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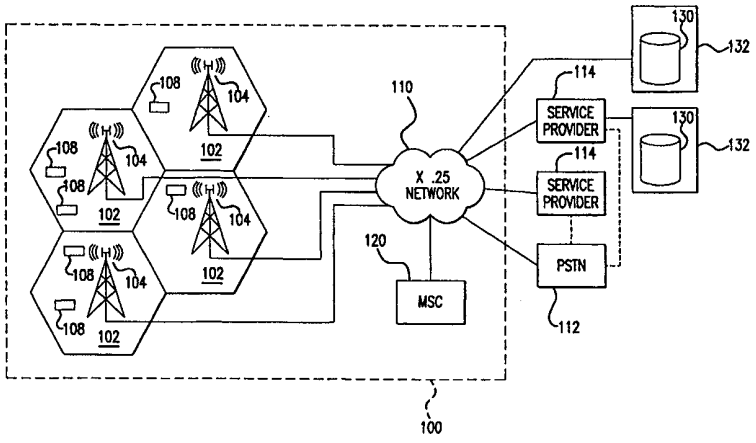

(57) Abstract

A method and system for providing localized information to a uniquely identifiable two–way wireless communications device via a wireless communications system that includes a plurality of cell sites that are coupled to a communications network. The method of the present invention includes the steps of receiving a request from a first two–way wireless communications device via a first cell site, identifying the first cell site, determining information correlated to the request and the first cell site, and sending a response to the first device based on the information. In one embodiment, the first cell site is identified based on the request. In an alternative embodiment, the first cell site is identified by identifying a first unique identifier of the first device based on the request, and by accessing a database that correlates cell sites and unique identifiers to thereby determine the identity of the first cell site based on the first unique identifier. In one embodiment, the step of determining the information includes the steps of determining first information relating to the request and determining second information relating to the first cell site. The information is then determined based on the first information and the second information. The first information can, for example, specify a class of information. The second information can be, for example, location information.

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METHOD AND SYSTEM FOR PROVIDING LOCALIZED INFORMATION

Background of the Invention

Field of the Invention

The present invention relates generally to a wireless paging system, and more particularly, to a method and system for sending localized information to a two-way paging device.

Related Art

Conventional wireless paging systems are typically one-way communication systems that can only send messages in a forward direction from a service provider to a subscriber's paging device. Because these one-way paging systems have no knowledge of the locations of paging devices, each message is distributed to all paging transmission facilities of a service provider, which can cover a geographic area such as North America. Each facility then transmits the message so that if an addressed paging device is within a coverage area of one of the transmitters, the message will be delivered to the paging device. This type of one-way paging system is often called a broadcast paging system. The message capacity of such a broadcast paging system is not used efficiently because each message is transmitted by every transmission facility in the system, but only one transmission facility will actually deliver the message to the subscriber's paging device. Therefore, the majority of the message traffic of any given transmitter will typically be occupied by messages addressed to pagers that are not within the coverage area of the transmitter. Accordingly, subscriptions to broadcast-type nationwide paging services are relatively expensive.

The messages sent in these one-way paging systems can be intended for one subscriber or for multiple subscribers. For example, a message intended for one subscriber's paging device may inform that subscriber that a third party is attempting to contact them. These paging devices are generally tuned to a predetermined frequency that is shared with many other paging devices. The reception of a particular message by a paging device activates an acoustic,

vibrating, or visible alert, thereby indicating to the subscriber that a message has been received. One of the many disadvantages of these one-way paging systems is that they are not capable of verifying whether a message was received by a subscriber's paging device.

The addressability of a one-way paging device is determined by a unique identifier stored within the pager. The unique identifier may be considered analogous to a telephone number. For historical reasons, it is often referred to as a "capcode" because in early paging devices, a code number was printed on a cap that fit on top of the pager. The capcode is typically a four or seven digit number. This number is used by the paging system to generate the right sequence of tones to alert a specific paging device. In other words, the capcode is the unique serial number that paging system transmitters transmit to notify a paging device of an incoming message.

Examples of one-way paging messages intended for multiple subscribers include headline news, sports scores, and financial information. More specifically, companies such as Mobeo, Inc. (formerly DocuPro, Inc.) of Bethesda, Maryland, provide real-time quotes of financial instruments, energy instruments, world metal markets, and late-breaking news. A subscriber of Mobeo can receive such message information using a one-way paging device such as the ADVISOR™ Gold pager manufactured by Motorola, Inc. of Schaumburg, Illinois. The same message information is broadcast by every transmission facility of the wireless data network supporting Mobeo. As discussed above, the addressability of a one-way paging device is determined by its capcode. These capcodes can be reprogrammed such that multiple paging devices have the same capcode. Thus, when multiple paging devices are programmed to have same capcode, each paging device can receive the message information broadcast by the transmitters. So long as a paging device having the Mobeo specific cap code is within a coverage area of one of the transmitters, the message can be received by the paging device.

A disadvantage of these one-way paging systems is that unauthorized parties can reprogram capcodes in order to receive information without

subscribing to a service. Thus, service providers can lose significant revenue if these reprogrammed paging devices are distributed.

Another disadvantage of these one-way paging systems is that they do not verify whether a paging device has received a message.

A further disadvantage of these one-way paging systems is that the message information sent to the multiple subscribers is not tailored to the interests of each subscriber. Rather the message information is generally created to appeal to a broad spectrum of subscribers regardless of their individual interests and/or needs. For example, if individuals subscribe to a nationwide sports paging service, the message information may include the final results of the current day's baseball games because this type of information would probably appeal to a broad spectrum of subscribers. However, since the performance of a Baltimore Orioles' player is probably not of interest to a subscriber located in Seattle, such information cannot be economically provided to a Baltimore subscriber. That is, it would be a very inefficient use of valuable airtime for a service provider to transmit information relating to a Baltimore player from every transmission facility in a nationwide system. More generally, it is not efficient to send an information to the entire coverage area of a nation wide paging service where the information is only of interest to subscribers in one specific geographic area

Still another disadvantage of these one-way paging systems is that subscribers pay the same amount for a service whether they desire information only once a day or fifty time a day. This may cause a service provider to lose revenue from customers that want only minimal information and are thus unwilling to pay for full service. Accordingly, it would be beneficial for a service provider to charge relative to the extent of a subscriber's use of service.

Attempts have been made to overcome some of the above disadvantages. For example, limited two-way wireless communications have been added to paging systems that were designed to handle one-way paging. For example, Motorola has developed the ReFLEX™ Protocol for two-way paging. A primary use of ReFLEX is to enable a paging device to send an acknowledgment (ACK)

message indicating that a message has been received. This increases the reliability of a paging system because a message can be resent until an ACK message has been received. However, since ReFLEX was designed to modify an existing one-way FLEX™ protocol, its two-way capabilities are somewhat limited. For example, for messages originating at a paging device, ReFLEX support data rates of only 800, 1600, 6400, or 9600 bits per second (bps). Additionally, it typically takes on the order of a few minutes, from the time a message is sent to a paging device, to receive an ACK message using ReFLEX. Accordingly, ReFLEX has not satisfactorily overcome most of the above discussed disadvantages. More generally, ReFLEX has not proved acceptable for real time two-way communications.

More robust two-way wireless paging systems include the BellSouth Wireless Data network (also known as the RAM Mobile Data network) and the ARDIS network. These networks provide two-way paging using paging devices such as the Inter@active Pager™ manufactured by Research In Motion (RIM), Limited, of Waterloo, Ontario, Canada. This RIM two-way pager provides fast two-way delivery of full-length, error-free, alphanumeric messages with guaranteed delivery. For example, when using the RIM pager with the BellSouth Wireless Data network or the ARDIS network, an acknowledgment message is received within a few seconds of the original message being sent. Thus, such networks and paging devices are beginning to provide two-way wireless paging services that have not previously been available.

Additional details of the BellSouth and ARDIS networks are publically available. For example, U.S. Patent No. 5,526,401, entitled *"Method and Apparatus for Acknowledging A Paging Message Via A Cellular Network Control Channel"*, and U.S. Patent No. 5,797,097, entitled *"Method and Apparatus for Identifying the Location of a Roaming Pager"*, both of which are assigned to BellSouth Corporation, of Atlanta, Georgia, and both of which are incorporated herein by reference, provide additional details of the BellSouth network.

