(A) Some small faults, but generally pretty good

DETAILED DESCRIPTION OF THE INVENTION

[0008] Figure 1 illustrates two perspective views of a wearable display configuration 100 according to an embodiment of the present invention. The wearable display configuration 100 includes a display apparatus 101 and a user 151. The display apparatus 101 includes a electronic display 112, an electronic display coupling mechanism 113, a first electronic communication port 120, and an electrical power source 126. The electronic display 112 includes a hermetic seal 116. The electronic display 112 displays a first image 114, as shown in the leftmost perspective view. The electronic display coupling mechanism 113 includes a plurality of supporting element interfaces 118 and a plurality of supporting elements 130. Each of the plurality of supporting elements 130 includes a first section 132 and a second section 142. The first section 132 includes a first outer end 134, a first main piece 135, a first inner end 136, and a first section connecting piece 138. The second section 142 includes a second outer end 144, a second main piece 145, a second inner end 146, and a second section connecting piece 148.

[0009] The hermetic seal 116 constitutes at least a portion of the exterior of the electronic display 112. The electrical power source 126 is electrically coupled to the electronic display 112. The electrical power source 126 receives charge through the first electronic communication port 120 when the first electronic communication port 120 is connected to and draws power from an external device. Each of the plurality of supporting element interfaces 118 is connected to the electronic display 112. Each of the plurality of supporting elements 130 is attached to one of the plurality of supporting element interfaces 118 at each of the first outer end 134 of the first section 132 and the

second outer end 144 of the second section 142 of such supporting element. For each of the plurality of supporting elements 130, the first section 132 is connected to the second section 142. To effect this connection, the first outer end 134 is connected to the first main piece 135, the first main piece 135 is connected to the first inner end 136, the second outer end 144 is connected to the second main piece 145, and the second main piece 145 is connected to the second inner end 146. The first inner end 136 is connected to the first section connecting piece 138, the second inner end 146 is connected to the second section connecting piece 148, and the first section connecting piece 138 is connected to the second section connecting piece 148. The electronic display coupling mechanism 113 couples the electronic display 112 to the user 151 of the electronic display 112.

[0010] The user 151 is preferably a participant in an event, such as an advertising campaign at a public venue such as a basketball game. The display apparatus 101 facilitates the presentation of the first image 114, such as an advertising image which depicts one or all of an advertiser's name, trademark, products or services. The first image 114 is visible to spectators at the event. The electronic display 112 is preferably the "electronic paper" or "e-paper" display manufactured by LG.Philips LCD. The first image 114 is maintained on the electronic display 112 without the electronic display 112 receiving any electrical power. The electronic display 112 only requires electrical power to receive data representing the first image 114. This data is received through, for example, the first electronic communication port 120, which is connected to and receives the data from the external device, which is preferably a computer. The first electronic communication port 120 is preferably a universal serial bus ("USB") port. The required

power to receive the data representing the first image 114 is drawn from the external device and provided directly to the electronic display 112 through the first electronic communication port 120. Once the first image 114 is displayed on the electronic display 112, the first image 114 remains on the electronic display 112 indefinitely. The electrical power source 126, which is preferably a battery, provides electrical power to allow the electronic display 112 to switch from displaying the first image 114 to displaying a second image 115 which is different from the first image 114, as shown in the rightmost perspective view.

[0011] As discussed above, the first section connecting piece 138 is connected to the second section connecting piece 148. Each of the first section connecting piece 138 and second section connecting piece 148 is preferably one piece of a standard "snap/squeeze" connector. For example, the first connecting piece 138 may be squeezed and pushed inside of the second connecting piece 148 until the first connecting piece 138 snaps into place inside of the second connecting piece 148.

[0012] The electronic display 112 is preferably not more than four millimeters thick, including the thickness of the hermetic seal 116. The thin nature of the electronic display 112 increases the comfort of the user 151 when the electronic display 112 is coupled to the user 151. The plurality of supporting element interfaces 118 is preferably a plurality of brackets, such as commercially available metal brackets, and the plurality of supporting elements 130 is preferably a plurality of straps, such as nylon straps. The electronic display 112 is coupled to the user 151 by, after attaching each of the plurality of supporting elements 130 to a supporting element interface of the plurality of supporting element interfaces 118, passing each of the plurality of supporting elements

130 around the user 151 before connecting the first section connecting piece 138 to the second section connecting piece 148. Accordingly, the plurality of supporting elements 130 supports the electronic display 112 as the electronic display 112 is worn on a body or clothing of the user 151, such as laterally adjacent to a chest or back of the user 151.

[0013] The present invention contemplates a number of variations to the above-described embodiment of the invention shown in Figure 1. For example, the required power to receive the data representing the first image 114 may, after being drawn through the external device, be provided first to the electrical power source 126, which may then provide the power to the electronic display 112. Additionally, the electronic display 112 may include a light source electrically coupled to the electrical power source 126. The light source may be, for example, a light-emitting diode which illuminates the electronic display 112 so that the first image 114 may be viewed on the electronic display 112 in low ambient light conditions. Instead of a light-emitting diode, the light source may also be an incandescent light bulb, a fluorescent light bulb, or any suitable light source. The light source may also receive power from a separate electrical power source instead of the electrical power source 126. The display apparatus 101 also may not include the electrical power source 126. If the display apparatus 101 does not include the electrical power source 126, the electronic display 112 will not be capable of loading the first image 114 or changing the first image 114 to another image unless the electronic display 112 receives power from another electrical power source or from the external device through the first electronic communication port 120.

[0014] In another embodiment, the display apparatus 101 may not include the first electronic communication port 120. In this embodiment, the image first 114 must be

stored on the electronic display 112 itself and the required power to load the first image 114 or change the first image 114 to another image must be stored in and provided by the electrical power source 126. In still another embodiment, the electrical power source 126 may not receive power from the first electronic communication port 120. In this embodiment, too, all required power must be stored in and provided by the electrical power source 126. The electronic display 112 also may not include the hermetic seal 116.

[0015] Additionally, instead of a USB communication port, the first electronic communication port 120 may be an Ethernet port, FireWire port, DB-25 port, or any suitable type of serial or parallel electronic communication port. Additionally, instead of a plurality of supporting element interfaces 118 and a plurality of supporting elements 130, the display apparatus 101 may include only one supporting element interface, only one supporting element, or only one of both a supporting element interface and a supporting element. For example, if the display apparatus 101 includes the plurality of supporting elements 130 but only a single supporting element interface, each of the plurality of supporting elements 130 may be attached to the single supporting element interface.

[0016] Instead of brackets, the plurality of supporting element interfaces 118 may be clips, hooks, hinges, buttons, pads, including Velcro® pads, screws, nuts, bolts, screw holes, adhesives, or any suitable type of supporting element interface. Instead of straps, the plurality of supporting elements 130 may be harnesses, chains, cables, cords, strings, ties, or any suitable type of supporting element. Instead of each being one piece of a standard "snap/squeeze" connector, the first section connecting piece 138 and the second

section connecting piece 148 may be a clip and a fastener, a hook and a fastener, a hinge and a pin, a button assembly, a screw and a screw hole, Velcro® pads or adhesives, or any suitable type of connecting pieces.

[0017] Figure 2 illustrates a block diagram of a system 200 for determining a location, according to one embodiment of the present invention. The system 200 includes a communication device 210, a server 220, a computing device 230, and a communication network 240. The communication network 240 includes at least one coverage area 242.

[0018] The computing device 230 is in bidirectional communication with the server 220. The server 220 is in bidirectional communication with the communication network 240. The communication device 210 is in bidirectional communication with the communication network 240.

[0019] The system 200 is used to determine the geographic location of the communication device 210 in an effort to verify that a participant who is paid to participate in an event, such as an advertising campaign, is satisfying his or her obligations to present at a predetermined geographic location or locations of the event. For example, the participant may be obliged to be present at the predetermined geographic location with the display apparatus 101 in order to present advertising images to spectators. The participant is told to take the communication device 210 with him or her to the predetermined geographic location, and the system's determination of the geographic location of the communication device 210 serves as a proxy for the determination of the geographic location of the participant and thus of the display

apparatus 101, which locations are assumed to be the same as the geographic location of the communication device 210.

[0020] Before the advertising campaign, identification information of the communication device 210, which is preferably a cellular telephone, is transmitted from the computing device 230 to the server 220. The identification information is preferably a cellular telephone number of the communication device 210. The identification information of the communication device 210 may be, for example, input by the participant to the computing device 230, which is preferably a personal computer.

[0021] To determine the location of the communication device 210, the server 220 sends to the communication network 240, which is preferably a cellular telephone network, an instruction to contact or "ping" the communication device 210 using the identification information of the communication device 210. The contact or "ping" preferably occurs over a secure connection as with all other transmissions within the system 200. The instruction to the communication network 240 is preferably sent periodically; by way of example, the instruction may be sent every fifteen minutes. In response to the instruction, the communication network 240 contacts the communication device 210 by transmitting a first signal to the communication device 210. The communication device 210 receives the first signal from the communication network 240 and, in response, transmits a second signal to the communication network 240. Because no call need be initiated by the communication device 210 during this transmission, the participant incurs no charges from his or her communication service provider.

[0022] The second signal indicates to the communication network 240 the presence of the communication device 210 in one coverage area of the at least one

coverage area 242. Each of the at least one coverage area 242 is preferably a cell of a cellular telephone network. Specifically, based on the strength of the second signal as received in various coverage areas of the communication network 240, it may be determined in which coverage area of the at least one coverage area the communication device 210 is present. The communication network 240 then transmits a third signal to the server 220. The third signal indicates the presence of the communication device 210 in the one coverage area. The server 220 receives the third signal from the communication network 240.

[0023] The server 220 then determines if the communication device 210 is present at the predetermined geographic location, such as a predetermined geographic location of an advertising campaign, by determining if the one coverage area in which the communication device is present includes the predetermined geographic location. This determination is made by determining if the one coverage area matches an event coverage area. The event coverage area is the coverage area which includes the predetermined geographic location.

[0024] The instruction to the communication network 240 to contact the communication device 210 may be sent at any periodic rate or in a nonperiodic manner. By way of example, the instruction may be sent on the demand of a user of the server 220. The user may input a "ping" command to the server 220 at any time, and the server 220 may then transmit that command to the communication network 240.

[0025] Instead of a cellular telephone, the system 200 may utilize as the communication device 210 a personal digital assistant ("PDA"), pager, wireless e-mail device, or any suitable communication device. Additionally, the system 200 may not

include the server 220 and the computing device 230 may send the instruction to contact or "ping" the communication device 210. The system 200 may also utilize as the computing device 230 a laptop computer, cellular telephone or other mobile wireless device, personal digital assistant, or any suitable computing device. The communication network 240 may be any suitable communication network or combination of networks, such as a combination of the Public Switched Telephone Network ("PSTN") and a cellular telephone network.

[0026] Figure 3 illustrates a block diagram of a system 300 for determining a location, according to one embodiment of the present invention. The system 300 includes a display device 310, a communication device 320, a first computing device 330, a second computing device 340, and a communication network 350. The display device 310 includes, in addition to the electronic display 112 and the electrical power source 126, a first communication system 312, a first computer-readable medium 318, and a second computer-readable medium 360. The first communication system 312 includes the first electronic communication port 120, a first radio frequency transceiver 314 and a heartbeat communication processor 316. The communication device 320 includes a location-determining unit 322 and a second communication system 324. The second communication system 324 includes a second radio frequency transceiver 326. The first computing device 330 includes a third communication system 332. The third communication system 332 includes a second electronic communication port 334 and a third electronic communication port 336. The second computing device 340 includes a fourth communication system 342 and a location-comparing unit 346. The fourth communication system 342 includes a fourth electronic communication port 344.

[0027] Within the display device 310, the first radio frequency transceiver 314 is electrically coupled to the heartbeat communication processor 316. The heartbeat communication processor 316 is also electrically coupled to the first computer-readable medium 318 and to the first electronic communication port 120. The electrical power source 126 is electrically coupled to the electronic display 112, the first electronic communication port 120, the first radio frequency transceiver 314, the heartbeat communication processor 316, and the first computer-readable medium 318. The electrical power source 126 receives power from the first electronic communication port 120 when the first electronic communication port 120 is connected to and draws power from the first computing device 330. The first electronic communication port 120 is also electrically coupled to the electronic display 112 and the second computer-readable medium 360. Within the communication device 320, the second radio frequency transceiver 326 is electrically coupled to the location-determining unit 322.

[0028] The first communication system 312 is in radio-frequency communication with the second communication system 324. Specifically, the first radio frequency transceiver 314 is in radio-frequency communication with the second radio frequency transceiver 326. The electronic communication port 120 is electrically coupled to the second electronic communication port 334 as needed in light of the teaching below. The second electronic communication port 334 is electrically coupled to the third electronic communication port 336. The third electronic communication port 336 is electrically coupled to the fourth electronic communication port 344 through the communication network 350, as needed in light of the teaching below.

[0029] The system 300 provides embodiments of a system for determining a location in addition to those provided by the system 200 of Figure 2. Similar to the system 200 of Figure 2, the system 300 may be used to determine the geographic location of the communication device 320 in an effort to verify that a participant who is paid to participate in an event, such as an advertising campaign, is satisfying his or her obligations to present at a predetermined geographic location or locations of the event.

[0030] The second computing device 340, which is preferably a server remote from the display device 310, assigns the display device 310 to display advertising images at the predetermined geographic location. This assignment may be communicated to the display device 310, by way of the third communication system 332 of the first computing device 330 being electrically coupled to the fourth communication system 342 of the second computing device 340. This electrical coupling may occur through a connection between the third electronic communication port 336, which is preferably an Ethernet port, and the fourth electronic communication port 344, which is also preferably an Ethernet port. The first communication system 312 of the display device 310, in turn, is electrically coupled to the third communication system 332 of the first computing device 330, which is preferably a personal computer, such as through a connection between the first electronic communication port 120 and the second electronic communication port 334, which is preferably a USB port. By way of the assignment, the participant is instructed to take the communication device 320, which is preferably a cellular telephone, with him or her to the predetermined geographic location for location-determination purposes.

