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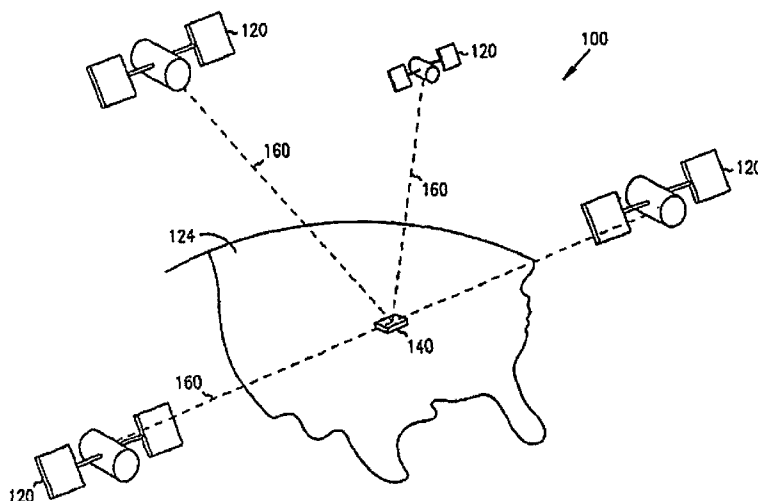
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(54) Title: A NAVIGATION DEVICE AND METHOD OF UPDATING INFORMATION ON A NAVIGATION DEVICE



(57) Abstract: A method and device are disclosed for updating information on a navigation device. In one embodiment, the method includes detecting a connection with a remote navigation device; automatically providing information to update the navigation device upon detecting the connection; and varying a display of the navigation device upon completion of a successful automatic update of information on the navigation device. In at least one other embodiment, the method includes establishing a connection with a remote server; automatically receiving updated information from the remote server upon establishing the connection; and displaying an indication of a successful update on the navigation device upon successfully receiving the updated information. Finally, in at least one other embodiment, the method includes establishing a connection between the navigation device and a remote server; requesting information to update the navigation device after the connection to the remote server is established; and updating information of the navigation device upon receiving the requested information from the remote server.

A NAVIGATION DEVICE AND METHOD OF UPDATING INFORMATION ON A NAVIGATION DEVICE

Priority Statement

The present application hereby claims priority under 35 U.S.C. §119 on each of Great Britain Patent Application numbers 0604709.6 filed March 8, 2006; 0604708.8 filed March 8, 2006; 0604710.4 filed March 8, 2006; 0604704.7 filed March 8, 2006; and 0604706.2 filed March 8, 2006, the entire contents of each of which is hereby incorporated herein by reference.

Field

The present application generally relates to navigation methods and devices.

Background

Navigation devices and methods are known to aid users in determining a route of travel between a current location of the navigation device and an input/selected travel destination. The navigation device stores information in memory including map information and route of travel calculation algorithms to aid the navigation device in determining an appropriate route of travel. A problem facing navigation devices is that routes of travel are constantly changing. New roads are being built, roads are being torn down and alternative routes of travel are constantly being provided. Further, a user typically purchases a navigation device with the software regarding not only map information which needs to be updated at a later date to account for new road construction, etc., but map information which further typically includes only geographic information for one area such as the United States and Europe. While a user can decide to purchase information for a different area if the user moves from the United States to Europe for example, it is difficult, tedious, and expensive for a user to constantly purchase the latest updated algorithmic and map information to constantly update his/her navigation device.

SUMMARY

In at least one embodiment, the present application is directed to a method of updating information on a navigation device in an automatic manner. In at least one embodiment, the method includes detecting a connection with a remote navigation device; automatically providing information to update the navigation device upon detecting the connection; and varying a display of the navigation device upon completion of a successful automatic update of information on the navigation device.

In at least one other embodiment, the present application is directed to a method of updating information on a navigation device in an automatic manner. The method includes establishing a connection with a remote server; automatically receiving updated information from the remote server upon establishing the connection; and displaying an indication of a successful update on the navigation device upon successfully receiving the updated information.

In at least one other embodiment, the present application is directed to a method of updating information on a navigation device in a non-automatic manner. The method includes establishing a connection between the navigation device and a remote server; requesting information to update the navigation device after the connection to the remote server is established; and updating information of the navigation device upon receiving the requested information from the remote server.

In at least one other embodiment, the present application is directed to a navigation device. The navigation device includes means for establishing a connection between the navigation device and a remote server; means for requesting information to update the navigation device after the connection to the remote server is established; and means for updating information of the navigation device upon receiving the requested information from the remote server.

In at least one other embodiment, the present application is directed to a navigation device. The navigation device includes means for establishing a connection with a remote server; means for automatically receiving updated information from the remote server upon establishing the connection; and means for displaying an indication of a successful update on the navigation device upon successfully receiving the updated information.

