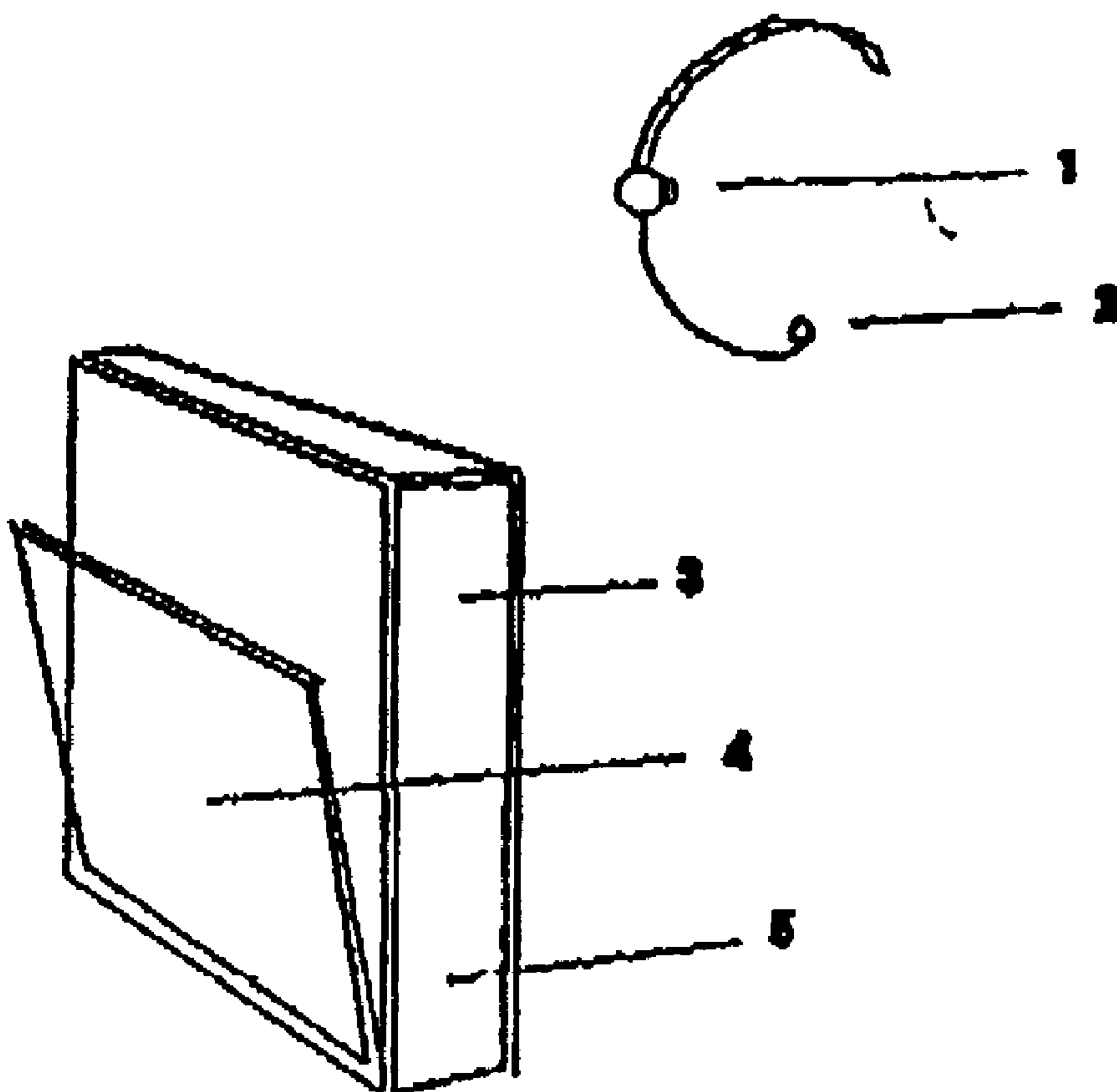




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(54) Titre : EXPLORATEUR GPS  
 (54) Title: GPS EXPLORER



(57) Abrégé/Abstract:

This is a portable information system which uses Global Positioning System (GPS) data as a key to automatically retrieve audiovisual data from a database. On a journey the system can automatically identify and describe places of specific interest to the user, landmarks and the history of nearby buildings, or locate hotels, hospitals, shops and products within a radius of the present position. Audible menus and voice command give hands-free and eyes-free control while driving, flying, sailing or walking.



ABSTRACT OF THE DISCLOSURE

This is a portable information system which uses Global Positioning System (GPS) data as a key to automatically retrieve audiovisual data from a database. On a journey the system can automatically identify and describe places of specific interest to the user, landmarks and the history of nearby buildings, or locate hotels, hospitals, shops and products within a radius of the present position. Audible menus and voice command give hands-free and eyes-free control while driving, flying, sailing or walking.

-1-

This application is a divisional of co-pending application No. 2,163,215.

### Technical Field

5 The invention is a portable information system which uses Global Positioning System (GPS) data as a key to retrieve audio visual information from a database or broadcast. It should be understood that the expression "the invention" and the like encompasses the subject matter of both the parent and the  
10 divisional applications.