[0031] The system 300 may determine the geographic location of the communication device 320 with GPS precision in a preferred embodiment wherein the communication device 320 is a Global Positioning System-enabled communication device and the location-determining unit 322 is a Global Positioning System ("GPS") receiver. The system 300 is consequently preferable over the system 200 of Figure 2 when increased precision is desired. As discussed above with respect to the system 200 of Figure 2, the second signal sent by the communication device 210 in response to the "ping" from the communication network 240 only indicates to the communication network 240 the presence of the communication device 210 in one coverage area of the at least one coverage area 242. A cell in a cellular telephone network, for example, may be approximately six kilometers in diameter. Thus, the system 200 of Figure 2 may not be able to differentiate between, for example, adjacent buildings. By contrast, as is known in the art, GPS location measurements may be accurate to within fifteen meters or less.

[0032] The first communication system 312 is used to transmit "heartbeat" communication signals to the communication device 320 in order to cause the communication device 320 to send location data representing a geographic location of the communication device 320 back to the first communication system 312 for later verification, as described below. The first communication system 312 of the display device 310 thus transmits a heartbeat communication signal to the second communication system 324, preferably over a secure connection as with all other transmissions in the system 300. For example, the heartbeat communication processor 316, which is preferably a microprocessor, causes the first radio frequency transceiver 314 to transmit the heartbeat communication signal 319. The first radio frequency transceiver 314 is, for

example, a Bluetooth radio frequency transceiver if the display device 310 is a Bluetooth-enabled display device.

[0033] The heartbeat communication processor 316 preferably causes the first radio frequency transceiver 314 to transmit the heartbeat communication signal at, for example, a conclusion of a time interval. The time interval is among a set of time intervals. The set of time intervals is preferably a set of consecutive time intervals, and each time interval of the set of time intervals is of equal length. In one embodiment, each time interval may be fifteen minutes in length. In this embodiment, the heartbeat communication processor 316 first receives an event start time and an event stop time from the second computing device 340. The event start time is a time at which the event is to begin, and the event stop time is a time at which the event is to conclude. The heartbeat communication processor then stores the event start time and event stop time on the first computer-readable medium 318, which is preferably a random access memory ("RAM").

[0034] The heartbeat communication processor 316 determines if a current time on an internal clock matches a conclusion time, where the conclusion time is a time of conclusion of the time interval, at which transmission of the heartbeat communication signal occurs. The processor determines the conclusion time by adding a predetermined time interval length stored on the first computer-readable medium 318 to the event start time. The predetermined time interval length is added to the event start time at least once, and is added more times in order to determine conclusion times of successive time intervals. When the current time matches the conclusion time, the heartbeat communication processor 316 causes the transmission of the heartbeat communication

signal 319. In this manner, the presence of the communication device 320 at the predetermined geographic location may be verified repeatedly over a period of time, such as the period of time spanned by the event.

[0035] The second communication system 324 receives the heartbeat communication signal from the first communication system 312. For example, the second radio frequency transceiver 326 receives the heartbeat communication signal from the first radio frequency transceiver 314. The second radio frequency transceiver is, for example, a Bluetooth radio frequency transceiver if the communication device 320 is a Bluetooth-enabled communication device. Preferably, the transmission of the heartbeat communication signal to the second radio frequency receiver 314 only succeeds over a short range; otherwise, the geographic location of the communication device 320 may be determined to be correct when the communication device 320 and thus, likely, the participant, are at a greater distance from the display device 310.

[0036] The first communication system 312 and the second communication system 324 are required to be synchronized for the radio-frequency communication between them to occur. For example, in the embodiment where the display device 310 and the communication device 320 are each Bluetooth-enabled, the first communication system 312 and the second communication system 324 must be synchronized for Bluetooth radio-frequency communication. The synchronization process preferably utilizes the capability of the second computing device 340 to control the radio frequency emissions of the display device 310. The second computing device 340 so controls the radio frequency emissions when the display device 310 is connected to the second computing device 340, through the first computing device 330, in the manner as

discussed above with respect to the assignment of the display device 310 to display advertising images. When a user of the first computing device 330, such as a participant in the event, initiates a command on the first computing device 330 through a web site hosted by the second computing device 340, such as by clicking on a button labeled "Go," the second computing device 340 causes the display device 310 to send a signal to the communication device 320 to attempt to synchronize with the communication device 320. The communication device 320 is preferably programmed to synchronize with the display device 310 upon receipt of the signal. If successful, the entire synchronization operation may occur in approximately five seconds. An indication is sent to the second computing device 340, through the first computing device 330, as to whether the operation was successful and if the operation was not successful, the second computing device 340 continues to attempt to effect the synchronization until it is successful.

[0037] The second communication system 324 then transmits a request for location data to the location-determining unit 322. The request may be in the form of a suitable digital or analog signal. The location data represents a geographic location of the location-determining unit 322, and thus of the communication device 320 of which the location-determining unit 322 is a part. The location-determining unit 322 of the communication device 320 determines its geographic location. By way of example, where the location-determining unit 322 is a GPS receiver, the location-determining unit 322 receives GPS information from the GPS system and thereby determines its geographic location. The location-determining unit 322 then transmits the location data to the second communication system 324.

[0038] In response to the second communication system 324 receiving the heartbeat communication signal from the first communication system 312, the second communication system 324 transmits the location data to the first communication system 312. For example, the second radio frequency transceiver 326 transmits the location data to the first radio frequency transceiver 314. Notably, as with the system 200 of Figure 2, because no call need be initiated by the communication device 320 during this transmission, the activity of the communication device 320 does not give rise to a charge to the participant.

[0039] The first communication system 312 receives the location data from the second communication system 324. The first computer-readable medium 318 then receives the location data from the first communication system 312. For example, the first computer-readable medium 318 receives the location data from the heartbeat communication processor 316 and stores the location data until it is further needed, as discussed below.

[0040] Preferably in response to the connection of the display device 310 to the first computing device 330 and the selection of an option to upload the location data by a user of the first computing device 330, the first communication system 312 receives the location data back from the first computer-readable medium 318. In particular, the heartbeat communication processor 316 receives the location data from the first computer-readable medium 318, and the first electronic communication port 120 then receives the location data from the heartbeat communication processor 316.

[0041] The third communication system 332 of the first computing device 330 then receives the location data from the first communication system 312. For example,

the second electronic communication port 334 receives the location data from the first electronic communication port 120. The fourth communication system 342 of the second computing device 340 then receives the location data from the third communication system 332. For example, the location data may first be transmitted within the third communication system 332 from the second electronic communication port 334 to the third electronic communication port 336, which as discussed above is preferably an Ethernet port. The fourth electronic communication port of the fourth communication system 342, which as discussed above is also preferably an Ethernet port, then receives the location data from the third electronic communication port 336, such as through the communication network 350, which is preferably the Internet.

[0042] The location-comparing unit 346 of the second computing device 340, which is preferably implemented as a suitable combination of digital logic, then receives the location data from the fourth communication system 342 of the second computing device 340. The location-comparing unit 346 determines if the geographic location represented by the location data matches a predetermined geographic location; namely, the predetermined geographic location to which the second computing device 340 has assigned the display device to display advertising images.

[0043] In addition to the above operation, the second computer-readable medium 360 of the display device 310 stores a display identification number used in, for example, registering the display device 310 for use in an event such as an advertising campaign, as discussed in further detail with respect to Figure 10. The first computing device 330 may, through the first electronic communication port 120, read the display identification

number from the second computer-readable medium 360 and provide the display identification number to the second computing device 340.

[0044] The present invention includes an alternate embodiment of the system 300, illustrated as the system 400 in Figure 4, which further increases precision. In this embodiment, the communication device 320 is removed and the location-determining unit 322 is integrated into the first communication system 312 of the display device 310. Integrating a GPS receiver or other suitable location-determining unit into the first communication system 312 is more costly than implementing the embodiment of Figure 3, but because the location-determining unit 322 is now at the precise predetermined geographic location to which the display device 310 has been assigned to display advertising images, the precision of the system 400 is increased. Moreover, the possibility for fraud on the part of the participant is reduced because the participant cannot simply carry the communication device 320 to a convenient geographic location and receive credit for being at the predetermined geographic location. As a consequence of the location-determining unit 322 being integrated into the first communication system 312, the first radio frequency transceiver 314 is also removed, because communication need no longer take place between the display device 310 and any external communication device aside from the first computing device 330 and the second computing device 340.

[0045] The location-determining unit 322 is electrically coupled to the heartbeat communication processor 316 and the electrical power source 126. All other connections of remaining elements are as in the system 300.

[0046] The heartbeat communication processor 316 causes the location-determining unit 322 to transmit location data representing its geographic location to the heartbeat communication processor 316. For example, the heartbeat communication processor 316 may cause the location-determining unit 322 to transmit the location data at a conclusion of a time interval that is among a set of time intervals. As in the system 300, the set of time intervals is preferably a set of consecutive time intervals, and each time interval of the set of time intervals is of equal length. For example, each time interval may be fifteen minutes in length. Upon receiving the location data from the location-determining unit 322, the heartbeat communication processor 316 stores the location data on the first computer-readable medium 318.

[0047] From this point, operation of the system 400 continues as does operation of the system 300. Namely, in response to the connection of the display device 310 to the first computing device 330 and the selection of an option to upload the location data by a user of the first computing device 330, the first communication system 312 receives the location data from the first computer-readable medium 318. The third communication system 332 of the first computing device 330 then receives the location data from the first communication system 312. The fourth communication system 342 of the second computing device 340 then receives the location data from the third communication system 332. The location-comparing unit 346 of the second computing device 340 then receives the location data from the fourth communication system 342. The location-comparing unit 346 determines if the geographic location represented by the location data matches a predetermined geographic location, such as the predetermined geographic

location to which the second computing device 340 has assigned the display device to display advertisements.

[0048] With respect to both systems 300 and 400, the transmission and reception of the various data may be direct or indirect. For example, the heartbeat communication signal may not be received by any other device before it is received by the second communication system 324 of the communication device 320, or the heartbeat communication signal may pass through a communication network before it is received by the second communication system 324. Additionally, instead of the heartbeat communication processor 316 either causing the first radio frequency transceiver 314 to transmit the heartbeat communication signal (in the system 300) or causing the location-determining unit 322 to transmit the location data to the heartbeat communication processor 316 (in the system 400) at a conclusion of a fifteen-minute time interval, the time interval may be ten minutes, thirty minutes, or any suitable length. This action may also take place irregularly or at any suitable time as controlled by the heartbeat communication processor 316. Moreover, in the first communication system 312, the first radio frequency transceiver 314 may be replaced with a separate first radio frequency transmitter and first radio frequency receiver. Likewise, in the second communication system 324, the second radio frequency transceiver 326 may be replaced with a separate second radio frequency transmitter and second radio frequency receiver.

[0049] Additionally with respect to both systems 300 and 400, the display device 310 may include one or more of the light source, the hermetic seal 116, the plurality of supporting element interfaces 118 or a single supporting element interface, and the plurality of supporting elements 130 or a single supporting element, as discussed with

respect to the system 100 of Figure 1. The display device 310 also may not include the electrical power source 126. In this embodiment, the electronic display 112 will require power from the first electronic communication port 120 in order to load an image or change the image being displayed.

[0050] Instead of Bluetooth radio frequency transceivers, one or more of the first radio frequency transceiver 314 and the second radio frequency transceiver 326 may be an IEEE "802.11" tranceiver, an IEEE "802.16" transceiver, or any suitable type of transceiver. Instead of a RAM, the first computer-readable medium 318 may be a static random access memory ("SRAM"), dynamic random access memory ("DRAM"), flash memory, or any suitable type of computer-readable medium. Instead of a cellular telephone, the communication device 320 may be a personal digital assistant ("PDA"), pager, wireless e-mail device, or any suitable communication device capable of transmitting location data to the display device 310. Instead of a personal computer, the first computing device 330 may be a laptop computer, a PDA, a cellular telephone or other mobile wireless device, or any suitable computing device. Instead of a server, the second computing device 340 may be a networked or un-networked personal computer, laptop computer, PDA, cellular telephone or other mobile wireless device, or any suitable computing device. Instead of being implemented as a suitable combination of digital logic, the location-comparing unit 346 may be implemented as software, a suitable combination of digital logic and software, or in any other suitable manner.

[0051] Figure 5 illustrates a flow chart 500 of a method for determining a location, according to one embodiment of the present invention. The method is used to determine the geographic location of a communication device of a participant who is paid

to participate in an event, such as an advertising campaign, in an effort to determine whether the participant is satisfying his or her obligations to present at a predetermined geographic location or locations of the event. The participant is told to take the communication device with him or her to the predetermined geographic location, and the method's determination of the geographic location of the communication device serves as a proxy for the determination of the geographic location of the participant, which is assumed to be the same as the geographic location of the communication device.

[0052] First, at step 510, a display device, such as the display device 310 of the system 300, is assigned, when the event is an advertising campaign, to display advertising images at the predetermined geographic location. This assignment may be made by, for example, a server remote from the display device when the display device is electrically coupled to a computing device that is in bidirectional communication with the server.

[0053] Next, at step 520, a heartbeat communication signal is transmitted by a first communication system within the display device. Specifically, the heartbeat communication signal is transmitted by a first radio frequency transceiver of the first communication system. The heartbeat communication signal may be, for example, a Bluetooth signal if the display device is a Bluetooth-enabled display device. The heartbeat communication signal is preferably transmitted at a conclusion of a time interval. The time interval is preferably among a set of time intervals. The set of time intervals is preferably a set of consecutive time intervals, and each time interval of the set of time intervals is preferably of equal length. In this manner, the presence of the display device at the predetermined location may be verified repeatedly over a period of time, such as the period of time spanned by the event.

