

70595 U.S. PTO



08/19/97

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PROVISIONAL APPLICATION FOR PATENT COVER SHEET

This is a request for filing a **PROVISIONAL APPLICATION FOR PATENT** under 37 CFR 1.53(b)(2)

Attorney Docket No. 97P7686US

Transmitted herewith for filing is the Provisional Application for Patent of:

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TITLE OF THE INVENTION

VEHICLE ROUTE GUIDANCE SYSTEM

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ENCLOSED APPLICATION PARTS:

<u>15</u> Pages Specification and Claims	Other (Specify)
<u>2</u> Sheets of Drawings	

METHOD OF PAYMENT OF FILING FEES FOR THIS PROVISIONAL APPLICATION FOR PATENT

The Commissioner is hereby authorized to charge my **Deposit Account No. 19-2187** in the amount of **\$150.00** for the provisional application filing fee. The Commissioner is hereby authorized to charge payment and any additional filing fees required under 37 CFR 1.16 and any provisional patent application processing fees under 37 CFR 1.17 that are associated with this communication or credit any overpayment to Deposit Account No. 19-2187.

This invention was not made by an agency of the United States Government or under the contract with any agency of the United States Government.

Respectfully Submitted,

Russel C. Wells, Reg. #24,188
Attorney of Record

Russel C. Wells
Signature

19 August 1997
Date

Certificate of Mailing Under 37 CFR §1.10

I hereby certify that this correspondence is being deposited with the United States Postal Service on 19 August 1997 in an envelope as "Express Mail Post Office to Addressee" Mailing Label Number E1599233801US addressed to: Box Provisional Patent Application, Assistant Commissioner for Patents, Washington, D.C. 20231.

Diane L. Ingamells 19 Aug 97
Diane L. Ingamells Date

Mail documents for filing with required cover sheet information to:

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Vehicle Route Guidance System

This invention relates in general to navigation systems for motor vehicle in general and more particularly to systems using telecommunications as the mode for sending and receiving guidance between a computing control center and the motor vehicle.

Background of Invention

Prior Art

In general the prior art systems, when in the vehicle navigation mode, utilize a map display to direct the vehicle operator to his destination. Such a map is contained in the in-vehicle unit typically on a compact disk ("CD") which is loaded into the unit. Such disks must be replaced periodically so as to be up to date. If such units have telecommunications capability, a control location receives a request for a navigation route from the vehicle. The control location calculates the route and sends the route back to the in-vehicle unit where it addresses the map and causes a map to be displayed. The route on the map is traced by means of a small icon such as a motor vehicle. Some prior art patents having map displays are US patents 5,612,881 entitled "Map Display System"; 5,587,911 entitled "Navigation System With Selective Intersection display"; 5,559,511 entitled "Vehicle Route Guidance Apparatus for Re-Searching for a New Route When Vehicle goes Out of Route"; and 5,504,482 entitled "Automobile Navigation Guidance, Control and Safety System".

The assignee of this application has a copending application entitled "Vehicle Navigation and Route Guidance System" filed on August 3, 1994 under Serial Number 08/285,241 with a continuing application filed on February 22, 1996 having Serial Number 08/605,648 by Sulich et al. In such a system, the in-vehicle unit is essentially a "dumb" terminal with very little processing capability. The data base, which is located at a fixed site, has a data base including a map data base and routing algorithms. The invehicle unit sends a request by radio frequency means, wireless and/or wire, identifying a destination location by any one of several means such as a telephone number and also the present position as determined

from a GPS device. The data base receives that information and calculates a route in terms of vector-like information units which give a direction from a point of beginning and a distance to the end of the vector. Several of these vector-like information units form a route from the present position to the destination position. These vector-like information units are displayed on an in-vehicle display unit in a turn-by-turn mode.

This basic system as defined in copending United States patent 5,565,874 issued on October 15, 1996 and assigned to the assignee entitled "Expandable, Multi-level Intelligent Vehicle Highway System" by Rode, et al., has as its basic system a stand-alone in-vehicle unit having a plurality of pre stored routes. This unit is expandable to include radio frequency communication

makes use of the geodetic coordinates of the destination location and roadside beacons to direct the vehicle to its destination. The display is a turn-by-turn display which is controlled by the use of a compass, a vehicle speed sensor and information from a roadside beacon. Outside the area covered by roadside beacons, the system relies on "dead reckoning" for navigation purposes.

