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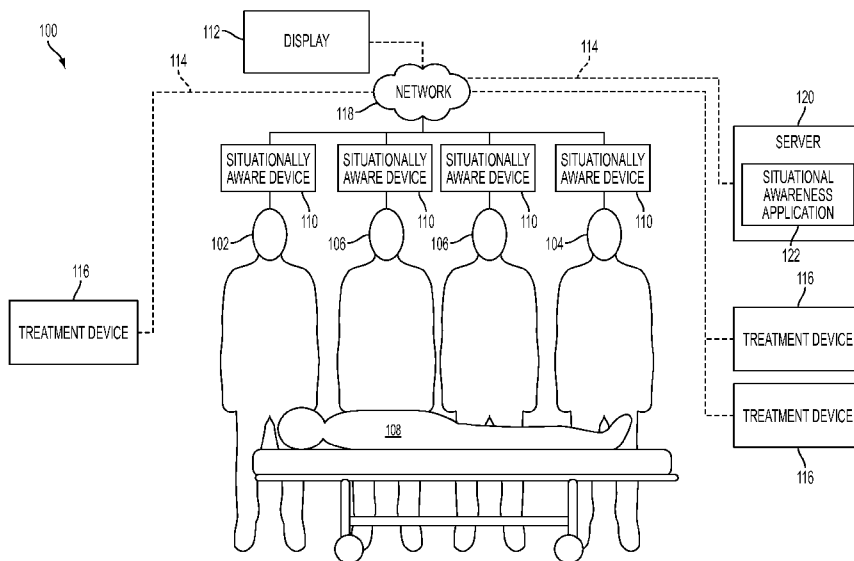


FIG. 1

(57) Abstract: A computer aided system, apparatus and method for addressing routine and emergency situations. In one example, an electronic command device is operable to receive a command, such that the command device provides at least one of a visual and audio representation of at least one instruction for addressing the situation in response to the command. A target electronic device receives an order from the command device and provides at least one of a visual and audio representation of the order. The electronic command device and the target device communicate with each other to monitor the status of carrying out the command.



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AUGMENTED SHARED SITUATIONAL AWARENESS SYSTEM

CROSS-REFERENCE TO RELATED APPLICATIONS

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This application claims benefit under 35 U.S.C. § 119(e) of U.S. Provisional Patent Application No. 61/769,615, entitled "DataLocus: Augmented Shared Situational Awareness System," filed February 26, 2013, which is expressly incorporated by reference herein in its entirety.

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FIELD OF THE DISCLOSURE

The present disclosure relates generally to systems and methods for coordinating tasks between team members, and specifically to systems and methods that allow a team to efficiently communicate during routine and emergency situations using electronic devices.

BACKGROUND

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Hospital trauma centers, intensive care units and emergency departments are examples of high stress environments requiring doctors to exercise both care and speed. When a patient enters a trauma center, doctors may be limited to only seconds to diagnose a patient and begin treatment. During initial treatment, these restraints can cause doctors to shout instructions to assistants without ensuring that they are executed, leading to situations where miscommunications result in incorrect treatments. Because trauma centers are reliant on human communication and must rely on verbal and/or a "pen and paper" approach to responding to such request, some opportunity for incorrect treatments remains. To mitigate the problem, in some cases healthcare systems have implemented "checklist" procedures to provide a limited amount of situational awareness. However, these procedures are incomplete, and may still result in negative consequences for the patient if a request is missed. It will be appreciated that such negative consequences can expand beyond scenarios in a trauma center to any patient care team within a health care setting or any high-consequence team activity that requires constant current information for effective performance.

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SUMMARY OF THE INVENTION

Exemplary systems, devices and methods provide enhanced situational awareness and communications related to team member tasks and statuses of the tasks, as well as patient care awareness through a real-time, wireless team/device linked display systems, such as head-mounted, fixed, and other forms of mobile display devices. Exemplary systems, devices and methods can address medical and other scenarios by (1) knowing what should be done, (2) keeping track of when requests were made and who should be performing tasks, (3) if a task is not acted upon in a timely manner, taking steps to ensure the task is addressed, and (4) effectively communicating guidelines, protocols, patient-level information, imagery and findings. Exemplary systems, devices and methods may include the ability to display to monitors, tablets, smartphones and the like. Embodiments can provide physiologic monitoring and alerts, medical device and database monitoring outputs and status updates, voice activated team assignments, critical therapeutic event timers, patient-level data and findings, and voice activated critical event guides. It will be appreciated that embodiments can expand beyond scenarios in a trauma center to any patient care team within a health care setting. Embodiments could further be extended to any team activity that needs constant up to the moment information for effective performance.

Certain exemplary embodiments include a computer-aided system for addressing routine and emergency situations to provide collaboration in an information dependent environment. The system includes an electronic command device that is operable to receive a command. The command provides at least one of a visual and audio representation of at least one instruction for addressing the situation in response to the command. A target electronic device receives an order from the command device and provides at least one of a visual and audio representation of the order. The electronic command device and the target device communicate with each other to monitor the status of carrying out the command. The command can pertain to a medical procedure.

The electronic command device and the target electronic device can communicate through a central computer. The electronic command device can include a display that displays multiple instructions. The display can show the completion status of the instructions. The display can also display the completion status of a task associated with the order sent to the target electronic device. The display of the electronic command device can show a virtual model of an organ of a patient in a trauma center. The display can also show a visual overlay of a Magnetic Resonance Imaging (MRI) image over the body of a trauma patient.

The exemplary system can include a timer that is set to correspond to a predetermined time for completing a task associated with the order. A timer can be incorporated into the command device. A timer can be incorporated into the target device. A timer can be incorporated into a central computer separate from the electronic command device and the target electronic device.

The exemplary system can include multiple target devices that respectively receive commands from the electronic command device. The electronic command device's display can show completion statuses of tasks related to the commands. If a central computer is used, it can provide an instruction to the electronic command device and facilitate communications between the command device and the target electronic devices. The central computer can track completion status of a task related to the command and inform the electronic command device when a predetermined time related to the task has lapsed. The central computer can inform the electronic command device when a task related to the command is complete. In accordance with an exemplary system, at least one of the electronic command device and the target electronic device can receive data from a medical appliance.

Certain embodiments provide an electronic command device for addressing a situation to provide collaboration in an information dependent environment. The device includes a receiver that is operable to receive a command and a display. The display can provide a visual representation of at least one instruction for addressing the emergency situation in response to the command. The device can also include a transmitter that sends an order to a target device. The transmitter can send communications to the target device through a central computer. The receiver can receive data from a medical appliance, such as an IV dosage meter, a ventilator, and a heart rate monitor, or the like.

The display of the electronic command device can provide an indication of the target device's status with respect to carrying out the command. The display can display multiple instructions and show a status of completion of the instructions. The display can also display the status of completion of a task associated with the order sent to the target device.

Certain embodiments include a computer aided interactive method for addressing a situation to provide collaboration in an information dependent environment. The method includes receiving a verbal command from a team member by an electronic device and displaying on a display at least one instruction for addressing the emergency situation in response to the command. The method can also include sending an order related to the emergency situation to a target electronic device and providing at least one of a visual and

audio representation of the order by the target device. Coordination is provided between the electronic device and the target device with respect to carrying out the order.

In accordance with the exemplary method, the target device can inform the electronic device when the order has been acted upon. A predetermined time for carrying out a task associated with the order can be monitored and if the predetermined time has lapsed an alert is provided to at least one of the target device and the electronic device. Also, if the task is completed before the predetermined time has lapsed, an alert can be provided to at least one of the target device and the electronic device. The method may also include receiving an additional command by the electronic device, wherein the command is given to clear one of the instructions. The instructions may be automatically cleared by completion of a corresponding task.

Multiple target devices can be provided that selectively receive orders, such that the orders are tailored to tasks directed to users of the target devices. The exemplary method may also include receiving data by the electronic device from a medical instrument. Also, data may be received by the target device from medical instruments. The data received from the medical instruments can be displayed on the electronic device and the target devices. The method may also include providing a central computer, wherein the central computer coordinates communications between the electronic device and the target device. The coordination may include tracking tasks and providing task updates to at least one of the target device and the electronic device.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 provides an exemplary situational awareness system in accordance with an embodiment of the disclosure.

FIG. 2 provides an exemplary illustration of connected devices in accordance with an embodiment of the disclosure.

FIG. 3 provides an exemplary illustration of users interacting with the system in accordance with an embodiment of the disclosure.

FIG. 4 provides an exemplary embodiment of an augmented reality system in accordance with the disclosure.

FIG. 5 provides an exemplary embodiment of a virtual reality system in accordance with the disclosure.

FIG. 6 provides an exemplary embodiment of an augmented virtualization system in accordance with the disclosure.

FIG. 7 provides an exemplary process for interaction between users in accordance with the disclosure.

5 FIG. 8 provides an exemplary method for processing an incoming patient in accordance with the disclosure.

FIG. 9 provides an exemplary method for providing situational awareness in accordance with the disclosure.

DETAILED DESCRIPTION

10 Embodiments disclosed herein provide automated situational awareness systems, devices and methods. Urgent patient care teams operate in a fast-paced and high-risk environment. These teams may be faced with high information and task loads in the course of providing care, where each member of the team must communicate with the others to ensure that tasks are completed correctly and promptly. In these situations, errors and omissions may
15 lead to serious consequences for a patient, and checks and balances are essential to ensure a high level of care.

Situational awareness is acknowledged as an essential shared-skill for accurate and complete decision making, while functioning in complex, dynamic and time-critical environments such as acute patient care. Situational awareness generally refers to an
20 individual's perception of the surrounding environment in a dynamic field during critical decision-making periods. Situational awareness is an acknowledged critical skill for individuals and teams involved in a wide variety of industries, including, for example, critical modes of transportation (e.g., aviation) and infrastructure (e.g., power plants). Situational awareness is also acknowledged as critical for the delivery of healthcare across a wide
25 spectrum of system delivery methods (hospital, prehospital, military medicine, etc.).

Analysis of data related to patient care errors and near misses frequently cites a lack of situational awareness, failure of communications, and failure to generally share the same "mental modeling" as the most common sources of patient care errors. Embodiments of the disclosure seek to decrease these failures by providing coordinated facilitating technologies
30 to improve team and team-member situational awareness, communications and access to critical patient care data.

Fig. 1 depicts an illustrative system for providing augmented situational awareness in accordance with an exemplary embodiment of the disclosure. Exemplary environment 100

represents an illustrative environment for providing situational awareness in accordance with an embodiment of the disclosure. In this illustrative embodiment, the environment comprises a hospital trauma or urgent care center. It is appreciated that other environments utilizing situational awareness are within the scope of the disclosure, including but not limited to
5 military, aviation, nautical navigation, power plants, emergency services such as policing and firefighting, auto-racing pits, demolition teams, or other disciplines and events where high-consequence, team-based activities occur.

Referring to Fig. 1, exemplary trauma environment 100 may include a doctor 102, a nurse 104, a technician 106, a patient 108, situationally aware devices 110, display 112, data
10 links 114, treatment devices 116, network 118, server 120, and application 122. The treatment devices 116 may be communicatively coupled to situationally aware devices 110. It will be appreciated that the links between the various components of Fig. 1 may be wired or wireless.