### BACKGROUND TO THE INVENTION

15 **Almost everyone who travels needs information about the place they are visiting. However, we all have different needs and interests, some need commercial information, others may wish to buy a product, some people like to know the history of a place, or to discover hidden corners, others are simply bored and long for their journey to be made more interesting.**

20 As databases grow in size so the problem of finding relevant data when it is needed becomes more difficult to solve. Few people have the time, motivation or patience to search through telephone  
25 books, yellow pages, guide books, information systems and the like. Having taken a long trip it is often only on returning home when one learns too late what has been missed. Even when at home it can be difficult to find out what is happening in the  
30 area today which might be of interest.

35 When walking, driving, sailing or flying our need for information remains, although our ability to search for it may be severely limited by the task in hand. We frequently need to switch modes of travel between car/aircraft/boat/bus/horseback or foot.

40 Most portable GPS receivers on the market today are designed for navigation, giving the user's position in terms of latitude and longitude or bearing and distance from a known point, both methods are cumbersome to use. Although GPS moving map displays show positions more clearly, their applications remain rather limited, due to the need for a screen  
45 and the risk of distraction when walking or driving. Both types of GPS system offer the user little other information.

50 Talking books using CD-ROM disks may provide the information lacking in the above mentioned navigation systems, however as the location of the user is not monitored automatically, any information must be extracted manually by the user, which can be laborious.  
55

-2-

5 Portable computers and pen computing systems provide  
essentially text based information on the move.  
However, neither offer user friendly, hands-free,  
eyes-free operation with automatic, dynamically  
10 retrieved audio (and video) data based on the users  
position, altitude, attitude, speed, time, direction  
of view, stated needs and interests. It is not easy  
to use such a portable PC when walking or riding on  
horseback.

### 15 THE INVENTION

20 GPS EXPLORER is a portable information system using  
Global Positioning System (GPS) data as a key to  
retrieve audio and video from a database or from  
broadcast data. The user may preselect the type of  
data of interest to him, then as his position,  
direction, speed, altitude or attitude change and  
25 the time of day changes, this is detected by the GPS  
receiver and the system automatically retrieves the  
appropriate data from the database. The device  
incorporates an internal exchangeable database on  
compact disk and can also access external databases  
and broadcast data.

30 GPS Explorer is designed to provide information on  
the move. In most of the applications envisaged the  
user has little need to know his location, simply  
wishing to be told about places of interest to him  
35 such as the history of a nearby building or where to  
buy a product. The fact that the information the  
user requires comes from a device which uses GPS  
position, speed, altitude or time as a key to access  
a database need not concern the user or be apparent.

40 To enable the user to operate the system hands-free  
and eyes-free while driving, flying, sailing, riding  
or walking, it may be controlled using audible menus  
and voice command. Telephone calls may also be made  
45 automatically via an integrated cellphone or  
satellite phone using numbers retrieved from the  
database.

50 On a journey the system can for example be set to  
automatically identify places of likely interest to  
the user, to describe the history of nearby  
buildings or the prettiest route to take. The user  
can also initiate an automatic search of the  
55 database for specific things of interest to him,  
such as landmarks, hotels, hospitals, shops or  
products, usually, though not necessarily, within a  
radius of his present position.

-3-

5 The basic device is a portable audio information system which uses GPS data as a key or keys to retrieve digital audio from a database contained within the device or attached to it by any means or received by any means including telephone, radio or television broadcast.

10 When equipped with or attached to a screen, the device may also include the facility to retrieve still and motion video sequences from a database contained within or attached to the device by any means or received by any means including telephone, radio or television broadcast. When connected to a display, the system may also be used to preview trips.

20 The system can provide GPS positioned simulations using virtual reality displays. The GPS derived position, elevation, viewing direction and time of day, enables simulated structures, buildings, dams, roads and landscape features to be dropped into the users field of view and to be examined from all angles around the proposed site while it is still virgin territory.

30 The device constantly monitors it's position, speed, direction of movement, the time and any like data by reference to a GPS receiver either incorporated within the device or connected to it by any means. Whenever the device detects a change in any GPS parameters, such as a change in location or time, it will use the new GPS data as a key or keys to search the database including received broadcast data and retrieve any data records which directly or indirectly match or relate to the new GPS parameters. Before being output as audio or displayed, the retrieved data will be checked against the mode of operation of the device and against other selection criteria, to determine which, if any, of the retrieved data items are to be presented to the user. A rolling log of messages will be kept to avoid needless repetition.

45 The device may be controlled by voice command or by keyboard, switch or joystick, directly or remotely. The user may select the mode of operation of the device, data retrieval criteria and other operating criteria.

55 The device has an audible menu system which when used with voice command, enables the device to be used hands free and eyes free. Feedback protection avoids the audio output triggering the voice input system.

The device may be fitted with a telephone interface enabling telephone calls to be placed to numbers retrieved from the database or broadcast data. The device may also be fitted with an interface for the attachment of optical, magnetic, radio or other devices capable of inputting data for the purpose of  
5 identifying location, products, persons, vehicles, systems, temperatures or any environmental variables.

The device determines user orientation, direction of movement, speed, pitch and role, altitude, rate of climb or descent, and the user's direction of view in  
10 terms of bearing, angle of azimuth and range. The system can also accept optical or other inputs to identify locations within buildings, which would otherwise be out of GPS reception.

According to the first aspect of the invention there is provided a personal  
15 information system comprising a global positioning receiver for generating global positioning (GPS) data indicative of a current location of a local user, means for generating a user message for transmission to a remote recipient, means for incorporating the GPS position data into the user message so that the remote recipient knows the location of the local user, and means for  
20 wirelessly transmitting the user message to the remote recipient.