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;

Figure 4 illustrates an example of a message display after navigation device/server connection is established;

Figure 5 illustrates an example main menu for display;

Figure 6 illustrates an example of an "options" display;

Figure 7 illustrates an example of a display of a list of regions;

Figure 8 illustrates an example of a display of a list of countries;

Figure 9 illustrates an example of an alphabetical entry display;

Figure 10 illustrates an example of a list of selectable options;

Figure 11 illustrates an example display;

Figure 12 illustrates an example of a message display;

Figure 13 illustrates an example of a request to purchase; and

Figure 14 illustrates an example of an alphabetical entry display.

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, 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.

In an embodiment of the present application, from the perspective of the server 302 for example, a method of updating information on a navigation device 200 includes detecting a connection with a remote navigation device 200; automatically providing information to update the navigation device 200 upon detecting the connection; and varying a display on the display screen 240 of the navigation device 200 upon completion of the successful automatic update of information on the navigation device 200. Further, in an embodiment of the present application directed to automatic updating from the perspective of the navigation device 200, a method includes establishing a connection with a remote server 302; requesting information to update the navigation device 200 after the connection to the remote server 302 is established; and updating information of the navigation device 200 upon receiving the requested information from the remote server 302. In another embodiment, from the perspective of the navigation device 200, a method of updating information on a navigation device 200 includes establishing a connection with a remote server 302; automatically receiving updated information from the remote server 302 upon establishing the connection; and displaying an indication of a successful update on the navigation device 200 upon successfully receiving the updated information..

In a first embodiment of the present application, the server 302 can be configured to communicate information automatically to navigation device 200, through an established communications channel or connection 318. By doing so, updated information can easily and automatically be provided to a navigation device 200 in an easy and efficient manner. Further, as will be

discussed in a later embodiment, the server 302 can distinguish between information to be automatically sent (such as update, including extended ephemeris data for example) and information which is new information and available for purchase by a user of the navigation device 200.

Ephemeris data is used by the GPS receiver (the navigation device 200) to calculate the positions of the satellites. This data can be received from the satellites themselves but that is a long and slow process (it can take up to 10 minutes) because of the very low bandwidth between the receiver and the satellites. To speed this process up, this data can be calculated off board for about a week in advance and stored on a server. This pre-calculated data is then sent from the server to the navigation device that will use this data instead of downloading it from the satellites. The whole purpose of this data is to shorten the time the navigation device 200 needs to obtain its current position after power on.

By providing updated information automatically to a navigation device 200, only a centrally located server 302 need be updated to provide information to a plurality of navigation devices 200. As such, a user of a navigation device 200 does not need to constantly replace software on their device, and instead need just establish a communications channel 318 with a server 302 to add updated information to their navigation device 200. From the perspective of the server 302, again only one centrally located device, namely server 302, need be updated to send updated information to a plurality of navigation devices 200. In at least one embodiment of the present application, no user interaction need be involved in the process, as information to update the navigation device happens automatically. For example, upon detecting a connection with a remote navigation device 200, and using received handshake information received from the particular navigation device 200 connected to the server 302, the server 302 may then identify the particular navigation device 200 from previously stored information regarding a plurality of navigation devices 200 (stored in memory 306 or mass data storage 312 for example). The processor 504 server 302 can then determine which information (map information for example) is stored on that particular navigation device 302, and can then determine whether or not such map information (for example) stored on the

particular navigation device 200 is the most recently updated version of information (such as map information for example) currently stored, in mass data storage 312 for example (further or alternatively, the processor 504 of the server 302 can determine if particular stored information, such as map information for example, has been recently updated and thus is marked, in some manner, for download). If such map information (for example) stored on the particular navigation device 200 is not the most recently updated version of information, then the server 302 can begin the automatic download process. As indicated above, in one example embodiment, the automatic update process may be implemented for the ephemeris data. However, this is merely exemplary, and the automatic update process of the embodiment described above should not be so limited.

In addition, in at least one embodiment, an expiry date may be associated with the data, wherein the user of the navigation device 200 may begin the download process if the data has expired, for example. In this case, the server 302 always sends the latest version without checking databases.

In another example embodiment, the process is used whenever a user of the navigation device 200 has bought a new map, or more generally may be entitled to some new content. In such an instance, the server 302 may download this data automatically upon detection. For this, the whole described procedure is used: handshaking, checking databases, downloading data, activation of data, maybe even installing of data (for example, activating the newly downloaded voice or automatically showing new POI on map).

Thereafter, a message can be sent to and displayed on the navigation device 200 as shown in Figure 4 for example (from server 302), indicating the automatic providing of an information update to the navigation device 200, such as downloading information from remote server 302 for example, is about to occur. This will permit the automatic downloading of information to the navigation device 200 in a quick and efficient manner.

The information can include but is not limited to extended ephemeris (EE) to Extended ephemeris data may contain, for example, pre-calculated ephemeris for GPS satellites in view to allow GPS receivers such as antenna/receiver 250 within navigation device 200 for example, to operate with enhanced

performance (e.g. to calculate its current position faster). This is only one example of the type of information that can be automatically downloaded to the navigation device 200 upon detecting a connection between the server 302 and a remote navigation device 200. Alternatively, other types of information can be updated. For example, this can include but is not limited to specifically formatted pages from the remote server 302.