[0054] Next, at step 530, the heartbeat communication signal is received at a second communication system of a second communication device, such as a cellular telephone. Specifically, the heartbeat communication signal is received by a second radio frequency transceiver of the second communication system. It is preferable that the heartbeat communication signal is only received when the communication device is a short distance from the display device, as is the case with a Bluetooth signal. Thus, the communication device, and the participant in the event who is likely to travel with the communication device, can travel only a limited distance from the display device without causing a determination that the communication device, and thus the participant, was not present at the predetermined geographic location.

[0055] Next, at step 540, the second communication system transmits, to a location-determining unit of the communication device, a request for location data. The location data represents a geographic location of the location-determining unit and thus a geographic location of the communication device.

[0056] Next, at step 545, the location-determining unit determines its geographic location. The location-determining unit is preferably a GPS receiver. Next, at step 550, the second communication system receives the location data from the location-determining unit. Next, at step 555, the second communication system, in response to receiving the heartbeat communication signal from the display device at step 530, transmits the location data to the first communication system. The transmission of the location data is preferably a wireless transmission such as a Bluetooth transmission where the display device and communication device are each Bluetooth-enabled.

[0057] Next, at step 560, the location data is stored on a computer-readable medium of the display device, such as a random access memory ("RAM"). Preferably, the geographic location of the communication device is monitored over successive time intervals as described above with respect to step 520, and the computer-readable medium stores location data from each of these time intervals until a later time at which the location data is to be read.

[0058] Next, at step 565, a determination is made as to whether the geographic location of the display device needs to be determined for any additional time intervals. That is, it is determined whether the time interval for which the geographic location of the communication device was determined was or was not the last time interval spanned by the event. If the geographic location of the display device needs to be determined for additional time intervals, flow proceeds to step 520 where another heartbeat communication signal is transmitted by the display device to effect the determination. If the geographic location of the display device does not need to be determined for additional time intervals, flow proceeds to step 570.

[0059] At step 570, the first communication system receives the location data stored on the computer-readable medium of the display device. Next, at step 575, a location-comparing unit, which may be, for example, a suitable combination of digital logic within the server, receives the location data from the first communication system.

[0060] Next, at step 580, for each geographic location represented by the location data it is determined, at the location-comparing unit, whether the geographic location matches a predetermined geographic location. From step 580, the method returns to, for

example, step 510, where the display device may be assigned to a new predetermined location to display further advertisements.

[0061] In an alternative embodiment, steps 520, 530, 540, 545, 550 and 555 are omitted and replaced by the steps of transmitting a request for the location data to the location-determining unit, which in this embodiment is included in the display device such as through a built-in GPS receiver, and determining the location data. In this embodiment, consequently, the location data represents a geographic location of the display device, and not the geographic location of the communication device. Accordingly, the communication device is not needed for location-determination purposes. The display device operates, for example, in the same manner as does the display device 310 in the system 400 of Figure 4. After the display device determines the location data, the method continues as before at step 560, where the location data is stored on a computer-readable medium of the display device.

[0062] In another alternative embodiment the display device is in direct communication with the server, such as through an Ethernet port of a computing device within the display device. Thus, at step 510, the assignment of the display device to display advertising images at the predetermined geographic location does not require the display device to be connected to an external computing device. Similarly, at step 580, the display device need not be electrically coupled to the computing device for the location data to be analyzed by the location-comparing unit of the server.

[0063] Figure 6 illustrates a flow chart 600 of a method for crediting a participant in an event, according to one embodiment of the present invention. First, at step 605, a server receives first data representing a desired number of participants in the event. The

first data is preferably received from a sponsor of the event through a sponsor computing device. The sponsor is, for example, an advertiser when the event is an advertising campaign. That is, advertising images displayed at the advertising campaign display the sponsor's name, trademark, products, services, or some combination thereof. Next, at step 610, the server receives second data representing a maximum bid amount. The second data is preferably received from the same source as the first data; namely, from the sponsor computing device.

[0064] Next, at step 615, the server receives a plurality of bids. Each bid of the plurality of bids is preferably received from a computing device belonging to a prospective participant in the event, and represents a monetary amount. Specifically, the monetary amount is the prospective participant's offer of compensation for participation in the event; that is, how much he or she would like to be paid for his or her participation, and is submitted before a closing time designated by the sponsor.

[0065] Next, at step 620, a set of lowest received bids is determined by the server. The set of lowest received bids includes the lowest bids out of all those received by the server, with the set including a number of lowest received bids equal to the desired number of participants represented by the first data received at step 605. The prospective participants who placed the bids in the set of lowest received bids will be chosen as participants in the event. Determining the set of lowest received bids, however, also includes requiring that, for each bid of the plurality of bids, the bid does not exceed the maximum bid amount, represented by the second data received at step 610 and known as a "reserve price," in order for the bid to be a member of the set of lowest received bids. It is, of course, possible that every bid of the plurality of bids exceeds the maximum bid

amount and that the set of lowest received bids consequently will be empty. This possibility is addressed at step 625, as discussed below. Additionally, no prospective participant is allowed to register twice for the event by having two bids for the event included in the set of lowest received bids. Thus, determining the set of lowest received bids also includes requiring that no two bids from the same prospective participant for the same event be included in the set of lowest received bids. Preferably, if two bids from the same prospective participant for the same event would otherwise be included in the set of lowest received bids, the higher of the two bids will not be included in the set. Once the set of lowest received bids has been determined, each prospective participant who placed a bid is notified by e-mail as to whether his or her bid is or is not included in the set of lowest received bids.

[0066] Next, at step 625, a determination is made as to whether the set of lowest received bids is empty. For example, the set of lowest received bids may be empty, as discussed above, if every bid of the plurality of bids exceeds the maximum bid amount. If the set of lowest received bids is empty, flow proceeds to step 615, where the server receives a new plurality of bids. If the set of lowest received bids is not empty, flow proceeds to step 630.

[0067] At step 630, the server transmits an image, such as advertising image if the event is an advertising campaign, to a computing device from which one bid of the set of lowest received bids was received, so that a participant who placed the one bid through the computing device may load the image on to a display to be worn at the event, such as the display 112 described above with respect to, for example, Figure 1.

[0068] At step 635, a fee is assessed against the sponsor of the event. The fee is equal to the sum of each bid of the set of lowest received bids plus a percentage of each bid of the set of lowest received bids, which a coordinator of the event takes as commission. The fee may be in addition to a flat charge for coordinating the event, a flat charge for establishment of the "reserve price," and any charges for upgrades to the sponsor's listing on a web site hosted by the server of the coordinator. The coordinator of the event may be, for example, the entity that operates the server and facilitates contact between the sponsor and participants by making the determination of the set of lowest received bids, transmitting advertising images to participants in the advertising campaign, and crediting participants for their participation as described below.

[0069] Next, at step 640, a determination is made as to whether a communication device, such as a cellular telephone, of the participant who placed the one bid was present at a first predetermined geographic location of the event at a first conclusion of a first predetermined time interval; that is, at the end of the first predetermined time interval. As discussed above with respect to, for example, the systems 200, 300 and 400 of Figures 2, 3 and 4, the method assumes that the participant carries the communication device with him or her at the event so that the geographic location of the communication device is the same as the geographic location of the participant. Thus, the method tracks the geographic location of the communication device as a proxy for determining whether the participant was present at the correct geographic location or locations at the event.

[0070] The method contemplates different rules regarding when the device is considered to be so present depending on which of the systems 200, 300, and 400 for determining a location is in use. For example, when the system 200 is in use, the

communication network 240 is able to ascertain whether the communication device 210 was turned on at a particular time, even if the communication network 240 could not receive the second signal, i.e., the response to the first signal. Thus, if the communication device 210 was turned on but the communication network 240 could not receive the second signal at the conclusion of the predetermined time interval, the participant will be given the benefit of the doubt and the communication device will be considered present at the first predetermined geographic location at the first conclusion of the first predetermined time interval. If the communication device was turned off at the first conclusion of the first predetermined time interval, the participant may be given one warning and the communication device may be considered present at the first predetermined geographic location at the first conclusion of the first predetermined time interval the first time the communication device was turned off, but not thereafter unless a suitable explanation is provided for the communication device having been turned off.

[0071] By contrast, when the system 300 or the system 400 for determining a location is in use, the second computing device 340 cannot determine whether the communication device 320 was on or off at a conclusion of a predetermined time interval for which location data is missing. Accordingly, the communication device may be considered present at the first predetermined geographic location at the first conclusion of the first predetermined time interval if the communication device is present at a second predetermined geographic location at a second conclusion of a second predetermined time interval; that is, at the end of the second predetermined time interval, and if the communication device is present at a third predetermined geographic location at a third conclusion of a third predetermined time interval; that is, at the end of the third

predetermined time interval. The second predetermined time interval preferably immediately precedes the first predetermined time interval, and the third predetermined time interval preferably immediately follows the first predetermined time interval.

[0072] Step 640 also involves the use of standard fraud protection methods common to the industry of which the event is a part. These methods supplement the use of systems such as the systems 200, 300, and 400. For example, the coordinator may employ persons to perform a visual check that the participant is present at the first predetermined geographic location at the first conclusion of the first predetermined time interval. Such visual checks may continue periodically throughout the event.

[0073] If it is determined at step 640 that the communication device was present at the first predetermined geographic location at the first conclusion of the first predetermined time interval, flow proceeds to step 645. If it is determined at step 640 that the communication device was not present at the first predetermined geographic location at the first conclusion of the first predetermined time interval, flow proceeds to step 650.

[0074] In the event that flow proceeds to step 645, the participant is credited, by way of a credit to his or her credit card account, with a monetary amount equal to a fraction of the one bid. The fraction may be, for example, based on a number of predetermined time intervals after which the geographic location of the communication device is to be verified. Thus, if the geographic location of the communication device is to be verified after ten different predetermined time intervals, then the communication device being present at the first predetermined geographic location at the first conclusion of the first predetermined time interval merits a credit for one tenth the amount of his or

her bid. At this point, the server preferably notifies the participant, such as by e-mail, that he or she has been credited. The server also preferably notifies the sponsor of the event that the communication device of the participant was present at the first predetermined geographic location at the first conclusion of the first predetermined time interval and has been credited appropriately. Flow then proceeds to step 655.

[0075] In the event that flow proceeds to step 650 from step 640, the participant is not credited. At this point, the server preferably notifies the participant, such as by e-mail, that he or she has not been credited. The server also preferably notifies the sponsor of this fact and credits any amount not paid to the participant to the sponsor, because the advertiser has been assessed that amount in fees at step 635. Flow then proceeds to step 655.

[0076] At step 655, a determination is made if the geographic location of the communication device is to be verified at the conclusion of additional predetermined time intervals. If the geographic location of the communication device is to be verified at the conclusion of additional predetermined time intervals, flow proceeds to step 640 for a determination as to whether the communication device was present at a new predetermined geographic location of the event at a new conclusion of a new predetermined time interval. If, by contrast, the geographic location of the communication device is not to be verified at the conclusion of additional predetermined time intervals, flow proceeds to step 660.

[0077] At step 660, a determination is made if any more communication devices of other participants are to have their geographic locations verified. If more communication devices are to have their geographic locations verified, flow proceeds to

step 640 for the above-described determinations of the geographic location of a new communication device of a new participant. If no more communication devices are to have their geographic locations verified, flow proceeds instead to step 605, at which point the method may be repeated.

[0078] The present invention contemplates various alternatives to the method of the flow chart 600. For example, at step 645, the participant may be credited other than by way of a credit to his or her credit card account. For example, the participant may have an account with the coordinator which represents an amount owed by the coordinator or the participant to the other. The participant may collect on any amount owed to him or her or pay any amount owed to the coordinator by initiating a credit card transfer, paying by check, and so on. Thus, the credit to the participant at step 645 may simply be a credit to the account with the coordinator and not a direct credit to a credit card account.

[0079] Additionally, when the system 300 or the system 400 for determining a location is in use, if location data is missing at the first conclusion of the first predetermined time interval, the communication device may, as described above, be considered present at the first predetermined geographic location at the first conclusion of the first predetermined time interval if the communication device is present at the second predetermined geographic location at the second conclusion of the second predetermined time interval and if the communication device is present at the third predetermined geographic location at the third conclusion of the third predetermined time interval. However, in this alternate embodiment, allowance is made for missing location data at the conclusions of multiple consecutive predetermined time intervals. Namely, the second

predetermined time interval may precede the first predetermined time interval by no more than a first allowable number of time intervals, where the first allowable number of time intervals may be greater than one. Similarly, the third predetermined time interval may precede the first predetermined time interval by no more than a second allowable number of time intervals, where the second allowable number of time intervals may be greater than one. The participant may also be offered the opportunity to explain missing location data to the coordinator, such as by telephone or e-mail.

[0080] In another alternate embodiment, step 610 is removed; that is, the method does not include receiving the second data representing the maximum bid amount or "reserve price." Thus, determining the set of lowest received bids does not include requiring that, for each bid of the plurality of bids, the bid does not exceed the maximum bid amount. In yet another alternate embodiment, if at step 660 it is determined that no more communication devices of other participants are to have their geographic locations verified, flow may proceed from step 660 to step 610 instead of to step 605. Thus, the method may be repeated without receiving new second data representing a new maximum bid amount. Similarly, flow may proceed from step 660 to step 615 instead of step 605; thus, the method may be repeated without receiving either the new second data or new first data representing a new desired number of participants.