According to the second aspect of the invention there is provided a method of communicating wherein a remote recipient knows the location of a local user, comprising generating global positioning (GPS) data indicative of a current  
25 location of the local user, generating a user message for transmission to the remote recipient, incorporating the GPS position data into the user message so that the remote recipient knows the location of the local user, and wirelessly transmitting the user message to the remote recipient.

30 According to the third aspect of the invention there is provided A personal information system comprising a global positioning receiver generating global positioning (GPS) data indicative of a current location of a user, a database of characteristic data items associated with points at predetermined locations within a geographic area, and means for generating a message associated

- 4a -

with a characteristic data item associated with a particular point when the current location of the user corresponds to that particular point.

5 In another aspect, the invention provides a personal information system comprising a global positioning receiver and a radio positioning receiver, together for constantly monitoring positioning data to determine a current location of a local user, means for generating a user message for  
10 transmission to a remote recipient, means for incorporating the position data into the user message, means for wirelessly transmitting the user message to the remote recipient, and an interface for inputting data identifying products, persons, vehicles, systems, temperatures, environmental variables or  
15 desired location.

In another aspect, the invention provides a method of communicating wherein a remote recipient knows the location of a local user, comprising constantly monitoring global  
20 positioning (GPS) data combined with radio positioning data, together determining a current location of the local user, generating a user message for transmission to the remote recipient, incorporating the GPS position data into the user message so that the remote recipient knows the location of the  
25 local user, wirelessly transmitting the user message to the remote recipient, and inputting data identifying products, persons, vehicles, systems, temperatures, environmental variables or desired location.

30 In another aspect, the invention provides a personal information system comprising a global positioning receiver combined with radio positioning receiver, together for constantly monitoring positioning data to determine a current location of a user, a database of characteristic data items  
35 associated with points at predetermined locations within a geographic area, and means for generating a message associated with a characteristic data item associated with a particular point when the current location of the user corresponds to that particular point,

40 wherein the database of characteristic items is stored remotely, and the data is retrieved by a wireless connection.

- 4b -

## DESCRIPTION OF PREFERRED EMBODIMENTS

1. An audio only version of the design will now be described by references to the accompanying drawings.

5

Figure 1 shows the audio only version of the device comprising: audio earpiece 1, microphone 2, the GPS receiver 3, the CD drive 4 and the processor 5.

10

Figure 2 shows the basic logic used to monitor the user's position and to retrieve and play the appropriate audio.

Figure 3 shows a map on which large dots represent the positions determined by GPS at which specific audio phrases will be selected from the database or radio broadcast and played. Samples of typical audio phrases are numbered 1-6.

15

The GPS latitude/longitude co-ordinates of places of interest such as historic buildings, castles, villages, parks, lakes, mountains, panoramic viewpoints and so forth may be digitized from maps or by on site survey. Audio describing each place of interest will then be recorded and stored, in compressed form, with corresponding GPS co-ordinates, in a database on a compact disc (GPS-CD).

20

The portable GPS Explorer may then be used with such a GPS-CD database to provide information to the user who may select one or more of the device's many modes of operation, such as for example:

25

En Route mode:

Figure 3 shows a typical journey by car along a major road. By constantly monitoring GPS data, the device will determine when each of the locations 1-6 has been reached, the corresponding audio phrase will then be retrieved from the GPS-CD database or broadcast data and played to the user through an earpiece or loudspeaker.

30

35

5

There may be several locations at which broadly similar messages would be applicable, such as approaching a village from the North, South, East or West. In this case, the appropriate audio messages may be assembled from several phrases with variables such as left and right inserted as determined by user orientation, thus enabling more economic use to be made of available database space.

10

15

#### Tour mode.

The user may select a tour either from the main menu or when offered the option en route. The system will then provide tour guidance and point out things of interest. For example when walking or driving past historic buildings or other features information about each building will be given. It's date of construction, who lived there, how it was built, if it is open to the public. The dialogue may include historic sounds, the crack of a coachman's whip, the voices of children at play, music drifting on the air, all creating the atmosphere of a bygone age.

20

25

30

#### Hazard Warning Mode.

If this mode has been selected it will take priority over other modes in use at the time such as tour mode. When approaching a hazard the system will interrupt any other audio message to alert the user. For example in road use a dangerous bend, a school or a steep hill. In flying mode to warn of controlled airspace.

35

40

#### Guidance mode.

The GPS lat/long location of a road junction will be digitized and audio recorded for each direction of approach to each junction. The device will identify the users position and direction of travel on the approach to a junction by reference to GPS data and then retrieve the appropriate audio in advance of the junction to act as an audio signpost. The audio signpost will not be restricted to just place names as it may include much more information about road type, places of interest en route, warnings such as no fuel for 50 miles and so on.

45

50

55

#### Destination oriented guidance mode.

When this mode is first selected the user will be prompted to choose a destination. A route from the present position to the destination will be

-6-

5 determined from routing data. The device will then provide only the single direction needed at each junction to reach the destination without referring to unwanted directions.

10 What's on mode.

15 The device will examine the co-ordinates of all the specially identified places of interest in the immediate area, gradually working out from the present GPS location. The device will then play a short audio phrase for each activity to briefly arouse the interest of the user. The user may then select any activity and obtain further details for deliberation, after which GPS guidance will be provided to the venue on request. An auto dial telephone number may be added for use via the telephone interface, to enable reservations to be made for hotels, theatres or similar venues without the need to write down then dial the number.