The doctor 102 may be a physician working in an urgent care facility. The doctor 102
15 may generally be trained to provide care for a trauma victim. The doctor 102 may be experienced in the use of computing technology in conjunction with providing urgent care (e.g., the doctor may be trained to consult computerized monitors displaying critical patient care information, such as heart rate or blood pressure), or the doctor 102 may have no prior experience with computing devices in an urgent care environment. In an embodiment, the
20 doctor 102 may be the only doctor on the urgent care team. In another embodiment, when, for example, the patient 108 suffers particularly severe or complex trauma, multiple doctors may be identified and selected as members of the trauma team for assisting in the care of the patient. In yet another embodiment, the doctor 102 may exercise a “primary” role on the trauma team. In this role, the doctor 102 may provide commands to other members of the
25 team, i.e., nurse 104 and/or technician 106.

The nurse 104 may be a nurse working in conjunction with doctor 102 in an urgent care facility. The nurse 104 may be trained to provide supporting services to a doctor for care of a trauma victim. The nurse 104 may generally execute commands issued by doctor 102 while treating a patient, and may also execute a standard set of treatment methods common to
30 all patients entering a trauma center (e.g., taking blood pressure or starting an IV).

The technician 106 may be a specialist suited to control operation of any or all of treatment devices 116. The technician may be trained to operate any of the treatment devices 116 quickly and efficiently. The technician 106 may implement commands issued by doctor

102 via treatment devices 116 for patient care, and may also execute a standard set of treatment methods common to all patients entering a trauma center (e.g., preparing a machine to monitor blood pressure).

5 The doctor 102, the nurse 104, and the technician 106 may collectively comprise an urgent care team. Although in this embodiment the team comprises three members, an urgent care team can comprise any number or combination of doctors, nurses, and technicians working together. For example, in another embodiment, an urgent care team may comprise three doctors, no nurses, and three technicians. In yet another embodiment, an urgent care team may comprise two doctors, two nurses, and one technician.

10 The patient 108 may be an individual who has suffered trauma and requires urgent and immediate care. The patient 108 may suffer from varying degrees of trauma, and may be conscious or unconscious. The patient 108 may thus be able to communicate with the trauma team in some scenarios but unable to in others. The trauma team may be unable to identify an unconscious patient (for example, if the patient is not carrying identification), or the team
15 may be able to discern the identity of the patient from other sources (for example, witnesses to the trauma). Information about the patient's identity (or the lack of such information) may be used by doctor 102 to provide input to the treatment devices 116 to develop a treatment plan.

20 In one embodiment, doctors may monitor multiple patients simultaneously for important events requiring urgent attention. In this embodiment, doctors may not have to independently keep track of critical tasks for each patient, as the system would provide the physician with alerts at each moment when action is required. The doctor 102 may further be provided with up to date status monitoring and continuously updated information on critical events for each patient. Across each of the situationally aware devices 110, system-wide
25 emergency alerting and status updating is provided.

30 The situationally aware devices 110 may be any devices capable of providing situational awareness to a user (e.g., the doctor 102, the nurse 104, or the technician 106). Situationally aware devices 110 can be considered to be electronic command devices capable of transmitting a command or order to another device, receiving a command from a user or another device, or both transmitting a command or order to and receiving a command or order from a device. Similarly, a situationally aware device 110 that receives a command or order from other device can be considered a target electronic device. Situationally aware devices 110 may further comprise using a known display technology with network

connectivity. In one exemplary embodiment, situationally aware device 110 may comprise GOOGLE GLASS®.

Situationally aware devices 110 may further accept input from a user. In one embodiment, the input may be recognized by voice recognition. In other embodiments, the input may be, for example, the user's eye movements, simple keyboard typing, a mouse, or a touch screen. Situationally aware devices 110 may be linked through network 118. In one embodiment, situationally aware devices may be linked through network 118 to central computer or server 120. Situationally aware devices 110 may make use of an application programming interface coordinating system with connectivity to a wide array of medical devices and patient monitors, e.g., treatment devices 116. Situationally aware devices 110 may connect to server 120 that coordinates inputs and directs communications amongst the situationally aware devices 110 and between situationally aware devices 110 and treatment devices 116. The server 120 may be any computer that is capable of providing communication between multiple electronic devices. The server 120 may also contain software or applications, e.g., situational awareness application 122, that facilitate the communication. In another embodiment, the situationally aware devices 110 and treatment devices 116 may communicate directly with each other without the use of a server 120, using Bluetooth technologies and the like, along with applications stored in memories of one or more of the situationally aware devices 110 and / or treatment devices 116.

In an exemplary embodiment, a situationally aware device 110 may comprise a head-mounted display system. In one implementation, this head-mounted display system may be GOOGLE GLASS®. The doctor 102 may wear the head-mounted display system on his head (see Fig. 2). When the patient 108 enters the trauma center, the system 100 may recognize a particular injury suffered by detecting input from the doctor 102. In one embodiment, this input may comprise recognizing speech from the doctor 102. Using the data links 114, the system may develop a list of tasks that may be required to be performed on the patient. In this example, the display on the head-mounted situationally aware device 110 may present to the doctor 102 an acknowledgment of the patient's injury. The situationally aware device 110 may additionally start a timer for other tasks to be completed. It will be appreciated that such timer(s) can be incorporated into the situationally aware devices 110 and/or server 120. TFor example, other tasks may include the insertion of an intravenous drip, the measurement of blood pressure, or the administration of particular medicine. These tasks may be created for the doctor 102 as well as the nurse 104 or technician 106. If a task is not performed within the

appropriate amount of time, the task may move to the foreground of the user's head-mounted display and create an alert for the task. A predetermined time for carrying out a task associated with a command or order can be monitored using the timer and if a predetermined time has lapsed an alert is provided to at least one of the situationally aware devices 110 and /
5 or server 120. Likewise, if a task is completed before the predetermined time has lapsed, an alert can be provided to at least one of the situationally aware devices 110 and / or server 120.

As an alternative to the head-mounted display method of information sharing and voice processing, one or more external displays, e.g., display 112, may display physiologic monitoring and alerts, medical device and database monitoring outputs and status updates,
10 team assignments, critical therapeutic event timers, and critical event guides. In this embodiment, an overhead, voice-recording system may record the verbalized data, for integration into the situational awareness monitoring and reporting system. The display 112 may be a device capable of providing critical information to one or more members of the trauma team during care for patient 108. In one embodiment, the display 112 may be a
15 television, a monitor, a tablet, or a mobile phone. The display 112 may be large enough to be readable by the entire trauma team at once, or may be small enough to allow only one person to use. The display 112 may further integrate interactive inputs such as touch screen or mouse technology, or it may provide only output.

In another aspect, one or more of the situationally aware devices 110 may be used by
20 a team member remote to the location of the trauma care center. For example, a doctor 102 located in a different state may use the situationally aware device 110 to receive a live input stream of video information and patient care information for diagnosis. In this embodiment, the doctor 102 may also generate commands to be executed by the supporting team members (e.g., the nurse 104 and the technician 106) from the remote location using situationally
25 aware device 110.

The data links 114 may be realized over any technology allowing intercommunication between devices. The data links 114 may be wired or wireless. In one embodiment, the data links 114 may be realized over 802.11 WiFi technology or other wireless communication protocols. The data links 114 may lead to a central network 118 as shown, or they may
30 directly connect two or more situationally aware devices 110 and treatment devices 116 to form an ad-hoc network.

The treatment devices 116 may be any devices used in a trauma center to assist in urgent patient care. For example, the treatment devices 116 may comprise an IV dosage

meter, a ventilator, anesthesia machine, capnometers, mechanical medication administration devices, fetal monitors, or a heart rate monitor, and the like. All of these devices have the ability to output a data stream conveying the monitoring information, device settings, alarms, and status updates. Currently a healthcare provider must individually access each of these
5 devices (sometimes across a wide-area within a patient room or through remote or distant systems) to acquire this data. In accordance with aspects of the invention, this information can be centrally communicated and incorporated with patient-level data (e.g., electronic medical records) and diagnostic findings (patient demographics, history, examination data, laboratory studies, x-rays, ultrasonography, etc.) as well as individual healthcare provider
10 actions in a shared fashion to a team.

The network 118 may be a local area network (LAN), a wide area network (WAN), the Internet, cellular network, satellite network, or other network that permits communication between the treatment devices 116, the display 112, the situationally aware devices 110, and other devices communicatively coupled to the network 118. The network 118 may further
15 include one, or any number, of the exemplary types of networks mentioned above operating as a stand-alone network or in cooperation with each other. The network 118 may utilize one or more protocols of one or more clients or servers to which they are communicatively coupled. The network 118 may translate to or from other protocols to one or more protocols of network devices. Although the network 118 is depicted as one network, it should be
20 appreciated that in some embodiments, the network 118 may comprise a plurality of interconnected networks. Other various network types or configurations may also be provided.

The server 120 may be any computer configured to handle a plurality of incoming connections from other devices. The server 120 may connect to each situationally aware
25 device 110 and each treatment device 116 through network 118. The server may contain situational awareness application 122. The server 120 may be local to the situational awareness environment (e.g., located within the hospital), or the server 120 may exist at a remote location.

Situational awareness application 122 may comprise an application capable of
30 receiving input from a user, e.g., doctor 102, and generating a list of outputs or instructions based on the received command. For example, situational awareness application 122 may receive input from situationally aware device 110 via network 118 indicating that the doctor 102 has spoken the command "start IV." Situational awareness application 122 may have

knowledge of the general protocol for providing an IV to a patient, and may generate a list of alarms with appropriate timers to provide as output to the situational awareness devices of the doctor 102, the nurse 104, and the technician 106. Situational awareness application 122 may keep track of the completion status of alarms to provide updates to other team members.

5 Situational awareness application 122 may also send electronic control signals to treatment devices 116 in response to the input. An updated list of general trauma room commands may be kept at the situational awareness application 122 in conjunction with a corresponding list of appropriate outputs or instructions to provide in response to the commands. Situational awareness application 122 may also be programmed to adaptively provide a response to a

10 previously unknown input in conjunction with an adaptive processing protocol.

In one exemplary embodiment, situational awareness application 122 may reside within server 120 and connect to situationally aware devices 110 via network 118. In another embodiment, situational awareness application 122 may reside within the situationally aware device 110 of a lead trauma team member (e.g., the doctor 102), and be capable of

15 interpreting input and providing output directly to other situational awareness devices without a central processing application. In yet another embodiment, all situational awareness devices may contain situational awareness application 122 that permits them to interpret input and provide output to other situational awareness devices. Other embodiments are within the scope of the disclosure.

20 Fig. 2 depicts an exemplary illustration of interconnected devices 200 in accordance with one embodiment of the disclosure. Referring to Fig. 2, and with further reference to Fig. 1, exemplary interconnected devices 200 may include situationally aware device 110, data link 114, and treatment devices 210, 212, and 214. Situationally aware device 110 may further comprise a display 202, processor 218, and microphone 220. The display 202 may

25 further display information relating to situational awareness, for example, an alarm 204, heart rate graph 206, blood pressure 208, and treatment procedure 216. Information other than the described embodiments may be displayed by situationally aware device 202, as described more fully in Figs. 4-6 below.

