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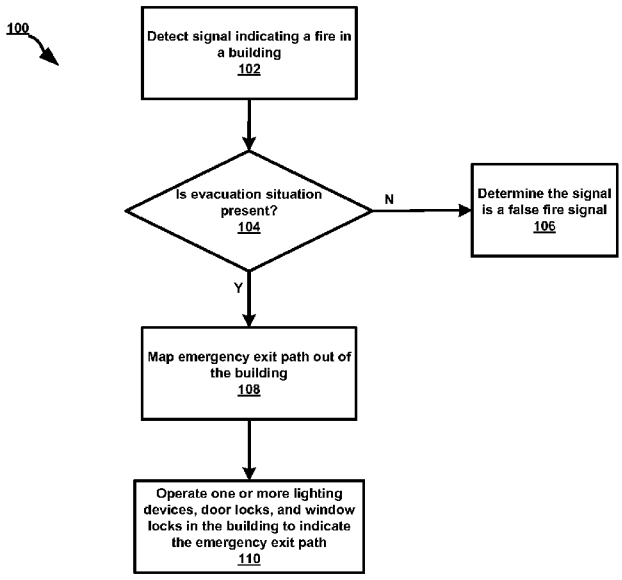

FIG. 1

(57) Abstract: Systems and methods for indicating an emergency exit path upon detection of a fire in a building structure. The systems and methods include detecting a signal indicating presence of the fire in the building structure and determining an evacuation situation is present based on a risk assessment. In response to determining the evacuation situation is present, the systems and methods include mapping the emergency exit path out of the building structure based on an identified location of the fire and an identified location of a person in the building structure, and operating a plurality of lighting devices in the building structure to indicate the emergency exit path out of the building structure.

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MAPPING AND FACILITATING EVACUATION ROUTES IN EMERGENCY

BACKGROUND

[0001] Home automation systems are becoming increasingly prevalent. Such systems may incorporate a variety of electronic devices, such as "smart" electronics that allow end-users to control and/or view status information of those devices, and non-smart electronics. Such systems may further be used to enhance home security, for instance by detecting and responding to emergency situations, such as fire, burglary, accidents, and other crisis. This disclosure is intended to enhance home automation systems and to provide related advantages.

SUMMARY

[0002] In one aspect, a method for indicating an emergency exit path upon detection of a fire in a building structure may comprise detecting, by a television receiver, a signal indicating presence of the fire in the building structure and upon detecting the signal indicating the presence of the fire, determining, by the television receiver, an evacuation situation is present based on a risk assessment. The method may comprise, in response to determining the evacuation situation is present, mapping, by the television receiver, the emergency exit path out of the building structure based on an identified location of the fire and an identified location of a person in the building structure. Further, the method may comprise operating, by the television receiver, a plurality of lighting devices in the building structure to indicate the emergency exit path out of the building structure.

[0003] Various embodiments of the present method may include one or more of the following features. The method may comprise unlocking, by the television receiver, at least one door lock of an in-path door in the building structure to indicate the emergency exit path out of the building structure, wherein the in-path door is located within the emergency exit path. The method may comprise signaling, by the television receiver, a door opening module corresponding to the in-path door in the building structure to open and maintain and open position of the in-path door. In another aspect, the method may comprise locking, by the television receiver, at least one door lock of an out-of-path door in the building structure to indicate the emergency exit path out of the building structure, wherein the out-of-path door lock is located outside of the emergency exit path. In another aspect, the method may comprise unlocking, by the television receiver, at least one window lock of a window in the building structure to indicate the emergency exit path out of the building structure.

[0004] Further, the method may comprise mapping, by the television receiver, a plurality of emergency exit paths out of the building structure based on the identified location of the fire

and a plurality of identified locations of a plurality of persons, and operating, by the television receiver, the plurality of lighting devices in the building structure to indicate the plurality of emergency exit paths out of the building structure. The risk assessment may comprise steps including collecting, by the television receiver, one or more conditions of the fire in the building structure, assessing, by the television receiver, a risk level based on the one or more collected conditions, and determining, by the television receiver, the evacuation situation is present based on the assessed risk level. In another aspect, the one or more conditions may comprise at least one or more of the identified location of the fire in the building structure, the identified location of the person in the building structure, an identified size of the fire in the building structure, an identified trait of the person in the building structure, and a status of a fire protection device in the building structure.

[0005] Still further, the status may comprise at least one of a presence, absence, active, and inactive status of the fire protection device. The fire protection device may comprise at least one of a fire extinguisher and a sprinkler system. In other aspects, the fire protection device may be located at the identified location of the fire in the building structure. Each of the identified location of the fire and the identified location of the person may comprise an identified room of the building structure. In another aspect, the identified trait of the person may comprise at least one of a name, an age range, a weight, a height, a handicap status, and a responsiveness status. Still, other aspects, the identified size of the fire in the building may be based on at least one sensed input detected by at least one sensor, wherein the at least one sensors comprises an optical sensor, an infrared sensor, a heat sensor, a temperature sensor, and an odor detector.

[0006] Even further, the signal indicating presence of the fire in the building structure may be based on a sensed input at a detector comprising at least one of a smoke detector and a heat detector. Still further, operating the plurality of lighting devices may comprise at least one of: intermittently powering on and off one or more of the plurality of lighting devices, intermitting dimming on and off one or more of the plurality of lighting devices, and controlling color changes of the one or more plurality of lighting devices. In other aspects, the method may comprise, in response to detecting the signal indicating the presence of the fire, outputting, by the television receiver, an audio broadcast over one or more audio speakers in communication with the television receiver. Further, the method may comprise detecting, by the television receiver, one or more emergency responders in a proximity of the building structure, and in response to detecting the one or more emergency responders, unlocking, by the television receiver, at least one door lock of the building structure.

[0007] In another aspect, a television receiver for indicating an emergency exit path upon detection of a fire in a building structure comprises one or more processors and a memory communicatively coupled with and readable by the one or more processors and having stored therein processor-readable instructions. When executed by the one or more processors, the processor-readable instructions may cause the one or more processors to detect a signal indicating presence of the fire in the building structure, and upon detecting the signal indicating the presence of the fire, determine an evacuation situation is present based on a risk assessment. The processor-readable instructions may further comprise, in response to determining the evacuation situation is present, map the emergency exit path out of the building structure based on an identified location of the fire and an identified location of a person in the building structure, and operate a plurality of lighting devices in the building structure to indicate the emergency exit path out of the building structure. The instructions, when executed, may cause the one or more processors to carry out any of the methods described herein.

[0008] In yet another aspect, a non-transitory computer readable medium may have stored thereon sets of instructions which, when executed by a computer, cause the computer to detect a signal indicating a presence of a fire in a building structure, and upon detecting the signal indicating the presence of the fire, determine an evacuation situation is present based on a risk assessment. The sets of instructions may further comprise, in response to determining the evacuation situation is present, map the emergency exit path out of the building structure based on an identified location of the fire and an identified location of a person in the building structure, and operate a plurality of lighting devices in the building structure to indicate the emergency exit path out of the building structure. The instructions, when executed, may cause the computer to carry out any of the methods described herein.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] **FIG. 1** shows an example method, according to various embodiments of the present disclosure;

[0010] **FIG. 2** shows an example content distribution system, according to various embodiments of the present disclosure;

[0011] **FIG. 3** shows an example block diagram of a television receiver of **FIG. 2,** according to various embodiments of the present disclosure;

[0012] **FIG. 4** shows an example home automation system, according to various embodiments of the present disclosure;

[0013] **FIG. 5** shows another example method of the system of **FIG. 4,** according to various embodiments of the present disclosure;

[0014] **FIG. 6** shows an example emergency exit path, according to various embodiments of the present disclosure; and

[0015] **FIG. 7** shows a computer system upon which various aspects of the present disclosure may be implemented.

DETAILED DESCRIPTION

[0016] The present disclosure is directed to systems and methods for mapping and facilitating evacuation routes in emergency situations. It is contemplated that the systems and methods disclosed herein may be implemented in a residential building structure, such as a home, by incorporating one or more centralized devices such as a television receiver, a home automation system, and/or other integrated systems. Advantageously, such an implementation may enhance safety and security of the home by detecting and responding to emergency situations, such as fire, burglary, accidents, and other crisis that may arise throughout the home in any floor or room, regardless of whether the home is occupied or vacant at the time. For instance, and merely by way of example, upon detection of a fire in a room, the systems and methods discussed herein may indicate or otherwise provide an evacuation route, e.g. an emergency exit path, out of the house. The emergency exit path may be immediately mapped according to determined locations of the fire and any occupants, and immediately indicated to the occupants by utilizing ambient lighting devices, e.g. ceiling light fixtures and lamps, door and/or window locks, and intercom or other speaker systems. Further, the systems and methods disclosed herein may interface with local emergency responders, such as vehicles and computer systems associated with police responders, fire department responders, and emergency medical responders. Although not so limited, various aspects of the present disclosure may be gained from the following discussion in connection with the drawings.

[0017] For instance, referring to **FIG. 1,** an example method **100** is shown in accordance with the principles of the present disclosure. It is contemplated that aspects of the method **100** may be implemented wholly or at least partially by a satellite television receiver, consistent with the example of a satellite television implementation as discussed throughout.

[0018] At step **102,** a particular television receiver that is incorporated into a home automation system as a home automation gateway device or the like may receive or otherwise detect a signal indicating a fire in a building structure, such as a home. The signal indicating the fire may comprise electrical signals or packets sent through a communication network or

protocol from a sensor that detected a fire-related sensed input. In another example, the signal indicating the fire may arise from detection of a fire-related sensed input by a sensor at the television receiver. Such fire-related sensed input may include detection of threshold levels of smoke particles, carbon dioxide, carbon monoxide, and/or any other triggering elements that register at the one or more sensor(s). In one embodiment, a user may customize and program various threshold levels and various components that can trigger the signal indicating the fire. Other examples are possible.

[0019] At step 104, the particular television receiver may make a determination as to whether an evacuation situation is present at the home. For instance, the television receiver may determine whether the detected signal corresponds to a valid fire signal or to a false fire signal, such as an unwanted fire signal or false alarm. Further, the television receiver may determine if there are one or more occupants within the home and if they need to be evacuated. The determination may be based on a risk analysis that takes into account one or more conditions detected at the time of detection of the fire signal. Such conditions may include, but are not limited to, an identified location of the fire, and identified size of the fire, an identified trait of one or more persons within the home, and a status of a fire protection device in the home and/or at the location of the fire. Such conditions may initially be sensed by "live" security cameras distributed throughout the rooms in the house, motion sensors, location sensors, audio sensors, temperature sensors, infrared sensors, signals to and from various communication/mobile devices, and the like. Any sensed data may be analyzed and assessed to correspond to various levels of conditions by the television receiver. Other examples are possible.

[0020] When, for example, the determination corresponds to the false fire signal, process flow within the example method 100 may branch to step 106. At step 106, the particular television receiver may log the false signal into a database, along with various conditions that may be related to the false signal, such as the particular sensor generating the false signal, a time and date stamp, and so on. In some examples, the television receiver may notify a designated user that a false fire signal was detected. Such notifications may be sent through various internet and cellular communication networks, as well as broadcast through various speakers, televisions, and/or intercom systems. The notifications may include a message that a false fire signal was detected in a certain room of the house and/or further user instructions. In other examples, the television receiver may continue monitoring the room from which the false signal was generated and continue assessing the situation for a predetermined period of

time, until sensors are no longer registering the triggering elements, and/or based on user input instructions received by the television receiver.

[0021] When, however, the determination corresponds to a valid fire signal, process flow within the example method **100** may branch to step **108.** At step **108,** the particular television receiver may map an emergency exit path out of the home. In some examples, mapping comprises determining one or more routes for exiting the home and/or visually providing the one or more routes to the one or more users, e.g. via television display screen and/or mobile devices associated with particular users. For instance, a unique route may be provided to the mobile device of each person based on a detected location of the person by live security cameras distributed throughout the house and/or a GPS location signal retrieved from the mobile device by the television receiver. The process flow within the example method **100** may further branch to step **110** where the television receiver operates one or more lighting devices, door locks, and/or window locks in the building structure to indicate to the occupant(s) the emergency exit path out of the house, or otherwise to a safety location located within or outside of the house. Further scenarios and/or beneficial aspects associated with mapping and facilitating evacuation routes in emergency situations are provided for by a television receiver are described in detail below in connection with the remaining figures.

[0022] It is noted that the term "lighting device(s)" as utilized herein refers to ambient lighting devices, for instance a light that may be used to illuminate a room. For instance, and merely by way of example, the lighting device(s) may include ceiling light fixtures, fan lights, lamps, desk lamps, floor lamps, light-up vanities, track lights, sconces, chandeliers, night lights, bathroom lights, and the like. It is contemplated that such lighting devices may be mounted onto a structure of room, such as a wall, ceiling column, or exposed beam, and/or provided on various furniture or flooring of the room for the purposes of illuminating that portion of the room, for instance, during standard use by occupants therein and/or for decorative purposes in a home. In this way, it is contemplated that the systems and methods disclosed herein may transform any standard lighting devices found and distributed throughout the home into emergency lights or evacuation route signals during an emergency situation.

[0023] Referring now to **FIG. 2,** an example satellite television distribution system **200** is shown in accordance with the present disclosure. For brevity, the system **200** is depicted in a simplified form, and may include more or fewer systems, devices, networks, and/or other components as desired. Further, number and type of features or elements incorporated within

the system **200** may or may not be implementation-specific, and at least some of the aspects of the system **200** may be similar to a cable television distribution system, an IPTV (Internet Protocol Television) content distribution system, and/or any other type of content distribution system.

[0024] The example system **200** may include a service provider **202,** a satellite uplink **204,** a plurality of satellites **206a-c,** a satellite dish **208,** a PTR (Primary Television Receiver) **210,** a plurality of STRs (Secondary Television Receivers) **212a-b,** a plurality of televisions **214a-c,** a plurality of computing devices **216a-b,** and at least one server **218** that may in general be associated with or operated or implemented by the service provider **202.** Additionally, the PTR **210,** computing devices **216a-b,** and server **218** may include or otherwise exhibit a fire alarm module **220.** In general, and as discussed in further detail below, the fire alarm module **220** may be configured and/or arranged for mapping and facilitating evacuation routes in emergency situations directly from or via one or more interfaces that might normally be used to access satellite television-related programming and services, in accordance with the principles of the present disclosure.

[0025] The system **200** may further include at least one network **224** that establishes a bi-directional communication path for data transfer between and among each respective element of the system **200,** outside or separate from the unidirectional satellite signaling path. The network **224** is intended to represent any number of terrestrial and/or non-terrestrial network features or elements. For example, the network **224** may incorporate or exhibit any number of features or elements of various wireless and/or hardwired packet-based communication networks such as, for example, a WAN (Wide Area Network) network, a HAN (Home Area Network) network, a LAN (Local Area Network) network, a WLAN (Wireless Local Area Network) network, the Internet, a cellular communications network, or any other type of communication network configured such that data may be transferred between and among elements of the system **200.**

[0026] The PTR **210,** and the STRs **212a-b,** as described throughout may generally be any type of television receiver, television converter, etc., such as a STB for example. In another example, the PTR **210,** and the STRs **212a-b,** may exhibit functionality integrated as part of or into a television, a DVR (Digital Video Recorder), a computer such as a tablet computing device, or any other computing system or device, as well as variations thereof. Further, the PTR **210** and the network **224,** together with the STRs **212a-b** and televisions **214a-c,** and possibly the computing devices **216a-b,** may each be incorporated within or form at least a

portion of a particular home computing network. Further, the PTR **210** may be configured so as to enable communications in accordance with any particular communication protocol(s) and/or standard(s) including, for example, TCP/IP (Transmission Control Protocol/Internet Protocol), DLNA/DTCP-IP (Digital Living Network Alliance/Digital Transmission Copy Protection over Internet Protocol), HDMI/HDCP (High-Definition Multimedia Interface/High-bandwidth Digital Content Protection), etc. Other examples are possible. For example, one or more of the various elements or components of the example system **200** may be configured to communicate in accordance with the MoCA® (Multimedia over Coax Alliance) home entertainment networking standard. Still other examples are possible.

