations can be, for example, natural disasters, such as earthquakes, floods volcanic eruptions, storms and the like; or other emergencies such as fires, power cuts, terror attacks, criminal attacks, or person health emergencies and the like.

In such situations, persons in the building may be in need of assistance, such as rescue. However, often it is difficult for emergency services, or other assistance to be provided as it is not known where the persons are and/or they cannot be communicated with. This is because regular power supply and/or regular communications infrastructure is unavailable and/or environmental conditions (such as smoke) restrict assistance.

SUMMARY OF THE INVENTION

Embodiments of the invention seek to provide an apparatus and/or system to assist people in a building, for example during an abnormal event such as an emergency situation

For example, embodiments of the invention could assist with reporting positions or alerts, presence of persons and their movements in real time.

A building could be, but is not limited to, an apartment, commercial office block, house, office, shop, hotel, or the like.

According to one aspect, there is provided a luminaire with integrated communications for use in assisting persons in a building to communicate with third parties outside of the building during an abnormal event, the luminaire comprising: at least one lighting module providing illumination as required to meet building regulations for provision of illumination inside of a building during an abnormal event when a regular power supply might fail, at least one communications component facilitating communication between persons in the

building and third parties outside of the building during an abnormal event when a regular power supply might fail, a controller, an uninterruptible power supply in or coupled to: the at least one lighting module as part of the regulatory requirement for the provision of illumination inside of the building during an abnormal event when a regular power supply might fail, the at least one communications component and/or controller in the absence of a regular power supply, and the uninterruptible power supply configured to operate in: a first mode of operation for a first period of time to supply a first power sufficient for at least illumination inside of the building by the at least one lighting module to meet building regulations for provision of illumination inside of the building during an abnormal event, and a second mode of operation for a second period of time, after which illumination inside of the building is not required to meet building regulations, to supply a second power, being lower than the first power, sufficient for at least the at least one communications component to communicate with third parties outside of the building, wherein the controller: triggers the lighting module to activate or maintain illumination inside of the building upon the abnormal event at least in the first mode of operation, facilitates communication via the communications between persons in the building and a third party outside of the building at least in the second mode of operation, and/or facilitates obtaining positioning of persons using the communications component and/or other components, wherein in the first mode of operation, the uninterruptible power supply provides power to all components in the luminaire, and wherein in the second mode of operation, the uninterruptible power supply provides power to a subset of components powered by the uninterruptible power supply operating in the first mode which excludes the lighting module and to facilitate communications with the third parties outside of the building.

According to another aspect, there is provided a luminaire for use in assisting persons in a building to communicate with third parties outside of the building during an abnormal event, the luminaire comprising: at least one lighting module providing illumination as required to meet building regulations for provision of illumination inside of a building during an abnormal event when a regular power supply might fail, at least one communications component facilitating communication between persons in the building and third parties outside of the building during an abnormal event when a regular power supply might fail, a controller, a removable and/or detachable uninterruptible power supply in or coupled to the at least one lighting module, at least one communications component and/or controller in the absence of a regular power supply, the uninterruptible power supply configured to operate in: a first mode of operation for a first period of time to supply a first power sufficient for at least illumination inside of the building by the at least one lighting module to meet building regulations for provision of illumination inside of the building during an abnormal event, and a second mode of operation for a second period of time, after which

illumination inside of the building is not required to meet building regulations, to supply a second power, being lower than the first power, sufficient for at least the at least one communications component to communicate with third parties outside of the building, wherein the controller: triggers the lighting module to activate or maintain illumination upon an activation event, facilitates communication via the communications between persons in the building and a third party outside of the building at least in the second mode of operation, and/or facilitates obtaining positioning of persons using the communications component and/or other components, wherein in the first mode of operation, the uninterruptible power supply provides power to all components in the luminaire, and wherein in the second mode of operation, the uninterruptible power supply provides power to a subset of components powered by the uninterruptible power supply operating in the first mode which excludes the lighting module and to facilitate communications with the third parties outside of the building.