25 Walking Mode v Driving Mode v Flying Mode, etc.

30 The system will adjust the presentation of messages to suit the mode of travel selected by the user and the GPS calculated speed. For example, when walking slowly around a town the user will be given more detail than when driving through the town or flying overhead.

35 Application specific modes

Certain applications may require a special mode of operation to focus the users attention on certain data, for example:

40 Walking tours in open country

45 A map provides only limited information, whereas by using a walks database GPS Explorer can provide orientation, directional guidance and can identify landmarks by name. It can also keep the casual walker entertained with a poem or music or a description of the view at the appropriate point on the walk. A group may share the audio with personal radio earpieces without the need for wire connection or noise pollution from a loudspeaker.

50 The system will orientate the user by compass bearing or turn left/right command enabling the user to be directed to a pathway or to safety. By pointing the device at a hill for example the system will retrieve the name of the hill, it's height and any hazards such as cliffs.

-7-

5 With a database of walks, giving distances and times the system will calculate from the present GPS position and time if the number of hours of daytime left are sufficient for the selected walk to be completed safely.

10 In an emergency, a distress call can be made via cellular or satellite phone, incorporating GPS position data into the audio message to aid rescue services.

15 **General Aviation Application.**

20 Having selected general aviation mode for example, the system will identify the users GPS position, altitude and speed in relation to aviation related points such as airports, restricted areas, danger areas, light aircraft routes, air traffic control boundaries and so forth. The device will then provide the pilot with audio guidance, airspace alerting or an information retrieval by voice command, accepting pilot response by voice command or in noisy cockpits by press button.

25 **Call ahead**

30 To find a telephone number when on the move can be difficult. This system provides several facilities which will help. In any mode the user has access to an audible facilities menu, providing a list of hotels, airlines and so on. When a selection has been made by the user, the system will automatically dial the telephone call using the telephone number held in the database.

40 The system uses GPS position, direction of travel and the user's pre-determined preferences to order the possible alternatives into a logical sequence for presentation to the user. For example, if the user is heading South at high speed by road, prefers a 4 star hotel and payment by AMEX the alternatives will be reduced. They will then be ranked in distance from present position. The system will then retrieve the correct telephone number ready for the user to request auto-dial telephone call for room reservation.

50 The system will also hold the users preferred credit card details on file avoiding any need to retrieve the card from a pocket while driving or flying. On the telephone, the user needs only to say "my AMEX number is" and the system will retrieve the card number data and finish the sentence for the user eg "1234 3456 567 expiry date 0695".

55

-8-

5 En route advertising could also be inserted into  
tours at specified points to provide the user with  
the facility to call ahead to reserve a table for  
dinner, order flowers, to book a hotel room or  
reserve a ferry space.

## 10 Audio Commands

15 The device may be controlled by audio commands,  
chosen by the user, to perform a range of basic  
information storage and retrieval functions. The  
user will need to select commands which he/she is  
comfortable with. Examples of these are given below:

20 Menu - plays the main menu  
OK - selects the last option stated  
Repeat - replays the last audio phrase  
X Mode - selects a specific mode  
Stop - stops the audio  
25 Start - starts the audio  
Earpiece - switches to earpiece  
Speaker - switches to loudspeaker  
Skip - skips the present audio phrase  
Position - gives position from...  
30 Distance - gives distance from start, to...  
Log on - starts a log of position data  
Log off - stops log

35 2. An audio visual version of the design will now be  
described by reference to the following drawing:

40 Figure 4. Shows a version of the audio/visual system  
based on a standard portable PC. Still and/or motion  
video sequences will be stored on GPS-CD along with  
the GPS co-ordinates described in the audio example  
above. This visual data can then be accessed in  
several modes:

### Pre-view mode:

45 Before visiting a remote location, the user may use  
the device to pre-view the various places he intends  
to visit. Any visual sequences may be retrieved and  
played simply by entering the name or lat/long of  
the desired place or by selecting it from a list  
50 given by the system.

### More detail mode:

55 In an audio mode, once audio details of a venue have  
been given by the system the user will be notified  
by a bleep or prompt if pictorial information is  
also available from the database. The user may then  
select it if required.

**Simulation mode:**

5

Having arrived at a physical location or identified it in pre-view mode, the user may access the database to obtain a computer based simulation of some aspect of the location. For example to see the route of a proposed new road or the simulated facade of a proposed new building. By walking around the physical site, as the GPS data changes so will the simulation to illustrate the simulated views from the new physical position taking into consideration the users orientation, height, direction of view, view angle of azimuth and time of day. The simulation may be presented on a display screen or any form of image projection system such as a virtual reality helmet or other device. If used in conjunction with a head up display the user will have both the present image and simulated future in view simultaneously enabling comparison.

10

15

20

25

**3. A real time version of the device will now be described.**

30

35

To enable the user to have access to up to the minute information the device incorporates a radio or television receiver to receive specially broadcast regional data transmissions. The system selects incoming data relevant to the chosen mode of use and location based on GPS calculated position. Selected data items are stored in memory in the device on receipt and then handled in the same way as other database data described earlier.

40

The real time data system could provide the user with access to and automatically search a wide range of information sources: local weather, weather reports for pilots and yachtsmen, scheduled flight delays, details of special events, hotel room availability, road conditions, audio guided diversions, financial market updates for example.