Summary of the Invention:

Outline of The Specification

Block diagram

Fig 1 is a prior art diagram

Fig. 2 is a schematic view of the vehicle navigation system

description

The server

block diagram more detail

inputs

other services

traffic

Help services

rescue

road repairs

outputs

wireless communications

internet connection via telephone

traffic segments interlaced and fused with route guidance segments

location

The IVU

block diagram

inputs

telephone wireless

P.C.

GPS

wheel speed

compass

outputs

screen

audio

components

IVU face

selector switch

pushbuttons

MMI--Man Machine Interface for driver communication

modem

CD reader

software

way points

diagram exhibiting curve

diagram exhibiting straight road

start location

parking lot

up date

automatic

beginning of call

end of call

off peak time

on-call

CD

characteristic of segment

angle of end from beginning

distance

putting segments together to create a route

IVU

storing in IVU

update of data base

automatic--on-line

upon access of telephone

prior to hang-up

driver load--off-line

data compression

by server

decompression by IVU

minimize wireless time

Creating a Route

Dialing in destination

layout of a route by sequence

address

city

street

Preverification of destination before logging on telephone line

Route Storing

primary routes

use frequently

last n routes

saves preverification

allows return to route

Scrolling

previous routes

commonly used

Claims

System

telecommunications

no map storage

turn by turn

audio output

visual output

destination preverification

updating

Way points

curve

straight

Compression of data

transmission

IVU

input by telephone

input by computer

input by CD

screen

scrolling

push button selector

multi-menu

Initialize start up

GPS

memory storage

Description of the Drawings:

In the drawings:

Fig. 1 is schematic view of a prior art vehicle route guidance system;

Fig. 2 is a schematic view of the vehicle navigation system;

Detailed Description

The vehicle navigation system has an invehicle component or unit, "IVU" and an out-of-vehicle component or unit. These two units are interconnected by means of a wireless medium such as radio frequency units, cellular communications, etc. Generally the request for a route comes from the invehicle unit and the segments or elements of the requested route comes from the out-of-vehicle unit or server.

The invehicle unit is comprised of an user interface which is a display device as illustrated in Fig. _____. The display unit is a visual display of words and symbols which describe locations, traffic incidents and other information and the symbols describe turn by turn navigation, traffic information and other information capable of being symbolize.

The display unit is electrically connected to an electronic unit having a microprocessor, a non-volatile memory, at least one modem, an audio control along with the necessary power supplies and other devices common to an electronic unit. Also electrically connected to the electronic unit is a RF communications unit, a vehicle state sensors, an audio speaker, and a GPS control unit and antenna.

The microprocessor functions to perform various mathematical functions and operate one or more software programs. The memory contains several tables which contain elements of destination information. Such elements being, as far as the United States is concerned, names of states, cities, streets and roads, address numbers, points of interest and various messages to be displayed on the display unit. In non-United States area, similar information is contained in the memory.

The vehicle state sensors function to describe the operation of the vehicle as respects navigation such as distance and angular change in direction. Such sensors indicate direction such as by a compass, differential odometers, gyroscope, etc.;

distance traveled such as by transmission sensor, vehicle speed. It is through the vehicle state sensors that dead reckoning of the vehicle is determined.

The GPS unit functions to determine the present position of the vehicle by using navigational techniques well known. The GPS unit coupled with the information from the vehicle state sensors can be used by the microprocessor to determine the vehicle position at any time. The GPS unit, for example, may not be effective within the confines of an area having high buildings or high peaks such that the necessary signals from the satellites can not be accessed.

Also connected to the electronic unit is an external bus unit which allows controlled access to the memory unit or the microprocessor unit. This controlled access will allow, as will hereinafter be explained, changes and updating of the several memory units.

The RF unit receives data through its wireless information via means of an antenna for processing by the microprocessor. Such data, for navigation purposes, is generally in a "vector" format wherein the routing vector information is in the form of an angle and a distance in feet or meters or some similar unit representing the distance a vehicle is to travel along the vector. It generally takes a number of vectors to establish a route.

The out-of-vehicle unit or server is connected through the wireless medium to the IVU and receives and transmits messages in a certain format and also functions to transmit from the server updating information relating to the several memories in the IVU. Operatively connected to the server may be the following units of information for the system operation. The information being transmitter over the wireless medium is condensed or compacted both at the IVU and the server. The effect of this compacting is to reduce the time the IVU is "on the air" and hence reduces the cost of the telephone call. Upon receipt of the compacted information, the receiving unit causes it to be expanded. It is then operated upon and the information, depending upon the location is expanded and answered or expanded and communicated to the vehicle operator.