[0027] In practice, the satellites **206a-c** may each be configured to receive uplink signals **226a-c** from the satellite uplink **204.** In this example, each the uplink signals **226a-c** may contain one or more transponder streams of particular data or content, such as one or more particular television channels, as supplied by the service provider **202.** For example, each of the respective uplink signals **226a-c** may contain various media or media content such as encoded HD (High Definition) television channels, SD (Standard Definition) television channels, on-demand programming, programming information, and/or any other content in the form of at least one transponder stream, and in accordance with an allotted carrier frequency and bandwidth. In this example, different media content may be carried using different ones of the satellites **206a-c.**

[0028] Further, different media content may be carried using different transponders of a particular satellite (e.g., satellite **206a);** thus, such media content may be transmitted at different frequencies and/or different frequency ranges. For example, a first and second television channel may be carried on a first carrier frequency over a first transponder of satellite **206a,** and a third, fourth, and fifth television channel may be carried on second carrier frequency over a first transponder of satellite **206b,** or, the third, fourth, and fifth television channel may be carried on a second carrier frequency over a second transponder of satellite **206a,** and etc. Each of these television channels may be scrambled such that unauthorized persons are prevented from accessing the television channels.

[0029] The satellites **206a-c** may further be configured to relay the uplink signals **226a-c** to the satellite dish **208** as downlink signals **228a-c.** Similar to the uplink signals **226a-c,** each of the downlink signals **228a-c** may contain one or more transponder streams of particular data or content, such as various encoded and/or at least partially electronically scrambled television channels, on-demand programming, etc., in accordance with an allotted carrier

frequency and bandwidth. The downlink signals **228a-c,** however, may not necessarily contain the same or similar content as a corresponding one of the uplink signals **226a-c.** For example, the uplink signal **226a** may include a first transponder stream containing at least a first group or grouping of television channels, and the downlink signal **228a** may include a second transponder stream containing at least a second, different group or grouping of television channels. In other examples, the first and second group of television channels may have one or more television channels in common. In sum, there may be varying degrees of correlation between the uplink signals **226a-c** and the downlink signals **228a-c,** both in terms of content and underlying characteristics.

[0030] Further, satellite television signals may be different from broadcast television or other types of signals. Satellite signals may include multiplexed, packetized, and modulated digital signals. Once multiplexed, packetized and modulated, one analog satellite transmission may carry digital data representing several television stations or service providers. Some examples of service providers include HBO®, CBS®, ESPN®, and etc. Further, the term "channel," may in some contexts carry a different meaning from or than its normal, plain language meaning. For example, the term "channel" may denote a particular carrier frequency or sub-band which can be tuned to by a particular tuner of a television receiver. In other contexts though, the term "channel" may refer to a single program/content service such as HBO®.

[0031] Additionally, a single satellite may typically have multiple transponders (e.g., 32 transponders) each one broadcasting a channel or frequency band of about 24-27 MHz in a broader frequency or polarity band of about 500 MHz. Thus, a frequency band of about 500 MHz may contain numerous sub-bands or channels of about 24-27 MHz, and each channel in turn may carry a combined stream of digital data comprising a number of content services. For example, a particular hypothetical transponder may carry HBO®, CBS®, ESPN®, plus several other channels, while another particular hypothetical transponder may itself carry 3, 4, 5, 6, etc., different channels depending on the bandwidth of the particular transponder and the amount of that bandwidth occupied by any particular channel or service on that transponder stream. Further, in many instances a single satellite may broadcast two orthogonal polarity bands of about 500 MHz. For example, a first polarity band of about 500 MHz broadcast by a particular satellite may be left-hand circular polarized, and a second polarity band of about 500 MHz may be right-hand circular polarized. Other examples are possible.

[0032] Continuing with the example scenario, the satellite dish **208** may be provided for use to receive television channels (e.g., on a subscription basis) provided by the service provider **202,** satellite uplink **204,** and/or satellites **206a-c.** For example, the satellite dish **208** may be configured to receive particular transponder streams, or downlink signals **228a-c,** from one or more of the satellites **206a-c.** Based on the characteristics of the PTR **210** and/or satellite dish **208,** however, it may only be possible to capture transponder streams from a limited number of transponders concurrently. For example, a particular tuner of the PTR **210** may be configured to tune to a single transponder stream from a transponder of a single satellite at a time.

[0033] Additionally, the PTR **210,** which is communicatively coupled to the satellite dish **208,** may subsequently select via tuner, decode, and relay particular transponder streams to the television **214c** for display thereon. For example, the satellite dish **208** and the PTR **210** may, respectively, be configured to receive, decode, and relay at least one premium HD-formatted television channel to the television **214c.** Programming or content associated with the HD channel may generally be presented live, or from a recording as previously stored on, by, or at the PTR **210.** Here, the HD channel may be output to the television **214c** in accordance with the HDMI/HDCP content protection technologies. Other examples are however possible.

[0034] Further, the PTR **210** may select via tuner, decode, and relay particular transponder streams to one or both of the STRs **212a-b,** which may in turn relay particular transponder streams to a corresponding one of the televisions **214a-b** for display thereon. For example, the satellite dish **208** and the PTR **210** may, respectively, be configured to receive, decode, and relay at least one television channel to the television **214a** by way of the STR **212a.** Similar to the above-example, the television channel may generally be presented live, or from a recording as previously stored on the PTR **210,** and may be output to the television **214a** by way of the STR **212a** in accordance with a particular content protection technology and/or networking standard. Still further, the satellite dish **208** and the PTR **210** may, respectively, be configured to receive, decode, and relay at least one premium television channel to one or each of the computing devices **216a-c.** Similar to the above-examples, the television channel may generally be presented live, or from a recording as previously stored on the PTR **210,** and may be output to one or both of the computing devices **216a-c** in accordance with a particular content protection technology and/or networking standard.

[0035] Referring now to **FIG. 3,** an example block diagram of the PTR **210** of **FIG. 2** is shown in accordance with the disclosure. In some examples, the STRs **312a-b** may be configured in a manner similar to that of the PTR **210.** In some examples, the STRs **312a-b** may be configured and arranged to exhibit a reduced functionality as compared to the PTR **210,** and may depend at least to a certain degree on the PTR **210** to implement certain features or functionality. The STRs **312a-b** in this example may be each referred to as a "thin client."

[0036] The PTR **210** may include one or more processors **302,** a plurality of tuners **304a-h,** at least one network interface **306,** at least one non-transitory computer-readable storage medium **308,** at least one EPG database **310,** at least one television interface **312,** at least one PSI (Program Specific Information) table **314,** at least one DVR database **316,** at least one user interface **318,** at least one demultiplexer **320,** at least one smart card **322,** at least one descrambling engine **324,** at least one decoder **326,** and at least one communication interface **328.** In other examples, fewer or greater numbers of components may be present. Further, functionality of one or more components may be combined; for example, functions of the descrambling engine **324** may be performed by the processors **302.** Still further, functionality of components may be distributed among additional components, and possibly additional systems such as, for example, in a cloud-computing implementation.

[0037] The processors **302** may include one or more specialized and/or general-purpose processors configured to perform processes such as tuning to a particular channel, accessing and displaying EPG information, and/or receiving and processing input from a user. For example, the processors **302** may include one or more processors dedicated to decoding video signals from a particular format, such as according to a particular MPEG (Motion Picture Experts Group) standard, for output and display on a television, and for performing or at least facilitating decryption or descrambling.

[0038] The tuners **304a-h** may be used to tune to television channels, such as television channels transmitted via satellites **206a-c.** Each one of the tuners **304a-h** may be capable of receiving and processing a single stream of data from a satellite transponder, or a cable RF channel, at a given time. As such, a single tuner may tune to a single transponder or, for a cable network, a single cable channel. Additionally, one tuner (e.g., tuner **304a)** may be used to tune to a television channel on a first transponder stream for display using a television, while another tuner (e.g., tuner **304b)** may be used to tune to a television channel on a second transponder for recording and viewing at some other time. If multiple television channels

transmitted on the same transponder stream are desired, a particular tuner (e.g., tuner **304c)** may be used to receive the signal containing the multiple television channels for presentation and/or recording of each of the respective multiple television channels, such as in a PTAT (Primetime Anytime) implementation for example. Although eight tuners are shown, the PTR **210** may include more or fewer tuners (e.g., three tuners, sixteen tuners, etc.), and the features of the disclosure may be implemented similarly and scale according to the number of tuners of the PTR **210.**

[0039] The network interface **306** may be used to communicate via alternate communication channel(s) with a service provider. For example, the primary communication channel between the service provider **202** of **FIG. 2** and the PTR **210** may be via satellites **206a-c,** which may be unidirectional to the PTR **210,** and another communication channel between the service provider **202** and the PTR **210,** which may be bidirectional, may be via the network **224.** In general, various types of information may be transmitted and/or received via the network interface **306.**

[0040] The storage medium **308** may represent a non-transitory computer-readable storage medium. The storage medium **308** may include memory and/or a hard drive. The storage medium **308** may be used to store information received from one or more satellites and/or information received via the network interface **306.** For example, the storage medium **308** may store information related to the EPG database **310,** the PSI table **314,** and/or the DVR database **316,** among other elements or features, such as the fire alarm **220** mentioned above. Recorded television programs may be stored using the storage medium **308** and ultimately accessed therefrom.

[0041] The EPG database **310** may store information related to television channels and the timing of programs appearing on such television channels. Information from the EPG database **310** may be used to inform users of what television channels or programs are available, popular and/or provide recommendations. Information from the EPG database **310** may be used to generate a visual interface displayed by a television that allows a user to browse and select television channels and/or television programs for viewing and/or recording. Information used to populate the EPG database **310** may be received via the network interface **306** and/or via satellites **206a-c** of **FIG. 2.** For example, updates to the EPG database **310** may be received periodically or at least intermittently via satellite. The EPG database **310** may serve as an interface for a user to control DVR functions of the PTR

210, and/or to enable viewing and/or recording of multiple television channels simultaneously.

[0042] The decoder **326** may convert encoded video and audio into a format suitable for output to a display device. For instance, the decoder **326** may receive MPEG video and audio from the storage medium **308,** or the descrambling engine **324,** to be output to a television. MPEG video and audio from the storage medium **308** may have been recorded to the DVR database **316** as part of a previously-recorded television program. The decoder **326** may convert the MPEG video and audio into a format appropriate to be displayed by a television or other form of display device and audio into a format appropriate to be output from speakers, respectively. The decoder **326** may be a single hardware element capable of decoding a finite number of television channels at a given time, such as in a time-division arrangement. In the example embodiment, eight television channels may be decoded concurrently or simultaneously.

[0043] The television interface **312** output a signal to a television, or another form of display device, in a proper format for display of video and play back of audio. As such, the television interface **312** may output one or more television channels, stored television programming from the storage medium **308,** such as television programs from the DVR database **316** and/or information from the EPG database **310** for example, to a television for presentation.

[0044] The PSI table **314** may store information used by the PTR **210** to access various television channels. Information used to populate the PSI table **314** may be received via satellite, or cable, through the tuners **304a-h** and/or may be received via the network interface **306** over the network **224** from the service provider **202** shown in **FIG. 2.** Information present in the PSI table **314** may be periodically or at least intermittently updated. Information that may be present in the PSI table **314** may include: television channel numbers, satellite identifiers, frequency identifiers, transponder identifiers, ECM PIDs (Entitlement Control Message, Packet Identifier), one or more audio PIDs, and video PIDs. A second audio PID of a channel may correspond to a second audio program, such as in another language. In some examples, the PSI table **314** may be divided into a number of tables, such as a NIT (Network Information Table), a PAT (Program Association Table), and a PMT (Program Management Table).

[0045] **Table 1** below provides a simplified example of the PSI table **314** for several television channels. It should be understood that in other examples, many more television

channels may be represented in the PSI table **314.** The PSI table **314** may be periodically or at least intermittently. As such, television channels may be reassigned to different satellites and/or transponders, and the PTR **210** may be able to handle this reassignment as long as the PSI table **314** is updated.

Channel	Satellite	Transponder	ECM PID	Audio PIDs	Video PID
4	1	2	27	2001	1011
5	2	11	29	2002	1012
7	2	3	31	2003	1013
13	2	4	33	2003, 2004	1013

Table 1

[0046] It should be understood that the values provided in **Table 1** are for example purposes only. Actual values, including how satellites and transponders are identified, may vary. Additional information may also be stored in the PSI table **314.** Video and/or audio for different television channels on different transponders may have the same PIDs. Such television channels may be differentiated based on which satellite and/or transponder to which a tuner is tuned.

[0047] DVR functionality of the PTR **210** may permit a television channel to be recorded for a period of time. The DVR database **316** may store timers that are used by the processors **302** to determine when a television channel should be tuned to and recorded to the DVR database **316** of storage medium **308.** In some examples, a limited amount of space of the storage medium **308** may be devoted to the DVR database **316.** Timers may be set by the service provider **202** and/or one or more users of the PTR **210.** DVR functionality of the PTR **210** may be configured by a user to record particular television programs. The PSI table **314** may be used by the PTR 210 to determine the satellite, transponder, ECM PID, audio PID, and video PID.

[0048] The user interface **318** may include a remote control, physically separate from PTR 210, and/or one or more buttons on the PTR **210** that allows a user to interact with the PTR **210.** The user interface **318** may be used to select a television channel for viewing, view information from the EPG database **310,** and/or program a timer stored to the DVR database **316** wherein the timer may be used to control the DVR functionality of the PTR **210.**

[0049] Referring back to the tuners **304a-h,** television channels received via satellite may contain at least some encrypted or scrambled data. Packets of audio and video may be scrambled to prevent unauthorized users, such as nonsubscribers, from receiving television programming without paying the service provider **202.** When one of the tuners **304a-h** is receiving data from a particular transponder of a satellite, the transponder stream may be a series of data packets corresponding to multiple television channels. Each data packet may contain a PID, which in combination with the PSI table **314,** can be determined to be associated with a particular television channel. Particular data packets, referred to as ECMs may be periodically transmitted. ECMs may be encrypted; the PTR **210** may use the smart card **322** to decrypt ECMs.

[0050] The smart card **322** may function as the CA (Controlled Access) which performs decryption of encryption data to obtain control words that are used to descramble video and/or audio of television channels. Decryption of an ECM may only be possible when the user (e.g., an individual who is associated with the PTR **210)** has authorization to access the particular television channel associated with the ECM. When an ECM is received by the demultiplexer **320** and the ECM is determined to correspond to a television channel being stored and/or displayed, the ECM may be provided to the smart card **322** for decryption.

