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Craine

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(54) **PERSONAL TRAFFIC CONGESTION
AVOIDANCE SYSTEM**

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2002.

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G08G 1/09 (2006.01)

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340/907; 340/910

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701/118, 120, 122, 213; 340/995.13, 906,
340/907, 910, 917
See application file for complete search history.

(56) **References Cited**

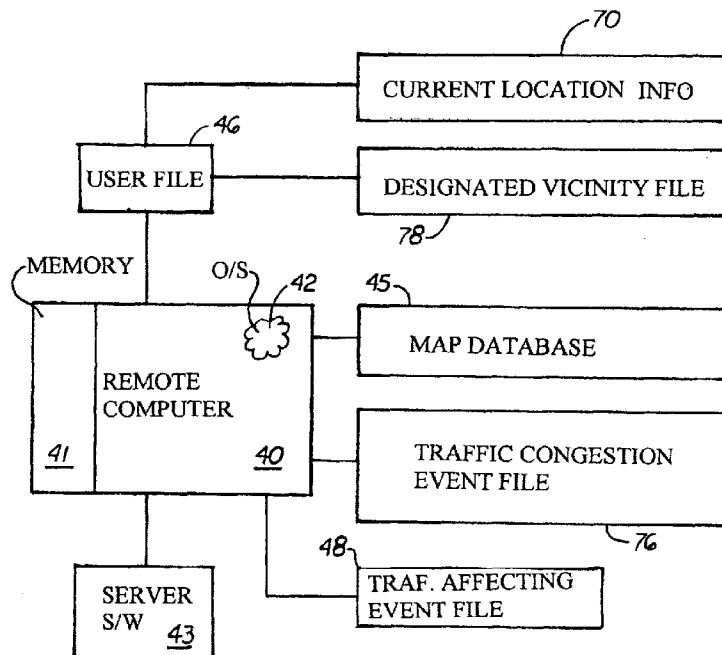
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(57) **ABSTRACT**

A personal traffic congestion avoidance system for drivers of motor vehicles traveling on roadways in motor vehicles with GPS-based navigational systems. The system includes a GPS-based navigational system that includes a GPS receiver connected to a visual display, a map database and a wireless communication device for communicating with a remote computer over a wireless communication network. The GPS-based navigation system continuously determines the motor vehicle exact physical location in a region that is intermittently or continuously uploaded to a remote computer via the wireless communication network. The remote computer is connected to a traffic monitoring database or service that provides current traffic affecting events in the region thereto. When a traffic affecting event is located in the designated vicinity of the current location of the motor vehicle, on the current roadway used by the motor vehicle, or on a roadway that may affect the traffic on the current roadway, an alert warning is generated and delivered to the GPS-based navigational system and displayed on the visual display. The driver may ignore the warning or take an alternative route to avoid the traffic congestion.

