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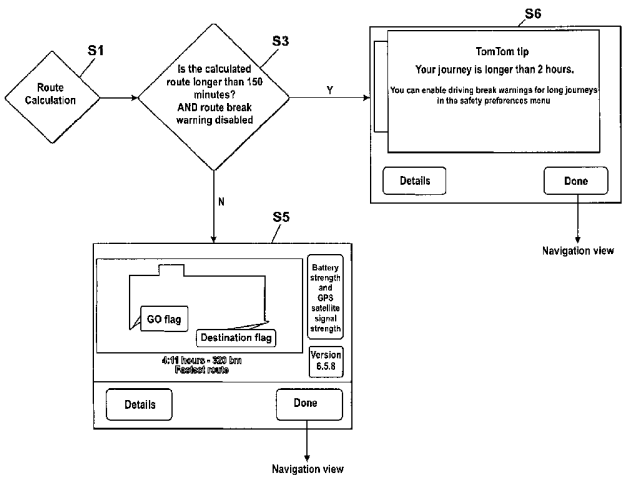
(54) **Title:** A NAVIGATION DEVICE AND METHOD FOR DRIVING BREAK WARNING



(57) **Abstract:** A method and device are disclosed for navigation. In at least one embodiment, the method includes determining a route of travel, in a navigation device, based upon at least a received destination location; determining whether or not travel along the determined route will at least one of meet and exceed a first threshold; and prompting, upon determining that travel along the determined route will at least one of meet and exceed the first threshold, a user of the navigation device to enable output of a warning to break from driving a vehicle, in which the navigation device is located, during travel along the determined route. In at least one embodiment, the navigation device includes a processor to determine a route of travel based upon at least a received destination location and to determine whether or not travel along the determined route will at least one of meet and exceed a first threshold; and an output device to prompt, upon the processor determining that travel along the determined route will at least one of meet and exceed the first threshold, a user of the navigation device to enable output of a warning to break from driving a vehicle, in which the navigation device is located, during travel along the determined route.

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A NAVIGATION DEVICE AND METHOD FOR DRIVING BREAK WARNING

Field

The present application generally relates to navigation methods and devices.

Background

Navigation devices were traditionally utilized mainly in the areas of vehicle use, such as on cars, motorcycles, trucks, boats, etc. Alternatively, if such navigation devices were portable, they were further transferable between vehicles and/or useable outside the vehicle, for foot travel for example.
These devices are typically tailored to produce a route of travel based upon an initial position of the navigation device and a selected/input travel destination (end position), noting that the initial position could be entered into the device, but is traditionally calculated via GPS Positioning from a GPS receiver within the navigation device. Such routes of travel, however, may be long and arduous.

SUMMARY

The inventors discovered that on such long routes of travel, problems such as fatigue may be likely. Thus, the inventors of the present application developed a warning method and implementation on a navigation device, to warn users of the navigation device to take a break from driving on such long trips.
In at least one embodiment of the present application, a method includes determining a route of travel, in a navigation device, based upon at least a received destination location; determining whether or not travel along the determined route will at least one of meet and exceed a first threshold; and prompting, upon determining that travel along the determined route will at least one of meet and exceed the first threshold, a user of the navigation device to enable output of a warning to break from driving a vehicle, in which the navigation device is located, during travel along the determined route.
In at least one embodiment of the present application, a navigation device includes a processor to determine a route of travel based upon at least a

received destination location and to determine whether or not travel along the determined route will at least one of meet and exceed a first threshold; and an output device to prompt, upon the processor determining that travel along the determined route will at least one of meet and exceed the first threshold, a user of the navigation device to enable output of a warning to break from driving a vehicle, in which the navigation device is located, during travel along the determined route.

In at least one other embodiment of the present application, a method includes enabling a navigation device to output a warning to break from driving a vehicle, in which the navigation device is located; determining a route of travel, in the navigation device, based upon at least a received destination location; determining whether or not travel along the determined route will at least one of meet and exceed a first threshold; and outputting the warning to break from driving a vehicle, in which the navigation device is located, upon the warning being enabled and upon determining that travel along the determined route will at least one of meet and exceed a first threshold.

In at least one other embodiment of the present application, a device includes an integrated input and display device to enable a navigation device to output a warning to break from driving a vehicle, in which the navigation device is located; and a processor to determine a route of travel, in the navigation device, based upon at least a received destination location and to determine whether or not travel along the determined route will at least one of meet and exceed a first threshold, the warning to break from driving a vehicle, in which the navigation device is located, being output via at least the integrated input and display device upon the warning being enabled and upon the processor determining that travel along the determined route will at least one of meet and exceed a first threshold.

BRIEF DESCRIPTION OF THE DRAWINGS

The present application will be described in more detail below by using example embodiments, which will be explained with the aid of the drawings, in which:

Figure 1 illustrates an example view of a Global Positioning System (GPS);

Figure 2 illustrates an example block diagram of electronic components of a navigation device of an embodiment of the present application;
Figure 3 illustrates an example block diagram of a server, navigation device and connection therebetween of an embodiment of the present application;
Figures 4A and 4B are perspective views of an implementation of an embodiment of the navigation device;
Figure 5A illustrates an example flow of an embodiment of the present application;
Figure 5B illustrates an example flow of an embodiment of the present application;
Figure 6A illustrates an example of a warning output sequence of an embodiment of the present application;
Figure 6B illustrates an example of alternative warning icons of an embodiment of the present application;
Figure 7 illustrates an example of a warning output sequence of an embodiment of the present application; and
Figure 8 illustrates an example of a selection screen of an embodiment of the present application.

DETAILED DESCRIPTION OF THE EXAMPLE EMBODIMENTS

The terminology used herein is for the purpose of describing particular embodiments only and is not intended to be limiting of the present invention. As used herein, the singular forms "a", "an", and "the" are intended to include the plural forms as well, unless the context clearly indicates otherwise. It will be further understood that the terms "includes" and/or "including", when used in this specification, specify the presence of stated features, integers, steps, operations, elements, and/or components, but do not preclude the presence or addition of one or more other features, integers, steps, operations, elements, components, and/or groups thereof.
In describing example embodiments illustrated in the drawings, specific terminology is employed for the sake of clarity. However, the disclosure of this patent specification is not intended to be limited to the specific terminology so

selected and it is to be understood that each specific element includes all technical equivalents that operate in a similar manner.

Referencing the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, example embodiments of the present patent application are hereafter described. Like numbers refer to like elements throughout. As used herein, the term "and/or" includes any and all combinations of one or more of the associated listed items.

Figure 1 illustrates an example view of Global Positioning System (GPS), usable by navigation devices, including the navigation device of embodiments of the present application. Such systems are known and are used for a variety of purposes. In general, GPS is a satellite-radio based navigation system capable of determining continuous position, velocity, time, and in some instances direction information for an unlimited number of users.

Formerly known as NAVSTAR, the GPS incorporates a plurality of satellites which work with the earth in extremely precise orbits. Based on these precise orbits, GPS satellites can relay their location to any number of receiving units. The GPS system is implemented when a device, specially equipped to receive GPS data, begins scanning radio frequencies for GPS satellite signals. Upon receiving a radio signal from a GPS satellite, the device determines the precise location of that satellite via one of a plurality of different conventional methods. The device will continue scanning, in most instances, for signals until it has acquired at least three different satellite signals (noting that position is not normally, but can be determined, with only two signals using other triangulation techniques). Implementing geometric triangulation, the receiver utilizes the three known positions to determine its own two-dimensional position relative to the satellites. This can be done in a known manner. Additionally, acquiring a fourth satellite signal will allow the receiving device to calculate its three dimensional position by the same geometrical calculation in a known manner. The position and velocity data can be updated in real time on a continuous basis by an unlimited number of users.

As shown in Figure 1, the GPS system is denoted generally by reference numeral 100. A plurality of satellites 120 are in orbit about the earth 124. The orbit of each satellite 120 is not necessarily synchronous with the orbits of

other satellites 120 and, in fact, is likely asynchronous. A GPS receiver 140, usable in embodiments of navigation devices of the present application, is shown receiving spread spectrum GPS satellite signals 160 from the various satellites 120.

The spread spectrum signals 160, continuously transmitted from each satellite 120, utilize a highly accurate frequency standard accomplished with an extremely accurate atomic clock. Each satellite 120, as part of its data signal transmission 160, transmits a data stream indicative of that particular satellite 120. It is appreciated by those skilled in the relevant art that the GPS receiver device 140 generally acquires spread spectrum GPS satellite signals 160 from at least three satellites 120 for the GPS receiver device 140 to calculate its two-dimensional position by triangulation. Acquisition of an additional signal, resulting in signals 160 from a total of four satellites 120, permits the GPS receiver device 140 to calculate its three-dimensional position in a known manner.

Figure 2 illustrates an example block diagram of electronic components of a navigation device 200 of an embodiment of the present application, in block component format. It should be noted that the block diagram of the navigation device 200 is not inclusive of all components of the navigation device, but is only representative of many example components.

The navigation device 200 is located within a housing (not shown). The housing includes a processor 210 connected to an input device 220 and a display screen 240. The input device 220 can include a keyboard device, voice input device, touch panel and/or any other known input device utilized to input information; and the display screen 240 can include any type of display screen such as an LCD display, for example. In at least one embodiment of the present application, the input device 220 and display screen 240 are integrated into an integrated input and display device, including a touchpad or touchscreen input wherein a user need only touch a portion of the display screen 240 to select one of a plurality of display choices or to activate one of a plurality of virtual buttons.

In addition, other types of output devices 250 can also include, including but not limited to, an audible output device. As output device 250 can produce

audible information to a user of the navigation device 200, it is equally understood that input device 240 can also include a microphone and software for receiving input voice commands as well.

In the navigation device 200, processor 210 is operatively connected to and set to receive input information from input device 240 via a connection 225, and operatively connected to at least one of display screen 240 and output device 250, via output connections 245, to output information thereto. Further, the processor 210 is operatively connected to memory 230 via connection 235 and is further adapted to receive/send information from/to input/output (I/O) ports 270 via connection 275, wherein the I/O port 270 is connectible to an I/O device 280 external to the navigation device 200. The external I/O device 270 may include, but is not limited to an external listening device such as an earpiece for example. The connection to I/O device 280 can further be a wired or wireless connection to any other external device such as a car stereo unit for hands-free operation and/or for voice activated operation for example, for connection to an ear piece or head phones, and/or for connection to a mobile phone for example, wherein the mobile phone connection may be used to establish a data connection between the navigation device 200 and the internet or any other network for example, and/or to establish a connection to a server via the internet or some other network for example.

The navigation device 200, in at least one embodiment, may establish a "mobile" network connection with the server 302 via a mobile device 400 (such as a mobile phone, PDA, and/or any device with mobile phone technology) establishing a digital connection (such as a digital connection via known Bluetooth technology for example). Thereafter, through its network service provider, the mobile device 400 can establish a network connection (through the internet for example) with a server 302. As such, a "mobile" network connection is established between the navigation device 200 (which can be, and often times is mobile as it travels alone and/or in a vehicle) and the server 302 to provide a "real-time" or at least very "up to date" gateway for information. The establishing of the network connection between the mobile device 400 (via a service provider) and another device such as the server 302, using the internet 410 for example, can be done in a known manner. This can include use of

TCP/IP layered protocol for example. The mobile device 400 can utilize any number of communication standards such as CDMA, GSM, WAN, etc.
As such, an internet connection may be utilized which is achieved via data connection, via a mobile phone or mobile phone technology within the navigation device 200 for example. For this connection, an internet connection between the server 302 and the navigation device 200 is established. This can be done, for example, through a mobile phone or other mobile device and a GPRS (General Packet Radio Service)-connection (GPRS connection is a high-speed data connection for mobile devices provided by telecom operators; GPRS is a method to connect to the internet.
The navigation device 200 can further complete a data connection with the mobile device 400, and eventually with the internet 410 and server 302, via existing Bluetooth technology for example, in a known manner, wherein the data protocol can utilize any number of standards, such as the GSRM, the Data Protocol Standard for the GSM standard, for example.
The navigation device 200 may include its own mobile phone technology within the navigation device 200 itself (including an antenna for example, wherein the internal antenna of the navigation device 200 can further alternatively be used). The mobile phone technology within the navigation device 200 can include internal components as specified above, and/or can include an insertable card, complete with necessary mobile phone technology and/or an antenna for example. As such, mobile phone technology within the navigation device 200 can similarly establish a network connection between the navigation device 200 and the server 302, via the internet 410 for example, in a manner similar to that of any mobile device 400.
For GRPS phone settings, the Bluetooth enabled device may be used to correctly work with the ever changing spectrum of mobile phone models, manufacturers, etc., model/manufacturer specific settings may be stored on the navigation device 200 for example. The data stored for this information can be updated in a manner discussed in any of the embodiments, previous and subsequent.
Figure 2 further illustrates an operative connection between the processor 210 and an antenna/receiver 250 via connection 255, wherein the antenna/receiver

250 can be a GPS antenna/receiver for example. It will be understood that the antenna and receiver designated by reference numeral 250 are combined schematically for illustration, but that the antenna and receiver may be separately located components, and that the antenna may be a GPS patch antenna or helical antenna for example.

Further, it will be understood by one of ordinary skill in the art that the electronic components shown in Figure 2 are powered by power sources (not shown) in a conventional manner. As will be understood by one of ordinary skill in the art, different configurations of the components shown in Figure 2 are considered within the scope of the present application. For example, in one embodiment, the components shown in Figure 2 may be in communication with one another via wired and/or wireless connections and the like. Thus, the scope of the navigation device 200 of the present application includes a portable or handheld navigation device 200.

In addition, the portable or handheld navigation device 200 of Figure 2 can be connected or "docked" in a known manner to a motorized vehicle such as a car or boat for example. Such a navigation device 200 is then removable from the docked location for portable or handheld navigation use.

Figure 3 illustrates an example block diagram of a server 302 and a navigation device 200 of the present application, via a generic communications channel 318, of an embodiment of the present application. The server 302 and a navigation device 200 of the present application can communicate when a connection via communications channel 318 is established between the server 302 and the navigation device 200 (noting that such a connection can be a data connection via mobile device, a direct connection via personal computer via the internet, etc.).

The server 302 includes, in addition to other components which may not be illustrated, a processor 304 operatively connected to a memory 306 and further operatively connected, via a wired or wireless connection 314, to a mass data storage device 312. The processor 304 is further operatively connected to transmitter 308 and receiver 310, to transmit and send information to and from navigation device 200 via communications channel 318. The signals sent and received may include data, communication, and/or other propagated signals.

The transmitter 308 and receiver 310 may be selected or designed according to the communications requirement and communication technology used in the communication design for the navigation system 200. Further, it should be noted that the functions of transmitter 308 and receiver 310 may be combined into a signal transceiver.

Server 302 is further connected to (or includes) a mass storage device 312, noting that the mass storage device 312 may be coupled to the server 302 via communication link 314. The mass storage device 312 contains a store of navigation data and map information, and can again be a separate device from the server 302 or can be incorporated into the server 302.

The navigation device 200 is adapted to communicate with the server 302 through communications channel 318, and includes processor, memory, etc. as previously described with regard to Figure 2, as well as transmitter 320 and receiver 322 to send and receive signals and/or data through the communications channel 318, noting that these devices can further be used to communicate with devices other than server 302. Further, the transmitter 320 and receiver 322 are selected or designed according to communication requirements and communication technology used in the communication design for the navigation device 200 and the functions of the transmitter 320 and receiver 322 may be combined into a single transceiver.

Software stored in server memory 306 provides instructions for the processor 304 and allows the server 302 to provide services to the navigation device 200. One service provided by the server 302 involves processing requests from the navigation device 200 and transmitting navigation data from the mass data storage 312 to the navigation device 200. According to at least one embodiment of the present application, another service provided by the server 302 includes processing the navigation data using various algorithms for a desired application and sending the results of these calculations to the navigation device 200.

The communication channel 318 generically represents the propagating medium or path that connects the navigation device 200 and the server 302. According to at least one embodiment of the present application, both the server 302 and navigation device 200 include a transmitter for transmitting data

through the communication channel and a receiver for receiving data that has been transmitted through the communication channel.

The communication channel 318 is not limited to a particular communication technology. Additionally, the communication channel 318 is not limited to a single communication technology; that is, the channel 318 may include several communication links that use a variety of technology. For example, according to at least one embodiment, the communication channel 318 can be adapted to provide a path for electrical, optical, and/or electromagnetic communications, etc. As such, the communication channel 318 includes, but is not limited to, one or a combination of the following: electric circuits, electrical conductors such as wires and coaxial cables, fiber optic cables, converters, radio-frequency (rf) waves, the atmosphere, empty space, etc. Furthermore, according to at least one various embodiment, the communication channel 318 can include intermediate devices such as routers, repeaters, buffers, transmitters, and receivers, for example.

In at least one embodiment of the present application, for example, the communication channel 318 includes telephone and computer networks. Furthermore, in at least one embodiment, the communication channel 318 may be capable of accommodating wireless communication such as radio frequency, microwave frequency, infrared communication, etc. Additionally, according to at least one embodiment, the communication channel 318 can accommodate satellite communication.

The communication signals transmitted through the communication channel 318 include, but are not limited to, signals as may be required or desired for given communication technology. For example, the signals may be adapted to be used in cellular communication technology such as Time Division Multiple Access (TDMA), Frequency Division Multiple Access (FDMA), Code Division Multiple Access (CDMA), Global System for Mobile Communications (GSM), etc. Both digital and analogue signals can be transmitted through the communication channel 318. According to at least one embodiment, these signals may be modulated, encrypted and/or compressed signals as may be desirable for the communication technology.

The mass data storage 312 includes sufficient memory for the desired navigation applications. Examples of the mass data storage 312 may include magnetic data storage media such as hard drives for example, optical storage media such as CD-Roms for example, charged data storage media such as flash memory for example, molecular memory, etc.

According to at least one embodiment of the present application, the server 302 includes a remote server accessible by the navigation device 200 via a wireless channel. According to at least one other embodiment of the application, the server 302 may include a network server located on a local area network (LAN), wide area network (WAN), virtual private network (VPN), etc.

According to at least one embodiment of the present application, the server 302 may include a personal computer such as a desktop or laptop computer, and the communication channel 318 may be a cable connected between the personal computer and the navigation device 200. Alternatively, a personal computer may be connected between the navigation device 200 and the server 302 to establish an internet connection between the server 302 and the navigation device 200. Alternatively, a mobile telephone or other handheld device may establish a wireless connection to the internet, for connecting the navigation device 200 to the server 302 via the internet.

The navigation device 200 may be provided with information from the server 302 via information downloads which may be periodically updated upon a user connecting navigation device 200 to the server 302 and/or may be more dynamic upon a more constant or frequent connection being made between the server 302 and navigation device 200 via a wireless mobile connection device and TCP/IP connection for example. For many dynamic calculations, the processor 304 in the server 302 may be used to handle the bulk of the processing needs; however, processor 210 of navigation device 200 can also handle much processing and calculation, oftentimes independent of a connection to a server 302.

The mass storage device 312 connected to the server 302 can include volumes more cartographic and route data than that which is able to be maintained on the navigation device 200 itself, including maps, etc. The server 302 may process, for example, the majority of the devices of a navigation device 200

which travel along the route using a set of processing algorithms. Further, the cartographic and route data stored in memory 312 can operate on signals (e.g. GPS signals), originally received by the navigation device 200.

As indicated above in Figure 2 of the application, a navigation device 200 of an embodiment of the present application includes a processor 210, an input device 220, and a display screen 240. In at least one embodiment, the input device 220 and display screen 240 are integrated into an integrated input and display device to enable both input of information (via direct input, menu selection, etc.) and display of information through a touch panel screen, for example. Such a screen may be a touch input LCD screen, for example, as is well known to those of ordinary skill in the art. Further, the navigation device 200 can also include any additional input device 220 and/or any additional output device 240, such as audio input/output devices for example.

Figures 4A and 4B are perspective views of an implementation of an embodiment of the navigation device 200. As shown in Fig. 4A, the navigation device 200 may be a unit that includes an integrated input and display device 290 (a touch panel screen for example) and the other components of figure 2 (including but not limited to internal GPS receiver 250, microprocessor 210, a power supply, memory systems 220, etc.).

The navigation device 200 may sit on an arm 292, which itself may be secured to a vehicle dashboard/window/etc. using a large suction cup 294. This arm 292 is one example of a docking station to which the navigation device 200 can be docked.

As shown in Fig. 4B, the navigation device 200 can be docked or otherwise connected to an arm 292 of the docking station by snap connecting the navigation device 292 to the arm 292 for example (this is only one example, as other known alternatives for connection to a docking station are within the scope of the present application). The navigation device 200 may then be rotatable on the arm 292, as shown by the arrow of Fig. 4B. To release the connection between the navigation device 200 and the docking station, a button on the navigation device 200 may be pressed, for example (this is only one example, as other known alternatives for disconnection to a docking station are within the scope of the present application).