Before the download process starts for providing information to update the navigation device 200, a message may be displayed on the navigation device 200, displaying the file size of the file that will be added. Further, there can also be an error message if the navigation device 200 does not have enough space to store the data in memory 230. Once the information is provided, a display 240 of the navigation device 200 can be varied to display a message during the updating of the information, and/or upon completion of a successful automatic update. For example, a change in color, such as a blue screen for example, may be displayed on the display 240 of the navigation device 200 to indicate a successful update. Further, the blue screen may include a display of a message upon completion of a successful update, announcing a successful download for example.

It should be noted that connection of the remote navigation device 200 with a server 302 can be established in any number of ways, including but not limited to a connection via the internet. The connection can further be a data connection utilizing a mobile phone or other mobile device for example.

Further, the updating method of the present application can be in the form of a subscription service that a user signs up for. For example, a software browser may be included with or added to the navigation device 200, for connecting to the remote server and for receiving information from the remote server to update information on the navigation device 200. Again, the updated information can include extended ephemeris data, map information, etc. Unlike known map updating or map downloading services, the flow of providing information to update the navigation device can be controlled at the server 302, which opens the possibility for additional changes/additions without having to contact the user.

For example, this may be implemented in any number of ways. In a first embodiment, as soon as the user of the navigation device 200 opens a connection, a background process on the navigation device 200 queries the server 302 if there is new data (this is done for ephemeris, for example, but could be implemented more generally for all data). In another embodiment, the navigation device 200 tries to be connected continuously by opening a push channel, and whenever the server 302 wants to send information to the navigation device 200, it sends a notification to the navigation device 200 (e.g. an indication that there is data to download) and again, the navigation device 200 starts downloading the available data. This may be done for server messages, traffic information, etc. Server messages can include, but are not limited to notifications to the customers of the navigation devices 200 (like an SMS) sent by the server 302 to a specific customer, a specific type of navigation device 200, to all customers, etc.

From the perspective of the navigation device 200, an embodiment of the present application is directed to a method of updating information on the navigation device 200. The method of this embodiment includes establishing a connection with a remote server 302 (via the internet, TCP/IP, etc.); automatically receiving updated information from the remote server 302 upon establishing the connection; and displaying (via display 240 for example, which may be integrated with input device 220) an indication of a successful update on the navigation device 200 upon successfully receiving the updated information. Again, the received information can include extended ephemeris data, and the display can include varying the color of the display upon completion of a successful update and/or displaying a message upon completion of a successful update.

It should be noted that the method of any of the embodiments of the present application can be implemented in the form of a navigation device 200 itself, and/or in the form of a computer readable medium including program segments for, when executed on the processor of a navigation device, causing the navigation device to implement an embodiment of any of the aforementioned methods.

From the perspective of the navigation device 200, another embodiment of the present application is directed to a method of updating information on the navigation device 200. The method of this embodiment includes establishing a connection between the navigation device 200 and a remote server 302; requesting information to update the navigation device 200 after the connection to the remote server 302 is established; and updating information of the navigation device 200 upon receiving the requested information from the remote server 302.

By control of download information from the server 302, additional optional information can be provided to a user of the navigation device 200, for purchase, for example. Figure 5 provides an example of a display screen 240 of a main menu which can be displayed on a navigation device 200 upon establishing a connection between the navigation device 200 and a remote server 302. The display screen 240 of Figure 5 includes an option for selecting "TomTom Plus Services," which can include additional services or additional information which can be provided to the user for an additional charge, for example.

Upon selecting the displayed "TomTom Plus Services" of Figure 5 (via selection of a touch screen of an integrated input and display device, integrating display screen 240 and input device 220 of the navigation device 200, for example), another display screen can be presented on the navigation device 200 as shown in Figure 6 for example. This display screen provides the user with a plurality of options from which to select, including a plurality of options to download a map, an update, a new map, a new voice, etc. Therefore, upon establishing a connection between the navigation device 200 and a remote server 302 (via communications channel 318 for example), the navigation device 200 can request information to update the navigation device 200. This request can include selecting, from a plurality of selections displayed on navigation device 200 such as those shown in Figure 6 for example, information to download. Upon the user then selecting a particular option shown in Figure 6 for example, such as "new map download" for example, a list of regions may be displayed as shown in Figure 7 for example. Once a region is displayed such as North America or Europe for example, a list of countries may then be displayed as

shown in Figure 8. Thereafter, once a country is selected, a city may be selected via alphabetical entries shown in Figure 9 and/or selection as shown in Figure 10. Once this occurs, information in the navigation device 200 may be updated upon receiving the requested information from the remote server 302. It should be noted that the sequence of Figures 5-10 is merely exemplary, as any type of selection process for selecting a map or any other information download can be used and is encompassed within at least one embodiment of the present application.