The situationally aware device 110 may be any device capable of providing

30 situational awareness to a user, as described in Fig. 1. In this embodiment, situationally aware device 110 may be configured to be worn on the user's head and provide transparent display 202 over one or both of the user's eyes. Situationally aware device 110 may receive input from the user and transmit the input to other situationally aware device over a network, e.g.,

network 118. The methods that situationally aware device 110 may use to receive input are described in Fig. 3. It will be appreciated that the situationally aware devices 110 and server 120 may include suitable transmitters and receivers for transmitting and receiving data between each other. Situationally aware device 110 may further receive information from the network and cause display 202 to display received information. In one embodiment, the received information may include alarm 204, heart rate graph 206, blood pressure 208, and treatment procedure 216. The types of output that situationally aware device 110 may create are also described in Fig. 3.

As above, the data links 114 may be realized over any technology allowing intercommunication between devices. The data links 114 may be wired or wireless. In one embodiment, the data links 114 may be realized over 802.11 WiFi technology or other wireless communication protocols. The data links 114 may lead to a central network 118 as shown, or they may directly connect two or more situationally aware devices 110 and treatment devices 116 to form an ad-hoc network.

The treatment devices 116 may be any devices used in a trauma center to assist in urgent patient care. For example, the treatment devices 116 may comprise an IV dosage meter, a ventilator, or a heart rate monitor, and the like. The treatment devices 116 may be linked to situationally aware device 110 via data link 114. Treatment devices 116 may be controlled via input received from situationally aware device 110 received over data link 114. For example, in response to a “start IV” command uttered by doctor 102, situationally aware device 110 may transmit a signal to a team member or situationally aware device 116, to commence an intravenous drip. Treatment devices 116 may further provide output to situationally aware device 110. For example, a treatment device may issue an acknowledgement to doctor 102 that an IV medication administration has started, causing a task alert for the doctor to be eliminated. In another example, a heart rate monitor may provide up to date heart rate data to situationally aware device 110, causing display 202 to show heart rate graph 206. Situationally aware device 110 may communicate with a plurality of other situationally aware devices simultaneously, as well as a plurality of treatment devices 116. Treatment devices 116 may also each communicate with a plurality of situational aware devices.

The processor 218 may be any processor capable of controlling situationally aware device 110 under the space and power constraints of the device. In one embodiment, processor 218 may provide situational awareness application 122. In another embodiment,

processor 218 may provide minimal functionality, such as that necessary to control the network interface, display driver, and input capture for the device.

Input capture components of situationally aware device 110 may comprise any components adapted to capture input from a user. In one exemplary embodiment, 5 situationally aware device 110 is adapted to receive voice input from a user. In this embodiment, situationally aware device 110 contains microphone 220 embedded within the device.

Figs. 3A-3D illustrate exemplary input interactions 300 and output interactions 302 of a user or treatment device with situational awareness devices in accordance with an 10 embodiment of the disclosure. Referring to Figs. 3A-3D, doctor 102, nurse 104, technician 106, and treatment device 116 may each interact with a situationally aware device 110. In Fig. 3A, input 304 may be provided from a user to the situational awareness device. In Figs. 3B-3D, outputs 306, 308, and 310 may be provided by situationally aware device 110 to users 104 and 106, and treatment device 116.

15 Exemplary input interactions are displayed in Fig. 3A. In Fig. 3A, doctor 102 may provide input 304 to situationally aware device 110. Input 304 may comprise any method of interacting with situationally aware device 110 to provide usable information. In one embodiment, input 304 may be an audible command spoken by doctor 102. In this embodiment, the doctor 102 may, for example, speak the command “take blood pressure.” 20 Situationally aware device 110 may capture this command via an embedded or attached microphone and process the command. In this embodiment, the processed command may be transformed into a task to be completed by technician 106, as described more fully below.

In another embodiment, situationally aware device 110 may capture the eye 25 movement of the doctor 102 as input. For example, in this embodiment, the situationally aware device 110 may display a task alarm to doctor 102 via display 202. Doctor 102 may then acknowledge the alarm by looking directly at the position of the alarm on display 102. Situationally aware device 110 may track this eye movement of doctor 102 and interpret this as an acknowledgement of the task alarm, causing the alarm to be silenced.

In yet another embodiment, situationally aware device 110 may be controlled with an 30 interactive touch screen interface. For example, in this embodiment, the situationally aware device 110 may comprise a wall mounted or mobile (handheld) display. The doctor 102 may interact with the situationally aware device 110 by directly touching elements presented on the screen, allowing the doctor to provide various forms of input to the system. In this

embodiment, the doctor 102 may also control situationally aware device 110 using physical buttons attached to situationally aware device 110 that are not part of the touch screen interface.

In yet another embodiment, the doctor 102 may control situationally aware device 110 by typing a command on a keyboard. In this embodiment, situationally aware device 110 may further comprise a keyboard, or may be capable of accepting input over a keyboard via data link 114.

Referring now to Figs. 3B-3D, exemplary output interactions are displayed. In Figs. 3B-3D, situationally aware device 110 may provide outputs 306, 308, or 310 to nurse 104, technician 106, or treatment device 116. Outputs 306, 308, and 310 may comprise any method for situationally aware device 110 to provide usable information to a user. In one embodiment, referring to Fig. 3B, output 306 may be an alarm prompt presented to technician 106. In this embodiment, the doctor 102 may, for example, speak the command “take blood pressure.” The processed command may be transformed into an alarm that provides a visible overlay to technician 106 within the technician’s field of vision. This visual overlay of the task (e.g., task 204) may be presented with a countdown timer. If the task is not completed within the allotted time, the visual overlay in display 102 may become larger or begin to blink and may remain in that state until technician 106 completes the appropriate task.

In another embodiment, referring to Fig. 3C, output 308 may be a visual display of patient information. In this embodiment, technician 106 may connect one treatment device 116, for example, a heart rate monitor, to the network 118. Situationally aware device 110 may then provide nurse 104 with a visual overlay on display 202 of the blood pressure information 208 of the patient 108. This visual overlay may dynamically change to match the output of the treatment device 116 and may remain visible until nurse 104 causes the display to be removed via an input to the system, as described more fully above.

In another embodiment, referring again to Fig. 3C output 308 may be an audible communication from another member of the trauma team. For example, doctor 102 may communicate with nurse 104 audibly by speaking “talk to nurse” into an embedded microphone within situationally aware device 110. A communication channel may then be opened between the situationally aware devices 110 used by nurse 104 and doctor 102, and they may communicate audibly through these devices. This form of communication advantageously allows each individual to hear the other more clearly in a crowded and

chaotic trauma environment while also permitting one or both individuals to leave the room temporarily and maintain communication with each other.

In yet another embodiment, referring to Fig. 3D, output 310 may be a direct control signal provided to a treatment device 116 that causes the device to execute a treatment. For example, doctor 102 may speak the command “start IV.” This may cause a task alarm to be displayed to technician 106. The technician 106 may then speak the command “start IV,” and audibly provide the appropriate IV settings. Situationally aware device 110 may then interpret the appropriate settings and cause IV treatment device 116 to begin an IV drip with the settings spoken by technician 106. It is appreciated that in this and the foregoing examples, the doctor 102, the nurse 104, and the technician 106 may each control any input and receive any output based on settings defined by their roles as provided to the situationally aware device 110. For example, doctor 102 may be provided with higher authority to execute or override commands of other roles, while some commands may not be overridden by any team member except the originator of the command.

Further reference will now be made to particular embodiments providing different types of visual overlays to a user in a high-information team environment. In each of the foregoing embodiments, situationally aware device 110 may provide the user with a particular visual overlay in the user’s field of vision. These embodiments may be realized via a head mounted display as discussed above, via a portable mobile display held by the user, or by a wall-mounted immovable display. Although any of these embodiments are contemplated, particular reference will be made to use of a head mounted display in the discussion of Figs. 4-6. Although reference is made below to overlays in the field of vision of a particular user, it is appreciated that that multiple users may share the view of the visual overlays to assist in efficient collaborative processing of information in a time-critical environment.

Fig. 4 depicts use of an augmented reality environment in accordance with an embodiment of the disclosure. In this embodiment, situationally aware device 110 may merge existing patient knowledge, for example, Magnetic Resonance Imaging (MRI) scans, x-rays, heart rate scans, blood pressure, prior diagnosis information, current diagnosis information, or other information, with details of the present environment using visual overlays, thereby providing the user with an augmented reality view of the situation.

Referring to Fig. 4, and with further reference to Figs. 1-2, exemplary augmented reality environment 400 may include patient 108 and situationally aware device 110.

Situationally aware device may further comprise a display 202 capable of displaying a virtual depiction of real data within the real environment 100 to create a form of mixed reality for the wearer. For example, display 202 may show heart rate graph 206, blood pressure information 208, and augmented reality image 402. Information beyond these illustrative
5 examples may also be displayed by situationally aware device 110.

In this environment, for example, a patient 108 may require an MRI to determine the severity of a particular injury. To assist in treatment, it may be desirable to superimpose the MRI image over the patient 108 in the appropriate location for a more complete picture of a potential injury. In this embodiment, situationally aware device 110 may locate the existing
10 MRI image, e.g., augmented reality image 402, and associate it with the appropriate location on the patient. Situationally aware device 110 may then provide the MRI within display 202 so that the image is rotated and scaled to display as an overlay on top of the patient's body. As the doctor 102 moves his head, changing the viewing angle and the distance from the patient, situationally aware device 110 may reposition and rescale augmented reality image
15 402 within display 202 to cause the image to remain in the appropriate location in the field of view of the doctor 102 to maintain the overlay of augmented reality image 402 on top of the patient. Alternatively, the viewing angle may be changed by using other directional control interfaces such as a touchpad, a mouse, or any other interactive control device.

Multiple augmented reality images 402 may be superimposed on the patient 108
20 simultaneously, or multiple images may be displayed sequentially at the direction of the doctor 102. Other situational awareness information, such as heart rate graph 206 and blood pressure information 208, may be displayed within environment 400. In one embodiment, heart rate graph 206 and blood pressure information 208 may be displayed on top of or directly adjacent to a patient's chest cavity via display 202. In another embodiment, heart rate
25 graph 206 and blood pressure information 208 may be displayed in a fixed position in the user's field of view within display 202 that is not related to the location of the patient 108 in the room.

In yet another embodiment, situationally aware device 110 may merge diagnosis information about a patient with details of the present environment by providing extra
30 information. For example, in a trauma environment, doctor 102 may wish to see all of the known injuries suffered by a trauma patient. In this environment, situationally aware device 110 may access a list of known injuries suffered by the patient. In one implementation, this list may be generated by nurses or technicians entering information provided to them by first

responders. In another embodiment, this list may be dynamically generated by the situationally aware device 110 via voice capture from audio keywords uttered by doctor 102. Based on the list of known injuries, the situationally aware device 110 may associate each injury with an appropriate location on the patient 108. Situationally aware device 110 may then provide a notation within display 202 over the top of the patient 108 in the field of vision of the doctor 102 showing the location of the injury and providing whatever details are available surrounding the injury. This view may, for example, allow doctor 102 to see a notation over a patient's face describing a bone fracture, while also providing a notation over the patient's left leg describing a laceration. Such a view may also be shared with other members of the team, e.g., nurse 104 and technician 106, to permit each member to simultaneously view a complete view of the injuries suffered by a patient. This sharing allows the team to collectively view a comprehensive assessment of patient health, allowing the doctor 102, nurse 104, and technician 106 to provide a higher level of care.

