

(19) World Intellectual Property Organization  
International Bureau



(43) International Publication Date  
29 November 2001 (29.11.2001)

PCT

(10) International Publication Number  
**WO 01/91414 A1**

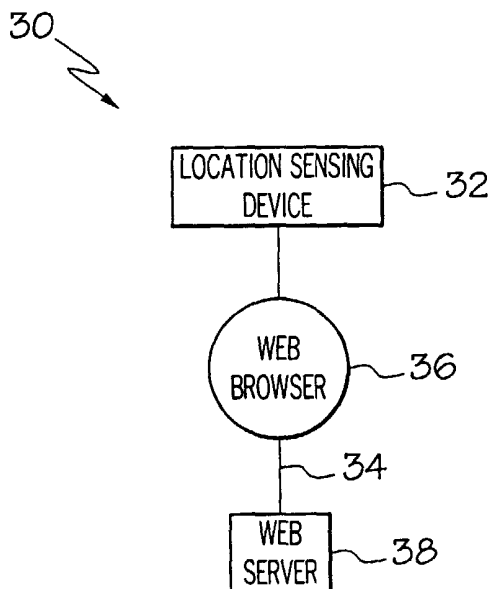
- (51) International Patent Classification<sup>7</sup>: **H04L 29/06**
- (21) International Application Number: PCT/US00/20075
- (22) International Filing Date: 24 July 2000 (24.07.2000)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:  
09/574,973 19 May 2000 (19.05.2000) US
- (71) Applicant (for all designated States except US): **MOBILE EARTH, INC.** [US/US]; 614 Melissa Drive, Oxford, OH 45056 (US).
- (74) Agents: **OBERHAUS, Geoffrey, L.** et al.; Dinsmore & Shohl LLP, 1900 Chemed Center, 255 East Fifth Street, Cincinnati, OH 45202 (US).
- (81) Designated States (national): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW.
- (84) Designated States (regional): ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

- (72) Inventors; and
- (75) Inventors/Applicants (for US only): **BECK, Richard, A.** [US/US]; 614 Melissa Drive, Oxford, OH 45056 (US). **FROHN, Robert, C.** [US/US]; Apartment 904, 405 Broadway Street, Cincinnati, OH 45202 (US).

**Published:**  
— with international search report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: METHOD AND SYSTEM FOR VIEWING LOCATION SPECIFIC DATA



(57) Abstract: Method for interacting with location specific data over a network, comprising the steps: providing a location sensing device, a communication link, and a web browser in communication with a web server, capturing location data from the location sensing device, and sending the location data to the web server. System for interaction with location specific data comprising: a location sensing device, a communication link, a web browser in communication with a web server.



WO 01/91414 A1

## Method and System For Viewing Location Specific Data

### STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

The present invention was invented to respond to NASA SBIR (Small  
Business Innovation Research) Solicitation 99-1 Subtopic no. 12.07 Earth Science  
5 Technology, "Data viewing and real-time data browse including fast general purpose  
rendering tools for scientific applications." It was confidentially disclosed to NASA  
SBIR in Mobile Earth Inc. Proposal No. 99-12.07-4198 dated July 12, 1999 and was  
awarded a Phase I contract award.

### FIELD OF THE INVENTION

10 The present invention relates generally to an information browser in which the  
information provided is location specific to the information browser; it will be  
specifically disclosed as Methods and Systems for viewing location specific data.

## BACKGROUND OF THE INVENTION

The virtual explosion of technical advances in microelectronics, digital computers and software have changed the face of modern society. In fact, these technological advances have become so important and pervasive that this explosion is sometimes referred to as "the information revolution." Through telephone lines, networks, satellite communications and the like, information and resources are ever increasingly being accessed and shared.

One of these recent technical advances is GPS, which stands for Global Positioning System. GPS is able to tell a user his exact (within a deminimus range) position on the Earth anytime, in any weather, anywhere. GPS typically has 3 components: a space segment, a user segment, and a control segment. The space segment consists of 24 satellites, each in its own orbit 11,000 nautical miles above the Earth. The user segment consists of a receiver, which is typically portable. The control segment consists of ground stations (five of them, located around the world) that make sure the satellites are working properly. GPS utilizes satellites for the positioning system. The satellites transmit signals that can be detected by anyone with a GPS receiver. The receiver is then able to determine the user's location with great precision. Hand held portable receivers are the most popular for general consumer use. Permanent-mounting receivers with large viewing screens are popular with yacht owners, blue water fishermen and pilots; they also are increasingly available as optional features on vehicles.