Two-way paging devices are addressed through the use of unique identifiers. Some identifiers are programmable and others are hard coded and fixed in a paging device. A programmable and/or hard coded identifier can be used to address a specific paging device. Because a two-way paging device transmits messages that include these unique identifiers, fraud is more likely to be detected.

There is a need to overcome the above discussed disadvantages. More specifically there is a need to cost effectively and efficiently provide subscribers with information specific to their needs and/or desires when the subscribers need and/or desire such information.

Summary of the Invention

The present invention is directed toward a method and system for providing localized information to a uniquely identifiable two-way wireless communications device via a wireless communications system that includes a plurality of cell sites that are coupled to a communications network, wherein each cell site has a corresponding coverage area. The method of the present invention includes the steps of receiving a request from a first two-way wireless communications device via a first cell site, identifying the first cell site, determining information correlated to the request and the first cell site, and sending a response to the first device based on the information. In one embodiment, the first cell site is identified based on the request. In an alternative embodiment, the first cell site is identified by identifying a first unique identifier of the first device based on the request, and by accessing a database that correlates cell sites and unique identifiers to thereby determine the identity of the first cell site based on the first unique identifier.

In another embodiment, the step of determining the information includes the steps of determining first information relating to the request and determining second information relating to the first cell site. The information is then

determined based on the first information and the second information. The first information can, for example, specify a class of information. The second information can, for example, specify a location of a cell site.

A first location of the first cell site can be determined by accessing a location database that provides location related information for each of the plurality of cell sites. The information can then be determined based on the first location and the request.

In yet another embodiment, a first class relating to the request can be determined. Then, by accessing a class database that provides a plurality of classes of information for each of the plurality of cell sites, the information can be determined based on the first class and the first cell site. The class database can include, for example, class information such as weather, sports, movie listings, restaurant information, business and government listings, emergency address/phone numbers, public transportation information, airline schedules, and automatic teller machine locations.

Brief Description of the Figures

The features, objects, and advantages of the present invention will become more apparent from the detailed description set forth below when taken in conjunction with the drawings in which like reference characters identify corresponding elements throughout and wherein:

FIG. 1 illustrates an exemplary wireless communication system in which the present invention is useful;

FIG. 2 illustrates an exemplary two-way paging device for use with the present invention;

FIG. 3 illustrates a table that maps cell sites and their corresponding location coordinates and/or zip codes;

FIG. 4 illustrates a table that maps location coordinates and classes of information;

FIG. 5 illustrates a table that maps zip codes and classes of information;

FIG. 6 illustrates a table that maps cell sites and classes of information;

FIGS. 7A and 7B illustrate portions of request messages for use with the present invention;

FIG. 8 illustrates a table that maps cell sites with unique identifiers of paging devices;

FIG. 9 illustrates an alternative table that maps cell sites with unique identifiers of paging devices;

FIG. 10 is a flowchart depicting the high level operation of an embodiment of the present invention; and

FIGS. 11-14 are flowcharts depicting additional features of the operation of the present invention.

Detailed Description of the Preferred Embodiments

I. Introduction

The present invention is particularly suited for use in two-way wireless communications systems. The method and system of the present invention support the efficient transmission of localized information to a two-way paging device upon receiving a request for such information from the paging device.

A preferred embodiment of the invention is discussed in detail below. While specific steps, configurations and arrangements are discussed, it should be understood that this is done for illustrative purposes only.

II. Exemplary Two-Way Wireless Communications System

An exemplary wireless communication system 100 in which the present invention is useful is illustrated in FIG. 1. Communications system 100 includes

a plurality of cell sites102 each having a coverage area that is typically about 5 to 10 miles in diameter. A coverage area of one cell site often overlaps a portion of a coverage area of another cell site, which are illustrated for exemplary purposes by the hexagonal regions. Each cell site 102 includes an antenna 104 for transmitting and receiving paging messages to and from two-way wireless paging devices 108 that are located within a geographic coverage area of the cell site 102. Alternatively, separate antennas may be used for sending and receiving messages, as would be apparent to a person skilled in the relevant art. Each cell 102 is coupled to communications network 110, which in a preferred embodiment is an X.25 packet switched network. Communications network 110 may include, but is not limited to, land based links such as fiber optics or terrestrial microwave, and/or satellite based links, as would also be apparent to a person skilled in the relevant art.

Each cell site 102 is in communications with a message system center (MSC) 120 that includes a subscriber database that maintains records of all subscribers on the system, a unique identity sequence for the subscriber's paging device, and an indication of the cell site from which the paging device last sent a message (such as an acknowledgment message). Preferably, communications between each cell cite 102 and MSC 120 is accomplished through communications network 110. Alternatively, each cell site 102 can have a dedicated link to MSC 120.

Communications network 110 can be coupled to public switched telephone network (PSTN) 112 so that a caller can use PSTN 112 to send a message to paging device 108, and vice versa.

A message can also be sent from one paging device 108 to another paging device 108 using communications system 100.

Messages transmitted to paging device 108 from antenna 104 of cell site 102 shall be referred to herein as forward channel messages or pages. Messages originating at paging device 108 and received by antenna 104 of cell site 102 shall be referred to herein as reverse channel messages.

In a preferred embodiment, communications system 100 is the Bell South Wireless Data network (also known as the RAM Mobile Data network) or the ARDIS network, which are both well known two-way nationwide wireless packet data networks.

Two-way wireless communications device 108 (also referred to herein as a paging device) typically identifies itself to MSC 120 by sending a registration or identification signal. Such signals include a data field including at least one unique identifier, such as a Mobile Identification Number (MIN) and/or Electronic Serial Number (ESN). A MIN, which can be reprogrammed, is analogous to a telephone number. An ESN is hard-coded and fixed such that it difficult, if not impossible to change. Some devices include both a MIN and an ESN. The paging device used in the preferred embodiment of the present invention, discussed in more detail below, only includes one unique identifier, known as a Mobile Access Number (MAN), which is similar to an ESN in that it is hard-coded and fixed. The identification signal sent by paging device 108 can include one or more of the above discussed unique identifiers. Such identification information can be periodically transmitted by paging device 108 and/or included with other types of messages sent by paging device 108.

An optional function of MSC 120 is to determine whether the unique identifier of a paging device is valid. A received unique identifier, such as a unique identity sequence comprising a string of digitally represented alphanumeric characters, can be compared to a database maintained of unique identifiers (*i.e.*, MIN, ESN, MAN) to detect fraud.

MSC 120 can keep track of the approximate whereabouts of each paging device 108 by keeping track of which cell site 102 a message, sent by a paging device 108, originated. When MSC 120 is thus informed of the approximate whereabouts of each individual paging device 108, it can later limit the number of cell sites 102 from which it transmits a message addressed to a particular paging device 108. MSC 120 can even limit the transmission of a message to only one cell site 120 having a coverage area within which the particular paging device 108

is believed to be located. The coverage area of a limited number of cell cites 102 (possibly only a single cell site or a last know site and its adjacent sites) shall be referred to as a targeted coverage area. Thus, the targeted area can be the area covered by a single cell site or a slightly larger area that is also covered by a few adjacent cell sites. This limited or "targetted paging" is much more efficient than broadcast-type paging where a message is transmitted from every cell site, regardless of a location of a paging device 108 to which the message is addressed.

Service providers 114 are supported by communications system 100. That is, communications system 100 provides for message delivery between a service provider 114 and one or more paging devices 108. Service providers 114 can communicate directly with paging devices 108 or indirectly with paging devices 108 via communications network 110. Alternatively, service providers 114 can communicate with communications network 110 through PSTN 112. In one embodiment, service providers 114 provide information to a paging device 108 upon receiving a request from the paging device 108. Additionally, service providers 114 can initiate the sending of information to a paging device 108. This can be done periodically or upon a triggering event. Additional details about the types of services and the information provided by services providers 114 are discussed below.

Service providers 114 maintain or otherwise have access to local or remote databases that store and/or provide various types of data. FIG. 1 shows remote databases 130 that are maintained by data sources 132. Service provider 114 can communicate with data sources 132 through dedicated links or through communications network 110, for example. The type and number of databases, and the form of communication of data between the service providers 114 and the databases, is implementation specific.