Fig. 5 depicts use of a virtual reality environment 500 in accordance with an embodiment of the disclosure. Referring to Fig. 5, and with further reference to Figs. 1-2, situationally aware device 110 contains display 202. The situationally aware device 110 may be configured to use display 202 to display a virtual organ 502 related to the patient 108.

Virtual reality environment 500 may be a mode of operation of situationally aware device 110 that permits the display 202 to provide a virtual model of an element, e.g., virtual organ 502. The model of virtual organ 502 may be derived from prior information collected from a patient, such as MRI scans, x-rays, or other visual imaging methods. In one embodiment, server 120 may use situational awareness application 122 to generate the model for display on situationally aware device 110. In another embodiment, the model may be generated by a processor within situationally aware device 110. Once a model has been created, situationally aware device 110 may be used to display a three dimensional interactive model of an organ, e.g., virtual organ 502, for use in diagnosis and treatment of patient 108.

In one embodiment, the doctor 102 may access the virtual organ 502 through an auditory statement. In other embodiments, the virtual organ 502 may be accessed via a menu controlled by touch screen or a touch pad on the side of the situationally aware device. The virtual organ 502 may be, for example, a virtual three dimensional image of the heart of the patient 108 constructed from a series of two dimensional MRI scans of the heart. The virtual organ 502 may be rotated by the doctor 102 for viewing at any angle, and may further be expanded and sliced to allow viewing of a cross-section of the heart at a desired angle. This

view of the virtual organ may be presented in the center of the display 202 within situationally aware device 110, and may not be dependent on the location of the patient 108 or other elements within the environment 500.

Fig. 6 depicts use of an augmented virtualization environment 600 in accordance with an embodiment of the disclosure. Referring to Fig. 5, and with further reference to Figs. 1-2, situationally aware device 110 contains display 202. The situationally aware device 110 may be configured to use display 202 to display augmented virtualization image 602 within virtual organ 502.

Augmented virtualization environment 600 may be an augmentation of virtual environment 500 allowing a form of mixed reality for the wearer of situationally aware device 110. In one embodiment, the doctor 102 may use situationally aware device 110 to generate virtual organ 502. The doctor 102 may then choose a cross-sectional view of virtual organ 502, as in Fig. 5. However, in this environment, the situationally aware device 110 may superimpose a real cross-sectional image, for example, one of a series of MRI images used to construct virtual organ 502, onto the virtual organ. Such a view may permit the doctor 102 to combine real elements with a virtualized environment for efficient and effective methods of diagnosing and treating patient injuries.

Fig. 7 depicts an exemplary method for processing a patient in accordance with a particular embodiment of the disclosure. The exemplary method 700 is provided by way of example, as there are a variety of ways to carry out methods disclosed herein. The method 700 shown in Fig. 7 may be executed or otherwise performed by one or a combination of various systems. The method 700 is described below as carried out by at least system 100 in Fig. 1, by way of example, and various elements of system 100 are referenced in explaining the exemplary method of Fig. 7. Each block shown in Fig. 7 represents one or more processes, methods, or subroutines carried in the exemplary method 700. The method 700 may be further altered, e.g., by having blocks added, removed, altered, or rearranged. A non-transitory computer-readable medium comprising code, which when performed by a computer, may perform the acts of the method 700 may also be provided. Referring to Fig. 7, the exemplary method 700 may begin at block 702.

At block 702, a patient is received into a trauma center. The patient may suffer from trauma of a known or unknown type. The patient may generally be delivered to the trauma center by an emergency vehicle, e.g., an ambulance.

At block 704, the doctor 102 generates a command during treatment based on the diagnosis of the patient. The command may involve time sensitive critical care tasks to be completed in the emergency environment. The command may be captured by situationally aware device 110.

5 At block 706, the situationally aware device 110 creates corresponding tasks for the members of the trauma team in conjunction with a treatment. The tasks may be created in response to the command directed at stage 702, and may generally be generated from a known protocol based on the particular command processed.

10 At block 708, the team members, e.g., the doctor 102, the nurse 104, and the technician 106 execute their assigned tasks. The assigned tasks will generally be time sensitive and are displayed to each team member individually on a corresponding situationally aware device.

At block 710, the team leader, e.g., doctor 102, receives confirmation of the completed tasks. At this stage, the doctor may be assured that the task was completed without
15 needing to remember to confirm the task with the other members of the team.

Fig. 8 depicts an exemplary method for processing a patient in accordance with a particular embodiment of the disclosure. The exemplary method 800 is provided by way of example, as there are a variety of ways to carry out methods disclosed herein. The method 800 shown in Fig. 8 may be executed or otherwise performed by one or a combination of
20 various systems. The method 800 is described below as carried out by at least system 100 in Fig. 1, by way of example, and various elements of system 100 are referenced in explaining the exemplary method of Fig. 8. Each block shown in Fig. 8 represents one or more processes, methods, or subroutines carried in the exemplary method 800. The method 800 may be further altered, e.g., by having blocks added, removed, altered, or rearranged. A non-
25 transitory computer-readable medium comprising code, which when performed by a computer, may perform the acts of the method 800 may also be provided. Referring to Fig. 8, the exemplary method 800 may begin at block 802.

At block 802, a command is received on an electronic device. In one embodiment, the electronic device may comprise a situationally aware device 110, and the command may be a
30 command uttered by a trauma team member in an emergency environment.

At block 804, the electronic device displays instructions for addressing the received command. The instructions may be displayed, for example, on situationally aware device 110, or on external display 112.

At block 806, the electronic device coordinates with a target device for processing of the command. The electronic device may be the situationally aware device 110, and the target device may be another situationally aware device 110 or a treatment device 116. This step may also be performed by application 122 resident on server 120.

5 At block 808, an output command or order is provided to the target device. This command may be a command related to addressing the emergency situation within the trauma center.

At block 810, a representation of the output is provided on the target device. This representation may be, for example, a simple display within situationally aware device 110,
10 or an audio acknowledgement on a treatment device 116.

Fig. 9 depicts an exemplary method for providing situational awareness in accordance with a particular embodiment of the disclosure. The exemplary method 900 is provided by way of example, as there are a variety of ways to carry out methods disclosed herein. The method 900 shown in Fig. 9 may be executed or otherwise performed by one or a
15 combination of various systems. The method 900 is described below as carried out by at least system 100 in Fig. 1, by way of example, and various elements of system 100 are referenced in explaining the exemplary method of Fig. 9. Each block shown in Fig. 9 represents one or more processes, methods, or subroutines carried in the exemplary method 900. The method 900 may be further altered, e.g., by having blocks added, removed, altered,
20 or rearranged. A non-transitory computer-readable medium comprising code, which when performed by a computer, may perform the acts of the method 900 may also be provided. Referring to Fig. 9, the exemplary method 900 may begin at block 902

At block 902, a command is received on an electronic device. In one embodiment, the electronic device may comprise a situationally aware device 110, and the command may be a
25 command uttered by a trauma team member in an emergency environment.

At block 904, a timer for completion of a task corresponding to the command is started. The timer may correspond to a predetermined time for completion of a particular task associated with the command uttered at block 902.

At block 906, the electronic device coordinates with a target device for processing of
30 the command. The electronic device may be the situationally aware device 110, and the target device may be another situationally aware device 110 or a treatment device 116. This step may also be performed by application 122 resident on server 120.

At block 908, the timed output task or order is provided to the target device. This task may be a task related to addressing the emergency situation within the trauma center and may be associated with a predetermined time associated with completing the command associated with the task.

5 At block 910, a representation of the timed task is provided on the target device. This representation may be, for example, a simple display of a countdown timer within situationally aware device 110, or an audio timer on a treatment device 116.

At block 912, an alarm is generated if the task is not completed within the allotted time. The alarm may be displayed in the visual field of a user of situationally aware device 10 110, may provide an audio alarm, or both. The alarm may also be provided on display 112 or treatment devices 116.

At block 914, the alarm is silenced upon completion of the designated task.

It is generally appreciated that many trauma centers may not have the resources to fully upgrade their systems for compatibility with the disclosure. Thus, embodiments of the disclosure also include a path that incrementally adds capabilities to a care center to advance 15 from technology to that of the present disclosure. This path may include three phases. In phase 1, simple situational awareness would occur. Phase 1 may involve mounting TVs on walls with no devices on clinicians. Requests and tasks may be inputted into the system by a "project manager" (already in the room) on a stenographic type of input device. The "project 20 manager" may be the request interpreter. In phase 2, the system may be upgraded to include an audio-based request system. This may involve adding microphones to a room and audio recognition technology for requests. In phase 3, the system may be upgraded to include head mounted or other mobile displays. This may involve developing a clinician head mounted display for "lead clinicians," while leaving the TVs on the wall.

25 Although specific reference has been made to particular embodiments, other elements are within the scope of the disclosure. The system of the disclosure may be used outside of a trauma care center in any context, for example, to assist with the requisition, access and display of patient Electronic Medical Record (EMR) data, laboratory studies results, imagery data. Such a system could facilitate reduced patient wait times and higher physician 30 productivity. Embodiments of the disclosure also allow information sharing between patient and provider healthcare applications prior to a visit to the hospital. Such information sharing can include both voice and visual data. This method of sharing information reduces the time necessary to review lengthy patient histories and eliminates a number of inefficiencies in

pulling patient records. Other embodiments not related to the medical field are contemplated and are described above.

The foregoing description, for the purpose of explanation, has been described with reference to specific embodiments. However, the illustrative discussions above are not
5 intended to be exhaustive or to limit the invention to the precise forms disclosed. Many modifications and variations are possible in view of the above teachings. The embodiments were chosen and described to explain aspects of the invention and its practical applications, to thereby enable others skilled in the art to best utilize the invention and various embodiments with various modifications as may be suited to the particular use contemplated.

10 The subject matter described herein may be implemented in digital electronic circuitry, or in computer software, firmware, or hardware, including the structural means disclosed in this specification and structural equivalents thereof, or in combinations of them. The subject matter described herein may be implemented as one or more computer program products, such as one or more computer programs tangibly embodied in an information
15 carrier (e.g., in a machine-readable storage device), or embodied in a propagated signal, for execution by, or to control the operation of, data processing apparatus (e.g., a programmable processor, a computer, or multiple computers). A computer program (also known as a program, software, software application, or code) may be written in any form of programming language, including compiled or interpreted languages, and it may be deployed
20 in any form, including as a stand-alone program or as a module, component, subroutine, or other unit suitable for use in a computing environment. A computer program does not necessarily correspond to a file. A program may be stored in a portion of a file that holds other programs or data, in a single file dedicated to the program in question, or in multiple coordinated files (e.g., files that store one or more modules, sub-programs, or portions of
25 code). A computer program may be deployed to be executed on one computer or on multiple computers at one site or distributed across multiple sites and interconnected by a communication network.