The inventors discovered that on such long routes of travel, problems such as fatigue may be likely. Thus, the inventors of the present application developed a warning method and implementation on a navigation device, to warn users of the navigation device to take a break from driving on such long trips.

In at least one embodiment of the present application, a method includes determining a route of travel, in a navigation device 200, based upon at least a received destination location; determining whether or not travel along the determined route will at least one of meet and exceed a first threshold; and prompting, upon determining that travel along the determined route will at least one of meet and exceed the first threshold, a user of the navigation device 200 to enable output of a warning to break from driving a vehicle, in which the navigation device is located, during travel along the determined route.

In at least one embodiment of the present application, a navigation device 200 includes a processor 210 to determine a route of travel based upon at least a received destination location and to determine whether or not travel along the determined route will at least one of meet and exceed a first threshold; and an output device 241 to prompt, upon the processor 210 determining that travel along the determined route will at least one of meet and exceed the first threshold, a user of the navigation device 200 to enable output of a warning to break from driving a vehicle, in which the navigation device 200 is located, during travel along the determined route.

Figure 5A of the present application illustrates one example of an embodiment of a method of the present application.

As shown in step S1 of Figure 5A, the route of travel is initially determined or calculated. This can be done in a known manner by processor 210 for example, wherein such a determination or calculation typically includes detection of a current location of the navigation device via a GPS receiver 250 receiving the GPS location of the device; input or selection by a user of a desired destination location, such that the processor 210 receives the destination location; and use of map information stored in memory 230.

Thereafter, in step S3, it is determined, by processor 210 for example, whether or not travel along the determined route will at least one of meet and exceed a first threshold. For example, as shown in step S3, the processor 210 whether

or not the calculated route will be longer, in estimated time of travel, than a threshold time of 150 minutes for example. Calculation of estimated time of travel can be achieved by the processor 210 in a known manner based upon the distance of the route of travel and estimated speed limits on the roads of the route of travel, for example, wherein all such data may be stored in memory 230 for example, along with the map information.

Although step S3 illustrates that the calculated route, in estimated time of travel, must be longer than the threshold of 150 minutes, such a determination can be made as to whether or not the calculated route meets or exceeds the 150 minute total, for example. Further, 150 minutes is just an example of a threshold which may be set within the system, noting that an example may be used, for example, to warn a user after the user has been driving for a time such as two hours, for example. Thus, a different time period such as 120 minutes may be used for example, or a time period greater than two hours, noting that the warning can be issued at a different time period, such as the two hour time period, for example, as will be explained hereafter regarding step S6. Accordingly, the 150 minute threshold set in step S3 is a set threshold, but it can be set to any time period (by the system by storing in memory 230 for example, and/or by the user upon being prompted to set such a threshold for example).

Thereafter, if the calculated route of travel is not determined to at least one of meet and exceed the threshold, the method to step S5 and merely displays the calculated or determined route of travel in a normal fashion (an example display being shown in step S5 of Figure 5A). However, if it is determined that the calculated or determined route of travel does at least one of meet and exceed the threshold, a prompt can be issued in step S6 to the user, to enable output of a warning to the user, to break from driving the vehicle in which the navigation device is located, during travel along the determined route. One example of such a prompt is shown in step S6 of Figure 5A wherein it states that "Your journey is longer than two hours. You can enable driving break warnings for long journeys in the safety preference menu". Optionally, further details of the driving break warnings may be displayed, and/or the user may just merely be prompted with virtual keys or buttons for example, to select to

enable driving break warnings at that moment (without the need to go to a further preference menu). Alternatively, by the user selecting the "Done" virtual button, the warnings may be enabled, for example. Thereafter, the method proceeds to the navigation view and awaits system navigation.

Figure 5B illustrates an embodiment of the present application. Similar to Figure 5A, a route of travel is initially determined or calculated in step S7, by processor 210 for example. Thereafter, in step S9, the processor 210 determines whether or not travel along the determined or calculated route of travel will at least one of meet and exceed a first threshold, for example a threshold of 120 minutes. If not, the system proceeds to a normal navigation view, and if so, the system may prompt the user as shown in step S11, for example. As shown in step S11, the prompt may be a display indicating that the route is longer than the threshold, 120 minutes for example, and asks the user if he would like to plan a break along the route. Thus, the user may be prompted, in step S11, to either enable a warning to break from driving the vehicle by selecting the "Yes" virtual button for example, or can choose not to enable the warning by selecting the "No" virtual button. If the user selects "yes", this is received by the processor 210 and thus the processor 210 knows that the user desires to enable the output of a warning to break from driving the vehicle. Thus, during travel along the route, the processor 210 will monitor the time passed and will signal the output of the warning at the appropriate time.

If the user selects "yes", in step S11, the method may proceed to the navigation view, or may alternatively proceed to step S13 wherein choices for implementation of the driving break may be displayed. As the processor 210 has already calculated the route of travel, and knows the threshold of two hours for example, at which the break is to be implemented, it can determined points of interest along the route of travel, and optionally their distances from this "two hour" threshold point along the route. Thus, the processor 210, in response to receipt of an indication of a "yes" selection in step S11, can direct the integrated input and display device 290 to display driving break points of interest as shown in step S13. These can be displayed as selectable options to aid in implementing the driving break in step S13.

Step S13 of Figure 5B merely illustrates some examples of selectable points of interest for implementing the driving break, wherein these can be displayed after selecting the enablement of the driving break option in step S11 or during the travel along the determined, after (or even in conjunction with) output of the driving break warning during travel along the determined route. The selectable options may be displayed with distances from this "two hour" threshold point along the route (if displayed after enablement of the driving break warning in step S11 for example) or with distances form a current location of the navigation device, if displayed after or in conjunction with the driving break warning during travel along the determined route. Although not shown in Figure 5A, it should be noted that the display of step S13 of figure 5B can be implemented after step S6 of Figure 5A in the same manner as described above regarding Figure 5B.

Thus, as shown in Figures 5A and 5B, the prompting may include displaying, on an integrated input and display device 290 of the navigation device 200, at least one of a selection to enable output of the warning and a selection not to enable output of the warning, wherein the enabling occurs subsequent to receipt of an indication of a selection to enable the warning. This can be true with regard to either of step S6 of Figure 5A or step S11 of Figure 5B, for example.

It should be noted that each of the aforementioned aspects of an embodiment of the present application have been described with regard to the method of the present application. However, at least one embodiment of the present application is directed to a navigation device 200, including a processor 210 to determine a route of travel based upon at least a received destination location and to determine whether or not travel along the determined route will at least one of meet and exceed a first threshold; and an output device 241 to prompt, upon the processor 210 determining that travel along the determined route will at least one of meet and exceed the first threshold, a user of the navigation device 200 to enable output of a warning to break from driving a vehicle, in which the navigation device 200 is located, during travel along the determined route. Such a navigation device 200 may include, as part of the output device 241 for example, an integrated input and display device 290 to enable display

and subsequent selection of options, warnings, etc. Thus, such a navigation device 200 may be used to perform the various aspects of the method described with regard to Figures 5A and 5B, as would be understood by one of ordinary skill in the art. Thus, further explanation is omitted for the sake of brevity.
Figures 6A and 6B illustrate examples of flowcharts of methodologies of an embodiment for outputting a warning during travel along a route. As shown in Figure 6A for example, a timer may be initially enabled in step S20. Such a timer can be enabled or reset by the processor 210 for example, and/or when the navigation device 200 is docked in a docking station 292 for example. By use of such a timer (as one non-limiting example embodiment of the present application), a processor 210 of the navigation device 200 can determine, during travel along the determined route and upon the warning being enabled (via the process of Figures 5A and/or 5B for example), whether or not at least a second threshold is met, the second threshold being less than the first threshold. Thereafter, upon determining that at least the second threshold is met, a warning may be output.
For example, as shown in Figure 6A, in step S20 the timer is reset and begins counting until another threshold (a second threshold of 105 minutes for example, compared with a first threshold 120 minutes, for example), is met. Upon determining that this threshold is met, the processor 210 can instruct an output device 241 to output to a user, such as shown in step S24. Such an output can include display of at least one of an icon 500 and a message 502 on an integrated input and display device 290 of the navigation device 200, for example. As indicated in step S22, the warning may be output for a limited duration, such as for 15 seconds for example.
As indicated above, the warning output in step S24 can include at least one of an icon and a message, wherein the at least one of an icon and a message may be displayed on the integrated input and display device 290 of the navigation device 200 for a limited duration. The icon 500 may itself be selectable, such that upon receipt of an indication of selection of the icon, in step S26 the processor 210 may direct a display for at least one of accessing selectable options to aid in implementing the driving break (selectable "suggest POI" virtual button 514 for example), acknowledging that a break has recently been

taken (selectable "break taken" virtual button 510 for example), and delaying output of a driving break notification (selectable "snooze" virtual button 512 for example). Thereafter, in step S28, selectable options to aid in implementing the driving break may be displayed including selectable categories as shown in the display of step S28. As shown in step S28, the selectable options may include categories of Points of Interest along the determined route. Thereafter, upon receipt of an indication of a selectable category in step S29, such as the petrol station category for example, different driving break locations and/or distances can be displayed for selection, in a manner similar to that previously discussed in step S13 of Figure 5B (noting that step S28 may be skipped, with POIs of steps S29 of Figure 6A and/or step S13 of Figure 5B being displayed directly). Thereafter, if the driver chooses to ignore the driving break warning, for example, the system moves to at least one of step S30 and step S32, wherein the processor 210 determines, during travel along the determined route and upon the warning being enabled, whether at least one additional threshold is met, the at least one additional threshold being less than the first threshold (thus, any number of N thresholds may be set during the process of Figure 6A, for example, before, during and after output of the warning). Upon determining that the at least one additional threshold is met, the warning is again output. For example, as shown in step S30, a next threshold may be that of 115 minutes wherein, once such a threshold is met, a warning is displayed in step S31, again including at least one of an icon 500 and a message 502. Thereafter or subsequent to step S22 (skipping step S30 if the system does not include a threshold such as that shown in Step S30), in step S32, a comparison to at least one additional threshold is made by processor 210 for example. As shown in step S34, once this primary threshold is reached, the display in step S34 may include display of at least one of an icon 504 and message 506, and this display may include elements varied in color based upon the at least one additional threshold being met (such as by displaying at least one of the icon 504 and message 506 in red or another distinct color, for example). This further may include adding an audio output, flashing at least one of the message or icon, or otherwise distinguishing or differentiating at least one of the message and/or icon from that previously displayed. Thus, irrespective of

the warning thresholds set in steps S22 and S30, the main threshold driving break time may produce such additional and possibly altered outputs. Thereafter, if the user still chooses to ignore the driving break message, the process may optionally move to step S36 wherein at a time subsequent to the additional threshold, perhaps at a time equal to the first threshold (if it was 150 minutes for example), warnings may be displayed in step S38 including display of an icon in a different color, and/or an indication that a driving break is overdue. This can also be accompanied by an audible signal, a flashing message, etc., somewhat similar to or further emphasized as compared to the display of S34. Thereafter, upon reaching a threshold greater than that of the first threshold, such as 166 minutes for example, the counter may be reset. Figure 6B illustrates a plurality of examples of an icon which could be displayable (in place of icon 500 or 504 for example) in any of steps S24, S31, S34, and S38 of Figure 6A. For example, the first icon shown in Figure 6B could be displayable in a first color, such as blue for example, along with some indicator of time remaining before the driving warning should be taken, such as a clock for example. As shown with regard to the icon 610 shown in Figure 6B, the clock can represent 15 minutes remaining before the break should be taken, and can be displayable in place of the icon and/or driving break messages 500 and 502 shown in step S24 for example. Thus, the icon can (but need not) include two portions, namely a first portion (the picnic table for example) representing the driving break and a second portion including the clock representing the time remaining before a driving break is to take place. The second icon shown in Figure 6B is icon 612, one which could be displayable in Step S31 for example, wherein 5 minutes remain before driving break. Finally, the third icon 614 shown in Figure 6B, can replace the icon displayable in step S34 of Figure 6A for example, wherein the icon and/or clock can be changed in color, from blue to red for example, to indicate that the driving break time has been reached.

It should be noted that Figures 6A and 6B are merely example embodiments, noting that determining whether or not travel along the determined route at least one of meets and exceeds a threshold, such as the second threshold and/or additional thresholds, may be based upon a comparison between the

second threshold and a time parameter as shown in Figure 6A, or may be based upon a comparison between the thresholds and a different parameter, such as a distance parameter for example, via the processor 210 for example. Thus, embodiments of the application should not be limited as such.

Figure 7 shows an example of varying the counter used to count a time for comparing to the various thresholds discussed in Figure 6A for example. As shown in Figure 7, the time count may begin, for example, at least one of when the navigation device 200 is docked, and when the vehicle in which the navigation device 200 is located, is traveling at a speed above a threshold speed. For example, as shown in step S40 of Figure 7, it is determined (by processor 210 for example) whether or not the driving break feature is enabled and the navigation device 200 is docked, and thereafter in step S42 the timer starts only after the speed is above a threshold speed, such as 10 kilometers per hour for example. Any of these parameters can be used to initiate a time at which the count begins, such as that in step S44.

Further, as shown in step S46, the time count may be paused at least one of when the navigation device 200 is undocked, and when the vehicle, in which the navigation device 200 is located, is traveling at a speed below a threshold speed. For example, in step S46, the timer is paused if the speed is less than a threshold or equals zero, for example, for a certain duration, such as 60 seconds, for example, or if the navigation device 200 is undocked. This means that the user is probably taking a break. Thereafter, the count continues to step S48, where a first threshold count is met.

In at least one other embodiment of the present application, a method includes enabling a navigation device 200 to output a warning to break from driving a vehicle, in which the navigation device 200 is located; determining a route of travel, in the navigation device 200, based upon at least a received destination location; determining whether or not travel along the determined route will at least one of meet and exceed a first threshold; and outputting the warning to break from driving a vehicle, in which the navigation device 200 is located, upon the warning being enabled and upon determining that travel along the determined route will at least one of meet and exceed a first threshold.

In at least one other embodiment of the present application, a device includes an integrated input and display device 290 to enable a navigation device 200 to output a warning to break from driving a vehicle, in which the navigation device 200 is located; and a processor 210 to determine a route of travel, in the navigation device 200, based upon at least a received destination location and to determine whether or not travel along the determined route will at least one of meet and exceed a first threshold, the warning to break from driving a vehicle, in which the navigation device 200 is located, being output via at least the integrated input and display device 290 upon the warning being enabled and upon the processor 210 determining that travel along the determined route will at least one of meet and exceed a first threshold.

Figure 8 illustrates a display screen for an example of an embodiment of a method of the present application. In this example embodiment, a user is initially able to enable a navigation device 200 to output a warning to break from driving a vehicle, in which the navigation device 200 is located. For example, an initial screen as shown in Figure 8 can be displayed to the user, on the integrated input and display device 290 for example, providing the user with a selectable option to enable output of warning break. Thereafter, a route of travel may be determined based upon at least a received destination location, and then it may be determined whether or not travel along the determined route will at least one of meet and exceed a first threshold, somewhat similar to that previously described with regard to Figures 5A and 5B, in steps S3 and S9 for example (with such similar steps being omitted herein for the sake of brevity). However, different from that of Figures 5A and 5B, instead of prompting a user to enable output of a warning of a break from driving a vehicle subsequent to making the determination that travel along the determined route will at least one of meet and exceed a first threshold, as the warning break is already enabled based upon the selection of Figure 8, the warning break may be output to the user.

Thus, upon the processor 210 determining that travel along the determined route will at least one of meet and exceed a first threshold, the warning may be output to break from driving a vehicle, in which the navigation device 200 is located. Somewhat similarly to that previously described with regard to Figure

6A for example, during travel along the determined route, it can be determined whether or not a second threshold is met, a second threshold being less than the first threshold, wherein the warning is output upon determining that the second threshold is met. Other aspects of Figures 5A-7 are additionally applicable to this additional embodiment, as will be understood by those of ordinary skill in the art.

It should be noted that each of the aforementioned aspects of an embodiment of the present application have been described with regard to the method of the present application. However, at least one embodiment of the present application is directed to a navigation device 200, including an integrated input and display device 290 to enable a navigation device 200 to output a warning to break from driving a vehicle, in which the navigation device 200 is located; and a processor 210 to determine a route of travel, in the navigation device 200, based upon at least a received destination location and to determine whether or not travel along the determined route will at least one of meet and exceed a first threshold, the warning to break from driving a vehicle, in which the navigation device 200 is located, being output via at least the integrated input and display device 290 upon the warning being enabled and upon the processor 210 determining that travel along the determined route will at least one of meet and exceed a first threshold. Such a navigation device 200 may be used to perform the various aspects of the method described with regard to Figure 8, as would be understood by one of ordinary skill in the art. Thus, further explanation is omitted for the sake of brevity.

The methods of at least one embodiment expressed above may be implemented as a computer data signal embodied in the carrier wave or propagated signal that represents a sequence of instructions which, when executed by a processor (such as processor 304 of server 302, and/or processor 210 of navigation device 200 for example) causes the processor to perform a respective method. In at least one other embodiment, at least one method provided above may be implemented above as a set of instructions contained on a computer readable or computer accessible medium, such as one of the memory devices previously described, for example, to perform the respective method when executed by a

processor or other computer device. In varying embodiments, the medium may be a magnetic medium, electronic medium, optical medium, etc.

Even further, any of the aforementioned methods may be embodied in the form of a program. The program may be stored on a computer readable media and is adapted to perform any one of the aforementioned methods when run on a computer device (a device including a processor). Thus, the storage medium or computer readable medium is adapted to store information and is adapted to interact with a data processing facility or computer device to perform the method of any of the above mentioned embodiments.

The storage medium may be a built-in medium installed inside a computer device main body or a removable medium arranged so that it can be separated from the computer device main body. Examples of the built-in medium include, but are not limited to, rewriteable non-volatile memories, such as ROMs and flash memories, and hard disks. Examples of the removable medium include, but are not limited to, optical storage media such as CD-ROMs and DVDs; magneto-optical storage media, such as MOs; magnetism storage media, including but not limited to floppy disks (trademark), cassette tapes, and removable hard disks; media with a built-in rewriteable non-volatile memory, including but not limited to memory cards; and media with a built-in ROM, including but not limited to ROM cassettes; etc. Furthermore, various information regarding stored images, for example, property information, may be stored in any other form, or it may be provided in other ways.

As one of ordinary skill in the art will understand upon reading the disclosure, the electronic components of the navigation device 200 and/or the components of the server 302 can be embodied as computer hardware circuitry or as a computer readable program, or as a combination of both.

The system and method of embodiments of the present application include software operative on the processor to perform at least one of the methods according to the teachings of the present application. One of ordinary skill in the art will understand, upon reading and comprehending this disclosure, the manner in which a software program can be launched from a computer readable medium in a computer based system to execute the functions found in the software program. One of ordinary skill in the art will further understand

the various programming languages which may be employed to create a software program designed to implement and perform at least one of the methods of the present application.

The programs can be structured in an object-orientation using an object-oriented language including but not limited to JAVA, Smalltalk, C++, etc., and the programs can be structured in a procedural-orientation using a procedural language including but not limited to COBOL, C, etc. The software components can communicate in any number of ways that are well known to those of ordinary skill in the art, including but not limited to by application of program interfaces (API), interprocess communication techniques, including but not limited to report procedure call (RPC), common object request broker architecture (CORBA), Component Object Model (COM), Distributed Component Object Model (DCOM), Distributed System Object Model (DSOM), and Remote Method Invocation (RMI). However, as will be appreciated by one of ordinary skill in the art upon reading the present application disclosure, the teachings of the present application are not limited to a particular programming language or environment.

The above systems, devices, and methods have been described by way of example and not by way of limitation with respect to improving accuracy, processor speed, and ease of user interaction, etc. with a navigation device 200. Further, elements and/or features of different example embodiments may be combined with each other and/or substituted for each other within the scope of this disclosure and appended claims.

Still further, any one of the above-described and other example features of the present invention may be embodied in the form of an apparatus, method, system, computer program and computer program product. For example, of the aforementioned methods may be embodied in the form of a system or device, including, but not limited to, any of the structure for performing the methodology illustrated in the drawings.

Example embodiments being thus described, it will be obvious that the same may be varied in many ways. Such variations are not to be regarded as a departure from the spirit and scope of the present invention, and all such

modifications as would be obvious to one skilled in the art are intended to be included within the scope of the following claims.

What is claimed is:

1. A method of operation of a navigation device, comprising:

determining a route of travel, based upon at least a received destination location and an identified location;

determining whether travel along the determined route will at least one of meet and exceed a first threshold, and if such determination is positive,

outputting information indicative of such determination to a user of the device at the time when the determination is made or thereafter.

2. The method of claim 1 wherein the information output includes a prompt, issued substantially immediately after a positive determination that travel along a determined route will at least one of meet and exceed the first threshold, to the user to enable output of subsequent information in the form of a warning to break from driving a vehicle in which the navigation device is located, during travel along the determined route.