Typically, a GPS receiver can be connected to a laptop through a serial or parallel port, and the laptop can determine the location data and retrieve location

specific information such as recreation-area, highway and street-level maps, and points of interest for travelers and tourists from compatible CD-ROM software utilizing the location information from the GPS receiver. In addition, GPS receiving cards are available for laptops and Personal Data Assistants (PDAs). These cards plug  
5 into the laptop or PDA and utilize CD-based or stored databases on the storage medium of the laptop or PDA. The CD-ROM software is locally stored on the computer. A program running on the computer utilizes the location information from the GPS receiver to retrieve information relating to the location information from the CD-ROM storage. Mobile, real-time mapping systems based on GPS and GIS  
10 (Geographical Information Systems) and CD-ROM databases are now in common use.

However, the database information contained on the CD-ROM becomes quickly outdated and limited due to the static nature of the storage environment. There is a need for an economical system that can automatically provide a broad selection of up-  
15 to-date information relevant to the current location of the GPS receiver. For example, a mobile user may seek traffic maps, when an accident has blocked the current route. A GPS receiver connected to a frequently-updated database would be highly desirable.

As such, there remains a need for a GPS receiver connected to an Internet  
20 browser to access dynamic data from the Internet.

## SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide novel methods and systems for viewing location specific data over the Internet which overcome one or more disadvantages of the prior art. It is a more specific object of the invention to provide novel methods and systems for the dynamic viewing and retrieval of location specific data provided from the Internet.

These and additional objects and advantages are provided by the systems and methods of viewing location specific information.

The present invention provides the crucial link between GPS (Global Positioning Systems) and the Internet. It provides the power and resources possible on the Internet needed to deal with today's massive databases by querying and filtering them with respect to location and time. It further provides the missing link necessary for Internet-based, real-time tracking systems for a multitude of applications.

One aspect of the present invention is a method for interacting with location specific data over a network. The method comprises the steps of: providing a location sensing device, a communication link, and a web browser in communication with a web server utilizing the communication link, wherein the web browser comprises executable instructions for receiving location data from the location sensing device; capturing location data from the location sensing device; and sending the location data to the web server.

Another aspect of the present invention is a system for interacting with location specific data. The system comprises a location sensing device, a

communication link, a web browser in communication with a web server utilizing the communication link, wherein the web browser comprises executable instructions for receiving location data from the location sensing device and sending information data requests to the web server, wherein the information data requests relate to the location data.

5

Still other objects, advantages and novel features of the present invention will become apparent to those skilled in the art from the following detailed description, which is simply by way of illustration various modes contemplated for carrying out the invention. As will be realized, the invention is capable of other different obvious aspects all without departing from the invention. Accordingly, the drawings and descriptions are illustrative in nature and not restrictive.

10

### **BRIEF DESCRIPTION OF THE DRAWINGS**

While the specification concludes with claims particularly pointing out and distinctly claiming the present invention, it is believed the same will be better understood from the following description taken in conjunction with the accompanying drawings in which:

15

Fig. 1 depicts an example of interconnected nodes, computers and a computer readable storage medium;

20

Fig. 2 depicts a schematic illustration of a system for interacting with location specific data of the present invention;

Fig. 3 depicts a flowchart of the method of interacting with location specific data of the present invention;

Fig. 4 depicts a flowchart of the method of interacting with location specific data of the present invention;

Fig. 5 depicts a flowchart of the method of interacting with location specific data of the present invention.

## 5 DETAILED DESCRIPTION

Reference will now be made in detail to various embodiments of the invention, an example of which is illustrated in the accompanying drawings, wherein the numerals indicate the same element throughout the views.

Often computers telecommunicate between each other and share information, applications and/or services. Sometimes in this setting, the various computers are referred to as nodes, which is a generic term referring to the point in an interconnected system. One type of computer network employs a client/server architecture, wherein the portions of network applications interact with human users are typically separated from the portions of network applications that process requests and information.

10

Often, the portions of an application that interact with users or accessed network resources are called client applications or client software, and portions of an application that processes requests and information are called server applications or server software. Client machines tend to run client software and server machines tend to run server software, however, a server can be a client as well.