In addition, by establishing this connection with the server and this ability to request information, the server 302 is also in a position to provide new services, new maps, new voices, etc. to the navigation device 200. The displayed upon selections can include at least one of a map and new map, including selections of at least one of a region, country, and a city, for example. Thus, in the case that the server 302 detects that the user of the navigation device 200 owns a particular map as selected in Figure 10, the map can be updated on the navigation device for "no charge." As such, information on the navigation device 200 can be updated upon receiving the requested new map or other information from the remote server 302.

However, in another embodiment of the present application, a display on the navigation device 200 can include selectable options to purchase or not purchase the requested information. For example, if the server 302 detects that the user of the navigation device 200 wants a map which was not previously owned, a message can be sent to the user requesting the user of the navigation device 200 to purchase the new map.

For example, in an embodiment of the present application, Figure 11 illustrates a situation where the server 302 detects that the map information requested is a map which was previously owned. As shown in Figure 11, the display can indicate "city map download" and can further provide an indication that the map is owned. The display can provide the size of the map to download, a prompt to the user indicating whether or not the user would like to download the map, etc. If the user would like to download the map, the user can select yes, and if not, the user can select no. If the user decides the select yes, and decides to receive the city map download, navigation device 200 can be updated

by downloading the map. A message can be displayed during the download and/or after completion of a successful update as shown in Figure 12 for example. Further, a color of the display of the navigation device 200 can be varied upon completion of a successful update in a manner similar to that previously described. Further, the received information can include an updated map, a new map, a new voice, extended ephemeris data, etc.

Alternatively, if the server 302 determines that the user of the navigation device 200 does not own the map, selectable options to purchase or not purchase the information can be displayed on the navigation device 200, as shown in Figure 13 for example. The display can indicate that the map is not previously owned, and can provide a request to purchase the map as shown in Figure 13. If the user decides that he or she would like to purchase the map, then the navigation device 200 can further display a request for information to complete the purchase upon selection of the option to purchase.

For example, as shown in Figure 14, if a user selects yes, the user may be prompted for a password to confirm the purchase. Thereafter, if the password fails for some reason, and/or if payment cannot be received in any other matter, an indication can be provided to the user. Similarly, if the password is successful and if payment is successful, an indication can be provided to the user prior to proceeding with the download of information.

As previously described, in any of the embodiments of the present application, a software browser may be included in the navigation device 200, for connecting to the remote server 302 and for receiving information from the remote server 302 to update information on the navigation device 200. The software browser can be used to control one or both of automatic providing of information to update the navigation device 200 upon detection of a connection between a navigation device 200 and a server 302; and/or for requesting information to update the navigation device 200 after connection to a remote server 302 is established, based upon payment for new information and/or receipt of an update of existing information at "no charge," for example.

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.

Further, any of the above-described example embodiments of methods of the present invention may be embodied in the form of an apparatus. For example, any of the aforementioned methods may be embodied in the form of a navigation device, including, but not limited to, any of the structure for performing the methodology illustrated in the drawings.

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 COBAL, 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 updating information on a navigation device, comprising:
detecting a connection with a remote navigation device;
automatically providing information to update the navigation device
upon detecting the connection; and
varying a display of the navigation device upon completion of a
successful automatic update of information on the navigation device.
2. The method of claim 1, wherein the connection is achieved via the Internet.
3. The method of claims 1-2, further comprising displaying a message during the updating of the information.
4. The method of claims 1-3, wherein the updated information includes specifically formatted remote pages from the server.
5. The method of claims 1-4, wherein a software browser is included in the navigation device for connecting to the remote server and for receiving information from the remote server to update information on the navigation device.
6. The method of claims 1-5, wherein the updated information includes extended ephemeris data.
7. The method of claims 1-6, wherein the information includes map information.
8. The method of claims 1-7, wherein the varying of the display includes displaying a message upon completion of a successful update.

9. The method of claims 1-8, wherein the varying of the display controlling the display to vary a color of the display upon completion of a successful update.
10. A computer readable medium including program segments for, when executed on a processor of a server, causing the server to implement the method of claim 1.
11. A method of updating information on a navigation device, comprising:
establishing a connection between the navigation device and a remote server;
requesting information to update the navigation device after the connection to the remote server is established; and
updating information of the navigation device upon receiving the requested information from the remote server.
12. The method of claim 11, wherein the received information includes extended ephemeris data.
13. The method of claims 11-12, further comprising displaying a message upon completion of a successful update.
14. The method of claims 11-13, further comprising varying a color of a display of the navigation device upon completion of a successful update.
15. The method of claims 11-14, wherein the requesting includes selecting, from a plurality of selections displayed on the navigation device, information to download.
16. The method of claim 15, wherein the selections include at least one of an updated map, a new map, and a new voice.

17. The method of claim 16, wherein further selections are displayed upon selections of at least one of a map and new map, including selections of at least one of a region, a country and a city.

18. The method of claims 11-17, further comprising displaying on the navigation device, selectable options to purchase or not purchase the requested information.