[0051] When the smart card **322** receives an encrypted ECM from the demultiplexer **320,** the smart card **322** may decrypt the ECM to obtain some number of control words. In some examples, from each ECM received by the smart card **322,** two control words are obtained. In some examples, when the smart card **322** receives an ECM, it compares the ECM to the previously received ECM. If the two ECMs match, the second ECM is not decrypted because the same control words would be obtained. In other examples, each ECM received by the smart card **322** is decrypted; however, if a second ECM matches a first ECM, the outputted control words will match; thus, effectively, the second ECM does not affect the control words output by the smart card **322.** When an ECM is received by the smart card **322,** it may take a period of time for the ECM to be decrypted to obtain the control words. As such, a period of time, such as about 0.2-0.5 seconds, may elapse before the control words indicated by the ECM can be obtained. The smart card **322** may be permanently part of the PTR **210** or may be configured to be inserted and removed from the PTR **210.**

[0052] The demultiplexer **320** may be configured to filter data packets based on PIDs. For example, if a transponder data stream includes multiple television channels, data packets corresponding to a television channel that are not desired to be stored or displayed by the user

may be ignored by the demultiplexer **320.** As such, only data packets corresponding to the one or more television channels desired to be stored and/or displayed may be passed to either the descrambling engine **324** or the smart card **322;** other data packets may be ignored. For each channel, a stream of video packets, a stream of audio packets and/or a stream of ECM packets may be present, each stream identified by a PID. In some examples, a common ECM stream may be used for multiple television channels. Additional data packets corresponding to other information, such as updates to the PSI table **314,** may be appropriately routed by the demultiplexer **320.**

[0053] The descrambling engine **324** may use the control words output by the smart card **322** in order to descramble video and/or audio corresponding to television channels for storage and/or presentation. Video and/or audio data contained in the transponder data stream received by the tuners **304a-h** may be scrambled. The video and/or audio may be descrambled by the descrambling engine **324** using a particular control word. Which control word output by the smart card **322** to be used for successful descrambling may be indicated by a scramble control identifier present within the data packet containing the scrambled video or audio. Descrambled video and/or audio may be output by the descrambling engine **324** to the storage medium **308** for storage, such as part of the DVR database **316** for example, and/or to the decoder **326** for output to a television or other presentation equipment via the television interface **312.**

[0054] The communication interface **328** may be used by the PTR **210** to establish a communication link or connection between the PTR **210** and one or more of the computing systems and devices as shown in **FIG. 2** and **FIG. 4,** discussed further below. It is contemplated that the communication interface **328** may take or exhibit any form as desired, and may be configured in a manner so as to be compatible with a like component or element incorporated within or to a particular one of the computing systems and devices as shown in **FIG. 2** and **FIG. 4,** and further may be defined such that the communication link may be wired and/or or wireless. Example technologies consistent with the principles or aspects of the present disclosure may include, but are not limited to, Bluetooth®, WiFi, NFC (Near Field Communication), HomePlug®, and/or any other communication device or subsystem similar to that discussed below in connection with **FIG. 9.**

[0055] For brevity, the PTR **210** is depicted in a simplified form, and may generally include more or fewer elements or components as desired, including those configured and/or arranged for implementing various features for enabling an end-user to access home

automation features or functionality directly from or via one or more interfaces that might normally be used to access satellite television-related programming and services, in accordance with the principles of the present disclosure. For example, the PTR **210** is shown in **FIG. 3** to include the fire alarm **220** as mentioned above in connection with **FIG. 2.** While shown stored to the storage medium **308** as executable instructions, the fire alarm module **220** could, wholly or at least partially, be stored to the processor(s) **302** of the PTR **210.** Further, some routing between the various modules of PTR **210** has been illustrated. Such illustrations are for exemplary purposes only. The state of two modules not being directly or indirectly connected does not indicate the modules cannot communicate. Rather, connections between modules of the PTR **210** are intended only to indicate possible common data routing. It should be understood that the modules of the PTR **210** may be combined into a fewer number of modules or divided into a greater number of modules.

[0056] Additionally, although not explicitly shown in **FIG. 3,** the PTR **210** may include one or more logical modules configured to implement a television steaming media functionality that encodes video into a particular format for transmission over the Internet such as to allow users to remotely view and control a home cable, satellite, or personal video recorder system from an Internet-enabled computer with a broadband Internet connection. The Slingbox® by Sling Media, Inc. of Foster City, CA, is one example of a product that implements such functionality. Further, the PTR **210** may be configured to include any number of other various components or logical modules that are implemented in hardware, software, firmware, or any combination thereof, and such components or logical modules may or may not be implementation-specific.

[0057] Referring now to **FIG. 4,** an example home automation system **400** is shown in accordance with the present disclosure. In general, the home automation system **400** is hosted by the PTR **210** of **FIG. 2,** and thus the PTR **210** may be considered a home automation gateway device or system. For example, the PTR **210** may be configured and/or arranged to communicate with multiple in-home or on-residence home automation-related systems and/or devices. Some examples of which include, but are not limited to: at least one pet door/feeder **402,** at least one smoke/CCh detector **404,** a home security system **406,** at least one security camera **408,** at least one window sensor **410,** at least one door sensor **412,** at least one weather sensor **414,** at least one shade controller **416,** at least one utility monitor **418,** at least one wireless device **420,** at least one health sensor **422,** at least one communication device **424,** at least one intercom **426,** at least one overlay device **428,** at least one display device **430,** at least one cellular modem **432,** at least one light controller **434,** at least one thermostat

436, at least one leak detection sensor **438,** at least one appliance controller **440,** at least one garage door controller **442,** at least one lock controller **444,** at least one irrigation controller **446,** and at least one doorbell sensor **448.** The home automation system **400** of **FIG. 4** is just an example. Other examples are possible, as discussed further below.

[0058] It is contemplated that the each of the elements of **FIG. 4,** that which with the PTR **210** communicates, may use different communication standards. For instance, one or more elements may use or otherwise leverage a ZigBee® communication protocol, while one or more other devices may communicate with the PTR **210** using a Z-Wave® communication protocol. Other forms of wireless communication may be used by particular elements of **FIG. 4** to enable communications to and from the PTR **210,** such as any particular IEEE (Institute of Electrical and Electronics Engineers) standard or specification or protocol, such as the IEEE 802.1 1 technology for example.

[0059] In some examples, a separate device may be connected with the PTR **210** to enable communication with the smart home automation systems or devices of **FIG. 4.** For instance, the communication device **424** as shown coupled with the PTR **210** may take the form of a dongle. In some examples, the communication device **424** may be configured to allow for Zigbee®, Z-Wave®, and/or other forms of wireless communication. In some example, the communication device **424** may connect with the PTR **210** via a USB (Universal Serial Bus) port or via some other type of (e.g., wired) communication port. Accordingly, the communication device **424** may be powered by the PTR **210** or may be separately coupled with another different particular power source. In some examples, the PTR **210** may be enabled to communicate with a local wireless network and may use communication device in order to communicate with devices that use a ZigBee® communication protocol, Z-Wave® communication protocol, and/or some other wireless communication protocols.

[0060] In some examples, the communication device **424** may also serve to allow or enable additional components to be connected with the PTR **210.** For instance, the communication device **424** may include additional audio/video inputs (e.g., HDMI), component, and/or composite inputs to allow for additional devices (e.g., Blu-Ray players) to be connected with the PTR **210.** Such a connection may allow video comprising home automation information to be "overlaid" with television programming, both being output for display by a particular presentation device. Whether home automation information is overlaid onto video on display may be triggered based on a press of a remote control button by an end-user.

[0061] Regardless of whether the PTR **210** uses the communication device **242** to communicate with any particular home automation device shown in **FIG. 4** or other particular home automation device not explicitly shown in **FIG. 4,** the PTR **210** may be configured to output home automation information for presentation via the display device **430.** It is contemplated that the display device **430** could correspond to any particular one of the mobile devices **216a-b** and televisions **214a-c** as shown in **FIG. 2.** Still other examples are possible. Such information may be presented simultaneously, concurrently, in tandem, etc., with any particular television programming received by the PTR **210** via any particular communication channel as discussed above in connection with at least **FIG. 2.** It is further contemplated that the PTR **210** may also, at any particular instant or given time, output only television programming or only home automation information based on preferences or commands or selections of particular controls within an interface of or by any particular end-user. Furthermore, an end-user may be able to provide input to the PTR **210** to control the home automation system **400,** in its entirety as hosted by the PTR **210** or by the overlay device **428,** as discussed further below.

[0062] In some examples (indicated by intermittent line in **FIG. 4),** the overlay device **428** may be coupled with the PTR **210** to allow or enable home automation information to be presented via the display device **430.** It is contemplated that the overlay device **428** may be configured and/or arranged to overlay information, such as home automation information, onto a signal that will ultimately enable the home automation information to be visually presented via the display device **430.** In this example, the PTR **210** may receive, decode, descramble, decrypt, store, and/or output television programming. The PTR **210** may output a signal, such as in the form of an HDMI signal. Rather than being directly input to the display device **430,** however, the output of the PTR **210** may be input to the overlay device **428.** Here, the overlay device **428** may receive the video and/or audio output from the PTR **210.**

[0063] The overlay device **428** may add additional information to the video and/or audio signal received from the PTR **210** so as to modify or augment or even "piggyback" on the same. That video and/or audio signal may then be output by the overlay device **428** to the display device **430** for presentation thereon. In some examples, the overlay device **428** may include or exhibit an HDMI input/output, with the HDMI output being connected to the display device **430.** While **FIG. 4** shows lines illustrating communication between the PTR **210** and other various devices, it will be appreciated that such communication may exist, in addition or in alternate via the communication device **424** and/or the overlay device **428.** In other words, any particular input to the PTR **210** as shown in **FIG. 4** may additionally, or

alternatively, be supplied as input to one or both of the communication device **424** and the overlay device **428.**

[0064] As alluded to above, the PTR **210** may be used to provide home automation functionality, but the overlay device **428** may be used to modify a particular signal so that particular home automation information may be presented via the display device **430.** Further, the home automation functionality as detailed throughout in relation to the PTR **210** may alternatively be provided by or via the overlay device **428.** Using the overlay device **428** to present automation information via the display device **430** may be beneficial and/or advantageous in many respects. For instance, it is contemplated that multiple devices may provide input video to the overlay device **428.** For instance, the PTR **210** may provide television programming to the overlay device **428,** a DVD/Blu-Ray player may provide video to the overlay device **428,** and a separate IPTV device may stream other programming to the overlay device **428.** Regardless of the source of particular video/audio, the overlay device **428** may output video and/or audio that has been modified or augmented, etc., to include home automation information and then output to the display device **430.** As such, regardless of the source of video/audio, the overlay device **428** may modify the audio/video to include home automation information and, possibly, solicit for user input. For instance, in some examples the overlay device **428** may have four video inputs (e.g., four HDMI inputs) and a single video output (e.g., an HDMI output). In other examples, the PTR **210** may exhibit such features or functionality. As such, a separate device, such as a Blu-ray player may be connected with a video input of the PTR **210,** thus allowing the PTR **210** to overlay home automation information when content from the Blu-Ray player is being output to the display device **430.**

[0065] Regardless of whether the PTR **210** is itself configured to provide home automation functionality and output home automation input for display via the display device **430** or such home automation functionality is provided via the overlay device **428,** home automation information may be presented by the display device **430** while television programming is also being presented by display device **430.** For instance, home automation information may be overlaid or may replace a portion of television programming, such as broadcast content, stored content, on-demand content, etc., presented via the display device **430.** As an example, while television programming consisting of a baseball game is being presented, the display may be augmented with information related to home automation by instruction of the PTR **210** which is configured to host the home automation system **400** in accordance with the principles of the present disclosure. In general, the television programming may represent

broadcast programming, recorded content, on-demand content, or some other form of content. The exemplary illustrated home automation information is related to a detected fire signal, such as information regarding the detected fire signal, and an emergency exit route, user-instructions for responding to a valid fire signal and/or an unwanted or false fire signal, and/or live video feed from a room in which the fire signal was detected. In another example, the displayed home automation information may be related to a user settings or control panel, such as a graphical user interface ("GUI"), that receives various user selections and settings. Such augmentation of the television programming may be performed directly by the PTR **210** (which may or may not be in communication with the communication device **242),** the overlay device **428,** or even a combination thereof. Such augmentation may result in solid or opaque or partially transparent graphics being overlaid onto television programming (or other forms of video) output by the PTR **210** and displayed by the television **214c.** Furthermore, the overlay device **428** and/or the PTR **210** may add or modify sound to television programming also or alternatively. For instance, in response to a doorbell ring, a sound may be played through the television **214c** (or connected audio system). In addition or in alternate, a graphic may be displayed. In other examples, other particular camera data (e.g., camera data) and/or associated sound or motion sensors may be integrated in the system and overlaid or otherwise made available to a user. For example, detection of the fire signal may trigger an on-screen alert to a user watching television.

[0066] Still further, such presented home automation information may request or at least enable end-user user input. For instance, an end-user may, via section of one or more controls of a particular interface output by the PTR **210** (e.g., via a remote control) and/or the overlay device **428,** specify whether video from a camera at the front door should be presented, not presented, or if future notifications related to such motion such be ignored. If ignored, this may be for a predefined period of time, such as an hour, or until the PTR **210** or the overlay device **428** is powered down and powered back on. Ignoring of video may be particularly useful if motion or some other event is triggering the presentation of video that is not interesting to a viewer of the display device **430** (or a wireless device), such as children playing on the lawn or snow falling.

[0067] Returning to **FIG. 4** alone, the PTR **210** and/or the overlay device **428,** depending on implementation-specific details, may communicate with one or more wireless devices, such as the wireless device **420.** The wireless device **420** may represent a tablet computer, cellular phone, laptop computer, remote computer, or some other device through which a user may desire to control home automation settings and view home automation information in

accordance with the principles of the present disclosure. Such a device also need not necessarily be wireless, such as in a desktop computer embodiment. It is contemplated that the PTR **210,** communication device **424,** and/or the overlay device **428** may communicate directly with the wireless device **420,** or may use a local wireless network, such as network **224** for instance. The wireless device **420** may be remotely located and not connected with a same local wireless network as one or more of the other devices or elements of **FIG. 4.** Via the Internet, the PTR **210** and/or the overlay device **428** may transmit a notification to the wireless device **420** regarding home automation information. For instance, a third-party notification server system, such as a notification server system operated by Apple Inc., of Cupertino, CA may be used to send such notifications to the wireless device **420.**

[0068] Various home automation devices may be in communication with the fire alarm module **220** of the PTR **210** (collectively, "PTR **210**" throughout) and/or the overlay device **428,** depending on implementation-specific details. Such home automation devices may use similar or disparate communication protocols. Such home automation devices may communicate with the PTR **210** directly or via the communication device **424.** Such home automation devices may be controlled by a user and/or have a status viewed by a user via the display device **430** and/or wireless device **420.** Such home automation devices may include, but are not limited to:

[0069] One or more cameras, such as the security camera **408.** It is contemplated that the security camera **408** may be installed indoors, outdoors, and may provide a video and, possibly, an audio stream that may be presented via the wireless device **420** and/or display device **430.** Video and/or audio from the security camera **408** may be recorded by the overlay device **428** and/or the PTR **210** continuously, in a loop as per a predefined time period, upon an event occurring, such as motion being detected by the security camera **408,** and etc. For example, video and/or audio from security camera **408** may be continuously recorded such as in the form of a rolling window, thus allowing a period of time of video/audio to be reviewed by a user from before a triggering event and after the triggering event. Video/audio may be recorded on a persistent storage device local to overlay device **428** and/or the PTR **210,** and/or may be recorded and stored on an external storage devices, such as a network attached storage device or the server **218** of **FIG. 2.** In some examples, video may be transmitted across a local and/or wide area network to other one or more other storage devices upon occurrence of a trigger event, for later playback. For initial setup for example, a still may be captured by the security camera **408** and stored by the PTR **210** for subsequent presentation as part of a user interface via the display device **430.** In this way, an end-user can determine

which camera, if multiple cameras are present or enabled, is being set up and/or later accessed. For example, a user interface may display a still image from a front door camera which may be easily recognized by the user because it shows a scene near or adjacent a front door of a residence, to allow a user to select the front door camera for viewing as desired.

[0070] Furthermore, video and, possibly, audio from the security camera **408** may be available live for viewing by a user via the overlay device **428** or the PTR **210.** Such video may be presented simultaneously with television programming being presented. In some examples, video may only be presented if motion is detected by the security camera **408,** otherwise video from the security camera **408** may not be presented by a particular display device presenting television programming. Also, such video (and, possibly, audio) from the security camera **408** may be recorded by the PTR **210** and/or the overlay device **428.** As discussed in further detail below in connection with at least **FIG. 8,** such video may be recorded based upon a user-configurable timer. For instance, features or functionality associated with the security camera **408** may be incorporated into an EPG that is output by the PTR **210** for display by a presentation or display device.