The invention covers the ability of a service provider system to provide information to paging devices (*i.e.*, uniquely identifiable two-way wireless communications devices) via a wireless communications system, which typically has a plurality of cell sites that are coupled to a communications network. The

functions performed by the service provider system can comprise software running on one or more general purpose computers or on telecommunications-specific hardware. Alternatively, the combination of the software and hardware to accomplish the functions of the present invention can be conceptualized as a union of service provider controllers that each perform a discrete task, such as: receiving requests from paging devices; receiving or determining an identity of a first cell site transferring a request from a paging device; determining information correlated to the request and the first cell site; sending, to the first device, a response to the request based on such information, or the like. Two or more of these discrete tasks can be performed by a single service provider controller. Alternatively, four discrete tasks can be performed by any number of service provider controllers. A further description of exemplary software and hardware controllers is provided below.

III. Exemplary Two-Way Paging Device

An exemplary two-way wireless paging device 108 is illustrated in FIG. 2. Paging device 108 includes antenna 202, transmitter 204, receiver 206, microprocessor 208, display 210 and keypad 212. Transmitter 204 is controlled by microprocessor 208 to transmit through antenna 202 reverse channel messages. Forward channel messages received from a transmitter of the communications system 100 are received through antenna 202 or a separate antenna (not shown). The received messages are routed from antenna 202 to receiver 206 and processed by microprocessor 208, for example. Display 210 can be a liquid crystal display and is used for displaying, to a user (also referred to as subscriber) of paging device 108, information received via communications system 100. Display 210 can also display lists and/or menus from which a subscriber can make selections and preform various functions. Other methods of presenting the received information, such as aurally through a speaker or through another type of display, are not precluded. Keypad 212 can include as few as one button, but may also

include an entire alphanumeric keypad. In a preferred embodiment, paging device 108 is an Inter@ctive™ Pager 950 manufactured by Research In Motion (RIM), Limited, of Waterloo, Ontario, Canada. The RIM Inter@ctive pager (RIM pager) is a commercially available device that provides for two-way wireless communications. The RIM pager includes a 31-key keypad, a roller wheel that is similar to a mouse, and a screen display with 8 lines of text by approximately 28 characters per line. Of course the use of other two-way cellular paging devices is within the spirit and scope of the present invention.

IV. Preferred Embodiment of the Invention

A. Mapping Cell Sites with Location Information

FIG. 3 illustrates a table 300 that maps cell sites 108 and their corresponding location coordinates and/or zip codes. In one embodiment, table 300 includes a cell site column 302, a longitude/latitude column 304, and a zip code column 306. Table 300 can be created and maintained by a service provider 114 or by the provider of communications network 100 (*i.e.*, BellSouth or ARDIS). For example, table 300 can be maintained within MSC 120. It is anticipated that table 300 is maintained within a database that can be updated as additional cell sites are added, for example in one or more of the databases 130. The location information for completing table 300 can be obtained directly from the provider of communications system 100 or can be obtained from public Federal Communications Commission (FCC) records. Zip code information can be obtained from the U.S. postal service or through other sources such as telephone books. It is anticipated that cell sites can be mapped to other location related information, besides longitude/latitude coordinates and zip codes, without departing from the spirit and scope of the present invention.

Network providers such as BellSouth and ARDIS are able to provide service providers with information relating to two-way paging devices supported

by the network. For example, network providers are capable of providing service providers with the cell site information (for example, a cell site number) of each active two-way paging device. This is discussed below in more detail in the descriptions of FIGS. 8 and 9.

B. Mapping Location Information with Class Information

A main feature of the present invention is to provide localized information to two-way pager subscribers. In order to achieve this "localized" aspect of the invention, the general location of a subscriber must be determined. In a preferred embodiment, service provider 114 maintains one or more tables, or the like, that correlate (*e.g.*, map) location-related information with various classes of information such as weather, sports, movie schedules, restaurant information, business and government listings, emergency address/phone numbers, public transportation information, airline schedules, automatic teller machine locations, and the like. Localized sales and advertisements are also potential information classes. It is anticipated that these tables are maintained in databases. In one embodiment, service provider 114 determines the class information by accessing external databases 130 that are maintained by external data sources 132.

FIGS. 4-6 illustrates exemplary tables that can be maintained by a service provider 114. In FIG. 4, longitude/latitude coordinates are mapped with different classes of information. More specifically, column 402 includes longitude/latitude coordinates, column 404 includes weather information, column 406 includes sports information, and column 408 includes movie information. The weather, sports, and movie information in row 410 correspond to a location having longitude X_1 and latitude Y_1. For example, for location X_1/Y_1, the current weather and/or forecast is W_1. Similarly, for location X_2/Y_2, the current weather and/or forecast is W_2. Because adjacent locations may have the same weather, it is possible that W_1 may equal W_2. However, where two locations are far apart, it is

most likely that the weather in the two locations are different. For example, W_1 is probably different from W_5.

Location X_1/Y_1 can be within the city of Baltimore while location X_5/Y_5 can be within a suburb of Seattle. Accordingly, information S_1 can relate to Baltimore sports teams, such as the Orioles or Ravens, where information S_5 can relate to Seattle sports teams, such as the Mariners or Seahawks.

Similarly, information M_1 can relate to movies schedules of theaters within the proximity of X_1/Y_1, while information M_3 can relate to movies schedules of theaters within the proximity X_3/Y_3. Depending the distance between X_1/Y_1 and X_3/Y_3, M_1 and M_3 can be identical, can include some of the same information, or can be completely different.

Topics such as weather, sports, and the like shall be referred to herein as classes of information. The information provided within table 400, such as W_2 and S_3, can include the actual weather or sports scores or can be related to an address of an external database that includes such information. In a preferred embodiment, where W_2 includes actual information relating to current and/or forecasted weather for location X_2/Y_2, table 400 must be updated in a timely manner. This can be accomplished by interfacing the database maintaining table 400 with an external database that provides realtime weather information. Such a database can be maintained by the organizations such as the National Weather Service. Many variations for organizing and updating the localized data will be apparent to a person skilled in the relevant art without departing from the sprit or scope of the present intention.

In an alternative embodiment, as illustrated in table 500 of FIG. 5, zip codes are mapped with the various classes of information. FIG. 6 illustrates a further embodiment where the cell sites are directly mapped with the various classes of information.

C. Mapping Paging Devices with Cell Sites

FIGS. 7A and 7B illustrate exemplary request messages that are generated by paging device 108. In FIG. 7A, request message 700 includes portions 702 and 704. Portion 702 specifies a unique identifier (for example, a MAN or ESN) of paging device 108. Portion 704 specifies the class of information that was requested by a user of paging device 108. In another embodiment, shown in FIG. 7B, the request message 700 also includes portion 706 which specifies a cell site from which request message 700 was sent. The cell site information can be added to the request by the provider of communications system 100. For example, the cell site information can be provided by MSC 120 before the request is forwarded to service provider 114. Additionally, request message 700 can include a server address (not shown) of service provider 114. In a preferred embodiment, this server address is coded into an application running on paging device 108. In this manner, when a user sends a request message 700 the server address is automatically included as part of the request message.

Cell site information can be maintained in a database of the provider of communications system 100 (such as BellSouth). This database, maintained at MSC 120 for example, can map unique identifiers of paging devices 108 with cell sites 102. MSC 120 can keep track of the whereabouts of each paging device 108 by keeping track of which cell site 102 a message, sent by a paging device 108, originated. Examples of tables that can be stored in such a database are shown in FIGS. 8 and 9. FIG. 8 shows table 800 which includes MAN column 802 and cell site column 804. Alternatively, FIG. 9 shows table 900 which includes cell site column 902 and MANs column 904. For example, row 906 of table 900 indicates that paging devices having MAN_1 and MAN_5 are within the coverage area of cell site 1. This cell site information can be added to a request message 700 before MSC forwards the message to service provider 114. Alternatively, service provider 114 can determine which cell site's coverage area paging device 108 is

within by requesting such cell site information from MSC 120 via communications network 110.