In the server, each segment of a route is further identified by means of way points which are a selection of points along a route from the beginning to the end which further defines the route segment. For a road segment that is essentially straight, there may be several points that are spaced some distance apart; but if the segment is a curved road, the points are spaced much closer.

The route tracking algorithm is to guide the driver along a series of maneuvers which form a route. Each of these maneuvers tell the driver what street to be on and which street to turn on to, which is the maneuver.

In order to make the route guidance work efficiently and to detect any off-route maneuvers, information in the form of way-points is provided. A way point is represented by latitude and longitude information with a distance number which is the distance between 2 consecutive way points. The way points define the curves and intersections of a street in the maneuver in addition to the long straight sections of a route.

Fig. __ is an example of a routing segment having four sections. The first section is long segment on an limited access highway. In this example the segment has a direction and distance. The direction is the angular change that the end point is from the beginning point and the distance is the length of the segment which is either a maximum number or the distance to a maneuver. The maximum distance is a number that the algorithm recognizes beyond which another segment is defined.

The second segment is the exit curve from the limited access highway which in the example shown is defined by six way points. Again each way point is defined by a latitude and longitude representation and a distance between adjacent way points. The next segment is a highway from the end of the exit curve to a maneuver. Here it is a right turn from one street to a second street. Since in the example, the road, while it changes direction, is nonetheless a continuous road. The road is defined by several way points, some of which are at possible positions where the drive could veer off course hence, the way point is a means of checking to make sure that the route is being followed.

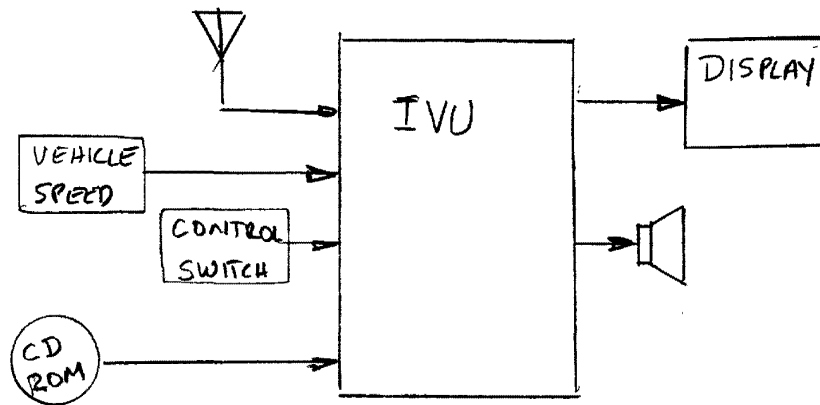
項目	単位	数値	単位	数値	
総人口	人	1,234,567	総人口	人	1,234,567
男性人口	人	612,345	女性人口	人	622,222
0歳人口	人	12,345	1歳人口	人	11,234
2歳人口	人	11,234	3歳人口	人	10,123
4歳人口	人	10,123	5歳人口	人	9,012
6歳人口	人	8,901	7歳人口	人	7,890
8歳人口	人	6,789	9歳人口	人	5,678
10歳人口	人	4,567	11歳人口	人	3,456
12歳人口	人	2,345	13歳人口	人	1,234
14歳人口	人	1,123	15歳人口	人	1,012
16歳人口	人	901	17歳人口	人	890
18歳人口	人	789	19歳人口	人	678
20歳人口	人	567	21歳人口	人	456
22歳人口	人	345	23歳人口	人	234
24歳人口	人	123	25歳人口	人	112
26歳人口	人	101	27歳人口	人	90
28歳人口	人	89	29歳人口	人	78
30歳人口	人	67	31歳人口	人	56
32歳人口	人	45	33歳人口	人	34
34歳人口	人	23	35歳人口	人	12
36歳人口	人	11	37歳人口	人	10
38歳人口	人	9	39歳人口	人	8
40歳人口	人	7	41歳人口	人	6
42歳人口	人	5	43歳人口	人	4
44歳人口	人	3	45歳人口	人	2
46歳人口	人	1	47歳人口	人	1
48歳人口	人	1	49歳人口	人	1
50歳人口	人	1	51歳人口	人	1
52歳人口	人	1	53歳人口	人	1
54歳人口	人	1	55歳人口	人	1
56歳人口	人	1	57歳人口	人	1
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132歳人口	人	1	133歳人口	人	1
134歳人口	人	1	135歳人口	人	1
136歳人口	人	1	137歳人口	人	1
138歳人口	人	1	139歳人口	人	1
140歳人口	人	1	141歳人口	人	1
142歳人口	人	1	143歳人口	人	1
144歳人口	人	1	145歳人口	人	1
146歳人口	人	1	147歳人口	人	1
148歳人口	人	1	149歳人口	人	1
150歳人口	人	1	151歳人口	人	1
152歳人口	人	1	153歳人口	人	1
154歳人口	人	1	155歳人口	人	1
156歳人口	人	1	157歳人口		