[0071] For instance, data as captured by the security camera **408** may be presented or may otherwise be accessible as a "channel" as part of the EPG along with other typical or conventional television programming channels. Accordingly, a user may be permitted to select that channel associated with the security camera **408** to access data as captured by the security camera **408** for presentation via the display device **430** and/or the wireless device **420,** and etc. The user may also be permitted to set a timer to activate the security camera **408** to record video and/or audio for a user-defined period of time on a user-defined date. Such recording may not be constrained by the rolling window mentioned above associated with a triggering event being detected. Such an implementation may be beneficial, for example, if a babysitter is going to be watching a child and the parents want to later review the babysitter's behavior in their absence. In some examples, video and/audio acquired by the security camera **408** may be backed up to a remote storage device, such as cloud-based storage hosted by the server **218** of **FIG. 3** for instance. Other data may also be cached to the cloud, such as configuration settings. Thus, if one or both of the PTR **210** and overlay device **428** malfunction, then a new device may be installed and the configuration data loaded onto the device from the cloud.

[0072] Further, one or more window sensors and door sensors, such as the window sensor **410** and the door sensor **412** may be integrated in to or as part of the home automation system

400, and each may transmit data to the PTR **210,** possibly via the communication device **424,** or the overlay device **428,** that indicates the status of a window or door, respectively. Such status may indicate open window or door, an ajar window or door, a closed window or door, whether the window or door is locked, and etc. When a status change occurs, an end-user may be notified as such via the wireless device **420** and/or the display device **430,** within an EPG or like interface for example. Further, a user may be able to view a status screen within an EPG or other interface to view the status one or more window sensors and/or one or more door sensors throughout the location. In some examples, the window sensor **410** and/or the door sensor **412** may have integrated "break" sensors to enable a determination as to whether glass or a hinge, or other integral component, etc., has been broken or compromised. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** it is contemplated that one or both of the window sensor **410** and the door sensor **412** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by one or both of the window sensor **410** and door sensor **412** may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface, such as a pop-up window, banner, and/or any other "interface" or "display" or the like, in accordance with the principles of the present disclosure.

[0073] Further, one or more smoke and/or **$C0_2$** detectors, such as detector **404,** may be integrated in to or as part of the home automation system **400.** As such, alerts as to whether a fire (e.g., heat, smoke), CO2, radon, etc., has been detected can be sent to the PTR **210,** wireless device **420,** etc., and/or one or more emergency first responders. Accordingly, when an alert occurs, a user may be notified as such the via wireless device **420** or the display device **430,** within an EPG or like interface for example. Further, it is contemplated that such an interface may be utilized to disable false alarms, and that one or more sensors dispersed throughout a residence and/or integrated within the home automation system **400** to detect gas leaks, radon, or various other dangerous situations. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the detector **404** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the detector **404** may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0074] Further, a pet door and/or feeder, such as pet door and/or feeder **402** may be integrated in to or as part of the home automation system **400.** For instance, a predefined amount of food may be dispensed at predefined times to a pet. A pet door may be locked and/or unlocked. The pet's weight or presence may trigger the locking or unlocking of the pet door. For instance, a camera located at the pet door may be used to perform image recognition of the pet or a weight sensor near the door may identify the presence of the pet and unlock the door. A user may also lock/unlock a pet door and/or dispense food for example from a "remote" location. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the pet door and/or feeder **402** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the pet door and/or feeder **402** may be consolidated, summarized, etc., and made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0075] Further, a weather sensor, such as the weather sensor **414** may be integrated in to or as part of the home automation system **400,** and may allow or enable the PTR **210** and/or overlay device **428** to receive, identify, and/or output various forms of environmental data, including local or non-local ambient temperature, humidity, wind speed, barometric pressure, etc. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the weather sensor **414** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the pet door and/or feeder **402** may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0076] Further, a shade controller, such as shade controller **416,** may be integrated in to or as part of the home automation system **400,** and may allow for control of one or more shades, such as window, door, and/or skylight shades, within a home or residence or any other location. The shade controller **416** may respond to commands received from the PTR **210** and/or overlay device **428** and may provide status updates, such as "shade up" or "shade 50% up" or "shade down" and etc. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the shade controller **416** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the shade controller **416** may be manipulated, consolidated, etc., as desired, and also made

accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0077] Further, a utility monitor, such as utility monitor **418,** may be integrated in to or as part of the home automation system **400,** and may serve to provide the PTR **210** and/or overlay device **428** with utility data or information, such as electricity usage, gas usage, water usage, wastewater usage, irrigation usage, etc. A user may via an EPG or like interface view a status page or may receive notifications upon predefined events occurring, such as electricity usage exceeding a defined threshold within a month, or current kilowatt usage exceeding a threshold. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the utility monitor **418** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the utility monitor **418** may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0078] Further, a health sensor, such as health sensor **422,** may be integrated in to or as part of the home automation system **400,** and may permit one or more vital characteristics of a particular individual to be acquired and/or monitored, such as a heart rate for instance. In some examples, additionally or alternatively, the health sensor **422** may contain a button or other type of actuator that a user can press to request assistance. As such, the health sensor **422** may be mounted to a fixed location, such as bedside, or may be carried by a user, such as on a lanyard. Such a request may trigger a notification to be presented to other users via the display device **430** and/or the wireless device **420.** Additionally or if the notification is not cleared by another user within a predefined period of time, a notification may be transmitted to emergency first responders to request help. In some examples, a home automation service provider may first try contacting the user, such as via phone, to determine if an emergency is indeed occurring. Such a health sensor **422** may have additional purposes, such as for notification of another form of emergency, such as a break-in, fire, flood, theft, disaster, etc.

[0079] In some examples, the health sensor **422** may be used as a medical alert pendant that can be worn or otherwise carried by an individual. It may contain a microphone and/or speaker to allow communication with other users and/or emergency first responders. The PTR **210** and/or overlay device **428** may be preprogrammed to contact a particular phone number, such as an emergency service provider, relative, caregiver, etc., based on an actuator of the health sensor **422** being activated by a user. The user may be placed in contact with a

person via the phone number and the microphone and/or speaker of the health sensor **422.** Furthermore, camera data may be combined with such alerts in order to give a contacted relative more information regarding the medical situation. For example, the health sensor **422,** when activated in the family room, may generate a command which is linked with security camera footage from the same room. Furthermore, in some examples, the health sensor **422** may be able to monitor vitals of a user, such as a blood pressure, temperature, heart rate, blood sugar, etc. In some examples, an event, such as a fall or exiting a structure can be detected.

[0080] Further, in response to an alert from the health sensor **422** or some other emergency or noteworthy event, parallel notifications may be sent to multiple users at approximately the same time. As such, multiple people can be made aware of the event at approximately the same time (as opposed to serial notification). Therefore, whoever the event is most pertinent to or notices the notification first can respond. Which users are notified for which type of event may be customized by a user of the PTR **210.** In addition to such parallel notifications being based on data from the health sensor **422,** data from other devices may trigger such parallel notifications. For instance, a mailbox open, a garage door open, an entry/exit door open during wrong time, an unauthorized control of specific lights during vacation period, a water sensor detecting a leak or flow, a temperature of room or equipment is outside of defined range, and/or motion detected at front door are examples of possible events which may trigger parallel notifications.

[0081] Additionally, a configuring user may be able to select from a list of users to notify and method of notification to enable such parallel notifications. The configuring user may prioritize which systems and people are notified, and specify that the notification may continue through the list unless acknowledged either electronically or by human interaction. For example, the user could specify that they want to be notified of any light switch operation in their home during their vacation. Notification priority could be: 1) SMS Message; 2) push notification; 3) electronic voice recorder places call to primary number; and 4) electronic voice recorder places call to spouse's number. Other examples are possible, however, it is contemplated that the second notification may never happen if the user replies to the SMS message with an acknowledgment. Or, the second notification would automatically happen if the SMS gateway cannot be contacted. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the health sensor **422** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as

acquired by the health sensor 422 may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0082] Further, an intercom, such as the intercom 426, may be integrated in to or as part of the home automation system 400, and may permit a user in one location to communicate with a user in another location, who may be using the wireless device 420, the display device 430, or some other device, such another television receiver within the structure. The intercom 426 may be integrated with the security camera 408 or may use a dedicated microphone/speaker, such as a Bluetooth® microphone. Microphones/speakers of the wireless device 420, display device 430, communication device 242, overlay device 428, etc., may also or alternatively be used. A MOCA network or other appropriate type of network may be used to provide audio and/or video from the intercom 426 to the PTR 210 and/or to other television receivers and/or wireless devices in communication with the PTR 210. Here, as well as in all instances of home automation related data as acquired and served to the PTR 210 and/or overlay device 428 by particular elements of FIG. 4, the intercom 426 may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the intercom 426 may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0083] Further, a light controller, such as light controller 434, may be integrated in to or as part of the home automation system 400, and may permit a light to be turned on, off, and/or dimmed by the PTR 210 or the overlay device 428, such as based on a user command received from the wireless device 420 or directly via PTR 210 or overlay device 428, etc. The light controller 434 may control a single light. As such, multiple different ones of the light controller 434 may be present within a house or residence. In some examples, a physical light switch, that opens and closes a circuit of the light, may be left in the "on" position such that light controller 434 can be used to control whether the light is on or off. The light controller 434 may be integrated into a light bulb or a circuit , such as between the light fixture and the power source, to control whether the light is on or off. An end-user, via the PTR 210 or overlay device 428, may be permitted to view a status of each instance of the light controller 434 within a location.

[0084] Since the PTR 210 or overlay device 428 may communicate using different home automation protocols, different instances of the light controller 434 within a location may use

disparate or different communication protocols, but may all still be controlled by the PTR **210** or overlay device **428.** In some examples, wireless light switches may be used that communicate with the PTR **210** or overlay device **428.** Such switches may use a different communication protocol than any particular instance of the light controller **434.** Such a difference may not affect functionality because the PTR **210** or overlay device **428** can serve as a hub for multiple disparate communication protocols and perform any necessary translation and/or bridging functions. For example, a tablet computer may transmit a command over a WiFi connection and the PTR **210** or overlay device **428** may translate the command into an appropriate Zigbee® or Zwave® command for a wireless light bulb. In some examples, the translation may occur for a group of disparate or different devices. For example, a user may decide to turn off all lights in a room and select a lighting command on a tablet computer, the overlay device 428 may then identify the lights in the room and output appropriate commands to all devices over different protocols, such as a Zigbee® wireless light bulb and a Zwave® table lamp.

[0085] Additionally, it is contemplated that the PTR **210** may permit timers and/or dimmer settings to be set for lights via the light controller **434.** For instance, lights can be configured to turn on/off at various times during a day according to a schedule and/or events being detected by the home automation system **400,** etc. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** each particular instance of the light controller **434** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by each particular instance of the light controller **434** may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0086] Further, a thermostat, such as the thermostat **436,** may be integrated in to or as part of the home automation system **400,** and may provide heating/cooling updates to the PTR **210** and/or overlay device **428** for display via display device **430** and/or wireless device **420.** Further, control of thermostat **436** may be effectuated via the PTR **210** or overlay device **428,** and zone control within a structure using multiple thermostats may also be possible. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the thermostat **436** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the thermostat **436** may be manipulated,

consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0087] Further, a leak detection sensor, such as the leak detection sensor **438,** may be integrated in to or as part of the home automation system **400,** and may be used to determine when a water leak as occurred, such as in pipes supplying water-based fixtures with water. The leak detection sensor **438** may be configured to attach to the exterior of a pipe and listen for a sound of water moving within a pipe. In other examples, sonar, temperature sensors or ion infused water with appropriate sensors may be used to detect moving water. As such, cutting or otherwise modifying plumbing may not be necessary to use or leverage the leak detection sensor **438.** If water movement is detected for greater than a threshold period of time, it may be determined a leak is occurring. The leak detection sensor **438** may have a component that couples over an existing valve such that the flow of water within one or more pipes can be stopped.

[0088] For instance, if the leak detection sensor **438** determines a leak may be occurring, a notification may be provided to a user via the wireless device **420** and/or display device **430** by the PTR **210** and/or overlay device **428.** If a user does not clear the notification, the flow of water may be shut off by the leak detection sensor **438** after a predefined period of time. A user may also be able to provide input to allow the flow of water to continue or to immediately interrupt the flow of water. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the leak detection sensor **438** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the leak detection sensor **438** may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0089] Further, an applicant controller, such as the appliance controller **440,** may be integrated in to or as part of the home automation system **400,** and may permit a status of an appliance to be retrieved and commands to control operation to be sent to an appliance by the PTR **210** or overlay device **428.** For instance, the appliance controller **440** may control a washing machine, a dryer, a dishwasher, an oven, a microwave, a refrigerator, a toaster, a coffee maker, a hot tub, or any other form of appliance. The appliance controller **440** may be connected with a particular appliance or may be integrated as part of the appliance. Additionally, or alternatively, the appliance controller **440** may enable for acquisition of data

or information regarding electricity usage of one or more devices (e.g., other home automation devices or circuits within a home that are monitored) to be determined. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the appliance controller **440** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the appliance controller **440** may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0090] Further, a garage door controller, such as the garage door controller **442,** may be integrated in to or as part of the home automation system **400,** and may permit a status of a garage door to be checked and the door to be opened or closed by a user via the PTR **210** or overlay device **428.** In some examples, based on a physical location of the wireless device **420,** the garage door may be controlled. For instance, if the wireless device **420** is a cellular phone and it is detected to have moved a threshold distance away from a house having the garage door controller **442** installed, a notification may be sent to the wireless device **420.** If no response is received within a threshold period of time, the garage may be automatically shut. If the wireless device **420** moves within a threshold distance of the garage door controller **442,** the garage may be opened. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the garage door controller **442** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the garage door controller **442** may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0091] Further, a lock controller, such as the lock controller **444,** may be integrated in to or as part of the home automation system **400,** and may permit a door to be locked and unlocked and/or monitored by a user via the PTR **210** or overlay device **428.** In some examples, the lock controller **444** may have an integrated door sensor **412** to determine if the door is open, shut, or partially ajar. Being able to only determine if a door is locked or unlocked may not be overly useful - for instance, a lock may be in a locked position, but if the door is ajar, the lock may not prevent access to the house. Therefore, for security, a user may benefit from knowing both that a door is closed (or open) and locked (or unlocked). To accomplish such notification and control, the lock controller **444** may have an integrated door sensor **412** that allows for the lock controller **444** to lock/unlock a door and provide a status as to whether the

door is open or shut. Therefore, a single device may control a lock and determine whether the associated door is shut or open. No mechanical or electrical component may need to be integrated separately into a door or doorframe to provide such functionality. Such a single device may have a single power source that allows for sensing of the lock position, sensing of the door position, and for engagement/disengagement of the lock.

[0092] For example, the lock controller **444** may have an integrated door sensor that includes a reed switch or proximity sensor that detects when the door is in a closed position, with a plate of the lock in proximity to a plate on the door frame of the door. For instance, a plate of the lock may have an integrated magnet or magnetized doorframe plate. When in proximity to the magnet, a reed switch located in the lock controller **444** may be used to determine that the door is closed; when not in proximity to the magnet, the reed switch located in the lock controller **444** may be used to determine that the door is at least partially ajar. Rather than using a reed switch, other forms of sensing may also be used, such as a proximity sensor to detect a doorframe. In some examples, the sensor to determine the door is shut may be integrated directly into the deadbolt or other latching mechanism of the lock controller **444.** When the deadbolt is extended, a sensor may be able to determine if the distal end of the deadbolt is properly latched within a door frame based on a proximity sensor or other sensing means. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the lock controller **444** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the lock controller **444** may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0093] Further, a home security system, such as the home security system **406,** may be integrated in to or as part of the home automation system **400.** In general, the home security system **406** may detect motion, when a user has armed/disarmed the home security system **406,** when windows/doors are opened or broken, etc. The PTR **210** may adjust settings of the home automation devices of **FIG. 4** based on home security system **406** being armed or disarmed. For example, a virtual control and alarm panel may be presented to a user via the display device **430.** The functions of a wall mounted panel alarm can be integrated in the graphical user interface of the TV viewing experience such as a menu system with an underlying tree hierarchical structure. It is contemplated that the virtual control and alarm

panel can appear in a full screen or PiP (Picture-in-Picture) with TV content. Alarms and event notification can be in the form of scrolling text overlays, popups, flashing icons, etc.