15

Fig. 1 schematically illustrates a sample client/server network 10 which might be employed to implement an embodiment of the present invention. As one with ordinary skill in the art will readily appreciate, a client/server network is only one type

20

of network, and a variety of other configurations, such as peer-to-peer connections, are also considered networks. In a client/server network, a plurality of nodes are interconnected such that the various nodes send and/or receive information to/from one another. As shown here, a server node (12) is interconnected with a plurality of client nodes (14) using a connection (16) such as a token ring, Ethernet, telephone modem connection, radio or microwave connection, parallel cables, serial cables, telephone lines, universal serial bus "USB", Firewire, Bluetooth, fiber optics, infrared "IR", radio frequency "RF", and the like, or combinations thereof.

A computer-readable medium, shown here as a CD ROM (18), holds information readable by a computer, such as programs, data, files, etc. As will be readily appreciated, computer-readable medium can take a variety of forms, including magnetic storage (such as hard disk drives, floppy diskettes, etc.), optical storage (such as laser discs, compact discs, DVD's, etc.), electronic storage (such as random access memory "RAM", read only memory "ROM", programmable read only memory "PROM", etc.), and the like.

The Internet and World Wide Web operate on a client/server model. The personal computer user runs a web client, or browser, on their computer. The web browser contacts a web server and requests data information, in the form of a Uniform Resource Locator (URL). URLs are typed into the browser to access web pages, and URLs are embedded within the pages themselves to provide the hypertext links to other pages. The URL contains the protocol prefix, port number, domain name, subdirectory names and file name. Port addresses are generally defaults and are rarely specified. To access a page of information on a web site, only the protocol and



domain name are required. Many browsers exist for accessing the Web. Examples of browsers include the Netscape Navigator from Netscape Communication Corp. and the Internet Explorer from Microsoft Corp. Numerous web servers exist for providing content to the World Wide Web. Examples of servers include Apache  
5 from the Apache Group, Internet Information Server from Microsoft Corp., Lotus Domino Go Webserver from IBM, Netscape Enterprise Server from Netscape Communications Corp. and Oracle Web Application Server from Oracle Corp.

A document on the web can include both Hypertext Markup Language ("HTML") files and embedded data that may be required by the HTML files.

10 Examples of embedded data includes images, video files and audio files. The web server locates and then sends the documents to the web browser, which displays the documents on the computer by interpreting the markup languages that are used to encode content on the web.

The communications protocol used to connect to servers on the World Wide  
15 Web is the HyperText Transfer Protocol (HTTP). Its primary function is to establish a connection with a web server and transmit HTML pages to the client browser.

One embodiment of the present invention, depicted in Fig. 2, is a system 30  
which can interact with location specific data. The system 30 comprises a location  
sensing device 32, a communication link 34, a web browser 36 in communication  
20 with a web server 38, wherein the web browser 36 comprises executable instructions for receiving the location data from the location sensing device 32 and sending information data requests to the web server 38, wherein the information data request relates to the location data.

In one embodiment, the web browser 36 is a standard web browser software operating on a computer. The location sensing device 32 may be attached to the web browser 36 or alternatively be incorporated into the web browser 36. Preferably, the location sensing device 32 is a GPS receiver.

5 In another embodiment, the location sensing device connects to a computer through a communication link. The communication link may comprise a token ring, Ethernet, telephone modem connection, radio or microwave connection, parallel cables, serial cables, telephone lines, universal serial bus "USB", Firewire, Bluetooth, fiber optics, infrared "IR", PCMCIA card, radio frequency "RF", and the like, or  
10 combinations thereof.

In one embodiment, the web browser 36 comprises a computer with standard web browsing software such as Internet Explorer from Microsoft Corp., and the executable instructions of the present invention. The executable instructions enable the web browser 36 to utilize location data from the location sensing device 32. The  
15 executable instructions preferably are stored on a computer readable medium. In one embodiment, the executable instructions are added to the web browser as a "plug-in" software addition, or alternatively the executable instructions could be directly incorporated into the web browser software at the time of release of the web browser software.

20 Another embodiment of the present invention, depicted in Fig. 3, is a method for interacting with location specific data over a network. The method comprises the steps of providing a location sensing device, a communication link, and a web browser in communication with a web server utilizing the communication link,

wherein the web browser comprises executable instructions for receiving location data from the location sensing device (step 40); capturing location data from the location sensing device (step 42); and sending the location data to the web server (step 44). In one embodiment, the method further comprises the step of receiving information data from the web server (step 46), wherein the information data relates to the location data. In another embodiment, the method further comprises the step of reformatting the location data from the location sensing device to conform to the web server's requirements.