According to another aspect, there is provided a luminaire for use in assisting persons in a building to communicate with third parties outside of the building during an abnormal event, the luminaire comprising: at least one lighting module providing illumination as required to meet building regulations for provision of illumination inside of a building during an abnormal event when a regular power supply might fail, at least one communications component facilitating communication between persons in the building and third parties outside of the building during an abnormal event when a regular power supply might fail, a controller, an uninterruptible power supply in or coupled to the at least one lighting module, the at least one communications component and the controller in the absence of a regular power supply, the uninterruptible power supply configured to operate in: a first mode of operation for a first period of time to supply a first power sufficient for at least illumination inside of the building by the at least one lighting module to meet building regulations for provision of illumination inside of the building during an abnormal event, and a second mode of operation for a second period of time, after which illumination inside of the building is not required to meet building regulations, to supply a second power, being lower than the first power, sufficient for at least the at least one communications component to communicate with third parties outside of the building, wherein the controller: triggers the lighting module to activate or maintain illumination upon an activation event, facilitates communication via the communications between persons in the building and a third party outside of the building at least in the second mode of operation, and facilitates positioning of persons using the communications component and/or other components, and wherein the communications component allows the person to obtain assistance by instigating communications to the outside of the building in the absence of regular power supply, wherein in the first mode of operation, the uninterruptible power supply provides power to

all components in the luminaire, and wherein in the second mode of operation, the uninterruptible power supply provides power to a subset of components powered by the uninterruptible power supply operating in the first mode which excludes the lighting module and to facilitate communications with the third parties outside of the building.

There is also disclosed a luminaire for use in assisting persons in a building comprising: at least one lighting module, at least one communications component, a controller, an uninterruptible power supply in or coupled to the luminaire to power the lighting module, communications component and/or controller in the absence of a regular (e.g. AC) power supply, wherein the controller: triggers the lighting module to illuminate upon an activation event, facilitates communication via the communications and/or

Preferably the luminaire further comprises a fixture box to hold the luminaire for mounting in/on a wall.

Preferably the uninterruptible power supply is configured to: operate in a first mode of operation for a first period of time; and operate in a second mode of operation for a second period of time.

Preferably in the first mode, the uninterruptible power supply provides power to all components in the luminaire; and in the second mode the uninterruptible power supply provides power to a subset of components powered by the uninterruptible power supply operating in the first mode.

Preferably in the first mode, the uninterruptible power supply provides power to: the at least one lighting module, the at least one communications component, at least one persons detection and/or positioning component, a Bluetooth beacon, a gateway router, and the controller; in the second mode, the uninterruptible power supply provides power to: the at least one persons detection and/or positioning component, the Bluetooth beacon, and the controller; wherein the uninterruptible power supply is configured to switch from operating in the first mode to the second mode when power is running out; and wherein the controller is configured to be powered by the uninterruptible power supply at all times.

Preferably the uninterruptible power supply is removable and/or detachable.

Preferably the luminaire is located outside of the building.

According to another aspect, there is provided a system for assisting persons in a building during an event comprising: a network of luminaires, each luminaire being as described above, wherein the network of luminaires can be controlled to: trigger the lighting modules to illuminate upon an activation event, facilitate communication via the communications modules, and/or utilise the persons detection and/or position module to detect a person in a building and/or determining the position of a person in the building.

In such situations, it is desirable to be able to detect persons, determine the position of persons and/or enable communications with persons in the building. However, usual telecommunications and/or positioning devices do not always work. Providing backup systems can be expensive, and may not be warranted. Providing power back up for

CLAIMS

1. A luminaire with integrated communications for use in assisting persons in a building to communicate with third parties outside of the building during an abnormal event, the luminaire comprising:

at least one lighting module providing illumination as required to meet building regulations for provision of illumination inside of a building during an abnormal event when a regular power supply might fail,

at least one communications component facilitating communication between persons in the building and third parties outside of the building during an abnormal event when a regular power supply might fail,

a controller,

an uninterruptible power supply in or coupled to:

the at least one lighting module as part of the regulatory requirement for the provision of illumination inside of the building during an abnormal event when a regular power supply might fail,

the at least one communications component and/or controller in the absence of a regular power supply, and

the uninterruptible power supply configured to operate in:

a first mode of operation for a first period of time to supply a first power sufficient for at least illumination inside of the building by the at least one lighting module to meet building regulations for provision of illumination inside of the building during an abnormal event, and