19 Claims, 5 Drawing Sheets



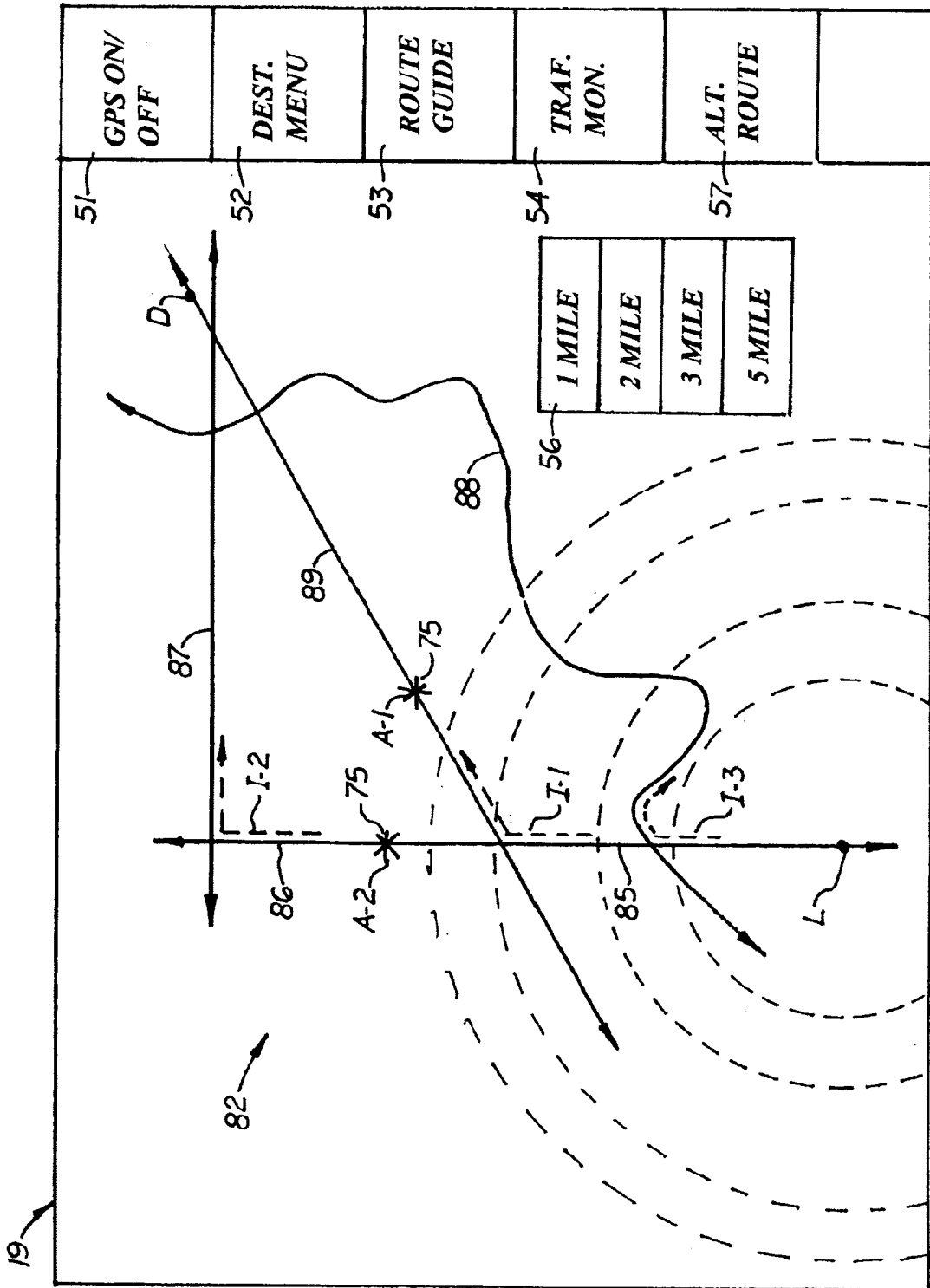


FIG. 1

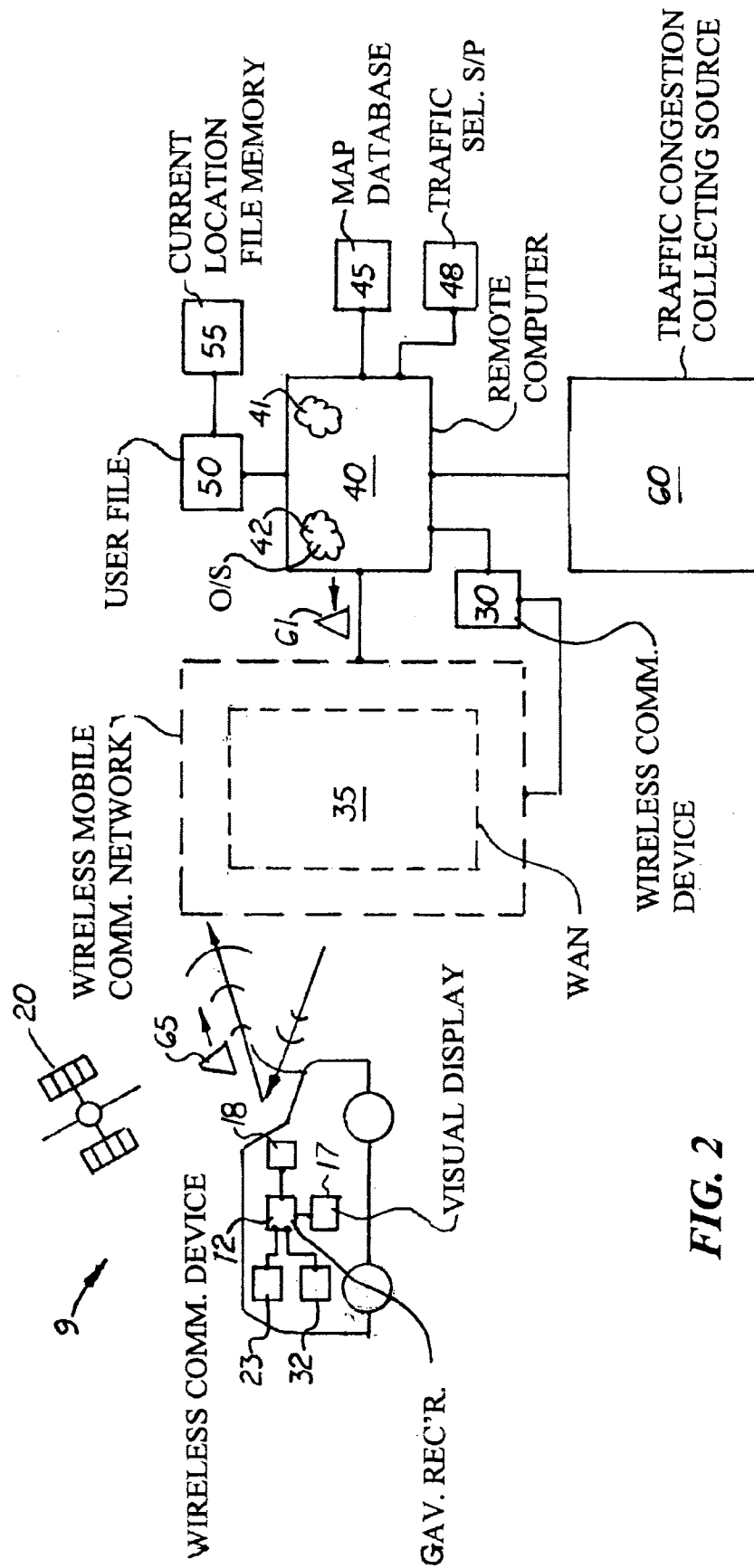


FIG. 2

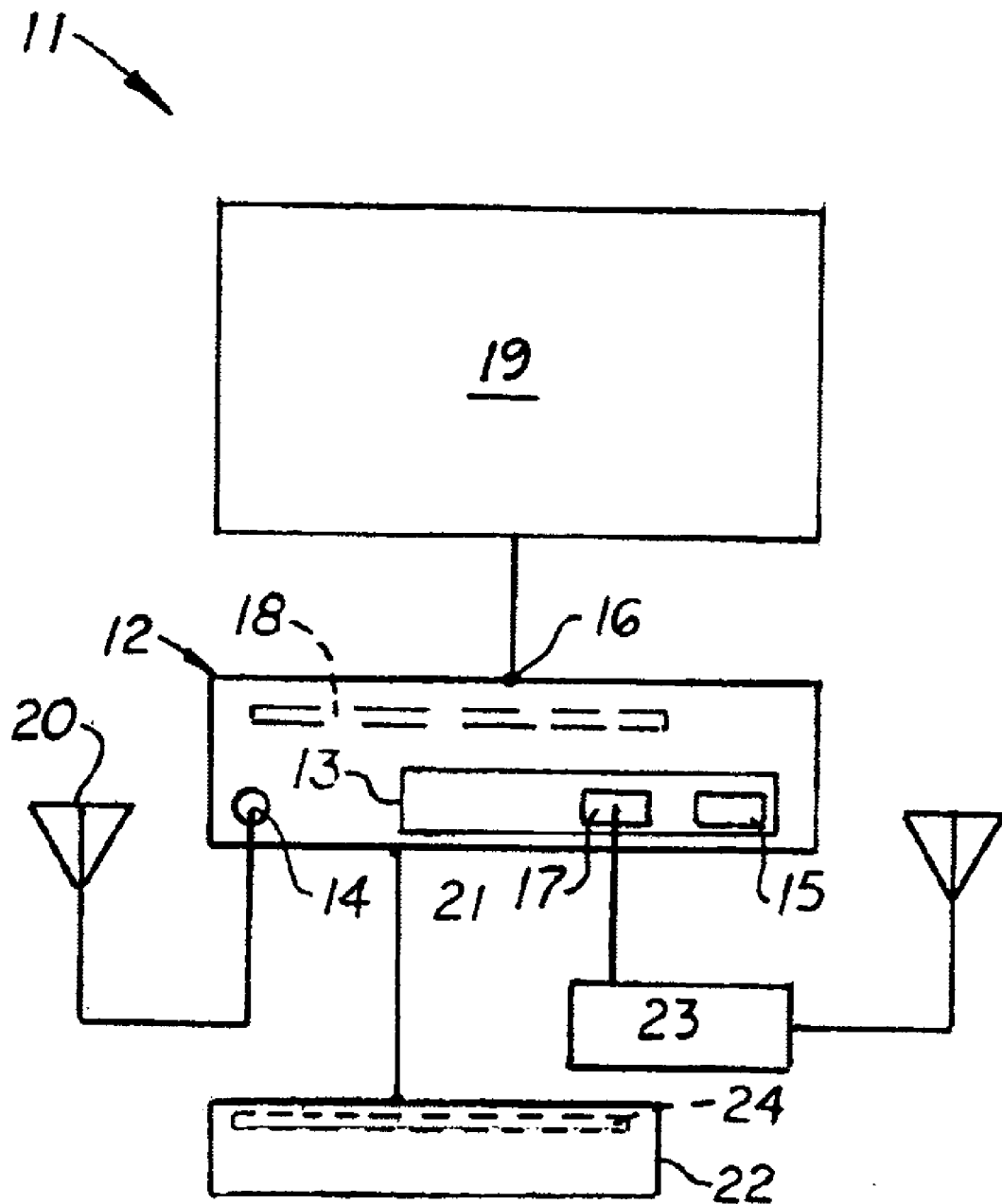


FIG. 3

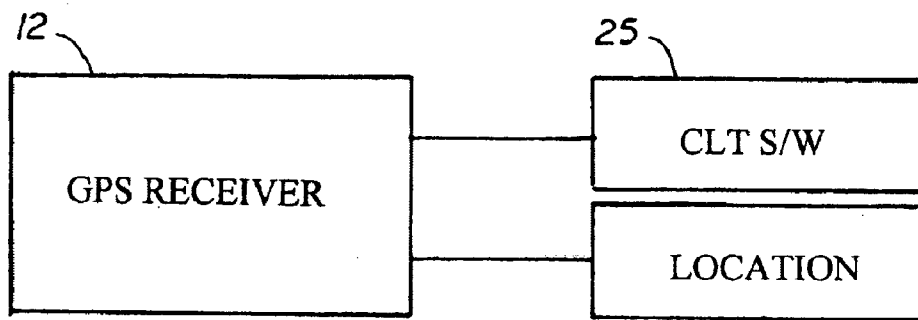


FIG. 4

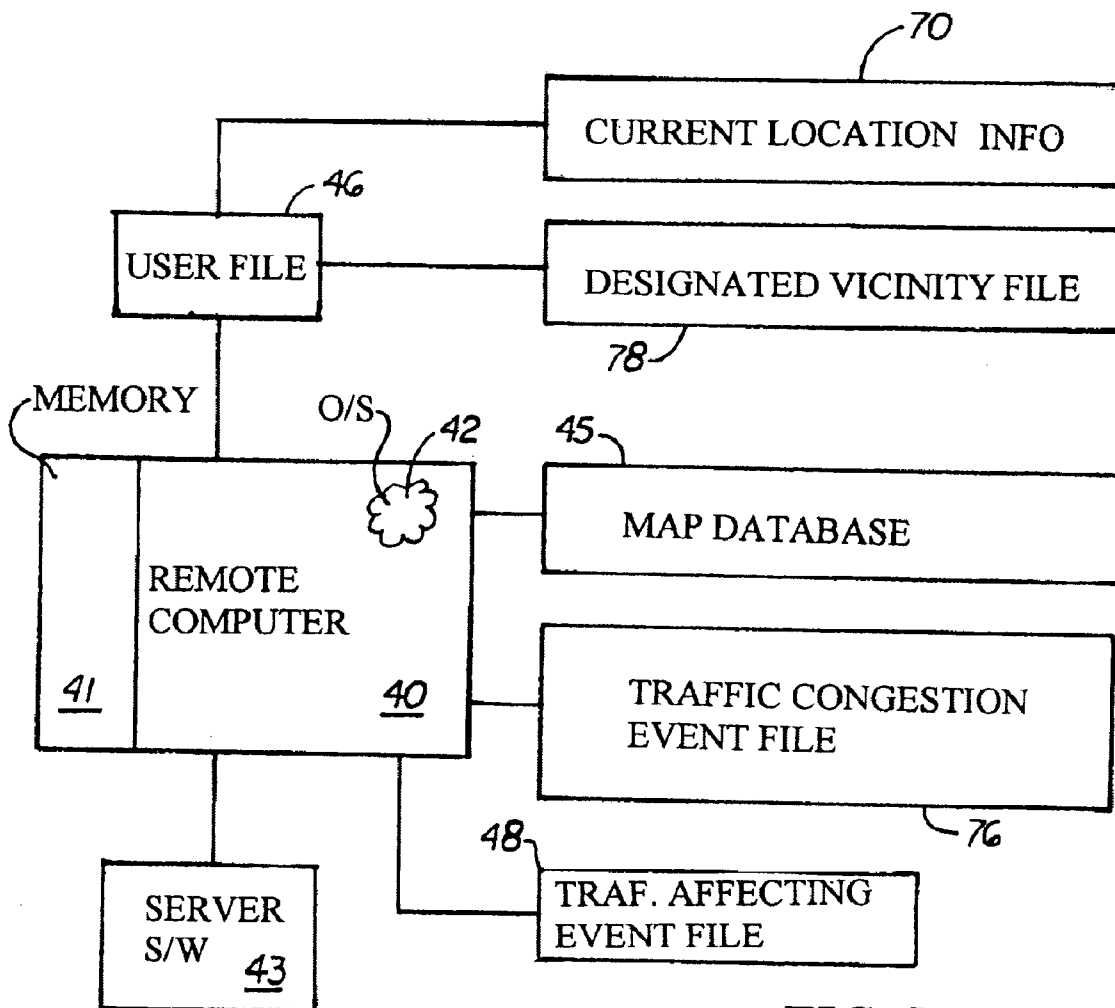