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Representative claims:

1. A vehicle route guidance system having a central server in wireless communication with at least one of plurality of invehicle units, each of said invehicle units receiving data from the server, expanding said data, making calculations based on said data for forming a route.
2. A vehicle route guidance system having a route calculation device for calculating a route including a series of way points which are received by the in-vehicle unit and operated upon to make sure that the vehicle maintains its route and to guide the vehicle operator into returning to the route when the vehicle is off the route.
3. A vehicle route guidance system wherein the route is communicated to the vehicle operator by means of turn-by-turn commands and distance display without a map display.
4. A vehicle route guidance system having the means on the in-vehicle unit to recall multi-menus having segments of a destination location and means for combining said segments for wireless transmission.
5. A vehicle route guidance system having computing means for receiving a distance vector having both a distance and a direction value and forming a continuous route segment from a present position to a destination position.
6. A vehicle route guidance system having wireless capability for connecting the in-vehicle unit to the internet.
7. A vehicle route guidance system having an in-vehicle unit memory means for storing the components of a destination location and verifying said destination location prior to transmission.
8. A vehicle route guidance system having GPS means and vehicle sensors for determining present location and compliance with the route to the destination location.
9. A vehicle route guidance system having means for generating help and assistance signals from the vehicle to the server to aid the vehicle operator.

Variable	Mean	SD	Min	Max
Age	34.5	12.5	18	65
Gender	0.5	0.5	0	1
Marital status	0.6	0.5	0	1
Education	12.5	2.5	9	16
Income	15.5	10.5	5	45
Occupation	1.5	1.5	1	5
Health status	1.5	1.5	1	5
Life satisfaction	4.5	1.5	1	7
Depression	1.5	1.5	1	5
Stress	2.5	1.5	1	5
Resilience	3.5	1.5	1	5
Optimism	4.5	1.5	1	7
Gratitude	5.5	1.5	1	7
Forgiveness	4.5	1.5	1	7
Compassion	4.5	1.5	1	7
Kindness	4.5	1.5	1	7
Generosity	4.5	1.5	1	7
Patience	4.5	1.5	1	7
Self-control	4.5	1.5	1	7
Emotional stability	4.5	1.5	1	7
Conscientiousness	4.5	1.5	1	7
Openness	4.5	1.5	1	7
Agreeableness	4.5	1.5	1	7
Neuroticism	1.5	1.5	1	5
Extraversion	4.5	1.5	1	7
Conscientiousness	4.5	1.5	1	7
Openness	4.5	1.5	1	7
Agreeableness	4.5	1.5	1	7
Neuroticism	1.5	1.5	1	5
Extraversion	4.5	1.5	1	7
Conscientiousness	4.5	1.5	1	7
Openness	4.5	1.5	1	7
Agreeableness	4.5	1.5	1	7
Neuroticism	1.5	1.5	1	5
Extraversion	4.5	1.5	1	7
Conscientiousness	4.5	1.5	1	7
Openness	4.5	1.5	1	7
Agreeableness	4.5	1.5	1	7
Neuroticism	1.5	1.5	1	5
Extraversion	4.5	1.5	1	7
Conscientiousness	4.5	1.5	1	7
Openness	4.5	1.5	1	7
Agreeableness	4.5	1.5	1	7
Neuroticism	1.5	1.5	1	5
Extraversion	4.5	1.5	1	7
Conscientiousness	4.5	1.5	1	7
Openness	4.5	1.5	1	7
Agreeableness	4.5	1.5	1	7
Neuroticism	1.5	1.5	1	5
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Conscientiousness	4.5	1.5	1	7
Openness	4.5	1.5	1	7
Agreeableness	4.5	1.5	1	7
Neuroticism	1.5	1.5	1	5
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Conscientiousness	4.5	1.5	1	7
Openness	4.5	1.5	1	7
Agreeableness	4.5	1.5	1	7
Neuroticism	1.5	1.5	1	5
Extraversion	4.5	1.5	1	7
Conscientiousness	4.5	1.5	1	7
Openness	4.5	1.5	1	7
Agreeableness	4.5	1.5	1	7
Neuroticism	1.5	1.5	1	5
Extraversion	4.5	1.5	1	7
Conscientiousness	4.5	1.5	1	7
Openness	4.5	1.5	1	7
Agreeableness	4.5	1.5	1	7
Neuroticism	1.5	1.5	1	5
Extraversion	4.5	1.5	1	7
Conscientiousness	4.5	1.5	1	7
Openness	4.5	1.5	1	7
Agreeableness	4.5	1.5	1	7
Neuroticism	1.5	1.5	1	5
Extraversion	4.5	1.5	1	7
Conscientiousness	4.5	1.5	1	7
Openness	4.5	1.5	1	7
Agreeableness	4.5	1.5	1	7
Neuroticism	1.5	1.5	1	5
Extraversion	4.5	1.5	1	7
Conscientiousness	4.5	1.5	1	7
Openness	4.5	1.5	1	7
Agreeableness	4.5	1.5	1	7
Neuroticism	1.5	1.5		