Another embodiment of the present invention, depicted in Fig. 4, is a method for interacting with location specific data over a network. The method comprises the steps of: capturing real-time GPS position-defining data from a GPS receiver (step 50). The real-time GPS position-defining data from the GPS receiver is then parsed (step 52). In one embodiment, the parsed data comprises NMEA (National Marine Electronic Association) data stream, or in the alternative a proprietary GPS data received from the GPS receiver. The parsed data is then formatted into a language compatible with the web server and web browser (step 54). In one embodiment, the parsed data is formatted into markup language, such as HTML or XML. One skilled in the art of the present invention will appreciate that the markup language could be any of several known markup languages that currently exist for data exchange over a network.

In one embodiment, the method further comprises converting the Latitude/Longitude data to map projection and datum (i.e., Universal Transverse Mercator (UTM) location coordinates) (step 56). The conversions for UTM are

published in Snyder's 1987 United States Geological Society Professional Paper 1395. The converted real-time data is then sent to the web server through the web browser as part of an information request (i.e., Uniform Resource Locator (URL)) (step 58). The web browser then receives location related data from the web server (step 60) and preferably one or more display options for displaying the data. After the user selects the desired display option, the web browser displays the location related data in the format selected by the user (step 62).

Another embodiment of the present invention is the method for interacting with location specific data over a network which is depicted in Fig. 5. The method comprises providing a laptop computer, wherein the laptop computer comprises a CPU and memory (step 70). The laptop is connected to a GPS receiver. Preferably, the GPS receiver is connected through a PCMCIA card, serial port, parallel port, "USB", "IR" or "RF". The laptop further comprises a computer readable storage medium, wherein the storage medium contains executable instructions for receiving location data from the location sensing device. After capturing the real-time data from the GPS receiver (step 72), the executable instructions determine whether the data is in NMEA format or a proprietary format (step 74). If the data is in NMEA format, the executable instructions parse the comma delimited ASCII characters that are the NMEA data to obtain the location information in Latitude and Longitude measurements (step 76). If the data is in a proprietary format, the executable instructions parse the non-NMEA character or binary data to obtain the location information in Latitude and Longitude measurements (step 78). The data is then formatted into markup language (step 80). The executable software then determines

whether the location data needs to be converted into UTM coordinates for the web server (step 82). If so, the executable instructions convert the latitude and longitude measurements into UTM coordinates (step 84). Then the executable instructions determine whether to present the location data from the location sensing device in a browser (step 86). If so, the executable instructions construct a web page with markup language to display via a web browser the location data from the location sensing device (step 88). The executable instructions may further comprise a toggle selection to toggle between sending data to remote web servers or choose to isolate the mobile unit from sending data to any remote web servers (step 90). If the transmission of data to remote web servers is permitted, the executable instructions may prepare a uniform resource locator (URL) query (step 92). For example, this query may be addressed to an Internet Map Server to provide mapping data corresponding to the location data. In another embodiment, the query may comprise a request to search a database for certain items within a certain proximity. The executable instructions may format the location data to conform to the web server's query requirements (step 94). The executable instructions instruct the web browser to send the information data request to the appropriate web server (step 96). The web server retrieves the appropriate data from data stores and sends the data to the web browser over the communication link (step 98). The web browser determines which type of presentation to present the data to the consumer (step 100), and presents the data to the consumer in the selected display mode. For example, the presentation of the retrieved data may comprise visual or audio information (step 102), or

alternatively may comprise a graphical map downloaded from an Internet Map Server (IMS) (step 104).

The specific embodiments set forth herein are for illustrative purposes only and are not intended to limit the scope of the methods and fabrics of the invention.

5 Additional methods and systems within the scope of the claimed invention will be apparent to one of ordinary skill in the art in view of the teachings set forth herein.

We claim:

1. A method for interacting with location specific data over a network, comprising the steps of:  
providing a location sensing device, a communication link, and a web browser in communication with a web server utilizing the communication link, wherein the web browser comprises executable instructions for receiving location data from the location sensing device;  
capturing location data from the location sensing device; and  
sending the location data to the web server.
2. The method of claim 1, further comprising the step of:  
receiving information data from the web server, wherein the information data relates to the location data.
3. The method of claim 1, wherein the location data comprises latitude and longitude data.
4. The method of claim 3, wherein the step of sending the location data to the web server comprises:  
reformatting the location data from the location sensing device to conform to the web server's format requirements.