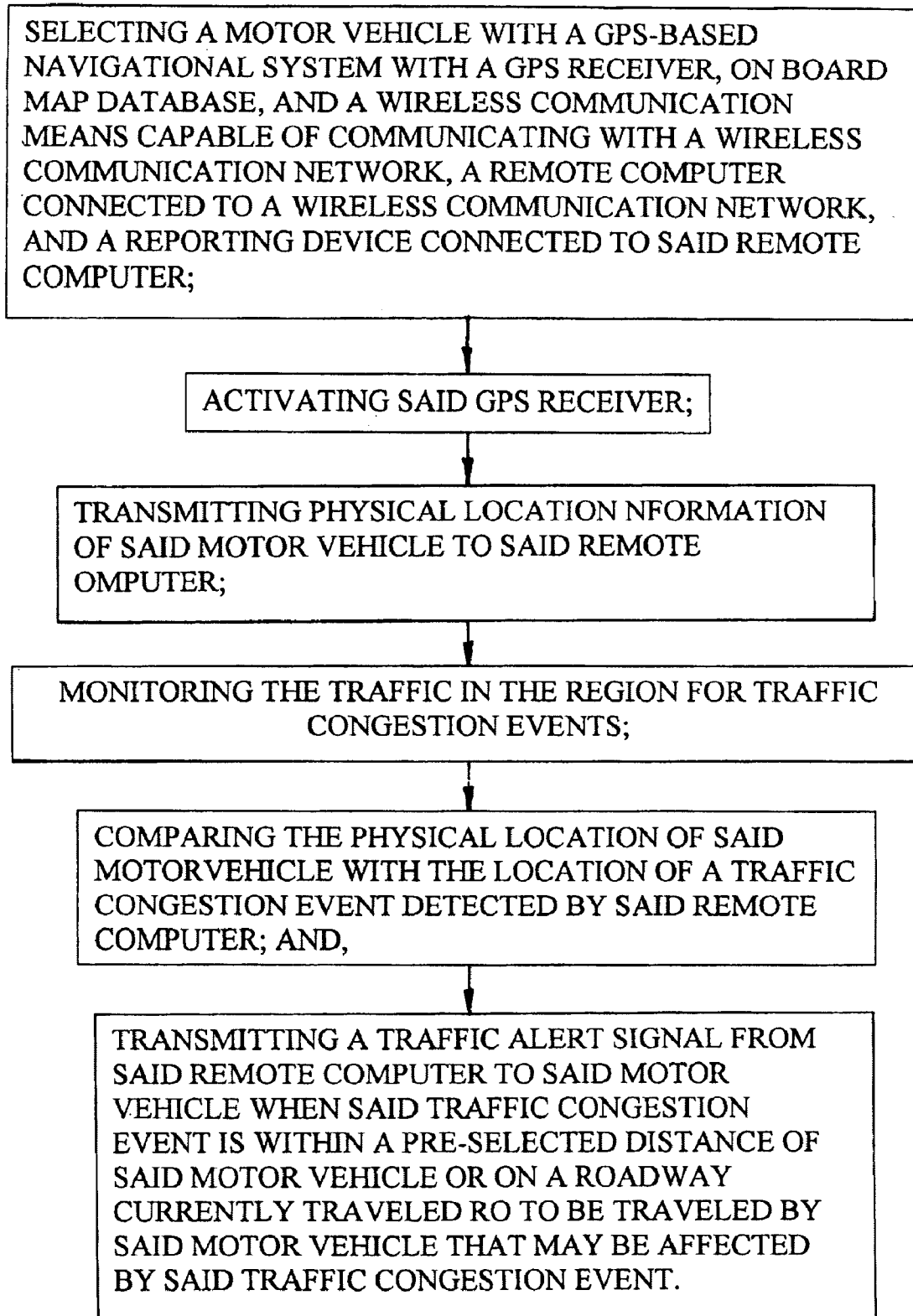


FIG. 5

**FIG. 6**

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PERSONAL TRAFFIC CONGESTION AVOIDANCE SYSTEM

This utility patent application claims the benefit of provisional patent application Ser. No. 60/417,516 filed on Oct. 9, 2002.

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to traffic congestion monitoring systems and, more particularly, to such systems designed to warn drivers of approaching traffic congestion on roadways while driving.