[0094] Additionally, camera video and/or audio, such as from the security camera **408,** can be integrated with DVR content provided by the PTR **210** with additional search, zoom, time-line capabilities. The camera's video stream can be displayed full screen, PiP with TV content, or as a tiled mosaic to display multiple camera's streams at a same time. In some examples, the display can switch between camera streams at fixed intervals. The PTR **210** may perform video scaling, adjust frame rate and transcoding on video received from the security camera **408.** In addition, the PTR **210** may adaptively transcode the camera content to match an Internet connection. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the home security system **406** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the home security system **406** may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0095] Further, an irrigation controller, such as the irrigation controller **446,** may be integrated in to or as part of the home automation system **400,** and may allow for a status and control of an irrigation system, such as a sprinkler system, to be controlled by a user via the PTR **210** and/or overlay device **428.** The irrigation controller **446** may be used in conjunction with the weather sensor **414** to determine whether and/or for how long (duration) the irrigation controller **446** should be activated for watering. Further, a user, via the PTR **210** and/or overlay device **428,** may turn on, turn off, or adjust settings of the irrigation controller **446.** Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the irrigation controller **446** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the irrigation controller **446** may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0096] Further, a doorbell sensor, such as the doorbell sensor **448,** may be integrated in to or as part of the home automation system **400,** and may permit an indication of when a doorbell has been rung to be sent to multiple devices, such as the PTR **210** and/or the wireless device **420.** In some examples, the doorbell sensor **448** detecting a doorbell ring may trigger

video to be recorded by the security camera **408** of the area near the doorbell and the video to be stored until deleted by a user, or stored for predefined period of time. Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** the doorbell sensor **448** may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by the doorbell sensor **448** may be manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0097] For example, "selection" of a doorbell by an individual so as to "trigger" the doorbell sensor **448** may activate or engage the PTR **210** to generate and output for display by a presentation device, such as the television **214c,** a user interface, display, pop-up, etc., that which may include particular information such as "There is someone at your front door ringing the doorbell" for example. Additional, or alternative, actions such as activating, by the PTR **210,** a security camera to record video and/or audio of the individual at the front door are contemplated as well. Further, similar steps or actions may be taken or implemented by the PTR **210** for example in response to a signal generated in response to detection of an event, etc., received by the PTR **210** from any of the elements of **FIG. 2.**

[0098] Additional forms of sensors not illustrated in **FIG. 2** may also be incorporated as part of the home automation system **400.** For instance, a mailbox sensor may be attached to a mailbox to determine when mail is present and/or has been picked up. The ability to control one or more showers, baths, and/or faucets from the PTR **210** and/or the wireless device **420** may also be possible. Pool and/or hot tub monitors may be incorporated into the home automation system **400.** Such sensors may detect whether or not a pump is running, water temperature, pH level, a splash/whether something has fallen in, etc. Further, various characteristics of the pool and/or hot tub may be controlled via the home automation system. In some examples, a vehicle "dashcam" may upload or otherwise make video/audio available to the PTR **210** when within range of a particular residence. For instance, when a vehicle has been parked within range of a local wireless network with which the PTR **210** is connected, video and/or audio may be transmitted from the dashcam to the PTR **210** for storage and/or uploading to a remote server, such as the server **218** as shown in **FIG. 2.** Here, as well as in all instances of home automation related data as acquired and served to the PTR **210** and/or overlay device **428** by particular elements of **FIG. 4,** such systems or sensors or devices may be controlled via interaction with particular controls as provided within or by an EPG or like interface, and information or data as acquired by such systems or sensors or devices may be

manipulated, consolidated, etc., as desired, and also made accessible within or by an EPG or like interface in accordance with the principles of the present disclosure.

[0099] Referring now to **FIG. 5,** an example method **500** of the home automation system **400** of **FIG. 4** is provided. In particular, the PTR **210** having the fire alarm module **220** in an in-home implementation or scenario may be configured to implement one or more steps of the method shown herein. It is noted that the the fire alarm module **220** may be installed on the PTR **210** by downloading the module **220** from a communication network, pushing the module **220** onto the PTR **210,** and/or provided by dedicated hardware and/or software in the PTR **210.** In one aspect, the fire alarm module **220** may be pushed from a satellite communication to the PTR **210** in response to a purchase and/or user-request for the fire alarm module **220.** Further, it is noted that the method **500** may include any additional steps not immediately shown or discussed, and that any step may be optional and/or provided in any order. Further, it is noted that the method may be provided on any other centralized devices having the fire alarm module **220** and in communication with the home automation system.

[0100] At step **502,** the PTR **210** may detect a signal indicating a fire in the building. It is contemplated that the signal may be a sensed input detected at one or more sensors in communication with, or provided at, the PTR **210,** such as the smoke/CCh detector **404.** For instance, the signal may be based on a sensed input at a detector located remotely or in another room separate from the PTR **210.** Merely by way of example, the detector may comprise a smoke detector and/or a heat detector. In other examples, the signal may comprise a user-input received via a communication network or protocol at the PTR **210.** For instance, an occupant at the home may notice an emergency or fire situation and activate the fire alarm module **220** via a mobile device and/or a GUI provided by the PTR **210** on a display device. Other examples are possible.

[0101] At step **504,** the PTR **210** may perform a risk assessment in response to detecting the signal indicating the fire. The risk assessment may be performed for purposes of distinguishing between a valid fire signal and a false or unwanted fire signal. It is contemplated that false fire signals may arise from, and merely by way of example, sensitive or malfunctioning sensors and/or sensed smoke, heat, and other inputs not attributed to an emergency fire situation. In some aspects, the risk assessment may comprise collecting, by the PTR **210,** one or more conditions of the fire in the building structure, assessing, by PTR **210,** a risk level based on the one or more collected conditions, and determining, by the PTR

210, whether the signal is a valid fire signal and/or a false fire signal. Further, the risk assessment may include determining, by PTR **210,** whether an evacuation situation is present based on the assessed risk level. In other aspects, the risk assessment may be completed by a separate module within the PTR **210** or in communication with the PTR **210,** and subsequently communicated with the fire alarm module **220** of the PTR **210.**

[0102] For example, the one or more conditions detected and/or gathered by the PTR **210** may include any one or variety of an identified location of the fire in the home, an identified location of an occupant or person in the building structure, an identified size of the fire in the building structure, an identified trait of the person in the building structure, and/or a status of a fire protection device in the building structure. For example, the PTR **210** may identify or otherwise retrieve the identified location of the fire by detecting which fire detector sensed the fire and the location of that sensor, and/or analyzing a video or image feed from a live camera, and/or comparing a plurality of sensed input received at a plurality of sensors to determine the location of the fire. In some aspects, the identified location of the fire includes GPS coordinates, the home address, and/or a specific room or floor level of the home. In another aspect, any identified conditions may be sent from the PTR **210** to one or more emergency responders upon detection of the fire or based on the assessed risk level by the PTR **210.** In another aspect, results from the risk assessment, such as the assessed risk level, may be sent to the emergency responders or other third parties, including live video, live audio, live data, sensed input detection, live communications with one or more occupants and/or from one or more mobile devices associated with the occupants, and so on. Other embodiments are possible.

[0103] In another aspect, the identified size of the fire may include an image or video monitoring and analysis by the PTR **210** to determine a spread of the fire. In another example, a heat sensor may detect a changing temperature, and/or a carbon dioxide or monoxide sensor may detect changing gases. In further examples, the identified size of the fire may be determined based on at least one sensed input detected by an optical sensor, an infrared sensor, a temperature sensor, and an odor detector. Such sensed data may be requested, retrieved, and/or detected, by the PTR **210** and analyzed in the risk assessment, and/or further sent to emergency responders.

[0104] In a further aspect, an identified location of the occupant or person comprises an identified room and/or floor level of the house, and/or a GPS location of the person. The identified location of the person may be based on camera and facial recognition analysis of

images, voice analysis, such as detecting a sound input in the room and identifying the sound input is associated with the person. In another aspect, the GPS location of the person may be determined based on a location of a mobile device associated with the person. It is contemplated that the PTR **210** may identify a plurality of locations of a plurality of persons in a variety of different manners. In still a further aspect, an identified trait of the person may include, but not be limited to, a name, an age range, a weight, a height, a handicap status, and/or a responsiveness status of the person. Such traits may be identified via user-input, for instance, prompting the person to provide such information and/or analysis of images or speech by the PTR **210.** For instance, the PTR **210** may estimate the age range, the weight, and the height of the person based on collected images. Further, the PTR **210** may determine the responsiveness status of the person based on motion sensors and/or audio sensors, e.g. the health sensor **422,** to detect a level of activity or the person. In another aspect, the PTR **210** may identify the handicap status by utilizing motion and/or optical sensors to determine if the person is immobile, handicapped, injured, and the like. It is noted that a variety of sensors may be utilized in various implementations described herein.

[0105] In yet another aspect, the status of the fire protection device may be determined by the PTR **210.** Merely by way of example, the fire protection device may comprise a fire extinguisher and/or a sprinkler system. The status may comprise a presence or an absence of the device within a vicinity of the fire, whether the device is accessible to any persons within the house based on the identified locations of the persons, and/or whether the device is capable of mitigating the detected fire based at least in part on the identified size, and other metrics, of the fire. The status may further provide an active or inactive status of the fire protection device. For instance, the PTR **210** may determine whether the device is expired, inoperative, or operable. In some cases, the PTR **210** may notify one or more persons, via audio alerts and/or text alerts, to retrieve the particular fire protection device for use on a fire detected in a particular room. In that case, an evacuation situation may not immediately be determined as necessary by the PTR **210.** In another aspect, the PTR **210** may determine whether a sprinkler system has activated at the identified location of the fire, and if not, then instruct activation of the sprinkler system. The PTR **210** may continue monitoring any conditions related to the fire after implementing the risk assessment(s), for instance, to determine any changes in the situation and/or relay such conditions to emergency responders. Other examples are possible.

[0106] Referring again to **FIG. 5,** at step **506,** the PTR **210** may determine if the evacuation situation is present based at least in part on the risk assessment. It is noted that any

determination may be overridden by user-input into the PTR **210** or other devices in communication with the PTR **210.** If an evacuation situation is determined as not necessary, then the PTR **210** may determine, at step **508,** that the signal is an unwanted fire signal. At step **510,** the PTR **210** may log the unwanted signal in a database, including a time and date stamp, location or room associated with the signal, captured image or video of the location, and/or sensor(s) statistics from one or more sensor(s) in relation to the signal. At step **512,** the PTR **210** may notify an end-user or occupant(s) of the occurrence of the unwanted signal and/or various details logged in the database.

[0107] However, in other aspects, the PTR **210** may determine that the evacuation situation is present. In that case, the PTR **210** may map, at step **514,** an emergency exit path out of the house. The emergency exit path may be determined based on the identified location of the fire and/or the identified location(s) of the person(s). In some embodiments, a unique emergency exit path is determined for each person in the home. In other embodiments, the emergency exit path is further determined based on a layout or fioorplan of the home, which may be previously provided and/or stored by the fire alarm module **220.** It is contemplated that the emergency exit path is mapped based on the locations of interior and exterior doors, windows, and other entries and exits of the house. The emergency exit path may comprise a shortest, quickest, and/or easiest route of the house that avoids the detected fire and/or other dangers.

[0108] At step **516,** the PTR **210** may operate one or more lighting devices in the house to indicate the emergency exit path. Merely by way of example, the PTR **210** may signal the light controller **434** and/or the lighting devices in rooms not within the emergency exit path and/or unoccupied to be turned off, dimmed, or changed to a different color, e.g. red. In another aspect, the PTR **210** may signal the light controller **434** and/or the lighting devices in rooms within the emergency exit path or occupied to be turned on, adjusted in brightness, and/or emit a particular color, e.g. green. Still, in further aspects, the PTR **210** may intermittently power on and off one or more of the plurality of lighting devices. In this case, the PTR **210** may provide various patterns of flashing and blinking lights at various timed intervals along the emergency exit path. In another aspect, the PTR **210** may implement flashing lights in an occupied room corresponding to the identified location of the occupant(s). In that case, the flashing lights may inform the occupants, such as deaf occupants, of the emergency situation, and/or inform emergency responders that there are occupants in that room. In a different example, the PTR **210** may intermittently dim on and off one or more of the plurality of lighting devices. In still another example, the PTR **210**

may control an emitted color or color changes of the one or more plurality of lighting devices. For instance, the PTR **210** may signal an LED light of a ceiling track light to emit a red color to further inform the occupant(s) of the emergency situation. Other embodiments are possible.

[0109] At step **518,** the PTR **210** may operate one or more locks, and/or one or more lock controllers **444,** on one or more doors and/or windows based on the risk assessment, the emergency exit path, and/or other sensed conditions. Merely by way of example, the PTR **210** may signal the lock controller **444** to unlock a door within the determined emergency exit path. Furthermore, the PTR **210** may signal for automatically opening and maintaining opening of the in-path door. The PTR **210** may also lock and/or close a door determined to be out of the emergency exit path, and/or associated with an unoccupied room or room where a heat sensor indicates an increasing temperature. For instance, the PTR **210** may close and lock the out-of-path door associated with the identified location of the fire to contain the fire and prevent fumes from spreading to other rooms. Similarly, the PTR **210** may unlock and/or open one or more windows that may provide an emergency escape, as determined in the emergency exit path. In another aspect, the PTR **210** may close and/or lock particular windows. In another aspect, the PTR **210** may unlock and/or open various cabinets and/or doors that may secure the fire protection device and/or a safe containing valuables. In a further aspect, the PTR **210** may detect an open or closed, or locked or unlocked, status of the doors or windows with various door sensors **412** and/or window sensors **410.** It is noted that operation of the doors, windows, and locks thereof, may be automatic based on the risk assessment, the emergency exit path, and/or the sensed conditions, and any of the operations may be overridden manually and/or by signal generated by a user-input received at the PTR **210.**

[0110] At step **520,** the PTR **210** may broadcast audio message(s) via speakers, for instance by turning on one or more speakers provided by the PTR **210** and/or display device, e.g. the displace device **430,** connected thereto, and/or to the intercom **426.** The PTR **210** may automatically set a volume for the broadcast audio message. It is contemplated that the audio message(s) may contain instructions for following the emergency exit path out of the home, a designated meeting location for occupants, and/or relay a live two-way audio communication with remotely-located emergency responder system(s). For instance, the PTR **210** may initiate the live, two-way audio communication with the emergency responder system based on the risk assessment and provide two-way communication through the intercom system of the home. Other embodiments are possible.

[0111] At step **522,** the PTR **210** may detect arrival or proximity of one or more emergency responder(s) at the house, a front entry of the house, and/or a designated exit of the determined emergency exit path. For instance, the PTR **210** may detect, via the communication device **424** or other wireless sensors, a fire truck arriving or approaching the house within a predetermined vicinity of the house. In some aspects, the predetermined vicinity may be user-selectable and/or between about 50 to 100 feet radius from a center point located at the house. In some cases, the PTR **210** may automatically unlock doors and/or windows of the house upon detection of the arrival of the emergency responders. In another aspect, the PTR **210** may be configured to grant access to an entryway of the house based on a scanned or otherwise detected smart card. In a particular aspect, at least two smart cards may be required to unlock and/or open a door of the house to deter inappropriate usage of the smart cards. Other embodiments are possible.