3. The method of claim 2, further comprising:

determining, during travel along the determined route and upon the warning output being enabled, whether or not at least a second threshold is met, the second threshold being less than the first threshold; and

outputting the warning upon determining that the second threshold is met.

4. The method of claim 1 or 3 wherein the information output is an audible or visible warning at a time period predetermined in relation to the first or second threshold.

5. The method of claim 4, wherein the outputting of the warning includes displaying at least one of an icon and a message on the integrated input and display device of the navigation device.

6. The method of claim 5, wherein the at least one of an icon and a message are displayed on the integrated input and display of the navigation device for a limited duration.

7. The method of claim 6, wherein the display of at least one of an icon and a message is varied in color based upon the determination of the first or second threshold being met or exceeded.

8. The method of claim 5 or any claim dependent thereon, wherein the icon is selectable, the method further comprising outputting selectable options to aid in implementing the driving break, upon receipt of an indication of selection of the icon.

9. The method of claim 8, wherein the selectable options include points of interest along the determined route of travel.

10. The method of claim 3 or any claim dependent thereon, wherein the determining of whether or not travel along the determined route will at least one of meet and exceed the second threshold, is based upon a comparison between the second threshold and at least one of a time parameter and a distance parameter.

11. The method of claim 3 or any claim dependent thereon, wherein the determining of whether or not travel along the determined route will at least one of meet and exceed the second threshold, is based upon a comparison between a time count during operation of the navigation device and the second threshold.

12. The method of claim 11, wherein the time count begins when at least one of the navigation device is docked, and the vehicle, in which the navigation device is located, is traveling at a speed above a threshold speed.

13. The method of claim 11 or 12, wherein the time count is paused when at least one of the navigation device is un-docked, and the vehicle, in which the navigation device is located, is traveling at a speed below a threshold speed.

14. A computer program comprising computer program code means adapted to perform all the steps of any of claims 1-13 when run on a computer.

15. A computer program as claimed in claim 14 when embodied on or in a computer readable medium.

16. A navigation device adapted for performing the method steps of any of claims 1-13, comprising:

a processor to determine a route of travel based upon at least a received destination location and an identified location, and to determine whether or not travel along the determined route will at least one of meet and exceed a first threshold; and

an output device to output information indicative of a positive determination having been made by said processor at that time or at a time thereafter.

17. The navigation device of claim 16, wherein the output device includes an integrated input and display device on which the information is output.

18. A navigation device programmed with the computer program of claims 14 or 15.

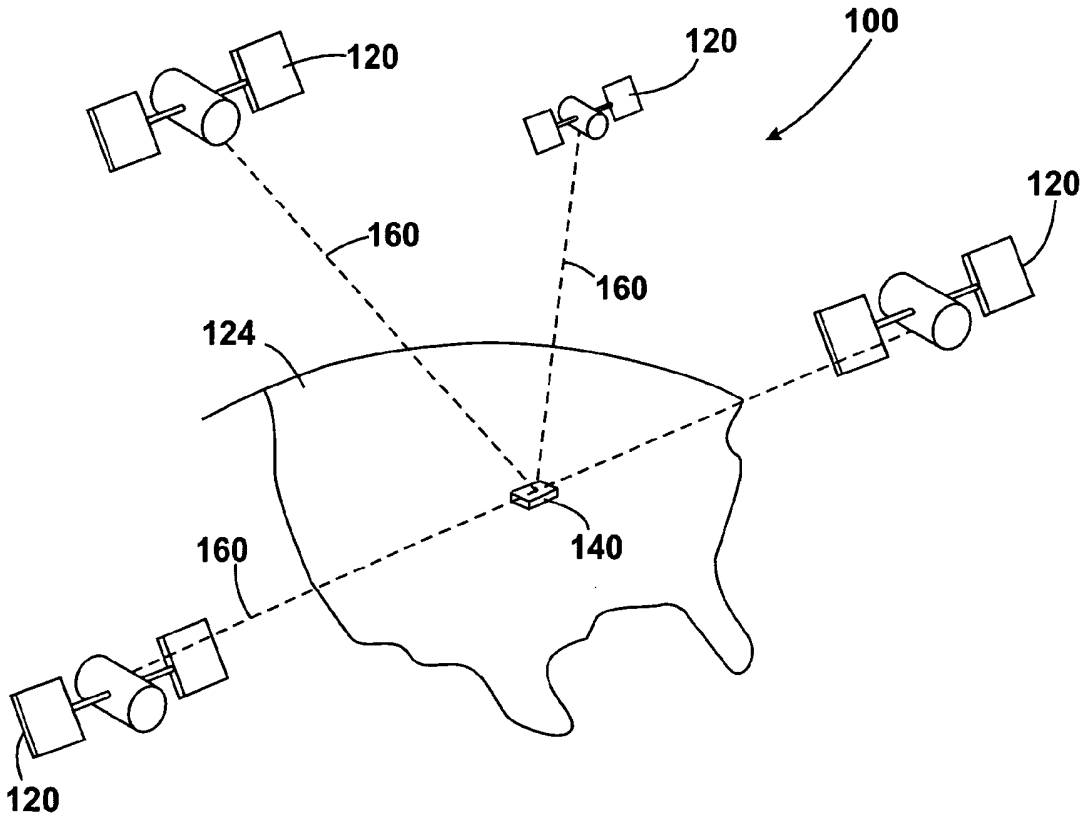


Fig. 1

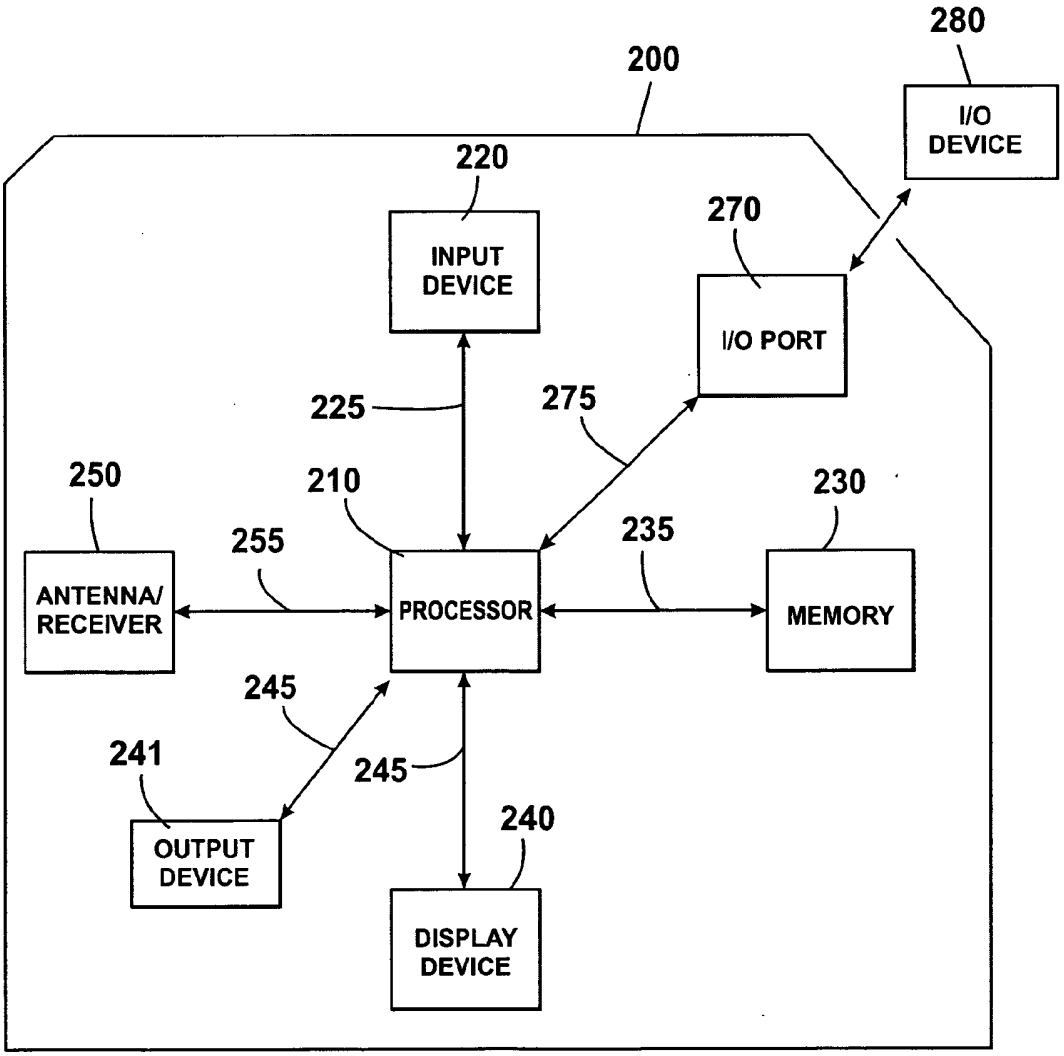

280
200
I/O DEVICE
220
INPUT DEVICE
270
I/O PORT
225
275
250
210
230
255
235
ANTENNA/ RECEIVER
PROCESSOR
MEMORY
245
241
245
240
OUTPUT DEVICE
DISPLAY DEVICE

Fig. 2

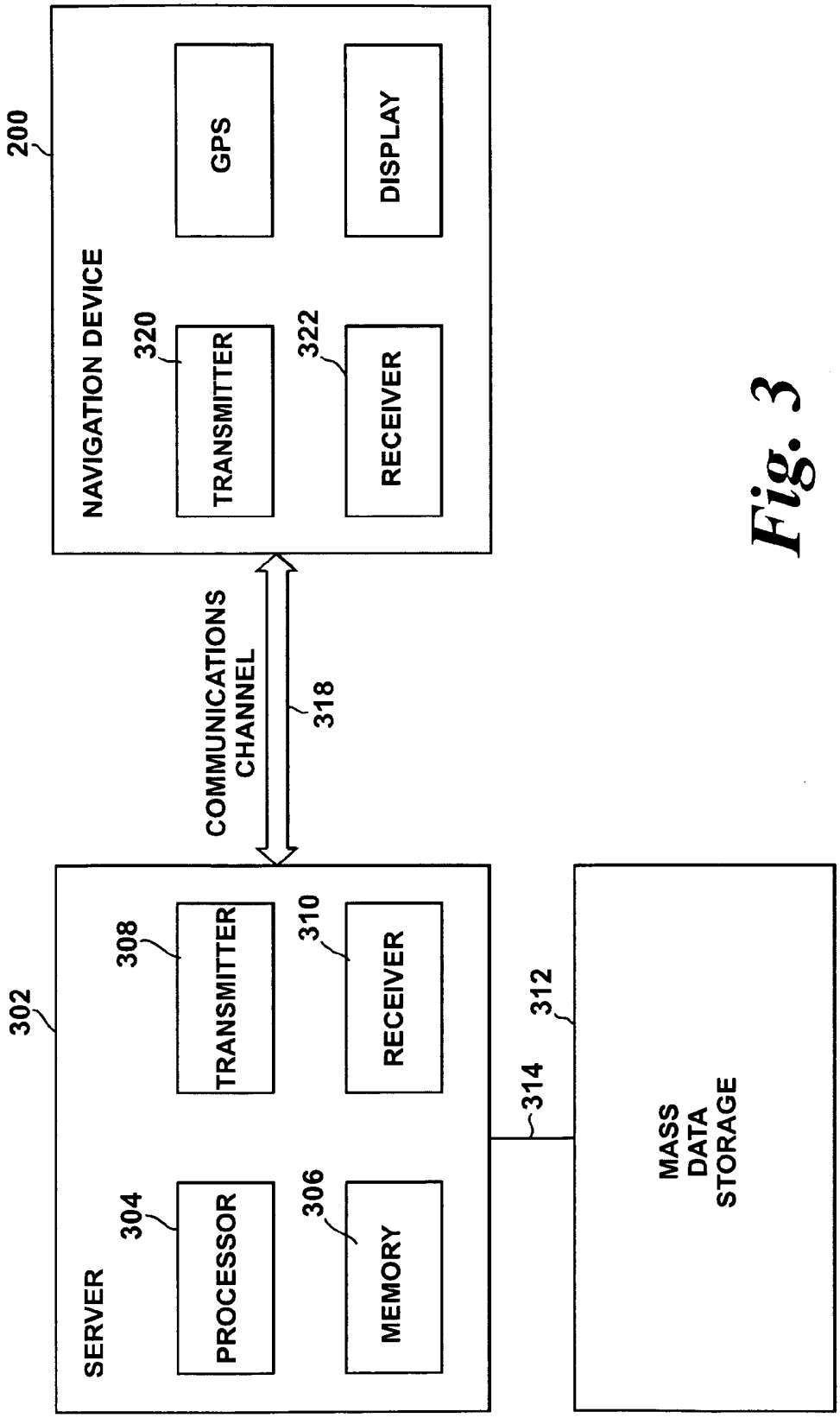

200
NAVIGATION DEVICE
GPS
DISPLAY
320
TRANSMITTER
322
RECEIVER
COMMUNICATIONS CHANNEL
318
302
SERVER
308
TRANSMITTER
310
RECEIVER
304
PROCESSOR
306
MEMORY
312
314
MASS DATA STORAGE