The processes and logic flows described in this specification, including the method
30 steps of the subject matter described herein, may be performed by one or more programmable processors executing one or more computer programs to perform functions of the subject matter described herein by operating on input data and generating output. The processes and logic flows may also be performed by, and apparatus of the subject matter described herein

may be implemented as, special purpose logic circuitry, e.g., an FPGA (field programmable gate array) or an ASIC (application-specific integrated circuit).

Processors suitable for the execution of a computer program include, by way of example, both general and special purpose microprocessors, and any one or more processor
5 of any kind of digital computer. Generally, a processor will receive instructions and data from a read-only memory or a random access memory or both. The essential elements of a computer are a processor for executing instructions and one or more memory devices for storing instructions and data. Generally, a computer will also include, or be operatively coupled to receive data from or transfer data to, or both, one or more mass storage devices for
10 storing data, e.g., magnetic, magneto-optical disks, or optical disks. Information carriers suitable for embodying computer program instructions and data include all forms of non-volatile memory, including by way of example semiconductor memory devices, (e.g., EPROM, EEPROM, and flash memory devices); magnetic disks, (e.g., internal hard disks or removable disks); magneto-optical disks; and optical disks (e.g., CD and DVD disks). The
15 processor and the memory may be supplemented by, or incorporated in, special purpose logic circuitry. The situatitally aware devices 110, treatment devices 116, and in certain embodiments, server 120, will include suitable transmitters and receivers for exchanging information, as will be appreciated by one of ordinary skill in the art.

The description herein describes network elements, computers, and/or components of
20 a system and method for providing a bundled product and/or service along with an insurance policy that may include one or more modules. As used herein, the term “module” refers to computing software, firmware, hardware, and/or various combinations thereof. At a minimum, however, Modules, are not to be interpreted as software that is not implemented on hardware, firmware, or recorded on a non-transitory processor readable recordable storage
25 medium (i.e., modules are not software per se). Indeed “module” is to be interpreted to always include at least some physical, non-transitory hardware such as a part of a processor or computer. Two different modules may share the same physical hardware (e.g., two different modules may use the same processor and network interface). The modules described herein may be combined, integrated, separated, and/or duplicated to support
30 various applications. Also, a function described herein as being performed at a particular module may be performed at one or more other modules and/or by one or more other devices instead of or in addition to the function performed at the particular module. Further, the

modules may be implemented across multiple devices and/or other components local or remote to one another.

Additionally, the modules may be moved from one device and added to another device, and/or may be included in both devices. To provide for interaction with a user, the subject matter described herein may be implemented on a computer having a display device, e.g., a CRT (cathode ray tube), LCD (liquid crystal display) monitor, or projector (for example, GOOGLE GLASS® utilizes a prism projector to display information) for displaying information to the user and a keyboard and a pointing device, (e.g., a mouse, trackball, touchpad or gesture control), by which the user may provide input to the computer. Other kinds of devices may be used to provide for interaction with a user as well. For example, feedback provided to the user may be any form of sensory feedback, (e.g., visual feedback, auditory feedback, or tactile feedback), and input from the user may be received in any form, including acoustic, speech, or tactile input.

The subject matter described herein may be implemented in a computing system that includes a back-end component (e.g., a data server), a middleware component (e.g., an application server), or a front-end component (e.g., a client computer having a graphical user interface or a web browser through which a user may interact with an implementation of the subject matter described herein), or any combination of such back-end, middleware, and front-end components. The components of the system may be interconnected by any form or medium of digital data communication, e.g., a communication network. Examples of communication networks include a local area network (LAN) and a wide area network (WAN), e.g., the Internet.

CLAIMS

What is claimed is:

1. A computer aided system for providing collaboration in an information dependent environment, the system comprising:

an electronic command device that is configured to receive a command, the electronic command device providing at least one of a visual and audio representation of at least one instruction for collaboration in response to the command; and

a target electronic device that receives an order from the command device, the target electronic device providing at least one of a visual and audio representation of the order,

wherein the electronic command device and the target electronic device communicate with each other to monitor the status of carrying out the command.

2. The system of claim 1, wherein the electronic command device and the target electronic device communicate through a central computer.

3. The system of claim 2, wherein the electronic command device includes a display that displays multiple instructions.

4. The system of claim 3, wherein the display shows the completion status of the instructions.

5. The system of claim 1, wherein the electronic command device includes a display that displays the completion status of a task associated with the order sent to the target electronic device.

6. The system of claim 1, further including a timer, the timer being set to correspond to a predetermined time for completing a task associated with the order.

7. The system of claim 6, wherein the timer is incorporated into the electronic command device.

8. The system of claim 6, wherein the timer is incorporated into the target electronic device.

8. The system of claim 6, wherein the timer is incorporated into a central computer separate from the electronic command device and the target electronic device.

9. The system of claim 1, wherein the at least one instruction and the command pertain to a medical procedure.

10. The system of claim 1, comprising multiple target electronic devices, wherein the target electronic devices respectively receive commands from the electronic command device.

11. The system of claim 10, wherein the electronic command device includes a display that shows completion statuses of tasks related to the commands.

12. The system of claim 2, wherein the central computer provides the at least one instruction to the electronic command device and facilitates communication between the electronic command device and the target electronic device.

13. The system of claim 12, wherein the central computer tracks completion status of a task related to the command and informs the electronic command device when a predetermined time related to the task has lapsed.

14. The system of claim 12, wherein the central computer informs the electronic command device when a task related to the command is complete.

15. The system of claim 1, wherein at least one of the electronic command device and the target electronic device receives data from a medical appliance.

16. The system of claim 15, wherein the medical appliance is one of an IV dosage meter, a ventilator, and a heart rate monitor.

17. The system claim 1, wherein the electronic command device includes a display that shows a virtual model of an organ of a patient in a trauma center.

18. The method of claim 1, wherein the electronic command device includes a display that shows a visual overlay of a Magnetic Resonance Imaging (MRI) image over the body of a trauma patient.

19. The system of claim 1, wherein the electronic command device is configured to be mounted on a user's head.

20. An electronic command device for providing collaboration in an information dependent environment, the device comprising:

a receiver that is configured to receive a command;

a display for providing a visual representation of at least one instruction for facilitating collaboration in response to the command; and

a transmitter that sends an order to a target device,

wherein the display provides an indication of the target device's status with respect to carrying out the command.

21. The device of claim 20, wherein the transmitter sends communications to the target electronic device through a central computer.

22. The device of claim 21, wherein the display displays multiple instructions.

23. The device of claim 22, wherein the display shows a status of completion of the instructions.

24. The device of claim 20, wherein the display displays the status of completion of a task associated with the order sent to the target device.
25. The device of claim 20, further including a timer, the timer being set to an amount that corresponds to a predetermined time for completing a task associated with the order.
26. The device of claim 20, wherein the at least one instruction and the command are based on a medical procedure.
27. The device of claim 21, wherein the central computer provides the at least one instruction and facilitates communication between the transmitter and the target electronic device.
28. The device of claim 27, wherein the central computer keeps track of completion status of a task related to the command and sends a signal to the receiver when a predetermined time related to the task has lapsed.
29. The device of claim 21, wherein the central computer sends a signal to the receiver when a task related to the command is complete.
30. The device of claim 20, wherein the receiver receives data from a medical appliance.
31. The device of claim 30, wherein the medical appliance is one of an IV dosage meter, an ventilator, and a heart rate monitor.
32. The device of claim 20, including a mount for positioning the display proximate a user's eye.
33. A computer aided interactive method for providing collaboration in an information dependent environment, the method comprising:
 - (a) receiving a verbal command from a team member by an electronic command device;
 - (b) displaying on a display at least one instruction associated with the information dependent environment in response to the command;
 - (c) sending an order related to the facilitating collaboration to a target electronic device;
 - (d) providing at least one of a visual and audio representation of the order by the target electronic device; and
 - (e) providing coordination between the electronic command device and the target electronic device with respect to carrying out the order.
34. The method of claim 33, comprising positioning the electronic device on a user's head.
35. The method of claim 33, wherein the display displays multiple instructions.
36. The method of claim 33, wherein the target electronic device informs the electronic command device when the order has been acted upon.

37. The method of claim 33, wherein a predetermined time for carrying out a task associated with the order is monitored and if the predetermined time has lapsed an alert is provided to at least one of the target electronic device and the electronic command device.
38. The method of claim 33, wherein a predetermined time for carrying out a task associated with the order is monitored and if the task is completed before the predetermined time has lapsed, an alert is provided to at least one of the target electronic device and the electronic command device.
39. The method of claim 33, wherein the display shows a virtual model of an organ of a patient in a trauma center
40. The method of claim 33, wherein the display shows a visual overlay of a Magnetic Resonance Imaging (MRI) image over the body of a trauma patient.
41. The method of claim 33, wherein the display shows an MRI image superimposed upon a cross section of a virtual model of an organ of a patient in a trauma center
42. The method of claim 35, further comprising receiving an additional command by the electric command device, wherein the command is given to clear one of the instructions.
43. The method of claim 35, wherein the instructions are automatically cleared by completion of a corresponding task.
44. The method of claim 33, wherein the command is based on input from a doctor.
45. The method of claim 33, wherein multiple target electronic devices are provided that selectively receive orders, the orders being tailored to tasks directed to users of the target electronic devices.
46. The method of claim 33, further comprising receiving data by the electronic command device from a medical instrument.
47. The method of claim 46, further comprising receiving data by the target electronic device from a medical instrument.
48. The method of claim 47, wherein the electronic command device and the target electronic device display the data received by medical instruments.
49. The method of claim 33, further comprising providing a central computer, wherein the central computer coordinates communications between the electronic command device and the target electronic device.
50. The method of claim 49, wherein the coordination includes tracking tasks and providing task updates to at least one of the target electronic device and the electronic command device.