[0112] In another example, it is contemplated that the PTR **210** may determine that the fire signal resulted from an attempted burglary and/or trespassing of the house. For instance, one or more security cameras **408** may indicate a break-in attempt in combination with the emergency fire. In that case, the PTR **210** may notify local authorities and provide the emergency exit path based at least in part on the determined location of the fire and a determined location of a trespasser. Merely by way of example, the PTR **210** may attempt to lock in the trespasser in a room until authorities arrive at the site. It is noted that various embodiments are possible.

[0113] In further aspects, the fire alarm module **220** may detect for new lighting devices incorporated in the home automation system or integration system at the house. In that case, the fire alarm module **220** may instruct the PTR **210** to incorporate the new lighting devices into the risk assessment, mapping, and other methods described herein. Further, it is noted that the systems and methods described herein may be implemented in any type of building structure, including residential, schools, malls, and commercial buildings.

[0114] Turning now to **FIG. 6,** an example mapping **600** determined by the PTR **210** and overlain on a floor plan of the house is shown. The mapping **600** includes a determined emergency exit path **602** based on the identified locations of the persons **604,606** and the identified location of a fire **608** within the house. As shown, a plurality of lighting devices **610** along the determined emergency exit path **602** are lit or otherwise operated by the PTR **210** to indicate the emergency exit path **602.** Further, it is contemplated that a doorway **612** between the emergency exit path **602** and a room containing the fire **608** is locked or

otherwise shut to deter entry into the room and/or spread of the fire. A designated meeting location **614** may further be provided by the mapping **600** as a place of gathering for the persons **604,606** in the emergency situation. It is contemplated that the designated meeting location **614** may be predetermined by a user, and/or may be one of a plurality of predetermined meeting locations stored by the PTR **210,** which may select a single meeting location based upon safety and other conditions associated with the emergency. Even further, it is noted that one or more default emergency exit paths may be pre-entered and stored by the PTR **210.** The default emergency exit paths may be user-preferred based on user selection and/or a pre-calculated mapping by the PTR **210.** Still further, it is noted that any of the mapping **600** and/or information of locations, such as last-seen locations, as detected by sensor(s) in operative communication with the PTR **210,** may be relayed to one or more emergency responder system(s) to aid in rescue and recovery missions.

[0115] It is contemplated that the systems and methods disclosed herein may be utilized with a variety of detectors, including smoke detectors and carbon monoxide detectors. For instance, evacuation in an event of carbon monoxide buildup may be facilitated with the present systems and methods. Advantageously, any lethal gas that may be odorless and/or colorless may be effectively invisible to occupants and therefore difficult for them to detect and avoid. The present systems and methods may provide a safe evacuation route that avoids areas of carbon monoxide buildup by detecting such buildup with sensors and mapping the evacuation route to avoid rooms exhibiting high levels of the lethal gas. Further, upon detection of the carbon monoxide, the systems and methods disclosed herein may automatically operate other devices in the home automation system accordingly. For instance, the systems and methods disclosed herein may automatically open one or more windows, turn on an extractor fan, turn off a gas appliance if the appliance is in a room with the dangerous levels of carbon monoxide detected therein, deny entrance to an unsafe room by locking and/or closing a door to that room assuming it is unoccupied, and so on. In a different aspect, the systems and methods disclosed herein may further provide evacuation routes in the event of danger that is sensed. For instance, a break-in situation may be sensed by a camera, microphone, or other sensor and/or processor. Merely by way of example, if a window or door is detected as broken in to, the systems and methods disclosed herein may indicate a safe evacuation route out of the house or to a secure room, while notifying authorities with video, text, phone call, and so on. In that case, the evacuation route may be provided to a mobile device associated with the one or more occupants. Other examples and benefits are possible.

[0116] **FIG. 7** shows an example computer system or device **700** in accordance with the disclosure. An example of a computer system or device includes a particular "smart" home automation-related sensor or device or system or controller or monitor or detector or the like, an enterprise server, blade server, desktop computer, laptop computer, tablet computer, personal data assistant, smartphone, gaming console, STB, television receiver, and/or any other type of machine configured for performing calculations. Any particular one of the previously-described computing devices may be wholly or at least partially configured to exhibit features similar to the computer system **700,** such as any of the respective elements of at least **FIG. 2** and **FIG. 4.** In this manner, any of one or more of the respective elements of at least **FIG. 2** and **FIG. 4** may be configured and/or arranged, wholly or at least partially, for enabling mapping and facilitating evacuation routes in emergency situations provided for by a television receiver, in manner consistent with that discussed above in connection with **FIGS. 1-6.** For example, any of one or more of the respective elements of at least **FIG. 2** and/or **FIG. 4** may be configured and/or arranged to perform and/or include instructions that, when executed, implement wholly or at least partially the method of **FIG. 1.** Still further, any of one or more of the respective elements of at least **FIG. 2** may be configured to perform and/or include instructions that, when executed, instantiate and implement functionality of the fire alarm module **220.**

[0117] The computer device **700** is shown comprising hardware elements that may be electrically coupled via a bus **702** (or may otherwise be in communication, as appropriate). The hardware elements may include a processing unit with one or more processors **704,** including without limitation one or more general-purpose processors and/or one or more special-purpose processors (such as digital signal processing chips, graphics acceleration processors, and/or the like); one or more input devices **706,** which may include without limitation a remote control, a mouse, a keyboard, and/or the like; and one or more output devices **708,** which may include without limitation a presentation device (e.g., television), a printer, and/or the like.

[0118] The computer system **700** may further include (and/or be in communication with) one or more non-transitory storage devices **710,** which may comprise, without limitation, local and/or network accessible storage, and/or may include, without limitation, a disk drive, a drive array, an optical storage device, a solid-state storage device, such as a random access memory, and/or a read-only memory, which may be programmable, flash-updateable, and/or the like. Such storage devices may be configured to implement any appropriate data stores, including without limitation, various file systems, database structures, and/or the like.

[0119] The computer device **700** might also include a communications subsystem **712,** which may include without limitation a modem, a network card (wireless and/or wired), an infrared communication device, a wireless communication device and/or a chipset such as a Bluetooth™ device, 802.1 1 device, WiFi device, WiMax device, cellular communication facilities such as GSM (Global System for Mobile Communications), W-CDMA (Wideband Code Division Multiple Access), LTE (Long Term Evolution), etc., and/or the like. The communications subsystem **712** may permit data to be exchanged with a network (such as the network described below, to name one example), other computer systems, and/or any other devices described herein. In many examples, the computer system **700** will further comprise a working memory **714,** which may include a random access memory and/or a read-only memory device, as described above.

[0120] The computer device **700** also may comprise software elements, shown as being currently located within the working memory **714,** including an operating system **716,** device drivers, executable libraries, and/or other code, such as one or more application programs **718,** which may comprise computer programs provided by various examples, and/or may be designed to implement methods, and/or configure systems, provided by other examples, as described herein. By way of example, one or more procedures described with respect to the method(s) discussed above, and/or system components might be implemented as code and/or instructions executable by a computer (and/or a processor within a computer); in an aspect, then, such code and/or instructions may be used to configure and/or adapt a general purpose computer (or other device) to perform one or more operations in accordance with the described methods.

[0121] A set of these instructions and/or code might be stored on a non-transitory computer-readable storage medium, such as the storage device(s) **710** described above. In some cases, the storage medium might be incorporated within a computer system, such as computer system **700.** In other examples, the storage medium might be separate from a computer system (e.g., a removable medium, such as flash memory), and/or provided in an installation package, such that the storage medium may be used to program, configure, and/or adapt a general purpose computer with the instructions/code stored thereon. These instructions might take the form of executable code, which is executable by the computer device **700** and/or might take the form of source and/or installable code, which, upon compilation and/or installation on the computer system **700** (e.g., using any of a variety of generally available compilers, installation programs, compression/decompression utilities, etc.), then takes the form of executable code.

[0122] It will be apparent that substantial variations may be made in accordance with specific requirements. For example, customized hardware might also be used, and/or particular elements might be implemented in hardware, software (including portable software, such as applets, etc.), or both. Further, connection to other computing devices such as network input/output devices may be employed.

[0123] As mentioned above, in one aspect, some examples may employ a computer system (such as the computer device 700) to perform methods in accordance with various examples of the disclosure. According to a set of examples, some or all of the procedures of such methods are performed by the computer system 700 in response to processor 704 executing one or more sequences of one or more instructions (which might be incorporated into the operating system 716 and/or other code, such as an application program 718) contained in the working memory 714. Such instructions may be read into the working memory 714 from another computer-readable medium, such as one or more of the storage device(s) 710. Merely by way of example, execution of the sequences of instructions contained in the working memory 714 may cause the processor(s) 704 to perform one or more procedures of the methods described herein.

[0124] The terms "machine-readable medium" and "computer-readable medium," as used herein, may refer to any non-transitory medium that participates in providing data that causes a machine to operate in a specific fashion. In an embodiment implemented using the computer device 700, various computer-readable media might be involved in providing instructions/code to processor(s) 704 for execution and/or might be used to store and/or carry such instructions/code. In many implementations, a computer-readable medium is a physical and/or tangible storage medium. Such a medium may take the form of a non-volatile media or volatile media. Non-volatile media may include, for example, optical and/or magnetic disks, such as the storage device(s) 710. Volatile media may include, without limitation, dynamic memory, such as the working memory 714.

[0125] Example forms of physical and/or tangible computer-readable media may include a floppy disk, a flexible disk, hard disk, magnetic tape, or any other magnetic medium, a compact disc, any other optical medium, ROM (Read Only Memory), RAM (Random Access Memory), and etc., any other memory chip or cartridge, or any other medium from which a computer may read instructions and/or code. Various forms of computer-readable media may be involved in carrying one or more sequences of one or more instructions to the processor(s) 704 for execution. By way of example, the instructions may initially be carried on a magnetic

disk and/or optical disc of a remote computer. A remote computer might load the instructions into its dynamic memory and send the instructions as signals over a transmission medium to be received and/or executed by the computer system **700.**

[0126] The communications subsystem **712** (and/or components thereof) generally will receive signals, and the bus **702** then might carry the signals (and/or the data, instructions, etc. carried by the signals) to the working memory **714,** from which the processor(s) **704** retrieves and executes the instructions. The instructions received by the working memory **714** may optionally be stored on a non-transitory storage device **710** either before or after execution by the processor(s) **704.** It should further be understood that the components of computer device **700** can be distributed across a network. For example, some processing may be performed in one location using a first processor while other processing may be performed by another processor remote from the first processor. Other components of computer system **700** may be similarly distributed. As such, computer device **700** may be interpreted as a distributed computing system that performs processing in multiple locations. In some instances, computer system **700** may be interpreted as a single computing device, such as a distinct laptop, desktop computer, or the like, depending on the context.

[0127] The methods, systems, and devices discussed above are examples. Various configurations may omit, substitute, or add various method steps or procedures, or system components as appropriate. For instance, in alternative configurations, the methods may be performed in an order different from that described, and/or various stages or steps or modules may be added, omitted, and/or combined. Also, features described with respect to certain configurations may be combined in various other configurations. Different aspects and elements of the configurations may be combined in a similar manner. Also, technology evolves and, thus, many of the elements are examples and do not limit the scope of the disclosure or claims.

[0128] Specific details are given in the description to provide a thorough understanding of example configurations (including implementations). However, configurations may be practiced without these specific details. For example, well-known circuits, processes, algorithms, structures, and techniques have been shown without unnecessary detail in order to avoid obscuring the configurations. This description provides example configurations only, and does not limit the scope, applicability, or configurations of the claims. Rather, the preceding description of the configurations will provide those of skill with an enabling description for implementing described techniques. Various changes may be made in the

function and arrangement of elements without departing from the spirit or scope of the disclosure.

[0129] Also, configurations may be described as a process which is depicted as a flow diagram or block diagram. Although each may describe the operations as a sequential process, many of the operations may be performed in parallel or concurrently. In addition, the order of the operations may be rearranged. A process may have additional steps not included in the figure. Furthermore, examples of the methods may be implemented by hardware, software, firmware, middleware, microcode, hardware description languages, or any combination thereof. When implemented in software, firmware, middleware, or microcode, the program code or code segments to perform the necessary tasks may be stored in a non-transitory computer-readable medium such as a storage medium. Processors may perform the described tasks.

[0130] Furthermore, the example examples described herein may be implemented as logical operations in a computing device in a networked computing system environment. The logical operations may be implemented as: (i) a sequence of computer implemented instructions, steps, or program modules running on a computing device; and (ii) interconnected logic or hardware modules running within a computing device.

[0131] Although the subject matter has been described in language specific to structural features and/or methodological acts, it is to be understood that the subject matter defined in the appended claims is not necessarily limited to the specific features or acts described above. Rather, the specific features and acts described above are disclosed as example forms of implementing the claims.

WHAT IS CLAIMED IS:

1. A method for indicating an emergency exit path upon detection of a fire in a building structure, comprising:

detecting, by a television receiver, a signal indicating presence of the fire in the building structure;

upon detecting the signal indicating the presence of the fire, determining, by the television receiver, an evacuation situation is present based on a risk assessment;

in response to determining the evacuation situation is present, mapping, by the television receiver, the emergency exit path out of the building structure based on an identified location of the fire and an identified location of a person in the building structure; and

operating, by the television receiver, a plurality of lighting devices in the building structure to indicate the emergency exit path out of the building structure.

2. The method for indicating the emergency exit path upon detection of the fire in the building structure of claim 1, further comprising:

unlocking, by the television receiver, at least one door lock of an in-path door in the building structure to indicate the emergency exit path out of the building structure, wherein the in-path door is located within the emergency exit path.

3. The method for indicating the emergency exit path upon detection of the fire in the building structure of claim 2, further comprising:

signaling, by the television receiver, a door opening module corresponding to the in-path door in the building structure to open and maintain and open position of the in-path door.

4. The method for indicating the emergency exit path upon detection of the fire in the building structure of any preceding claim, further comprising:

locking, by the television receiver, at least one door lock of an out-of-path door in the building structure to indicate the emergency exit path out of the building structure, wherein the out-of-path door lock is located outside of the emergency exit path.

5. The method for indicating the emergency exit path upon detection of the fire in the building structure of any preceding claim, further comprising:

unlocking, by the television receiver, at least one window lock of a window in the building structure to indicate the emergency exit path out of the building structure.

6. The method for indicating the emergency exit path upon detection of the fire in the building structure of any preceding claim, further comprising:

mapping, by the television receiver, a plurality of emergency exit paths out of the building structure based on the identified location of the fire and a plurality of identified locations of a plurality of persons; and

operating, by the television receiver, the plurality of lighting devices in the building structure to indicate the plurality of emergency exit paths out of the building structure.

7. The method for indicating the emergency exit path upon detection of the fire in the building structure of any preceding claim, further comprising:

wherein the risk assessment comprises:

collecting, by the television receiver, one or more conditions of the fire in the building structure;

assessing, by the television receiver, a risk level based on the one or more collected conditions; and

determining, by the television receiver, the evacuation situation is present based on the assessed risk level.

8. The method for indicating the emergency exit path upon detection of the fire in the building structure of claim 7, further comprising:

wherein the one or more conditions comprises at least one or more of:

the identified location of the fire in the building structure,

the identified location of the person in the building structure,

an identified size of the fire in the building structure,

an identified trait of the person in the building structure, and

a status of a fire protection device in the building structure.

9. The method for indicating the emergency exit path upon detection of the fire in the building structure of claim 8, wherein the status comprises at least one of a presence, absence, active, and inactive status of the fire protection device.

10. The method for indicating the emergency exit path upon detection of the fire in the building structure of claim 8 or 9, wherein the fire protection device comprises at least one of a fire extinguisher and a sprinkler system.

11. The method for indicating the emergency exit path upon detection of the fire in the building structure of any of claims 8 to 10, wherein the fire protection device is located at the identified location of the fire in the building structure.