Fig. 3

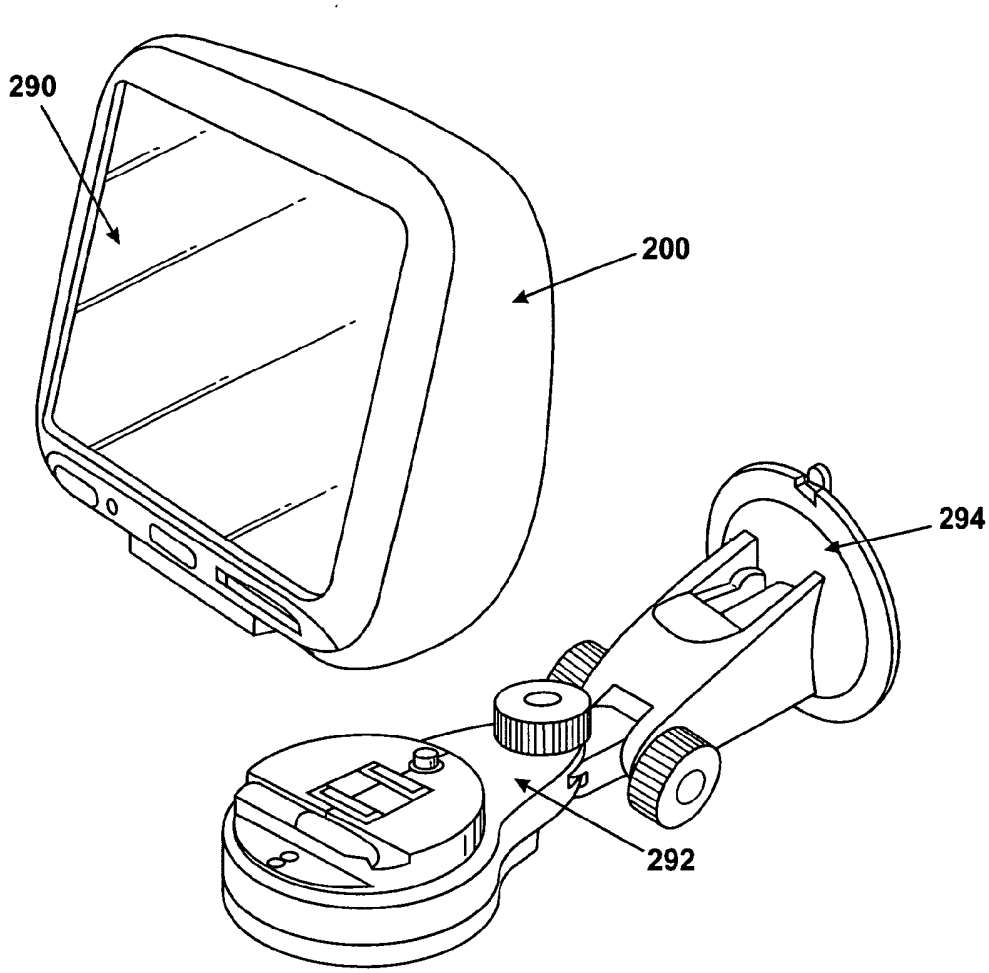


Fig. 4A

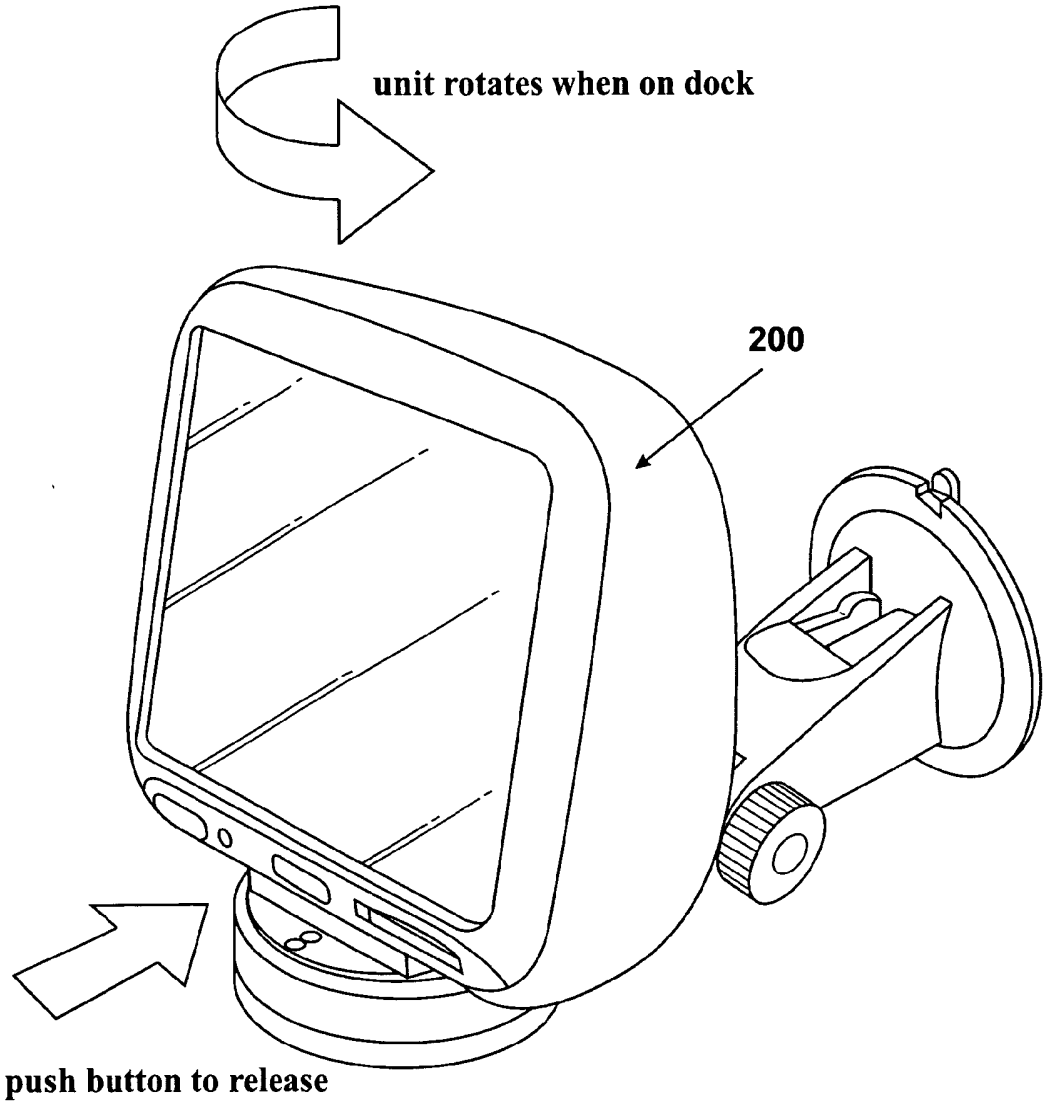


Fig. 4B

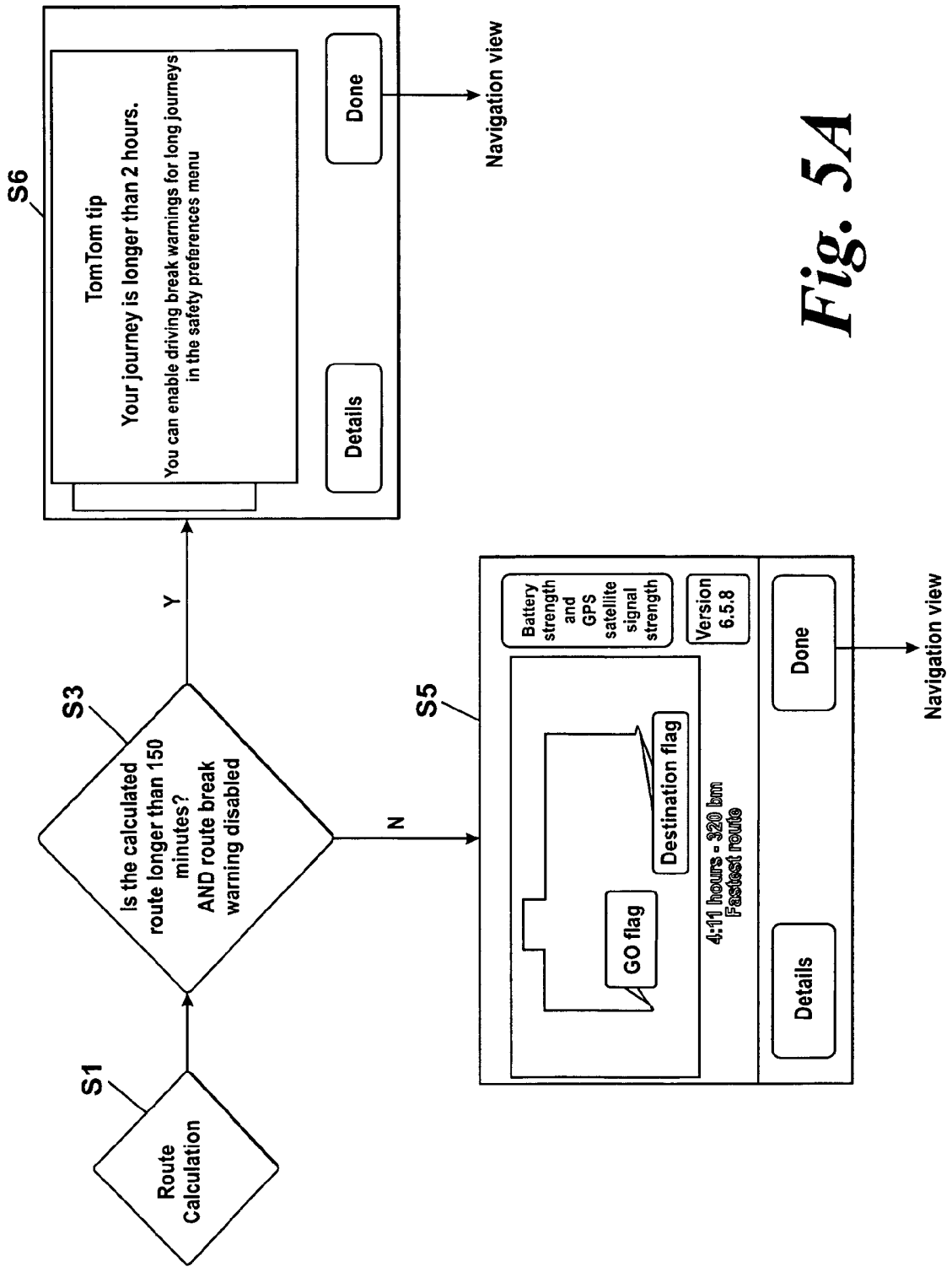

S1
Route Calculation
S3
Is the calculated route longer than 150 minutes? AND route break warning disabled
Y
N
S5
Battery strength and GPS satellite signal strength
Version 6.5.8
Destination flag
GO flag
4:11 hours - 320 km
Fastest route
Details
Done
Navigation view
S6
TomTom tip
Your journey is longer than 2 hours.
You can enable driving break warnings for long journeys in the safety preferences menu
Details
Done
Navigation view

Fig. 5A

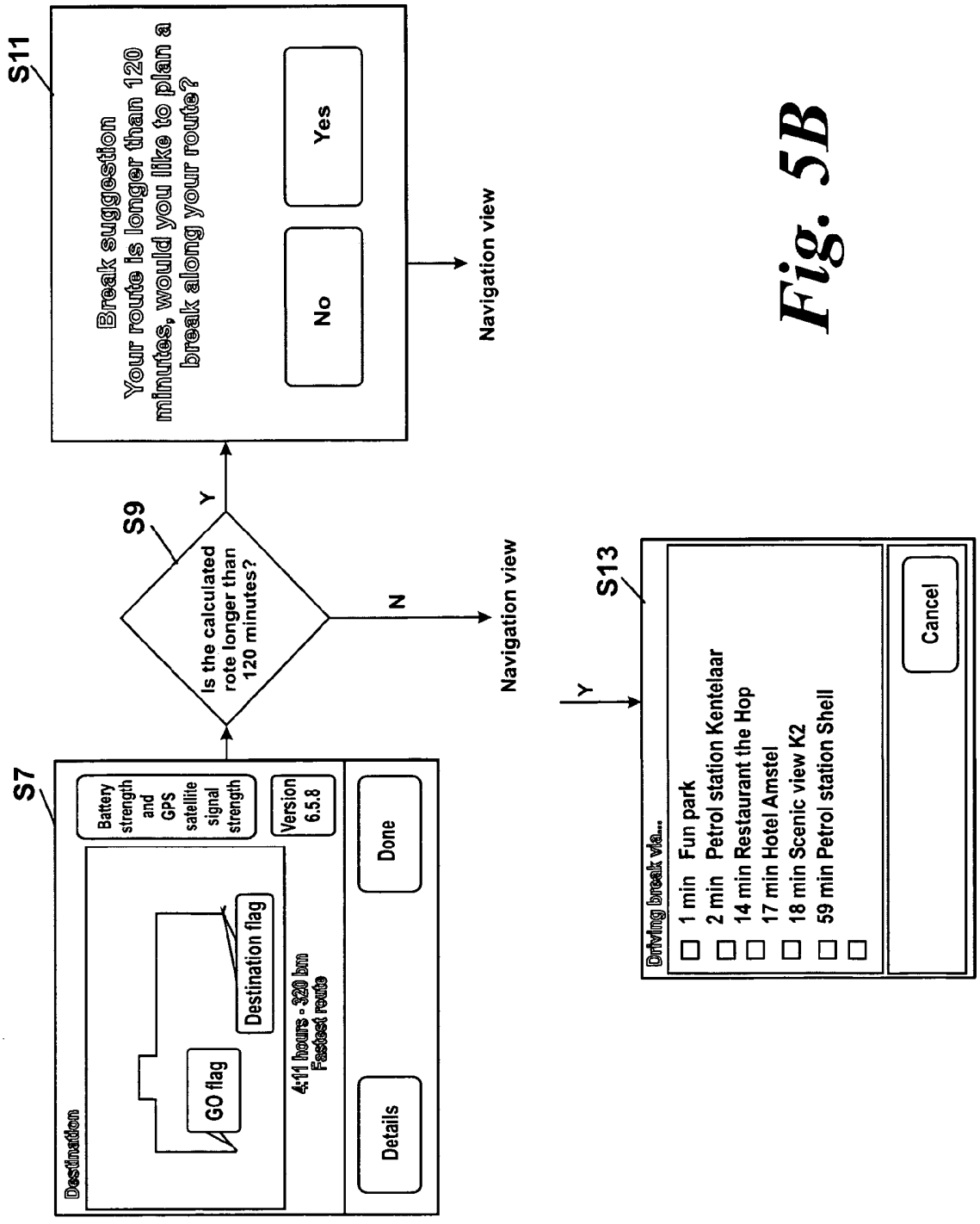

S11
Break suggestion
Your route is longer than 120 minutes, would you like to plan a break along your route?
No
Yes
Navigation view
S9
Is the calculated rote longer than 120 minutes?
Y
N
Navigation view
S7
Destination
Battery strength and GPS satellite signal strength
Version 6.5.8
GO flag
Destination flag
4:11 hours - 329 km
Fastest route
Details
Done
S13
Driving break via...
1 min Fun park
2 min Petrol station Kentelaar
14 min Restaurant the Hop
17 min Hotel Amstel
18 min Scenic view K2
59 min Petrol station Shell
Cancel

Fig. 5B

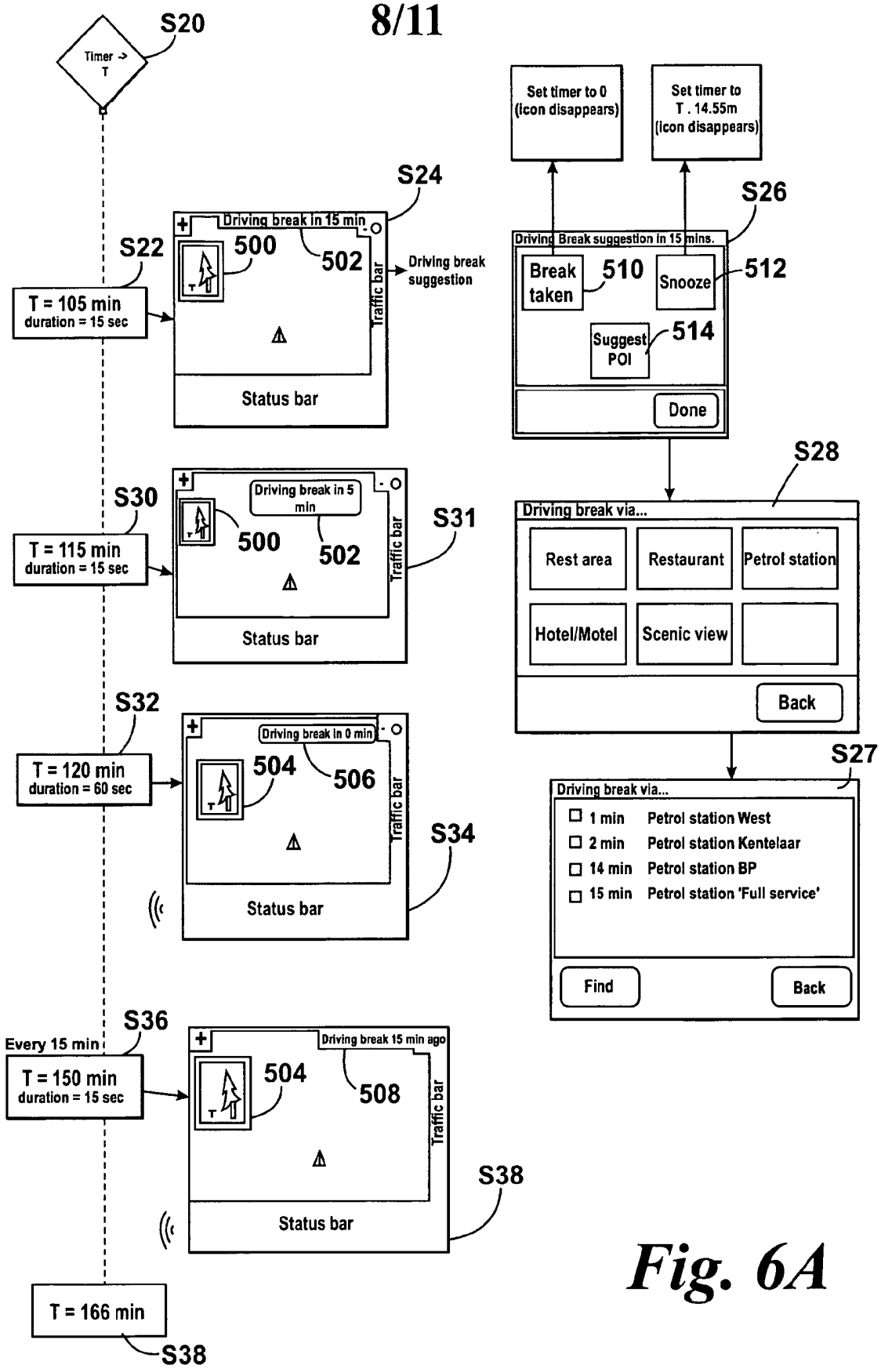
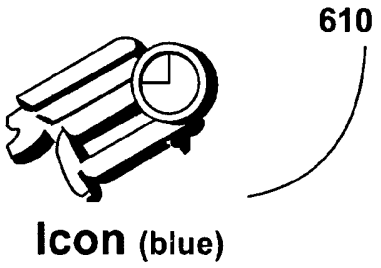
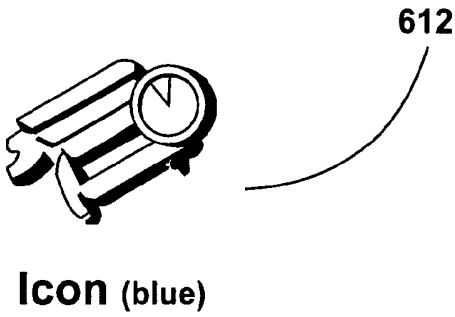

S20
Timer -> T
S22
T = 105 min
duration = 15 sec
S24
Driving break in 15 min
500
502
Traffic bar
Driving break suggestion
Status bar
S26
Set timer to 0 (icon disappears)
Set timer to T . 14.55m (icon disappears)
Driving Break suggestion in 15 mins.
Break taken
510
Snooze
512
Suggest POI
514
Done
S28
Driving break via...
Rest area
Restaurant
Petrol station
Hotel/Motel
Scenic view
Back
S27
Driving break via...
1 min Petrol station West
2 min Petrol station Kentelaar
14 min Petrol station BP
15 min Petrol station 'Full service'
Find
Back
S30
T = 115 min
duration = 15 sec
S31
Driving break in 5 min
500
502
Traffic bar
Status bar
S32
T = 120 min
duration = 60 sec
S34
Driving break in 0 min
504
506
Traffic bar
Status bar
S36
Every 15 min
T = 150 min
duration = 15 sec
Driving break 15 min ago
504
508
Traffic bar
S38
Status bar
T = 166 min
S38

Fig. 6A





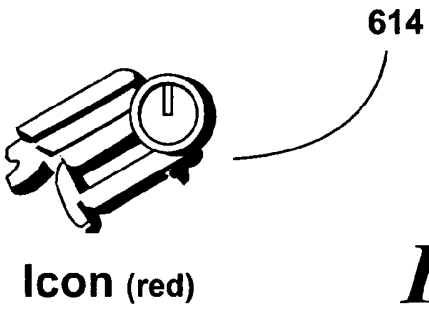


Fig. 6B

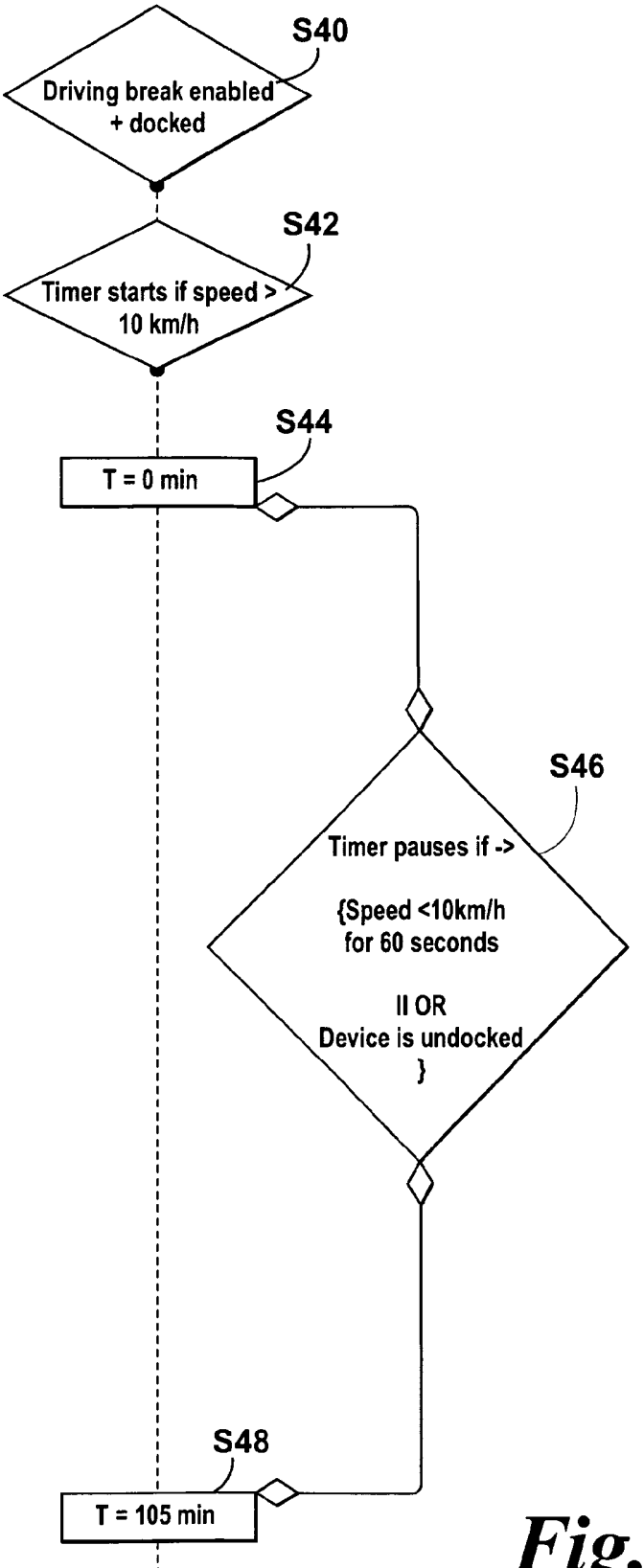

S40
Driving break enabled + docked
S42
Timer starts if speed > 10 km/h
S44
T = 0 min
S46
Timer pauses if ->
{Speed <10km/h for 60 seconds
II OR
Device is undocked
}
S48
T = 105 min

Fig. 7

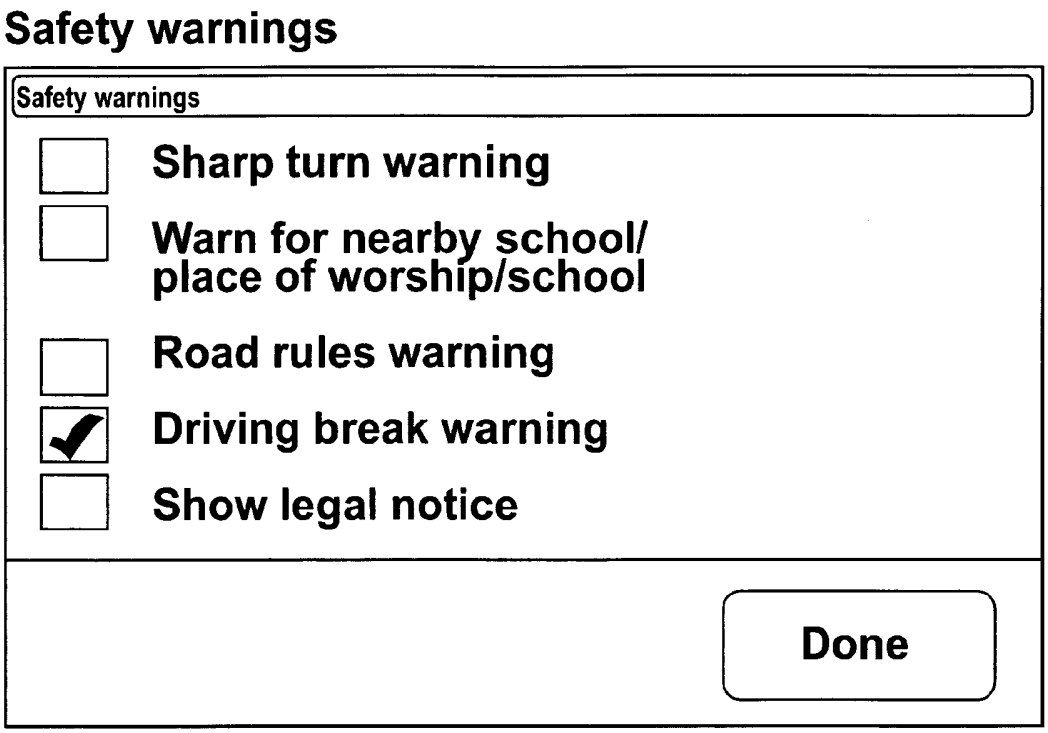

Safety warnings
Safety warnings
Sharp turn warning
Warn for nearby school/ place of worship/school
Road rules warning
Driving break warning
Show legal notice
Done

Fig. 8

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2007/008743

A. CLASSIFICATION OF SUBJECT MATTER
INV. G01C21/34 G08G1/0969

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
G01C G08G

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

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

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	JP 2005 055223 A (FUJITSU LTD) 3 March 2005 (2005-03-03) the whole document	1-18
X	DE 199 33 345 A1 (BOSCH GMBH ROBERT [DE]) 18 January 2001 (2001-01-18) column 1, lines 27-47 column 2, lines 22-36	1-18
X	EP 1 571 420 A (BOSCH GMBH ROBERT [DE]) 7 September 2005 (2005-09-07) column 1, lines 20-33 column 2, lines 45-56 column 3, lines 4-24	1,2,4-9, 14-18

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

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

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

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

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

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

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

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

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

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 January 2008	21/01/2008

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Jakob, Clemens

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2007/008743

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
JP 2005055223 A	03-03-2005	NONE	
DE 19933345 A1	18-01-2001	NONE	
EP 1571420 A	07-09-2005	DE 102004010508 A1	22-09-2005