5. The method of claim 4, wherein the step of reformatting data comprises converting the location data to map coordinate data.
6. The method of claim 2, wherein the step of receiving information data from the web server comprises:
- receiving one or more options for displaying the information data from the web server;
  - 5 selecting a display option;
  - sending the selected option to the web server;
  - receiving the information data corresponding to the selected display option from the web server;
  - displaying the information data from the web server.
7. The method of claim 4, wherein the step of reformatting the location data comprises:
- formatting the location data in mark-up language; and
  - converting the location data from latitude and longitude data to map
- 5 coordinate data.
8. The method of claim 1, wherein the executable instructions comprise a browser plug-in.



9. The method of claim 1, wherein the location sensing device comprises a GPS receiver.
10. A system for interaction with location specific data, comprising:  
a location sensing device;  
a communication link; and  
a web browser in communication with a web server utilizing the  
5 communication link, wherein the web browser comprises executable instructions for receiving location data from the location sensing device and sending information data requests to the web server, wherein the information data requests relate to the location data.
11. The system of claim 10, wherein the location sensing device comprises a GPS receiver.
12. The system of claim 10, wherein the communication link comprises a wireless Internet connection.
13. A computer-readable medium containing instructions for controlling a computer system to interact with a user for interactive collection and distribution of information relating to location specific data, comprising the steps of:  
capturing location data from a location sensing device;  
5 sending the location data in an information page request to a web server; and

receiving the requested information page relating to the location data.

14. The computer-readable medium of claim 13, further comprising instructions for:

reformatting the location data from the location sensing device into a format compatible with the web server.

15. A computer data signal embedded in a carrier wave for transmitting executable instructions for the interactive collection and distribution of information relating to location specific data, the signal comprising the instructions of:

capturing location data from a location sensing device;

5 sending the location data in an information page request to a web server; and receiving the requested information page relating to the location data.

16. The computer data signal of claim 15, further comprising the instructions of receiving the requested information page relating to the location data.