[0081] Figure 7 illustrates a flow chart 700 of a method for crediting a participant in an event, such as an advertising campaign, according to one embodiment of the present invention. First, at step 710, a first telephone number is designated. The first telephone number represents a first telephone connection, such as a land line telephone connection. The first telephone number is preferably designated by a coordinator of the event. For

example, if the event is an advertising campaign, the first telephone connection may be set up by the coordinator to take calls from spectators at the advertising campaign who are interested in contacting the advertiser after seeing displayed advertisements. As discussed hereinafter, once a spectator calls the first telephone number, the coordinator properly credits the participant in the advertising campaign who facilitated the call, and the spectator is then passed from the first telephone connection to a second telephone connection that belongs to the advertiser.

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[0082] Next, at step 720, a second telephone number is designated. The second telephone number is designated by the sponsor of the event; thus, if the event is an advertising campaign, the second telephone number is designated by an advertiser conducting the advertising campaign. The second telephone number represents a second telephone connection, such as a land line telephone connection.

[0083] Next, at step 730, for each bid that has been determined to be in a set of lowest received bids, such as through the method of Figure 6, the first telephone number is transmitted to a computing device of the participant in the event from whom the bid was received. The first telephone number may be transmitted by, for example, a server of the coordinator.

[0084] Next, at step 740, a connection is established between the first telephone connection and a communication device of a participant in the event. The communication device may be, for example, a cellular telephone. The connection may be established, for example, by the communication device initiating a cellular telephone call to the first telephone number that was transmitted to the computing device of the participant. Thus, spectators at the event may use the communication device of the

participant to contact the sponsor, and as discussed in further detail hereinafter, the participant may be credited for providing such a "lead."

[0085] Next, at step 750, the participant is credited, such as through a credit card account, with a predetermined monetary amount for the establishment of the connection between the communication device and the first telephone connection. The predetermined monetary amount is specified by the sponsor. The participant is credited by the coordinator of the event, who then assesses a fee against the sponsor for the predetermined amount plus any applicable commission. The coordinator is able to credit the participant because the first telephone number that represents the first telephone connection is designated by the coordinator. Thus, at the first telephone connection, the coordinator recognizes the communication device, and consequently the participant to whom it belongs, as having facilitated the establishment of the connection.

[0086] Next, at step 760, the communication device is connected to the second telephone connection. This connection is performed by the first telephone connection and completes the process of establishing a connection between the communication device and the second telephone connection so that the spectator using the communication device may communicate with the sponsor.

[0087] From step 760, the method proceeds, for example, to step 740 where another connection is established between the communication device and the first telephone connection, as in a situation where the participant provides a subsequent "lead."

[0088] In an alternative embodiment, step 760 is omitted and the coordinator answers any questions posed by the spectator using the communication device once the

connection is established between the communication device and the first telephone connection. In another alternative embodiment, step 730 involves text messaging the first telephone number directly to the communication device instead of transmitting the first telephone number to the computing device of the participant.

[0089] In another alternative embodiment, step 750 involves crediting the participant through other than a credit card account. For example, the participant may have an account with the coordinator which represents an amount owed by the coordinator or participant to the other. The participant may collect on any amount owed to him or her or pay any amount owed to the coordinator by initiating a credit card transfer, paying by check or cash, and so on. Thus, the credit to the participant at step 750 may simply be a credit to the account with the coordinator and not a direct credit to a credit card account.

[0090] In yet another alternative embodiment, flow may proceed from step 760 to step 710 where a new first telephone number is designated and the method is repeated from step 710. Similarly, flow may proceed from step 760 to step 720 where a new second telephone number, but not a new first telephone number, is designated, such as if the sponsor wishes to change its contact telephone number but the coordinator does not wish to change its contact telephone number.

[0091] Figure 8 illustrates a block diagram of a system 800 for crediting a participant in an event, according to one embodiment of the present invention. The system 800 includes a server 810, a remote computing device 820, and a sponsor computing device 830.

[0092] The server 810 is in bidirectional communication with the sponsor computing device 830 and the remote computing device 820.

[0093] In operation, the server 810 receives, from the sponsor computing device 830, first data representing a desired number of participants in an event. The sponsor computing device 830 is operated by a sponsor of the event and the desired number of participants in the event is specified by the sponsor. For example, the sponsor may be an advertiser conducting an advertising campaign. The server 810 then receives, from the sponsor computing device 830, second data representing a maximum bid amount. The maximum bid amount represents a maximum bid placed by a prospective participant which will be considered in selecting participants for the event. A bid represents a monetary amount that a prospective participant wishes to be paid for participation in the event. The prospective participant places a bid through the remote computing device 820 and other prospective participants similarly place bids through other remote computing devices that are in bidirectional communication with the server 810.

[0094] The server 810 receives the bid from the remote computing device 820. The server 810 then determines a set of lowest received bids. The set of lowest received bids includes the lowest bids out of all those received by the server 810, with the set including a number of lowest received bids equal to the desired number of participants represented by the first data received by the server 810. The prospective participants who placed the bids in the set of lowest received bids will be chosen as participants in the event. Determining the set of lowest received bids, however, also includes requiring that no bid of the set of lowest received bids exceeds the maximum bid amount, represented by the second data received by the server 810 and known as a "reserve price," in order to

be a member of the set of lowest received bids. The server 810 transmits an image, such as an advertising image when the event is an advertising campaign, to the remote computing device 820 if the bid received from the remote computing device 820 is a member of the set of lowest received bids. The advertising image is an image to be displayed on a display device of the participant at the advertising campaign. The server 810 also assesses a fee against the sponsor. The fee is equal to a sum of each bid of the set of lowest received bids plus a percentage of each bid of the set of lowest received bids, which a coordinator of the event who operates the server 810 takes as commission.

[0095] In accordance with the teachings of the method of Figure 6, and specifically steps 640 and 645 of the flow chart 600, the server 810 determines if a communication device of a participant in the event, such as a cellular telephone, is present at a first predetermined geographic location. The participant is one who placed one bid of the set of lowest received bids. The server 810 credits the participant a monetary amount equal to a fraction of the one bid if the device is present at the first predetermined geographic location.

[0096] In an alternative embodiment, the server 810 may not receive from the sponsor computing device 830 the second data representing the maximum bid amount or "reserve price." In this embodiment, the determination of the set of lowest received bids does not include requiring that no bid of the set of lowest received bids exceeds the maximum bid amount. In another embodiment, the sponsor computing device 830 may be omitted. In this embodiment, the first data and if present, the second data, are provided by a user of the server 810. The user of the server 810 may be, for example, the

coordinator of the event, who has received the first data and second data from the sponsor ahead of time.

[0097] In yet another embodiment, the display device of the participant includes a built-in computing device that performs the functions of the remote computing device 820, and the remote computing device 820 is omitted.

[0098] Figure 9 illustrates a block diagram of a system 900 for crediting a participant in an event, such as an advertising campaign, according to one embodiment of the present invention. The system 900 includes a server 910, a remote computing device 920, a communication device 930, a coordinator computing device 940, a sponsor computing device 950, a first telephone connection 960, and a second telephone connection 970.

[0099] The server 910 is in bidirectional communication with the remote computing device 920 and the coordinator computing device 940. The remote computing device 920 communicates unidirectionally to the communication device 930. The communication device 930 is in bidirectional communication with the first telephone connection 960, subject to the operation of the system 900 as described hereinafter. The communication device 930 is in bidirectional communication with the second telephone connection 970, subject to the operation of the system 900 as described hereinafter. The sponsor computing device 950 communicates unidirectionally to the first telephone connection 960. The first telephone connection 960 communicates unidirectionally to the second telephone connection 970.

[00100] In operation, the first telephone connection 960 is represented by a first telephone number. The second telephone connection 970 is represented by a second

telephone number. The first telephone number is designated by the coordinator computing device 940, which is preferably a personal computer and is operated by a coordinator of an event, and the second telephone number is designated by the sponsor computing device 950, which is preferably a personal computer and is operated by a sponsor of the event, such as an advertiser conducting an advertising campaign. As discussed above with respect to the method of Figure 7, where the event is an advertising campaign, the first telephone connection may be set up by the coordinator to take calls from spectators at the advertising campaign who are interested in contacting the advertiser after seeing displayed advertisements.

[00101] The server 910 receives the first telephone number from the coordinator computing device 940. If a bid placed to the server 910 through the remote computing device 920, which is preferably a personal computer, has been determined to be a member of a set of lowest received bids, such as through the method of Figure 6, the server 910 transmits the first telephone number to the remote computing device 920. The remote computing device 920 is operated by a participant in the event who placed the bid, and the communication device 930, which is preferably a cellular telephone, is also operated by the participant. The communication device 930 thus receives the first telephone number from the participant.

[00102] When a spectator at the event expresses to the participant a desire to contact the sponsor, the participant causes the communication device 930 to establish a connection with the first telephone connection 960, which is preferably a land line telephone connection, using the first telephone number. For example, the participant may give the communication device 930 to the spectator to initiate a call using the first

telephone number. The server 910 credits the participant, such as through a credit card account, with a predetermined monetary amount for establishing the connection between the communication device 930 and the first telephone connection 960. The predetermined monetary amount is specified by the sponsor. The server 910 is able to credit the participant because the server 910 is preferably operated by the coordinator and the first telephone number that represents the first telephone connection 960 is designated by the coordinator. Thus, the coordinator recognizes the communication device 930, and consequently the participant who operates it, as having facilitated the establishment of the connection to the first telephone connection 960.

[00103] The first telephone connection 960 then connects the communication device 930 to the second telephone connection 970, which is preferably a land line telephone connection, by using the second telephone number. The first telephone connection 960 receives the second telephone number from the sponsor computing device 950. After the communication device 930 is connected to the second telephone connection 970, the spectator using the communication device 930 may communicate with the sponsor regarding content the spectator has observed at the event.

[00104] The present invention contemplates several alternative embodiments of the system 900. For example, the remote computing device 920 may be omitted, and instead of the server 910 transmitting the first telephone number to the remote computing device 920, the server 910 may send a text message including the first telephone number directly to the communication device 930. Additionally, the second telephone connection 970 may be omitted and the coordinator may answer any questions posed by the spectator using the communication device 930 once the connection is established between the

communication device 930 and the first telephone connection 960. In still another alternate embodiment, the coordinator computing device 940 may be omitted and the first telephone number may be designated by a user of the server 910. The user of the server 910 may be, for example, the coordinator itself.

[00105] Figure 10 illustrates a flow chart 1000 of a method for conducting an event, such as an advertising campaign, according to one embodiment of the present invention. First, at step 1005, a prospective participant in the event acquires a display apparatus, such as the display apparatus 101 of Figure 1, to be worn at the event for displaying images. The prospective participant may acquire the display apparatus, for example, by connecting to the web site of a coordinator of the event and paying for the display apparatus in full through the web site. Preferably, if the prospective participant ever loses or breaks the display apparatus, the prospective participant is responsible for acquiring a new display apparatus.

[00106] Next, at step 1010, the prospective participant creates an account for himself or herself and registers his or her display apparatus. These actions are accomplished through the web site of the coordinator of the event. In particular, to register the display apparatus, a server hosting the web site reads a display identification number from a computer-readable medium of the display apparatus, as discussed above with respect to, for example, the system 300 of Figure 3, and associates the display identification number with an account of the prospective participant. In order for the display identification number to be read, the display apparatus must be connected to a computing device of the prospective participant which is used to connect to the web site of the coordinator.

[00107] Next, at step 1015, the prospective participant provides payment information to the web site of the coordinator. The payment information may be, for example, credit card information, and indicates how the prospective participant is to be paid upon a determination that the prospective participant was present at a predetermined geographic location at a conclusion of a predetermined time interval. By providing credit card information, the prospective participant also implicitly confirms that he or she is at least eighteen years of age, as may be required by one or more of the coordinator and a sponsor of the event, such as an advertiser if the event is an advertising campaign.

[00108] Next, at step 1020, the prospective participant provides device identification information, such as a cellular telephone number, to the web site of the coordinator so that the coordinator may confirm that the prospective participant is using a communication device, such as a cellular telephone having the cellular telephone number, that has, for example, functioning GPS capability. Thus, the prospective participant's geographic location throughout the event can be determined by, for example, the system 300 of Figure 3.

[00109] Next, at step 1025, the prospective participant consents to have the server of the coordinator initiate an attempt to contact his or her communication device to confirm that the communication device has, for example, functioning GPS capability. Next, at step 1030, the server of the coordinator initiates the attempt to contact or "ping" the communication device through a communication network with which the communication device is communicating, such that if the communication device is successfully contacted and a reply successfully received by the communication network,

the communication network will provide the geographic location of the communication device to the server of the coordinator.

[00110] Next, at step 1035, a determination is made as to whether the geographic location of the communication device was received by the server of the coordinator in response to the contact attempt. If the geographic location was received, flow proceeds to step 1040. If the geographic location was not received, flow proceeds to step 1030 where the server initiates another attempt to contact the communication device.

[00111] In the event that flow proceeds to step 1040, the prospective participant synchronizes a heartbeat communication system in his or her display apparatus, such as the first communication system 312 of the display device 310, with his or her communication device. The synchronization proceeds in the manner described above with respect to the system 300 of Figure 3.

[00112] Next, at step 1045, a test heartbeat communication operation is performed in order to ensure that the display apparatus and the communication device are operating properly. Namely, in the manner described with reference to, for example, the system 300, the server causes the first communication system 312 to transmit the heartbeat communication signal to the communication device 320. The communication device then sends location data to the display apparatus in response and the location data is stored on the display apparatus. The server then reads the location data from the display apparatus, through the computing device of the prospective participant to confirm proper heartbeat communication system operation.

[00113] Next, at step 1050, the coordinator receives from the sponsor information about the event. This information includes, for example, the desired number of

participants in the event, a maximum bid amount or "reserve price" representing the highest bid that the sponsor is willing to accept from a prospective participant, the geographic location or locations at which participants are required to be present during the event, and the start and stop times of the event.