PRIOR ART

FIG 1

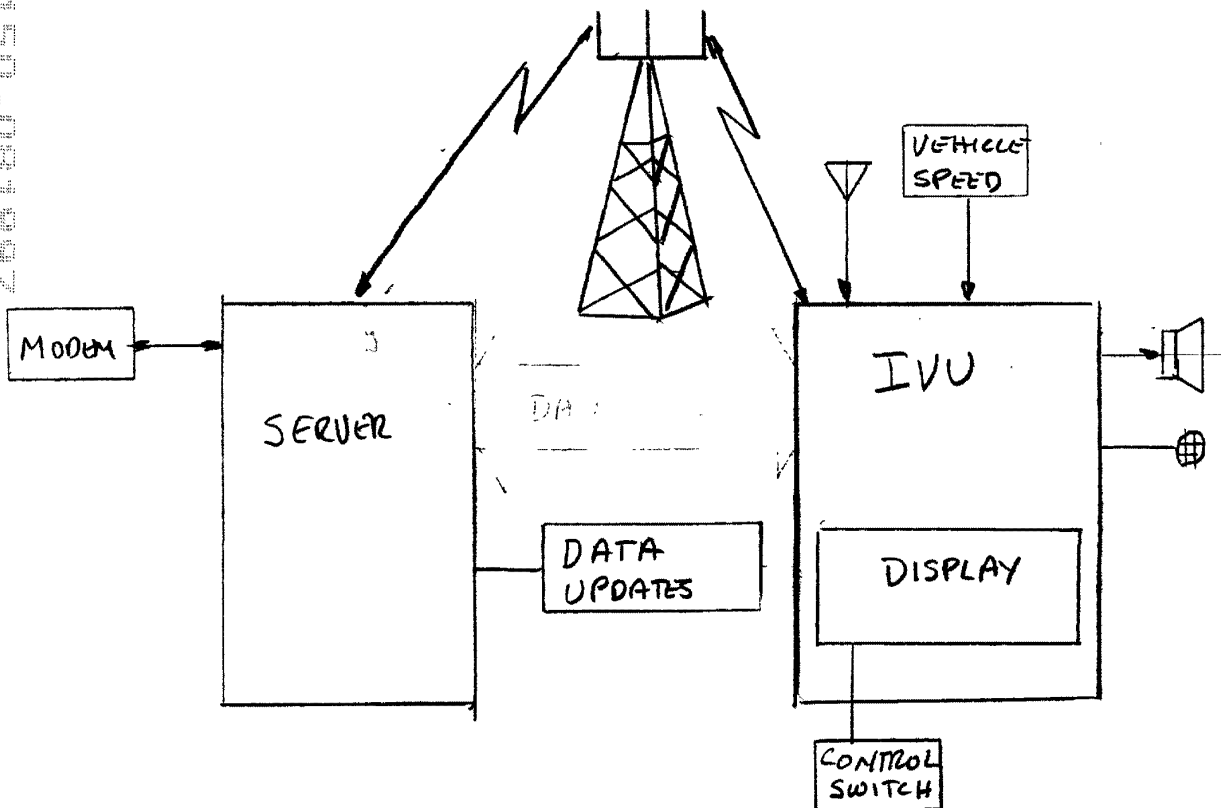


FIG 2

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