45

**4. A virtual reality version of the device will now be described.**

50

Virtual reality is a term used to describe a computer generated three dimensional image which when observed using a special form of projection system or helmet, creates the illusion of reality and allows the user to move through it and to react with computer generated objects.

55

This invention combines the real world image with computer generated images. The device obtains it's real world frame of reference from it's GPS position. This allows the device to generate virtual

-10-

5 objects so they are correctly located within the  
observers real world. The resulting computer  
generated image may then be projected into the users  
field of view using split image spectacles.  
10 Alternatively the computer generated objects may be  
overlaid on a video picture of the real world and  
the resulting composite image projected for an  
observer wearing an artificial reality helmet.

15 The device enables a fire or rescue crew visiting  
say an oil rig to superimpose structural, electrical  
or hazard data onto their real world view of the  
structure, giving them safety related information  
and audible hazard alerts.

20 The device would also enable a user visiting the  
site for a new building to see the computer  
generated image of the new building superimposed in  
the landscape. The computer generated image will  
change as the user's GPS position changes when he  
walks around the site.

#### 25 COMMERCIAL EXPLOITATION OF THE INVENTION

30 Revenue can be generated from sales of the GPS  
Explorer units, application CD's and real time  
services.

35 Sales of GPS Explorer CD's are expected to provide  
the greatest growth potential as the range of  
potential applications for the system is almost  
unlimited. Each new application will require  
companies around the world to produce new CD's for  
their market. Many Explorer CD's will incorporate  
40 details of the businesses in an area, rather like an  
interactive version of Yellow Pages. But unlike  
Yellow Pages who leave customers with the problem of  
finding the advertisers premises, the GPS Explorer  
system leads the customer to the advertiser, even if  
their premises are difficult to find, it will even  
45 dial the number automatically to enable the user to  
check requirements before going there.

50

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A personal information system comprising a global positioning receiver and a radio positioning receiver, together for constantly monitoring positioning data to determine a current location of a local user, means for generating a user message for transmission to a remote recipient, means for incorporating the position data into the user message, means for wirelessly transmitting the user message to the remote recipient, and an interface for inputting data identifying products, persons, vehicles, systems, temperatures, environmental variables or desired location.
2. The personal information system of claim 1, further comprising means for determining the orientation of the user with respect to one or more people, one or more places, one or more things, or any combination thereof.
3. The personal information system of claim 1, further comprising a visual display for orienting the user with respect to one or more people, one or more places, one or more things, or any combination thereof, by presenting visual orientation information.
4. The personal information system of claim 1, further comprising means for overlaying data or computer generated objects over a real world view of the environment or surroundings of the user.

5. A personal information system as claimed in any one of claims 1 to 4, wherein the user message is an audio message.

6. A personal information system as claimed in any one of claims 1 to 5, wherein the means for wireless transmitting the user message to the remote recipient is a cellular or satellite phone.

7. A personal information system as claimed in any one of claims 1 to 6, wherein the user message is a distress message.

8. A method of communicating wherein a remote recipient knows the location of a local user, comprising constantly monitoring global positioning (GPS) data combined with radio positioning data, together determining a current location of the local user, generating a user message for transmission to the remote recipient, incorporating the GPS position data into the user message so that the remote recipient knows the location of the local user, wirelessly transmitting the user message to the remote recipient, and inputting data identifying products, persons, vehicles, systems, temperatures, environmental variables or desired location.

9. The method of claim 8, further comprising determining orientation of the user with respect to one or more people, one or more places, one or more things, or any combination thereof.

10. The method of claim 8, further comprising orientating the user with respect to one or more people, one or more

places, one or more things, or any combination thereof, by means of displaying visual orientation information

11. The method of claim 8, further comprising overlaying data or computer generated objects over a real world view of the environment or surroundings of the user.

12. A method as claimed in any one of claims 8 to 11, wherein the user message is an audio message.

13. A method as claimed in any one of claims 8 to 12, wherein the means for wireless transmitting the user message to the remote recipient is a cellular or satellite phone.

14. A method as claimed in any one of claims 8 to 13, wherein the user message is a distress message.

15. A personal information system comprising a global positioning receiver combined with radio positioning receiver, together for constantly monitoring positioning data to determine a current location of a user, a database of characteristic data items associated with points at predetermined locations within a geographic area, and means for generating a message associated with a characteristic data item associated with a particular point when the current location of the user corresponds to that particular point,

wherein the database of characteristic items is stored remotely, and the data is retrieved by a wireless connection.

16. The personal information system of claim 15, further comprising means for determining the orientation of the user with respect to one or more people, one or more places, one or more things, or any combination thereof.

17. The personal information system of claim 15, further comprising a visual display for orienting the user with respect to one or more people, one or more places, one or more things, or any combination thereof, by presenting visual orientation information.

18. The personal information system of claim 15, further comprising means for overlaying data or computer generated objects over a real world view of the environment or surroundings of the user.

19. A personal information system as claimed in any one of claims 15 to 18, wherein the points at predetermined locations lie along a predefined route.