2. Description of the Related Art

Many drivers listen to radio stations that broadcast current traffic condition information during commuter periods. When a traffic report is broadcast, the report includes locations of "slow downs" or accidents, hereinafter known as traffic affecting events, throughout the listening region of the radio station. Drivers are required to listen closely to the entire report to determine whether one of the traffic affecting events reported concerns his or her commute. One problem with a radio traffic reports is that traffic affecting events in the entire region are given which may not affect a particular driver. Also, because the length of the report is limited to 15 to 30 seconds, the number of traffic affecting events reported is restricted or the report is spoken at a fast rate, making it incomprehensible to the driver. Lastly, drivers may not be that familiar with the areas or addresses given for the traffic affecting events given during the report and will not know whether it will affect their commute.

Many motor vehicle manufacturers offer Global Positioning System (GPS)-based navigational systems in their motor vehicles. Such systems are very popular because they give drivers visual and audible guidance over the routes they drive. Such systems include a GPS receiver that receives signals from twenty orbiting satellites operated by the U.S. Department of Defense and a map database that indicates the driver's current location on a map of the region. Using the map database, drivers are able to select variable routes to a desired destination in the region. The map database is stored on optical discs (i.e. CD-ROM or DVD-ROM disc) that are played in a disc player connected to the GPS receiver and located inside the motor vehicle.

The map and route guidance features are particularly useful because they enable drivers to select different routes and to request instruction to a chosen destination. When activated and traveling, the map and route guidance features present a map of the region with the current location of the motor vehicle and the roadways along the selected route highlighted. As the motor vehicle travels on the route, the map is constantly updated so that the motor vehicle current location is always presented, along with approaching and passing roadways and intersections. Although most GPS-based navigational systems present the driver from entering new destinations while moving, most allow the driver to manually request a detour or a new route to a given destination if the need arises.

Except for the satellites, the GPS-based navigation system is located entirely inside the motor vehicle. The visual display, which is connected to the GPS receiver, is typically mounted on the center console of the motor vehicle. In many motor vehicles, the visual display is a "touch screen" with a plurality of menu buttons that enable the driver to activate the system, select previously traveled destinations, request route guidance and enter alphanumeric characters to search for addresses, intersections, and the names of new destinations.

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What is needed is an inexpensive traffic congestion avoidance system that can be easily coupled to motor vehicle GPS-based navigational system that informs a driver of traffic affecting events in his vicinity or that may affect the roadways on his route so that he may select a detour or other routes to avoid the traffic affecting event.

SUMMARY OF THE INVENTION

It is an object of the present invention to provide a personal traffic congestion avoidance system for drivers of motor vehicles.

It is another object of the present invention to provide such a system that can be easily coupled to a motor vehicle GPS-based navigational system.

It is another object of the present invention to provide such a system that is simple to use and does not distract the driver when driving.

These and other objects of the present invention are met by a personal traffic congestion avoidance system disclosed herein which is capable of being coupled to a motor vehicle current GPS-based navigational system. The system includes a means for wireless communication that connects to the motor vehicle GPS-based navigational system and communicates with a remote computer via the means for wireless communication. The remote computer is connected to a traffic monitoring service that constantly monitors motor vehicle traffic on a plurality of roadways in the region.

During use, the visual display on the GPS-based navigation system presents a map of the region showing important roadways and points of interest. The exact physical location of the motor vehicle is displayed on the map along with the names of the roadways and points of interest. When the system is initially activated, the navigational system GPS receiver transmits the user's identification and password information to the remote computer informing the remote computer that the driver is an authorized user and currently connected to the system. Simultaneously, or shortly thereafter, the GPS receiver begins transmitting physical location information to the remote computer. When the remote computer recognizes the driver as an authorized user, it opens a user file and begins to collect the physical location information from the GPS receiver. While the driver is connected to the remote computer, the physical location information from the motor vehicle GPS receiver is then intermittently or continuously uploaded to the remote computer via the means for wireless communication and network.

As mentioned above, the remote computer is connected to a traffic monitoring service that provides current traffic congestion information on a plurality of roadways in the region. Loaded into the working memory of the remote computer is a traffic selecting software program that compares the information in the user file with the traffic congestion information from the traffic monitoring service. When a traffic affecting event occurs, location information regarding the traffic affecting event is delivered from the traffic monitoring service to the remote computer. The remote computer then uses the traffic selecting software program and a map database to determine whether the traffic affecting event is in the designated vicinity, on a roadway currently used by the driver, or on a roadway that may be affected by the traffic affecting event based on the current location of the motor vehicle. If the motor vehicle is in the designated vicinity or traveling on an affected roadway, then an alert signal is created by the remote computer and transmitted via means for wireless communication to the

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GPS receiver located inside the motor vehicle. The alert signal, which contains location information regarding the traffic affecting event, may be displayed on the navigational system visual display or audibly broadcasted to the driver. The driver may ignore the alert or immediately change his or her route to avoid the traffic affecting event. The driver may also request assistance from the GPS-based navigational system route guidance feature to find an alternative route that avoids the traffic affecting event. Once a proposed route is selected, it may be transmitted to the remote computer to determine if it too may be affected by the traffic affecting event.

In the above-described system, the traffic monitoring service transmits all of the traffic congestion information in the region to the remote computer. The remote computer then determines whether any of the traffic affecting events are in the vicinity or affect roadways connected to the currently traveled roadway. It should be understood that the remote computer first determines the vicinity range and affected roadways of the user and then requests traffic affecting events that affect these roadways.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is an illustration of a map depicting four roadways in a region showing the current location of a motor vehicle on one of the roadways and traveling to a destination, with two of the roadways having traffic affecting events.

FIG. 2 is an illustration of the GPS-based navigational traffic warning system disclosed herein.

FIG. 3 is a rear elevational view of the GPS receiver connected to a GPS antenna, wireless transmitter, and receiver.

FIG. 4 is a diagram showing the information collected and transmitted by the GPS receiver.