[19] 中华人民共和国国家知识产权局

[51] Int. Cl.
G01C 21/34 (2006.01)
G08G 1/0969 (2006.01)

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[21] 申请号 200780049319.1
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[32] 2007. 1.10 [33] US [31] 60/879,549
[32] 2007. 1.10 [33] US [31] 60/879,553
[32] 2007. 1.10 [33] US [31] 60/879,577
[32] 2007. 1.10 [33] US [31] 60/879,599
[32] 2007. 1.10 [33] US [31] 60/879,529
[32] 2007. 1.10 [33] US [31] 60/879,601
[86] 国际申请 PCT/EP2007/008743 2007.10.5
[87] 国际公布 WO2008/083749 英 2008.7.17
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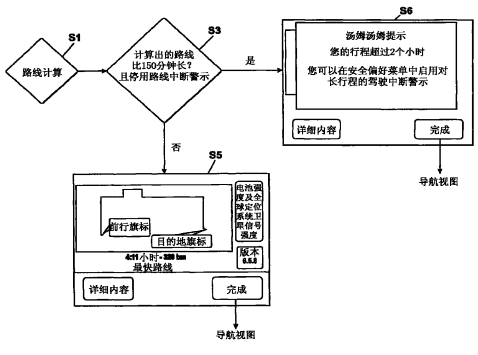
权利要求书 3 页 说明书 16 页 附图 11 页

[54] 发明名称

导航装置及用于驾驶中断警示的方法

[57] 摘要

本发明揭示一种用于导航的方法及装置。 在至少一个实施例中，所述方法包括：基于至少一接收到的目的地位置在导航装置中确定行进路线；确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者；及在确定沿着所述已确定的路线的行进将为符合所述第一阈值及超过所述第一阈值中的至少一者后，提示所述导航装置的用户启用警示的输出以在沿着所述已确定的路线的行进期间中断驾驶所述导航装置所在的交通工具。 在至少一个实施例中，所述导航装置包括：处理器，其用以基于至少一接收到的目的地位置而确定行进路线，且用以确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者；及输出装置，其用以在所述处理器确定沿着所述已确定的路线的行进将为符合所述第一阈值及超过所述第一阈值中的至少一者后，提示所述导航装置的用户启用警示的输出以在沿着所述已确定的路线的行进期间中断驾驶所述导航装置所在的交通工具。



1. 一种操作导航装置的方法，其包含：

基于至少一接收到的目的地位置及一已识别的位置而确定行进路线；

确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者，且如果所述确定是肯定的，

那么在进行所述确定时或进行所述确定后的时间，将指示所述确定的信息输出到所述装置的用户。

2. 根据权利要求 1 所述的方法，其中所述信息输出包括提示，所述提示在沿着已确定的路线的行进将为符合所述第一阈值及超过所述第一阈值中的至少一者的肯定确定后大体上立即被发出到所述用户，以启用呈警示形式的后续信息的输出，以在沿所述已确定的路线的行进期间中断驾驶所述导航装置所在的交通工具。

3. 根据权利要求 2 所述的方法，其进一步包含：

在沿着所述已确定的路线的行进期间且在启用所述警示输出后，确定是否符合至少一第二阈值，所述第二阈值小于所述第一阈值；以及

在确定符合所述第二阈值后，输出所述警示。

4. 根据权利要求 1 或 3 所述的方法，其中在相对于所述第一或第二阈值而预定的时间周期，所述信息输出为可听警示或可见警示。

5. 根据权利要求 4 所述的方法，其中所述警示的所述输出包括在所述导航装置的集成式输入及显示装置上显示图标及消息中的至少一者。

6. 根据权利要求 5 所述的方法，其中在所述导航装置的所述集成式输入及显示装置上显示图标及消息中的所述至少一者达有限持续时间。

7. 根据权利要求 6 所述的方法，其中基于对符合或超过所述第一或第二阈值的所述确定而在色彩上改变图标及消息中的至少一者的所述显示。

8. 根据权利要求 5 或从属于其的任一所述的方法，其中所述图标是可选择的，所述方

法进一步包含在接收到选择所述图标的指示后，输出用以辅助实施驾驶中断的可选择的选项。

9. 根据权利要求 8 所述的方法，其中所述可选择的选项包括沿着所述已确定的行进路线的关注点。

10. 根据权利要求 3 或从属于其的任一所述的方法，其中沿着所述已确定的路线的行进是否将为符合所述第二阈值及超过所述第二阈值中的至少一者的所述确定是基于所述第二阈值与时间参数及距离参数中的至少一者之间的比较。

11. 根据权利要求 3 或从属于其的任一所述的方法，其中沿着所述已确定的路线的行进是否将为符合所述第二阈值及超过所述第二阈值中的至少一者的所述确定是基于所述导航装置的操作期间的时间计数与所述第二阈值之间的比较。

12. 根据权利要求 11 所述的方法，其中当所述导航装置经对接及所述导航装置所在的所述交通工具正以高于阈值速度的速度行进中的至少一者时，所述时间计数开始。

13. 根据权利要求 11 或 12 所述的方法，其中当所述导航装置未经对接及所述导航装置所在的所述交通工具正以低于阈值速度的速度行进中的至少一者时，暂停所述时间计数。

14. 一种计算机程序，其包含当在计算机上运行时适于执行根据权利要求 1 到 13 中任一所述的所有步骤的计算机程序代码构件。

15. 一种根据权利要求 14 所述的计算机程序，其被包含在计算机可读媒体上或计算机可读媒体中。

16. 一种导航装置，其适于执行根据权利要求 1 到 13 中任一所述的方法步骤，所述导航装置包含：

处理器，其用以基于至少一接收到的目的地位置及一已识别的位置而确定行进路线，且用以确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者；以及

输出装置，其用以在所述时间或在所述时间后的时间输出指示所述处理器已做出肯定确定的信息。

17. 根据权利要求 16 所述的导航装置，其中所述输出装置包括集成式输入及显示装置，所述信息在所述集成式输入及显示装置上输出。

18. 一种导航装置，其通过根据权利要求 14 或 15 所述的计算机程序予以编程。

导航装置及用于驾驶中断警示的方法

技术领域

本申请案大体涉及导航方法及装置。

背景技术

导航装置传统上主要用于交通工具使用领域中，例如用于汽车、摩托车、卡车、船等上。或者，如果所述导航装置为便携式的，那么其可进一步在交通工具之间转移及/或可用于交通工具外部，例如用于徒步行进。

这些装置通常经特制以基于导航装置的初始位置及选定/输入的行进目的地（终点位置）来产生行进路线，请注意，所述初始位置可被键入到所述装置中，但传统上经由来自导航装置内的 GPS 接收器的 GPS 定位来计算。然而，此类行进路线可能为较长且险峻的。

发明内容

本发明者发现，在此类长的行进路线上，例如出现疲劳等问题是很可能的。因此，本申请案的发明者开发出一种警示方法及在导航装置上的实施，以警示导航装置的用户在此类较长的行程上中断驾驶休息一下。

在本申请案的至少一个实施例中，一种方法包括：基于至少一接收到的目的地位置在导航装置中确定行进路线；确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者；及在确定沿着所述已确定的路线的行进将为符合所述第一阈值及超过所述第一阈值中的至少一者后，提示所述导航装置的用户启用警示的输出以在沿着所述已确定的路线的行进期间中断驾驶所述导航装置所在的交通工具。

在本申请案的至少一个实施例中，一种导航装置包括：处理器，其用以基于至少一接收到的目的地位置而确定行进路线，且用以确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者；及输出装置，其用以在所述处理器确定沿着所述已确定的路线的行进将为符合所述第一阈值及超过所述第一阈值中的至少一者后，提示所述导航装置的用户启用警示的输出以在沿着所述已确定的路线的行进期间中断驾驶所述导航装置所在的交通工具。

在本申请案的至少一个其它实施例中，一种方法包括：启用导航装置输出警示以中断驾驶所述导航装置所在的交通工具；基于至少一接收到的目的地位置在所述导航装置中确定行进路线；确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者；及在启用了所述警示后且在确定沿着所述已确定的路线的行进将为符合第一阈值及超过第一阈值中的至少一者后，输出警示以中断驾驶所述导航装置所在的交通工具。

在本申请案的至少一个其它实施例中，一种装置包括：集成式输入及显示装置，其用以启用导航装置输出警示以中断驾驶所述导航装置所在的交通工具；及处理器，其用以基于至少一接收到的目的地位置在所述导航装置中确定行进路线，且用以确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者，对中断驾驶所述导航装置所在的交通工具的警示是在启用了所述警示后且在所述处理器确定沿着所述已确定的路线的行进将为符合第一阈值及超过第一阈值中的至少一者后，经由至少所述集成式输入及显示装置被输出。

附图说明

下文将通过使用实例性实施例来更详细地描述本申请案，将借助于附图来解释所述实例性实施例，在附图中：

图 1 说明全球定位系统（GPS）的实例性视图；

图 2 说明本申请案的实施例的导航装置的电子组件的实例性框图；

图 3 说明本申请案的实施例的服务器、导航装置及其间连接的实例性框图；

图 4A 及图 4B 为导航装置的实施例的实施方案的透视图；

图 5A 说明本申请案的实施例的实例性流程；

图 5B 说明本申请案的实施例的实例性流程；

图 6A 说明本申请案的实施例的警示输出序列的实例；

图 6B 说明本申请案的实施例的替代警示图标的实例；

图 7 说明本申请案的实施例的警示输出序列的实例；及

图 8 说明本申请案的实施例的选择屏幕的实例。

具体实施方式

本文中使用的术语仅用于描述特定实施例的目的，且并不希望限制本发明。如本文中所使用，单数形式“一”及“所述”希望还包括复数形式，除非上下文另外清楚地指

出。将进一步了解到，术语“包括”在用于本说明书中时指定所陈述的特征、整体、步骤、操作、元件及/或组件的存在，但并不排除一个或一个以上其它特征、整体、步骤、操作、元件、组件及/或其群组的存在或添加。

在描述图式中所说明的实例性实施例的过程中，为了清楚起见，采用特定术语。然而，本专利说明书的揭示内容并不希望限于如此选定的特定术语，且应了解，每一特定元件包括以类似方式操作的所有技术等效物。

下文中参看图式来描述本专利申请案的实例性实施例，其中在若干视图中相同参考数字始终表示相同或对应的部分。相同数字始终指代相同元件。如本文中所使用，术语“及/或”包括相关联的所列项目中的一者或一者以上的任何及所有组合。

图 1 说明可由导航装置使用的全球定位系统（GPS）的实例性视图，所述导航装置包括本申请案的实施例的导航装置。所述系统为已知的且用于多种用途。一般来说，GPS 为基于卫星无线电的导航系统，其能够为无限数目个用户确定连续位置、速度、时间及（在一些情况下）方向信息。

先前称为 NAVSTAR 的 GPS 并入有在极其精确的轨道中与地球一起运转的多个卫星。基于这些精确轨道，GPS 卫星可将其位置中继到任何数目个接收单元。

当经专门装备以接收 GPS 数据的装置开始扫描射频以查找 GPS 卫星信号时实施 GPS 系统。在从 GPS 卫星接收到无线电信号后，所述装置经由多种不同常规方法中的一者来确定所述卫星的精确位置。在大多数情况下，所述装置将继续扫描以查找信号，直到其已获得至少三个不同的卫星信号为止（请注意，通常并不（但可以）使用其它三角测量技术用仅两个信号来确定位置）。通过实施几何三角测量，接收器利用三个已知位置来确定其自身相对于卫星的二维位置。这可以已知方式来完成。另外，获得第四卫星信号将允许接收装置通过相同的几何计算以已知方式来计算其三维位置。位置及速度数据可由无限数目个用户连续地实时更新。

如图 1 中所示，GPS 系统大体上由参考数字 100 表示。多个卫星 120 处于围绕地球 124 的轨道中。每一卫星 120 的轨道未必与其它卫星 120 的轨道同步，且实际上很可能不同步。可用于本申请案的导航装置的实施例中的 GPS 接收器 140 经展示为从各种卫星 120 接收扩频 GPS 卫星信号 160。

从每一卫星 120 连续地发射的扩频信号 160 利用通过极其准确的原子钟实现的高度准确的频率标准。每一卫星 120 作为其数据信号发射 160 的一部分而发射指示所述特定卫星 120 的数据流。相关领域的技术人员了解到，GPS 接收器装置 140 通常获得来自至少三个卫星 120 的扩频 GPS 卫星信号 160 以供所述 GPS 接收器装置 140 通过三角测量

来计算其二维位置。额外信号的获得（其产生来自总共四个卫星 120 的信号 160）准许 GPS 接收器装置 140 以已知方式来计算其三维位置。

图 2 以方框组件格式来说明本申请案的实施例的导航装置 200 的电子组件的实例性框图。应注意，导航装置 200 的框图并不包括所述导航装置的所有组件，而是仅表示许多实例性组件。

导航装置 200 位于外壳（未图示）内。所述外壳包括连接到输入装置 220 及显示屏幕 240 的处理器 210。输入装置 220 可包括键盘装置、语音输入装置、触摸面板及/或用于输入信息的任何其它已知输入装置；且显示屏幕 240 可包括任何类型的显示屏幕，例如 LCD 显示器。在本申请案的至少一个实施例中，输入装置 220 及显示屏幕 240 经集成为集成式输入及显示装置，所述集成式输入及显示装置包括触摸垫或触摸屏输入端，其中用户仅需触摸显示屏幕 240 的一部分便可选择多个显示选项中的一者或激活多个虚拟按钮中的一者。

此外，其它类型的输出装置 250 还可包括（包括但不限于）可听输出装置。因为输出装置 250 可向导航装置 200 的用户产生可听信息，所以同样应了解，输入装置 240 还可包括麦克风以及用于接收输入语音命令的软件。

在导航装置 200 中，处理器 210 经由连接 225 而操作性地连接到输入装置 240 且经设定以经由连接 225 从输入装置 240 接收输入信息，且经由输出连接 245 而操作性地连接到显示屏幕 240 及输出装置 250 中的至少一者以将信息输出到所述至少一者。另外，处理器 210 经由连接 235 而操作性地连接到存储器 230，且进一步适于经由连接 275 从输入/输出（I/O）端口 270 接收信息/将信息发送到输入/输出（I/O）端口 270，其中 I/O 端口 270 可连接到在导航装置 200 外部的 I/O 装置 280。外部 I/O 装置 270 可包括（但不限于）外部收听装置，例如耳机。到 I/O 装置 280 的连接可进一步为到任何其它外部装置（例如汽车立体声单元）的有线或无线连接，用于不用手的操作及/或用于（例如）语音激活式操作，用于到耳机或头戴式耳机的连接及/或用于到（例如）移动电话的连接，其中移动电话连接可用以在导航装置 200 与（例如）因特网或任何其它网络之间建立数据连接且/或用以经由（例如）因特网或某其它网络建立到服务器的连接。

在至少一个实施例中，导航装置 200 可经由移动装置 400（例如移动电话、PDA 及/或具有移动电话技术的任一装置）建立与服务器 302 的“移动”网络连接，从而建立数字连接（例如经由（例如）已知的蓝牙技术的数字连接）。此后，通过其网络服务提供者，移动装置 400 可建立与服务器 302 的网络连接（例如，通过因特网）。如此，在导航装置 200（当其独自及/或在交通工具中行进时，其可为且通常为移动的）与服务器 302

之间建立“移动”网络连接以便为信息提供“实时”或至少非常“新式的”网关。

使用（例如）因特网 410 来建立移动装置 400（经由服务提供者）与例如服务器 302 等另一装置之间的网络连接可以已知方式来完成。举例来说，这可包括 TCP/IP 分层协议的使用。移动装置 400 可利用任何数目个通信标准，例如 CDMA、GSM、WAN 等。

如此，可利用经由数据连接（例如，经由移动电话或导航装置 200 内的移动电话技术）所实现的因特网连接。对于此连接，建立服务器 302 与导航装置 200 之间的因特网连接。这可（例如）通过移动电话或其它移动装置及 GPRS（通用分组无线电服务）连接（GPRS 连接是由电信运营商提供的用于移动装置的高速数据连接；GPRS 是用以连接到因特网的方法）来完成。

导航装置 200 可进一步经由（例如）现有的蓝牙技术以已知方式来完成与移动装置 400 的数据连接且最终完成与因特网 410 及服务器 302 的数据连接，其中数据协议可利用任何数目个标准，例如 GSRM、用于 GSM 标准的数据协议标准。

导航装置 200 可在导航装置 200 本身内包括其自身的移动电话技术（例如，包括天线，其中作为替代可另外使用导航装置 200 的内部天线）。导航装置 200 内的移动电话技术可包括如上指定的内部组件，且/或可包括可插入式卡，连同（例如）必要的移动电话技术及/或天线。如此，导航装置 200 内的移动电话技术可类似地经由（例如）因特网 410 以与任一移动装置 400 的方式类似的方式来建立导航装置 200 与服务器 302 之间的网络连接。

对于 GRPS 电话设定，具备蓝牙功能的装置可用以配合移动电话模型、制造商等的不断改变的频谱正确地工作，举例来说，模型/制造商特定设定可存储于导航装置 200 上。可以在先前或随后实施例中的任一者中所论述的方式来更新针对此信息而存储的数据。

图 2 进一步说明处理器 210 与天线/接收器 250 之间经由连接 255 的操作性连接，其中天线/接收器 250 可为（例如）GPS 天线/接收器。将了解到，为了说明而示意性地组合由参考数字 250 表示的天线与接收器，但天线及接收器可为分开定位的组件，且天线可为（例如）GPS 片状天线或螺旋天线。

另外，所属领域的技术人员将了解，图 2 中所示的电子组件以常规方式由电源（未图示）供电。如所属领域的技术人员将了解的，图 2 中所示的组件的不同配置被视为属于本申请案的范围内。举例来说，在一个实施例中，图 2 中所示的组件可经由有线及/或无线连接等相互通信。因此，本申请案的导航装置 200 的范围包括便携式或手持式导航装置 200。

此外，图 2 的便携式或手持式导航装置 200 可以已知方式连接或“对接”到机动交通工具，例如汽车或船。此导航装置 200 接着可针对便携式或手持式导航用途而从对接位置移除。

图 3 说明本申请案的实施例的服务器 302 与本申请案的导航装置 200（经由一般通信信道 318）的实例性框图。当在服务器 302 与本申请案的导航装置 200 之间建立经由通信信道 318 的连接（请注意，此连接可为经由移动装置的数据连接、经由个人计算机经由因特网的直接连接等）时，服务器 302 与导航装置 200 可通信。

除了可能未说明的其它组件之外，服务器 302 还包括处理器 304，所述处理器 304 操作性地连接到存储器 306 且经由有线或无线连接 314 进一步操作性地连接到大容量数据存储装置 312。处理器 304 进一步操作性地连接到发射器 308 及接收器 310，以经由通信信道 318 将信息发射到导航装置 200 及从导航装置 200 发送信息。所发送及所接收的信号可包括数据、通信及/或其它传播信号。可根据对于导航系统 200 的通信设计中所使用的通信要求及通信技术来选择或设计发射器 308 及接收器 310。另外，应注意，可将发射器 308 及接收器 310 的功能组合为信号收发器。

服务器 302 进一步连接到（或包括）大容量存储装置 312，请注意，大容量存储装置 312 可经由通信链路 314 耦合到服务器 302。大容量存储装置 312 含有导航数据及地图信息的存储装置，且可同样为与服务器 302 分离的装置，或者可并入到服务器 302 中。

导航装置 200 适于通过通信信道 318 而与服务器 302 通信，且包括如先前关于图 2 所描述的处理器、存储器等以及发射器 320 及接收器 322 以通过通信信道 318 发送及接收信号及/或数据，请注意，这些装置可进一步用于与不同于服务器 302 的装置进行通信。另外，根据对于导航装置 200 的通信设计中所使用的通信要求及通信技术来选择或设计发射器 320 及接收器 322，且可将发射器 320 及接收器 322 的功能组合为单一收发器。

存储于服务器存储器 306 中的软件为处理器 304 提供指令且允许服务器 302 向导航装置 200 提供服务。由服务器 302 提供的一个服务涉及处理来自导航装置 200 的请求及将导航数据从大容量数据存储装置 312 发射到导航装置 200。根据本申请案的至少一个实施例，由服务器 302 提供的另一服务包括针对所需应用使用各种算法来处理导航数据及将这些计算的结果发送到导航装置 200。

通信信道 318 大体上表示连接导航装置 200 与服务器 302 的传播媒体或路径。根据本申请案的至少一个实施例，服务器 302 及导航装置 200 两者均包括用于通过所述通信信道发射数据的发射器及用于接收已通过所述通信信道发射的数据的接收器。

通信信道 318 不限于特定通信技术。另外，通信信道 318 不限于单一通信技术；也

就是说，信道318可包括使用多种技术的若干通信链路。举例来说，根据至少一个实施例，通信信道318可适于提供用于电通信、光通信及/或电磁通信等的路径。如此，通信信道318包括（但不限于）以下各项中的一者或其组合：电路、例如电线及同轴电缆的电导体、光纤电缆、转换器、射频（rf）波、大气、真空等。此外，根据至少一个各种实施例，通信信道318可包括中间装置，例如路由器、转发器、缓冲器、发射器及接收器。