a second mode of operation for a second period of time, after which illumination inside of the building is not required to meet building regulations, to supply a second power, being lower than the first power, sufficient for at least the at least one communications component to communicate with third parties outside of the building,

wherein the controller:

triggers the lighting module to activate or maintain illumination inside of the building upon the abnormal event at least in the first mode of operation,

facilitates communication via the communications between persons in the building and a third party outside of the building at least in the second mode of operation, and/or

facilitates obtaining positioning of persons using the communications component and/or other components,

wherein in the first mode of operation, the uninterruptible power supply provides power to all components in the luminaire, and

wherein in the second mode of operation, the uninterruptible power supply provides power to a subset of components powered by the uninterruptible power supply operating in the first mode which excludes the lighting module and to facilitate communications with the third parties outside of the building.

2. A system for assisting persons in a building during an event comprising:
a network of luminaires, each luminaire being according to claim 1,
wherein the network of luminaires is controlled to:
trigger the lighting modules to illuminate upon an activation event,
facilitate communication via the communications modules, and/or
utilize the persons detection and/or position module to detect a person in a building and/or determining the position of a person in the building.

3. The luminaire according to claim 1, wherein the at least one communications component includes a gateway and/or is configured to communicate with a gateway.

4. The luminaire according to claim 1, wherein:
in the first mode, the uninterruptible power supply provides power to:
the at least one lighting module,
the at least one communications component,
at least one persons detection and/or positioning component,
a Bluetooth beacon,
a gateway router, and
the controller;
in the second mode, the uninterruptible power supply provides power to:
the at least one communications component,
the at least one persons detection and/or positioning component,
the Bluetooth beacon, and
the controller; and
wherein the uninterruptible power supply is configured to switch from operating in the first mode to the second mode when power is running out; and
wherein the controller is configured to be powered by the uninterruptible power supply at all times.

5. A luminaire for use in assisting persons in a building to communicate with third parties outside of the building during an abnormal event, the luminaire comprising:

at least one lighting module providing illumination as required to meet building regulations for provision of illumination inside of a building during an abnormal event when a regular power supply might fail,

at least one communications component facilitating communication between persons in the building and third parties outside of the building during an abnormal event when a regular power supply might fail,

a controller,

a removable and/or detachable uninterruptible power supply in or coupled to the at least one lighting module, at least one communications component and/or controller in the absence of a regular power supply,

the uninterruptible power supply configured to operate in:

a first mode of operation for a first period of time to supply a first power sufficient for at least illumination inside of the building by the at least one lighting module to meet building regulations for provision of illumination inside of the building during an abnormal event, and

a second mode of operation for a second period of time, after which illumination inside of the building is not required to meet building regulations, to supply a second power, being lower than the first power, sufficient for at least the at least one communications component to communicate with third parties outside of the building,

wherein the controller:

triggers the lighting module to activate or maintain illumination upon an activation event,

facilitates communication via the communications between persons in the building and a third party outside of the building at least in the second mode of operation, and/or

facilitates obtaining positioning of persons using the communications component and/or other components,

wherein in the first mode of operation, the uninterruptible power supply provides power to all components in the luminaire, and

wherein in the second mode of operation, the uninterruptible power supply provides power to a subset of components powered by the uninterruptible power supply operating in the first mode which excludes the lighting module and to facilitate communications with the third parties outside of the building.

6. A system for assisting persons in a building during an event comprising:

a network of luminaires, each luminaire being according to claim 5,

wherein the network of luminaires is controlled to:

trigger the lighting modules to illuminate upon an activation event,

facilitate communication via the communications modules, and/or

utilize the persons detection and/or position module to detect a person in a building and/or determining the position of a person in the building.

7. The luminaire according to claim 5, wherein:

in the first mode, the uninterruptible power supply provides power to:

the at least one lighting module,

the at least one communications component,

at least one persons detection and/or positioning component,

a Bluetooth beacon,

a gateway router, and

the controller;

in the second mode, the uninterruptible power supply provides power to:

the at least one communications component,

the at least one persons detection and/or positioning component,

the Bluetooth beacon, and

the controller; and

wherein the uninterruptible power supply is configured to switch from operating in the first mode to the second mode when power is running out; and

wherein the controller is configured to be powered by the uninterruptible power supply at all times.