19. The method of claim 18, further comprising displaying on the navigation device, a request for information to complete the purchase upon selection of the option to purchase.

20. The method of claim 15, further comprising displaying on the navigation device, selectable options to purchase or not purchase the requested information.

21. The method of claim 20, further comprising displaying on the navigation device, a request for information to complete the purchase upon selection of the option to purchase.

22. A computer readable medium including program segments for, when executed on a processor of a navigation device, causing the navigation device to implement the method of claim 11.

23. A method of updating information on a navigation device, comprising:
establishing a connection with a remote server;
automatically receiving updated information from the remote server upon establishing the connection; and
displaying an indication of a successful update on the navigation device upon successfully receiving the updated information.

24. The method of claim 23, wherein the received information includes extended ephemeris data.

25. The method of claims 23-24, wherein the displaying of an indication of a successful update includes displaying a message upon completion of a successful update.

26. The method of claims 23-25, wherein the displaying of an indication of a successful update includes varying a color of a display of the navigation device upon completion of a successful update.

27. A computer readable medium including program segments for, when executed on a processor of a navigation device, causing the navigation device to implement the method of claim 23.

28. A navigation device, comprising:
means for establishing a connection between the navigation device and a remote server;
means for requesting information to update the navigation device after the connection to the remote server is established; and
means for updating information of the navigation device upon receiving the requested information from the remote server.

29. The navigation device of claim 28, wherein the received information includes extended ephemeris data.

30. The navigation device of claims 28-29, further comprising means for displaying a message upon completion of a successful update.

31. The navigation device of claims 28-30, further comprising means for varying a color of a display of the navigation device upon completion of a successful update.

32. The navigation device of claims 28-31, wherein the means for requesting includes means for selecting, from a plurality of selections displayed on the navigation device, information to download.

33. The navigation device of claim 32, wherein the selections include at least one of an updated map, a new map, and a new voice.

34. The navigation device of claim 33, wherein the means for displaying is further for displaying further selections, upon selections of at least one of a map and new map, the further selections including selections of at least one of a region, a country and a city.

35. The navigation device of claims 28-34, further comprising means for displaying on the navigation device, selectable options to purchase or not purchase the requested information.

36. The navigation device of claim 35, further comprising means for displaying on the navigation device, a request for information to complete the purchase upon selection of the option to purchase.

37. The navigation device of claim 32, further comprising means for displaying on the navigation device, selectable options to purchase or not purchase the requested information.

38. The navigation device of claim 37, wherein the means for displaying is further for displaying, on the navigation device, a request for information to complete the purchase upon selection of the option to purchase.

39. A navigation device, comprising:
means for establishing a connection with a remote server;
means for automatically receiving updated information from the remote server upon establishing the connection; and

means for displaying an indication of a successful update on the navigation device upon successfully receiving the updated information.

40. The means for of claim 39, wherein the received information includes extended ephemeris data.

41. The means for of claims 39-40, wherein the means for displaying is further for displaying a message upon completion of a successful update.

42. The method of claims 39-41, wherein the means for displaying is further for varying a color of a display of the navigation device upon completion of a successful update.