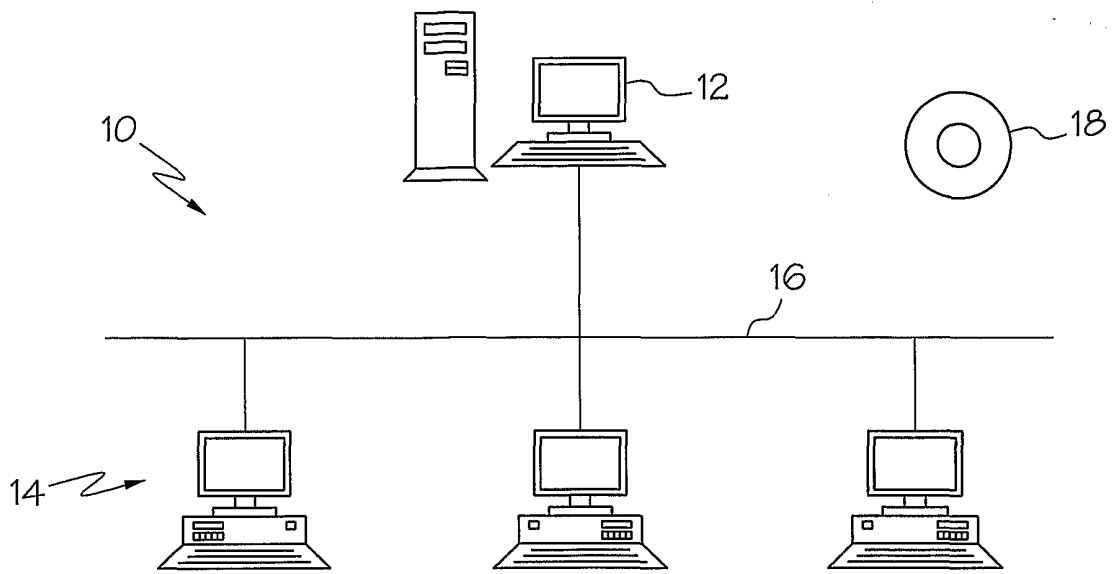


FIG. 1

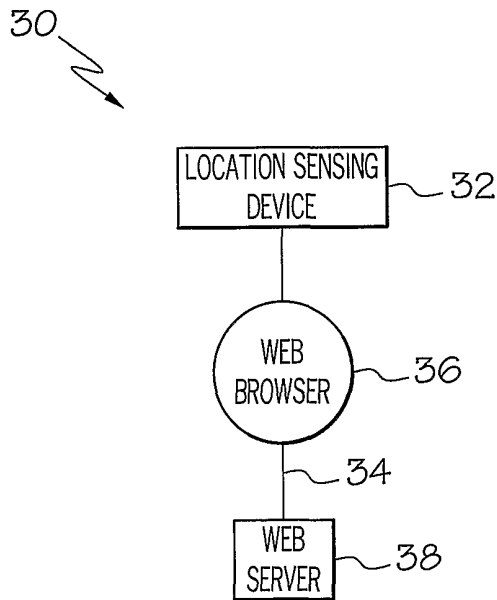


FIG. 2

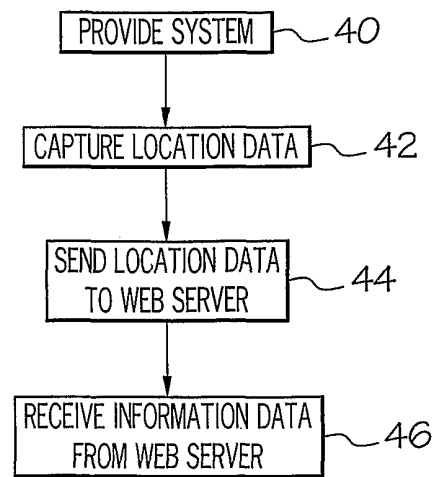


FIG. 3

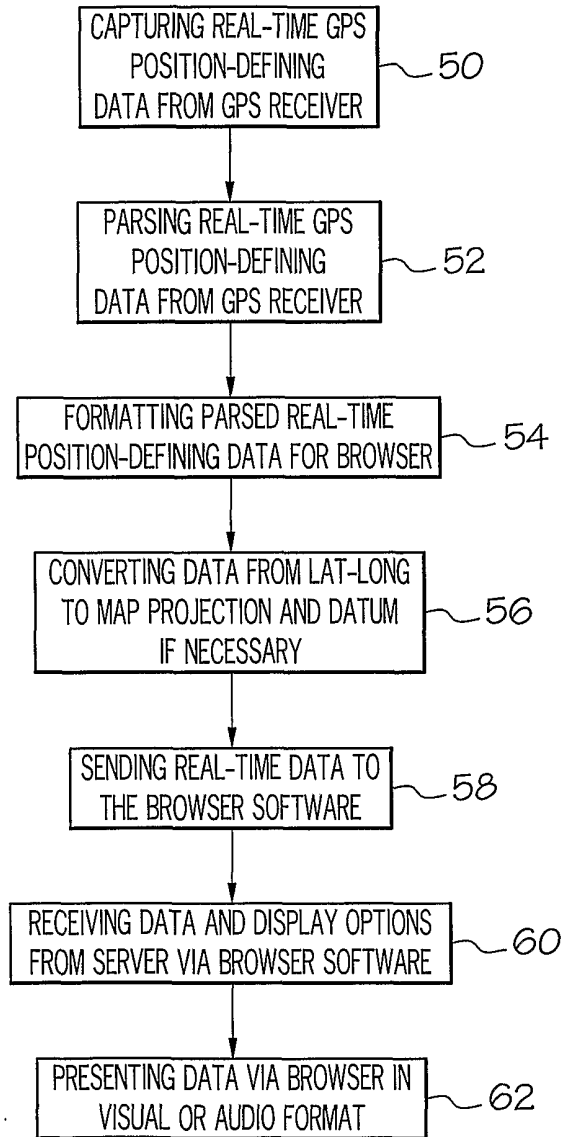


FIG. 4

3 / 4

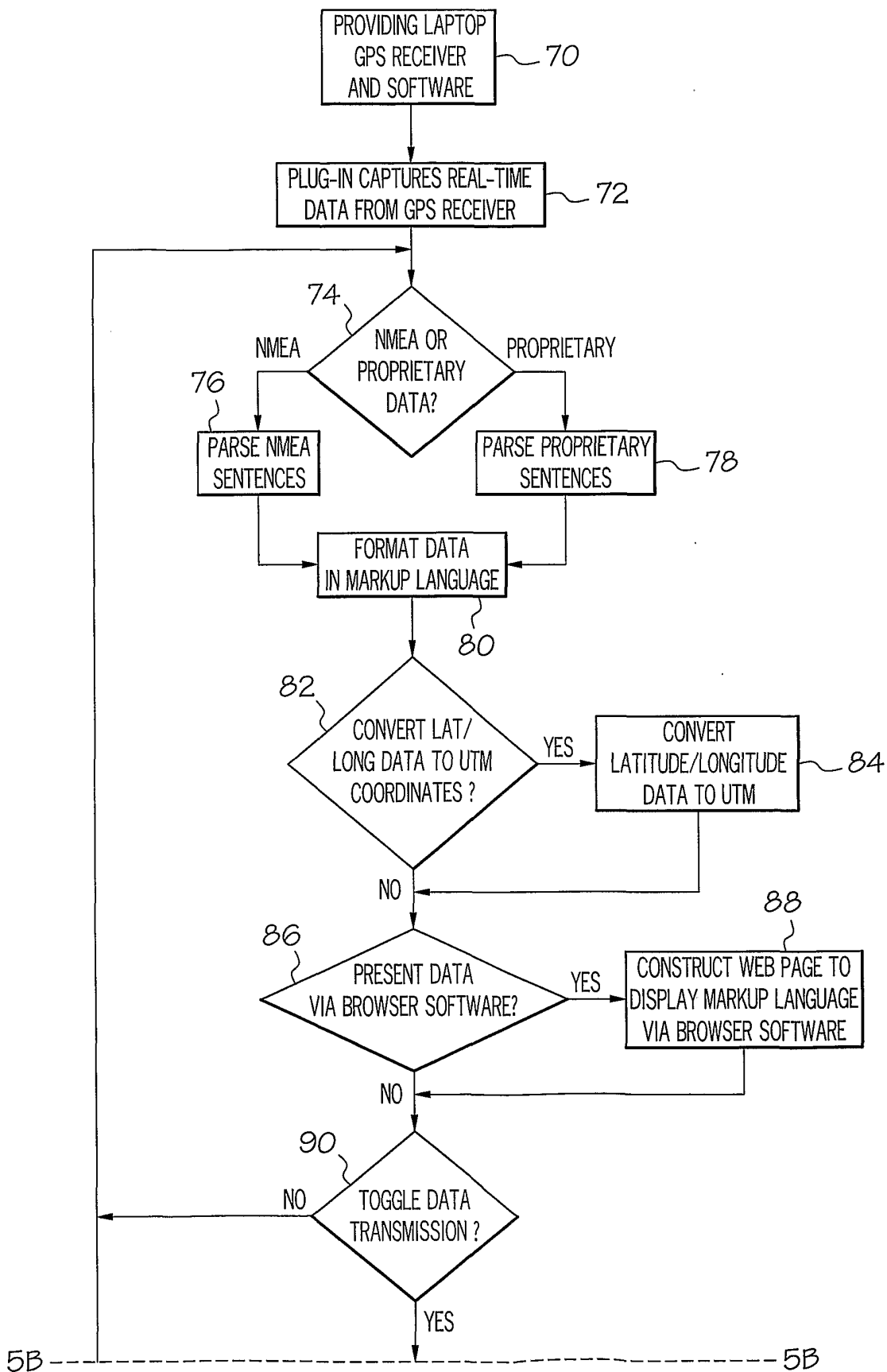


FIG. 5A

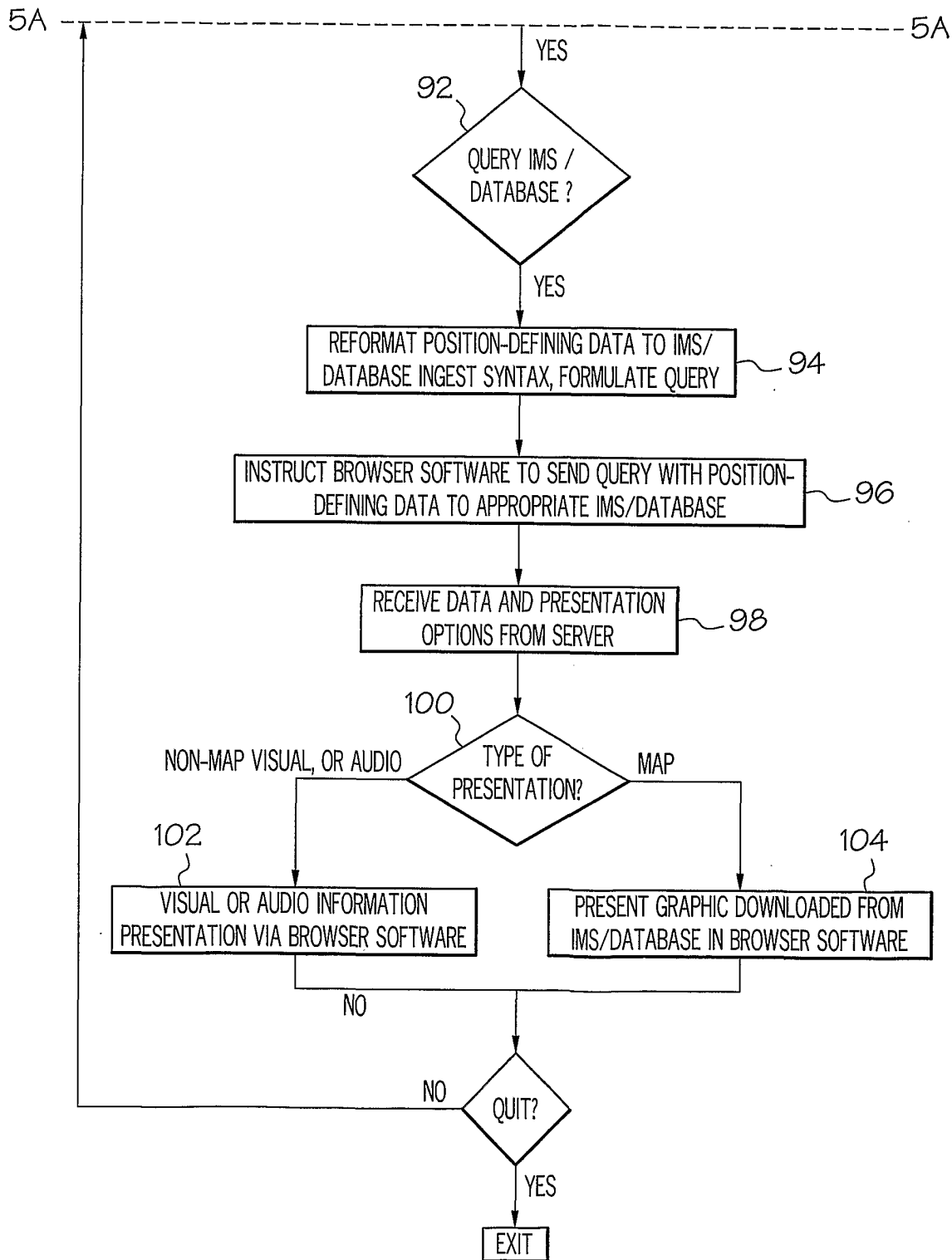


FIG. 5B

INTERNATIONAL SEARCH REPORT

International Application No

PCT/US 00/20075

A. CLASSIFICATION OF SUBJECT MATTER  
IPC 7 H04L29/06

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

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
IPC 7 H04L H04Q G06F

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

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ, INSPEC, IBM-TDB

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 97 07467 A (PHELAN SEAN) 27 February 1997 (1997-02-27) page 1, line 18 - line 27 page 6, line 34 -page 7, line 9 page 8, line 26 -page 9, line 1 page 9, line 14 - line 19 page 9, line 28 - line 34 page 13, line 3 - line 11 page 13, line 28 -page 14, line 7 page 15, line 7 - line 14	1-16