举例来说，在本申请案的至少一个实施例中，通信信道318包括电话及计算机网络。此外，在至少一个实施例中，通信信道318可能能够适应例如射频、微波频率、红外通信等无线通信。另外，根据至少一个实施例，通信信道318可适应卫星通信。

通过通信信道318所发射的通信信号包括（但不限于）如对于给定通信技术可能要求或需要的信号。举例来说，所述信号可适于在蜂窝式通信技术中使用，所述蜂窝式通信技术例如为时分多址（TDMA）、频分多址（FDMA）、码分多址（CDMA）、全球移动通信系统（GSM）等。可通过通信信道318发射数字及模拟信号两者。根据至少一个实施例，这些信号可为如对于所述通信技术可能需要的经调制、经加密且/或经压缩的信号。

大容量数据存储装置312包括用于所需导航应用的足够存储量。大容量数据存储装置312的实例可包括磁性数据存储媒体（例如硬盘驱动器）、光学存储媒体（例如CD-Rom）、带电数据存储媒体（例如快闪存储器）、分子存储器等。

根据本申请案的至少一个实施例，服务器302包括可由导航装置200经由无线信道接入的远程服务器。根据本申请案的至少一个其它实施例，服务器302可包括位于局域网（LAN）、广域网（WAN）、虚拟专用网络（VPN）等上的网络服务器。

根据本申请案的至少一个实施例，服务器302可包括例如桌上型或膝上型计算机的个人计算机，且通信信道318可为连接在个人计算机与导航装置200之间的电缆。或者，可将个人计算机连接在导航装置200与服务器302之间以在服务器302与导航装置200之间建立因特网连接。或者，移动电话或其它手持式装置可建立到因特网的无线连接，以用于经由因特网将导航装置200连接到服务器302。

可经由信息下载为导航装置200提供来自服务器302的信息，所述信息下载可在用户将导航装置200连接到服务器302后周期性地更新且/或可在经由（例如）无线移动连接装置及TCP/IP连接在服务器302与导航装置200之间进行较恒定或频繁的连接后更为动态。对于许多动态计算，服务器302中的处理器304可用于处置大量的处理需要，然而，导航装置200的处理器210还可时常独立于到服务器302的连接而处置许多处理及计算。

连接到服务器302的大容量存储装置312可包括比能够维持于导航装置200本身上的数据更多量的制图及路线数据，包括地图等。举例来说，服务器302可使用一组处理算法来处理导航装置200的沿着所述路线行进的大部分装置。另外，存储于存储器312中的制图及路线数据可对原先由导航装置200接收到的信号（例如，GPS信号）进行操作。

如以上在本申请案的图2中所指示，本申请案的实施例的导航装置200包括处理器210、输入装置220及显示屏幕240。在至少一个实施例中，输入装置220及显示屏幕240经集成为集成式输入及显示装置以启用信息输入（经由直接输入、菜单选择等）及信息显示（例如通过触摸面板屏幕）两者。如所属领域的技术人员众所周知的，此屏幕可为（例如）触摸输入LCD屏幕。另外，导航装置200还可包括任何额外输入装置220及/或任何额外输出装置240，例如音频输入/输出装置。

图4A及图4B为导航装置200的实施例的实施方案的透视图。如图4A中所示，导航装置200可为包括集成式输入及显示装置290（例如，触摸面板屏幕）及图2的其它组件（包括但不限于内部GPS接收器250、微处理器210、电源、存储器系统220等）的单元。

导航装置200可搁置于臂292上，所述臂292本身可使用大吸盘294而紧固到交通工具仪表板/窗/等。此臂292为导航装置200可对接到的对接台的一个实例。

如图4B中所示，导航装置200可对接或通过（例如）将导航装置292搭扣连接到对接台的臂292来以其它方式连接到对接台的臂292（此仅为一个实例，因为用于连接到对接台的其它已知替代物属于本申请案的范围内）。导航装置200可接着可在臂292上旋转，如图4B的箭头所示。为了释放导航装置200与对接台之间的连接，例如可按压导航装置200上的按钮（此仅为一个实例，因为用于与对接台断开连接的其它已知替代物属于本申请案的范围内）。

本发明者发现，在此类长的行进路线上，例如出现疲劳等问题是很可能的。因此，本申请案的发明者开发出一种警示方法及在导航装置上的实施方案，以警示导航装置的用户在此类长的行程上中断驾驶休息一下。

在本申请案的至少一个实施例中，一种方法包括：基于至少接收到的目的地位置在导航装置200中确定行进路线；确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者；及在确定沿着所述已确定的路线的行进将为符合所述第一阈值及超过所述第一阈值中的至少一者后，提示所述导航装置200的用户启用警示输出以在沿着所述已确定的路线的行进期间中断驾驶所述导航装置所在的交通工具。

在本申请案的至少一个实施例中，一种导航装置 200 包括：处理器 210，其用以基于至少接收到的目的地位置而确定行进路线，且用以确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者；及输出装置 241，其用以在所述处理器 210 确定沿着所述已确定的路线的行进将为符合所述第一阈值及超过所述第一阈值中的至少一者后，提示所述导航装置 200 的用户启用警示输出以在沿着所述已确定的路线的行进期间中断驾驶所述导航装置 200 所在的交通工具。

本申请案的图 5A 说明本申请案的方法的实施例的一个实例。

如图 5A 的步骤 S1 中所示，首先确定或计算行进路线。可由（例如）处理器 210 以已知方式进行此确定或计算，其中此确定或计算通常包括：经由接收所述装置的 GPS 位置的 GPS 接收器 250 来检测导航装置的当前位置；用户输入或选择所需目的地位置，使得处理器 210 接收目的地位置；及使用存储于存储器 230 中的地图信息。

其后，在步骤 S3 中，（例如）由处理器 210 确定沿着所述已确定的路线的行进是否将为符合所述第一阈值及超过所述第一阈值中的至少一者。举例来说，如步骤 S3 中所示，处理器 210 确定在估计的行进时间中，计算出的路线是否将比（例如）150 分钟的阈值时间长。例如，处理器 210 可基于行进路线的距离及行进路线的道路上的估计速度极限以已知方式实现估计的行进时间的计算，其中所有此类数据连同地图信息一起存储于（例如）存储器 230 中。

虽然步骤 S3 说明在估计的行进时间中，计算出的路线必须比 150 分钟的阈值长，但可进行关于计算出的路线是否符合或超过（例如）总共 150 分钟的所述确定。另外，150 分钟仅为可在系统内设定的阈值的实例，注意，可使用（例如）用来在用户已驾驶达例如两个小时的时间后警示用户的实例。因此，例如可使用例如 120 分钟的不同时间周期，或者大于两个小时的时间周期，注意，可在不同时间周期（例如两小时的时间周期）发出警示（如在下文关于步骤 S6 将阐释）。因此，步骤 S3 中设定的 150 分钟阈值为设定的阈值，但可（例如由系统通过存储在存储器 230 中，且/或例如由用户在得到提示设定此阈值后）将其设定为任一时间周期。

其后，如果确定计算出的行进路线不为符合所述阈值及超过所述阈值中的至少一者，那么方法进行到步骤 S5，且仅以常规方式显示计算出的或已确定的行进路线（实例显示展示于图 5A 的步骤 S5 中）。然而，如果确定计算出的或已确定的行进路线确实为符合所述阈值及超过所述阈值中的至少一者，那么在步骤 S6 中可向用户发出提示，以对用户启用警示的输出，以在沿着所述已确定的路线的行进期间中断驾驶所述导航装置所在的交通工具。此提示的一个实例展示于图 5A 的步骤 S6 中，其中其陈述“您的行程

超过两个小时。您可在安全偏好菜单中启用对长行程的驾驶中断警示”。任选地，可显示驾驶中断警示的另外的细节，且/或可仅通过（例如）选择在所述时刻启用驾驶中断警示的虚拟键或按钮而提示用户（无需转向另外的偏好菜单）。或者，可例如通过用户选择“完成”虚拟按钮来启用警示。其后，方法进行到导航视图且等待系统导航。

图 5B 说明本申请案的实施例。类似于图 5A，最初在步骤 S7 中，（例如）由处理器 210 确定或计算行进路线。其后，在步骤 S9 中，处理器 210 确定沿着所述已确定的或计算出的行进路线的行进是否为符合第一阈值（例如，120 分钟的阈值）及超过第一阈值中的至少一者。如果否，那么系统进行到正常导航视图，且如果是，那么系统可例如如步骤 S11 中所示提示用户。如步骤 S11 中所示，提示可为指示路线比阈值（例如，120 分钟）长的显示，且询问用户其是否希望规划沿着路线的中断。因此，在步骤 S11 中，可提示用户（例如）通过选择“是”虚拟按钮来启用警示来中断驾驶交通工具，或者可通过选择“否”虚拟按钮来选择不启用所述警示。如果用户选择“是”，那么由处理器 210 接收此选择，且因此处理器 210 知晓用户想要启用警示的输出以中断驾驶交通工具。因此，在沿着路线的行进期间，处理器 210 将监视已过去的时间，且将在适当时间用信号通知警示的输出。

如果在步骤 S11 中，用户选择“是”，那么方法可进行到导航视图，或者可替代地进行到步骤 S13，在步骤 S13 中可显示对于驾驶中断的实施的备选项。因为处理器 210 已计算出行进路线且知晓将要实施中断的（例如）两个小时的阈值，所以可确定沿着行进路线的关注点及（任选地）所述关注点沿着路线的与此“两小时”阈值点相距的距离。因此，响应于接收到对步骤 S11 中“是”的选择的指示，处理器 210 可指导集成式输入及显示装置 290 显示如步骤 S13 中所示的驾驶中断关注点。可将这些显示为辅助实施步骤 S13 中的驾驶中断的可选择的选项。

图 5B 的步骤 S13 仅说明用于实施驾驶中断的可选择的关注点的一些实例，其中在选择步骤 S11 中启用驾驶中断选项后或在沿着已确定的路线的行进期间，在于沿着已确定的路线的行进期间输出驾驶中断警示后（或甚至与其一起），可显示这些可选择的关注点的一些实例。所述可选择的选项可显示有沿着路线的与此“两个小时”阈值点相距的距离（例如，如果在步骤 S11 中启用驾驶中断警示后得以显示），或者显示有与导航装置的当前位置相距的距离（如果在沿着已确定的路线的行进期间的驾驶中断警示后或与其一起得以显示）。虽然在图 5A 中未展示，但应注意，可以如上关于图 5B 所述的同一方式在图 5A 的步骤 S6 后实施图 5B 的步骤 S13 的显示。

因此，如图 5A 及图 5B 中所示，提示可包括在导航装置 200 的集成式输入及显示装

置 290 上显示启用警示的输出的选择及不启用警示的输出的选择中的至少一者，其中所述启用发生在接收到对启用所述警示的选择的指示之后。举例来说，对于图 5A 的步骤 S6 或图 5B 的步骤 S11 中的任一者，可为此种情况。

应注意，已关于本申请案的方法描述本申请案的实施例的前述方面中的每一者。然而，本申请案的至少一个实施例针对于一种导航装置 200，其包括：处理器 210，其用以基于至少一接收到的目的地位置而确定行进路线，且用以确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者；及输出装置 241，其用以在所述处理器 210 确定沿着所述已确定的路线的行进将为符合所述第一阈值及超过所述第一阈值中的至少一者后，提示所述导航装置 200 的用户启用警示的输出以在沿着所述已确定的路线的行进期间中断驾驶所述导航装置 200 所在的交通工具。此导航装置 200 可包括集成式输入及显示装置 290 作为输出装置 241 的部分，所述集成式输入及显示装置 290 用以启用选项、警示等的显示及随后对其的选择。因此，如所属领域的技术人员将理解，此导航装置 200 可用以执行关于图 5A 及图 5B 描述的方法的各种方面。因此，为了简洁起见，省略了进一步阐释。

图 6A 及图 6B 说明用于在沿着路线的行进期间输出警示的实施例的方法的流程图的实例。例如，如图 6A 中所示，最初，在步骤 S20 中，可启用计时器。可由（例如）处理器 210 且/或当导航装置 200 经对接在例如对接台 292 中时启用或重设此计时器。通过使用此计时器（作为本申请案的非限制性实例性实施例），在沿着已确定的路线的行进期间且在（例如，经由图 5A 及/或图 5B 的过程）启用了警示后，导航装置 200 的处理器 210 可确定是否符合至少一第二阈值，所述第二阈值小于第一阈值。其后，在确定符合至少所述第二阈值后，可输出警示。

举例来说，如图 6A 中所示，在步骤 S20 中，计时器经重设且开始计时，直到符合另一阈值（与例如 120 分钟的第一阈值相比，例如为 105 分钟的第二阈值）为止。在确定符合此阈值后，处理器 210 可下令输出装置 241 向用户输出，例如步骤 S24 中所示。此输出可包括例如图标 500 及消息 502 中的至少一者在导航装置 200 的集成式输入及显示装置 290 上的显示。如步骤 S22 中所指示，可输出警示达有限持续时间，例如达 15 秒。

如上所指示，步骤 S24 中输出的警示可包括图标及消息中的至少一者，其中可在导航装置 200 的集成式输入及显示装置 290 上显示图标及消息中的所述至少一者达有限持续时间。图标 500 本身可为可选择的，使得在接收到对选择所述图标的指示后，在步骤 S26 中，处理器 210 可指导对以下各项中至少一者的显示：访问用以辅助实施驾驶中断

的可选择的选项（例如，可选择的“建议 POI”虚拟按钮 514），确认最近已进行了中断（例如，可选择的“已进行中断”虚拟按钮 510），且延迟驾驶中断通知的输出（例如，可选择的“小睡”虚拟按钮 512）。其后，在步骤 S28 中，可显示辅助实施驾驶中断的可选择的选项，其包括如步骤 S28 的显示中所示的可选择的类别。如步骤 S28 中所示，可选择的选项可包括沿着已确定的路线的关注点的类别。其后，在于步骤 S29 中接收到对可选择的类别（例如，加油站类别）的指示后，可以与先前在图 5B 的步骤 S13 中论述的方式类似的方式显示不同的驾驶中断位置及/或距离，以供选择（注意，可跳过步骤 S28，直接显示图 6A 的步骤 S29 及/或图 5B 的步骤 S13 的 POI）。

其后，如果司机选择（例如）忽略驾驶中断警示，那么系统移到步骤 S30 及步骤 S32 中的至少一者，其中在沿着所述已确定的路线的行进期间且在启用了警示后，处理器 210 确定是否符合至少一个额外的阈值，所述至少一个额外的阈值小于第一阈值（因此，在图 6A 的过程期间，例如在警示的输出之前、期间及之后，可设定任何数目的 N 个阈值）。在确定了符合至少一个额外的阈值后，再次输出警示。举例来说，如步骤 S30 中所示，下一个阈值可为 115 分钟的阈值，其中，一旦符合此阈值，便在步骤 S31 中显示警示，所述警示再次包括图标 500 及消息 502 中的至少一者。其后，或在步骤 S22 之后（如果系统不包括例如步骤 S30 中所示的阈值的阈值，那么跳过步骤 S30），在步骤 S32 中，（例如）由处理器 210 进行与至少一个额外的阈值的比较。如步骤 S34 中所示，一旦达到此主阈值，步骤 S34 中的显示便可包括对图标 504 及消息 506 中的至少一者的显示，且此显示可包括基于符合至少一个额外的阈值而改变要素的色彩（例如，通过以红色或另一不同色彩显示图标 504 及消息 506 中的至少一者）。此进一步可包括添加音频输出、使消息或图标中的至少一者闪动，或者以其它方式将消息及/或图标中的至少一者与先前显示的消息及/或图标区别或区分开。因此，与步骤 S22 及 S30 中设定的警示阈值无关，主要阈值驾驶中断时间可产生此类额外的且可能已更改的输出。

其后，如果用户仍选择忽略驾驶中断消息，那么过程可任选地可移到步骤 S36，在步骤 S36 中在额外的阈值之后的时间，可能在等于第一阈值（例如，如果其为 150 分钟）的时间，在步骤 S38 中可显示警示，其包括以不同色彩对图标的显示及/或对驾驶中断已过期的指示。此还可伴随有可听信号、闪动消息等，其有些类似于 S34 的显示或者与 S34 的显示相比被进一步强调。其后，在达到大于第一阈值的阈值的阈值（例如，166 分钟）后，可重设计数器。

图 6B 说明在图 6A 的步骤 S24、S31、S34 及 S38 中的任一者中可为可显示的图标（例如，代替图标 500 或 504）的多个实例。举例来说，图 6B 中所示的第一图标可为连

同在应进行驾驶警示前剩余的时间的某一指示符（例如，时钟）一起可以第一色彩（例如，蓝色）显示的。如关于图 6B 中所示的图标 610 所展示，时钟可表示在应进行中断前剩余的 15 分钟，且可为代替（例如）在步骤 S24 中所示的图标及/或驾驶中断消息 500 及 502 可显示的。因此，图标可（但未必）包括两个部分，即，表示驾驶中断的第一部分（例如，野餐桌），及包括表示在将要发生驾驶中断前剩余的时间的时钟的第二部分。

图 6B 中所示的第二图标为图标 612，例如，其可为可在步骤 S31 中显示的图标，其中在驾驶中断前剩余 5 分钟。最后，图 6B 中所示的第三图标 614 可替代（例如）图 6A 的步骤 S34 中可显示的图标，其中图标及/或时钟的色彩可从（例如）蓝色改变为红色，以指示已到达驾驶中断时间。

应注意，图 6A 及图 6B 仅为实例性实施例，注意，确定沿着已确定的路线的行进是否为符合阈值（例如，第二阈值及/或额外的阈值）及超过所述阈值中的至少一者可基于第二阈值与如图 6A 中所示的时间参数之间的比较，或者可基于阈值与不同参数（例如，距离参数）之间的比较，此比较经由（例如）处理器 210 进行。因此，本申请案的实施例不应因而受限制。

图 7 展示改变所述计数器的实例，所述计数器用以对用于与（例如）图 6A 中论述的各种阈值相比较的时间进行计数。如图 7 中所示，举例来说，在当导航装置 200 经对接时及当导航装置 200 所在的交通工具正以高于阈值速度的速度行进时中的至少一者下，时间计数可开始。举例来说，如图 7 的步骤 S40 中所示，确定（例如，由处理器 210）驾驶中断特征是否经启用及导航装置 200 是否经对接，且其后在步骤 S42 中，计时器仅在速度高于阈值速度（例如，每小时 10 公里）后开始。这些参数中的任一者可用以起始计数开始时的时间，例如，步骤 S44 中的时间。

另外，如步骤 S46 中所示，可在当导航装置 200 未经对接时及当导航装置 200 所在的交通工具正以低于阈值速度的速度行进时中的至少一者下暂停时间计数。举例来说，在步骤 S46 中，如果速度小于阈值或等于（例如）零达某一持续时间（例如 60 秒），或者如果导航装置 200 未经对接，那么暂停计时器。此意味着，用户可能正在进行休息。其后，计数继续到步骤 S48，在步骤 S48 中，符合第一阈值计数。

在本申请案的至少一个其它实施例中，一种方法包括：启用导航装置 200 输出警示以中断驾驶所述导航装置 200 所在的交通工具；基于至少一接收到的目的地位置在所述导航装置 200 中确定行进路线；确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者；及在启用了所述警示后且在确定沿着所述已确定的路线的行进将为符合第一阈值及超过第一阈值中的至少一者后，输出警示以中断驾驶所述

导航装置200所在的交通工具。

在本申请案的至少一个其它实施例中，一种装置包括：集成式输入及显示装置290，其用以启用导航装置200输出警示以中断驾驶所述导航装置200所在的交通工具；及处理器210，其用以基于至少一接收到的目的地位置在所述导航装置200中确定行进路线，且用以确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者，中断驾驶所述导航装置200所在的交通工具的警示是在启用了所述警示后且在所述处理器210确定沿着所述已确定的路线的行进将为符合第一阈值及超过第一阈值中的至少一者后，经由至少所述集成式输入及显示装置290被输出。

图8说明本申请案的方法的实施例的实例的显示屏。在此实例性实施例中，用户最初能够启用导航装置200输出警示以中断驾驶导航装置200所在的交通工具。举例来说，可在（例如）集成式输入及显示装置290上向用户显示如图8中所示的初始屏幕，从而为用户提供启用警示中断的输出的可选择的选项。其后，可基于至少一接收到的目的地位置而确定行进路线，且接着可确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者，其有些类似于（例如）先前关于图5A及图5B在步骤S3及S9中所描述的步骤（为了简洁起见，此处省略了所述类似步骤）。然而，与图5A及图5B的方法不同，并非在确定了沿着已确定的路线的行进将为符合第一阈值及超过第一阈值中的至少一者后提示用户启用对中断驾驶交通工具的警示的输出，因为已基于图8的选择而启用警示中断，所以可向用户输出警示中断。