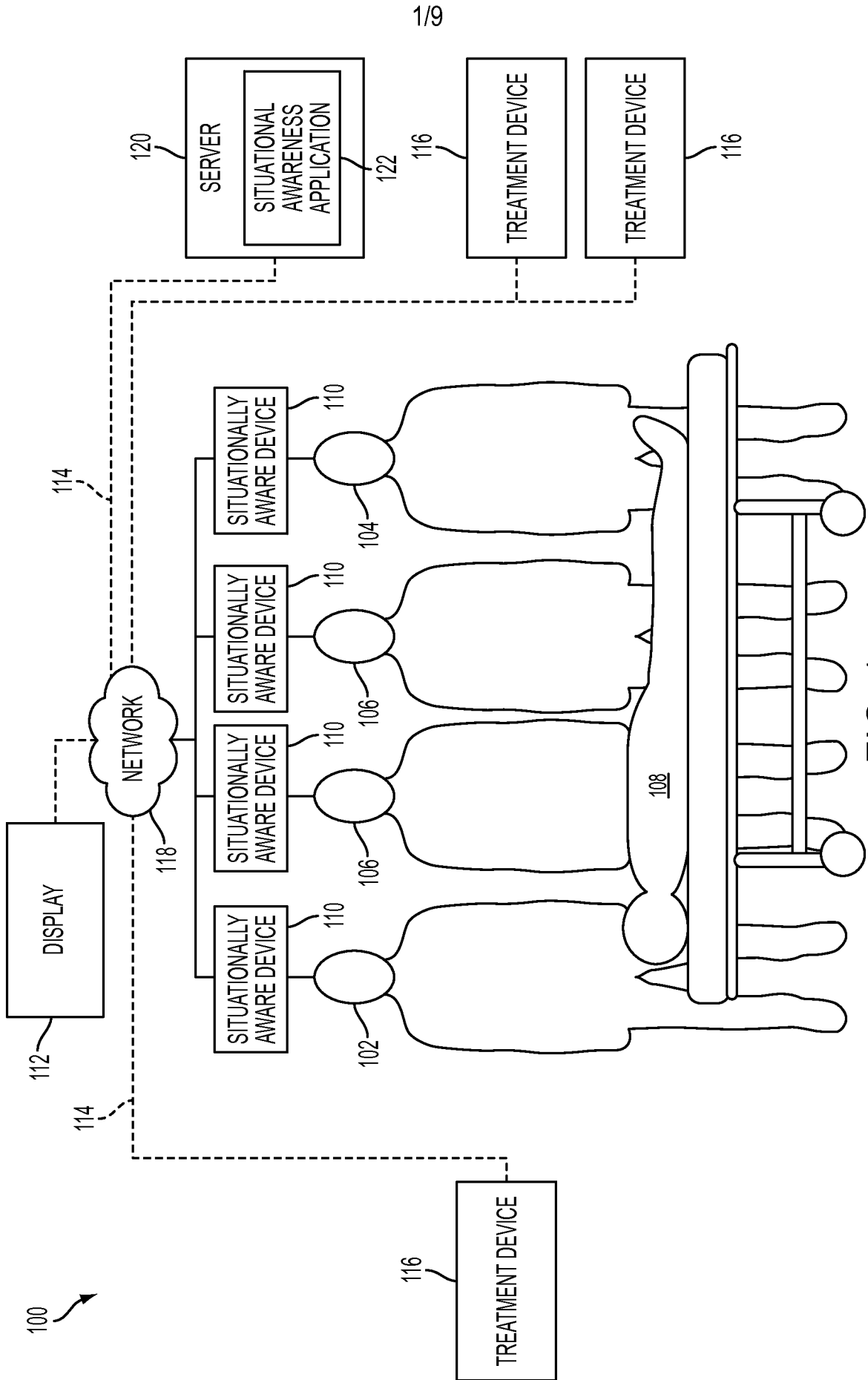


FIG. 1

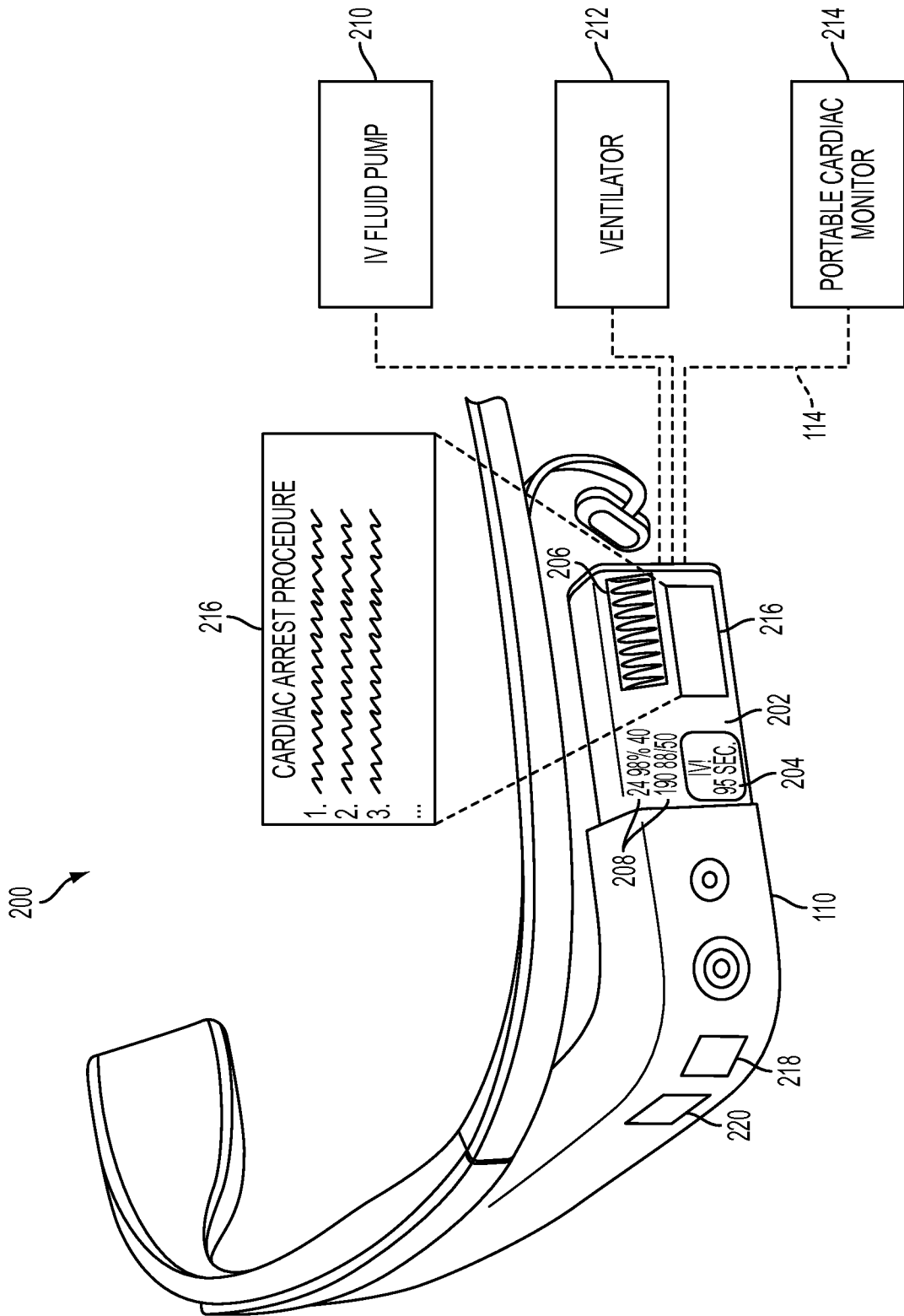


FIG. 2

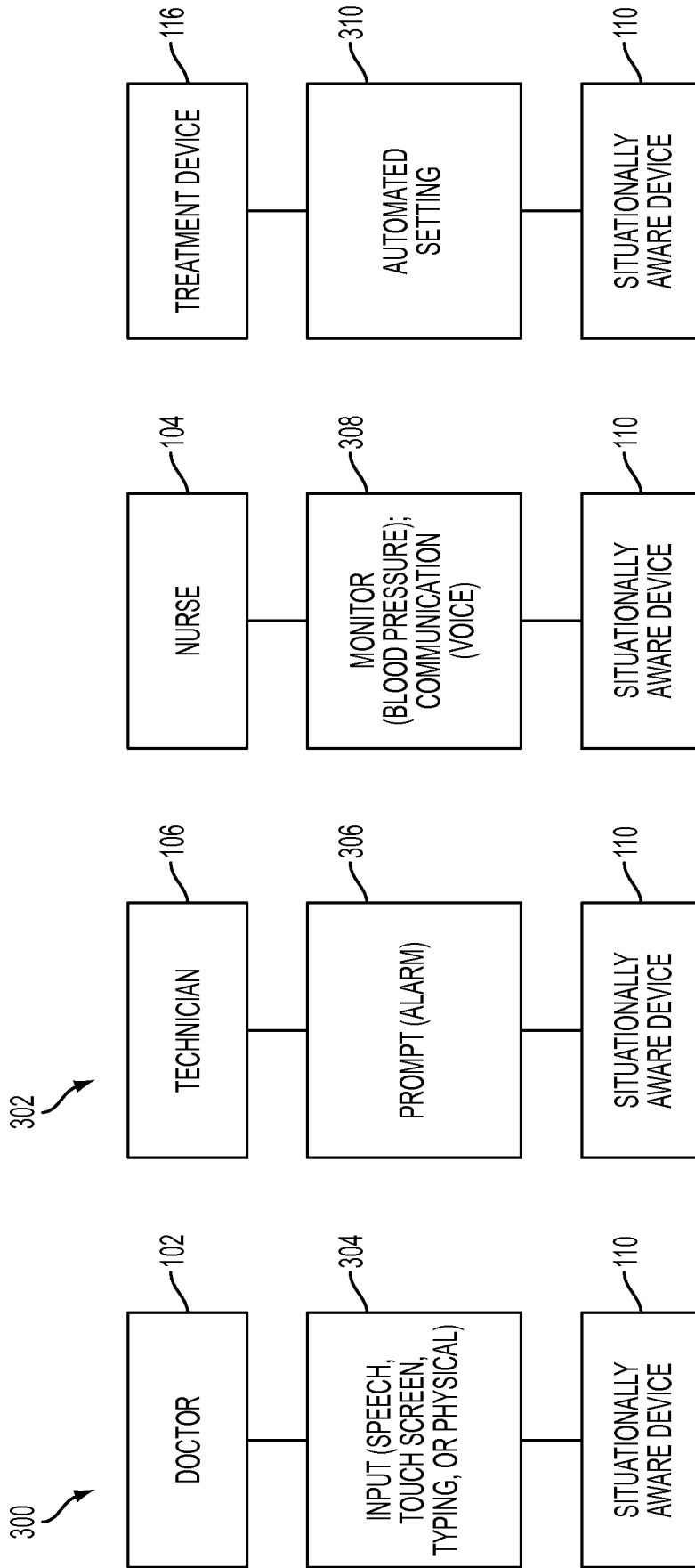


FIG. 3A

FIG. 3B

FIG. 3C

FIG. 3D

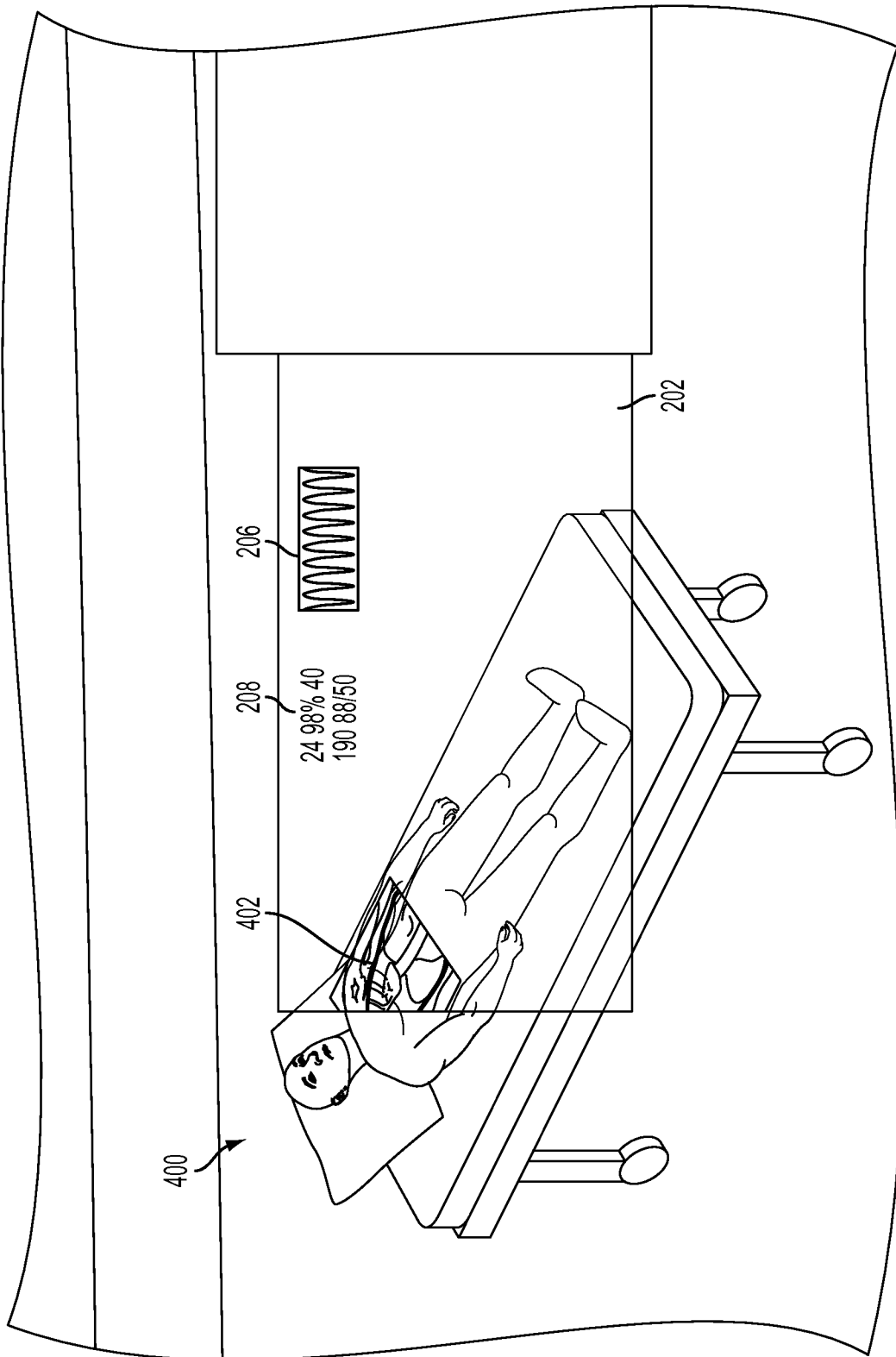


FIG. 4

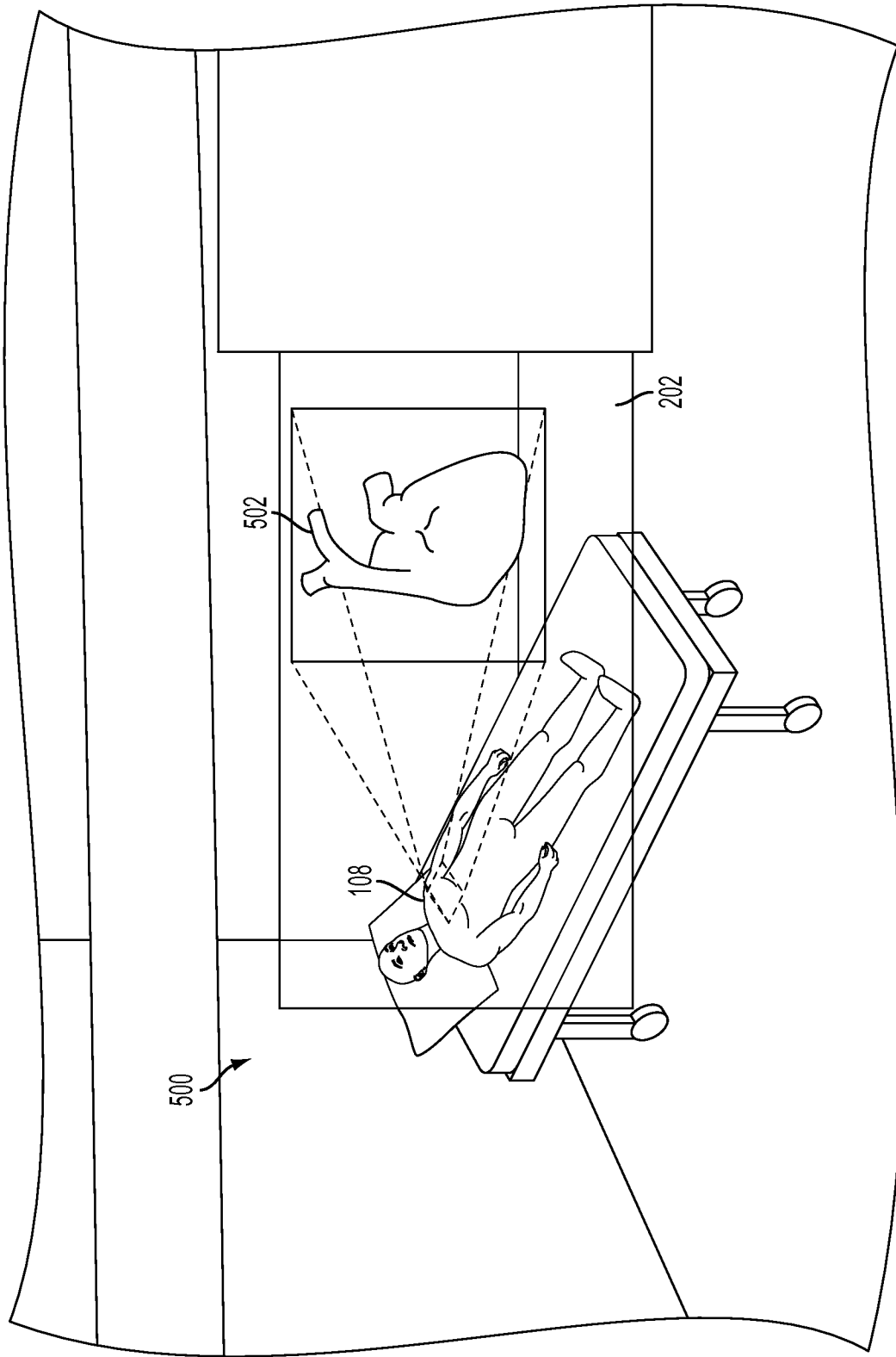


FIG. 5

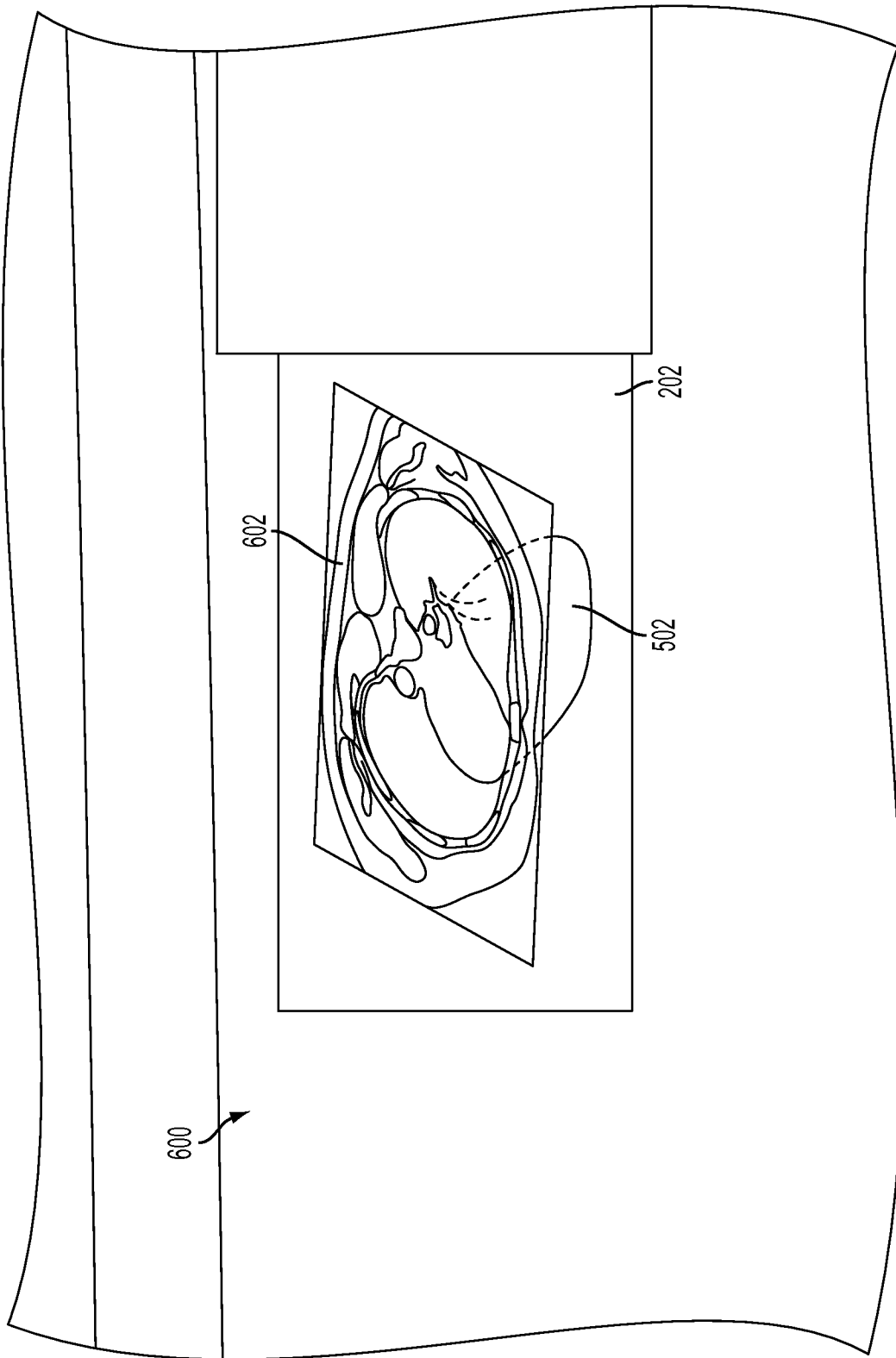


FIG. 6

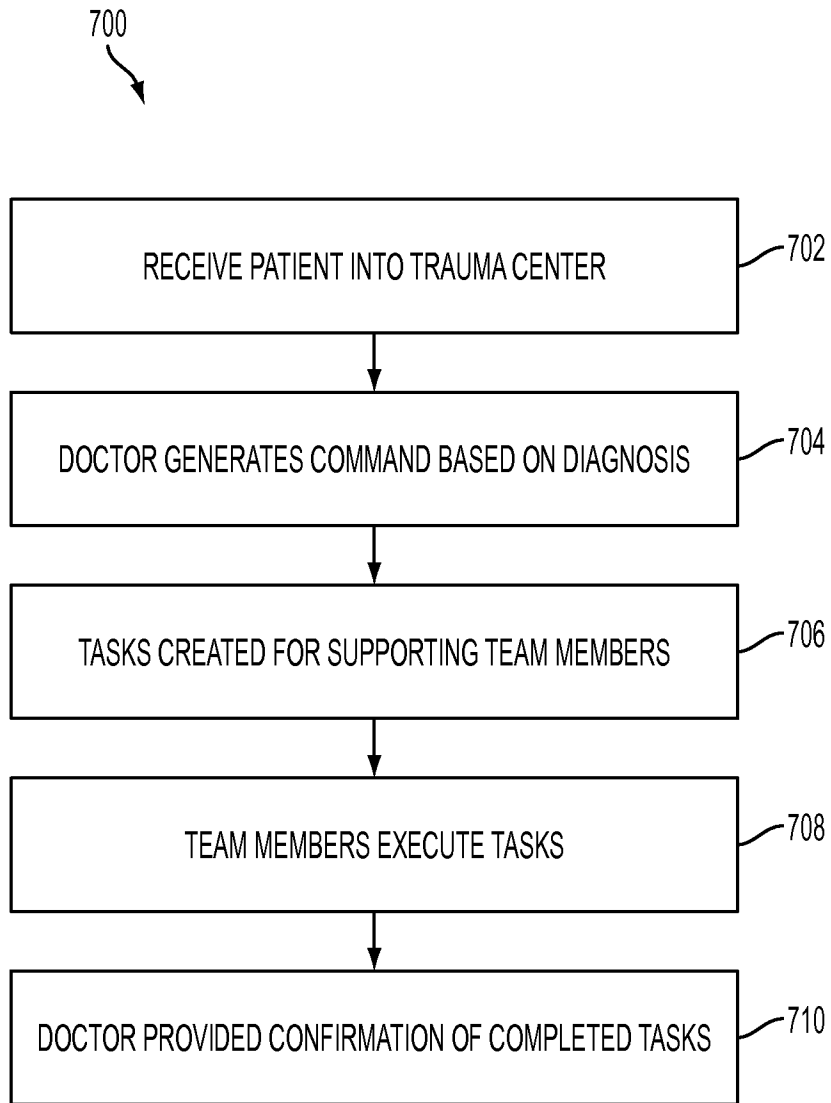


FIG. 7

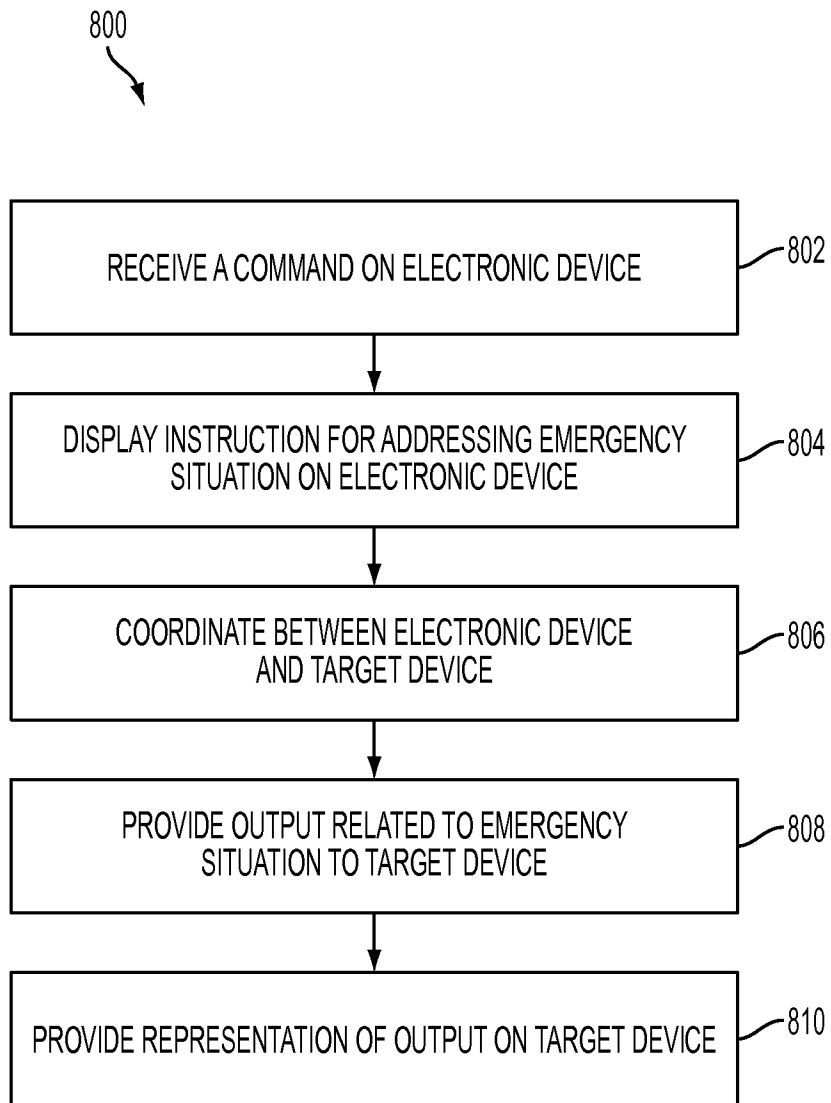


FIG. 8

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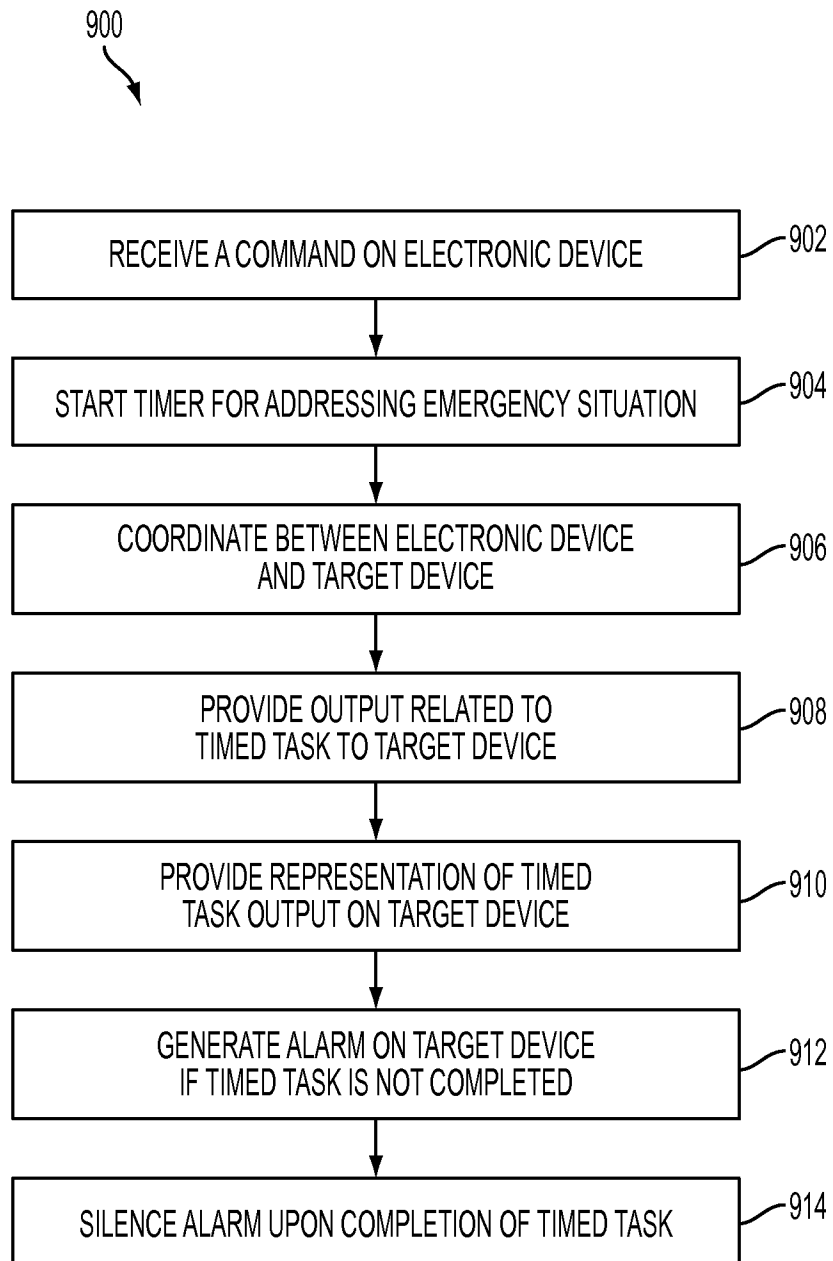


FIG. 9

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US2014/018751

A. CLASSIFICATION OF SUBJECT MATTER
IPC(8) - G03B 21/26 (2014.01)
USPC - 359/630
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)
IPC(8) - A61B 5/053, 19/00; G03B 21/26; G05B 19/00; G05B 19/042, 19/048; G06F 19/00; G09G 5/00; G06Q 50/22 (2014.01)
USPC - 345/633, 353/028, 359/13, 630, 600/300, 301, 410

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
CPC - G02B 2027/01, 2027/017, 2027/0178; G06F 19/345 (2014.02)