D. Description of Flow Diagrams

The method according to the present invention provides information to uniquely identifiable two-way wireless communications devices. FIGS. 10-14 are high level flow diagrams that illustrate the method of the present invention in a wireless communications system including a plurality of cell sites that are coupled to a communications network. Each cell site has a corresponding coverage area as described above.

Turning now for FIG. 10, the method of the invention begins when a request from a first two-way wireless communications device (two-way pager) is received over the communications network via a first cell site, as shown at a step 1002. The first cell site must be identified, as shown at a step 1004. The identity of the cell site can be provided automatically to the service provider 114 by the network 110 when the request is first relayed by the network 110, or the service provider 114 can request the cell site information after the request is received. An example of how the cell site identification is provided is described above in connection with FIGS. 7A, 7B, 8 and 9. The service provider then determines or otherwise looks-up an item of information that is correlated to both the request and the first cell site, as shown at a step 1006. This correlation is described above in connection with FIGS. 3-6. Finally, a response to the request is sent to the first device based on the information derived from the request itself and the cell site. Alternative and more detailed steps of the method of FIG. 10 are described in connection with FIGS. 11-14.

As alluded to in the previous paragraph, one way to identify the (first) cell cite is based on the request itself. This is illustrated at 1102 of FIG. 11A. Alternatively, a first unique identifier of the first device (pager) can be determined using the request, as shown at a step 1104. A database is then accessed that

correlates cell sites and unique identifiers, as shown at a step 1106. The first unique identifier can be determined via a mobile access number (MAN) or an electronic serial number (ESN), as shown at a step 1108.

Step 1106, determining information correlated to the request and the first cell site, can be accomplished in many ways. Three alterative method embodiments are illustrated in FIGS. 12, 13 and 14. In FIG. 12, a first item of information related to the request itself is isolated, as shown at a step 1202. Then the isolated first item of information, along with the first cell site identity, is used to map information for a response, as shown at a step 1204.

Alternatively, a second item of information relating to the first cell site is determined, as shown at a step 1302. This second information can be determined, for example, by accessing a location database that provides location-related information for a plurality of cell sites, as shown at a step 1306. Accessing the location database determines a first location of the first cell site, as shown at a step 1308. Using the first and second items of information a response is generated, as shown at a step 1304. For example, information for a response can be generated based on the first location and the first information, as shown at a step 1310.

Still another method of determining information correlated to the request and the first cell site can be accomplished as illustrated in FIG. 14. A first class (*e.g.*, sports scores, movie schedules, etc.) relating to the request is determined, as shown at a step 1402. A class database is then accessed that provides a plurality of classes of information for each of the plurality of cell sites, as shown at a step 1402. Finally, information for a response is determined based on the first class and the first cell site, as show at a step 1406.

E. Hardware and Software Implementations

Service provider 114 can perform specific features of the present invention using service provider controllers, which in effect comprise a computer system. Such a computer system includes, for example, one or more processors that are

connected to a communication bus. Although telecommunication-specific hardware can be used to implement the present invention, the following description of a general purpose computer system is provided for completeness.

The computer system can also include a main memory, preferably a random access memory (RAM), and can also include a secondary memory. The secondary memory can include, for example, a hard disk drive and/or a removable storage drive, representing a floppy disk drive, a magnetic tape drive, an optical disk drive, and the like. The removable storage drive reads from and/or writes to a removable storage unit in a well known manner. The removable storage unit, represents a floppy disk, magnetic tape, optical disk, and the like, which is read by and written to by the removable storage drive. The removable storage unit includes a computer usable storage medium having stored therein computer software and/or data.

The secondary memory can include other similar means for allowing computer programs or other instructions to be loaded into the computer system. Such means can include, for example, a removable storage unit and an interface. Examples of such can include a program cartridge and cartridge interface (such as that found in video game devices), a removable memory chip (such as an EPROM, or PROM) and associated socket, and other removable storage units and interfaces which allow software and data to be transferred from the removable storage unit to the computer system.

The computer system can also include a communications interface. The communications interface allows software and data to be transferred between the computer system and external devices. Examples of communications interfaces include, but are not limited to a modem, a network interface (such as an Ethernet card), a communications port, a PCMCIA slot and card, etc. Software and data transferred via the communications interface are in the form of signals which can be electronic, electromagnetic, optical or other signals capable of being received by the communications interface. These signals are provided to communications

interface via a channel that can be implemented using wire or cable, fiber optics, a phone line, a cellular phone link, an RF link, and the like.

In this document, the terms "computer program medium" and "computer usable medium" are used to generally refer to media such as removable storage device, a hard disk installed in a hard disk drive, and signals. Computer program products are means for providing software to the computer system.

Computer programs (also called computer control logic) are stored in the main memory and/or secondary memory. Computer programs can also be received via the communications interface. Such computer programs, when executed, enable the computer system to perform certain features of the present invention as discussed herein. In particular, the computer programs, when executed, enable the processor to perform features of the present invention. Accordingly, such computer programs represent controllers of the computer system.

In an embodiment where the invention is implemented using software, the software can be stored in a computer program product and loaded into the computer system using the removable storage drive, the hard drive or the communications interface. The control logic (software), when executed by the processor, causes the processor to perform certain functions of the invention as described herein.

In another embodiment, features of the invention are implemented primarily in hardware using, for example, hardware components such as application specific integrated circuits (ASICs). Implementation of the hardware state machine so as to perform the functions described herein will be apparent to persons skilled in the relevant art(s).

In yet another embodiment, features of the invention can be implemented using a combination of both hardware and software.

V. Conclusion

While various embodiments of the present invention have been described above, it should be understood that they have been presented by way of example, and not limitation. It will be apparent to persons skilled in the relevant art that various changes in form and detail can be made therein without departing from the spirit and scope of the invention. Thus the present invention should not be limited by any of the above-described exemplary embodiments, but should be defined only in accordance with the following claims and their equivalents. All cited patent documents and publications in the above description are incorporated herein by reference.

What Is Claimed Is:

1. In a wireless communications system including a plurality of cell sites that are coupled to a communications network, a method of providing information to uniquely identifiable two-way wireless communications devices, comprising the steps of:

(a) receiving a request over the communications network from a first two-way wireless communications device via a first cell site;

(b) identifying said first cell site;

(c) determining information correlated to said request and said first cell site; and

(d) sending, to said first device, a response to said request based on said information.

2. The method of claim 1, wherein step (b) comprises:

(i) identifying said first cell site based on said request.

3. The method of claim 1, wherein step (b) comprises:

(i) identifying a first unique identifier of said first device based on said request; and

(ii) accessing a database that correlates cell sites and unique identifiers, to thereby determine the identity of said first cell site based on said first unique identifier.

4. The method of claim 3, wherein step (b)(i) comprises determining a mobile access number (MAN) or an electronic serial number (ESN) corresponding to said first device.

5. The method of claim 1, wherein step (c) further comprises the step of:

(i) determining first information relating to said request.

6. The method of claim 5, wherein step (c) further comprises the step of:

(ii) determining said information based on said first information and said first cell site.

7. The method of claim 5, wherein step (c) further comprises the step of:

(ii) determining second information relating to said first cell site; and

(iii) determining said information based on said first information and said second information.

8. The method of claim 7, wherein step (c)(ii) further comprises the steps of:

accessing a location database that provides location related information for each of the plurality of cell sites; and

determining a first location of said first cell site.

9. The method of claim 8, wherein step (c)(iii) comprises:

determining said information based on said first location and said first information.

10. The method of claim 1, wherein step (c) comprises:

(i) determining a first class relating to said request; and

(ii) accessing a class database that provides a plurality of classes of information for each of the plurality of cell sites; and

(iii) determining said information based on said first class and said first cell site.

11. The method of claims 1, wherein step (d) comprises the step of:

(i) transmitting said information to said first device via said first cell site.

12. The method of claim 3, wherein the step (d)(i) comprises transmitting said first information via only said first cell site.

13. The method of claim 8, wherein said location database cross-references cell sites with latitude/longitude information.

14. The method of claim 8, wherein said location database cross-references cell sites with zip codes.

15. The method of claim 10, wherein said class database includes class information selected from the group consisting of weather, sports, movie listings, restaurant information, business and government listings, emergency address/phone numbers, public transportation information, airline schedules, and automatic teller machine locations.