因此，在处理器210确定沿着已确定的路线的行进将为符合第一阈值及超过第一阈值中的至少一者后，可输出警示以中断驾驶导航装置200所在的交通工具。有些类似于（例如）先前关于图6A描述的方法，在沿着已确定的路线的行进期间，可确定是否符合第二阈值，第二阈值小于第一阈值，其中在确定符合第二阈值后输出警示。如所属领域的技术人员将理解，图5A到图7的其它方面可另外适用于此额外实施例。

应注意，已关于本申请案的方法描述本申请案的实施例的前述方面中的每一者。然而，本申请案的至少一个实施例针对于一种导航装置200，其包括：集成式输入及显示装置290，其用以启用导航装置200输出警示以中断驾驶所述导航装置200所在的交通工具；及处理器210，其用以基于至少一接收到的目的地位置在所述导航装置200中确定行进路线，且用以确定沿着所述已确定的路线的行进是否将为符合第一阈值及超过第一阈值中的至少一者，对中断驾驶所述导航装置200所在的交通工具的警示是在启用了所述警示后且在所述处理器210确定沿着所述已确定的路线的行进将为符合第一阈值及超过第一阈值中的至少一者后，经由至少所述集成式输入及显示装置290被输出。如所

属领域的技术人员将理解，此导航装置200可用以执行关于图8描述的方法的各种方面。因此，为了简洁起见，省略了进一步阐释。

上文表达的至少一个实施例的方法可实施为包含于载波或传播信号中的计算机数据信号，所述计算机数据信号表示指令序列，所述指令序列在由处理器（例如服务器302的处理器304及/或导航装置200的处理器210）执行时致使所述处理器执行相应方法。在至少一个其它实施例中，上文提供的至少一种方法可在上文实施为计算机可读或计算机可存取媒体（例如先前描述的存储器装置中的一者）上所含有的一组指令，以在由处理器或其它计算机装置执行时执行相应方法。在不同的实施例中，媒体可为磁性媒体、电子媒体、光学媒体等。

更进一步地，前述方法中的任一者可体现为程序的形式。程序可存储于计算机可读媒体上且当在计算机装置（包括处理器的装置）上运行时适于执行前述方法中的任一者。因此，存储媒体或计算机可读媒体适于存储信息且适于与数据处理设施或计算机装置交互以执行上文所提及的实施例中的任一者的方法。

存储媒体可为安装于计算机装置主体内部的内建式媒体或布置成可与计算机装置主体分开的可移除式媒体。内建式媒体的实例包括（但不限于）可重写非易失性存储器（例如ROM及快闪存储器）及硬盘。可移除式媒体的实例包括（但不限于）：光学存储媒体，例如CD-ROM及DVD；磁光存储媒体，例如MO；磁性存储媒体，包括（但不限于）软盘（商标）、盒式磁带及可移除式硬盘；具有内建式可重写非易失性存储器的媒体，包括（但不限于）存储卡；以及具有内建式ROM的媒体，包括（但不限于）ROM盒式磁带；等。此外，关于所存储图像的各种信息（例如，特性信息）可以任何其它形式来存储，或其可以其它方式来提供。

如所属领域的技术人员在阅读本揭示内容后将了解，导航装置200的电子组件及/或服务器302的组件可体现为计算机硬件电路或体现为计算机可读程序，或者体现为所述两者的组合。

本申请案的实施例的系统及方法包括在处理器上操作以执行根据本申请案的教示的方法中的至少一者的软件。所属领域的技术人员在阅读并理解本发明后将了解可从基于计算机的系统中的计算机可读媒体起动软件程序以执行在所述软件程序中找到的功能的方式。所属领域的技术人员将进一步了解可用于创建经设计以实施并执行本申请案的方法中的至少一者的软件程序的各种编程语言。

所述程序可使用面向对象的语言（包括但不限于JAVA、Smalltalk、C++等）以对象导向来构造，且所述程序可使用程序语言（包括但不限于COBOL、C等）以程序导向

来构造。软件组件可以所属领域的技术人员众所周知的任何数目种方式来通信，其包括（但不限于）通过应用程序接口（API）、过程间通信技术（包括但不限于报告程序调用（RPC）、共同对象请求代理结构（CORBA）、组件对象模型（COM）、分布式组件对象模型（DCOM）、分布式系统对象模型（DSOM）及远程方法调用（RMI））。然而，如所属领域的技术人员在阅读本申请案揭示内容后将了解，本申请案的教示不限于特定编程语言或环境。

已相对于对导航装置200改进准确度、处理器速度及用户交互简易性等来以实例方式而非以限制方式描述了以上系统、装置及方法。

另外，在本揭示内容及所附权利要求书的范围内，不同实例性实施例的元件及/或特征可彼此组合且/或彼此替代。

更进一步地，本发明的上述及其它实例性特征中的任一者可体现为设备、方法、系统、计算机程序及计算机程序产品的形式。举例来说，前述方法可体现为系统或装置的形式，其包括（但不限于）用于执行图式中所说明的方法的任何结构。

已如此描述了实例性实施例，将显而易见的是可以许多方式使其变化。不应将所述变化视为脱离本发明的精神及范围，且对于所属领域的技术人员将显而易见的所有所述修改均希望包括于所附权利要求书的范围内。

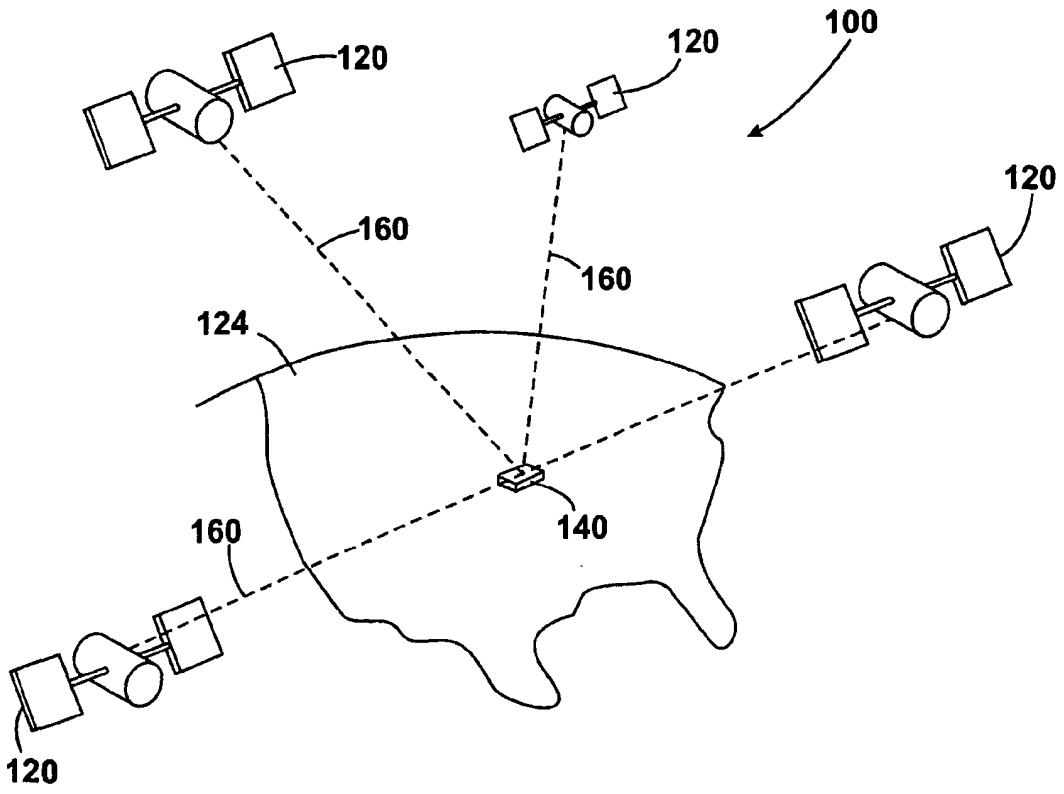


图1

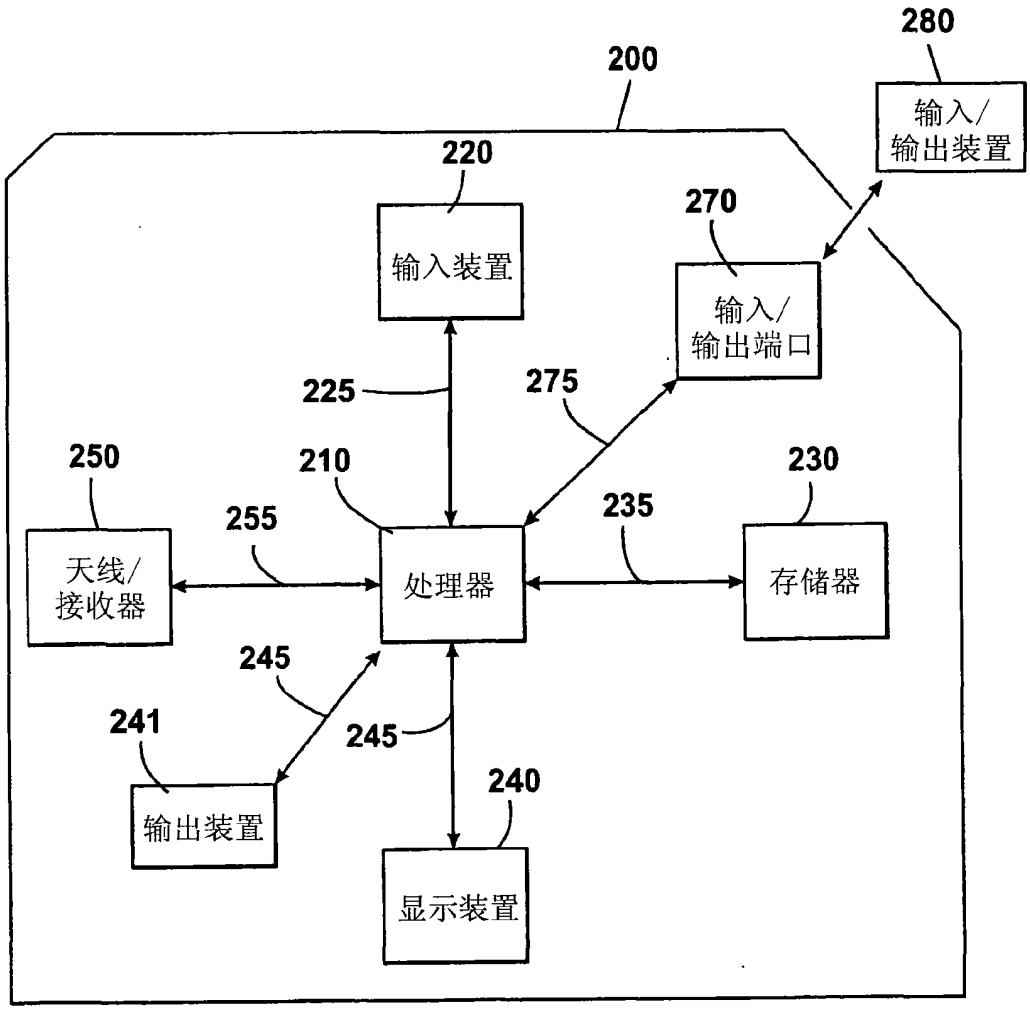

280
200
输入/
输出装置
220
输入装置
270
输入/
输出端口
225
275
250
210
230
255
235
天线/
接收器
处理器
存储器
245
241
245
240
输出装置
显示装置

图2

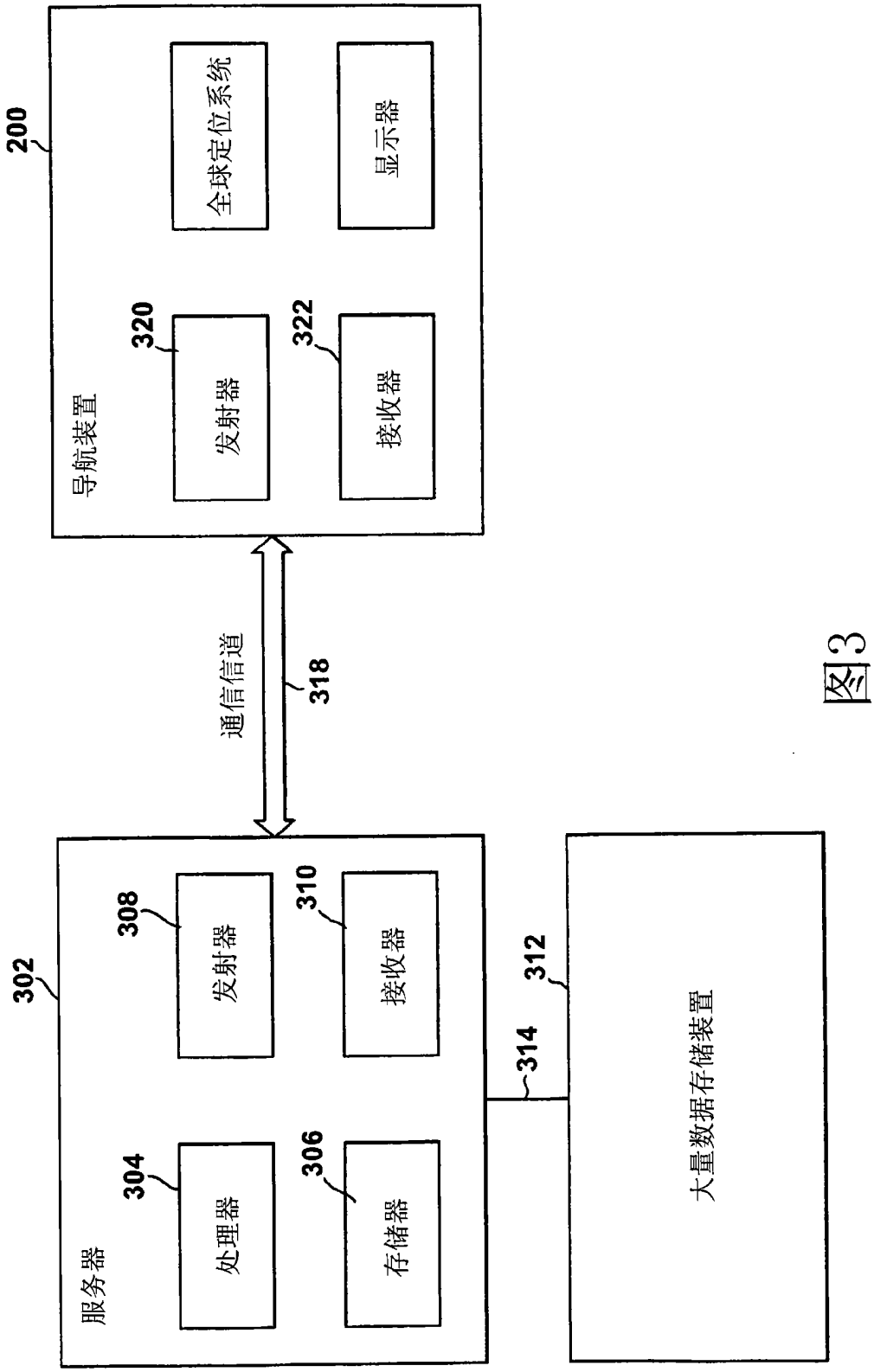

200
导航装置
全球定位系统
显示器
320
发射器
322
接收器
通信信道
318
302
服务器
308
发射器
310
接收器
304
处理器
306
存储器
314
312
大量数据存储装置