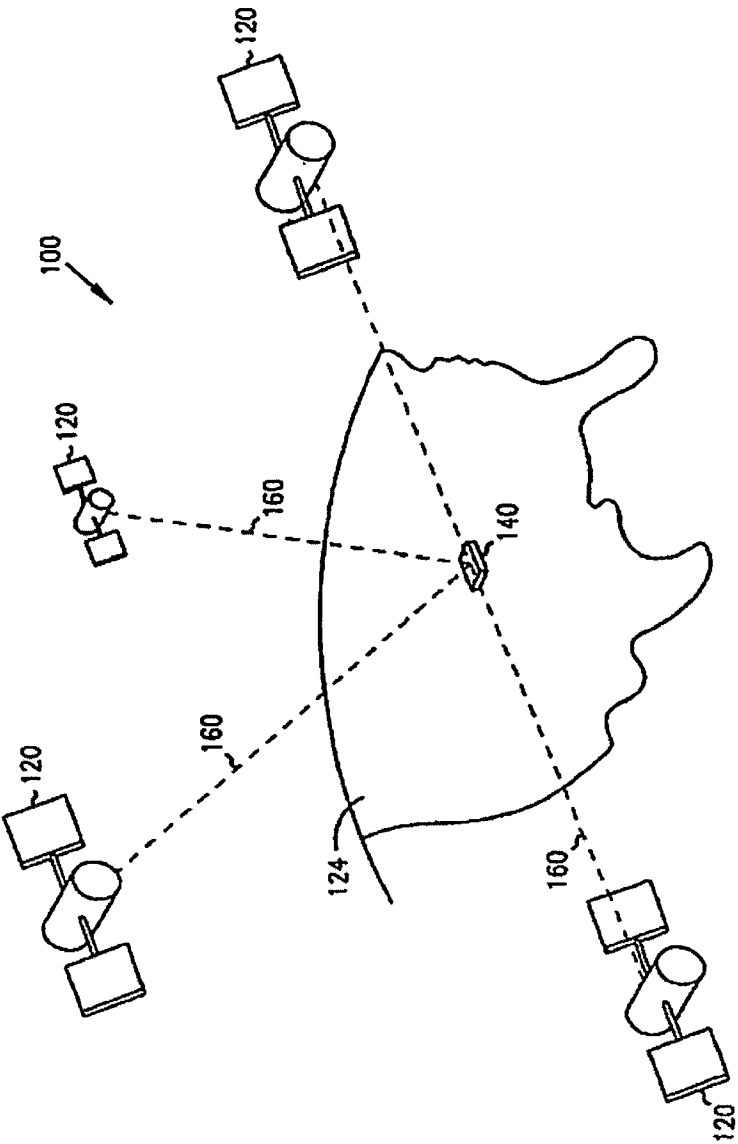
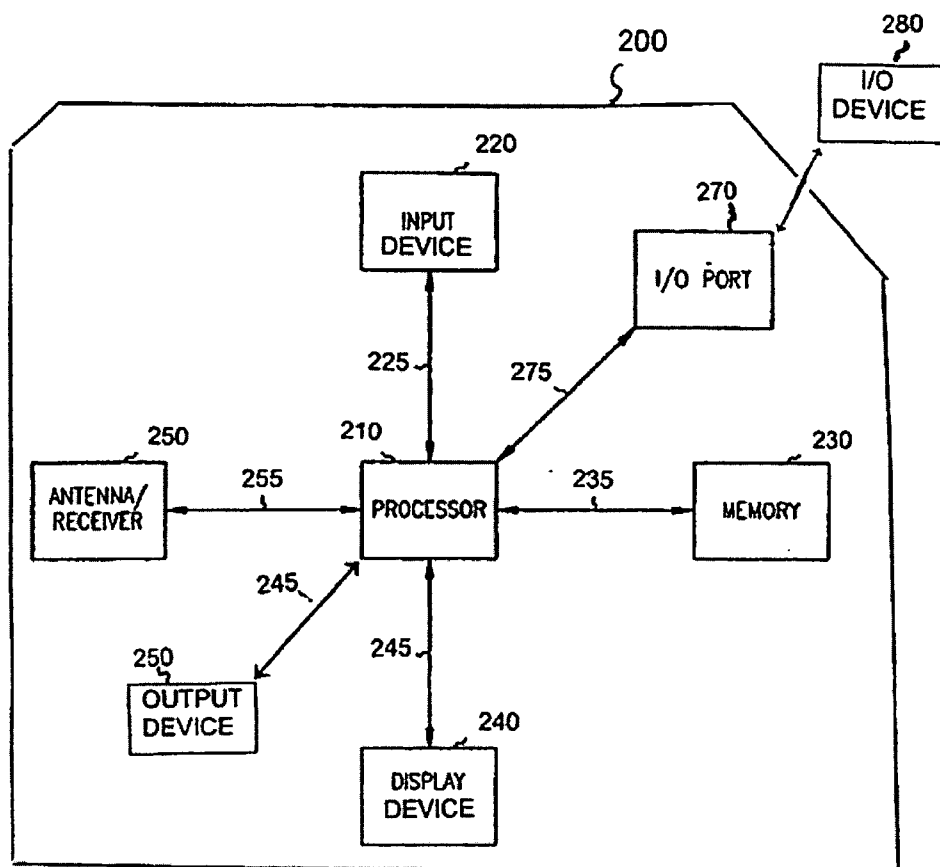