[00114] Next, at step 1055, the prospective participant places one or more bids to participate in the event. Each bid represents an offer of compensation for participation in the event; that is, each bid represents an amount that the participant would like to be paid for participating in the event. Next, at step 1060, a determination is made as to whether any bid placed by the prospective participant has been determined to be a member of a set of lowest received bids. As discussed above with respect to, for example, Figure 6, the set of lowest received bids includes the lowest bids out of all those received from all prospective participants, with the set including a number of lowest received bids equal to the desired number of participants specified by the sponsor. If one or more bids placed by the prospective participant has been determined to be a member of the set of lowest received bids, flow proceeds to step 1065. If no bid placed by the prospective participant has been determined to be a member of the set of lowest received bids, flow proceeds to step 1050 where the coordinator receives information about a new event that is to be bid on.

[00115] In the event that flow proceeds to step 1065, the participant is notified, preferably by e-mail, that one or more of his or her bids has been determined to be a member of the set of lowest received bids. Next, at step 1070, the participant, with the display apparatus connected to his or her computing device, obtains one or more images

for the display apparatus from the web site of the coordinator. The one or more images are to be displayed on the display apparatus during the event.

[00116] Next, at step 1075, a determination is made after the event as to whether each geographic location represented by the location data stored on the display apparatus during the event is correct. Namely, the server of the coordinator receives all of the location information after the participant connects the display apparatus to his or her computing device. The server then compares each individual geographic location to a predetermined geographic location at which the participant was obliged to be present at a conclusion of a predetermined time interval during the event. If one or more of the individual geographic locations matches the appropriate predetermined geographic location, flow proceeds to step 1080. If no individual geographic locations match the appropriate predetermined geographic location, flow proceeds to step 1085.

[00117] In the event that flow proceeds to step 1080, the participant is credited an appropriate amount for his or her communication device, and thus presumably the participant, being at one or more of the predetermined geographic locations at the conclusion of one or more of the predetermined time intervals during the event. For example, as described above with respect to the flow chart 600, if the geographic location of the communication device is verified at the conclusion of ten predetermined time intervals by receiving location data through the heartbeat system that corresponds to ten geographic locations, then for each of the conclusions of the ten predetermined time intervals that the communication device is present at the predetermined geographic location, the participant will be credited one tenth the amount of his or her bid. The participant and sponsor are each preferably notified by e-mail that the participant has

been credited. Flow then proceeds to step 1050 where the coordinator receives information about a new event that is to be bid on.

[00118] In the event that flow proceeds instead to step 1085, the participant is not credited and the participant and sponsor are preferably notified of this fact by e-mail. Flow then proceeds to step 1050 where the coordinator receives information about a new event that is to be bid on.

[00119] Instead of the prospective participant acquiring the display apparatus at step 1005 by connecting to the web site of a coordinator of the event and paying for the display apparatus in full through the web site, the display apparatus may be acquired in various other ways. For example, the coordinator may give away some display apparatuses at no cost to promote interest in participation in events coordinated by the coordinator. Additionally, the prospective participant may connect to the web site of the coordinator but instead of paying for the display apparatus in full, may pay a percentage of his or her earnings from participation in events coordinated by the coordinator until the display apparatus is fully paid for or a certain amount of time has passed, such as one year, whichever occurs first. If the certain amount of time passes before the display apparatus is paid for in full, the prospective participant may be charged for the remaining cost of the display apparatus by way of a charge to his or her credit card account or a charge to an account that he or she has with the coordinator. Further still, the prospective participant may acquire a display paid for by a sponsor in return for participation in one or more of that sponsor's events.

[00120] Another alternative embodiment contemplates the separation of step 1015 into two separate steps. At the first step, the prospective participant would provide

provides payment information to the web site of the coordinator, which may be other than credit card information. For example, the prospective participant may provide an address to which checks or cash may be mailed. At the second step, the prospective participant may provide any age verification which was unable to be discerned from the information provided in the first step. The age verification may include, for example, a scanned photocopy of a driver's license, identification card, passport, or the like.

[00121] In still another alternative embodiment, flow may return to step 1005 at any time as needed, such as, for example, when the prospective participant loses or breaks his or her display apparatus and is forced to acquire a new display apparatus and set up a new account with the coordinator.

[00122] In yet another alternative embodiment, if it is determined at step 1035 that the location of the communication device was not received by the coordinator in response to the contact attempt, flow may proceed to step 1020 instead of step 1030. For example, if the prospective participant has erroneously entered the identification information of the communication device, the prospective participant may re-enter this information when flow proceeds to step 1020.

[00123] The teachings of the present invention may be applied to events other than advertising campaigns. For example, the present invention may be used for providing information, though not advertising content, at outdoor public venues where information cannot readily be provided by television screens. For example, participants may use display devices to display information about different airplanes flying in an outdoor air show. The display devices may also provide television content or interactive

entertainment in areas where standard televisions are not available or where it is desired that such content presentation be readily movable from one place to another.

[00124] Additionally, in the various embodiments of the present invention, the coordinator and sponsor may be collapsed into a single entity, such as in the case where the same entity whose products and services are being advertised also assumes responsibility for choosing participants in the advertising campaign, verifying those participants' geographic locations, crediting those participants when their geographic locations match predetermined geographic locations, and so on as described above with respect to the actions of the coordinator.

[00125] In view of the foregoing teaching, the present invention provides numerous advantages over other known display configurations, systems, and methods. For example, in contrast to other wearable display configurations that use standard computer screen displays and cumbersome display apparatuses, the wearable display configuration 100 of the present invention allows the user 151 to wear a lightweight electronic display 112 which maintains the first image 114 thereon without receiving any electrical power. The need for an electrical power source in the wearable display configuration 100 is eliminated. The present invention nonetheless provides an improvement over many such electronic displays, which lack the ability to switch from displaying one image to another image without the use of wall current. Namely, in one embodiment of the present invention, an electrical power source such as a battery is provided which allows the electronic display 112 to switch from displaying the first image 114 to the second image 115.

[00126] The present invention also remedies the deficiencies of other systems and methods for determining a geographic location. Previously known systems require in-person monitoring of the event by a coordinator or sponsor of the event in order to verify correct geographic locations of participants. In several embodiments, however, the present invention provides systems and methods by which the geographic location of a communication device of a participant is automatically determined as a proxy for the geographic location of the participant himself or herself. The geographic location is determined without the need for human monitoring and data representing that geographic location is then transmitted to a computing device, such as a server operated by a coordinator of the event, for comparison with a predetermined geographic location to which the participant was assigned. Moreover, the systems and methods determine the geographic location of the communication device without causing the participant to incur any charges from his or her communication service provider. The present invention thus provides more efficient and cost-effective administration of events for each of the participant, coordinator, and sponsor.

OK

[00127] Additionally, however, the present invention recognizes that with automatic verification of geographic location comes the possibility that geographic location data will be missing or unascertainable for a variety of reasons, including technology shortcomings. Consequently, several embodiments of the present invention provide desirable rules regarding when the communication device of the participant will be considered to be present at the predetermined geographic location at a particular conclusion of a particular time interval even if the geographic location data is missing or unascertainable at that time.

[00128] The present invention also provides other new and desirable automated features in connection with the systems and methods for determining geographic location. For example, the present invention provides for control of the timing of location-determining operations through the heartbeat communication processor 316, which causes the transmission of the heartbeat communication signal at a conclusion of a time interval. The present invention also provides for the storage of location data representing the geographic location of the communication device on a computer-readable medium of a display device used by the participant at the event, so that the location data may later be read from the computer-readable medium and provided to the server. Additionally, the display device used by the participant may be automatically assigned to the predetermined geographic location by the server.

[00129] The present invention provides still further improvements as compared to prior art systems and methods which rely on human monitoring of participants to verify their geographic locations. For example, the present invention utilizes automatic location verification capabilities in connection with the administration of events, such as advertising campaigns, in which a participant is selected by the server based on whether one of his or her bids is among a set of lowest received bids. In this manner, the present invention provides a unified system and method for automatically and efficiently administering such events.

[00130] Moreover, previously known systems and methods rely on participants only to display images by way of display devices. Another desirable feature of the present invention includes a system and method for crediting a participant in an event, such as an advertising campaign, when the participant allows a spectator at the event to

use a communication device to establish a connection with a first telephone connection. By crediting the participant at that point and then connecting the communication device directly to a second telephone connection operated by the sponsor of the event, the present invention incentivizes participants to facilitate immediate contact between spectators and the sponsor. Consequently, the present invention increases the likelihood that the event will yield desirable results, such as increased sales of advertised products and services, for the sponsor.

[00131] Accordingly, it will be seen that the present invention includes numerous embodiments which facilitate the administration of an event. These embodiments provide greater comfort for the participant and, for the coordinator and sponsor of the event, greater efficiency in monitoring and rewarding the participant's performance. Other benefits of the present invention will be recognized by one of ordinary skill in the art.

[00132] While particular elements, embodiments, and applications of the present invention have been shown and described, it is understood that the invention is not limited thereto because modifications may be made by those skilled in the art, particularly in light of the foregoing teaching. It is therefore contemplated by the appended claims to cover such modifications and incorporate those features which come within the spirit and scope of the invention.

Figure 1

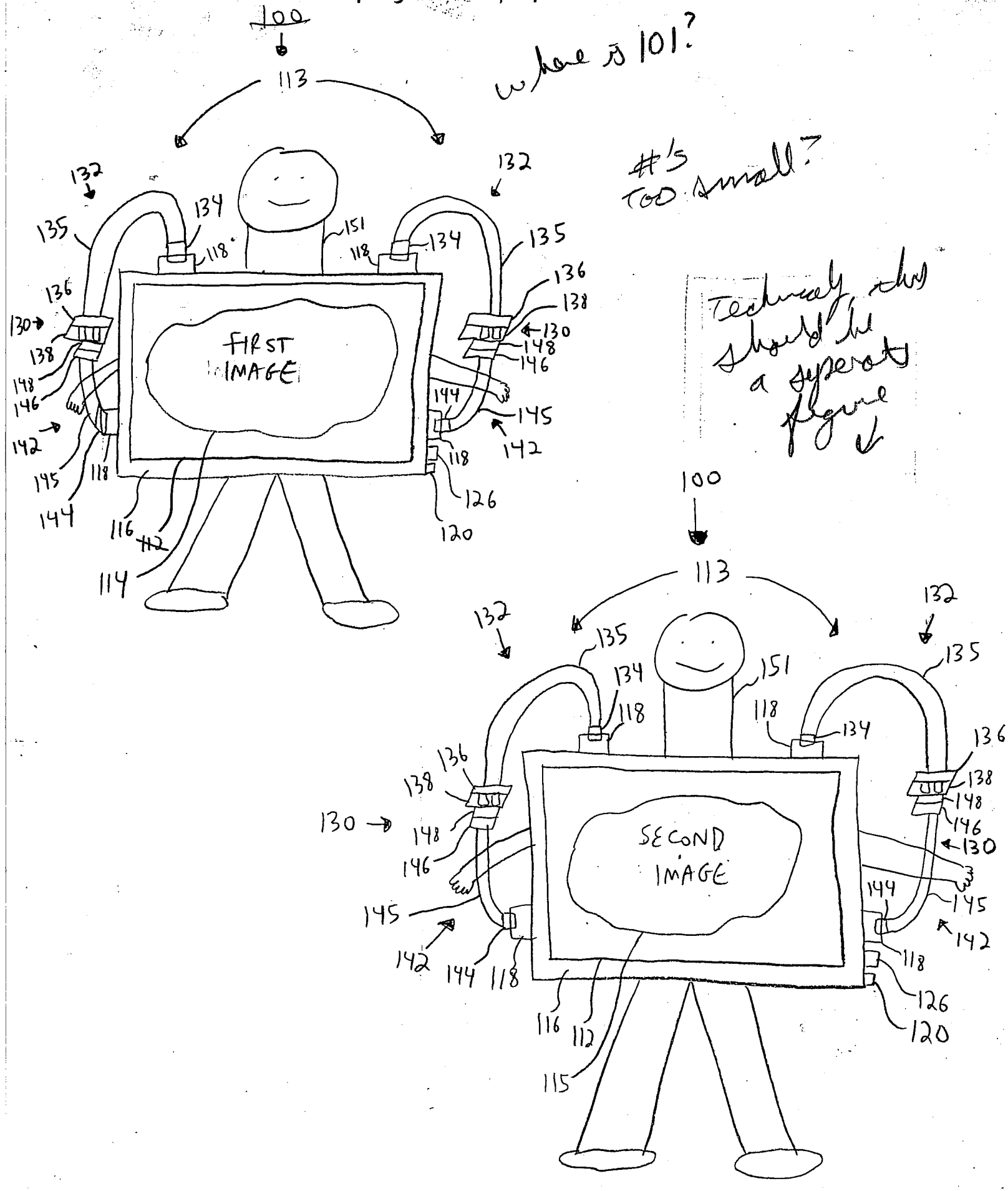

100
113
where is 101?
#'s too small?
132
134
135
151
118
136
138
130
148
146
142
144
145
126
120
116
112
114
FIRST IMAGE
Technically this should be a seperate figure
SECOND IMAGE
115