FIG. 5 is a diagram showing the information collected and transmitted by the remote computer.

FIG. 6 is a diagram showing the steps included in the method avoiding traffic congestion using the system disclosed herein.

DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

Shown in the accompanying Figs., there is shown a personal traffic congestion avoidance system 9 that uses a GPS-based navigational system 11 located inside a motor vehicle 10 capable of sending and receiving data through a wireless communication link. The system 9 includes a wireless communication device 30 that communicates with a remote computer 40 via a wireless communication network 32. The remote computer 40 is connected to a traffic monitoring service 60 that monitors traffic on roadways 85-89 in the region 82.

The GPS navigational system 11 includes a GPS receiver 12 connected to a visual display 19 that presents a map 80 of a selected region 82 showing roadways 85-89, as shown on FIG. 1. The motor vehicle current location information 70 is also indicated on the map 80 along with names of the roadway and the points of interest (not shown). When the system 9 is initially activated, the GPS receiver 12 transmits a signal 65 to the remote computer 40 via the wireless communication device 30 and network 32. When the signal 65 from the GPS receiver 12 is recognized, the remote computer 40 opens a user file 46 and begins to collect current location information 70. The current location information 70 from the motor vehicle GPS receiver 12 is then

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intermittently or continuously uploaded to the remote computer 40 via the wireless communication device 30 and network 32.

As mentioned above, the remote computer 40 is connected to a traffic monitoring service 60 that provides current traffic congestion information on a plurality of roadways 85-89 in the region 82. When a traffic affecting event 75 occurs, it is reported by the traffic monitoring service 60 to the remote computer 40, which uses a traffic selecting software program 48 and a map database 45 to determine whether the traffic affecting event 75 is in the designated vicinity of the last reported location of the motor vehicle 10 or on a roadway that may affect the last roadway on which the motor vehicle 10 was traveling. If the motor vehicle 10 is in the vicinity or traveling on such a roadway, then an alert signal 61 is created by the remote computer 40 and transmitted via the wireless communication network 32 to the GPS receiver 12 located inside the motor vehicle 10 to warn the driver of the traffic affecting event 75. The driver may ignore the alert or immediately change his route to avoid the traffic congestion. The driver may also request the GPS-based navigational system route guidance system to find an alternative route.

GPS-based Navigational System

The GPS-based navigation system 11 includes a twelve-channel GPS receiver 12 with a CPU 13, memory 14, an operating system 15, AV port 16, a communication port 17 or PC-card slot 18, a visual display 19, and a GPS antenna 20. In the preferred embodiment, the system 11 has a guidance feature that provides visual and audible instruction to a selected destination from a current or designated location. Such GPS receivers 12 are manufactured by Alpine Electronics of America, Inc. of Tokyo, Japan, and Pioneer North America, Inc. of Tokyo, Japan. The GPS receiver 12 may include a built-in DVD disc player (not shown) or include ports 21 for connecting to a separate DVD disc player 22 with a map data base 24. A wireless modem 23 may be attached to the communication port 17, or a wireless PCMCIA card (not shown) may be inserted into the PC-card slot 18.

Loaded into the memory 14 of the GPS receiver 12 is a client-side software program 25 that stores the driver's user name, address, password, and network address and enables the GPS receiver 12 to communicate with the remote computer 40.

Remote Computer

The remote computer 40 may be a standard server-configured computer with suitable memory 41 and operating system 42 designed to communicate with the GPS receiver 12. The remote computer 40 includes server side software program 43 that communicates with the client side software program 25, used by the GPS receiver 12 and a traffic selecting software program 48.

The remote computer 40 is designed to collect stored location data from the GPS receiver 12 process information from the traffic monitoring service 60. In the preferred embodiment, the remote computer 40 is connected via a landline connection link 44 to a wide area computer network 35 that is linked to a wireless communication network 32. It should be understood, however, that the remote computer 40 could include a wireless communication device 30 such as a cellular telephone transmitter/receiver to communicate directly to the wireless modem 23 or card (not shown) attached to the GPS receiver 12.

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The remote computer 40 is connected to a map database 45 of the region 82 similar to the map database 24 used by the GPS receiver 12. During use, the physical location of a traffic affecting event 75 in the region is reported and sent to the remote computer 40 and stored in a traffic affecting event file 76. In the first embodiment, the remote computer 40 then uses the traffic selecting software program 48 and the map database 45 to determine whether the traffic affecting event 75 is within the designated vicinity of the last reported location of the motor vehicle 10 or on a roadway 86, 89 that may affect the flow of traffic on a roadway 85 currently used by the motor vehicle 12. The remote computer 40 continues to compare the information in the traffic affecting event file 76 with the current location information 70 and map database 45 until the user logs off from the system 9.

In the first embodiment, only traffic affecting events 75 located in the current vicinity, on the current roadway, or a roadway that may affect the flow of traffic on the currently used roadway are transmitted to the GPS receiver 12. The size of the file containing such information is relatively small compared to the size of the file needed to transmit all of the traffic affecting events in the region to the GPS receiver 12. Since the size of the file inversely affects the download time and available memory, it is desirable to use smaller files for faster communication. Also, since most users adjust the scale on the visual displays from 1/8 to 1 mile distances, traffic affecting events occurring in areas not used by the driver are not needed.

In a second embodiment, the remote computer 40 would first inform the traffic monitoring service 60 of the designated vicinities and roadways to be monitored, which are stored in a designated vicinity file 78, and then request only traffic affecting events 75 that impact them.

Traffic Monitoring Service

The traffic monitoring service 60 may be the regional Department of Transportation or other agency that continuously monitors traffic in a region. The traffic monitoring service 60 may also be a private company or service such as the service described in U.S. Pat. No. 6,236,933, which is incorporated herein.