FIG. 1

**Fig. 2**

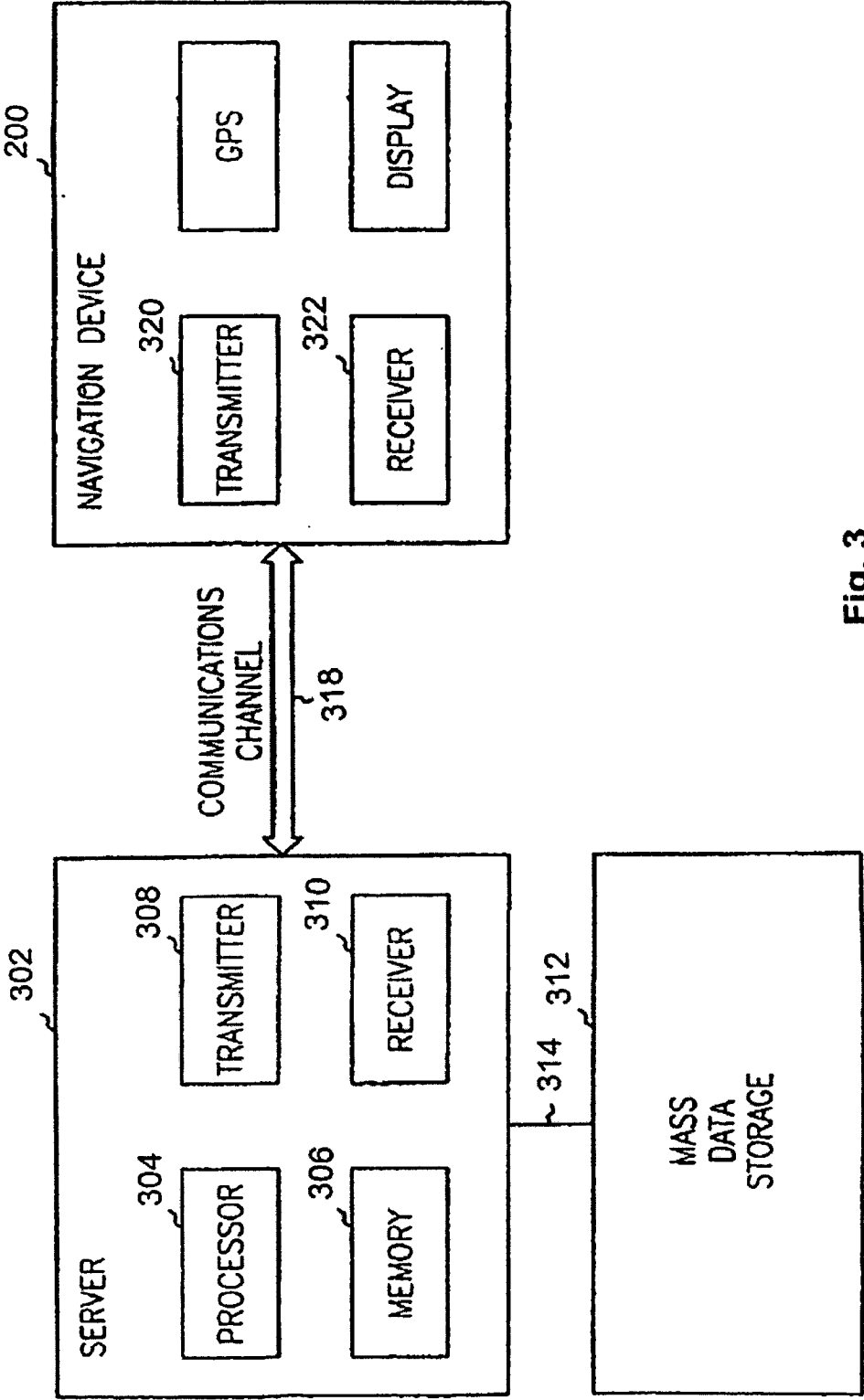


Fig. 3

Fig. 4

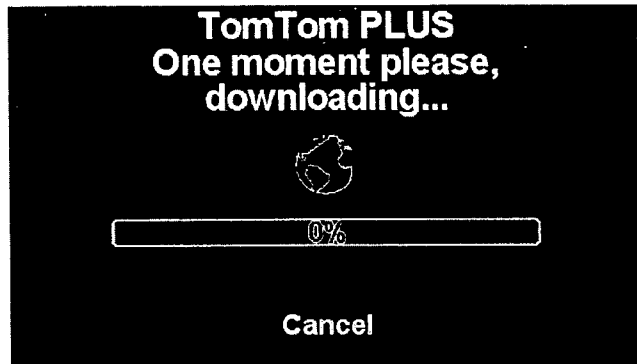


Fig. 5

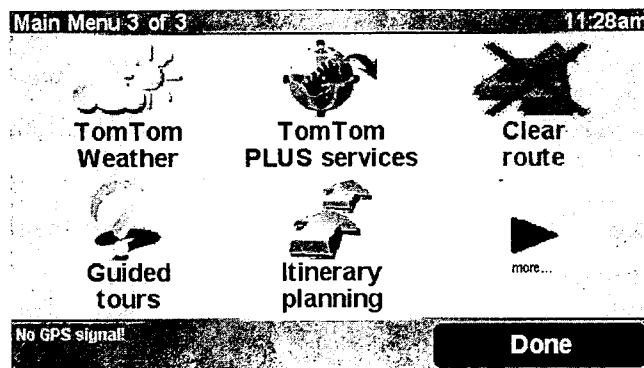


Fig. 6

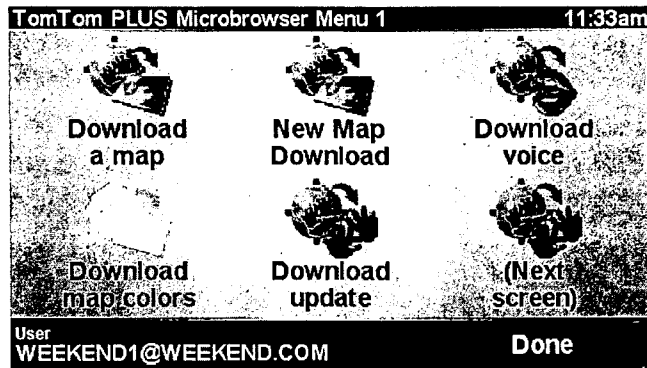


Fig. 7

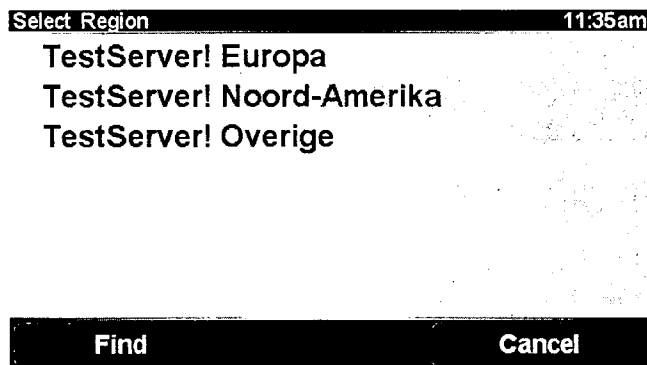