Figure 2

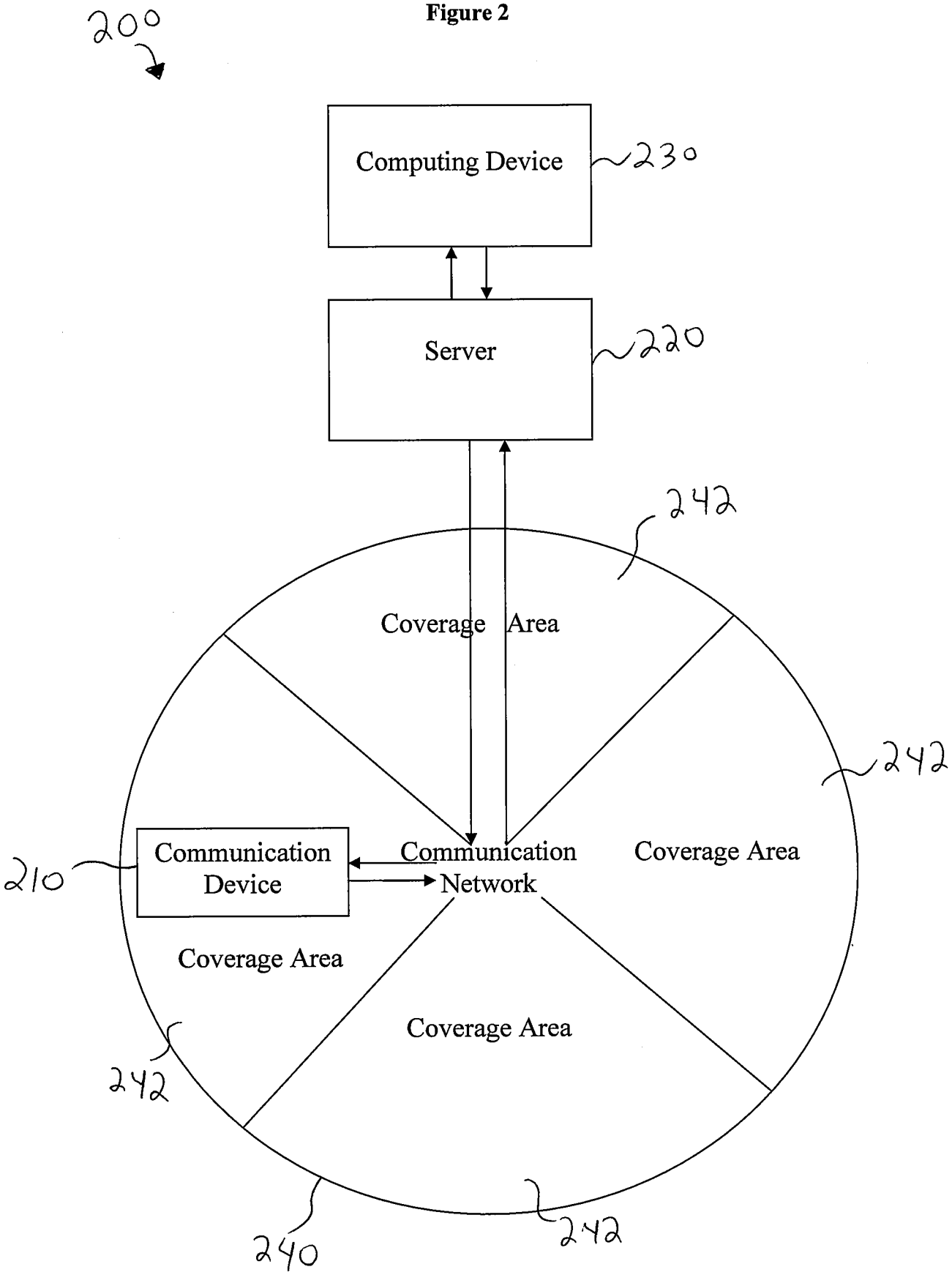
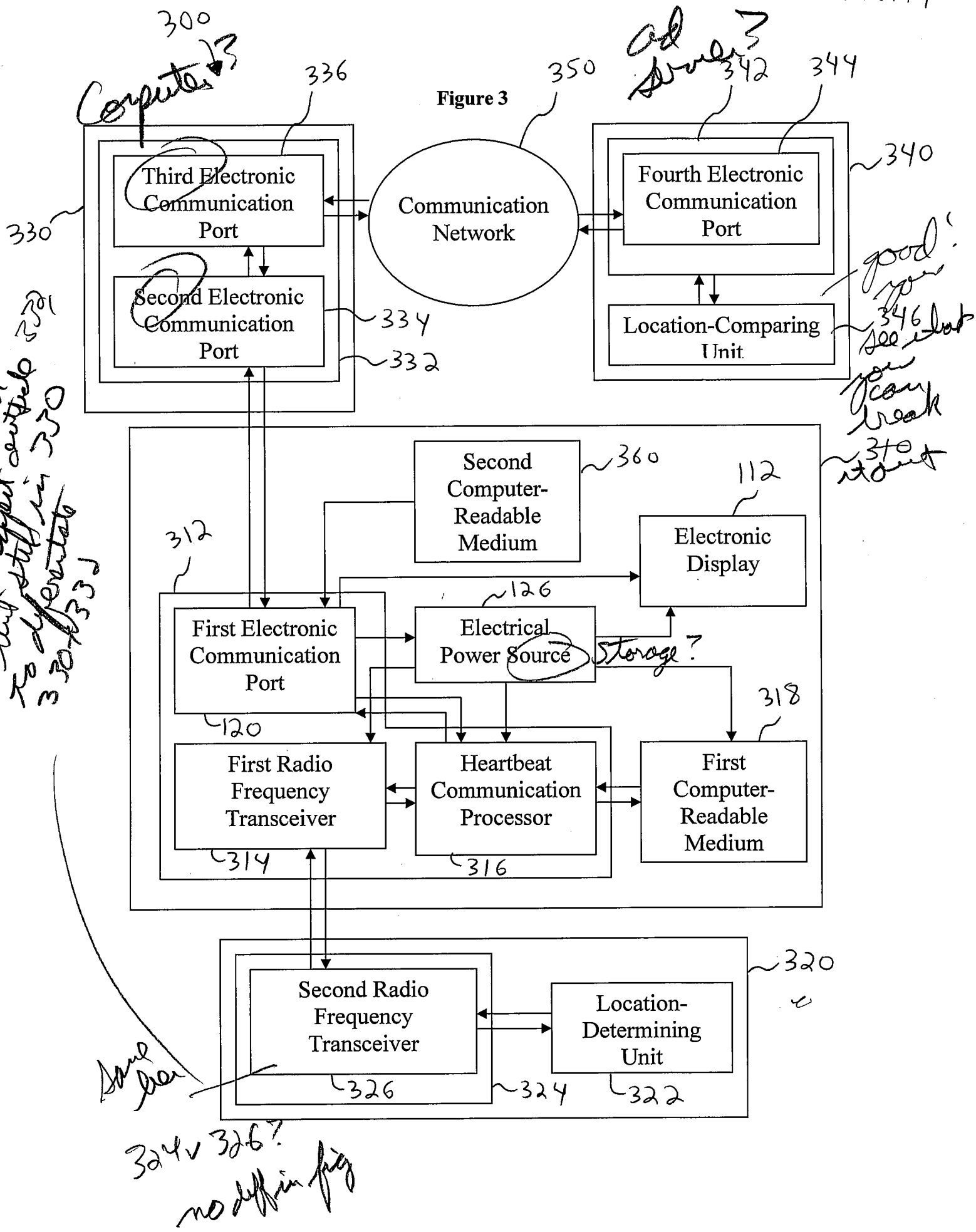
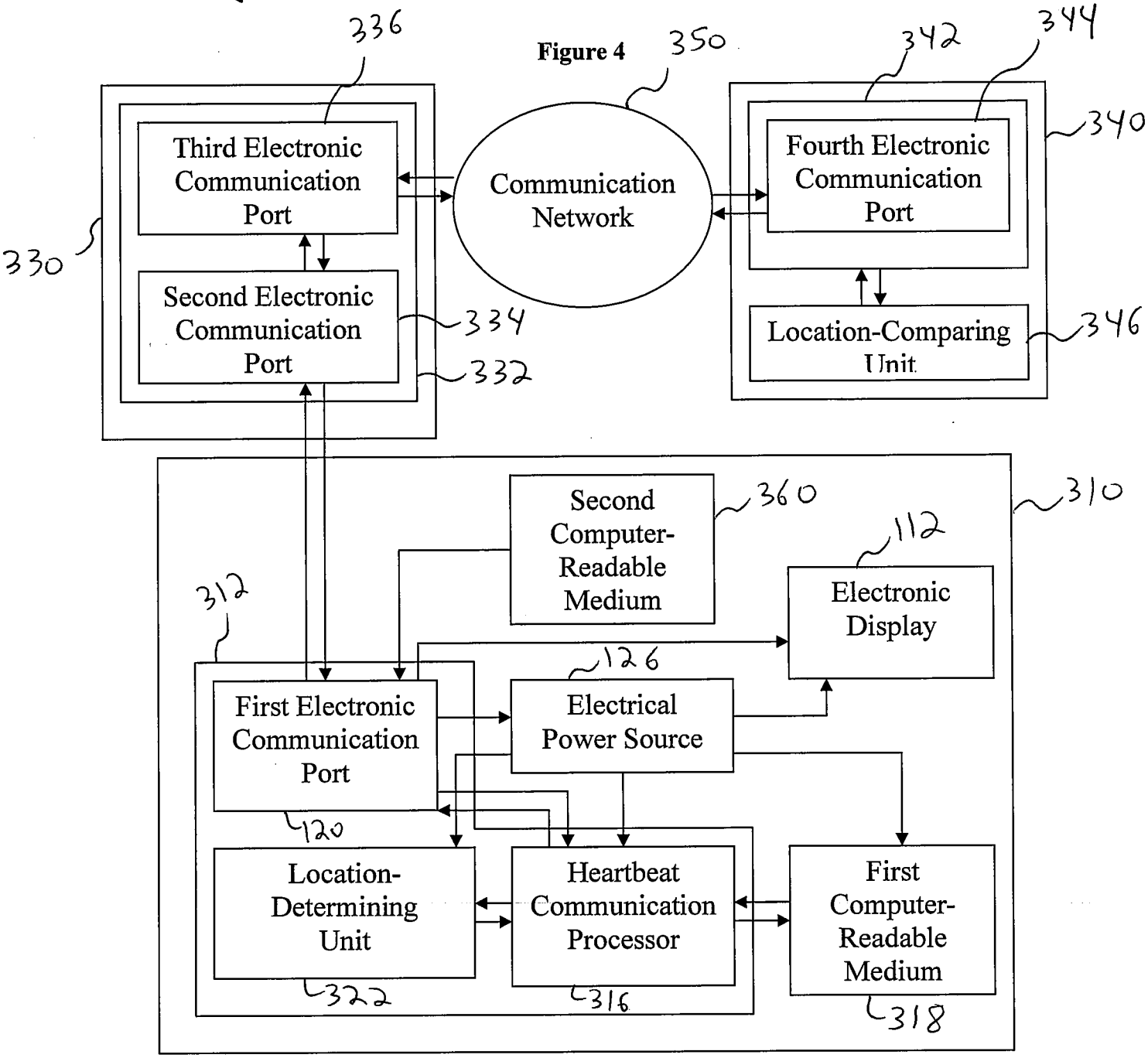

200
Computing Device
230
Server
220
242
Coverage Area
242
Communication Device
210
Communication Network
Coverage Area
Coverage Area
Coverage Area
242
240
242

Figure 3


300
336
350
342
344
340
Third Electronic Communication Port
Communication Network
Fourth Electronic Communication Port
330
Second Electronic Communication Port
334
332
Location-Comparing Unit
346
360
112
Second Computer-Readable Medium
Electronic Display
312
126
First Electronic Communication Port
Electrical Power Source
120
318
First Radio Frequency Transceiver
Heartbeat Communication Processor
First Computer-Readable Medium
314
316
320
Second Radio Frequency Transceiver
Location-Determining Unit
326
324
322

400

Figure 4


336
350
342
344
340
Third Electronic Communication Port
Communication Network
Fourth Electronic Communication Port
330
Second Electronic Communication Port
334
332
Location-Comparing Unit
346
310
Second Computer-Readable Medium
360
112
Electronic Display
312
126
First Electronic Communication Port
Electrical Power Source
120
Location-Determining Unit
Heartbeat Communication Processor
First Computer-Readable Medium
322
316
318