In the first embodiment, all of the traffic affecting events 75 in the region are sent to the remote computer 40 which then determines whether each traffic affecting event 75 affects a particular user currently logged onto the system 9. It should be understood that the traffic monitoring service 60 could be instructed to transmit to the remote computer 40 only traffic information that falls within a designated vicinity or roadway.

Operation

The GPS-based navigational system 11 in the motor vehicle 10 is first activated by pressing the receiver ON/OFF manual button 51. A destination may be selected using the Destination Menu button 52 along with the Route Guidance button 53 for assistance in selecting a particular route. The traffic-monitoring menu button 54 on the visual display 19 is then activated with causes the GPS receiver 12 to log onto the remote computer 40 via the wireless modem 23 and the wireless communication network 32. During the log-on process, the GPS receiver 12 uses the client-side software program 25 to communicate with the server side software program 43 loaded into the memory 41 of the remote computer 40 to transmit the user's previously registered name, a password, and the GPS receiver network address to the remote computer 40. The remote computer 40 identifies

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the user and opens a user file 46. Simultaneously or immediately after logging onto the remote computer 40, the GPS receiver 12 begins transmitting current location information 70 to the remote computer 40 which is temporarily stored in the user file 46. During the initial log-on process, an optionally beginning display 55 may be presented on the visual display 19 which prompts the user to select one of the monitoring distance buttons 56, (1 mile to 5 miles shown) from the motor vehicle 10 to monitor traffic congestion. The remote computer 40 then begins to monitor traffic affecting events 75 sent from the traffic monitoring service 60 for traffic affecting events 75 within the designated monitoring distance or affected roadways.

FIG. 1 depicts a visual display 19 coupled to the GPS receiver 12 that presents a map 80, with the motor vehicle 10 located at location "L" and traveling northbound on roadway I-1. Also presented on the visual display 19 is a plurality of monitoring distance buttons 56 that correspond to mileage distances represented in concentric circles 99 also shown on the visual display 19. Prior to using the system 9, the user selects one of the monitoring distances buttons 56 to request a distance around the current to be monitored. The motor vehicle 10 is currently traveling towards the destination "D" located northeast from its current location. According to the motor vehicle route guidance system 50 feature, the fastest route is to follow roadway I-1 northbound and then take the exit E-1 to roadway I, and then follow roadway I-2 to destination "D".

When the motor vehicle 10 is traveling northbound on roadway I-1, and located at location "L", a traffic affecting event 75 occurs at location "A-1" on roadway I-2. When a traffic affecting event 75 is detected by the traffic monitoring service 60 and information regarding the traffic affecting event 75 is sent to the remote computer 40, the remote computer 40 records the traffic affecting event 75 and determines whether the traffic affecting event 75 is within the designated vicinity of location L or on roadway I-2, I-3, I-4 that connects to roadway I-1. Since roadway I-2 connects to roadway I-1, the remote computer 40 immediately sends a traffic alert signal 61 to the motor vehicle GPS receiver 12. A traffic alert signal 61 contains the address or latitude/longitudinal coordinates of the traffic affecting event 75 and may contain the name of a roadway, direction of travel, or the closest exit off on roadway I-1. The exact location of the traffic affecting event 75 may also be displayed on the visual display 19, as shown in FIG. 1. An audible signal may also be broadcast. If the route guidance feature is used, an alternative route button 57 may also be presented on the visual display 19 enabling the driver to request a detour or new route to the destination "D".

Referring to FIG. 1, the driver elects to follow a new, slightly longer route to destination "D" using roadway I-2. Shortly thereafter, a second traffic alert signal 61 is delivered to the GPS receiver 12 regarding a second traffic affecting event 75 at location A-2 that has occurred on roadway I-1. The driver changes his or her plans and elects to follow a third, much longer route using roadway I-4 to the destination "D".

Using the above system 9, a method of avoiding traffic congestion is provided which includes the following steps:

- selecting a motor vehicle 10 with a GPS-based navigational system 11 with a GPS receiver 12 and on board map database 24, and a wireless communication device 30 capable of communicating with a wireless communication network 32, a remote computer 40 connected to a wireless communication network 32, and a traffic monitoring service 60 connected to said remote computer 40;

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- b. activating said GPS receiver 12;
- c. transmitting current location information 70 of said motor vehicle 10 to said remote computer 40;
- d. monitoring the traffic in the region 82 for traffic affecting events 75;
- e. comparing the current location information 70 of said motor vehicle 10 with the location of traffic affecting events 75 by said remote computer 40; and,
- f. transmitting a traffic alert signal 61 from said remote computer 40 to said motor vehicle 10 when said traffic affecting event 75 is within a preselected distance of said motor vehicle 10 or on a roadway currently traveled or to be traveled by said motor vehicle 10 that may be affected by said traffic affecting event 75.

In compliance with the statute, the invention described herein has been described in language more or less specific as to structural features. It should be understood, however, that the invention is not limited to the specific features shown, since the means and construction shown, is comprised only of the preferred embodiments for putting the invention into effect. The invention is therefore claimed in any of its forms or modifications within the legitimate and valid scope of the amended claims, appropriately interpreted in accordance with the doctrine of equivalents.

I claim:

1. A personal traffic congestion avoidance system, comprising

- a. a motor vehicle;
- b. a GPS-based navigational system mounted inside said motor vehicle, said GPS-based navigational system including a GPS receiver, a visual display, and a map database;
- c. means for wireless communication coupled to said GPS-based navigation system;
- d. a remote computer connected to said means for wireless communication, said remote computer being used to collect physical location data from said GPS-based navigation system located inside said motor vehicle;
- e. means for monitoring traffic on roadways in a region for a traffic affecting event connected to said remote computer; and,
- f. said remote computer being used to compare the current location of said motor vehicle with the location of a detected traffic affecting event and said remote computer being used to transmit to said GPS based navigational system a traffic alert warning when said motor vehicle is in the vicinity of, or is traveling on a roadway affected by, the detected traffic affecting event.