8. A luminaire for use in assisting persons in a building to communicate with third parties outside of the building during an abnormal event, the luminaire comprising:

at least one lighting module providing illumination as required to meet building regulations for provision of illumination inside of a building during an abnormal event when a regular power supply might fail,

at least one communications component facilitating communication between persons in the building and third parties outside of the building during an abnormal event when a regular power supply might fail,

a controller,

an uninterruptible power supply in or coupled to the at least one lighting module, the at least one communications component and the controller in the absence of a regular power supply,

the uninterruptible power supply configured to operate in:

a first mode of operation for a first period of time to supply a first power sufficient for at least illumination inside of the building by the at least one lighting module to meet building regulations for provision of illumination inside of the building during an abnormal event, and

a second mode of operation for a second period of time, after which illumination inside of the building is not required to meet building regulations, to supply a second power, being lower than the first power, sufficient for at least the at least one communications component to communicate with third parties outside of the building,

wherein the controller:

triggers the lighting module to activate or maintain illumination upon an activation event,

facilitates communication via the communications between persons in the building and a third party outside of the building at least in the second mode of operation, and

facilitates positioning of persons using the communications component and/or other components, and

wherein the communications component allows the person to obtain assistance by instigating communications to the outside of the building in the absence of regular power supply,

wherein in the first mode of operation, the uninterruptible power supply provides power to all components in the luminaire, and

wherein in the second mode of operation, the uninterruptible power supply provides power to a subset of components powered by the uninterruptible power supply operating in the first mode which excludes the lighting module and to facilitate communications with the third parties outside of the building.

9. The luminaire according to claim 8, wherein the luminaire has an address including: information about physical location of the building the luminaire is located at, as well as information about physical positioning of the at least one lighting module in the building.

10. The luminaire according to claim 8, wherein the controller facilitates obtaining a positioning of persons based on the address of the at least one lighting module by using the at least one communications component and/or other components.

11. The luminaire according to claim 8, further comprising at least one persons detection and/or positioning component, wherein the controller utilizes the persons

detection and/or position component to detect a person in a building and/or determining the position of a person in the building.

12. The luminaire according to claim 8, wherein each communications component comprises one or more communications components being one or more of:

a Wi-Fi transceiver,

gateway,

a 3GPP transceiver,

Bluetooth transceiver, and

removable router/RF signal enhancer.

13. The luminaire according to claim 8, wherein each person's detection and/or positioning component comprises one or more components being one or more of:

proximity sensor,

Motion detector,

GPS transceiver,

BLE beacon,

Wi-Fi transceiver,

3GPP transceiver, and/or

Modem router/RF signal enhancer.

14. The luminaire according to claim 8, wherein the controller facilitates communications between a mobile communications device on a person in the building and a third party outside the building using one or more of the at least one communications component(s).

15. The luminaire according to claim 8, wherein the controller detects a person and/or determine the location of a person in a building, and/or communicate the detection and/or location of the person to a third party outside the building using the at least one communications component(s).

16. The luminaire according to claim 8, further comprising one or more of:

one or more power sockets for powering external devices from the uninterruptible power supply,

a chargeable torch removably coupled to the at least one lighting module and/or triggered to illuminate on an activation event, and

an AC power supply.

17. The luminaire according to claim 8, wherein:

in the first mode, the uninterruptible power supply provides power to:

the at least one lighting module,

the at least one communications component,

at least one persons detection and/or positioning component,

a Bluetooth beacon,

a gateway router, and

the controller;

in the second mode, the uninterruptible power supply provides power to:

the at least one communications component,

the at least one persons detection and/or positioning component,

the Bluetooth beacon, and

the controller; and

wherein the uninterruptible power supply is configured to switch from operating in the first mode to the second mode when power is running out; and

wherein the controller is configured to be powered by the uninterruptible power supply at all times.

18. A system for assisting persons in a building during an event comprising:

a network of luminaires, each luminaire being according to claim 8,

wherein the network of luminaires is controlled to:

trigger the lighting modules to illuminate upon an activation event,

facilitate communication via the communications modules, and/or

utilize the persons detection and/or position module to detect a person in a building and/or determining the position of a person in the building.