20. A personal information system as claimed in any one of claims 15 to 19, wherein the predefined route is a road.

21. A personal information system as claimed in any one of claims 15 to 20, wherein the message is an audio message.

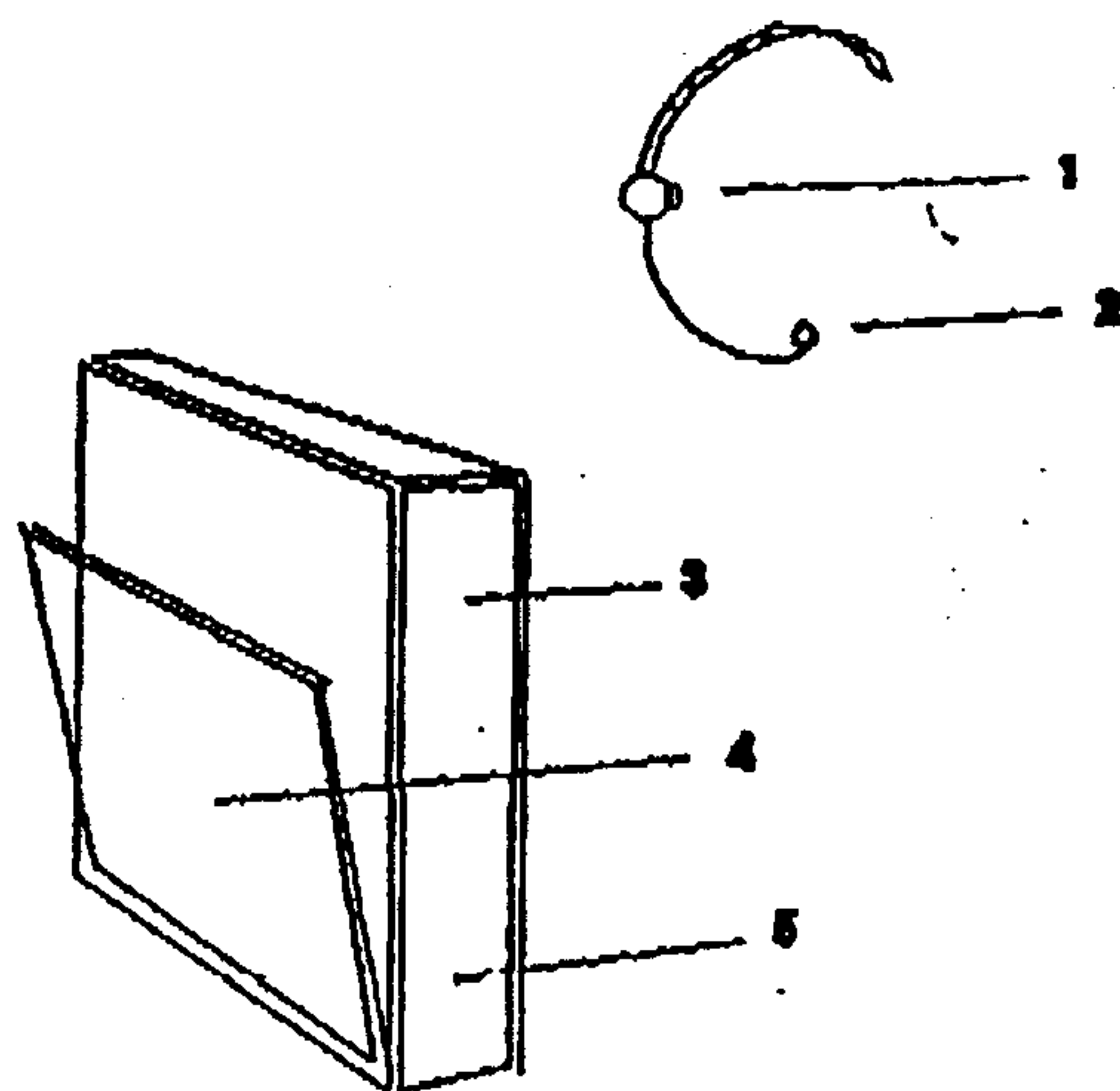
22. A personal information system as claimed in any one of claims 15 to 21, wherein the characteristic data items are points of interest geographically separated from said points at predetermined locations, and the message contains information about the point of interest corresponding to the particular predetermined point.

23. A personal information system as claimed any one of claims 15 to 18, wherein the predetermined points are associated with road junctions, and the characteristic data items are guidance information relevant to a particular road junction corresponding to the current location of the user.

24. A personal information system as claimed in claim 23, wherein the message contains hazard warning information relevant to the particular road junction.