2. The personal traffic congestion avoidance system, as recited in claim 1, wherein said means for wireless communication is a wireless telephone coupled to said GPS-based navigational system and a wireless telephone network.

3. The personal traffic congestion avoidance system, as recited in claim 2, further including a landline telephone network located between said wireless telephone network and said remote computer.

4. The personal traffic congestion avoidance system, as recited in claim 1, including means to select the monitoring distances for monitoring traffic affecting events from the current location of said motor vehicle.

5. The personal traffic congestion avoidance system, as recited in claim 1, wherein said GPS-based navigational system includes a route guidance system that uses said map database to direct said motor vehicle to a selected destination.

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6. The personal traffic congestion avoidance system, as recited in claim 1, wherein said means for monitoring traffic on roadways in a region is a traffic monitoring service that monitors roadways in a selected region for traffic affecting events.

7. The personal traffic congestion avoidance system, as recited in claim 1, including means for selecting distances for monitoring traffic affecting events from the current physical location of said motor vehicle.

8. A personal traffic congestion avoidance system, comprising:

- a. a motor vehicle;
- b. a GPS-based navigational system mounted inside said motor vehicle, said GPS-based navigational system including a GPS receiver, a visual display, a map database, and a route guidance system;
- c. means for wireless communication coupled to said navigational system;
- b. a remote computer able to communicate with said means for wireless communication;
- e. means for monitoring traffic on roadways in a region for a traffic affecting event, said means for monitoring traffic being connected to said remote computer to transmit traffic affecting events thereof; and
- f. a traffic selecting software program loaded into said remote computer, said traffic selecting software program being used to compare the current location of said motor vehicle with the location of a traffic affecting event identified by said means for monitoring traffic on roadways, said remote computer being used to transmit to said GPS-based navigational system a traffic alert warning when said motor vehicle is in the vicinity or is traveling on a roadway on said map database affected by a traffic affecting event.

9. The personal traffic congestion avoidance system, as recited in claim 8, wherein said means for wireless communication is a wireless telephone coupled to said GPS-based navigational system and a wireless telephone network.

10. The personal traffic congestion avoidance system, as recited in claim 8, further including means to select the distances for monitoring traffic affecting events from the current physical location of said motor vehicle.

11. A method for avoiding traffic congestion, comprising the following steps

- a. selecting a personal traffic congestion avoidance system comprising a motor vehicle with a GPS-based navigational system that includes a GPS receiver, a map database, a visual display, and a wireless communication means capable of communicating with a wireless communication network, a remote computer capable of connecting to said wireless communication network and a remote computer traffic monitoring system capable of monitoring the roadways in the region contained in said map database for traffic affecting events;
- b. activating said GPS-based navigational system;
- c. transmitting physical location information of said motor vehicle from said GPS based navigational system to said remote computer via said wireless communication network;
- d. activating said remote computer to monitor the location of said motor vehicle in the region;
- e. activating said traffic monitoring service to monitor the traffic in the region where said motor vehicle is driven for traffic affecting events;

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- f. using said remote computer to compare the physical location of said motor vehicle with the physical location of a traffic affecting event detected by said traffic monitoring service; and
- g. transmitting a traffic alert signal from said remote computer to said GPS-based navigational system in said motor vehicle when said traffic affecting event is within a pre-selected distance from the physical location of said motor vehicle or affects a roadway that is currently used by said motor vehicle or affects a roadway that connects to the current roadway.

12. The method as recited in claim 11, further including the step of selecting a distance from the physical location of said motor vehicle to monitor for traffic affecting events.

13. The method as recited in claim 12, wherein said traffic monitoring service transmits all of the traffic affecting events in a plurality of regions and then delivers the location of all traffic affecting events located within the selected distance to said remote computer.

14. The method as recited in claim 11, wherein said GPS-based navigational system further includes a route guidance system that provides alternative roadways to a driver that avoid the traffic affecting event transmitted from said remote computer.

15. The method as recited in claim 13, wherein said remote computer determines whether said traffic traffic events delivered from said remote computer is within the vicinity of said motor vehicle or on a roadway traveled.

16. The method as recited in claim 12, wherein said remote computer determines whether said traffic affecting event delivered from said remote computer is on a roadway currently traveled by said motor vehicle.

17. The method as claimed in claim 13, wherein said remote computer determines whether said traffic affecting event delivered from said remote computer is on a roadway currently traveled by said motor vehicle.

18. A method for monitoring traffic when traveling in a motor vehicle, comprising the following steps:

- a. selecting a personal traffic congestion avoidance system that includes a navigational system mounted inside said

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motor vehicle that includes a means for determining the physical location of said motor vehicle, a visual display, a map database and a route guidance system, means for wireless communication coupled to said navigational system, a remote computer able to communicate with said means for wireless communication, means for monitoring traffic on selected roadways in a region, and traffic selecting software program loaded into said remote computer used to identify and transmit traffic affecting events from said means for monitoring traffic to said navigational system based on the current location of said motor vehicle;

- b. activating said personal traffic congestion avoidance system, said remote computer and said means for monitoring traffic;

- c. connecting said personal traffic congestion avoidance system to said remote computer;

- d. transmitting the current physical location information of said motor vehicle to said remote computer;

- e. using said means for monitoring traffic to monitor the traffic in the roadways shown in said map database for traffic affecting events;

- f. transmitting traffic affecting events to said remote computer the are in the vicinity of said motor vehicle and may affect the movement of said motor vehicle on the roadways in said map database;

- g. transmitting said traffic affecting events, from said remote computer to said personal traffic congestion system using said means for wireless communication; and,

- h. presenting said traffic affecting events to a driver of said motor vehicle on said navigational system.

19. The method of monitoring traffic, as recited in claim 18, further including step (i) selecting said route guidance system to find an alternative route in said map database to avoid traffic congestion.

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