12. The method for indicating the emergency exit path upon detection of the fire in the building structure of any of claims 8 to 11, wherein each of the identified location of the fire and the identified location of the person comprises an identified room of the building structure.

13. The method for indicating the emergency exit path upon detection of the fire in the building structure of any of claims 8 to 12, wherein the identified trait of the person comprises at least one of a name, an age range, a weight, a height, a handicap status, and a responsiveness status.

14. The method for indicating the emergency exit path upon detection of the fire in the building structure of any of claims 8 to 13, wherein the identified size of the fire in the building is based on at least one sensed input detected by at least one sensor, wherein the at least one sensors comprises an optical sensor, an infrared sensor, a heat sensor, a temperature sensor, and an odor detector.

15. The method for indicating the emergency exit path upon detection of the fire in the building structure of any preceding claim, wherein the signal indicating presence of the fire in the building structure is based on a sensed input at a detector comprising at least one of a smoke detector and a heat detector.

16. The method for indicating the emergency exit path upon detection of the fire in the building structure of claim 15, wherein operating the plurality of lighting devices further comprises at least one of:

intermittently powering on and off one or more of the plurality of lighting devices;

intermitting dimming on and off one or more of the plurality of lighting devices; and

controlling color changes of the one or more plurality of lighting devices.

17. The method for indicating the emergency exit path upon detection of the fire in the building structure of any preceding claim, further comprising:

in response to detecting the signal indicating the presence of the fire, outputting, by the television receiver, an audio broadcast over one or more audio speakers in communication with the television receiver.

18. The method for indicating the emergency exit path upon detection of the fire in the building structure of any preceding claim, further comprising:

detecting, by the television receiver, one or more emergency responders in a proximity of the building structure; and

in response to detecting the one or more emergency responders, unlocking, by the television receiver, at least one door lock of the building structure.

19. A television receiver for indicating an emergency exit path upon detection of a fire in a building structure, comprising:

one or more processors; and

a memory communicatively coupled with and readable by the one or more processors and having stored therein processor-readable instructions that, when executed by the one or more processors, cause the one or more processors to:

detect a signal indicating presence of the fire in the building structure;

upon detecting the signal indicating the presence of the fire, determine an evacuation situation is present based on a risk assessment;

in response to determining the evacuation situation is present, map the emergency exit path out of the building structure based on an identified location of the fire and an identified location of a person in the building structure; and

operate a plurality of lighting devices in the building structure to indicate the emergency exit path out of the building structure.

20. A non-transitory computer readable medium having stored thereon sets of instructions which, when executed by a computer, cause the computer to:

detect a signal indicating a presence of a fire in a building structure;

upon detecting the signal indicating the presence of the fire, determine an evacuation situation is present based on a risk assessment;

in response to determining the evacuation situation is present, map the emergency exit path out of the building structure based on an identified location of the fire and an identified location of a person in the building structure; and

operate a plurality of lighting devices in the building structure to indicate the emergency exit path out of the building structure.

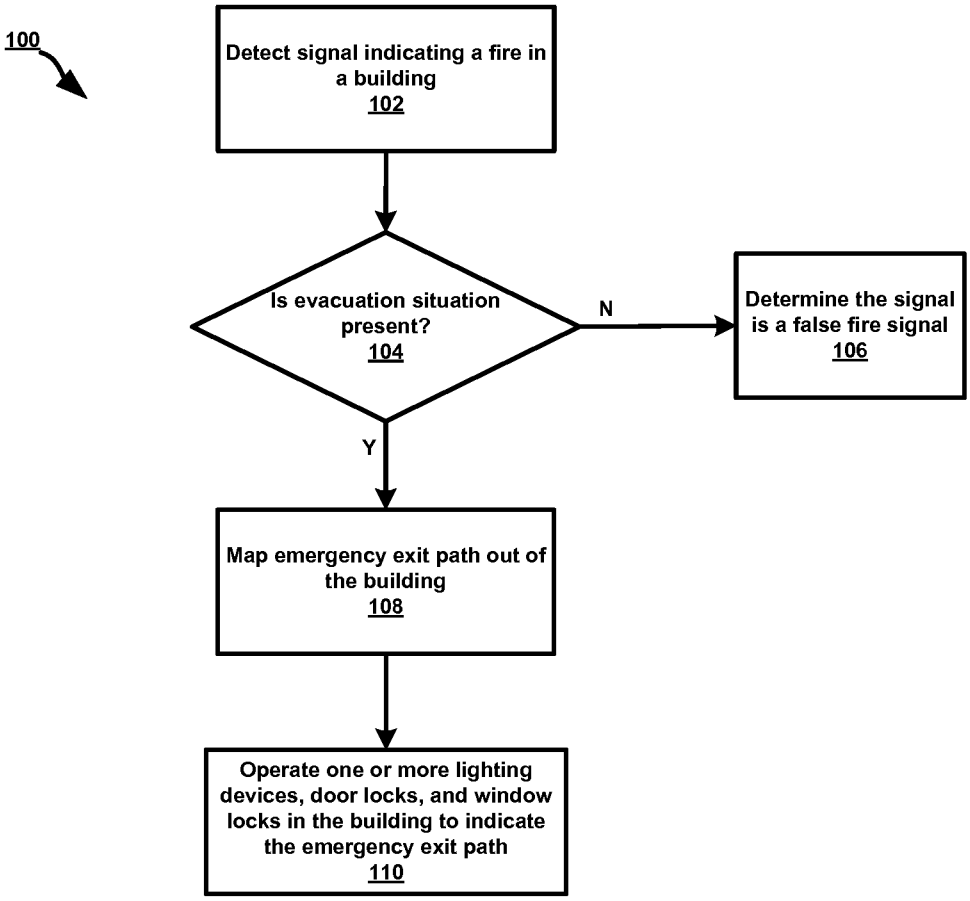
100
Detect signal indicating a fire in a building
102
Is evacuation situation present?
104
N
Determine the signal is a false fire signal
106
Y
Map emergency exit path out of the building
108
Operate one or more lighting devices, door locks, and window locks in the building to indicate the emergency exit path
110

FIG. 1

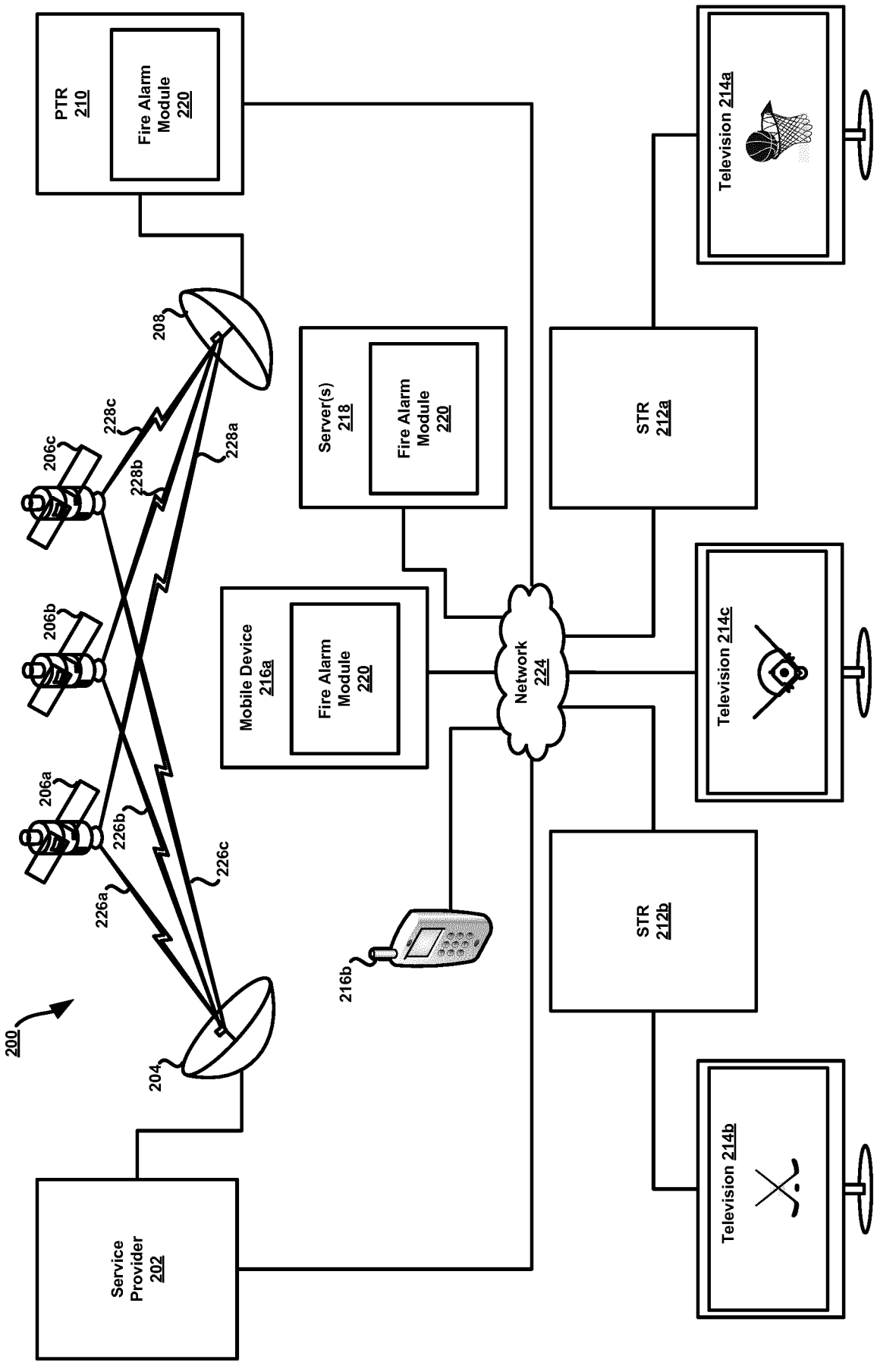
PTR 210
Fire Alarm Module 220
Service Provider 202
Server(s) 218
Fire Alarm Module 220
Mobile Device 216a
Fire Alarm Module 220
Network 224
STR 212a
STR 212b
Television 214a
Television 214b
Television 214c
200
204
206a
206b
206c
208
216b
226a
226b
226c
228a
228b
228c

FIG. 2

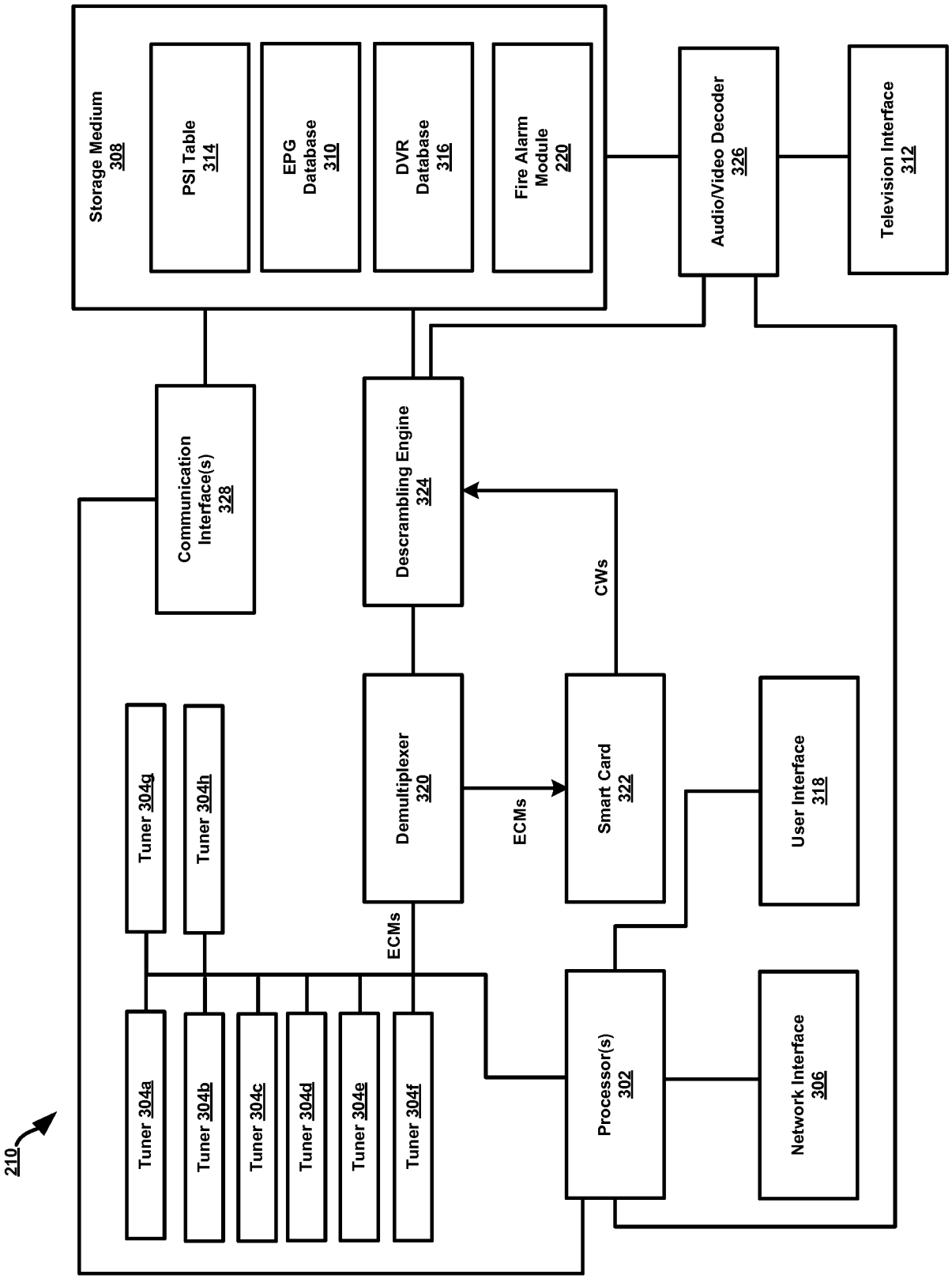
210
Storage Medium 308
PSI Table 314
EPG Database 310
DVR Database 316
Fire Alarm Module 220
Audio/Video Decoder 326
Television Interface 312
Communication Interface(s) 328
Descrambling Engine 324
CWs
Demultiplexer 320
ECMs
Smart Card 322
User Interface 318
Tuner 304g
Tuner 304h
ECMs
Tuner 304a
Tuner 304b
Tuner 304c
Tuner 304d
Tuner 304e
Tuner 304f
Processor(s) 302
Network Interface 306