X	WO 99 56144 A (SNAPTRACK INC) 4 November 1999 (1999-11-04) page 4, line 21 - line 31 page 25, line 3 -page 32, line 22 --- -/--	1-6,9-16

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

° Special categories of cited documents :

- \*A\* document defining the general state of the art which is not considered to be of particular relevance
- \*E\* earlier document but published on or after the international filing date
- \*L\* document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- \*O\* document referring to an oral disclosure, use, exhibition or other means
- \*P\* document published prior to the international filing date but later than the priority date claimed

- \*T\* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
- \*X\* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
- \*Y\* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.
- \*Z\* document member of the same patent family

Date of the actual completion of the international search

7 February 2001

Date of mailing of the international search report

15/02/2001

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Tous Fajardo, J

## INTERNATIONAL SEARCH REPORT

Int ional Application No

PCT/US 00/20075

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	EP 0 785 535 A (MITSUBISHI ELECTRIC CORP) 23 July 1997 (1997-07-23) column 2, line 22 - line 45 column 4, line 15 - line 23 column 4, line 56 -column 5, line 2 column 5, line 24 - line 33 -----	1-16



# INTERNATIONAL SEARCH REPORT

Information on patent family members

In: International Application No

PCT/US 00/20075

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9707467      A	27-02-1997	AU      708387 B	05-08-1999
		AU      6749496 A	12-03-1997
		CA      2229733 A	27-02-1997
		DE      69608453 D	21-06-2000
		EP      0845124 A	03-06-1998
WO 9956144      A	04-11-1999	AU      4181099 A	16-11-1999
		AU      4181199 A	16-11-1999
		WO      9956143 A	04-11-1999
EP 0785535      A	23-07-1997	CA      2189515 A	17-07-1997
		JP      9257501 A	03-10-1997