1/4

Figure 1



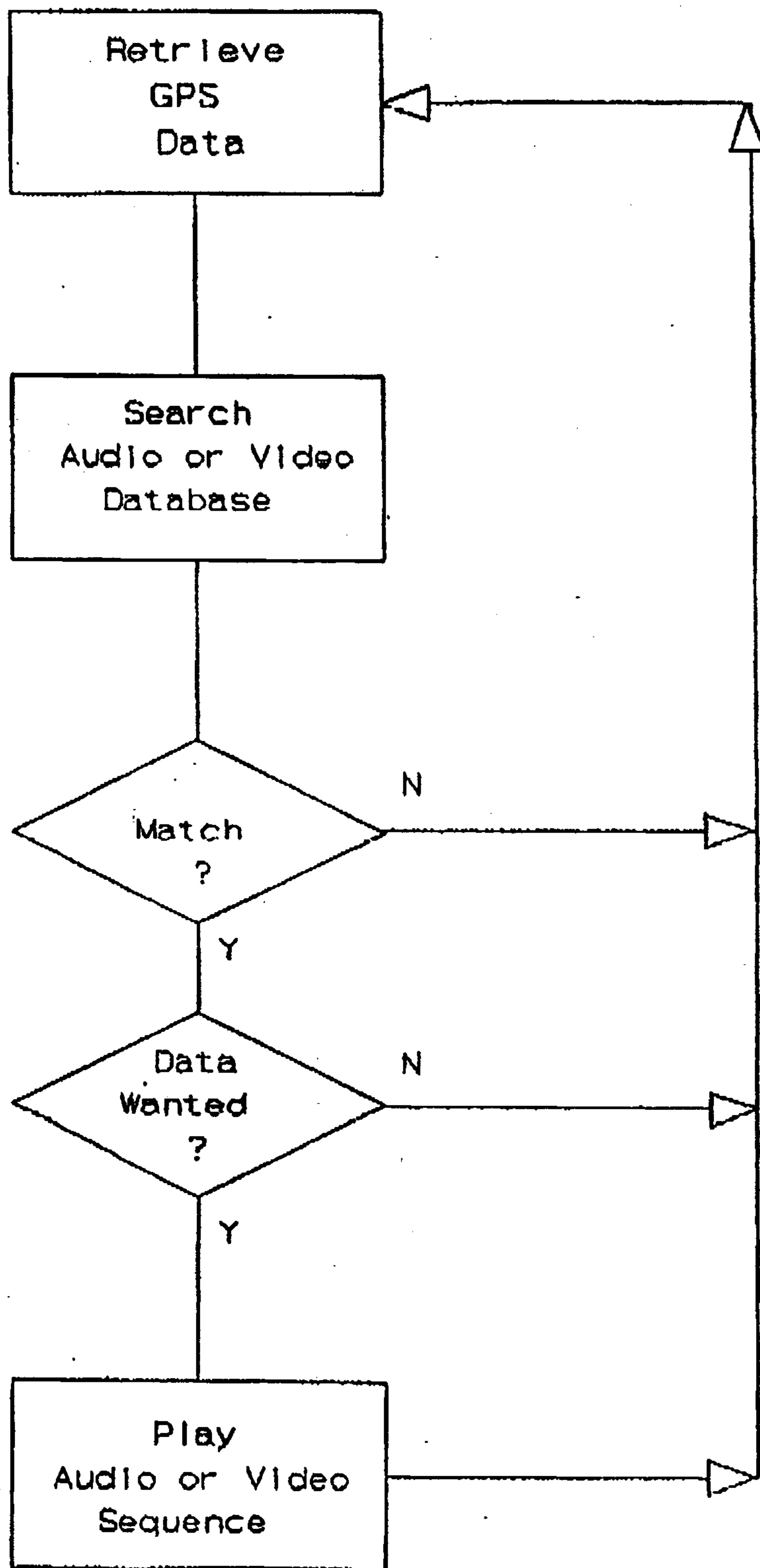


Figure 2