16. A system for providing information to uniquely identifiable two-way wireless communications devices via a wireless communications system having a plurality of cell sites that are coupled to a communications network, the system comprising:

a first service provider controller adapted to receive a request from a first two-way wireless communications device via a first cell site;

a second service provider controller adapted to one of receive or determine an identity of said first cell site;

a third service provider controller adapted to determine information correlated to said request and said first cell site identity; and

a fourth service provider controller adapted to send, to said first device, a response to said request based on said information.

17. The system of claim 16, wherein said second service provider controller is adapted to identify said first cell site based on said request.

18. The system of claim 16, wherein said second service provider controller is adapted to:

(i) identify a first unique identifier of said first device based on said request; and

(ii) access a database that correlates cell sites and unique identifiers, to thereby determine the identity of said first cell site based on said first unique identifier.

19. The system of claim 18, wherein said access is preformed using a mobile access number (MAN) or an electronic serial number (ESN) corresponding to said first device.

20. The system of claim 16, wherein said third service provider controller is adapted to determine first information relating to said request.

21. The system of claim 20, wherein said third service provider determines said information based on said first information and said first cell site.

22. The system of claim 21, wherein said third service provider controller is adapted to:

(ii) determine second information relating to said first cell site; and

(iii) determine said information based on said first information and said second information.

23. The system of claim 22, wherein said third service provider controller is further adapted to:

access a location database that provides location related information for each of the plurality of cell sites; and

determine a first location of said first cell site.

24. The system of claim 23, wherein said third service provider controller is adapted to determine said information based on said first location and said first information.

25. The system of claim 16, wherein said third service provider controller is adapted to:

(i) determine a first class relating to said request;

(ii) access a class database that provides a plurality of classes of information for each of the plurality of cell sites; and

(iii) determine said information based on said first class and said first cell site.

26. The system of claims 16, wherein said fourth service provider controller is adapted to transmit said information to said first device via said first cell site.

27. The system of claim 18, wherein said third service provider controller is adapted to transmit said first information via only said first cell site.

28. The system of claim 23, wherein said location database cross-references cell sites with latitude/longitude information.

28. The system of claim 23, wherein said location database cross-references cell sites with zip codes.

30. The system of claim 25, wherein said class database includes class information selected from the group consisting of weather, sports, movie listings, restaurant information, business and government listings, emergency address/phone numbers, public transportation information, airline schedules, and automatic teller machine locations.

31. A system for providing information to uniquely identifiable two-way wireless communications devices via a wireless communications system having a plurality of cell sites that are coupled to a communications network, the system comprising:

first means for receiving a request from a first two-way wireless communications device via a first cell site;

second means for one of receiving or determining an identity of said first cell site;

third means for determining information correlated to said request and said first cell site identity; and

fourth means for sending, to said first device, a response to said request based on said information.

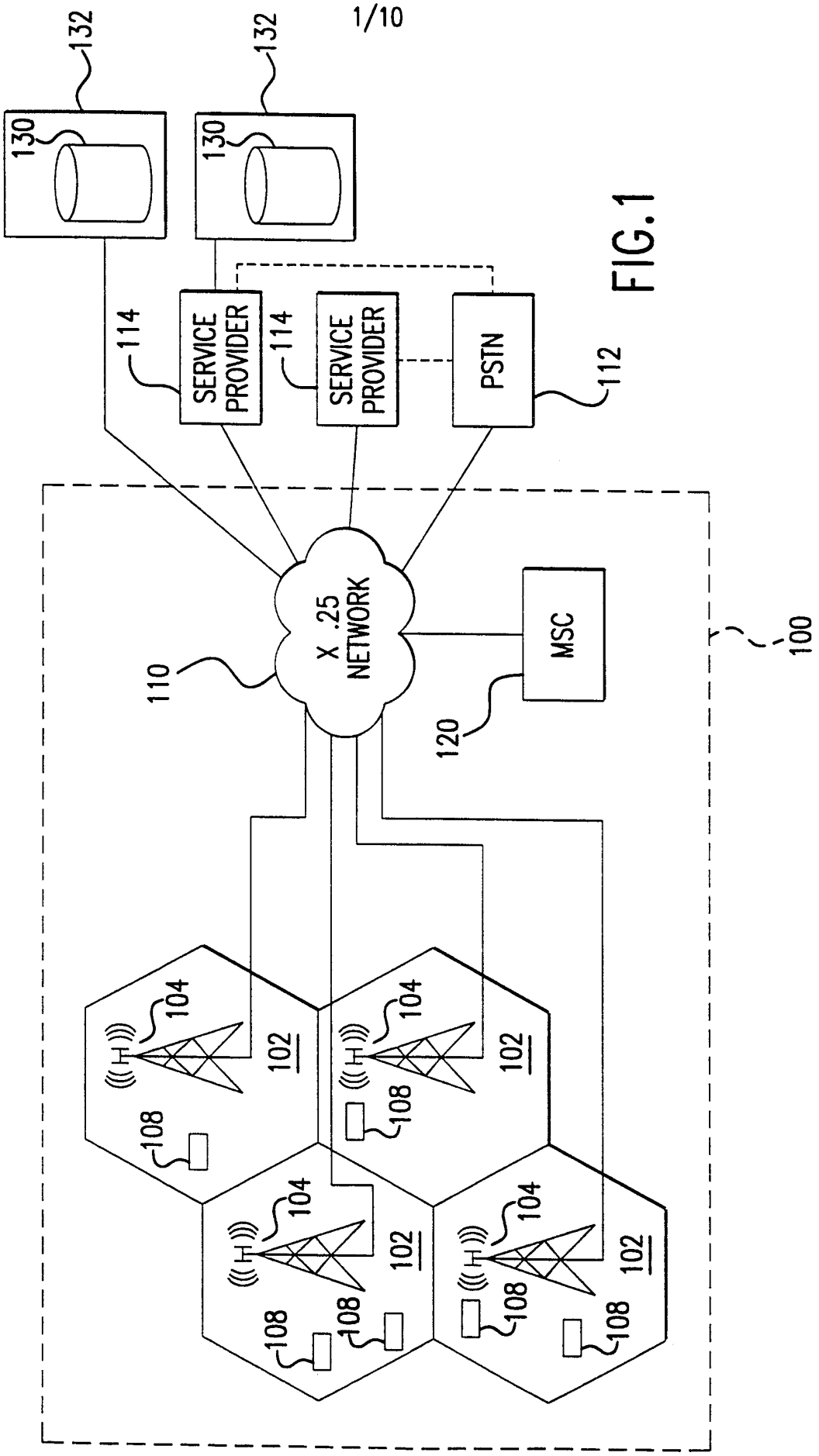
132
132
130
130
114
114
SERVICE PROVIDER
SERVICE PROVIDER
PSTN
112
X .25 NETWORK
110
MSC
120
100
104
102
108

FIG.1

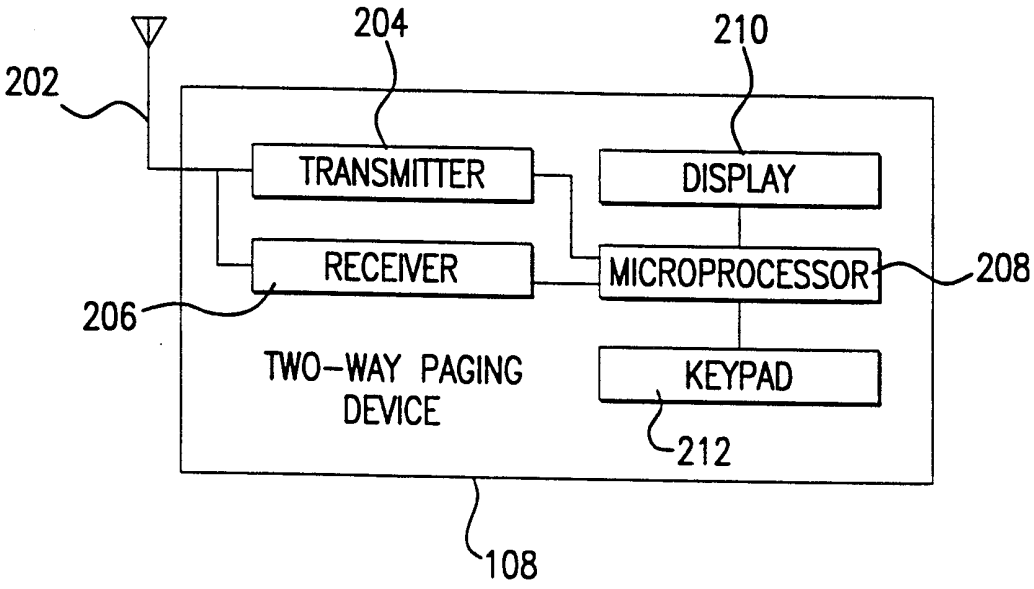

FIG.2

302 CELL SITE	304 LONGITUDE/LATITIUDE	306 ZIP CODE
1	X_1/Y_1	Z_1
2	X_2/Y_2	Z_2
3	X_3/Y_3	Z_3
4	X_4/Y_4	Z_4
5	X_5/Y_5	Z_5
•	•	•
•	•	•
N	X_N/Y_N	Z_N