Fig. 8



Fig. 9

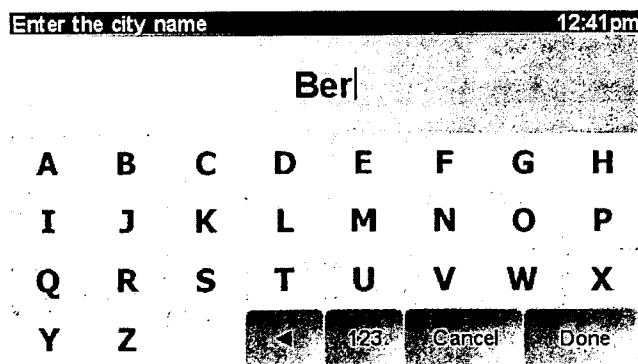


Fig. 10

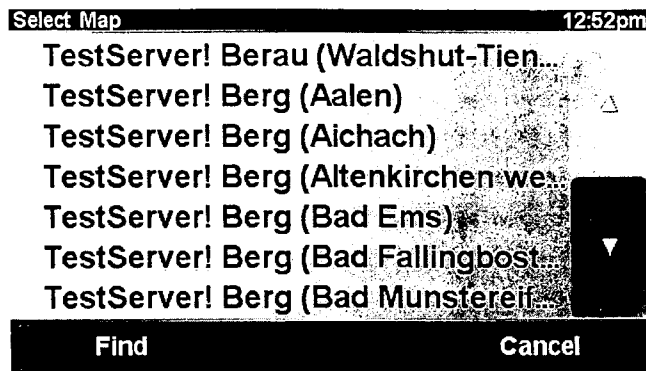


Fig. 11

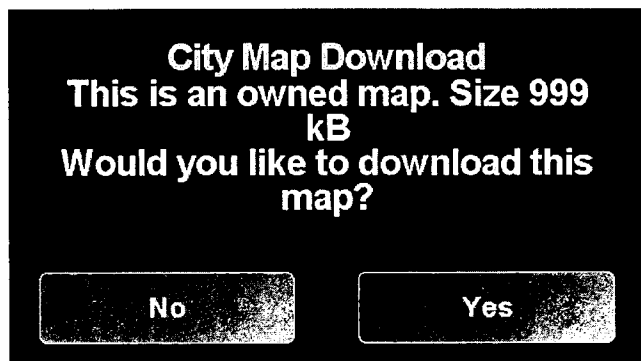


Fig. 12

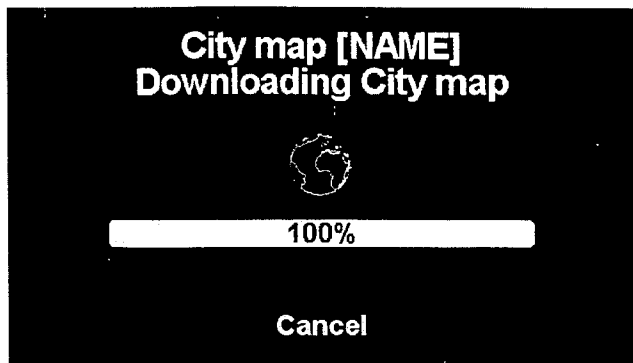


Fig. 13

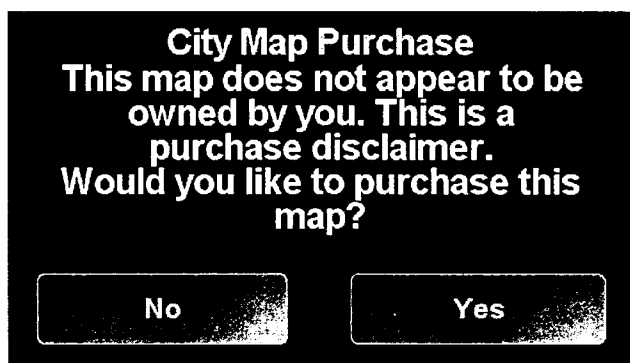


Fig. 14