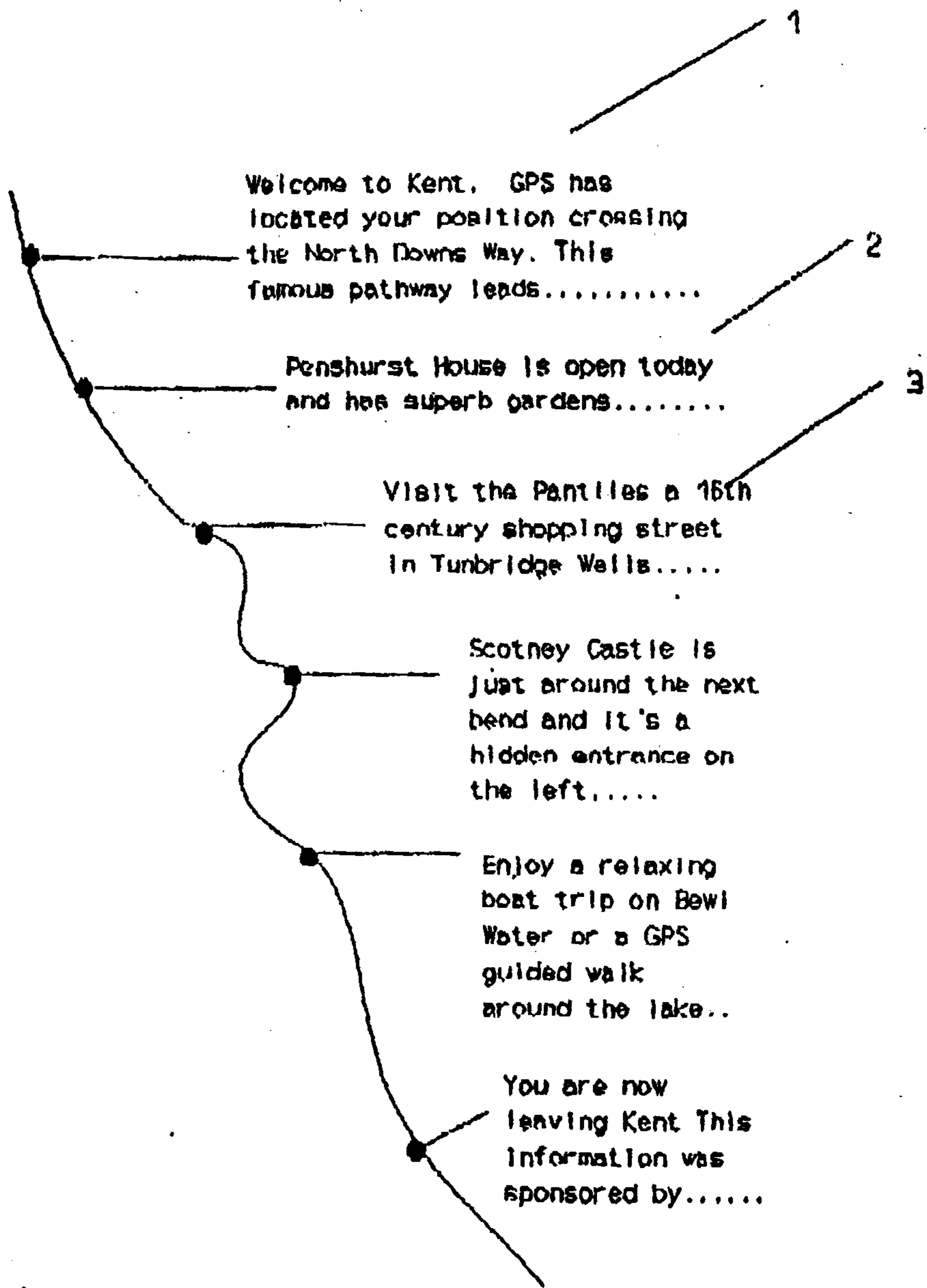
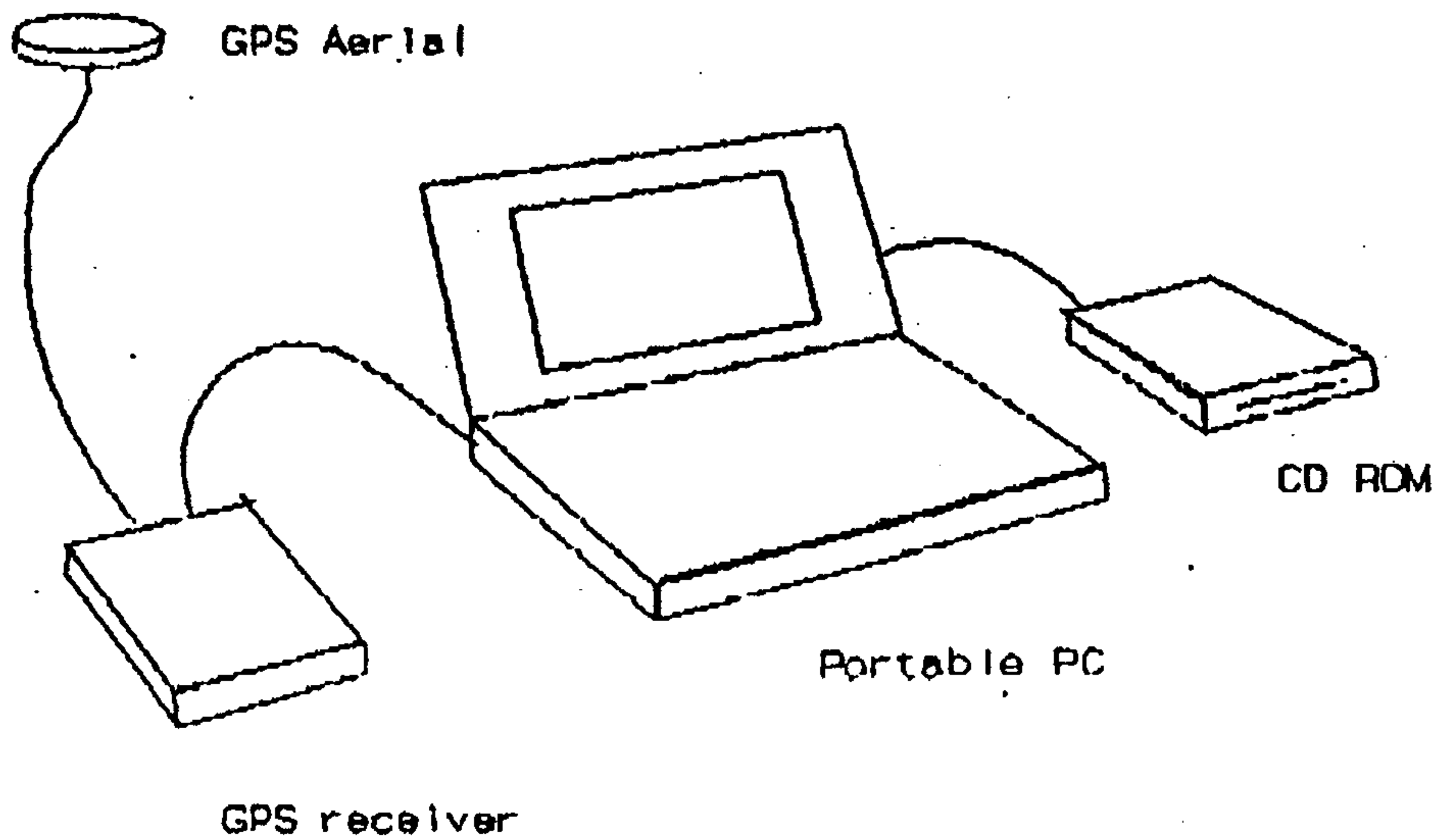


Figure 3



**Figure 4**