300

FIG.3

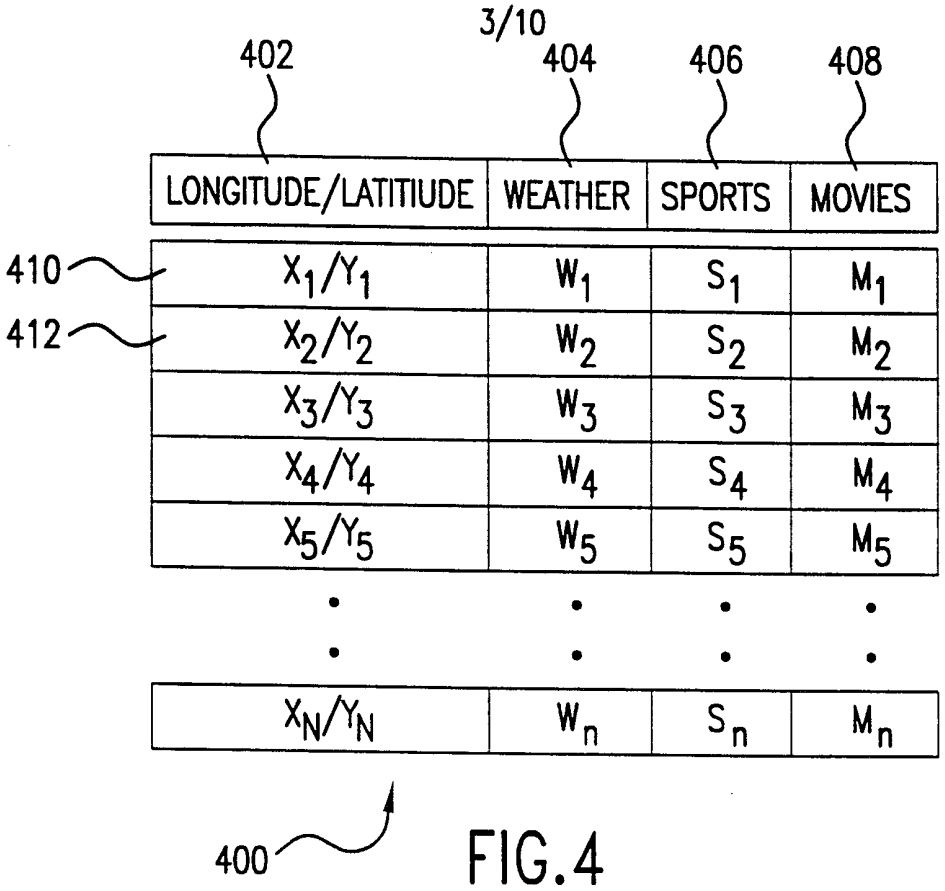
402
404
406
408
LONGITUDE/LATITIUDE
WEATHER
SPORTS
MOVIES
410
412
X_1/Y_1 W_1 S_1 M_1
X_2/Y_2 W_2 S_2 M_2
X_3/Y_3 W_3 S_3 M_3
X_4/Y_4 W_4 S_4 M_4
X_5/Y_5 W_5 S_5 M_5
X_N/Y_N W_n S_n M_n
400

FIG.4

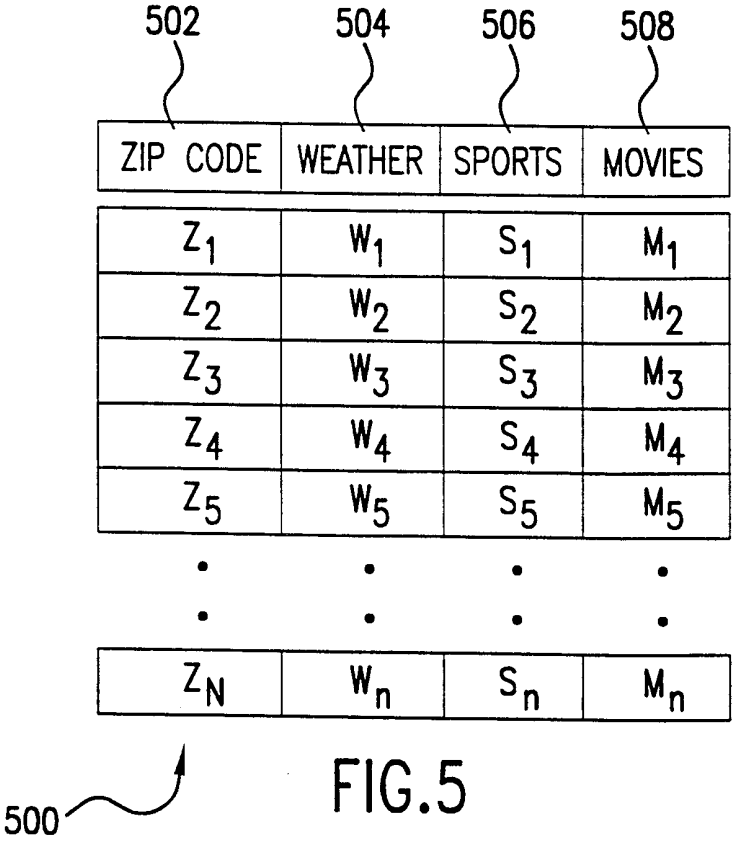
502
504
506
508
ZIP CODE
WEATHER
SPORTS
MOVIES
Z_1 W_1 S_1 M_1
Z_2 W_2 S_2 M_2
Z_3 W_3 S_3 M_3
Z_4 W_4 S_4 M_4
Z_5 W_5 S_5 M_5
Z_N W_n S_n M_n
500

FIG.5

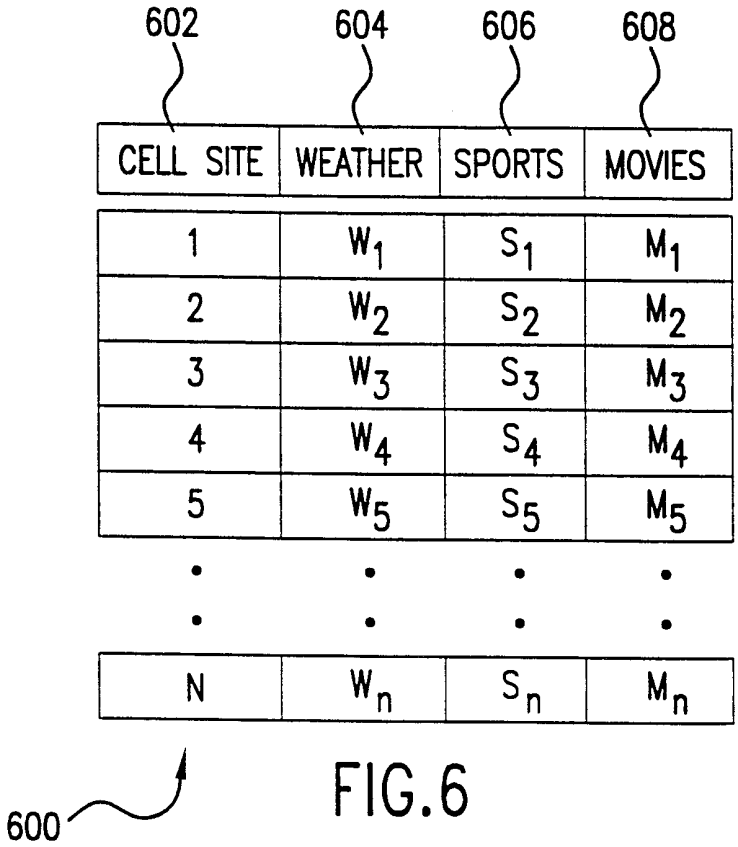
602
604
606
608
CELL SITE
WEATHER
SPORTS
MOVIES
1
W1
S1
M1
2
W2
S2
M2
3
W3
S3
M3
4
W4
S4
M4
5
W5
S5
M5
N
Wn
Sn
Mn
600