FIG. 3

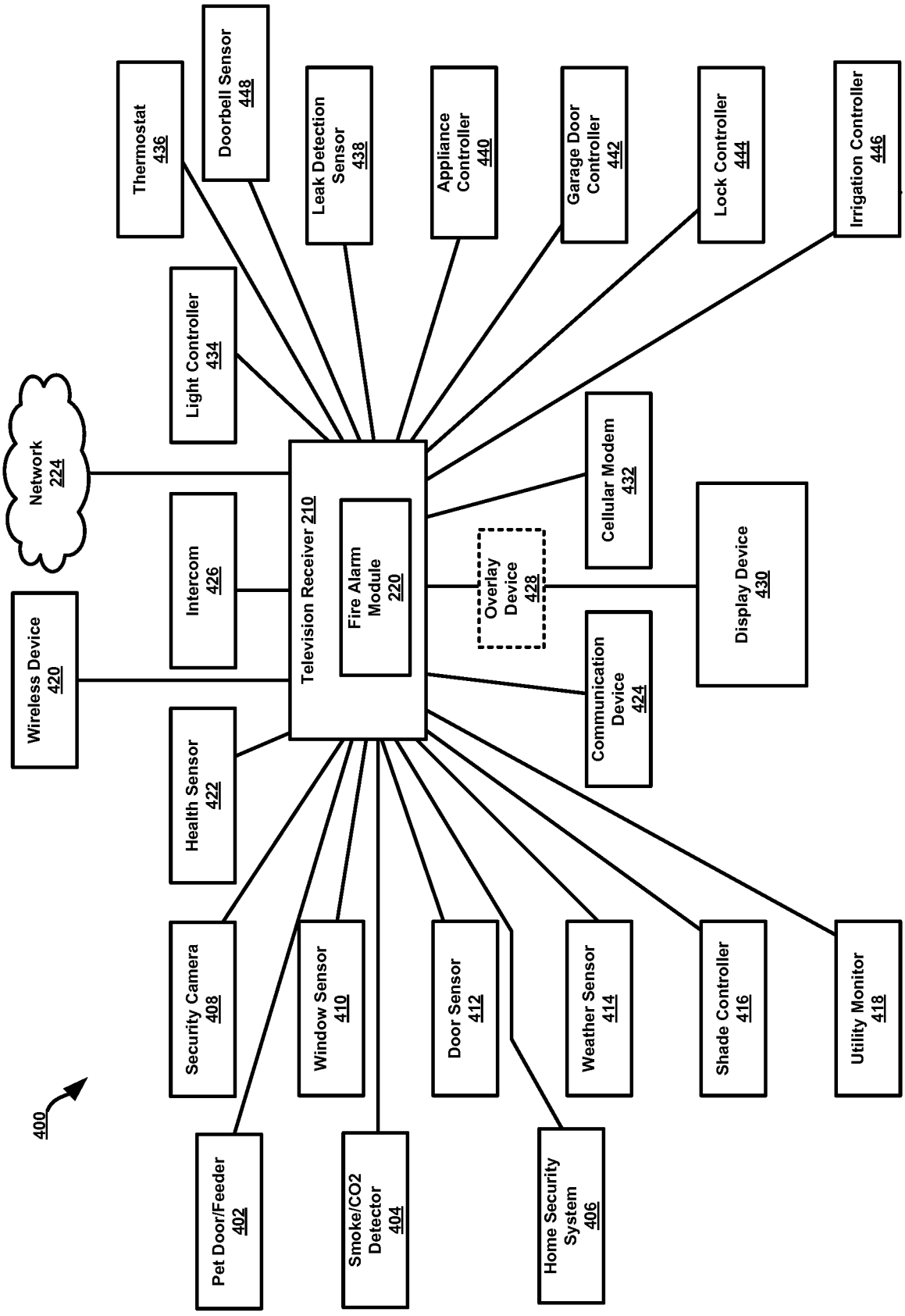
400
Pet Door/Feeder 402
Smoke/CO2 Detector 404
Home Security System 406
Security Camera 408
Window Sensor 410
Door Sensor 412
Weather Sensor 414
Shade Controller 416
Utility Monitor 418
Wireless Device 420
Health Sensor 422
Intercom 426
Network 224
Light Controller 434
Thermostat 436
Doorbell Sensor 448
Leak Detection Sensor 438
Appliance Controller 440
Garage Door Controller 442
Lock Controller 444
Irrigation Controller 446
Television Receiver 210
Fire Alarm Module 220
Overlay Device 428
Communication Device 424
Cellular Modem 432
Display Device 430

FIG. 4

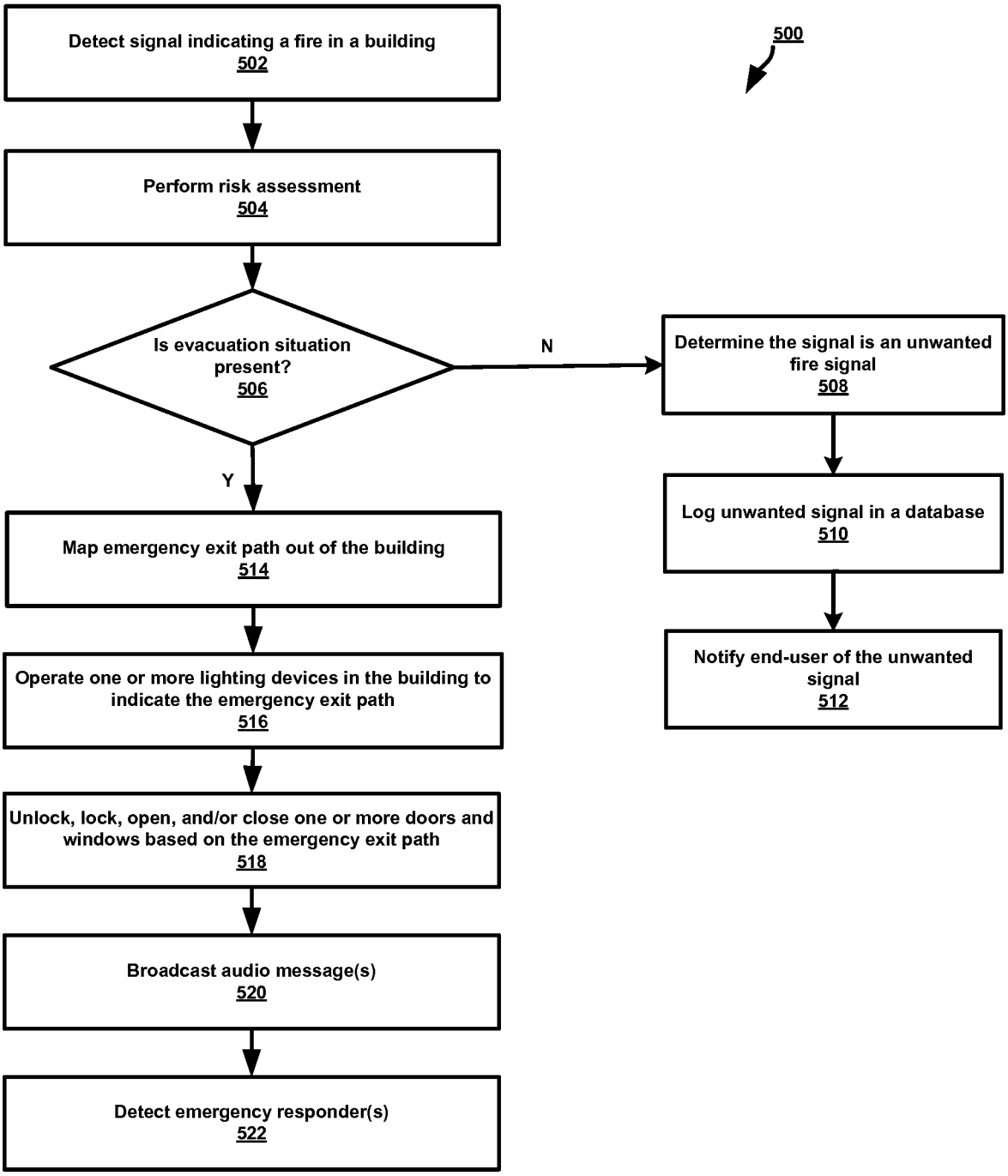
Detect signal indicating a fire in a building
502
500
Perform risk assessment
504
Is evacuation situation present?
506
N
Determine the signal is an unwanted fire signal
508
Y
Log unwanted signal in a database
510
Notify end-user of the unwanted signal
512
Map emergency exit path out of the building
514
Operate one or more lighting devices in the building to indicate the emergency exit path
516
Unlock, lock, open, and/or close one or more doors and windows based on the emergency exit path
518
Broadcast audio message(s)
520
Detect emergency responder(s)
522

FIG. 5

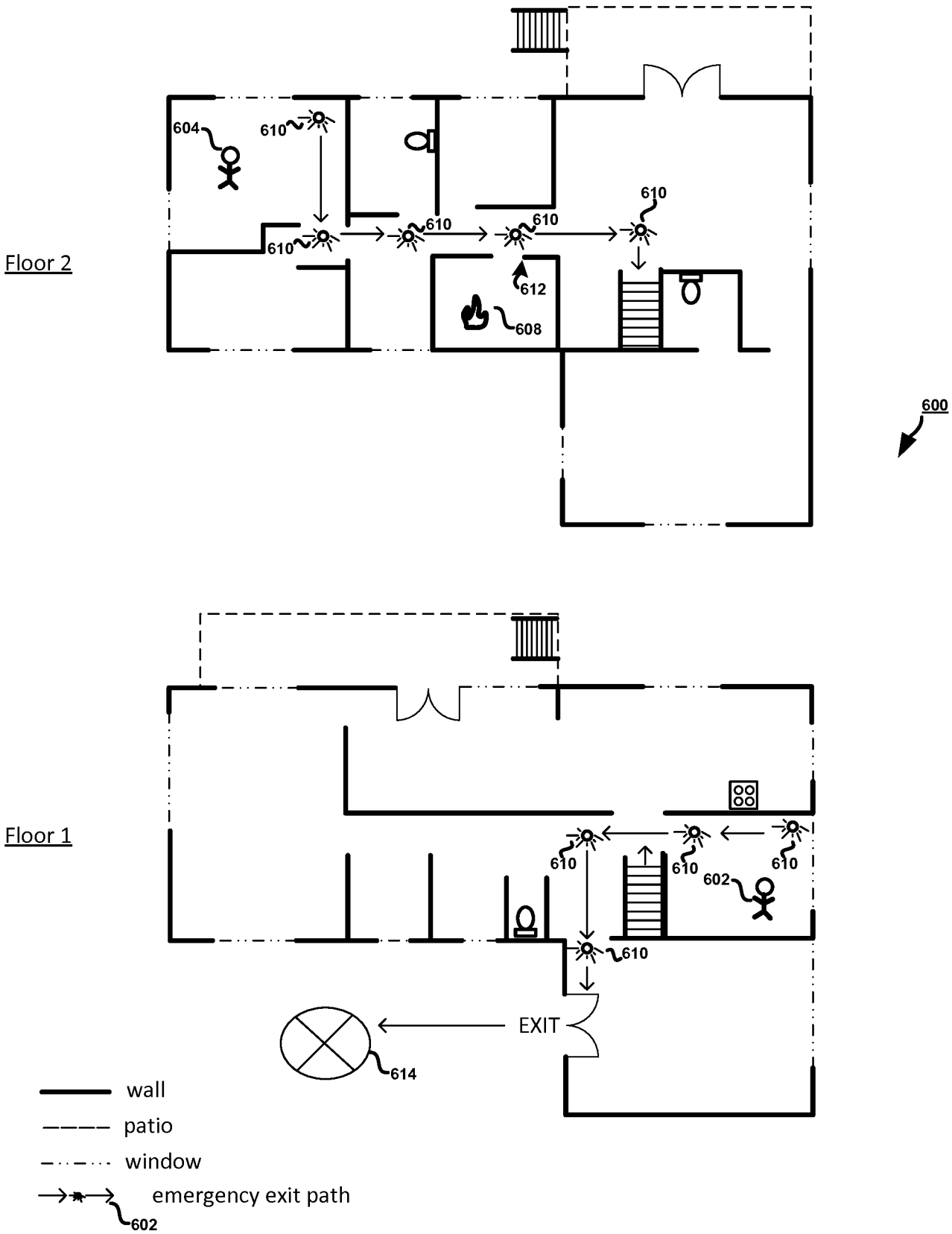
Floor 2
Floor 1
600
604
610
612
608
602
614
EXIT
wall
patio
window
emergency exit path

FIG. 6

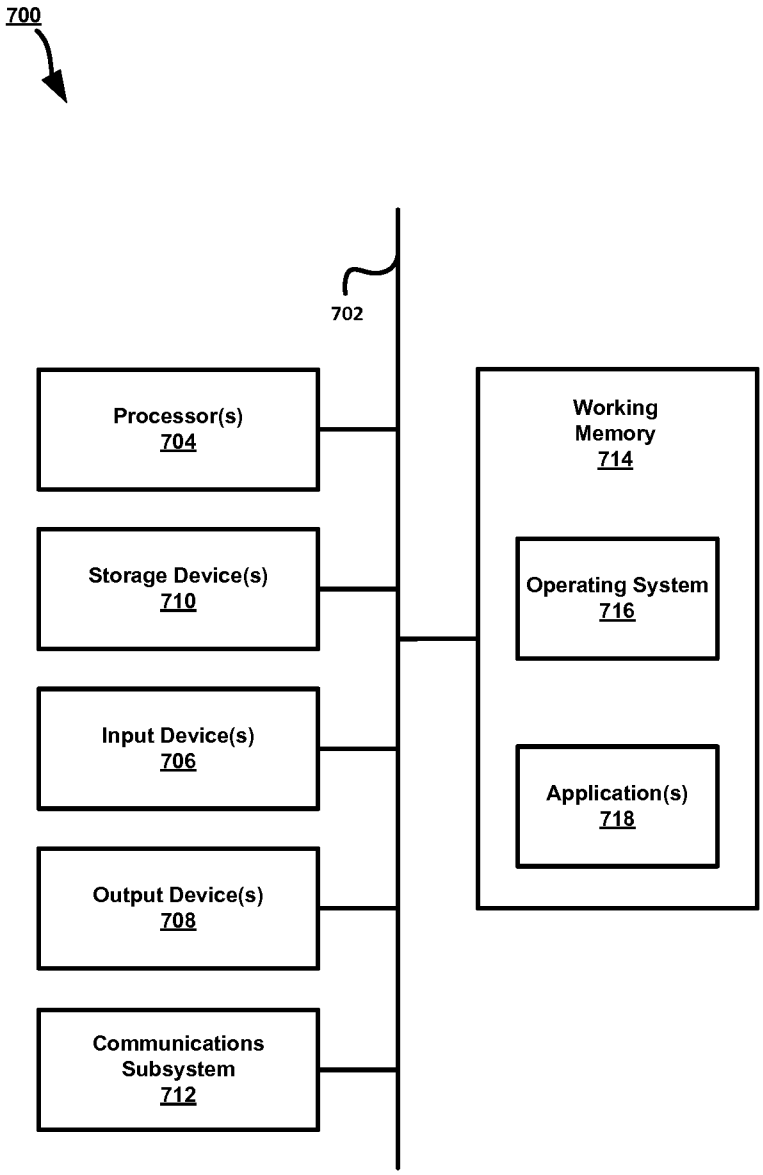
700
702
Processor(s)
704
Storage Device(s)
710
Input Device(s)
706
Output Device(s)
708
Communications
Subsystem
712
Working
Memory
714
Operating System
716
Application(s)
718

FIG. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2015/073936

A. CLASSIFICATION OF SUBJECT MATTER
INV. G08B7/06 F21S9/02 G08B27/00
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G08B F21S

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal , WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 736 027 A1 (ATS GROUP IP HOLDINGS LTD [VG]) 28 May 2014 (2014-05-28)	1,6-8, 12-17, 19,20
Y	paragraphs [0001], [0005], [0011], [0022] - [0045], [0047] - [0048], [0051] - [0052]; figures 1-4,6	2-5, 9-11, 18
Y	WO 93/20544 A1 (BARBEAU PAUL E [CA]) 14 October 1993 (1993-10-14) page 7, paragraph 1 - page 10, paragraph 3 page 11, paragraph 3 - page 14, paragraph 3; figure 4	2-5

-/- .

[X] Further documents are listed in the continuation of Box C. [X] See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
27 January 2016	04/02/2016

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Russo, Michela

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Form PCT/ISA/210 (second sheet) (April 2005)

C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2013/053063 A1 (MCSHEFFREY BRENDAN T [US]) 28 February 2013 (2013-02-28) paragraphs [0002], [0016] - [0030]; figures 1-3 paragraphs [0049] - [0050], [0052] - [0058], [0063], [0068] - [0079]; figures 10,12	9-11,18

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2015/073936

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2736027 A1	28-05-2014	EP 2736027 A1	28-05-2014
		WO 2014080040 A2	30-05-2014
WO 9320544 A1	14-10-1993	AU 3881993 A	08-11-1993
		WO 9320544 A1	14-10-1993
US 2013053063 A1	28-02-2013	NONE	