图3

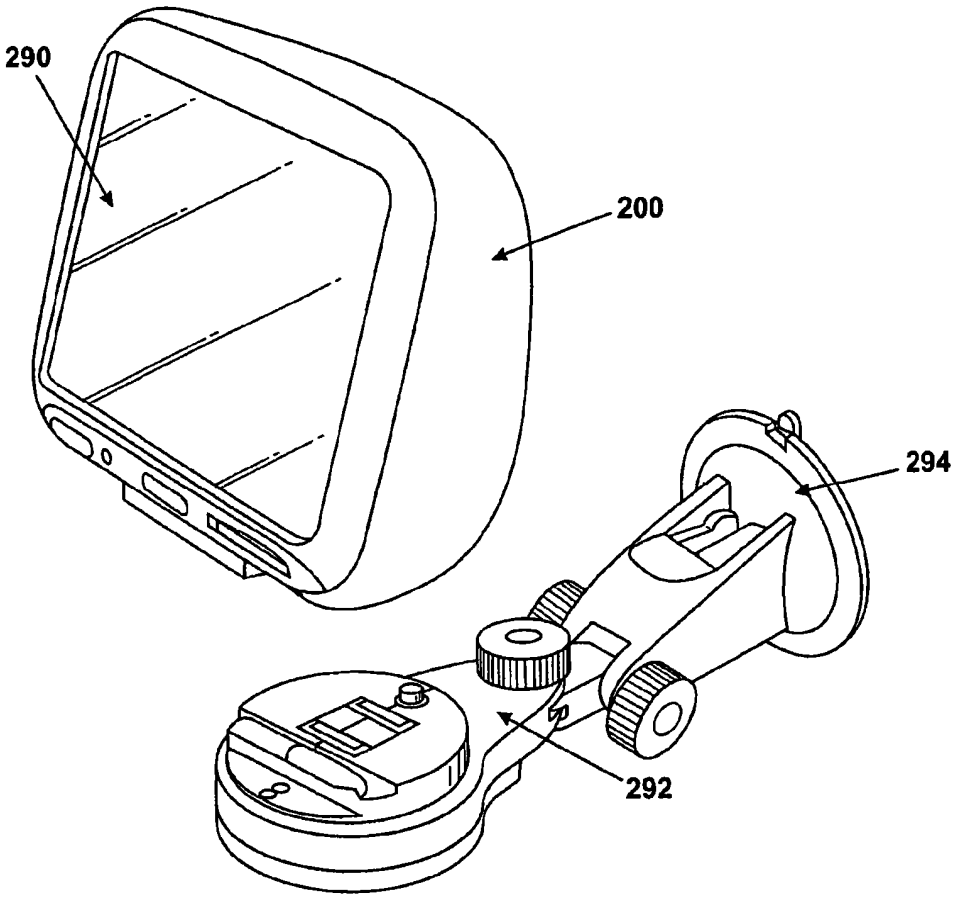


图4A

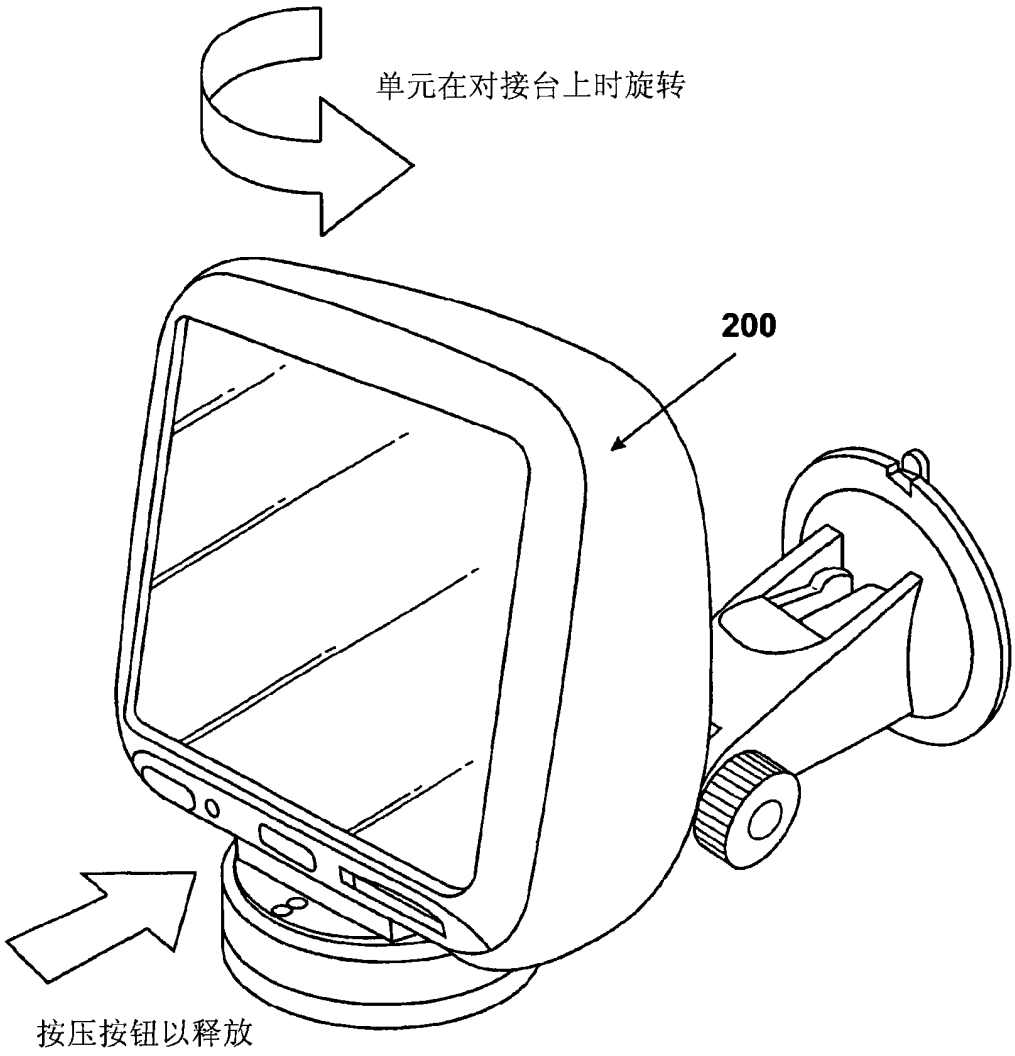


图4B

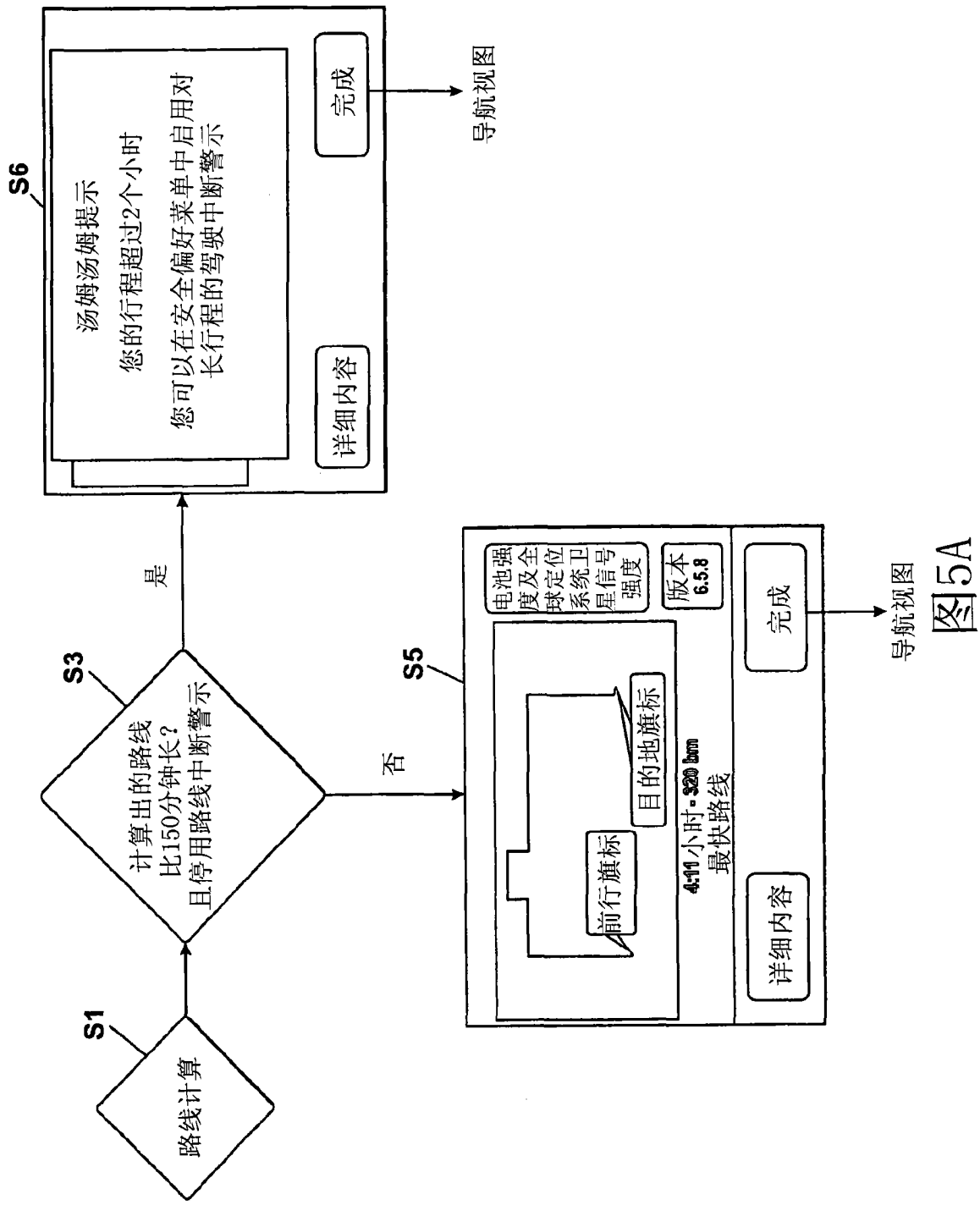

S1
路线计算
S3
计算出的路线
比150分钟长？
且停用路线中断警示
是
否
S6
汤姆汤姆提示
您的行程超过2个小时
您可以在安全偏好菜单中启用对
长行程的驾驶中断警示
详细内容
完成
导航视图
S5
电池强度及全球定位系统卫星信号强度
版本 6.5.8
前行旗标
目的地旗标
4:11小时 - $20 bmm
最快路线
详细内容
完成
导航视图

图5A

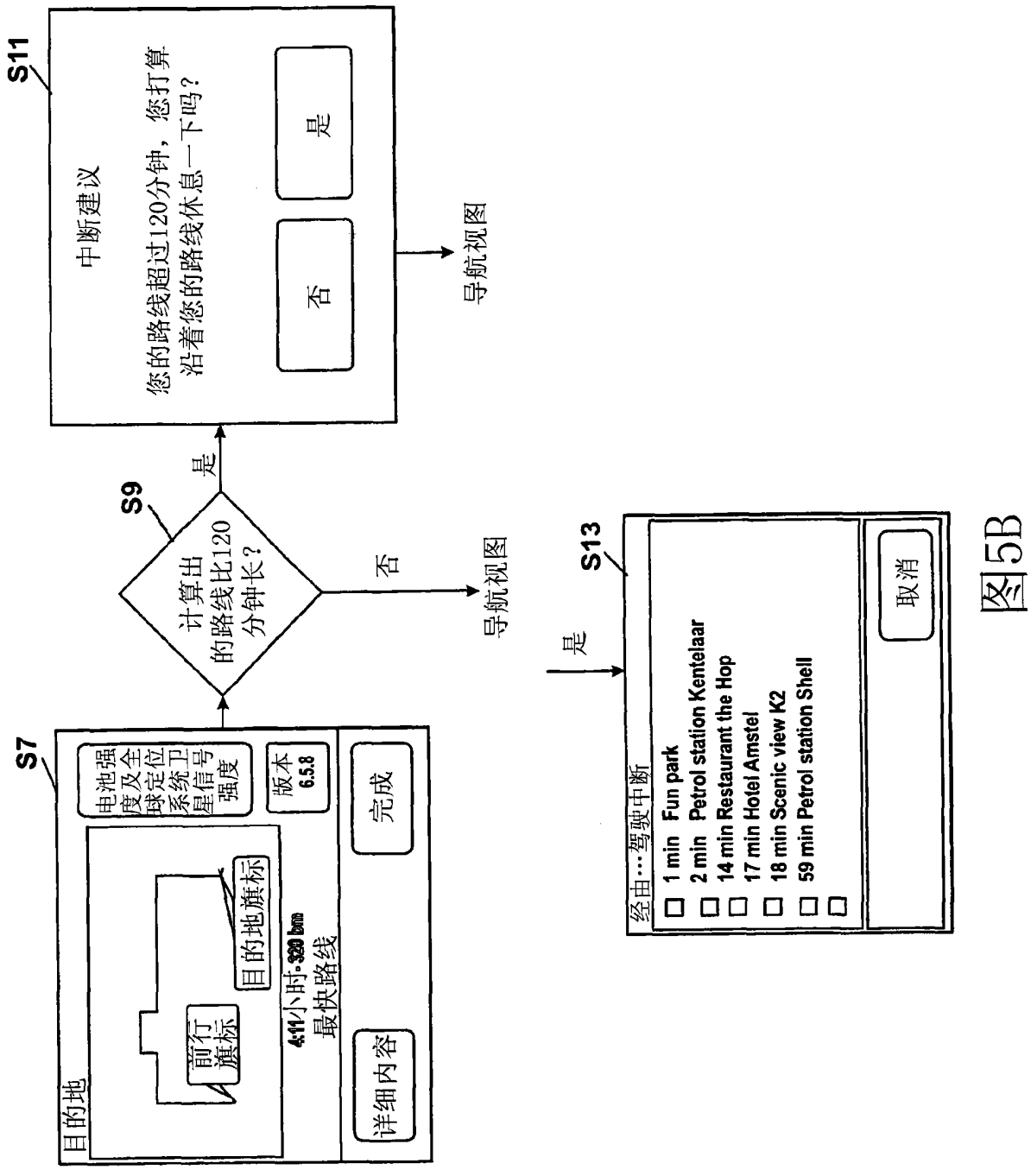

S11
中断建议
您的路线超过120分钟，您打算沿着您的路线休息一下吗？
否
是
导航视图
S9
计算出的路线比120分钟长？
是
否
导航视图
S7
目的地
电池强度及全球定位系统卫星信号强度
版本 6.5.8
前行旗标
目的地旗标
4:11小时·320 bmm
最快路线
详细内容
完成
是
S13
经由…驾驶中断
1 min Fun park
2 min Petrol station Kentelaar
14 min Restaurant the Hop
17 min Hotel Amstel
18 min Scenic view K2
59 min Petrol station Shell
取消

图5B

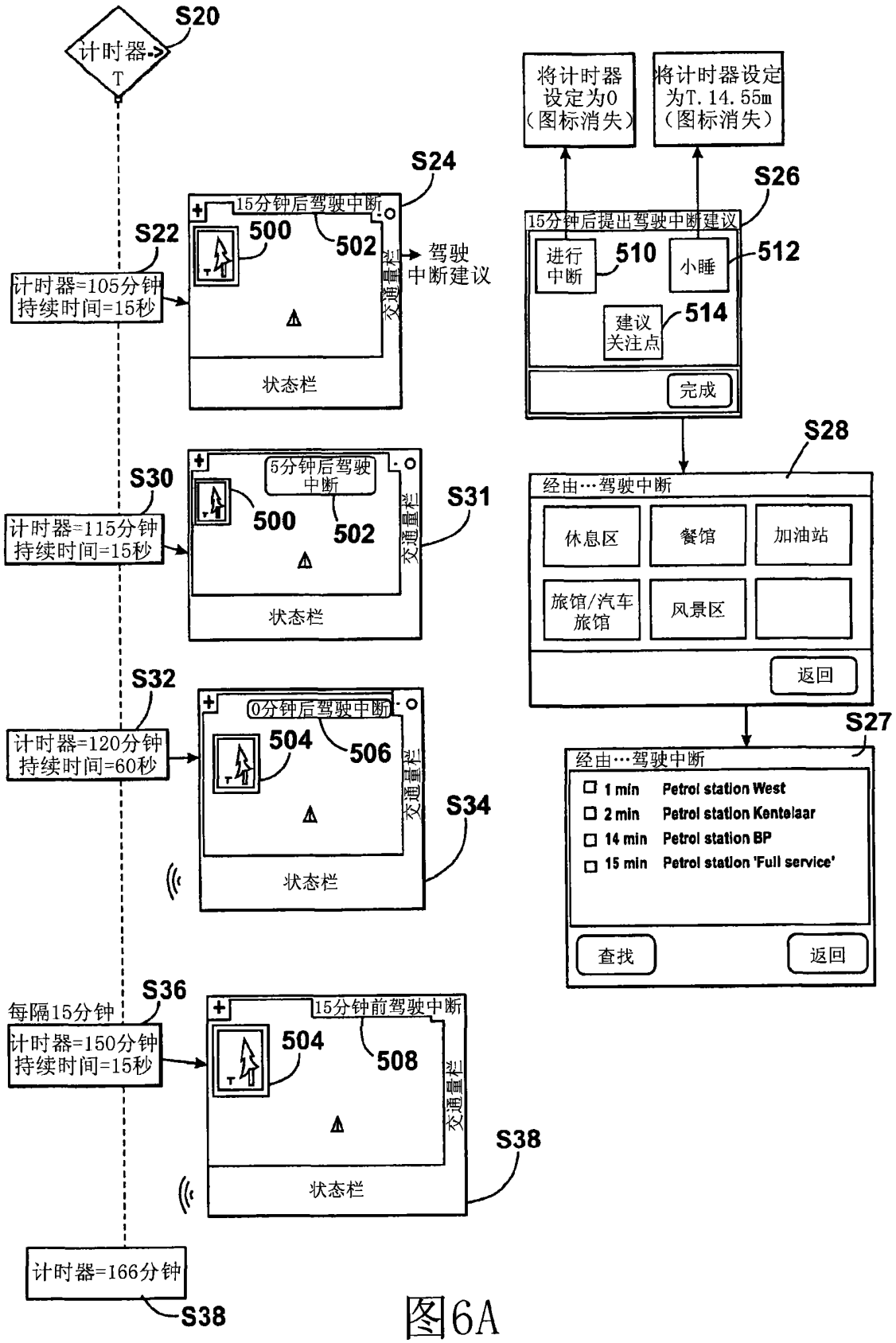
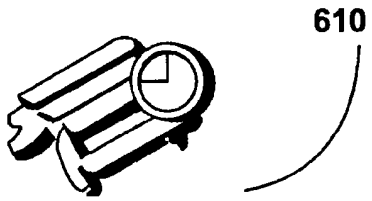
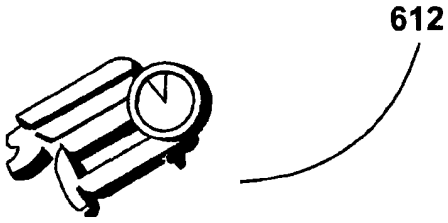

S20
计时器->
T
S22
计时器=105分钟
持续时间=15秒
S24
15分钟后驾驶中断
500
502
交通量栏
驾驶
中断建议
状态栏
S26
将计时器
设定为0
(图标消失)
将计时器设定
为T.14.55m
(图标消失)
15分钟后提出驾驶中断建议
进行
中断
510
小睡
512
建议
关注点
514
完成
S28
经由…驾驶中断
休息区
餐馆
加油站
旅馆/汽车
旅馆
风景区
返回
S27
经由…驾驶中断
1 min Petrol station West
2 min Petrol station Kentelaar
14 min Petrol station BP
15 min Petrol station 'Full service'
查找
返回
S30
计时器=115分钟
持续时间=15秒
5分钟后驾驶
中断
500
502
S31
交通量栏
状态栏
S32
计时器=120分钟
持续时间=60秒
0分钟后驾驶中断
504
506
交通量栏
S34
状态栏
每隔15分钟
S36
计时器=150分钟
持续时间=15秒
15分钟前驾驶中断
504
508
交通量栏
S38
状态栏
计时器=166分钟
S38

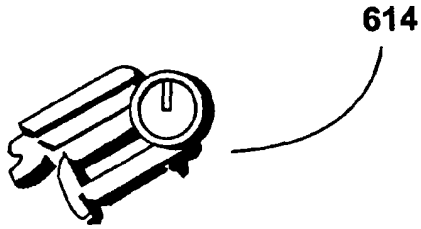
图6A



图标（蓝色）



图标（蓝色）



图标（红色）

图6B

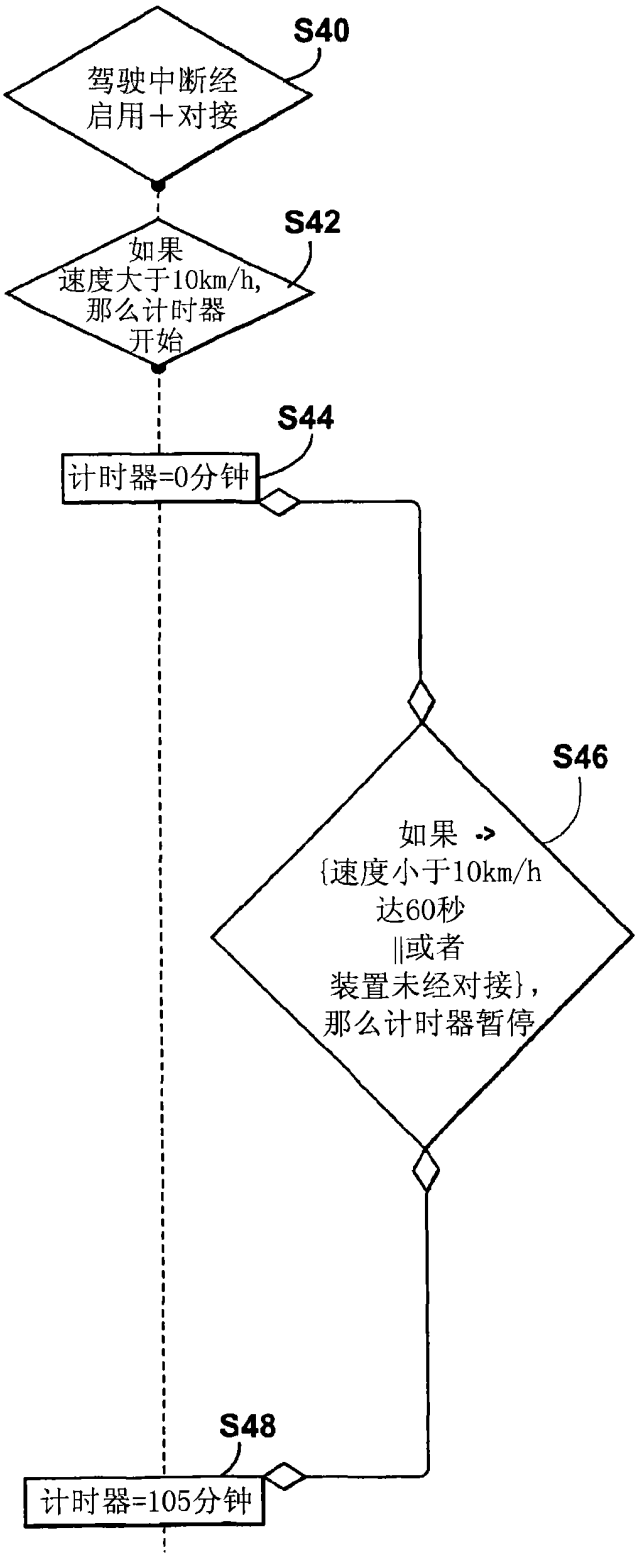

S40
驾驶中断经
启用＋对接
S42
如果
速度大于10km/h,
那么计时器
开始
S44
计时器=0分钟
S46
如果 ->
{速度小于10km/h
达60秒
||或者
装置未经对接},
那么计时器暂停
S48
计时器=105分钟

图7

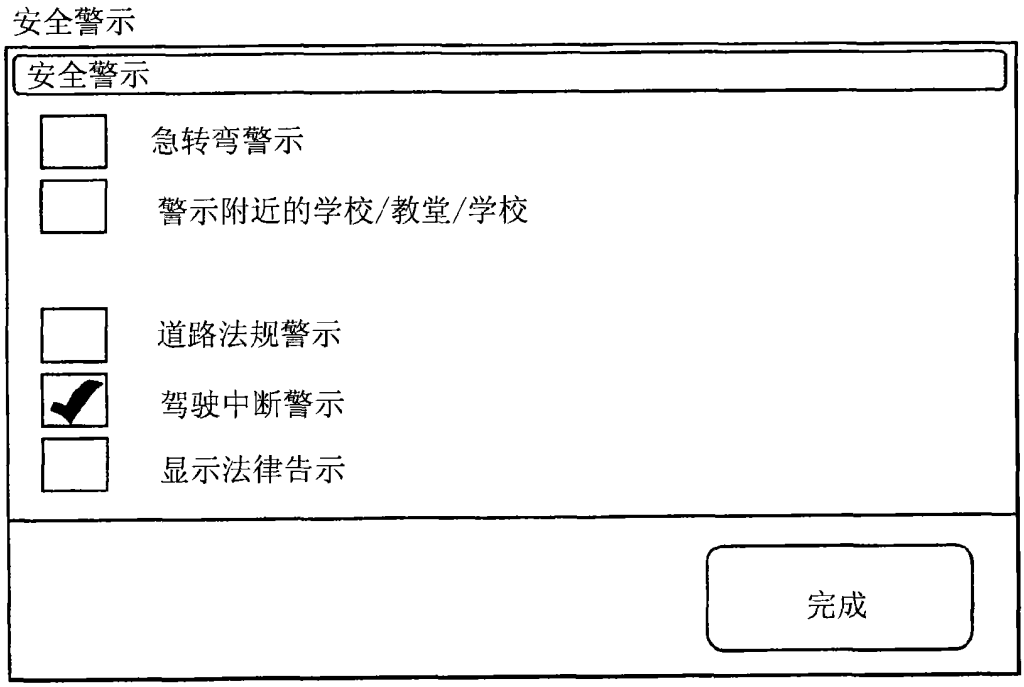


图8