FIG.6

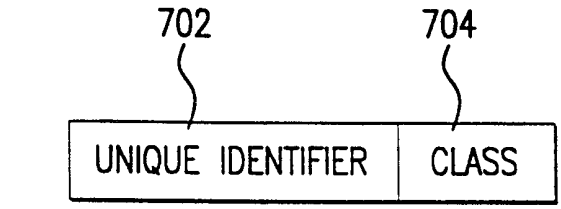
702
704
UNIQUE IDENTIFIER
CLASS
700

FIG.7A

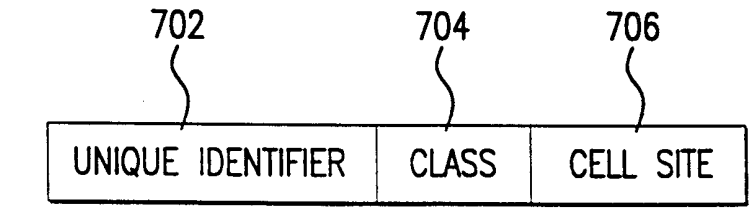
702
704
706
UNIQUE IDENTIFIER
CLASS
CELL SITE
700

FIG.7B

802 804

MOBILE ACCESS NUMBER (MAN)	CELL SITE
MAN_1	4
MAN_2	22
MAN_3	3
MAN_4	13
MAN_5	N
•	•
•	•
MAN_n	54

800

FIG.8

902 904

CELL SITE	MOBILE ACCESS NUMBERS (MANs)
1	MAN_1, MAN_5
2	MAN_8, MAN_{20}, MAN_3
3	MAN_n
4	MAN_{34}, MAN_6
5	MAN_{52}, MAN_{67}
•	•
•	•
N	MAN_2

906

900

FIG.9

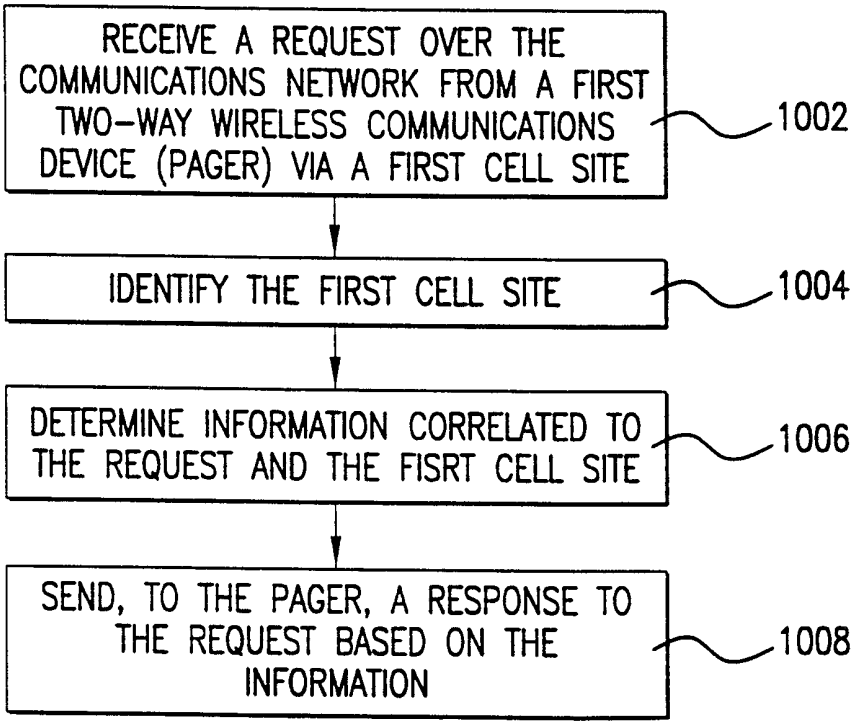
RECEIVE A REQUEST OVER THE COMMUNICATIONS NETWORK FROM A FIRST TWO-WAY WIRELESS COMMUNICATIONS DEVICE (PAGER) VIA A FIRST CELL SITE
1002
IDENTIFY THE FIRST CELL SITE
1004
DETERMINE INFORMATION CORRELATED TO THE REQUEST AND THE FISRT CELL SITE
1006
SEND, TO THE PAGER, A RESPONSE TO THE REQUEST BASED ON THE INFORMATION
1008

FIG.10

FIG.11A

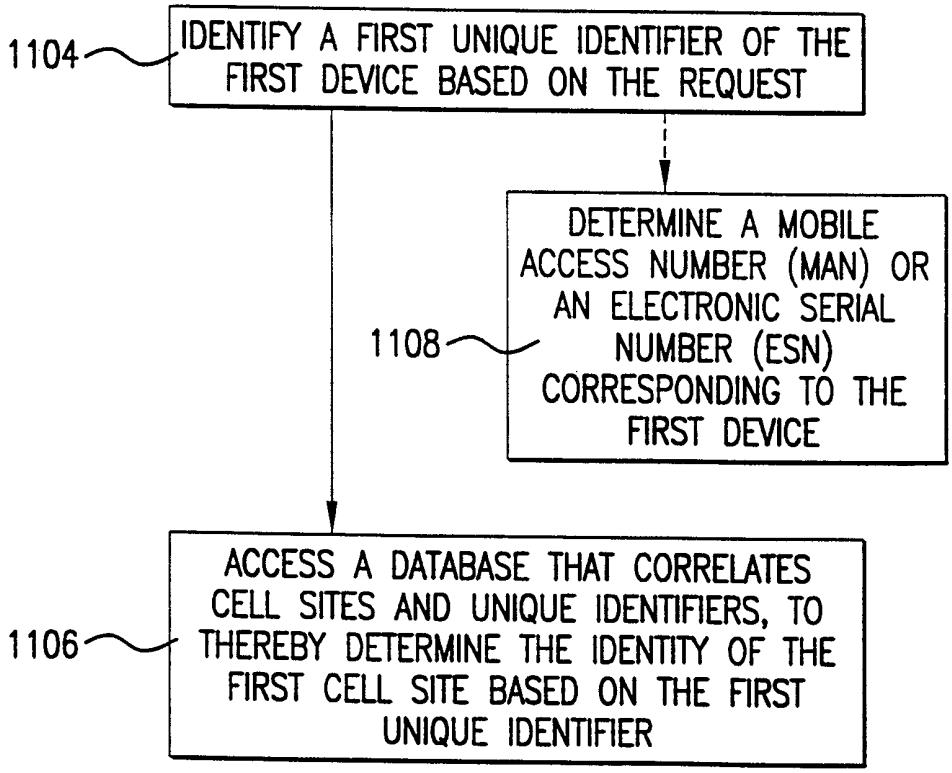

FIG.11B

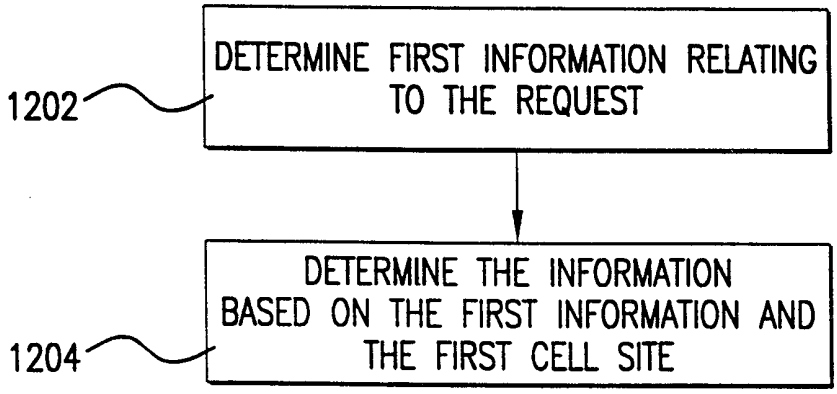
DETERMINE FIRST INFORMATION RELATING TO THE REQUEST
1202
DETERMINE THE INFORMATION BASED ON THE FIRST INFORMATION AND THE FIRST CELL SITE
1204