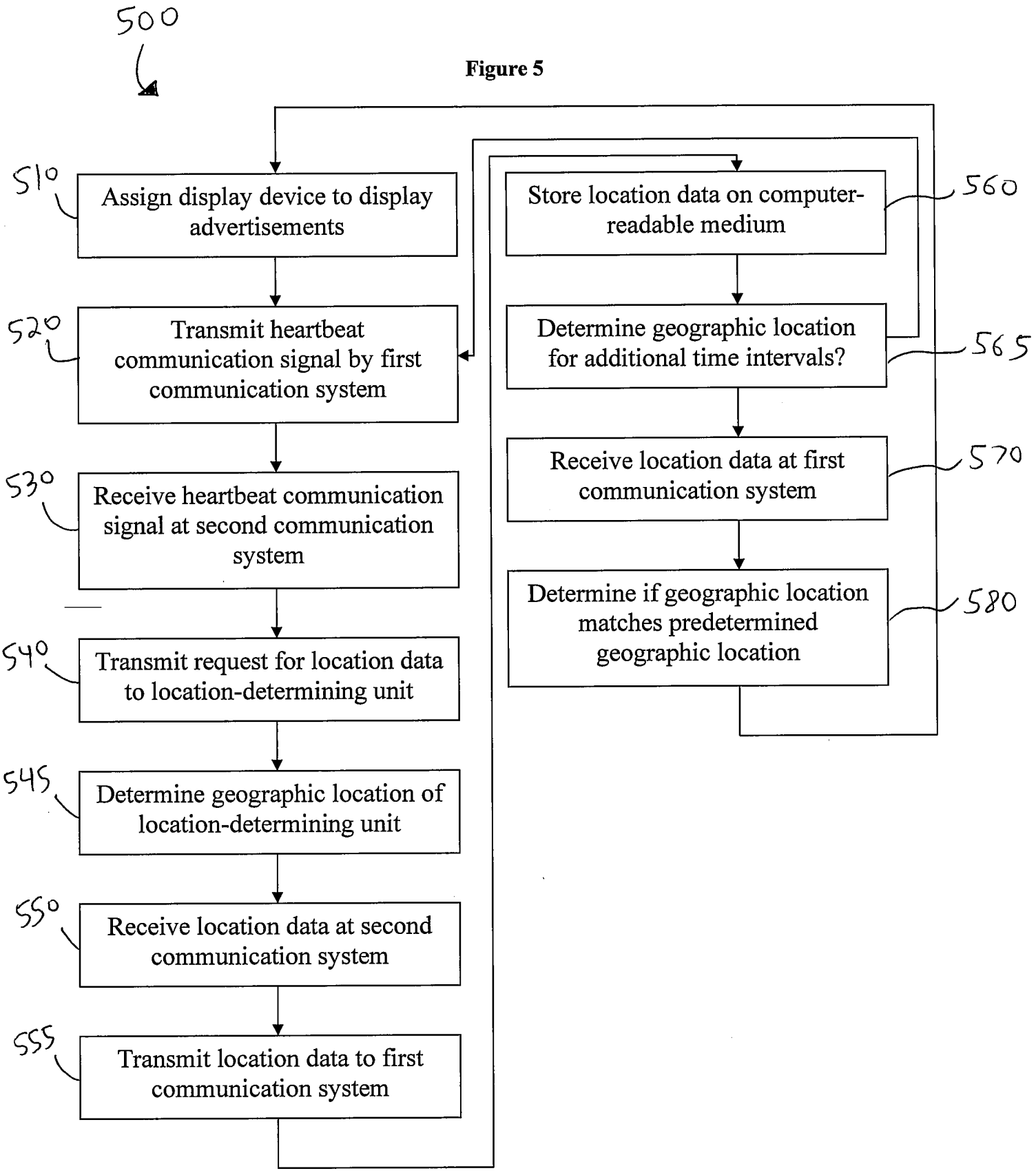

500
510
Assign display device to display advertisements
520
Transmit heartbeat communication signal by first communication system
530
Receive heartbeat communication signal at second communication system
540
Transmit request for location data to location-determining unit
545
Determine geographic location of location-determining unit
550
Receive location data at second communication system
555
Transmit location data to first communication system
560
Store location data on computer-readable medium
565
Determine geographic location for additional time intervals?
570
Receive location data at first communication system
580
Determine if geographic location matches predetermined geographic location

Figure 5

600

Figure 6

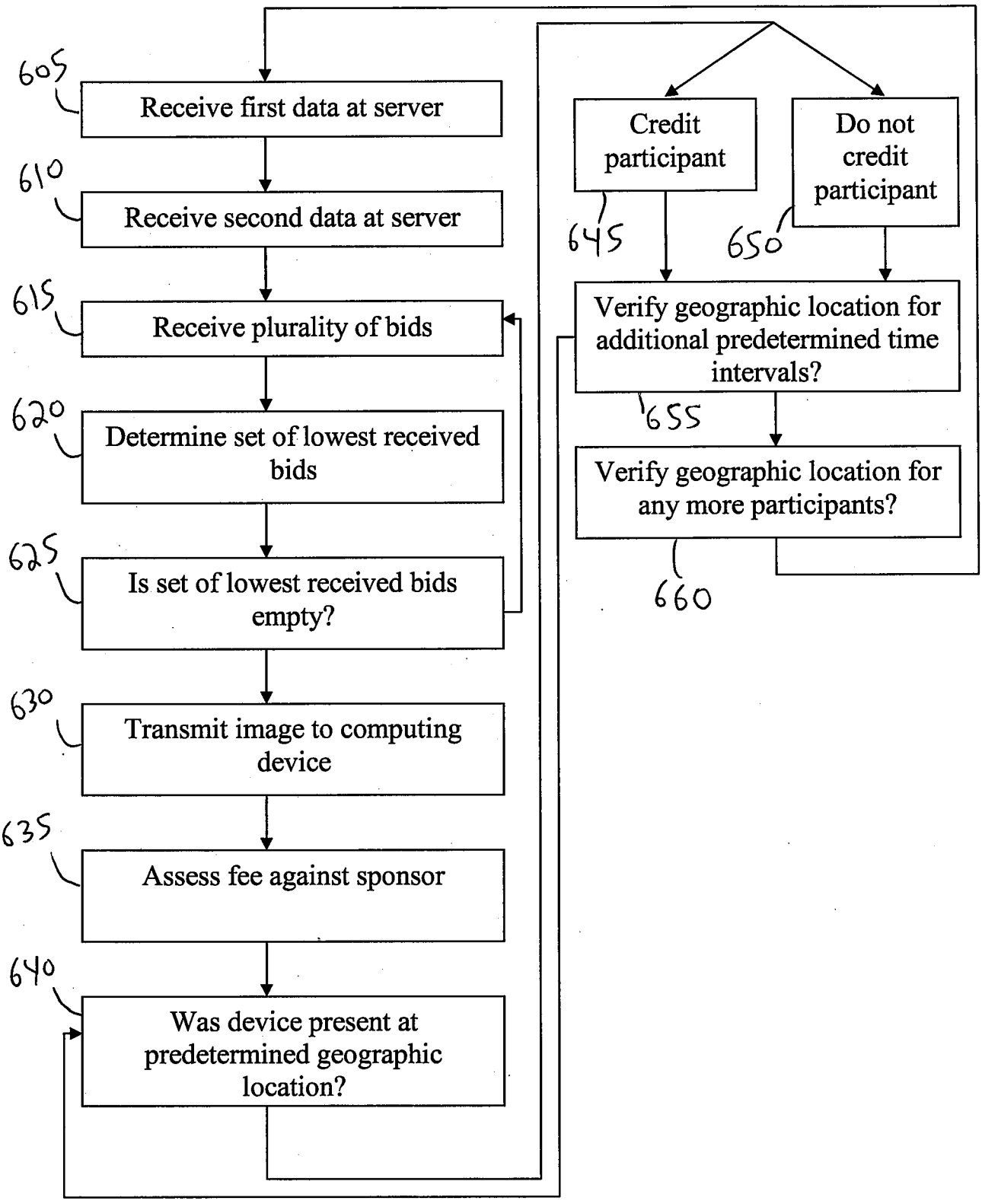
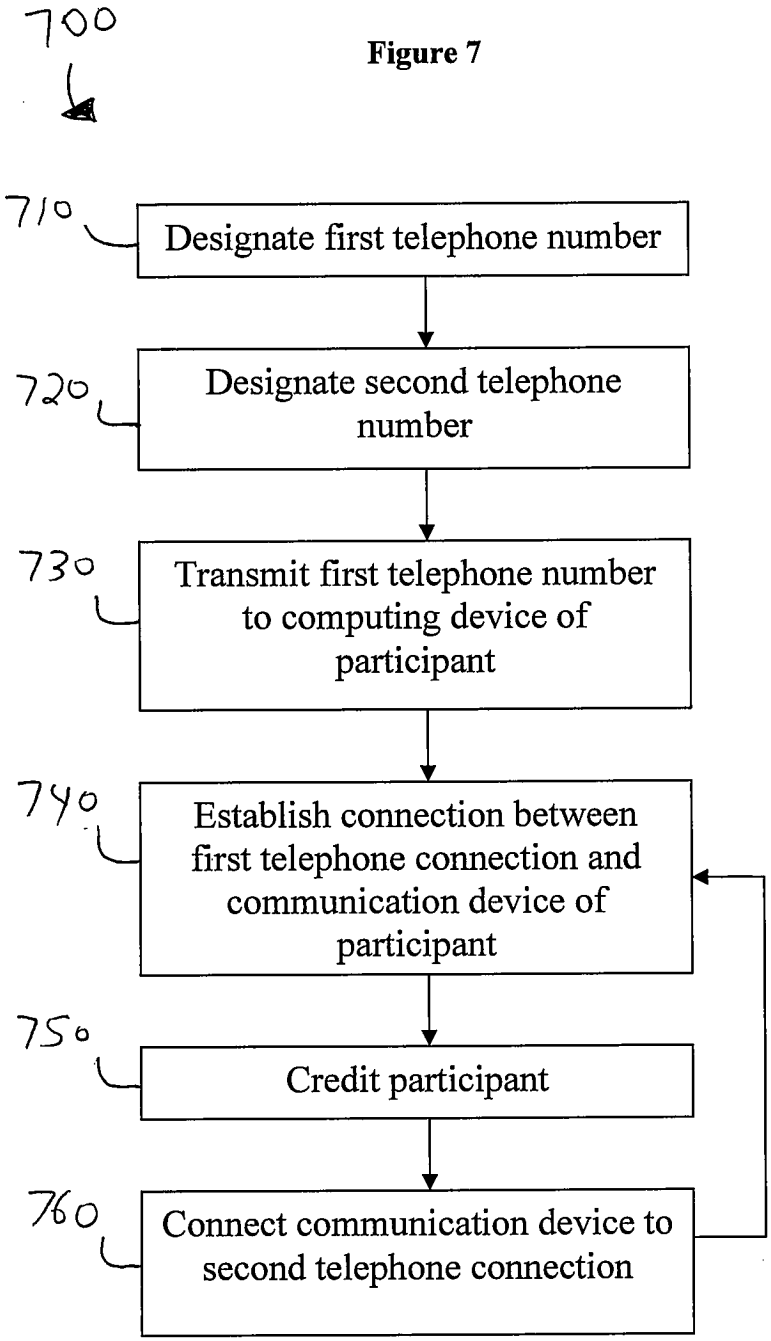

605
Receive first data at server
610
Receive second data at server
615
Receive plurality of bids
620
Determine set of lowest received bids
625
Is set of lowest received bids empty?
630
Transmit image to computing device
635
Assess fee against sponsor
640
Was device present at predetermined geographic location?
Credit participant
Do not credit participant
645
650
Verify geographic location for additional predetermined time intervals?
655
Verify geographic location for any more participants?
660

Figure 7


700
710
Designate first telephone number
720
Designate second telephone number
730
Transmit first telephone number to computing device of participant
740
Establish connection between first telephone connection and communication device of participant
750
Credit participant
760
Connect communication device to second telephone connection