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
Orbit, Google Patents, Google.com

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 2012/0212399 A1 (BORDER et al) 23 August 2012 (23.08.2012) entire document	1- 8[a], 8[b], 9-50
Y	US 2007/0089067 A1 (ABBOTT, III et al) 19 April 2007 (19.04.2007) entire document	1- 8[a], 8[b], 9-32, 36-38
Y	DAVIES. NEC Tele Scouter wearable computer goes on sale in 2010. 26 October 2009. [retrieved on 2014-05-23] Retrieved from the Internet: <URL: http://www.slashgear.com/nec-tele-scouter-wearable-computer-goes-on-sale-in-2010-2661809/ > entire document	2-4, 12-14, 21-23, 27-29, 33-50
Y	US 4,526,473 A (ZAHN, III) 02 July 1985 (02.07.1985) entire document	6-7, 8[a], 8[b], 25, 37-38
Y	HARRISON, R. Timing user tasks with seconds precision. 20 July 2011. [retrieved on 2014-05-23] Retrieved from the Internet: <URL: http://stackoverflow.com/questions/6727940/timing-user-tasks-with-seconds-precision > entire document	8[B], 13-14, 28-29
Y	US 2005/0216789 A1 (HAAGENS et al) 29 September 2005 (29.09.2005) entire document	42-43
A	GROEN et al. Medical Informatics: Emerging Technologies, 'Open' EHR Systems, and Ethics in the 21st Century. April 2008. [retrieved on 2014-05-23] Retrieved from the Internet: <URL: http://www.shepherd.edu/surc/groen%20profile.htm > entire document	1- 8[a], 8[b], 9-50

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:	
"A" document defining the general state of the art which is not considered to be of particular relevance	"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
"E" earlier application or patent but published on or after the international filing date	"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
"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"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
"O" document referring to an oral disclosure, use, exhibition or other means	"&" document member of the same patent family
"P" document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search 23 May 2014	Date of mailing of the international search report 09 JUN 2014
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