FIG.12

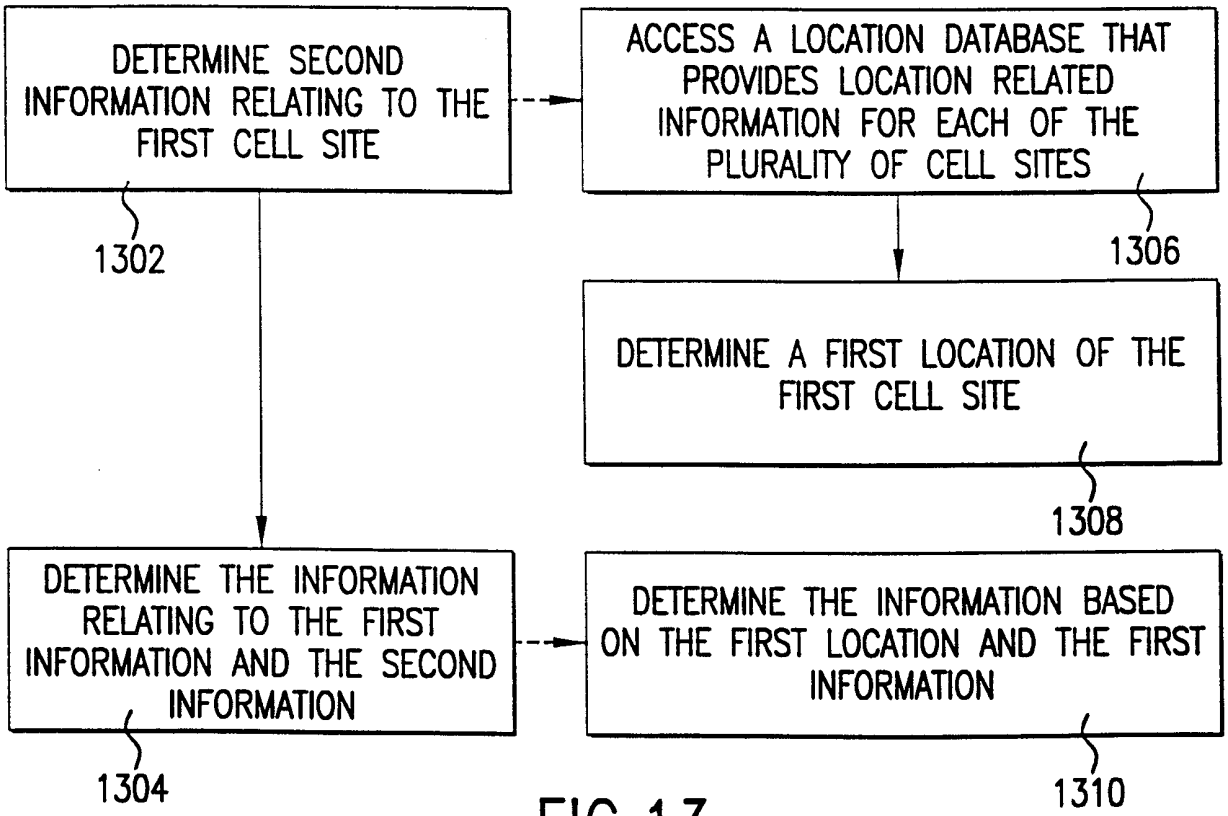
DETERMINE SECOND INFORMATION RELATING TO THE FIRST CELL SITE
1302
ACCESS A LOCATION DATABASE THAT PROVIDES LOCATION RELATED INFORMATION FOR EACH OF THE PLURALITY OF CELL SITES
1306
DETERMINE A FIRST LOCATION OF THE FIRST CELL SITE
1308
DETERMINE THE INFORMATION RELATING TO THE FIRST INFORMATION AND THE SECOND INFORMATION
1304
DETERMINE THE INFORMATION BASED ON THE FIRST LOCATION AND THE FIRST INFORMATION
1310

FIG.13

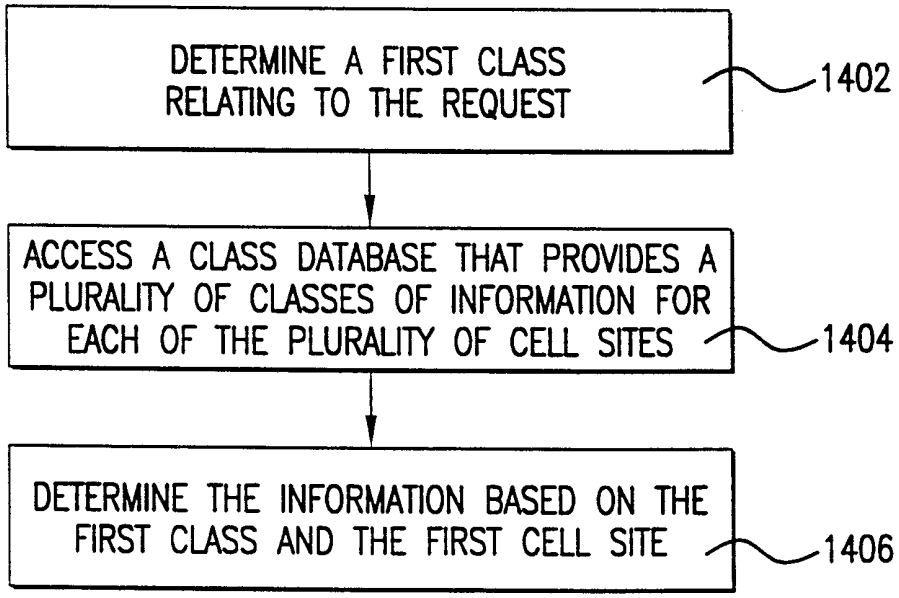
DETERMINE A FIRST CLASS RELATING TO THE REQUEST
1402
ACCESS A CLASS DATABASE THAT PROVIDES A PLURALITY OF CLASSES OF INFORMATION FOR EACH OF THE PLURALITY OF CELL SITES
1404
DETERMINE THE INFORMATION BASED ON THE FIRST CLASS AND THE FIRST CELL SITE
1406

FIG.14

INTERNATIONAL SEARCH REPORT

Internat Application No
PCT/US 99/26418

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04Q7/22

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 H04Q

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)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 21913 A (ERICSSON GE MOBILE INC) 22 May 1998 (1998-05-22) page 1, line 31 -page 2, line 19 page 3, line 25 -page 4, line 33	1,2, 5-11, 15-17, 20-26, 30,31
X	EP 0 800 320 A (LUCENT TECHNOLOGIES INC) 8 October 1997 (1997-10-08) column 1, line 55 -column 2, line 41 column 4, line 10 - line 25 column 4, line 39 - line 43 claims 1,2,3	1,2, 5-11, 15-17, 20-24, 26,31

☐ 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.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
29 March 2000	06/04/2000

Name and mailing address of the ISA	Authorized officer
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	Dionisi, M

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

Internal Application No
PCT/US 99/26418

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9821913 A	22-05-1998	US 5930699 A	27-07-1999
		AU 5105898 A	03-06-1998
		CN 1237315 A	01-12-1999
		EP 0940055 A	08-09-1999
EP 0800320 A	08-10-1997	US 5963861 A	05-10-1999
		AU 1664697 A	09-10-1997
		CA 2199879 A	05-10-1997
		JP 10051859 A	20-02-1998