800

Figure 8

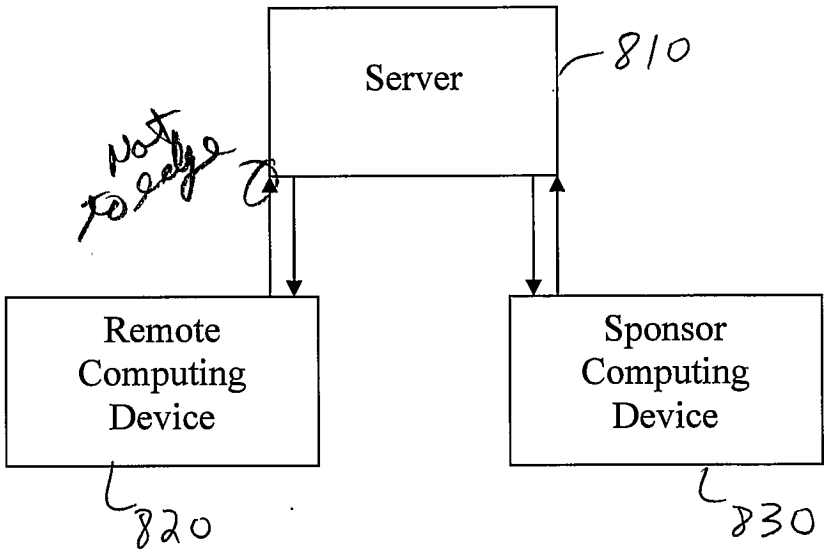
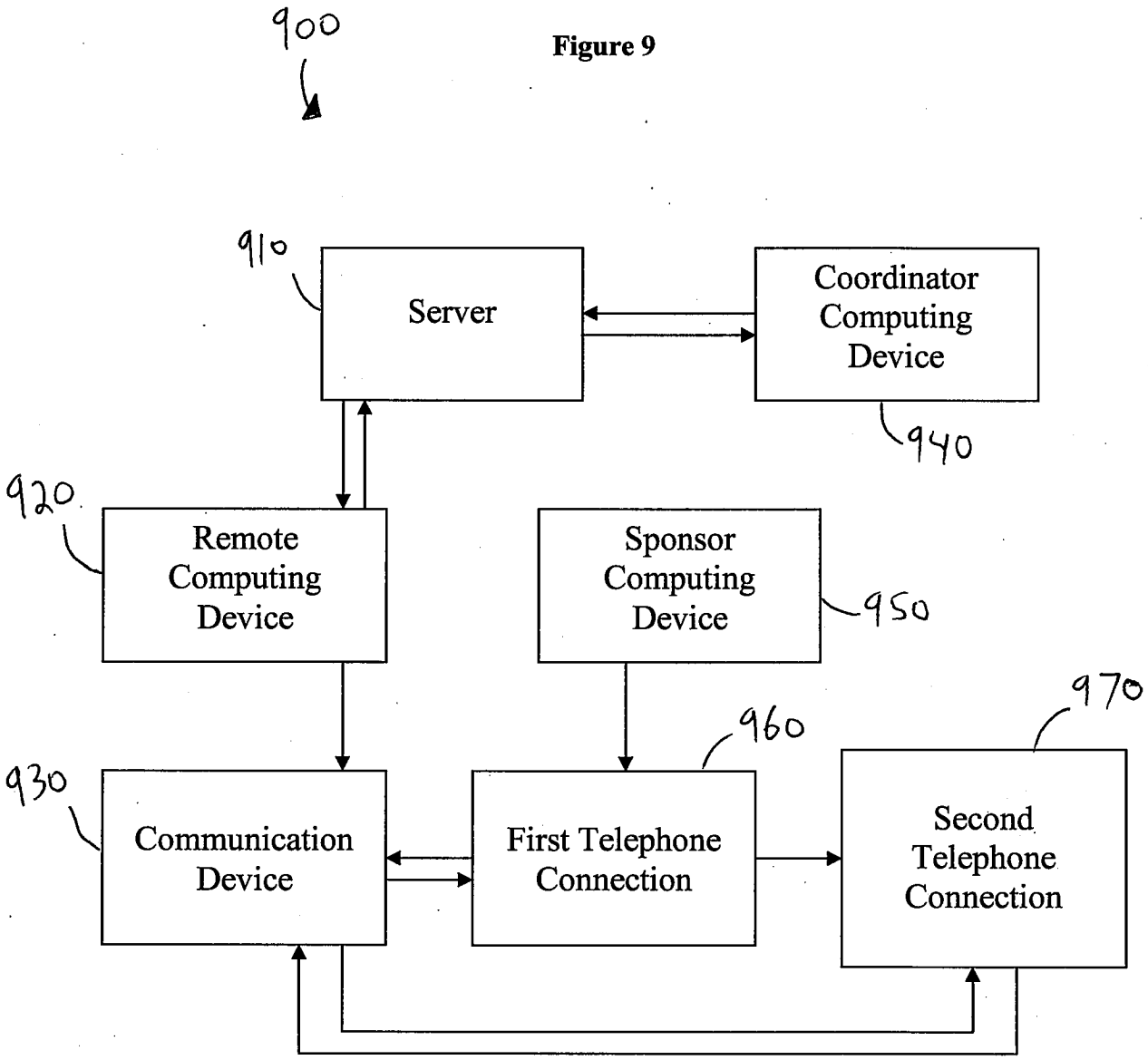
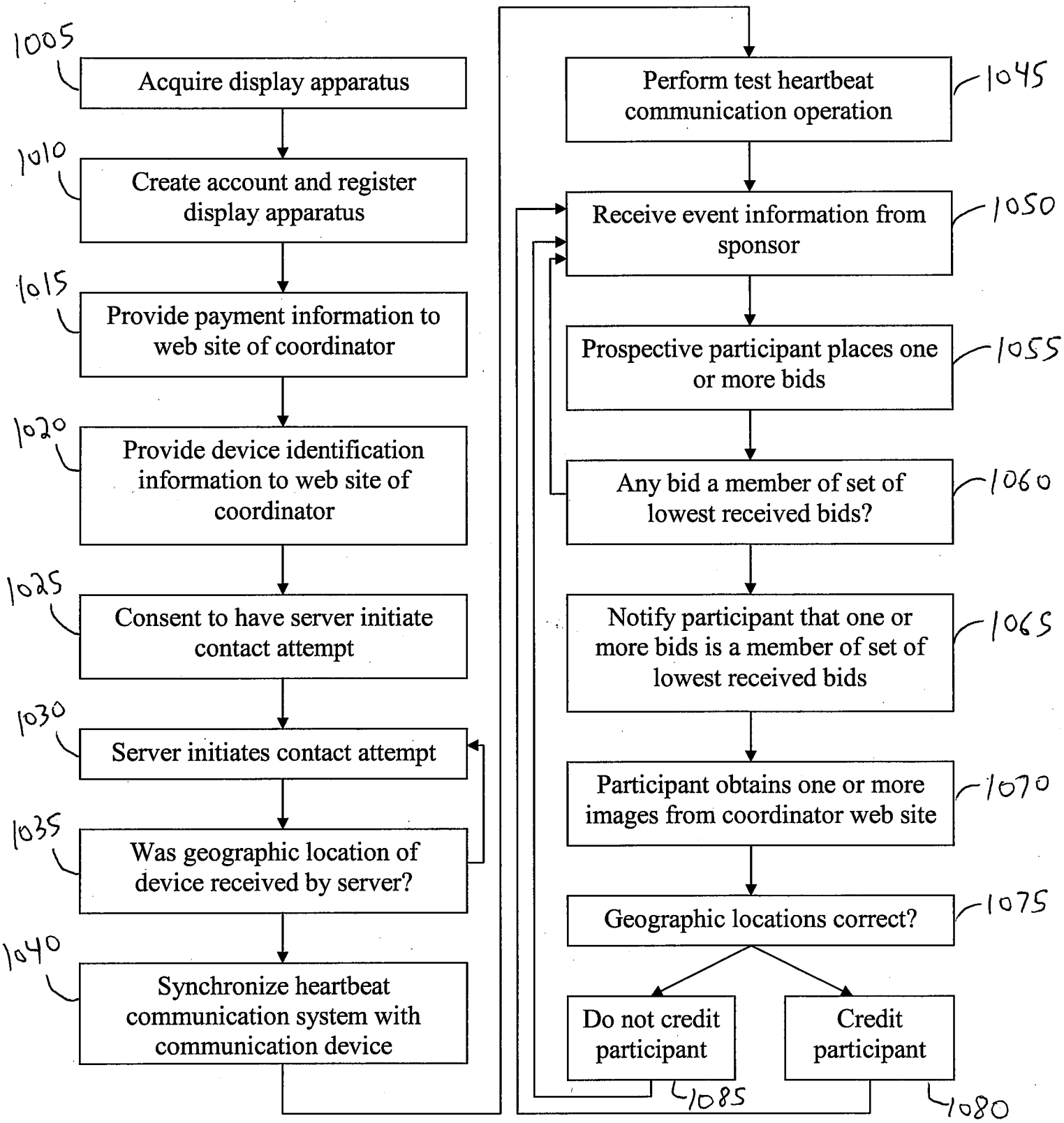

Server
810
Remote Computing Device
820
Sponsor Computing Device
830

Figure 9


900
910
Server
Coordinator Computing Device
940
920
Remote Computing Device
Sponsor Computing Device
950
960
970
930
Communication Device
First Telephone Connection
Second Telephone Connection

1000

Figure 10



this is an alternative rather than a preferred embodiment, but the claim works

CLAIMS:

What is claimed is:

1. A display apparatus including:

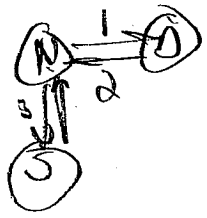
an electronic display, wherein a first image is maintained on said electronic display without said electronic display receiving any power; and

OK

a battery, wherein said battery allows said electronic display to switch from displaying said first image to displaying a second image, and wherein said first image is different from said second image.

2. The display apparatus of claim 1, wherein said electronic display includes a hermetic seal.

3. The display apparatus of claim 2, wherein said electronic display is not more than four millimeters thick.



4. A system for determining a location, said system including:

a network, said network including at least one coverage area;

a device in bidirectional communication with said network; and

a server in bidirectional communication with said network,

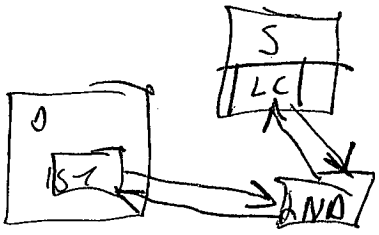
wherein said device receives a first signal from said network,

wherein said device transmits a second signal to said network in response to receiving said first signal, said second signal indicating the presence of said device in one coverage area of said at least one coverage area,

wherein said server receives a third signal from said network, said third signal indicating the presence of said device in said one coverage area, and

wherein said server determines if said device is present at a predetermined geographic location of an advertising campaign by determining if said one coverage area includes said predetermined geographic location.

good! you need the geographic location



A system for determining a location, said system including:

a device including:

a first communication system; and

a server remote from said device, said server including:

a location-comparing unit,

wherein a second communication system receives a signal from said first communication system,

wherein said second communication system transmits a request for location data to a location-determining unit, said location data representing a geographic location of said location-determining unit,

Dave? no AB ... MEN, MAYBE

wherein said location-determining unit transmits said location data to said second communication system,

wherein said second communication system transmits said location data to said first communication system in response to said second communication system receiving said signal, and

Hmm, makes it sound like 2ND already has the data before 1ST asks + then 2ND merely transmits it

wherein said location-comparing unit receives said location data from said first communication system and determines if said geographic location represented by said location data matches a predetermined geographic location.

6. The system of claim 5, wherein said device further includes a computer-readable medium, and wherein said computer-readable medium receives said location data from said first communication system.

7. The system of claim 5, wherein said first communication system is a Bluetooth-enabled communication system, wherein said second communication system is a Bluetooth-enabled communication system, and wherein said location-determining unit is a Global Positioning System receiver.

8. The system of claim 5, wherein said server assigns said device to display advertising images at said predetermined geographic location.

9. The system of claim 5, wherein said first communication system transmits said signal at a conclusion of a time interval of a set of time intervals, and wherein each time interval of said set of time intervals is of equal length.

10. The system of claim 9, wherein said first communication system includes a processor, wherein said processor determines if a current time matches a

conclusion time, and wherein said conclusion time is a time at which said conclusion of said time interval occurs.

11. The system of claim 10, wherein said device further includes a computer-readable medium, wherein an event start time is stored on said computer-readable medium, and wherein said processor determines said conclusion time by adding, at least once, a time interval length to said event start time.

12. The system of claim 5, wherein said device further includes an electronic display, said electronic display including a hermetic seal.

13. A method for determining a location, said method including:

transmitting, by a first communication system of a device, a signal;

receiving said signal at a second communication system;

transmitting, by said second communication system, a request for location data to a location-determining unit, said location data representing a geographic location of said location-determining unit;

receiving said location data at said second communication system;

transmitting said location data to said first communication system in response to receiving said signal at said second communication system;

receiving, at a location-comparing unit remote from said first communication system, said location data from said first communication system; and

determining, at said location-comparing unit, if said geographic location represented by said location data matches a predetermined geographic location.

14. The method of claim 13, further including storing said location data on a computer-readable medium of said device.

15. The method of claim 13, further including assigning said device to display advertising images at said predetermined geographic location.

16. The method of claim 13, wherein transmitting said signal includes transmitting said signal at a conclusion of a time interval of a set of time intervals, and wherein each time interval of said set of time intervals is of an equal length.

17. A method for crediting a participant in an event, said method including:

receiving, at a server, first data representing a desired number of participants in an event;

receiving a plurality of bids at said server, wherein each bid of said plurality of bids represents a monetary amount;

determining a set of lowest received bids, said set of lowest received bids including a number of lowest received bids equal to said desired number of participants;

determining if a device of a participant in said event is present at a first predetermined geographic location, wherein one bid of said set of lowest received bids was placed by said participant; and

crediting said participant a monetary amount equal to a fraction of said one bid if said device is present at said first predetermined geographic location.

18. The method of claim 17, further including receiving, at said server, second data representing a maximum bid amount, wherein determining said set of lowest received bids includes requiring that, for each bid of said plurality of bids, said bid does not exceed said maximum bid amount in order for said bid to be a member of said set of lowest received bids.

19. The method of claim 17, further including transmitting, by said server, an advertising image to a computing device from which one bid of said set of lowest received bids was received.

20. The method of claim 17, further including assessing a fee against a sponsor of said event, wherein said first data was received at said server from said sponsor, and wherein said fee is equal to a sum of each bid of said set of lowest received bids plus a percentage of each bid of said set of lowest received bids.

21. The method of claim 17, wherein determining if said device is present at said first predetermined geographic location is performed by determining if said device is

present at said first predetermined geographic location at a first conclusion of a first predetermined time interval

22. The method of claim 21, wherein said device is considered present at said first predetermined geographic location at said first conclusion of said first predetermined time interval if said device is present at a second predetermined geographic location at a second conclusion of a second predetermined time interval and if said device is present at a third predetermined geographic location at a third conclusion of a third predetermined time interval, wherein said second predetermined time interval immediately precedes said first predetermined time interval, and wherein said third predetermined time interval immediately follows said first predetermined time interval.

23. The method of claim 21, wherein said device is considered present at said first predetermined geographic location at said first conclusion of said first predetermined time interval if said device is present at a second predetermined geographic location at a second conclusion of a second predetermined time interval and if said device is present at a third predetermined geographic location at a third conclusion of a third predetermined time interval, wherein said second predetermined time interval precedes said first predetermined time interval by no more than a first allowable number of time intervals, and wherein said third predetermined time interval follows said first predetermined time interval by no more than a second allowable number of time intervals.

24. The method of claim 17, wherein said crediting is performed by crediting a credit card account of said participant.

25. The method of claim 17, further including:

establishing a connection between a first telephone connection and a device of a participant in said event;

crediting said participant a predetermined monetary amount for establishing said connection; and

connecting said device to said second telephone connection.

26. A system for crediting a participant in an event, said system including:

a server;

a remote computing device in bidirectional communication with said server; and

a sponsor computing device in bidirectional communication with said server,

wherein said server receives, from said sponsor computing device, first data representing a desired number of participants in an event,

wherein said server receives, from said remote computing device, a bid representing a monetary amount,

wherein said server determines a set of lowest received bids, said set of lowest received bids including a number of lowest received bids equal to said desired number of participants,

wherein said server determines if a device of a participant in said event is present at a first predetermined geographic location, wherein one bid of said set of lowest received bids was placed by said participant, and

wherein said server credits said participant a monetary amount equal to a fraction of said one bid if said device is present at said first predetermined geographic location.

27. The system of claim 26, wherein said server receives, from said sponsor computing device, second data representing a maximum bid amount, and wherein said set of lowest received bids includes no bid exceeding said maximum bid amount.

28. The system of claim 26, wherein said server assesses a fee against a sponsor, wherein said sponsor specifies said desired number of participants in said event, and wherein said fee is equal to a sum of each bid of said set of lowest received bids plus a percentage of each bid of said set of lowest received bids.

29. The method of claim 26, wherein said server transmits an advertising image to said remote computing device if said bid is a member of said set of lowest received bids.

30. The system of claim 26, further including:

a first telephone connection; and

a second telephone connection,

wherein a device of a participant in said event establishes a connection with said first telephone connection,

wherein said server credits said participant a predetermined monetary amount for establishing said connection, and

wherein said first telephone connection connects said device to said second telephone connection.